

Product Range 2024/25





View the entire range of products online

shop.maxongroup.com

- → Wide selection of brushed and brushless DC motors, compact drives, gearheads, sensors, controllers and drive systems
- → Easy to configure

maxon selection guide

Get an overview of the extensive range of DC brushed and brushless motors, drives, encoders, control electronics, and the variety of possible combinations. Make a preliminary selection based on the power and size, commutation, or bearings. Quickly find what you're looking for, including sterilizable drives for use under special ambient conditions or drives with integrated electronics.

Accessories overview

Easily find the accessories you need for connecting maxon DC motors to maxon controllers.

4-35_Welcome to maxon

36_New products

37-60_maxon selection guide

57_Accessories overview

62-86_Technology - short and to the point

87-89_Standard Specification

91-186_maxon DC motor

Brushed DC motors with ironless winding.

187-356_maxon EC motor (BLDC)

Brushless DC motors with ironless or iron core winding.

357-370_maxon compact drive

Compact drives with integrated positioning/speed controller.

371-465_maxon gear

Precision planetary, spur and angular gearheads.

467-489_maxon screw drive

Compact screw drives with steel or ceramic screws.

491-543_maxon sensor

Magnetic, optical, and inductive encoders, DC tachometers, and resolvers.

545-580_maxon motor&motion control

4-Q PWM servo controllers, 1-Q-EC amplifiers, positioning controllers, and multi-axis motion controllers.

581-596_maxon accessories

Brakes, end caps and connecting cables.

599-609_maxon ceramic

Custom ceramic components and standard components such as ceramic axles, shafts, or screws.

611-614_Contact

Headquarters, business units, labs, production companies, sales companies and sales partners.

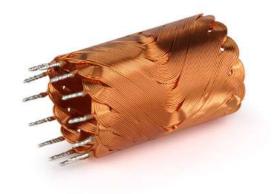
© 2024 maxon. All rights reserved. Any use, in particular reproduction, editing, translation and copying without prior written approval is not permitted (contact: maxon international ltd., Brünigstrasse 220, CH-6072 Sachseln, +41 41 666 15 00, www.maxongroup.com). Infringements will be prosecuted under civil and criminal law. The mentioned trademarks belong to their respective owner and are protected under trademark laws. Subject to change without prior notice.

We are maxon

We develop and build high precision electric drive systems that are among the best in the world.

We combine brushed and brushless DC motors, gearheads, sensors, and controllers into complete mechatronic drive systems – from customized single units to mass production.

Since 1961, businesses from a wide range of industries including medical technology, robotics, industrial automation, mobility, and aerospace place their trust in reliable drive systems by maxon. Our drives are perfectly suited for wherever extreme precision and the highest quality standards are needed and where compromises cannot be tolerated – on Earth and on Mars.



Technologies that improve people's lives

Welcome to the new maxon catalog. Here you will find pioneering technologies for global challenges. Our products are designed to meet the demands of today's world, offering solutions that combine innovation and efficiency.

The ECX FLAT 42 S drive is ideal for use in applications for the reduction of CO_2 emissions in the automotive industry. The latest ECX products are tailor-made for medical devices and robotics, where they increase efficiency and save space, as well as enabling maximum precision and cost-effective solutions.

Robotics is undergoing a revolution, driven by the EC frameless DT 38 Dynamic Torque and ESCON products – powerful, compact motors and controllers that allow precise movements. Our GB 9 worm gear systems play a key role in the area of infrastructure optimization, making the best possible use of space in areas such as elevators and agricultural applications. For the autonomous future, our flat motors and TSX encoders offer advanced solutions that guarantee precise positioning and real-time performance in autonomous vehicles.

In this catalog you can explore our products and solutions as well as new concepts designed to meet the challenges of Al and IoT-based innovation in every industry today and advance the mission of a sustainable future. At maxon we aren't just driven by motors; we are actively shaping a sustainable world and improving people's lives.

"We are actively shaping a sustainable world and improving people's lives."

Eugen Elmiger, CEO maxon Group







Close to 100%

We have a portfolio of drives for any application, and DC motors with an efficiency of more than 90%

Maximum power packed into tiny spaces. maxon drives feature the following:

- → High acceleration
- → Long service life
- → Low power consumption
- → Unsurpassed reliability
- → Able to bear high overloads for short periods
- → Excellent control properties

One stop shop

DC and BLDC motors

Brushed and brushless DC motors. Diameter 4 to 90 mm.

Gearheads and screw drives

Planetary, spur, angular, and special gearheads. Compact screw drives with steel and ceramic screws.

Sensors

Magnetic, optical, and inductive encoders, DC tachometers and resolvers.

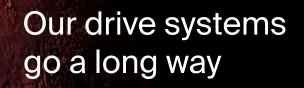
Controllers

4-Q PWM servo controllers, 1-Q EC amplifiers, positioning controllers, and multi-axis motion controllers.

Ceramic components

Custom ceramic components and standard components such as ceramic axles, shafts, or screws.

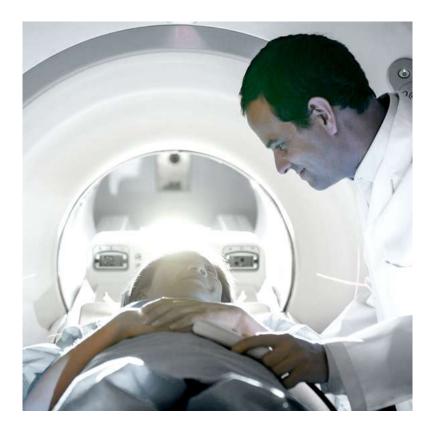




Change the world with a partner you can rely on

At maxon, we believe that outstanding engineers and technicians can make a positive impact on the world. This is why we support them in their efforts to go off the beaten path and provide the perfect drive system for their ideas.





Medical

Drive systems for medical technology

maxon drives are used in numerous fields of medicine. Our motors provide reliable, high-quality performance in high-precision devices such as active implants, insulin pumps, surgical robots, power tools, and hand and foot prostheses. Drive components for medical technology applications must meet extremely demanding requirements: precision, sterilizability, low noise levels, durability, and minimal heat build-up of the DC and EC drives are essential.

maxon's medical business unit specializes in developing and producing drive systems for a variety of medical applications. Our engineers are well versed in the technical requirements of the medical technology industry, whether for active implants or robot-assisted rehabilitation. In close partnership with our customers, we develop the perfect drive system based on a modular standard solution or create a fully customized solution tailored to the customer's specifications.

Active implants

- → Cardiac support systems
- → Active valves
- → Positioning systems
- → Pump systems

Surgical systems

- → Surgical robots
- Power tools
- → Dental devices
- → Ventilators
- → Respirators

Pumps and medication delivery systems

- → Insulin/pain pumps
- → Dialysis pumps

Rehabilitation and prosthetics

- → Hand prostheses
- → Foot prostheses
- → Exoskeletons
- → Therapy systems

Drive components for medical technology applications must meet extremely demanding requirements.



Active implants

Many therapeutic approaches prove to be far more effective within the body than external methods. Whether precise dosage of medications or supporting heart or muscle functions, maxon drives do it all with maximum efficiency and reliability. Professional project organization and a proven risk management system enable the smooth execution of medical technology projects in risk classes IIb and III. All production processes, production facilities, testing systems, and documentation meet the highest quality guidelines.

Surgical robots

Robot-assisted or robotic surgery is mainly used in minimally invasive surgery and makes it possible to carry out all kinds of complex interventions with much more precision, flexibility, control, and efficiency than with conventional techniques. There are two different methods: either with a direct telemanipulator or with computer control. maxon offers a wide range of customer-specific products and system solutions for both methods in order to meet complex customer requirements with respect to force feedback, safety, standards, traceability, etc., and to make a significant contribution to medical technology. The benefits for the patient are a much shorter surgery and healing time, as well as fewer complications and less risk of infection and scarring.





Surgical power tools

In many surgical interventions, doctors rely on power tools. The areas of application are extremely varied, ranging from sawing bones to other small-bone and large-bone applications to stapling tissue structures. For each case, maxon offers the perfect drive solution from different motor and gearhead families. These brushless electric motors are characterized by extremely high power density and, not least, can be autoclaved up to 1,000 times.

Exoskeletons and prostheses

For people with a physical disability, everyday tasks such as climbing stairs or opening doors can represent a huge challenge. maxon has been heavily involved in this field for years, providing technical solutions that make life easier for those affected. For exoskeletons and prostheses, we have developed motors optimized for torque and weight, as well as system solutions. With our mix of engineering disciplines, we also offer the possibility of tailored approaches for specific applications. maxon will continue to drive the development of products and system solutions for exoskeletons and prostheses in the future.





Aerospace

Drive systems for the aerospace industry

For more than 20 years, drive technology from maxon has powered the Mars rovers on the Red Planet. And every modern long-haul airliner has hundreds of drive systems on board today. Back here on the ground, we work closely with our customers to develop drive solutions consisting of individual components or sophisticated technical systems for passenger aircraft, helicopters, spacecraft, and even autonomous and uncrewed aerial vehicles. maxon guarantees the unrivaled quality of the efficient, reliable, and powerful drive systems for the aerospace industry. maxon has been certified according to EN 9100 since 2012. The standard has been drawn up especially for companies that develop and produce components for the aerospace industry. In our own labs, we test how the drives cope with vibrations, shock, and cold, as well as heat in accordance with aviation standard DO-160, and in vacuum.

The name maxon is synonymous with customized precision and stands for an extensive support network that guarantees the highest Swiss standards all over the world. Our dedicated aerospace team assists customers with simple applications as well as complex, multi-year development projects. maxon engineers have transferred the knowledge they have gained from numerous special projects, such as the drives for the Mars missions, to other aerospace projects and further developed this expertise for serial production. Our state-of-the-art technology and extensive laboratory tests make this possible. We are forever expanding the possibilities of aerospace technology, both crewed and uncrewed.

The new urban mobility made possible by air taxis, counts on safe, efficient and compact actuators from maxon. Thanks to many years of experience in aviation, our experts know what it takes.

Aerospace

- → Aircraft control systems: Actuators for small control surfaces, air and liquid valves of all types, fly-by-wire control systems, flaps, air-conditioning systems
- On-board communication and cabin equipment: actuators for antennas, window shade systems, power seat adjustment, lavatory equipment, ands, locking devices for overhead baggage compartments

Space travel

- Drives for rocket engine valves, solar array drive and deployment. Actuators for docking and separating systems
- → Mission-specific mechanisms for research spacecraft and robotic probes, especially for the Moon and Mars

Uncrewed aerial vehicles

- Infrastructure: Actuators for docking, servicing, starting and landing systems, robotic systems for maintenance work
- → Payload mechanisms: Control surface actuators, electro-optics, gimbal and load drives, winch and load locking mechanisms
- → Drive systems consisting of an optimized combination of motor, controller and propeller for multirotor, fixed-wing and VTOL aircraft

Here on the ground, maxon and its customers develop drive solutions consisting of individual components.



In addition to the catalog range, maxon offers its customers from the aerospace industry specially modified aerospace products. These are adaptations of products that were previously developed over the course of more than ten years for similar applications with very strict environmental and quality requirements. The available products include various preconfigured DCX, EC-4pole, EC flat motors, GPX UP planetary gearheads and ENX 10/16 XT encoders, and others. All products have been optimized for demanding environmental conditions such as vibrations, temperature, vacuum, or corrosion. In this way, we decrease the development time and complete new projects cost-efficiently. By prequalifying the products, we significantly reduce the risk.

Application-specific drive solutions

For selected fields of application, maxon provides tailor-made special solutions. For the manufacturing of sophisticated, professional drones, the so-called UAVs (Uncrewed Aerial Vehicles), these are propeller drive motors and controllers (Electronic Speed Controllers, ESC). The products are closely matched to each other and are characterized by unrivaled efficiency and reliability for the highest safety and profitability during operation.



Custom drive systems

When customers have requirements that go beyond the capabilities of the existing solutions, maxon also develops completely new drive systems. These can be novel components such as electric motors, gearheads, sensors, or controllers, or combinations thereof in the form of a complete actuator. Here maxon supports the customers during the specification phase, stands by their side during the industrialization, and supplies constant high quality for very demanding applications.

Lab automation

- → Liquid handling (pipetting robots)
- → Point of care diagnostics (POC)
- → DNA sequencing
- → PCR analysis

Power tools

- Strapping tools, battery-powered staplers
- Pruning shears, plant tying machines, saws, harvester implements
- Electric screwdrivers, nail guns, pressing tools

Oil and gas industry

- → Measurement while drilling (MWD)
- → Measurement and inspection systems
- → Valve controllers
- → Hydraulic pump systems

Semiconductor industry

- → Wafer production
- → Semiconductor finishing
- → Pick-and-place applications
- → Analysis and test systems for product testing

Test and measurement technology

- → 3D measuring devices
- → LiDAR systems
- Surface testing devices
- → Scanner
- → Total stations
- → Precision scales

Safety systems

- → Safety doors
- Locking systems
- → Mobile inspection systems
- → Surveillance cameras



Industrial automation

Drive systems for industrial automation

Industry 4.0, the Internet of Things and artificial intelligence are affecting manufacturing processes at every company. Industrial production is also being redefined at maxon. We are constantly raising our standards of quality, efficiency and flexibility to new levels without losing focus on costs. This is essential because complex mechatronic systems only work if components are of the highest quality and perfectly synchronized. maxon meets this requirement and is one of the only suppliers in the world that develops and manufactures complete mechatronic drive systems, including: DC motors, gearheads, sensors and controllers. Our customers benefit from this in many ways, especially when it comes to drive systems for lab automation, the oil and gas industry, test and measurement technology or semiconductor manufacturing. All of these applications require the highest accuracy, sustainability, reliability and quality.

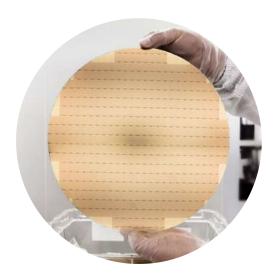
Our interdisciplinary engineering team works closely with customers to develop the perfect, tailor-made solution for customer-specific applications. From simple modifications to completely new designs, maxon offers everything from a single source.

We are constantly raising our standards of quality, efficiency and flexibility to a new levels.

Drive systems for laboratory automation

As laboratory procedures and processes grow increasingly complex, automation is becoming more important. Here reliability, precision and speed play key roles: maxon motors and drive systems are used in various laboratory applications for dosing liquids, analyzing and transporting samples, and moving axes. The exceptional reliability, high precision, and excellent dynamics make it possible to accelerate laboratory procedures and perform these reliably without downtime. In particular with regards to the XYZ axes, the high power density of maxon's motors helps to save space and the high dynamics combined with a precision multi-axis controller facilitates optimization of the laboratory procedure and thus increases the throughput rate.





Drive systems for the semiconductor market

The semiconductor industry is at the center of technological innovation and requires drive solutions that can keep up with its momentum. maxon offers drive systems specifically tailored to meet the challenges of semiconductor production. Our motors and systems are known for their precision and reliability and also have the flexibility to adapt to the specific requirements of microchip and semiconductor production. Whether it's precisely positioning wafers, carefully controlling etching processes, or handling sensitive components, maxon drives offer consistent and precise performance. They can play a decisive role in achieving more efficient and precise semiconductor manufacturing. Join us in discovering solutions that redefine semiconductor technology.

Drive systems for the oil and gas industry

The production of oil and natural gas constantly requires new technologies and innovations in deep drilling technology. The equipment used for deep drilling is exposed to extremely harsh ambient conditions, including temperatures above 200°C, high pressure and extreme shocks and vibrations. maxon drive systems are used in a variety of drilling applications, hydraulic valve controllers, communication mechanisms and measuring instruments. The maxon Heavy Duty range of motors is designed for these operating conditions and features efficiency levels of up to 88% in air and over 70% in oil. In addition, these motors are designed to withstand extreme temperatures as well as pressure, shocks and vibrations. This makes them ideal and reliable solutions for applications in extremely harsh operating conditions.





Mobility solutions

Drive systems for people and goods

On the street, in logistics, or underwater – drive systems by maxon move people and goods reliably, efficiently, and safely.

Our specialists from the Mobility Solutions business unit know the requirements of the individual industries. In close collaboration with our customers, we develop tailor-made drive systems for complex applications. To meet the high requirements for power density and efficiency, all components are perfectly matched to each other. Flexibility, safety, and quality are the focal points in the development of our competitive system solutions.

Automotive

- > Dynamic suspension control
- → Brake-by-wire (electric brake system)
- → LiDAR systems (remote sensing technology for autonomous vehicles)
- → AdBlue systems (exhaust gas treatment for diesel vehicles)

E-mobility

- → E-bike systems
- → Urban mobility

Invisible, light, and strong.

For more information on our BIKEDRIVE AIR system, refer to page 20–21.

Logistics

- → Logistics shuttles
- → Autonomous mobile robots (AMR)
- → Automated guided vehicle (AGV)

Robotics

- → Multi-axis lightweight robots
- → Service robots
- → Collaborative robots (Cobot)
- → Farm robots

Maritime applications

- → Remotely operated underwater vehicles (ROV)
- Autonomous underwater vehicles (AUV)

16



Logistics

Due to the increasing flow of goods and the requirements from Industry 4.0, the demands on efficiency, flexibility, and reliability are constantly getting higher. The drive systems from maxon are used in a variety of driverless transport systems, and their high power density makes them the perfect solution for space-saving integration. The reliability and high efficiency of our system solutions guarantee reliable operation without interruptions.

Automotive

The need for higher safety and the rise of semi-autonomous driving are increasingly presenting the automotive manufacturers with new challenges. maxon's drive solutions are used in applications such as LiDAR, AdBlue systems, adaptive chassis systems, and electrical brakes. Our customers count on maxon when it comes to special requirements for safety and reliability under challenging environmental conditions. As an IATF-certified development partner, we work with you to shape the future of the automotive industry.





Robotics

The market demands specific robots for industrial and service applications. maxon defines and develops the joint drives required for this purpose together with the customer. Motors with outstanding torque density, zero-backlash gearheads, high-resolution encoders as well as integrated holding brakes and integrated position controllers with EtherCAT interface form the basis of the highly efficient drive systems. The power density and competitive safety functions are only some of the factors that make our drives the perfect solution for applications in robotics.



Intralogistics

Drive systems for building and logistics automation

The intralogistics business unit at maxon focuses on two core areas: building automation and logistics.

In modern logistics and with Industry 4.0, automated and digitalized warehousing is gaining importance. Systems for material handling, such as conveyor systems, packaging machines, and sorting machines, must be extremely reliable and durable to meet the demands of the market. maxon's motors, gearheads, sensors, brakes, and controllers have been designed for these demanding tasks and can also be customized in the exact configurations needed for special applications.

In the field of building technology, the market for automation is also growing rapidly. With its range of compact and efficient drives, as well as angular and inline gearheads in combination with motors and controllers, maxon offers one of the most comprehensive mechatronics systems for the automation of building access, lifts, and hoisting equipment in buildings, access control systems, and more.

Applications in building automation

- → Sliding and swing doors
- → Elevator doors
- → Access systems, such as turnstiles, gates, and barriers
- → Platform systems

Applications for lifts

- → Lifting, leveling, and auxiliary drives for stair lifts
- Mobility and industrial lifting equipment
- → Elevators
- → Platform lifts

Applications in logistics automation

- → Conveyors
- → Sorting systems
- Packaging technology

Applications in auxiliary vehicles

- → Wheelchairs and wheeled walkers
- → Motor homes and caravans
- → Tractors and forklifts

Applications in train, tram, and railway systems

- → Windshield wiper systems
- Internal and external doors, as well as access to the station platforms for trains
- → Pantographs
- → Brake systems
- → Grinding systems

Drive systems for doors

In airports, shops, hotels, and offices all over the world, automatic doors are in use around the clock. maxon offers compact and efficient drives for door access automation. The certified product range has proven itself around the world and encompasses everything from angular and inline drives to brushed and brushless DC motors. These are available with sensors and customer-specific drive control systems.



The market-leading quality offered by maxon makes it the ideal mechatronics partner.



Drive systems for conveyors

Conveyor systems are frequently used in material handling. As the needs of the market and Industry 4.0 grow, the demands on drive systems also increase. They must be fail-safe, with proven durability, because the production and processing systems used in intralogistics frequently run around the clock. For these applications, maxon offers a range of intelligent, highly reliable systems with high power density and high efficiency. The market-leading quality offered by maxon makes it the ideal mechatronics partner for the material handling solutions of today and tomorrow.

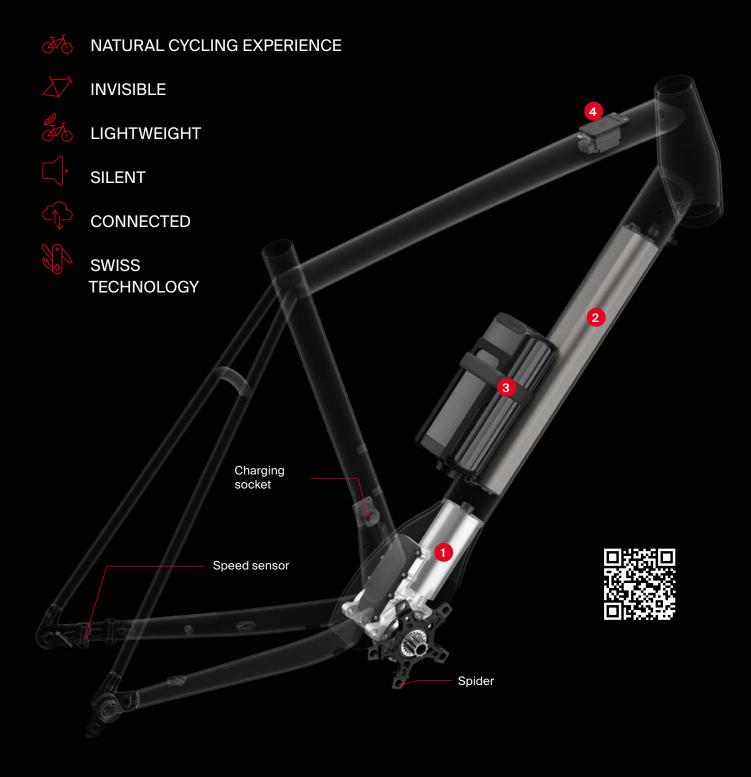
Drive systems for stair lifts

For many years, maxon has been cooperating with leading stair lift manufacturers and knows the complex requirements of the end customer. maxon offers gear motor combinations for safe operation of all types of stair lifts. They are suitable for straight, curved, narrow, and wide stair lifts. Our motors are available not only for the main drive, but also for the seat adjustment, footrest, and rotation requirements. Our specialists also develop customized solutions with tailor-made designs, which are frequently less complex and require fewer components.



The invisible E-Bike drive

The maxon BIKEDRIVE AIR e-bike system is mounted out of sight inside the frame. Only an inconspicuously integrated control element on the top tube hints at the extra power hidden within the bike. A system weight of 3.5 kg, torque of max. 40 Nm, more than 300 W of power, 250 Wh or 360 Wh in the main battery, optionally 250 Wh in the Range Extender. The maxon BIKEDRIVE AIR is suitable for electric racing bikes weighing up to 10.5 kg and e-MTB trail full-sussers weighing up to 15.5 kg. The system is suitable for all bike types.



Drive unit



MX AIR

Description		Data
Max. torque	Nm	40
Max. supported cadence	rpm	115
Max. speed	km/h	25/33
Weight of motor unit	kg	1.9
Weight of complete system	kg	3.5
Patented freewheel technology		
Integrated torque measurement on both sides		
Min. diameter of down tube	mm	60
Width of bottom bracket	mm	97.5
Chainline: racing bike 2x	mm	47
Chainline: racing bike 1x	mm	46
Chainline: MTB boost, 148 mm	mm	52/55
Q-factor	mm	≥ 155*

^{*}depending on frame design and crank selection

2 Battery



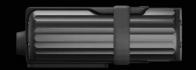
BX250I

Description		Data
Nominal voltage	V	36
Watt-hours	Wh	250
Charging time with 2 A charger	h	3.5
Weight	kg	1.4

BX360I

Description		Data
Nominal voltage	V	36
Watt-hours	Wh	360
Charging time with 3.5 A charger	h	2.8
Weight	kg	1.8

3 Range Extender



BX250E

Description		Data
Nominal voltage	V	36
Watt-hours	Wh	250
Charging time with 2 A charger	h	3.5
Weight	kg	1.5

Control unit







HMI POWERTAB

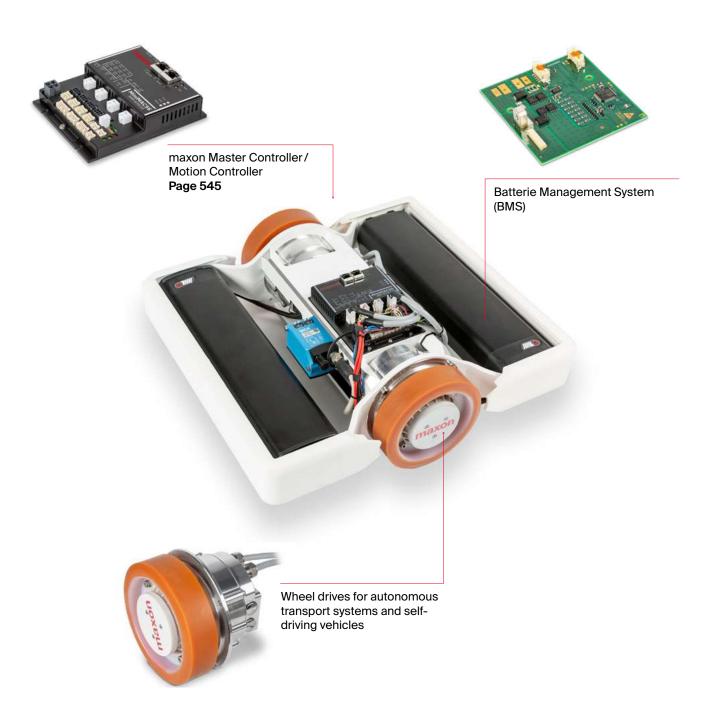
Description
Level adjustment
Battery charge indicator
BLE / ANT+
Light

Part numbers			
Part numbers	Description*		
729020	MX AIR motor unit incl. cabling		
699584	POWERTAB control unit		
770624	BX 250 I battery incl. cabling / 250 Wh		
801249	BX 360 I battery incl. cabling / 360 Wh		
786584	Range Extender BX 250 e-kit / 250 Wh incl. holder and cabling		
735990	Charger, Li-ion, 2 A/36 VDC 230 VAC / 90° outlet		
801857	Li-ion charger 3.5 A / 36 V 110-230 V		
801859	Li-ion charger 2 A / 12 V car charging socket		
831542	Charging socket, complete with cover and cable, ST-10 right, 190 mm		
831471	Charging socket, complete with cover and cable, ST-10 left, 190 mm		
724125	Dropout speed sensor, HIGO connector, 734 mm		
710994	Magnet holder for center lock brake disks / internal thread		
710995	Magnet holder for 6-hole brake disks		
710996	Magnet holder for centerlock brake disks with thru axles		
741375	Chain ring holder BCD104		
735310	Chain ring holder BCD110		
*The BIKEDRIVE	E AIR system is only available as complete system.		

Ready for the next step

At maxon we develop customized mechatronic drive systems, of the highest quality from a single source.

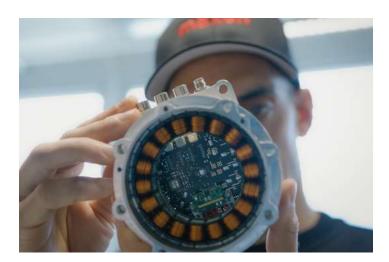
maxon not only develops and produces DC and BLDC motors, gearheads, sensors, and controllers, but we can also combine these drive components in a housing as a customized mechatronic unit.



keynote.maxongroup.com

Trends in drive technology

We dive into three truly exciting and innovative topics that showcase the diversity and versatility of our company's high-precision drives and systems. Electric vehicles, lab automation, and robotics – all areas in which maxon is making a major impact.

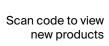


Scan code to watch keynote

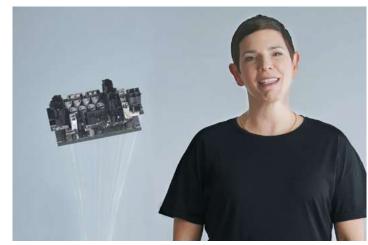


Discover new products

Learn about our latest product introductions in this short video.







maxon X drives

Configure your drive online - according to your individual needs

When configured online, you can download your specific mechanical and electrical data, dimensional drawings and CAD files immediately, and within 11 working days your drive system will be ready to ship.

Brushed DC motors



DCX

The powerful drive available in a variety of versions.

DC-max

The cost-optimized drive with a very good price/performance ratio.

Brushless DC motors



ECX SPEED

The high-speed drive for grinders, fans, sterilizable hand-held tools, etc.

ECX PRIME

The high-performance drive with outstanding speed-torque gradient.



ECX TORQUE

The high-torque drive for power tools like screw drivers, pruning shears, etc.



IDX MOTOR

The industrial solution with IP65 protection and integrated incremental or absolute encoder.



ECX FLAT

The flat, space-saving drive with lots of torque.

Drives with integrated positioning/speed controller



IDX - CO



IDX – ET



IDX - i/O

1/0 €



1/0←

IDX DRIVE

The intelligent drive system with IP65 protection, integrated controller, and optional holding brake.

ECX FLAT

The flat compact drive with integrated speed controller that can be configured online.

Produced within 11 days

Lean, automated processes ensure that all drive versions are ready for shipment within 11 days

Assemble your individual brushed or brushless DC drive: You can configure the gear stages, the motor bearings, the shafts, the encoder and much more. Design your custom drive online today and your finished drive will ship from Switzerland in 11 working days.

Planetary gearhead



GPX A, C, LN, LZ

Planetary gearhead A: Standard

C: Ceramic axes LN: Reduced noise level

LZ: Reduced backlash



GPX SPEED

High-speed, sterilizable gearhead for surgical applications.



GPX HP

High-power planetary gearhead with reinforced output. Also available as a sterilizable version.



GPX UP

Ultra-performance planetary gearhead with optimal efficiency and reinforced output.

Encoder



ENX EASY

Magnetic incremental encoder, 3-channel, differential.



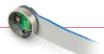
ENX MAG

Magnetic incremental encoder, 3-channel, for small motor diameters.



ENX GAMA

Radiation-resistant, magnetic incremental encoder, 2-channel.



ENX RIO

High-resolution, optical incremental encoder, 3-channel, differential.



ENX EASY Abs

Absolute single-turn encoder (SSI/BiSS-C)



ENX EMT

Absolute multi-turn encoder (SSI/BiSS-C)



ENX MILE

High-resolution and high-precision inductive encoder integrated in ECX FLAT.

Modify

The online configurator

With our configurator, you can easily modify your drive online as you need it. It allows you to adapt a shaft, flange, bearing, or electrical connection perfectly to your application. With our automated processes, you will be holding your customized drives in your hands within a few days.

If you need further adjustments to your drives, such as hollow shafts, special lubricants, or special windings, please contact us for assistance.

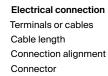
Shaft Length Diameter Surface Cross bore



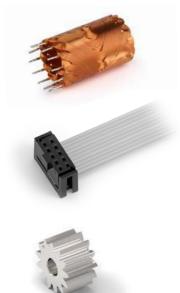




Winding Nominal voltage Temperature range







Notes on the catalog.

Disclaimer

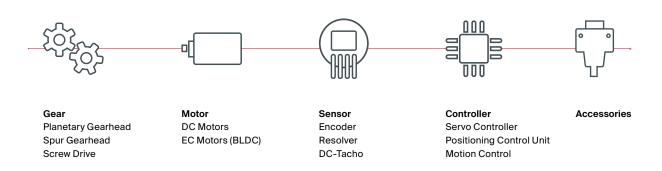
maxon shall not be held liable for errors in this documentation. This documentation is subject to change without notice. maxon shall not be liable for direct or indirect damage resulting from the use of this documentation. May be subject to laws and regulations. Copies, including excerpts, require prior written permission of maxon.

Combine

The maxon modular system

The motors, gearheads, sensors, brakes, and controllers of maxon are perfectly matched to each other and can be combined in a number of ways. Our modular system makes it easy to find suitable components for your motor – in the catalog and in the online shop.

shop.maxongroup.com



Great choice, easy ordering

The diversity of motors and product combinations offered by maxon is unmatched worldwide. The maxon modular system and the numerous options for windings offer even more possibilities for variation. To make the delivery times as short as possible for our customers, we organized our products into program groups.





We are engineers. Dedicated to the development of drive technology.

Quality with no compromise

Development engineers and designers at maxon motor use only state-of-the-art calculation and configuration software. This enables us to develop customer-specific solutions quickly. Advanced qualification and risk assessment methods guarantee that all of our products are highly reliable and robust. Simultaneously, systematic process and product optimization programs enable us to provide our customers with more options for drive configuration – in shorter delivery times. An example are maxon DCX drives, which can be configured online.



Consistent standards on quality, safety, and procedures ensure that only premium products leave our factories. The business and production processes fulfill international standards such as ISO 9001 and ISO 14001. maxon medical has ISO 13485 certification and products for the aerospace industry have EN 9100 certification.

We are experts in precision drives.

Flexible in-house production

All important components found in our maxon motor drive systems are produced on machines and manufacturing lines developed in-house. Our customers are guaranteed efficient and fast manufacturing of their products, whether in small or in large quantities, as well as maximum flexibility to meet special needs and requirements.



Our core areas of expertise include:

- Winding technology
- Standard and special gearhead engineering
- Encoder technology
- Electronics and systems technology
- Injection molding processes for plastics as well as ceramic and metal powder (CIM/MIM)
- Installation and automation technology
- Development / project management
- Quality management



SN EN ISO 9001

SN EN ISO 9001 specifies the requirements to a quality management system (process approach) that an organization has to meet in order to provide products and services that meet the customer expectations as well as comply with applicable regulatory requirements. Simultaneously, the management system has to be subject to continuous improvement.

SN EN ISO 14001

Is an internationally accepted quality norm for environmental management systems (EMS). It covers environmentalrelevant processes and procedures in a company, requiring a company's management and employees to adopt environmentally-compatible behavior and constantly seek to improve its procedures and documentation.

■ EN 9100

This is an internationally accepted quality standard of the aerospace industry. It requires companies and employees to reduce potential risks in the aerospace industry to a minimum by structuring the design and manufacturing processes accordingly. At maxon, this standard is applied for customer-specific products on request – except for A-max motors and controllers.

SN EN ISO 13485

Is an internationally accepted quality norm for medical products that requires management and staff to ensure that the design and manufacture of medical products minimizes the potential risks for patients. Traceability of processes and raw materials is also ensured. At maxon, this standard is applied for customer-specific products on request.

■ IATF 16949

maxon is IATF 16949 certified. The IATF (International Automotive Task Force) is a group of automotive manufacturers and associations that defines the quality requirements in the automotive industry. The IATF 16949 standard is an international technical specification and quality management standard for the entire supply chain of the automotive industry. It is based on the EN ISO 9001 standard and describes the special requirements that apply for the development and manufacturing of products for the automotive market. At maxon, it is implemented within the scope of customer-specific projects.

Overview of the maxon certifications

	ISO 9001	ISO 14001	EN 9100	ISO 13485	IATF 16949
maxon Switzerland					
maxon Germany/Sexau					
maxon Hungary					
maxon South Korea					
maxon USA					
maxon China					
maxon France					
maxon Netherlands					



Quality management

Only performance counts

Drives manufactured by maxon can be absolutely relied upon even under the most difficult conditions – they have for example been in use on Mars for years. But maxon DC motors do not only do their job in space, they also function in tough conditions on and deep below the surface of the Earth flawlessly and efficiently.

The quality management system of maxon is an integral part of the overall management system. The operational and organizational structures, the powers and responsibilities, as well as the process and procedure assessments are documented for all employees. The quality management system is enacted, maintained and periodically verified.

View certificates: quality.maxongroup.com

EU Directives

2006/42/EC Machinery Directive

maxon products are designed for installation in complete devices and are considered incomplete machines according to EU Directive 2006/42/EC (Machinery Directive). They are designed to be installed in machines or other incomplete machines and are therefore not CE marked. It is the responsibility of the end device manufacturer to identify the relevant directives and issue a declaration of conformity.

2011/65/EU RoHS

Directive 2011/65/EU and (EU) 2017/2102 incl. 2015/863/EU (RoHS) on the restriction of the use of certain hazardous substances in electrical and electronic equipment regulates certain prerequisites for placing electrical and electronic equipment on the market. The RoHS directive restricts the use of certain substances in electrical and electronic equipment. The substances listed in Annex II of the directive must not exceed a specified maximum concentration, unless an exemption under Annex III and IV of the directive is applicable to be respective application. The RoHS directives are not directly applicable to components. Irrespective of this, maxon complies with the substance restrictions of this directive – taking into account the exemptions listed in Annex III and IV (e.g. 6a, 6b, 6c ...) – for most of the catalog products. Those maxon products that do not correspond to the directive are identified on the respective product page. A detailed conformity assessment is available from maxon upon request. It is the responsibility of the distributor of the electrical or electronic equipment to assess whether the exemption approvals are applicable for the end product.

1907/2006/EU REACH

All chemical substances used in maxon products conform to Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). Corresponding REACH certificates can be requested from maxon.

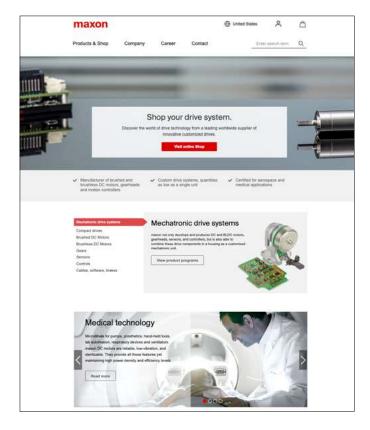
UL and CSA

Certain applications and markets require UL- or CSA-certified motors and drives. maxon's standard catalog products do not have such certification. However, we are able to certify our motors and drives in accordance with UL or CSA standards. Please contact your local maxon partner for more information.

www.maxongroup.com

Visit us online and discover the digital maxon world

On our website, you can find general news and information on our products and services, as well as an integrated online shop, the selection program and the maxon online configurator.





maxon online configurator

Configure and combine brushed and brushless DC motors, gearheads and compact drives according to your individual requirements. Fast, easy, and online. We guide you through our configurator step-by-step.



maxon selection program

Find the right drive by entering just a few parameters, such as supply voltage and torque. After you have entered the requirements of your drive, the maxon selection program shows the possible solution combinations from the maxon product program.



maxon Online Shop

In the maxon online shop, we provide a complete overview of all maxon products. You can also order your drive solution, download detailed product specifications and 3D CAD drawings immediately.

driven magazine

Read and explore

In driven, our print magazine, we present exciting applications, expert interviews, and tips and tricks from the field of drive technology. High-quality, entertaining, informative. Happy reading!

magazin.maxongroup.com



Print magazine

Would you like to read more?

Order back issues of driven





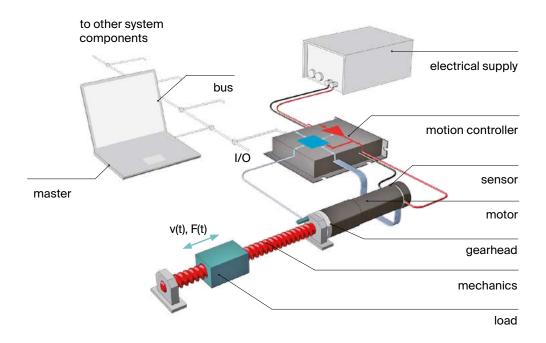




Increase your knowledge of drive technology and motion control

Learn more about the interaction of drive components, namely motor, gears, sensors and controllers. maxon academy brings together maxon products to provide ongoing education on drive technology. In addition to the maxon academy books and brochures, you will find E-learning modules, the currently planned seminars on drive technology and motion control as well as teaching material. These range from presentation and sample motors that can be taken apart for student exercises to models for hands-on training with suggestions for practical work.

academy.maxongroup.com





The selection of high-precision microdrives

Step by step from the specific formulation of the drive problem to its solution. Numerous tips and explanations, focusing only on theory where required for greater understanding. Various examples of applications deal with the practical aspects of drive technology. (Author: Dr. Urs Kafader, 149 pages, ISBN 978-3-9523654-5-8)



maxon Formula Compendium

Formulae, terms and explanations for all types of calculations concerning drive systems. Detailed collection with illustrations and descriptions. Flow chart for targeted drive selection.

35

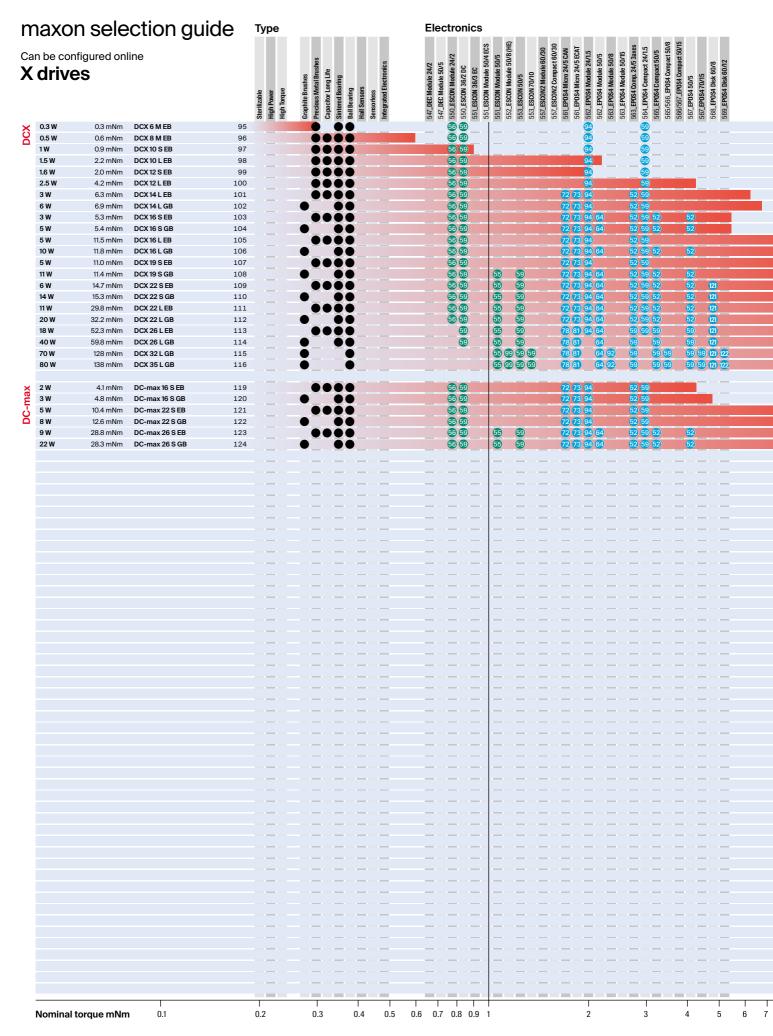
New products

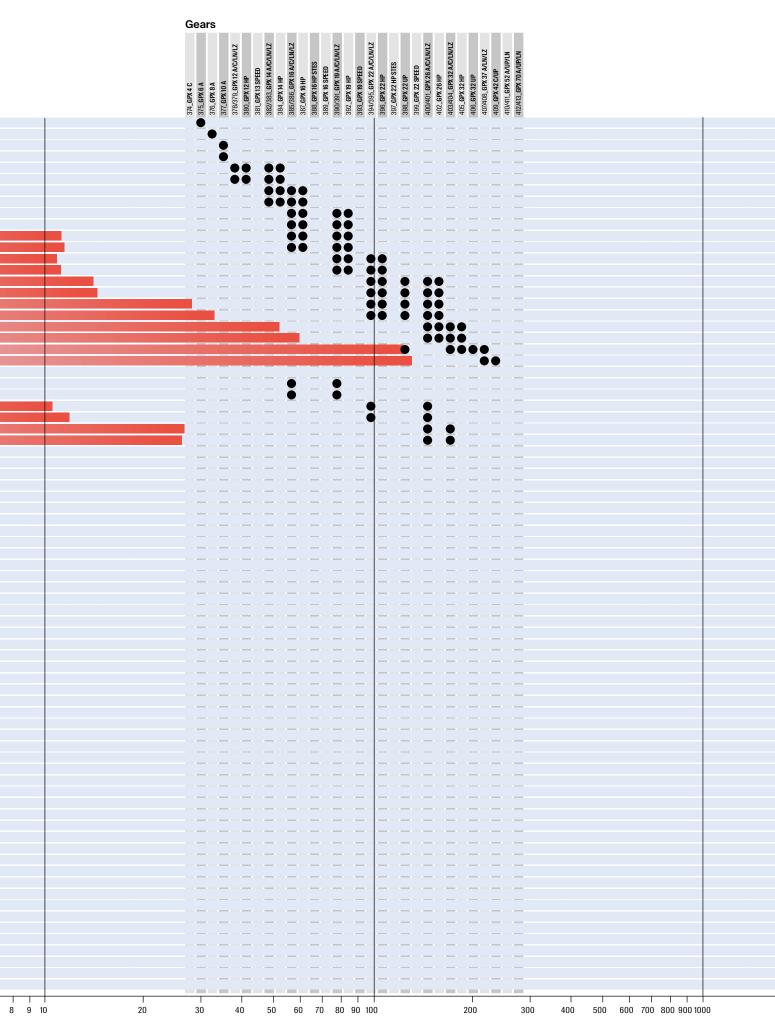
197	ECX SPEED 10 M, Ø10 mm, brushless, 8 W, High Power	NEW
234	ECX PRIME 16 L, Ø16 mm, brushless, 50 W	NEW
235	ECX PRIME 16 L, Ø16 mm, brushless, 60 W, sterilizable, ceramic	NEW
255	ECX FLAT 22 L, Ø22 mm, brushless, 37 W, High Torque	NEW
260	ECX FLAT 42 S, Ø42 mm, brushless, 40 W	NEW
259	ECX FLAT 42 S, \varnothing 42 mm, brushless, 100 W, High Torque	NEW
261	ECX FLAT 42 M, Ø42 mm, brushless, 150 W, High Torque	NEW
349	EC frameless DT 38 S, Ø42 mm, brushless, 105 W, Dynamic Torque	NEW
350	EC frameless DT 38 M, Ø42 mm, brushless, 100 W, Dynamic Torque	NEW
388	GPX 16 HP, ∅16 mm, planetary gearhead, sterilizable	NEW
397	GPX 22 HP, Ø22 mm, planetary gearhead, sterilizable	NEW
462	GB 80, worm gear, composite version	NEW
463	GB 12, worm gear, bronze version	NEW
464	GB 9, worm gear, composite version	NEW
465	GB 65, worm gear, steel/bronze version	NEW
496	ENX 42 MILE, Ø42 mm, encoder, 2048 counts per turn	NEW
500	ENX 10 MAG INT, Ø10 mm, encoder, 1-256 counts per turn	NEW
515	ENX 22 EASY INT, \varnothing 22 mm, encoder, 1024 counts per turn	NEW
520	TSX 38 MAG, encoder, 1792 counts per turn, EC frameless DT	NEW
524	TSX 40 MAG, encoder, \varnothing 40 mm, 1792–2048 counts per turn	NEW
525	TSX 40 RIO, encoder, \varnothing 40 mm, 1–524288 counts per turn, 21 bits	NEW
554	ESCON2 Module 60/30, servo controller up to 1800/3600 W	NEW
554	ESCON2 Compact 60/30, servo controller up to 1800/3600 W	NEW

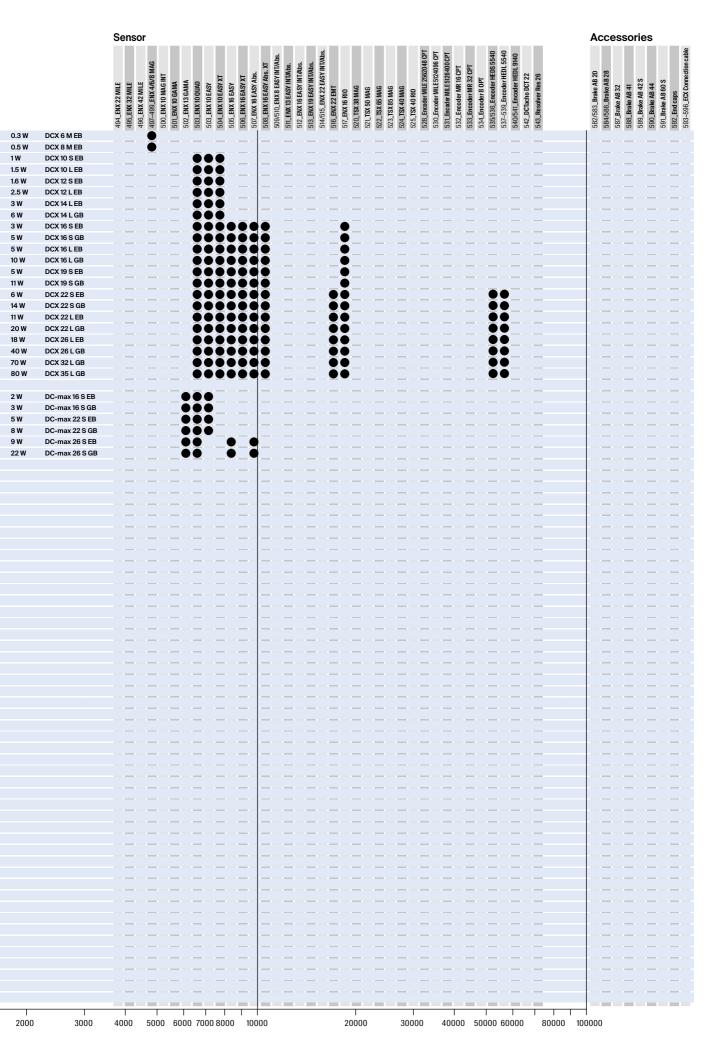
maxon selection guide

X drives	38-44
compact drive	42-44
DC motor	46-48
EC motor	50-56
Summary accessories	57
sensor	58
gear	60
screw drive	60

Classification of the maxon ranges according to performance classes. Performance, also in conjunction with size, is frequently a central requirement when considering drive systems. A preliminary size-related selection can be made from the different product ranges with the maxon selection guide. Our data sheets provide detailed specifications related to individual motors. Should you need any additional information, simply call us!

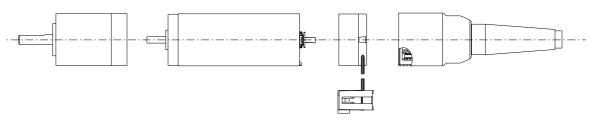


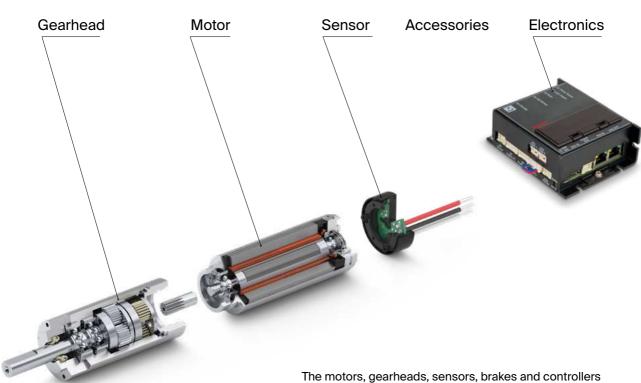




maxon selection guide

The right drive based on just a few parameters



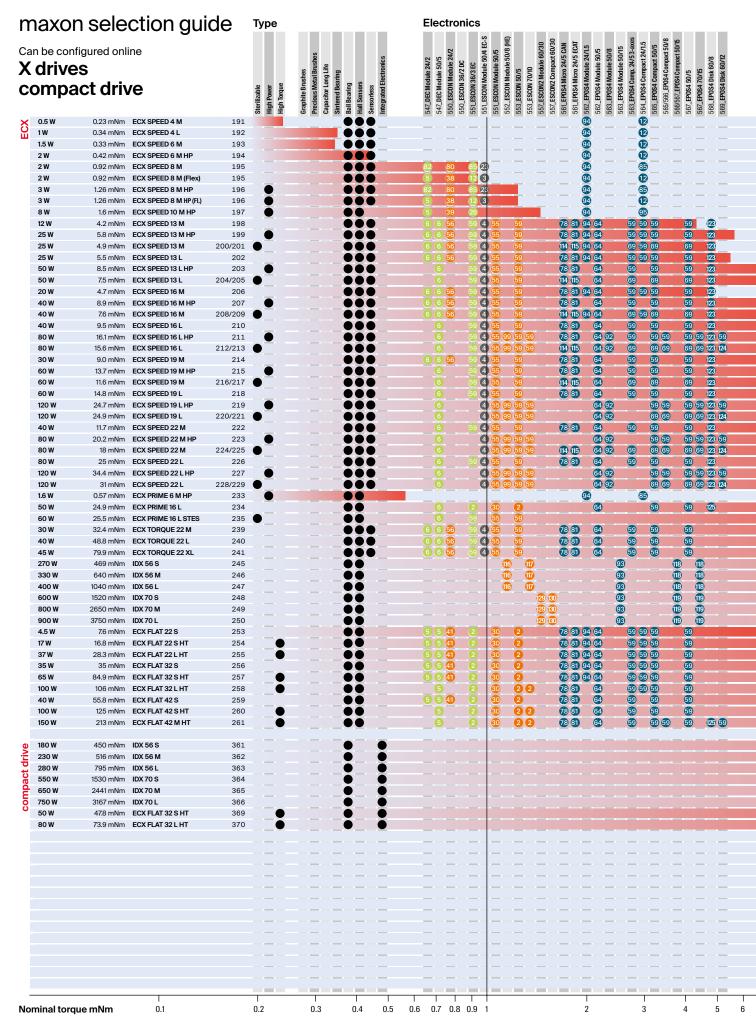


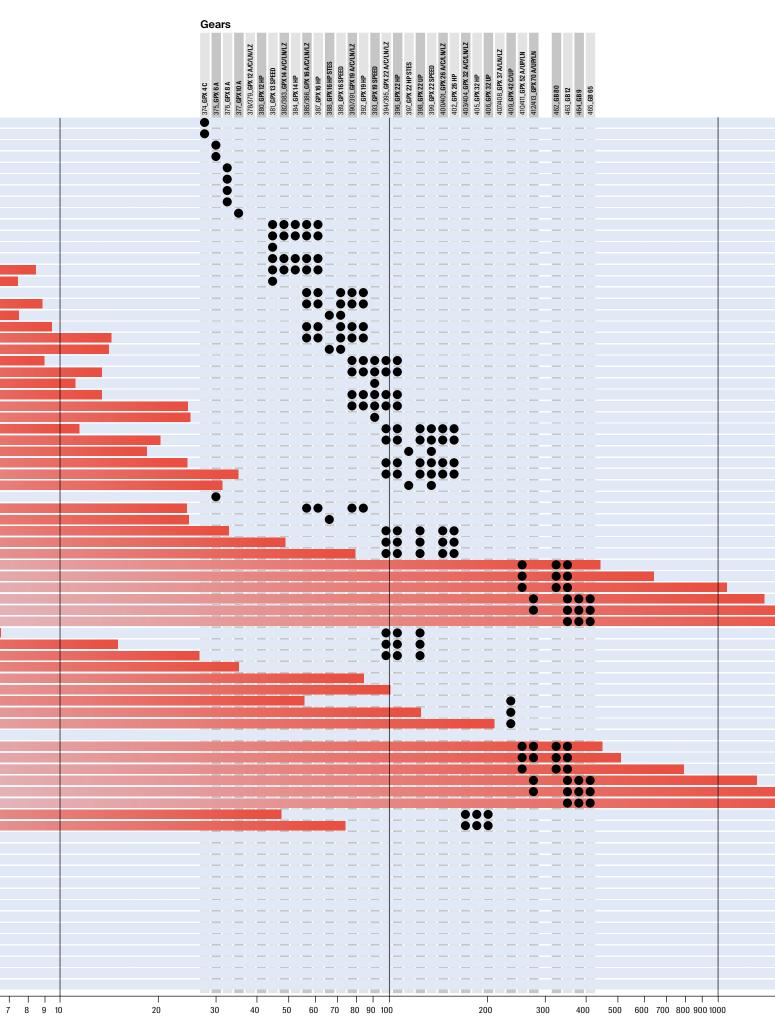
The motors, gearheads, sensors, brakes and controllers of maxon are perfectly matched to each other and can be combined in a number of ways. Our modular system makes it easy to find suitable components for your motor.

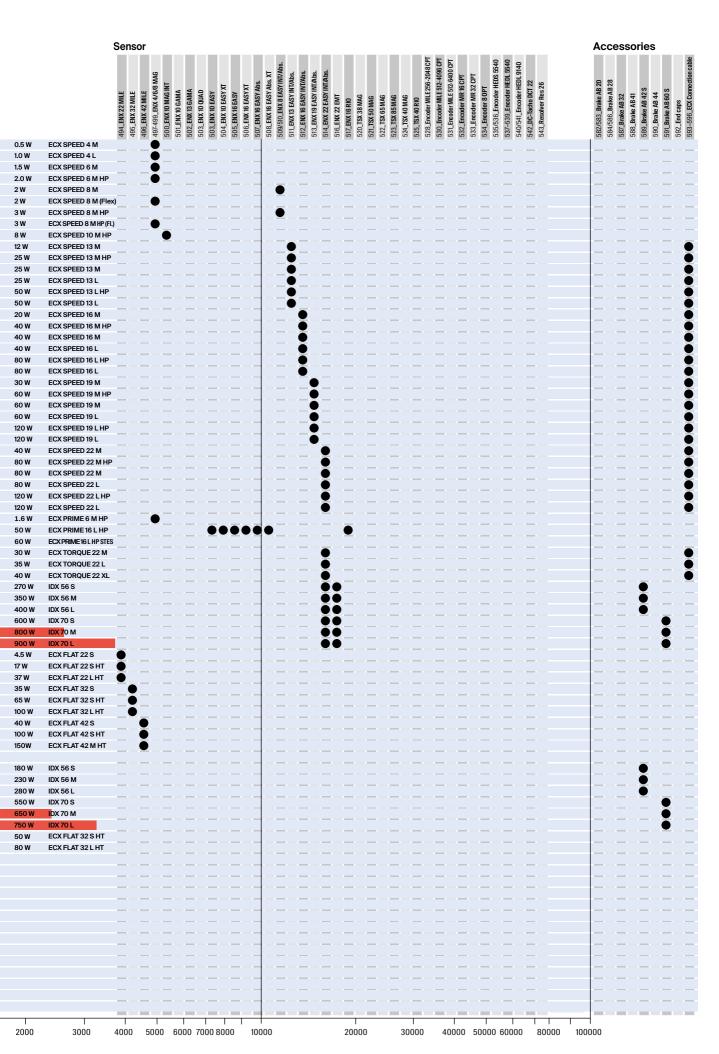


View the entire range of products online

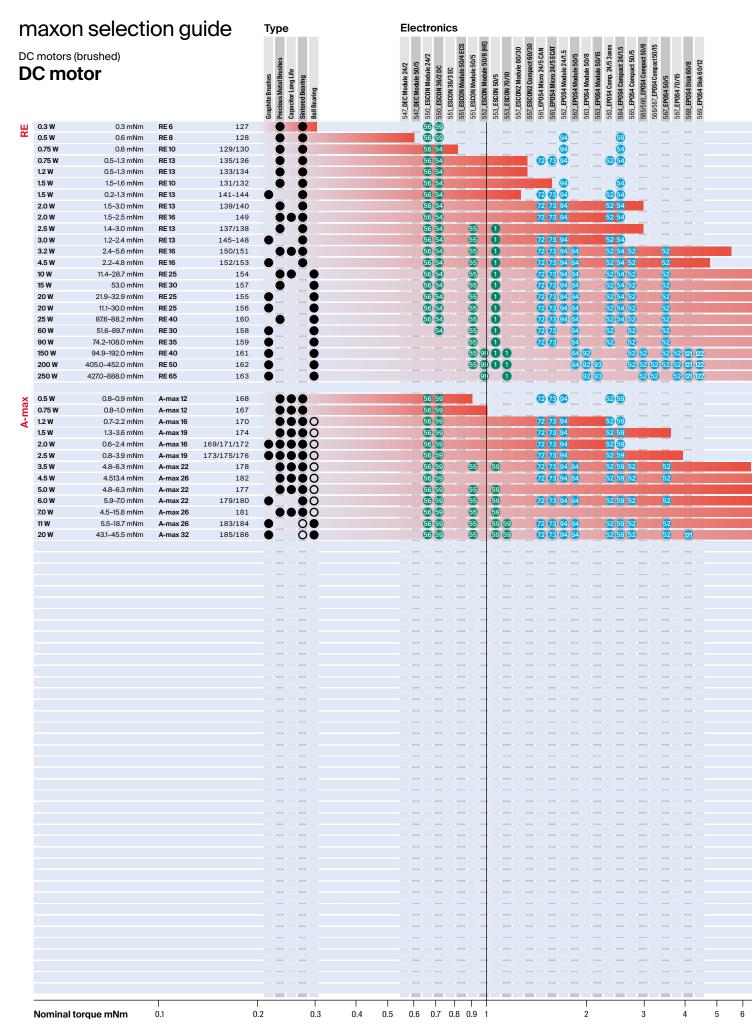
shop.maxongroup.com

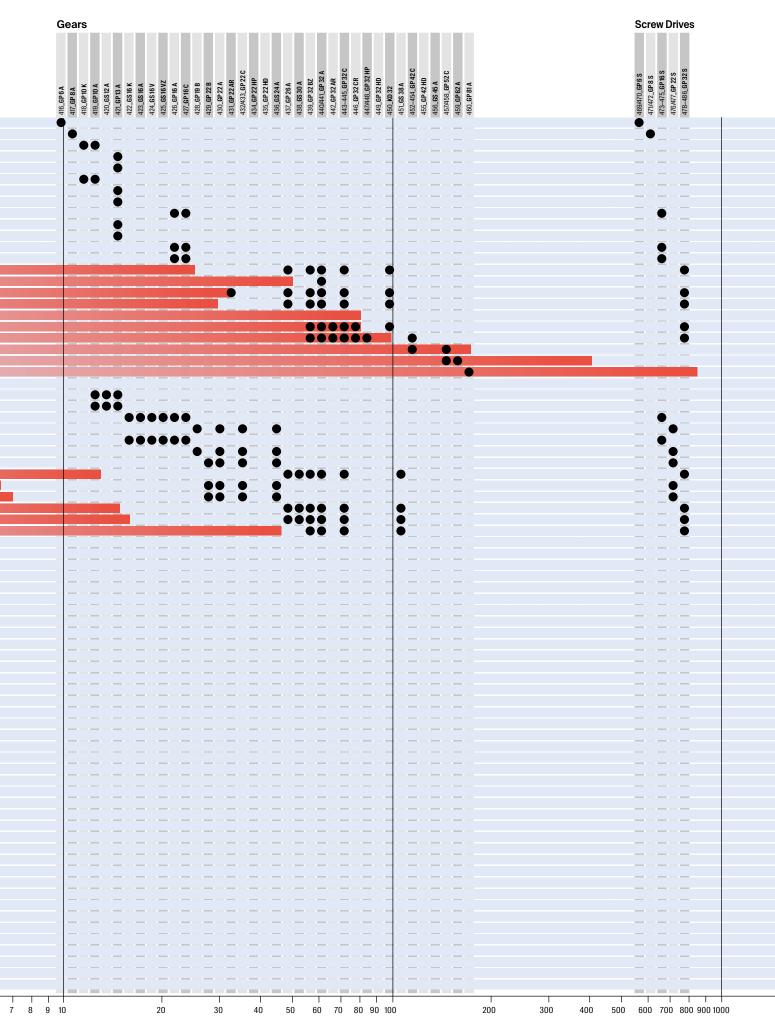


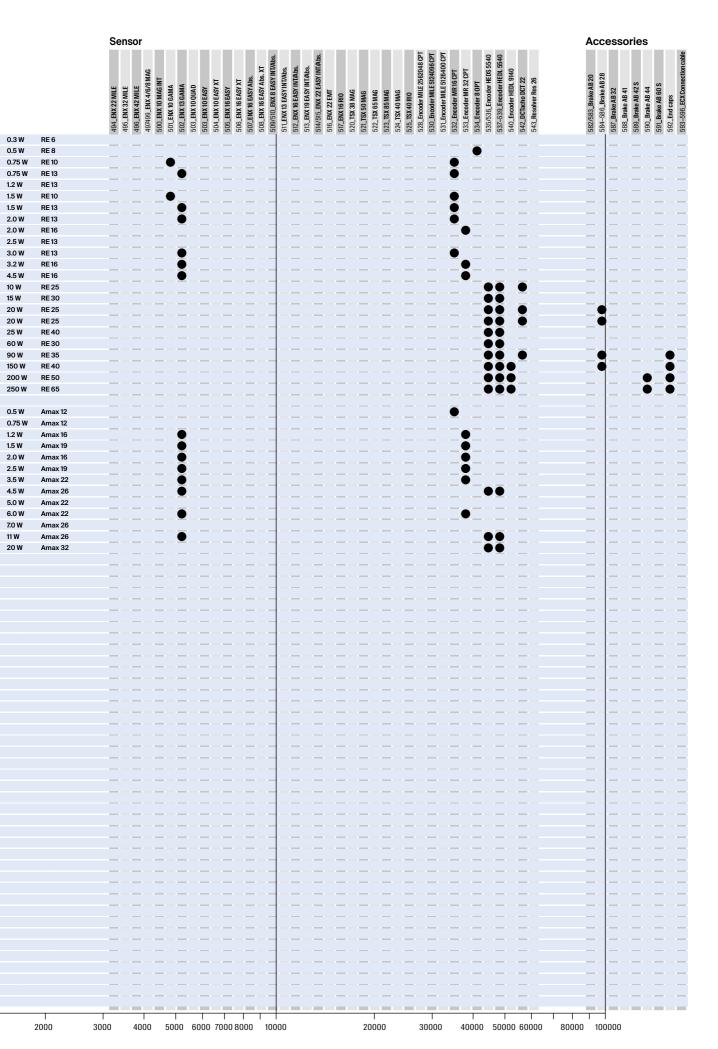






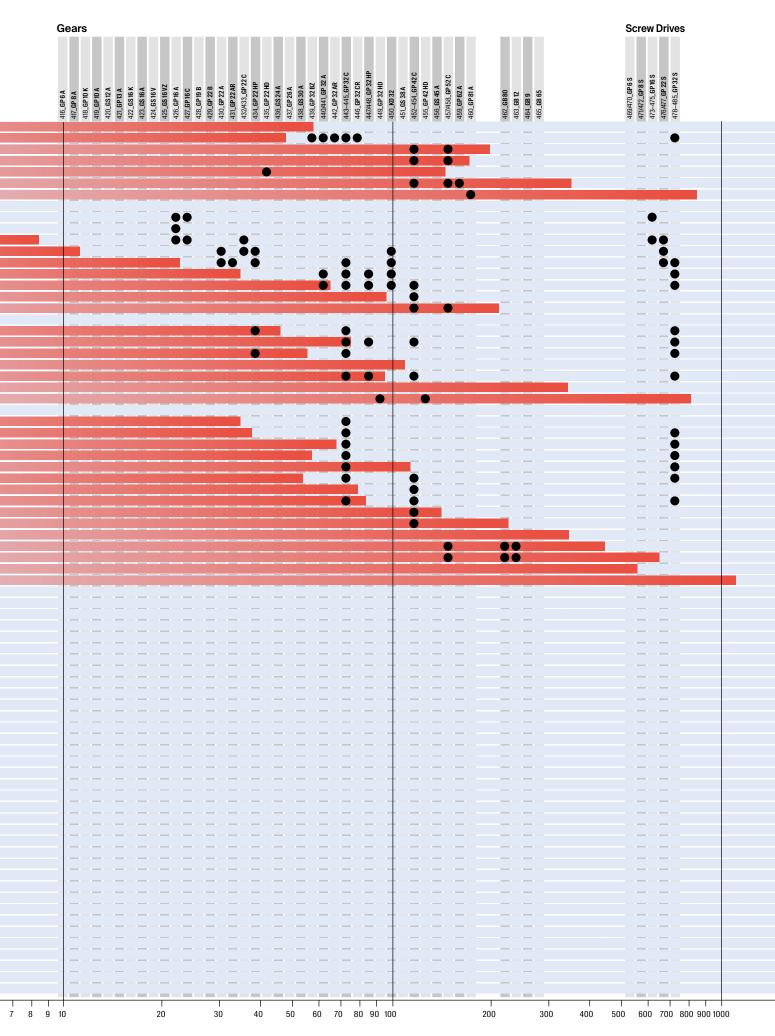


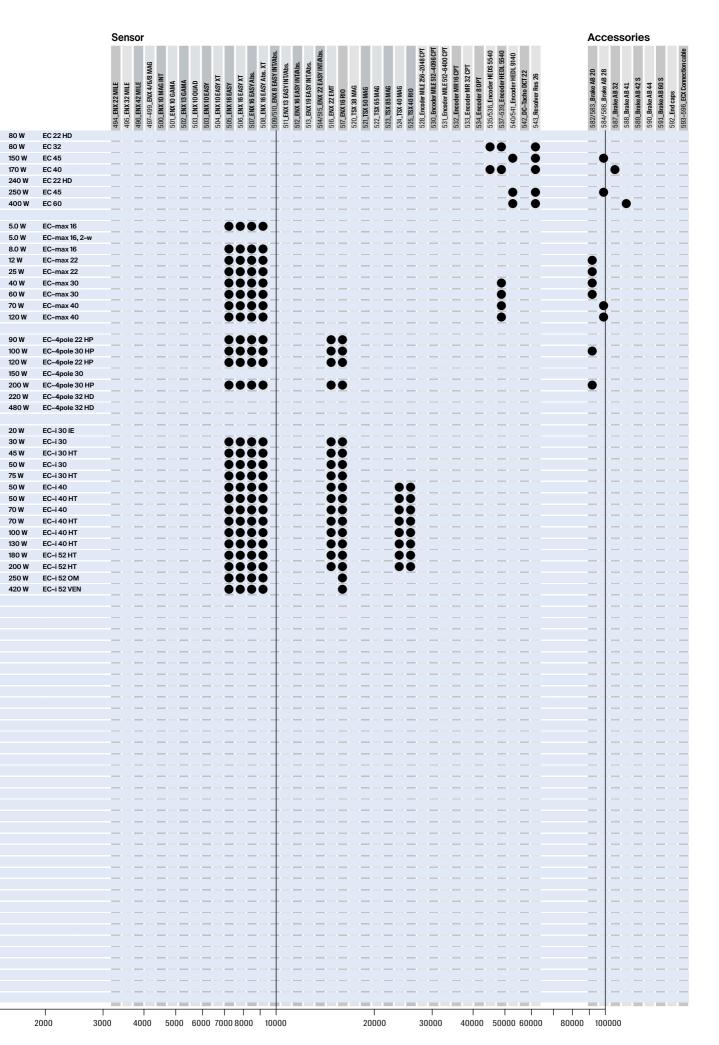




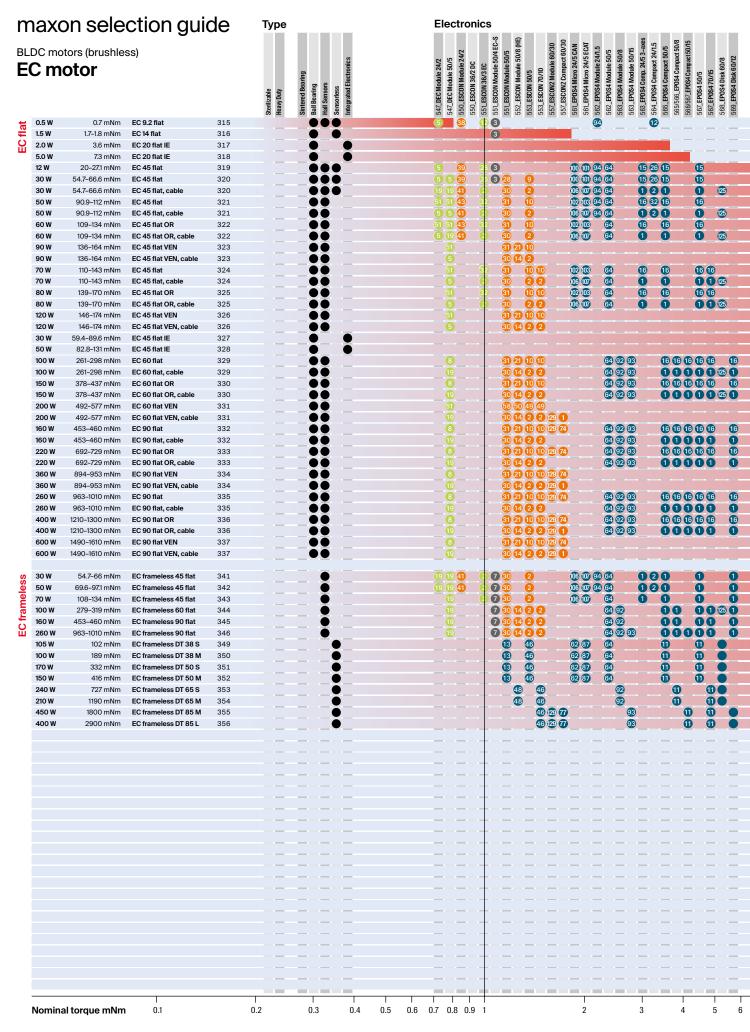


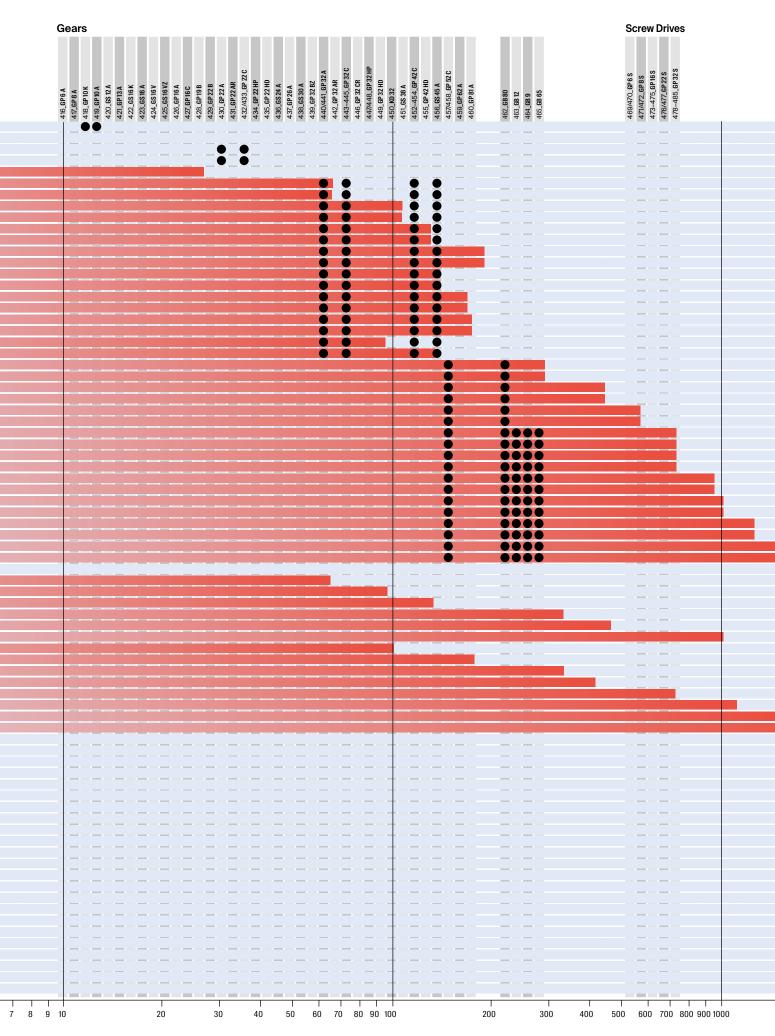


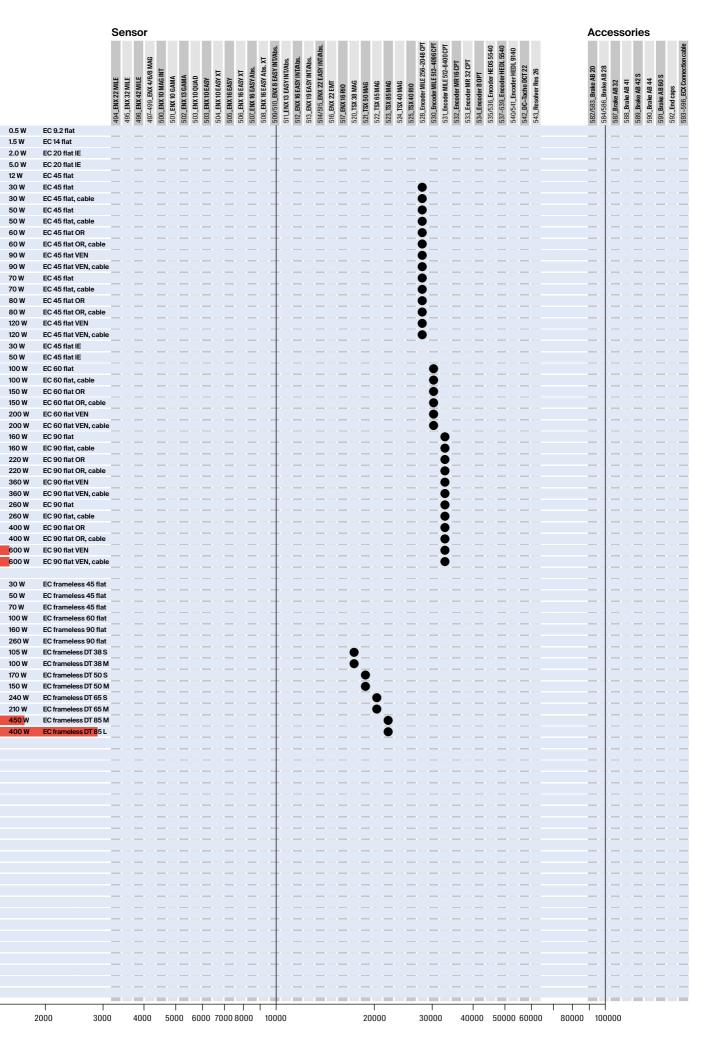












Accessories overview

The following table contains information on connecting maxon motors with maxon controllers. All listed adapters, plugs, evaluation boards, etc. must be ordered separately. The numbers refer to the Selection Guide pages 38–60.

 Can be connected directly. No accessories required. 69 Can be connected directly with suitable configura-104 Intended for use with customer-specific motherboard. Combination Adapter 223774 or 262359 and cable 354046. Can be connected directly. Plug must be removed. with EPOS4 EB Micro (638677) possible. Adapter 405120 required. 3 ESCON Module Motherboard sensorless 450237 and adapter Adapter 223774 and extension cable 3409.506 105 Intended for use with customer-specific motherboard. Combination 220310 required. (6 poles plug must be removed) required. with EPOS4 FB Micro (638677) and EPOS4 MB Micro EtherCAT 3-axes 4 ESCON Module Motherboard sensorless 450237 required 2 Intended for use with customer-specific motherboard. Combination with (659508) possible. Adapter 405120 required. Can be connected directly with suitable configuration. EPOS4 EB Micro (638677) possible. Connector set 520859 required. ${\Large \Large \ \, \textbf{00}} \textbf{Intended for use with customer-specific motherboard. Combination}$ Evaluation board 370652 required. Connector needs to be removed. with EPOS4 EB Micro (638677) possible. Can be connected directly. 6 Evaluation board 370652 required. Can be connected directly with 63 ESCON Module Motherboard 438779 and adapter 459875 required. Intended for use with customer-specific motherboard. Combination suitable configuration. 64 Intended for use with customer-specific Motherboard. Combination with with EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT ♠ ESCON Module Motherboard sensorless 450237 required. EPOS4 CB 50/5 CAN (534133) yields EPOS4 Compact 50/5 CAN (541718). 3-axes (659508) possible. Can be connected directly. Plug must be removed. 65 Can be connected directly. Attach solder bridges (jumpers) to printed (108) Intended for use with customer-specific motherboard. Combination 8 Evaluation board 370652 and extension cable 339380 required. with EPOS4 EB Micro (638677) possible. Adapter 488167 and cable circuit board. Adapter 220300 required. 66 Adapter 223774 or 262359 and cable 354046. 520852 required. 10 Extension cable 339380 required. 109 Intended for use with customer-specific motherboard. Combination Connector needs to be removed. 11 Cable 708583 or cable 708586 required. Extension cable 403964 required. with EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT Adapter 418723 required. Adapter 425931 and extension cable 354046 required. 3-axes (659508) possible. Adapter 488167 and cable 520852 BSCON Module Motherboard 438779 and cable 708584 or cable 708587 Connector needs to be removed. required. 69 Cable 275851 and cable 275878 required. 10 Intended for use with customer-specific motherboard. Combination ESCON Module 50/8 Motherboard 586048 required. Connectors at the Extension cable 354046 required with EPOS4 EB Micro (638677) possible. Extension cable 354046 Adapter 405120 required. motor need to be removed. required. 15 Adapter 220300, extension cable 275878 and extension cable Intended for use with customer-specific motherboard. Combination with Intended for use with customer-specific motherboard. Combination 275851 required.

16 Extension cable 354045 required. EPOS4 EB Micro (638677) possible. Extension cable 275851 required. with EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 13 Intended for use with customer-specific motherboard. Combination with 3-axes (659508) possible. Extension cable 354046 required. Cable 708583 required EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 3-axes 12 Intended for use with customer-specific motherboard. Combination (13) Cable 708586 required. (659508) possible. Extension cable 275851 required. with EPOS4 EB Micro (638677) possible. Adapter 223774 or Evaluation board 370652 required. Connectors at the motor 74 Cable 339380 and connector set 846645 required. 262359 and cable 354046. Connector needs to be removed. ESCON Module Motherboard 438779 and extension cable need to be removed. 113 Intended for use with customer-specific motherboard. Combination ESCON Module 50/8 Motherboard 586048 required. 354046 required. with EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 21 ESCON Module 50/8 Motherboard 586048 and extension cable ESCON Module Motherboard 438779 and adapter 223774 required. 3-axes (659508) possible. Adapter 223774 or 262359 and cable Plug must be removed 339380 required. 354046. Connector needs to be removed. Intended for use with customer-specific motherboard. Combination with EPOS4 EB Micro (638677) possible. Motor with cable 22 Adapter 262359 and cable 354046 required. Connector 77 Connector set 846645 and cable 708583 or 708586 required. needs to be removed. 18 Intended for use with customer-specific motherboard. Combination with 23 ESCON Module Motherboard sensorless 450237 and adapter EPOS4 EB Micro (638677) possible. Can be connected directly when configured. Cable 275851 and cable 275878 required. Intended for use with customer-specific motherboard. Combination with EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 498157 required. combined with Molex connector. 24 ESCON Module 24/2 Motherboard 486400 required. SCON Module Motherboard 438779, adapter 223774 and extension 25 ESCON Module Motherboard 438779 and cable 708584 required. cable 3409.506 (6-pin plug must be removed) are required 3-axes (659508) possible. Motor with cable configured. Cable 275851 and cable 275878 required.

11 IDX power cable (684644, 684646, 684647 or 684648) and IDX Adapter 418719 required. ESCON Module 24/2 Motherboard 486400 and adapter 498157 required. Adapter 425931 and cable 354046 (remove connector on one end) 1 Intended for use with customer-specific motherboard. Combination with EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 3-axes sensor cable (684650 or 684651) required. Motherboard 586048, required. Install solder bridge (jumper) on circuit board. 28 ESCON Module Motherboard 438779 and adapter 220300 required. (659508) possible. Can be connected directly when combined with adapter 262359 and cable 354046 required. 29 Adapter 459875 required. Molex connector. IDX power cable (684644, 684646, 684647 or 684648) and IDX ESCON Module Motherboard 438779 required. Plug must be removed. DEC Module Evaluation board 370652 and adapter 498157 required. sensor cable (684650 or 684651) required. Adapter 262359 and cable 354046 required. 31 ESCON Module Motherboard 438779 and extension cable 83 ESCON Module Motherboard 586048 and cable 708584 required. 339380 required. ESCON Module Motherboard 586048 and cable 708587 required. (18) IDX power cable (684644, 684646, 684647 or 684648) and IDX 32 Extension cable 442086 required. Adapter 498157 required. sensor cable (684650 or 684651) required. Connector set 33 ESCON Module Motherboard 438779 and cable 708587 required. Connector set 846645 required. 520859, adapter 262359 and cable 354046 required 34 Cable 708584 required. 87 Intended for use with customer-specific motherboard. Combination with IDX power cable (711319) and IDX sensor cable (684650 or 35 Adapter 262359, cable 354046 and extension cable 3409.506 EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 3-axes 684651) required. Extension cable 696283 and connector set 520859, (659508) possible. Connector set 520859 required. Connector needs to (6-pin connector needs to be removed) required. adapter 262359 and cable 354046 required 66 ESCON Module Motherboard 586048, adapter 223774, and extension Adapter cable 693573 required. cable 3409.506 (6-pin connector needs to be removed) required. 88 ESCON Module Motherboard 438779 required. 2 Extension cable 696283 required 37 ESCON Module Motherboard 586048 and adapter 223774 required 89 Plug set 520859 required. Plug must be removed. Extension cable 710930 required. Connector needs to be removed. Plug set 520859 required. (23) Cable 696283 and cable 696284 required. 33 ESCON Module 24/2 Motherboard 486400 and adapter 425931 required. Adapter 488167 and cable 520852 required. 24 Cable 710930 and cable 696284 required. 39 ESCON Module 24/2 Motherboard 486400 and adapter 220300 required. Intended for use with customer-specific Motherboard. Combination with 23 Connector set 710926 required. Connector needs to be removed. ESCON Module 24/2 Motherboard 486400 and adapter 405120 required EPOS4 CB Power CAN (520884) yields EPOS4 Compact 50/8 CAN Connector set 710926 required ESCON Module 24/2 Motherboard 486400 required; connector needs to (520885). Adapter 488167 and cable 696285 required. Intended for use with customer-specific Motherboard. Combination with Cable 708590 required. ESCON Module 50/8 Motherboard 586048 and extension cable EPOS4 CB Power CAN (520884) yields EPOS4 Compact 50/15 CAN (29) Intended for use with customer-specific motherboard. Combination with ESCON2 CB 60/30 (783729) yields 354046 required. (520886). 43 ESCON Module 24/2 Motherboard 486400 and extension cable (Motherboard Combination with Customer-specific Motherboard Combination with ESCON2 Compact 60/30 (783734). 339380 required. EPOS4 CB 24/1.5 CAN (536997) yields EPOS4 Compact 24/1.5 CAN (30) IDX power cable (711319) and IDX sensor cable (684650 or 684651) required. Connector set 846645 required. ESCON Module 24/2 Motherboard 486400 and adapter 459875 required. (546714). 45 Cable 708587 required. Adapter 804420 required. Cable 708582 required 46 Cable 708584 or 708587 required. Adapter 549609 required. 32 Cable 708582 required. 43 ESCON Module Motherboard 586048 and cable 708584 or cable 708587 ESCON Module Motherboard 438779 and adapter 549609 required. 99 ESCON Module 50/8 Motherboard 586048 required. Can be connected 49 Cable 520851 and 275878 required. directly with suitable configuration. 60 ESCON Module 50/8 Motherboard 546048 and cable 520851 and (Intended for use with customer-specific motherboard. Combination with EPOS4 EB Micro (638677) possible. Adapter 220300, extension cable 51 FVA Board 370652 and extension cable 442086 required. 275878 and extension cable 275851 required. 52 Extension cable 275851 required. (Intended for use with customer-specific motherboard. Combination with 54 Extension cable 403962 required for motors with terminals EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 3-axes 55 ESCON Module Motherboard 438779 required. Can be connected (659508) possible. Adapter 220300, extension cable 275878 and directly with suitable configuration. extension cable 275851 required. 66 ESCON Module 24/2 Motherboard 486400 required 102 Intended for use with customer-specific motherboard. Combination with Can be connected directly with suitable configuration EPOS4 EB Micro (638677) possible. Extension cable 354045 required. SSCON Module 24/2 Motherboard 486400 and adapter 223774 required. (D3) Intended for use with customer-specific motherboard. Combination with EPOS4 EB Micro (638677) and EPOS4 MB Micro EtherCAT 3-axes Connector needs to be removed. 63 ESCON Module Motherboard 438779 and cable 520851 and (659508) possible. Extension cable 354045 required.

For motors with absolute encoder (SSI) or with Hall sensors and incremental encoder (line driver recommended)

For motors with Hall sensors, with or without encoders

For motors with Hall sensors, without encoders

For motors without Hall sensors, without encoders

275878 required.

For motors with or without encoder
For motors with encoder (line driver recommended)

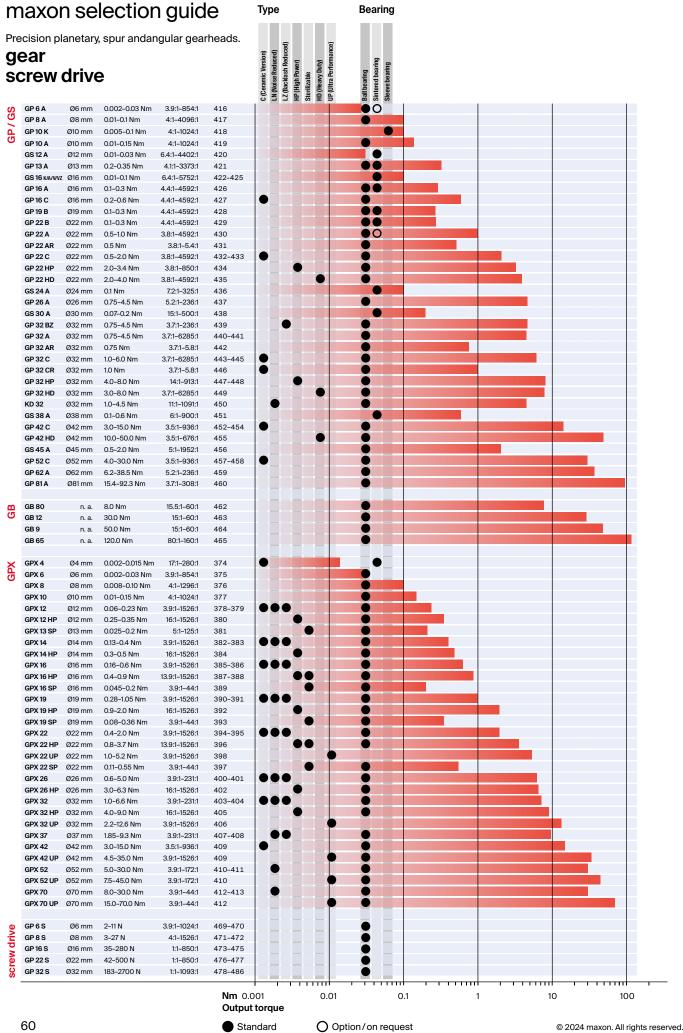
maxon selection guide

	naxon selectio	on guide			Reco	omme	ended		tron	ics			, e	ß			
SE	coder, DC tacho, resolver			Sterilizable Radiation-resistant			551_ESCON 36/3 EC 551_ESCON Module 50/4 ECS 551_ESCON Module 50/5		553_ESCON 70/10 557_ESCON2 Module 60/3	557_ESCON2 Compact 60/3 561_EPOS4 Micro 24/5 CAN	561_EP0S4 Micro 24/5 ECAT 562_EP0S4 Module 24/1.5	562_EPOS4 Module 50/5 563_EPOS4 Module 50/8					
ENX	ENX 22 MILE ENX 32 MILE	1024 CPT, 2 channel 2048 CPT, 2 channel	494 495			24 24					(T) (94) (T) (94)		0			0	Ø
ш	ENX 42 MILE	2048 CPT, 2 channel	495			4			_			64			0	ŏ	9
	ENX 4/6/8 MAG	1-256 CPT, 3 channel	497-499			30 85	00		U		94				, U	U	w
	ENX 10 MAG INT	1-256 CPT, 3 channel	500			95					94			95 95			
	ENX 10 GAMA	12 CPT, 2 channel	501			₩					_			•			
	ENX 13 GAMA	16 CPT, 2 channel	502			37 69	73	2						-	-		
	ENX 10 EASY	1–1024 CPT, 3 channel	503			49 0		9	ത		1 94	@ @	0	0 00 0	മ		@ @
	ENX 10 QUAD	4 CPT, 2 channel	503			••			9			4	_ 4		,	4	99
	ENX 10 EASY XT	1-1024 CPT, 3 channel	504			20	3 3	0	n	1	W 94	@ @	0	000	0	0	@ @
	ENX 16 EASY	1-1024 CPT, 3 channel	505			200				a a	m 94	@ @	തര				000
	ENX 16 EASY XT	1-1024 CPT, 3 channel	506			200	68	Ô	100	ā ē	m 02	60 02	000 (2	006	000	00	<u> </u>
	ENX 16 EASY Absolute	4096 steps, Single Turn	507			•										999	
	ENX 16 EASY Absolute XT	4096 steps, Single Turn	508													ŎŎ	
	ENX 8 EASY INT	1-1024 CPT, 3 channel	509			30					94			3			
	ENX 8 EASY INT Absolute	4096 steps, Single Turn	510								94			9			
	ENX 13 EASY INT	1-1024 CPT, 3 channel	511			24	88	0		@	1 94	64	(2	D O O		0	@ @
	ENX 13 EASY INT Absolute	4096 steps, Single Turn	511	Ŏ						62	99	60		0 94 9		90	20 20
	ENX 16 EASY INT	1-1024 CPT, 3 channel	512	Ŏ	(24	63	200	0		1 94			000		Õ	7
	ENX 16 EASY INT Absolute	4096 steps, Single Turn	512								99			0000	90	90	20 20
	ENX 19 EASY INT	1-1024 CPT, 3 channel	513			24	63	200	0		1 94			000		Õ	@
	ENX 19 EASY INT Absolute	4096 steps, Single Turn	513								37 94			0000		90	20 20
	ENX 22 EASY INT	1-1024 CPT, 3 channel	514			24	63	200	0	(@ 94	69 92	0	000	0	0	7
	ENX 22 EASY INT Absolute	4096 steps, Single Turn	515								99			0000		90	20 20
	ENX 22 EMT Absolute	65536 turns, Multi Turn	516										(2		B (23	23 2	2 3
	ENX 16 RIO	512-65536 CPT, 3 channel	517		(40	88	200	1 29	1 1	₩ 94	69 02	93 2	000	00	00	@ @
	TSX 38 MAG axial	1792 CPT, 2 channel	520				25					64		1)	D	
	TSX 38 MAG radial	1792 CPT, 2 channel	520				6 3	45				64		0	<u>) </u>	13	
	TSX 50 MAG axial	2560 CPT, 2 channel	521				3 3	34				64		0		•	
	TSX 50 MAG radial	2560 CPT, 2 channel	521						_			69		•		10	
	TSX 65 MAG axial	2560 CPT, 2 channel	522						3			@			Ø		
	TSX 65 MAG radial	2560 CPT, 2 channel	522					84	4			92			13	_Œ	
	TSX 85 MAG axial	2560 CPT, 2 channel	523						@				93		0) Œ	_
	TSX 85 MAG radial	2560 CPT, 2 channel	523					_	4 9 @	®			9 3		0		
	TSX 40 MAG axial	1792-2048 CPT, 2 channel	524								_	64		0		O	
	TSX 40 MAG radial	1792-2048 CPT, 2 channel	524					45				₩ _		0		®	
	TSX 40 RIO axial	1524 288 CPT, 3 channel	525									@ @) @ @	000	
	TSX 40 RIO axial	1524 288 CPT, 3 channel	525									69 92	93	@	9 @ @	9 9	
																_	
Ö	Encoder MILE	256–2048 CPT, 2 channel, LD	528			_	@			_ ©	00	(A) (B)		100 0		<u> </u>	-
sensor	Encoder MILE	256-2048 CPT, 2 channel, LD, cable	528			24)			_		@ 9					0	@ @
S	Encoder MILE	512-4096 CPT, 2 channel, LD	530					420				60 02					
	Encoder MILE Encoder MILE	512-4096 CPT, 2 channel, LD, cable 512-6400 CPT, 2 channel, LD	530 531					49 49				69 62	990				
	Encoder MILE	512-6400 CPT, 2 channel, LD, cable	531						_		-						
	Encoder MR, type S		331					200	v		•		93 (2	<i>y</i> •		000	
	Lilcodel Witt, type 3		532		- (അ അ	<i>-</i> 78	0							, , ,		
	Encoder MR type M	16 CPT, 2 channel	532 533			37 68 57 68	1				m m	(A)	-			രീ	
	Encoder MR, type M Encoder 8 OPT	32 CPT, 2 channel	533			37 68	76			®	1B 99	64		60 6		60	
	Encoder 8 OPT	32 CPT, 2 channel 50 CPT, 2 channel	533 534		(3 6	70	2	a	_ @	® Ø	€				60	
	Encoder 8 OPT Encoder HEDS 5540	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel	533 534 535-536			36	7	2 3 3 3) @ @	69 6	9		@ @
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539			3 6	7 0	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	0		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel	533 534 535-536			9 6 9 6 2 0	79 88 97	2 3 3 3	0 Ø Ø		1 79		1000	66 0 0 0	000		
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			36	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	
	Encoder 8 OPT Encoder HEDS 5540 Encoder HEDL 5540 Encoder HEDL 9140	32 CPT, 2 channel 50 CPT, 2 channel 500 CPT, 3 channel 500 CPT, 3 channel 500 CPT, 3 channel	533 534 535-536 537-539 540-541			9 6 9 6 2 0	79 88 97	9 9 9 9 9 9 9	0 Ø Ø		1 79	6 9 9 2	1000	66 0 0 0	000	00	

Recommended Electronics

"Sometimes, you have to take the first step alone."

Ursula von der Leyen



DC Motor

Technology short and to the point

Selection Guide	38-60
maxon DC motor	62-63
maxon EC motor	64-67
maxon EC frameless motor	68-69
maxon compact drive	70-71
maxon gear	72-73
maxon sensor	74-75
maxon motor control	76-77
Key information	78-85
Conversion tables	86
Standard Specification	87-89



Here you can find short descriptions of the structure and technology of maxon products. Under "key information", you will find details about characteristics and diagrams, motor properties, motor selection, and many other important details.

The outstanding technical features of maxon DC motors:

- No magnetic cogging
- High acceleration thanks to a low mass inertia
- Low electromagnetic interference
- Low inductance
- High efficiency
- Linearity between voltage and speed
- Linearity between load and speed
- Linearity between load and current
- Small torque ripple thanks to multi-segment commutator
- Able to bear high overloads for short periods
- Compact design small dimensions
- Multiple combination possibilities with gears as well as DC tachometers and encoders

Characteristics of the maxon DCX range:

- High power density
- High-quality DC motor with NdFeB magnet
- High speeds and torques
- Robust design (metal flange)
- Easily configured online
- Fast delivery

Characteristics of the maxon DC-max range:

- High-performance at low cost
- Combines rational manufacturing and design of the A-max motors with the higher power density of the NdFeB magnets
- Automated manufacturing process
- Easily configured online
- Fast delivery

Characteristics of the maxon RE range:

- High power density
- High-quality DC motor with NdFeB magnet
- High speeds and torques
- Robust design (metal flange)

Characteristics of the maxon A-max range:

- Good price-performance ratio
- DC motor with AlNiCo magnet
- Automated manufacturing process

Turning speed

The optimal operating speeds are between 4000 rpm and 9000 rpm depending on the motor size. Speeds of more than 20000 rpm have been attained with some special versions.

A physical property of a DC motor is that, at a constant voltage, the speed is reduced with increasing loads. A good adaptation to the desired conditions is possible thanks to a variety of winding variants.

At lower speeds, a gear combination is often more favorable than a slowly turning motor.

Program

- DCX
- DC-max
- RE
- A-max

- 1 Flange, front
- 2 Permanent magnet
- 3 Housing (magnetic return)
- 4
- 5 Winding
- 6 Commutator plate
- 7 Commutator
- 8 Graphite brushes
- 9 Precious metal brushes
- 10 Cover
- 11 Electrical connection
- 12 Ball bearing
- 13 Sintered sleeve bearing
- 14 Flange, rear

The maxon winding

The "heart" of the maxon motor is the worldwide patented ironless winding, System maxon. This motor principle has very specific advantages. There is no magnetic detent and minimal electromagnetic interference. The efficiency of up to 90% exceeds that of other motor systems.

There are numerous winding variants for each motor type (see motor data sheets). They are differentiated by the wire diameter and number of turns. This results in various motor terminal resistances. The wire sizes used are between 32 µm and 0.45 mm, resulting in the different terminal resistances of the motors.

This influences the motor parameters that describe the transformation of electrical and mechanical energy (torque and speed constants). It allows you to select the motor that is best suited to your application.

Effects of wire gauge and number of windings

Low terminal resistance

- Low resistance winding
- Thick wire, few turns
- High starting currents
- High specific speed (rpm per volt)

High terminal resistance

- High resistance winding
- Thin wire, many turns
- Low starting currents
- Low specific speed (rpm per volt)

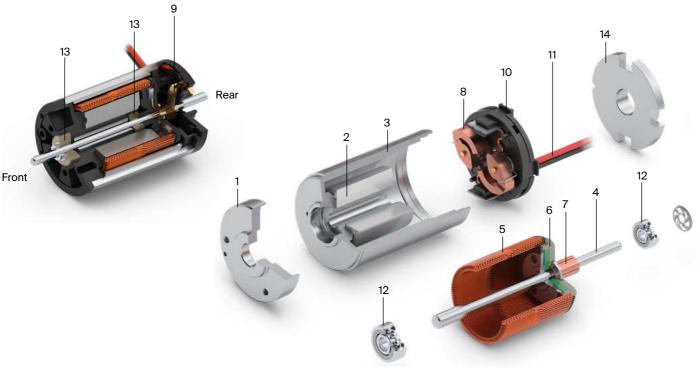
The maximum permissible winding temperature in high-temperature applications is 125°C (155°C in special cases), otherwise 100°C or 85°C.

Service life

A general statement about service life cannot be made due to many influencing factors. Service life can vary between more than 20000 hours under favorable conditions, and less than 100 hours under extreme conditions (in rare cases). Roughly 1000 to 3000 hours are attained with average requirements.

The following have an influence:

- 1. The electric load: higher current loads result in greater electric wear. Therefore, it may be advisable to select a somewhat stronger motor for certain applications. We would be happy to advise you.
- 2. Speed: the higher the speed, the greater the mechanical wear.
- 3. Type of operation: extreme start/stop, left/ right operation leads to a reduction in service
- 4. Environmental influences: temperature, humidity, vibration, type of installation, etc.
- 5. In the case of precious metal brushes, the CLL concept increases service life at higher loads and the benefits of precious metal brushes are retained.
- 6. Combinations of graphite brushes and ball bearings lead to a long service life, even under extreme conditions.



Mechanical commutation

Graphite brushes

In combination with copper commutators for the most rigorous applications.

More than 10 million cycles were attained in different applications.

Graphite brushes are typically used:

- In larger motors
- With high current loads
- In start/stop operation
- In reverse operation
- While controlling at pulsed power stage (PWM)

The special properties of graphite brushes can cause so-called spikes. They are visible in the commutation pattern. Despite the highfrequency interference caused by the spikes, these motors have become popular in applications with electronic controls. Please note, that the contact resistance of the graphite brushes changes dependent on load.

Precious metal brushes and commutator

Our precious metal combinations ensure a highly constant and low contact resistance, even after a prolonged standstill time. The motors work with very low starting voltages and electromagnetic interferences.

Precious metal brushes are typically used:

- In small motors
- In continuous operation
- With small current loads
- With battery operation
- In DC tachometers

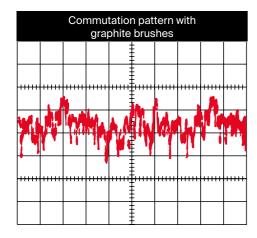
The commutation pattern is uniform and free of spikes, as opposed to that of other motors. The combination of precious metal brushes and maxon rotor system results in minimum of high-frequency interference, which otherwise leads to major problems in electronical circuits. The motors need practically no interference suppression.

CLL concept

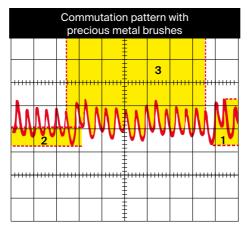
With precious metal commutation, the wear on commutators and brushes is caused mainly by sparks. The CLL concept suppresses spark generation to a large extent, thus greatly extending service life.

When driven with a pulsed power stage (PWM) higher no load currents occur and an unwanted motor heating can result. Additional inductance (chokes) in the motor supply lines help.

For further explanations, please see page 92 or "The selection of high-precision microdrives" by Dr. Urs Kafader.



© 2024 maxon. All rights reserved. April edition. Subject to change.



Commutation pattern

The commutation pattern shows the current pattern of a maxon DC motor over one motor revolution.

Please place a low-ohm series resistor in series with the motor (approx. 50 times smaller than the motor resistance). Observe the voltage drop over the resistor on the oscilloscope.

Legend

- 1 Ripple, actual peak-to-peak ripple
- 2 Modulation, attributable mainly to asymmetry in the magnetic field and in the winding.
- 3 Signal pattern within a revolution (number of peaks = twice the number of commutator segments)

maxon EC motor ironless winding

Technology – short and to the point

Characteristics of the **maxon EC motors** with ironless winding:

- Brushless DC motor (BLDC)
- Long service life
- Highly efficient
- Linear motor characteristics, excellent control properties
- Ironless winding system maxon with three phases in the stator
- Lowest electrical time constant and low inductance
- No detent
- Good heat dissipation, high overload capacity
- Rotating NdFeB permanent magnet with 1 or 2 pole pairs

Characteristics of the **maxon ECX SPEED** range:

- Power optimized, with high speeds up to 120 000 rpm
- Robust design
- Various types: e.g. short/long, sterilizable
- Lowest residual imbalance
- Easily configured online
- Fast delivery

Characteristics of the maxon EC range:

- Power-optimized, with high speeds of up to 25,000 rpm
- Robust design
- Lowest residual imbalance

Characteristics of the maxon EC-max range:

- attractive price-performance ratio
- robust steel casing
- speeds of up to 20000 rpm
- rotor with 1 pole pair

Characteristics of the **maxon ECX PRIME and EC-4pole** range:

- Highest power density thanks to rotor with 2 pole pairs
- Knitted winding system maxon with optimised interconnection of the partial windings
- Speeds of up to 50 000 rpm
- High-quality magnetic return material to reduce eddy current losses
- Mechanical time constants below 3 ms
- Special version

Program

- ECX SPEED
- ECX PRIME
- EC
- EC-max
- EC-4pole
- with Hall sensors
- sensorless
- with integrated electronics
- sterilizable
- heavy duty

- 1 Flange, front
- 2 Housing
- 3 Laminated steel stack
- 4 Winding
- 5 Permanent magnet
- 6 Shaft
- 7 Print with Hall sensors
- 8 Control magnet
- 9 Ball bearing
- 10 Flange, rear

Electronical commutation

Block commutation

Rotor position is reported by three in-built Hall sensors. The Hall sensors arranged offset by 120° provide six different signal combinations per revolution. The three partial windings are now supplied in six different conducting phases in accordance with the sensor information. The current and voltage curves are block-shaped. The switching position of each electronic commutation is offset by 30° from the respective torque maximum.

Properties of block commutation

- Relatively simple and favorably priced electronics
- Torque ripple of 14%
- Controlled motor start-up
- High starting torques and accelerations possible
- Servo drives, Start/stop operation
- Positioning tasks
- The data of the maxon EC motors are determined with block commutation.

Sensorless block commutation

The rotor position is determined using the progression of the induced voltage. The electronics evaluate the zero crossing of the induced voltage (EMF) and commute the motor current after a speed dependent pause (30°e after EMF zero crossing).

When stalled or at low speed, the voltage signal is too small and the zero crossing cannot be detected precisely. This is why special algorithms are required for starting (similar to stepper motor control).

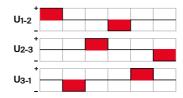
To allow EC motors to be commuted without sensors in a Δ arrangement, a virtual star point is usually created in the electronics.

Properties of sensorless commutation

- Torque ripple of 14% (block commutation)
- No defined start-up
- Not suitable for low speeds and for dynamic applications
- Continuous operation at higher speeds (Fans, mills, drills)

Block commutation Signal sequence diagram for the Hall sensors Conductive phases I II III IV V VI Rotor position 60 120 180 240 300 360 Hall sensor 1 0 Hall sensor 2 1 Hall sensor 3 0

Supplied motor voltage (phase to phase)



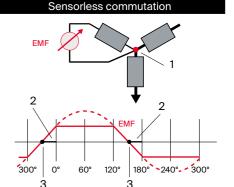
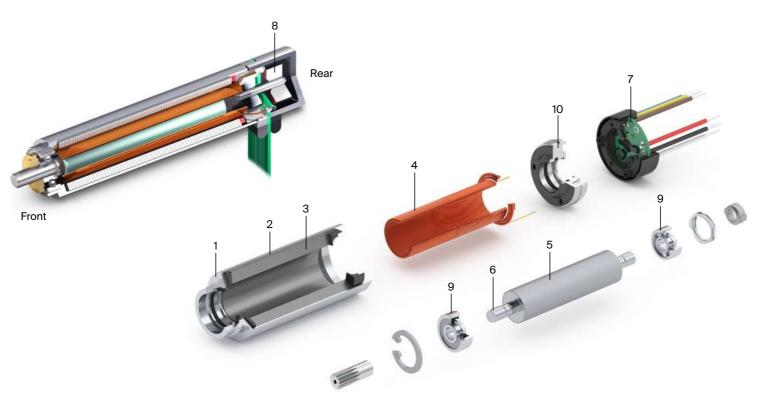


Diagram applies to phase 1

Legend

The commutation angle is based on the length of a full commutation sequence (360°e). The length of a commutation interval is therefore 60°e.

The commutation rotor position is identical to the motor shaft position for motors with 1 pole pair. The values of the shaft position are halved for motors with 2 pole pairs.



Sinusoidal commutation

The high resolution signals from the encoder or resolver are used for generating sine-shape motor currents in the electronics. The currents through the three motor windings are related to the rotor position and are shifted at each phase by 120° (sinusoidal commutation). This results in the very smooth, precise running of the motor and, in a very precise, high quality control.

Properties of sinusoidal commutation

- More expensive electronics
- Field-oriented control (FOC)
- No torque ripple
- Very smooth running, even at very low speeds
- Approx. 5% more continuous torque compared to block commutation
- Highly dynamic servo drives
- Positioning tasks

Hall sensor circuit

The open collector output of Hall sensors does not normally have its own pull-up resistance, as this is integral in maxon controllers. Any exceptions are specifically mentioned in the relevant motor data sheets.

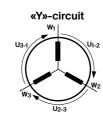
Wiring diagram for Hall sensors Hall sensor supply voltage Hall sensor

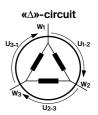
The power consumption of a Hall sensor is typically 4 mA (for output of Hall sensor = "HI").

Winding arrangement

The maxon rhombic winding is divided into three partial windings, each shifted by 120°. The partial windings can be connected in two different manners - "Y" or "Δ". This changes the speed and torque inversely proportional by the factor $\sqrt{3}$.

However, the winding arrangement does not play a decisive role in the selection of the motor. It is important that the motor-specific parameters (speed and torque constants) are in line with requirements.





120° 180° Turning angle 300° 0 240° 3009

Bearings and service life

The long service life of the brushless design can only be properly exploited by using preloaded ball bearings.

- Bearings designed for tens of thousands
- Service life is affected by maximum speed, residual unbalance and bearing load

For further explanations, please see page 188 or "The selection of high-precision microdrives" by Dr. Urs Kafader.

Legend

- 1 Star point
- 2 Time delay 30°e
- 3 Zero crossing of EMF

maxon EC motor iron-cored winding

Technology - short and to the point

Characteristics of the **maxon EC motors** with iron winding:

- Brushless DC motor (BLDC)
- Long service life
- Comparatively high inertia
- Motor characteristics may vary from the strongly linear behaviour
- Hall sensor signals utilizable for simple speed and position control
- Multipole NdFeB permanent magnet
- Smaller commutation steps
- Winding with iron core and several teeth per phase in the stator
- Low detent torque
- Good heat dissipation, high overload capacity

Properties of the **maxon ECX TORQUE**-Programs:

- Highly dynamic due to internal, multipole rotor
- Mechanical time constants below one millisecond
- High torque density
- Easily configured online
- Fast delivery

Properties of the maxon IDX program:

- High continuous torque
- High power density
- IP65-protected design
- Easily configured online

Characteristics of the maxon EC-i program:

- Highly dynamic due to internal, multipole rotor
- Mechanical time constants below 3 ms
- High torque density
- Speeds of up to 15,000 rpm

Properties of the **maxon ECX-FLAT** and **EC-flat** programs:

- Attractive price-performance ratio
- High torques due to external, multipole rotor
- Excellent heat dissipation at higher speeds thanks to open design
- Variants with open rotor or fan for even higher torques
- Flat design for when space is limited

Program

- ECX TORQUE
- IDX
- ECX FLAT
- EC-i
- EC flat
- with Hall sensors
- sensorless
- with integrated electronics

- 1 Flange, front
- 2 Housing
- 3 Laminated steel stack
- 4 Winding
- 5 Permanent magnet
- 6 Shaft
- 7 Print with Hall sensors
- 8 Ball bearing
- 9 Spring (bearing preload)
- 10 Flange, rear

Electronical commutation

Block commutation

Rotor position is reported by three built-in Hall sensors which deliver six different signal combinations per commutation sequence. The three phases are powered in six different conducting phases in line with this sensor information. The current and voltage curves are block-shaped. The switching position of every electronic commutation lies symmetrically around the respective torque maximum.

Properties of block commutation

- Relatively simple and favorably priced electronics
- Controlled motor start-up
- High starting torques and accelerations possible
- Servo drives, start/stop operation
- Positioning tasks
- The data of the maxon EC motors are determined with block commutation.

Sensorless block commutation

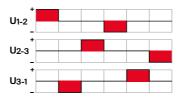
The rotor position is determined using the progression of the induced voltage. The electronics evaluate the zero crossing of the induced voltage (EMF) and commute the motor current after a speed dependent pause (30°e after EMF zero crossing).

When stalled or at low speed, the voltage signal is too small and the zero crossing cannot be detected precisely. This is why special algorithms are required for starting (similar to stepper motor control). To allow EC motors to be commuted without sensors in a Δ arrangement, a virtual star point is usually created in the electronics.

Properties of sensorless commutation

- No defined start-up
- Not suitable for low speeds and for dynamic applications
- Continuous operation at higher speeds (Fans, pumps)

Supplied motor voltage (phase to phase)



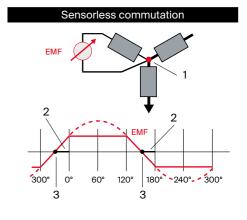
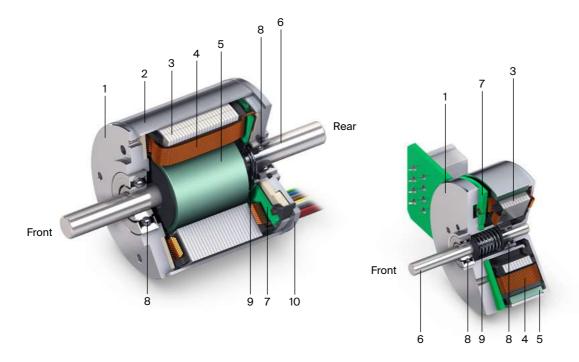


Diagram applies to phase 1

Legend

The commutation angle is based on the length of a full commutation sequence (360°e). The length of a commutation interval is therefore 60°e.

The values of the shaft position can be calculated from the commutation angle divided by the number of pole pairs.

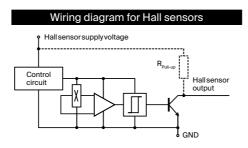


Sinusoidal commutation

Sinusoidal commutation or field-oriented control (FOC) for EC motors with grooved winding is possible. The main benefit of sinusoidal commutation - the smooth operation - only comes into play to a limited degree due to the

Hall sensor circuit

The open collector output of Hall sensors does not normally have its own pull-up resistance, as this is integral in maxon controllers. Any exceptions are specifically mentioned in the relevant motor data sheets.

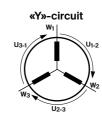


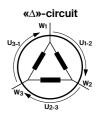
The power consumption of a Hall sensor is typically 4 mA (for output of Hall sensor = "HI").

Winding arrangement

The winding is divided into 3 partial windings which have several stator teeth each. The partial windings can be connected in two different manners - "Y" or "Δ". This changes the speed and torque inversely proportional by the factor $\sqrt{3}$.

However, the winding arrangement does not play a decisive role in the selection of the motor. It is important that the motor-specific parameters (speed and torque constants) are in line with requiremenats.





Bearings and service life

The long service life of the brushless design can only be properly exploited by using preloaded ball bearings.

- Bearings designed for tens of thousands
- Service life is affected by maximum speed, residual imbalance and bearing load

Legend

- Star point
- Time delay 30°
- Zero crossing of EMF

For further explanations, please see page 188 or "The selection of high-precision microdrives" by Dr. Urs Kafader.

In EC frameless motor kits, rotor and stator are delivered separately, without bearings and motor shaft. The motor is operational only when the two components are assembled

Characteristics of the maxon EC frameless motors:

- Brushless DC (BLDC) direct drive motor
- Long service life
- High torque grace to multi-pole motor design with NdFeB permanent magnet
- Winding with iron core and several teeth per phase in the stator
- Low detent torque
- Motor characteristics may vary from the strongly linear behavior
- Good heat dissipation, high overload capacity
- Sensor for supervising the temperature (NTC hot conductor)
- Space-saving integration into the application
- Hall sensor signals utilizable for simple speed and position control
- Flat design for space saving application integration
- Hollow shaft for transfering cables, vacuum lines, light, ...

Characteristics of the **maxon EC frameless flat** program:

- High torques due to external, multipole rotor
- Speeds of up to 10 000 rpm
- Hall sensor signals for simple speed and position control.

Properties of the maxon **EC frameless Dynamic Torque (DT)** Programs:

- Highly dynamic due to internal, multipole rotor
- Mechanical time constants below one millisecond
- High torque density
- Speeds of up to 5000 rpm
- optional TSX encoder with additional commutation signals

Program

- EC frameless flat
- EC frameless DT
- with Hall sensors
- sensorless

- 1 Stator packet
- 2 Winding
- 3 Rotor
- 4 Permanent magnet
- 5 Circuit board with Hall sensors

Electronical commutation

Block commutation with Hall sensors

The rotor position is reported by three built-in Hall sensors or by the optional TSX encoder. The Hall sensors are set at an angle of 120° to one another and provide six different signal combinations per turn. The three partial windings are now powered in six different conductive phases, depending on the sensor information. The current and voltage supply are block-shaped. The switching position of each electronic commutation is offset 30° from the respective torque peak.

Properties of block commutation

- Relatively simple and favorably priced electronics
- Torque ripple of 14%
- Controlled motor start-up
- High starting torques and accelerations possible
- Servo drives, Start/stop operation
- Positioning tasks
- The data of the maxon EC motors are determined with block commutation.

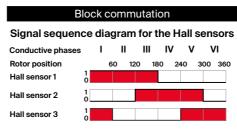
Sinusoidal commutation

Sinusoidal commutation or field-oriented control (FOC) for frameless EC motors with slotted winding is possible. However, the main benefit of sinusoidal commutation – the smooth operation – only comes into play to a limited degree due to the detent.

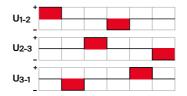
The high-resolution signals from the encoder are used for generating sine-shape motor currents in the electronics. The currents through the three motor windings are related to the rotor position and are shifted at each phase by 120° (sinusoidal commutation). This results in the theoretically very smooth, precise running of the motor and, in a very precise, high quality control.

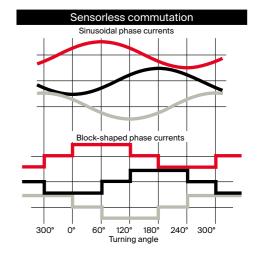
Properties of sinusoidal commutation

- More expensive electronics
- Requires an encoder
- Precise, high quality field-oriented control (FOC)
- Approx. 5% more continuous torque compared to block commutation
- Highly dynamic servo drives
- Positioning tasks



Supplied motor voltage (phase to phase)

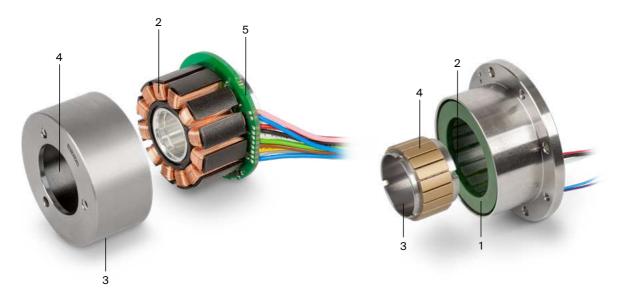




Legend

The commutation angle is based on the length of a full commutation sequence (360°e). The length of a commutation interval is therefore 60°e.

The commutation rotor position is identical to the motor shaft position for motors with 1 pole pair. The values of the shaft position are halved for motors with 2 pole pairs.



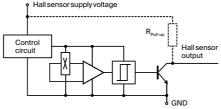
TSX MAG encoder

The optional TSX MAG encoder module can be combined with the EC frameless DT motors. The rotor of the motor needs to be equipped with an additional magnetic target ring. The TSX MAG module will be placed on the stator leaving the hollow rotor shaft free and programmed to deliver proper commutation signals as well. Hence, rotor and stator need to be paired.

Hall sensor circuit

The open collector output of Hall sensors does not normally have its own pull-up resistance, as this is integral in maxon controllers. Any exceptions are specifically mentioned in the relevant motor data sheets.

Wiring diagram for Hall sensors Hall sensor supply voltage



The power consumption of a Hall sensor is typically 4 mA (for output of Hall sensor = "HI").

Integration and service life

Frameless motors are direct drives that are integrated in the application. The installation instructions available on the maxon website give detailed specification for optimum assembly.

The service life will be mainly defined by the chosen bearing assembly and the operational conditions (bearing load, speed).



maxon compact drive Technology - short and to the point

Properties of the brushless maxon EC-max motors with integrated electronics:

- Operated directly with DC voltage
- Integrated commutation electronics
- Ironless winding for good synchronization without cogging torque

Properties of the brushless maxon EC-i motors with integrated electronics:

- Can be operated directly with DC voltage
- Integrated commutation electronics with 4-Q speed control
- Separate set value input. Optionally with **Enable or Direction input**
- Speed monitor output
- Flat design with high torque

Properties of the brushless maxon EC flat motors with integrated electronics:

- Can be operated directly with DC voltage
- Integrated commutation electronics with 1-Q or 4-Q speed control (Hall sensor feedback)
- 2-wire version: Set value proportional to supply voltage
- 5-wire version: Separate set value input. Optionally with Enable or Direction input, speed monitor output
- Short design with high torque

Properties of the brushless maxon ECX flat motors with integrated electronics

- Can be operated directly with DC voltage
- Integrated commutation electronics with 4Q speed control (Hall sensor feedback)
- Configurable speed range
- Configurable set value: analog voltage, fixed set value
- Configurable digital inputs and outputs: Enable, Direction, Monitor outputs for speed or
- Short design with high torque

Properties of the maxon IDX drives:

- Compact drive with integrated EPOS4 positioning/speed controller
- Field-oriented control
- Command via CANopen, EtherCAT or I/Os
- Integrated absolute encoder
- High power density
- IP65-protected design
- Optional holding brake and gearhead

Program

- EC-max with integrated electronics
- EC-i with integrated electronics
- EC flat with integrated electronics

- ECX FLAT with integrated electronics

- IDX drives

- Gearhead (optional)
- 2
- 3 Holding brake (optional)
- 4 Encoder
- 5 Housing with connections
- Electronics (EPOS4)

Integrated electronics

On motors with integrated electronics, the electronic commutation (usually block commutation with Hall sensors) is built in. Usually speed control and other functionalities (activation, reversal of direction of rotation, speed monitor) are also implemented.

Properties

- Easy operation with DC voltage
- Fewer connections than EC motor
- No additional electronics required for commutation
- Possible power loss due to space constraints and the thermal coupling in the motor



EC-max 16







EC 20 flat





IDX drives

The maxon IDX drives consist of a motor based on EC-i technology, a magnetic absolute encoder and an EPOS4 positioning controller with integrated field-oriented control (FOC).

- IP65 protection; only the output shaft needs to be sealed by the customer.
- Integrated temperature sensors on the winding and in the controller are evaluated directly in the drive and enable optimal utilization of the operating range.

EPOS4 positioning controller

The integrated EPOS4 enables different operating modes: Positioning, speed or current control. The drive can be commanded via EtherCAT or CANopen. The IDX drive is equipped with configurable digital and analog inputs and outputs. These are matched optimally to the various functions and operating modes of the CiA-402 device profile.

- Easy commissioning due to preconfigured motor, encoder and brake parameters, as well as auto-tuning function
- EPOS Studio: Intuitive software for commissioning
- Libraries for lean integration into a wide variety of master systems
- All documentation and software is available free of charge

Alternative version without fieldbus (I/O version)

Commands are given via the inputs and outputs. In this case, only current and speed control are supported (no position control).

Optional brake

The holding brake blocks the motor when disconnected from power. The brake is controlled by the integrated controller.

- Minimally longer drive
- Holding brake, not suitable for deceleration.
- The brake influences the temperature range and the minimum permissible supply voltage The electrical properties, performance data, dimensional drawings and CAD data of the brake with drive are available online.

Cables

Only minimal work is needed for cabling the IDX drive, as only the power supply, command cabling and, if necessary, the I/Os have to be connected. In the online shop, maxon offers a selection of suitable cables.

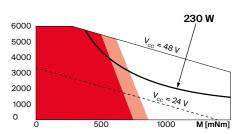
Drive selection

maxon IDX drives are integrated systems that cannot be viewed and specified like separate motor-controller combinations. The supply current and supply voltage are not the currents and voltages that are present at the motor. For this reason, the data sheet does not specify motor characteristics, such as torque constant or speed constant.

For specification in an application, the nominal torque, the maximum torque (short-term), the nominal speed, as well as the maximum drive speed have to be referenced for the given supply voltage. The operating range diagrams can be useful for this.

At www.maxongroup.com, detailed documentation can be downloaded.

n [rpm] 48-V-system



Gears

If mechanical power is required at a high torque and correspondingly reduced speed, a maxon precision gear is recommended. According to the gear ratio the output speed is reduced while the output torque is enhanced. For a more precise determination of the latter, efficiency must be taken into consideration.

Conversion

The conversion of speed and torque of the gear output (n_L, M_L) to the motor shaft (n_{mot}, M_{mot}) follows the following equations:

$$n_{mot} = i \cdot n_L$$

$$M_{mot} = \frac{M_L}{i \cdot \eta}$$

i: reduction

Gearhead efficiency

Program

- GPX/GP (Planetary gearhead)
- GS (Spur gearhead)
- KD (Koaxdrive)
- GPS (Screw drives)

- 1 Output shaft
- 2 Mounting flange
- 3 Bearing of the output shaft
- Axial security
- Intermediate plate
- Cogwheel
- Planetary gearwheel
- Sun gearwheel
- Planet carrier
- 10 Internal gear

Selection of gears

For the selection of the gearhead, the maximum transmittable power - the product of speed and torque - is decisive. It should be noted that the transmittable power depends on the number of gear stages.

The load torque should be below the nominal torque (max. continuous torque) of the gearhead $M_{N,G}$.

$$M_{N,G} \geq M_L$$

For short-term loading, the short-term torque of the gearhead must also be considered. Where possible, the input speed of the gear $n_{max,G}$ should not be exceeded. This limits the maximum possible reduction i_{max} at a given operating speed. The following applies to the selection of the reduction i

$$i \le i_{max} = \frac{n_{max,G}}{n_L}$$

If the gear is selected, the data conversed to the motor axis (n_{mot}, M_{mot}) are used to select the motor. The maxon modular system defines the proper motor-gear combinations.

Service life

The gears usually achieve 1000 to 3000 operating hours in continuous operation at the maximum permissible load and recommended input speed. Service life is significantly extended if these limits are not pushed. If the speed drops below this threshold, the gearhead may be loaded with higher torques without compromising the life span. On the other hand, higher speeds and thus higher reduction ratios can be chosen if the torque limits are not fully exploited.

Factors affecting life span include:

- Exceeding maximum torque can lead to excessive wear.
- Local temperature peaks in the area of tooth contact can destroy the lubricant.
- Massively exceeding the gear input speed reduces the service life.
- Radial and axial loads on the bearing.

Temperature/lubrication

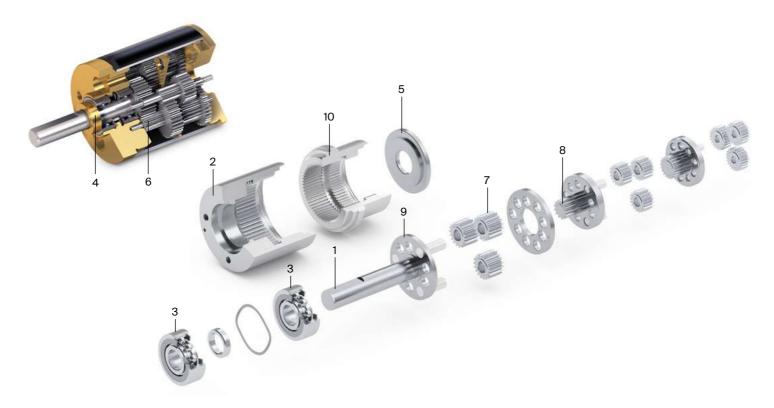
maxon gears are lubricated for life. The lubricants used are especially effective in the recommended temperature range. At higher or lower operating temperatures we offer recommendations for special lubricants.

Spur gearhead

The gear consists of one or more stages. One stage represents the pairing of two cogwheels. The first cogwheel (pinion) is mounted directly on the motor shaft. The bearing of the output shaft is usually made of sintered material.

- Favorably priced
- For low torques
- Output torque up to 2 Nm
- Reduction ratios of 5:1 to 5752:1
- External Ø12 45 mm
- Low noise level
- High efficiency





Planetary gearhead

Planetary gears are particularly suitable for the transfer of high torques. Large gearheads are normally fitted with ball bearings at gearhead output.

- For transferring high torques up to 180 Nm
- Reduction ratios of 4:1 to 6285:1
- External diameter 4-81 mm
- High performance in a small space
- High reduction ratio in a small space
- Concentric gear input and output

Plastic versions

Favorably priced and yet compact drives can be realized with plastic gears. The mechanical load is slightly smaller than that of metal designs, however, it is significantly higher than that of spur gears.

Ultra-performance gearhead

The UP (Ultra Performance) gearhead uses rolling bearings in all stages. This results in a very high efficiency and thus in a higher load capacity, as well as back-drivability even with high reductions.

Ceramic versions

By using ceramic components in gearheads. the wear characteristics of critical components can be significantly improved. The result when compared to purely metal gearheads is:

- Longer service life
- Higher continuous torques
- Higher intermittent torques
- Higher input speeds

High power gearhead

Especially high output torques in the output stage of planetary gearheads can be achieved through the following measures

- Use of ceramic components
- 4 instead of 3 planet gears in the output stage
- Additional motor-side support of the output
- Reinforcement of the output bearings

Heavy duty gearhead

The HD (heavy duty) gearheads are characterized by their robust construction. The use of stainless steel and optimized welding joints enable use under the most extreme conditions.

Reduced backlash gearhead

The reduction in backlash is achieved through a preloading of the planet gears in the output stage. Despite the wear that occurs during operation, the gearhead backlash remains constantly low, unlike for gearheads in which the backlash reduction is achieved by lowtolerance manufacturing and material pairing.

Sterilizable gearhead

Sterilizable gearheads are characterized by the use of stainless steel and special lubricants. The bearing of the output shaft and the connection to the motor are designed so that fluid leaking into the gearhead is inhibited.

Koaxdrive

Noise reduction

Noise is primarily generated in the input stage of the gearhead. The following measures can help to reduce noise:

- Smaller input speeds and thus smaller relative velocity of the tooth flanks
- Input stage with plastic gears
- Use of a Koaxdrive gearhead

The quiet "Koaxdrive" combines worm and planetary gearing. In the first stage, a separately mounted worm drives the three offset planetary wheels which then mesh in the specially toothed internal geared wheel. All further stages are designed as a normal planetary gear:

- low noise
- high reduction ratio in the first stage
- other properties as planetary gears





Encoder

maxon offers a range of different encoders. Their main characteristics are:

Digital incremental encoders

- Relative position signal, suitable for positioning tasks
- Direction of rotation detection
- Speed information from number of pulses per unit of time
- Standard solution for many applications

Digital absolute encoders

- Absolute position signal, suitable for positioning without a homing procedure
- Option to generate commutation signals

DC tacho

- Analog speed signal
- Direction of rotation detection
- Not suited for positioning tasks

Resolve

- Analog signal transmission
- More complex evaluation electronics required in controller
- For special industrial solutions

Encoder signals

Digital incremental encoders

Position changes (relative position) are transmitted to the controller as square pulses. The controller evaluates these pulses for precise positioning or speed measurement. The signal transmission is implemented via two phaseshifted channels (A and B) that are compared to determine the direction of rotation. Usually the phasing of channels A and B applies for operation in a clockwise direction (CW), relative to the motor shaft seen from the outside. The maxon controllers evaluate the signal edges. This results in a four times higher positioning resolution relative to the counts per turn of the encoder. The technical term for this is quad counts or states. The absolute position can be determined by homing to a fixed position. The signal edges of index channel I can be used for a precise reference position.

Program

- MILE (inductive encoders)
- EASY, MAG, MR, GAMA, TSX (magnetic encoders)
- Enc, HEDS, HEDL, RIO (optical encoders)
- DC-Tacho, Resolver (analog sensors)
- EMT (magnetic absolute encoder)

- 1 End cap
- 2 Electrical connections motor and encoder
- 3 PCB
- 4 MR sensor
- 5 Magnetic multi-pole wheel
- 6 Encoder housing
- 7 Graduated disk
- 8 Encoder fork coupler
- 9 Flange
- 10 Solid measure
- 11 Sensor with housing



Take a look at the ENX 22 EMT encoder.

The line driver is a driver built into the encoder to improve the signal quality through steeper edges. Additionally, it generates the complementary signals \overline{A} , \overline{B} , and \overline{I} . Differential signals make it possible to eliminate faults during transmission.

Absolute encoders

Absolute encoders return the absolute position as a bit sequence which is transmitted at the clock rate of the controller with a suitable protocol (SSI, BiSS-C). The resolution is given as a bit length; e.g., 12-bit equals 4096 positions. Single-turn absolute encoders output the position only within one motor revolution. Multi-turn absolute encoders determine the position unambiguously over several revolutions. They are able to detect motor revolutions even without a power supply. At start-up, the motor position over multiple revolutions is thus known.

Key points for encoder selection

These are the main characteristics of maxon incremental encoders:

- Counts per turn (increments)
- Accuracy
- Use of an index channel
- Use of a line driver
- Maximum supported speed
- Suitability for special ambient conditions (dust, oil, magnetic fields, ionizing radiation)

Encoders and maxon controllers

- The input frequency of the control electronics may limit the maximum possible counts per turn of the encoder.
- The higher the counts per turn and the accuracy, the easier it is to achieve a smooth, jolt-free operation even at low speeds.
- The maxon controllers can be configured for encoders with low (at least 16 cpt) or high counts per turn.

For positioning systems, the following applies:

- The higher the counts per turn, the more accurate the positioning. At 500 counts (2000 statuses), a mechanical angle resolution of 0.18° is achieved. This is usually much higher than the precision of the mechanical drive components.
- In positioning controllers, only encoders with an integrated line driver should be used (e.g. RS422). This prevents signal loss and accumulated positioning errors due to electromagnetic interference.
- Positioning applications often required the encoder's index channel for precise determination of a reference point.

Representation of the output signal of a digital encoder
90° e Phase shift A,B 360° e Cycle
Channel A
Channel B
Channel I Index puls width CW Phase shift of index pulse

	Recommendations on encoder selection								
, ,	Conditionally applicable PT, ENC, HEDL, HEDS	QUAD	GAMA	MR	EASY	MILE	optical*	RIO	
1	very high speed	1	1	1	1	(\$\)		/	
2	very low speed			(\$\)	(\$\)	1	1	/	
3	precise position			(/)	(/)	(⁄)	1	1	
4	line driver possible			\	\	1	/	/	
5	index channel possible			/	✓		/	^	
6	compact design	1	(\$\)	/	/	1		\	
7	dust, dirt, oil	1	1	/	\	1		(/)	
8	external magnetic fields	(⁄)	(\$\)		(/)	1	1	1	
9	ionising radiation		1						



Magnetic encoders

In magnetic encoders, a small permanent magnet is installed on the spinning motor shaft. Sensors in the stator capture the changes in the magnetic flux. The signals are evaluated in the encoder and transmitted to the controller as pulses or as an absolute signal. Magnetic encoders are typically very small and resilient to dirt.

EASY, TSX and MAG encoders

- Integrated circuit based on Hall sensors and interpolator
- EASY incremental: Factory programmable resolution from 1 to 1024 counts per turn, with index channel and line driver
- TSX incremental encoder for peripheral mounting: Programmed for specific rotor and stator; 2 channels plus commutation signals
- EASY absolute: Single-turn with 4096 states (12-bit) and Biss-C or SSI interface
- MAG incremental: Various resolutions available (up to 256 counts per turn); recommended for battery operation

MR encoder (incremental)

- Magneto-resistive Sensor with/without interpolator
- Various resolutions available (up to 1024 counts per turn)
- With/Without index channel and/or line driver
- Magnetoresistive sensor
- Up to 1024 counts
- With/without index channel and/or line driver

GAMA and QUAD encoder (incremental)

- Digital Hall sensors without interpolation
- Line driver not available
- GAMA: 12 or 16 counts per turn
- QUAD: 1 count per turn (4 states)
- Please note: For operation with maxon controllers, at least 16 counts per turn are required.

EMT (absolute)

- Multi-turn absolute encoder
- Resolution: 16-bit multi-turn, up to 17-bit single-turn
- BiSS-C or SSI interface
- Equipped with Wiegand wire technology, thus no batteries required.

Optical encoders

In optical encoders, an LED emits light through a finely structured code wheel (HEDL, HEDS) or directed at a structured reflector (RIO) attached to the motor shaft. The receiver converts the light/dark signals into electrical currents, which are amplified and turned into electrical pulses by the respective electronics. Optical encoders typically have a high resolution and high accuracy.

RIO encoder

- Reflective interpolated optical encoder
- Very high resolution (typically 4096 to 16384 counts per turn), programmable at the factory
- With index channel and RS422 line driver
- Very small size

Encoder attachment HEDL, HEDS

- Transmissive optical encoders
- With line driver RS422 (HEDL)
- Relatively large size

Inductive encoder

With inductive MILE encoders, a high-frequency alternating field is transmitted via transformer while being modulated angle-dependently using a structured copper disk.

Characteristics

- Highly resistant to magnetic and electrical fields as well as soiling.
- High speeds possible
- High accuracy
- Line driver (can be acc. to RS422)

DC tacho

In principle, any maxon DC motor can be used as a DC tacho. For motor-tacho combinations, we offer a DC tacho that has the tacho rotor mounted directly on the motor shaft.

Characteristics

- Output DC voltage proportional to the speed due to precious metal brushes
- AlNiCo magnet for high signal stability even with temperature fluctuations
- Without additional tacho bearing; no added friction torque
- No couplings, high mechanical resonant frequency

Resolver

The resolver is attached to the continuous shaft of the motor and aligned perfectly with the rotor's magnetic field.

A high-frequency alternating voltage (10 kHz) is transmitted to the rotor via a transformer. During retransformation on two stator coils, the signal is modulated with the sine/cosine of the rotation angle. This makes it possible to derive the position of the rotor.

Characteristics

- Robust, for industrial use
- Long service life
- No mechanical wear
- Interference-free signal transmission over long distances
- No sensitive electronics
- Special signal evaluation required
- Only one encoder for position and speed information
- EC motors with resolvers are delivered without Hall sensors

maxon motor control Technology - short and to the point

Controllers

The maxon motor control range includes servo amplifiers for controlling the dynamic maxon DC and EC motors.

Notable features:

- High efficiency
- High PWM frequencies (>50kHz)
- Built-in additional inductance for operation with low-inductance motors

The MACS-multi-axis motion controllers are programmable master controllers for demanding drive systems.

Notable features:

- Highly dynamic synchronization of multi-axis drives
- Curve interpolation
- Extensive functions for programming multiaxis applications

Program

- DEC modules: 1-Q speed controllers (closed loop) for EC motors
- ESCON: 4-Q speed and current controllers for DC and EC motors
- EPOS: position controllers for DC and EC
- MicroMACS6, MiniMACS6, MasterMACS: programmable multi-axis masters

Motor type

- maxon DC motor
- maxon EC motor

Process variables

- Current, torque
- Speed
- Position

Feedback

- Incremental encoders
- Absolute encoders
- Hall sensors

Communication

- Analog and digital inputs and outputs
- Bus systems (CANopen, EtherCAT, RS232, USB, ...)

Master system

The application program runs on the higherlevel master, coordinating all lower-level elements (slaves). The process control uses a suitable communication system to send commands to the motor controllers and to other slave modules in the system. Typically, the master reads the parameters of the slave modules (e.g., current position or the status of an input) and uses them to generate new commands (e.g., a new target position or setting of an output).

Possible master systems

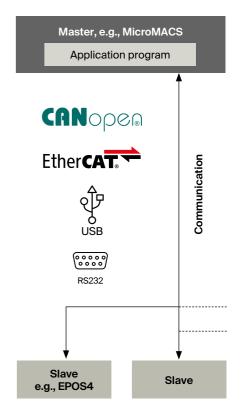
- MasterMACS
- MiniMACS6-AMP
- MicroMACS6
- PLC
- Microcontrollers
- Personal computers

Multi-axis motion controllers

MACS (Multi-Axis Control Systems) are freely programmable master controllers that make it possible to easily synchronize coordinated movements of multiple axes. Powerful commands are available, which can easily handle tasks such as the following:

- PLC functionality as a sequential program (for cyclical processing) or as state machines that work in parallel
- Coordinated time- or path-synchronized multi-axis positioning
- Synchronized execution of CAM profiles (for cam disks) on multiple axes
- Control of freely definable path trajectories with different kinematics (X-Y tables, 3D plotters, SCARA robots, delta robots, etc.)
- Master-slave synchronization of multiple axes with marker comparison

Master-slave architecture





Motor controllers (Slave)

EPOS

- Current, speed, and/or position controllers (slave) with CANopen or EtherCAT communication.
- Positioning with motion profile, Homing
- Cyclic Synchronous operating modes (CST, CSV, CSP)

ESCON

Current and/or speed controllers (slaves) with I/O communication. (ESCON2 also with CANopen)

Communication

Digital and analog I/O

For simple commands such as Specifying analog set values Activation Stop Reversal of direction of rotation

RS232 and USB

For non-time-critical communication between the master and slaves. Typically up to several tens of milliseconds per command, and not in real time.

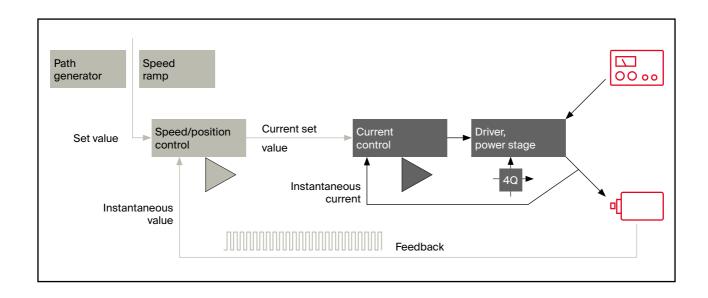
CANopen

For time-critical communication of up to 6 commands per ms. Suitable for many applications that do not have extremely high requirements in terms of speed and the number of slaves or axes.

EtherCAT

For top performance, with very fast data exchange between many slaves, even over long distances.

Motor controller (schematic diagram)



The motor as an energy converter

The electrical motor converts electrical power P_{el} (current I_{mot} and voltage U_{mol}) into mechanical power P_{mech} (speed n and torque M). The losses that arise are divided into frictional losses, attributable to P_{mech} and in Joule power losses P_J of the winding (resistance R). Iron losses do not occur in the coreless maxon DC motors. In maxon EC motors, they are treated formally like an additional friction torque. The power balance can therefore be formulated as:

$$P_{el} = P_{mech} + P_J$$

The detailed result is as follows

$$U_{mot} \cdot I_{mot} = \frac{\pi}{30\,000} \, n \cdot M + R \cdot I_{mot}^{-2}$$

Electromechanical motor constants

The geometric arrangement of the magnetic circuit and winding defines in detail how the motor converts the electrical input power (current, voltage) into mechanical output power (speed, torque). Two important characteristic values of this energy conversion are the speed constant k_n and the torque constant k_m . The speed constant combines the speed n with the voltage induced in the winding U_{ind} (= EMF). U_{ind} is proportional to the speed; the following applies:

$$n = k_n \cdot U_{ind}$$

Similarly, the torque constant links the mechanical torque M with the electrical current I_{mot} .

$$M = k_M \cdot I_{mot}$$

The main point of this proportionality is that torque and current are equivalent for the maxon motor.

The current axis in the motor diagrams is therefore shown as parallel to the torque axis as well.

See also: explanation of the motor

Units

In all formulas, the variables are to be used in the units according to the catalog (cf. physical variables and their units on page 84).

The following applies in particular:

- All torques in mNm
- All currents in A (even no load currents)
- Speeds (rpm) instead of angular velocity (rad/s)



Motor constants

Speed constant k_n and torque constant k_M are not independent of one another. The following applies:

$$k_{n} \cdot k_{M} = \frac{30\ 000}{\pi}$$

The speed constant is also called specific speed. Specific voltage, generator or voltage constants are mainly the reciprocal value of the speed constant and describe the voltage induced in the motor per speed. The torque constant is also called specific torque. The reciprocal value is called specific current or current constant.

Motor diagrams

A diagram can be drawn for every maxon DC and EC motor, from which key motor data can be taken. Although tolerances and temperature influences are not taken into consideration, the values are sufficient for a first estimation in most applications. In the diagram, speed n, current I_{mot} , power output P_2 and efficiency η are applied as a function of torque M at constant voltage U_{mot} .

Speed-torque line

This curve describes the mechanical behavior of the motor at a constant voltage U_{mot} :

- Speed decreases linearly with increasing torque.
- The faster the motor turns, the less torque it can provide.

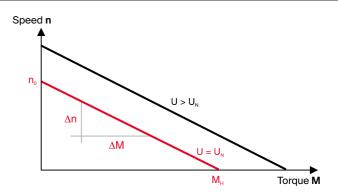
The curve can be described with the help of the two end points, no load speed n_0 and stall torque M_H (cf. lines 2 and 7 in the motor data). DC motors can be operated at any voltage. No load speed and stall torque change proportionally to the applied voltage. This is equivalent to a parallel shift of the speed-torque line in the diagram. Between the no load speed and voltage, the following proportionality applies in good approximation

$$n_0 \approx k_n \cdot U_{mot}$$

where k_n is the speed constant (line 13 of the motor data).

Independent of the voltage, the speed-torque line is described most practically by the slope or gradient of the curve (line 14 of the motor data).

$$\frac{\Delta n}{\Delta M} = \frac{n_0}{M_H}$$



Derivation of the speed-torque line

The following occurs if one replaces current I_{mot} with torque M using the torque constant in the detailed power balance:

$$U_{mot} \cdot \frac{M}{k_{M}} = \frac{\pi}{30\,000} \; n \cdot M + R \cdot \left(\frac{M}{k_{M}}\right)^{2}$$

Transformed and taking account of the close relationship of k_M and k_n , an equation is produced of a straight line between speed n and torque M.

$$n = k_n \cdot U_{mot} - \frac{30\,000}{\pi} \cdot \frac{R}{k_M^2} \cdot M$$

or with the gradient and the no load speed n_0

$$n = n_0 - \frac{\Delta n}{\Delta M} \cdot M$$

The speed-torque gradient is one of the most informative pieces of data and allows direct comparison between different motors. The smaller the speed-torque gradient, the less sensitive the speed reacts to torque (load) changes and the stronger the motor. With the maxon motor, the speed-torque gradient within the winding series of a motor type (i.e. on one catalog page) remains practically constant.

Current gradient

The equivalence of current to torque is shown by an axis parallel to the torque: more current flowing through the motor produces more torque. The current scale is determined by the two points no load current I_0 and starting current I_4 (lines 3 and 8 of motor data).

The no load current is equivalent to the friction torque M_R , that describes the internal friction in the bearings and commutation system.

$$M_R = k_M \cdot I_O$$

In the maxon EC motor, there are strong, speed dependent iron losses in the stator iron stack instead of friction losses in the commutation system.

The motors develop the highest torque when starting. It is many times greater than the normal operating torque, so the current uptake is the greatest as well.

The following applies for the stall torque M_H and starting current I_A

$$M_H = k_M \cdot I_A$$

Efficiency curve

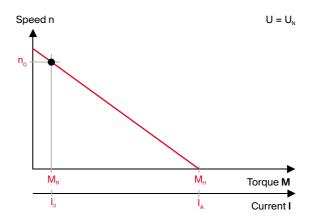
The efficiency η describes the relationship of mechanical power delivered to electrical power consumed.

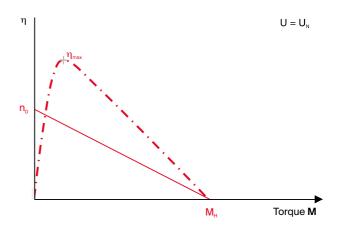
$$\eta = \frac{\pi}{30\,000} \cdot \frac{n \cdot (M-M_R)}{U_{mot} \cdot I_{mot}}$$

One can see that at constant applied voltage *U* and due to the proportionality of torque and current, the efficiency increases with increasing speed (decreasing torque). At low torques, friction losses become increasingly significant and efficiency rapidly approaches zero. Maximum efficiency (line 9 of motor data) is calculated using the starting current and no load current and is dependent on voltage.

$$\eta_{max} = \left(1 - \sqrt{\frac{I_0}{I_A}}\right)^2$$

Maximum efficiency and maximum output power do not occur at the same torque.



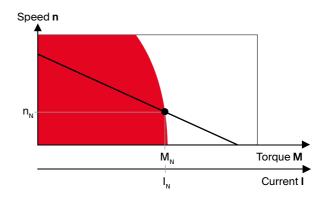


Rated operating point

The rated operating point is an ideal operating point for the motor and derives from operation at nominal voltage U_N (line 1 of motor data) and nominal current I_N (line 6). The nominal torque M_N produced (line 5) in this operating point follows from the equivalence of torque and current.

$$M_N \cong k_M \cdot (I_N - I_0)$$

Nominal speed n_N (line 4) is reached in line with the speed gradient. The choice of nominal voltage follows from considerations of where the maximum no load speed should be. The nominal current derives from the motor's thermally maximum permissible continuous current.



Motor diagrams, operating ranges

The catalog contains a diagram of every maxon DC and EC motor type that shows the operating ranges of the different winding types using a typical motor.

Permanent operating range

The two criteria "maximum continuous torque" and "maximum permissible speed" limit the continuous operating range. Operating points within this range are not critical thermally and do not generally cause increased wear of the commutation system.

Short-term operating range

The motor may only be loaded with the maximum continuous current for thermal reasons. However, temporary higher currents (torques) are allowed. As long as the winding temperature is below the critical value, the winding will not be damaged. Phases with increased currents are time limited. A measure of how long the temporary overload can last is provided by the thermal time constant of the winding (line 19 of the motor data). The magnitude of the times with overload ranges from several seconds for the smallest motors (6 mm to 13 mm diameter) up to roughly one minute for the largest (60 mm to 90 mm diameter). The calculation of the exact overload duration depends highly on the motor current and the winding temperature at the beginning.

Max. permissible winding temperature

Due to the winding resistance, the motor current causes the winding to heat up. To prevent the motor from overheating, this heat needs to be dissipated to the environment via the stator. The maximum winding temperature (line 22 of the motor data) must not be exceeded even for a short time. For graphite brush motors and EC motors with their usually higher current load, it is 125°C (in some cases up to 155°C). Precious metal commutated motors only allow for low current loads, so that the rotor temperature must not exceed 85°C. Precautions taken during installation, such as good air circulation or cooling plates, may significantly lower the temperature.

Permissible continuous current, permissible continuous torque

The electrical heat losses define the max. permissible continuous current at which the maximum winding temperature is reached under standard conditions (25°C ambient temperature, no heat dissipation via the flange, air circulating freely). Larger motor currents result in too high winding temperatures.

The nominal current is selected to correspond with this maximum permissible continuous current. It is highly dependent on the winding. Windings with thin wire have lower nominal currents than windings with thick wire. In the case of windings with very low resistance, the current capacity of the brush system can further restrict the permissible continuous current. The graphite brush motors significantly increase the friction losses at high speeds. In EC motors, the eddy current loss in the magnetic return increases when the speed increases and generates additional heat. The maximum permissible continuous current decreases at higher speeds.

The nominal current assigned to the rated torque is practically constant within the winding type of a motor type and is one of the characteristics of the motor type.

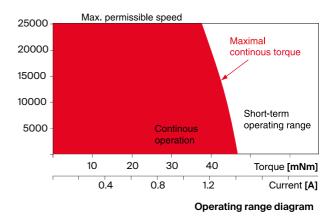
The maximum permissible speed

for DC motors is primarily limited by the commutation system. The commutator and brushes wear more rapidly at very high speeds. The reasons are:

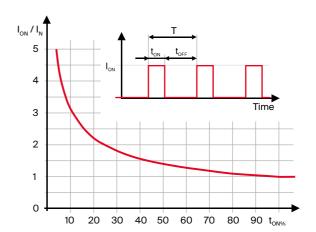
- Increased mechanical wear because of the large traveled path of the commutator
- Increased electro-erosion because of brush vibration and spark formation.

A further reason for limiting the speed is the rotor's residual mechanical imbalance which shortens the service life of the bearings. Higher speeds than the limit speed $n_{\rm max}$ (line 23) are possible, however, they are "paid for" by a reduced service life expectancy. The maximum permissible speed for the EC motor is calculated based on service life considerations of the ball bearings (at least 20 000 hours) at the maximum residual imbalance and bearing load.

Speed [rpm]



Intermittent operationSwitch-on duration and current



ON Motor in operation

OFF Motor stationary

I_{ON} Max. peak current

I_N Max. permissible continuous current (line 6)

 t_{ON} ON time [s], should not exceed τ_{w} (line 19)

T Cycle time $t_{ON} + t_{OFF}$ [s] $t_{ON\%}$ Duty cycle as percental

Duty cycle as percentage of cycle time. The motor may be overloaded by the relationship

 I_{ON}/I_N at X % of the total cycle time.

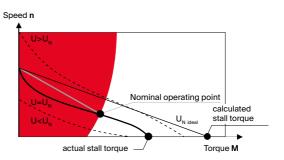
$$I_{on} = I_N \sqrt{\frac{T}{t_{ON}}}$$

maxon EC flat and EC-i motors

Multi-pole maxon flat motors and EC-i motors require a greater number of commutation steps per revolution (6 x number of pole pairs). Due to their wound stator teeth, they have a higher terminal inductance than motors with an ironless winding. At high speeds, the current cannot fully develop due to the short commutation intervals. The torque is therefore less. In addition, some current is returned to the controller power stage. As a result, the behavior deviates from the ideal linear characteristic depending on voltage and speed: The apparent speed/torque gradient is steeper at higher speeds and flatter at very low speeds.

Mostly, flat motors are operated in the continuous operation range where the achievable speed-torque gradient at nominal voltage can be approximated by a straight line between no load speed and nominal operating point. The achievable speed-torque gradient is approximate.

$$\frac{\Delta n}{\Delta M} \approx \frac{n_0 - n_N}{M_N}$$



The stall torque specified on the product page is equal to the linearly calculated load torque (without magnetic saturation effect) which causes the shaft to stall at nominal voltage. With EC-flat and EC-i motors, this torque often cannot be achieved due to saturation effects.

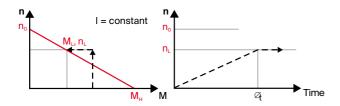
Acceleration

In accordance with the electrical boundary conditions (power supply, control, battery), a distinction is primarily made between two different starting processes:

- Start at constant voltage (without current limitation)
- Start at constant current (with current limitation)

Start under constant current

A current limit always means that the motor can only deliver a limited torque. In the speed-torque diagram, the speed increases on a vertical line with a constant torque. Acceleration is also constant, thus simplifying the calculation. Start at constant current is usually found in applications with servo amplifiers, where acceleration torques are limited by the amplifier's peak current.



 Angular acceleration α (in rad/s²) at constant current I or constant torque M with an additional load of inertia J_L:

$$\alpha = 10^4 \cdot \frac{k_M \cdot I_{mot}}{J_R + J_L} = 10^4 \cdot \frac{M}{J_R + J_L}$$

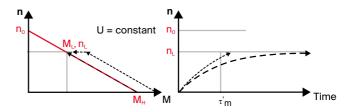
Run-up time ∆t (in ms) at a speed change ∆n with an additional load inertia. I.:

$$\Delta t = \frac{\pi}{300} \cdot \Delta n \cdot \frac{J_R + J_L}{k_M \cdot I_{mot}}$$

(all variables in units according to the catalog)

Start with constant terminal voltage

Here, the speed increases from the stall torque along the speed-torque line. The greatest torque and thus the greatest acceleration is effective at the start. The faster the motor turns, the lower the acceleration. The speed increases more slowly. This exponentially flattening increase is described by the mechanical time constant τ_m (line 15 of the motor data). After this time, the rotor at the free shaft end has attained 63% of the no load speed. After roughly three mechanical time constants, the rotor has almost reached the no load speed.



- Mechanical time constant τ_m (in ms) of the unloaded motor:

$$\tau_m = 100 \cdot \frac{J_R \cdot R}{k_M^2}$$

- Mechanical time constants τ_m (in ms) with an additional load inertia. L:

$$\tau_m' = 100 \cdot \frac{J_R \cdot R}{k_M^2} \left(1 + \frac{J_L}{J_R} \right)$$

– Maximum angular acceleration a_{max} (in rad/s²) of the unloaded motor:

$$\alpha_{max} = 10^4 \cdot \frac{M_H}{J_R}$$

Maximum angular acceleration \(\alpha_{max}\) (in rad/s²) with an additional load inertia \(J_i:\)

$$\alpha_{max} = 10^4 \cdot \frac{M_H}{J_R + J_I}$$

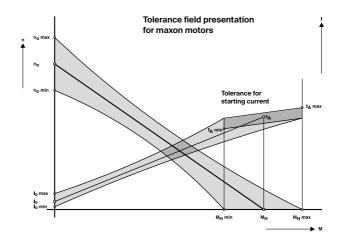
Speeding up to an operation point with constant load torque M_L and load speed n_L follows an exponential law.

$$n(t) = n_L \left(1 - e^{-t/\tau'_m} \right)$$

The motor voltage U must be selected to achieve this operation point. Faster acceleration requires a higher voltage that eventually must be reduced for reaching the required operation speed (see the thin dashed line).

Tolerances

Tolerances must be considered in critical ranges. The possible deviations of the mechanical dimensions can be found in the overview drawings. The motor data are average values: the adjacent diagram shows the effect of tolerances on the curve characteristics. They are mainly caused by differences in the magnetic field strength and in wire resistance, and not so much by mechanical influences. The changes are heavily exaggerated in the diagram and are simplified to improve understanding. It is clear, however, that in the motor's actual operating range, the tolerance range is more limited than at start or at no load. Our computer sheets contain all detailed specifications.



Thermal behavior

The Joule power losses P_J in the winding determine heating of the motor. This heat energy must be dissipated via the surfaces of the winding and motor. The increase ΔT_W of the winding temperature T_W with regard to the ambient temperature arises from heat losses P_J and thermal resistances R_{th1} and R_{th2} .

$$T_W - T_U = \Delta T_W = (R_{th1} + R_{th2}) \cdot P_J$$

Here, thermal resistance R_{th1} relates to the heat transfer between the winding and the stator (magnetic return and magnet), whereas R_{th2} describes the heat transfer from the housing to the environment. Mounting the motor on a heat dissipating chassis noticeably lowers thermal resistance R_{th2} . The values specified in the data sheets for thermal resistances and the maximum continuous current were determined in a series of tests, in which the motor was end-mounted onto a vertical plastic plate. The modified thermal resistance R_{th2} that occurs in a particular application must be determined using original installation and ambient conditions. Thermal resistance R_{th2} on motors with metal flanges decreases by up to 80% if the motor is coupled to a good heat-conducting (e.g. metallic) retainer.

The heating runs at different rates for the winding and stator due to the different masses. After switching on the current, the winding heats up first (with time constants from several seconds to half a minute). The stator reacts much slower, with time constants ranging from 1 to 30 minutes depending on motor size. A thermal balance is gradually established. The temperature difference of the winding compared to the ambient temperature can be determined with the value of the current I (or in intermittent operation with the effective value of the current $I = I_{RMS}$).

$$\varDelta T_{w} = \frac{\left(R_{th1} + R_{th2}\right) \cdot R \cdot I_{mot}^{2}}{1 - \alpha_{Cu} \cdot \left(R_{th1} + R_{th2}\right) \cdot R \cdot I_{mot}^{2}}$$

Here, electrical resistance R must be applied at the actual ambient temperature.

Influence of temperature

An increased motor temperature affects winding resistance and magnetic characteristic values.

Winding resistance increases linearly according to the thermal resistance coefficient for copper ($\alpha_{Cu} = 0.0039$):

$$R_T = R_{25} \cdot (1 + \alpha_{Cu} (T - 25^{\circ}C))$$

Example: a winding temperature of 75°C causes the winding resistance to increase by nearly 20%.

The magnet becomes weaker at higher temperatures. The reduction is 0.5 to 5% at 75° C depending on the magnet material.

The most important consequence of increased motor temperature is that the speed curve becomes steeper which reduces the stall torque. The changed stall torque can be calculated in first approximation from the voltage and increased winding resistance:

$$M_{H} = k_{M} \cdot I_{A} = k_{M} \cdot \frac{U_{mot}}{R_{T}}$$

Motor selection

The drive requirements must be defined before proceeding to motor selection.

- How fast and at which torques does the load move?
- How long do the individual load phases last?
- What accelerations take place?
- How great are the mass inertias?

Often the drive is indirect, this means that there is a mechanical transformation of the motor output power using belts, gears, screws and the like. The drive parameters, therefore, are to be calculated to the motor shaft. Additional steps for gear selection are listed below.

Furthermore, the power supply requirements need to be checked.

- Which maximum voltage is available at the motor terminals?
- Which limitations apply with regard to current?

The current and voltage of motors supplied with batteries or solar cells are very limited. In the case of control of the unit via a servo amplifier, the amplifier's maximum current is often an important limit.

Selection of motor types

The possible motor types are selected using the required torque. On the one hand, the peak torque, M_{max} , is to be taken into consideration and on the other, the effective torque M_{RMS} . Continuous operation is characterized by a single operating or load point (M_L , n_L). The motor types in question must have a nominal torque M_N that is greater than load torque M_L .

$$M_N > M_L$$

In operating cycles, such as start/stop operation, the motor's nominal torque must be greater than the effective load torque (RMS). This prevents the motor from overheating.

$$M_N > M_{RMS}$$

The stall torque of the selected motor should usually exceed the emerging load peak torque.

$$M_H > M_{max}$$

Selection of the winding: electric requirement

In selecting the winding, it must be ensured that the voltage applied directly to the motor is sufficient for attaining the required speed in all operating points.

Uncontrolled operation

In applications with only one operating point, this is often achieved with a fixed voltage U. A winding is sought with a speed-torque line that passes through the operating point at the specified voltage. The calculation uses the fact that all motors of a type feature practically the same speed-torque gradient. A target no load speed $n_{\textit{O,theor}}$ is calculated from operating point (n_{L}, M_{L}) .

$$n_{0, theor} = n_L + \frac{\Delta n}{\Delta M} M_L$$

This target no load speed must be achieved with the existing voltage U, which defines the target speed constant.

$$k_{n, theor} = \frac{n_{0, theo}}{U_{mot}}$$

Those windings whose k_n is as close to $k_{n,theor}$ as possible, will approximate the operating point the best at the specified voltage. A somewhat larger speed constant results in a somewhat higher speed, a smaller speed constant results in a lower one. The variation of the voltage adjusts the speed to the required value, a principle that servo amplifiers also use.

The motor current I_{mot} is calculated using the torque constant k_M of the selected winding and the load torque M_L .

$$I_{mot} = \frac{M_L}{k}$$

Advices for evaluating the requirements:

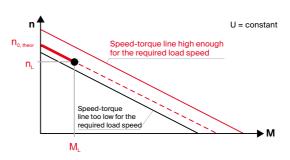
Often the load points (especially the torque) are not known or are difficult to determine. In such cases you can operate your device with a measuring motor roughly estimated according to size and power. Vary the voltage until the desired operating points and motion sequences have been achieved. Measure the voltage and current flow. Using these specifications and the part number of the measuring motor, our engineers can often specify the suitable motor for your application.

Additional optimization criteria are, for example:

- Mass to be accelerated (type, mass inertia)
- Type of operation (continuous, intermittent, reversing)
- Ambient conditions (temperature, humidity, medium)
- Power supply, battery

When selecting the motor type, other constraints also play a major role:

- What maximum length should the drive unit have, including gear and encoder diameter?
- What service life is expected from the motor and which commutation system should be used?
- Precious metal commutation for continuous operation at low currents (rule of thumb for longest service life: up to approx. 50% of I_N).
- Graphite commutation for high continuous currents (rule of thumb: 50% to approx. 75% of I_N) and frequent current peaks (start/stop operation, reversing operation).
- Electronic commutation for highest speeds and longest service life.
- How great are the forces on the shaft, do ball bearings have to be used or are less expensive sintered bearings sufficient?

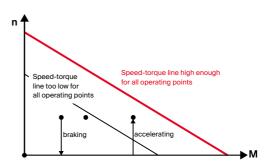


Regulated servo drives

In operating cycles, all operating points must lie beneath the curve at a maximum voltage U_{max} . Mathematically, this means that the following must apply for all operating points (n_L, M_L) :

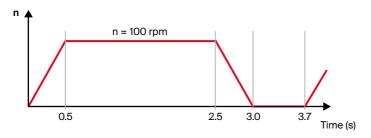
$$k_n \cdot U_{max} = n_0 > n_L + \frac{\varDelta n}{\varDelta M} M_L$$

When using servo amplifiers, a voltage drop occurs at the power stage, so that the effective voltage applied to the motor is lower. This must be taken into consideration when determining the maximum supply voltage $U_{\rm max}$. It is recommended that a regulating reserve of some 20% be included, so that regulation is even ensured with an unfavorable tolerance situation of motor, load, amplifier and supply voltage. Finally, the average current load and peak current are calculated ensuring that the servo amplifier used can deliver these currents. In some cases, a higher resistance winding must be selected, so that the currents are lower. However, the required voltage is then increased.



Example for motor/gear selection

The following speed curve is to be repeated cyclically.



The accelerated load inertia J_L is 300 000 gcm² = 0.03 kgm². The friction torque is 400 mNm. The motor is driven with the 4-Q servo amplifier ESCON 36/2 DC for DC motors. The power supply has a maximum output of 3 A and 24 V.

Calculation of load data

The torque required for acceleration and braking are calculated as follows (motor and gearhead inertia omitted):

$$M_a = J_L \cdot \frac{\pi}{30} \frac{dn}{dt} = 0.03 \cdot \frac{\pi}{30} \cdot \frac{100}{0.5} = 0.628 \text{ Nm} = 628 \text{ mNm}$$

Together with the friction torque, the following torques result for the different phases of motion.

 Acceleration phase 	(duration 0.5 s)	1028 mNm
 Constant speed 	(duration 2 s)	400 mNm
 Braking (friction brakes 		
with 400 mNm)	(duration 0.5 s)	-228 mNm
- Standstill	(duration 0.7 s)	0 mNm

Peak torque occurs during acceleration.

The RMS determined torque of the entire operating cycle is

$$M_{RMS} = \sqrt{\frac{t_1 \cdot M_{1}^2 + t_2 \cdot M_{2}^2 + t_3 \cdot M_{3}^2 + t_4 \cdot M_{4}^2}{t_{tot}}}$$

$$= \sqrt{\frac{0.5 \cdot 1028^2 + 2 \cdot 400^2 + 0.5 \cdot (-228)^2 + 0.7 \cdot 0}{3.7}} \approx 486 \text{ mNm}$$

The maximum speed (100 rpm) occurs at the end of the acceleration phase at maximum torque (1028 mNm). Thus, the peak mechanical power is:

$$P_{max} = M_{max} \cdot \frac{\pi}{30} \ n_{max} = 1.028 \cdot \frac{\pi}{30} \cdot 100 \approx 11 \text{ W}$$

Physica	l variables	and th	eir units
		SI	Catalog
i	Gear reduction*		-
I _{mot}	Motor current	Α	A, mA
I _A	Stall current*	Α	A, mA
I _o	No load current*	Α	mA
I _{RMS}	RMS determined current	Α	A, mA
I _N	Nominal current*	Α	A, mA
J_R	Moment of inertia of the rotor*	kgm²	gcm ²
J_L	Moment of inertia of the load	kgm²	gcm ²
k _M	Torque constant*	Nm/A	•
K _n	Speed constant*		rpm/V
M	(Motor) torque	Nm	mNm
M _L	Load torque	Nm	mNm
M _H	Stall torque*	Nm	mNm
M _{mot}	Motor torque	Nm	mNm
M _R	Moment of friction	Nm	mNm
M _{RMS}	RMS determined torque	Nm	mNm
M _N	Nominal torque*	Nm	mNm
M _{N.G}	Max. torque of gear*	Nm	Nm
n n	Speed		rpm
n_L	Operating speed of the load		rpm
n _{max}	Limit speed of motor*		rpm
n _{max.G}	Limit speed of meter		rpm
n _{mot}	Motor speed		rpm
n_0	No load speed*		rpm
P_{el}	Electrical power	W	W
P.	Joule power loss	W	W
P _{mech}	Mechanical power	W	W
R mecn	Terminal resistance	Ω	Ω
R ₂₅	Resistance at 25°C*	Ω	Ω
R_{τ}	Resistance at temperature T	Ω	Ω
R _{th1}	Heat resistance winding housing*		K/W
R _{th2}	Heat resistance housing/air*		K/W
t t	Time	s	S
T	Temperature	K	°C
T _{max}	Max. winding temperature*	K	°Č
T _U	Ambient temperature	K	°C
T _w	Winding temperature	K	°Č
U _{mot}	Motor voltage	V	v
U _{ind}	Induced voltage (EMF)	v	V
U _{max}	Max. supplied voltage	v	V
U _N	Nominal voltage*	v	V
α_{Cu}	Resistance coefficient of Cu	= 0.00	-
α_{Cu}	Max. angle acceleration	= 0.00 rad/s ²	
Λη/ΛΜ	Curve gradient*	rpm/m	Nm
ΔT_{W}	Temperature difference	i Pill/III	
W	winding/ambient	K	K
Δt	Run up time	S	ms
η	(Motor) efficiency	5	%
1	(Gear) efficiency*		%
η_G	Max. efficiency*		%
$\eta_{ ext{max}}$	Mechanical time constant*	s	ms
τ_m	Therm. time constant of the motor*	S	S
τ _S	Therm. time constant of the motor Therm. time constant of the winding*	S	S
τ _W	=	3	5
(*Specified in	the motor or gear data)		

Gear selection

We are looking for a gearhead with a maximum continuous torque of at least 0.486 Nm and a short-term torque of at least 1.028 Nm. This requirement can be fulfilled by the ceramic version of the configurable GPX 22 gearhead with 2 or 3 stages. With 2 stages, the maximum gearhead input speed of 10 000 rpm permits a maximum ratio of

$$i_{max} = \frac{n_{max, G}}{n_i} = \frac{10\,000}{100} = 100:1$$

Three-stage gearheads permit higher input speeds, and the maximum ratio is 120:1. Because of the shorter design, we decide to use the 2-stage gearhead. To keep the motor torque as small as possible, we select the highest possible ratio of 44:1. The 2-stage gearhead has an efficiency of 81%.

Motor type selection

Speed and torque are calculated to the motor shaft

$$n_{mot} = i \cdot n_L = 44 \cdot 100 = 4400 \text{ rpm}$$

$$M_{mot, RMS} = \frac{M_{RMS}}{i \cdot \eta} = \frac{486}{44 \cdot 0.81} \approx 13.6 \text{ mNm}$$

$$M_{mot, max} = \frac{M_{max}}{i \cdot \eta} = \frac{1028}{44 \cdot 0.81} \approx 28.8 \text{ mNm}$$

The possible motors, which match the selected gears in accordance with the maxon modular system, are summarized in the table opposite. The table shows only motors with graphite commutation because they are better suited for stop-and-go operation.

We select the DCX 22 S, which has sufficient continuous torque. The motor should have a torque reserve so that it will be able to function in slightly less favorable conditions.

The additional torque requirement during acceleration is no problem for the motor. The short-term peak torque is only slightly less than twice as high as the permissible continuous torque of the motor.

Selection of the winding

The DCX 22 S motor has a mean characteristic gradient of about 110 rpm/mNm. The desired idle speed is calculated as follows:

$$n_{0, theor} = n_{mot} + \frac{\Delta n}{\Delta M} \cdot M_{max} = 4400 + 110 \cdot 28.8 = 7570 \text{ rpm}$$

The extreme operating point should of course be used in the calculation (max. speed and max. torque), since the speed-torque line of the winding must run above all operating points in the speed / torque diagram. This target no load speed must be achieved with the maximum voltage U = 24 V supplied by the control (ESCON 36/2), which defines the minimum target speed constant $k_{n,theor}$ of the motor.

$$k_{n, theor} = \frac{n_{0, theor}}{U_{mot}} = \frac{7570}{24} = 315 \frac{\text{rpm}}{V}$$

If one considers the speed constant of the windings, then the first choice would be the motor with a nominal speed of 36 V. At a speed constant of 342 rpm V^{-1} however, it has only a small speed control reserve. If the tolerances are insufficient, then the winding with the next higher speed constant (24 V nominal voltage) offers better safety.

The higher speed constant of the winding compared to the calculated value means that the motor runs faster at 24 V than required, which can be compensated with the speed controller. The motor can be equipped with an encoder to record the speed. The speed constant of the selected 24 V winding is 18.4 mNm/A. The maximum torque therefore corresponds to a peak current of

$$I_{max} = \frac{M_{max}}{k_{tt}} + I_0 = \frac{28.8}{18.4} + 0.036 = 1.6 A$$

This current is smaller than the maximum current (4 A) of the controller and the power supply unit (3 A).

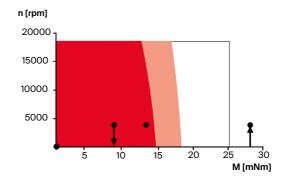
Thus, a gear motor has been found that fulfils the requirements (torque and speed) and can be operated by the controller provided.

Alternative solutions

GPX 19 ceramic gearhead 3 stages (138:1 reduction) with motor type DCX 16 S (graphite brushes)

GPX 22 gearhead, standard configuration 3 stages (111:1 reduction) with motor type DCX 19 S (graphite brushes)





General Information

Quantities and their basic units in the International System of Measurements (SI)

Quantity	Basic- unit	Sign
Length	Meter	m
Mass	Kilogram	kg
Time	Second	S
Electrical current	Ampere	Α
Thermodynamic		
Temperature	Kelvin	K

Conversion Example

A known unit B unit sought

known: multiply by sought: oz-in 7.06

Factors used for ...

... conversions:

= 2.834952313 · 10⁻² kg = 2.54 · 10⁻² m 1 oz 1 in

... gravitational acceleration:

= 9.80665 m s⁻² $= 386.08858 \text{ in s}^{-2}$

... derived units:

1 yd 1 lb

ed units: = 3 ft = 36 in = 16 oz = 7000 gr (grains) = 1 kg · 9.80665 ms⁻² = 1 kgms⁻² = 1 Nms⁻¹ = 1 kgm² s⁻³ = 1 Nms⁻¹ = 1 Ws 1 kp

1 N

1 W

1J

Decimal multiples and fractions of units

Prefix	Abbre- viation	Multiply	Prefix	Abbre- viation	Multiply
Deka	da	10¹	Dezi	d	10-1
Hekto	h	10 ²	Zenti	С	10-2
Kilo	k	10 ³	Milli	m	10-3
Mega	М	10 ⁶	Mikro	μ	10-6
Giga	G	10 ⁹	Nano	n	10-9
Tera	Т	1012	Piko	p	10-12

Arc definition





$1 \text{ rad} = \frac{1 \text{ m}}{1 \text{ m}} \triangleq 57.2958^{\circ}$	

Power								P [W]
ВА	oz-in-s ⁻¹	oz-in-min ⁻¹	in-lbf-s ⁻¹	ft-lbf-s ⁻¹	$W = N \cdot ms^{-1}$	mW	kpm s ⁻¹	mNm min ⁻¹
$W = N \cdot ms^{-1}$	7.06 · 10-3	1.17 ⋅ 10-4	0.113	1.356	1	1 · 10-3	9.807	^{2π} / ₆₀₀₀₀
mW	7.06	0.117	112.9	1.356 · 10 ³	1 · 10³	1	$9.807 \cdot 10^{3}$	2π/ ₆₀
oz-in-s ⁻¹	1	1/60	16	192	141.6	0.142	1.39 · 10 ³	2.36 · 10-3
ft-lbf-s ⁻¹	1/192	1/11520	1/12	1	0.737	$0.737 \cdot 10^{-3}$	7.233	1.23 · 10-5
kpm s ⁻¹	7.20 · 10-4	1.2 · 10-5	1.15 · 10 ⁻²	0.138	0.102	$0.102 \cdot 10^{-3}$	1	1.70 · 10-6

Torque								M [Nm]
ВА	oz-in	ft-lbf	Nm = Ws	Ncm	mNm	kpm	pcm	
Nm	7.06 · 10-3	1.356	1	1 · 10-2	1 · 10-3	9.807	$9.807 \cdot 10^{-5}$	
mNm	7.06	$1.356 \cdot 10^{3}$	1 · 10³	10	1	$9.807 \cdot 10^{3}$	9.807 -10-2	
kpm	7.20 · 10-4	0.138	0.102	$0.102 \cdot 10^{-2}$	$0.102 \cdot 10^{-3}$	1	1 · 10-5	
oz-in	1	192	141.6	1.416	0.142	1.39 · 10³	1.39 · 10-2	
ft-lbf	1/192	1	0.737	0.737 · 10-2	0.737 · 10 ⁻³	7.233	7.233 · 10-5	

Moment of Inertia										
ВА	oz-in²	oz-in-s²	lb-in²	lb-in-s²	Nms ² =kgm ²	mNm s²	gcm ²	kpm s²		
g cm²	182.9	7.06 · 104	2.93 · 10 ³	1.13 · 10 ⁶	1 · 10 ⁷	1 ⋅ 10⁴	1	9.807 · 10 ⁷		
kgm²=Nms²	1.83 · 10-5	7.06 · 10-3	2.93 · 10-4	0.113	1	1 · 10-3	1 · 10-7	9.807		
oz-in²	1	386.08	16	6.18 · 10 ³	5.46 ⋅ 10⁴	54.6	5.46 ·10 ⁻³	5.35 ⋅ 10⁵		
lb-in²	1/16	24.130	1	386.08	3.41 · 10 ³	3.41	3.41 -10-4	3.35 ⋅ 10⁴		

Mass m [kg]							Force				F [N]
ВА	oz	lb	gr (grain)	kg	g	ВА	OZ	lbf	N	kp	р
kg	28.35 ·10 ⁻³	0.454	64.79-10-6	1	1 · 10-3	N	0.278	4.448	1	9.807	9.807-10-3
g	28.35	0.454 · 10 ³	64.79-10-3	1 · 10³	1	kp	0.028	0.454	0.102	1	1 · 10-3
oz	1	16	2.28 · 10-3	35.27	35.27 · 10 ³	oz	1	16	3.600	35.27	35.27 · 10-3
lb	1/16	1	1/7000	2.205	2.205 · 10 ³	lbf	1/16	1	0.225	2.205	2.205 · 10-3
gr (grain)	437.5	7000	1	15.43 · 10 ³	15.43 · 10 ⁶	pdl	2.011	32.17	7.233	70.93	70.93 · 10-3

Length								l [m]
ВА	in	ft	yd	Mil	m	cm	mm	μ
m	25.4 · 10 ⁻³	0.305	0.914	25.4 · 10-6	1	0.01	1 · 10-3	1 · 10-6
cm	2.54	30.5	91.4	25.4 · 10-4	1 · 10 ²	1	0.1	1 ⋅ 10-4
mm	25.4	305	914	25.4 · 10-3	1 · 10³	10	1	1 · 10-3
in	1	12	36	1 · 10-3	39.37	0.394	3.94 · 10-2	3.94 · 10-5
ft	1/12	1	3	1/12 · 10 ⁻³	3.281	3.281 · 10-2	3.281 · 10-3	3.281 · 10-6

Angular	Velocity	,	ω [s ⁻¹]	Angular	Acceler	ation		α [s-2]
BA	s ⁻¹ = Hz	rpm	rad s ⁻¹	ВА	min ⁻²	S ⁻²	rad s ⁻²	min ⁻¹ s ⁻¹
rad s ⁻¹	2π	π/₃0	1	S ⁻²	1/3600	1	$1/2\pi$	1/60
rpm	1/60	1	³⁰ /π	rad s ⁻²	^π / ₁₈₀₀	2π	1	π/30

Linear V	/elocity							v [m s ⁻¹]
ВА	in-s ⁻¹	in-min ⁻¹	ft-s ⁻¹	ft-min ⁻¹	m s ⁻¹	cm s⁻¹	mm s ⁻¹	m min ⁻¹
m s ⁻¹	2.54 · 10-2	4.23 · 10-4	0.305	5.08 · 10-3	1	1 · 10-2	1 · 10-3	1/60
in-s ⁻¹	1	60	12	720	39.37	39.37 · 10-2	39.37 · 10-3	0.656
ft-s ⁻¹	1/12	5	1	60	3.281	3.281 · 10-2	3.281 · 10-3	5.46 · 10-2

Tempera	ature		T [K]
BA	° Fahrenheit	° Celsius = Centigrade	Kelvin
Kelvin	(°F -305.15) / 1.8	+ 273.15	1
° Celsius	(°F -32) / 1.8	1	-273.15
° Fahrenheit	1	1.8°C + 32	1.8 K + 305.15

Units used in this brochure

maxon standard specification

Our standard specifications gives you the means to assess the key aspects of maxon products. In our experience, the standard specifications cover normal cases. It is part of our Terms and Conditions of Delivery.



Standard specification no. 100

maxon DC motor

Standard specification no. 101

maxon EC motor

Standard specification no. 102

maxon gear maxon screw drive

Standard specification no. 103

maxon sensor

Standard specification no. 100

maxon DC motor

1 Basics

The standard specification describes tests and inspections that are performed on the finished motor and during the manufacturing process. To safeguard our high quality standard, we inspect materials, individual parts, assemblies, and the finished motor for conformity with specified dimensions and properties. The results are recorded statistically and can be viewed by the customer on request. Sampling plans in acc. with ISO 2859 and DIN/ISO 3951 are used (attribute inspection, follow-up inspection and variable inspection), as well as self-monitoring procedures of the manufacturing departments. This standard specification applies in all cases where no other specification has been agreed upon between the customer and maxon.

2. Data

2.1 Electrical data apply at temperatures between 22 and 25 °C. Data check within one minute of runtime.

Measuring voltage $\pm 0.5\%$ for voltages ≥ 3 V and

±0.015 V for voltages ≤ 3 V

No-load speed ±10 %
No-load current ≤ maximum
Direction of rotation cw = clockwise
Motor orientation horizontal or vertical

Additional information: The measuring voltage may deviate from the nominal voltage listed in the catalog. The no-load current specified in the catalog is a typical value, not the maximum. If the red wire or the terminal marked + is connected to the positive terminal, then the shaft (seen from the face) turns clockwise. For counterclockwise (ccw) operation, the specified tolerances may be exceeded slightly.

Terminal resistance: Winding resistance is checked in samples during production. The terminal resistance is determined during the product qualification. Observe that the terminal resistance depends on the rotor position. Because contact resistance of graphite brushes varies with the current density, resistance measurement with an ohmmeter does not deliver meaningful results for small currents. In the case of precious metal brushes, the resistance measurements show a value that's too low when the brush bridges two commutator plates, shorting part of a coil.

The **inductance** is determined during the product qualification. The measuring frequency is 1 kHz. The terminal inductance of the motor is frequency-dependent.

Commutation: The check for neutral setting and electrical errors, e.g. winding discontinuities or winding shorts, is performed using an oscilloscope. The commutation graphs of precious metal and graphite brushes are not directly comparable. Precious metal brushes have a clearer commutation graph that remains interference-free up to the limit speed, approximately. For graphite brushes, this can only be expected at speeds up to 1/3 of the limit speed. For graphite brush motors, the brush contact resistance changes over time. The same applies to the torque constant due to the overlap between commutator plates. As a result, the no-load current and the speed change slightly. A similar effect can be observed when the motor has been run without load over a long time.

- 2.2 Mechanical data as shown in the dimensional drawing: Assembly-dependent dimensions are sampled in acc. with the sampling schedule. This does not apply to form and position tolerances. The process uses standard measurement tools (electrical length measurement, micrometers, dial gauges, calipers, plug and thread gauges, etc.). The calibration of the measuring instruments follows the standards listed below:
 - EN ISO 10012:2003 Measurement management systems Requirements for measurement processes and measuring equipment
 - EN ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories
 - VDI/VDE/DGQ 2618 Test equipment monitoring
- 2.3 Imbalance: Rotors are balanced according to our standard during the manufacturing process.
- 2.4 Noise: Each batch is tested for outliers. The motion inside a motor causes noise and vibration depending on speed. The noise and vibrations may vary in their frequency and intensity. The noise level of an individual sample does not permit any conclusions about the noise or vibration level of a future delivery.
- 2.5 Service life: Service life tests are conducted according to unified, internal criteria as part of the product qualification. The service life of a motor primarily depends on the operating modes and ambient conditions. The great diversity of applications does not permit us to make a general statement of service life.

2.6 Environmental testing

Corrosion protection: Our products are tested based on DIN EN 60068-2-30 during product qualification.

Coating of the components: The finishing and coating processes are selected for best corrosion protection. Such layers are checked during product qualification, in accordance with the applicable standard.

Parameters that deviate from or supplement the data sheet can be determined and then become part of the systematically performed inspection, as customer specification. Inspection certificates are supplied, if agreed upon in advance.

Standard specification no. 101

maxon EC motor

1. Basics

The standard specification describes tests and inspections that are performed on the finished motor and during the manufacturing process. To safeguard our high quality standard, we inspect materials, individual parts, assemblies, and the finished motor for conformity with specified dimensions and properties. The results are recorded statistically and can be viewed by the customer on request. Sampling plans in acc. with ISO 2859 and DIN/ISO 3951 are used (attribute inspection, follow-up inspection and variable inspection), as well as self-monitoring procedures of the manufacturing departments. This standard specification applies in all cases where no other specification has been agreed upon between the customer and maxon.

2. Data

2.1 **Electrical data** apply at temperatures from 22 to 25 °C, using a 1-quadrant controller with block commutation. Data check within one minute of runtime.

Measuring voltage $\pm 0.5\%$ for voltages > 3 V and ± 0.015 V for voltages ≤ 3 V

No-load speed ±10 %
No-load current ≤ maximum
Direction of rotation cw = clockwise
Motor orientation horizontal or vertical

Additional information: The measuring voltage may deviate from the nominal voltage listed in the catalog. The no-load current specified in the catalog is a typical value, not the maximum. When connected as per the catalog (or marking), the shaft rotates clockwise (seen from the face side).

The terminal resistance is checked by sampling.

The **inductance** is determined during product qualification. The measuring frequency is 1 kHz. The terminal inductance is frequency-dependent. These measurements are sufficient to ensure compliance with electro-mechanical specifications.

- 2.2 Mechanical data as shown in the dimensional drawing: Assembly-dependent dimensions are sampled in acc. with the sampling schedule. This does not apply to form and position tolerances. The process uses standard measurement tools (electrical length measurement, micrometers, dial gauges, calipers, plug and thread gauges, etc.). The calibration of the measuring instruments follows the standards listed below:
 - EN ISO 10012:2003 Measurement management systems Requirements for measurement processes and measuring equipment
 - EN ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories
 - VDI/VDE/DGQ 2618 Test equipment monitoring
- 2.3 Imbalance: Rotors for EC motors with air-gap windings are balanced in accordance with our standard during the manufacturing process. For EC motors with wound stator teeth, the rotors are mounted in gauges but, as a standard, are not balanced. For the finished motor, only a subjective assessment is possible, which is done by sampling.
- 2.4 Following DIN EN 60204-1 and EN 60034-1, the dielectric strength is always determined using a high-voltage tester. It is connected between motor connection (electrical) and motor housing or shaft. Parts with integrated electronics are excepted.

Test conditions for EC motors ≤ \varnothing 13 mm

- Test voltage 250 VDC for 2 s (motor at standstill)
- Ramp time (up and down): 1 s
- Good / bad output
- Leakage current < 0.25 mA

Test conditions for EC motors > \varnothing 13 mm

- Test voltage 500 VDC for 2 s (motor at standstill)
- Ramp time (up and down): 1 s
- Good / bad output
- Leakage current: < 0.5 mA
- 2.5 Noise: Each batch is tested for outliers. The motion inside a motor causes noise and vibration depending on speed. The noise and vibrations may vary in their frequency and intensity. The noise level of an individual sample does not permit any conclusions about the noise or vibration level of a future delivery.
- 2.6 Service life: Service life tests are conducted according to unified, internal criteria as part of the product qualification. The service life of an EC motor mainly depends on the bearing life. This is determined by the operating mode, the bearing load, and ambient conditions. The great diversity of applications does not permit us to make a general statement of service life.

2.7 Environmental testing

Corrosion protection: Our products are tested based on DIN EN 60068-2-30 during product qualification.

Coating of the components: The finishing and coating processes are selected for best corrosion protection. Such layers are checked during product qualification, in accordance with the applicable standard.

Parameters that deviate from or supplement the data sheet can be determined and then become part of the systematically performed inspection, as customer specification. Inspection certificates are supplied, if agreed upon in advance.

Standard specification no. 102

maxon gear/maxon screw drive

Basics

The standard specification describes tests and inspections that are performed on the finished gearhead and during the manufacturing process. To safeguard our high quality standard, we inspect materials, individual parts, assemblies, and the finished gearhead for conformity with specified dimensions and pro-perties. The results are recorded statistically and can be viewed by the custo-mer on request. Sampling plans in acc. with ISO 2859 and DIN/ISO 3951 are used (attribute inspection, follow-up inspection and variable inspection), as well as self-monitoring procedures of the manufacturing departments. This specification applies in all cases where no other specification has been agreed upon between the customer and maxon.

2. Data

- Mechanical data as shown in the dimensional drawing: Assembly-dependent dimensions are sampled in acc. with the sampling schedule. This does not apply to form and position tolerances. The process uses standard measurement tools (electrical length measurement, micrometers, dial gauges, calipers, plug and thread gauges, etc.). The calibration of the measuring instruments follows the standards listed below:
 - EN ISO 10012:2003 Measurement management systems Requirements for measurement processes and measuring equipment
 - EN ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories
 - VDI/VDE/DGQ 2618 Test equipment monitoring

2.2 Noise

Each batch is tested for outliers. The motion inside a gearhead causes noise and vibration depending on speed. The noise and vibrations may vary in their frequency and intensity. The noise levels of an individual sample do not permit any conclusions about the noise or vibration level of a future delivery

Service life

Service life tests are conducted according to unified, internal criteria as part of the product qualification. The service life of a gearhead primarily depends on the operating modes and ambient conditions. The great diversity of applications does not permit us to make a general statement of service life. The minimum expected service life for the relevant maxon gearheads is in reference to standard conditions.

- -25°C
- Normal room conditions
- Horizontal orientation of unit
- No axial or radial load on the output shaft

2.4 Environmental testing

Corrosion protection: Our products are tested based on DIN EN 60068-2-30 during product qualification.

Coating of the components: The finishing and coating processes are selected for best corrosion protection. Such layers are checked during product qualification, in accordance with the applicable standard.

Parameters that deviate from or supplement the data sheet can be determined and then become part of the systematically performed inspection, as customer specification. Inspection certificates are supplied, if agreed upon in advance.

Standard specification no. 103

maxon sensor

Basics

The standard specification describes tests and inspections that are performed on the finished combination of sensor and motor (in some cases also with gearhead), as well as during the manufacturing process. To safeguard our high quality standard, we inspect materials, individual parts, assemblies and the finished combination for conformity with the specified dimensions and properties. For sensor testing, it is necessary to keep in mind that the measuring signal inevitably contains the speed fluctuations of the motor and in some cases those of the gearhead.

The results are recorded statistically. Sampling plans in acc. with ISO 2859 and DIN / ISO 3951 are used (attribute inspection, follow-up inspection and va-riable inspection), as well as self-monitoring procedures of the manufacturing departments. This standard specification applies in all cases where no other specification has been agreed upon between the customer and maxon.

Electrical data apply at temperatures between 22 and 25°C. Data check within one minute of runtime or a minimum of three measuring revolutions.

The conditions during the sensor measurement are:

Operating voltage Set value ±50 mV Direction of rotation cw = clockwise Motor orientation Horizontal Operation No load

Set value ±40% Measuring speed Every incremental encoder is tested while installed: **Current draw** Minimum/maximum value

Signal level For encoders without a line driver ("single-ended output"): "Low" level: maximum

value; "High" level: minimum value

For encoders with a line driver ("differential output"): Controlling an RS422-compatible line receiver.

Signal integrity Signals present

Counts per turn (3-channel encoder)

Single unique index pulse

(if applicable)

Angle information For the angle information, one or several of the fol-

lowing characteristics are tested, depending on the technology: Phasing A to B, duty cycles of the incremental signals, cycle length, INL, DNL, minimum/

maximum state length, jitter

Additional information: maxon testing devices have built-in glitch filters. Glitches on individual encoder signals are not recognized and are permissible.

Every absolute encoder is tested while installed: **Current draw** Minimum/maximum value Signal integrity CLK signals, data present

Protocol in acc. with the specification

(SSI, BiSS, coding)

Counting direction of angle values: as listed in catalog

- 2.2 Mechanical data as shown in the dimensional drawing: Assembly-dependent dimensions are sampled in acc. with the sampling schedule. This does not apply to form and position tolerances. The process uses standard measurement tools (electrical length measurement, micrometers, dial gauges, calipers, plug and thread gauges, etc.). The calibration of the measuring instruments follows the standards listed below:
 - EN ISO 10012:2003 Measurement management systems Requirements for measurement processes and measuring equipment
 - EN ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories
 - VDI/VDE/DGQ 2618 Test equipment monitoring

The solid measure of the sensor (target, pole wheel) is mounted on the shaft and can cause additional imbalance.

2.4 Service life

The service life of sensors is usually not limited by wear but by the ambient conditions. These are highly diverse, so that no general statement regarding the service life can be made.

2.5 Environmental testing

Humidity: Sensors consist of electronic and, in some cases, optical components. Condensation has to be prevented or removed prior to startup, even when this is not explicitly stated. In the case of optical encoders, condensation and humidity can cause stains and thus lead to signal errors.

Parameters that deviate from or supplement the data sheet can be determined and then become part of the systematically performed inspection, as customer specification. Inspection certificates are supplied, if agreed upon in advance.

Brushed DC motors with ironless windings

Standard Specification No. 100	88
Terminology explanations	92
DCX Program	95-116
DC-max Program	119-124
RE Program	127-163
A-max Program	167-186

Explanations of maxon terminology: DC motor

Dimensional drawings

Presentation of the views according to the projection method E (ISO). All dimensions in [mm].

Mounting in plastic

Screwed connections on motors with plastic flanges require special attention.

Max. tightening torque [Ncm]

A torque screw driver may be adjusted to this value.

Active depth of screw connection [mm]

The depth of the screw connection must be less than the usable length of the thread!

Motor Data

The values stated are based on a motor temperature of 25°C (so-called cold data).

Nominal voltage U_N [Volt]

is the DC voltage on the motor connections on which all nominal data are based (lines 2-9). Lower and higher voltages are permissible, provided set limits are not exceeded.

No load speed n_0 [rpm] $\pm 10\%$

This is the speed at which the motor turns at nominal voltage and without load. It is approximately proportional to the applied voltage.

No load current I₀ [mA] ±50%

This is the typical current that the unloaded motor draws when operating at nominal voltage. It depends on brush friction and friction in the bearings, and also increases with rising speed. No load friction depends heavily on temperature, particularly with precious metal commutation. In extended operation, no load friction decreases and increases at lower temperatures.

Nominal speed n_N [rpm]

is the speed set for operation at nominal voltage and nominal torque at a motor temperature of 25°C.

Nominal torque M_N [mNm]

is the torque generated for operation at nominal voltage and nominal current at a motor temperature of 25°C. It is at the limit of the motor's continuous operation range. Higher torques heat up the winding too much.

Nominal current I_N [A]

is the current that, at 25°C ambient temperature, heats the winding up to the maximum permissible temperature (= max, permissible continuous current). $I_{\mbox{\scriptsize N}}$ decreases as speed increases due to additional friction losses.

Stall torque MH [mNm]

is the calculated load torque that causes the shaft to stop at nominal voltage. Rising motor temperatures reduce stall torque.

Stall current | [A]

is the quotient from nominal voltage and the motor's terminal resistance. Stall current is equivalent to stall torque. With larger motors, $I_{\mbox{\tiny A}}$ can often not be reached due to the amplifier's current limits.

Max. efficiency η_{max} [%]

is the optimal relationship between input and output power at nominal voltage. It also doesn't always denote the optimal operating point.

Terminal resistance $R[\Omega]$

is the resistance at the terminals at 25°C and determines the stall current at a given voltage. For graphite brushes, it should be noted that resistance is loaddependent and the value only applies to large cur-

11 Terminal inductance L [mH]

is the winding inductance when stationary and measured at 1 kHz, sinusoidal.

Torque constant k_M [mNm/A]

This may also be referred to as "specific torque" and represents the quotient from generated torque and applicable current.

Speed constant k_n [rpm/V]

shows the ideal no load speed per 1 volt of applied voltage. Friction losses not taken into account.

Speed/torque gradient

 $\Delta n/\Delta M$ [rpm/mNm]

The speed/torque gradient is an indicator of the motor's performance. The smaller the value, the more powerful the motor and consequently the less motor speed varies with load variations. It is based on the quotient of ideal no load speed and ideal stall torque.

Mechanical time constant τ_m [ms]

is the time required for the rotor to accelerate from standstill to 63% of its no load speed.

Rotor inertia J_R [gcm²]

is the mass moment of inertia of the rotor, based on the axis of rotation.

17 Thermal resistance

housing-ambient R_{th2} [K/W]

and

Thermal resistance

winding-housing R_{th1} [K/W]

Characteristic values of thermal contact resistance without additional heat sinking. Lines 17 and 18 combined define the maximum heating at a given power loss (load). Thermal resistance R_{th2} on motors with metal flanges can decrease by up to 80% if the motor is coupled directly to a good heat-conducting (e.g. metallic) mounting rather than a plastic panel.

19 Thermal time constant winding $\tau_w[s]$

and

20 Thermal time constant motor $\tau_s[s]$ These are the typical reaction times for a temperature

change of winding and motor. It can be seen that the motor reacts much more sluggishly in thermal terms than the winding. The values are calculated from the product of thermal capacity and given heat resistances.

Ambient temperature [°C]

Operating temperature range. This derives from the heat reliability of the materials used and viscosity of bearing lubrication.

Max. winding temperature [°C]

Maximum permissible winding temperature.

Max. speed n_{max} [rpm]

is the maximum recommended speed based on thermal and mechanical perspectives. A reduced service life can be expected at higher speeds.

Axial play [mm]

On motors that are not preloaded, these are the tolerance limits for the bearing play. A preload cancels out the axial play up to the specified axial force. When load is applied in the direction of the preload force (away from the flange), the axial play is always zero. The length tolerance of the shaft includes the maximum axial play.

25 Radial play [mm]

Radial play is the bearing's radial movement. A spring is utilized to preload the motor's bearings, eliminating radial play up to a given axial load.

Max. axial load [N]

Dynamic: axial load permissible in operation. If different values apply for traction and thrust, the smaller value is given.

Static: maximum axial force that does not cause permanent damage when applied to the front of the shaft at standstill.

Shaft supported: maximum axial force applying to the shaft at standstill if the force is not input at the other shaft end. This is not possible for motors with only one

Max. radial load [N]

The value is given for a typical distance from the front flange. As the distance increases, this value decreas-

29 Number of pole pairs

Number of north poles of the permanent magnet. The phase streams and commutation signals pass through per revolution p cycles. Servo-controllers require the correct details of the number of pole pairs.

30 **Number of commutator segments**

31 Weight of motor [a]

Typical noise level [dBA]

is that statistical average of the noise level measured according to maxon standard (10 cm distance radially to the drive, no load operation at a speed of 6000 rpm. The drive lies freely on a plastic foam mat in the noise chamber).

The acoustic noise level depends on a number of factors, such as component tolerances, and it is greatly influenced by the overall system in which the drive is installed. When the drive is installed in an unfavorable constellation, the noise level may be significantly higher than the noise level of the drive alone.

The acoustic noise level is measured and determined during product qualification. In manufacturing, a structure-borne noise test is performed with defined limits. Impermissible deviations can thus be identi-

Standard Specification No. 100	88
Terminology explanations	92
DCX Program (can be configured online)	95-116
DCX 6 M Ø6 mm, Precious metal brushes, 0.3 Watt	95
DCX 8 M Ø8 mm, Precious metal brushes, 0.5 Watt	96
DCX 10 S ∅10 mm, Precious metal brushes, 1 Watt	97
DCX 10 L Ø10 mm, Precious metal brushes, 1.5 Watt	98
DCX 12 S Ø12 mm, Precious metal brushes, 1.6 Watt	99
DCX 12 L ∅12 mm, Precious metal brushes, 2.5 Watt	100
DCX 14 L Ø14 mm, Precious metal brushes, 3 Watt	101
DCX 14 L Ø14 mm, Graphite brushes, 6 Watt	102
DCX 16 S ∅16 mm, Precious metal brushes, 3 Watt	103
DCX 16 S ∅16 mm, Graphite brushes, 5 Watt	104
DCX 16 L Ø16 mm, Precious metal brushes, 5 Watt	105
DCX 16 L Ø16 mm, Graphite brushes, 10 Watt	106
DCX 19 S ∅19 mm, Precious metal brushes, 5 Watt	107
DCX 19 S ∅19 mm, Graphite brushes, 11 Watt	108
DCX 22 S Ø22 mm, Precious metal brushes, 6 Watt	109
DCX 22 S Ø22 mm, Graphite brushes, 14 Watt	110
DCX 22 L Ø22 mm, Precious metal brushes, 11 Watt	111
DCX 22 L Ø22 mm, Graphite brushes, 20 Watt	112
DCX 26 L Ø26 mm, Precious metal brushes, 18 Watt	113
DCX 26 L Ø26 mm, Graphite brushes, 40 Watt	114
DCX 32 L Ø32 mm, Graphite brushes, 70 Watt	115
DCX 35 L ∅35 mm, Graphite brushes, 80 Watt	116

maxon DCX



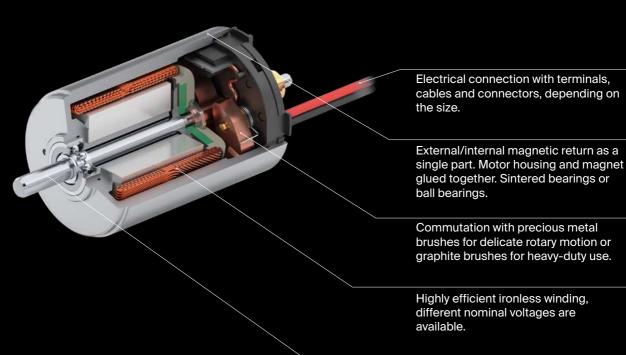
© 2024 maxon. All rights reserved.

maxon DCX

The maxon DCX brushed motors feature unrivaled torque density and quiet running. The robust design and the ironless maxon rotor make the DCX motors a dynamic drive for almost all applications. Choose between graphite and precious metal brushes, sintered and ball bearings, and many other components.

Key data

Motor Ø6 ... 35 mmMotor length15.6 ... 72 mmPower0.3 ... 80 WNominal torqueup to 138 mNmMax. permissible speedup to 18 000 rpm

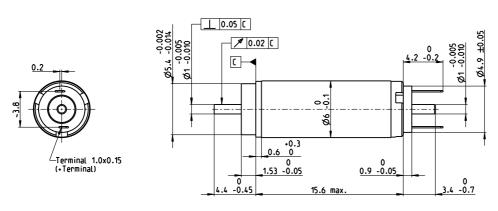


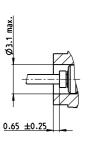
- Compact and light design
- Precious metal brushes guarantee a low, constant contact resistance during the entire service life
- Easy torque control using the current
- → Low start-up voltage, even after a long period in standstill
- → Easily configured online

Stainless steel shaft with high stiffness; various modification options are available.









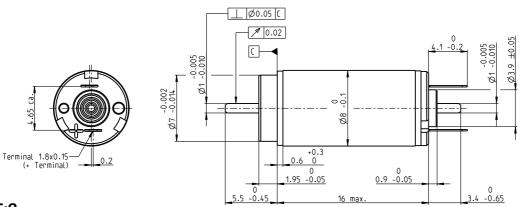
M 5:2

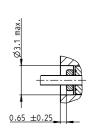
										IVI 3.2
	Motor Data									
1	Nominal voltage	V	1.5		3	4.5	5	6		
_	No load speed	rpm	17300	17!	500	17400		17400		
_	No load current	mA	34.1		7.1	11.4		8.54		
	Nominal speed	rpm	4950		940	5730		5690		
_	Nominal torque	mNm	0.309		332	0.326		0.325		
_	Nominal current (max. continuous curre		0.425		228	0.149		0.111		
_	Stall torque	mNm	0.453		524	0.50		0.503		
	Stall current	A	0.581		336	0.21		0.161		
_	Max. efficiency	%	58	0.0	61	60.21		60		
	Terminal resistance	Ω	2.58		9.0	20.8	-	37.2		
_	Terminal inductance	mH	0.008	0.03		0.071		0.126		
_	Torque constant	mNm/A	0.779		560	2.34		3.12		
_	Speed constant	rpm/V	12300		130	4090		3060		
_	•	rpm/mNm	40600		100	36300		36600		
_	Mechanical time constant	ms	7.06		5.74	6.83		6.81		
_	Rotor inertia	gcm ²	0.017	0.0		0.0179		0.018		
	Thermal data	gciii	0.017	Operatin				0.010		
	Thermal resistance housing-ambient	K/W	105	n [rpm]						
_	Thermal resistance winding-housing	K/W	20	ունեայ	willuli	ıg 4.5 v				
	Thermal time constant winding	S	1.71							
_	Thermal time constant motor	s		20000						
_	Ambient temperature ball bearings	°Č	-30+85	20000						
	Ambient temperature sleeve bearings	°C	-30+85						1	
22	Max. winding temperature	°C	100	15000						
	Mechanical data ball bearings		.00							
	Max. speed	rpm	17300	10000						
_	Axial play	mm	00.1	10000						
- ·-	Preload	N	0.5							
25	Radial play	mm	0.012	5000						Continuous operation
_	Max. axial load (dynamic)	N	0.1							Continuous operation with reduced
_	Max. force for press fits (static)	N	5	0						thermal resistance R _{th2} 50%
-	(shaft supported)	N	100	o o		0.2	0.4	M [mNm	Í 🗆	Intermittent operation
28	Max. radial load [mm from flange]	N	0.6 [5]							
_	Mechanical data sleeve bearings			Modular	Systen	n				Details on catalog page 38
	Max. speed	rpm	17300				es [opt.]	Sensor		Motor Control
	Axial play	mm	0.020.1	375 GP	(6A	1-5	oo [opt.]	498_ENX 6	MAG	550_ESCON Module 24/2
_	Preload	N	0	5, 5_di /		. 0		.55_2.00	10	550_ESCON 36/2 DC
25	Radial play	mm	0.012							562_EPOS4 Module 24/1.5
	Max. axial load (dynamic)	N	0.1							564_EPOS4 Compact 24/1.5
	Max. force for press fits (static)	N	10							55Ei 66 i 66iiipd6t E47 i.6
_	(shaft supported)	N	100							
28_	Max. radial load [mm from flange]	N	0.4 [5]							
_	Other specifications									
29	Number of pole pairs		1							
	Number of commutator segments		5							
_	Weight of motor	g	2.4							
_	Typical noise level	dBA		Configur	ation					
_				<u> </u>	01			inao prolonda		

Bearing: Sleeve bearings/ball bearings preloaded
Commutation: Precious metal brushes
Flange front/back: Standard flange
Shaft front/back: Length
Electric connection: Terminals or cables (encoder always with Flex)





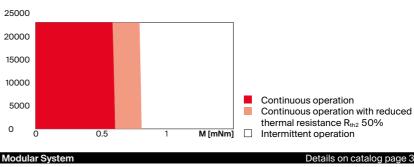




M 5:2

Motor Data								
1_ Nominal voltage	V	2.4	4.2	6	7.2	9	12	
2_ No load speed	rpm	11500	11700	11000	11900	11900	12900	
3_ No load current	mA	11.9	6.93	4.51	4.12	3.3	2.74	
4_ Nominal speed	rpm	4780	4950	4190	4820	5190	5800	
5_ Nominal torque	mNm	0.653	0.649	0.641	0.62	0.652	0.614	
6_ Nominal current (max. continu	ous current) A	0.345	0.199	0.13	0.113	0.0949	0.0728	
7_ Stall torque	mNm	1.13	1.14	1.05	1.06	1.17	1.13	
8_ Stall current	Α	0.581	0.34	0.207	0.187	0.166	0.13	
9_ Max. efficiency	%	74	74	73	73	74	74	
10_ Terminal resistance	Ω	4.13	12	29	38.5	54.3	92.2	
11_ Terminal inductance	mH	0.014	0.0411	0.0941	0.117	0.183	0.276	
12_ Torque constant	mNm/A	1.95	3.360	5.08	5.67	7.07	8.71	
13_ Speed constant	rpm/V	4900	2850	1880	1680	1350	1100	
14_ Speed/torque gradient	rpm/mNm	10400	10500	10700	11400	10400	11600	
15_ Mechanical time constant	ms	4.17	4.15	4.18	4.24	4.15	4.28	
16_ Rotor inertia	gcm ²	0.038	0.0379	0.0372	0.035	0.038	0.035	
Thermal data		С	perating Rang	ie				

17_ Thermal resistance housing-ambient18_ Thermal resistance winding-housing K/W 101 n [rpm] Winding 6 V K/W 16.9 19_ Thermal time constant winding 2.31 s 20_ Thermal time constant motor 162 s 21_ Ambient temperature ball bearings -30...+85 °C Ambient temperature sleeve bearings °C -30...+85 Max. winding temperature °C 100 Mechanical data ball bearings 17300 23_ Max. speed rpm 24_ Axial play 0...0.1 mm Preload N 0.5 25_ Radial play 0.012 mm 26_ Max. axial load (dynamic) N 0.1 27_ Max. force for press fits (static) Ν 5 (shaft supported) N Max. radial load [mm from flange] Ν



100 0.6 [5] Mechanical data sleeve bea 23_ Max. speed rpm 17300 Gear 24_ Axial play mm Preload Ν 25_ Radial play mm 0.012 26_ Max. axial load (dynamic) Ν 0.1 27_ Max. force for press fits (static) Ν 10 (shaft supported) Ν 100 Max. radial load [mm from flange] 0.4 [5] Other specifications 29_ Number of pole pairs 30_ Number of commutator segments 5 31_ Weight of motor dBA 32_ Typical noise level

Stages [opt.] Sensor 0.02...0.1 376_GPX 8 A 499_ENX 8 MAG Motor Control 550_ESCON Module 24/2 550_ESCON 36/2 DC 562_EPOS4 Module 24/1.5 564_EPOS4 Compact 24/1.5

Details on catalog page 38

Bearing: Sleeve bearings/ball bearings preloaded

Commutation: Precious metal brushes with or without CLL

Flange front/back: Standard flange

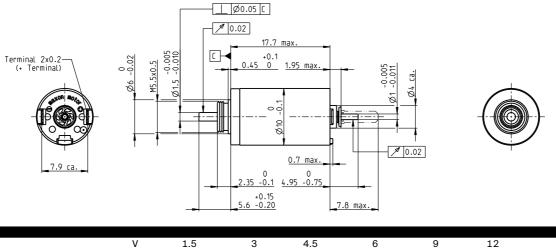
Shaft front/back: Length

Electric connection: Terminals or cables (encoder always with Flex)





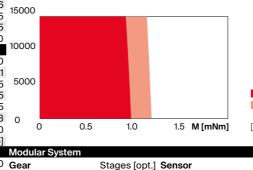
M 3:2

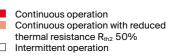


Malan Bala								
Motor Data								
1_ Nominal voltage	V	1.5	3	4.5	6	9	12	
2_ No load speed	rpm	12600	13000	12600	11400	12600	12500	
3_ No load current	mA	84.1	43.8	28	18.2	14	10.5	
4_ Nominal speed	rpm	4530	4690	4270	3310	3930	3890	
5_ Nominal torque	mNm	0.918	0.948	0.944	0.993	0.909	0.905	
6_ Nominal current (max. continuous	current) A	0.924	0.49	0.316	0.223	0.152	0.114	
7_ Stall torque	mNm	1.49	1.54	1.48	1.46	1.38	1.37	
8_ Stall current	Α	1.39	0.742	0.463	0.307	0.215	0.16	
9_ Max. efficiency	%	58	58	58	58	56	56	
10_ Terminal resistance	Ω	1.08	4.04	9.72	19.5	41.8	74.9	
11_ Terminal inductance	mH	0.014	0.051	0.122	0.268	0.488	0.868	
12_ Torque constant	mNm/A	1.07	2.07	3.2	4.74	6.4	8.53	
13_ Speed constant	rpm/V	8950	4600	2980	2010	1490	1120	
14_ Speed/torque gradient	rpm/mNm	9030	8970	9060	8290	9750	9830	
15_ Mechanical time constant	ms	7.24	7.19	7.21	7.03	7.27	7.26	
16_ Rotor inertia	gcm ²	0.077	0.077	0.076	0.081	0.071	0.071	
Thermal data		0	perating Rang	е				

n [rpm] Winding 4.5 V

Thermal data		
17_ Thermal resistance housing-ambient	K/W	37.6
18_ Thermal resistance winding-housing	K/W	22.0
19_ Thermal time constant winding	S	4.69
20_ Thermal time constant motor	S	156
21_ Ambient temperature ball bearings	°C	-40+85
Ambient temperature sleeve bearings	°C	-30+85
22_ Max. winding temperature	°C	100
Mechanical data ball bearings		
23_ Max. speed	rpm	14300
24_ Axial play	mm	00.1
Preload	N	0.5
25_ Radial play	mm	0.015
26_ Max. axial load (dynamic)	N	0.5
27_ Max. force for press fits (static)	N	8.8
(shaft supported)	N	120





(Silaii	. Supportouj	14	120
28_ Max.	radial load [mm from flange]	N	1.5 [5]
Mech	nanical data sleeve bearings		
23_ Max.	speed	rpm	14300
24_ Axial	play	mm	00.15
Prelo	ad	N	0
25_ Radia	al play	mm	0.015
26_ Max.	axial load (dynamic)	N	0.1
27_ Max.	force for press fits (static)	N	30
(shaft	supported)	N	120
28_ Max.	radial load [mm from flange]	N	0.8 [5]
Othe	r specifications		
29_ Numl	per of pole pairs		1
30_ Numl	per of commutator segments		7
31_ Weigl	nt of motor	g	6.3
32_ Typica	al noise level	dBA	35

Stages [opt.] Sensor 377_GPX 10 A 1-5 503_ENX 10 EASY 503_ENX 10 QUAD 504_ENX 10 EASY XT Motor Control 550_ESCON Module 24/2 550_ESCON 36/2 DC 562_EPOS4 Module 24/1.5 564_EPOS4 Compact 24/1.5

Details on catalog page 38

Bearing: Sleeve bearings/ball bearings preloaded

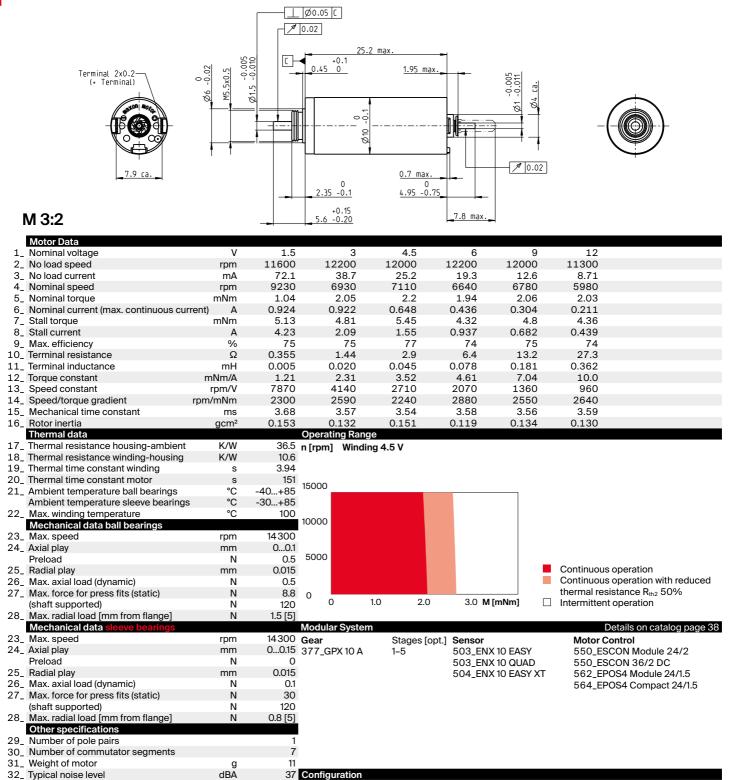
Commutation: Precious metal brushes with or without CLL

Flange front/back: Standard flange/Flange with thread holes/no flange

Shaft front/back: Length

Electric connection: Terminals or cable/cable length/connector type

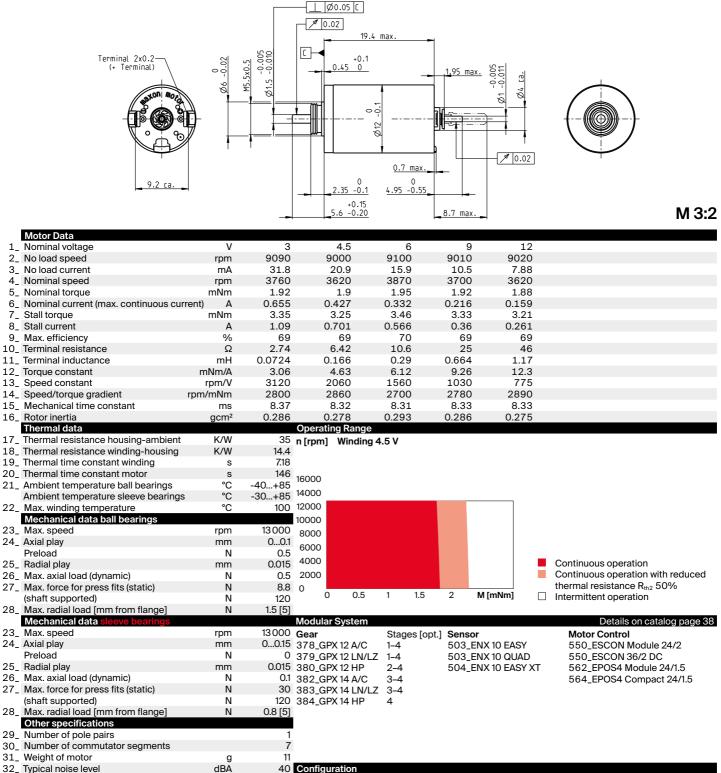




Bearing: Sleeve bearings/ball bearings preloaded Commutation: Precious metal brushes with or without CLL Flange front/back: Standard flange/Flange with thread holes/no flange Shaft front/back: Length Electric connection: Terminals or cable/cable length/connector type







Bearing: Sleeve bearings/ball bearings preloaded Commutation: Precious metal brushes with CLL

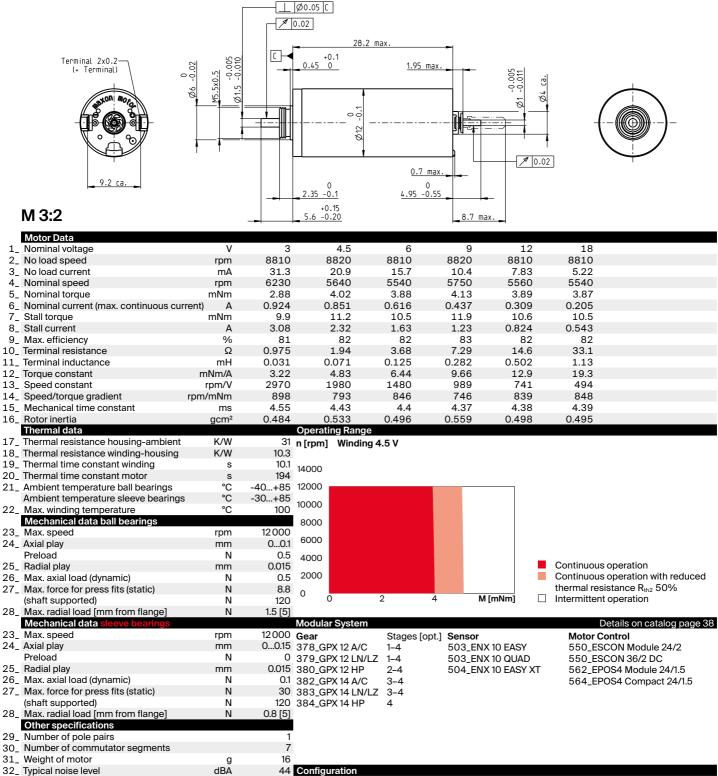
Flange front/back: Standard flange/Flange with thread holes/no flange

Shaft front/back: Length

Electric connection: Terminals or cable/cable length/connector type

Key Data: 2.5/4.8 W, 4.2 mNm, 12000 rpm





Bearing: Sleeve bearings/ball bearings preloaded Commutation: Precious metal brushes with CLL

Flange front/back: Standard flange/Flange with thread holes/no flange

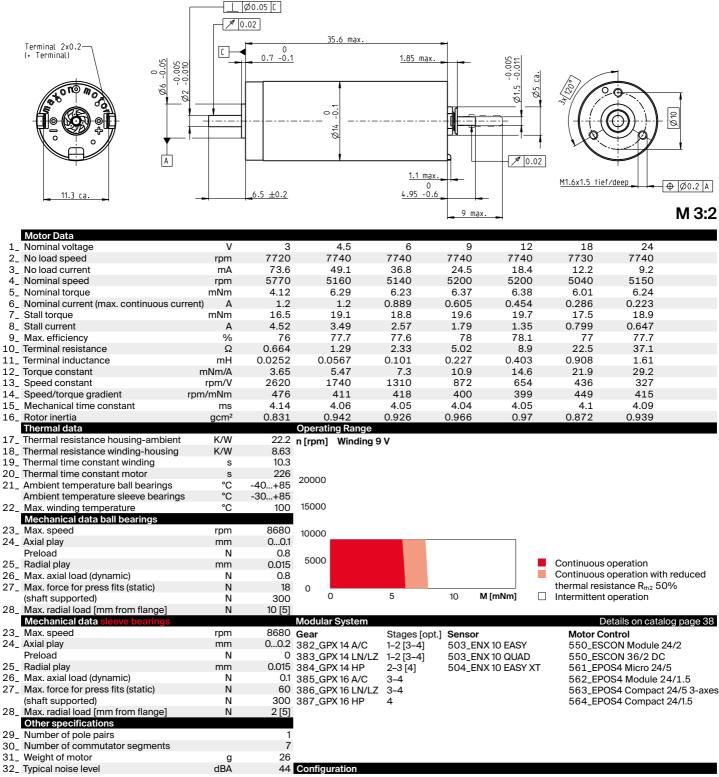
Shaft front/back: Length

Electric connection: Terminals or cable/cable length/connector type

DCX 14 L Ø14 mm, precious metal brushes, DC motor

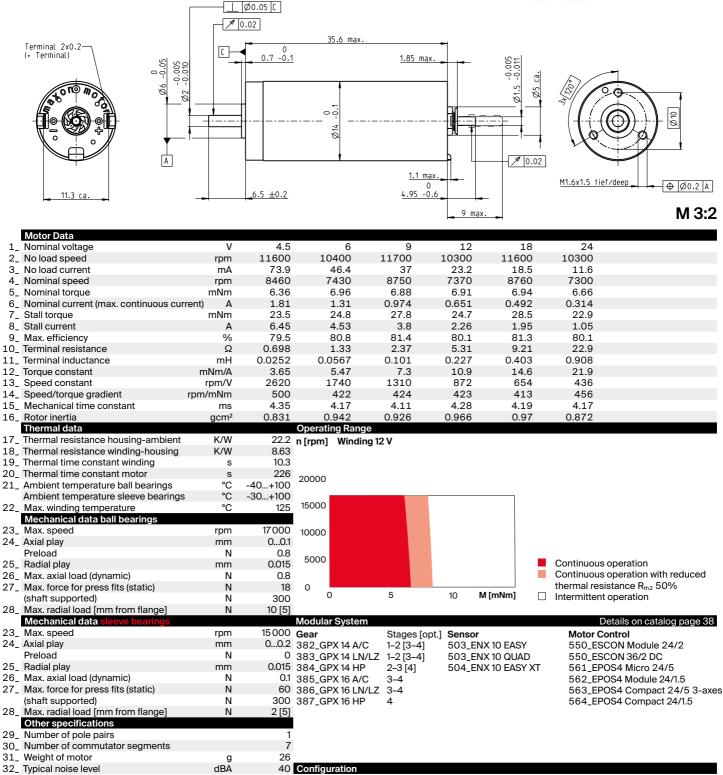
Key Data: 3/5 W, 6.3 mNm, 8680 rpm





Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face

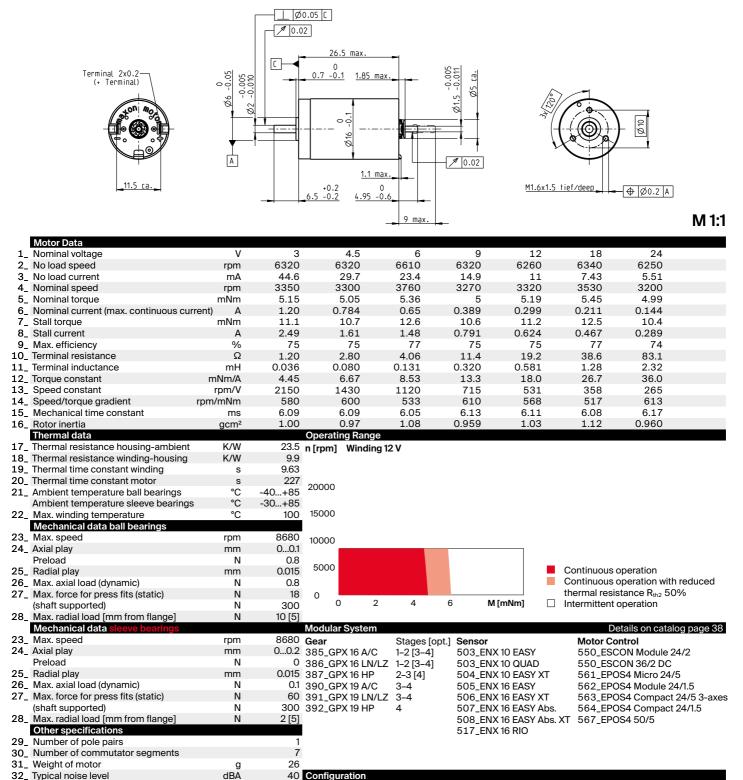




Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face



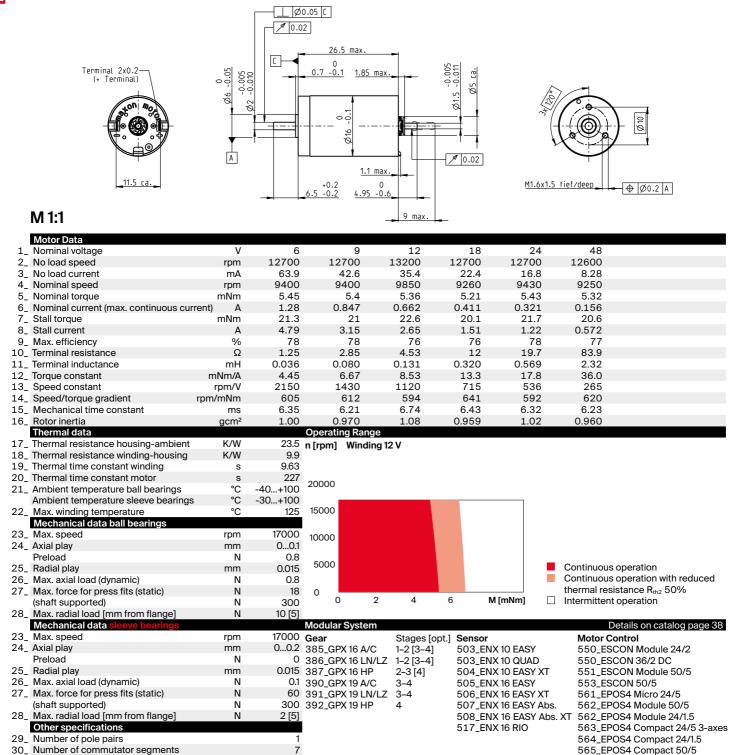




Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face







Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face

Electric connection: Terminals or cable/alignment of connection/cable length/connector type

31_ Weight of motor

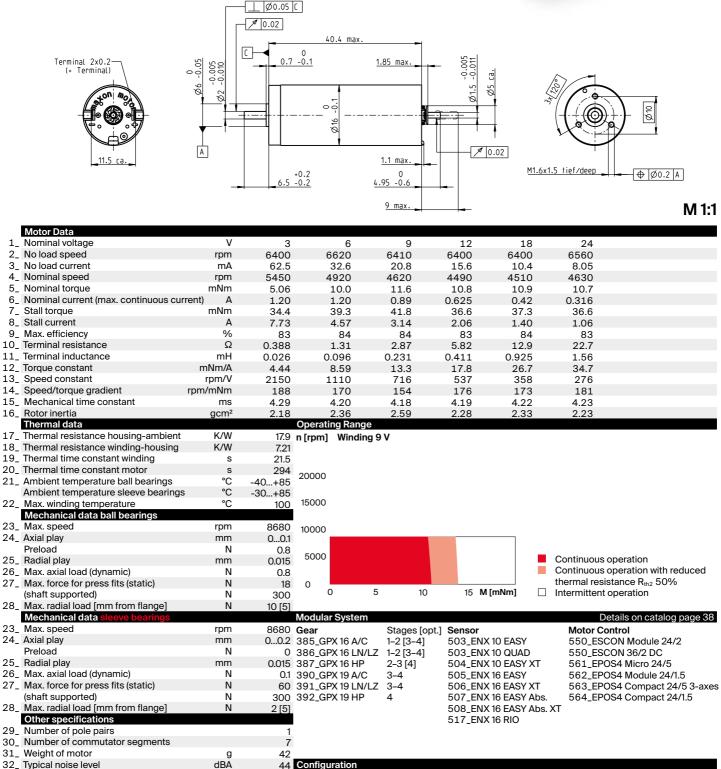
32_ Typical noise level

dBA

567_EPOS4 50/5

Key Data: 5/10 W, 11.5 mNm, 8680 rpm

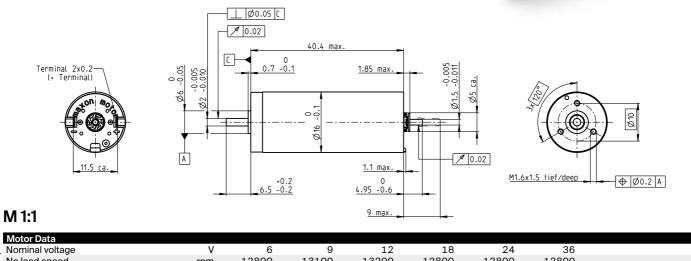




Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face

Key Data: 10/19 W, 11.8 mNm, 17000 rpm





Motor Data								
1_ Nominal voltage	V	6	9	12	18	24	36	
2_ No load speed	•	12800	13100	13200	12800	12800	12800	
3 No load current	rpm mA	73.5	50.7	38.6	24.5	18.4	12.3	
4_ Nominal speed		11000	11000	10700	10600	10600	10700	
-	rpm							
5_ Nominal torque	mNm	8.58	11.8	10.4	11.6	11.3	11.6	
6_ Nominal current (max. continuo		2.00	1.85	1.24	0.896	0.651	0.447	
7_ Stall torque	mNm	61.8	74.2	63.3	74.5	68.5	72	
8_ Stall current	Α	13.9	11.4	7.37	5.59	3.85	2.70	
9_ Max. efficiency	%	85	87	83	86	86	87	
10_ Terminal resistance	Ω	0.431	0.791	1.63	3.22	6.23	13.3	
11_ Terminal inductance	mH	0.026	0.055	0.096	0.231	0.411	0.925	
12_ Torque constant	mNm/A	4.44	6.52	8.59	13.3	17.8	26.7	
13_ Speed constant	rpm/V	2150	1470	1110	716	537	358	
14_ Speed/torque gradient	rpm/mNm	209	178	211	173	188	179	
15_ Mechanical time constant	ms	4.77	4.47	5.21	4.70	4.48	4.37	
16_ Rotor inertia	gcm²	2.18	2.40	2.36	2.59	2.28	2.33	
Thermal data		0	perating Rang	е				

17_	Thermal resistance housing-ambient	K/W	17.9	n [rpm]	Winding 12 V	
18_	Thermal resistance winding-housing	K/W	7.21			
19_	Thermal time constant winding	S	21.5			
20_	Thermal time constant motor	S	294			
21_	Ambient temperature ball bearings	°C	-40+100	20000		
	Ambient temperature sleeve bearings	°C	-30+100			
22_	Max. winding temperature	°C	125	15000		
	Mechanical data ball bearings					
23_	Max. speed	rpm	17000	1		
24_	Axial play	mm	00.1			
	Preload	N	8.0			
25_	Radial play	mm	0.015	5000		Continuous operation
26_	Max. axial load (dynamic)	N	8.0			Continuous operation with reduced
27_	Max. force for press fits (static)	N	18	0		thermal resistance R _{th2} 50%
	(shaft supported)	N	300	0	5 10 15 M [mNm]	Intermittent operation
28_	Max. radial load [mm from flange]	N	10 [5]			
	Mechanical data sleeve bearings			Modular	System	Details on catalog page 38
00			15.000	_		

log page 38 15000 Gear 23_ Max. speed rpm Stages [opt.] Sensor **Motor Control** 24_ Axial play mm 0...0.2 385_GPX 16 A/C 503_ENX 10 EASY 550_ESCON Module 24/2 1-2 [3-4] Preload Ν 0 386_GPX 16 LN/LZ 503_ENX 10 QUAD 550_ESCON 36/2 DC 1-2 [3-4] 25_ Radial play mm 0.015 387_GPX 16 HP 2-3 [4] 504_ENX 10 EASY XT 561_EPOS4 Micro 24/5 26_ Max. axial load (dynamic) Ν 0.1 390_GPX 19 A/C 505_ENX 16 EASY 562_EPOS4 Module 24/1.5 3-4 27_ Max. force for press fits (static) Ν 60 391_GPX 19 LN/LZ 3-4 506_ENX 16 EASY XT 562_EPOS4 Module 50/5 (shaft supported) Ν 300 392_GPX 19 HP 507_ENX 16 EASY Abs. 563_EPOS4 Compact 24/5 3-axes Max. radial load [mm from flange] Ν 2 [5] 508_ENX 16 EASY Abs. XT 564_EPOS4 Compact 24/1.5 Other specifications 517_ENX 16 RIO 565_EPOS4 Compact 50/5 29_ Number of pole pairs 567_EPOS4 50/5 30_ Number of commutator segments 31_ Weight of motor dBA 32_ Typical noise level

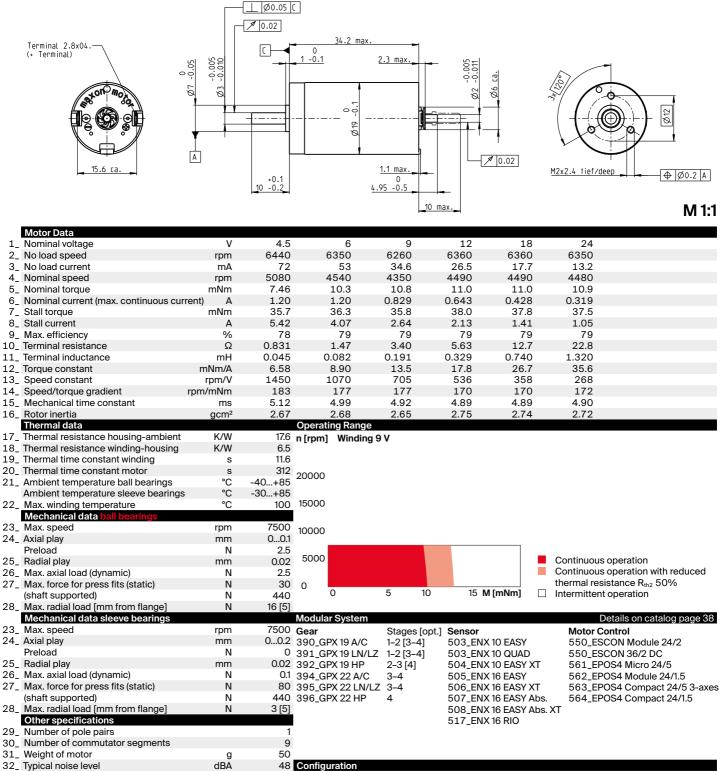
Configuration

Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange

Shaft front/back: Length/diameter/flat face

Key Data: 5/8 W, 11.0 mNm, 7500 rpm

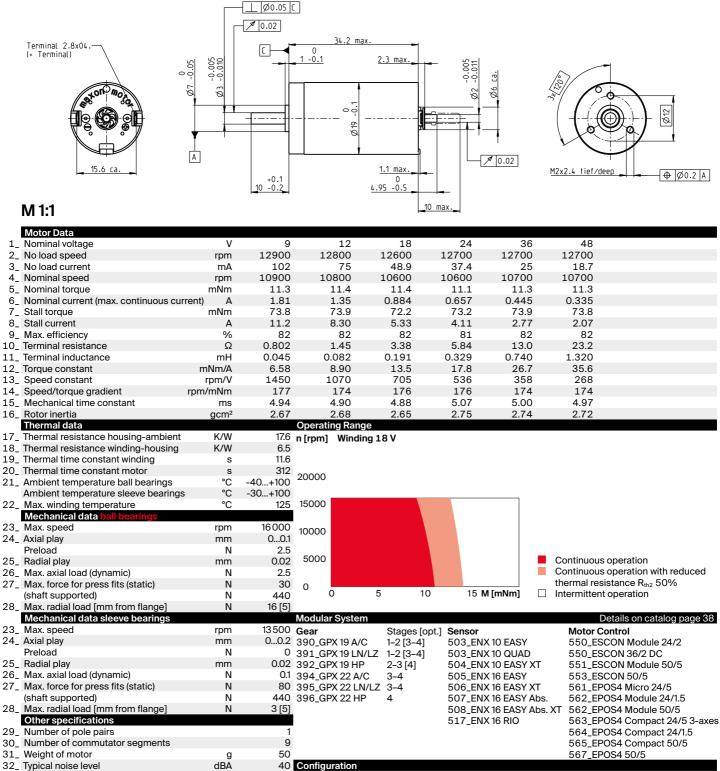




Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face

Key Data: 11/17 W, 11.4 mNm, 16 000 rpm

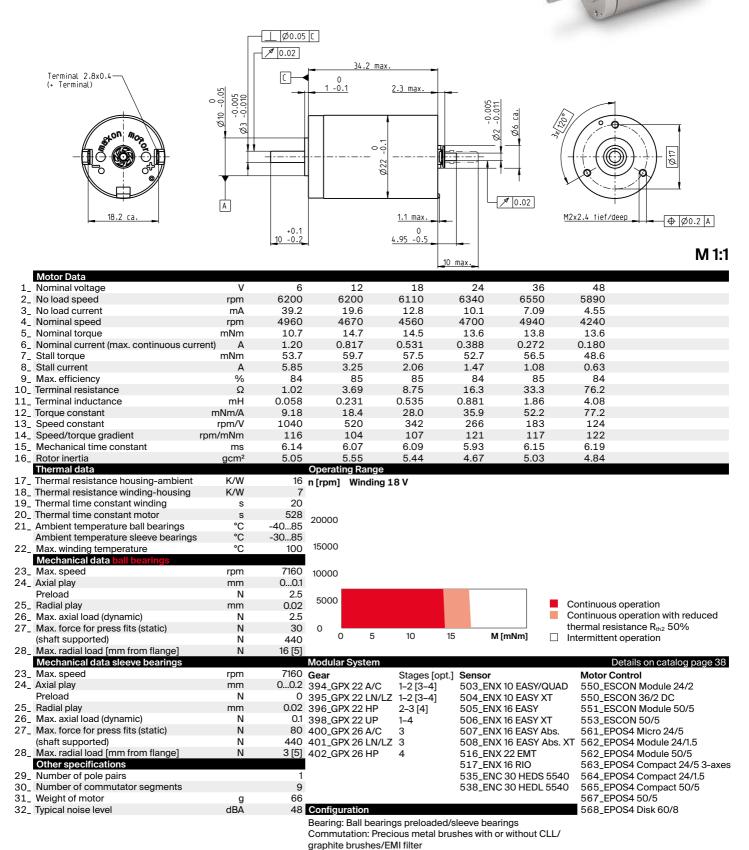




Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face

maxon

Key Data: 6/10 W, 14.7 mNm, 7160 rpm



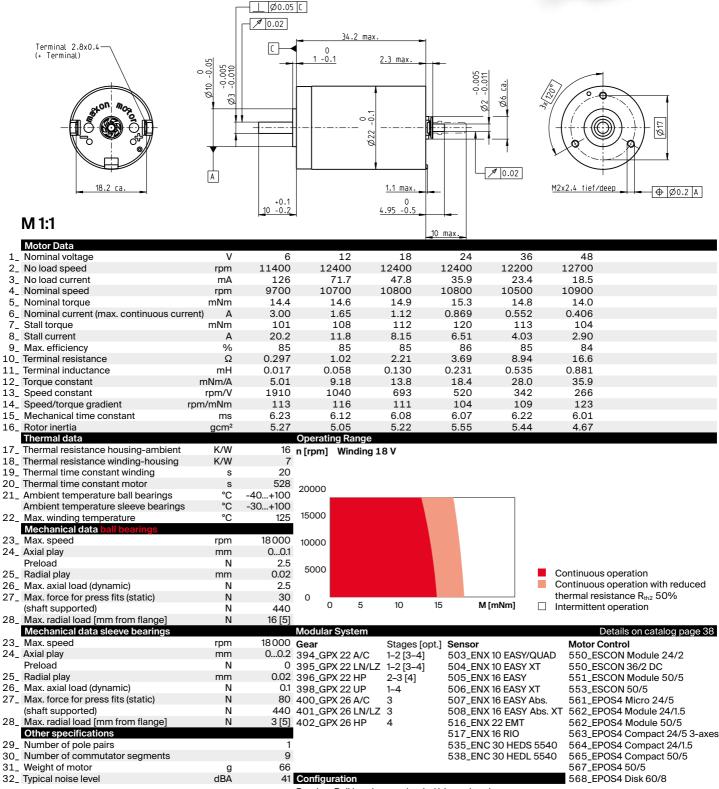
Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/ alignment of connection/cable length/connector type

no flange

Flange front/back: Standard flange/configurable flange/

Key Data: 14/24 W, 15.3 mNm, 18 000 rpm





Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with or without CLL/ graphite brushes/EMI filter Flange front/back: Standard flange/configurable flange/

Flange front/back: Standard flange/configurable flange/ no flange

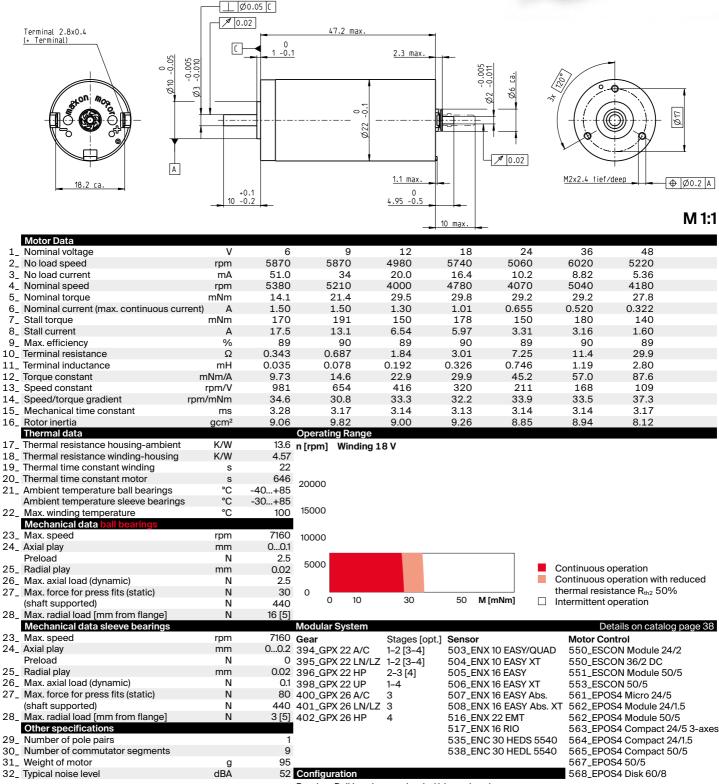
Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/

alignment of connection/cable length/connector type

DCX 22 L Ø22 mm, precious metal brushes, DC motor

Key Data: 11/20 W, 29.8 mNm, 7160 rpm





Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with or without CLL/ graphite brushes/EMI filter Flange front/back: Standard flange/configurable flange/ no flange Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/ alignment of connection/cable length/connector type

Ν

N

Ν

Ν

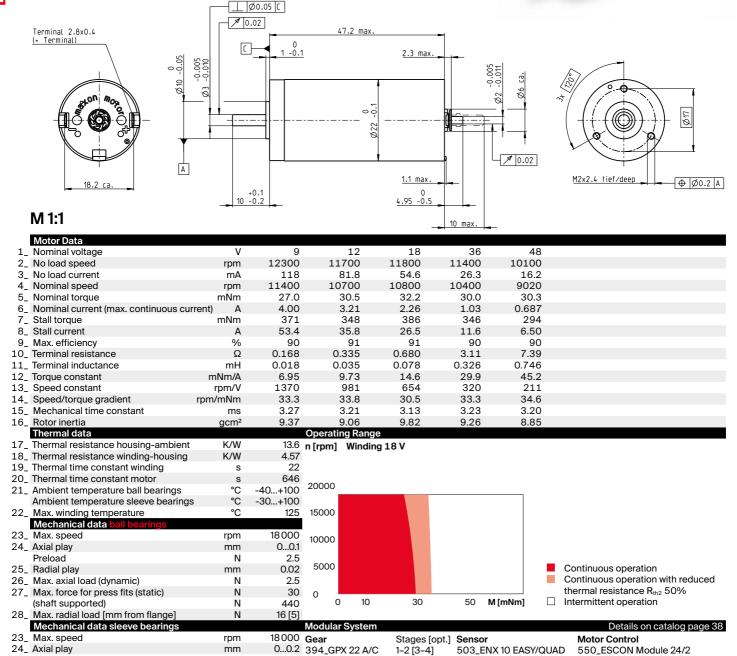
Ν

dBA

mm

Key Data: 20/49 W, 32.2 mNm, 18 000 rpm





Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with or without CLL/ graphite brushes/EMI filter Flange front/back: Standard flange/configurable flange/ no flange

504_ENX 10 EASY XT

506_ENX 16 EASY XT

507_ENX 16 EASY Abs. 508_ENX 16 EASY Abs. XT

535_ENC 30 HEDS 5540

539_ENC 30 HEDL 5540

505_ENX 16 EASY

516_ENX 22 EMT

517_ENX 16 RIO

Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/

395_GPX 22 LN/LZ

0.02 396_GPX 22 HP

0.1 398_GPX 22 UP

80 400_GPX 26 A/C

3 [5] 402_GPX 26 HP

9

440 401_GPX 26 LN/LZ

alignment of connection/cable length/connector type

1-2 [3-4]

2-3 [4]

1-4

Preload

26_ Max. axial load (dynamic)

Other specifications

(shaft supported)

29_ Number of pole pairs

31_ Weight of motor

32_ Typical noise level

27_ Max. force for press fits (static)

Max. radial load [mm from flange]

30_ Number of commutator segments

25_ Radial play

550_ESCON 36/2 DC

561_EPOS4 Micro 24/5

553_ESCON 50/5

551_ESCON Module 50/5

562_EPOS4 Module 24/1.5

562_EPOS4 Module 50/5

564_EPOS4 Compact 24/1.5

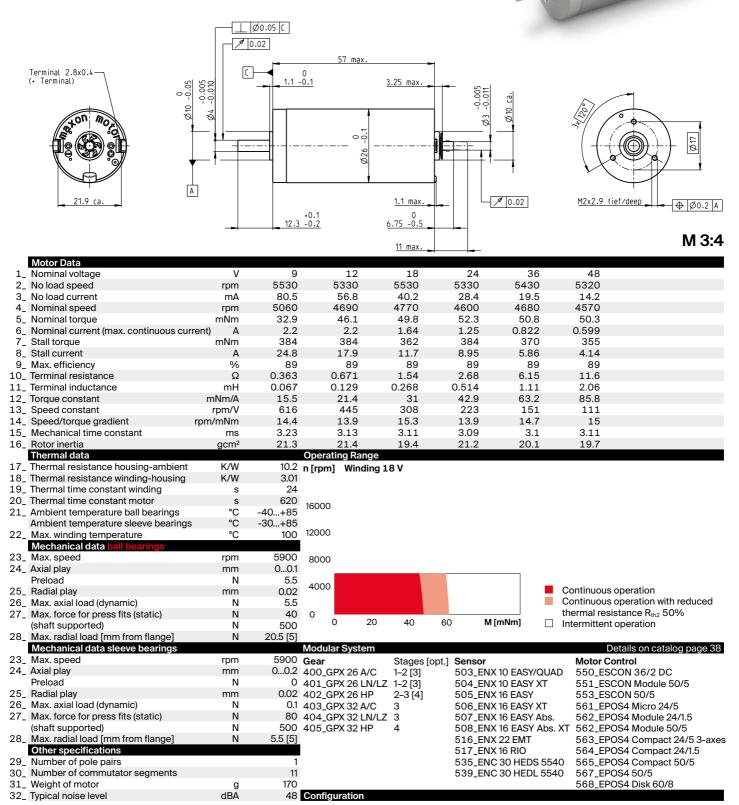
565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

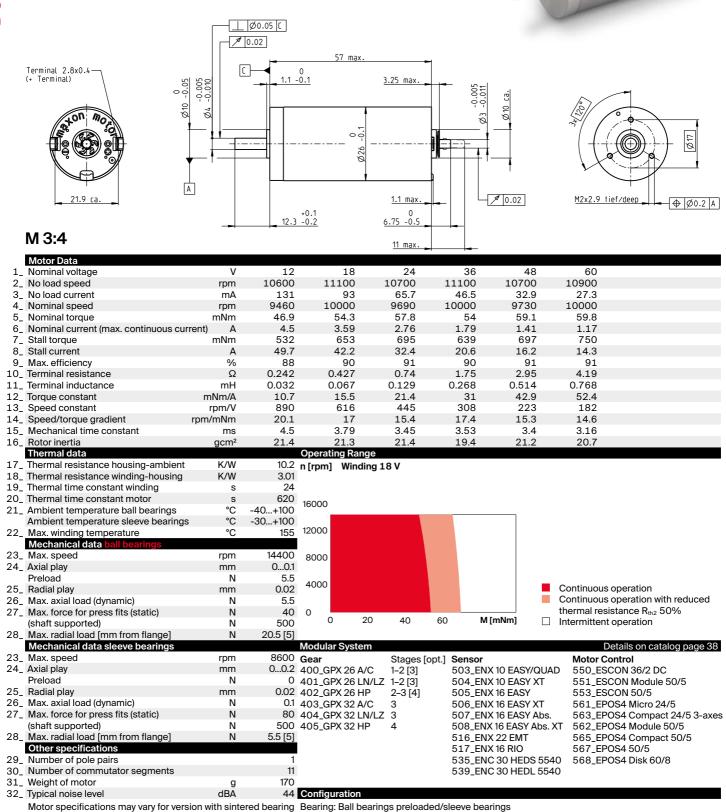
563_EPOS4 Compact 24/5 3-axes

maxon

Key Data: 18/29 W, 52.3 mNm, 5900 rpm



Bearing: Ball bearings preloaded/sleeve bearings Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/ alignment of connection/cable length/connector type



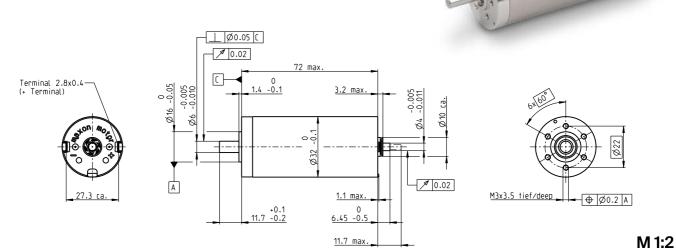
Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/alignment of connection/cable length/connector type

Commutation: Precious metal brushes with CLL/graphite brushes Flange front/back: Standard flange/configurable flange/no flange

(max. winding temperature 125°C).

maxon

Key Data: 70/110 W, 128 mNm, 11300 rpm



Motor Data								
1_ Nominal voltage	V	12	18	24	36	48	60	
2_ No load speed	rpm	7120	8630	8270	7940	7780	5840	
3_ No load current	mA	274	234	164	103	75.2	41.6	
4_ Nominal speed	rpm	6560	8070	7710	7410	7260	5290	
5_ Nominal torque	mNm	89.4	101	108	119	123	128	
6_ Nominal current (max. continuou	is current) A	6.00	5.42	4.12	2.87	2.17	1.35	
7_ Stall torque	mNm	1730	2120	1980	2020	2000	1420	
8_ Stall current	Α	111	109	72.5	47.1	34.2	14.5	
9_ Max. efficiency	%	85	88	88	90	90	89	
10_ Terminal resistance	Ω	0.108	0.165	0.331	0.764	1.40	4.12	
11_ Terminal inductance	mH	0.034	0.053	0.103	0.254	0.473	1.31	
12_ Torque constant	mNm/A	15.6	19.5	27.3	42.9	58.5	97.5	
13_ Speed constant	rpm/V	612	490	350	223	163	97.9	
14_ Speed/torque gradient	rpm/mNm	4.24	4.15	4.24	3.96	3.92	4.14	
15_ Mechanical time constant	ms	3.44	3.30	3.24	3.19	3.11	3.11	
16_ Rotor inertia	gcm²	77.6	75.9	72.8	76.8	75.9	71.7	
Thermal data		O	perating Range	9				

n [rpm] Winding 36 V

15000

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	7.28
18_	Thermal resistance winding-housing	K/W	2.3
19_	Thermal time constant winding	S	42.2
20_	Thermal time constant motor	s	837
21_	Ambient temperature	°C	-40+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23_	Max. speed	rpm	11300
24_	Axial play	mm	00.1
	Preload	N	7
25_	Radial play	mm	0.02
26_	Max. axial load (dynamic)	N	7
27_	Max. force for press fits (static)	N	22.6
	(shaft supported)	N	2510
28	Max. radial load [mm from flange]	N	65.3 [5]

10000 5000 0 50 100 150 **M [mNm]**

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

551_ESCON Module 50/5

552_ESCON Module 50/8 HE

Motor Control

553_ESCON 50/5

553_ESCON 70/10

Details on catalog page 38

maxon

28_	Max. radial load [mm from flange]	N	65.3 [5]	
	Other specifications			Мо
29_	Number of pole pairs		1	Ge
30_	Number of commutator segments		11	40
31_	Weight of motor	g	325	40
32_	Typical noise level	dBA	47	40
				40

10 1_01 1 02 2147 22	2-3 [4] 1-4 3	Sensor 503_ENX 10 EASY/QUAD 504_ENX 10 EASY XT 505_ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Abs. XT 508_ENX 16 EASY Abs. XT 517_ENX 22 EMT 517_ENX 16 RIO 535_ENC 30 HEDS 5540

561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8

567_EPOS4 50/5 567_EPOS4 70/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

Configuration

Modular System

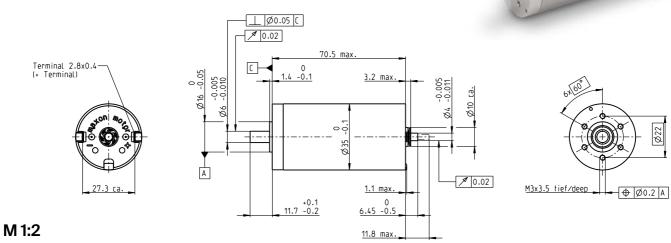
Bearing: Ball bearings preloaded Commutation: Graphite brushes

Flange front/back: Standard flange/configurable flange/ no flange

Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/

alignment of connection/cable length/connector type

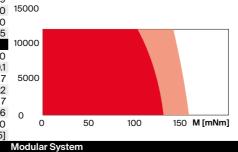
Key Data: 80/120 W, 138 mNm, 12300 rpm



	Motor Data								
1_	Nominal voltage	V	12	18	24	36	48	60	
2_	No load speed	rpm	8130	7200	7720	7940	6670	7690	
3_	No load current	mA	320	177	146	101	58.6	57.5	
4_	Nominal speed	rpm	7610	6640	7160	7410	6140	7160	
5_	Nominal torque	mNm	77.7	120	121	128	138	132	
6_	Nominal current (max. continuous curre	nt) A	6.00	5.32	4.26	3.07	2.08	1.84	
7_	Stall torque	mNm	2080	1980	2030	2160	1860	2050	
8_	Stall current	Α	152	84.8	69.3	50.3	27.3	27.7	
9_	Max. efficiency	%	85	88	89	90	90	90	
10_	Terminal resistance	Ω	0.079	0.212	0.346	0.716	1.76	2.16	
11_	Terminal inductance	mH	0.026	0.077	0.121	0.260	0.658	0.776	
12_	Torque constant	mNm/A	13.7	23.4	29.3	42.9	68.3	74.1	
13_	Speed constant	rpm/V	699	408	326	223	140	129	
14_	Speed/torque gradient rp	om/mNm	4.04	3.70	3.86	3.72	3.61	3.76	
15_	Mechanical time constant	ms	4.21	3.97	3.91	3.84	3.76	3.75	
16_	Rotor inertia	gcm ²	99.5	102	96.6	98.7	99.5	95.2	
	Thermal data		C	perating Ran	ge				

n [rpm] Winding 36 V

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	6.98
18_	Thermal resistance winding-housing	K/W	2.1
19_	Thermal time constant winding	S	43.9
20_	Thermal time constant motor	S	1030
21_	Ambient temperature	°C	-40+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23_	Max. speed	rpm	12300
24_	Axial play	mm	00.1
	Preload	N	7
25_	Radial play	mm	0.02
26_	Max. axial load (dynamic)	N	7
27_	Max. force for press fits (static)	N	22.6
	(shaft supported)	N	2510



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

maxon

28_ Max. radial load [mm from flange]	N	65.3 [5]	
Other specifications			Modu
29_ Number of pole pairs		1	Gear
30_ Number of commutator segments		11	407_
31_ Weight of motor	g	385	408_
32_ Typical noise level	dBA	48	409_
			409

1	Gear	Stages [opt.]	Sensor
11	407_GPX 37 A	1–2	503_ENX 10 EASY/QUAD
35	408_GPX 37 LN/LZ	1-2	504_ENX 10 EASY XT
18	409_GPX 42 C	1-4	505_ENX 16 EASY
	409_GPX 42 UP	1-4	506_ENX 16 EASY XT
			507_ENX 16 EASY Abs.
			508_ENX 16 EASY Abs. XT
			516_ENX 22 EMT
			517_ENX 16 RIO
			535_ENC 30 HEDS 5540
			539_ENC 30 HEDL 5540

Motor Control 551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 561_EPOS4 Micro 24/5 T 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS470/15

568_EPOS4 Disk 60/8

569_EPOS4 Disk 60/12

Details on catalog page 38

Configuration

Bearing: Ball bearings preloaded Commutation: Graphite brushes

Flange front/back: Standard flange/configurable flange/ no flange

Shaft front/back: Length/diameter/flat face Electric connection: Terminals or cable/

Ш	
Ξ	١
	i
	1
•	1
_	١
	١
_	

DC Motor		
DC Mote	ł	
DC Mo		
DC M	ł	
DC	۱	
8	ı	
_	ŧ	
	ı	

Screw drive

maxon DC-max

Standard Specification No. 100	88
Terminology explanations	92
DC-max Program (can be configured online)	119-124
DC-max 16 S Ø16 mm, Precious metal brushes, 2 Watt	119
DC-max 16 S Ø16 mm, Graphite brushes, 3 Watt	120
DC-max 22 S Ø22 mm, Precious metal brushes, 5 Watt	121
DC-max 22 S Ø22 mm, Graphite brushes, 8 Watt	122
DC-max 26 S Ø26 mm, Precious metal brushes, 9 Watt	123
DC-max 26 S Ø26 mm. Graphite brushes, 22 Watt	124



© 2024 maxon. All rights reserved.

maxon DC-max

Strong neodymium magnet, state-of-the-art winding technology, cost-optimized design, economical manufacturing: The brushed maxon DC-max motors feature maximum performance at minimum volume and an unrivaled price-performance ratio. Choose between graphite and precious metal brushes, sintered and ball bearings, and many other components.

Key data

Motor Ø16 ... 26 mmMotor length25.4 ... 44.7 mmPower2 ... 22 WNominal torqueup to 32.7 mNmMax. permissible speedup to 11000 rpm



Electrical connection with terminals, cables and connectors, depending on the size.

Commutation with precious metal brushes for fine rotary motion or graphite brushes for heavy-duty use.

In a hybrid process, a stator is formed by assembling the motor housing and magnet in one step using injection molding of PPA plastic. Sintered bearings or ball bearings.

Highly efficient ironless winding, system maxon – different nominal voltages available.

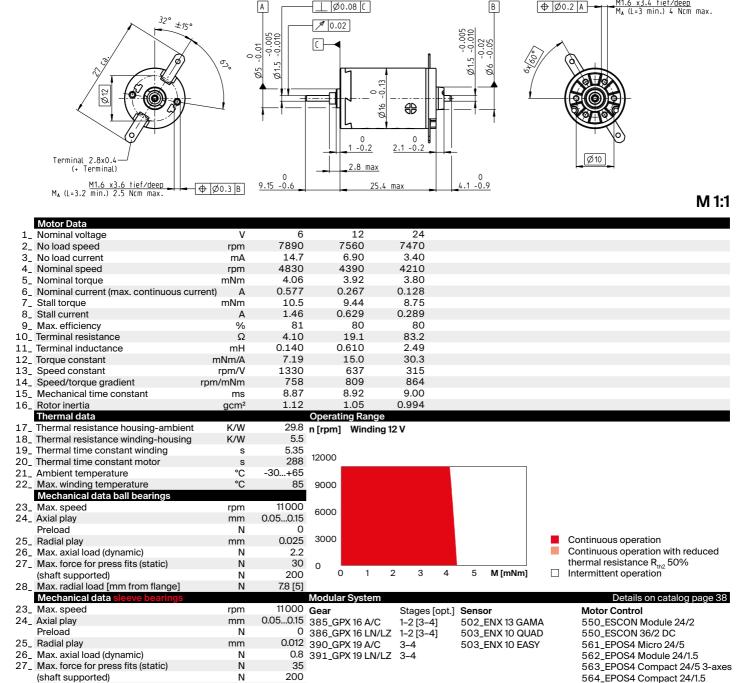
Stainless steel shaft with high stiffness; various modification options available.

- → The cost-effective alternative to the DCX program
- High performance at a low cost
- Combines the rational manufacturing and design of A-max motors with the higher power density offered by NdFeB magnets
- → Automated manufacturing process
- Easily configured online

DC-max 16 S Ø16 mm, precious metal brushes, DC motor

Key Data: 2/4.3 W, 4.1 mNm, 11000 rpm





Bearing: Sleeve bearings/ball bearings Commutation: Precious metal brushes with CLL/Graphite Brushes Shaft front/back: Length Electric connection: Terminals/cable

Ν

g

1.4 [5]

23.3

Configuration

Max. radial load [mm from flange]

30_ Number of commutator segments

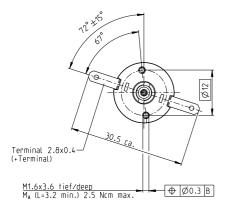
Other specifications 29_ Number of pole pairs

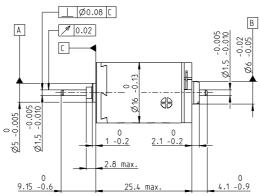
31_ Weight of motor

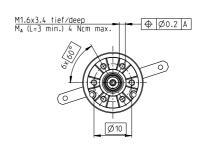
DC-max 16 S Ø16 mm, graphite brushes, DC motor

Key Data: 3/4.7 W, 4.8 mNm, 11000 rpm









M 1:1

								IVI I. I
	Motor Data							
1	Nominal voltage	V	6		12	24		
	No load speed	rpm	9870	o	860	9920		
_	No load speed	mA	67.3		33.6	16.8		
	Nominal speed	rpm	6770		33.0	6580		
_	Nominal torque	mNm	3.71		4.31	4.76		
_	Nominal current (max. continuous cur		0.720		.413	0.227		
_	Stall torque	mNm	12.1		11.9	14.4		
_	Stall current	A	2.15		1.05	0.64		
_	Max. efficiency	%	68		68	71		
_	Terminal resistance	70	2.79		11.4	37.5		
	Terminal inductance	mH	0.086		.343	1.37		
_		mNm/A	5.62		11.2	22.5		
	Torque constant Speed constant	rpm/V	1700		849	424		
_	·							
_	Speed/torque gradient	rpm/mNm	843		858	707		
_	Mechanical time constant	ms	8.85		8.92	8.57		
TP_	Rotor inertia	gcm²	1.00		.993	1.16		
	Thermal data	14.044	00.0		ng Range			
	Thermal resistance housing-ambient	K/W		n [rpm]	Winding 2	24 V		
	Thermal resistance winding-housing	K/W	5.5					
_	Thermal time constant winding	S	5.35	12000				
_	Thermal time constant motor	S	288	.2000				
	Ambient temperature	°C	-30+85					
22_	Max. winding temperature	°C	125	9000				
	Mechanical data ball bearings							
	Max. speed	rpm	11000	6000				
24_	Axial play	mm	0.050.15					
	Preload	N	0	2000				
	Radial play	mm	0.025	3000				Continuous operation
	Max. axial load (dynamic)	N	2.2					Continuous operation with reduced
27_	Max. force for press fits (static)	N	30	0	-	2 0 4	5 1451	thermal resistance R _{th2} 50%
	(shaft supported)	N	200	0	1 :	2 3 4	5 M [mNm]	☐ Intermittent operation
28_	Max. radial load [mm from flange]	N	7.8 [5]					
	Mechanical data sleeve bearings				r System			Details on catalog page 38
	Max. speed	rpm	11000	Gear		Stages [opt.] Sensor	Motor Control
24_	Axial play	mm	0.050.15	385_GP	X 16 A/C	1-2 [3-4]	502_ENX 13 GAMA	550_ESCON Module 24/2
	Preload	N				1-2 [3-4]	503_ENX 10 QUAD	550_ESCON 36/2 DC
25_	Radial play	mm	0.012	390_GP	X 19 A/C	3-4	503_ENX 10 EASY	561_EPOS4 Micro 24/5
26_	Max. axial load (dynamic)	N			X 19 LN/LZ	3-4	= -	562_EPOS4 Module 24/1.5
27_	Max. force for press fits (static)	N	35					563_EPOS4 Compact 24/5 3-axe
	(shaft supported)	N	200					564_EPOS4 Compact 24/1.5
28_	Max. radial load [mm from flange]	N	1.4 [5]					
_	Other specifications							
29_	Number of pole pairs		1					
	Number of commutator segments		7					
31_	Weight of motor	g	23.1					
-	-	J						

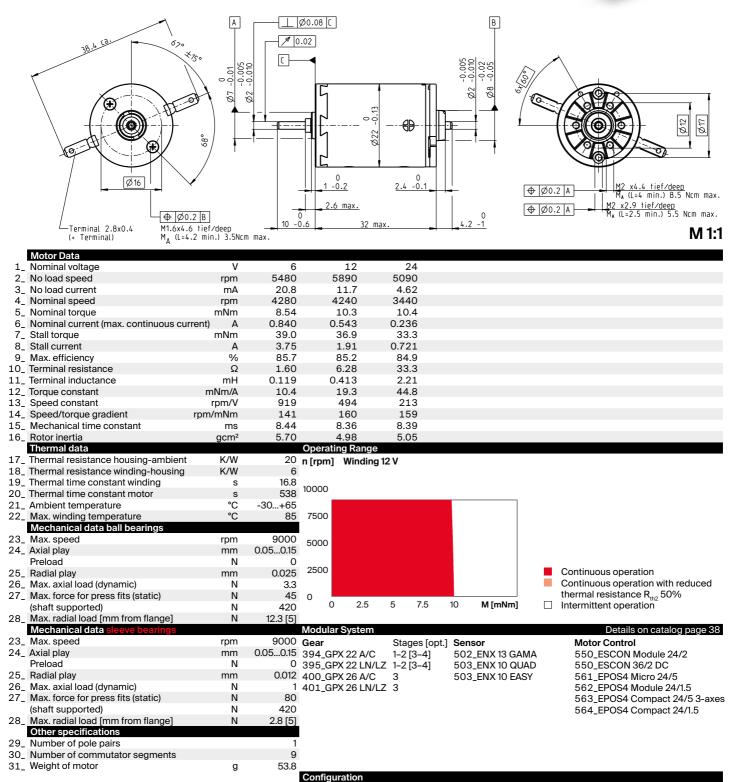
Configuration

Bearing: Sleeve bearings/ball bearings
Commutation: Precious metal brushes with CLL/Graphite Brushes
Shaft front/back: Length
Electric connection: Terminals/cable

DC-max 22 S Ø22 mm, precious metal brushes, DC motor

Key Data: 5/9.6 W, 10.4 mNm, 9000 rpm





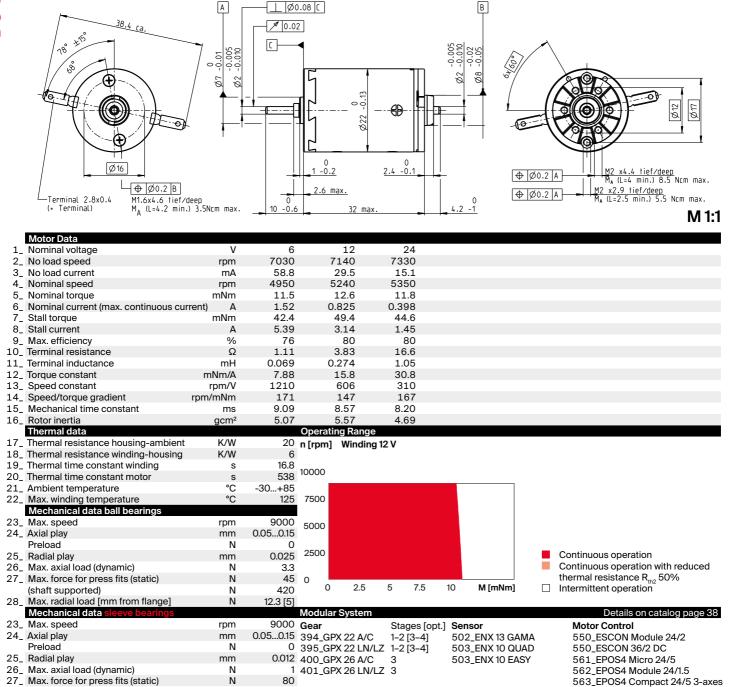
Bearing: Sleeve bearings/ball bearings Commutation: Precious metal brushes with CLL/Graphite Brushes Shaft front/back: Length

Electric connection: Terminals/cable

DC-max 22 S Ø22 mm, graphite brushes, DC motor

Key Data: 8/10 W, 12.6 mNm, 9000 rpm





Configuration

420

9

53.8

2.8 [5]

N

Ν

g

Bearing: Sleeve bearings/ball bearings Commutation: Precious metal brushes with CLL/Graphite Brushes Shaft front/back: Length

Electric connection: Terminals/cable

(shaft supported)

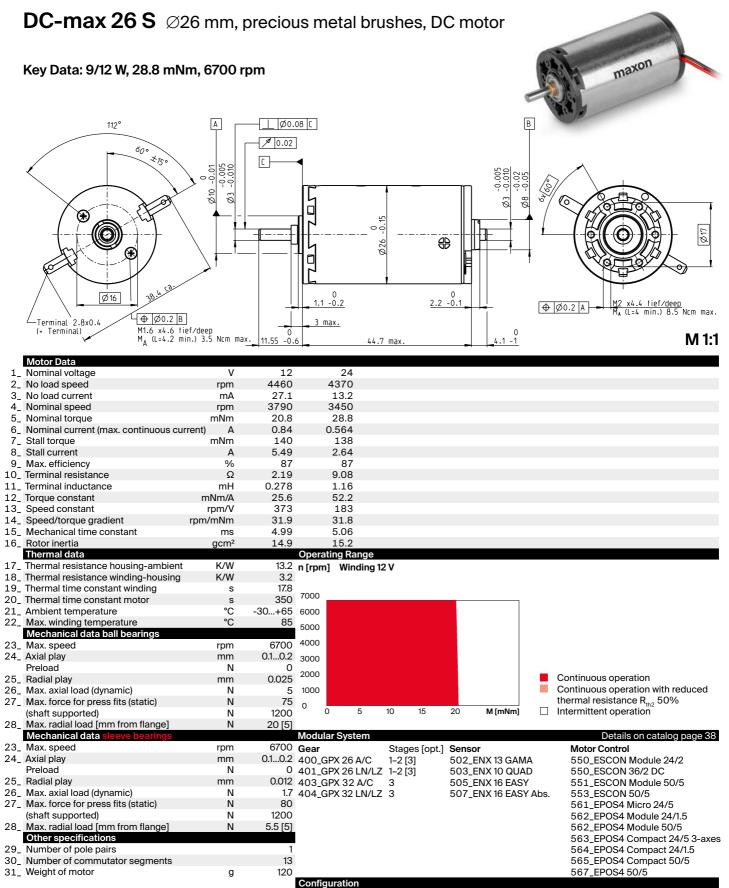
31_ Weight of motor

Other specifications
29_ Number of pole pairs

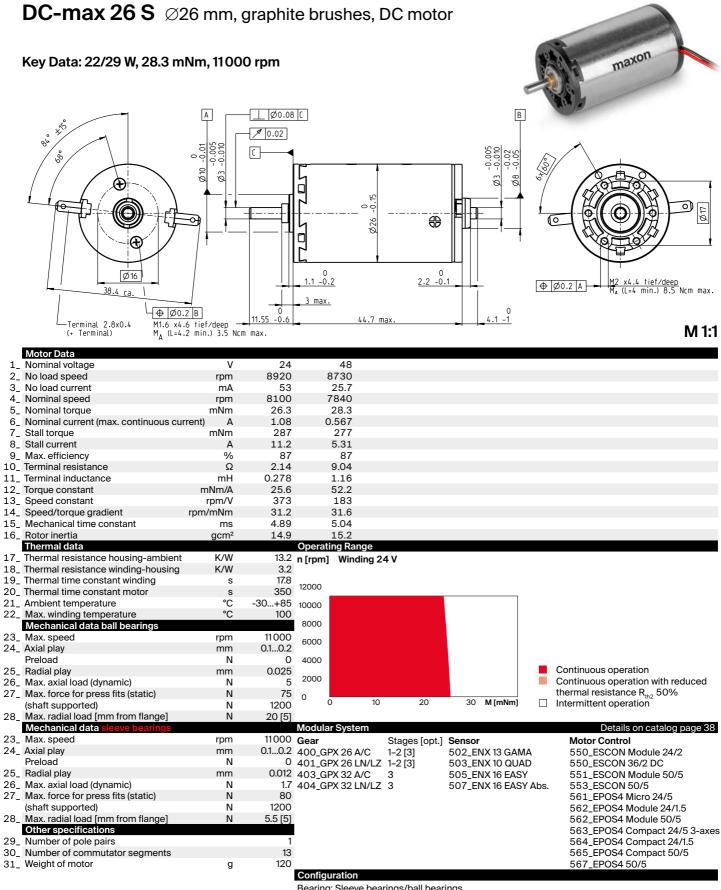
Max. radial load [mm from flange]

30_ Number of commutator segments

564_EPOS4 Compact 24/1.5



Bearing: Sleeve bearings/ball bearings Commutation: Precious metal brushes with CLL/Graphite Brushes Shaft front/back: Length Electric connection: Terminals/cable



Bearing: Sleeve bearings/ball bearings Commutation: Precious metal brushes with CLL/Graphite Brushes Shaft front/back: Length Electric connection: Terminals/cable

Standard Opecinication No. 100	00
Terminology explanations	92
RE Program	127-163
RE 6 Ø6 mm, Precious metal brushes, 0.3 Watt	127
RE 8 Ø8 mm, Precious metal brushes, 0.5 Watt	128
RE 10 ∅10 mm, Precious metal brushes, 0.75 Watt	129-130
RE 10 Ø10 mm, Precious metal brushes, 1.5 Watt	131-132
RE 13 Ø13 mm, Precious metal brushes, 1.2 Watt	133-134
RE 13 Ø13 mm, Precious metal brushes, 0.75 Watt	135-136
RE 13 Ø13 mm, Precious metal brushes, 2.5 Watt	137-138
RE 13 Ø13 mm, Precious metal brushes, 2 Watt	139-140
RE 13 Ø13 mm, Graphite brushes, 1.5 Watt	141-144
RE 13 Ø13 mm, Graphite brushes, 3 Watt	145-148
RE 16 Ø16 mm, Precious metal brushes CLL, 2 Watt	149
RE 16 Ø16 mm, Precious metal brushes CLL, 3.2 Watt	150-151
RE 16 ∅16 mm, Graphite brushes, 4.5 Watt	152-153
RE 25 Ø25 mm, Precious metal brushes CLL, 10 Watt	154
RE 25 Ø25 mm, Graphite brushes, 20 Watt	155-156
RE 30 Ø30 mm, Precious metal brushes, 15 Watt	157
RE 30 Ø30 mm, Graphite brushes, 60 Watt	158
RE 35 Ø35 mm, Graphite brushes, 90 Watt	159
RE 40 Ø40 mm, Precious metal brushes, 25 Watt	160
RE 40 Ø40 mm, Graphite brushes, 150 Watt	161
RE 50 Ø50 mm, Graphite brushes, 200 Watt	162
RE 65 Ø65 mm. Graphite brushes, 250 Watt	163



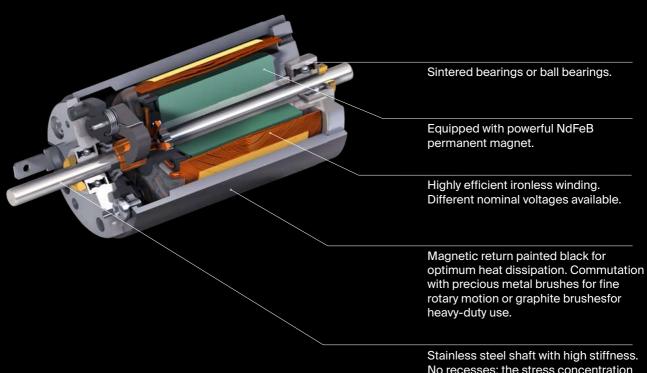
DC Motor Screw drive

© 2024 maxon. All rights reserved.

maxon RE

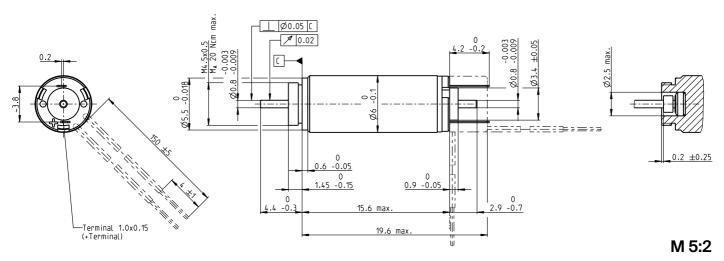
maxon brushed RE-motors are high-quality DC motors, equipped with powerful permanent magnets. The centerpiece of the motor is the ironless rotor. This means cutting-edge technology for compact, powerful drives with low inertia. As a result of the low mass moment of inertia, the DC motors feature high acceleration.

Motor \emptyset 6 ... 65 mm 15.6 ... 131.4 mm Motor length 0.3 ... 250 W Power Nominal torque up to 888 mNm Max. permissible speed up to 23 000 rpm

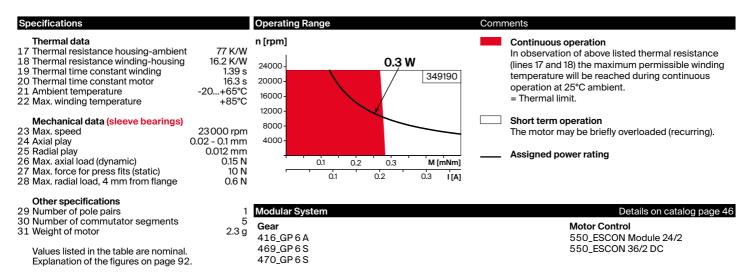


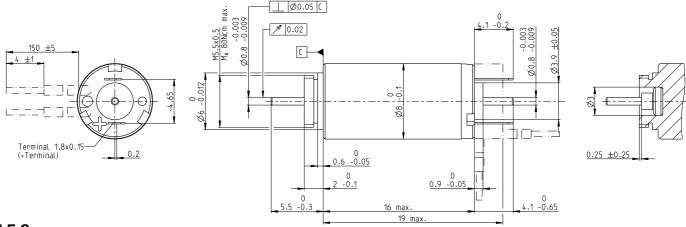
- High power density
- High-quality DC motor with NdFeB magnet
- High speeds and torques
- Robust design (metal flange)

No recesses; the stress concentration is eliminated.



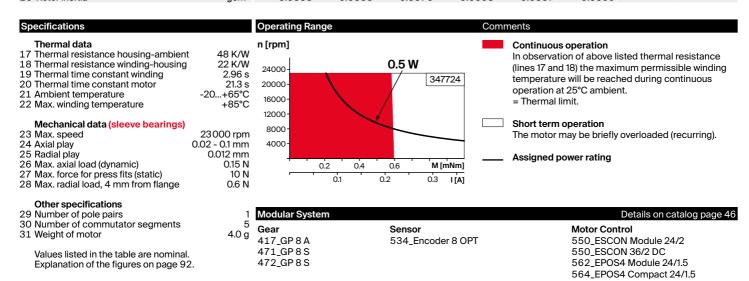
Stock program Standard program Special program (on request)		Part Numbers	;		
	B with cables	386780	386781	386782	386783
	A with terminals	349189	349190	349191	349192
Motor Data					
Values at nominal voltage					
1 Nominal voltage	V	1.5	3	4.5	6
2 No load speed	rpm	18500	18600	18600	18600
3 No load current	mA	42.6	21.3	14.2	10.7
4 Nominal speed	rpm	4680	5670	5400	5340
5 Nominal torque	mNm	0.302	0.324	0.318	0.316
6 Nominal current (max. continuous		0.453	0.242	0.158	0.118
7 Stall torque	mNm	0.419	0.485	0.469	0.465
8 Stall current	Α	0.581	0.336	0.217	0.161
9 Max. efficiency	%	54	56	56	56
Characteristics					
10 Terminal resistance	Ω	2.58	8.92	20.8	37.2
11 Terminal inductance	mH	0.023	0.091	0.204	0.363
12 Torque constant	mNm/A	0.72	1.44	2.16	2.88
13 Speed constant	rpm/V	13300	6630	4420	3310
14 Speed/torque gradient	rpm/mNm	47500	41000	42400	42700
15 Mechanical time constant	ms	7.45	7.18	7.24	7.24
16 Rotor inertia	gcm ²	0.015	0.0167	0.0163	0.0162

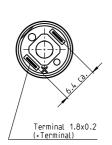


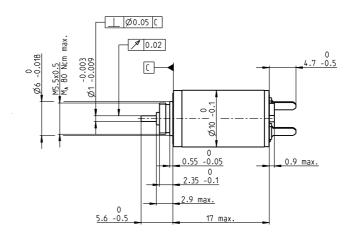


M 5:2

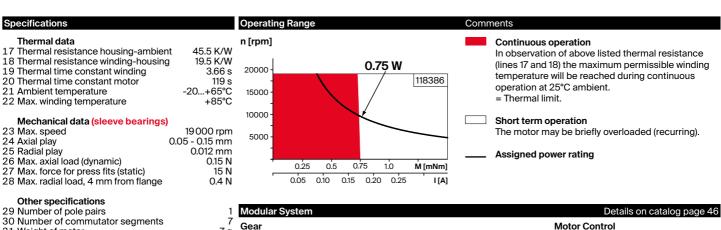
Stock program Standard program Special program (on request	t)	Part Numbers	.				
	B with cables	462207	463219	463220	463221	463222	463223
	A with terminals	347723	347724	347725	347728	347726	347727
Motor Data							
Values at nominal voltage							
1 Nominal voltage	V	2.4	4.2	6	7.2	9	12
2 No load speed	rpm	13900	14200	13300	14300	14400	15600
3 No load current	mA	19.2	11.2	7.3	6.66	5.35	4.44
4 Nominal speed	rpm	4320	4480	3500	4220	4760	5410
5 Nominal torque	mNm	0.63	0.624	0.616	0.596	0.626	0.589
6 Nominal current (max. continuo	ous current) A	0.412	0.237	0.155	0.134	0.113	0.0865
7 Stall torque	mNm	0.925	0.932	0.857	0.866	0.957	0.925
8 Stall current	Α	0.581	0.34	0.207	0.187	0.166	0.13
9 Max. efficiency	%	67	67	66	66	68	67
Characteristics							
10 Terminal resistance	Ω	4.13	12.3	29	38.5	54.3	92.2
11 Terminal inductance	mH	0.03	0.09	0.206	0.257	0.4	0.606
12 Torque constant	mNm/A	1.59	2.74	4.15	4.63	5.77	7.11
13 Speed constant	rpm/V	6000	3490	2300	2060	1650	1340
14 Speed/torque gradient	rpm/mNm	15600	15700	16100	17200	15500	17400
15 Mechanical time constant	ms	6.31	6.3	6.34	6.44	6.29	6.49
16 Rotor inertia	gcm ²	0.0388	0.0383	0.0375	0.0358	0.0387	0.0355







Stock program **Part Numbers** Standard program Special program (on request) 118382 | 118383 | 118384 | 118385 | 118386 | 118387 | 118388 | 118389 | 118390 | 118391 **Motor Data** Values at nominal voltage Nominal voltage 3.6 2 No load speed 10300 10400 9930 11300 13000 11400 11700 10600 10700 11600 rpm 3 No load current mΑ 16 12.8 10.1 9.52 8.51 7.18 6.22 5.46 4.44 3.68 4 Nominal speed 1610 1970 1500 2950 4670 3150 3340 1860 2000 2790 rpm 5 Nominal torque mNm 0.757 0.789 0.784 0.787 0.784 0.8 0.784 0.757 0.757 0.746 6 Nominal current (max. continuous current) 0.367 0.243 0.222 0.17 0.101 0.081 0.306 0.19 0.143 0.125 0.924 0.949 1.09 7 Stall torque mNm 1.25 1.13 1.12 0.944 0.957 1.01 8 Stall current 0.432 0.375 0.284 0.297 0.292 0.232 0.198 0.15 0.123 0.106 9 Max. efficiency % 66 67 68 69 68 68 67 Characteristics 10 Terminal resistance Ω 5.55 8 12.7 15.2 20.6 25.8 36.4 47.9 72.9 114 0.072 11 Terminal inductance mΗ 0.046 0.112 0.136 0.184 0.24 0.325 0.398 0.605 0.92 12 Torque constant mNm/A 2.14 2.67 3.34 3.67 4.27 4.88 5.68 6.28 7.75 9.55 4470 3570 2860 2600 13 Speed constant rpm/\ 2230 1960 1680 1520 1230 1000 14 Speed/torque gradient rpm/mNm 11600 10700 10800 10700 10700 10400 10800 11600 11600 11900 15 Mechanical time constant 8.15 8.11 8.14 8.09 8.09 8.03 8.13 8.26 8.25 8.34 ms 0.0671 0.0719 0.0719 0.0669 16 Rotor inertia 0.0723 0.0717 0.0719 0.0739 0.068 0.068 gcm²



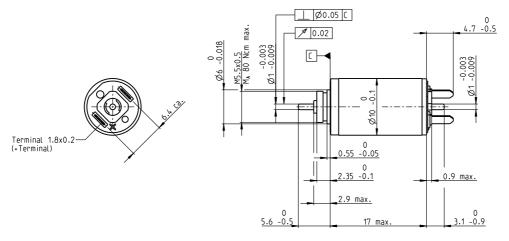
- 31 Weight of motor

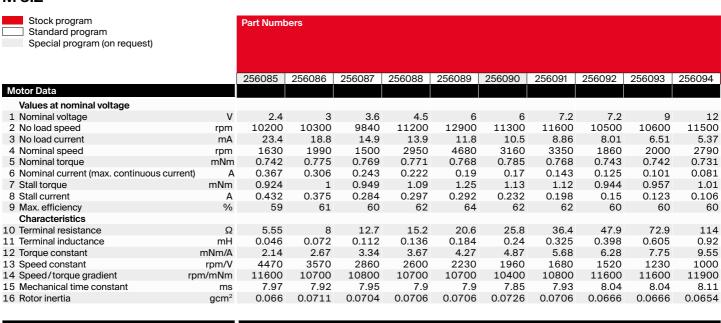
Values listed in the table are nominal. Explanation of the figures on page 92. Gear 418 GP 10 K

419_GP10A

7 g

Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC





Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 45 5 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 18 Thermal resistance winding-housing 19.5 K/W 0.75 W (lines 17 and 18) the maximum permissible winding 15000 19 Thermal time constant winding 3.16 s 256089 temperature will be reached during continuous 108 s 20 Thermal time constant motor operation at 25°C ambient. 21 Ambient temperature -20...+65°C 10000 = Thermal limit. 22 Max. winding temperature +85°C Mechanical data (sleeve bearings) Short term operation 5000 14000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 24 Axial play 25 Radial play 0.05 - 0.15 mm 0.012 mm Assigned power rating 26 Max. axial load (dynamic) 0.15 N 0.5 0.75 1.0 M [mNm] 27 Max. force for press fits (static) 28 Max. radial load, 4 mm from flange 0.10 0.15 0.20 0.25 0.4 N Other specifications

Values listed in the table are nominal. Explanation of the figures on page 92.

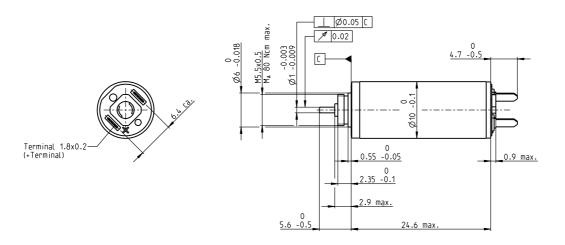
29 Number of pole pairs 30 Number of commutator segments

31 Weight of motor

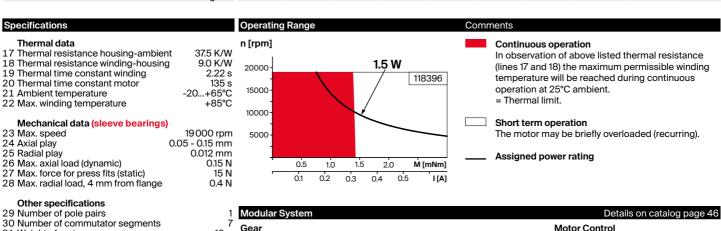
1 Modular System 7 Gear 418_GP 10 K 419_GP 10 A

Sensor 501_ENX 10 GAMA 532_Encoder MR 16 CPT Motor Control 550_ESCON Module 24/2 550_ESCON 36/2 DC 562_EPOS4 Module 24/1.5 564_EPOS4 Compact 24/1.5

Details on catalog page 46



Stock program Standard program Special program (on request)		Part Numb	ers							
	[118392	118393	118394	118395	118396	118397	118398	118399	118400
Motor Data										
Values at nominal voltage										
1 Nominal voltage	V	3	3	4.5	4.5	6	6	9	9	12
2 No load speed	rpm	13000	10700	12800	10600	12400	9880	12200	11100	12500
3 No load current	mA	23.9	18.5	15.5	12.1	11.1	8.33	7.27	6.42	5.67
4 Nominal speed	rpm	6840	4430	6530	4210	6160	3880	6080	4990	6510
5 Nominal torque	mNm	1.5	1.49	1.48	1.47	1.5	1.57	1.53	1.54	1.54
6 Nominal current (max. continuous current)	Α	0.713	0.582	0.462	0.379	0.338	0.282	0.226	0.207	0.176
7 Stall torque	mNm	3.12	2.52	3.04	2.47	3.01	2.61	3.08	2.83	3.24
8 Stall current	Α	1.44	0.963	0.919	0.619	0.66	0.458	0.444	0.371	0.36
9 Max. efficiency	%	76	74	76	74	76	75	76	76	77
Characteristics										
10 Terminal resistance	Ω	2.08	3.11	4.9	7.27	9.09	13.1	20.3	24.3	33.3
11 Terminal inductance	mΗ	0.017	0.025	0.04	0.059	0.077	0.12	0.178	0.215	0.299
12 Torque constant	mNm/A	2.16	2.62	3.3	3.99	4.56	5.7	6.95	7.63	9
13 Speed constant	rpm/V	4410	3640	2890	2400	2100	1680	1370	1250	1060
14 Speed/torque gradient rpn	n/mNm	4240	4330	4280	4370	4180	3860	4010	3980	3930
15 Mechanical time constant	ms	4.62	4.61	4.6	4.59	4.58	4.56	4.59	4.56	4.56
16 Rotor inertia	gcm ²	0.104	0.102	0.102	0.1	0.105	0.113	0.109	0.11	0.111



550_ESCON Module 24/2 550_ESCON 36/2 DC

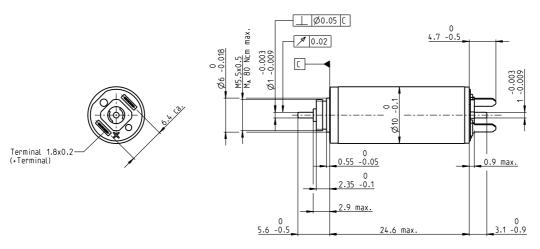
10 g

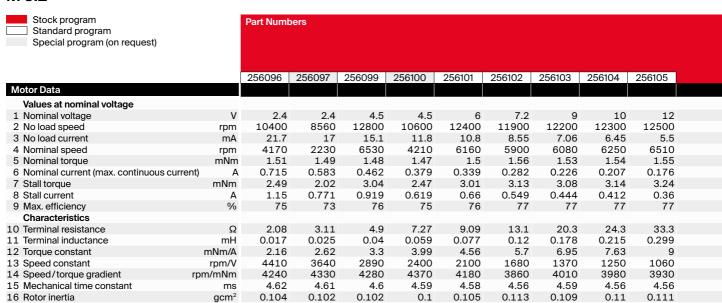
418_GP10 K

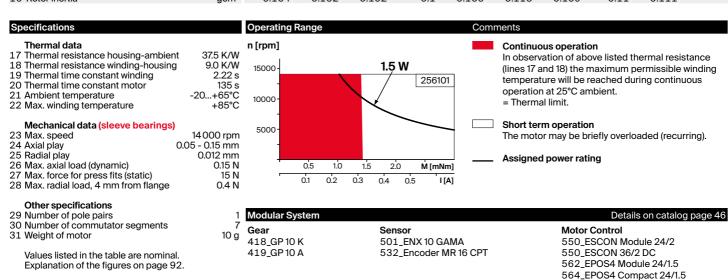
419_GP10A

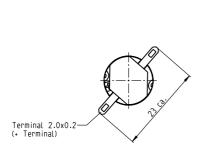
31 Weight of motor

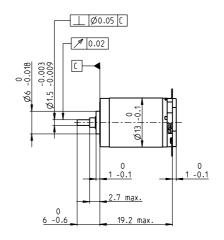
Values listed in the table are nominal. Explanation of the figures on page 92.



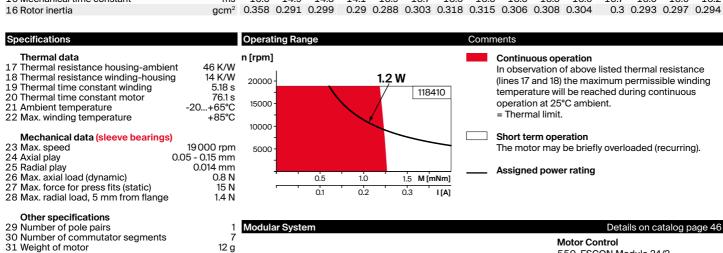




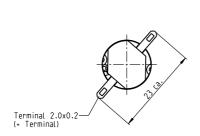


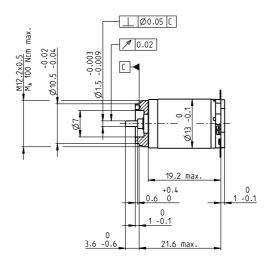


Stock program **Part Numbers** Standard program Special program (on request) 118401 | 118402 | 118403 | 118404 | 118405 | 118406 | 118407 | 118408 | 118409 | 118410 | 118411 | 118412 | 118413 | 118414 | 118415 **Motor Data** Values at nominal voltage 1 Nominal voltage 1.8 2.4 3 3.6 2 No load speed $\mathsf{rpm}\ 11600\ 11300\ 11100\ 11000\ 11300\ 11600\ 12100\ 11500\ 11300\ 10900\ 11700\ 10600\ 11000\ 11200\ 10700$ 3 No load current mΑ 104 84.1 65.7 53.8 42 34.5 30.6 24.5 20.1 13.2 10.3 9.75 8.31 6.21 4 Nominal speed 9930 8600 7670 6520 5860 6250 6960 6310 6010 5650 6400 5210 5590 5820 5300 rpm 5 Nominal torque mNm 0.499 0.63 0.825 1.02 1.24 1.27 1.31 1.3 1.28 1.28 1.27 1.26 1.24 1.25 1.27 0.72 0.666 0.557 0.499 0.405 0.329 0.266 0.211 0.169 0.156 0.133 6 Nominal current (max. continuous current) 0.72 0.72 0.72 0.103 2.86 2.4 2.52 2.45 2.54 2.76 3.08 2.9 2.76 2.69 2.84 2.52 2.57 2.65 2.57 7 Stall torque mNm 0.674 3.56 2.45 2.02 0.857 0.53 0.449 0.321 0.307 0.268 8 Stall current 1.62 1.3 1.15 1.11 0.198 9 Max. efficiency % 69 67 68 67 68 69 70 70 69 69 69 68 68 68 68 Characteristics 10 Terminal resistance Ω 0.281 0.491 0.742 1.11 1.85 2.61 3.23 4.9 7.42 11.3 17.8 28 32.6 44.9 78.8 11 Terminal inductance mΗ 0.006 0.009 0.015 0.022 0.036 0.054 0.072 0.108 0.158 0.243 0.377 0.579 0.661 0.921 1.6 mNm/A 0.802 0.98 1.51 1.96 2.41 2.76 3.39 4.1 5.08 6.32 7.84 8.37 9.89 13 12 Torque constant 1.25 11900 9740 7660 6310 4870 3970 3460 2820 2330 1880 1510 1220 1140 966 734 13 Speed constant rpm/V 14 Speed/torque gradient rpm/mNm 4170 4880 4560 4640 4600 4310 4040 4090 4220 4190 4250 4350 4440 4380 4280 15 Mechanical time constant 15.6 14.9 14.3 14.1 13.9 13.7 13.5 13.5 13.5 13.5 13.6 13.7 13.6 13.6 13.2 ms



Values listed in the table are nominal. Explanation of the figures on page 92. Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC





Stock program Part Numbers Standard program Special program (on request)

		118416	118417	118418	118419	118420	118421	118422	118423	118424	118425	118426	118427	118428	118429	118430
Motor Data																
Values at nominal voltage																
1 Nominal voltage	V	1	1.2	1.5	1.8	2.4	3	3.6	4.2	5	6	8	9	10	12	15
2 No load speed	rpm	11600	11300	11100	11000	11300	11600	12100	11500	11300	10900	11700	10600	11000	11200	10700
3 No load current	mA	104	84.1	65.7	53.8	42	34.5	30.6	24.5	20.1	16	13.2	10.3	9.75	8.31	6.2
4 Nominal speed	rpm	9930	8600	7670	6520	5860	6250	6960	6310	6010	5650	6400	5210	5590	5820	5190
5 Nominal torque	mNm	0.499	0.63	0.825	1.02	1.24	1.27	1.31	1.3	1.28	1.28	1.27	1.26	1.24	1.25	1.24
6 Nominal current (max. continuous curre	nt) A	0.72	0.72	0.72	0.72	0.666	0.557	0.499	0.405	0.329	0.266	0.211	0.169	0.156	0.133	0.101
7 Stall torque	mNm	2.86	2.4	2.52	2.45	2.54	2.76	3.08	2.9	2.76	2.69	2.84	2.52	2.57	2.65	2.48
8 Stall current	Α	3.56	2.45	2.02	1.62	1.3	1.15	1.11	0.857	0.674	0.53	0.449	0.321	0.307	0.268	0.19
9 Max. efficiency	%	69	67	68	67	68	69	70	70	69	69	69	68	68	68	68
Characteristics																
10 Terminal resistance	Ω	0.281	0.491	0.742	1.11	1.85	2.61	3.23	4.9	7.42	11.3	17.8	28	32.6	44.9	78.8
11 Terminal inductance	mH	0.006	0.009	0.015	0.022	0.036	0.054	0.072	0.108	0.158	0.243	0.377	0.579	0.661	0.921	1.59
12 Torque constant	mNm/A	0.802	0.98	1.25	1.51	1.96	2.41	2.76	3.39	4.1	5.08	6.32	7.84	8.37	9.89	13
13 Speed constant	rpm/V	11900	9740	7660	6310	4870	3970	3460	2820	2330	1880	1510	1220	1140	966	734
14 Speed/torque gradient	rpm/mNm	4170	4880	4560	4640	4600	4310	4040	4090	4220	4190	4250	4350	4440	4380	4450
15 Mechanical time constant	ms	15.6	14.9	14.3	14.1	13.9	13.7	13.5	13.5	13.5	13.5	13.6	13.7	13.6	13.6	13.7
16 Rotor inertia	gcm ²	0.358	0.291	0.299	0.29	0.288	0.303	0.318	0.315	0.306	0.308	0.304	0.3	0.293	0.297	0.294

Operating Range Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 46 K/W In observation of above listed thermal resistance 14 K/W 1.2 W (lines 17 and 18) the maximum permissible winding 20000 5.18 s 118425 temperature will be reached during continuous 20 Thermal time constant motor 21 Ambient temperature 76.1 s -20...+65°C operation at 25°C ambient. 15000 = Thermal limit. 22 Max. winding temperature +85°C 10000 Mechanical data (sleeve bearings) Short term operation 19 000 rpm 0.05 - 0.15 mm 0.014 mm 23 Max. speed The motor may be briefly overloaded (recurring). 5000 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.8 N 0.5 1.0 1.5 M [mNm] 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 15 N 1.4 N 0.1 0.2 0.3

Other specifications

29 Number of pole pairs 30 Number of commutator segments

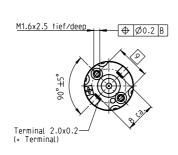
31 Weight of motor

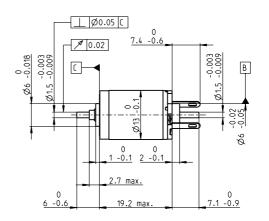
Values listed in the table are nominal. Explanation of the figures on page 92.

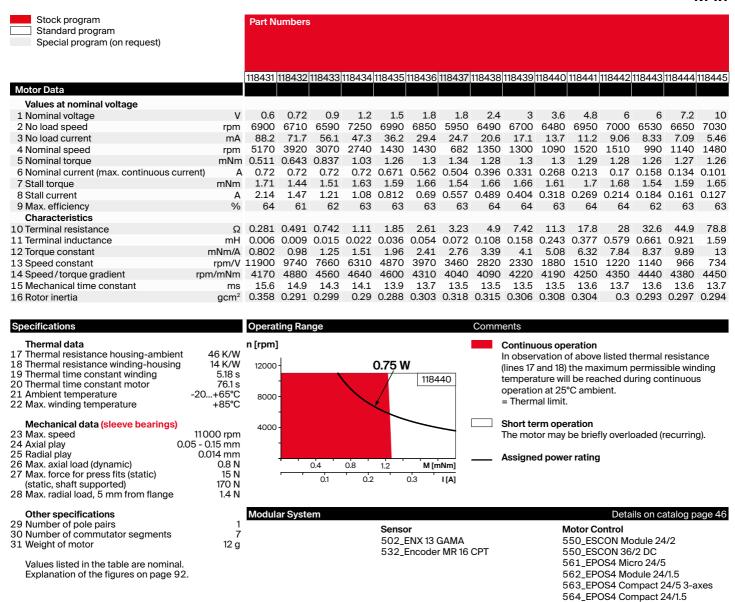
Modular System Gear 15 g 421_GP 13 A

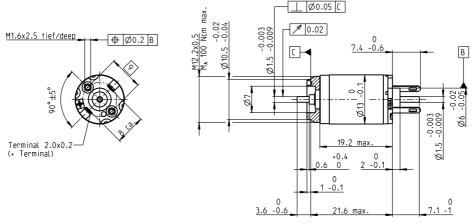
Details on catalog page 46 Motor Control 550_ESCON Module 24/2

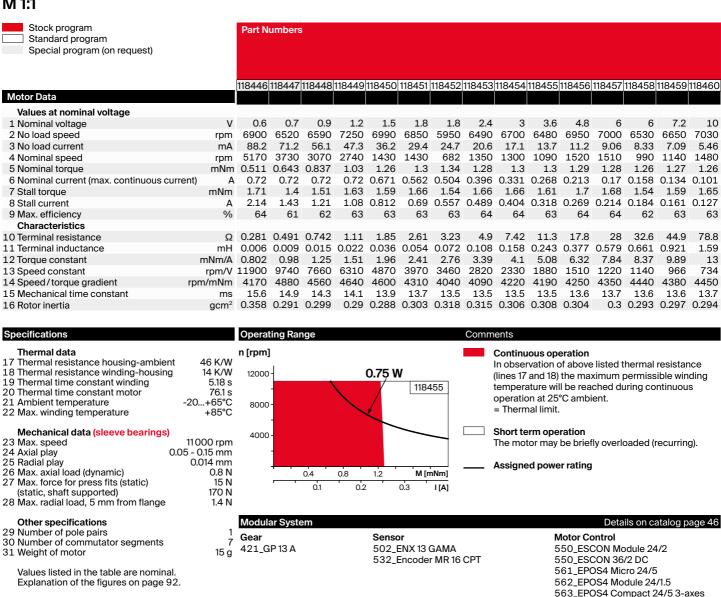
550_ESCON 36/2 DC



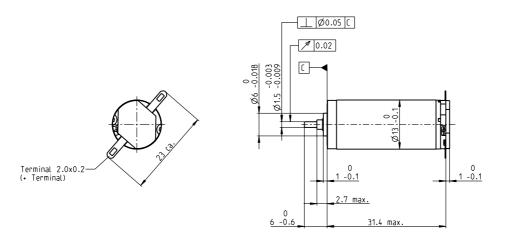








564_EPOS4 Compact 24/1.5



Stock program **Part Numbers** Standard program Special program (on request) | 118461 | 118462 | 118463 | 118464 | 118465 | 118466 | 118467 | 118468 | 118469 | 118470 | 118471 | 118472 | 118473 | 118474 | 118475 | **Motor Data** Values at nominal voltage 1 Nominal voltage 3.6 4.8 4.8 6 10 2 No load speed $\mathsf{rpm}\ 10600\ 12200\ 10700\ 10800\ 11400\ 10100\ 11400\ 11400\ 10900\ 11400\ 11100\ 10300\ 10600\ 11500$ 3 No load current mΑ 51.5 50.8 42 35.5 28.8 24.4 23 19.2 16.1 13.8 11 8.87 7.98 6.9 5.82 4 Nominal speed 9160 10500 8490 8050 7890 6430 7660 7730 7320 7790 7390 7470 6620 6920 7800 rpm 5 Nominal torque mNm 1.44 1.56 1.8 2.16 2.76 2.87 2.81 2.86 2.98 2.9 2.89 2.9 2.88 2.9 2.84 0.72 0.72 0.664 0.586 0.497 0.443 0.363 0.291 0.217 0.187 0.149 6 Nominal current (max. continuous current) 0.72 0.72 0.72 0.235 9.95 10.2 8.34 8.25 8.81 7.78 8.51 8.84 9.1 8.13 8.44 8.87 7 Stall torque mNm 9.15 8.77 8.9 4.42 3.15 1.74 2.22 0.856 0.699 0.592 0.526 8 Stall current 4.63 2.63 1.72 1.48 1.31 1.11 0.451 9 Max. efficiency % 80 80 79 78 79 78 79 79 79 79 79 79 78 79 79 Characteristics 10 Terminal resistance Ω 0.519 0.679 0.951 1.37 2.16 2.75 3.5 4.85 6.11 9.03 14 21.5 25.3 34.2 53.2 11 Terminal inductance mΗ 0.021 0.025 0.032 0.046 0.073 0.092 0.114 0.164 0.223 0.316 0.485 0.749 0.87 1.19 1.79 mNm/A 2.31 2.65 3.14 3.97 4.46 4.96 5.95 6.94 8.27 10.2 13.7 12 Torque constant 2.15 12.7 16 19.7 4440 4130 3610 3040 2410 2140 1930 1600 1380 1160 932 750 696 595 485 13 Speed constant rpm/V 14 Speed/torque gradient 1070 1210 1300 1330 1310 1320 1360 1310 1210 1260 1270 1260 1280 1270 1310 rpm/mNm 15 Mechanical time constant 7.65 7.55 7.45 7.37 7.28 7.27 7.28 7.23 7.16 7.2 7.21 7.21 7.21 7.22 7.27 ms 0.681 0.596 0.548 0.526 0.512 0.528 0.565 0.545 0.541 0.544 0.543 16 Rotor inertia 0.53 0.53 0.536 gcm² Specifications Operating Range Comments n [rpm] Continuous operation 33 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 7.0 K/W 18 Thermal resistance winding-housing 2.5 W (lines 17 and 18) the maximum permissible winding 20000 4.88 s 19 Thermal time constant winding temperature will be reached during continuous 118471 20 Thermal time constant motor 229 s operation at 25°C ambient. 15000 -20...+65°C 21 Ambient temperature = Thermal limit. 22 Max. winding temperature +85°C 10000 Mechanical data (sleeve bearings) Short term operation 19 000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 5000 24 Axial play 0.05 - 0.15 mm 0.014 mm 25 Radial play Assigned power rating 0.8 N 26 Max. axial load (dynamic) 2.0 3.0 M [mNm] 1.0 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 15 N 0.1 0.2 0.3 0.4 ΊΓΑΊ 1.4 N Other specifications Modular System 29 Number of pole pairs Details on catalog page 46 30 Number of commutator segments

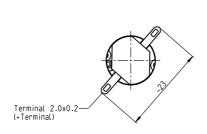
Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5

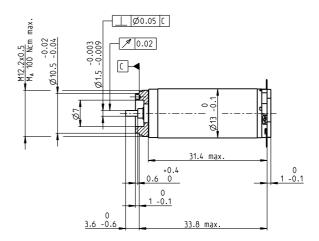
21 g

31 Weight of motor

Values listed in the table are nominal.

Explanation of the figures on page 92.





Stock program Standard program Special program (on request)

Part Numbers

		118476	118477	118478	118479	118480	118481	118482	118483	118484	118485	118486	118487	118488	118489	118490
Motor Data																
Values at nominal voltage																
1 Nominal voltage	V	2.4	3	3	3.6	4.8	4.8	6	7.2	8	10	12	15	15	18	24
2 No load speed	rpm	10600	12200	10700	10800	11400	10100	11400	11400	10900	11400	11000	11100	10300	10600	11500
3 No load current	mA	51.5	50.8	42	35.5	28.8	24.4	23	19.2	16.1	13.8	11	8.87	7.98	6.9	5.82
4 Nominal speed	rpm	9160	10500	8490	8050	7890	6430	7660	7730	7320	7790	7390	7470	6620	6920	7800
5 Nominal torque	mNm	1.44	1.56	1.8	2.16	2.76	2.87	2.81	2.86	2.98	2.9	2.89	2.9	2.88	2.9	2.84
6 Nominal current (max. continuous curre	ent) A	0.72	0.72	0.72	0.72	0.72	0.664	0.586	0.497	0.443	0.363	0.291	0.235	0.217	0.187	0.149
7 Stall torque	mNm	9.95	10.2	8.34	8.25	8.81	7.78	8.51	8.84	9.1	9.15	8.77	8.9	8.13	8.44	8.87
8 Stall current	Α	4.63	4.42	3.15	2.63	2.22	1.74	1.72	1.48	1.31	1.11	0.856	0.699	0.592	0.526	0.451
9 Max. efficiency	%	80	80	79	78	79	78	79	79	79	79	79	79	78	79	79
Characteristics																
10 Terminal resistance	Ω	0.519	0.679	0.951	1.37	2.16	2.75	3.5	4.85	6.11	9.03	14	21.5	25.3	34.2	53.2
11 Terminal inductance	mH	0.021	0.025	0.032	0.046	0.073	0.092	0.114	0.164	0.223	0.316	0.486	0.75	0.871	1.19	1.79
12 Torque constant	mNm/A	2.15	2.31	2.65	3.14	3.97	4.46	4.96	5.95	6.94	8.27	10.2	12.7	13.7	16	19.7
13 Speed constant	rpm/V	4440	4130	3610	3040	2410	2140	1930	1600	1380	1160	932	750	696	595	485
14 Speed/torque gradient	rpm/mNm	1070	1210	1300	1330	1310	1320	1360	1310	1210	1260	1270	1260	1280	1270	1310
15 Mechanical time constant	ms	7.65	7.55	7.45	7.37	7.28	7.27	7.28	7.23	7.16	7.2	7.21	7.21	7.21	7.22	7.27
16 Rotor inertia	gcm ²	0.681	0.596	0.548	0.53	0.53	0.526	0.512	0.528	0.565	0.545	0.541	0.544	0.536	0.543	0.529

Operating Range Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 33 K/W In observation of above listed thermal resistance 7.0 K/W 2.5 W (lines 17 and 18) the maximum permissible winding 20000 4.88 s 118486 temperature will be reached during continuous 20 Thermal time constant motor 21 Ambient temperature 229 s -20...+65°C operation at 25°C ambient. 15000 = Thermal limit. 22 Max. winding temperature +85°C 10000 Mechanical data (sleeve bearings) Short term operation 19 000 rpm 0.05 - 0.15 mm 0.014 mm 23 Max. speed The motor may be briefly overloaded (recurring). 5000 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.8 N 2.0 3.0 M [mNm] 1.0 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 15 N 1.4 N 0.1 0.2 0.3 0.4 | |[A]

Other specifications

29 Number of pole pairs 30 Number of commutator segments

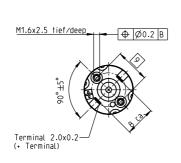
31 Weight of motor

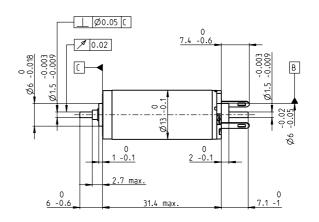
Values listed in the table are nominal. Explanation of the figures on page 92.

Modular System Gear 24 g 421_GP 13 A

Details on catalog page 46 Motor Control

550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5





Stock program **Part Numbers** Standard program Special program (on request) 118491 | 118492 | 118493 | 118494 | 118495 | 118496 | 118497 | 118498 | 118499 | 118500 | 118501 | 118502 | 118503 | 118504 | 118505 | 118505 | 118506 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 118507 | 1**Motor Data** Values at nominal voltage 1 Nominal voltage 1.5 1.8 3.6 4.8 10 2 No load speed 6570 6090 6380 7170 7100 6300 6800 6620 6490 6810 6590 6630 6840 7020 7150 rpm 3 No load current mΑ 43.8 39.8 35.3 30.8 24.3 20.8 19.2 15.8 13.5 11.5 9.19 7.41 6.94 5.99 4.91 4 Nominal speed 5170 4320 4160 4400 3560 2550 3000 2880 2880 3130 2880 2940 3120 3330 3400 rpm 5 Nominal torque mNm 1.46 1.58 1.82 2.18 2.78 2.91 2.85 2.91 3.02 2.95 2.93 2.94 2.92 2.93 2.88 0.72 0.669 0.592 0.502 0.446 0.367 0.294 0.237 0.218 6 Nominal current (max. continuous current) 0.72 0.72 0.72 0.72 0.188 0.151 6.22 5.12 5.01 5.5 5.51 4.86 5.1 5.16 5.46 5.49 5.26 5.34 7 Stall torque mNm 5.42 5.63 5.54 1.75 1.03 0.866 0.786 0.665 0.514 0.419 0.395 0.351 0.282 8 Stall current 2.89 2.21 1.89 1.39 1.09 9 Max. efficiency % 75 75 76 76 75 75 75 76 76 75 76 76 76 Characteristics 10 Terminal resistance Ω 0.519 0.679 0.951 1.37 2.16 2.75 3.5 4.85 6.11 9.03 14 21.5 25.3 34.2 53.2 0.021 0.025 0.032 0.046 0.073 0.092 0.114 0.164 0.223 0.316 0.485 0.749 11 Terminal inductance mΗ 0.87 1.19 1.79 mNm/A 2.15 2.31 2.65 3.14 3.97 4.46 4.96 5.95 6.94 8.27 10.2 12.7 13.7 16 12 Torque constant 19.7 4440 4130 3610 3040 2410 2140 1930 1600 1380 1160 932 750 696 595 485 13 Speed constant rpm/V 14 Speed/torque gradient rpm/mNm 1070 1210 1300 1330 1310 1320 1360 1310 1210 1260 1270 1260 1280 1270 1310 15 Mechanical time constant 7.23 7.16 7.65 7.55 7.45 7.37 7.28 7.27 7.28 7.2 7.21 7.21 7.21 7.22 ms 0.681 0.596 0.548 0.53 0.53 0.526 0.512 0.528 0.565 0.545 0.541 0.544 0.536 0.543 0.529 16 Rotor inertia acm² Specifications **Operating Range** Comments n [rpm] Continuous operation 33 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 7.0 K/W 18 Thermal resistance winding-housing 12000 2.0 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 4.88 s 118501 temperature will be reached during continuous 10000 20 Thermal time constant motor 229 s operation at 25°C ambient. -20...+65°C 21 Ambient temperature 8000 = Thermal limit. 22 Max. winding temperature +85°C 6000 Mechanical data (sleeve bearings) Short term operation 4000 11000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 2000 24 Axial play 25 Radial play 0.05 - 0.15 mm 0.014 mm Assigned power rating 0.8 N 26 Max. axial load (dynamic) 1.0 2.0 3.0 M [mNm] Max. force for press fits (static) 15 N 0.1 0.2 0.3 Ϊ[A] 0.4 95 N (static, shaft supported) 28 Max. radial load, 5 mm from flange

Modular System

12 g

Details on catalog page 46

Sensor

502 ENX 13 GAMA 532 Encoder MR 16 CPT Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5

Values listed in the table are nominal.

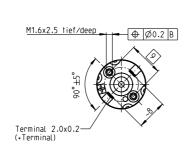
Explanation of the figures on page 92.

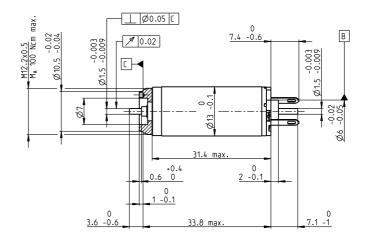
Other specifications

30 Number of commutator segments

29 Number of pole pairs

31 Weight of motor





Motor Data

1 Nominal voltage

2 No load speed

3 No load current

4 Nominal speed

5 Nominal torque

16 Rotor inertia

Values at nominal voltage

Stock program Part Numbers Standard program Special program (on request)

| 18506| 118507| 118508| 118509| 118510 | 118511 | 118512 | 118513 | 118514 | 118515 | 118516 | 118517 | 118518 | 118519 | 118520 1.8 3 3.6 6570 6090 6380 7170 7100 6300 6800 6620 6490 6810 6590 6630 6840 7020 7150 rpm mΑ 43.8 39.8 35.3 30.8 24.3 20.8 19.2 15.8 13.5 11.5 9.19 7.41 6.94 5.99 4.91 5170 4320 4160 4400 3560 2550 3000 2880 2880 3130 2880 2940 3120 3330 3400 rpm mNm 1.46 1.58 1.82 2.18 2.78 2.91 2.85 2.91 3.02 2.95 2.93 2.94 2.92 2.93 2.88 0.72 0.72 0.72 0.72 0.72 0.669 0.592 0.502 0.446 0.367 0.294 0.237 0.218 0.188 0.151 6.22 5.12 5.01 5.5 5.51 4.86 5.1 5.16 5.46 5.49 5.26 5.34 5.42 5.54 1.03 0.866 0.786 0.665 0.514 0.419 0.395 0.351 0.282 2.89 2.21 1.89 1.75 1.39 1.09 75 75 76 76 75 75 75 76 76 75 76 76 76

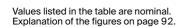
6 Nominal current (max. continuous current) 7 Stall torque mNm 8 Stall current 9 Max. efficiency % Characteristics 10 Terminal resistance 11 Terminal inductance mΗ 12 Torque constant mNm/A 2.15 13 Speed constant 4440 rpm/V 14 Speed/torque gradient 15 Mechanical time constant 7.65 ms

 Ω 0.519 0.679 0.951 1.37 2.16 2.75 3.5 4.85 6.11 9.03 14 21.5 25.3 34.2 53.2 0.021 0.025 0.032 0.046 0.073 0.092 0.114 0.164 0.223 0.316 0.486 0.75 0.871 1.19 1.79 2.31 2.65 3.14 3.97 4.46 4.96 5.95 6.94 8.27 10.2 12.7 16 19.7 13.7 4130 3610 3040 2410 2140 1930 1600 1380 1160 932 750 696 595 485 rpm/mNm 1070 1210 1300 1330 1310 1320 1360 1310 1210 1260 1270 1260 1280 1270 1310 7.55 7.45 7.37 7.28 7.27 7.28 7.23 7.16 7.2 7.21 7.21 7.21 7.22 gcm2 0.681 0.596 0.548 0.53 0.526 0.512 0.528 0.565 0.545 0.541 0.544 0.536 0.543 0.529 0.53

Comments

Specifications 33 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 7.0 K/W 19 Thermal time constant winding 4.88 s 229 s 20 Thermal time constant motor 21 Ambient temperature -20...+65°C 22 Max. winding temperature +85°C

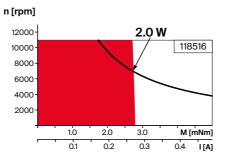




30 Number of commutator segments

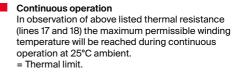
Other specifications 29 Number of pole pairs

31 Weight of motor



Operating Range

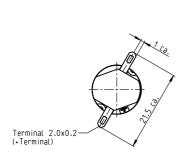
24 a

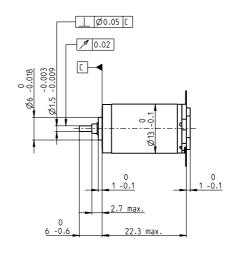


Short term operation The motor may be briefly overloaded (recurring). Assigned power rating

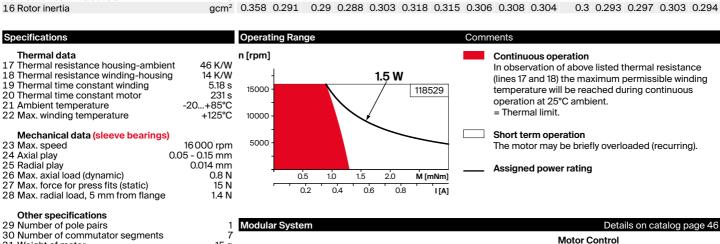
Modular System Gear Sensor 502 ENX 13 GAMA 421 GP 13 A 532 Encoder MR 16 CPT

Details on catalog page 46 Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5





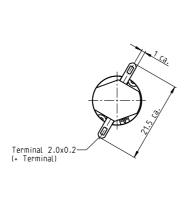
Stock program **Part Numbers** Standard program Special program (on request) $118521 \ | 118522 \ | 118523 \ | 118524 \ | 118525 \ | 118526 \ | 118527 \ | 118528 \ | 118529 \ | 118530 \ | 118531 \ | 118532 \ | 118532 \ | 118533 \ | 118534 \ | 118535 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \ | 118536 \$ Motor Data Values at nominal voltage 1 Nominal voltage 1.2 3.6 4.8 12 2 No load speed $\mathsf{rpm}\ 13300\ 13300\ 13700\ 13200\ 13000\ 13300\ 12300\ 12700\ 12300\ 12300\ 13300\ 12300\ 13100\ 14000\ 13300$ 3 No load current mΑ 482 394 259 197 159 140 111 92.5 73.7 59.2 49.2 44.7 38.9 35.1 29.7 rpm 12600 11800 10600 4 Nominal speed 8520 7790 8260 7130 7480 7010 7000 8040 6940 7870 8890 8020 5 Nominal torque 0.194 0.329 0.719 1.06 1.23 1.27 1.28 1.25 1.26 1.25 1.21 1.22 1.21 1.2 1.19 0.72 0.659 0.588 0.481 0.316 0.252 0.186 0.157 6 Nominal current (max. continuous current) 0.72 0.72 0.72 0.39 0.199 0.139 0.119 4.07 3.25 3.33 3.19 3.3 3.56 3.26 3.25 3.16 3.12 3.28 3.23 3.51 3.22 7 Stall torque mNm 3.01 1.32 2.26 0.989 0.814 0.639 0.506 0.429 0.368 0.335 0.321 8 Stall current 5.2 3.4 1.67 1.41 0.254 9 Max. efficiency % 49 44 45 44 45 46 45 45 44 44 45 43 44 46 44 Characteristics 10 Terminal resistance Ω 0.231 0.441 1.06 1.8 2.56 3.18 4.85 7.37 11.3 17.8 28 32.6 44.8 56.1 78.8 11 Terminal inductance mΗ 0.006 0.009 0.022 0.036 0.054 0.072 0.108 0.158 0.243 0.377 0.579 0.661 0.921 1.19 1.59 mNm/A 0.782 0.956 1.91 2.35 2.69 3.3 4.95 6.17 7.64 8.17 9.64 10.9 12 Torque constant 1.48 12.7 12200 9990 6470 5000 4070 3550 2890 2390 1930 1550 1250 990 872 753 13 Speed constant rpm/V 1170 14 Speed/torque gradient rpm/mNm 3600 4610 4660 4700 4440 4190 4250 4410 4390 4460 4570 4660 4600 4470 4680 15 Mechanical time constant 13.5 14 14.1 14.2 14.1 14 14 14.1 14.2 14.2 14.3 14.3 14.3 14.2 14.4 ms

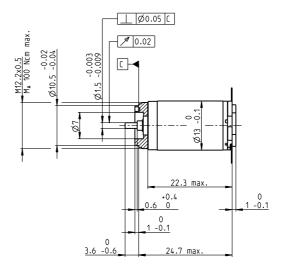


Values listed in the table are nominal. Explanation of the figures on page 92. 15 g

31 Weight of motor

Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC





Stock program Standard program Special program (on request)

Part Numbers

		118536	118537	118538	118539	118540	118541	118542	118543	118544	118545	118546	118547	118548	118549	118550
Motor Data																
Values at nominal voltage																
1 Nominal voltage	V	1.2	1.5	2.4	3	3.6	4.2	4.8	6	7.2	9	12	12	15	18	20
2 No load speed	rpm	13300	13300	13700	13200	13000	13300	12300	12700	12300	12300	13300	12300	13100	14000	13300
3 No load current	mA	482	394	259	197	159	140	111	92.5	73.7	59.2	49.2	44.7	38.9	35.1	29.7
4 Nominal speed	rpm	12600	11800	10600	8520	7790	8260	7130	7480	7010	7000	8040	6940	7870	8890	8020
5 Nominal torque	mNm	0.194	0.329	0.719	1.06	1.23	1.27	1.28	1.25	1.26	1.25	1.21	1.22	1.21	1.2	1.19
6 Nominal current (max. continuous currer	nt) A	0.72	0.72	0.72	0.72	0.659	0.588	0.481	0.39	0.316	0.252	0.199	0.186	0.157	0.139	0.119
7 Stall torque	mNm	4.07	3.25	3.33	3.19	3.3	3.56	3.26	3.25	3.16	3.12	3.28	3.01	3.23	3.51	3.22
8 Stall current	Α	5.2	3.4	2.26	1.67	1.41	1.32	0.989	0.814	0.639	0.506	0.429	0.368	0.335	0.321	0.254
9 Max. efficiency	%	49	44	45	44	45	46	45	45	44	44	45	43	44	46	44
Characteristics																
10 Terminal resistance	Ω	0.231	0.441	1.06	1.8	2.56	3.18	4.85	7.37	11.3	17.8	28	32.6	44.8	56.1	78.8
11 Terminal inductance	mH	0.006	0.009	0.022	0.036	0.054	0.072	0.108	0.158	0.243	0.377	0.579	0.661	0.921	1.19	1.59
12 Torque constant	mNm/A	0.782	0.956	1.48	1.91	2.35	2.69	3.3	4	4.95	6.17	7.64	8.17	9.64	10.9	12.7
13 Speed constant	rpm/V	12200	9990	6470	5000	4070	3550	2890	2390	1930	1550	1250	1170	990	872	753
14 Speed / torque gradient	rpm/mNm	3600	4610	4660	4700	4440	4190	4250	4410	4390	4460	4570	4660	4600	4470	4680
15 Mechanical time constant	ms	13.5	14	14.1	14.2	14.1	14	14	14.1	14.2	14.2	14.3	14.3	14.3	14.2	14.4
16 Rotor inertia	gcm ²	0.358	0.291	0.29	0.288	0.303	0.318	0.315	0.306	0.308	0.304	0.3	0.293	0.297	0.303	0.294

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 46 K/W In observation of above listed thermal resistance 14 K/W 1.5 W (lines 17 and 18) the maximum permissible winding 5.38 s 118541 15000 temperature will be reached during continuous 20 Thermal time constant motor 21 Ambient temperature 231 s -20...+85°C operation at 25°C ambient. = Thermal limit. 22 Max. winding temperature +125°C 10000 Mechanical data (sleeve bearings) Short term operation 16 000 rpm 0.05 - 0.15 mm 0.014 mm 5000 23 Max. speed The motor may be briefly overloaded (recurring). 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.8 N 0.5 1.0 2.0 1.5 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 15 N 1.4 N 0.2 0.4 0.6 0.8

Other specifications

29 Number of pole pairs 30 Number of commutator segments

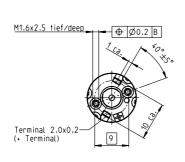
31 Weight of motor

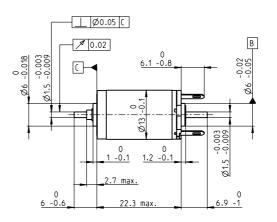
Values listed in the table are nominal. Explanation of the figures on page 92.

Modular System Gear 17 g 421_GP 13 A

Details on catalog page 46 Motor Control

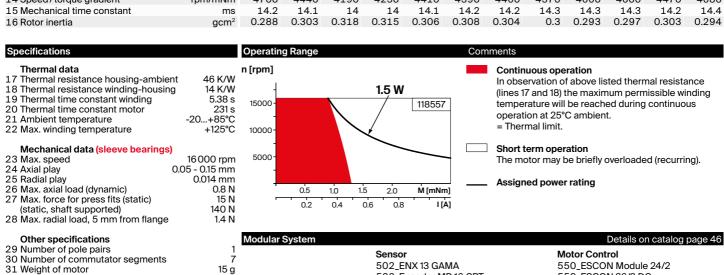
550_ESCON Module 24/2 550_ESCON 36/2 DC





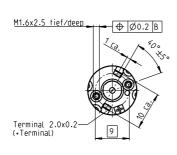
M 1·1

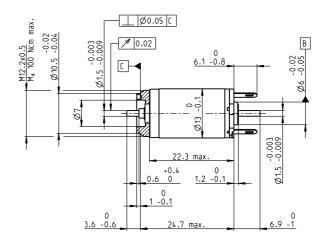
													IVI I:I
Stock program Standard program Special program (on request)		Part Nur	nbers										
		118555	118556	118557	118558	118559	118560	118561	118562	118563	118564	118565	118566
Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	3	3.6	4.2	4.8	6	7.2	9	12	12	15	18	20
2 No load speed	rpm	13200	13000	13300	12300	12700	12300	12300	13300	12300	13100	14000	13300
3 No load current	mA	197	159	140	111	92.5	73.7	59.2	49.2	44.7	38.9	35.1	29.7
4 Nominal speed	rpm	8520	7790	8260	7130	7480	7010	7000	8040	6940	7870	8890	8020
5 Nominal torque	mNm	1.06	1.23	1.27	1.28	1.25	1.26	1.25	1.21	1.22	1.21	1.2	1.19
6 Nominal current (max. continuous	current) A	0.72	0.659	0.588	0.481	0.39	0.316	0.252	0.199	0.186	0.157	0.139	0.119
7 Stall torque	mNm	3.19	3.3	3.56	3.26	3.25	3.16	3.12	3.28	3.01	3.23	3.51	3.22
8 Stall current	Α	1.67	1.41	1.32	0.989	0.814	0.639	0.506	0.429	0.368	0.335	0.321	0.254
9 Max. efficiency	%	44	45	46	45	45	44	44	45	43	44	46	44
Characteristics													
10 Terminal resistance	Ω	1.8	2.56	3.18	4.85	7.37	11.3	17.8	28	32.6	44.8	56.1	78.8
11 Terminal inductance	mH	0.036	0.054	0.072	0.108	0.158	0.243	0.377	0.579	0.661	0.921	1.19	1.59
12 Torque constant	mNm/A	1.91	2.35	2.69	3.3	4	4.95	6.17	7.64	8.17	9.64	10.9	12.7
13 Speed constant	rpm/V	5000	4070	3550	2890	2390	1930	1550	1250	1170	990	872	753
14 Speed/torque gradient	rpm/mNm	4700	4440	4190	4250	4410	4390	4460	4570	4660	4600	4470	4680
15 Mechanical time constant	ms	14.2	14.1	14	14	14.1	14.2	14.2	14.3	14.3	14.3	14.2	14.4
16 Rotor inertia	gcm ²	0.288	0.303	0.318	0.315	0.306	0.308	0.304	0.3	0.293	0.297	0.303	0.294
Specifications		Operatin	g Range				Cor	nments					



Values listed in the table are nominal. Explanation of the figures on page 92. 15 g

502 ENX 13 GAMA 532_Encoder MR 16 CPT **Motor Control** 550_ESCON Module 24/2 550_ESCON 36/2 DC 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5





Stock program Part Numbers Standard program Special program (on request) 118570 | 118571 | 118572 | 118573 | 118574 | 118575 | 118576 | 118577 | 118578 | 118579 | 118580 | 118581 **Motor Data** Values at nominal voltage 1 Nominal voltage 3.6 4.8 2 No load speed 13200 13000 13300 12300 12700 12300 12300 13300 12300 13100 14000 13300 rpm 3 No load current mΑ 197 159 140 111 92.5 73.7 59.2 49.2 44.7 38.9 35.1 29.7 8520 7790 8260 7130 7480 7010 7000 8040 6940 7870 8890 8020 4 Nominal speed rpm 5 Nominal torque mNm 1.06 1.23 1.27 1.28 1.25 1.26 1.25 1.21 1.22 1.21 1.2 1.19 0.72 0.659 0.588 0.481 0.39 0.252 0.199 0.186 0.139 6 Nominal current (max. continuous current) 0.316 0.157 0.119 3.19 3.3 3.56 3.26 3.25 3.16 3.12 3.28 3.01 3.23 3.51 3.22 7 Stall torque mNm 1.32 0.989 0.814 0.639 0.506 0.429 0.368 0.335 0.254 8 Stall current 1.67 1.41 0.321 Δ 9 Max. efficiency % 44 45 46 45 45 44 44 45 43 44 46 44 Characteristics 10 Terminal resistance Ω 1.8 2.56 3.18 4.85 7.37 11.3 17.8 28 32.6 44.8 56.1 78.8 11 Terminal inductance mΗ 0.036 0.054 0.072 0.108 0.158 0.243 0.377 0.579 0.661 0.921 1.19 1.59 12 Torque constant mNm/A 1.91 2.35 2.69 3.3 4.95 6.17 7.64 8.17 9.64 4 10.9 12.7 2390 5000 4070 3550 2890 1930 1550 1250 1170 990 872 753 13 Speed constant rpm/\ 14 Speed/torque gradient rpm/mNm 4700 4440 4190 4250 4410 4390 4460 4570 4660 4600 4470 4680 15 Mechanical time constant 14.2 14.1 14 14 14.1 14.2 14.2 14.3 14.3 14.3 14.2 14.4 ms 0.288 0.303 0.318 0.315 0.306 0.304 0.293 0.297 0.294 16 Rotor inertia gcm² 0.308 0.3 0.303

Specifications **Operating Range** Comments n [rpm] Continuous operation 46 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 18 Thermal resistance winding-housing 14 K/W 1.5 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 5.38 s 15000 118572 temperature will be reached during continuous 231 s -20...+85°C 20 Thermal time constant motor operation at 25°C ambient. 21 Ambient temperature = Thermal limit. 22 Max. winding temperature +125°C 10000 Short term operation Mechanical data (sleeve bearings) 5000 16 000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 24 Axial play 25 Radial play 0.05 - 0.15 mm 0.014 mm Assigned power rating 26 Max. axial load (dynamic) 0.8 N 0.5 1.0 1.5 2.0 M [mNm] 27 Max. force for press fits (static) (static, shaft supported) 15 N 140 N 0.2 0.4 0.6 0.8 I [A] 28 Max. radial load, 5 mm from flange

Other specifications 29 Number of pole pairs

30 Number of commutator segments

31 Weight of motor

Values listed in the table are nominal. Explanation of the figures on page 92. Modular System

18 a

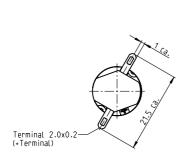
Gear 421_GP 13 A Sensor

502 ENX 13 GAMA 532 Encoder MR 16 CPT Motor Control

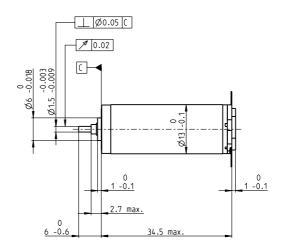
550 FSCON Module 24/2 550_ESCON 36/2 DC 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5

563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5

Details on catalog page 46



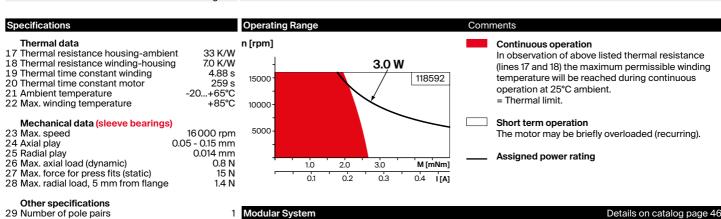
Part Numbers



M 1:1

Stock program Standard program Special program (on request)

		118582	118583	118584	118585	118586	118587	118588	118589	118590	118591	118592	118593	118594	118595	118596
Motor Data																
Values at nominal voltage																
1 Nominal voltage	V	3	3.6	3.6	4.8	6	6	7.2	9	10	12	15	18	21	24	30
2 No load speed	rpm	12000	13600	11900	13600	13600	12100	13100	13800	13200	13300	13400	13000	14100	13800	14000
3 No load current	mA	168	164	136	121	95.5	81	75.3	64	53.9	45.4	36.8	29.2	28	23.8	19.5
4 Nominal speed	rpm	9520	10800	8780	10100	10300	8660	9790	10600	10100	10200	10400	9910	11100	10800	11000
5 Nominal torque	mNm	1.22	1.32	1.58	1.92	2.05	2.17	2.12	2.17	2.32	2.3	2.31	2.36	2.29	2.33	2.28
6 Nominal current (max. continuous currer	nt) A	0.72	0.72	0.72	0.72	0.602	0.558	0.495	0.422	0.383	0.319	0.259	0.212	0.192	0.167	0.134
7 Stall torque	mNm	7.44	8.13	7.11	8.58	9.25	8.35	9.03	10.1	10.5	10.4	10.5	10.4	11.1	11	10.9
8 Stall current	Α	3.46	3.51	2.69	2.73	2.33	1.87	1.82	1.69	1.52	1.25	1.03	0.814	0.809	0.688	0.556
9 Max. efficiency	%	50	53	53	57	60	60	61	63	64	65	65	66	66	66	66
Characteristics																
10 Terminal resistance	Ω	0.867	1.02	1.34	1.76	2.57	3.21	3.96	5.32	6.6	9.56	14.6	22.1	26	34.9	54
11 Terminal inductance	mH	0.021	0.025	0.032	0.046	0.073	0.092	0.114	0.164	0.223	0.316	0.486	0.75	0.871	1.19	1.79
12 Torque constant	mNm/A	2.15	2.31	2.65	3.14	3.97	4.46	4.96	5.95	6.94	8.27	10.2	12.7	13.7	16	19.7
13 Speed constant	rpm/V	4440	4130	3610	3040	2410	2140	1930	1600	1380	1160	932	750	696	595	485
14 Speed/torque gradient	rpm/mNm	1790	1830	1830	1700	1560	1540	1540	1430	1310	1340	1330	1300	1320	1300	1330
15 Mechanical time constant	ms	12.8	11.4	10.5	9.44	8.68	8.46	8.23	7.93	7.74	7.62	7.51	7.42	7.39	7.37	7.38
16 Rotor inertia	gcm ²	0.681	0.596	0.548	0.53	0.53	0.526	0.512	0.528	0.565	0.545	0.541	0.544	0.536	0.543	0.529



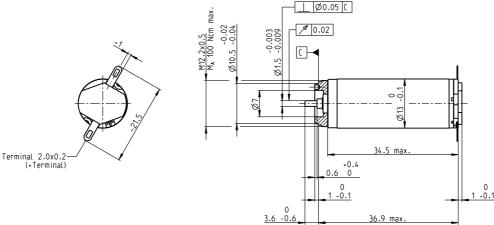
29 Number of pole pairs
30 Number of commutator segments 31 Weight of motor

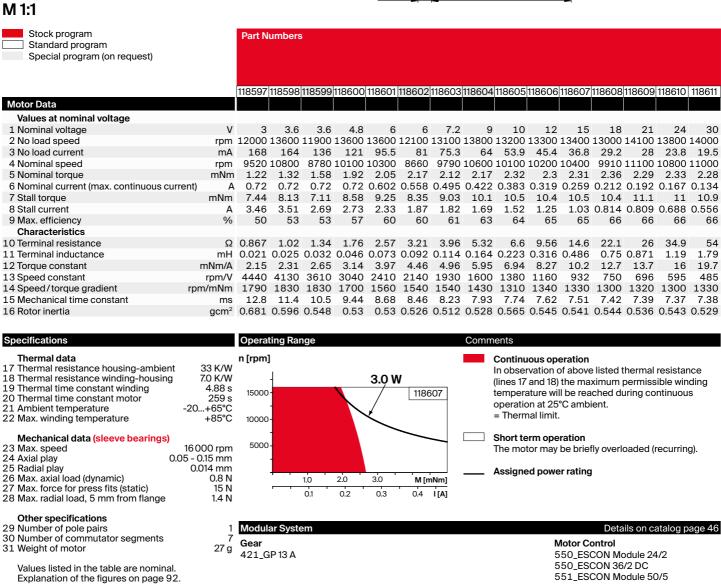
24 g

Values listed in the table are nominal. Explanation of the figures on page 92.

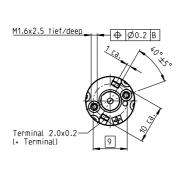
Details on catalog page 46 Motor Control

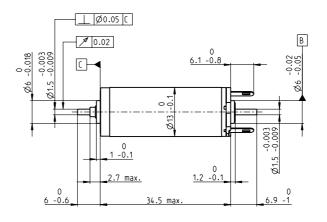
550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5





553_ESCON 50/5





Stock program **Part Numbers** Standard program Special program (on request) 118613 | 118614 | 118615 | 118616 | 118617 | 118618 | 118619 | 118620 | 118621 | 118622 | 118623 | 118624 | 118625 | 118626 | 118627 **Motor Data** Values at nominal voltage 1 Nominal voltage 3.6 3.6 4.8 6 7.2 10 12 2 No load speed $\mathsf{rpm}\ 12000\ 13600\ 11900\ 13600\ 12100\ 13100\ 13800\ 13200\ 13300\ 13400\ 13000\ 14100\ 13800\ 14000$ 3 No load current mΑ 168 164 136 121 95.5 81 75.3 64 53.9 45.4 36.8 29.2 28 23.8 19.5 4 Nominal speed 9520 10800 8780 10100 10300 8660 9790 10600 10100 10200 10400 9910 11100 10800 11000 rpm 5 Nominal torque mNm 1.22 1.32 1.58 1.92 2.05 2.17 2.12 2.17 2.32 2.3 2.31 2.36 2.29 2.33 2.28 0.72 0.72 0.72 0.602 0.558 0.495 0.422 0.383 0.319 0.259 0.212 0.192 0.167 0.134 6 Nominal current (max. continuous current) 0.72 7.44 8.13 8.58 9.25 8.35 9.03 10.1 10.5 10.4 10.5 10.4 7 Stall torque mNm 7.11 11.1 1.52 1.25 1.03 0.814 0.809 0.688 0.556 3.46 2.33 8 Stall current 3.51 2.69 2.73 1.87 1.82 1.69 9 Max. efficiency % 50 53 53 57 60 60 61 63 64 65 65 66 66 66 66 Characteristics 10 Terminal resistance Ω 0.867 1.02 1.34 1.76 2.57 3.21 3.96 5.32 6.6 9.56 14.6 22.1 26 34.9 0.021 0.025 0.032 0.046 0.073 0.092 0.114 0.164 0.223 0.316 0.486 11 Terminal inductance mΗ 0.75 0.871 1.19 1.79 12 Torque constant mNm/A 2.15 2.31 2.65 3.14 3.97 4.46 4.96 5.95 6.94 8.27 10.2 12.7 13.7 16 19.7 4440 4130 3610 3040 2410 2140 1930 1600 1380 1160 932 750 696 595 485 13 Speed constant rpm/V 14 Speed/torque gradient rpm/mNm 1790 1830 1830 1700 1560 1540 1540 1430 1310 1340 1330 1300 1320 1300 1330 15 Mechanical time constant 8.46 8.23 7.93 7.74 12.8 11.4 10.5 9.44 8.68 7.62 7.51 7.42 7.39 7.37 7.38 ms 0.681 0.596 0.548 0.53 0.526 0.512 0.528 0.565 0.545 0.541 0.544 0.536 0.543 0.529 16 Rotor inertia 0.53 acm² Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 33 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 7.0 K/W 18 Thermal resistance winding-housing (lines 17 and 18) the maximum permissible winding 3.0 W 19 Thermal time constant winding 4.88 s temperature will be reached during continuous 118623 15000 259 s20 Thermal time constant motor operation at 25°C ambient. -20...+65°C 21 Ambient temperature = Thermal limit.

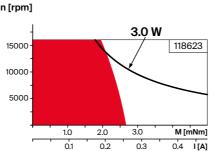
22 Max. winding temperature +85°C Mechanical data (sleeve bearings) 16 000 rpm 23 Max. speed 0.05 - 0.15 mm 0.014 mm

24 Axial play 25 Radial play 0.8 N 26 Max. axial load (dynamic) Max. force for press fits (static) 15 N 95 N (static, shaft supported) 28 Max. radial load, 5 mm from flange Other specifications 29 Number of pole pairs

Values listed in the table are nominal. Explanation of the figures on page 92.

30 Number of commutator segments

31 Weight of motor



Short term operation

The motor may be briefly overloaded (recurring).

Assigned power rating

Sensor

Modular System

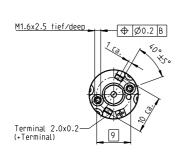
24 g

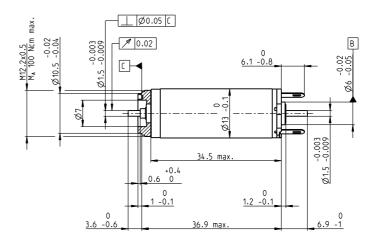
502 ENX 13 GAMA 532 Encoder MR 16 CPT

Details on catalog page 46

Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562 EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes

564_EPOS4 Compact 24/1.5





Stock program Standard program Special program (on request)

		118628	118629	118630	118631	118632	118633	118634	118635	118636	118637	118638	118639	118640	118641	118642
Motor Data																
Values at nominal voltage																
1 Nominal voltage	V	3	3.6	3.6	4.8	6	6	7.2	9	10	12	15	18	21	24	30
2 No load speed	rpm	12000	13600	11900	13600	13600	12100	13100	13800	13200	13300	13400	13000	14100	13800	14000
3 No load current	mA	168	164	136	121	95.5	81	75.3	64	53.9	45.4	36.8	29.2	28	23.8	19.5
4 Nominal speed	rpm	9520	10800	8780	10100	10300	8660	9790	10600	10100	10200	10400	9910	11100	10800	11000
5 Nominal torque	mNm	1.22	1.32	1.58	1.92	2.05	2.17	2.12	2.17	2.32	2.3	2.31	2.36	2.29	2.33	2.28
6 Nominal current (max. continuous currer	nt) A	0.72	0.72	0.72	0.72	0.602	0.558	0.495	0.422	0.383	0.319	0.259	0.212	0.192	0.167	0.134
7 Stall torque	mNm	7.44	8.13	7.11	8.58	9.25	8.35	9.03	10.1	10.5	10.4	10.5	10.4	11.1	11	10.9
8 Stall current	Α	3.46	3.51	2.69	2.73	2.33	1.87	1.82	1.69	1.52	1.25	1.03	0.814	0.809	0.688	0.556
9 Max. efficiency	%	50	53	53	57	60	60	61	63	64	65	65	66	66	66	66
Characteristics																
10 Terminal resistance	Ω	0.867	1.02	1.34	1.76	2.57	3.21	3.96	5.32	6.6	9.56	14.6	22.1	26	34.9	54
11 Terminal inductance	mH	0.021	0.025	0.032	0.046	0.073	0.092	0.114	0.164	0.223	0.316	0.486	0.75	0.871	1.19	1.79
12 Torque constant	mNm/A	2.15	2.31	2.65	3.14	3.97	4.46	4.96	5.95	6.94	8.27	10.2	12.7	13.7	16	19.7
13 Speed constant	rpm/V	4440	4130	3610	3040	2410	2140	1930	1600	1380	1160	932	750	696	595	485
14 Speed/torque gradient	rpm/mNm	1790	1830	1830	1700	1560	1540	1540	1430	1310	1340	1330	1300	1320	1300	1330
15 Mechanical time constant	ms	12.8	11.4	10.5	9.44	8.68	8.46	8.23	7.93	7.74	7.62	7.51	7.42	7.39	7.37	7.38
16 Rotor inertia	gcm ²	0.681	0.596	0.548	0.53	0.53	0.526	0.512	0.528	0.565	0.545	0.541	0.544	0.536	0.543	0.529

Part Numbers

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 33 K/W In observation of above listed thermal resistance 7.0 K/W (lines 17 and 18) the maximum permissible winding 3.0 W 19 Thermal time constant winding 4.88 s temperature will be reached during continuous 118638 15000 20 Thermal time constant motor 21 Ambient temperature 259 s -20...+65°C operation at 25°C ambient. = Thermal limit. 22 Max. winding temperature +85°C 10000 Mechanical data (sleeve bearings) Short term operation 16 000 rpm 0.05 - 0.15 mm 0.014 mm 23 Max. speed The motor may be briefly overloaded (recurring). 5000 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.8 N 2.0 3.0 M [mNm] 1.0 27 Max. force for press fits (static) (static, shaft supported) 15 N 95 N 0.1 0.2 0.3 0.4 ί[A] 28 Max. radial load, 5 mm from flange Modular System Other specifications

Values listed in the table are nominal. Explanation of the figures on page 92. 27 g

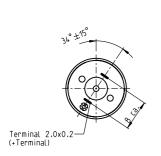
30 Number of commutator segments

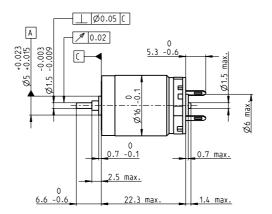
29 Number of pole pairs

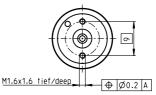
31 Weight of motor

Gear Sensor 502 ENX 13 GAMA 421_GP 13 A 532_Encoder MR 16 CPT

Details on catalog page 46 Motor Control 550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5







Stock program **Part Numbers** Standard program Special program (on request) 320173 320174 320175 409575 320176 320177 320178 320179 **Motor Data** Values at nominal voltage Nominal voltage 1.8 24 2 No load speed 7730 7820 7960 7920 7730 7590 7450 7280 rpm 3 No load current mΑ 32.2 19.6 10.1 13.8 6.44 5.35 3.08 2.24 4 Nominal speed 5700 4430 4520 4530 4290 4070 3880 3610 rpm 5 Nominal torque mNm 1.52 2.55 2.54 2.5 2.54 2.45 2.44 2.37 6 Nominal current (max. continuous current) 0.72 0.72 0.365 0.364 0.237 0.0784 0.169 0.11 7 Stall torque 5.83 5.92 5.92 5.92 5.76 5.34 5.13 4.75 mNm 0.833 0.833 0.524 0.359 0.226 8 Stall current 2.65 1.64 0.153 9 Max. efficiency % 79 76 79 77 78 78 Characteristics 0.679 10 Terminal resistance Ω 1.83 7.2 7.2 17.2 33.4 79.8 157 11 Terminal inductance mΗ 0.0169 0.0457 0.176 0.176 0.421 0.771 1.81 3.36 12 Torque constant mNm/A 2.2 3.62 14.9 22.8 31 7.11 7.11 11 4350 2640 1340 1340 869 642 420 308 13 Speed constant rpm/V 14 Speed/torque gradient rpm/mNm 1340 1340 1360 1360 1360 1440 1470 1550 15 Mechanical time constant 9.13 8.76 8.67 8.67 8.67 8.77 8.72 8.89 ms 0.65 0.626 0.609 0.546 16 Rotor inertia 0.609 0.61 0.58 0.565 gcm²

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 40.6 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 18 Thermal resistance winding-housing 9.52 K/W 12000 2.0 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 5.33 s 320175 temperature will be reached during continuous 20 Thermal time constant motor 295 s operation at 25°C ambient. 21 Ambient temperature -20...+65°C 8000 = Thermal limit. 22 Max. winding temperature +85°C Short term operation Mechanical data (sleeve bearings) 4000 11000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 0.05 - 0.15 mm 0.014 mm 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 2.0 1.0 3.0 M [mNm] 27 Max. force for press fits (static)28 Max. radial load, 5 mm from flange 0.2 0.4 0.1 0.3 1.5 N Other specifications 29 Number of pole pairs 30 Number of commutator segments Details on catalog page 46 Modular System

Values listed in the table are nominal.

CLL = Capacitor Long Life

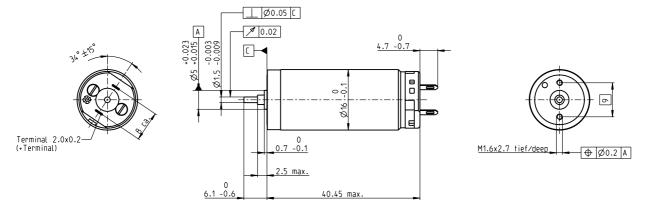
31 Weight of motor

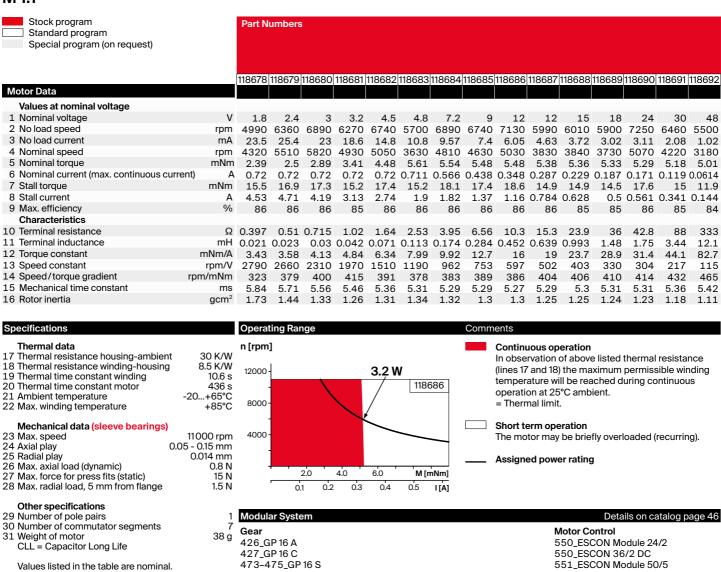
Explanation of the figures on page 92

Gear Sensor 426 GP16 A 533 Encoder MR 32 CPT 427_GP16 C 473-475_GP 16 S

21 g

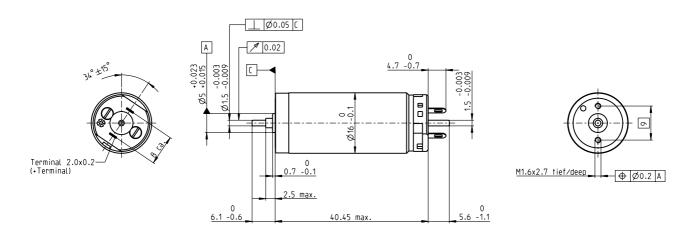
Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5





Explanation of the figures on page 92.

553_ESCON 50/5



Stock program **Part Numbers** Standard program Special program (on request) 118693 | 118694 | 118695 | 118696 | 118697 | 118698 | 118699 | 118700 | 118701 | 118702 | 118703 | 118704 | 118705 | 118706 | 118707 **Motor Data** Values at nominal voltage 2.4 Nominal voltage 1.8 2 No load speed 4990 6360 6890 6270 6740 5700 6890 6740 7130 5990 6010 5900 7250 6460 5500 rpm 3 No load current mΑ 23.5 25.4 23 18.6 14.8 10.8 9.57 7.4 6.05 4.63 3.72 3.02 3.11 2.08 1.02 4 Nominal speed 4320 5510 5820 4930 5050 3630 4810 4630 5030 3830 3840 3730 5070 4220 3180 rpm 5 Nominal torque mNm 2.39 2.5 2.89 3.41 4.48 5.61 5.54 5.48 5.48 5.38 5.36 5.33 5.29 5.18 5.01 6 Nominal current (max. continuous current) 0.72 0.72 0.72 0.711 0.566 0.438 0.348 0.287 0.229 0.187 0.171 0.119 0.0614 0.72 0.72 17.3 15.2 17.4 17.4 14.9 14.5 7 Stall torque mNm 15.5 16.9 15.2 18.1 18.6 14.9 17.6 15 11.9 4.19 3.13 2.74 1.9 1.82 1.37 1.16 0.784 0.628 4.53 0.5 0.561 0.341 0.144 8 Stall current 4.71 9 Max. efficiency % 86 86 86 85 86 86 86 86 86 86 85 85 86 85 Characteristics 10 Terminal resistance Ω 0.397 0.51 0.715 1.02 1.64 2.53 3.95 6.56 10.3 15.3 23.9 36 42.8 88 333 11 Terminal inductance mΗ 0.021 0.023 0.03 0.042 0.071 0.113 0.174 0.284 0.452 0.639 0.993 1.48 1.75 3.44 12.1 mNm/A 3.43 3.58 4.13 4.84 6.34 9.92 23.7 28.9 44.1 82.7 12 Torque constant 7.99 12.7 16 19 31.4 2790 2660 2310 1970 1510 1190 962 753 597 502 403 330 304 217 115 13 Speed constant rpm/V 14 Speed/torque gradient 323 379 400 415 391 378 383 389 386 404 406 410 414 432 465 rpm/mNm 15 Mechanical time constant 5.29 5.31 5.31 5.84 5.71 5.56 5.46 5.36 5.31 5.29 5.29 5.27 5.3 5.36 5.42 ms 1.25 1.24 16 Rotor inertia gcm² 1.26 1.34 1.32 1.3 1.3 1.23 1.18 1.73 1.33 1.31 1.25

Specifications **Operating Range** Comments n [rpm] Continuous operation 30 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 8.5 K/W 18 Thermal resistance winding-housing 3.2 W (lines 17 and 18) the maximum permissible winding 12000 19 Thermal time constant winding 10.6 s temperature will be reached during continuous 118701 20 Thermal time constant motor 436 s operation at 25°C ambient. 21 Ambient temperature -20...+65°C 8000 = Thermal limit. 22 Max. winding temperature +85°C Short term operation Mechanical data (sleeve bearings) 4000 11000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 24 Axial play 0.05 - 0.15 mm 0.014 mm 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.8 N 2.0 4.0 6.0 M [mNm] Max. force for press fits (static) (static, shaft supported) 15 N 0.1 0.2 0.3 0.4 ΙĖ 70 N 28 Max. radial load, 5 mm from flange

Other specifications

29 Number of pole pairs

30 Number of commutator segments

31 Weight of motor CLL = Capacitor Long Life

Values listed in the table are nominal.

Explanation of the figures on page 92.

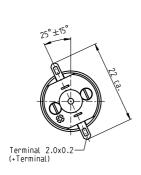
Gear 426 GP16 A 427_GP16 C 473-475 GP 16 S

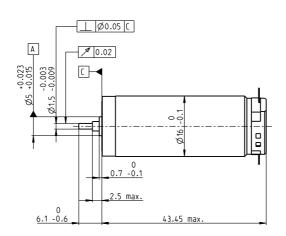
Modular System

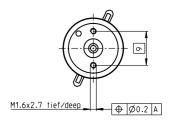
38 g

502_ENX 13 GAMA 533 Encoder MR 32 CPT Motor Control 550 FSCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562 EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

Details on catalog page 46







Stock program Standard program Special program (on request)

Part Numbers

		118710	118711	118712	118713	118714	118715	118716	118717	118718	118719	118720	118721	118722	118723	118724
Motor Data																
Values at nominal voltage																
1 Nominal voltage	V	4.8	4.8	6	7.2	9	12	15	18	24	30	36	45	48	48	48
2 No load speed	rpm	12700	12100	13200	13600	13100	13900	14000	13200	14000	14700	14100	14500	14200	10100	5320
3 No load current	mA	105	98.7	87.6	75.4	56.9	45.9	37.1	28.5	23	19.6	15.6	12.8	11.8	7.66	3.63
4 Nominal speed	rpm	11200	10500	11500	11700	11000	11900	12100	11300	12100	12900	12300	12700	12400	8120	3170
5 Nominal torque	mNm	2.15	2.27	2.67	3.18	4.23	4.36	4.42	4.53	4.53	4.4	4.46	4.42	4.43	4.65	4.77
6 Nominal current (max. continuous current)	Α	0.72	0.72	0.72	0.72	0.712	0.582	0.475	0.379	0.302	0.247	0.2	0.163	0.15	0.111	0.0603
7 Stall torque	mNm	26.3	22.8	25.8	27.4	29.9	34.3	35.3	33.4	36.3	36.8	35.6	36.2	35.4	24.2	12.1
8 Stall current	Α	7.56	6.26	6.16	5.58	4.65	4.23	3.51	2.6	2.24	1.91	1.48	1.23	1.11	0.541	0.144
9 Max. efficiency	%	73	72	74	76	77	79	80	80	80	81	81	81	81	78	71
Characteristics																
10 Terminal resistance	Ω	0.635	0.767	0.975	1.29	1.94	2.83	4.28	6.93	10.7	15.7	24.4	36.5	43.3	88.7	334
11 Terminal inductance	mH	0.021	0.023	0.03	0.042	0.071	0.113	0.174	0.284	0.452	0.639	0.993	1.48	1.74	3.44	12.1
12 Torque constant	mNm/A	3.48	3.64	4.2	4.91	6.43	8.11	10.1	12.9	16.2	19.3	24.1	29.4	31.9	44.8	83.9
13 Speed constant	rpm/V	2750	2630	2280	1940	1480	1180	948	742	589	495	397	325	299	213	114
14 Speed/torque gradient rp	m/mNm	502	554	529	510	447	411	403	399	389	403	402	404	407	423	453
15 Mechanical time constant	ms	9.07	8.35	7.36	6.71	6.13	5.78	5.56	5.43	5.31	5.28	5.25	5.23	5.22	5.24	5.28
16 Rotor inertia	gcm ²	1.73	1.44	1.33	1.26	1.31	1.34	1.32	1.3	1.3	1.25	1.25	1.24	1.23	1.18	1.11

Operating Range Comments Thermal data n [rpm] Continuous operation 30 K/W 8.5 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding In observation of above listed thermal resistance 4.5 W (lines 17 and 18) the maximum permissible winding 10.6 s 16000 temperature will be reached during continuous 118718 20 Thermal time constant motor 21 Ambient temperature 504 s -20...+65°C operation at 25°C ambient. 12000 = Thermal limit. 22 Max. winding temperature +85°C 8000 Short term operation Mechanical data (sleeve bearings) 16 000 rpm 0.05 - 0.15 mm 0.014 mm 23 Max. speed The motor may be briefly overloaded (recurring). 4000 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.8 N 2.0 4.0 6.0 M [mNm] 15 N 1.5 N 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 0.1 0.2 0.3 0.4 0.5 I[A]

Other specifications
29 Number of pole pairs
30 Number of commutator segments

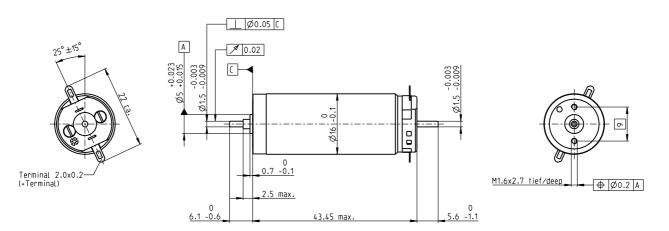
31 Weight of motor

Values listed in the table are nominal. Explanation of the figures on page 92. **Modular System**

40 g

Gear 426_GP 16 A 427_GP 16 C 473-475_GP 16 S Details on catalog page 46

Motor Control 550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5



Stock program **Part Numbers** Standard program Special program (on request) 118725 | 118726 | 118727 | 118728 | 118729 | 118730 | 118731 | 118732 | 118733 | 118734 | 118735 | 118736 | 118737 | 118738 | 118739 **Motor Data** Values at nominal voltage Nominal voltage 4.8 12 30 2 No load speed 12700 12100 13200 13600 13100 13900 14000 13200 14000 14700 14100 14500 14200 10100 5320 rpm 3 No load current mΑ 105 98.7 87.6 75.4 56.9 45.9 37.1 28.5 23 19.6 15.6 12.8 11.8 7.66 3.63 4 Nominal speed 11200 10500 11500 11700 11000 11900 12200 11300 12200 12900 12300 12700 12400 8130 3170 rpm 5 Nominal torque mNm 2.15 2.27 2.67 3.18 4.09 4.36 4.34 4.48 4.5 4.37 4.44 4.41 4.43 4.65 4.77 6 Nominal current (max. continuous current) 0.72 0.69 0.582 0.467 0.375 0.299 0.245 0.199 0.111 0.0603 0.72 0.72 0.72 0.162 0.15 26.3 22.7 25.8 27.4 29.9 34.3 35.3 33.4 36.3 36.8 35.6 36.2 35.4 24.2 7 Stall torque mNm 12.1 6.16 5.58 4.23 2.6 2.24 0.541 0.144 8 Stall current 7.56 6.26 4.65 3.51 1.91 1.48 1.23 1.11 9 Max. efficiency % 69 69 72 73 76 79 79 80 80 80 81 81 78 71 Characteristics 10 Terminal resistance Ω 0.635 0.767 0.975 1.29 1.94 2.83 4.28 6.93 10.7 15.7 24.4 36.5 43.3 88.7 334 11 Terminal inductance mΗ 0.021 0.023 0.03 0.042 0.071 0.113 0.174 0.285 0.452 0.64 0.994 1.48 1.74 3.44 12.1 mNm/A 3.64 4.91 6.43 8.11 12.9 16.2 24.1 31.9 44.8 12 Torque constant 3.48 4.2 10.1 19.3 29.4 83.9 2750 2630 2280 1940 1480 1180 948 742 589 495 397 325 299 213 13 Speed constant 114 rpm/\ 14 Speed/torque gradient 502 554 529 511 447 411 403 399 389 403 402 404 407 423 453 rpm/mNm 15 Mechanical time constant 7.36 5.78 5.25 5.24 9.07 8.35 6.71 6.13 5.56 5.43 5.31 5.28 5.23 5.22 5.28 ms 1.3 1.25 16 Rotor inertia 1.33 1.26 1.25 1.24 1.73 1.34 1.18 gcm² 1.31

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 30 K/W In observation of above listed thermal resistance 8.5 K/W 18 Thermal resistance winding-housing 4.5 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 10.6 s 16000 temperature will be reached during continuous 118733 20 Thermal time constant motor 459 s operation at 25°C ambient. 21 Ambient temperature -20...+65°C 12000 = Thermal limit. 22 Max. winding temperature +85°C 8000 Short term operation Mechanical data (sleeve bearings) 16 000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 4000 24 Axial play 0.05 - 0.15 mm 0.014 mm 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.8 N 4.0 M [mNm] Max. force for press fits (static) (static, shaft supported) 15 N 01 0.2 0.3 0.4 0.5 ΙſΑΊ 60 N 28 Max. radial load, 5 mm from flange Modular System Details on catalog page 46

Other specifications

- 29 Number of pole pairs
- 30 Number of commutator segments
- 31 Weight of motor

Values listed in the table are nominal. Explanation of the figures on page 92

Gear 40 g

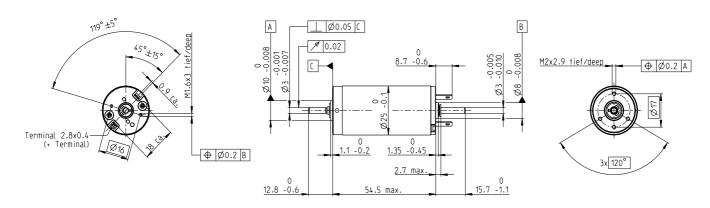
426 GP16 A 427_GP16 C 473-475 GP 16 S

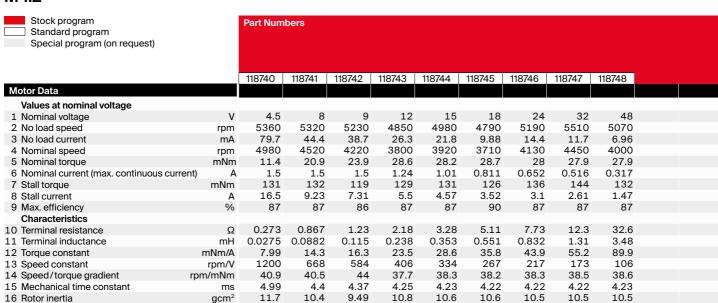
Sensor

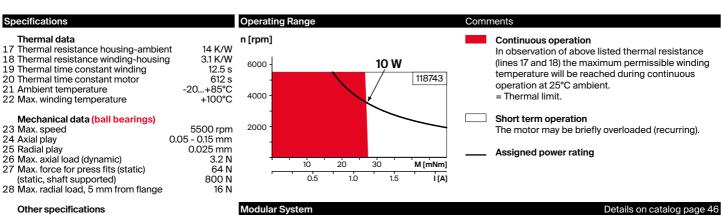
502 ENX 13 GAMA 533 Encoder MR 32 CPT

Motor Control

550 FSCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562 EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5







Other specifications

- 29 Number of pole pairs
- 30 Number of commutator segments Weight of motor
- CLL = Capacitor Long Life

Values listed in the table are nominal Explanation of the figures on page 92.

Option

Preloaded ball bearings

Gear 437_GP 26 A 439_GP 32 BZ 440_GP 32 A 443_GP 32 C

11

130 g

450 KD 32 478-486_GP 32 S

535_Encoder HEDS 5540 537_Encoder HEDL 5540 542_DC-Tacho DCT 22

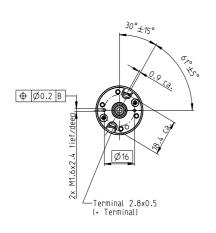
Motor Control

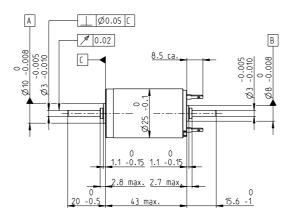
550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553 ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5

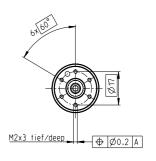
562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5

567_EPOS4 50/5







Stock program **Part Numbers** Standard program Special program (on request) 302534 339149 339150 339151 339152 339153 339154 339155 339156 339157 339158 **Motor Data** Values at nominal voltage Nominal voltage 18 24 30 36 48 48 48 48 2 No load speed 10500 9710 9620 10400 10900 9210 10100 9540 8450 6720 4650 rpm 13.7 3 No load current mΑ 133 93.2 68.1 50.6 40.2 25 23.7 16.4 9.89 4 Nominal speed 8970 8260 8310 9190 9690 8010 8860 8360 7270 5530 3430 rpm 5 Nominal torque mNm 21.9 24.4 27.5 29.1 30.4 31.4 30.7 31.7 32.3 32.9 32.8 6 Nominal current (max. continuous current) 3.68 2.97 2.45 1.85 1.04 0.931 0.614 0.495 0.341 1.5 0.68 259 238 268 297 325 265 279 270 243 192 127 7 Stall torque mNm 8.24 5.67 4.51 2.84 8 Stall current 42.1 28.1 23.2 18.4 15.6 8.61 1.3 9 Max. efficiency % 81 84 86 88 88 88 89 88 88 86 Characteristics 10 Terminal resistance Ω 0.171 0.32 0.517 0.98 1.53 3.49 4.37 8.47 10.6 16.9 36.8 11 Terminal inductance mΗ 0.016 0.031 0.057 0.112 0.186 0.407 0.493 0.979 1.25 1.97 4.11 12 Torque constant mNm/A 6.15 8.46 11.5 20.8 30.8 33.8 47.7 53.8 67.7 97.6 16.1 1550 1130 828 591 460 311 282 200 141 97.8 13 Speed constant rpm/\ 177 14 Speed/torque gradient 43.2 42.8 37.1 35.9 34 35.2 36.5 35.6 35.1 35.2 36.9 rpm/mNm 15 Mechanical time constant 6.52 6.06 5.62 5.36 5.24 5.17 5.16 5.13 5.12 5.12 5.14 ms 13.9 13.9 16 Rotor inertia gcm² 14.4 13.5 13.5 13.8 13.3 14.7

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 14 4 K/W In observation of above listed thermal resistance 18 Thermal resistance winding-housing 5.1 K/W 20 W 15000 (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 27.7 s 339155 temperature will be reached during continuous 543 s 20 Thermal time constant motor operation at 25°C ambient. -30...+100°C 21 Ambient temperature 10000 = Thermal limit. 22 Max. winding temperature +155°C Mechanical data (ball bearings) Short term operation 5000 14 000 rpm The motor may be briefly overloaded (recurring). 23 Max. speed 24 Axial play 0.05 - 0.15 mm 0.025 mm 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 10 20 30 Max. force for press fits (static) (static, shaft supported) 60 N 0.25 0.5 1.0 1000 N 28 Max. radial load, 5 mm from flange Details on catalog page 46 Modular System

Other specifications

- 29 Number of pole pairs
- 30 Number of commutator segments 31 Weight of motor

Values listed in the table are nominal. Explanation of the figures on page 92

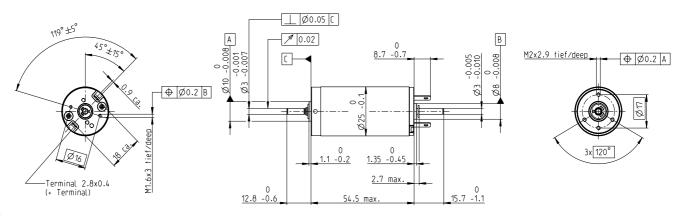
Gear 435_GP 22 HD 437_GP 26 A 439_GP 32 BZ 440_GP 32 A 443_GP 32 C 450 KD 32 478-486_GP 32 S

115 g

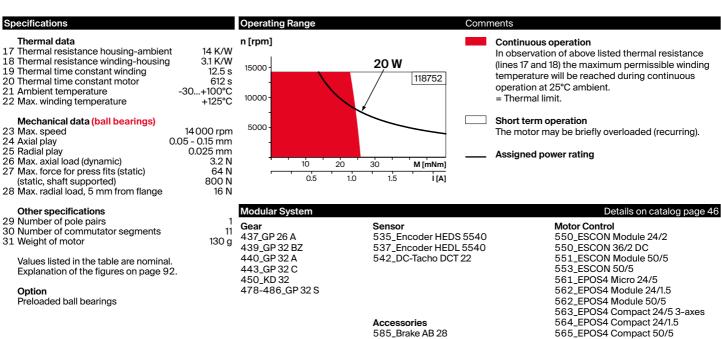
536_Encoder HEDS 5540 537_Encoder HEDL 5540 542_DC-Tacho DCT 22

Accessories 585_Brake AB 28

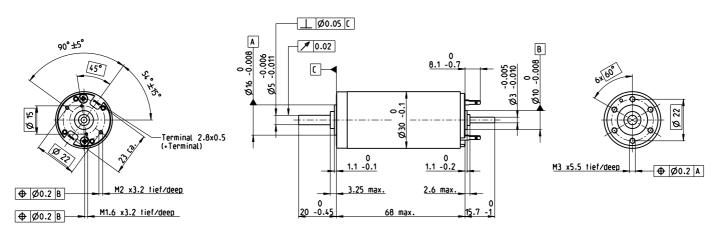
Motor Control 550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553 ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5



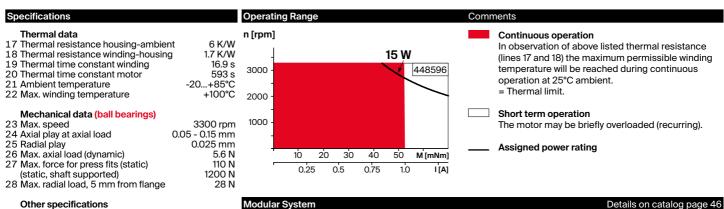
Stock program Standard program Special program (on request)		Part Numb	ers								
according to dimensional		118749	118750	118751	118752	118753	118754	118755	118756	118757	
shaft length 15.7 shortened t	:o 4 mm	302002	302003	302004	302005	302006	302007	302001	302008	302009	
Motor Data											
Values at nominal voltage											
1 Nominal voltage	V	9	15	18	24	30	42	48	48	48	
2 No load speed	rpm	10000	9660	10200	9560	9860	11100	10300	8240	5050	
3 No load current	mA	110	60.8	53.9	36.9	30.5	25.2	20.1	15.2	8.52	
4 Nominal speed	rpm	8970	8430	8850	8330	8640	9920	9160	7040	3830	
5 Nominal torque	mNm	11.1	20.5	22.9	26.3	26.7	27.1	27.7	28.7	30	
6 Nominal current (max. continuous current)	Α	1.5	1.5	1.46	1.16	0.968	0.784	0.653	0.536	0.343	
7 Stall torque	mNm	232	225	220	243	249	283	264	209	129	
8 Stall current	Α	29.1	15.8	13.5	10.4	8.72	7.94	6.03	3.81	1.44	
9 Max. efficiency	%	76	82	83	85	86	87	87	86	84	
Characteristics											
10 Terminal resistance	Ω	0.309	0.952	1.33	2.32	3.44	5.29	7.96	12.6	33.4	
11 Terminal inductance	mH	0.028	0.088	0.115	0.238	0.353	0.551	0.832	1.31	3.48	
12 Torque constant	mNm/A	7.96	14.3	16.3	23.4	28.5	35.6	43.8	55	89.6	
13 Speed constant	rpm/V	1200	670	586	408	335	268	218	174	107	
14 Speed/torque gradient rpr	n/mNm	46.5	44.7	48	40.3	40.4	39.8	39.6	39.8	39.7	
15 Mechanical time constant	ms	5.68	4.87	4.77	4.55	4.47	4.4	4.37	4.37	4.35	
16 Rotor inertia	gcm ²	11.7	10.4	9.49	10.8	10.6	10.6	10.5	10.5	10.5	



567_EPOS4 50/5



Stock program Standard program Special program (on request)		Part Numbers					
		448593	448594	448595	448596		
Motor Data (provisional)							
Values at nominal voltage							
1 Nominal voltage	V	6	9	12	18		
2 No load speed	rpm	2870	3310	2870	3190		
3 No load current	mA	41.6	33.4	20.8	15.9		
4 Nominal speed	rpm	2450	2870	2420	2770		
5 Nominal torque	mNm	53	53	53	53		
6 Nominal current (max. continuous currer	,	2.7	2.08	1.35	1		
7 Stall torque	mNm	364	402	342	401		
8 Stall current	Α	18.3	15.5	8.58	7.45		
9 Max. efficiency	%	90	91	90	91		
Characteristics							
10 Terminal resistance	Ω	0.378	0.63	1.45	2.47		
11 Terminal inductance	mH	0.07	0.119	0.281	0.513		
12 Torque constant	mNm/A	19.9	25.9	39.8	53.8		
13 Speed constant	rpm/V	479	369	240	178		
	rpm/mNm	9.1	8.97	8.71	8.14		
15 Mechanical time constant	ms	3.42	3.14	3.02	2.96		
16 Rotor inertia	gcm ²	35.9	33.5	33.1	34.7		



Values listed in the table are nominal. Explanation of the figures on page 92.

30 Number of commutator segments 31 Weight of motor

Option

Preloaded ball bearings

29 Number of pole pairs

441_GP 32 A

Gear

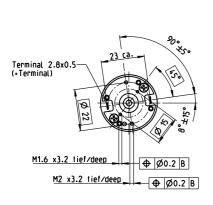
13

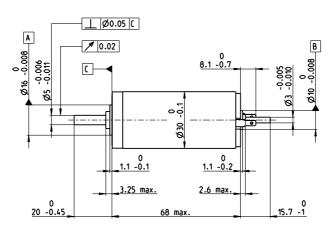
260 g

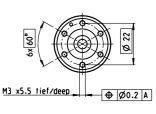
535 Encoder HEDS 5540 537_Encoder HEDL 5540

Motor Control

550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562 EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5







16 Rotor inertia

Stock program Part Numbers Standard program Special program (on request) according to dimensional drawing 310005 310006 310007 310008 310009 shaft length 15.7 shortened to 8.7 mm 268193 268213 268214 268215 268216 **Motor Data** Values at nominal voltage Nominal voltage 12 18 24 36 48 2 No load speed 8170 8590 8810 8590 8490 rpm 3 No load current mΑ 301 213 165 106 78.6 4 Nominal speed 7630 7910 8050 7840 7760 rpm 5 Nominal torque mNm 51.6 75.5 85.6 86.6 89.7 6 Nominal current (max. continuous current) 3.47 2.28 1.74 7 Stall torque 853 1000 1020 1000 1050 mNm 8 Stall current 61.1 50.3 39.3 25.2 19.6 9 Max. efficiency % 85 87 87 88 Characteristics 10 Terminal resistance Ω 0.196 0.358 0.611 1.43 2.45 11 Terminal inductance mΗ 0.034 0.07 0.119 0.281 0.513 12 Torque constant mNm/A 13.9 19.9 25.9 39.8 53.8 13 Speed constant rpm/\ 685 479 369 240 178 14 Speed/torque gradient rpm/mNm 9.64 8.61 8.7 8.61 8.09 15 Mechanical time constant 3.05 2.98 3.4 3.24 2.94 ms

gcm² Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 6.0 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 18 Thermal resistance winding-housing 1.7 K/W 60 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 16.3 s 12000 temperature will be reached during continuous 310007 593 s +100°C 20 Thermal time constant motor operation at 25°C ambient. 21 Ambient temperature = Thermal limit. 22 Max. winding temperature +125°C 8000 Short term operation Mechanical data (ball bearings) 23 Max. speed 12000 rpm 4000 The motor may be briefly overloaded (recurring). 24 Axial play 25 Radial play 0.05 - 0.15 mm 0.025 mm Assigned power rating 26 Max. axial load (dynamic) 5.6 N 50 M [mNm] 25 75 100 27 Max. force for press fits (static) (static, shaft supported) 110 N 1200 N 1.0 2.0 3.0 4.0 28 Max. radial load, 5 mm from flange Modular System Details on catalog page 46 Other specifications 29 Number of pole pairs Motor Control Gear 30 Number of commutator segments 13 439 GP 32 BZ 31 Weight of motor

35.9

Values listed in the table are nominal. Explanation of the figures on page 92. Option Preloaded ball bearings

260 g 440_GP 32 A 442_GP 32 AR 443_GP 32 C 446_GP 32 CR 450 KD 32 478-486_GP 32 S

33.7

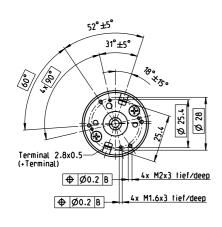
535_Encoder HEDS 5540 537_Encoder HEDL 5540

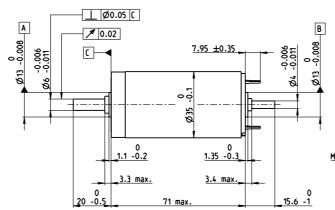
33.1

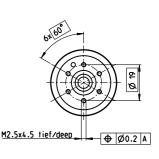
33.5

34.7

550 ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 567_EPOS4 50/5

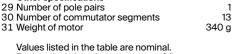






Stock program Standard program Special program (on request)		Part Nu	mbers									
according to dim	nensional drawing	273752	323890	273753	273754	273755	273756	273757	273758	273759		
shaft length 15.6 sh												
Motor Data												
Values at nominal voltage												
1 Nominal voltage	V	15	24	30	42	48	48	48	48	48		
2 No load speed	rpm	7200	7750	7280	7580	7310	6680	5990	4770	3830		
3 No load current	mA	188	128	94.1	70.5	58.9	52.6	46	34.9	27		
4 Nominal speed	rpm	6500	6970	6470	6800	6510	5870	5170	3930	2990		
5 Nominal torque	mNm	74.2	108	101	105	103	104	104	106	108		
6 Nominal current (max. continuous	current) A	4	3.81	2.68	2.07	1.71	1.58	1.41	1.15	0.934		
7 Stall torque	mNm	931	1210	976	1090	983	892	778	621	499		
8 Stall current	Α	47.9	41.6	25.1	20.7	15.8	13.1	10.3	6.52	4.21		
9 Max. efficiency	%	85	88	87	88	88	87	86	85	84		
Characteristics												
10 Terminal resistance	Ω	0.313	0.577	1.2	2.03	3.04	3.66	4.68	7.36	11.4		
11 Terminal inductance	mH	0.085	0.191	0.34	0.62	0.87	1.04	1.29	2.04	3.16		
12 Torque constant	mNm/A	19.4	29.2	38.9	52.5	62.2	68	75.8	95.2	119		
13 Speed constant	rpm/V	491	328	246	182	154	140	126	100	80.5		
14 Speed/torque gradient	rpm/mNm	7.91	6.48	7.55	7.03	7.5	7.55	7.77	7.75	7.74		

Specifications Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 6.2 K/W In observation of above listed thermal resistance 2 K/W 90 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 30.1 s 12000 temperature will be reached during continuous 273754 20 Thermal time constant motor 21 Ambient temperature 707 s operation at 25°C ambient. -30...+100°C 8000 = Thermal limit. 22 Max. winding temperature +155°C Mechanical data (ball bearings) Short term operation 4000 23 Max. speed 12000 rpm The motor may be briefly overloaded (recurring). 0.05 - 0.15 mm 0.025 mm 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 5.6 N 50 100 150 M [mNm] 27 Max. force for press fits (static) (static, shaft supported) 110 N 1.0 2.0 3.0 1200 N 28 Max. radial load, 5 mm from flange



Explanation of the figures on page 92.

Option

Hollow shaft as special design Preloaded ball bearings

Other specifications

15 Mechanical time constant

16 Rotor inertia

Gear 439_GP 32 BZ 440_GP 32 A 442_GP 32 AR 443_GP 32 C 446_GP 32 CR 447_GP 32 HP 452_GP 42 C 478-486_GP 32 S

Modular System

5.41

79

5.62

67.9

ms

gcm²

5.37

67.9

5.32

72.3

5.32

67.7

5.32

67.2

5.33

65.4

5.33

65.7

5.33

65.7

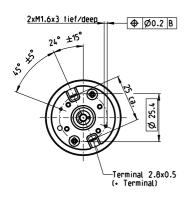
Sensor

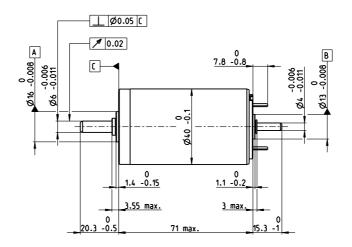
535 Encoder HEDS 5540 537_Encoder HEDL 5540 542_DC-Tacho DCT 22

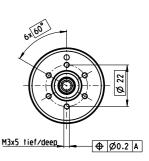
Accessories 585_Brake AB 28 592_End cap

Details on catalog page 46 Motor Control

551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 567_EPOS4 50/5







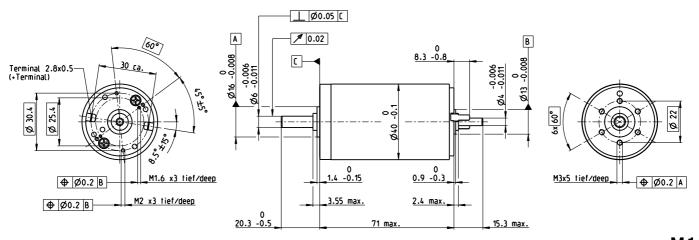
Stock program
Standard program
Special program (on request)

Part Numbers request)

		448588	448589	448590	448591	448592			
Motor Data (provisional)									
Values at nominal voltage									
1 Nominal voltage	V	9	18	24	42	48			
2 No load speed	rpm	2850	2850	2780	2920	2690			
3 No load current	mA	49.7	24.8	18.1	11	8.62			
4 Nominal speed	rpm	2560	2580	2470	2640	2400			
5 Nominal torque	mNm	87.8	87.8	88.2	87.6	87.6			
6 Nominal current (max. continuous currer	nt) A	2.96	1.48	1.09	0.65	0.524			
7 Stall torque	mNm	873	956	794	895	818			
8 Stall current	Α	29	15.9	9.66	6.53	4.81			
9 Max. efficiency	%	92	92	92	92	92			
Characteristics									
O Terminal resistance	Ω	0.311	1.14	2.49	6.43	9.97			
1 Terminal inductance	mH	0.082	0.33	0.613	1.7	2.62			
L2 Torque constant	mNm/A	30.2	60.3	82.2	137	170			
13 Speed constant	rpm/V	317	158	116	69.7	56.2			
14 Speed/torque gradient	rpm/mNm	3.27	2.98	3.51	3.27	3.3			
L5 Mechanical time constant	ms	4.85	4.29	4.36	4.14	4.13			
L6 Rotor inertia	gcm ²	142	137	119	121	120			

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 4.65 K/W In observation of above listed thermal resistance 1.93 K/W (lines 17 and 18) the maximum permissible winding 25 W 41.5 s temperature will be reached during continuous 448588 20 Thermal time constant motor 21 Ambient temperature 809 s -20...+85°C 3000 operation at 25°C ambient. = Thermal limit. 22 Max. winding temperature +100°C 2000 Mechanical data (ball bearings) Short term operation 3330 rpm 0.05 - 0.15 mm 0.025 mm 23 Max. speed 1000 The motor may be briefly overloaded (recurring). 24 Axial play 25 Radial play Assigned power rating 5.6 N 110 N 1200 N 26 Max. axial load (dynamic) M [mNm] 40 60 80 100 27 Max. force for press fits (static) (static, shaft supported) 4.0 10 20 3.0 I[Å] 28 Max. radial load, 5 mm from flange Modular System Details on catalog page 46 Other specifications 29 Number of pole pairs Motor Control 30 Number of commutator segments 31 Weight of motor 13 550_ESCON Module 24/2 535 Encoder HEDS 5540 480 g 550_ESCON 36/2 DC 538_Encoder HEDL 5540 551_ESCON Module 50/5 Values listed in the table are nominal. 553_ESCON 50/5 Explanation of the figures on page 92. 561_EPOS4 Micro 24/5 Option 562 EPOS4 Module 24/1.5 Preloaded ball bearings 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5



Stock program
Standard program
Special program (on request)

		148866	148867	148877	218008	218009	218010	218011	218012	218013	
Motor Data											
Values at nominal voltage											
1 Nominal voltage	V	12	24	48	48	48	48	48	48	48	
2 No load speed	rpm	6920	7580	7590	6420	5560	3330	2690	2130	1720	
3 No load current	mA	241	137	68.6	53.7	43.7	21.9	16.6	12.5	9.66	
4 Nominal speed	rpm	6380	6940	7000	5810	4930	2710	2060	1510	1080	
5 Nominal torque	mNm	94.9	177	187	186	180	189	190	192	192	
6 Nominal current (max. continuous currer	nt) A	6	6	3.17	2.66	2.23	1.4	1.13	0.909	0.73	
7 Stall torque	mNm	1720	2420	2560	2040	1620	1020	814	655	523	
8 Stall current	Α	105	80.2	42.4	28.6	19.7	7.43	4.79	3.06	1.97	
9 Max. efficiency	%	88	91	92	91	91	89	89	88	86	
Characteristics											
10 Terminal resistance	Ω	0.115	0.299	1.13	1.68	2.44	6.46	10	15.7	24.4	
11 Terminal inductance	mH	0.024	0.082	0.33	0.46	0.613	1.7	2.62	4.14	6.41	
12 Torque constant	mNm/A	16.4	30.2	60.3	71.3	82.2	137	170	214	266	
13 Speed constant	rpm/V	581	317	158	134	116	69.7	56.2	44.7	35.9	
14 Speed/torque gradient	rpm/mNm	4.05	3.14	2.97	3.16	3.45	3.29	3.31	3.27	3.29	
15 Mechanical time constant	ms	5.89	4.67	4.28	4.2	4.19	4.16	4.15	4.15	4.15	
16 Rotor inertia	gcm ²	139	142	137	127	116	121	120	121	120	

Part Numbers

Specification Operating Range n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 4.7 K/W In observation of above listed thermal resistance 1.9 K/W 150 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 41.5 s 12000 temperature will be reached during continuous 20 Thermal time constant motor 21 Ambient temperature 809 s operation at 25°C ambient. -30...+100°C 8000 = Thermal limit. 22 Max. winding temperature +155°C Short term operation Mechanical data (ball bearings) 4000 23 Max. speed 12000 rpm The motor may be briefly overloaded (recurring). 0.05 - 0.15 mm 0.025 mm 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 5.6 N 150 50 100 200 M [mNm] 27 Max. force for press fits (static) (static, shaft supported) 110 N 1.0 2.0 3.0 4.0 1200 N 28 Max. radial load, 5 mm from flange

Other specifications 29 Number of pole pairs 30 Number of commutator segments 13 480 g 31 Weight of motor

Values listed in the table are nominal. Explanation of the figures on page 92.

Option

Preloaded ball bearings

Industrial version with radial shaft seal ring (resulting in increased no load current). IP54 protection only if mounted on brush side, in compliance with maxon modular system.

Modular System

Gear

452_GP 42 C 535_Encoder HEDS 5540 457_GP 52 C 538_Encoder HEDL 5540 585_Brake AB 28

Industrial Version IP54*

540_Encoder HEDL 9140 586_Brake AB 28 592_End cap

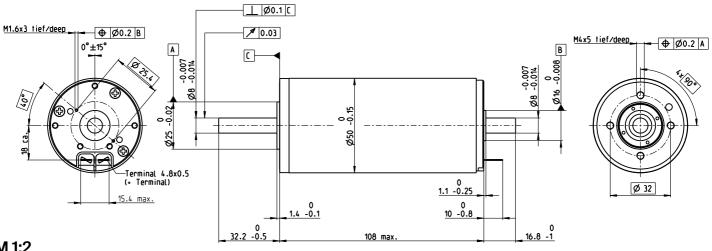
Details on catalog page 46 Motor Control

551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5

553_ESCON 70/10 562_EPOS4 Module 50/5 563 EPOS4 Module 50/8

565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 CAN 567_EPOS4 50/5

567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12



Stock program Standard program Special program (on request)		Part Numb	ers				
		578296	578297	578298	578299		
Industria	al Version IP54*	618570	618571	618572	618573		
Motor Data							
Values at nominal voltage							
1 Nominal voltage	V	24	36	48	70		
2 No load speed	rpm	5950	5680	4900	2760		

Motor Data								
Values at nominal voltage								
1 Nominal voltage	V	24	36	48	70			
2 No load speed	rpm	5950	5680	4900	2760			
3 No load current	mA	236	147	88.4	27.4			
4 Nominal speed	rpm	5680	5420	4620	2470			
5 Nominal torque	mNm	405	418	420	452			
6 Nominal current (max. continuous current)	. A	10.8	7.07	4.58	1.89			
7 Stall torque	mNm	8920	8920	7370	4340			
8 Stall current	Α	232	148	78.9	17.9			
9 Max. efficiency	%	94	94	94	92			
Characteristics								
10 Terminal resistance	Ω	0.103	0.244	0.608	3.9			
11 Terminal inductance	mH	0.072	0.177	0.423	2.83			
12 Torque constant	mNm/A	38.5	60.4	93.4	242			
13 Speed constant	rpm/V	248	158	102	39.5			
14 Speed/torque gradient rp	m/mNm	0.668	0.638	0.666	0.638			
15 Mechanical time constant	ms	3.75	3.74	3.78	3.74			
16 Rotor inertia	gcm ²	536	560	542	560			

Operating Range Comments Thermal data n [rpm] 3.8 K/W 17 Thermal resistance housing-ambient 1.2 K/W 71.7 s 18 Thermal resistance winding-housing 200 W 19 Thermal time constant winding 578297 1370 s -30...+100°C 20 Thermal time constant motor 8000 21 Ambient temperature = Thermal limit. 22 Max. winding temperature +125°C 6000 Mechanical data Short term operation 4000 (preloaded ball bearings) 23 Max. speed 24 Axial play at axial load 2000 9500 rpm 0 mm < 11.5 N 0.1 mm 150 300 450 M [mNm] 25 Radial play 26 Max. axial load (dynamic) 27 Max. force for press fits (static) preloaded 30 N 2.5 5.0 10.0 150 N 6000 N 110 N (static, shaft supported) Modular System 28 Max. radial load, 15 mm from flange

Gear

1100 g

Continuous operation

In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.

The motor may be briefly overloaded (recurring).

Assigned power rating

Weight of motor	
Values listed in the table are nominal.	

Other specifications

29 Number of pole pairs

Explanation of the figures on page 92.

Industrial version with radial shaft seal ring (resulting in increased no load current).

IP54 protection only if mounted on brush side, in compliance with maxon modular system.

457 GP 52 C 536 Encoder HEDS 5540 459_GP 62 A 538_Encoder HEDL 5540

Industrial Version IP54* 541_Encoder HEDL 9140

590_Brake AB 44 592_End cap

Motor Control

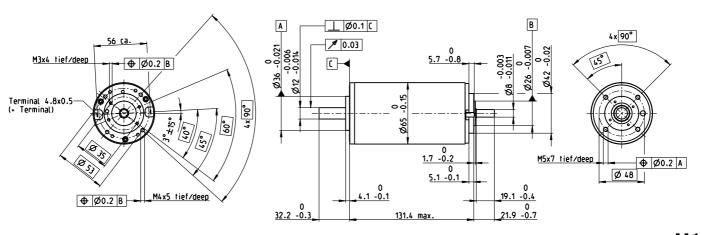
551 ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10

Details on catalog page 46

562_EPOS4 Module 50/5 563 EPOS4 Module 50/8 563_EPOS4 Module 50/15 565_EPOS4 Compact 50/5

565_EPOS4 Compact 50/8 CAN 566_EPOS4 Compact 50/15 567_EPOS4 50/5

567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12



Stock program Standard program Special program (on reques	t)	Part Num	bers						
		353294	353295	353296	353297	353298	353299	353300	353301
Inde	ustrial Version IP54*	388984	388985	388986	388987	388988	388989	388990	388991
Motor Data									
Values at nominal voltage									
1 Nominal voltage	V	18	24	36	48	60	70	70	70
2 No load speed	rpm	3520	4090	3970	3670	3680	3440	3190	2690
3 No load current	mA	755	697	437	289	231	179	160	125
4 Nominal speed	rpm	3250	3810	3700	3420	3450	3220	2960	2470
5 Nominal torque	mNm	427	501	751	800	813	832	839	888
6 Nominal current (max. continue	ous current) A	10	10	9.32	6.8	5.53	4.51	4.21	3.74
7 Stall torque	mNm	13600	15700	17400	16100	16200	15100	13700	12200
8 Stall current	Α	295	292	207	131	106	78.6	66.1	49.7
9 Max. efficiency	%	81	83	87	88	89	89	89	89
Characteristics									
10 Terminal resistance	Ω	0.0609	0.0821	0.174	0.365	0.568	0.891	1.06	1.41
11 Terminal inductance	mH	0.023	0.031	0.076	0.161	0.251	0.393	0.458	0.644
12 Torque constant	mNm/A	46	53.7	84.4	123	153	192	207	245
13 Speed constant	rpm/V	208	178	113	77.8	62.3	49.8	46.1	38.9
14 Speed/torque gradient	rpm/mNm	0.275	0.272	0.234	0.231	0.231	0.231	0.236	0.223
15 Mechanical time constant	ms	3.98	3.68	3.38	3.25	3.19	3.16	3.16	3.13
16 Rotor inertia	gcm ²	1380	1290	1380	1340	1320	1310	1280	1340

Specifications Operating Range Thermal data n [rpm] Continuous operation 1.3 K/W 1.85 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing In observation of above listed thermal resistance 250 W (lines 17 and 18) the maximum permissible winding 6000 19 Thermal time constant winding 123 s temperature will be reached during continuous 20 Thermal time constant motor 1060 soperation at 25°C ambient. -30...+100°C 4500 21 Ambient temperature = Thermal limit. 22 Max. winding temperature +125°C 3000 Mechanical data Short term operation (preloaded ball bearings) The motor may be briefly overloaded (recurring). 1500 23 Max. speed 5500 rpm I 0 mm 24 Axial play at axial load < 25 NAssigned power rating 450 600 0.1 mm 150 300 750 M [mNm] 25 Radial play 26 Max. axial load (dynamic) preloaded 4.5 6.0 70 N 420 N Max. force for press fits (static) (static, shaft supported) 28 Max. radial load, 15 mm from flange 12 000 N 350 N Modular System Details on catalog page 46 Motor Control Gear Other specifications

Values listed in the table are nominal. Explanation of the figures on page 92

29 Number of pole pairs 30 Number of commutator segments

31 Weight of motor

Industrial version with radial shaft seal ring (resulting in increased no load current). IP54 protection only if mounted on brush side, in compliance with maxon modular system.

460_GP 81 A

2

2100 g

536 Encoder HEDS 5540 538_Encoder HEDL 5540

Industrial Version IP54* 541_Encoder HEDL 9140 590_Brake AB 44 592_End cap

551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 563_EPOS4 Module 50/8 563 EPOS4 Module 50/15 565_EPOS4 Compact 50/8 CAN 566_EPOS4 Compact 50/15 567_EPOS4 70/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

maxon A-max

Standard Specification No. 100	88
Terminology explanations	92
A-max Program	167-186
A-max 12 Ø12 mm, Precious metal brushes, CLL, 0.75 W	167
A-max 12 ∅12 mm, Precious metal brushes, CLL, 0.5 W	168
A-max 16 Ø16 mm, Precious metal brushes, CLL, 2 W	169
A-max 16 Ø16 mm, Precious metal brushes, CLL, 1.2 W	170
A-max 16 Ø16 mm, Graphite brushes, 2 W	171-172
A-max 19 Ø19 mm, Precious metal brushes, CLL, 2.5 W	173
A-max 19 Ø19 mm, Precious metal brushes, CLL, 1.5 W	174
A-max 19 Ø19 mm, Graphite brushes, 2.5 W	175-176
A-max 22 Ø22 mm, Precious metal brushes, CLL, 5 W	177
A-max 22 Ø22 mm, Precious metal brushes, CLL, 3.5 W	178
A-max 22 Ø22 mm, Graphite brushes, 6 W	179-180
A-max 26 Ø26 mm, Precious metal brushes, CLL, 7 W	181
A-max 26 Ø26 mm, Precious metal brushes, CLL, 4.5 W	182
A-max 26 Ø26 mm, Graphite brushes, 11 W	183-184
A-max 32 Ø32 mm, Graphite brushes, 20 W	185-186

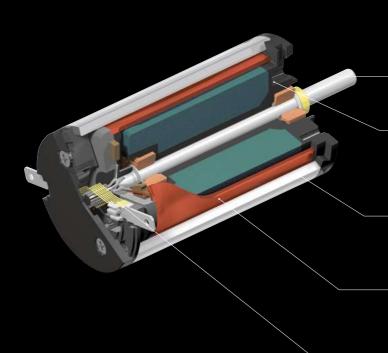


© 2024 maxon. All rights reserved.

maxon A-max

The drives use an ironless rotor and AlNiCo magnets. Automated manufacturing means that maxon's brushed A-max motors offer top performance at an attractive price. In maxon's modular system you can combine the A-max motors with gears, sensors and controllers for a complete drive system.

Key data



Torque-resistant shaft. No recesses; the stress concentration is eliminated.

In a hybrid process, a stator is formed by assembling the motor housing and magnet in one step using injection molding of PPA plastic. Sintered bearings or ball bearings.

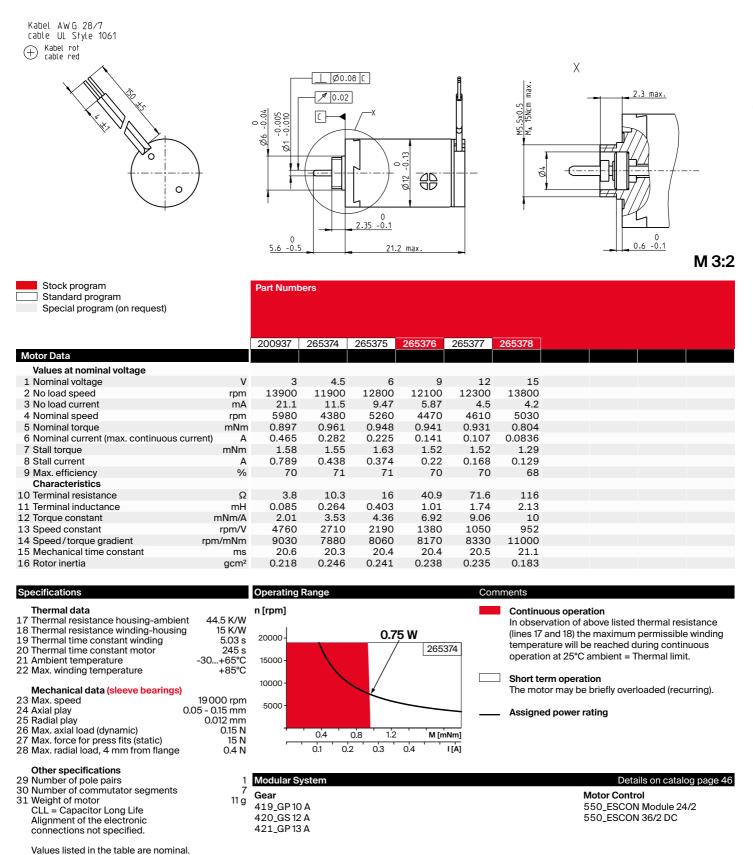
Motor housing made of strip steel, produced with highest precision at low cost, with no waste.

Proven winding procedure. Better performance resulting from optimal use of the air gap in the entire winding series.

- Good price-performance ratio
- → DC motor with AlNiCo magnet
- → Torque-resistant shaft
- Automated manufacturing process

4-, 5- or 7-fingered precious metal brushes for fine rotary motions. Graphite brushes for heavy-duty use.

A-max 12 Ø12 mm, precious metal brushes CLL, 0.75 watt

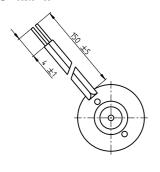


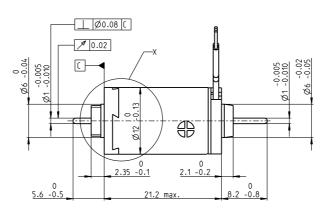
Explanation of the figures on page 92

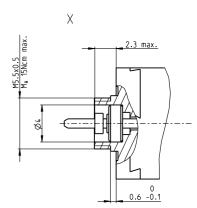
A-max 12 Ø12 mm, precious metal brushes CLL, 0.5 watt

Kabel AWG 28/7 cable UL Style 1061

H Kabel rot cable red







M 3:2

Motor Data

Stock program Standard program

1 Nominal voltage 2 No load speed 3 No load current 4 Nominal speed 5 Nominal torque

7 Stall torque 8 Stall current 9 Max. efficiency Characteristics 10 Terminal resistance 11 Terminal inductance 12 Torque constant 13 Speed constant 14 Speed/torque gradient 15 Mechanical time constant

16 Rotor inertia

Special program (on request)

6 Nominal current (max. continuous of

Values at nominal voltage

		Part Numb	pers				
		200938	265389	265390	265391	265392	265393
	V	3	4.5	6	9	12	15
	rpm	13700	11700	12600	11900	12100	13500
	mA	34.5	18.8	15.5	9.63	7.38	6.88
	rpm	6000	4390	5280	4480	4620	5050
	mNm	0.872	0.937	0.923	0.918	0.908	0.78
current)	A	0.464	0.282	0.225	0.141	0.106	0.0835
ourronty	mNm	1.58	1.55	1.63	1.52	1.52	1.29
	A	0.789	0.438	0.374	0.22	0.168	0.129
	%	63	63	64	63	63	60
	70	03	00	04	03	03	00
	Ω	3.8	10.3	16	40.9	71.6	116
	mH	0.085	0.264	0.403	1.01	1.74	2.13
	nNm/A	2.01	3.53	4.36	6.92	9.06	10
		4760	2710	2190	1380	1050	952
VIO.10	rpm/V	9030	7880	8060	8170	8330	11000
rpn	n/mNm ms	20.6	20.3	20.4	20.4	20.5	21.1

0.235

0.183

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 44 5 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing In observation of above listed thermal resistance 15 K/W 0.5 W (lines 17 and 18) the maximum permissible winding 15000 19 Thermal time constant winding 5.03 s temperature will be reached during continuous 265389 20 Thermal time constant motor 21 Ambient temperature 267 s -30...+65°C operation at 25°C ambient = Thermal limit. 10000 22 Max. winding temperature +85°C Short term operation The motor may be briefly overloaded (recurring). Mechanical data (sleeve bearings) 14 000 rpm 0.05 - 0.15 mm 0.012 mm 23 Max. speed 5000 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 0.15 N 0.4 0.8 1.2 M [mNm] 27 Max. force for press fits (static) (static, shaft supported) 15 N 70 N 0.1 0.2 0.3 0.4 ITAI 28 Max. radial load, 4 mm from flange Modular System Other specifications Details on catalog page 46 29 Number of pole pairs Gear

0.241

0.238

30 Number of commutator segments

31 Weight of motor CLL = Capacitor Long Life Alignment of the electronic connections not specified.

> Values listed in the table are nominal. Explanation of the figures on page 92.

419 GP10 A 12 g 420_GS 12 A 421_GP13A

gcm²

0.218

0.246

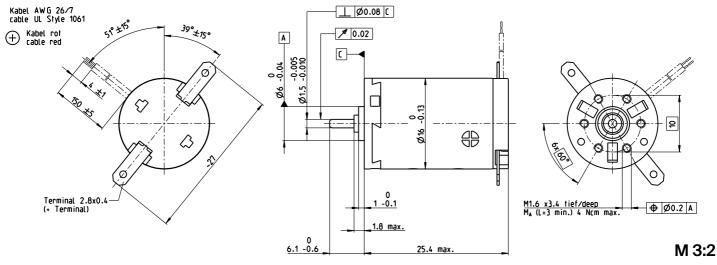
Sensor

532_Encoder MR 16 CPT

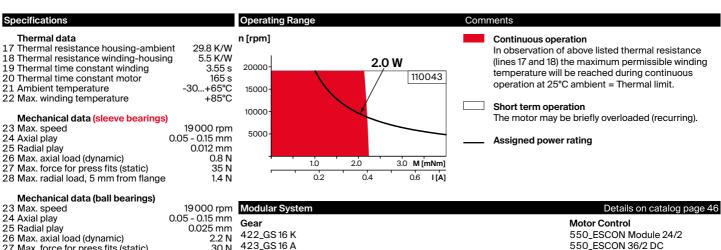
Motor Control 550 ESCON Module 24/2

550_ESCON 36/2 DC 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5

A-max 16 Ø16 mm, precious metal brushes CLL, 2 watt



Stock program Standard program Special program (on request)		Part Numb	ers								
	with terminals	110041	110042	110043	110044	110045	110046	110047	110048	110049	110050
	with cables	139820	352815	134844	231379	220514	304672	352823	352816	260678	352817
Motor Data											
Values at nominal voltage											
1 Nominal voltage	V	1.5	3	6	9	12	15	18	21	24	30
2 No load speed	rpm	10800	11000	10100	12300	12300	13200	14100	13700	13800	11400
3 No load current	mA	61.4	38.1	13.9	12.7	9.54	8.57	7.99	6.53	5.83	3.37
4 Nominal speed	rpm	9360	8810	4530	6700	6660	7590	8480	8040	8120	5480
5 Nominal torque	mNm	0.712	1.3	2.22	2.19	2.17	2.17	2.15	2.14	2.11	2.08
6 Nominal current (max. continuous	s current) A	0.6	0.6	0.408	0.327	0.243	0.209	0.185	0.153	0.134	0.0864
7 Stall torque	mNm	4.79	4.51	4.03	4.82	4.77	5.16	5.44	5.22	5.12	4.04
8 Stall current	Α	3.66	1.97	0.723	0.702	0.52	0.482	0.453	0.362	0.315	0.164
9 Max. efficiency	%	76	75	75	76	76	76	76	76	76	74
Characteristics											
10Terminal resistance	Ω	0.41	1.52	8.3	12.8	23.1	31.1	39.7	57.9	76.2	183
11 Terminal inductance	mH	0.017	0.052	0.306	0.467	0.83	1.13	1.42	2.05	2.61	6.01
12Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13 Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14 Speed / torque gradient	rpm/mNm	2280	2770	2560	2590	2620	2600	2630	2670	2750	2880
15 Mechanical time constant	ms	25.3	23.8	23.2	23.3	23.3	23.4	23.5	23.4	23.5	23.9
16 Rotor inertia	gcm ²	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793



424_GS 16 V 425_GS 16 VZ 426_GP16 A

427 GP 16 C

473-475_GP 16 S

23 Max. speed	19 000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	2.2 N
27 Max. force for press fits (static)	30 N
28 Max. radial load, 5 mm from flange	7.8 N
Other specifications	
29 Number of pole pairs	1

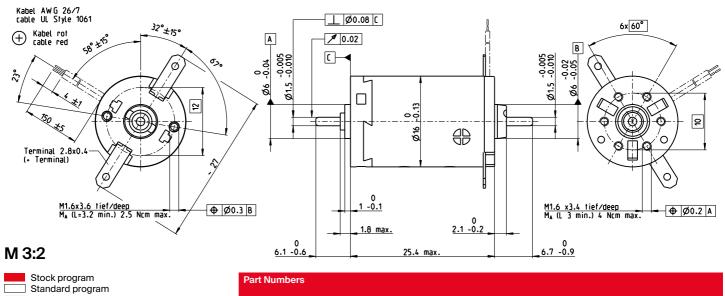
CLL = Capacitor Long Life Values listed in the table are nominal. Explanation of the figures on page 92.

30 Number of commutator segments

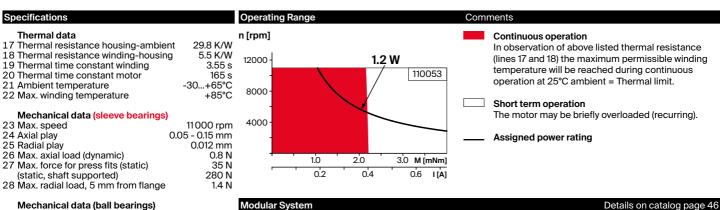
Weight of motor

Ball bearings in place of sleeve bearings Without CLL

A-max 16 Ø16 mm, precious metal brushes CLL, 1.2 watt



Stock program Standard program Special program (on request	;)	Part Numb	ers								
	with terminals	110051	110052	110053	110054	110055	110056	110057	110058	110059	110060
	with cables	139823	352825	352826	352827	352828	352829	352830	352831	352832	352833
Motor Data											
Values at nominal voltage											
1 Nominal voltage	V	1.2	2.4	6	7.2	9	12	15	18	18	30
2 No load speed	rpm	8560	9730	10000	9740	9120	10400	11600	11600	10300	11300
3 No load current	mA	73.9	44.1	18.3	14.7	10.8	9.69	8.99	7.49	6.34	4.33
4 Nominal speed	rpm	7170	6310	4540	4200	3530	4900	6090	6050	4580	5500
5 Nominal torque	mNm	0.694	1.29	2.18	2.17	2.16	2.16	2.13	2.12	2.09	2.04
6 Nominal current (max. continuo	ous current) A	0.6	0.6	0.407	0.327	0.244	0.21	0.185	0.153	0.134	0.0862
7 Stall torque	mNm	3.83	3.61	4.03	3.86	3.57	4.13	4.54	4.48	3.84	4.04
8 Stall current	Α	2.93	1.58	0.723	0.561	0.39	0.386	0.378	0.311	0.236	0.164
9 Max. efficiency	%	71	70	71	71	70	71	72	72	71	71
Characteristics											
10Terminal resistance	Ω	0.41	1.52	8.3	12.8	23.1	31.1	39.7	57.9	76.2	183
11 Terminal inductance	mH	0.017	0.0519	0.306	0.467	0.831	1.13	1.42	2.05	2.61	6.01
12 Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13 Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14Speed/torque gradient	rpm/mNm	2280	2770	2560	2590	2620	2600	2630	2670	2750	2880
15 Mechanical time constant	ms	25.3	23.7	23.2	23.3	23.3	23.3	23.4	23.3	23.4	23.8
16 Rotor inertia	gcm ²	1.06	0.818	0.866	0.857	0.847	0.857	0.85	0.836	0.814	0.791



Modular System Mechanical data (ball bearings) 23 Max. speed 11000 rpm Gear Sensor 24 Axial play 25 Radial play 0.05 - 0.15 mm 0.025 mm 502 ENX 13 GAMA 422_GS 16 K 423_GS 16 A 533_Encoder MR 32 CPT 26 Max. axial load (dynamic) 30 N 424_GS 16 V 27 Max. force for press fits (static) (static, shaft supported) 280 N 425_GS 16 VZ 28 Max. radial load, 5 mm from flange 426_GP 16 A 427_GP16 C Other specifications 473-475_GP 16 S

22 g

Motor Control 550 ESCON Module 24/2 550_ESCON 36/2 DC 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5

Values listed in the table are nominal. Explanation of the figures on page 92.

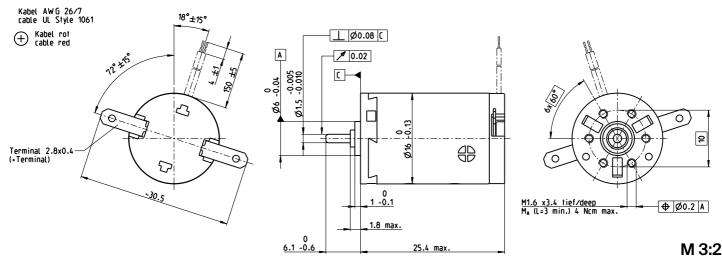
30 Number of commutator segments

Ball bearings in place of sleeve bearings Without CLL

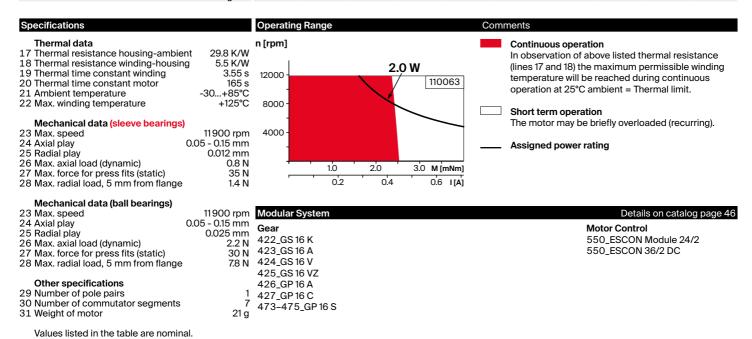
29 Number of pole pairs

31 Weight of motor CLL = Capacitor Long Life

A-max 16 Ø16 mm, graphite brushes, 2 watt



Stock program Standard program Special program (on request)		Part Numb	ers								
	with terminals	110061	110062	110063	110064	110065	110066	110067	110068	110069	110070
	with cables	139821	352853	352854	352855	325083	352856	205903	352857	266076	352858
Motor Data											
Values at nominal voltage		,	·		ï		·				
1 Nominal voltage	V	1.5	3	6	9	12	14	15	18	21	30
2 No load speed	rpm	10200	11500	9360	11500	11500	11500	11000	10900	11300	10500
3 No load current	mA	282	164	65.6	54.6	41	35.1	31.1	25.9	23	15
4 Nominal speed	rpm	9010	8060	3280	5510	5460	5500	4860	4810	5100	4180
5 Nominal torque	mNm	0.579	1.29	2.42	2.36	2.34	2.35	2.35	2.33	2.28	2.24
6 Nominal current (max. continuous	current) A	0.72	0.72	0.495	0.394	0.293	0.253	0.224	0.186	0.162	0.105
7 Stall torque	mNm	5.36	4.65	4.05	4.84	4.78	4.82	4.54	4.48	4.49	4.04
8 Stall current	Α	4.1	2.03	0.727	0.704	0.521	0.451	0.378	0.311	0.276	0.164
9 Max. efficiency	%	54	51	49	52	52	52	51	51	50	48
Characteristics											
10Terminal resistance	Ω	0.366	1.48	8.25	12.8	23	31.1	39.7	57.9	76.1	183
11 Terminal inductance	mH	0.017	0.052	0.306	0.467	0.83	1.13	1.42	2.05	2.61	6.01
12 Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13 Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14 Speed / torque gradient	rpm/mNm	2040	2690	2540	2580	2620	2590	2630	2660	2750	2880
15 Mechanical time constant	ms	22.6	23.1	23.1	23.2	23.3	23.3	23.5	23.4	23.5	23.9
16 Rotor inertia	gcm ²	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793

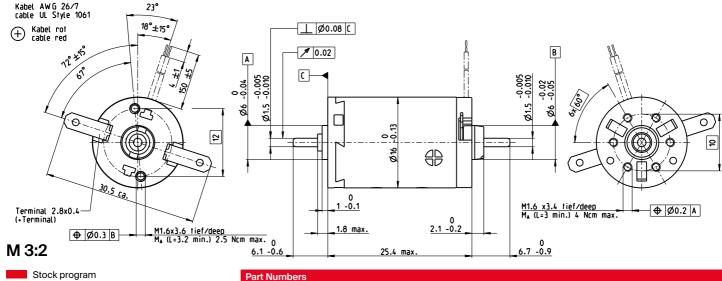


Explanation of the figures on page 92.

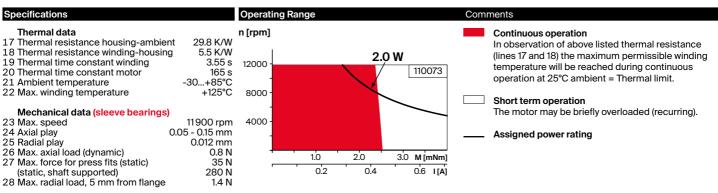
Option

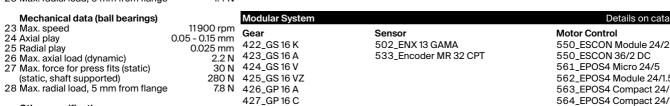
Ball bearings in place of sleeve bearings

A-max 16 Ø16 mm, graphite brushes, 2 watt



IVI 3:2		6.1 -0.6	-	25	5.4 max.	-	6.7	-0.9			
Stock program Standard program Special program (on request)		Part Numb	ers								
	with terminals	110071	110072	110073	110074	110075	110076	110077	110078	110079	110080
	with cables	139825	352870	352871	352872	352873	352874	352875	352876	352877	352878
Motor Data											
Values at nominal voltage											
1 Nominal voltage	V	1.5	3	6	9	12	14	15	18	21	30
2 No load speed	rpm	10200	11500	9360	11500	11500	11500	11000	10900	11300	10500
3 No load current	mA	282	164	65.6	54.6	41	35.1	31.1	25.9	23	15
4 Nominal speed	rpm	9010	8060	3280	5510	5460	5500	4860	4810	5100	4180
5 Nominal torque	mNm	0.579	1.29	2.42	2.36	2.34	2.35	2.35	2.33	2.28	2.24
6 Nominal current (max. continuous	,	0.72	0.72	0.495	0.394	0.293	0.253	0.224	0.186	0.162	0.105
7 Stall torque	mNm	5.36	4.65	4.05	4.84	4.78	4.82	4.54	4.48	4.49	4.04
8 Stall current	Α	4.1	2.03	0.727	0.704	0.521	0.451	0.378	0.311	0.276	0.164
9 Max. efficiency	%	54	51	49	52	52	52	51	51	50	48
Characteristics	_										
10Terminal resistance	Ω	0.366	1.48	8.25	12.8	23	31.1	39.7	57.9	76.1	183
11 Terminal inductance	mH	0.017	0.052	0.306	0.467	0.83	1.13	1.42	2.05	2.61	6.01
12 Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13 Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14Speed/torque gradient	rpm/mNm	2040	2690	2540	2580	2620	2590	2630	2660	2750	2880
15 Mechanical time constant	ms	22.6	23.1	23.1	23.2	23.3	23.3	23.5	23.4	23.5	23.9
16 Rotor inertia	gcm ²	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793





561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 427_GP16 C 564_EPOS4 Compact 24/1.5 Other specifications 473-475_GP16S 29 Number of pole pairs 30 Number of commutator segments 22 g 31 Weight of motor

Values listed in the table are nominal. Explanation of the figures on page 92.

Ball bearings in place of sleeve bearings

Details on catalog page 46

A-max 19 Ø19 mm, precious metal brushes CLL, 2.5 watt

Part Numbers

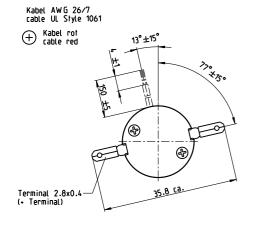
430_GP 22 A

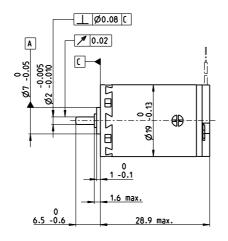
432_GP 22 C

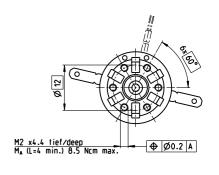
436_GS 24 A

476_GP 22 S

477 GP 22 S







M 1:1

Stock program
Standard program
0

Standard program										
Special program (on request	t)									
	with terminals	110081	110082	110083	110084	110085	110086	110087	110088	110089
	with cables	139828	202411	352922	202412	352923	233453	238388	267427	235373
Matari	With Cables	139626	202411	332922	202412	352923	233433	230300	201421	233373
Motor Data										
Values at nominal voltage										
1 Nominal voltage	V	1.5	3.6	4.5	6	9	12	15	18	24
2 No load speed	rpm	8040	10800	9420	7790	9220	10300	10300	9300	8870
3 No load current	mA	78	52.9	33.6	18.6	16.2	14.6	11.7	8.25	5.73
4 Nominal speed	rpm	6840	8080	5710	4000	5470	6510	6500	5380	4900
5 Nominal torque	mNm	1.35	2.48	3.61	3.59	3.59	3.49	3.48	3.42	3.39
6 Nominal current (max. continuo	ous current) A	0.84	0.84	0.83	0.51	0.403	0.33	0.264	0.195	0.138
7 Stall torque	mNm	7.79	9.43	9	7.36	8.83	9.47	9.45	8.16	7.63
8 Stall current	Α	4.44	3.02	2.01	1.02	0.963	0.867	0.692	0.45	0.301
9 Max. efficiency	%	76	76	76	76	76	76	76	76	75
Characteristics										
10 Terminal resistance	Ω	0.338	1.19	2.24	5.88	9.34	13.8	21.7	40	79.7
11 Terminal inductance	mH	0.019	0.059	0.121	0.314	0.506	0.719	1.12	1.98	3.87
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377
14 Speed/torque gradient	rpm/mNm	1050	1170	1060	1080	1060	1110	1110	1160	1180
15 Mechanical time constant	ms	27.9	25.4	24.3	24.2	24.1	24.2	24.3	25	24.6
16 Rotor inertia	gcm ²	2.54	2.07	2.18	2.14	2.16	2.09	2.09	2.06	1.99

Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 21.3 K/W In observation of above listed thermal resistance 10.5 K/W 2.5 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 11 s temperature will be reached during continuous 15000 110086 201 s 20 Thermal time constant motor 21 Ambient temperature operation at 25°C ambient = Thermal limit. -30...+65°C 22 Max. winding temperature 10000 Short term operation Mechanical data (sleeve bearings) The motor may be briefly overloaded (recurring). 23 Max. speed 16 000 rpm 5000 0.05 - 0.15 mm 0.012 mm 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 1.0 2.0 3.0 4.0 5.0 M [mNm] 80 N 2.7 N 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 0.1 0.2 0.3 0.4 0.5 Mechanical data (ball bearings) 23 Max. speed 16000 rpm Details on catalog page 46 Modular System 24 Axial play 0.05 - 0.15 mm Gear Motor Control 0.025 mm 428_GP 19 B 550 ESCON Module 24/2

25 Radial play 26 Max. axial load (dynamic) 3.3 N 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 11.9 N

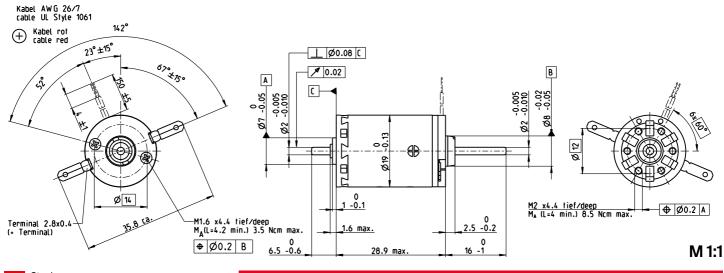
Other specifications 29 Number of pole pairs 30 Number of commutator segments 31 Weight of motor 33 g CLL = Capacitor Long Life

Values listed in the table are nominal. Explanation of the figures on page 92.

Ball bearings in place of sleeve bearings Without CLL

550_ESCON 36/2 DC

A-max 19 \varnothing 19 mm, precious metal brushes CLL, 1.5 watt



	[7-1-1		.0	20.9 IIId	×	10 -1				IVI III
Stock program Standard program Special program (on reques	t)	Part Numbe	ers							
	with terminals	110090	110091	110092	110093	110094	110095	110096	110097	110098
	with cables	139832	352925	352926	352927	352928	352929	352930	315468	352931
Motor Data								ĺ		
Values at nominal voltage				ĺ						_
1 Nominal voltage	V	1.2	2.4	3	4.8	6	7.2	9	12	18
2 No load speed	rpm	6390	7160	6230	6190	6090	6130	6130	6140	6590
3 No load current	mA	88.3	52	34.2	21.2	16.6	14	11.2	8.41	6.19
4 Nominal speed	rpm	5210	4410	2500	2410	2330	2290	2280	2210	2630
5 Nominal torque	mNm	1.33	2.49	3.62	3.57	3.59	3.51	3.51	3.43	3.38
6 Nominal current (max. continuo		0.84	0.84	0.833	0.511	0.405	0.332	0.265	0.195	0.138
7 Stall torque	mNm	6.23	6.28	6	5.89	5.89	5.68	5.67	5.44	5.73
8 Stall current	Α	3.55	2.01	1.34	0.816	0.642	0.52	0.415	0.3	0.226
9 Max. efficiency	%	72	71	71	71	71	70	70	70	70
Characteristics										
10 Terminal resistance	Ω	0.338	1.19	2.24	5.88	9.34	13.8	21.7	40	79.7
11 Terminal inductance	mH	0.019	0.059	0.121	0.314	0.506	0.719	1.12	1.98	3.87
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377
14 Speed/torque gradient	rpm/mNm	1050	1170	1060	1080	1060	1110	1110	1160	1180
15 Mechanical time constant	ms	27.9	25.4	24.3	24.2	24.1	24.3	24.3	25	24.7
16 Rotor inertia	gcm ²	2.54	2.08	2.18	2.15	2.17	2.09	2.09	2.06	1.99

Specifications n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 21.3 K/W In observation of above listed thermal resistance 10.5 K/W 1.5 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 10000 temperature will be reached during continuous 201 s -30...+65°C 20 Thermal time constant motor 21 Ambient temperature 110095 operation at 25°C ambient = Thermal limit. 8000 22 Max. winding temperature +85°C 6000 Short term operation Mechanical data (sleeve bearings) The motor may be briefly overloaded (recurring). 4000 10 000 rpm 0.05 - 0.15 mm 0.012 mm 23 Max. speed 24 Axial play 25 Radial play 2000 Assigned power rating 26 Max. axial load (dynamic) 2.0 3.0 4.0 5.0 1.0 M [mNm] 27 Max. force for press fits (static) (static, shaft supported)28 Max. radial load, 5 mm from flange 80 N 440 N 0.1 0.2 0.3 0.4

Mechanical data (ball bearings)		Modular System	
23 Max. speed	10 000 rpm	Gear	Sensor
24 Axial play	0.05 - 0.15 mm		
25 Radial play	0.025 mm	428_GP 19 B	502_ENX 13 GAMA
26 Max. axial load (dynamic)	3.3 N	430_GP 22 A	533_Encoder MR 32 CPT
27 Max. force for press fits (static)	45 N	432_GP 22 C	
(static, shaft supported)	440 N	436_GS 24 A	
28 Max. radial load, 5 mm from flange	11.9 N	476_GP 22 S	
		477_GP 22 S	
Other specifications			
29 Number of pole pairs	1		

34 g

Details on catalog page 46

Motor Control

550_ESCON Module 24/2

550_ESCON 36/2 DC

561_EPOS4 Micro 24/5

562_EPOS4 Module 24/1.5

563_EPOS4 Compact 24/5 3-axes

564_EPOS4 Compact 24/1.5

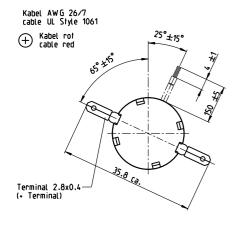
Values listed in the table are nominal. Explanation of the figures on page 92.

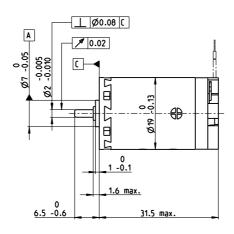
30 Number of commutator segments 31 Weight of motor CLL = Capacitor Long Life

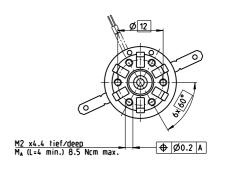
Option

Ball bearings in place of sleeve bearings Without CLL

A-max 19 Ø19 mm, graphite brushes, 2.5 watt







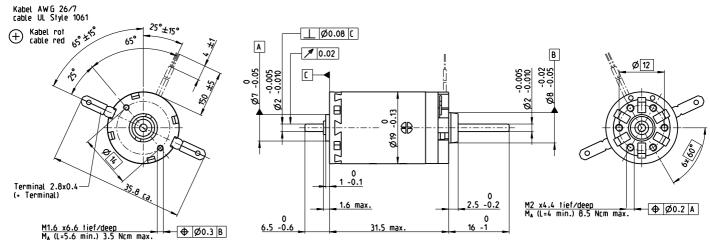
M 1:1

Stock program Standard program Special program (on request)		Part Numbe	rs							
	with terminals	249982	249983	249984	249985	249986	249987	249988	249989	249990
	with cables	240133	352942	310977	352943	352944	352945	352946	352947	310980
Motor Data										
Values at nominal voltage										
1 Nominal voltage	V	2.4	3.6	6	7.2	9	12	15	18	24
2 No load speed	rpm	12400	10400	12200	8980	8850	9930	9930	8910	8470
3 No load current	mA	292	158	114	66.1	51.9	44.6	35.7	26.3	18.6
4 Nominal speed	rpm	11700	8350	9310	4750	4630	5670	5670	4520	4020
5 Nominal torque	mNm	0.759	1.78	2.75	3.98	4.02	3.89	3.89	3.83	3.8
6 Nominal current (max. continuous	current) A	0.72	0.72	0.72	0.612	0.485	0.397	0.317	0.235	0.167
7 Stall torque	mNm	14.1	9.66	12.1	8.84	8.83	9.47	9.44	8.16	7.63
8 Stall current	Α	8.04	3.09	2.71	1.23	0.963	0.867	0.691	0.45	0.301
9 Max. efficiency	%	64	59	63	59	59	60	60	58	57
Characteristics										
10 Terminal resistance	Ω	0.299	1.16	2.22	5.88	9.35	13.8	21.7	40	79.8
11 Terminal inductance	mH	0.019	0.059	0.121	0.314	0.506	0.719	1.12	1.98	3.87
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377
14 Speed/torque gradient	rpm/mNm	925	1140	1050	1080	1060	1110	1110	1160	1180
15 Mechanical time constant	ms	24.9	25.1	24.4	24.5	24.4	24.6	24.7	25.4	25
16 Rotor inertia	gcm²	2.57	2.1	2.21	2.17	2.2	2.12	2.12	2.09	2.02

Specification Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 21.3 K/W In observation of above listed thermal resistance 10.5 K/W 2.5 W (lines 17 and 18) the maximum permissible winding 11.0 s 12000 temperature will be reached during continuous 20 Thermal time constant motor 21 Ambient temperature 201 s -30...+85°C operation at 25°C ambient = Thermal limit. 22 Max. winding temperature +125°C 8000 Short term operation Mechanical data (sleeve bearings) The motor may be briefly overloaded (recurring). 23 Max. speed 12000 rpm 4000 0.05 - 0.15 mm 0.012 mm 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 1.0 2.0 3.0 4.0 5.0 M [mNm] 80 N 2.7 N 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 0.1 0.2 0.3 0.4 0.5 Mechanical data (ball bearings) 23 Max. speed 24 Axial play 12000 rpm Details on catalog page 46 Modular System 0.05 - 0.15 mm Gear Motor Control 25 Radial play 26 Max. axial load (dynamic) 0.025 mm 428_GP 19 B 550 ESCON Module 24/2 3.3 N 550_ESCON 36/2 DC 430_GP 22 A 27 Max. force for press fits (static) 432_GP 22 C 28 Max. radial load, 5 mm from flange 11.9 N 436_GS 24 A Other specifications 476_GP 22 S 29 Number of pole pairs 477 GP 22 S 30 Number of commutator segments 31 Weight of motor 33 g Values listed in the table are nominal. Explanation of the figures on page 92.

Option Ball bearings in place of sleeve bearings

A-max 19 Ø19 mm, graphite brushes, 2.5 watt



M 1:1

Stock program Standard program Special program (on request)		Part Numbe	ers							
	with terminals	249991	249992	249993	249994	249995	249996	249997	249998	249999
	with cables	240035	352971	353590	352972	352973	344596	352974	352975	352976
Motor Data										
Values at nominal voltage										
1 Nominal voltage	V	2.4	3.6	6	7.2	9	12	15	18	24
2 No load speed	rpm	12400	10400	12200	8980	8850	9930	9930	8910	8470
3 No load current	mA	292	158	114	66.1	51.9	44.6	35.7	26.3	18.6
4 Nominal speed	rpm	11700	8350	9310	4750	4630	5670	5670	4520	4020
5 Nominal torque	mNm	0.759	1.78	2.75	3.98	4.02	3.89	3.89	3.83	3.8
6 Nominal current (max. continuou	us current) A	0.72	0.72	0.72	0.612	0.485	0.397	0.317	0.235	0.167
7 Stall torque	mNm	14.1	9.66	12.1	8.84	8.83	9.47	9.44	8.16	7.63
8 Stall current	Α	8.04	3.09	2.71	1.23	0.963	0.867	0.691	0.45	0.301
9 Max. efficiency	%	64	59	63	59	59	60	60	58	57
Characteristics										
10 Terminal resistance	Ω	0.299	1.16	2.22	5.88	9.35	13.8	21.7	40	79.8
11 Terminal inductance	mH	0.019	0.059	0.121	0.314	0.506	0.719	1.12	1.98	3.87
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377
14 Speed/torque gradient	rpm/mNm	925	1140	1050	1080	1060	1110	1110	1160	1180
15 Mechanical time constant	ms	24.6	24.8	24	24.2	24.1	24.2	24.3	25	24.6
16 Rotor inertia	gcm ²	2.54	2.07	2.18	2.14	2.16	2.09	2.09	2.06	1.99

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 21.3 K/W In observation of above listed thermal resistance 10.5 K/W (lines 17 and 18) the maximum permissible winding 2.5 W 19 Thermal time constant winding 11.0 s 12000 temperature will be reached during continuous 249996 20 Thermal time constant motor 21 Ambient temperature 201 s -30...+85°C operation at 25°C ambient = Thermal limit. 22 Max. winding temperature +125°C 8000 Short term operation The motor may be briefly overloaded (recurring). Mechanical data (sleeve bearings) 12 000 rpm 0.05 - 0.15 mm 0.012 mm 23 Max. speed 4000 24 Axial play 25 Radial play Assigned power rating 26 Max. axial load (dynamic) 2.0 3.0 4.0 5.0 M [mNm] 1.0 80 N 480 N 2.7 N 27 Max. force for press fits (static) (static, shaft supported) 0.1 0.2 0.3 0.4 28 Max. radial load, 5 mm from flange Modular System Details on catalog page 46 Motor Control Gear Sensor 428_GP 19 B 502 ENX 13 GAMA 550 ESCON Module 24/2 430_GP 22 A 550_ESCON 36/2 DC 533_Encoder MR 32 CPT

432_GP 22 C

436_GS 24 A

476_GP 22 S 477_GP 22 S

	Mechanical data (ball bearings)	
23	Max. speed	12 000 rpm
24	Axial play	0.05 - 0.15 mm
25	Radial play	0.025 mm
26	Max. axial load (dynamic)	3.3 N
27	Max. force for press fits (static)	45 N
	(static, shaft supported)	240 N
28	Max. radial load, 5 mm from flange	11.9 N
	Other specifications	
α	Ni. and a superior and a superior	4

29 Number of pole pairs 1
30 Number of commutator segments 9
31 Weight of motor 34 g

Values listed in the table are nominal. Explanation of the figures on page 92.

Option

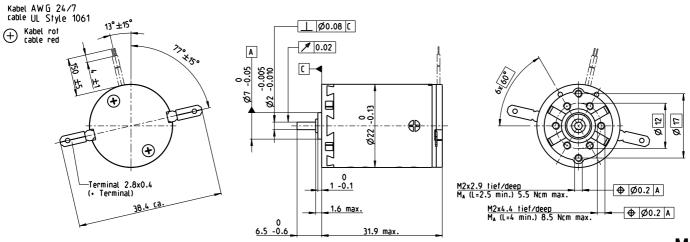
Ball bearings in place of sleeve bearings

561_EPOS4 Micro 24/5

562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes

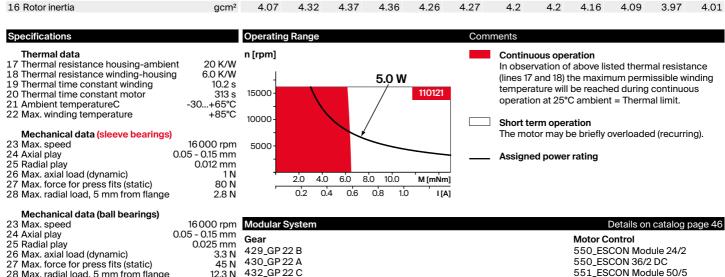
564_EPOS4 Compact 24/1.5

A-max 22 Ø22 mm, precious metal brushes CLL, 5 watt



M 1:1

Stock program		Part Nur	nbers										
Standard program													
Special program (on request)													
		,											
	with terminals	110117	110119	110120	110121	110122	110123	110124	110125	110126	110127	110128	110129
	with cables	139838	218799	238798	202413	258367	137255	134267	134666	267423	137476	310003	342390
Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	6	9	9	12	12	15	18	24	30	36	48	48
2 No load speed	rpm	9630	9970	8760	10400	9400	10300	9970	10700	10800	9800	9280	8370
3 No load current	mA	29.5	20.8	16.8	16.8	14.2	13.1	10.4	8.81	7.18	5.06	3.47	2.93
4 Nominal speed	rpm	7390	7300	6100	7770	6700	7530	7220	7970	8070	7000	6420	5520
5 Nominal torque	mNm	4.81	6.22	6.3	6.24	6.18	6.1	6.05	6.02	5.98	5.94	5.83	5.9
6 Nominal current (max. continuous of the con	current) A	0.84	0.745	0.661	0.586	0.523	0.451	0.362	0.291	0.234	0.175	0.122	0.111
7 Stall torque	mNm	20.1	22.9	20.5	24.3	21.4	22.9	22	23.5	23.5	20.8	19	17.4
8 Stall current	Α	3.42	2.68	2.11	2.23	1.77	1.65	1.28	1.11	0.894	0.599	0.387	0.32
9 Max. efficiency	%	83	84	83	84	83	83	83	83	83	83	82	82
Characteristics													
10 Terminal resistance	Ω	1.76	3.36	4.27	5.39	6.78	9.07	14	21.6	33.5	60.1	124	150
11 Terminal inductance	mH	0.106	0.222	0.288	0.362	0.445	0.584	0.89	1.37	2.1	3.68	7.29	8.95
12 Torque constant	mNm/A	5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed/torque gradient	rpm/mNm	482	438	430	432	443	451	458	459	465	474	494	486
15 Mechanical time constant	ms	20.5	19.8	19.7	19.7	19.8	20.2	20.1	20.2	20.3	20.3	20.5	20.4
16 Rotor inertia	gcm ²	4.07	4.32	4.37	4.36	4.26	4.27	4.2	4.2	4.16	4.09	3.97	4.01



436_GS 24 A

476_GP 22 S

477 GP 22 S

28 Max. radial load, 5 mm from flange 12.3 N Other specifications 29 Number of pole pairs 30 Number of commutator segments Weight of motor 54 g

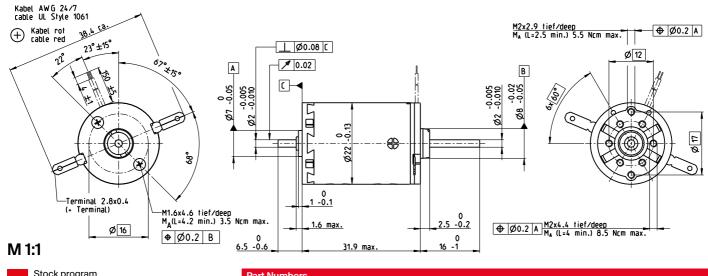
Values listed in the table are nominal. Explanation of the figures on page 92.

CLL = Capacitor Long Life

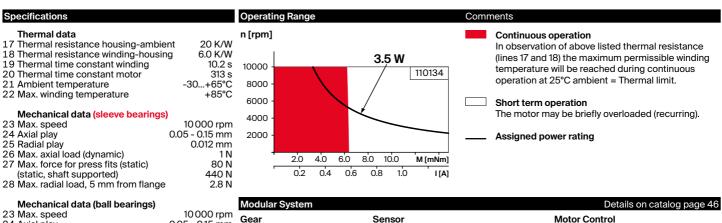
Ball bearings in place of sleeve bearings Without CLL

553_ESCON 50/5

A-max 22 Ø22 mm, precious metal brushes CLL, 3.5 watt



Stock program Standard program Special program (on request)		Part Nur	nbers										
	with terminals	110130	110132	110133	110134	110135	110136	110137	110138	110139	110140	110141	110142
	with cables		352986		352988			352991			352994		352996
Motor Data													
Values at nominal voltage	_												
1 Nominal voltage	V	4.5	6	7.2	7.2	7.2	9	12	15	18	24	36	42
2 No load speed	rpm	7210	6630	7000	6240	5620	6140	6630	6680	6480	6520	6950	7320
3 No load current	mA	26.7	17.8	16	13.6	11.8	10.6	8.88	7.17	5.73	4.33	3.16	2.92
4 Nominal speed	rpm	5010	3940	4330	3550	2890	3400	3890	3930	3710	3720	4100	4490
5 Nominal torque	mNm	4.82	6.27	6.31	6.31	6.24	6.21	6.16	6.15	6.11	6.05	5.91	5.95
6 Nominal current (max. continuou	us current) A	0.84	0.749	0.662	0.589	0.525	0.457	0.368	0.296	0.237	0.177	0.123	0.112
7 Stall torque	mNm	15.4	15.3	16.4	14.6	12.8	14	14.9	15	14.4	14.2	14.5	15.5
8 Stall current	Α	2.61	1.79	1.69	1.34	1.06	1.01	0.872	0.706	0.547	0.407	0.296	0.286
9 Max. efficiency	%	81	81	82	81	80	81	81	81	81	81	81	81
Characteristics													
10 Terminal resistance	Ω	1.72	3.36	4.27	5.39	6.78	8.9	13.8	21.2	32.9	59	122	147
11 Terminal inductance	mH	0.106	0.222	0.288	0.362	0.445	0.585	0.89	1.37	2.1	3.69	7.29	8.95
12 Torque constant	mNm/A	5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed/torque gradient	rpm/mNm	474	438	430	432	443	443	449	450	456	465	485	477
15 Mechanical time constant	ms	20.2	19.8	19.7	19.7	19.8	19.8	19.8	19.8	19.9	19.9	20.2	20
16 Rotor inertia	gcm²	4.07	4.32	4.38	4.36	4.26	4.27	4.2	4.21	4.16	4.1	3.97	4.01



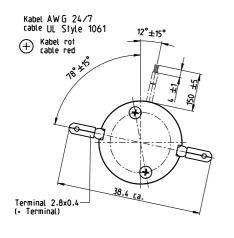
Mechanical data (ball bearings)		Modular System		Details on catalog page 46
23 Max. speed 24 Axial play 25 Radial play 26 Max. axial load (dynamic)		Gear 429_GP 22 B 430_GP 22 A 432_GP 22 C	Sensor 502_ENX 13 GAMA 533_Encoder MR 32 CPT	Motor Control 550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5
27 Max. force for press fits (static) (static, shaft supported) 28 Max. radial load, 5 mm from flange Other specifications	440 N	436_GS 24 A 476_GP 22 S 477_GP 22 S		553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5
29 Number of pole pairs 30 Number of commutator segments 31 Weight of motor CLL = Capacitor Long Life	1 9 54 g			562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5

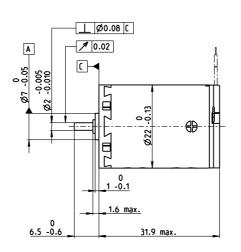
Values listed in the table are nominal. Explanation of the figures on page 92.

Option

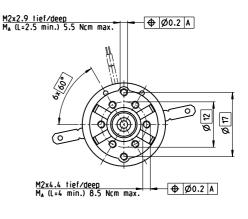
Ball bearings in place of sleeve bearings Without CLL

A-max 22 Ø22 mm, graphite brushes, 6 watt





Part Numbers



M 1:1

Stock program
Standard program
Special program (o

Standard program													
Special program (on request)													
	with terminals	110143	110145	110146	110147	110148	110149	110150	110151	110152	110153	110154	110155
	with cables	139840	353017	199807	320206	323856	108828	199424	202921	267433	325492	313302	353019
Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	6	9	9	12	12	15	18	24	24	36	48	48
2 No load speed	rpm	9240	9690	8500	10200	9170	10000	9770	10500	8480	9630	9110	8210
3 No load current	mA	83.1	57.9	49.6	45.8	40.5	36	29	23.7	18.4	14.2	9.99	8.84
4 Nominal speed	rpm	6240	6530	5350	7060	6000	6890	6600	7380	5270	6420	5840	4940
5 Nominal torque	mNm	5.91	6.88	7.04	6.96	6.95	6.93	6.92	6.9	6.97	6.86	6.75	6.86
6 Nominal current (max. continuou	s current) A	1.08	0.859	0.77	0.681	0.613	0.534	0.432	0.347	0.283	0.21	0.147	0.135
7 Stall torque	mNm	19.4	22.1	19.8	23.7	20.9	22.9	22	23.7	18.9	21.1	19.2	17.6
8 Stall current	Α	3.29	2.59	2.04	2.17	1.72	1.65	1.29	1.12	0.721	0.606	0.393	0.325
9 Max. efficiency	%	67	70	69	72	70	72	72	73	70	72	71	70
Characteristics													
10 Terminal resistance	Ω	1.82	3.48	4.42	5.53	6.96	9.09	14	21.5	33.3	59.4	122	148
11 Terminal inductance	mH	0.106	0.223	0.288	0.363	0.445	0.585	0.891	1.37	2.1	3.69	7.3	8.97
12 Torque constant	mNm/A	5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed/torque gradient	rpm/mNm	500	454	446	444	455	452	457	456	461	468	487	479
15 Mechanical time constant	ms	20.9	20.2	20.1	19.9	19.9	19.9	19.7	19.7	19.8	19.7	19.9	19.8
16 Rotor inertia	gcm ²	4	4.25	4.3	4.29	4.19	4.2	4.13	4.13	4.09	4.02	3.9	3.94

Comments Thermal data n [rpm] Continuous operation 20 K/W 6.0 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing In observation of above listed thermal resistance 6.0 W (lines 17 and 18) the maximum permissible winding 19 Thermal time constant winding 10.2 s 10000 temperature will be reached during continuous 110147 20 Thermal time constant motor 21 Ambient temperature 314 s -30...+85°C operation at 25°C ambient = Thermal limit. 8000 22 Max. winding temperature +125°C 6000 Short term operation Mechanical data (sleeve bearings) The motor may be briefly overloaded (recurring). 4000 23 Max. speed 9800 rpm 0.05 - 0.15 mm 0.012 mm 24 Axial play 25 Radial play 2000 Assigned power rating 26 Max. axial load (dynamic) 2.0 4.0 6.0 8.0 10.0 M [mNm] 80 N 2.8 N 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 0.4 0.6 0.8 1.0 Mechanical data (ball bearings) 23 Max. speed 9800 rpm Details on catalog page 46 Modular System 24 Axial play 0.05 - 0.15 mm Gear Motor Control 25 Radial play 26 Max. axial load (dynamic) 0.025 mm 3.3 N 429 GP 22 B 550 FSCON Module 24/2 430_GP 22 A 550_ESCON 36/2 DC 27 Max. force for press fits (static) 45 N 432_GP 22 C 551_ESCON Module 50/5 28 Max. radial load, 5 mm from flange 12.3 N 436_GS 24 A 553_ESCON 50/5 Other specifications 476_GP 22 S 29 Number of pole pairs 477 GP 22 S 30 Number of commutator segments

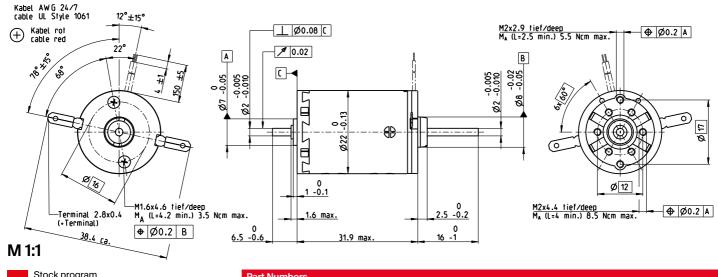
Option

31 Weight of motor

Ball bearings in place of sleeve bearings

Values listed in the table are nominal. Explanation of the figures on page 92. 54 g

A-max 22 Ø22 mm, graphite brushes, 6 watt



Stock program Standard program Special program (on request)	Part Nu	mbers										
with termina	ls 110156	110158	110159	110160	110161	110162	110163	110164	110165	110166	110167	110168
with cabl			353024	231171		353026	231174	353027	353028	353029	316659	353603
Motor Data												
Values at nominal voltage												
1 Nominal voltage	V 6	9	9	12	12	15	18	24	24	36	48	48
2 No load speed rp	m 9240	9690	8500	10200	9170	10000	9770	10500	8480	9630	9110	8210
3 No load current	A 83.1	57.9	49.6	45.8	40.5	36	29	23.7	18.4	14.2	9.99	8.84
4 Nominal speed rp	m 6240	6530	5350	7060	6000	6890	6600	7380	5270	6420	5840	4940
5 Nominal torque ml	m 5.91	6.88	7.04	6.96	6.95	6.93	6.92	6.9	6.97	6.86	6.75	6.86
6 Nominal current (max. continuous current)	A 1.08	0.859	0.77	0.681	0.613	0.534	0.432	0.347	0.283	0.21	0.147	0.135
7 Stall torque mN	m 19.4	22.1	19.8	23.7	20.9	22.9	22	23.7	18.9	21.1	19.2	17.6
8 Stall current	A 3.29	2.59	2.04	2.17	1.72	1.65	1.29	1.12	0.721	0.606	0.393	0.325
9 Max. efficiency	% 67	70	69	72	70	72	72	73	70	72	71	70
Characteristics												
10 Terminal resistance	Ω 1.82	3.48	4.42	5.53	6.96	9.09	14	21.5	33.3	59.4	122	148
11 Terminal inductance n	H 0.106	0.223	0.288	0.363	0.445	0.585	0.891	1.37	2.1	3.69	7.3	8.97
12 Torque constant mNm	Ά 5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant rpm	V 1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed/torque gradient rpm/mN	m 500	454	446	444	455	452	457	456	461	468	487	479
15 Mechanical time constant r	ns 21.3		20.4	20.2	20.3	20.2	20.1	20.1	20.1	20.1	20.2	20.1
16 Rotor inertia gci	n² 4.07	4.32	4.37	4.36	4.26	4.27	4.2	4.2	4.16	4.09	3.97	4.01

Operating Range Comments Thermal data n [rpm] Continuous operation 20 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding In observation of above listed thermal resistance 6.0 K/W (lines 17 and 18) the maximum permissible winding 6.0 W 10000 temperature will be reached during continuous 110160 20 Thermal time constant motor 21 Ambient temperature 313 s -30...+85°C operation at 25°C ambient = Thermal limit. 8000 22 Max. winding temperature +125°C 6000 Short term operation The motor may be briefly overloaded (recurring). Mechanical data (sleeve bearings) 4000 9800 rpm 0.05 - 0.15 mm 0.012 mm 23 Max. speed 24 Axial play 25 Radial play 2000 Assigned power rating 26 Max. axial load (dynamic) 2.0 4.0 6.0 8.0 10.0 M [mNm] 27 Max. force for press fits (static) (static, shaft supported)28 Max. radial load, 5 mm from flange 80 N 440 N 0.4 0.6 0.8 1.0

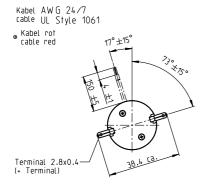
Mechanical data (ball bearings)		Modular System		Details on catalog page 46
23 Max. speed	9800 rpm	Gear	Sensor	Motor Control
24 Axial play	0.05 - 0.15 mm	429_GP 22 B	502 ENX 13 GAMA	550 ESCON Module 24/2
25 Radial play	0.025 mm	400 00 00 4		
26 Max. axial load (dynamic)			533_Encoder MR 32 CPT	550_ESCON 36/2 DC
27 Max. force for press fits (static)	45 N	432_GP 22 C		551_ESCON Module 50/5
(static, shaft supported)	240 N	436_GS 24 A		553_ESCON 50/5
28 Max. radial load, 5 mm from flange	12.3 N	476_GP 22 S		561_EPOS4 Micro 24/5
		477_GP 22 S		562_EPOS4 Module 24/1.5
Other specifications				562 EPOS4 Module 50/5
29 Number of pole pairs	1			563_EPOS4 Compact 24/5 3-axes
30 Number of commutator segments	9			
31 Weight of motor	54 g			564_EPOS4 Compact 24/1.5
or weight of motor	Oig			565_EPOS4 Compact 50/5

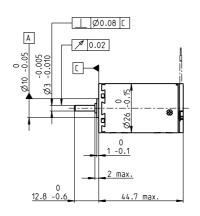
Values listed in the table are nominal. Explanation of the figures on page 92.

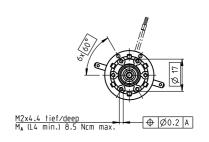
Option

Ball bearings in place of sleeve bearings

A-max 26 Ø26 mm, precious metal brushes CLL, 7 watt

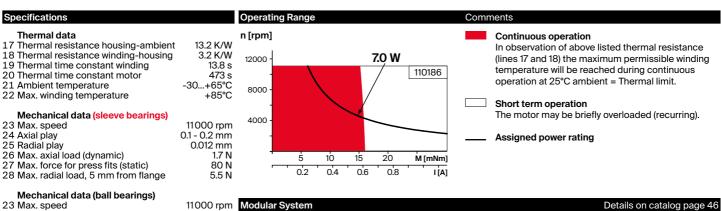






M 1:2

Stock program Standard program Special program (on request)		Part Num	bers									
wi	th terminals	110181	110182	110183	110184	110185	110186	110187	110188	110189	110190	110191
	with cables	353078	353079	353080	353081	329757	353082	332818	353083	353084	353085	353086
Motor Data												
Values at nominal voltage												
1 Nominal voltage	V	4.5	6	9	12	15	18	24	30	36	42	48
2 No load speed	rpm	7320	8670	6160	6780	6720	6690	5670	6090	6780	6570	6050
3 No load current	mA	78.9	77.7	30.2	26.3	20.7	17.1	9.97	8.9	8.76	7.15	5.5
4 Nominal speed	rpm	6900	8130	5000	5340	5060		3940	4370	5060	4820	4280
5 Nominal torque	mNm	4.46	5.02	11.3	13.7	15.8	15.6	15.3	15.3	15.2	15	15
6 Nominal current (max. continuous curre	,	0.84	0.84	0.84	0.84	0.766	0.627	0.391	0.336	0.31	0.254	0.204
7 Stall torque	mNm	67.3	73.5	58.8	63.5	63.6	62.1	50.3	54.2	60.2	56.4	51.4
8 Stall current	Α	11.5	11.2	4.25	3.78	3.01	2.43	1.25	1.16	1.2	0.93	0.683
9 Max. efficiency	%	84	84	84	84	84	84	83	84	84	84	83
Characteristics												
10 Terminal resistance	Ω	0.39	0.536	2.12	3.17	4.99	7.41	19.2	25.8	30.1	45.1	70.2
11 Terminal inductance	mH	0.04	0.051	0.227	0.333	0.529	0.77	1.9	2.58	2.99	4.34	6.68
12 Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2
13 Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127
14 Speed/torque gradient	rpm/mNm	109	119	105	108	106	108	114	113	114	117	119
15 Mechanical time constant	ms	16.5	16	15	14.9	14.8	14.8	14.9	14.9	14.9	15	15
16 Rotor inertia	gcm²	14.4	12.9	13.6	13.2	13.3	13.1	12.5	12.6	12.5	12.2	12.1



Gear

13

437_GP 26 A

438_GS 30 A

439_GP 32 BZ

440_GP 32 A

443_GP 32 C

451 GS 38 A

478-486_GP 32 S



25 Radial play 26 Max. axial load (dynamic) 0.025 mm 5 N 27 Max. force for press fits (static) 28 Max. radial load, 5 mm from flange 20.5 N

Other specifications

29 Number of pole pairs

30 Number of commutator segments 31 Weight of motor CLL = Capacitor Long Life

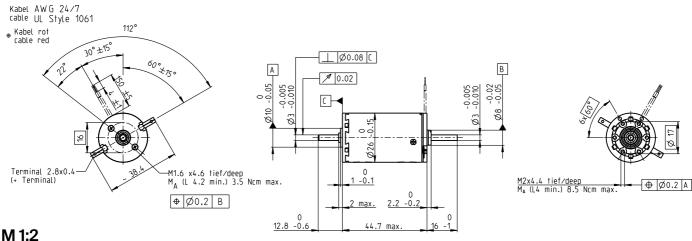
Values listed in the table are nominal. Explanation of the figures on page 92.

Ball bearings in place of sleeve bearings Without CLL

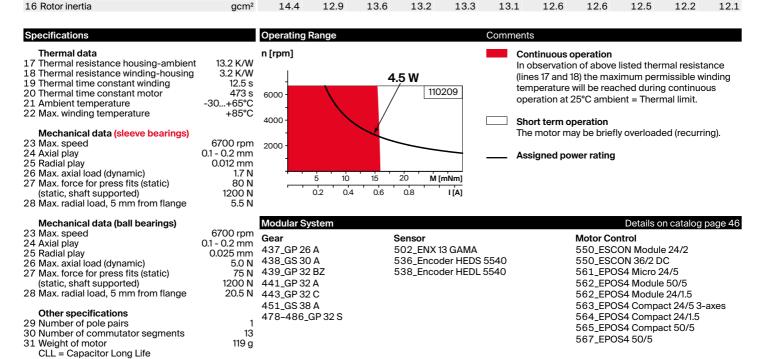
Motor Control

550 FSCON Module 24/2

550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5

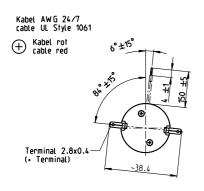


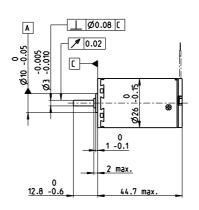
Stock program		Part Num	bers									
Standard program												
Special program (on reques	t)											
	with terminals	110204	110205	110206	110207	110208	110209	110210	110211	110212	110213	110214
	with cables	353109	353110	353111	353112	353113	353114	353115	353116	353117	353118	353119
Motor Data												
Values at nominal voltage												
1 Nominal voltage	V	2.4	3.6	6	7.2	9	12	15	18	24	30	36
2 No load speed	rpm	3890	5190	4090	4060	4020	4440	3530	3640	4510	4680	4520
3 No load current	mA	67.7	69.9	29.2	24	19	16.5	9.41	8.2	8.45	7.16	5.67
4 Nominal speed	rpm	3460	4640	2940	2650	2620	3030	2070	2180	3060	3210	3050
5 Nominal torque	mNm	4.53	5.08	11.3	13.3	13.4	13.2	12.9	12.9	12.8	12.6	12.5
6 Nominal current (max. continue	ous current) A	0.84	0.84	0.84	0.814	0.647	0.529	0.33	0.284	0.262	0.214	0.171
7 Stall torque	mNm	35.9	44.1	39.2	38.1	38.2	41.4	31.4	32.5	40.1	40.3	38.5
8 Stall current	Α	6.15	6.71	2.83	2.27	1.8	1.62	0.783	0.697	0.797	0.665	0.513
9 Max. efficiency	%	81	81	81	81	81	81	80	80	81	81	81
Characteristics												
10 Terminal resistance	Ω	0.39	0.536	2.12	3.17	4.99	7.41	19.2	25.8	30.1	45.1	70.2
11 Terminal inductance	mH	0.0402	0.0509	0.227	0.332	0.528	0.77	1.9	2.57	2.99	4.34	6.68
12 Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2
13 Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127
14 Speed/torque gradient	rpm/mNm	109	119	105	108	106	108	114	113	114	117	119
15 Mechanical time constant	ms	16.6	16.1	15	14.9	14.9	14.9	14.9	14.9	14.9	15	15
10 D. L		4 4 4	100	100	100	100	101	100	100	10 5	100	101

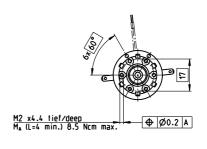


Values listed in the table are nominal. Explanation of the figures on page 92.

Ball bearings in place of sleeve bearings Without CLL

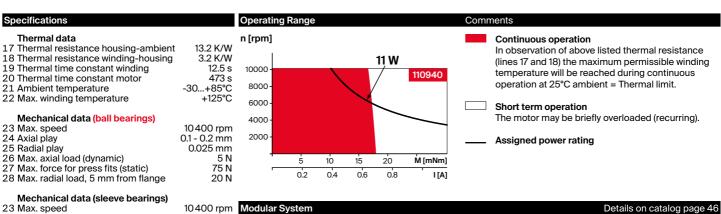






M 1:2

Stock program Standard program Special program (on request)		Part Num	bers									
	with terminals	110935	110936	110937	110938	110939	110940	110941	110942	110943	110944	110945
	with cables	139852	353166	353167	353168	353169	206344	353171	314214	202893	353174	353175
Motor Data												
Values at nominal voltage												
1 Nominal voltage	V	6	7.2	12	15	18	24	30	36	42	48	48
2 No load speed	rpm	9740	10400	8190	8450	8040	8890	7050	7280	7880	7470	6010
3 No load current	mA	143	130	57	47.5	37.1	31.7	18.9	16.4	15.5	12.7	9.66
4 Nominal speed	rpm	9210	9700	6720	6620	6080	6910	5000	5230	5840	5390	3900
5 Nominal torque	mNm	5.48	6.26	14.2	17.4	18.7	18.4	18.2	18.2	18.1	17.8	17.9
6 Nominal current (max. continuous	s current) A	1.08	1.08	1.08	1.08	0.919	0.749	0.47	0.404	0.373	0.305	0.247
7 Stall torque	mNm	102	96.4	80.2	80.5	77.1	83.3	63	65.2	70.3	64.5	51.4
8 Stall current	Α	17.4	14.7	5.79	4.8	3.64	3.26	1.57	1.4	1.4	1.06	0.684
9 Max. efficiency	%	83	82	81	81	81	82	80	80	80	80	78
Characteristics												
10 Terminal resistance	Ω	0.345	0.49	2.07	3.13	4.94	7.36	19.1	25.8	30.1	45.1	70.2
11 Terminal inductance	mH	0.04	0.051	0.227	0.333	0.529	0.77	1.9	2.58	2.99	4.34	6.68
12 Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2
13 Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127
14 Speed/torque gradient	rpm/mNm	96.6	109	103	106	105	108	113	113	113	117	119
15 Mechanical time constant	ms	14.6	14.7	14.6	14.7	14.7	14.7	14.9	14.9	14.9	15	15



Gear

13

437_GP 26 A

438_GS 30 A

439_GP 32 BZ

441_GP 32 A

443_GP 32 C

451 GS 38 A

478-486_GP 32 S

gcm² 14.4 12.9 13.6 13.2 13.3 13.1 12.5

- 24 Axial play 0.1 - 0.2 mm 25 Radial play 26 Max. axial load (dynamic) 0.012 mm 1.7 N 27 Max. force for press fits (static)
- 28 Max. radial load, 5 mm from flange

Other specifications 29 Number of pole pairs

- 30 Number of commutator segments
- 31 Weight of motor

16 Rotor inertia

Values listed in the table are nominal. Explanation of the figures on page 92.

Option

Sleeve bearings in place of ball bearings

Motor Control

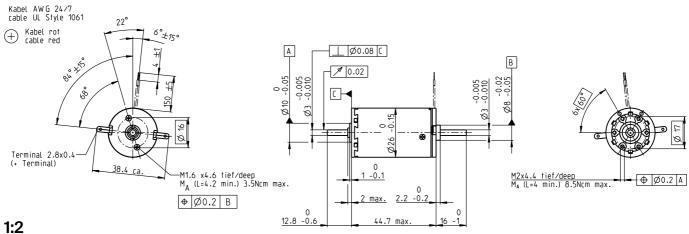
12.6

12.5

12.2

12.1

550_ESCON Module 24/2 550_ESCON 36/2 DC 551_ESCON Module 50/5 553_ESCON 50/5 553_ESCON 70/10



M 1:2

Stock program Standard program Special program (on request)		Part Num	bers									
	with terminals	110958	110959	110960	110961	110962	110963	110964	110965	110966	110967	110968
	with cables	353606	353607	353608	353609	353610	353611	353612	353613	353614	353615	353616
Motor Data												
Values at nominal voltage												
1 Nominal voltage	V	6	7.2	12	15	18	24	30	36	42	48	48
2 No load speed	rpm	9740	10400	8190	8450	8040	8890	7050	7280	7880	7470	6010
3 No load current	mA	143	130	57	47.5	37.1	31.7	18.9	16.4	15.5	12.7	9.66
4 Nominal speed	rpm	9210	9700	6720	6620	6080	6910	5000	5230	5840	5390	3900
5 Nominal torque	mNm	5.48	6.26	14.2	17.4	18.7	18.4	18.2	18.2	18.1	17.8	17.9
6 Nominal current (max. continuous	current) A	1.08	1.08	1.08	1.08	0.919	0.749	0.47	0.404	0.373	0.305	0.247
7 Stall torque	mNm	102	96.4	80.2	80.5	77.1	83.3	63	65.2	70.3	64.5	51.4
8 Stall current	Α	17.4	14.7	5.79	4.8	3.64	3.26	1.57	1.4	1.4	1.06	0.684
9 Max. efficiency	%	83	82	81	81	81	82	80	80	80	80	78
Characteristics												
10 Terminal resistance	Ω	0.345	0.49	2.07	3.13	4.94	7.36	19.1	25.8	30.1	45.1	70.2
11 Terminal inductance	mH	0.04	0.051	0.227	0.333	0.529	0.77	1.9	2.58	2.99	4.34	6.68
12 Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2
13 Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127
14 Speed/torque gradient	rpm/mNm	96.6	109	103	106	105	108	113	113	113	117	119
15 Mechanical time constant	ms	14.6	14.7	14.6	14.7	14.7	14.7	14.9	14.9	14.9	15	15
16 Rotor inertia	gcm²	14.4	12.9	13.6	13.2	13.3	13.1	12.5	12.6	12.5	12.2	12.1

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 13.2 K/W In observation of above listed thermal resistance 3.2 K/W (lines 17 and 18) the maximum permissible winding 11 W 19 Thermal time constant winding 12.5 s temperature will be reached during continuous 10000 110963 20 Thermal time constant motor 473 s operation at 25°C ambient = Thermal limit. 21 Ambient temperature -30...+85°C 8000 22 Max. winding temperature +125°C 6000 Short term operation The motor may be briefly overloaded (recurring). Mechanical data (ball bearings) 10 400 rpm 0.1 - 0.2 mm 0.025 mm 4000 23 Max. speed 24 Axial play 25 Radial play 2000 Assigned power rating 26 Max. axial load (dynamic) 5 N 5 10 15 20 M [mNm] 75 N 1200 N 27 Max. force for press fits (static) (static, shaft supported) 0.2 0.4 0.6 0.8 ΙΓΑΊ 28 Max. radial load, 5 mm from flange Details on catalog page 46 **Modular System** Mechanical data (sleeve bearings) 10 400 rpm 0.1 - 0.2 mm 0.012 mm 23 Max. speed Motor Control Gear Sensor 24 Axial play 25 Radial play 437_GP 26 A 502 ENX 13 GAMA 550_ESCON Module 24/2 438_GS 30 A 536_Encoder HEDS 5540 550_ESCON 36/2 DC 26 Max. axial load (dynamic) 80 N 439_GP 32 BZ 551_ESCON Module 50/5 27 Max. force for press fits (static) (static, shaft supported) 538 Encoder HEDL 5540 1200 N 441_GP 32 A 553_ESCON 50/5 28 Max. radial load, 5 mm from flange 443_GP 32 C 553_ESCON 70/10 451 GS 38 A 561 EPOS4 Micro 24/5 Other specifications 478-486_GP 32 S 562_EPOS4 Module 50/5 29 Number of pole pairs 562_EPOS4 Module 24/1.5 30 Number of commutator segments 13 563_EPOS4 Compact 24/5 3-axes 119 g 31 Weight of motor 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5

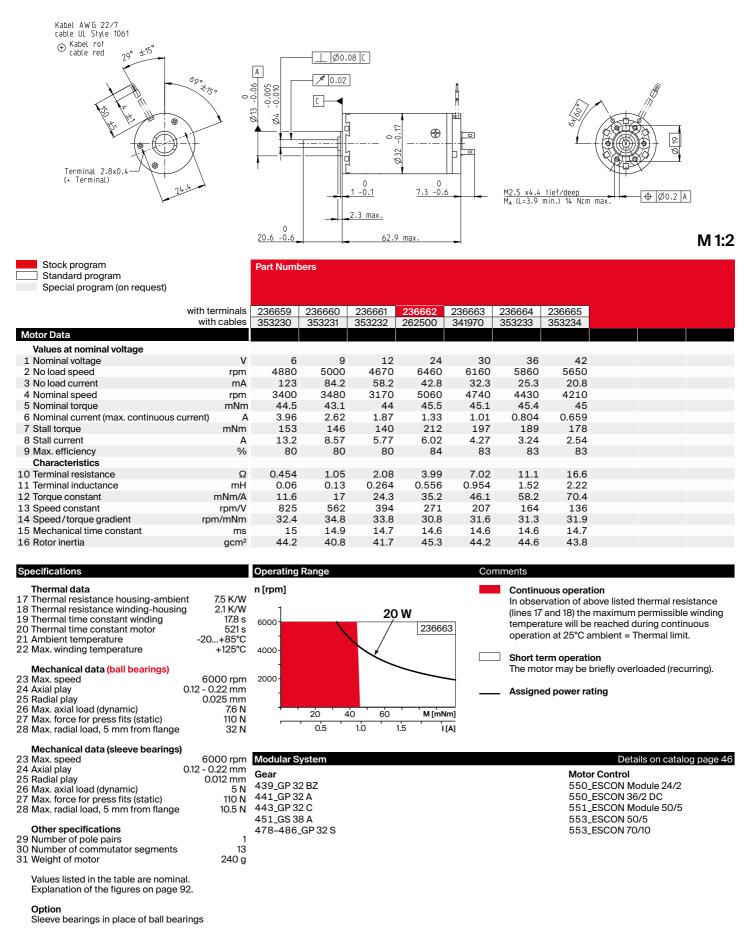
Sleeve bearings in place of ball bearings

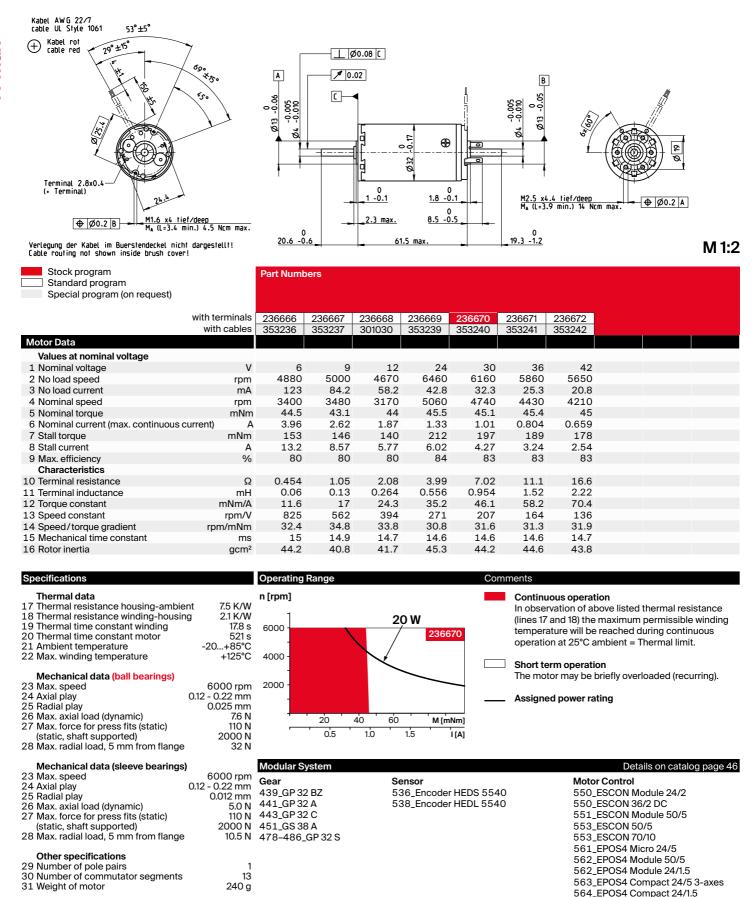
Values listed in the table are nominal.

Explanation of the figures on page 92.

567_EPOS4 50/5

A-max 32 Ø32 mm, graphite brushes, 20 watt





Option

Values listed in the table are nominal.

Explanation of the figures on page 92.

Sleeve bearings in place of ball bearings

567_EPOS4 50/5

568_EPOS4 Disk 60/8

565_EPOS4 Compact 50/5

∃C motol

C Motor

EC Motor (BLDC Motor)

lead Compact drive

Brushless DC motors (BLDC) with ironless or iron core windings

Standard Specification No. 101	88
Terminology explanations	188
ECX SPEED Program	191-229
ECX PRIME Program	233-235
ECX TORQUE Program	239-241
IDX Program	245-250
ECX FLAT Program	253-261
EC Program	265-271
EC-max Program	275-283
EC-4pole Program	287-293
EC-i Program	297-311
EC-flat Program	315-337
EC-frameless flat Program	341-346
EC-frameless DT Program	349-356

Explanations of maxon terminology EC motor

Dimensional drawings

Presentation of the views according to the projection method E (ISO). All dimensions in [mm].

Motor Data

The values in lines 2-15 are valid when using block commutation.

1 Nominal voltage U_N [Volt]

is the applied voltage between two powered phases in block commutation. See page 64 for the timing diagram of the voltage in the three phases. All nominal data (lines 2–9) refer to this voltage. Lower and higher voltages are permissible, provided that limits are not exceeded.

2 No load speed n₀ [rpm] ±10%

is the speed at which the unloaded motor runs with the nominal voltage applied. It is approximately proportional to the applied voltage.

3 No load current I₀ [mA] ±50%

This is the typical current that the unloaded motor draws when operating at nominal voltage. It increases with rising speed owing to bearing friction and iron losses. No load friction depends heavily on temperature. It decreases in extended operation and increases at lower temperatures.

4 Nominal speed n_N [rpm]

is the speed set for operation at nominal voltage and nominal torque at a motor temperature of 25°C.

5 Nominal torque M_N [mNm]

is the torque generated for operation at nominal voltage and nominal current at a motor temperature of 25°C. It is at the limit of the motor's continuous operation range. Higher torques heat up the winding too much.

6 Nominal current I_N [A]

is the current in the active phase in block commutation that generates the nominal torque at the given nominal speed (= max. permissible continuous load current). The maximum winding temperature is reached at $25^{\circ}\mathrm{C}$ ambient temperature in continuous operation with $I_{\rm N}$. $I_{\rm N}$ decreases as speed increases due to additional losses in the lamination.

7 Stall torque M_H [mNm]

is the linearly calculated load torque for motors that causes the shaft to stall at nominal voltage. With EC-flat and EC-i motors, this torque often cannot be achieved due to saturation effects.

8 Stall current I_A [A]

is the quotient from nominal voltage and the motor's terminal resistance. Stall current is equivalent to stall torque. With larger motors, $I_{\rm A}$ cannot often be reached due to the amplifier's current limits.

9 Max. efficiency η_{max} [%]

is the optimal relationship between input and output power at nominal voltage. It also doesn't always denote the optimal operating point.

10 Terminal resistance phase to phase $R[\Omega]$

is determined by the resistance at 25°C between two connections of the default configuration.

11 Terminal inductance phase to phase L [mH] is the winding inductance between two connections. It is measured at 1 kHz, sinusoidal

12 Torque constant k_M [mNm/A]

This may also be referred to as «specific torque» and represents the quotient from generated torque and applicable current.

13 Speed constant k, [rpm/V]

indicates the theoretical no load speed per volt of applied voltage, disregarding friction losses.

14 Speed/torque gradient

 Δ_n/Δ_M [rpm/mNm]

The speed/torque gradient is an indicator of the motor's performance. The smaller the value, the more powerful the motor and consequently the less motor speed varies with load variations. It is based on the quotient of ideal no load speed and ideal stall torque (tolerance ± 20%).

The real characteristic curve depends on the speed for EC motors with slotted winding (EC flat and EC-i); it is steeper at high speeds and flatter at slow speeds. The real gradient at nominal voltage can be approximated by a straight line between no load speed and the nominal operating point (see page 81).

15 Mechanical time constant τ_m [ms]

is the time required for the rotor to accelerate from standstill to 63% of its no load speed.

16 Rotor moment of inertia J_R [gcm²]

is the mass moment of inertia of the rotor, based on the axis of rotation.

17 Thermal resistance

housing-ambient R_{th2} [K/W]

18 Thermal resistance

winding-housing R_{th1} [K/W]

Characteristic values of thermal contact resistance without additional heat sinking. Lines 17 and 18 combined define the maximum heating at a given power loss (load). Thermal resistance $R_{\text{th}2}$ on motors with metal flanges can decrease by up to 80% if the motor is coupled directly to a good heat-conducting (e.g. metallic) mounting rather than a plastic panel.

19 Thermal time constant winding $\tau_w[s]$

and

and

Thermal time constant motor τ_s [s]

These are the typical reaction times for a temperature change of winding and motor. It can be seen that the motor reacts much more sluggishly in thermal terms than the winding. The values are calculated from the product of thermal capacity and given heat resistances.

21 Ambient temperature [°C]

Operating temperature range. This derives from the heat reliability of the materials used and viscosity of bearing lubrication.

22 Max. winding temperature [°C]

Maximum permissible winding temperature.

23 Max. speed n_{max} [rpm]

is the maximum recommended speed based on thermal and mechanical perspectives. A reduced service life can be expected at higher speeds.

24 Axial play [mm]

On motors that are not preloaded, these are the tolerance limits for the bearing play. A preload cancels out the axial play up to the specified axial force. When load is applied in the direction of the preload force (away from the flange), the axial play is always zero. The length tolerance of the shaft includes the maximum axial play.

25 Radial play [mm]

Radial play is the bearing's radial movement. A spring is utilized to preload the motor's bearings, eliminating radial play up to a given axial load.

26/27 Max. axial load [N]

Dynamic: axial loading permissible in operation. If different values apply for traction and thrust, the smaller value is given.

Static: maximum axial force that does not cause permanent damage when applied to the front of the shaft at standstill.

Shaft supported: maximum axial force applying to the shaft at standstill if the force is not input at the other shaft end. This is not possible for motors with only one shaft end.

28 Max. radial load [N]

The value is given for a typical distance from the front flange. As the distance increases, this value decreases.

29 Number of pole pairs

Number of north poles of the permanent magnet. The phase streams and commutation signals pass through per revolution p cycles. Servo-controllers require the correct details of the number of pole pairs.

30 Number of phases

All maxon EC motors have three phases.

31 Weight of motor [g]

32 Typical noise level [dBA]

Is the statistical average of the noise level measured in accordance with the maxon standard (10 cm distance radially to the drive, no-load operation at a certain speed. The drive lies freely on a plastic foam mat in the noise chamber).

The acoustic noise level depends on a number of factors, such as component tolerances, and it is greatly influenced by the overall system in which the drive is installed. When the drive is installed in an unfavorable constellation, the noise level may be significantly higher than the noise level of the drive alone.

The acoustic noise level is measured and determined during product qualification. In manufacturing, a structure-borne noise test is performed with defined limits. Impermissible deviations can thus be identified.

33 Max. torque M_{max} [mNm]

Maximum torque the motor can briefly deliver. It is limited by the overload protection of the electronics.

34 Max. current I_{max} [A]

Surge current with which the peak torque is generated at nominal voltage. With an active speed controller, surge current is not proportionate to the torque, but also depends on the supply voltage. As a result, this value only applies at nominal voltage.

35 Type of control

«Speed» means that the drive is fitted with an integral speed controller. «Controlled» means that the drive is fitted with true commutation electronics.

36 Supply voltage +V_{CC} [V]

Range of supply voltages measured in respect of GND at which the drive functions.

37 Speed set value input $U_c[V]$

Range of analog voltage for set speed value measured in respect of GND. For 2 wire solutions, the supply voltage acts as speed setting at the same time.

38 Scaling Set speed value input k_c [rpm/V] Set speed value n_c is based on the product $n_c = k_c \cdot U_c$.

39 Speed range

Achievable speeds in the controlled range.

40 Max. acceleration

The set speed value follows a sudden set point change with a ramp. This value indicates the increase in the ramp.

maxon ECX SPEED

Standard Specification No. 101	88
Terminology explanations	188
ECX SPEED Program (can be configured online)	191-229
ECX SPEED 4 M Ø4 mm, 0.5 Watt	191
ECX SPEED 4 L Ø4 mm, 1 Watt	192
ECX SPEED 6 M Ø6 mm, 1.5 Watt	193
ECX SPEED 6 M Ø6 mm, 2 Watt, High Power	194
ECX SPEED 8 M Ø8 mm, 2 Watt	195
ECX SPEED 8 M Ø8 mm, 3 Watt, High Power	196
ECX SPEED 10 M Ø10 mm, 8 Watt NEW	197
ECX SPEED 13 M Ø13 mm, 12 Watt	198
ECX SPEED 13 M Ø13 mm, 25 Watt, High Power	199
ECX SPEED 13 M Ø13 mm, 25 Watt, sterilizable	200
ECX SPEED 13 M Ø13 mm, 25 Watt, sterilizable ceramic	201
ECX SPEED 13 L Ø13 mm, 25 Watt	202
ECX SPEED 13 L Ø13 mm, 50 Watt, High Power	203
ECX SPEED 13 L Ø13 mm, 50 Watt, sterilizable	204
ECX SPEED 13 L Ø13 mm, 50 Watt, sterilizable ceramic	205
ECX SPEED 16 M Ø16 mm, 20 Watt	206
ECX SPEED 16 M Ø16 mm, 40 Watt, High Power	207
ECX SPEED 16 M Ø16 mm, 40 Watt, sterilizable	208
ECX SPEED 16 M Ø16 mm, 40 Watt, sterilizable ceramic	209
ECX SPEED 16 L Ø16 mm, 40 Watt	210
ECX SPEED 16 L Ø16 mm, 80 Watt, High Power	211
ECX SPEED 16 L Ø16 mm, 80 Watt, sterilizable	212
ECX SPEED 16 L Ø16 mm, 80 Watt, sterilizable ceramic	213
ECX SPEED 19 M Ø19 mm, 30 Watt	214
ECX SPEED 19 M Ø19 mm, 60 Watt, High Power	215
ECX SPEED 19 M Ø19 mm, 60 Watt, sterilizable	216
ECX SPEED 19 M Ø19 mm, 60 Watt, sterilizable ceramic	217
ECX SPEED 19 L Ø19 mm, 60 Watt	218
ECX SPEED 19 L Ø19 mm, 120 Watt, High Power	219
ECX SPEED 19 L Ø19 mm, 120 Watt, sterilizable	220
ECX SPEED 19 L Ø19 mm, 120 Watt, sterilizable ceramic	221
ECX SPEED 22 M Ø22 mm, 40 Watt	222
ECX SPEED 22 M Ø22 mm, 80 Watt, High Power	223
ECX SPEED 22 M Ø22 mm, 80 Watt, sterilizable	224
ECX SPEED 22 M Ø22 mm, 80 Watt, sterilizable ceramic	225
ECX SPEED 22 L Ø22 mm, 80 Watt	226
ECX SPEED 22 L Ø22 mm, 120 Watt, High Power	227
ECX SPEED 22 L Ø22 mm, 120 Watt, sterilizable	228
ECX SPEED 22 L Ø22 mm. 120 Watt, sterilizable ceramic	229

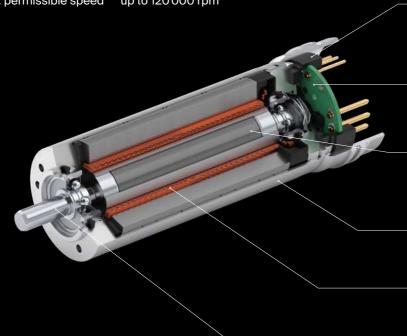


maxon ECX SPEED

The brushless ECX SPEED series of motors has been optimized for high speeds (up to 120 000 rpm). Depending on the application, different versions are available: Standard, high power, sterilizable (up to 2000 cycles) or with ceramic bearings for very high speed. Select your mechanical and electrical interface online. The ECX program is fully configurable and is ready for shipping in 11 working days.

Key data

Motor Ø4 ... 22 mmMotor length19 ... 60 mmPower0.5 ... 120 WNominal torqueup to 34 mNmMax. permissible speedup to 120 000 rpm



Electrical connection with single wires, flexprint or as pluggable pin solution, depending on the size.

Variety of sensor options can be integrated: temperature sensor, hall elements, encoder.

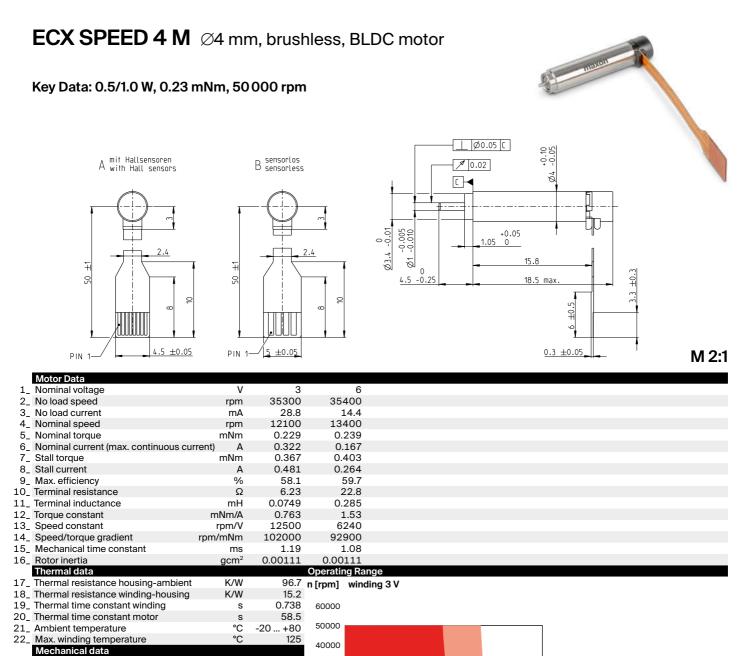
Balanced rotor, 2-pole and with topquality magnets — encapsulated in the sterilizable version.

Motor housing including mounting flange as a single part stainless steel and non-magnetic.

Highly efficient ironless winding, system maxon – potted in sterilizable version.

Stainless steel shaft with high stiffness – various modification options available.

- Extremely fast and quiet
- → Autoclavable up to 2000 times (sterilizable version)
- → Low noise and low vibration
- The ironless winding with no cogging torque
- Minimal heat build-up
- Easily configured online



26_	Max. axial load (dynamic)	N	0.1
27_	Max. force for press fits (static)	N	5
	(static, shaft supported)	N	10
28_	Max. radial load [mm from flange]	N	0.2 [2]
	Other specifications		
29_	Number of pole pairs		1 ;
30_	Number of phases		3
31_	Weight of motor	g	1.2
32_	Typical noise level [rpm]	dBA 46	[50000]

Modular System Gear Stages [opt.] Sensor 374_GPX 4 C for motor type A: 497_ENX 4 MAG

Details on catalog page 42 **Motor Control** 562_EPOS4 Module 24/1.5 564_EPOS4 Compact 24/1.5

Continuous operation with reduced

thermal resistance R_{th2} 50%

Continuous operation

Short term operation

0.3 **M [mNm]**

Connection motor with hall sensor (A)

23_ Max. speed 24_ Max. Axial play

Preload

25_ Radial play

Direction of force

FPC Flexprint 8-pole, pitch 0.5 mm Motor winding 1 Pin 1 Motor winding 2 Pin 2 Motor winding 3 Pin 3 Pin 4 V_{Hall} 2.5...5.5 VDC GND Pin 5 Pin 6 Hall sensor 1 Pin 7 Hall sensor 2 Hall sensor 3

Output signals: CMOS compatible push-pull stage

Output current per channel: max. 0.5 mA

Connection motor sensorless (B)

FPC flexprint 4-pole, pitch 1.0 mm: Pin 1 Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4

50000

0.06

0.012

30000

20000

10000

0

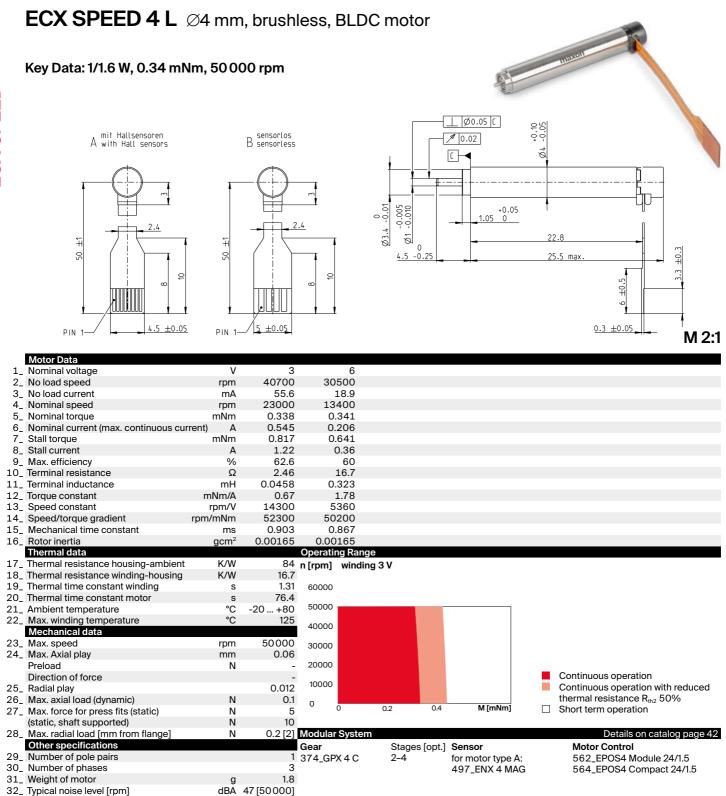
rpm

mm

N

Shaft front: length/diameter

Electrical connection: Flex cable/round cable



Connection motor with hall sensor (A)

FPC Flexprint 8-pole, pitch 0.5 mm Motor winding 1 Pin 1 Pin 2 Motor winding 2 Motor winding 3 Pin 3 Pin 4 V_{Hall} 2.5...5.5 VDC GND Pin 5 Pin 6 Hall sensor 1 Pin 7 Hall sensor 2 Hall sensor 3

Output signals: CMOS compatible push-pull stage

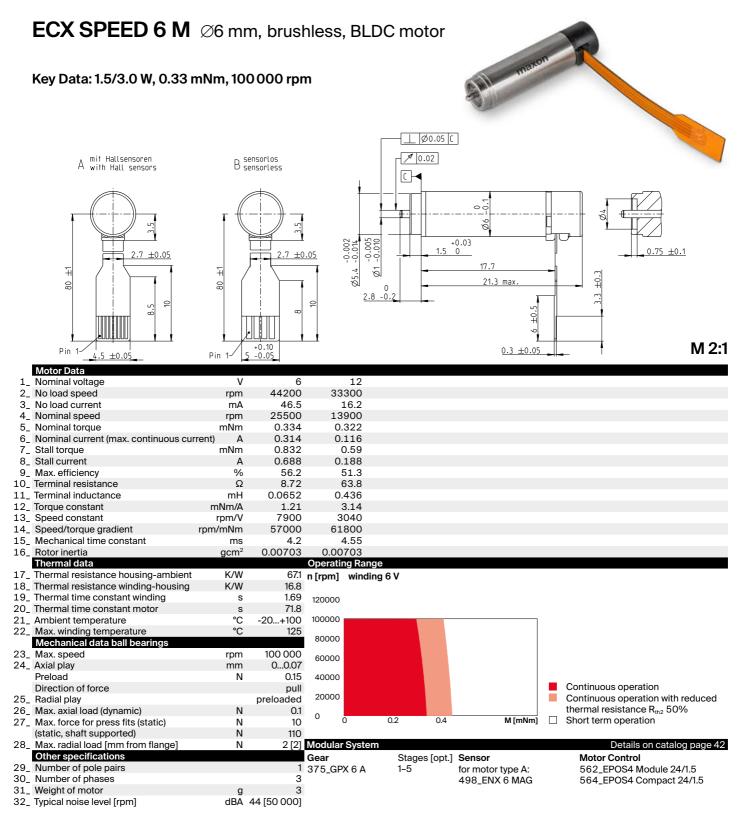
Output current per channel: max. 0.5 mA

Connection motor sensorless (B)

FPC flexprint 4-pole, pitch 1.0 mm: Pin 1 Motor winding 1 Pin 2 Motor winding 2 Motor winding 3

Shaft front: length/diameter

Electrical connection: Flex cable/round cable



Connection motor with hall sensor (A)

FPC Flexprint 8-pole, pitch 0.5 mm Motor winding 1 Pin 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 V_{Hall} 2.5...5.5 VDC GND Pin 5 Pin 6 Hall sensor 1 Pin 7 Hall sensor 2 Hall sensor 3

Output signals: CMOS compatible push-pull stage

Output current per channel: max. 0.5 mA

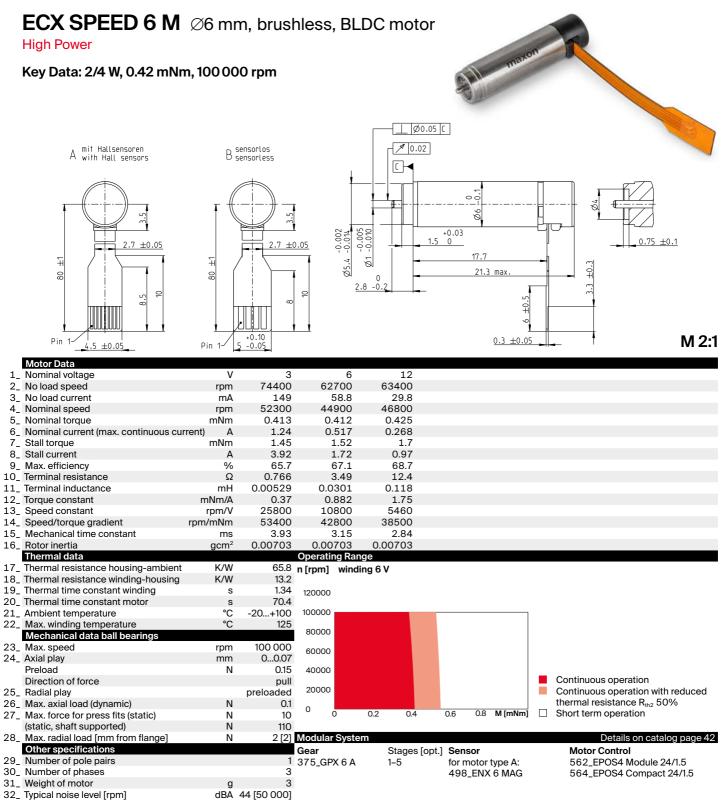
Connection motor sensorless (B)

FPC flexprint 4-pole, pitch 1.0 mm: Pin 1 Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3

Pin 4

Shaft front: length

Electrical connection: Flexprint/pins (on request)



Connection motor with hall sensor (A)

FPC Flexprint 8-pole, pitch 0.5 mm Motor winding 1 Pin 1 Pin 2 Motor winding 2 Motor winding 3 Pin 3 Pin 4 V_{Hall} 2.5...5.5 VDC GND Pin 5 Pin 6 Hall sensor 1 Pin 7 Hall sensor 2 Hall sensor 3

Output signals: CMOS compatible push-pull stage

Output current per channel: max. 0.5 mA

Connection motor sensorless (B)

FPC flexprint 4-pole, pitch 1.0 mm: Pin 1 Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4

Shaft front: length

Electrical connection: Flexprint/pins (on request)

ECX SPEED 8 M Ø8 mm, brushless, BLDC motor maxon Key Data: 2/4.7 W, 0.92 mNm, 50 000 rpm ___ Ø0.05 C mit Hall-Sensoren with Hall sensors B sensorlos sensorless **1**0.02 PIN 1 Ansicht X 0 1.95 -0.05 0 _3.7 -0.3 PIN 1 PIN C 300 ±10 300 ±10 Connector: Connector: 8 pole, 1.27 mm, MICA08 4 pole, 1.27 mm, MICA04 Lumberg Connect GmbH Lumberg Connect GmbH M 3:2 **Motor Data** V Nominal voltage 6 12 24 2_ No load speed rpm 35400 43300 42200 3_ No load current 105 69 33.2 mΑ 4_ Nominal speed rpm 24200 33100 32300 5_ Nominal torque 0.917 0.874 0.877 mNm 6_ Nominal current (max. continuous current) 0.687 0.406 0.198 Stall torque mNm 3.04 3.88 3.92 8_ Stall current Α 1.98 1.54 0.755 9_ Max. efficiency 61 % 63 64 10_ Terminal resistance Ω 3.02 7.8 31.8 11_ Terminal inductance 0.039 0.106 0.447 mΗ 12_ Torque constant mNm/A 1.53 2.51 5.19 6230 3780 1840 13_ Speed constant rpm/V 14_ Speed/torque gradient rpm/mNm 12300 11700 11300 15_ Mechanical time constant 3.21 3.06 2.95 ms Rotor inertia 0.0249 0.0249 0.0249 16 gcm² Thermal data Operating Range Thermal resistance housing-ambient K/W 51.2 n [rpm] Winding 12 V 18_ Thermal resistance winding-housing K/W 3.5 19_ Thermal time constant winding 0.811 s 20_ Thermal time constant motor 60000 154 s 21_ Ambient temperature¹ -20...+85 °C 50000 Max. winding temperature °C +125Mechanical data ball bearing 40000 50000 23_ Max. speed rpm 30000 24_ Axial play 0...0.07 mm Preload N 0.3 20000 Continuous operation Direction of force pull 10000 preloaded Continuous operation with reduced 25_ Radial play thermal resistance R_{th2} 50% 26_ Max. axial load (dynamic) N 0.2 0 1.5 M [mNm] Short term operation 27_ Max. force for press fits (static) N 10 (static, shaft supported) N 110 2 [2] Modular System Details on catalog page 42 Max. radial load [mm from flange] N Other specifications **Motor Control** Gear Stages [opt.] Sensor 29_ Number of pole pairs 376_GPX 8 A for motor type A: 547_DEC Module 24/2 30_ Number of phases 499_ENX 8 MAG 550_ESCON Module 24/2 31_ Weight of motor 6 551_ESCON 36/3 EC for motor type A + B: 32_ Typical noise level [rpm] dBA 49 [50 000] 551_ESCON Module 50/4 EC-S 509_ENX 8 EASY INT 510_ENX 8 EASY INT Abs. 562_EPOS4 Module 24/1.5 Connection A (flat band cable AWG 28, pitch 1.27 mm) 564_EPOS4 Compact 24/1.5 Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 5

V_{Hall} 2.5...5.5 VDC GND Hall sensor 1 Pin 6 Hall sensor 2 Pin 8 Hall sensor 3 Output signal: CMOS compatible Output current per channel: max 0.5 mA

Connection B (flat band cable AWG 28, pitch 1.27 mm)

Pin 1 Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4

Shaft front: length Electric connection: pins/flexprint/cable length Cable insulation: PVC/PO/FEP

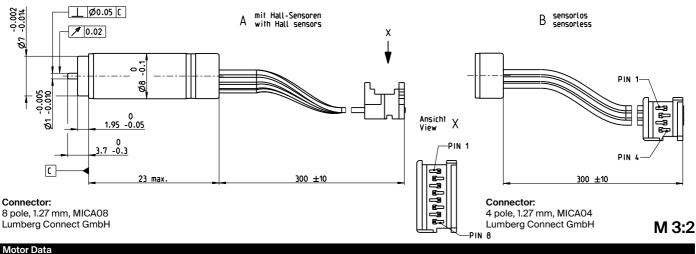
For type A: PVC-cable (-20...85°C) PO- and FEP cable (-30...85°C) For type B: PVC-cable (-20...100°C) PO- and FEP cable (-40...100°C)

Cable and plug configuration: Adapter Micromotor (Part number 498157) required for all maxon controllers.

High Power

Key Data: 3/6 W, 1.26 mNm, 50 000 rpm

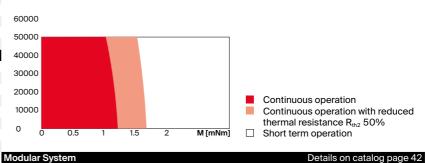




Motor Data									
1_ Nominal voltage	V	6	9	12					
2_ No load speed	rpm	35500	29100	30500					
3_ No load current	mA	128	63.4	50.9					
4_ Nominal speed	rpm	26700	21200	22800					
5_ Nominal torque	mNm	1.23	1.26	1.26					
6_ Nominal current (max. continuou	is current) A	0.902	0.497	0.391					
7_ Stall torque	mNm	5.18	4.83	5.18					
8_ Stall current	Α	3.34	1.7	1.43					
9_ Max. efficiency	%	66	66	67					
10_ Terminal resistance	Ω	1.8	5.3	8.38					
11_ Terminal inductance	mH	0.026	0.089	0.144					
12_ Torque constant	mNm/A	1.55	2.84	3.62					
13_ Speed constant	rpm/V	6160	3360	2640					
14_ Speed/torque gradient	rpm/mNm	7130	6260	6110					
15_ Mechanical time constant	ms	1.86	1.64	1.6					
16_ Rotor inertia	gcm ²	0.0249	0.0249	0.0249					
Thermal data	Thermal data Operating Range								

n [rpm] Winding 9 V

16_ Rotor inertia	gcm-	0.0249
Thermal data		
17_ Thermal resistance housing-ambient	K/W	51.2
18_ Thermal resistance winding-housing	K/W	4.11
19_ Thermal time constant winding	S	0.874
20_ Thermal time constant motor	S	154
21_ Ambient temperature ¹	°C	-20+85
22_ Max. winding temperature	°C	+125
Mechanical data ball bearings		
23_ Max. speed	rpm	50000
24_ Axial play	mm	00.07
Preload	N	0.3
Direction of force		pull
25_ Radial play		preloaded
26_ Max. axial load (dynamic)	N	0.2
27_ Max. force for press fits (static)	N	10
(atatia aboft aupported)	N	110



	(static, snart supported)	I/I	110
28_	Max. radial load [mm from flange]	N	2 [2]
	Other specifications		
29_	Number of pole pairs		1
30_	Number of phases		3
31_	Weight of motor	g	6
32_	Typical noise level [rpm]	dBA	49 [50 000]

376_GPX 8 A 1-5 for motor type A: 499_ENX 8 MAG for motor type A + B: 509_ENX 8 EASY INT 510_ENX 8 EASY INT Abs.

Stages [opt.] Sensor

Motor Control 547_DEC Module 24/2 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 562_EPOS4 Module 24/1.5 564_EPOS4 Compact 24/1.5

Connection A (flat band cable AWG 28, pitch 1.27 mm)

Motor winding 1 Motor winding 2 Motor winding 3 V_{Hall} 2.5...5.5 VDC GND Pin 2 Pin 3 Pin 5 Pin 6 Hall sensor 1 Hall sensor 2 Pin 8 Hall sensor 3 Output signal: CMOS compatible Output current per channel: max 0.5 mA

Connection B (flat band cable AWG 28, pitch 1.27 mm)

Motor winding 1 Motor winding 2 Pin 1 Pin 2 Pin 3 Motor winding 3 Pin 4

Gear

Shaft front: length Electric connection: pins/flexprint/cable length Cable insulation: PVC/PO/FEP

¹For type A: PVC-cable (-20...85°C) PO- and FEP cable (-30...85°C) For type B: PVC-cable (-20...100°C) PO- and FEP cable (-40...100°C)

Cable and plug configuration: Adapter Micromotor (Part number 498157) required for all maxon controllers.

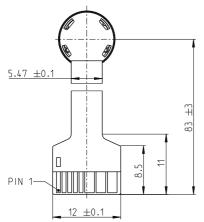
M 1:1

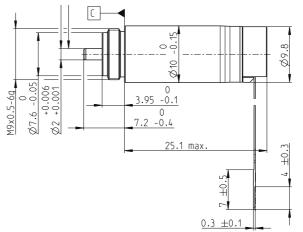
ECX SPEED 10 M Ø10 mm, brushless, BLDC motor

High Power

Key Data: 8/9.3 W, 1.6 mNm, 65 000 rpm

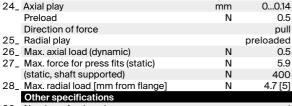




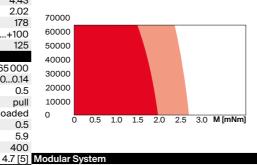


	Motor Data					
1_	Nominal voltage	V	9	18	36	
2_	No load speed	rpm	58400	58400	57600	
3_	No load current	mA	165	82.3	40.4	
4_	Nominal speed	rpm	53500	53500	52700	
5_	Nominal torque	mNm	1.58	1.58	1.6	
6_	Nominal current (max. continuous cur	rrent) A	1.24	0.619	0.309	
7_	Stall torque	mNm	19.3	19.3	19.3	
8_	Stall current	Α	13.3	6.65	3.28	
9_	Max. efficiency	%	79.5	79.5	79.6	
10_	Terminal resistance	Ω	0.677	2.71	11.0	
11_	Terminal inductance	mH	0.00599	0.0239	0.0982	
12_	Torque constant	mNm/A	1.45	2.91	5.89	
13_	Speed constant	rpm/V	6570	3280	1620	
14_	Speed/torque gradient	rpm/mNm	3060	3060	3020	
15_	Mechanical time constant	ms	1.86	1.86	1.84	
16_	Rotor inertia	gcm²	0.0581	0.0581	0.0581	
	Thermal data			Operating Ra	ange	
17_	Thermal resistance housing-ambient	K/W	39.8	n [rpm] win	ding 36 V	
18_	Thermal resistance winding-housing	K/W	4.43		•	
			0.00			

	mermar data		
1	.7_ Thermal resistance housing-ambient	K/W	39.8
1	.8_ Thermal resistance winding-housing	K/W	4.43
1	.9_ Thermal time constant winding	s	2.02
2	20_ Thermal time constant motor	S	178
2	21_ Ambient temperature	°C	-20+100
2	22_ Max. winding temperature	°C	125
	Mechanical data ball bearings		
2	23_ Max. speed	rpm	65000
2	24_ Axial play	mm	00.14
	Preload	N	0.5
	Direction of force		pull



	Max. radia read [min nom nange]		[0]
	Other specifications		
29_	Number of pole pairs		1
30_	Number of phases		3
31_	Weight of motor	g	9
32_	Typical noise level [rpm]	dBA	55 [50 000]



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Stages [opt.] Sensor Gear 377_GPX 10 A **ENX 10 MAG INT** 1-5

Motor Control 547_DEC Module 24/2 550_ESCON Module 24/2 551_ESCON 36/3 EC 562_EPOS4 Module 24/1.5 564_EPOS4 Compact 24/1.5

Details on catalog page 42

Connection flexprint cable (FPC)

V_{cc} 3.3...6.0 V Hall sensor 3 Pin 1 Pin 2 Pin 3 Hall sensor 1 Pin 4 Hall sensor 2 Pin 5 GND

Motor winding 3 Pin 6 Motor winding 2 Pin 7 Pin 8 Motor winding 1

Maximum permissible continuous current in the flexprint cables to the motor windings: 2.0 A

Output signals: CMOS compatible push-pull stage Signal voltage, high: 3.3 V

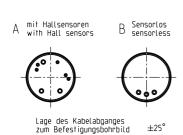
Hall signals are generated by the MAG sensor.

Possible matching connectors for the FPC connection: 11-pole, 1.0 mm pitch, e.g., Molex 52207-1185 Available maxon adapter connectors: 220300, 418719

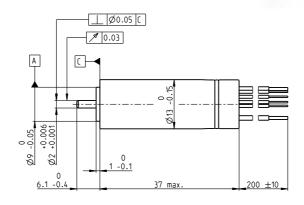
Front flange: Center thread/without thread Shaft, front: Length/diameter

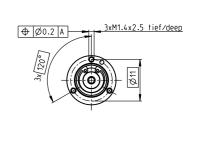
Key Data: 12/18 W, 4.2 mNm, 50 000 rpm





alignment of cables relative to mounting holes

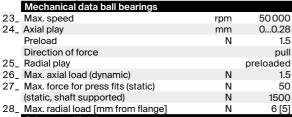




M 1:1

Motor Data									
 Nominal voltage 	V	18	24	36	48				
2_ No load speed	rpm	45700	45500	44300	44700				
3_ No load current	mA	80.8	60.3	38.8	29.4				
4_ Nominal speed	rpm	38400	38400	36900	37300				
5_ Nominal torque	mNm	4.21	4.23	4.05	3.99				
6_ Nominal current (ma	x. continuous current) A	1.2	0.899	0.56	0.419				
7_ Stall torque	mNm	27.9	28.3	25.4	25.1				
8_ Stall current	Α	7.49	5.68	3.32	2.48				
9_ Max. efficiency	%	80.7	80.8	79.9	79.8				
10_ Terminal resistance	Ω	2.4	4.22	10.9	19.3				
11_ Terminal inductance	mH	0.0546	0.0978	0.232	0.404				
12_ Torque constant	mNm/A	3.72	4.98	7.66	10.1				
13_ Speed constant	rpm/V	2570	1920	1250	943				
14_ Speed/torque gradie	ent rpm/mNm	1660	1630	1770	1800				
15_ Mechanical time cor	nstant ms	4.23	4.15	4.51	4.6				
16_ Rotor inertia	gcm ²	0.244	0.244	0.244	0.244				
Thermal data	•								

Thermal data		
17_ Thermal resistance housing-ambient	K/W	20
18_ Thermal resistance winding-housing	K/W	2.21
19_ Thermal time constant winding	S	1.31
20_ Thermal time constant motor	S	306
21_ Ambient temperature	°C	-20+100
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		
OO Man arrand		F0.000





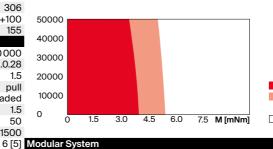
Connection A and B, motor (Cable AWG A: 26, B: 22)

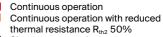
Motor winding 1 black Motor winding 2 white Motor winding 3

 $\begin{array}{ll} \textbf{Connection A, sensors} \text{ (Cable AWG 28)} \\ \text{orange} & \text{V}_{\text{CC}} \text{ 5 \pm} \text{0.5 V} \\ \text{blue} & \text{GND} \\ \end{array}$ yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3 grey

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used.

n [rpm] winding 36 V





Short term operation

Gear	Stages [opt.]	Sensor
381_GPX 13 SPEED	1-3	for motor type A:
382_GPX 14 A/C	1-2 [3-4]	511_ENX 13 EASY INT
383_GPX 14 LN/LZ	1-2 [3-4]	for motor type B:
384_GPX 14 HP	2-3 [4]	511_ENX 13 EASY INT Abs.
385_GPX 16 A/C	3-4	
386_GPX 16 LN/LZ	3-4	
387_GPX 16 HP	4	

Flange front: thread holes/center thread Flange back: metal ring/external thread Shaft front: length/diameter

Electric connection: cable length/pin connection/connector Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 **Motor Control** 547_DEC Module 24/2 547_DEC Module 50/5

550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5

561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

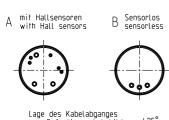
564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

High Power

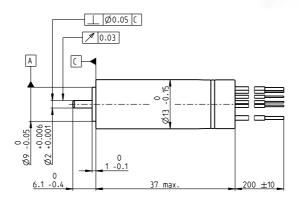
Key Data: 25/36 W, 5.8 mNm, 70 000 rpm

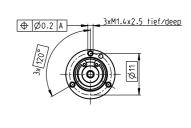




zum Befestigungsbohrbild

alignment of cables relative to mounting holes

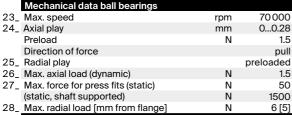




M 1:1

	Motor Data							
1_	Nominal voltage	V	18	24	36	48		
2_	No load speed	rpm	66800	66800	66800	64100		
3_	No load current	mA	99.1	74.4	49.6	35		
4_	Nominal speed	rpm	61400	61600	61600	59100		
5_	Nominal torque	mNm	5.88	5.84	5.52	5.72		
6_	Nominal current (max. co	ntinuous current) A	2.37	1.76	1.12	0.831		
7_	Stall torque	mNm	80.2	84.3	79.4	80.7		
8_	Stall current	Α	31.3	24.7	15.5	11.3		
9_	Max. efficiency	%	89.2	89.4	89.1	89.3		
10_	Terminal resistance	Ω	0.576	0.973	2.33	4.24		
11_	Terminal inductance	mH	0.0204	0.0362	0.0814	0.157		
12_	Torque constant	mNm/A	2.57	3.42	5.13	7.13		
13_	Speed constant	rpm/V	3720	2790	1860	1340		
14_	Speed/torque gradient	rpm/mNm	835	795	844	797		
15_	Mechanical time constan	t ms	2.13	2.03	2.16	2.04		
16_	Rotor inertia	gcm ²	0.244	0.244	0.244	0.244		
	Thermal data Operating Range							

17_ Thermal resistance housing-ambient K/W 20 18_ Thermal resistance winding-housing 2.53 K/W 19_ Thermal time constant winding 1.71 s 20_ Thermal time constant motor 311 21_ Ambient temperature -20...+100 °C 22_ Max. winding temperature °C 155 Mechanical data ball bearing



Other specifications 29_ Number of pole pairs 30_ Number of phases 3 31_ Weight of motor 32_ Typical noise level [rpm] dBA 46 [50 000]

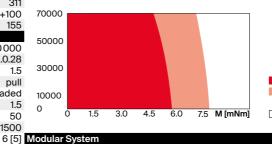
Connection A and B, motor (Cable AWG A: 26, B: 22)

Motor winding 1 black Motor winding 2 Motor winding 3 white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3 grey

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used.

n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Gear Stages [opt.] Sensor 381_GPX 13 SPEED 1-3 for motor type A: 382_GPX 14 A/C 511_ENX 13 EASY INT 1-2 [3-4] 383_GPX 14 LN/LZ 1-2 [3-4] for motor type B: 2-3 [4] 511_ENX 13 EASY INT Abs. 384_GPX 14 HP 385_GPX 16 A/C 386_GPX 16 LN/LZ 3-4 387_GPX 16 HP

Flange front: thread holes/center thread Flange back: metal ring/external thread Shaft front: length/diameter

Electric connection: cable length/pin connection/connector Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 **Motor Control** 547_DEC Module 24/2

547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S

551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5

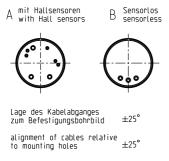
562_EPOS4 Module 50/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5

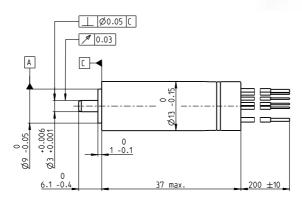
565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8

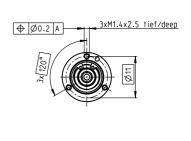
Sterilizable

Key Data: 25/40 W, 4.9 mNm, 90 000 rpm









M 1:1

								M ·
	Motor Data							
	Nominal voltage	V	18	24	36	48		
	No load speed	rpm	79000	79000	78900	75800		
	No load current	mA	209	157	105	73.2		
_	Nominal speed	rpm	72500	72800	72800	69800		
_	Nominal torque	mNm	4.92	4.89	4.61	4.77		
	Nominal current (max. continuous o		2.45	1.83	1.16	0.856		
_	Stall torque	mNm	67.6	71	66.8	68		
	Stall current	Α	31.3	24.7	15.5	11.3		
_	Max. efficiency	%	84.7	85	84.6	84.9		
	Terminal resistance	Ω	0.576	0.973	2.33	4.24		
_	Terminal inductance	mH	0.0207	0.0369	0.0829	0.16		
_	Torque constant	mNm/A	2.16	2.88	4.32	6		
	Speed constant	rpm/V	4420	3310	2210	1590		
	Speed/torque gradient	rpm/mNm	1180	1120	1190	1120		
	Mechanical time constant	ms	1.6	1.52	1.62	1.53		
_	Rotor inertia	gcm ²	0.13	0.13	0.13	0.13		
	Thermal data	90	0.10	Operating Ran		0.120		Sterilization information
	Thermal resistance housing-ambier	nt K/W	20	n [rpm] wind				Sterilization cycles
	Thermal resistance winding-housing		2.5	ii [ipiii] wiiid	ing 50 v		135°C	Sensorless: typical 2000
_	Thermal time constant winding	s	1.69					Hall sensors: typical 1000
	Thermal time constant motor	s	313	100000				riali serisors, typicar 1000
_	Ambient temperature	°Č	-40+135	100000				Sterilization with steam
_	Max. winding temperature	°C	155	80000				Temperature +134°C ±4
	Mechanical data ball bearings		.00					Compression pressure up to 2.3 l
	Max. speed	rpm	90 000	60000				Rel. humidity 100
_	Axial play	mm	00.28					Cycle length 18 m
-	Preload	N	1.5	40000				Oyele length 10 h
	Direction of force		pull					Continuous operation
5	Radial play		preloaded	20000				Continuous operation with reduce
	Max. axial load (dynamic)	N	1.5					thermal resistance R _{th2} 50%
	Max. force for press fits (static)	N	50	0 0	1.5 3.0 4.5	6.0 7.5	M [mNm]	☐ Short term operation
٠-	(static, shaft supported)	N	1500					·
8	Max. radial load [mm from flange]	N		Modular Syste	m			Details on catalog page
_	Other specifications		0 [0]	Gear		pt.] Sensor		Motor Control
	Number of pole pairs		1	381_GPX 13 S		for motor	tuno A:	547_DEC Module 24/2
	Number of phases		3	301_GFX 13 3	FLLD I-3		(13 EASY I	
	Weight of motor	g	32			for motor		550_ESCON Module 24/2
_	Typical noise level [rpm]		46 [50 000]				(13 EASY II	
	Typical Holde level [Ipili]	UDA	40 [00 000]			OII_LINA	I IS LAST II	551_ESCON Module 50/4 EC-
	Connection A and B, motor (Cable	AMC A- 26 B- 2	201					551_ESCON Module 50/5
	red Motor winding 1	AVVG A. 20, B. 2	- - -)					553 ESCON 50/5
	black Motor winding 2							561_EPOS4 Micro 24/5
	white Motor winding 3							562_EPOS4 Module 50/5
								562_EPOS4 Module 50/5 562_EPOS4 Module 24/1.5
	Connection A, sensors (Cable AWC	G 28)		Configuration				563_EPOS4 Compact 24/5 3-a
	orange $V_{CC} = 5 \pm 0.5 \text{ V}$					and the second		564_EPOS4 Compact 24/1.5
	blue GND				read holes/cent			
	yellow Hall sensor 1				netal ring/extern	aı tnread		565_EPOS4 Compact 50/5 567_EPOS4 50/5
	brown Hall sensor 2 grey Hall sensor 3			Shaft front: len		H. A. L.		567_EPOS4 50/5 568_EPOS4 Disk 60/8
	grey Hall sensor 3				ction: cable leng			
	Output signals: CMOS compatible p	ush-pull stage	No pull-up		nnectors and co	•		
	at o.ga.o. o.moo oompatible p	pan olago.		for the configu	ration of the pin	connection to	gerner wit	n ine

for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

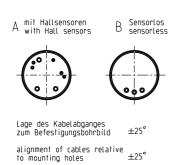
and blue (GND) connections are not used.

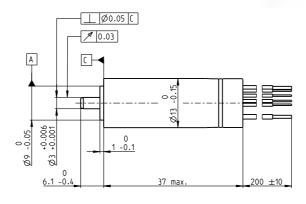
Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (Vcc)

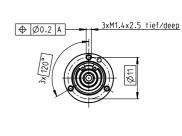
Sterilizable, ceramic bearings

Key Data: 25/48 W, 4.9 mNm, 120 000 rpm







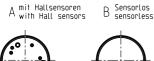


M 1:1

								IVI I:I
	Motor Data							
1	Nominal voltage	V	18	24	36	48		
	No load speed	rpm	79000	79000	79000	75800		
_	No load speed	mA	209	157	96	73.2		
	Nominal speed	rpm	72500	72800	72800	69800		
_	Nominal torque	mNm	4.92	4.89	4.67	4.77		
	Nominal current (max. continuous c		2.45	1.83	1.16	0.856		
_	Stall torque	mNm	67.6	71	66.8	68		
	Stall current	A	31.3	24.7	15.5	11.3		
	Max. efficiency	%	84.7	85	85.1	84.9		
	Terminal resistance	Ω	0.576	0.973	2.33	4.24		
	Terminal inductance	mH	0.0207	0.0369	0.0829	0.16		
	Torque constant	mNm/A	2.16 4420	2.88	4.32 2210	6 1590		
_	Speed constant	rpm/V		3310				
_	Speed/torque gradient	rpm/mNm	1180	1120	1190	1120		
	Mechanical time constant	ms	1.6	1.52	1.62	1.53		
	Rotor inertia	gcm ²	0.13	0.13	0.13	0.13	O	
	Thermal data	. 16046		Operating Rai				ization information
_	Thermal resistance housing-ambien			n [rpm] wind	ling 36 V			zation cycles
	Thermal resistance winding-housing	,	2.5					orless: typical 2000
	Thermal time constant winding	S	1.69				Hall s	ensors: typical 1000
_	Thermal time constant motor	s	313					
	Ambient temperature	°C	-40+135	120000				zation with steam
_	Max. winding temperature	°C	155	100000				erature +134°C ±4°C
	Mechanical data ball bearings		100.000	80000				pression pressure up to 2.3 bar
_	Max. speed	rpm	120 000					umidity 100%
24_	Axial play	mm	00.28	60000			Cycle	length 18 min.
	Preload	N	1.5	40000				ontinuous operation
0.5	Direction of force		pull				I	ontinuous operation ontinuous operation with reduced
_	Radial play		preloaded	20000				ermal resistance R _{th2} 50%
	Max. axial load (dynamic)	N	1.5	0	1.5 3.5	5.5 7.5 N		nort term operation
27_	Max. force for press fits (static)	N	50	U	1.0 3.0	5.5 7.5 N		iori term operation
00	(static, shaft supported)	N	1500	Mark In Oak				D. I
	Max. radial load [mm from flange]	N	6 [5]	Modular Syste				Details on catalog page 42
	Other specifications			Gear	•	[opt.] Sensor		Motor Control
_	Number of pole pairs		1	381_GPX 13 S	SPEED 1-3	for motor t		547_DEC Module 24/2
	Number of phases		3			· -	13 EASY INT	547_DEC Module 50/5
_	Weight of motor	_ g	32			for motor t		550_ESCON Module 24/2
32_	Typical noise level [rpm]	dBA	46 [50 000]			511_ENX1	3 EASY INT Abs.	551_ESCON 36/3 EC
								551_ESCON Module 50/4 EC-S
	Connection A and B, motor (Cable A	AWG A: 26, B: 2	22)					551_ESCON Module 50/5
	red Motor winding 1							553_ESCON 50/5
	black Motor winding 2							561_EPOS4 Micro 24/5
	white Motor winding 3							562_EPOS4 Module 50/5
	Connection A, sensors (Cable AWG	(28)						562_EPOS4 Module 24/1.5
	orange V_{CC} 5 ± 0.5 V	. 20)		Configuration				563_EPOS4 Compact 24/5 3-axes
	blue GND				hread holes/ce			564_EPOS4 Compact 24/1.5
	yellow Hall sensor 1				netal ring/exter	nal thread		565_EPOS4 Compact 50/5
	brown Hall sensor 2			Shaft front: ler	•			567_EPOS4 50/5
	grey Hall sensor 3			Electric conne	ection: cable ler	ngth/pin connecti	on	568_EPOS4 Disk 60/8
	Output signals: CMOS sampatible ::	uob pull star-	No pull			connecting cable		
	Output signals: CMOS compatible puresistor required. Hall signals are ger					n connection tog		
	sensor. In combination with the ENX			external threa	d: see catalog,	Accessories sect	ion.	
	and blue (GND) connections are not							
	,							

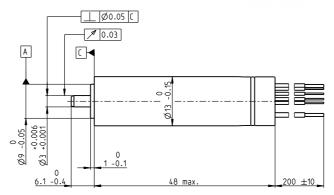
Key Data: 25/25 W, 5.5 mNm, 50 000 rpm

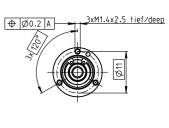




Lage des Kabelabganges zum Befestigungsbohrbild

alignment of cables relative +25 to mounting holes





M 1:1

Motor I	Data								
 Nomina 	l voltage	V	18	24	36	48			
2_ No load	speed	rpm	41900	42800	42000	42400			
3_ No load	current	mA	169	130	84.4	64.2			
4_ Nomina	l speed	rpm	37500	38600	37900	38200			
5_ Nomina	l torque	mNm	5.16	5.41	5.57	5.45			
6_ Nomina	l current (max. continuous cu	urrent) A	1.42	1.14	0.762	0.567			
7_ Stall tor	que	mNm	51.3	58.9	60.4	59.3			
8_ Stall cu	rrent	Α	12.7	11.1	7.47	5.55			
9_ Max. ef	ficiency	%	79	80.1	80.5	80.3			
10_ Termina	l resistance	Ω	1.42	2.16	4.82	8.64			
11_ Termina	l inductance	mH	0.0453	0.0776	0.181	0.316			
12_ Torque	constant	mNm/A	4.04	5.29	8.08	10.7			
13_ Speed	constant	rpm/V	2360	1800	1180	894			
14_ Speed/	torque gradient	rpm/mNm	830	736	705	724			
15_ Mechar	nical time constant	ms	3.25	2.88	2.76	2.83			
16_ Rotor in	ertia	gcm ²	0.374	0.374	0.374	0.374			
Therma	Thermal data Operating Range								

17_ Thermal resistance housing-ambient K/W 19.5 18_ Thermal resistance winding-housing K/W 19_ Thermal time constant winding 2.12 s 20_ Thermal time constant motor 328 21_ Ambient temperature -20...+100 °C 22_ Max. winding temperature °C 155 Mechanical data ball bearings

50000 23_ Max. speed rpm 24_ Axial play 0...0.28 mm Preload N 1.5 Direction of force pull preloaded 25_ Radial play 26_ Max. axial load (dynamic) N 1.5 27_ Max. force for press fits (static) N 50 (static, shaft supported) N 1500 Max. radial load [mm from flange] N

Other specifications 29_ Number of pole pairs 30_ Number of phases 3 31_ Weight of motor dBA 47 [50 000] 384_GPX 14 HP 32_ Typical noise level [rpm]

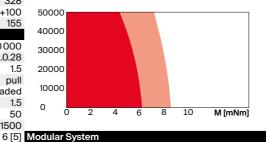
Connection A and B, motor (Cable AWG A: 26, B: 22)

Motor winding 1 black Motor winding 2 white Motor winding 3

 $\begin{array}{ll} \textbf{Connection A, sensors} \text{ (Cable AWG 28)} \\ \textbf{orange} & \textbf{V}_{CC} \text{ 5 \pm} 0.5 \text{ V} \\ \textbf{blue} & \textbf{GND} \\ \end{array}$ yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3 grey

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used.

n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Stages [opt.] Sensor 381_GPX 13 SPEED 1-3 for motor type A: 382_GPX 14 A/C 511_ENX 13 EASY INT 1-2 [3-4] 383_GPX 14 LN/LZ 1-2 [3-4] for motor type B: 2-3 [4] 511_ENX 13 EASY INT Abs.

385_GPX 16 A/C

387_GPX 16 HP

386_GPX 16 LN/LZ 3-4

Gear

Flange front: thread holes/center thread Flange back: metal ring/external thread Shaft front: length/diameter

Electric connection: cable length/pin connection/connector Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 **Motor Control** 547_DEC Module 50/5

550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5

561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

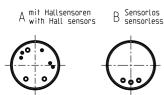
564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

High Power

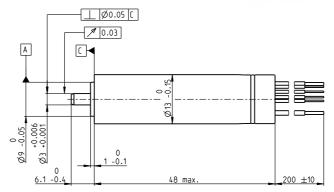
Key Data: 50/54 W, 8.5 mNm, 70 000 rpm





Lage des Kabelabganges zum Befestigungsbohrbild

alignment of cables relative ±25° to mounting holes



M 1:1

3xM1.4x2.5 tief/deep

Motor D	ata						
 Nomina 	l voltage	V	18	24	36	48	
2_ No load	speed	rpm	67300	65800	67300	61700	
3_ No load	current	mA	113	82.2	56.6	37.4	
4_ Nomina	l speed	rpm	63000	61700	63300	57700	
5_ Nomina	Itorque	mNm	8.28	8.57	8.27	8.5	
6_ Nomina	l current (max. continuous curi	ent) A	3.33	2.52	1.66	1.17	
7_ Stall tore	que	mNm	151	163	163	152	
8_ Stall cur	rent	Α	59.1	46.8	31.9	20.5	
9_ Max. eff	iciency	%	91.5	91.9	91.8	91.7	
10_ Termina	l resistance	Ω	0.304	0.512	1.13	2.34	
11_ Termina	l inductance	mH	0.0166	0.0309	0.0664	0.141	
12_ Torque o	constant	mNm/A	2.55	3.48	5.1	7.42	
13_ Speed o	constant	rpm/V	3750	2750	1870	1290	
14_ Speed/t	orque gradient	rpm/mNm	447	405	414	406	
15_ Mechan	ical time constant	ms	1.63	1.48	1.51	1.48	
16_ Rotor in	ertia	gcm ²	0.349	0.349	0.349	0.349	
Therma	l data						

17_ Thermal resistance housing-ambient K/W 18_ Thermal resistance winding-housing K/W 1.6 19_ Thermal time constant winding 1.68 s 20_ Thermal time constant motor 329 21_ Ambient temperature -20...+100 °C 22_ Max. winding temperature °C 155 Mechanical data ball bearing

70000 23_ Max. speed rpm 24_ Axial play 0...0.28 mm Preload N 1.5 Direction of force pull 25_ Radial play preloaded 26_ Max. axial load (dynamic) N 1.5 27_ Max. force for press fits (static) N 50 (static, shaft supported) Ν 1500 N

Max. radial load [mm from flange] Other specifications 29_ Number of pole pairs 30_ Number of phases 3 38 42 38 31_ Weight of motor 32_ Typical noise level [rpm] dBA 47 [50 000]

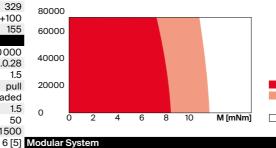
Connection A and B, motor (Cable AWG A: 26, B: 22)

Motor winding 1 black Motor winding 2 Motor winding 3 white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3 grey

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used.

19.5 n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

	Wodalai Oystoiii		
	Gear	Stages [opt.]	Sensor
	381_GPX 13 SPEED	1-3	for motor type A:
	382_GPX 14 A/C	1-2 [3-4]	511_ENX 13 EASY INT
2	383_GPX 14 LN/LZ	1-2 [3-4]	for motor type B:
l	384_GPX 14 HP	2-3 [4]	511_ENX 13 EASY INT Abs.
	385_GPX 16 A/C	3-4	
	386_GPX 16 LN/LZ	3-4	
	387_GPX 16 HP	4	

Flange front: thread holes/center thread Flange back: metal ring/external thread

Shaft front: length/diameter

Electric connection: cable length/pin connection/connector Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 **Motor Control**

547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5

567_EPOS4 50/5 568_EPOS4 Disk 60/8

maxon EC motor 203

Sterilizable

Key Data: 50/62 W, 7.5 mNm, 90 000 rpm



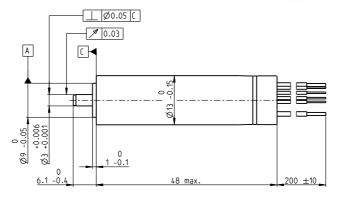


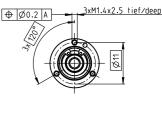


B Sensorlos sensorless

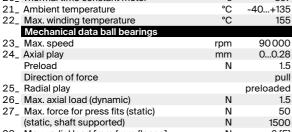
Lage des Kabelabganges zum Befestigungsbohrbild

alignment of cables relative ±25° to mounting holes





Motor Data 1_ Nominal voltage	
1_ Nominal voltage V 18 24 36 48	
2_ No load speed rpm 71000 69500 71000 65100	
3_ No load current	
4_ Nominal speed rpm 66400 65300 67100 61200	
5_ Nominal torque mNm 7.29 7.57 7.26 7.56	
6_ Nominal current (max. continuous current) A 3.22 2.44 1.6 1.14	
7_ Stall torque mNm 126 143 149 142	
8_ Stall current A 52.3 43.4 30.8 20.2	
9_ Max. efficiency	
10_ Terminal resistance Ω 0.344 0.552 1.17 2.38	
11_ Terminal inductance mH 0.0128 0.0238 0.0512 0.108	
12_ Torque constant	
13_ Speed constant rpm/V 3960 2910 1980 1360	
14_ Speed/torque gradient rpm/mNm 567 489 480 462	
15_ Mechanical time constant ms 1.87 1.61 1.58 1.52	
16_ Rotor inertia gcm ² 0.315 0.315 0.315 0.315	
Thermal data Operating Range Sterilization information	
17_ Thermal resistance housing-ambient K/W 19.5 n [rpm] winding 36 V Sterilization cycles	
18_ Thermal resistance winding-nousing K/W 2.04 (((Sensorless: typical 2000	
19_ Thermal time constant winding s 2.13 Hall sensors: typical 1000	
20_ Thermal time constant motor s 397	
21_ Ambient temperature °C -40+135 90000 Sterilization with steam	
22_ Max. winding temperature °C 155 Temperature	+134°C ±4°C
Mechanical data ball bearings 70000 Compression pressure up to	2.3 bar



Max. radial load [mm from flange] N Other specifications 29_ Number of pole pairs 30_ Number of phases 3 31_ Weight of motor 42 32_ Typical noise level [rpm] dBA 47 [50 000]

6 [5] Modular Syste Gear Stages [opt.] Sensor 381_GPX 13 SPEED 1-3 for motor type A: 511_ENX 13 EASY INT for motor type B: 511_ENX 13 EASY INT Abs.

Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

> **Motor Control** 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S

M [mNm]

551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

Details on catalog page 42

565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8

Connection A and B, motor (Cable AWG A: 26, B: 22)

Motor winding 1 black Motor winding 2 white Motor winding 3

 $\begin{array}{ll} \textbf{Connection A, sensors} \text{ (Cable AWG 28)} \\ \textbf{orange} & \textbf{V}_{CC} \text{ 5 \pm} 0.5 \text{ V} \\ \textbf{blue} & \textbf{GND} \\ \end{array}$

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3 grey

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used.

50000

30000

10000

0

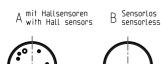
Flange front: thread holes/center thread Flange back: metal ring/external thread Shaft front: length/diameter

Electric connection: cable length/pin connection Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Sterilizable, ceramic bearings

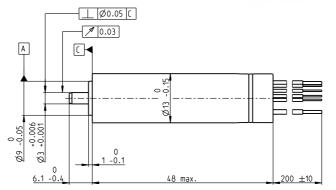
Key Data: 50/59 W, 7.5 mNm, 120 000 rpm

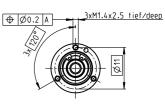




Lage des Kabelabganges zum Befestigungsbohrbild

alignment of cables relative ±25° to mounting holes





									M 1:1
	Motor Data								
1_	Nominal voltage	V	18	24	. 36	48			
2_	No load speed	rpm	71000	69500	71000	65100			
3_	No load current	mA	224	162	112	72			
4_	Nominal speed	rpm	66400	65300	67100	61200			
5_	Nominal torque	mNm	7.3	7.57	7.26	7.56			
6_	Nominal current (max. continuous cur	rrent) A	3.22	2.44		1.14			
7_	Stall torque	mNm	126	143	149	142			
8_	Stall current	Α	52.3	43.4		20.2			
	Max. efficiency	%	87.6	88.4		88.6			
10_	Terminal resistance	Ω	0.344	0.552		2.38			
	Terminal inductance	mH	0.0128	0.0238	0.0512	0.108			
12_	Torque constant	mNm/A	2.41	3.29	4.82	7.01			
13_	Speed constant	rpm/V	3960	2910	1980	1360			
14_	Speed/torque gradient	rpm/mNm	567	489	480	462			
15_	Mechanical time constant	ms	1.87	1.61	1.58	1.52			
16_	Rotor inertia	gcm ²	0.315	0.315		0.315			
	Thermal data			Operating R				Sterilization information	
17_	Thermal resistance housing-ambient	K/W	19.5	n [rpm] wir	nding 36 V		135°C	Sterilization cycles	
18_	Thermal resistance winding-housing	K/W	2.04		_			Sensorless: typical 2000	
19_	Thermal time constant winding	S	2.13				<i></i>	Hall sensors: typical 1000	
20_	Thermal time constant motor	s	397						
21_	Ambient temperature	°C	-40+135	120000				Sterilization with steam	
22_	Max. winding temperature	°C	155	100000				Temperature +134°	C ±4°C
	Mechanical data ball bearings							Compression pressure up to	2.3 bar
23_	Max. speed	rpm	120 000	80000	,			Rel. humidity	100%
24_	Axial play	mm	00.28	60000				Cycle length	18 min.
	Preload	N	1.5	40000					

40000

20000

0

Gear

pull

1.5

50

1500

preloaded

N

N

Ν

N

Max. radial load [mm from flange] 6 [5] Modular Syst Other specifications 29_ Number of pole pairs 30_ Number of phases 3 31_ Weight of motor 42 32_ Typical noise level [rpm] dBA 47 [50 000]

Connection A and B, motor (Cable AWG A: 26, B: 22)

Motor winding 1 black Motor winding 2 Motor winding 3 white

Direction of force

26_ Max. axial load (dynamic)

27_ Max. force for press fits (static)

(static, shaft supported)

25_ Radial play

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3 grey

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used.

381_GPX 13 SPEED 1-3

Flange front: thread holes/center thread Flange back: metal ring/external thread

Shaft front: length/diameter

Electric connection: cable length/pin connection Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

10

for motor type A:

for motor type B:

511_ENX 13 EASY INT

511_ENX 13 EASY INT Abs.

Stages [opt.] Sensor

M [mNm]

Details on catalog page 42 **Motor Control**

thermal resistance R_{th2} 50%

Continuous operation with reduced

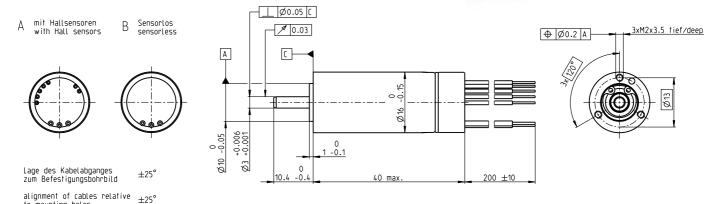
Continuous operation

Short term operation

547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8

Key Data: 20/22 W, 4.7 mNm, 55 000 rpm

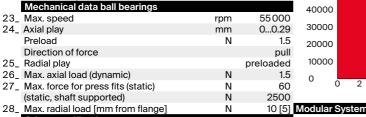




to mounting holes M 1:1

Motor Data						
1_ Nominal voltage	V	18	24	36	48	
2_ No load speed	rpm	49000	49100	49100	49000	
3_ No load current	mA	231	173	116	86.7	
4_ Nominal speed	rpm	45000	45200	45400	45200	
5_ Nominal torque	mNm	4.34	4.54	4.68	4.38	
6_ Nominal current (max. cor	ntinuous current) A	1.46	1.14	0.781	0.553	
7_ Stall torque	mNm	58	64	68.7	60.7	
8_ Stall current	Α	16.8	13.9	9.94	6.59	
9_ Max. efficiency	%	78.6	79.5	80.1	79	
10_ Terminal resistance	Ω	1.07	1.73	3.62	7.29	
11_ Terminal inductance	mH	0.0453	0.0805	0.181	0.322	
12_ Torque constant	mNm/A	3.45	4.61	6.91	9.21	
13_ Speed constant	rpm/V	2760	2070	1380	1040	
14_ Speed/torque gradient	rpm/mNm	858	778	725	820	
15_ Mechanical time constant	t ms	7.25	6.57	6.12	6.92	
16_ Rotor inertia	gcm ²	0.806	0.806	0.806	0.806	
Thermal data			Operating Ran	ge		

Thermal data		
17_ Thermal resistance housing-ambient	K/W	16.1
18_ Thermal resistance winding-housing	K/W	1.52
19_ Thermal time constant winding	S	1.83
20_ Thermal time constant motor	S	391
21_ Ambient temperature	°C	-20+100
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		



Other specifications 29_ Number of pole pairs 30_ Number of phases 31_ Weight of motor 49 32_ Typical noise level [rpm] dBA 50 [50 000]

Connection A and B, motor (Cable AWG 22)

Motor winding 1 black Motor winding 2 Motor winding 3 white

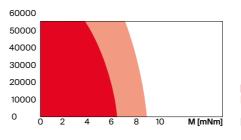
yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Details on catalog page 42

387_GPX 16 HP 389_GPX 16 SPEED 390_GPX 19 A/C 391_GPX 19 LN/LZ 392_GPX 19 HP	2-3 [4] 1-2 3-4 3-4 4	Sensor for motor type A: 512_ENX 16 EASY INT for motor type B: 512_ENX 16 EASY INT Abs.
393_GFX 19 3FEED	[0]	
	385_GPX 16 A/C 386_GPX 16 LN/LZ 387_GPX 16 HP 389_GPX 16 SPEED 390_GPX 19 A/C 391_GPX 19 LN/LZ 392_GPX 19 HP	385_GPX 16 A/C 1-2 [3-4] 386_GPX 16 LN/LZ 1-2 [3-4] 387_GPX 16 HP 2-3 [4] 389_GPX 16 SPEED 1-2 390_GPX 19 A/C 3-4 391_GPX 19 LN/LZ 3-4

Configuration

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Motor Control

547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 562_EPOS4 Module 24/1.5

563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5

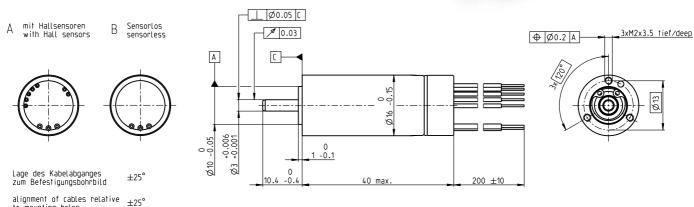
567_EPOS4 50/5 568_EPOS4 Disk 60/8

High Power

to mounting holes

Key Data: 40/50 W, 8.9 mNm, 70 000 rpm





M 1:1

	Motor Data						
1_	Nominal voltage	V	18	24	36	48	
2_	No load speed	rpm	51900	54900	53100	53100	
3_	No load current	mA	103	83	52.9	39.7	
4_	Nominal speed	rpm	47300	50300	48600	48700	
5_	Nominal torque	mNm	8.95	8.56	8.79	8.83	
6_	Nominal current (max. continuous curre	ent) A	2.78	2.11	1.4	1.05	
7_	Stall torque	mNm	116	119	121	123	
8_	Stall current	Α	35.1	28.5	18.8	14.3	
9_	Max. efficiency	%	89.5	89.6	89.7	89.8	
10_	Terminal resistance	Ω	0.512	0.841	1.92	3.35	
11_	Terminal inductance	mH	0.0336	0.0534	0.129	0.229	
12_	Torque constant	mNm/A	3.3	4.16	6.46	8.61	
13_	Speed constant	rpm/V	2890	2300	1480	1110	
14_	Speed/torque gradient r	pm/mNm	449	464	439	432	
15_	Mechanical time constant	ms	3.82	3.95	3.74	3.67	
16_	Rotor inertia	gcm ²	0.812	0.812	0.812	0.812	
	Thermal data			Operating Rar	nge		

17_ Thermal resistance housing-ambient K/W 18_ Thermal resistance winding-housing K/W 1.8 19_ Thermal time constant winding 2.16 s 20_ Thermal time constant motor 398 s -20...+100 Ambient temperature °C 22_ Max. winding temperature °C 155

	Mechanical data ball bearings		
23_	Max. speed	rpm	70 000
24_	Axial play	mm	00.29
	Preload	N	1.5
	Direction of force		pul
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	1.5
27_	Max. force for press fits (static)	N	60
	(static, shaft supported)	N	2500
28_	Max. radial load [mm from flange]	N	10 [5
	0.1		

Other specifications 29_ Number of pole pairs 30_ Number of phases 3 31_ Weight of motor 50 dBA 50 [50 000] 32_ Typical noise level [rpm]

Connection A and B, motor (Cable AWG 22)

Motor winding 1 Motor winding 2 Motor winding 3 black white

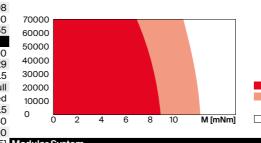
yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

16.1 n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Modular System			Details on catalog
Gear	Stages [opt.]	Sensor	Motor Control
385_GPX 16 A/C	1-2 [3-4]	for motor type A:	547_DEC Module 24/2
386_GPX 16 LN/LZ	1-2 [3-4]	512_ENX 16 EASY INT	547_DEC Module 50/5
387_GPX 16 HP	2-3 [4]	for motor type B:	550_ESCON Module 24
389_GPX 16 SPEED	1-2	512_ENX 16 EASY INT Abs.	551_ESCON 36/3 EC
390_GPX 19 A/C	3-4		551_ESCON Module 50
391_GPX 19 LN/LZ	3-4		551_ESCON Module 50
392_GPX 19 HP	4		553_ESCON 50/5
393_GPX 19 SPEED	[3]		561_EPOS4 Micro 24/5
			562_EPOS4 Module 50
			563_EPOS4 Compact 24

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

Details on catalog page 42

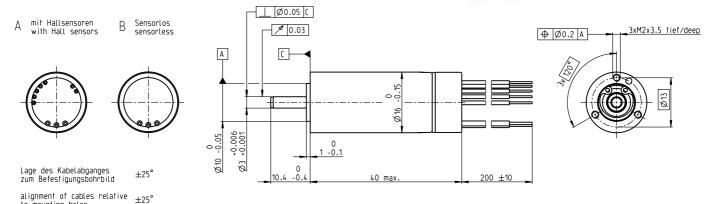
565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8

Sterilizable

to mounting holes

Key Data: 40/48 W, 7.6 mNm, 70 000 rpm





1

	•							!	M 1:1
	Motor Data								
1	Nominal voltage	V	18	24	36	48			
	No load speed	rpm	59900	63400	56200	57400			
	No load current	mA	199	163	90.4	70			
	Nominal speed	rpm	54600	58100	50900	52200			
	Nominal torque	mNm	7.63	7.29	7.37	7.4			
	Nominal current (max. continuous o		2.83	2.16	1.28	0.987			
	Stall torque	mNm	100	102	89.8	93.6			
8_	Stall current	Α	35.1	28.5	14.8	11.8			
9_	Max. efficiency	%	85.7	85.7	85.2	85.4			
10_	Terminal resistance	Ω	0.512	0.841	2.43	4.06			
11_	Terminal inductance	mH	0.033	0.0524	0.15	0.255			
12_	Torque constant	mNm/A	2.85	3.59	6.07	7.93			
13_	Speed constant	rpm/V	3350	2660	1570	1200			
14_	Speed/torque gradient	rpm/mNm	603	623	631	618			
15_	Mechanical time constant	ms	3.72	3.84	3.89	3.81			
16_	Rotor inertia	gcm ²	0.589	0.589	0.589	0.589			
	Thermal data			Operating Range			Sterili	zation information	
	Thermal resistance housing-ambier			n [rpm] winding	36 V		135°C Steriliz	zation cycles	
	Thermal resistance winding-housing	g K/W	1.8				Senso	orless: typical 2000	
	Thermal time constant winding	S	2.16				Hall se	ensors: typical 1000	
	Thermal time constant motor	S	400						
	Ambient temperature	°C	-40+135	70000			Steriliz	zation with steam	
22_	Max. winding temperature	°C	155	60000	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Tempe		C ±4°C
	Mechanical data ball bearings			50000					2.3 bar
	Max. speed	rpm	70 000	40000				umidity	100%
24_	Axial play	mm	00.29				Cycle	length	18 min.
	Preload	N	1.5	30000					
	Direction of force		pull	20000				ontinuous operation	
	Radial play		preloaded	10000				ontinuous operation with red	ucea
	Max. axial load (dynamic)	N	1.5	0 0 2	4 6	8 10		ermal resistance R _{th2} 50%	
27_	Max. force for press fits (static)	N	60	0 2	4 6	8 10 I	M[mNm] ☐ Sh	nort term operation	
	(static, shaft supported)	N	2500						
28_	Max. radial load [mm from flange]	N	10 [5]	Modular System				Details on catalog p	age 42
0.0	Other specifications			Gear		opt.] Sensor		Motor Control	
	Number of pole pairs			388_GPX 16 HP	1–3	for motor		547_DEC Module 50/5	
	Number of phases			389_GPX 16 SPE		_	(16 EASY INT	547_DEC Module 24/2	
	Weight of motor	g	50	393_GPX 19 SPE	ED [3]	for motor		550_ESCON Module 24/2	
32_	Typical noise level [rpm]	dBA	50 [50 000]			512_ENX	16 EASY INT Abs.	551_ESCON 36/3 EC	

Connection A and B, motor (Cable AWG 22)

Motor winding 1 black Motor winding 2 Motor winding 3 white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

Configuration

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

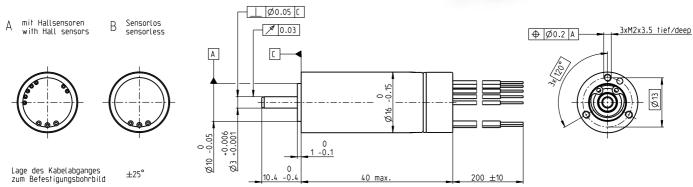
568_EPOS4 Disk 60/8

Sterilizable, ceramic bearings

alignment of cables relative ±25° to mounting holes

Key Data: 40/60 W, 7.6 mNm, 120 000 rpm





Motor Data 1_ Nominal voltage V 2_ No load speed rpm 3_ No load current mA 4_ Nominal speed rpm 5_ Nominal torque mNm	18 59900 200 54600 7.63 2.83 100	24 63400 163 58100 7.29	36 56200 90.5 50900	48 57400 70		
1_ Nominal voltage V 2_ No load speed rpm 3_ No load current mA 4_ Nominal speed rpm 5_ Nominal torque mNm	59900 200 54600 7.63 2.83	63400 163 58100 7.29	56200 90.5	57400		
2_ No load speed rpm 3_ No load current mA 4_ Nominal speed rpm 5_ Nominal torque mNm	200 54600 7.63 2.83	163 58100 7.29	90.5			
3_ No load current	54600 7.63 2.83	58100 7.29		70		
4_ Nominal speed rpm 5_ Nominal torque mNm	54600 7.63 2.83	58100 7.29				
5_ Nominal torque mNm	7.63 2.83	7.29		52200		
	2.83		7.37	7.4		
6_ Nominal current (max. continuous current) A		2.16	1.28	0.987		
7_ Stall torque mNm		102	89.8	93.6		
3_ Stall current A	35.1	28.5	14.8	11.8		
9_ Max. efficiency %	85.7	85.7	85.2	85.4		
Terminal resistance Ω	0.512	0.841	2.43	4.06		
L_ Terminal inductance mH	0.033	0.0524	0.15	0.255		
2_ Torque constant mNm/A	2.85	3.59	6.07	7.93		
3_ Speed constant rpm/V	3350	2660	1570	1200		
4_ Speed/torque gradient rpm/mNm	603	623	631	618		
5_ Mechanical time constant ms	3.72	3.84	3.89	3.81		
6_ Rotor inertia gcm ²	0.589	0.589	0.589	0.589		
Thermal data	0.009	Operating Rang		0.509	9	terilization information
'_ Thermal resistance housing-ambient K/W	161	n [rpm] windi	_			terilization cycles
Thermal resistance winding-housing K/W	1.8	n [rpin] windi	ilg 30 V		[190 6]	ensorless: typical 2000
2_ Thermal time constant winding s	2.16					all sensors: typical 2000
2 Thermal time constant winding 5	400				— п	all serisors, typical 1000
_ Ambient temperature °C	-40+135	120000				terilization with steam
2_ Max. winding temperature °C	155					emperature +134°C ±4
Mechanical data ball bearings	100	100000				ompression pressure up to 2.3 b
Max. speed rpm	120 000	80000				el. humidity 2.3 b
L Axial play mm	00.29					
Preload N	1.5	60000			'	ycle length 18 m
Direction of force	pull	40000				Continuous operation
5_ Radial play	preloaded	20000				Continuous operation with reduced
	1.5					thermal resistance R _{th2} 50%
	60	0	2 4 6	8 10	M [mNm]	
7_ Max. force for press fits (static) N (static, shaft supported) N			2 4 0	0 10	ivi [iiiiviii] _	Short term operation
	2500	Madulan Costan				Dataila an astalan nana
B_ Max. radial load [mm from flange] N	10 [5]	Modular Syster				Details on catalog page
Other specifications		Gear		[opt.] Senso		Motor Control
_ Number of pole pairs		388_GPX 16 HF			tor type A:	547_DEC Module 24/2
)_ Number of phases		389_GPX 16 SP		_	NX 16 EASY INT	547_DEC Module 50/5
_ Weight of motor g	50	393_GPX 19 SP	PEED [3]		tor type B:	550_ESCON Module 24/2
2_ Typical noise level [rpm] dBA	50 [50 000]			512_E	NX 16 EASY INT A	
						551_ESCON Module 50/4 EC-S
Connection A and B, motor (Cable AWG 22)						551_ESCON Module 50/5

Motor winding 1 red Motor winding 2 Motor winding 3 black white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26)

purple

NTC NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

Configuration

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening

Shaft front: length/diameter

Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5

567_EPOS4 50/5 568_EPOS4 Disk 60/8

K/W

s

°C

°C

rpm

mm

N

N

N

Ν

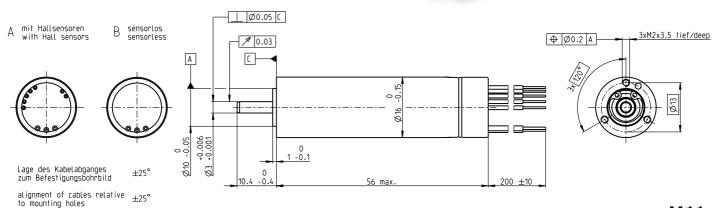
N

2.34

4.91

Key Data: 40/43 W, 9.5 mNm, 50 000 rpm

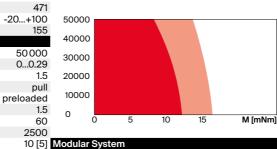




M 1:1

	Motor Data						
1	Nominal voltage	V	18	24	36	48	
2	No load speed	rpm	46300	46300	47100	47500	
3	No load current	mA	295	221	152	115	
4	Nominal speed	rpm	43100	43200	44200	44800	
5	Nominal torque	mNm	9.01	9.1	9.37	9.54	
6	Nominal current (max. continuous cui	rrent) A	2.71	2.05	1.43	1.1	
7	_ Stall torque	mNm	147	154	175	187	
8	Stall current	Α	39.8	31.4	24.1	19.6	
9	_ Max. efficiency	%	83.8	84.2	85.1	85.5	
10	Terminal resistance	Ω	0.453	0.765	1.49	2.45	
11	Terminal inductance	mH	0.0246	0.0437	0.095	0.166	
	Torque constant	mNm/A	3.68	4.91	7.25	9.58	
	Speed constant	rpm/V	2590	1940	1320	997	
14	Speed/torque gradient	rpm/mNm	318	303	271	255	
15	Mechanical time constant	ms	3.32	3.16	2.83	2.66	
16	Rotor inertia	gcm ²	0.997	0.997	0.997	0.997	
	Thermal data			perating Rang	je		
17	Thermal resistance housing-ambient	K/W	13.5 n	[rpm] windin	ng 36 V		
10	The sum of the sinks are a value sline at least size at	17.047	0.04		-		

13.5	n [rpm]	winding 36 V				
2.34		·				



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Other specifications		
29_ Number of pole pairs		1
30_ Number of phases		3
31_ Weight of motor	g	70
32_ Typical noise level [rpm]	dBA	52 [50 000]

Connection A and B, motor (Cable AWG 22)

Motor winding 1 black Motor winding 2 Motor winding 3 white

18_ Thermal resistance winding-housing

Mechanical data ball bearings

19_ Thermal time constant winding

20_ Thermal time constant motor

22_ Max. winding temperature

21_ Ambient temperature

Direction of force

26_ Max. axial load (dynamic)

27_ Max. force for press fits (static)

28_ Max. radial load [mm from flange]

(static, shaft supported)

23_ Max. speed

Preload

24_ Axial play

25_ Radial play

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange ($V_{\rm cc}$) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26)

NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
385_GPX 16 A/C	1-2 [3-4]	for motor type A:	547_DEC Module 50/5
386_GPX 16 LN/LZ	1-2 [3-4]	512_ENX 16 EASY INT	551_ESCON 36/3 EC
387_GPX 16 HP	2-3 [4]	for motor type B:	551_ESCON Module 50/4 EC-S
389_GPX 16 SPEED	1-2	512_ENX 16 EASY INT Abs.	551_ESCON Module 50/5
390_GPX 19 A/C	3-4		553_ESCON 50/5
391_GPX 19 LN/LZ	3-4		561_EPOS4 Micro 24/5
392_GPX 19 HP	4		562_EPOS4 Module 50/5
393_GPX 19 SPEED	[3]		563_EPOS4 Compact 24/5 3-axe
			565_EPOS4 Compact 50/5

Flange front: thread holes/center thread

Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Shaft rear: length

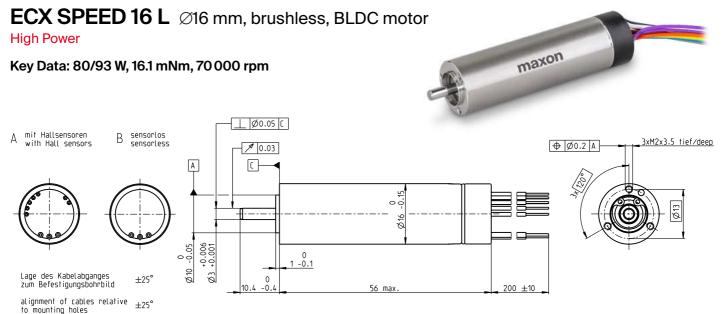
Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

562_EPOS4 Module 50/5

565_EPOS4 Compact 50/5 567_EPOS4 50/5

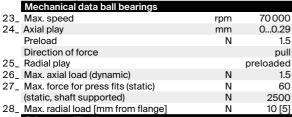
568_EPOS4 Disk 60/8

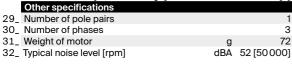


M 1:1

Motor Data						
1_ Nominal voltage	V	18	24	36	48	
2_ No load speed	rpm	61200	61200	61200	61200	
3_ No load current	mA	219	164	110	82.1	
4_ Nominal speed	rpm	58000	58300	58400	58400	
5_ Nominal torque	mNm	15.5	16.1	15.4	14.8	
6_ Nominal current (max. continuous cu	rrent) A	5.69	4.41	2.83	2.05	
7_ Stall torque	mNm	366	431	438	419	
8_ Stall current	Α	131	115	78.1	56	
9_ Max. efficiency	%	92	92.6	92.7	92.5	
10_ Terminal resistance	Ω	0.138	0.208	0.461	0.858	
11_ Terminal inductance	mH	0.0114	0.0202	0.0454	0.0808	
12_ Torque constant	mNm/A	2.8	3.74	5.61	7.48	
13_ Speed constant	rpm/V	3410	2550	1700	1280	
14_ Speed/torque gradient	rpm/mNm	167	142	140	146	
15_ Mechanical time constant	ms	2.1	1.79	1.76	1.84	
16_ Rotor inertia	gcm ²	1.2	1.2	1.2	1.2	
Thermal data		0	perating Rang	ge		

13.5 n K/W 17 Thermal resistance housing-ambient 18_ Thermal resistance winding-housing 0.58 K/W 19_ Thermal time constant winding 1.37 s 20_ Thermal time constant motor 483 21_ Ambient temperature -20...+100 °C 22_ Max. winding temperature °C 155 Mechanical data ball bearing 70000 23_ Max. speed rpm





Connection A and B, motor (Cable AWG 22)

Motor winding 1 black Motor winding 2 Motor winding 3 white

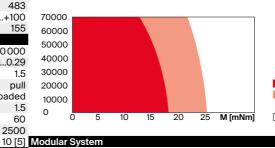
yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

[rpm]	winding	36	٧
-------	---------	----	---





Gear	Stages [opt.]	Sensor
385_GPX 16 A/C	1-2 [3-4]	for motor type A:
386_GPX 16 LN/LZ	1-2 [3-4]	512_ENX 16 EASY INT
387_GPX 16 HP	2-3 [4]	for motor type B:
389_GPX 16 SPEED	1-2	512_ENX 16 EASY INT Abs.
390_GPX 19 A/C	3-4	
391_GPX 19 LN/LZ	3-4	
392_GPX 19 HP	4	
393_GPX 19 SPEED	[3]	

Flange front: thread holes/center thread

Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Motor Control 547_DEC Module 50/5 551_ESCON 36/3 EC

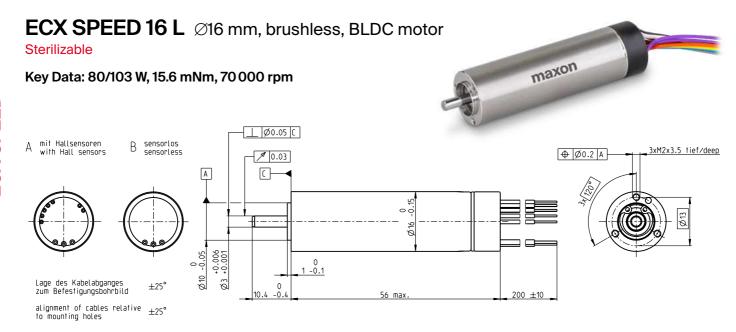
551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10

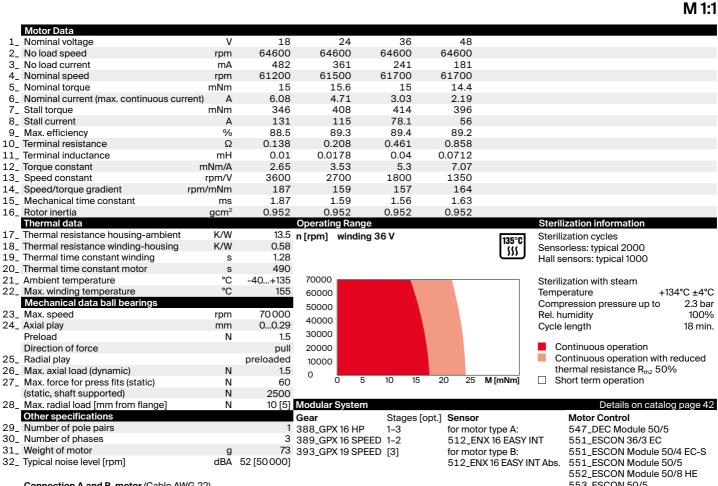
561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5

563_EPOS4 Compact 24/5 3-axes 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5

565_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS4 70/15

568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12





Connection A and B, motor (Cable AWG 22)

Motor winding 1 black Motor winding 2 white Motor winding 3

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (V_{cc}) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) NTC

Resistance 25°C: 10 kOhm ±1%, beta (25-85°C): 3490 K

Configuration

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

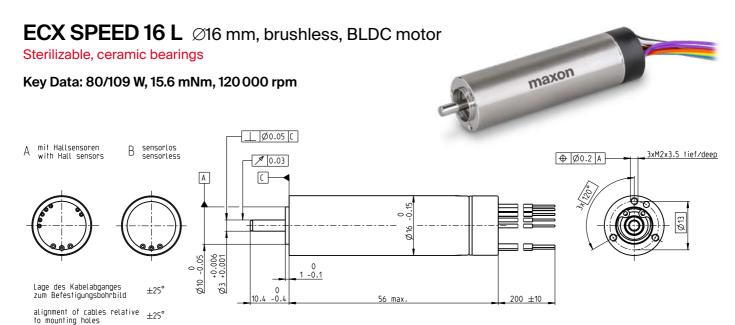
Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

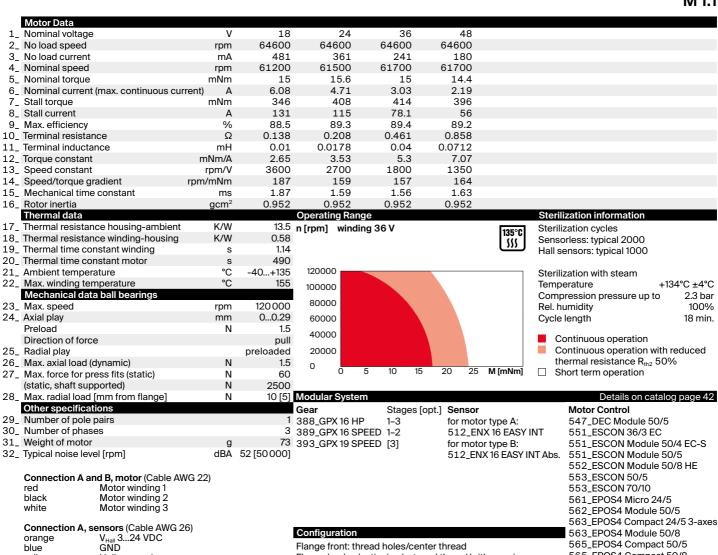
553_ESCON 50/5 553_ESCON 70/10 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

563_EPOS4 Module 50/8 565_EPOS4 Compact 50/8 565_EPOS4 Compact 50/5

567_EPOS4 50/5 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12



M 1:1



yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (V_{cc}) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) purple NTC

NTC purple

Resistance 25°C: 10 kOhm ±1%, beta (25-85°C): 3490 K

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

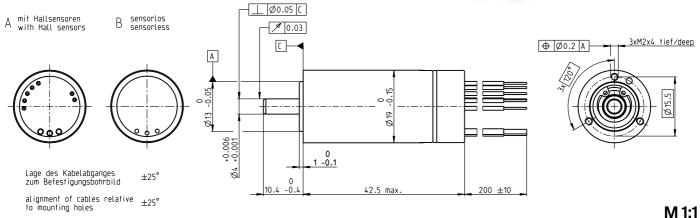
Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

Key Data: 30/41 W, 9.0 mNm, 50 000 rpm





Motor Data						
1_ Nominal voltage	V	18	24	36	48	
2_ No load speed	rpm	46500	49100	46500	48400	
3_ No load current	mA	151	121	75.7	59.7	
4_ Nominal speed	rpm	41300	44000	41400	43200	
5_ Nominal torque	mNm	9.04	8.91	8.99	8.47	
6_ Nominal current (max. continuous cur	rent) A	2.57	2.01	1.28	0.946	
7_ Stall torque	mNm	92.5	98.9	94.4	89.6	
8_ Stall current	Α	25.2	21.3	12.8	9.54	
9_ Max. efficiency	%	85.1	85.5	85.3	84.8	
10_ Terminal resistance	Ω	0.715	1.13	2.8	5.03	
11_ Terminal inductance	mH	0.0513	0.0817	0.205	0.336	
12_ Torque constant	mNm/A	3.67	4.64	7.35	9.4	
13_ Speed constant	rpm/V	2600	2060	1300	1020	
14_ Speed/torque gradient	rpm/mNm	506	500	496	544	
15_ Mechanical time constant	ms	6.09	6.02	5.97	6.56	
16_ Rotor inertia	gcm ²	1.15	1.15	1.15	1.15	
Thermal data		0	perating Rang	e		

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	12.4
18_	Thermal resistance winding-housing	K/W	2.77
19_	Thermal time constant winding	S	5.55
20_	Thermal time constant motor	s	513
21_	Ambient temperature	°C	-20+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23	May speed	rnm	50,000

	Mechanical data ball bearings		
23_	Max. speed	rpm	50000
24_	Axial play	mm	00.29
	Preload	N	4
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	4
27_	Max. force for press fits (static)	N	70
	(static, shaft supported)	N	5000
28_	Max. radial load [mm from flange]	N	12 [5]
	0.1		

	Other specifications		
29_	Number of pole pairs		
30_	Number of phases		3
31_	Weight of motor	g	7
32_	Typical noise level [rpm]	dBA	48 [50 000]

Connection A and B, motor (Cable AWG 20)

Motor winding 1 black Motor winding 2 Motor winding 3 white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

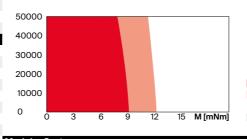
Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

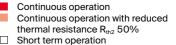
Connection NTC (Cable AWG 26)

NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

n [rpm] winding	36 V
-----------------	------





Modular System			
Gear	Stages [opt.]	Sensor	ı
390_GPX 19 A/C	1-2 [3-4]	for motor type A:	į
391_GPX 19 LN/LZ	1-2 [3-4]	513_ENX 19 EASY INT	į
392_GPX 19 HP	2-3 [4]	for motor type B:	ļ
393_GPX 19 SPEED	1-2	513_ENX 19 EASY INT Abs.	į
394_GPX 22 A/C	3-4		ļ
395_GPX 22 LN/LZ	3-4		į
396_GPX 22 HP	4		į
397_GPX 22 SPEED	[3]		ļ
			į
			Ę

Configuration

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 **Motor Control**

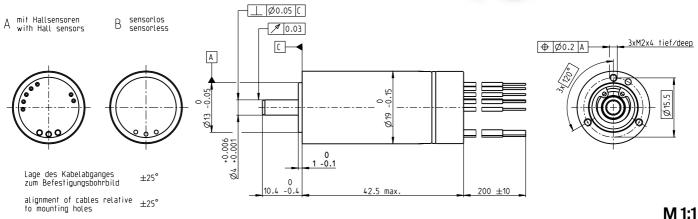
547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

High Power

Key Data: 60/79 W, 13.7 mNm, 65 000 rpm





	Motor Data						
1_	Nominal voltage	V	18	24	36	48	
2_	No load speed	rpm	57200	55700	55700	54700	
3_	No load current	mA	169	124	82.4	60.6	
4_	Nominal speed	rpm	52400	50900	51100	50200	
5_	Nominal torque	mNm	13.7	12.5	12.9	13.2	
6_	Nominal current (max. continuous curre	ent) A	4.65	3.12	2.14	1.61	
7_	Stall torque	mNm	203	174	190	196	
8_	Stall current	Α	67.7	42.4	31	23.5	
9_	Max. efficiency	%	90.2	89.4	89.9	90	
10_	Terminal resistance	Ω	0.266	0.566	1.16	2.04	
11_	Terminal inductance	mH	0.0259	0.0486	0.109	0.202	
12_	Torque constant	mNm/A	2.99	4.1	6.15	8.35	
13_	Speed constant	rpm/V	3190	2330	1550	1140	
14_	Speed/torque gradient r	pm/mNm	283	322	294	279	
15_	Mechanical time constant	ms	3.88	4.41	4.03	3.83	
16_	Rotor inertia	gcm ²	1.31	1.31	1.31	1.31	
	Thermal data			Operating Ran	ige		

	memiai data			_
17_	Thermal resistance housing-ambient	K/W	12.4	n [
18_	Thermal resistance winding-housing	K/W	0.75	
19_	Thermal time constant winding	S	1.27	
20_	Thermal time constant motor	S	513	
21_	Ambient temperature	°C	-20+100	
22_	Max. winding temperature	°C	155	
	Mechanical data ball bearings			
23_	Max. speed	rpm	65000	

	Mechanical data ball bearings		
23_	Max. speed	rpm	65000
24_	Axial play	mm	00.29
	Preload	N	4
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	4
27_	Max. force for press fits (static)	N	70
	(static, shaft supported)	N	5000
28_	Max. radial load [mm from flange]	N	12 [5]
	0.1		

	Other specifications		
29_	Number of pole pairs		-
30_	Number of phases		3
31_	Weight of motor	g	7
32_	Typical noise level [rpm]	dBA	48 [50 000]

Connection A and B, motor (Cable AWG 20)

Motor winding 1 Motor winding 2 Motor winding 3 black white

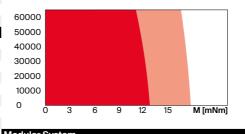
yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

[rpm]	winding	36 V
-------	---------	------





568_EPOS4 Disk 60/8

Continuous operation

J	Modular System			Details on catalog page 42
	Gear	Stages [opt.]	Sensor	Motor Control
1	390_GPX 19 A/C	1-2 [3-4]	for motor type A:	547_DEC Module 50/5
3	391_GPX 19 LN/LZ	1-2 [3-4]	513_ENX 19 EASY INT	551_ESCON 36/3 EC
1	392_GPX 19 HP	2-3 [4]	for motor type B:	551_ESCON Module 50/4 EC-S
]	393_GPX 19 SPEED	1-2	513_ENX 19 EASY INT Abs.	551_ESCON Module 50/5
	394_GPX 22 A/C	3-4		553_ESCON 50/5
	395_GPX 22 LN/LZ	3-4		561_EPOS4 Micro 24/5
	396_GPX 22 HP	4		562_EPOS4 Module 50/5
	397_GPX 22 SPEED	[3]		563_EPOS4 Compact 24/5 3-axes
				565_EPOS4 Compact 50/5
				567_EPOS4 50/5

Flange front: thread holes/center thread

Flange back: plastic ring/external thread/with opening

Shaft front: length/diameter

Shaft rear: length

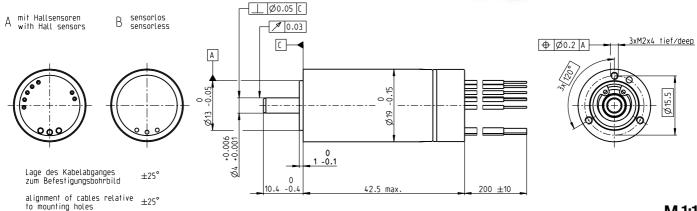
Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Sterilizable

Key Data: 60/73 W, 11.6 mNm, 70 000 rpm





	To mounting notes							M 1:1	
	Motor Data								l
1_	Nominal voltage	V	18	24	36	48			
2_	No load speed	rpm	64800	64700	64700	63500			
3_	No load current	mA	169	127	84.4	61.9			
4_	Nominal speed	rpm	59600	59200	59500	58400			
5_	Nominal torque	mNm	11.6	10.3	10.7	10.9			
6_	Nominal current (max. continuous cui	rrent) A	4.49	3	2.06	1.55			
	Stall torque	mNm	179	150	164	169			
8_	Stall current	Α	67.7	42.4	31	23.5			
9_	Max. efficiency	%	90.2	89.4	89.8	90			
	Terminal resistance	Ω	0.266	0.566	1.16	2.04			
	Terminal inductance	mH	0.0235	0.0439	0.0989	0.183			
12_	Torque constant	mNm/A	2.64	3.53	5.3	7.2			
13_	Speed constant	rpm/V	3610	2700	1800	1330			
14_	Speed/torque gradient	rpm/mNm	363	433	396	376			
15_	Mechanical time constant	ms	4.38	5.22	4.77	4.53			
16_	Rotor inertia	gcm ²	1.15	1.15	1.15	1.15			
Thermal data Operating Range Sterilization information							J		
	Thermal resistance housing-ambient		12.4	n [rpm] winding 36 V			135°C	Sterilization cycles	
_	Thermal resistance winding-housing	K/W	1.6					Sensorless: typical 2000	
	Thermal time constant winding	S	2.36				<i>''''</i>	Hall sensors: typical 1000	
_	Thermal time constant motor	S	513						
_	Ambient temperature	°C	-40+135	70000	1			Sterilization with steam	
22_	Max. winding temperature	°C	155	60000	1			Temperature +134°C ±4°C	
	Mechanical data ball bearings			50000				Compression pressure up to 2.3 bar	
	Max. speed	rpm	70 000	40000				Rel. humidity 100%	
24_	Axial play	mm	00.29					Cycle length 18 min.	
	Preload	N	4	30000				_ 0	
	Direction of force		pull	20000				Continuous operation	
25_	Radial play		preloaded	10000				Continuous operation with reduced	

(static, shaft supported) Max. radial load [mm from flange] 12 [5] Modular Syste N Other specifications 29_ Number of pole pairs 30_ Number of phases 31_ Weight of motor 32_ Typical noise level [rpm] dBA 48 [50 000]

Gear Stages [opt.] Sensor 393_GPX 19 SPEED 1-2 for motor type A: 3 397_GPX 22 SPEED [3] 513_ENX 19 EASY INT for motor type B:

Details on catalog page 42 **Motor Control** 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 513_ENX 19 EASY INT Abs. 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5

M [mNm]

562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8

thermal resistance R_{th2} 50%

Short term operation

Connection A and B, motor (Cable AWG 20)

Motor winding 1 black Motor winding 2 Motor winding 3 white

26_ Max. axial load (dynamic)

27_ Max. force for press fits (static)

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26)

NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

4 0

70

5000

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder). Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the

external thread: see catalog, Accessories section.

N

N

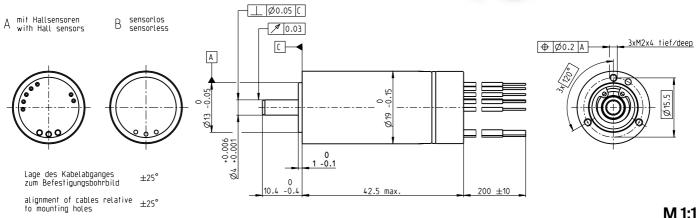
Ν

ECX SPEED 19 M Ø19 mm, brushless, BLDC motor

Sterilizable, ceramic bearings

Key Data: 60/92 W, 11.6 mNm, 100 000 rpm





	-							IVI	1.1
	Motor Data								
1_	Nominal voltage	V	18	2	4 36	48			
2_	No load speed	rpm	64800	6470	0 64700	63500			
3_	No load current	mA	169	12	7 84.5	61.9			
4_	Nominal speed	rpm	59600	5920	0 59500	58400			
5_	Nominal torque	mNm	11.6	10.	3 10.7	10.9			
6_	Nominal current (max. continuous cur	rent) A	4.49		3 2.06	1.55			
7_	Stall torque	mNm	179	15	0 164	169			
8_	Stall current	Α	67.7	42.	4 31	23.5			
9_	Max. efficiency	%	90.2	89.	4 89.8	90			
10_	Terminal resistance	Ω	0.266	0.56		2.04			
11_	Terminal inductance	mH	0.0235	0.043		0.183			
	Torque constant	mNm/A	2.64	3.5		7.2			
13_	Speed constant	rpm/V	3610	270		1330			
14_	Speed/torque gradient	rpm/mNm	363	43		376			
	Mechanical time constant	ms	4.38	5.2		4.53			
16_	Rotor inertia	gcm ²	1.15	1.1		1.15			
	Thermal data			Operating F	Range			Sterilization information	
_	Thermal resistance housing-ambient	K/W	12.4	n [rpm] wi	inding 36 V		135°C	Sterilization cycles	
_	Thermal resistance winding-housing	K/W	1.6					Sensorless: typical 2000	
_	Thermal time constant winding	S	2.36				<i>''''</i>	Hall sensors: typical 1000	
	Thermal time constant motor	S	513						
	Ambient temperature	°C	-40+135	100000				Sterilization with steam	
22_	Max. winding temperature	°C	155	80000				Temperature +134°C ±4	·°С
	Mechanical data ball bearings			80000				Compression pressure up to 2.3 b	
	Max. speed	rpm	100 000	60000				Rel. humidity 100	
24_	Axial play	mm	00.29					Cycle length 18 m	in.
	Preload	N	4	40000			\	- 0 "	
	Direction of force		pull	00000				Continuous operation	
_	Radial play		preloaded	20000				Continuous operation with reduced	1
26_	Max. axial load (dynamic)	N	4	0	2 0	0 12	1F M Inchine	thermal resistance R _{th2} 50%	

Connection A and B, motor (Cable AWG 20)

Motor winding 1 black Motor winding 2 Motor winding 3 white

27_ Max. force for press fits (static)

Max. radial load [mm from flange]

(static, shaft supported)

Other specifications

32_ Typical noise level [rpm]

29_ Number of pole pairs

30_ Number of phases

31_ Weight of motor

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

N

Ν

N

dBA 48 [50 000]

70

12 [5] Modular Syst

393_GPX 19 SPEED 1-2

3 397_GPX 22 SPEED [3]

Gear

5000

Connection NTC (Cable AWG 26)

purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A

Stages [opt.] Sensor

15 M [mNm]

for motor type A:

for motor type B:

513_ENX 19 EASY INT

513_ENX 19 EASY INT Abs.

☐ Short term operation

Motor Control

547_DEC Module 50/5

551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5

562_EPOS4 Module 50/5

565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

551_ESCON Module 50/4 EC-S

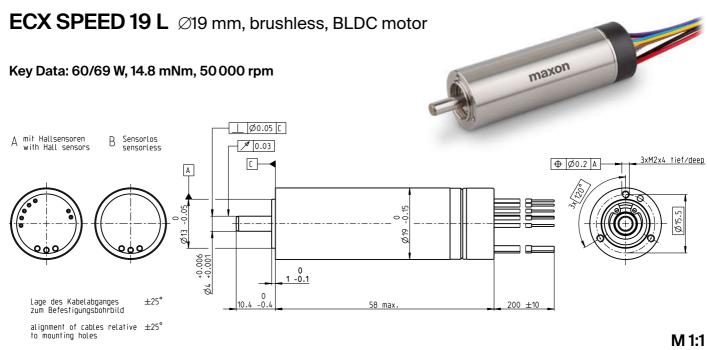
563_EPOS4 Compact 24/5 3-axes

551_ESCON 36/3 EC

Details on catalog page 42

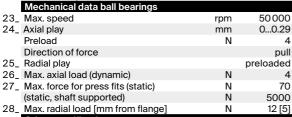
and only when not combined with an encoder). Appropriate connectors and connecting cables are available

for the configuration of the pin connection together with the external thread: see catalog, Accessories section.



Moto	or Data					
1_ Nomi	inal voltage	V	18	24	36	
2_ No lo	ad speed	rpm	47500	48300	49200	
3_ No lo	ad current	mA	354	273	187	
4_ Nomi	inal speed	rpm	43800	45000	46000	
5_ Nomi	inal torque	mNm	14.2	14.8	14.8	
6_ Nomi	inal current (max. continuous current	t) A	4.23	3.37	2.28	
7_ Stall	torque	mNm	214	251	271	
8_ Stall	current	Α	59.6	53.3	39	
9_ Max.	efficiency	%	85.4	86.4	86.8	
10_ Termi	inal resistance	Ω	0.302	0.45	0.924	
11_ Termi	inal inductance	mΗ	0.0231	0.0396	0.086	
12_ Torqu	ie constant	mNm/A	3.6	4.71	6.94	
13_ Spee	ed constant	rpm/V	2660	2030	1380	
14_ Spee	d/torque gradient rpr	n/mNm	223	194	183	
15_ Mech	nanical time constant	ms	3.9	3.39	3.2	
16_ Rotor	r inertia	gcm ²	1.67	1.67	1.67	
Therr	mal data			Operating Ran	ige	

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	10.1
18_	Thermal resistance winding-housing	K/W	1.2
19_	Thermal time constant winding	S	3.62
20_	Thermal time constant motor	s	418
21_	Ambient temperature	°C	-20+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23	Max speed	rpm	50,000





Connection A and B, motor (Cable AWG 20)

Motor winding 1 black Motor winding 2 Motor winding 3 white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

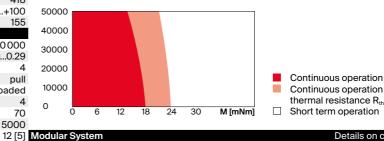
Connection NTC (Cable AWG 26)

NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

[rpm]	winding	36 V
-------	---------	------

n



Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation Details on catalog page 42

547_DEC Module 50/5

551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5

562_EPOS4 Module 50/5

565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

551_ESCON Module 50/4 EC-S

563_EPOS4 Compact 24/5 3-axes

551_ESCON 36/3 EC

Motor Control

Gear	Stages [opt.]	Sensor
390_GPX 19 A/C	1-2 [3-4]	for motor type A:
391_GPX 19 LN/LZ	1-2 [3-4]	513_ENX 19 EASY INT
392_GPX 19 HP	2-3 [4]	for motor type B:
393_GPX 19 SPEED	1–2	513_ENX 19 EASY INT Abs.
394_GPX 22 A/C	3-4	
395_GPX 22 LN/LZ	3-4	
396 GPX 22 HP	4	

Flange front: thread holes/center thread

Flange back: plastic ring/external thread/with opening

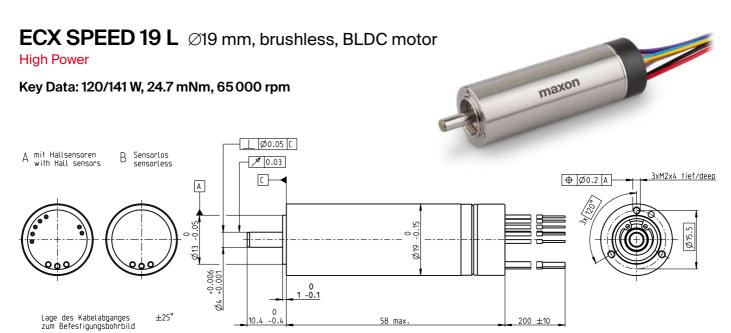
Shaft front: length/diameter

397_GPX 22 SPEED [3]

Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

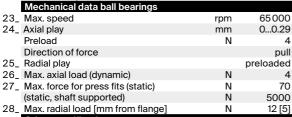


alignment of cables relative ±25° to mounting holes

M 1:1

	Motor Data						
	Motor Data		1.0	0.4	0.0	40	
_	Nominal voltage	V	18	24	36	48	
2_	No load speed	rpm	57700	57700	54700	60200	
3_	No load current	mA	327	245	150	131	
4_	Nominal speed	rpm	54500	54700	51800	57400	
5_	Nominal torque	mNm	24	23.7	24.7	22.8	
6_	Nominal current (max. continuous o	urrent) A	8.27	6.12	4.02	3.09	
7_	Stall torque	mNm	589	630	665	703	
8_	Stall current	Α	198	159	106	92.6	
9_	Max. efficiency	%	92.1	92.4	92.7	92.7	
10_	Terminal resistance	Ω	0.0908	0.151	0.34	0.518	
11_	Terminal inductance	mH	0.0124	0.0221	0.0555	0.0813	
12_	Torque constant	mNm/A	2.97	3.96	6.28	7.6	
13_	Speed constant	rpm/V	3210	2410	1520	1260	
14_	Speed/torque gradient	rpm/mNm	98.1	91.7	82.4	85.8	
15_	Mechanical time constant	ms	1.69	1.58	1.42	1.47	
16_	Rotor inertia	gcm ²	1.64	1.64	1.64	1.64	
	Thermal data		0	perating Rang	je		

	i nermai data		
17_	Thermal resistance housing-ambient	K/W	10.1
18_	Thermal resistance winding-housing	K/W	1.32
19_	Thermal time constant winding	S	4.01
20_	Thermal time constant motor	S	418
21_	Ambient temperature	°C	-20+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		





Connection A and B, motor (Cable AWG 20)

Motor winding 1 black Motor winding 2 Motor winding 3 white

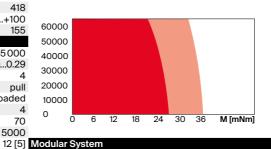
yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Stages [opt.] Sensor 390_GPX 19 A/C 1-2 [3-4] for motor type A: 391_GPX 19 LN/LZ 513_ENX 19 EASY INT 1-2 [3-4] 392_GPX 19 HP 2-3 [4] for motor type B: 513_ENX 19 EASY INT Abs. 394_GPX 22 A/C 3-4

395_GPX 22 LN/LZ 3-4 396_GPX 22 HP 397_GPX 22 SPEED [3]

Gear

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Shaft rear: length

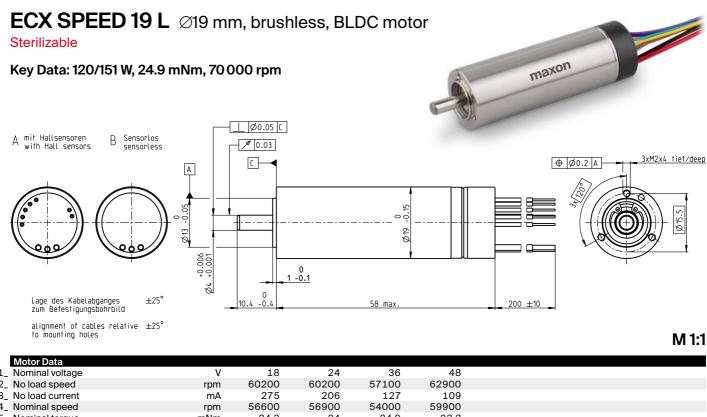
Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 **Motor Control**

547_DEC Module 50/5 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 562_EPOS4 Module 50/5 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5

567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12



	Motor Data							
1	Nominal voltage	V	18	24	36	48		
	No load speed	-	60200	60200	57100	62900		
	No load speed	rpm	275	206	127	109		
		mA	56600	56900	54000	59900		
	Nominal speed	rpm						
5_	Nominal torque	mNm	24.3	24	24.9	23.2		
6_	Nominal current (max. continuous cur		8.69	6.43	4.2	3.26		
	Stall torque	mNm	508	566	619	661		
8_	Stall current	Α	178	149	103	90.8		
9_	Max. efficiency	%	92.3	92.7	93.1	93.2		
	Terminal resistance	Ω	0.101	0.161	0.35	0.528		
_	Terminal inductance	mH	0.0101	0.018	0.0451	0.0662		
	Torque constant	mNm/A	2.85	3.8	6.01	7.28		
	Speed constant	rpm/V	3350	2510	1590	1310		
	Speed/torque gradient	rpm/mNm	119	107	92.4	95.2		
	Mechanical time constant	ms	2.22	2	1.73	1.79		
16_	Rotor inertia	gcm ²	1.79	1.79	1.79	1.79		
	Thermal data			Operating Rar				Sterilization information
17_	Thermal resistance housing-ambient	K/W	10.1	n [rpm] wind	ina 36 V			Sterilization cycles
	Ţ.			[.p]a			1135°C1	Otermzation cycles
	Thermal resistance winding-housing	K/W	0.9		9 00 1		135°C (((Sensorless: typical 2000
19_	Thermal time constant winding	K/W s	0.9 2.74				135°C	•
19_ 20_	Thermal time constant winding Thermal time constant motor	s s	0.9 2.74 418		9 00 1			Sensorless: typical 2000
19_ 20_ 21_	Thermal time constant winding Thermal time constant motor Ambient temperature	s s °C	0.9 2.74 418 -40+135	70000				Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam
19_ 20_ 21_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature	s s	0.9 2.74 418					Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C
19_ 20_ 21_ 22_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings	s s °C	0.9 2.74 418 -40+135 155	70000				Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar
19_ 20_ 21_ 22_ 23_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed	s s °C °C rpm	0.9 2.74 418 -40+135 155	70000 60000 50000				Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C
19_ 20_ 21_ 22_ 23_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play	s s °C °C rpm mm	0.9 2.74 418 -40+135 155 70 000 00.29	70000 60000 50000 40000				Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar
19_ 20_ 21_ 22_ 23_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload	s s °C °C rpm	0.9 2.74 418 -40+135 155	70000 60000 50000 40000 30000				Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min.
19_ 20_ 21_ 22_ 23_ 24_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force	s s °C °C rpm mm	0.9 2.74 418 -40+135 155 70 000 00.29	70000 60000 50000 40000				Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation
19_ 20_ 21_ 22_ 23_ 24_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force Radial play	s °C °C rpm mm N	0.9 2.74 418 -40+135 155 70 000 00.29 4 pull preloaded	70000 60000 50000 40000 30000				Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced
19_ 20_ 21_ 22_ 23_ 24_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force	s s °C °C rpm mm	0.9 2.74 418 -40+135 155 70 000 00.29 4 pull preloaded 4	70000 60000 50000 40000 30000 20000 10000			555	Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced thermal resistance R _{th2} 50%
19_ 20_ 21_ 22_ 23_ 24_ 25_ 26_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force Radial play	s °C °C rpm mm N	0.9 2.74 418 -40+135 155 70 000 00.29 4 pull preloaded	70000 60000 50000 40000 30000 20000		24 30 36		Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced
19_ 20_ 21_ 22_ 23_ 24_ 25_ 26_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force Radial play Max. axial load (dynamic)	s s °C °C rpm mm N	0.9 2.74 418 -40+135 155 70 000 00.29 4 pull preloaded 4 70 5000	70000 60000 50000 40000 30000 20000 10000 0	6 12 18 2	24 30 36	555	Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced thermal resistance R _{th2} 50% Short term operation
19_ 20_ 21_ 22_ 23_ 24_ 25_ 26_ 27_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force Radial play Max. axial load (dynamic) Max. force for press fits (static) (static, shaft supported) Max. radial load [mm from flange]	s s °C °C rpm mm N	0.9 2.74 418 -40+135 155 70 000 00.29 4 pull preloaded 4 70 5000	70000 60000 50000 40000 30000 20000 10000	6 12 18 2	24 30 36	555	Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced thermal resistance R _{th2} 50%
19_ 20_ 21_ 22_ 23_ 24_ 25_ 26_ 27_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force Radial play Max. axial load (dynamic) Max. force for press fits (static) (static, shaft supported)	s s °C °C rpm mm N	0.9 2.74 418 -40+135 155 70 000 00.29 4 pull preloaded 4 70 5000 12 [5]	70000 60000 50000 40000 30000 20000 10000 0	6 12 18 2	24 30 36 [opt.] Sensor	M [mNm]	Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced thermal resistance R _{th2} 50% Short term operation
19_ 20_ 21_ 22_ 23_ 24_ 25_ 26_ 27_ 28_	Thermal time constant winding Thermal time constant motor Ambient temperature Max. winding temperature Mechanical data ball bearings Max. speed Axial play Preload Direction of force Radial play Max. axial load (dynamic) Max. force for press fits (static) (static, shaft supported) Max. radial load [mm from flange]	s s °C °C rpm mm N	0.9 2.74 418 -40+135 155 70 000 00.29 4 pull preloaded 4 70 5000 12 [5]	70000 60000 50000 40000 30000 20000 10000 0	5 12 18 2 m Stages PEED 1-2	[opt.] Sensor	M [mNm]	Sensorless: typical 2000 Hall sensors: typical 1000 Sterilization with steam Temperature +134°C ±4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min. Continuous operation Continuous operation with reduced thermal resistance R _{th2} 50% Short term operation Details on catalog page 42

Connection A and B, motor (Cable AWG 20)

Motor winding 1 Motor winding 2 Motor winding 3 black white

31_ Weight of motor

32_ Typical noise level [rpm]

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) NTC

purple NTC Presistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

100

dBA 51 [50 000]

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

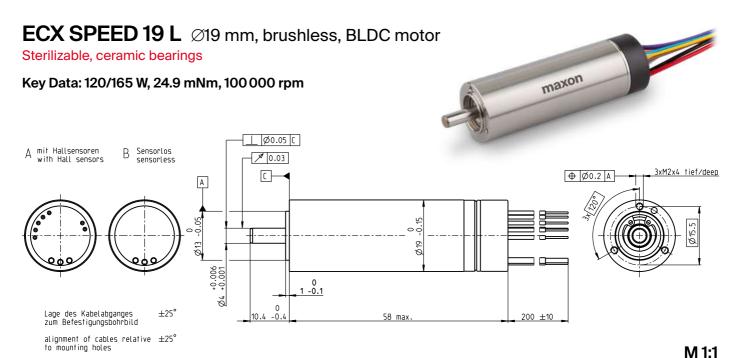
for motor type B:

513_ENX 19 EASY INT Abs.

Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 562_EPOS4 Module 50/5 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12



	Motor Data						
_	Nominal voltage	V	18	24	36	48	
2_	No load speed	rpm	60200	60200	57100	62900	
3_	No load current	mA	274	206	127	109	
4_	Nominal speed	rpm	56600	56900	54000	59900	
5_	Nominal torque	mNm	24.3	24	24.9	23.2	
6_	Nominal current (max. continuous cu	rrent) A	8.69	6.43	4.2	3.26	
7_	Stall torque	mNm	508	566	619	661	
8_	Stall current	Α	178	149	103	90.8	
9_	Max. efficiency	%	92.3	92.7	93.1	93.2	
10_	Terminal resistance	Ω	0.101	0.161	0.35	0.528	
11_	Terminal inductance	mH	0.0101	0.018	0.0451	0.0662	
12_	Torque constant	mNm/A	2.85	3.8	6.01	7.28	
13_	Speed constant	rpm/V	3350	2510	1590	1310	
14_	Speed/torque gradient	rpm/mNm	119	107	92.4	95.2	
15_	Mechanical time constant	ms	2.22	2	1.73	1.79	
16_	Rotor inertia	gcm ²	1.79	1.79	1.79	1.79	
	Thermal data			Operating Ra	nge		Sterilization information
17_	Thermal resistance housing-ambient	K/W	10.1	n [rpm] wind	ling 36 V		135°C Sterilization cycles
18_	Thermal resistance winding-housing	K/W	0.9		-		Sensorless: typical 2000
19_	Thermal time constant winding	S	2.74				Hall sensors: typical 1000
20_	Thermal time constant motor	S	418				••
21_	Ambient temperature	°C	-40+135	100000			Sterilization with steam
22_	Max. winding temperature	°C	155				Temperature +134°C ±4
	Mechanical data ball bearings			80000			Compression pressure up to 2.3 b
23_	Max. speed	rpm	100 000	60000			Rel. humidity 100
24_	Axial play	mm	00.29	00000			Cycle length 18 m
	Preload	N	4	40000			
	Direction of force		pull				Continuous operation
25_	Radial play		preloaded	20000			Continuous operation with reduced
26_	Max. axial load (dynamic)	N	4	0			thermal resistance R _{th2} 50%
27_	Max. force for press fits (static)	N	70	0	6 12 18	24 30 36	M [mNm] ☐ Short term operation
	(static, shaft supported)	N	5000				
28_	Max. radial load [mm from flange]	N	12 [5]	Modular Syste	em		Details on catalog page
	Other specifications			Gear	Stogge I	opt.] Sensor	Motor Control
	Other specifications			Gear	Stages	opt.j Senso i	MOTOL COLLINI

Connection A and B, motor (Cable AWG 20)

Motor winding 1 Motor winding 2 Motor winding 3 black white

29_ Number of pole pairs

32_ Typical noise level [rpm]

30_ Number of phases

31_ Weight of motor

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

100

dBA 51 [50 000]

393_GPX 19 SPEED 1-2

3 397_GPX 22 SPEED [3]

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

for motor type A:

for motor type B:

513_ENX 19 EASY INT

513_ENX 19 EASY INT Abs.

Electric connection: cable length/pin connection Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

547_DEC Module 50/5

553_ESCON 50/5 553_ESCON 70/10

567_EPOS4 50/5 567_EPOS470/15

551_ESCON Module 50/5

562_EPOS4 Module 50/5

563_EPOS4 Module 50/8

565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8

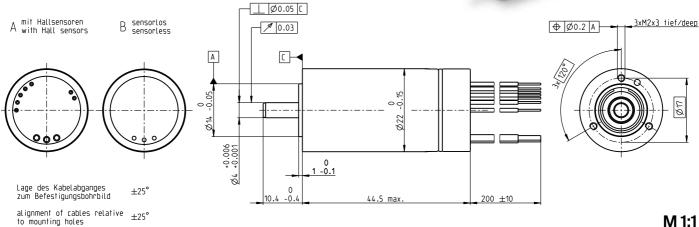
551_ESCON Module 50/4 EC-S

552_ESCON Module 50/8 HE

ECX SPEED 22 M Ø22 mm, brushless, BLDC motor

Key Data: 40/49 W, 11.7 mNm, 45 000 rpm





Motor Data						
 Nominal voltage 	V	18	24	36	48	
2_ No load speed	rpm	40200	39700	40300	40200	
3_ No load current	mA	528	388	265	197	
4_ Nominal speed	rpm	37200	36900	37600	37400	
5_ Nominal torque	mNm	10.4	11.3	11.7	11.5	
6_ Nominal current (max. conti	nuous current) A	2.93	2.32	1.63	1.2	
7_ Stall torque	mNm	154	175	197	189	
8_ Stall current	Α	36.5	30.8	23.3	16.8	
9_ Max. efficiency	%	78.3	79.6	80.5	80.2	
10_ Terminal resistance	Ω	0.493	0.779	1.54	2.86	
11_ Terminal inductance	mH	0.0294	0.0535	0.117	0.21	
12_ Torque constant	mNm/A	4.21	5.68	8.42	11.3	
13_ Speed constant	rpm/V	2270	1680	1130	848	
14_ Speed/torque gradient	rpm/mNm	265	230	208	215	
15_ Mechanical time constant	ms	5.92	5.14	4.63	4.8	
16_ Rotor inertia	gcm ²	2.13	2.13	2.13	2.13	
Thermal data		0	perating Rang	е		

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	11.3
18_	Thermal resistance winding-housing	K/W	1.34
19_	Thermal time constant winding	S	2.71
20_	Thermal time constant motor	s	314
21_	Ambient temperature	°C	-20+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23	Max speed	rpm	45,000

	Mechanical data ball bearings		
23_	Max. speed	rpm	45000
24_	Axial play	mm	00.24
	Preload	N	4
	Direction of force		pul
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	4
27_	Max. force for press fits (static)	N	110
	(static, shaft supported)	N	6000
28_	Max. radial load [mm from flange]	N	16 [5]
	0.1		

	Other specifications		
29_	Number of pole pairs		
30_	Number of phases		(
31_	Weight of motor	g	10:
32_	Typical noise level [rpm]	dBA	53 [45 000

Connection A and B, motor (Cable AWG 18)

Motor winding 1 black Motor winding 2 Motor winding 3 white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

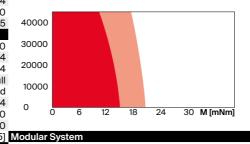
Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange ($V_{\rm CC}$) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26)

NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

> 565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

Details on catalog page 42

Motor Control Gear Stages [opt.] Sensor 394_GPX 22 A/C 1-2 [3-4] for motor type A: 547_DEC Module 50/5 395_GPX 22 LN/LZ 514_ENX 22 EASY INT 551_ESCON 36/3 EC 1-2 [3-4] 396_GPX 22 HP 551_ESCON Module 50/4 EC-S 2-3 [4] for motor type B: 397_GPX 22 SPEED 1-2 514_ENX 22 EASY INT Abs. 551_ESCON Module 50/5 398_GPX 22 UP 553_ESCON 50/5 400_GPX 26 A/C 561_EPOS4 Micro 24/5 401_GPX 26 LN/LZ 3 562_EPOS4 Module 50/5 402_GPX 26 HP 563_EPOS4 Compact 24/5 3-axes

Flange front: thread holes/center thread

Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

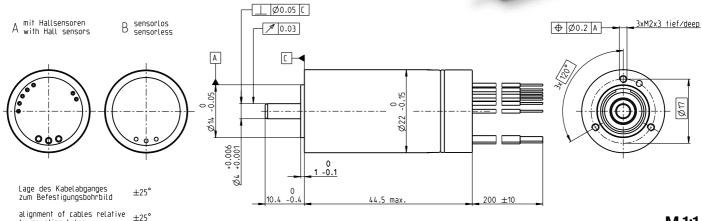
M 1:1

ECX SPEED 22 M Ø22 mm, brushless, BLDC motor

High Power

Key Data: 80/106 W, 20.2 mNm, 60 000 rpm





Motor Data								
1_ Nominal voltage	V	18	24	36	48			
2_ No load speed	rpm	51500	58900	56200	53200			
3_ No load current	mA	247	224	140	96.8			
4_ Nominal speed	rpm	48700	56300	53700	50400			
5_ Nominal torque	mNm	20.2	18.9	19.4	18			
6_ Nominal current (max.	continuous current) A	6.24	5.03	3.29	2.17			
7_ Stall torque	mNm	449	543	539	420			
8_ Stall current	Α	135	140	88.4	48.8			
9_ Max. efficiency	%	91.7	92.2	92.2	91.3			
10_ Terminal resistance	Ω	0.133	0.172	0.407	0.983			
11_ Terminal inductance	mH	0.012	0.0163	0.0403	0.0801			
12_ Torque constant	mNm/A	3.33	3.88	6.1	8.6			
13_ Speed constant	rpm/V	2870	2460	1560	1110			
14_ Speed/torque gradien	t rpm/mNm	115	109	104	127			
15_ Mechanical time cons	tant ms	2.59	2.45	2.35	2.86			
16_ Rotor inertia	gcm ²	2.15	2.15	2.15	2.15			
Thermal data Operating Range								

	i nermai data		
17_	Thermal resistance housing-ambient	K/W	11.3
18_	Thermal resistance winding-housing	K/W	0.6
19_	Thermal time constant winding	s	1.22
20_	Thermal time constant motor	S	314
21_	Ambient temperature	°C	-20+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23_	Max. speed	rpm	60 000

	Mechanical data ball bearings		
23_	Max. speed	rpm	60 000
24_	Axial play	mm	00.24
	Preload	N	4
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	4
27_	Max. force for press fits (static)	N	110
	(static, shaft supported)	N	6000
28_	Max. radial load [mm from flange]	N	16 [5]

	Other specifications		
29_	Number of pole pairs		
30_	Number of phases		3
31_	Weight of motor	g	105
32_	Typical noise level [rpm]	dBA	53 [50 000]

Connection A and B, motor (Cable AWG 18)

Motor winding 1 Motor winding 2 Motor winding 3 black white

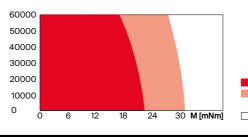
yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26) purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

n [rpm] winding 36 V



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

5]	Modular System			
	Gear	Stages [opt.]	Sensor	N
1	394_GPX 22 A/C	1-2 [3-4]	for motor type A:	5
3	395_GPX 22 LN/LZ	1-2 [3-4]	514_ENX 22 EASY INT	5
)5	396_GPX 22 HP	2-3 [4]	for motor type B:	5
0]	397_GPX 22 SPEED	1-2	514_ENX 22 EASY INT Abs.	5
	398_GPX 22 UP	1-4		5
	400_GPX 26 A/C	3		5
	401_GPX 26 LN/LZ	3		5
	402_GPX 26 HP	4		5
				5
				5

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 Motor Control

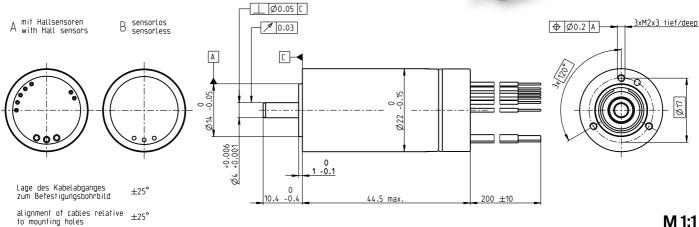
547_DEC Module 50/5 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 662_EPOS4 Module 50/5 563_EPOS4 Module 50/8 665_EPOS4 Compact 50/5 665_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

ECX SPEED 22 M Ø22 mm, brushless, BLDC motor

Sterilizable

Key Data: 80/95 W, 18 mNm, 60 000 rpm





Motor Data							
1_ Nominal voltage	V	18	24	36	48		
2_ No load speed	rpm	52700	54700	56800	54700		
3_ No load current	mA	254	201	142	101		
4_ Nominal speed	rpm	49300	51400	53500	51500		
5_ Nominal torque	mNm	18	17.8	17	17.4		
6_ Nominal current (max. continuous c	urrent) A	5.72	4.4	2.92	2.16		
7_ Stall torque	mNm	341	366	368	365		
8_ Stall current	Α	105	87.5	60.9	43.7		
9_ Max. efficiency	%	90.5	90.7	90.7	90.7		
10_ Terminal resistance	Ω	0.172	0.274	0.591	1.1		
11_ Terminal inductance	mH	0.0164	0.0272	0.0567	0.109		
12_ Torque constant	mNm/A	3.25	4.18	6.04	8.36		
13_ Speed constant	rpm/V	2940	2290	1580	1140		
14_ Speed/torque gradient	rpm/mNm	155	150	155	150		
15_ Mechanical time constant	ms	3.1	3	3.1	3		
16_ Rotor inertia	gcm ²	1.91	1.91	1.91	1.91		
Thermal data		0	perating Rang	ge			Sterilization information
17_ Thermal resistance housing-ambier	nt K/W	11.3 n	[rpm] windir	ng 36 V		10500	Sterilization cycles
10 = 1 1 1 1 1 1 1 1	14044			U • •		135°C	· · · · · · · · · · · · · · · · · · ·

10_ Notor inertia	gciii	1.51
Thermal data		
17_ Thermal resistance housing-ambient	K/W	11.3
18_ Thermal resistance winding-housing	K/W	0.6
19_ Thermal time constant winding	s	1.25
20_ Thermal time constant motor	s	314
21_ Ambient temperature	°C	-40+135
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		
23_ Max. speed	rpm	60 000
24_ Axial play	mm	00.24
Preload	N	4
Direction of force		pull
25_ Radial play		preloaded
26_ Max. axial load (dynamic)	N	4
27_ Max. force for press fits (static)	N	110
(static, shaft supported)	N	6000
28 Max. radial load [mm from flange]	N	16 [5]

SSS 60000 50000 40000 30000 20000 10000 0 30 M [mNm]

Sterilization cycles Sensorless: typical 2000 Hall sensors: typical 1000

Sterilization with steam +134°C ±4°C Temperature Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 min.

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Number of phases		3
Weight of motor	g	105
Typical noise level [rpm]	dBA	54 [50 000]
0 (0 A)M(0 -10)		

Stages [opt.] Sensor Gear 397_GPX 22 HP 1-3 399_GPX 22 SPEED 1-2

Flange front: thread holes/center thread

Shaft front: length/diameter

Flange back: plastic ring/external thread/with opening

Temperature sensor: NTC-Thermistor (only for motor type A

Appropriate connectors and connecting cables are available

for the configuration of the pin connection together with the

Electric connection: cable length/pin connection

external thread: see catalog, Accessories section.

and only when not combined with an encoder).

3

for motor type A: 514_ENX 22 EASY INT for motor type B:

135°C

Details on catalog page 42 **Motor Control** 547_DEC Module 50/5 551_ESCON Module 50/4 EC-S

551_ESCON Module 50/5 514_ENX 22 EASY INT Abs. 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10

> 562_EPOS4 Module 50/5 563_EPOS4 Module 50/8 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5

565_EPOS4 Compact 50/8 567_EPOS4 50/5

567_EPOS4 70/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

561_EPOS4 Micro 24/5

Connection A and B. motor (Cable AWG 18)

Motor winding 1 black Motor winding 2 Motor winding 3 white

Other specifications

29_ Number of pole pairs

30_

31_

32

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26)

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

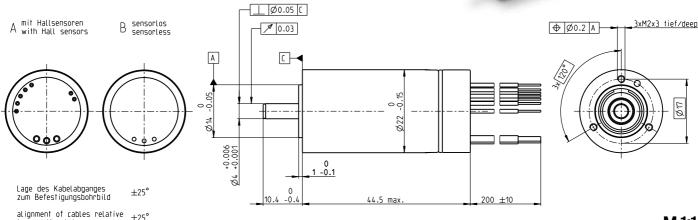
M 1:1

ECX SPEED 22 M Ø22 mm, brushless, BLDC motor

Sterilizable, ceramic bearings

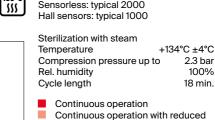
Key Data: 80/107 W, 18 mNm, 85 000 rpm





	-							
	Motor Data							
1_	Nominal voltage	V	18	24	36	48		
2_	No load speed	rpm	52700	54700	56800	54700		
3_	No load current	mA	254	201	142	101		
4_	Nominal speed	rpm	49300	51400	53500	51500		
5_	Nominal torque	mNm	18	17.8	17	17.4		
6_	Nominal current (max. continuous cur	rent) A	5.72	4.4	2.92	2.16		
7_	Stall torque	mNm	341	366	368	365		
8_	Stall current	Α	105	87.5	60.9	43.7		
_	Max. efficiency	%	90.5	90.7	90.7	90.7		
10_	Terminal resistance	Ω	0.172	0.274	0.591	1.1		
	Terminal inductance	mH	0.0164	0.0272	0.0567	0.109		
12_	Torque constant	mNm/A	3.25	4.18	6.04	8.36		
	Speed constant	rpm/V	2940	2290	1580	1140		
14_	Speed/torque gradient	rpm/mNm	155	150	155	150		
15_	Mechanical time constant	ms	3.1	3	3.1	3		
16_	Rotor inertia	gcm ²	1.91	1.91	1.91	1.91		
	Thermal data			Operating Ran	ge			Sterilization information
17_	Thermal resistance housing-ambient	K/W	11.3 r	rpm] windi	ing 36 V		135°C	Sterilization cycles
18	Thermal resistance winding-housing	K/W	0.6				1133,01	Sensorless: typical 2000

17_	Thermal resistance housing-ambient	K/W	11.3	n [rpm]	winding 36 \	V		135°C
18_	Thermal resistance winding-housing	K/W	0.6		· ·			135 6
19_	Thermal time constant winding	S	1.25					<u> </u>
20_	Thermal time constant motor	S	314	100000)			
21_	Ambient temperature	°C	-40+135					
22_	Max. winding temperature	°C	155	80000				
	Mechanical data ball bearings							
23_	Max. speed	rpm	85000	60000				
24_	Axial play	mm	00.24					
	Preload	N	4	40000)			
	Direction of force		pull	00000				
25_	Radial play		preloaded	20000)			
26_	Max. axial load (dynamic)	N	4	0				
27_	Max. force for press fits (static)	N	110	Ü	0 10	20	30	M [mNm]
	(static, shaft supported)	N	6000					
28	Max. radial load [mm from flange]	N	16 [5]	Modular	System			



thermal resistance R_{th2} 50%

547_DEC Module 50/5

568_EPOS4 Disk 60/8

569_EPOS4 Disk 60/12

Short term operation

Motor Control

	(otatio, otiait supported)		0000
28_	Max. radial load [mm from flange]	N	16 [5]
	Other specifications		
29_	Number of pole pairs		1
30_	Number of phases		3
31_	Weight of motor	g	105
32_	Typical noise level [rpm]	dBA	54 [50 000]

Stages [opt.] Sensor for motor type A: 514_ENX 22 EASY INT for motor type B:

551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 514_ENX 22 EASY INT Abs. 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Module 50/8 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS4 70/15

Details on catalog page 42

Connection A and B, motor (Cable AWG 18) Motor winding 1

Motor winding 2 Motor winding 3 black white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26)

purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

Configuration

Gear

397_GPX 22 HP

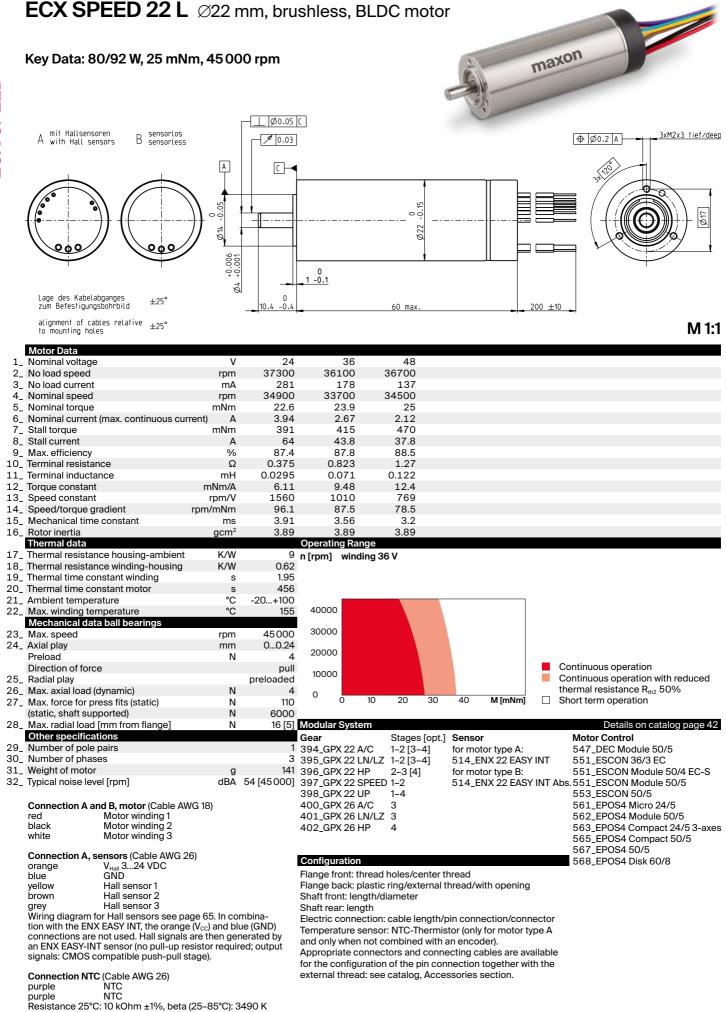
399_GPX 22 SPEED 1-2

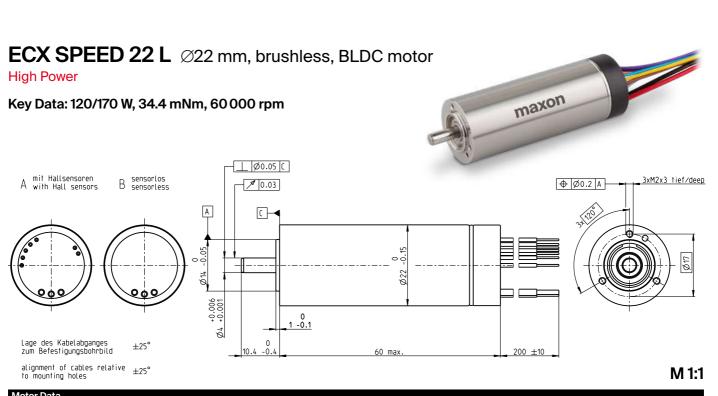
Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter Electric connection: cable length/pin connection

1-3

Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

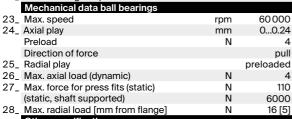
Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

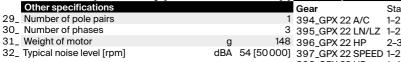




	Motor Data								
1.	Nominal voltage	V	24	36	48				
2.	No load speed	rpm	47600	49400	50400				
3.	No load current	mA	280	198	154				
4.	Nominal speed	rpm	45700	47700	48700				
5.	Nominal torque	mNm	34.3	34.4	32.2				
6.	Nominal current (max. continuous currer	nt) A	7.34	5.11	3.66				
7.	Stall torque	mNm	1120	1340	1280				
8.	Stall current	Α	233	193	141				
9.	Max. efficiency	%	93.2	93.7	93.6				
10	Terminal resistance	Ω	0.103	0.187	0.341				
11.	Terminal inductance	mH	0.0128	0.0266	0.0455				
12.	Torque constant	mNm/A	4.81	6.95	9.09				
13	Speed constant	rpm/V	1980	1370	1050				
14	Speed/torque gradient rp	m/mNm	42.5	37	39.4				
15	Mechanical time constant	ms	1.75	1.53	1.63				
16.	Rotor inertia	gcm ²	3.94	3.94	3.94				
	Thermal data Operating Range								
						·			

mermai data		
17_ Thermal resistance housing-ambient	K/W	9
18_ Thermal resistance winding-housing	K/W	0.84
19_ Thermal time constant winding	S	2.77
20_ Thermal time constant motor	S	456
21_ Ambient temperature	°C	-20+100
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		
23_ Max. speed	rpm	60000
24 Axial play	mm	00.24





Connection A and B, motor (Cable AWG 18)

Motor winding 1 black Motor winding 2 Motor winding 3 white

yellow brown Hall sensor 1 Hall sensor 2 Hall sensor 3

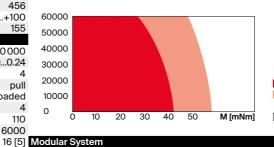
Wiring diagram for Hall sensors see page 65. In combination with the ENX EASY INT, the orange (Vcc) and blue (GND) connections are not used. Hall signals are then generated by an ENX EASY-INT sensor (no pull-up resistor required; output signals: CMOS compatible push-pull stage).

Connection NTC (Cable AWG 26)

purple NTC

purple NTC Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

n [rpm] winding 36 V



1-2 [3-4]

1-2 [3-4]

2-3 [4]

Stages [opt.] Sensor for motor type A: 514_ENX 22 EASY INT for motor type B:

Gear

394_GPX 22 A/C

396_GPX 22 HP

398_GPX 22 UP

400_GPX 26 A/C

402_GPX 26 HP

401_GPX 26 LN/LZ 3

395_GPX 22 LN/LZ

Flange front: thread holes/center thread Flange back: plastic ring/external thread/with opening Shaft front: length/diameter

Shaft rear: length

Electric connection: cable length/pin connection/connector Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an encoder).

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog, Accessories section.

Details on catalog page 42 **Motor Control**

thermal resistance R_{th2} 50%

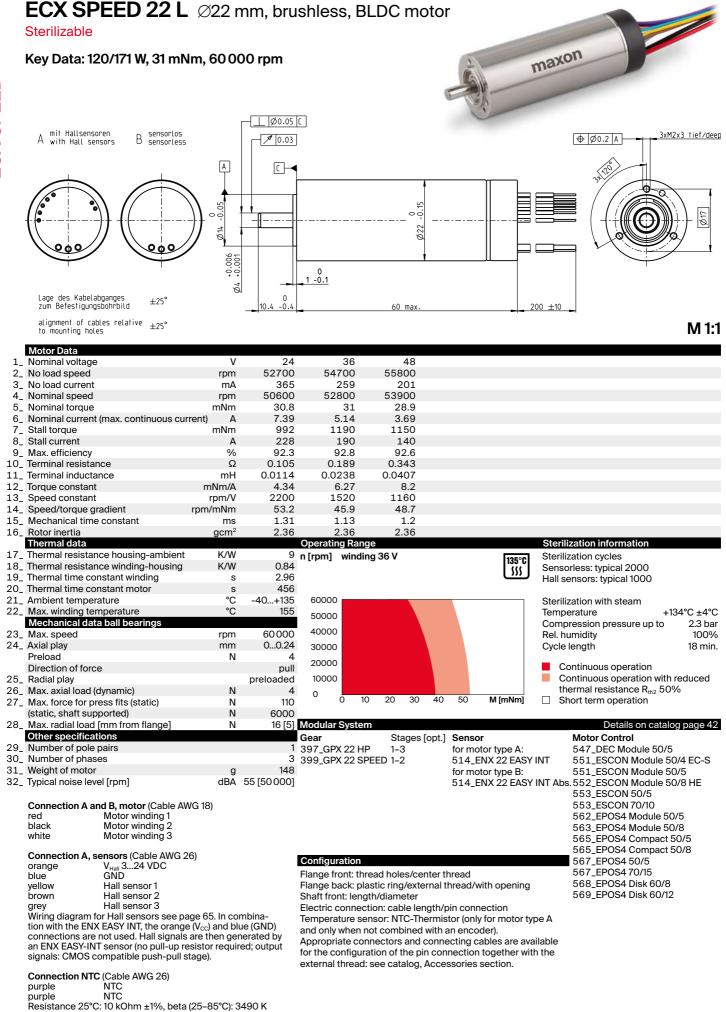
Continuous operation with reduced

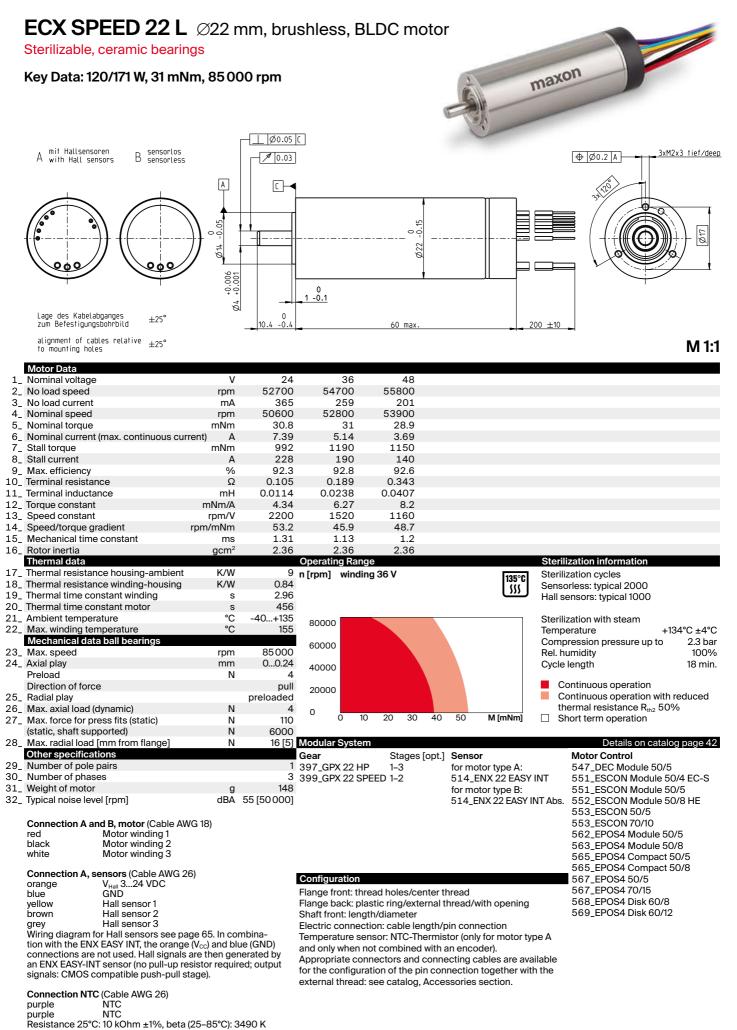
Continuous operation

Short term operation

547_DEC Module 50/5 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 514_ENX 22 EASY INT Abs. 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 562_EPOS4 Module 50/5 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5

567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12





_		

maxon ECX PRIME

Standard Specification No. 101		88
Terminology explanations		188
ECX PRIME Program (can be configured online)		233
ECX PRIME 6 M Ø6 mm, 1.6 Watt		233
ECX PRIME 16 L Ø16 mm, 50 Watt	NEW	234
ECX PRIME 16 L Ø16 mm, 60 W, sterilizable ceramic	NEW	235



Screw drive

maxon ECX PRIME

The brushless ECX PRIME motors combine high speeds and high torques in a unique motor design. Equipped with high-quality magnets and iron materials, the ECX PRIME motors have an extremely rigid speed-torque characteristic, combined with excellent controller dynamics. The ECX program is fully configurable online.

Key data

Motor Ø6 ... 16 mmMotor length19.9 ... 53 mmPower1.6 ... 60 WNominal torqueup to 25 mNmMax. permissible speedup to 50 000 rpm

Electrical connection with flexprint or single wires, depending on the size.

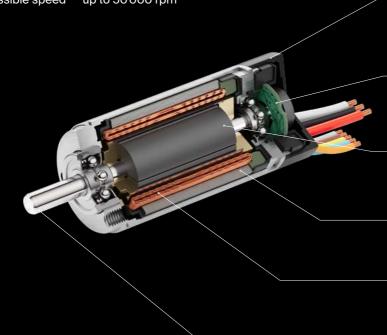
Sensors integrated for space-saving installation.

4-pole rotor with top-quality magnets.

Motor housing and mounting flange made of stainless steel, non-magnetic.

Highly efficient ironless winding, enclosed with high-quality magnetic return material to minimize losses.

Stainless steel shaft with high stiffness – various modification options available.



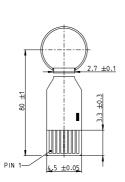
- High torques combined with high speeds
- The ironless winding with no cogging torque
- → High overload capacity
- Easily configured online

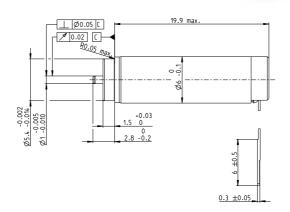
ECX PRIME 6 M Ø6 mm, brushless, BLDC motor

High Power

Key Data: 1.6/2.2 W, 0.57 mNm, 50 000 rpm







M 2:1

	Motor Data										
1_	Nominal voltage	V	6		12						
2_	No load speed	rpm	36300	363	00						
3_	No load current	mA	83.8	41	L.9						
4_	Nominal speed	rpm	29500	295	00						
5_	Nominal torque	mNm	0.58	0.	58						
6_	Nominal current (max. continuous c	urrent) A	0.458	0.2	29						
7_	Stall torque	mNm	3.21	3.	21						
8_	Stall current	Α	2.12	1.0	06						
9_	Max. efficiency	%	65.3	65	5.3						
10_	Terminal resistance	Ω	2.83	11	L.3						
11_	Terminal inductance	mH	0.0187	0.07	46						
12_	Torque constant	mNm/A	1.52	3.0							
13_	Speed constant	rpm/V	6300	31							
	Speed/torque gradient	rpm/mNm	11800	118							
	Mechanical time constant	ms	1.47		47						
	Rotor inertia	gcm ²	0.0119	0.01							
	Thermal data			Operating							
	Thermal resistance housing-ambier		93.9	n [rpm] v	winding	6 V					
	Thermal resistance winding-housing	g K/W	2.98								
	Thermal time constant winding	S	0.358								
	Thermal time constant motor	S	138								
	Ambient temperature	°C	-20+100	50000							
	Max. winding temperature	°C	125	40000							
	Mechanical data ball bearings			40000							
	Max. speed	rpm	50 000	30000							
24_	Axial play	mm	00.07								
	Preload	N	0.45	20000						_	0
	Direction of force		pull	10000							Continuous operation
	Radial play		preloaded	10000				1			Continuous operation with reduced
	Max. axial load (dynamic)	N	0.2	0	0.2	0.4	0.6	0.8	1.0 M [mNm]		thermal resistance R _{th2} 50%
27_	Max. force for press fits (static)	N	10	U	0.2	0.4	0.6	0.6	1.0 Wi[mininj		Short term operation
	(static, shaft supported)	N	110								
	Max. radial load [mm from flange]	N		Modular S	ystem						Details on catalog page 42
	Other specifications			Gear			ges [or	ot.] Se			Motor Control ¹
	Number of pole pairs		2	375_GPX	6 A	1–5		49	8_ENX 6 MAG		562_EPOS4 Module 24/1.5
	Number of phases		3								564_EPOS4 Compact 24/1.5
_	Weight of motor	g	3								
32_	Typical noise level [rpm]	aBA	35 [20 000]								

Connection motor with hall sensor (A)

FPC Flexprint 8-pole, pitch 0.5 mm Pin 1 Motor winding 1

Pin 2 Motor winding 2 Pin 3 Motor winding 3

Pin 4 V_{cc} 3.0...3.6 V Pin 5 GND

Pin 6 Hall sensor 1

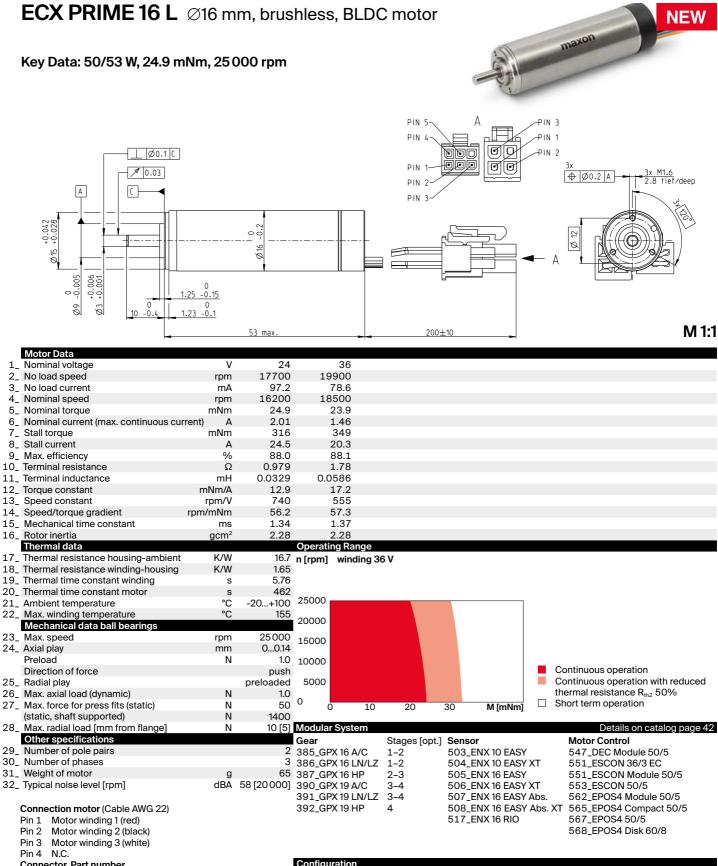
Pin 7 Hall sensor 2 Pin 8 Hall sensor 3

Output signals: CMOS compatible push-pull stage Hall signals are generated by the MAG sensor.

¹ENX 6 MAG encoder and adapter 498157 required for all maxon controllers.

Front flange: Standard flange/threaded hole

Shaft front: length



Connector, Part number

Molex, 39-01-2040

Connection sensors (Cable AWG 26)

Pin 1 Hall sensor 1 (vellow)

Hall sensor 2 (brown) Pin 2

Hall sensor 3 (grey) Pin 3

Pin 4 GND (blue)

Pin 5 V_{Hall} 3...24 VDC (orange) Pin 6 N.C.

Connector, Part number

Molex, 430-25-0600

Wiring diagram for Hall sensors see p. 65

Flange back: end cap/flange with thread holes Shaft front/back: length/diameter

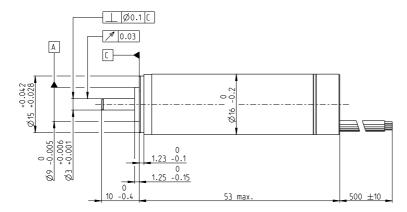
Electric connection: cable length/connector/connection alignment

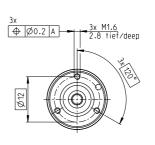
ECX PRIME 16 L Ø16 mm, brushless, BLDC motor

Sterilizable, ceramic bearings

Key Data: 60/75 W, 25.5 mNm, 40 000 rpm







M 1:1

								141 1.11
	Motor Data							
1_	Nominal voltage	V	24	36				
2_	No load speed	rpm	17700	19900				
3_	No load current	mA	110	87.0				
4_	Nominal speed	rpm	16200	18400				
5_	Nominal torque	mNm	25.5	24.8				
6_	Nominal current (max. continuous cu	rrent) A	2.07	1.52				
7_	Stall torque	mNm	316	349				
8_	Stall current	Α	24.5	20.3				
9_	Max. efficiency	%	87.3	87.6				
10_	Terminal resistance	Ω	0.979	1.78				
11_	Terminal inductance	mH	0.0329	0.0586				
12_	Torque constant	mNm/A	12.9	17.2				
13_	Speed constant	rpm/V	740	555				
14_	Speed/torque gradient	rpm/mNm	56.2	57.3				
15_	Mechanical time constant	ms	1.22	1.25				
16_	Rotor inertia	gcm ²	2.08	2.08				
	Thermal data			Operating Ra	ange			Sterilization information
	Thermal resistance housing-ambient		16.7	n [rpm] win	ding 36 V		135°C	Number of sterilization cycles:
	Thermal resistance winding-housing	K/W	1.65					typically 1000
	Thermal time constant winding	S	5.76				(")	
20_	Thermal time constant motor	s	459	40000				Sterilization with steam
	Ambient temperature	°C	-20+135	40000	1			Temperature +134°C ±4°C
22_	Max. winding temperature	°C	155		· · · · · · · · · · · · · · · · · · ·			Compression pressure up to 2.3 bar
	Mechanical data ball bearings			30000				Rel. humidity 100%
23_	Max. speed	rpm	40 000					Cycle length 18 min.
24_	Axial play	mm	00.14	20000				
	Preload	N	1.0					
	Direction of force		push	10000				Continuous operation
	Radial play		preloaded					Continuous operation with reduced
	Max. axial load (dynamic)	N	1.0	0				thermal resistance R _{th2} 50%
27_	Max. force for press fits (static)	N	50	0	10 2	0 30	M [mNm]	☐ Short term operation
	(static, shaft supported)	N	1400					
28_	Max. radial load [mm from flange]	N		Modular Syst	tem			Details on catalog page 42
	Other specifications			Gear		es [opt.]		Motor Control
	Number of pole pairs			388_GPX 16 I	HPSTE 1-3			547_DEC Module 50/5
	Number of phases		3					551_ESCON 36/3 EC
	Weight of motor	g	65					551_ESCON Module 50/5
32_	Typical noise level [rpm]	dBA	58 [20 000]					553_ESCON 50/5

Connection motor (Cable AWG 22)

Red: Motor winding 1
Black: Motor winding 2 White: Motor winding 3

Connection sensors (Cable AWG 26)

Yellow: Hall sensor 1 Brown: Hall sensor 2 Grey: Hall sensor 3 Blue: GND (blue)

Orange: V_{Hall} 3...24 VDC Wiring diagram for Hall sensors see p. 65

Flange back: end cap/flange with thread holes Shaft front/back: length/diameter Electric connection: cable length/connection alignment

maxon ECX TORQUE

Standard Specification No. 101	88
Terminology explanations	188
ECX TORQUE Program (can be configured online)	239-241
ECX TORQUE 22 M Ø22 mm, 30 Watt	239
ECX TORQUE 22 L Ø22 mm, 40 Watt	240
ECX TORQUE 22 XL Ø22 mm, 45 Watt	241



© 2024 maxon. All rights reserved.

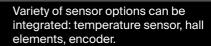
maxon ECX TORQUE

High torque density and unrivaled dynamics: The iron core winding and multi-pole rotor design of the brushless ECX TORQUE motors allow them to achieve a high torque density. The robust design and high build quality provide a long service life. ECX motors can be configured online and are ready for shipping in 11 working days.



Motor Ø22 mmMotor length43 ... 82 mmPower30 ... 45 WNominal torqueup to 80 mNmMax. permissible speedup to 16 000 rpm

Electrical connection with single wires or as pluggable pin solution. Both versions are completely potted, for strain relief and to protect the motor against dirt.



Multi-pole internal rotor with topquality magnets for maximum torque.

Motor housing includes a mounting flange as a single part, stainless steel and non-magnetic.

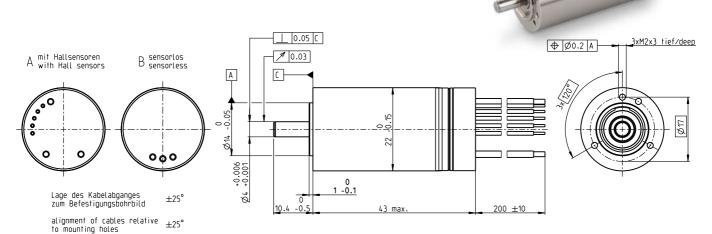
Stator with iron core winding. High fill factor for max efficiency. Potted winding system for optimal heat dissipation and mechanical stability.

- High torque density
- Multi-pole internal-rotor motor with iron core winding
- Mechanical time constants below one millisecond
- Robust and durable design
- Easily configured online

Stainless steel shaft with high stiffness – various modification options available.

ECX TORQUE 22 M Ø22 mm, brushless, BLDC motor

Key Data: 30/43 W, 32.4 mNm, 16 000 rpm



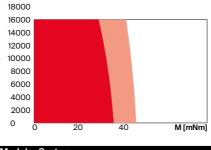
M 1:1

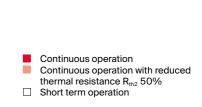
Motor Data								
1_ Nominal voltage	V	12	18	24	36	48		
2_ No load speed	rpm	12700	14300	15300	15100	13000		
3_ No load current	mA	220	175	145	94.8	56.5		
4_ Nominal speed	rpm	10700	12200	13100	12900	10900		
5_ Nominal torque	mNm	29.1	29.4	28.5	29.7	32.4		
6_ Nominal current (max. continuous	current) A	3.18	2.41	1.88	1.28	0.885		
7_ Stall torque	mNm	222	245	253	260	251		
8_ Stall current	Α	40.1	37.1	31.5	21.9	13.2		
9_ Max. efficiency	%	85.7	86.6	86.8	87.2	87.2		
10_ Terminal resistance	Ω	0.299	0.486	0.763	1.64	3.63		
11_ Terminal inductance	mH	0.154	0.274	0.428	0.988	2.38		
12_ Torque constant	mNm/A	8.88	11.8	14.8	22.5	34.9		
13_ Speed constant	rpm/V	1080	806	645	424	273		
14_ Speed/torque gradient	rpm/mNm	36.2	33.1	33.2	31	28.4		
15_ Mechanical time constant	ms	0.652	0.596	0.599	0.558	0.512		
16_ Rotor inertia	gcm ²	1.72	1.72	1.72	1.72	1.72		
Thermal data Operating Range								

winding 24 V

n [rpm]

	Thermal data		
17	Thermal resistance housing-ambient	K/W	15.7
18	Thermal resistance winding-housing	K/W	4.48
19	Thermal time constant winding	S	14.1
20	Thermal time constant motor	S	644
21	Ambient temperature	°C	-40+100
22	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23	Max. speed	rpm	16 0 0 0
24	Axial play	mm	00.24
	Preload	N	4.0
	Direction of force		pull
25	Radial play		preloaded
26	Max. axial load (dynamic)	N	4.0





maxon

	(otatio, oriait oupportou)		
28_	Max. radial load [mm from flange]	N	22 [5]
	Other specifications		
29_	Number of pole pairs		4
30_	Number of phases		3
31_	Weight of motor	g	82.1
32_	Typical noise level [rpm]	dBA	54 [12 000]

Ν

N

110

Connection A and B, motor (Cable AWG 18) Motor winding 1 black Motor winding 2 white Motor winding 3

yellow Hall sensor 1 brown Hall sensor 2 Hall sensor 3 grey

27_ Max. force for press fits (static)

(static, shaft supported)

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (V_{cc}) and blue (GND) connections are not used.

Connection Temperature sensor (Cable AWG 26)

purple NTC purple NTC Resistance 25°C: 10 kOhm ±5%, beta (25–85°C): 3434 K

Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
394_GPX 22 A/C	1-2	for motor type A:	547_DEC Module 24/2
395_GPX 22 LN/LZ	1-2	514_ENX 22 EASY INT	547_DEC Module 50/5
396_GPX 22 HP	2-3	for motor type B:	550_ESCON Module 24/2
398_GPX 22 UP	1-4	514_ENX 22 EASY INT Abs	.551_ESCON 36/3 EC
400_GPX 26 A/C	3		551_ESCON Module 50/4 EC-S
401_GPX 26 LN/LZ	3		551_ESCON Module 50/5
402_GPX 26 HP	4		553_ESCON 50/5
			561_EPOS4 Micro 24/5
			562_EPOS4 Module 50/5
			565 FPOS4 Compact 50/5

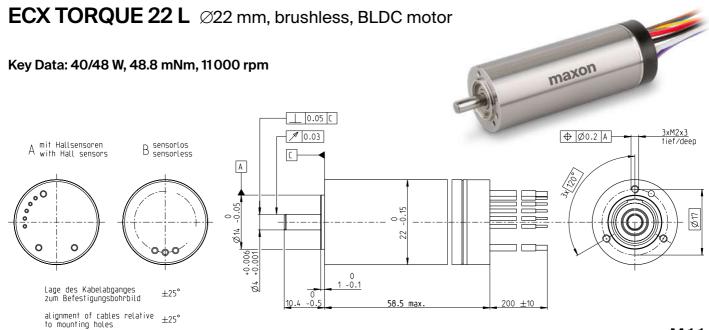
Flange front: thread holes/center thread Flange back: plastic ring/center thread

Shaft front: length/diameter

Electric connection: cable length/pin connection/connector

Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog Accessories section.

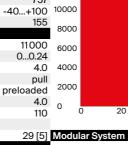


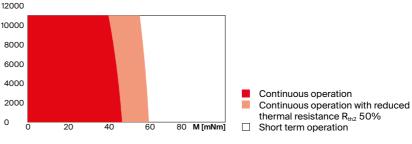
M 1:1

Motor Data							
1_ Nominal voltage	V	12	18	24	36	48	
2_ No load speed	rpm	9380	10300	10300	10700	10900	
3_ No load current	mA	224	172	129	90.7	69.9	
4_ Nominal speed	rpm	7930	8840	8850	9190	9380	
5_ Nominal torque	mNm	45.7	46.2	48.1	45.2	48.8	
6_ Nominal current (max. continuous curr	ent) A	3.7	2.74	2.13	1.39	1.14	
7_ Stall torque	mNm	440	486	509	492	539	
8_ Stall current	Α	43.6	38.1	31.1	20.2	18.3	
9_ Max. efficiency	%	86.2	87.2	87.5	87.2	88.2	
10_ Terminal resistance	Ω	0.275	0.473	0.771	1.78	2.62	
11_ Terminal inductance	mH	0.148	0.275	0.49	1.03	1.77	
12_ Torque constant	mNm/A	12.1	16.5	22	31.9	41.8	
13_ Speed constant	rpm/V	789	579	434	299	228	
14_ Speed/torque gradient	rpm/mNm	17.9	16.6	15.2	16.7	14.3	
15_ Mechanical time constant	ms	0.575	0.531	0.488	0.536	0.459	
16_ Rotor inertia	gcm ²	3.06	3.06	3.06	3.06	3.06	
Thermal data			Operating Ran	ige			

n [rpm] winding 24 V

16_ Rotor inertia	gcm ²	3.06
Thermal data		
17_ Thermal resistance housing-ambient	K/W	13.4
18_ Thermal resistance winding-housing	K/W	3.8
19_ Thermal time constant winding	s	19.4
20_ Thermal time constant motor	S	757
21_ Ambient temperature	°C	-40+100
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		
23_ Max. speed	rpm	11000
24_ Axial play	mm	00.24
Preload	N	4.0





28_	Max. radial load [mm from flange]	N	29 [5]
	Other specifications		
29_	Number of pole pairs		4
30_	Number of phases		3
31_	Weight of motor	g	113
32_	Typical noise level [rpm]	dBA	56 [9000]

Ν

Ν

Connection A and B, motor (Cable AWG 18) Motor winding 1 black Motor winding 2 white Motor winding 3

yellow Hall sensor 1 brown Hall sensor 2 Hall sensor 3 grey

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (V_{CC}) and blue (GND) connections are not used.

Connection Temperature sensor (Cable AWG 26) NTC

purple

Direction of force

26_ Max. axial load (dynamic)

27_ Max. force for press fits (static)

(static, shaft supported)

25_ Radial play

purple NTC Resistance 25°C: 10 kOhm ±5%, beta (25–85°C): 3434 K

Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
394_GPX 22 A/C	1-2	for motor type A:	547_DEC Module 24/2
395_GPX 22 LN/LZ	1-2	514_ENX 22 EASY INT	547_DEC Module 50/5
396_GPX 22 HP	2-3	for motor type B:	550_ESCON Module 24/2
398_GPX 22 UP	1-4	514_ENX 22 EASY INT Abs	.551_ESCON 36/3 EC
400_GPX 26 A/C	3		551_ESCON Module 50/4 EC-S
401_GPX 26 LN/LZ	3		551_ESCON Module 50/5
402_GPX 26 HP	4		553_ESCON 50/5
			561 FPOS4 Micro 24/5

Flange front: thread holes/center thread Flange back: plastic ring/center thread

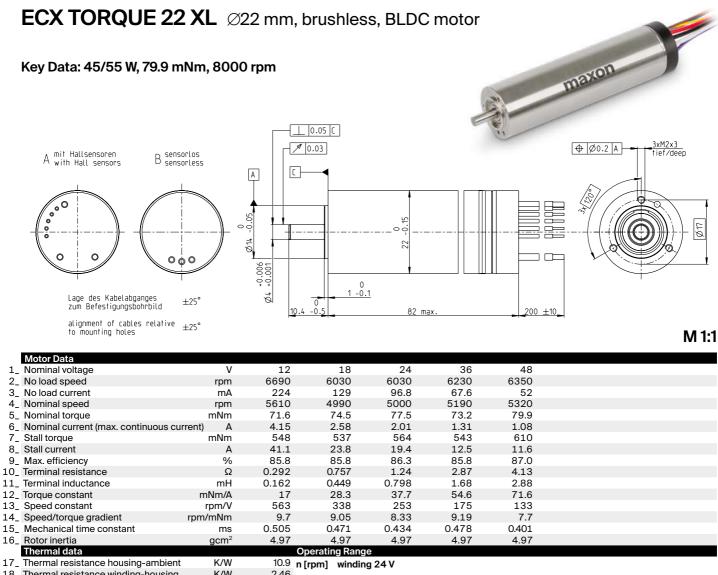
Shaft front: length/diameter

Electric connection: cable length/pin connection/connector

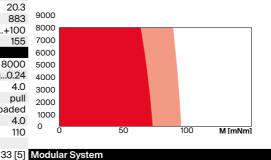
Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an

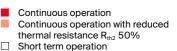
Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog Accessories section.

562_EPOS4 Module 50/5 565_EPOS4 Compact 50/5



TO_	ROLUI IIIEI LIA	gciii	4.91
	Thermal data		
17_	Thermal resistance housing-ambient	K/W	10.9
18_	Thermal resistance winding-housing	K/W	2.46
19_	Thermal time constant winding	S	20.3
20_	Thermal time constant motor	S	883
21_	Ambient temperature	°C	-40+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23_	Max. speed	rpm	8000
24_	Axial play	mm	00.24
	Preload	N	4.0
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	4.0
27_	Max. force for press fits (static)	N	110
	(static, shaft supported)	N	





565_EPOS4 Compact 50/5

Details on catalog page 42

	Other specifications		
29_	Number of pole pairs		4
30_	Number of phases		3
31_	Weight of motor	g	162
32_	Typical noise level [rpm]	dBA	60 [5000]

N

Connection A and B, motor (Cable AWG 18) Motor winding 1 black Motor winding 2

Motor winding 3

Connection A, sensors (Cable AWG 26)

V_{cc} 5 ±0.5 V GND orange blue yellow Hall sensor 1 brown Hall sensor 2 Hall sensor 3 grey

Max. radial load [mm from flange]

28

white

Output signals: CMOS compatible push-pull stage. No pull-up resistor required. Hall signals are generated by an EASY INT sensor. In combination with the ENX EASY INT, the orange (V_{CC}) and blue (GND) connections are not used.

Connection Temperature sensor (Cable AWG 26)

purple NTC purple

Resistance 25°C: 10 kOhm ±5%, beta (25-85°C): 3434 K

Gear	Stages [opt.]	Sensor	Motor Control
394_GPX 22 A/C	1-2	for motor type A:	547_DEC Module 24/2
395_GPX 22 LN/LZ	1-2	514_ENX 22 EASY INT	547_DEC Module 50/5
396_GPX 22 HP	2-3	for motor type B:	550_ESCON Module 24/2
398_GPX 22 UP	1-4	514_ENX 22 EASY INT Abs	.551_ESCON 36/3 EC
400_GPX 26 A/C	3		551_ESCON Module 50/4 EC-S
401_GPX 26 LN/LZ	3		551_ESCON Module 50/5
402_GPX 26 HP	4		553_ESCON 50/5
			561_EPOS4 Micro 24/5
			562_EPOS4 Module 50/5

Flange front: thread holes/center thread Flange back: plastic ring/center thread

Shaft front: length/diameter

Electric connection: cable length/pin connection/connector

 $\label{thm:combined} \textit{Temperature sensor: NTC-Thermistor (only for motor type A and only when not combined with an algorithm) and the sensor of the senso$

Appropriate connectors and connecting cables are available for the configuration of the pin connection together with the external thread: see catalog Accessories section.

maxon IDX

Standard Specification No. 101	88
Terminology explanations	188
IDX Program (can be configured online)	245-250
IDX 56 S □56 mm, 270 Watt	245
IDX 56 M □56 mm, 330 Watt	246
IDX 56 L □56 mm, 400 Watt	247
IDX 70 S □70 mm, 600 Watt	248
IDX 70 M □70 mm, 800 Watt	249
IDX 70 L □70 mm, 900 Watt	250



X

DC Motor

EC Motor

Compact

Geal

Screw drive

Sensor

Motor &

ic Acc

Contact

maxon IDX

The compact brushless EC-i motor combined with a high-quality sensor in robust industrial housing is ideally suited to demanding speed and positioning tasks. This motor is also available as a drive with integrated positioning and speed controller.



- → High continuous torque
- → Outstanding energy efficiency
- Maximum power density
- → Unmatched precision in dynamic motion
- → IP65-protected design
- → Easily configured online

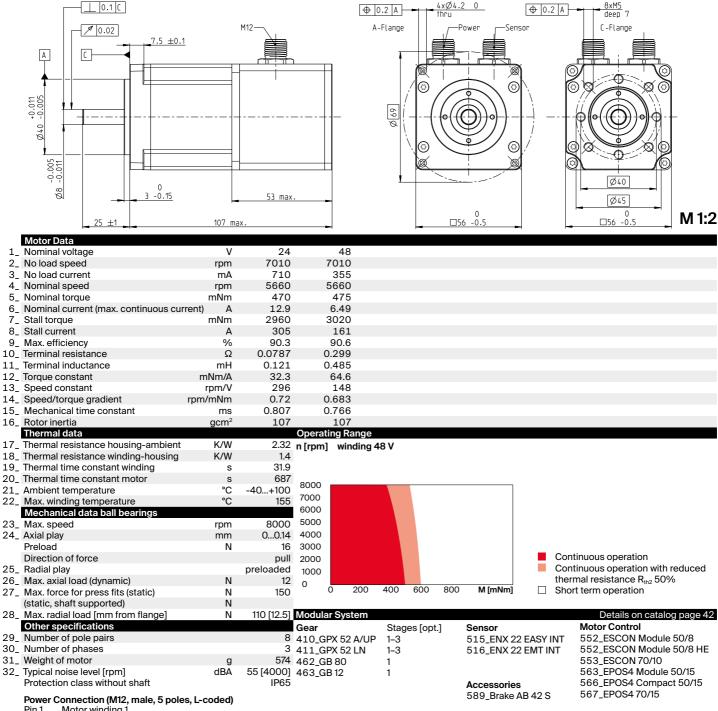
IDX 56 S □56 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 270/305 W, 469 mNm, 8000 rpm







Flange front: A-Flange/C-Flange

Encoder Interface: SSI/BiSS-C Shaft: standard/short

Motor winding 1 Pin 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 U_{brake} + (optional) U_{brake} GND (optional)

Sensor Connection (M12, male, 17 poles, A-coded)

Connection (witz, ma	ie, ir puit	55, A-COUCU)
GND	Pin 10	В
NTC	Pin 11	DATA/
V _{cc} 4.7526 V	Pin 12	DATA
A	Pin 13	CLK
1/	Pin 14	CLK/
A/	Pin 15	Hall Sensor 3
B/	Pin 16	Hall Sensor 1
1	Pin 17	Hall Sensor 2
NTC		
	GND NTC V _{cc} 4.7526 V A I/ A/ B/	NTC Pin 11 V _{cc} 4.7526 V Pin 12 A Pin 13 I/ Pin 14 A/ Pin 15 B/ Pin 16 I Pin 17

NTC resistor 25°C: 10 kOhm ±1%, beta (25-100°C): 3460 K

Compatible cables available online in the configurator

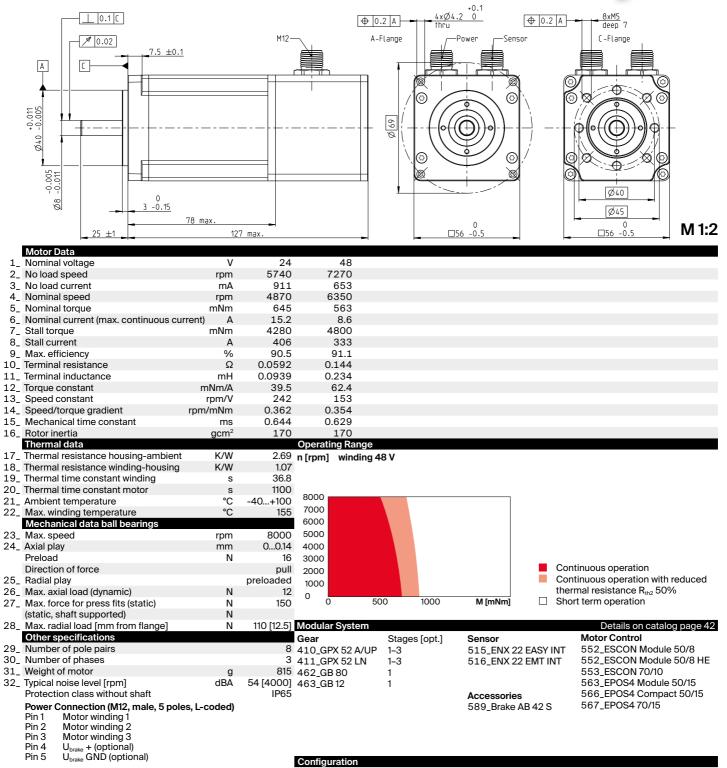
IDX 56 M □56 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 330/375 W, 640 mNm, 8000 rpm







Sensor Connection (M12, male, 17 poles, A-coded)

Pin 1 GND Pin 10 Ŕ Pin 2 Pin 11 DATA/ NTC V_{cc} 4.75...26 V Pin 3 Pin 12 DATA Pin 4 Pin 5 Pin 13 CLK A I/ Pin 14 CLK/ Pin 6 A/ Pin 15 Hall Sensor 3 Pin 7 B/ Hall Sensor 1 Pin 8 Pin 17 Hall Sensor 2 Flange front: A-Flange/C-Flange Encoder Interface: SSI/BiSS-C

Shaft: standard/short

NTC resistor 25°C: 10 kOhm ±1%, beta (25-100°C): 3460 K

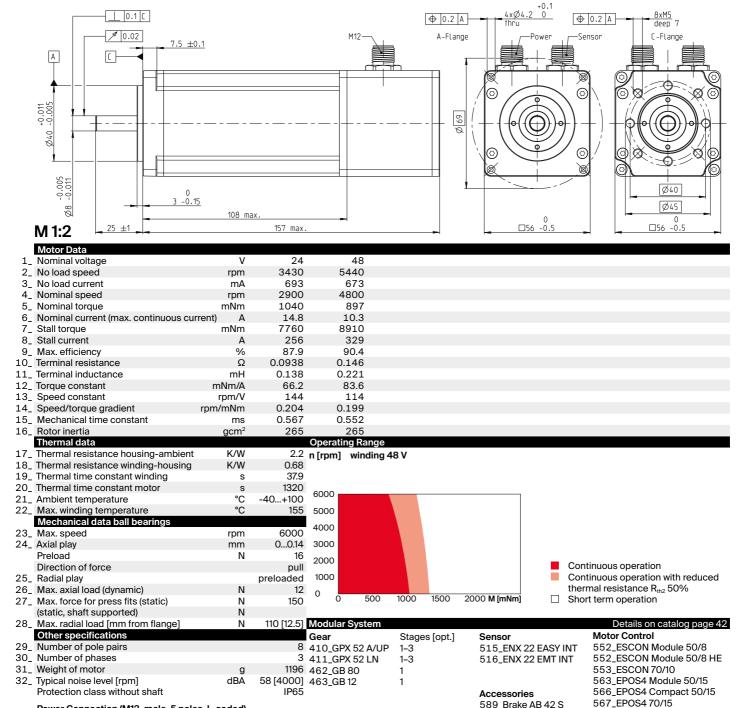
Compatible cables available online in the configurator

IDX 56 L □56 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 400/457 W, 1040 mNm, 6000 rpm





Power Connection (M12, male, 5 poles, L-coded)

Motor winding 1 Pin 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 U_{brake} + (optional) U_{brake} GND (optional)

Sensor Connection (M12, male, 17 poles, A-coded)

Pin 1	GND	Pin 10	В
Pin 2	NTC	Pin 11	DATA/
Pin 3	V _{cc} 4.7526 V	Pin 12	DATA
Pin 4	A	Pin 13	CLK
Pin 5	1/	Pin 14	CLK/
Pin 6	A/	Pin 15	Hall Sensor 3
Pin 7	B/	Pin 16	Hall Sensor 1
Pin 8	1	Pin 17	Hall Sensor 2
Pin 9	NTC		

Flange front: A-Flange/C-Flange Encoder Interface: SSI/BiSS-C Shaft: standard/short

NTC resistor 25°C: 10 kOhm ±1%, beta (25-100°C): 3460 K

Compatible cables available online in the configurator



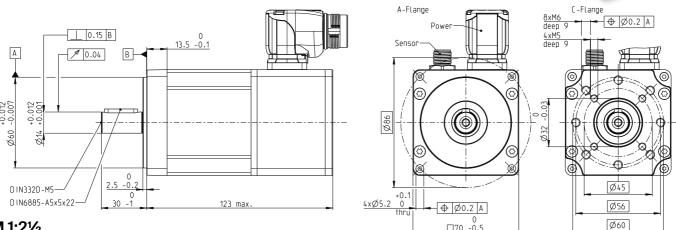
IDX 70 S □70 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 600/651 W, 1520 mNm, 6000 rpm







M 1:21/2

	Motor Data				
1,	Nominal voltage	V	24	48	60
2	No load speed	rpm	4770	4790	5000
3	No load current	mA	1250	629	536
4	Nominal speed	rpm	4090	4110	4310
5	Nominal torque	mNm	1520	1510	1430
6	Nominal current (max. c	continuous current) A	29.2	14.6	11.6
7	_ Stall torque	mNm	10200	10900	10800
8	Stall current	Α	1000	557	462
9	Max. efficiency	%	92.9	93.2	93.1
10	Terminal resistance	Ω	0.024	0.0862	0.13
11.	_ Terminal inductance	mH	0.058	0.235	0.344
12	Torque constant	mNm/A	47.7	95	114
13	_ Speed constant	rpm/V	200	101	83.9
14	Speed/torque gradient	rpm/mNm	0.101	0.0912	0.0957
15	_ Mechanical time consta	ant ms	0.598	0.543	0.569
16	Rotor inertia	gcm ²	568	568	568
	Thermal data			Operating Rai	nge

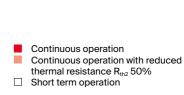
n [rpm] winding 48 V

6000 5000

	90	
Thermal data		
17_ Thermal resistance housing-ambient	K/W	1.73
18_ Thermal resistance winding-housing	K/W	0.6
19_ Thermal time constant winding	S	38.9
20_ Thermal time constant motor	S	969
21_ Ambient temperature	°C	-40+100
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		
23_ Max. speed	rpm	6000

20_	Thermal time constant motor	S	969	
21_	Ambient temperature	°C	-40+100	60
22_	Max. winding temperature	°C	155	50
	Mechanical data ball bearings			40
23_	Max. speed	rpm	6000	40
24_	Axial play	mm	0.22	30
	Preload	N	28	20
	Direction of force		pull	20
25_	Radial play		preloaded	10
26_	Max. axial load (dynamic)	N	22	0
27_	Max. force for press fits (static)	N	270	
	(static, shaft supported)	N		
28_	Max. radial load [mm from flange]	N	300 [15]	Mod
	Other specifications			Gea

4000			
3000			
2000			
1000			
0 (500	1500	2500 M [mNm]
Modula	r System		



20_	Max. radiai load [iiiiii iioiii lialige]	IV	300 [13]	MICC
	Other specifications			Gea
29_	Number of pole pairs		8	412
30_	Number of phases		3	413
31_	Weight of motor	g	1595	463
32_	Typical noise level [rpm]	dBA	55 [3000]	464
	Protection class without shaft		IP65	465

ı	Modular System		
	Gear	Stages [opt.]	Sensor
;	412_GPX 70 A/UP	1–2	515_ENX 22 EASY II
;	413_GPX 70 LN	1-2	516_ENX 22 EMT IN
,	463_GB12	1	
ı	464_GB9	1	
•	465_GB 65	2	Accessories
			591_Brake AB 60 S

Motor Control NX 22 EASY INT 557_ESCON2 Module 60/30 NX 22 EMT INT 557_ESCON2 Compact 60/30 563_EPOS4 Module 50/15 566-567_EPOS4 Compact 50/15 567_EPOS470/15

Details on catalog page 42

Power Connection (M23, male, 6 poles, N-coded)

Pin 1	Motor winding 1
Pin 2	Motor winding 3
Pin 3	FE
Pin 4	U _{brake} + (optional)
Pin 5	U _{brake} GND (optional
Pin 6	Motor winding 2

Sensor Connection (M12, male, 17 poles, A-coded)

Pin 1	GND	Pin 10	В
Pin 2	NTC	Pin 11	DATA/
Pin 3	V _{cc} 4.7526 V	Pin 12	DATA
Pin 4	A	Pin 13	CLK
Pin 5	1/	Pin 14	CLK/
Pin 6	A/	Pin 15	Hall Sensor 3
Pin 7	B/	Pin 16	Hall Sensor 1
Pin 8	1	Pin 17	Hall Sensor 2
Din 0	NTC		

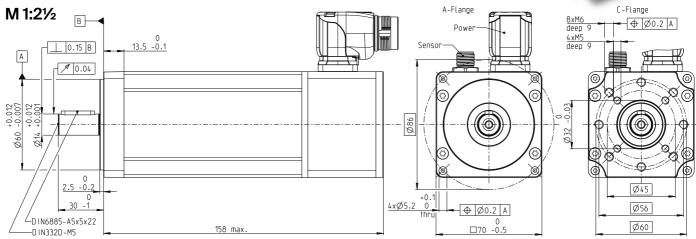
NTC resistor 25°C: 10 kOhm ±1%, beta (25-100°C): 3460 K Compatible cables available online in the configurator

Flange front: A-Flange/C-Flange Encoder Interface: SSI/BiSS-C Angle Power Connector: 0°/90°

Shaft: Standard with feather key/small diameter without feather key

Key Data: 800/890 W, 2650 mNm, 4000 rpm



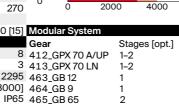


	Motor Data				
1_	Nominal voltage	V	48	60	
2_	No load speed	rpm	3670	3730	
3_	No load current	mA	815	668	
4_	Nominal speed	rpm	3130	3170	
5_	Nominal torque	mNm	2530	2650	
6_	Nominal current (max. continuous curr	rent) A	18.6	15.7	
7_	Stall torque	mNm	25400	27900	
8_	Stall current	Α	672	618	
9_	Max. efficiency	%	93.0	93.3	
10_	Terminal resistance	Ω	0.0715	0.097	
11_	Terminal inductance	mH	0.246	0.373	
12_	Torque constant	mNm/A	124	153	
13_	Speed constant	rpm/V	76.9	62.5	
14_	Speed/torque gradient	rpm/mNm	0.0443	0.0397	
15_	Mechanical time constant	ms	0.487	0.437	
16_	Rotor inertia	gcm ²	1050	1050	

	Thermal data			Operatir	ng Range
17_	Thermal resistance housing-ambient	K/W	1.35	n [rpm]	winding 4
18_	Thermal resistance winding-housing	K/W	0.38		•
19_	Thermal time constant winding	S	40.7		
20_	Thermal time constant motor	s	1130		
21_	Ambient temperature	°C	-40+100		
22_	Max. winding temperature	°C	155		

	Mechanical data ball bearings		
23_	Max. speed	rpm	4000
24_	Axial play	mm	0.22
	Preload	N	28
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	22
27_	Max. force for press fits (static)	N	270
	(static, shaft supported)	N	
28_	Max. radial load [mm from flange]	N	300 [15]

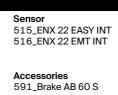




n [rpm] winding 48 V

4000 3000 2000

1000



6000 M [mNm]

Details on catalog page 42 **Motor Control** 557_ESCON2 Module 60/30 557_ESCON2 Compact 60/30 563_EPOS4 Module 50/15 566-567_EPOS4 Compact 50/15 567_EPOS470/15

Continuous operation with reduced

thermal resistance R_{th2} 50%

Continuous operation

Short term operation

Power Connection (M23, male, 6 poles, N-coded)

Pin 1 Motor winding 1 Pin 2 Motor winding 3 Pin 3 FE Pin 4 U_{brake} + (optional) U_{brake} GND (optional) Motor winding 2 Pin 5 Pin 6

Sensor Connection (M12, male, 17 poles, A-coded)

Pin 1	GND	Pin 10	В
Pin 2	NTC	Pin 11	DATA/
Pin 3	V _{cc} 4.7526 V	Pin 12	DATA
Pin 4	Α	Pin 13	CLK
Pin 5	1/	Pin 14	CLK/
Pin 6	A/	Pin 15	Hall Sensor 3
Pin 7	B/	Pin 16	Hall Sensor 1
Pin 8	1	Pin 17	Hall Sensor 2
Pin 9	NTC		

NTC resistor 25°C: 10 kOhm ±1%, beta (25-100°C): 3460 K Compatible cables available online in the configurator

Flange front: A-Flange/C-Flange Encoder Interface: SSI/BiSS-C Angle Power Connector: 0°/90°

Shaft: Standard with feather key/small diameter without feather key

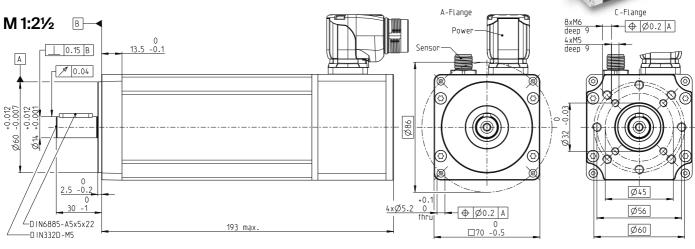


IDX 70 L □70 mm, brushless, BLDC motor

IP65 motor with industrial housing

Key Data: 900/954 W, 3750 mNm, 3000 rpm



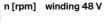


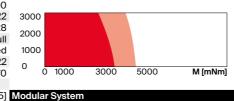
	Motor Data				
1_	Nominal voltage	V	48	60	
2_	No load speed	rpm	2780	3070	
3_	No load current	mA	771	712	
4_	Nominal speed	rpm	2430	2710	
5_	Nominal torque	mNm	3750	3360	
6_	Nominal current (max. continuous current) A	21.3	17.1	
7_	Stall torque	mNm	25800	25400	
8_	Stall current	Α	669	592	
9_	Max. efficiency	%	93.2	93.1	
10_	Terminal resistance	Ω	0.0718	0.101	
11_	Terminal inductance	mH	0.221	0.287	
12_	Torque constant	mNm/A	164	186	
13_	Speed constant	rpm/V	58.2	51.4	
14_	Speed/torque gradient rpn	n/mNm	0.0254	0.028	
15_	Mechanical time constant	ms	0.408	0.449	
16_	Rotor inertia	gcm ²	1530	1530	
	Thermal data		C	perating Range	e
					·

Thermal data		
17_ Thermal resistance housing-ambient	K/W	1.21
18_ Thermal resistance winding-housing	K/W	0.28
19_ Thermal time constant winding	S	46.8
20_ Thermal time constant motor	S	1820
21_ Ambient temperature	°C	-40+100
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		

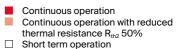
	Mechanical data ball bearings		
23_	Max. speed	rpm	3200
24_	Axial play	mm	0.22
	Preload	N	28
	Direction of force		pul
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	22
27_	Max. force for press fits (static)	N	270
	(static, shaft supported)	N	
28_	Max. radial load [mm from flange]	N	300 [15

28_	Max. radiai load [mm from flange]	IN	300 [15]	Modu
	Other specifications			Gear
29_	Number of pole pairs		8	464_0
30_	Number of phases		3	465_0
31_	Weight of motor	g	2995	
32_	Typical noise level [rpm] Protection class without shaft	dBA	65 [3000] IP65	





Stages [opt.]



Details on catalog page 42 **Motor Control** 557_ESCON2 Module 60/30 515_ENX 22 EASY INT 516_ENX 22 EMT INT 557_ESCON2 Compact 60/30 563_EPOS4 Module 50/15 566-567_EPOS4 Compact 50/15 567_EPOS470/15

Accessories 591_Brake AB 60 S

Sensor

Power Connection (M23, male, 6 poles, N-coded)

Pin 1 Motor winding 1 Pin 2 Motor winding 3 Pin 3 FE Pin 4 U_{brake} + (optional) U_{brake} GND (optional) Motor winding 2 Pin 5 Pin 6

Connection (M12, male, 17 poles, A-coded) GND Pin 10 B Sensor Pin 1

Pin 2 Pin 11 DATA/ Pin 3 Pin 4 Pin 12 Pin 13 DATA CLK V_{cc} 4.75...26 V Α Pin 5 Pin 14 CLK/ A/ B/ Pin 15 Pin 16 Pin 6 Hall Sensor 3 Pin 7 Hall Sensor 1 Pin 8 Pin 17 Hall Sensor 2 Pin 9 NTC

NTC resistor 25°C: 10 kOhm ±1%, beta (25-100°C): 3460 K Compatible cables available online in the configurator

Configuration

464_GB9

465_GB 65

Flange front: A-Flange/C-Flange Encoder Interface: SSI/BiSS-C Angle Power Connector: 0°/90°

Shaft: Standard with feather key/small diameter without feather key

ECX FLAT

maxon ECX FLAT

Standard Specification No. 101	88
Terminology explanations	188
ECX FLAT Program	253-261
ECX FLAT 22 S Ø22 mm, 4.5 Watt	253
ECX FLAT 22 S Ø22 mm, 17 Watt, High Torque	254
ECX FLAT 22 L Ø22 mm, 37 Watt	EW 255
ECX FLAT 32 S Ø32 mm, 35 Watt	256
ECX FLAT 32 S Ø32 mm, 65 Watt, High Torque	257
ECX FLAT 32 L Ø32 mm, 100 Watt, High Torque	258
ECX FLAT 42 S Ø42 mm, 40 Watt	EW 259
ECX FLAT 42 S Ø42 mm, 100 Watt, High Torque NI	EW 260
ECX FLAT 42 M Ø42 mm, 150 Watt, High Torque N	EW 261



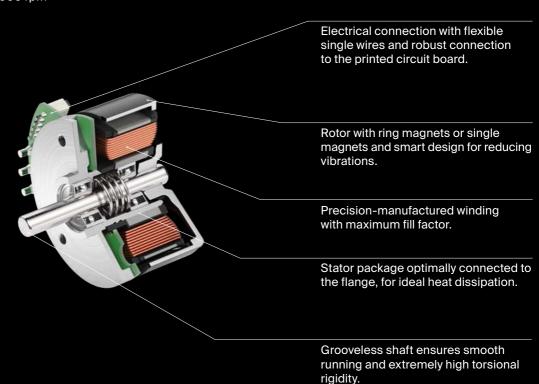
© 2024 maxon. All rights reserved.

maxon ECX FLAT

The brushless ECX FLAT motor series is optimized for high torques and is suitable for small spaces. As a result of its innovative winding technology and high-performance rare-earth magnets, the ECX FLAT has a unique ratio of torque to size. There are two versions: the economical standard version or the high-torque version. The ECX FLAT program is fully configurable. Select your mechanical and electrical interface online.

Key data

Motor Ø22 ... 42 mmMotor length14 ... 21.2 mmPower4.5 ... 150 WNominal torqueup to 214 mNmMax. permissible speedup to 15 000 rpm

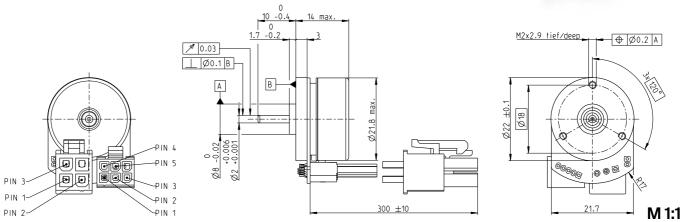


- Top torque density
- → Short length
- → Attractive price/performance ratio
- Open design for excellent heat dissipation at high speeds
- Innovative design

ECX FLAT 22 S Ø22 mm, brushless, BLDC motor

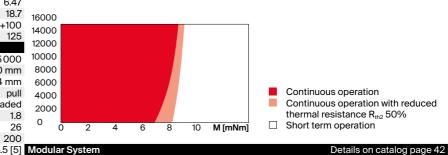
Key Data: 4.5/9.8 W, 7.6 mNm, 15 000 rpm





Motor Data				
1_ Nominal voltage	V	9	18	
2_ No load speed	rpm	10100	10600	
3_ No load current	mA	60.5	32.7	
4_ Nominal speed	rpm	5240	5650	
5_ Nominal torque	mNm	7.95	7.99	
6_ Nominal current (max. continuous	s current) A	0.977	0.514	
7_ Stall torque ¹	mNm	22.7	23.7	
8_ Stall current	Α	2.84	1.57	
9_ Max. efficiency	%	67.2	67.5	
10_ Terminal resistance	Ω	3.16	11.5	
11_ Terminal inductance	mH	0.6	2.18	
12_ Torque constant	mNm/A	8.23	15.7	
13_ Speed constant	rpm/V	1160	610	
14_ Speed/torque gradient	rpm/mNm	447	446	
15_ Mechanical time constant	ms	31.3	31.3	
16_ Rotor inertia	gcm ²	6.7	6.7	
Thermal data		0	perating Range	
17_ Thermal resistance housing-ambi	ient K/W	7.82 n	[rpm] winding 9 V	
10 7		'	•	

Thermal data		
17_ Thermal resistance housing-ambient	K/W	7.82
18_ Thermal resistance winding-housing	K/W	9.6
19_ Thermal time constant winding	S	6.47
20_ Thermal time constant motor	S	18.7
21_ Ambient temperature	°C	-40+100
22_ Max. winding temperature	°C	125
Mechanical data ball bearings		
23_ Max. speed	rpm	15 0 0 0
24_ Axial play at axial load	< 1.5 N	0 mm
	> 1.5 N	0.14 mm
Direction of force		pull
25_ Radial play		preloaded
26 Max. axial load (dynamic)	N	1.8



28_	Max. radial load [mm from flange]	N	3.5 [5]
	Other specifications		
29_	Number of pole pairs		6
30_	Number of phases		3
31_	Weight of motor	g	28.2

Gear Stages [opt.] Sensor 394_GPX 22 A/C 1-4 494_ENX 22 MILE 395_GPX 22 LN/LZ 1-4 396_GPX 22 HP 2-4 398_GPX 22 UP

Motor Control 547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_Compact 24/5 EtherCAT 3-axes

Connector, Part number Molex, 39-01-2040

N.C.

Pin 2

Pin 3

Pin 4

27_ Max. force for press fits (static)

(static, shaft supported)

Connections, sensors (cable AWG 28)

Connections, motor (cable AWG 22) Motor winding 1

Motor winding 2

Motor winding 3

Pin 1 Pin 2 Hall sensor 1 Hall sensor 3 Pin 3 Hall sensor 3 GND Pin 5

V_{Hall} 3.5...24 VDC N.C. Pin 6

Connector, Part number Molex, 43025-0600

Circuit diagram for Hall sensors see page 67. No pull-up resistor required.

Output signals: CMOS compatible push-pull stage.

¹Calculation does not include saturation effect (p. 81/188)

26

Ν

Flange: Standard flange/aluminum flange Shaft, front: Length/shaft shoulder/faces Shaft, rear: Length/shaft shoulder

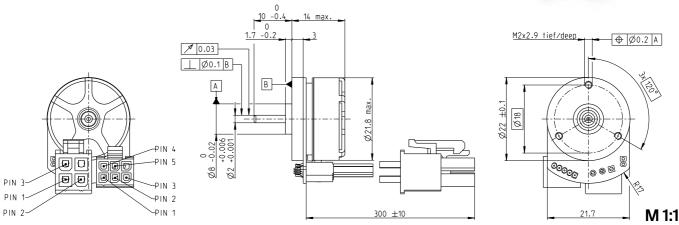
564_EPOS4 Compact 24/1.5

ECX FLAT 22 S Ø22 mm, brushless, BLDC motor

High Torque

Key Data: 17/23.7 W, 16.8 mNm, 15 000 rpm

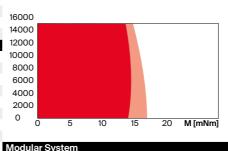


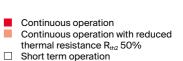


	Motor Data			
1	Nominal voltage	V	12	24
	No load speed	rpm	13300	12600
	No load speed	mA	122	55.7
	Nominal speed	rpm	10300	9650
	Nominal torque	mNm	15.1	15
	Nominal current (max. continu		1.75	0.823
	Stall torque ¹	mNm	64.5	63.1
8.	Stall current	Α	11.3	5.08
9.	Max. efficiency	%	80.7	80.5
10	Terminal resistance	Ω	1.06	4.73
11.	Terminal inductance	mH	0.158	0.706
12	Torque constant	mNm/A	8.47	17.9
13.	Speed constant	rpm/V	1130	533
	Speed/torque gradient	rpm/mNm	141	141
15.	Mechanical time constant	ms	7.15	7.13
16.	Rotor inertia	gcm ²	4.84	4.84
	Thermal data		0	perating Rar

n [rpm] winding 24 V

	THO THAT WATER		
	17_ Thermal resistance housing-ambient	K/W	9.66
:	18_ Thermal resistance winding-housing	K/W	12.6
:	19_ Thermal time constant winding	s	9.94
2	20_ Thermal time constant motor	s	23.1
2	21_ Ambient temperature	°C	-40+100
2	22_ Max. winding temperature	°C	155
	Mechanical data ball bearings		
2	23_ Max. speed	rpm	15 000
2	24_ Axial play at axial load	< 1.5 N	0 mm
		> 1.5 N	0.14 mm
	Direction of force		pull
2	25_ Radial play		preloaded
2	26_ Max. axial load (dynamic)	N	1.8
2	27_ Max. force for press fits (static)	N	26
	(static, shaft supported)	N	200
,	20 May radial load [mm from flange]	N	2 5 151





2	o_ wax.radianoad [mm from hange]	IN	ა.၁ [၁	Modular System		
	Other specifications			Gear	Stages [opt.]	Sensor
2	9_ Number of pole pairs		6	394_GPX 22 A/C	1-4	494_ENX 22 MILE
30	O_ Number of phases		3	395_GPX 22 LN/LZ	1-4	
3	1_ Weight of motor	g	26.4	396_GPX 22 HP	2-4	
				398_GPX 22 UP	1-4	
	Connections, motor (cable AWG 22)					

Details on catalog page 42 **Motor Control** 547_DEC Module 24/2 547_DEC Module 50/5

550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/5 553_ESCON 50/5

561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5

563_Compact 24/5 EtherCAT 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

Flange: Standard flange/aluminum flange Shaft, front: Length/shaft shoulder/faces Shaft, rear: Length/shaft shoulder

Connector, Part number

Motor winding 1

Motor winding 2

Motor winding 3

Molex, 39-01-2040

Connections, sensors (cable AWG 28)

Pin 1 Pin 2 Hall sensor 1 Hall sensor 3 Pin 3 Hall sensor 3 GND V_{Hall} 3.5...24 VDC N.C. Pin 4

Pin 5

Pin 2

Pin 3

Connector, Part number

Molex, 43025-0600

Circuit diagram for Hall sensors see page 67.

No pull-up resistor required.

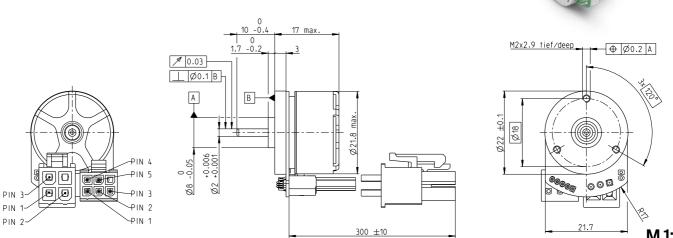
Output signals: CMOS compatible push-pull stage.

¹Calculation does not include saturation effect (p. 81/188)

ECX FLAT 22 L Ø22 mm, brushless, BLDC motor

High Torque

Key Data: 37/46.8 W, 28.3 mNm, 15 000 rpm



			-	-	IVI	1111
Motor Data						
1_ Nominal voltage	V	18	36			
2_ No load speed	rpm	11800	11100			
3_ No load current	mA	99.7	45.5			
4_ Nominal speed	rpm	9070	8520			
5_ Nominal torque	mNm	28.3	28			
6_ Nominal current (max. continuo)		1.89	0.885			
7_ Stall torque ¹	mNm	129	126			
8_ Stall current	Α	12.5	5.67			
9_ Max. efficiency	%	83.2	83.2			
10_ Terminal resistance	Ω	1.44	6.34			
11_ Terminal inductance	mH	0.26	1.16			
12_ Torque constant	mNm/A	14.4	30.6			
13_ Speed constant	rpm/V	661	313			
14_ Speed/torque gradient	rpm/mNm	65.9	64.9			
15_ Mechanical time constant	ms	4.7	4.64			
16_ Rotor inertia	gcm ²	6.82	6.82			
Thermal data			Operating Range			
17_ Thermal resistance housing-am		7.15	n [rpm] winding 18 V			
18_ Thermal resistance winding-hou	•	6.42				
19_ Thermal time constant winding	S	6.7	16000			
20_ Thermal time constant motor	S	17.1	14000			
21_ Ambient temperature	°C	-40+100	12000			
22_ Max. winding temperature		155	10000			
Mechanical data ball bearings		15,000	8000			
23_ Max. speed	rpm < 1.5 N	15 000 0 mm				
24_ Axial play at axial load	< 1.5 N > 1.5 N	0.14 mm	6000			
Direction of force	> 1.0 IV	0.14 mm pull	4000		Continuous operation	
Direction of force		pull	2000		Johnnada operation	

25_	Direction of force Radial play	> 1.5 N	0.14 mm pull preloaded	400 200										Continuous operation Continuous operation with reduced
26_	Max. axial load (dynamic)	N	1.8	0	0	5	10	15	20	25	30	M [mNm]	_	thermal resistance R _{th2} 50%
27_	Max. force for press fits (static)	N	26										Ш	Short term operation
	(static, shaft supported)	N	200											
28_	Max. radial load [mm from flange]	N	3.5 [5]	Modu	lar S	ysten	n							Details on catalog page 42
	Other specifications			Gear			9	Stage	s [opt	t.]	Sens	or		Motor Control
29_	Number of pole pairs		6	394_0	PX 2	22 A/C	1	-4		-	494_	ENX 22 MIL	E	547_DEC Module 24/2

394_GPX 22 A/C 30_ Number of phases 3 395_GPX 22 LN/LZ 1-4 31_ Weight of motor 396_GPX 22 HP 398_GPX 22 UP

Connections, motor (cable AWG 22) Pin 1 Motor winding 1

N.C. Connector, Part number Molex, 39-01-2040

Motor winding 2

Motor winding 3

Pin 2

Pin 3

Connections, sensors (cable AWG 28)

Pin 1 Pin 2 Hall sensor 1 Hall sensor 3 Hall sensor 3 Pin 3 GND V_{Hall} 3.5...24 VDC N.C. Pin 5 Pin 6

Connector, Part number

Molex, 43025-0600

Circuit diagram for Hall sensors see page 67.

No pull-up resistor required.

Output signals: CMOS compatible push-pull stage.

¹Calculation does not include saturation effect (p. 81/188)

Flange: Standard flange/aluminum flange

Shaft, front: Length/shaft shoulder/faces

Shaft, rear: Length/shaft shoulder

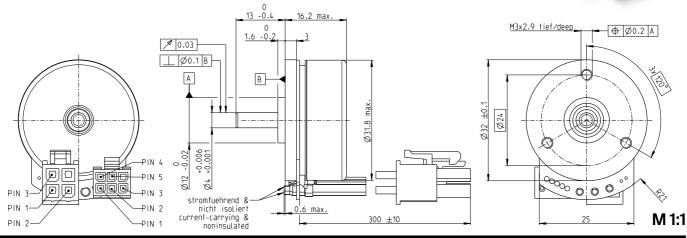
547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5

563_Compact 24/5 EtherCAT 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

ECX FLAT 32 S Ø32 mm, brushless, BLDC motor

Key Data: 35/50.7 W, 35 mNm, 14000 rpm





Motor Data					
 Nominal voltage 	V	12	24	48	
2_ No load speed	rpm	11000	12200	13700	
3_ No load current	mA	179	106	64.8	
4_ Nominal speed	rpm	7320	8380	9600	
5_ Nominal torque	mNm	35	33.6	32.3	
6_ Nominal current (max. co	ontinuous current) A	3.03	1.66	0.905	
7_ Stall torque	mNm	107	114	117	
8_ Stall current	Α	26.6	17.4	10.3	
9_ Max. efficiency	%	76.7	77.3	77.2	
10_ Terminal resistance	Ω	0.452	1.38	4.66	
11_ Terminal inductance	mH	0.345	1.12	3.53	
12_ Torque constant	mNm/A	10.2	18.3	32.6	
13_ Speed constant	rpm/V	937	521	293	
14_ Speed/torque gradient	rpm/mNm	41.6	39.2	41.8	
15_ Mechanical time constar	nt ms	14.2	13.4	14.3	
16_ Rotor inertia	gcm ²	32.6	32.6	32.6	
Thermal data			perating Rang	е	

n [rpm] winding 24 V

6000

4000

2000

Thermal data		
17_ Thermal resistance housing-ambient	K/W	3.99
18_ Thermal resistance winding-housing	K/W	4.74
19_ Thermal time constant winding	S	11.3
20_ Thermal time constant motor	S	125
21_ Ambient temperature	°C	-40+100
22_ Max. winding temperature	°C	125
Mechanical data ball bearings		
23_ Max. speed	rpm	14000

~~_	wax. Willaing temperature	U	120
	Mechanical data ball bearings		
23_	Max. speed	rpm	14000
24_	Axial play at axial load	< 4 N	0 mm
		> 4 N	0.14 mm
	Direction of force		pull
25_	Radial play		preloaded
26_	Max. axial load (dynamic)	N	4
27_	Max. force for press fits (static)	N	45
	(static, shaft supported)	N	1000
28_	Max. radial load [mm from flange]	N	12 [5]
	Other enceifications		

28_	Max. radial load [mm from flange]	N	12 [5]
	Other specifications		
29_	Number of pole pairs		6
30_	Number of phases		3
31_	Weight of motor	g	62.9

Modular System Gear Stages [opt.] Sensor 403_GPX 32 A/C 1-3 404_GPX 32 LN/LZ 1-3 405_GPX 32 HP 406_GPX 32 UP

30

20

Flange: Standard flange/aluminum flange

Shaft, front: Length/shaft shoulder/faces

Shaft, rear: Length/shaft shoulder

495_ENX 32 MILE

50 M [mNm]

551_ESCON 36/3 EC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5

Continuous operation

Short term operation

Motor Control

Continuous operation with reduced

Details on catalog page 42

thermal resistance R_{th2} 50%

547_DEC Module 24/2

547_DEC Module 50/5

550_ESCON Module 24/2

563_Compact 24/5 EtherCAT 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

Connections, motor (cable AWG 20)

Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 N.C. Connector, Part number Molex, 39-01-2040

Connections, sensors (cable AWG 28) Hall sensor 1

Pin 1 Pin 2 Hall sensor 2 Hall sensor 3 GND V_{Hall} 2.7...24 VDC N.C. Pin 4 Pin 5

Connector, Part number Molex, 43025-0600

Circuit diagram for Hall sensors see page 67.

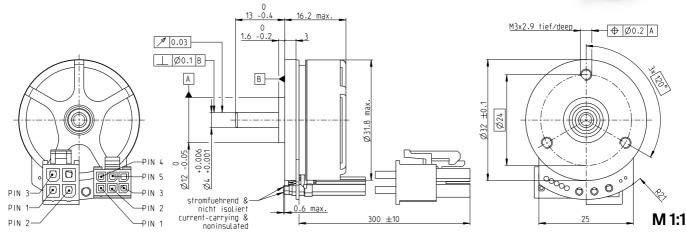
No pull-up resistor required. Output signals: CMOS compatible push-pull stage.

ECX FLAT 32 S Ø32 mm, brushless, BLDC motor

High Torque

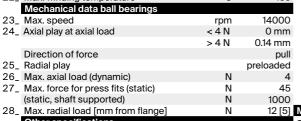
Key Data: 65/145 W, 84.9 mNm, 14 000 rpm





Motor Data					
1_ Nominal voltage	V	18	24	48	
2_ No load speed	rpm	11800	12600	13500	
3_ No load current	mA	206	172	96.4	
4_ Nominal speed	rpm	8740	9400	10400	
5_ Nominal torque	mNm	81.5	83.1	84.9	
6_ Nominal current (max. continuo	ous current) A	4.99	4.05	2.24	
7_ Stall torque	mNm	274	287	265	
8_ Stall current	Α	49.4	43.8	27.5	
9_ Max. efficiency	%	87	87.5	88.4	
10_ Terminal resistance	Ω	0.365	0.548	1.75	
11_ Terminal inductance	mH	0.194	0.303	1.05	
12_ Torque constant	mNm/A	14.4	18	33.7	
13_ Speed constant	rpm/V	662	529	284	
14_ Speed/torque gradient	rpm/mNm	16.7	16.1	14.7	
15_ Mechanical time constant	ms	4.27	4.11	3.76	
16_ Rotor inertia	gcm ²	24.4	24.4	24.4	
Thermal data		C	perating Rang	е	

	Thermal data		
17_	Thermal resistance housing-ambient	K/W	4.31
18_	Thermal resistance winding-housing	K/W	2.56
19_	Thermal time constant winding	s	7.33
20_	Thermal time constant motor	s	128
21_	Ambient temperature	°C	-40+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23_	Max. speed	rpm	14000
24_	Axial play at axial load	< 4 N	0 mm





Connections, motor (cable AWG 20)

Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Connector, Part number Molex, 39-01-2040

Connections, sensors (cable AWG 28)

Pin 1 Hall sensor 1 Pin 2 Hall sensor 2 Pin 3 Hall sensor 3 Pin 4 GND Pin 5 V_{Hall} 2.7...24 VDC Pin 6 N.C.

Connector, Part number

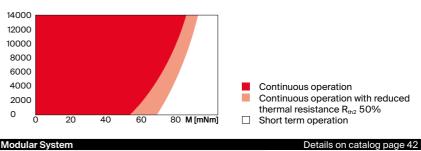
Molex, 43025-0600

Circuit diagram for Hall sensors see page 67.

No pull-up resistor required.

Output signals: CMOS compatible push-pull stage.

n [rpm] winding 24 V



Modulai Oystoiii		
Gear	Stages [opt.]	Sensor
403_GPX 32 A/C	1-3	495_ENX 32 MILE
404_GPX 32 LN/LZ	1-3	
405_GPX 32 HP	2-4	
406_GPX 32 UP	1-4	

Flange: Standard flange/aluminum flange Shaft, front: Length/shaft shoulder/faces Shaft, rear: Length/shaft shoulder

Motor Control 547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC

551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN

561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_Compact 24/5 EtherCAT 3-axes

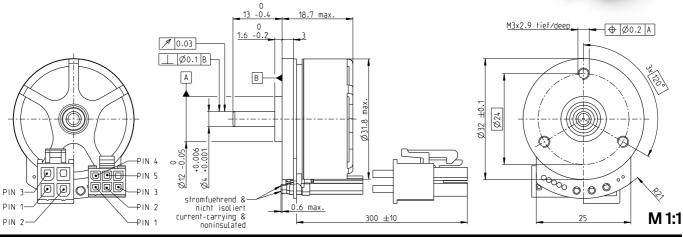
564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

ECX FLAT 32 L Ø32 mm, brushless, BLDC motor

High Torque

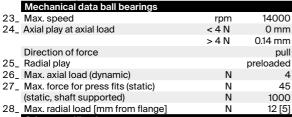
Key Data: 100/168 W, 106 mNm, 14000 rpm





Motor Data					
 Nominal voltage 	V	24	36	48	
2_ No load speed	rpm	10600	12800	13800	
3_ No load current	mA	179	161	138	
4_ Nominal speed	rpm	8100	9870	10700	
5_ Nominal torque	mNm	103	105	106	
6_ Nominal current (max	c. continuous current) A	4.24	3.46	2.81	
7_ Stall torque	mNm	438	473	488	
8_ Stall current	Α	51.6	51.1	44.9	
9_ Max. efficiency	%	88.5	89	89.2	
10_ Terminal resistance	Ω	0.465	0.705	1.07	
11_ Terminal inductance	mH	0.339	0.53	0.805	
12_ Torque constant	mNm/A	21.3	26.6	32.8	
13_ Speed constant	rpm/V	448	359	291	
14_ Speed/torque gradie	nt rpm/mNm	9.79	9.5	9.47	
15_ Mechanical time con-	stant ms	3.15	3.05	3.04	
16_ Rotor inertia	gcm ²	30.7	30.7	30.7	
Thermal data			Operating Ra	nge	

	The sum of state		
	Thermal data		
17_	Thermal resistance housing-ambient	K/W	4.31
18_	Thermal resistance winding-housing	K/W	3.1
19_	Thermal time constant winding	S	12.3
20_	Thermal time constant motor	s	153
21_	Ambient temperature	°C	-40+100
22_	Max. winding temperature	°C	155
	Mechanical data ball bearings		
23_	Max. speed	rpm	14000
24_	Axial play at axial load	< 4 N	0 mm



28_	Max. radial load [mm from flange]	N	12 [5]	Modu
	Other specifications			Gear
29_	Number of pole pairs		6	403 (
30_	Number of phases		3	404_0
31_	Weight of motor	g	71.2	405 0
				406 0

Connections, motor (cable AWG 20)

Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 N.C. Connector, Part number

Molex, 39-01-2040

Connections, sensors (cable AWG 28) Pin 1 Pin 2 Hall sensor 1 Hall sensor 2 Hall sensor 3 Pin 4

GND V_{Hall} 2.7...24 VDC N.C. Pin 5

Connector, Part number Molex, 43025-0600

Circuit diagram for Hall sensors see page 67.

No pull-up resistor required. Output signals: CMOS compatible push-pull stage.

n [rpm] winding 24 V

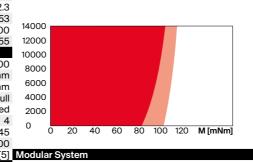
403_GPX 32 A/C

405_GPX 32 HP

406_GPX 32 UP

404_GPX 32 LN/LZ 1-3

Shaft, rear: Length/shaft shoulder



1-3

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

547_DEC Module 50/5

551_ESCON Module 50/5

551_ESCON 36/3 EC

Details on catalog page 42

Stages [opt.] Sensor 495_ENX 32 MILE

553_ESCON 50/5 553_ESCON 70/10 561_EPOS4 Micro 24/5 CAN

Motor Control

561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 50/5 563_Compact 24/5 EtherCAT 3-axes 564_EPOS4 Compact 24/1.5

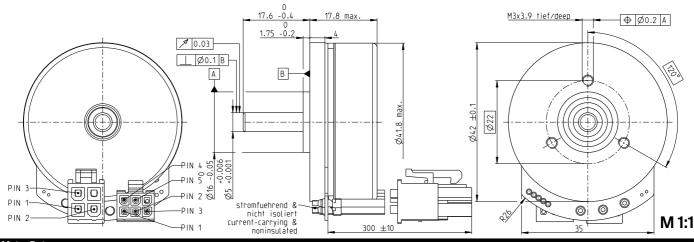
565_EPOS4 Compact 50/5 567_EPOS4 50/5

Flange: Standard flange/aluminum flange Shaft, front: Length/shaft shoulder/faces

ECX FLAT 42 S Ø42 mm, brushless, BLDC motor

Key Data: 40/58.4 W, 55.8 mNm, 10 000 rpm





	Motor Data		
1_	Nominal voltage	V	24
2_	No load speed	rpm	8700
3_	No load current	mA	174
4_	Nominal speed	rpm	6290
5_	Nominal torque	mNm	59.8
6_	Nominal current (max. continuous curr	rent) A	2.17
7_	Stall torque	mNm	217
8_	Stall current	Α	23.6
9_	Max. efficiency	%	77.5
10_	Terminal resistance	Ω	1.01
11_	Terminal inductance	mH	0.802
12_	Torque constant	mNm/A	25.7
13_	Speed constant	rpm/V	372
14_	Speed/torque gradient	rpm/mNm	14.7
15_	Mechanical time constant	ms	13.5
16_	Rotor inertia	gcm ²	87.5

10_ Rotor mertia	gciii	01.5		
Thermal data			Operatin	g Range
17_ Thermal resistance housing-ambient	K/W	2.83	n [rpm]	winding 4
18_ Thermal resistance winding-housing	K/W	5.82		•
19_ Thermal time constant winding	S	19.9		
20_ Thermal time constant motor	S	157	10000	
21_ Ambient temperature	°C	-40+100	10000	
22_ Max. winding temperature	°C	125	8000	
Mechanical data ball bearings				
23_ Max. speed	rpm	10000	6000	

23_ Max. speed	rpm	10000
24_ Axial play at axial load	< 6 N	0 mm
	> 6 N	0.14 mm
Direction of force		pull
25_ Radial play		preloaded
26_ Max. axial load (dynamic)	N	6
27_ Max. force for press fits (static)	N	86
(static, shaft supported)	N	1300
28_ Max. radial load [mm from flange]	N	35 [5]
Other specifications		

29_ Number of pole pairs 8 30_ Number of phases 31_ Weight of motor 112

Gear Stages [opt.] Sensor 409_GPX 42 C 1-4 496_ENX 42 MILE 409_GPX 42 UP

Connections, motor (cable AWG 18) Pin 1 Motor winding 1

Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 N.C. Connector, Part number Molex, 39-01-2040

Connections, sensors (cable AWG 28) Hall sensor 1

Pin 1 Pin 2 Hall sensor 2 Hall sensor 3 GND V_{Hall} 2.7...24 VDC N.C. Pin 4 Pin 5

Connector, Part number Molex, 43025-0600

Circuit diagram for Hall sensors see page 67.

No pull-up resistor required. Output signals: CMOS compatible push-pull stage.

0 10 20 30 40 50 60 70 M [mNm]

547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 50/5 563_Compact 24/5 EtherCAT 3-axes 565_EPOS4 Compact 50/5

Details on catalog page 42

Continuous operation

Short term operation

Motor Control

567_EPOS4 50/5

Continuous operation with reduced thermal resistance R_{th2} 50%

n [rpm] winding 48 V

2000

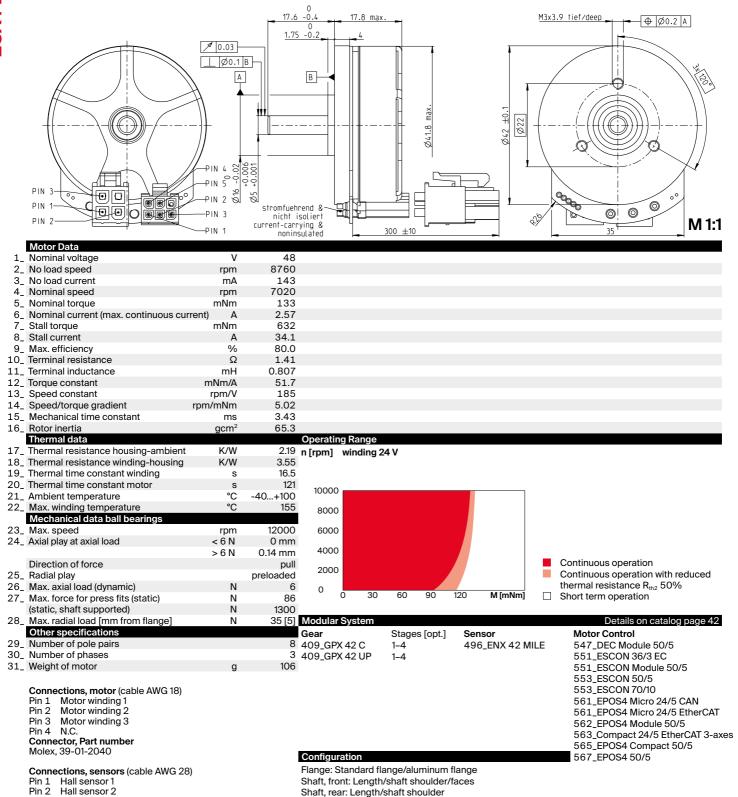
Flange: Standard flange/aluminum flange Shaft, front: Length/shaft shoulder/faces Shaft, rear: Length/shaft shoulder

ECX FLAT 42 S Ø42 mm, brushless, BLDC motor

High Torque

Key Data: 100/131 W, 125 mNm, 10 000 rpm





Shaft, rear: Length/shaft shoulder

maxon EC motor

Hall sensor 2

Hall sensor 3 GND V_{Hall} 2.7...24 VDC N.C.

Connector, Part number Molex, 43025-0600

Circuit diagram for Hall sensors see page 67. No pull-up resistor required. Output signals: CMOS compatible push-pull stage.

Pin 4 Pin 5

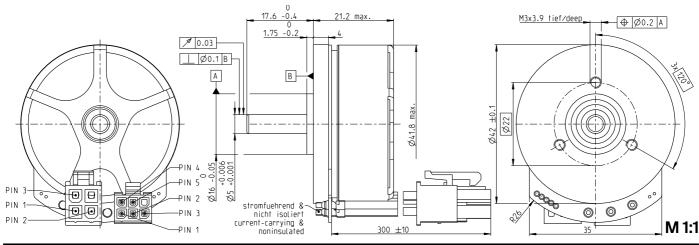
260

ECX FLAT 42 M Ø42 mm, brushless, BLDC motor

High Torque

Key Data: 150/224 W, 213 mNm, 10 000 rpm





Motor Data			
1_ Nominal voltage	V	24	
2_ No load speed	rpm	8050	
3_ No load current	mA	363	
4_ Nominal speed	rpm	6470	
5_ Nominal torque	mNm	214	
6_ Nominal current (max. conf	tinuous current) A	7.34	
7_ Stall torque	mNm	1120	
8_ Stall current	Α	103	
9_ Max. efficiency	%	83.5	
10_ Terminal resistance	Ω	0.233	
11_ Terminal inductance	mH	0.153	
12_ Torque constant	mNm/A	28.2	
13_ Speed constant	rpm/V	339	
14_ Speed/torque gradient	rpm/mNm	2.8	
15_ Mechanical time constant	ms	2.53	
16_ Rotor inertia	gcm ²	86.2	
Thermal data			Operating Range

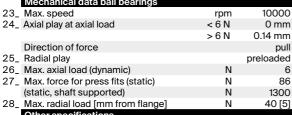
n [rpm] winding 24 V

10000 8000 6000

4000

2000

TO_ ROTOL ILIEUTIA	gcm-	00.2
Thermal data		
17_ Thermal resistance housing-ambient	K/W	1.66
18_ Thermal resistance winding-housing	K/W	3.01
19_ Thermal time constant winding	S	20.1
20_ Thermal time constant motor	s	92.2
21_ Ambient temperature	°C	-40+100
22_ Max. winding temperature	°C	155
Mechanical data ball bearings		
23_ Max. speed	rpm	10000



Other specifications 29_ Number of pole pairs 30_ Number of phases 31_ Weight of motor

0 100 150 200 M [mNm] 40 [5] Modular System Gear Stages [opt.] Sensor 8 409_GPX 42 C 1-4 496_ENX 42 MILE

3 409_GPX 42 UP

Connections, motor (cable AWG 18) Motor winding 1

Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 N.C. Connector, Part number Molex, 39-01-2040

Connections, sensors (cable AWG 28) Hall sensor 1

Pin 1 Pin 2 Hall sensor 2 Hall sensor 3 GND V_{Hall} 2.7...24 VDC N.C. Pin 4 Pin 5

Connector, Part number Molex, 43025-0600

Circuit diagram for Hall sensors see page 67.

No pull-up resistor required. Output signals: CMOS compatible push-pull stage.

Flange: Standard flange/aluminum flange Shaft, front: Length/shaft shoulder/faces Shaft, rear: Length/shaft shoulder

Motor Control 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/5 553_ESCON 50/5 553_ESCON 70/10 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 50/5 563_Compact 24/5 EtherCAT 3-axes

Details on catalog page 42

Continuous operation with reduced

thermal resistance R_{th2} 50%

Continuous operation

Short term operation

565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

-	

maxon EC

Standard Specification No. 101		88
Terminology explanations		188
EC Program		265-271
EC 22 Ø22 mm, 80 Watt	HD	265
EC 22 Ø22 mm, 240 Watt	HD	266
EC 32 Ø32 mm, 80 Watt		267
EC 40 Ø40 mm, 170 Watt		268
EC 45 Ø45 mm, 150 Watt		269
EC 45 Ø45 mm, 250 Watt		270
EC 60 Ø60 mm, 400 Watt		271



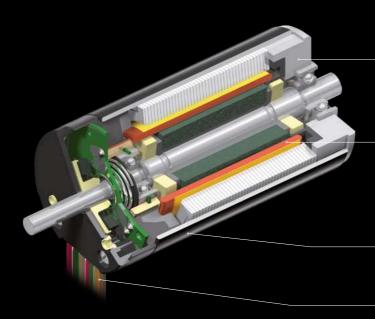
© 2024 maxon. All rights reserved.

maxon EC

The electrically commutated maxon EC motors are longer-lasting than their counterparts in the DC range. The long life span offered by the brushless design is due to the use of preloaded ball bearings. The EC motors have excellent torque characteristics, high power, and a wide speed range. The outstanding controllability of the motors enables high-precision positioning tasks.

Key data

Motor Ø22 ... 60 mmMotor length60 ... 180 mmPower80 ... 400 WNominal torqueup to 800 mNmMax. permissible speedup to 25 000 rpm



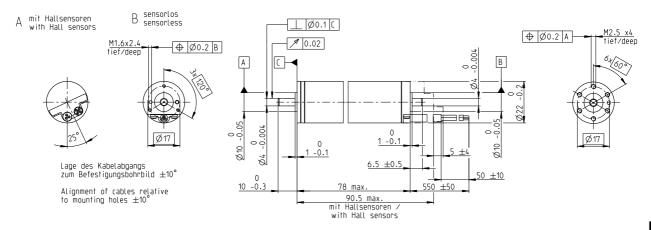
Metal housing and flange ensure good heat dissipation and mechanical stability.

"The centerpiece" is the ironless maxon winding. Its physical design offer benefits such as a zero cogging torque, high efficiency and excellent control dynamics.

The motor housing is a steel tube – non-magnetic, rigid, coated.

Strain-relieved cables; dust-protected depending on the size, with or without connector.

- Designed for long uptime
- Robust design
- → From diameter 45 mm with dust and splash protection
- "Heavy Duty" version for extreme environmental conditions



M 1:2

Stock program		Part Numbers					
Standard program		r art reambers					
Special program (on request)							
A with	n Hall sensors		42644	8			
	B sensorless		42644	.9			
Motor Data							
Values at nominal voltage and ambient temp	erature °C	25	100	150	200		
1 Nominal voltage	V	48	48	48	48		
2 No load speed	rpm	13200	13600	13800	14100		
3 No load current	mA	83.1	53.4	54.9	56.5		
4 Nominal speed ¹	rpm	11400	11700	12200	13200		
5 Nominal torque ¹	mNm	56.6	44	32.4	14.9		
6 Nominal current (max. continuous cu	rrent) A	1.72	1.35	1.03	0.515		
7 Stall torque	mNm	460	346	295	256		
8 Stall current	Α	13.4	10.3	8.98	7.93		
9 Max. efficiency	%	85.2	86	85	84		
Characteristics							
10 Terminal resistance phase to phase	Ω	3.59	4.64	5.35	6.05		
11 Terminal inductance phase to phase	mH	0.626	0.626	0.626	0.626		
12 Torque constant	mNm/A	34.4	33.5	32.9	32.3		
13 Speed constant	rpm/V	278	285	290	296		
14 Speed / torque gradient	rpm/mNm	29	39.5	47.2	55.4		
15 Mechanical time constant	ms	2.31	3.16	3.77	4.43		
16 Rotor inertia	acm ²	7.63	7.63	7.63	7.63		

¹Values for operation in thermal equilibrium. Operating Range Thermal data n [rpm] Continuous operation 912 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing In observation of above listed thermal 0.92 K/W 25000 resistance (lines 17 and 18) and above listed 19 Thermal time constant winding 5.84 sambient temperature, the maximum permissible 20 Thermal time constant motor 21 Ambient temperature* 462 s -55...+200°C 20000 winding temperature will be reached during 120 W continuous operation = thermal limit. 22 Max. winding temperature +240°C 15000 Mechanical data (preloaded ball bearing 80 W 10000 20 000 rpm Short term operation 23 Max. speed 24 Axial play at axial load < 5 N The motor may be briefly overloaded (recurring). 0 mm 40 W 5000 max. 0.14 mm > 5 N 20 W 25 Radial play preloaded Assigned power rating 20 50 40 M [mNm] 26 Max. axial load (dynamic) 8 N 30 27 Max. force for press fits (static) 98 N 0.5 1.0 1.5 2.0 ITA1 250 N (static, shaft supported) 28 Max. radial load, 5 mm from flange 16 N

Other specifications

- 29 Number of pole pairs
- 30 Number of phases
- 31 Weight of motor

Connection A, motor cable PTFE (AWG 19)

Motor winding 1 red black Motor winding 2

white Motor winding 3 Connection A, sensors cable PTFE (AWG 24)

green V_{Hall} 4.5...24 V GND blue Hall sensor 1 red black Hall sensor 2 Hall sensor 3 white

Connection B, motor cable PTFE (AWG 19)

Motor winding 1 black Motor winding 2 white Motor winding 3

Wiring diagram for Hall sensors see p. 65

General

- extreme temperature applications 210 g

- vibration tested (according to MIL-STD810F/Jan2000 Fig. 514.5C-10)

ultra-high vacuum applications (modifications necessary). low outgassing, can be baked out at 240°C

Aerospace gas turbine starter/generators for aircraft engines

regulation of combustion engines

Oil & Gas Industry

oil, gas and geothermal wells

Robotics

- robotic exploration vehicles

Industry

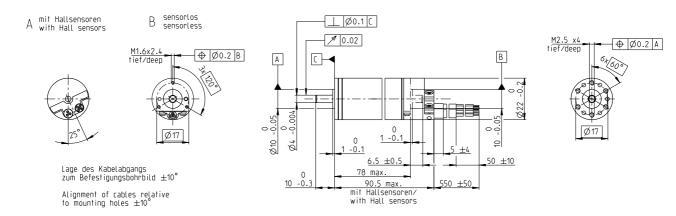
pumps and valves for liquid metal cooling systems/turbine

fuel and steam control

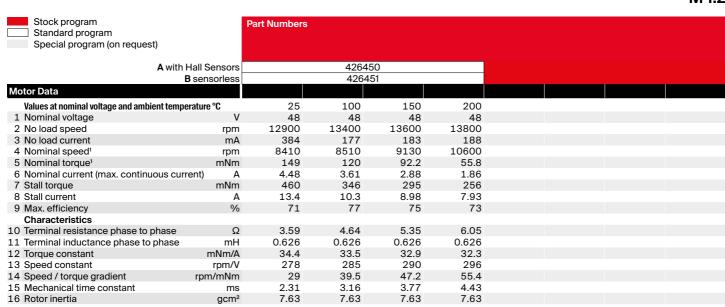
valve adjustment for gas and steam power plants

This motor contains leaded solder. It therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The motor may therefore only be used for devices that are not subject to this directive.

*The Hall sensors in this motor are rated for ambient temperatures up to 150°C. The motor with Hall sensors is fully tested at 200°C in the final inspection. Nevertheless, the Hall sensors may temporarily fail below 200°C under certain conditions.



M 1:2



¹Values in thermal steady state.

Specification **Operating Range** Comments Thermal data n [rpm] Continuous operation 0.793 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing In observation of above listed thermal 0.754 K/W resistance (lines 17 and 18) and above listed 19 Thermal time constant winding 4.78 sambient temperature, the maximum permissible 20 Thermal time constant motor 40.2 s winding temperature will be reached during 21 Ambient temperature -55...+200°C 15000 22 Max. winding temperature +240°C 240 W 200 W continuous operation = thermal limit. Mechanical data (preloaded ball bearings) 140 W 20 000 rpm Short term operation 23 Max. speed 5000 80 W 24 Axial play at axial load < 5 N The motor may be briefly overloaded (recurring). 0 mm > 5 Nmax. 0.14 mm 20 40 60 80 100 120 140 M [mNm] 25 Radial play preloaded Assigned power rating 26 Max. axial load (dynamic) 8 N 1.0 2.0 3.0 4.0 I[A] 98 N Max. force for press fits (static) 250 N

28 Max. radial load, 5 mm from flange Other specifications 29 Number of pole pairs

(static, shaft supported)

- 30 Number of phases 31 Weight of motor
- Connection A, motor cable PTFE (AWG 19)

Motor winding 1 red Motor winding 2 black

white Motor winding 3
Connection A, sensors cable PTFE (AWG 24)

V_{Hall} 4.5...24 V GND green blue red Hall sensor 1 Hall sensor 2 black Hall sensor 3 white

Connection B, motor cable PTFE (AWG 19) Motor winding 1 red Motor winding 2 black

white Motor winding 3

Wiring diagram for Hall sensors see p. 65

Application

General - extreme temperature applications

- vibration tested according to MIL-STD810F/ Jan2000 Fig. 514.5C-10

operation in oil and high pressure (only minimal lubrication, therefore use under rated ambient conditions is not suggested)

Oil & Gas Industry

435 GP 22 HD

16 N

210 g

- oil, gas and geothermal wells

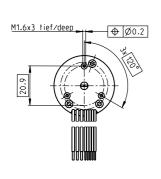
modular system	Details on catalog page 50
Gear	

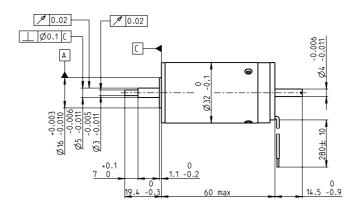
This motor contains leaded solder. It therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The motor may therefore only be used for devices that are not subject to this directive.

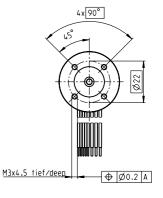
Reference medium: Shell Tellus oil T32

Operation in oil of different viscosity will affect the motor data.

*The Hall sensors in this motor are rated for ambient temperatures up to 150°C. The motor with Hall sensors is fully tested at 200°C in the final inspection. Nevertheless, the Hall sensors may temporarily fail below 200°C under certain conditions.







M 1:2

Stock program Standard program

Special program (on request)								
		118891	118892	118888	118889	118893	118890	
Motor Data								
Values at nominal voltage								
1 Nominal voltage	V	12	18	18	24	36	48	
2 No load speed	rpm	15100	14300	13100	11000	14700	11300	
3 No load current	mA	662	404	349	199	211	104	
4 Nominal speed	rpm	13400	12700	11500	9450	13200	9740	
5 Nominal torque	mNm	44.6	45.2	45.9	47.2	43.8	45.9	
6 Nominal current (max. continuous cur	rent) A	6.51	4.15	3.82	2.46	2.07	1.23	
7 Stall torque	mNm	428	443	407	355	454	353	
8 Stall current	Α	57.2	37.4	31.4	17.3	19.7	8.84	
9 Max. efficiency	%	80	81	81	80	81	80	
Characteristics								
10 Terminal resistance phase to phase	Ω	0.21	0.481	0.573	1.39	1.83	5.43	
11 Terminal inductance phase to phase	mH	0.03	0.0752	0.09	0.226	0.285	0.856	
12 Torque constant	mNm/A	7.48	11.8	13	20.5	23.1	40	
13 Speed constant	rpm/V	1280	806	737	465	414	239	
14 Speed/torque gradient	rpm/mNm	35.8	32.7	32.6	31.5	32.8	32.5	
15 Mechanical time constant	ms	7.49	6.86	6.82	6.59	6.87	6.8	
16 Rotor inertia	gcm²	20	20	20	20	20	20	

Part Numbers

Operating Range Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 54 K/W In observation of above listed thermal resistance 2.5 K/W 80 W (lines 17 and 18) and an ambient temperature 19 Thermal time constant winding 14.8 s 25000 1180 s -20...+100°C 118888 of 25°C, the maximum permissible winding 20 Thermal time constant motor 21 Ambient temperature 20000 temperature will be reached during continuous 22 Max. winding temperature +125°C operation = thermal limit. 15000 Mechanical data (preloaded ball bearings Short term operation 10000 23 Max. speed1 25000 rpm The motor may be briefly overloaded (recurring). 24 Axial play at axial load < 8 N 0 mm max. 0.14 mm 5000 > 8 N Assigned power rating 25 Radial play preloaded 20 40 60 M [mNm] 26 Max. axial load (dynamic) 27 Max. force for press fits (static) 5.6 N 98 N 2.0 4.0 6.0 Ι[A] (static, shaft supported) 1200 N 28 Max. radial load, 5 mm from flange 28 N

Other specifications

29 Number of pole pairs 30 Number of phases

31 Weight of motor

Values listed in the table are nominal.

Connection motor (Cable AWG 22) red Motor winding 1 black Motor winding 2 white Motor winding 3
Connection sensors (Cable AWG 26) V_{Hall} 4.5...24 VDC green GND blue

red/grey Hall sensor 1 black/grey Hall sensor 2 white/grey Hall sensor 3

Wiring diagram for Hall sensors see p. 65

Sensor 3 439_GP 32 BZ

Modular System

478-486_GP 32 S

441_GP32A

Gear

270 g

536 Encoder HEDS 5540 538_Encoder HEDL 5540 543 Resolver Res 26

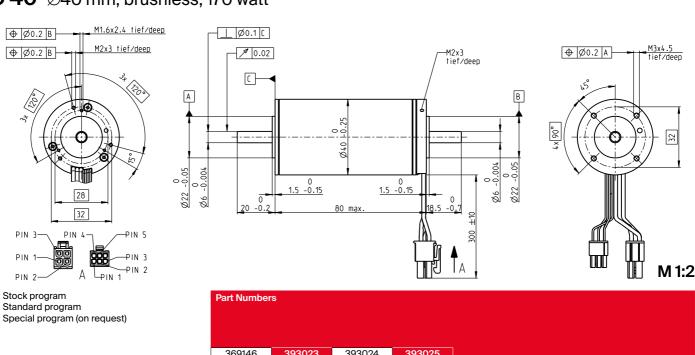
Details on catalog page 50 Motor Control 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S

552_ESCON Module 50/8 HE 553_ESCON 50/5 561 EPOS4 Micro 24/5

562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 CAN

567_EPOS4 50/5 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12



369146 **393023** 393024 393025 Motor Data (provisional) Values at nominal voltage 1 Nominal voltage 15 48 2 No load speed 9840 9840 10100 9840 rpm 3 No load current mΑ 654 408 243 204 4 Nominal speed 9090 9130 9380 9150 rpm 5 Nominal torque mNm 169 163 160 163 4.21 3.67 6 Nominal current (max. continuous current) 12.1 7.35 2620 2660 2740 2760 7 Stall torque mNm 8 Stall current 181 115 69.1 59.6 9 Max. efficiency % 89 89 89 Characteristics 10 Terminal resistance phase to phase Ω 0.0829 0.209 0.608 0.806 11 Terminal inductance phase to phase mΗ 0.0329 0.0843 0.246 0.337 12 Torque constant mNm/A 14.5 23.2 39.6 46.4 13 Speed constant rpm/\ 659 412 241 206 14 Speed/torque gradient rpm/mNm 3.77 3.71 3.7 3.57 15 Mechanical time constant 2.12 2.08 2.09 2.01 ms gcm² 53.8 16 Rotor inertia 53.8 53.8 53.8

Specifications Operating Range Comments Thermal data n [rpm] Continuous operation 5.21 K/W 17 Thermal resistance housing-ambient In observation of above listed thermal resistance 18 Thermal resistance winding-housing 1.05 K/W 170 W (lines 17 and 18) and an ambient temperature of 25°C, the maximum permissible winding 19 Thermal time constant winding 18.7 s 18000 369146 20 Thermal time constant motor 1910 s temperature will be reached during continuous 21 Ambient temperature 22 Max. winding temperature -40...+100°C +155°C operation = thermal limit. 12000 Mechanical data (preloaded ball bearings) 18 000 rpm Short term operation 23 Max. speed 24 Axial play at axial load < 9 N 6000 The motor may be briefly overloaded (recurring). 0 mm max. 0.14 mm Assigned power rating 25 Radial play preloaded 23 N 106 N 26 Max. axial load (dynamic) 50 100 150 200 M [mNm] 27 Max. force for press fits (static) (static, shaft supported) 5 10 15 20 I[A] 5500 N 75 N 28 Max. radial load, 5 mm from flange

Accessories

587_Brake AB 32

Modular System Other specifications 29 Number of pole pairs 3 Gear 30 Number of phases Sensor 580 g 452_GP 42 C 536 Encoder HEDS 5540 31 Weight of motor 457_GP 52 C 538_Encoder HEDL 5540 Values listed in the table are nominal. 543 Resolver Res 26

Connection motor (Cable AWG 16) Motor winding 1 red Motor winding 2 Motor winding 3 Pin 2 Pin 3 black white Connector Part number Molex 39-01-2040 Connection sensors (Cable AWG 26) Hall sensor 1 Pin 2 brown Hall sensor 2 Pin 3 Hall sensor 3 grey blue **GND** Pin 4 V_{Hall} 3...24 VDC N.C. green Connector Part number

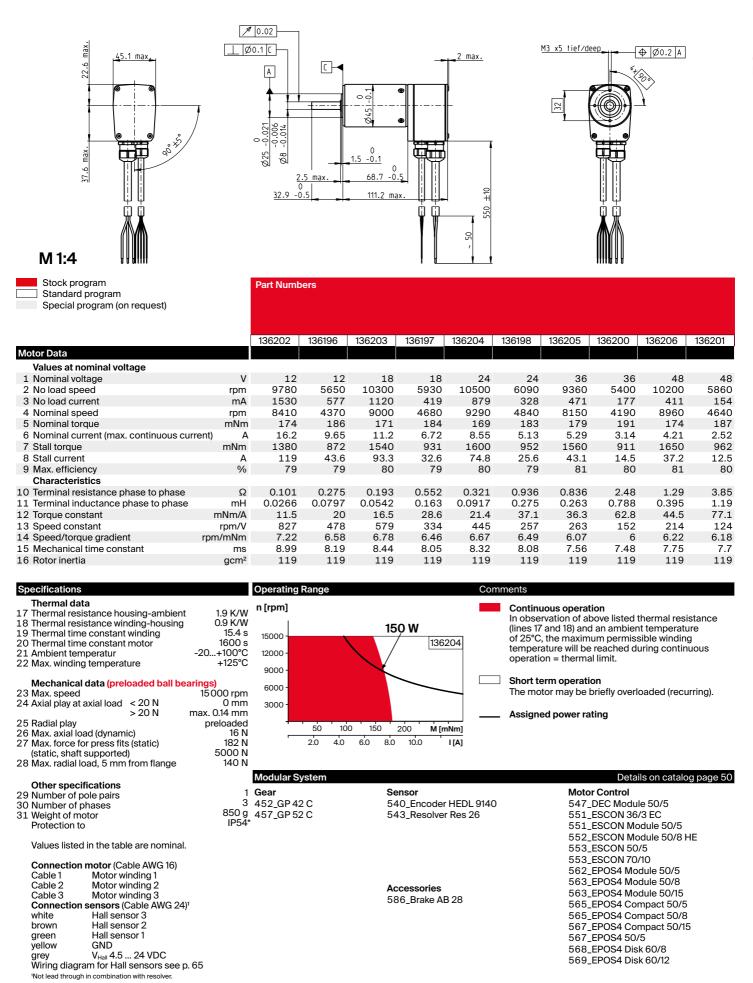
Molex 430-25-0600 Wiring diagram for Hall sensors see p. 65

551_ESCON Module 50/5 551_ESCON Module 50/4 EC-S 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 562_EPOS4 Module 50/5 563_EPOS4 Module 50/8 563_EPOS4 Module 50/15 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 566_EPOS4 Compact 50/15 567_EPOS4 50/5 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

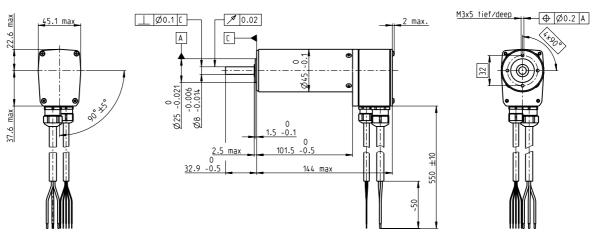
547_DEC Module 50/5

Motor Control

Details on catalog page 50



^{*}Protection level only when installed with flange-side seal.



N/I 1-4

								W I:4
Stock program Standard program Special program (on request)		Part Numbers	;					
		136210	136207	136211	136208	136212	136209	
Motor Data								
Values at nominal voltage				·				
1 Nominal voltage	V	24	24	36	36	48	48	
2 No load speed	rpm	8670	5000	10400	6010	10700	6160	
3 No load current	mA	897	341	834	312	656	244	
4 Nominal speed	rpm	7970	4300	9730	5320	10000	5490	
5 Nominal torque	mNm	311	331	312	341	316	347	
6 Nominal current (max. continuous curre	ent) A	12.5	7.51	10.2	6.21	7.94	4.86	
7 Stall torque	mNm	4400	2540	5750	3320	6110	3530	
8 Stall current	Α	167	55.8	175	58.3	143	47.7	
9 Max. efficiency	%	86	85	87	86	87	87	
Characteristics								
10 Terminal resistance phase to phase	Ω	0.143	0.43	0.206	0.617	0.336	1.01	
11 Terminal inductance phase to phase	mH	0.0565	0.17	0.0883	0.265	0.149	0.448	
12 Torque constant	mNm/A	26.3	45.5	32.8	56.9	42.7	73.9	
13 Speed constant	rpm/V	364	210	291	168	224	129	
, , ,	rpm/mNm	1.98	1.98	1.82	1.82	1.76	1.76	
15 Mechanical time constant	ms	4.34	4.34	3.99	3.99	3.85	3.85	
16 Rotor inertia	gcm²	209	209	209	209	209	209	

Operating Range Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 17 K/W In observation of above listed thermal resistance 1.1 K/W 31 s 1570 s 250 W (lines 17 and 18) and an ambient temperature of 25°C, the maximum permissible winding 19 Thermal time constant winding 12000 136210 20 Thermal time constant motor 21 Ambient temperature temperature will be reached during continuous -20...+100°C 9000 operation = thermal limit. 22 Max. winding temperature +125°C 6000 Short term operation Mechanical data (preloaded ball bearings) The motor may be briefly overloaded (recurring). 23 Max. speed 12000 rpm 3000 24 Axial play at axial load < 20 N 0 mm max. 0.15 mm > 20 N Assigned power rating 25 Radial play preloaded 100 200 300 M [mNm] 26 Max. axial load (dynamic) 27 Max. force for press fits (static) 16 N 182 N 5.0 10.0 15.0 I[A] (static, shaft supported) 5000 N 28 Max. radial load, 5 mm from flange 180 N Modular System

Values listed in the table are nominal.

Other specifications 29 Number of pole pairs

30 Number of phases

31 Weight of motor

Connection motor (Cable AWG 16) Motor winding 1 Motor winding 2 Cable 1 Cable 2 Cable 3 Motor winding 3
Connection sensors (Cable AWG 24)¹

Hall sensor 3 white brown Hall sensor 2 green yellow Hall sensor 1 GND V_{Hall} 4.5...24 VDC Wiring diagram for Hall sensors see p. 65

Sensor

1 Gear

1150 g 458_GP 52 C IP54* 459 GP 62 A

3 452_GP 42 C

459_GP 62 A

540 Encoder HEDL 9140 543 Resolver Res 26

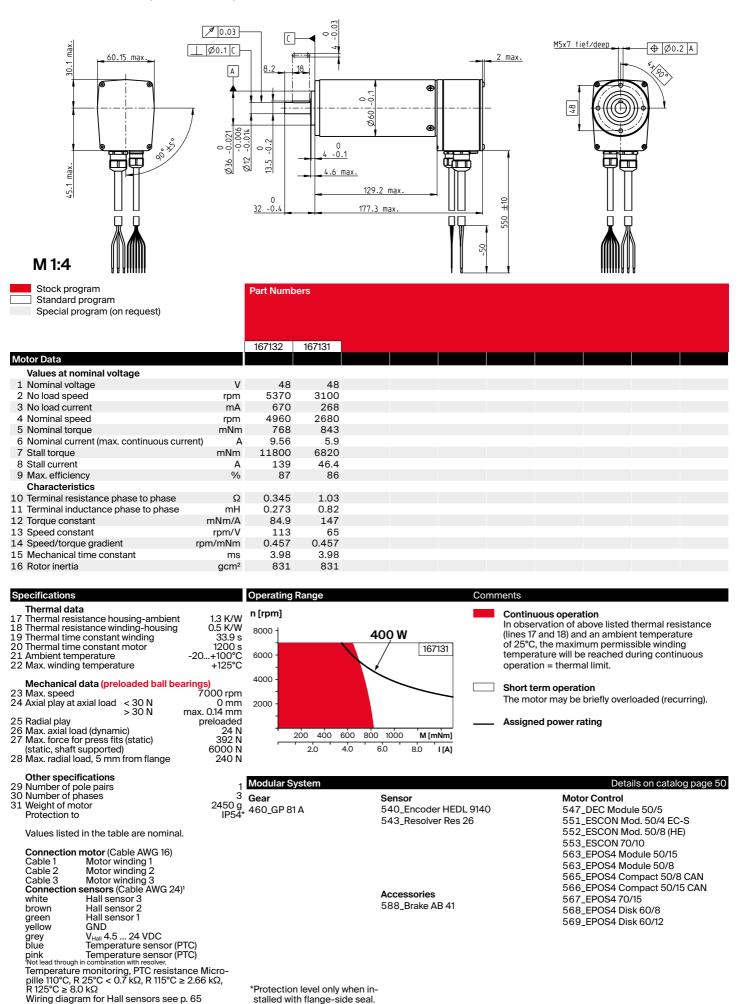
Accessories 586_Brake AB 28

Details on catalog page 50 Motor Control

551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 562_EPOS4 Module 50/5 563 EPOS4 Module 50/8 563_EPOS4 Module 50/15 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 Compact 50/15 567_EPOS4 50/5 567_EPOS470/15

568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

^{*}Protection level only when installed with flange-side seal.



-	

maxon EC-max

Standard Specification No. 101		88
Terminology explanations		188
EC-max Program		275-283
EC-max 16 Ø16 mm, 5 Watt		275
EC-max 16 Ø16 mm 2-wire, 5 Watt	IE	276
EC-max 16 Ø16 mm, 8 Watt		277
EC-max 22 Ø22 mm, 12 Watt		278
EC-max 22 Ø22 mm, 25 Watt		279
EC-max 30 Ø30 mm, 40 Watt		280
EC-max 30 Ø30 mm, 60 Watt		281
EC-max 40 Ø40 mm, 70 Watt		282
EC-max 40 Ø40 mm, 120 Watt		283

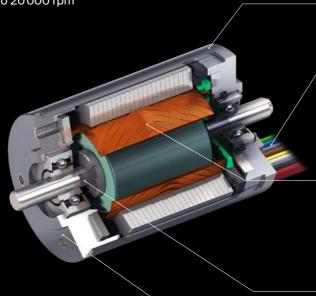


maxon EC-max

maxon EC-max drives takes the principle behind the A-max and RE-max programs one step further. The automated manufacturing ensures that the costs are kept low. Yet you can still tailor the products to your own needs: maxon EC-max stands for an optimal price/performance ratio, with all of the advantages offered by a brushless DC motor.

Key data

Motor Ø16 ... 40 mmMotor length24 ... 88 mmPower5 ... 120 WNominal torqueup to 200 mNmMax. permissible speedup to 20 000 rpm



The motor housing, a simple tube made of stainless steel – non magnetic, rigid, rust-proof.

Non-tension cables can be directed both radially and axially from the motor. Wide range of plug options.

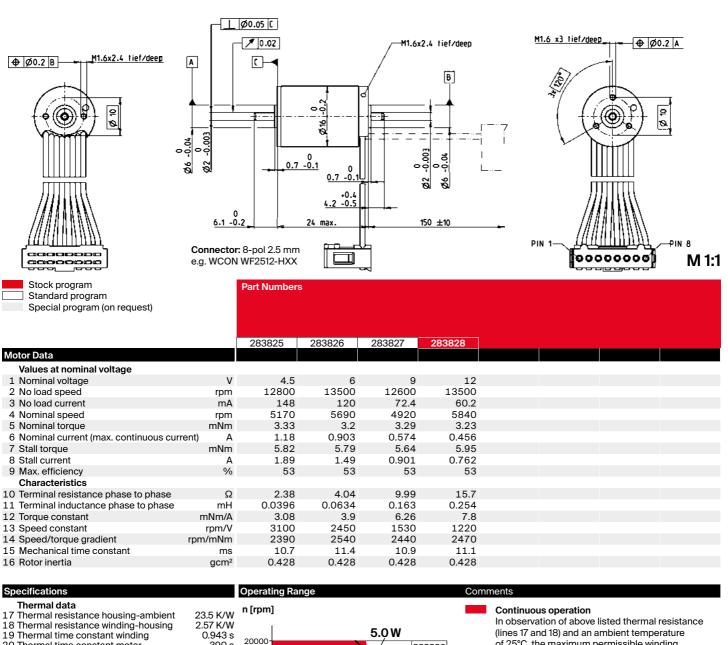
The «heart» is the ironless winding, System maxon. This means physically dependent – advantages like no detent, high efficiency and excellent regulating dynamics.

Shaft with no groove guarantees torsional stability and smooth running.

Metallic housing and flange allow good heat dissipation and mechanical stability.

- → Designed for long uptime
- Robust steel casing
- → Attractive price-performance ratio
- Speeds of up to 20 000 rpm
- Rotor with one pole pair

EC-max 16 Ø16 mm, brushless, 5 watt



17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding of 25°C, the maximum permissible winding 20 Thermal time constant motor 390 s -40...+100°C 283826 21 Ambient temperature temperature will be reached during continuous 15000 22 Max. winding temperature +155°C operation = thermal limit. 10000 Mechanical data (preloaded ball bearings) Short term operation 23 Max. speed 20000 rpm The motor may be briefly overloaded (recurring). 24 Axial play at axial load 0 mm 0.14 mm 5000 > 1.5 N Assigned power rating 25 Radial play preloaded 2.0 1.0 3.0 M [mNm] 26 Max. axial load (dynamic) 27 Max. force for press fits (static) 1 N 18 N 02 0.4 0.6 0.8 1.0 I[A] (static, shaft supported) 600 N 28 Max. radial load, 5 mm from flange 6 N

Other specifications

29 Number of pole pairs 30 Number of phases 31 Weight of motor

Values listed in the table are nominal.

Connection (Cable AWG 24) Motor winding 1 Pin 1 brown Motor winding 2 Pin 2 red Motor winding 3 V_{Hall} 3...24 VDC orange Pin 3 Pin 4 vellow GND green Pin 5 blue Hall sensor 1 Pin 6 Hall sensor 2 Pin 7 violet grey Hall sensor 3 1.... Wiring diagram for Hall sensors see p. 65

426_GP16 A 36 g 427_GP16 C 473-475_GP 16 S

Modular System

Gear

Sensor

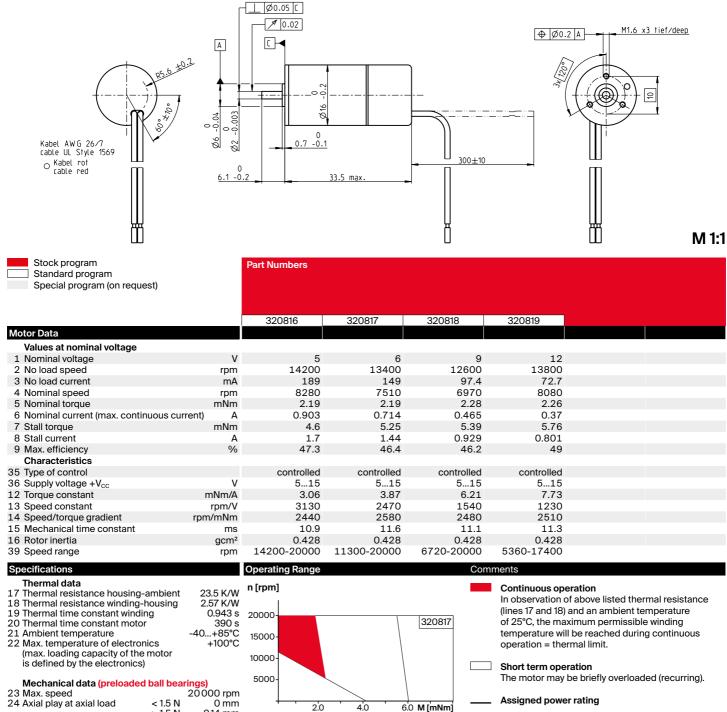
505 ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT

Motor Control 547_DEC Module 24/2

550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 561_EPOS4 Micro 24/5 562 EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5

Details on catalog page 50

EC-max 16 2-wire Ø16 mm, brushless, 5 watt, with integrated electronics



23 Max. speed 20 000 rpm
24 Axial play at axial load < 1.5 N 0 mm
> 1.5 N 0.14 mm
25 Radial play preloaded
26 Max. axial load (dynamic) 1 N
27 Max. force for press fits (static) 18 N
28 Max. radial load, 5 mm from flange 6 N

Other specifications

31 Weight of motor 32 g
Direction of rotation Clockwise (CW)

Gear g 426_GP16A

Modular System

0.5

1.0

1.5

2.0 I[A]

Values listed in the table are nominal.

Connection (Cable AWG 26/7 UL Style 1569)

 $\begin{array}{cc} \text{red} & + V_{\text{cc}} \\ \text{black} & \text{GND} \end{array}$

Protective functions

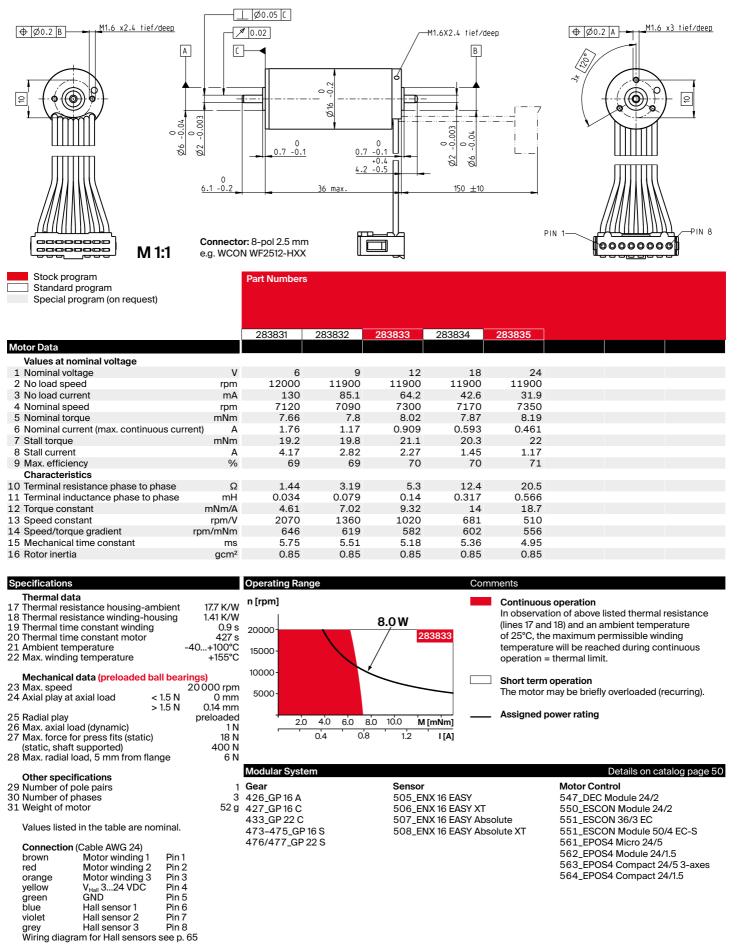
Inverse-polarity protection up to max.

Blockage protection at speed < 76 rpm
Temperature monitoring > 104°C
Current limitation 1.6 A ± 15%
Low voltage monitoring < 4 VDC

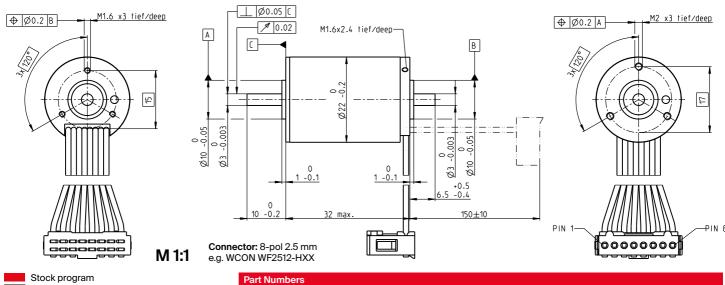
Attention: Operating voltage V_{cc} > 18 VDC will destroy the electronics Option: Direction of rotation counter-clockwise (CCW)

Details on catalog page 50

EC-max 16 Ø16 mm, brushless, 8 watt



EC-max 22 Ø22 mm, brushless, 12 watt



Stock program
Standard program
Special program (on request)

283838 283839 **283840** 283841 283837 **Motor Data** Values at nominal voltage 1 Nominal voltage 24 36 2 No load speed 11900 12100 12100 12100 12100 rpm 3 No load current mΑ 301 155 103 77.3 51.6 4 Nominal speed 7920 8040 8250 8250 8210 rpm 5 Nominal torque mNm 11 10.2 10.9 10.8 10.6 6 Nominal current (max. continuous current) 2.61 1.25 0.88 0.657 0.432 7 Stall torque 33.9 35.4 mNm 31.3 35.1 34.1 8 Stall current 7.36 3.47 2.6 1.94 1.25 9 Max. efficiency % 65 65 Characteristics 10 Terminal resistance phase to phase Ω 0.816 3.46 6.93 12.4 28.7 11 Terminal inductance phase to phase mΗ 0.0315 0.121 0.275 0.488 1.09 12 Torque constant mNm/A 4.61 9.02 13.6 18.1 27.2 13 Speed constant 2070 1060 352 rpm/\ 701 526 14 Speed/torque gradient rpm/mNm 366 406 356 360 372 15 Mechanical time constant 8.63 8.47 8.75 9.56 8.39 ms 16 Rotor inertia gcm² 2.25 2.25 2.25 2.25 2.25

Specifications **Operating Range** Comments Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 13.5 K/W In observation of above listed thermal resistance 1.72 K/W 12 W (lines 17 and 18) and an ambient temperature 19 Thermal time constant winding 1.85 s 18000 283840 of 25°C, the maximum permissible winding 20 Thermal time constant motor 567 s 21 Ambient temperature -40...+100°C temperature will be reached during continuous 22 Max. winding temperature +155°C 12000 operation = thermal limit. Mechanical data (preloaded ball bearings) Short term operation 23 Max. speed 18 000 rpm 6000 The motor may be briefly overloaded (recurring). < 4 N 24 Axial play at axial load 0 mm 0.14 mm > 4 N Assigned power rating 25 Radial play preloaded 4.0 8.0 12.0 M [mNm] 26 Max. axial load (dynamic) 27 Max. force for press fits (static) 3.5 N 53 N 0.2 0.4 0.6 0.8 Π[A] (static, shaft supported) 1400 N 28 Max. radial load, 5 mm from flange

Other specifications

- 29 Number of pole pairs 30 Number of phases
- 31 Weight of motor

Values listed in the table are nominal.

Connection	(Cable AWG 24)	
brown	Motor winding 1	Pin 1
red	Motor winding 2	Pin 2
orange	Motor winding 3	Pin 3
yellow	V _{Hall} 324 VDC	Pin 4
green	GND	Pin 5
blue	Hall sensor 1	Pin 6
violet	Hall sensor 2	Pin 7
grey	Hall sensor 3	Pin 8
Wiring diagr	am for Hall sensors	see p. 65

Modular System Gear

430_GP 22 A 3 433_GP 22 C 434_GP 22 HP 450_KD 32 476/477_GP 22 S

16 N

Sensor

505 ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT

Accessories

582_Brake AB 20

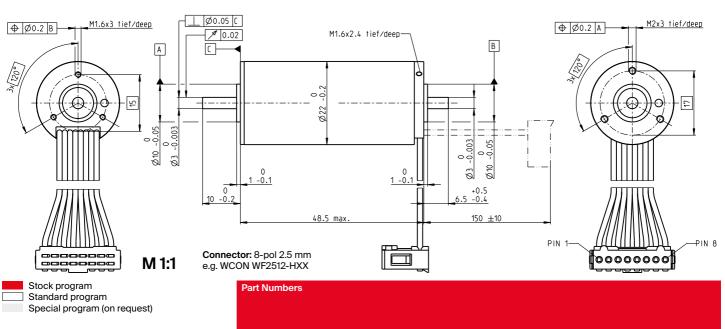
Motor Control

547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551 ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5

Details on catalog page 50

maxon EC motor

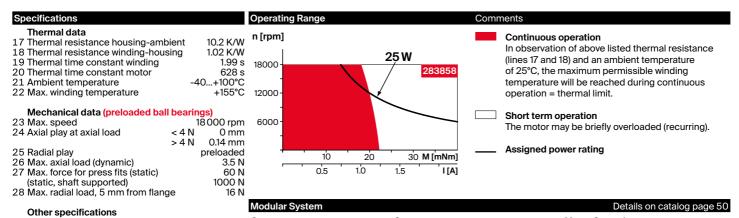
567_EPOS4 50/5



	[283856	283857	283858	283859	283860
Motor Data						
Values at nominal voltage						
1 Nominal voltage	V	12	18	24	36	48
2 No load speed	rpm	12400	12900	12900	12200	12900
3 No load current	mA	226	161	121	73.5	60.4
4 Nominal speed	rpm	9800	10300	10400	9630	10500
5 Nominal torque	mNm	23	21.8	22.7	22.5	23.2
6 Nominal current (max. continuous curr	rent) A	2.71	1.8	1.4	0.872	0.716
7 Stall torque	mNm	114	112	121	111	127
8 Stall current	Α	12.6	8.55	6.97	4	3.66
9 Max. efficiency	%	76	75	76	75	77
Characteristics						
10 Terminal resistance phase to phase	Ω	0.955	2.1	3.44	9.01	13.1
11 Terminal inductance phase to phase	mH	0.05	0.103	0.182	0.462	0.729
12 Torque constant	mNm/A	9.1	13	17.4	27.7	34.8
13 Speed constant	rpm/V	1050	732	549	345	274
14 Speed/torque gradient	rpm/mNm	110	118	109	112	103
15 Mechanical time constant	ms	5.14	5.5	5.06	5.23	4.82

4.45

4.45



29 Number of pole pairs 30 Number of phases 31 Weight of motor						
Values liste	Values listed in the table are nominal.					
Connection brown red orange	Motor winding 1 Motor winding 2 Motor winding 3	Pin 1 Pin 2 Pin 3				

16 Rotor inertia

vellow V_{Hall} 3...24 VDC Pin 4 GND Pin 5 green blue Hall sensor 1 Pin 6 Pin 7 Hall sensor 2 violet grey Hall sensor 3 1.... Wiring diagram for Hall sensors see p. 65 Hall sensor 3

Gear 3 430_GP 22 A 110 g 431_GP 22 AR 434_GP 22 HP 443_GP 32 C 450_KD 32 476/477 GP 22 S

478-486_GP 32 S

gcm²

4.45

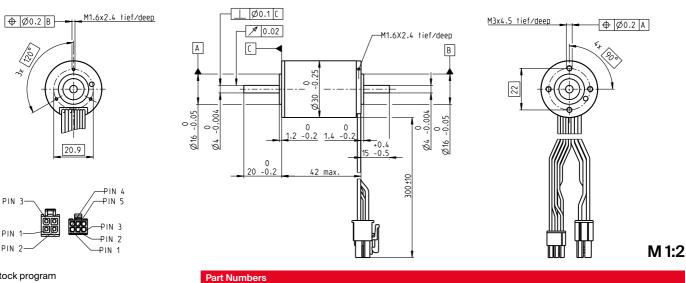
Sensor 505 ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT

4.45

4.45

Accessories 582_Brake AB 20 Motor Control 547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551 ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

EC-max 30 Ø30 mm, brushless, 40 watt



Stock program Standard program Special program (on request)

272770 272766 272768 272769 **Motor Data** Values at nominal voltage 1 Nominal voltage 12 48 2 No load speed rpm 8680 9250 9150 9250 3 No load current mΑ 223 123 80.5 61.4 4 Nominal speed 6630 7220 7090 7210 rpm mNm 5 Nominal torque 34.9 33.8 33.3 33.4 6 Nominal current (max. continuous current) 2.88 1.49 0.97 0.738 7 Stall torque mNm 153 160 154 157 8 Stall current 11.8 6.57 4.18 3.24 9 Max. efficiency % 75 75 Characteristics 10 Terminal resistance phase to phase Ω 1.01 3.65 8.61 14.8 0.088 11 Terminal inductance phase to phase mΗ 0.31 0.713 1.24 12 Torque constant mNm/A 12.9 24.3 36.8 48.6 13 Speed constant 738 259 rpm/V 393 197

60.6

6.98

11

59.9

6.9

11

Specifications	Operating Range	Comments
Thermal data 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 20 Thermal time constant motor 21 Ambient temperature 22 Max. winding temperature 3.6 K/N 1 K/N 2.1 K/N 3.25 3.25 40+100° -40+100° +155°	V 5 15000 272768	Continuous operation In observation of above listed thermal resistance (lines 17 and 18) and an ambient temperature of 25°C, the maximum permissible winding temperature will be reached during continuous operation = thermal limit.
Mechanical data (preloaded ball bearings) 23 Max. speed 15 000 rpr 24 Axial play at axial load < 6.0 N	10 20 30 40 M [mNm] N 0.5 1.0 1.5 I [A]	

59.1

6.81

11

Other specifications 29 Number of pole pairs 30 Number of phases 31 Weight of motor

14 Speed/torque gradient

16 Rotor inertia

15 Mechanical time constant

Values listed in the table are nominal.

valued libited	in the table are non	iii iai.						
Connection motor (Cable AWG 20)								
red	Motor winding 1	Pin 1						
black	Motor winding 2	Pin 2						
white	Motor winding 3	Pin 3						
	N.C.	Pin 4						
Connector	Part number							
Molex	39-01-2040							
Connection sensors (Cable AWG 26)								
yellow	Hall sensor 1	Pin 1						
brown	Hall sensor 2	Pin 2						
grey	Hall sensor 3	Pin 3						
blue	GND	Pin 4						
green	V _{Hall} 324 VDC	Pin 5						
	N.C.	Pin 6						
Connector	Part number							
Molex	430-25-0600							

Wiring diagram for Hall sensors see p. 65

Modular System Gear 195 g 441 GP 32 A 444_GP 32 C 447_GP 32 HP 450_KD 32 478-486_GP 32 S

57.8

6.66

11

rpm/mNm

ms

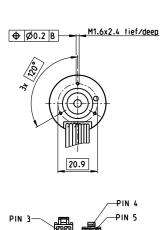
gcm²

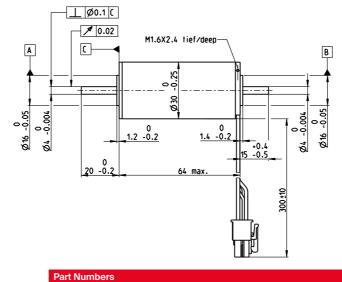
Sensor 505 ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT 539_Encoder HEDL 5540

Accessories 582_Brake AB 20

Motor Control 547 DEC Module 24/2 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553 ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 562_EPOS4 Module 24/1.5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

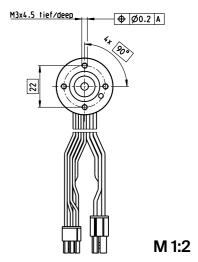
Details on catalog page 50





272763 272764

272765



Stock program
Standard program
Special program (on request)

PIN

PIN 2

272762 **Motor Data**

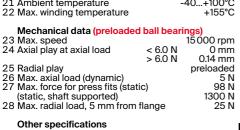
PIN 3

PIN 2

-PIN 1

Values at nominal voltage Nominal voltage 24 48 2 No load speed 7980 9340 9490 9350 rpm 3 No load current mΑ 302 191 130 95.4 4 Nominal speed 6590 8040 8270 8130 rpm 5 Nominal torque mNm 63.6 60.7 63.7 64.1 6 Nominal current (max. continuous current) 4.72 2.66 1.88 1.4 7 Stall torque 381 458 522 519 mNm 8 Stall current 26.8 18.8 14.5 10.7 9 Max. efficiency % 80 81 82 82 Characteristics 10 Terminal resistance phase to phase Ω 0.447 1.27 2.48 4.49 11 Terminal inductance phase to phase mΗ 0.049 0.143 0.312 0.573 12 Torque constant mNm/A 14.2 24.3 35.9 48.6 13 Speed constant rpm/V 672 393 266 197 14 Speed/torque gradient rpm/mNm 21.2 20.6 18.4 18.2 4.73 15 Mechanical time constant 4.86 4.21 4.17 ms 16 Rotor inertia 21.9 21.9 21.9 21.9 gcm²

Thermal data 7.4 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 0.5 K/W 2.76 s 1000 s -40...+100°C 19 Thermal time constant winding 20 Thermal time constant motor 21 Ambient temperature 22 Max. winding temperature 23 Max. speed 24 Axial play at axial load



red black

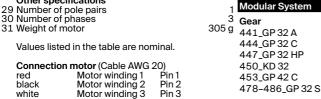
white

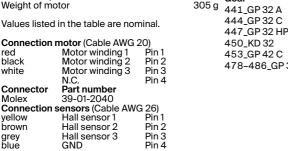
Molex

yellow

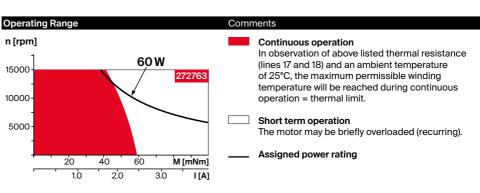
grey blue

areen Connector





Pin 5



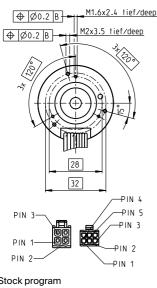
Sensor 505_ENX 16 EASY 506_ENX 16 EASY XT	
507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT 539_Encoder HEDL 5540	
Accessories 582_Brake AB 20	

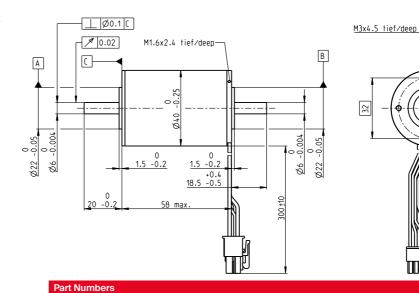
Details on catalog page 50
Motor Control
547 DEC Module 50/5
551 ESCON 36/3 EC
551 ESCON Module 50/4 EC-S
551 ESCON Module 50/5
553 ESCON 50/5
561 EPOS4 Micro 24/5
562 EPOS4 Module 50/5
563 EPOS4 Compact 24/5 3-axes
565 EPOS4 Compact 50/5
567 EPOS4 50/5
568 EPOS4 Disk 60/8
569 EPOS4 Disk 60/12

V_{Hall} 3...24 VDC N.C. Part number

430-25-0600 Wiring diagram for Hall sensors see p. 65

EC-max 40 Ø40 mm, brushless, 70 watt





Stock program Standard program Special program (on request)

Values at nominal voltage

Motor Data

1 Nominal voltage

2 No load speed

283866 **283867** 283868 283869 12 48 8030 8040 8470 9030 rpm mΑ 584 292 209 173 6410 6520 7030 7610 89.7 89.6 95 94.2 6.88 3.44 2.55 2.02 497 466 595 636 33.3 17.8 14.9 12.7 78 79 0.36 1.35 2.42 3.78 0.0464 0.186 0.379 0.592

3 No load current 4 Nominal speed rpm 5 Nominal torque mNm 6 Nominal current (max. continuous current) 7 Stall torque mNm 8 Stall current 9 Max. efficiency % Characteristics 10 Terminal resistance phase to phase Ω 11 Terminal inductance phase to phase mΗ 12 Torque constant mNm/A 14 28 40 50 341 239 13 Speed constant 682 191 rpm/\ 14 Speed/torque gradient rpm/mNm 17.6 16.5 14.4 14.4 15 Mechanical time constant 7.73 9.41 8.82 7.74 ms 16 Rotor inertia gcm² 51.2 51.2 51.2 51.2 Specifications

Operating Range Comments Thermal data n [rpm] Continuous operation 4.63 K/W 17 Thermal resistance housing-ambient 0.542 K/W 3.78 s In observation of above listed thermal resistance 18 Thermal resistance winding-housing 70 W 19 Thermal time constant winding (lines 17 and 18) and an ambient temperature 12000 20 Thermal time constant motor 1060 s of 25°C, the maximum permissible winding 21 Ambient temperature 22 Max. winding temperature -40...+100°C temperature will be reached during continuous +155°C 8000 operation = thermal limit. Mechanical data (preloaded ball bearings) 12 000 rpm 23 Max. speed 24 Axial play at axial load Short term operation 4000 The motor may be briefly overloaded (recurring). < 10 N 0 mm 0.14 mm 25 Radial play preloaded Assigned power rating 8 N 211 N 26 Max. axial load (dynamic) 40 60 100 20 80 M [mNm] 27 Max. force for press fits (static) (static, shaft supported) 1.0 2.0 3.0 4.0 ľ[A] 5000 N

Other specifications 29 Number of pole pairs 30 Number of phases

31 Weight of motor

Values listed in the table are nominal.

28 Max. radial load, 5 mm from flange

Connection motor (Cable AWG 20) Motor winding 1 Motor winding 2 Motor winding 3 Pin 2 Pin 3 black white Pin 4

Connector Part number Molex 39-01-2040 Connection sensor (Cable AWG 26) Hall sensor 1 Pin 2 brown Hall sensor 2 Pin 3 Hall sensor 3 grey blue GND Pin 4 V_{Hall} 3...24 VDC N.C. green

Part number Connector

Molex 430-25-0600 Wiring diagram for Hall sensors see p. 65

Modular System Sensor

80 N

3 Gear

460 g 453_GP 42 C 505 ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT

Accessories

584_Brake AB 28

539 Encoder HEDL 5540

Details on catalog page 50

Ф Ø0.2 A

M 1:2

М

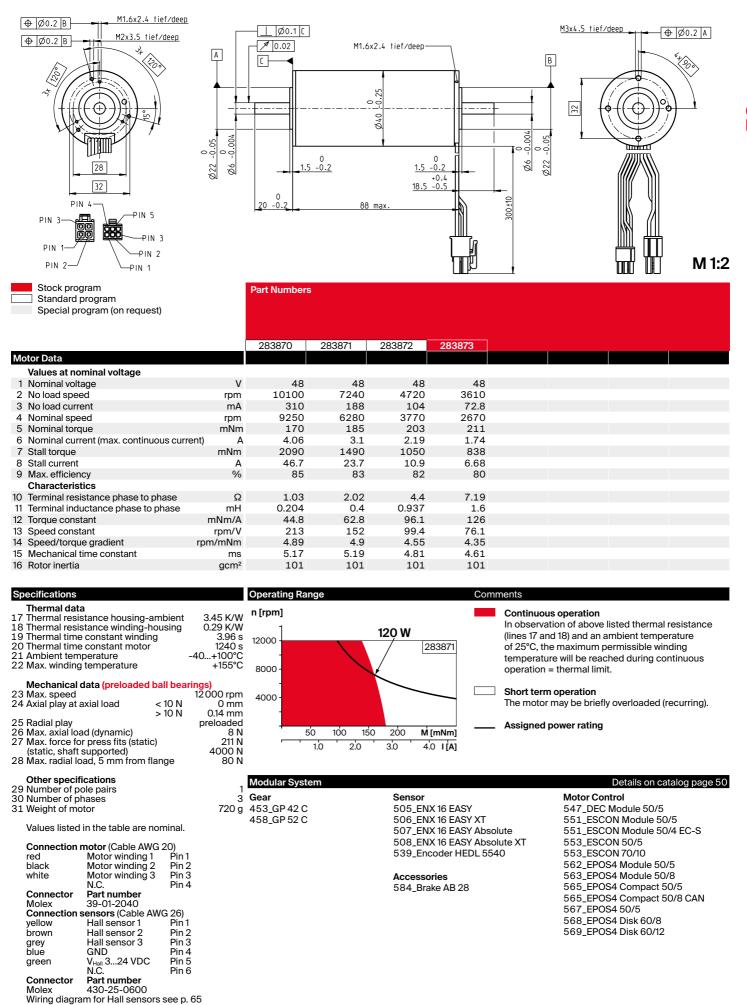
Motor Control 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/5 551_ESCON Module 50/4 EC-S 552_ESCON Module 50/8 HE 553 ESCON 50/5 553_ESCON 70/10

561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 563_EPOS4 Module 50/8

565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5

567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

EC-max 40 Ø40 mm, brushless, 120 watt



maxon EC-4pole

Standard Specification No. 101		88
Terminology explanations		188
EC-4pole Program		287-293
EC-4pole 22 Ø22 mm, 90 Watt, High Power		287
EC-4pole 22 Ø22 mm, 120 Watt, High Power		288
EC-4pole 30 Ø30 mm, 100 Watt, High Power		289
EC-4pole 30 Ø30 mm, 150 Watt, sterilizable		290
EC-4pole 30 Ø30 mm, 200 Watt, High Power		291
EC-4pole 32 Ø32 mm, 220 Watt	HD	292
EC-4pole 32 Ø32 mm, 480 Watt	HD	293

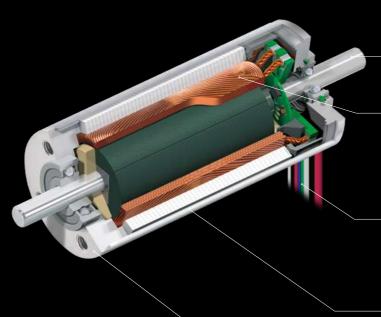


maxon EC-4pole

Ø30 mm, 200 W. That is top performance. Their special winding technology and 4-pole magnets make maxon's brushless EC-4pole drives unbeatable when it comes to delivering the highest driving power per unit of volume and weight. The motors feature a no cogging torque, high efficiency, and excellent control dynamics. The metal housing ensures good heat dissipation and mechanical stability. When it comes to service life, these drives leave the competition far behind.

Key data

Motor Ø22 ... 32 mmMotor length47 ... 162 mmPower90 ... 480 WNominal torqueup to 800 mNmMax. permissible speedup to 25 000 rpm



Grooveless shaft ensures smooth running and extremely high torsional rigidity.

The centerpiece is the ironless maxon winding. Its physical design offer benefits such as: zero cogging torque, high efficiency and excellent control dynamics.

Strain-relieved cables can be routed away from the motor both radially and axially. Connectors are possible.

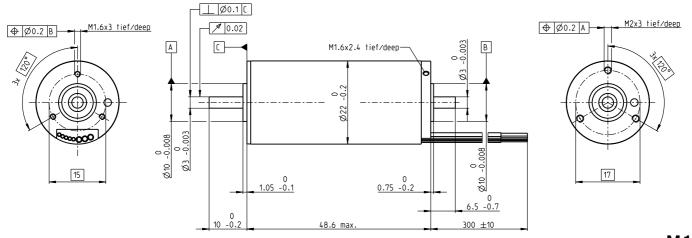
The motor housing is a steel tube – non-magnetic, rigid, stainless.

- Maximum power density due to rotors with two pole pairs
- maxon® winding with optimized interconnection of the partial windings
- Speeds up to 25 000 rpm
- High-quality magnetic return material to reduce eddy current losses
- «Heavy Duty» version for extreme environmental conditions

The metal housing and flange ensure good heat dissipation and mechanical stability.

EC-4pole 22 Ø22 mm, brushless, 90 watt

High Power



M 1:1

Stock program Standard program

Special program (on request)

		323217	323218	323219	323220	327739		
Motor Data								
Values at nominal voltage								
1 Nominal voltage	V	18	24	36	48	48		
2 No load speed	rpm	16200	16300	16300	16300	6900		
3 No load current	mA	333	164	109	81.8	20.7		
4 Nominal speed	rpm	14900	15000	14900	14900	5550		
5 Nominal torque	mNm	42.6	45.1	43.7	42.6	43.9		
6 Nominal current (max. continuous curr	ent) A	4.32	3.34	2.16	1.58	0.679		
7 Stall torque	mNm	588	639	612	586	234		
8 Stall current	Α	55.8	45.5	29.1	20.9	3.55		
9 Max. efficiency	%	85.5	89	88	88	85		
Characteristics								
10 Terminal resistance phase to phase	Ω	0.323	0.527	1.24	2.3	13.5		
11 Terminal inductance phase to phase	mH	0.0283	0.0503	0.113	0.201	1.11		
12 Torque constant	mNm/A	10.5	14	21.1	28.1	66		
13 Speed constant	rpm/V	907	680	453	340	145		
14 Speed/torque gradient	rpm/mNm	27.8	25.5	26.7	27.9	29.7		
15 Mechanical time constant	ms	1.61	1.48	1.55	1.62	1.72		
16 Rotor inertia	gcm²	5.54	5.54	5.54	5.54	5.54		

Specifications Thermal data

12.2 K/W 17 Thermal resistance housing-ambient 1.19 K/W 18 Thermal resistance winding-housing 19 Thermal time constant winding 5.12 s 482 s 20 Thermal time constant motor 21 Ambient temperature -20...+100°C 22 Max. winding temperature +155°C

Mechanical data (preloaded ball bearings)
25 000 rpm 23 Max. speed 24 Axial play at axial load < 3.0 N 0 mm 0.14 mm > 3.0 N 25 Radial play 26 Max. axial load (dynamic) 27 Max. force for press fits (static) preloaded 4 N 53 N (static, shaft supported) 1000 N 28 Max. radial load, 5 mm from flange 16 N

Other specifications

29 Number of pole pairs 30 Number of phases

31 Weight of motor

Values listed in the table are nominal.

Connection motor (Cable AWG 20) red Motor winding 1 Motor winding 3

white black Motor winding 2 Connection sensors (Cable AWG 26) Hall sensor 1 red/grey black/grey Hall sensor 2 white/grey Hall sensor 3

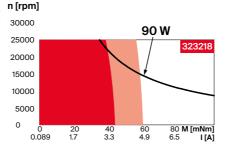
V_{Hall} 3...24 VDC green GND

Wiring diagram for Hall sensors see p. 65

Operating Range

Part Numbers

Comments



Continuous operation Continuous operation with reduced thermal resistance Rth2 50% Intermittent operation

Assigned power rating

Gear 434_GP 22 HP

444_GP 32 C 478-486_GP 32 S

Modular System

2

Sensor 505_ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT 516_ENX 22 EMT 517_ENX 16 RIO

Details on catalog page 50 Motor Control

547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/5 551_ESCON Module 50/4 EC-S 553_ESCON 50/5 553_ESCON 70/10

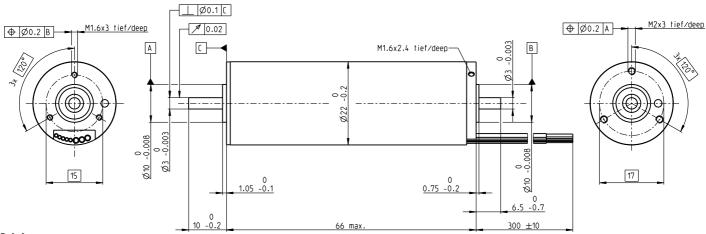
561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes

565_EPOS4 Compact 50/5 567_EPOS4 50/5

568_EPOS4 Disk 60/8

EC-4pole 22 Ø22 mm, brushless, 120 watt

High Power



M 1:1

Stock program Standard program Special program (on request)

		311535	311536	311537	311538		
Motor Data							
Values at nominal voltage							
1 Nominal voltage	V	18	24	36	48		
2 No load speed	rpm	16800	16900	17800	16900		
3 No load current	mA	298	223	166	112		
4 Nominal speed	rpm	15700	15800	16800	15800		
5 Nominal torque	mNm	54	54.6	54	54.5		
6 Nominal current (max. continuous curr	ent) A	5.55	4.21	2.95	2.1		
7 Stall torque	mNm	874	954	1090	1020		
8 Stall current	Α	86	70.4	56.8	37.7		
9 Max. efficiency	%	89	89	90	90		
Characteristics							
10 Terminal resistance phase to phase	Ω	0.209	0.341	0.634	1.27		
11 Terminal inductance phase to phase	mH	0.017	0.031	0.062	0.123		
12 Torque constant	mNm/A	10.2	13.5	19.2	27.1		
13 Speed constant	rpm/V	940	705	497	352		
14 Speed/torque gradient	rpm/mNm	19.4	17.7	16.4	16.6		
15 Mechanical time constant	ms	1.81	1.65	1.53	1.54		
16 Rotor inertia	gcm ²	8.91	8.91	8.91	8.91		

Specifications **Operating Range** Thermal data 10.7 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 0.7 K/W

19 Thermal time constant winding 4.66 s 20 Thermal time constant motor 936 s21 Ambient temperature -20...+100°C 22 Max. winding temperature +155°C

Mechanical data (preloaded ball bearings)
25 000 rpm 23 Max. speed 24 Axial play at axial load < 3.0 N 0 mm 0.14 mm > 3.0 N 25 Radial play 26 Max. axial load (dynamic) 27 Max. force for press fits (static) preloaded 4 N 53 N (static, shaft supported) 600 N 28 Max. radial load, 5 mm from flange 16 N

Other specifications

29 Number of pole pairs 30 Number of phases

31 Weight of motor

Values listed in the table are nominal.

Connection motor (Cable AWG 20) red Motor winding 1 white Motor winding 3 black Motor winding 2
Connection sensors (Cable AWG 26) Hall sensor 1 red/grey black/grey Hall sensor 2 white/grey Hall sensor 3 V_{Hall} 3...24 VDC green

GND Wiring diagram for Hall sensors see p. 65

30000 120 W 25000 20000 15000 10000 5000

50 2.2

Continuous operation Continuous operation with reduced thermal resistance Rth2 50% Intermittent operation Assigned power rating

Modular System Gear

0.077

Part Numbers

2 434_GP 22 HP 444_GP 32 C 478-486_GP 32 S

n [rpm]

Sensor 505_ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT 516_ENX 22 EMT 517_ENX 16 RIO

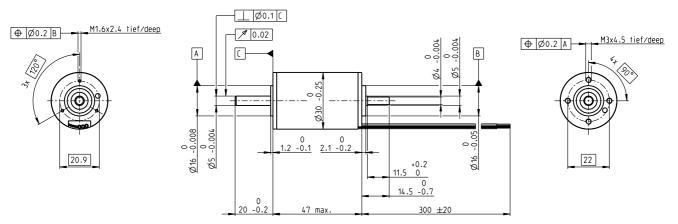
M [mNm] I [A]

Details on catalog page 50 Motor Control

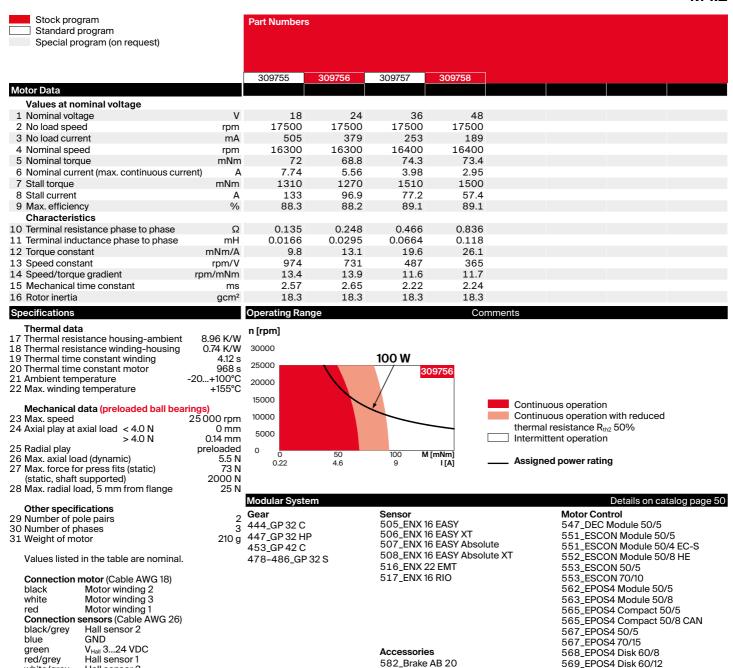
547_DEC Module 50/5 551_ESCON Module 50/5 551_ESCON Module 50/4 EC-S 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8

EC-4pole 30 Ø30 mm, brushless, 100 watt

High Power



M 1:2

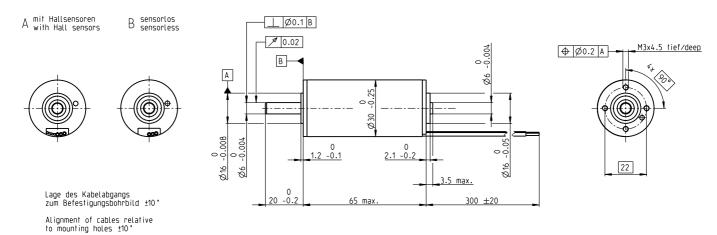


Hall sensor 3 Wiring diagram for Hall sensors see p. 65

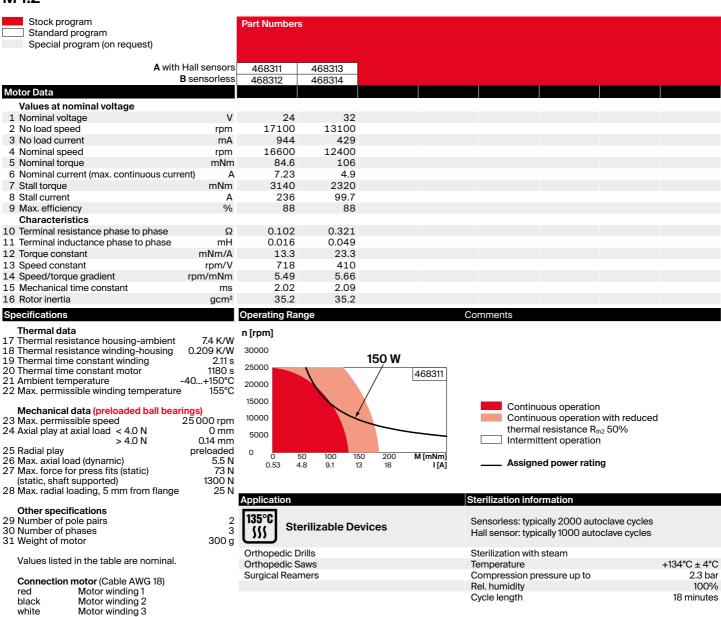
white/grey

EC-4pole 30 Ø30 mm, brushless, 150 watt

Sterilizable



M 1:2



Modular System

Details on catalog page 50 Motor Control 547_DEC Module 50/5

551_ESCON Module 50/5 551_ESCON Module 50/4 EC-S 552_ESCON Module 50/8 HE 553 ESCON 50/5 553_ESCON 70/10

blue

red/grey black/grey

white/grey

Hollow shaft with bore diameter up to 4.1 mm

Connection sensors (Cable AWG 26) green V_{Hall} 3...24 VDC

Hall sensor 1

Hall sensor 2

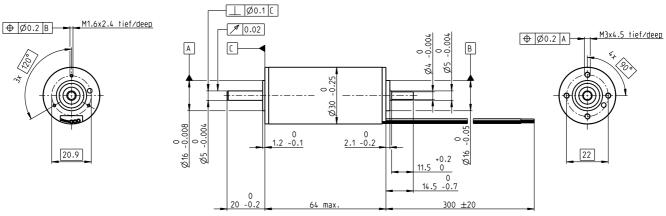
Hall sensor 3

Wiring diagram for Hall sensors see p. 65

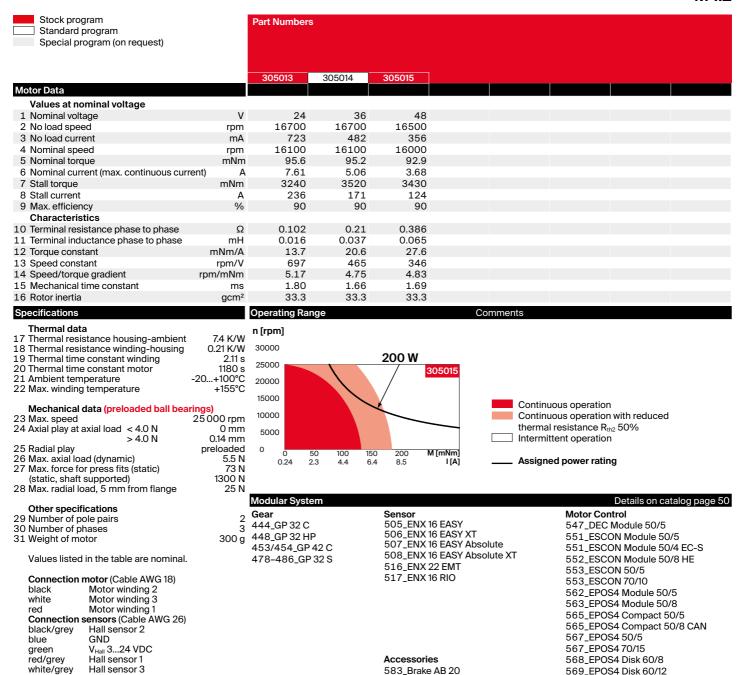
GND

EC-4pole 30 Ø30 mm, brushless, 200 watt

High Power



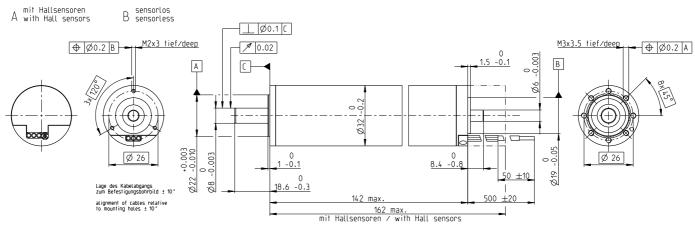
M 1:2



Wiring diagram for Hall sensors see p. 65

EC-4pole 32 Ø32 mm, brushless, 220 watt

Heavy Duty - for applications in air



M 1:2

Stock program Part Numbers Standard program Special program (on request) A with Hall sensors 397798 **B** sensorless 393879 Motor Data (provisional) Values at nominal voltage and ambient temperature °C 25 100 150 200 1 Nominal voltage 48 48 48 48 2 No load speed 6470 6650 6770 6890 109 3 No load current mΑ 149 113 107 5710 5870 6080 6470 4 Nominal speed¹ rpm 5 Nominal torque¹ mNm 334 261 196 104 4.87 6 Nominal current (max. continuous current) 3.85 2.98 1.67 mNm 3350 2520 7 Stall torque 2150 1860 8 Stall current 47.5 36.7 31.9 28.1 9 Max. efficiency % 89 89 88 Characteristics 10 Terminal resistance phase to phase Ω 1.01 1.31 1.51 1.71 0.298 11 Terminal inductance phase to phase mΗ 0.298 0.298 0.298 12 Torque constant mNm/A 70.5 68.7 67.4 66.2 13 Speed constant rpm/\ 142 144 135 139 14 Speed / torque gradient rpm/mNm 2.65 3.16 3.71 1.94 15 Mechanical time constant 2.6 3.55 4.24 4.98 ms 128 16 Rotor inertia acm² 128 128 128

¹Values for operation in thermal equilibrium.

Operating Range Thermal data n [rpm] Continuous operation 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 4 K/W 220W In observation of above listed thermal resistance 0.53 K/W (lines 17 and 18) and above listed ambient 19 Thermal time constant winding 18.4 stemperature, the maximum permissible winding 12000 20 Thermal time constant motor 1720 s temperature will be reached during continuous 21 Ambient temperature .+200°C operation = thermal limit. 9000 22 Max. winding temperature +240°C **Short term operation**The motor may be briefly overloaded (recurring). 6000 Mechanical data (preloaded ball bearings) 23 Max. speed 12000 rpm 24 Axial play at axial load < 20 N 0 mm 0.14 mm 3000 Assigned power rating > 20 N 25 Radial play preloaded 50 100 150 200 250 300 **M [mNm]** 26 Max. axial load (dynamic) 27 Max. force for press fits (static) 16 N 80 N 3.0 4.5 6.0 I[A] 10 (static, shaft supported) 3000 N 28 Max. radial load, 5 mm from flange 75 N Application

Other specifications

- 29 Number of pole pairs 30 Number of phases
- 31 Weight of motor

Connection A, motor cable PTFE (AWG 14)

Motor winding 1 red black Motor winding 2 white Motor winding 3

Connection A, sensors cable PTFE (AWG 24) green

V_{Hall} 4.5...24 V GND blue red Hall sensor 1 black Hall sensor 2 Hall sensor 3 white

Connection B, motor cable PTFE (AWG 14)

red Motor winding 1 Motor winding 2 black white Motor winding 3

Wiring diagram for Hall sensors see p. 65

General

860 g

extreme temperature applications

- vibration tested (according to MIL-STD810F/Jan2000 Fig. 514.5C-10)

ultra-high vacuum applications (modifications necessary). low outgassing, can be baked out at 240°C

Aerospace gas turbine starter/generators for aircraft engines

regulation of combustion engines

Oil & Gas Industry

oil, gas and geothermal wells

Robotics

robotic exploration vehicles

Industry

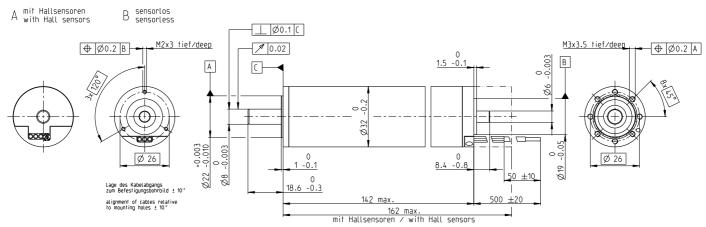
- pumps and valves for liquid metal cooling systems/turbine fuel and steam control
- valve adjustment for gas and steam power plants

This motor contains leaded solder. It therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The motor may therefore only be used for devices that are not subject to this directive.

*The Hall sensors in this motor are rated for ambient temperatures up to 150°C. The motor with Hall sensors is fully tested at 200°C in the final inspection. Nevertheless. the Hall sensors may temporarily fail below 200°C under certain conditions.

EC-4pole 32 Ø32 mm, brushless, 480 watt

Heavy Duty - for applications in oil



M 1:2

Stock program Standard program Special program (on request)		Part Numbers			
A with H	lall sensors		397799)	
В	sensorless		397800)	
Motor Data (provisional)					
Values at nominal voltage and ambient temp	erature °C	25	100	150	200
1 Nominal voltage	V	48	48	48	48
2 No load speed	rpm	6420	6630	6750	6860
3 No load current	mA	482	222	212	216
4 Nominal speed ¹	rpm	4670	4420	4700	5340
5 Nominal torque ¹	mNm	804	762	596	379
6 Nominal current (max. continuous currer	nt) A	11.4	10.9	8.75	5.78
7 Stall torque	mNm	3350	2520	2150	1860
8 Stall current	Α	47.5	36.7	31.9	28.1
9 Max. efficiency	%	82	85	85	84
Characteristics					
10 Terminal resistance phase to phase	Ω	1.01	1.31	1.51	1.71
11 Terminal inductance phase to phase	mH	0.298	0.298	0.298	0.298
12 Torque constant	mNm/A	70.5	68.7	67.4	66.2
13 Speed constant	rpm/V	135	139	142	144
14 Speed / torque gradient	rpm/mNm	1.94	2.65	3.16	3.71
15 Mechanical time constant	ms	2.85	3.88	4.64	5.45
16 Rotor inertia	gcm ²	140	140	140	140

Values for operation in thermal equilibrium.

Operating Range Thermal data n [rpm] Continuous operation 0.3 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 350W 250W 180M In observation of above listed thermal resistance 0.53 K/W (lines 17 and 18) and above listed ambient 19 Thermal time constant winding 18.4 s temperature, the maximum permissible winding 12000 20 Thermal time constant motor 129 s -55...+200°C temperature will be reached during continuous 21 Ambient temperature operation = thermal limit. 9000 22 Max. winding temperature +240°C Short term operation Mechanical data (preloaded ball bearings 6000 The motor may be briefly overloaded (recurring). 23 Max. speed 12000 rpm 24 Axial play at axial load < 20 N 0 mm 0.14 mm 3000 Assigned power rating > 20 N 25 Radial play preloaded 400 600 800 M [mNm] 200 26 Max. axial load (dynamic) 27 Max. force for press fits (static) 16 N 80 N 4 0 8.0 12 0 16 0 IIAI (static, shaft supported) 28 Max. radial load, 5 mm from flange 75 N Application

Other specifications

29 Number of pole pairs 30 Number of phases

31 Weight of motor

Connection A, motor cable PTFE (AWG 14) Motor winding 1 red black Motor winding 2

Motor winding 3 white Connection A, sensors cable PTFE (AWG 24)

V_{Hall} 4.5...24 V GND green blue Hall sensor 1 red black Hall sensor 2 Hall sensor 3 white

Connection B, motor cable PTFE (AWG 14)

red Motor winding 1 Motor winding 2 black white Motor winding 3

Wiring diagram for Hall sensors see p. 65

General

extreme temperature applications

- vibration tested (according to MIL-STD810F/Jan2000 860 g

operation in oil and high pressure (only minimal lubrication, therefore use under rated ambient conditions is not suggested)

Oil & Gas Industry

- oil, gas and geothermal wells

maxon Modular System

Gear 449_GP 32 HD 455_GP 42 HD

This motor contains leaded solder. It therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The motor may therefore only be used for devices that are not subject to this directive.

Reference medium: Shell Tellus oil T32

Operation in oil of different viscosity will affect the motor data

Details on catalog page 50 *The Hall sensors in this motor are rated for ambient temperatures up to 150°C. The motor with Hall sensors is fully tested at 200°C in the final inspection. Nevertheless, the Hall sensors may temporarily fail below 200°C under certain conditions

maxon EC-i

Standard Specification No. 101		88
Terminology explanations		188
EC-i Program		297-311
EC-i 30 Ø30 mm, 20 Watt	ΙE	297
EC-i 30 Ø30 mm, 30 Watt		298
EC-i 30 Ø30 mm, 45 Watt, High Torque		299
EC-i 30 Ø30 mm, 50 Watt		300
EC-i 30 Ø30 mm, 75 Watt, High Torque		301
EC-i 40 Ø40 mm, 50 Watt		302
EC-i 40 Ø40 mm, 50 Watt, High Torque		303
EC-i 40 Ø40 mm, 70 Watt		304
EC-i 40 Ø40 mm, 70 Watt, High Torque		305
EC-i 40 Ø40 mm, 100 Watt, High Torque		306
EC-i 40 Ø40 mm, 130 Watt, High Torque		307
EC-i 52 Ø52 mm, 180 Watt, High Torque		308
EC-i 52 Ø52 mm, 200 Watt, High Torque		309
EC-i 52 Ø52 mm, 250 Watt, open housing		310
EC-i 52 Ø52 mm, 420 Watt, ventilated		311

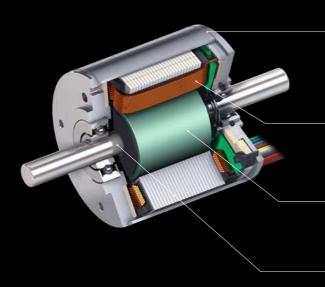


maxon EC-i

Powerhouses for extremely small spaces. With their optimized magnetic circuit, these brushless EC-i motors with iron windings offer a very high torque density and very low cogging torque. The multipole internal rotor has excellent dynamics. The robust design with a steel flange and housing makes this unit suitable for a wide variety of applications.

Key data

Motor Ø30 ... 52 mmMotor length26 ... 110 mmPower20 ... 420 WNominal torqueup to 649 mNmMax. permissible speedup to 15 000 rpm



The steel housing and flange ensure good heat dissipation and mechanical stability.

The stator with an iron winding is designed for high power at a low cogging torque.

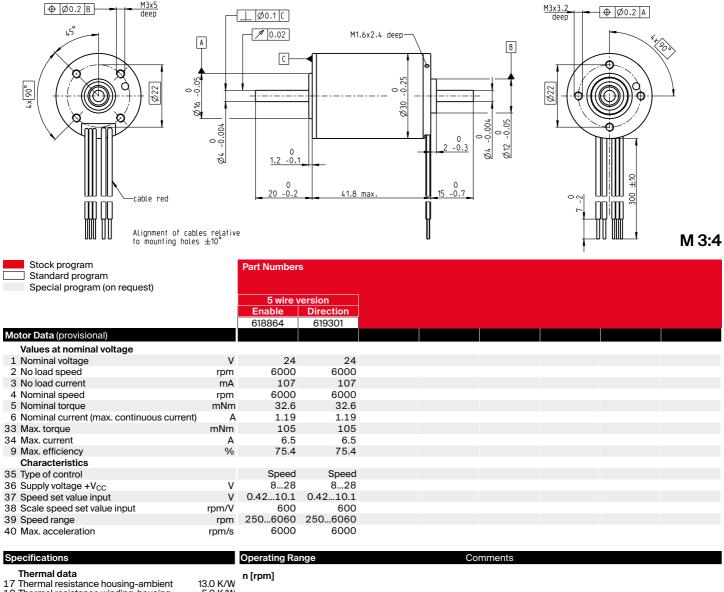
The modular rotor delivers good dynamics and large torques.

Grooveless shaft ensures smooth running and extremely high torsional rigidity.

- → Highly dynamic due to internal, multi-pole rotor
- → Mechanical time constants of less than 3 milliseconds
- → High torque density
- → Speeds up to 15 000 rpm

EC-i 30 Ø30 mm brushless, 20 watt, with integrated electronics

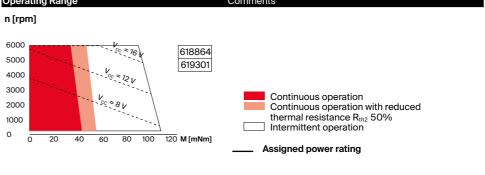
4-Q-Speed Controller



Thermal data 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 20 Thermal time constant motor 21 Ambient temperature 22 Max. winding temperature 41 Max. temperature of electronics	13.0 K/W 5.9 K/W 34.1 s 1030 s -40+85°C +155°C 100°C
Mechanical data (preloaded ball bea	
16 Rotor inertia	6.69 gcm ²
24 Axial play at axial load < 9.0 N	0 mm
> 9.0 N	0.14 mm
25 Radial play	preloaded
26 Max. axial load (dynamic)	9 N

27 Max. force for press fits (static) 48.8 N (static, shaft supported)
28 Max. radial load, 10 mm from flange 2510 N 30 N Other specifications

160 g Clockwise (CW) 31 Weight of motor 32 Direction of rotation



Modular System Gear

444_GP 32 C

Values listed in the table are nominal.

Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

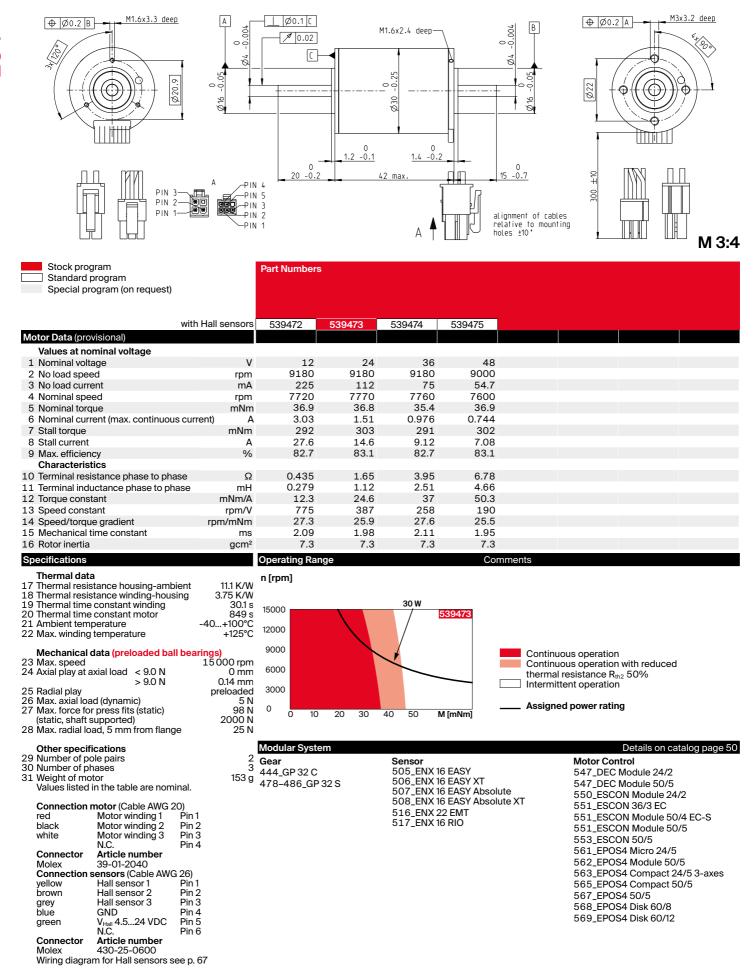
 $\begin{array}{lll} \textbf{Connection 5 wire version} \, (\text{Cable AWG 20/24}) \\ \text{red} & + \text{V}_{\text{CC}} \, 8...28 \, \text{VDC} \\ \text{black} & \text{GND} \\ \end{array}$

Speed set value input white

Monitor n (6 pulses per revolution) green Disable (Type Enable) or sense of direction (Type Direction) grey

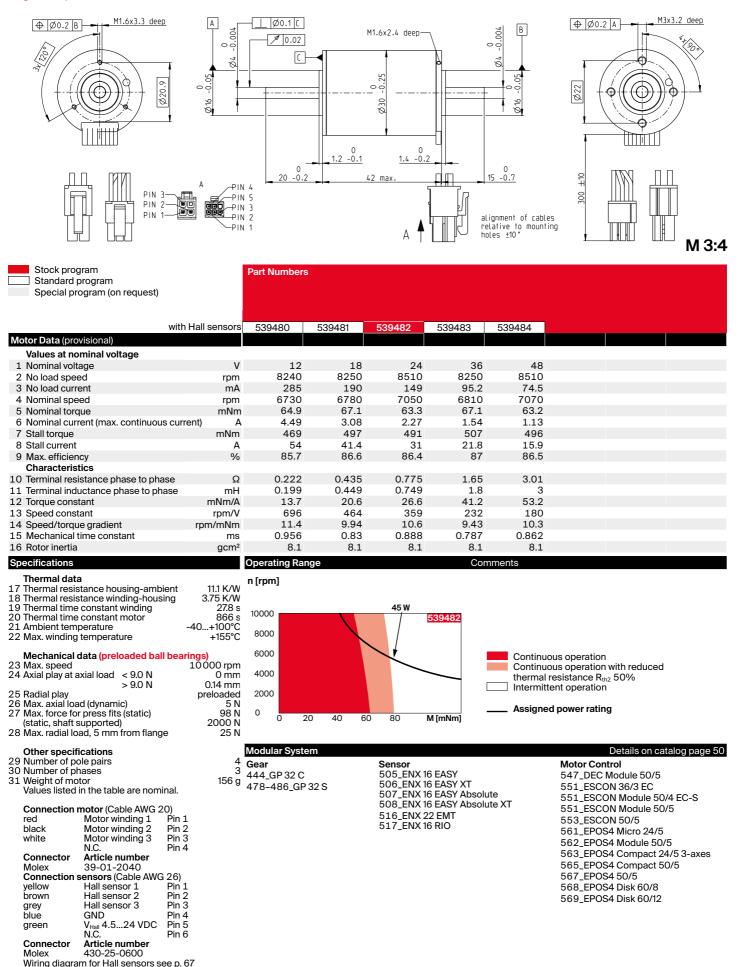
maxon EC motor 297

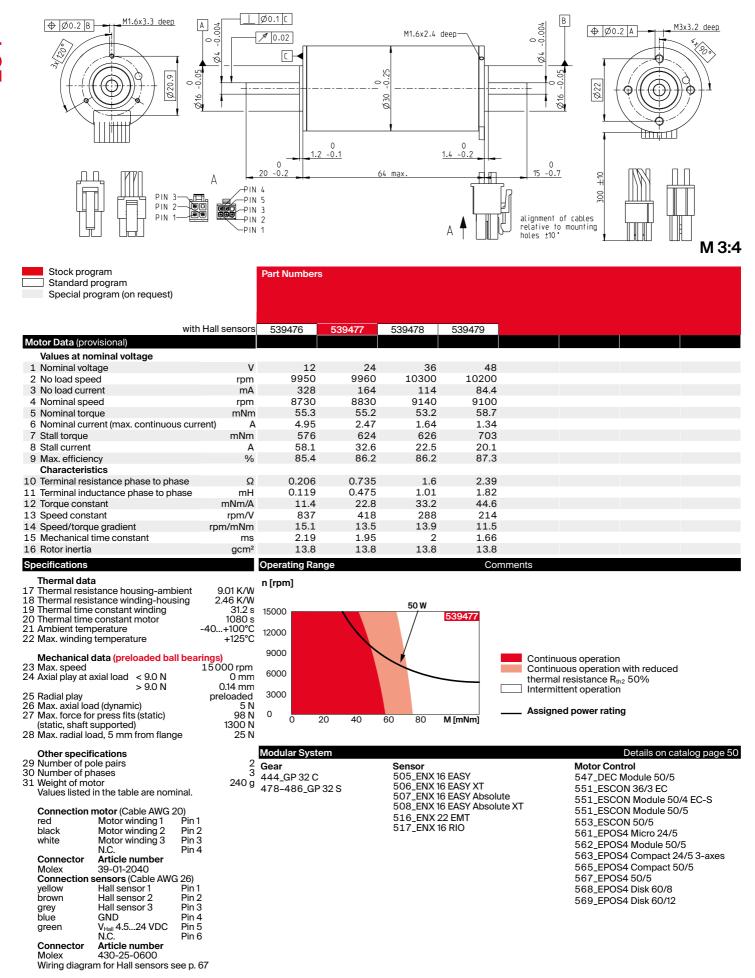
Details on catalog page 50



EC-i 30 Ø30 mm, brushless, 45 watt

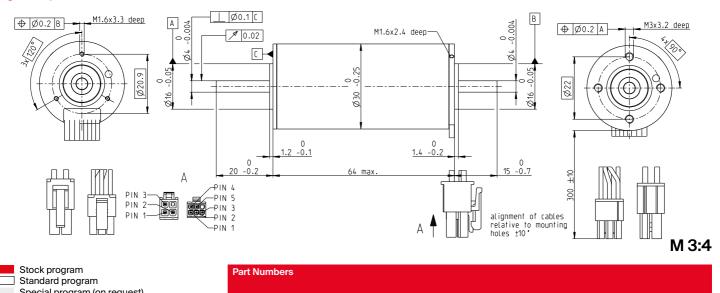
High Torque





EC-i 30 Ø30 mm, brushless, 75 watt

High Torque



Special program (on request)								
with	Hall sensors	539485	539486	539487	539488	539489		
Motor Data (provisional)		000 100	000 100		000 100	555 155		
Values at nominal voltage							•	-
1 Nominal voltage	V	12	18	24	36	48		
2 No load speed	rpm	7940	7950	7950	7950	8210		
3 No load current	mA	454	303	227	151	119		
4 Nominal speed	rpm	6760	6840	6870	6890	7150		
5 Nominal torque	mNm	108	110	107	110	104		
6 Nominal current (max. continuous curr	rent) A	7.34	4.98	3.65	2.48	1.84		
7 Stall torque	mNm	895	962	968	993	986		
8 Stall current	Α	103	83.4	63.8	46.5	35.1		
9 Max. efficiency	%	87.1	88.2	88.3	88.8	88.6		
Characteristics								
10 Terminal resistance phase to phase	Ω	0.117	0.216	0.376	0.773	1.37		
11 Terminal inductance phase to phase	mH	0.0975	0.219	0.39	0.877	1.46		
12 Torque constant	mNm/A	14.3	21.4	28.6	42.9	55.4		
13 Speed constant	rpm/V	668	446	334	223	173		
14 Speed/torque gradient	rpm/mNm	5.45	4.49	4.4	4.02	4.26		
15 Mechanical time constant	ms	0.885	0.729	0.714	0.653	0.692		
16 Rotor inertia	gcm ²	15.5	15.5	15.5	15.5	15.5		

Thermal data 9.01 K/W 17 Thermal resistance housing-ambient 9.01 K/W 2.46 K/W 31.3 s 1090 s 0...+100°C 18 Thermal resistance winding-housing 19 Thermal time constant winding 20 Thermal time constant motor 21 Ambient temperature 22 Max. winding temperature +155°C

Specifications

Mechanical data (preloaded ball bearings 10000 rpm Max. speed 24 Axial play at axial load < 9.0 N 0 mm 0.14 mm 25 Radial play 26 Max. axial load (dynamic) preloaded 5 N 98 N 1300 N Max. force for press fits (static) (static, shaft supported) 28 Max. radial load, 5 mm from flange 25 N

Other specifications 29 Number of pole pairs 30 Number of phases 31 Weight of motor Values listed in the table are nominal.

Connection motor (Cable AWG 20) Pin 1 Pin 2 Motor winding 1 black Motor winding 2 white Motor winding 3 N.C Article number Connector 39-01-2040 sensors (Cable AWG 26) Connection yellow brown Pin 1 Pin 2 Hall sensor 1 Hall sensor 2 Hall sensor 3 Pin 3 grey Pin 4 Pin 5 blue GND V_{Hall} 4.5...24 VDC N.C. green Pin 6 Article number Connector 430-25-0600 Wiring diagram for Hall sensors see p. 67 n [rpm] 10000 8000 6000 4000 2000 0 ō 40 80 120 160 M [mNm]

Operating Range

Gear

445_GP 32 C

478-486_GP 32 S

Continuous operation Continuous operation with reduced thermal resistance Rth2 50% Intermittent operation Assigned power rating

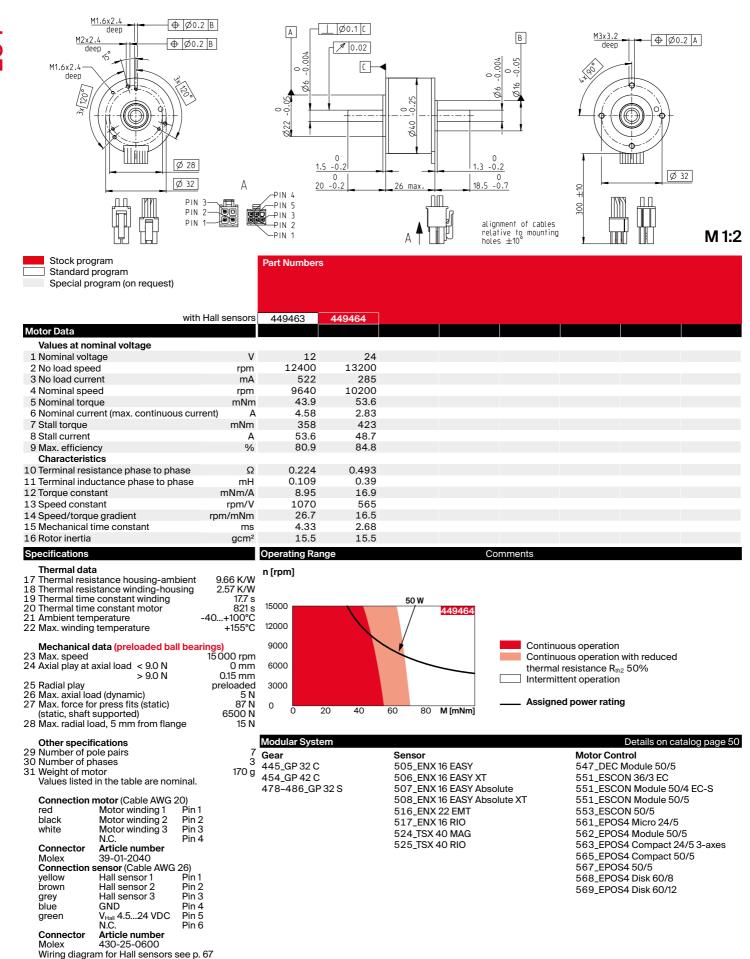
Sensor 505_ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT

Comments

516_ENX 22 EMT 517_ENX 16 RIO

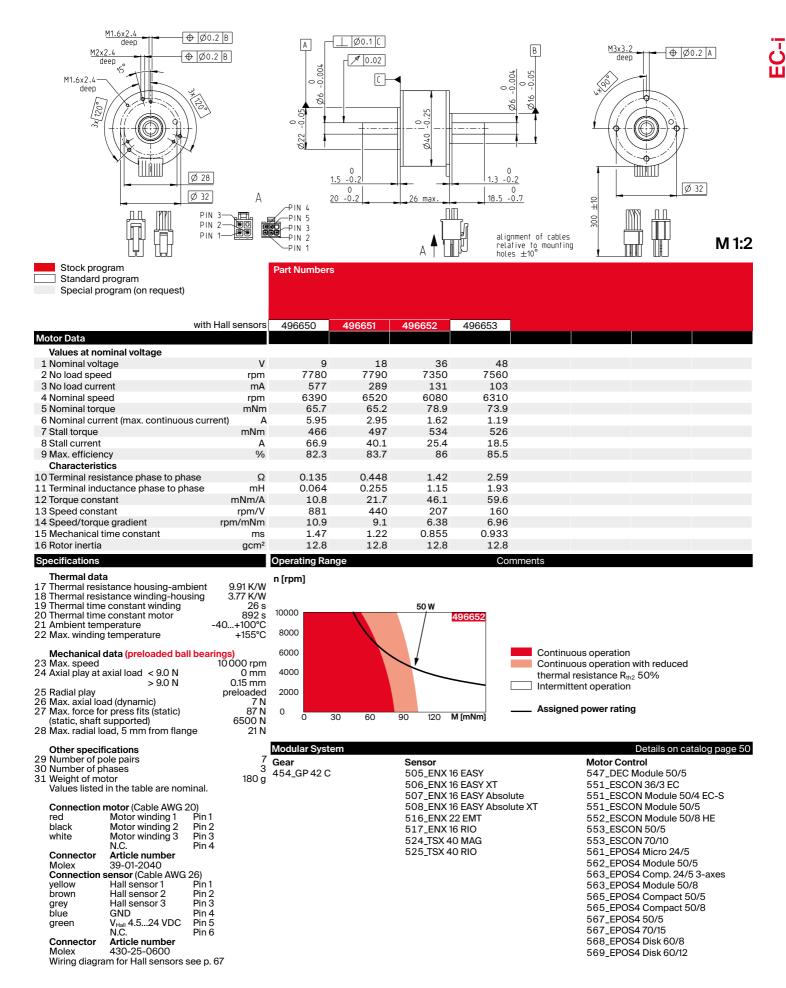
Motor Control 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

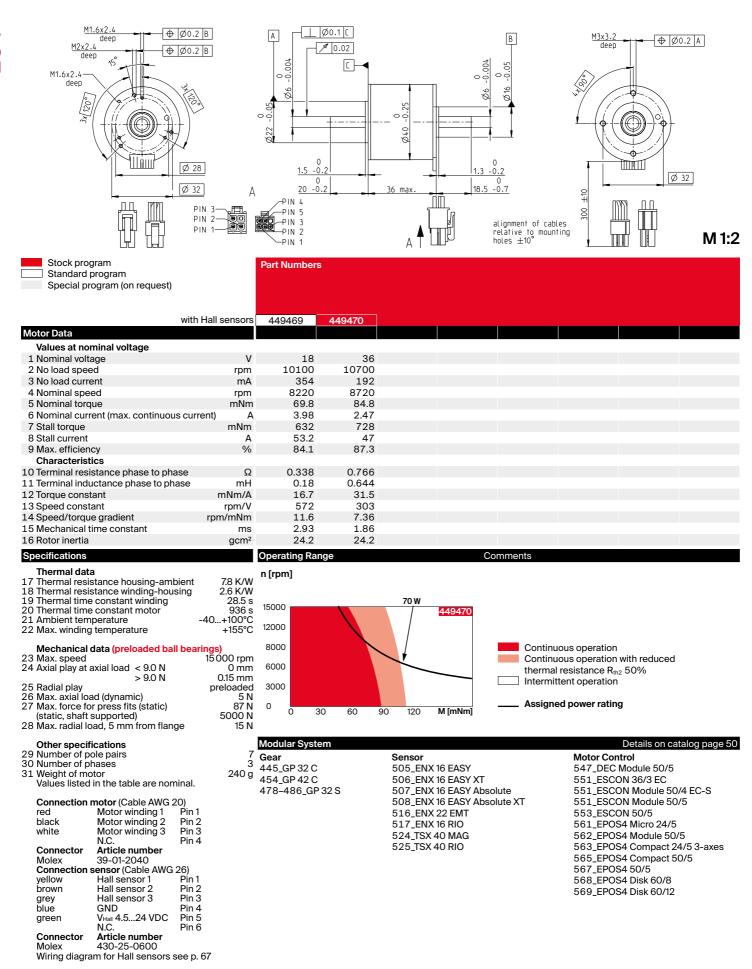
Details on catalog page 50



EC-i 40 Ø40 mm, brushless, 50 watt

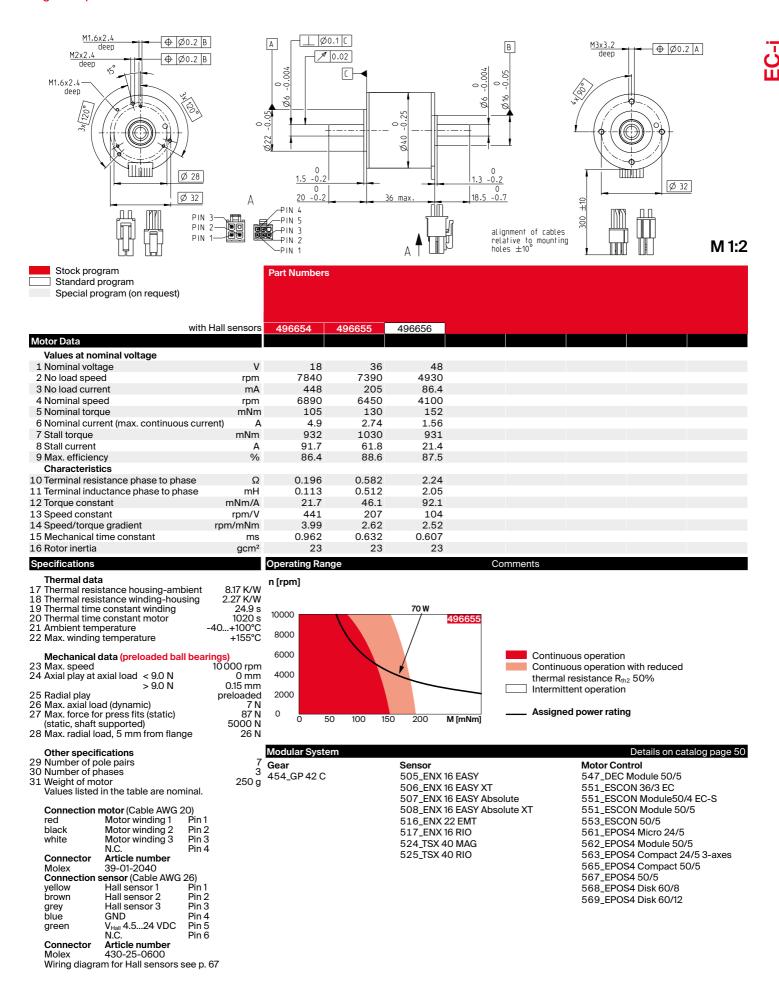
High Torque



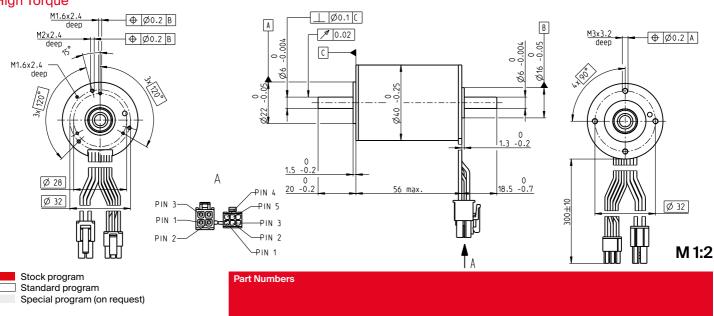


EC-i 40 Ø40 mm, brushless, 70 watt

High Torque



High Torque



with Hall sensors 496660 496661 488607 **Motor Data** Values at nominal voltage 1 Nominal voltage 18 48 2 No load speed 4540 4550 5000 rpm 3 No load current mΑ 352 176 150 4 Nominal speed 3920 3950 4390 rpm 5 Nominal torque mNm 209 210 224 6 Nominal current (max. continuous current) 2.76 2.41 5.5 7 Stall torque mNm 1850 1930 2080 8 Stall current 77.4 43.4 48.3 9 Max. efficiency % 86.8 87.5 89 Characteristics 10 Terminal resistance phase to phase Ω 0.233 0.829 0.994 11 Terminal inductance phase to phase mΗ 0.169 0.675 0.995 mNm/A 37.5 74.9 91 12 Torque constant 13 Speed constant rpm/\ 255 105 127 14 Speed/torque gradient rpm/mNm 1.58 1.41 1.15 15 Mechanical time constant 0.729 0.65 0.528 ms 16 Rotor inertia gcm² 44 44 44

Specifications **Operating Range** n [rpm]

Gear

390 g

454_GP 42 C

Thermal data 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 20 Thermal time constant motor 21 Ambient temperature 22 Max. winding temperature	7:17 K/W 1:35 K/W 25:8 s 1400 s -40+100°C +155°C

Mechanical data (preloaded ball bearings)

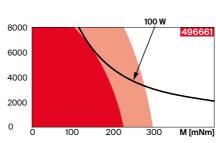
23 Max. speed	8000 rpm
24 Axial play at axial load < 9.0 N	0 mm
> 9.0 N	0.15 mm
25 Radial play	preloaded
26 Max. axial load (dynamic)	7 N
27 Max. force for press fits (static)	87 N
(static, shaft supported)	3000 N
28 Max. radial load, 5 mm from flange	29.9 N

Other specifications 29 Number of pole pairs 30 Number of phases

31 Weight of motor Values listed in the table are nominal.

Connection motor (Cable AWG 20) Motor winding 1 red black Motor winding 2 Pin 2 Motor winding 3 white Pin 4 N.C Article number Connector Molex 39-01-2040 Connection sensor (Cable AWG 26) Pin 1 Pin 2 yellow Hall sensor 1 brown Hall sensor 2 Hall sensor 3 grey Pin 4 Pin 5 blue GND V_{Hall} 4.5...24 VDC N.C. green Pin 6 Connector Article number 430-25-0600

Wiring diagram for Hall sensors see p. 67

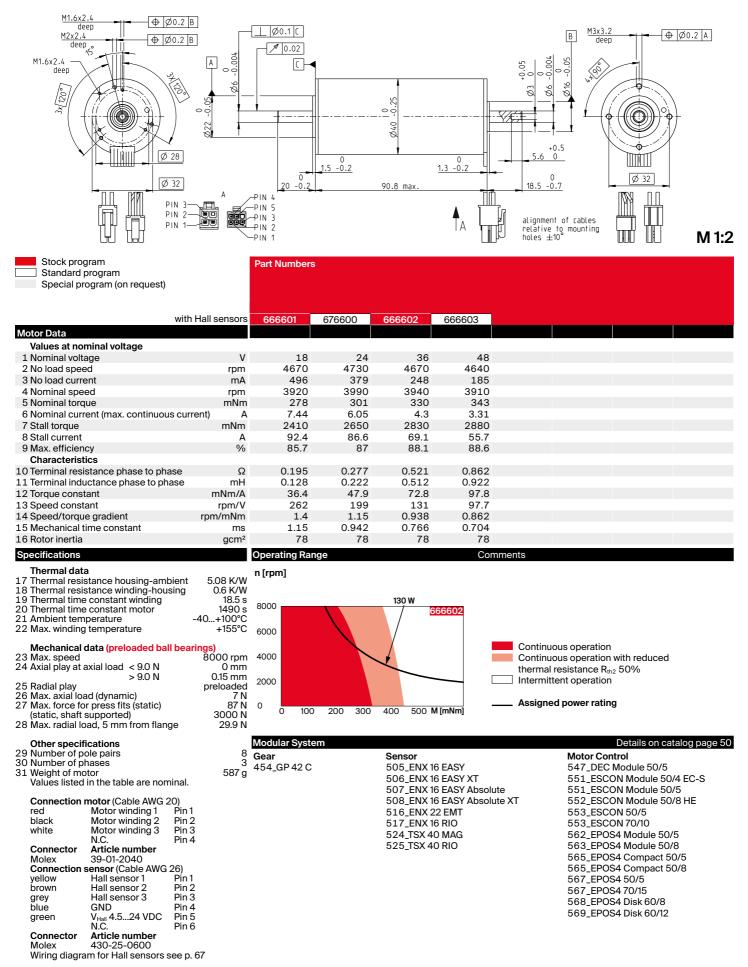


Continuous operation Continuous operation with reduced thermal resistance Rth2 50% Intermittent operation Assigned power rating

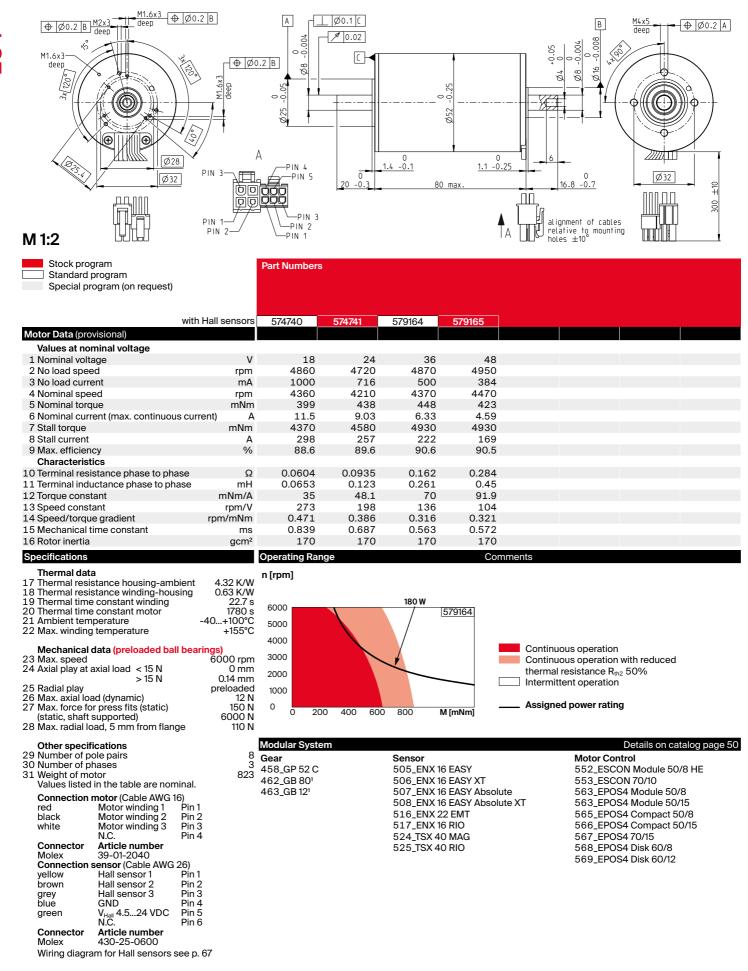
> Sensor 505_ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT 516_ENX 22 EMT 517_ENX 16 RIO 524_TSX 40 MAG 525_TSX 40 RIO

Motor Control 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 562_EPOS4 Module 50/5 563_EPOS4 Module 50/8 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/8 567_EPOS4 50/5 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

Details on catalog page 50

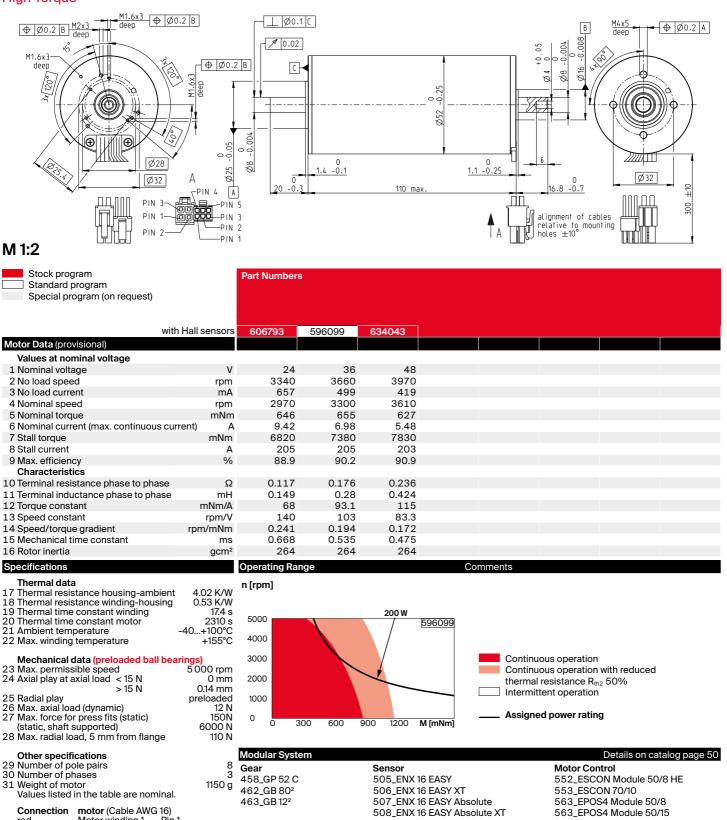


High Torque



EC-i 52 Ø52 mm, brushless, 200 watt

High Torque



Connection	motor (Cable AWG	i 16)
red	Motor winding 1	Pin 1
black	Motor winding 2	Pin 2
white	Motor winding 3	Pin 3
	N.C.	Pin 4
Connector	Article number	
Molex	39-01-2040	
Connection	sensor (Cable AW)	G 26)
yellow	Hall sensor 1	Pin 1
brown	Hall sensor 2	Pin 2
grey	Hall sensor 3	Pin 3
blue	GND	Pin 4
green	V _{Hall} 4.524 VDC	Pin 5
	N.C.	Pin 6
Connector	Article number	
Molex	430-25-0600	

Wiring diagram for Hall sensors see p. 67

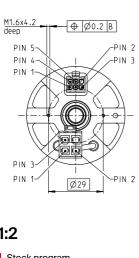
516_ENX 22 EMT 517_ENX 16 RIO 524_TSX 40 MAG 525_TSX 40 RIO

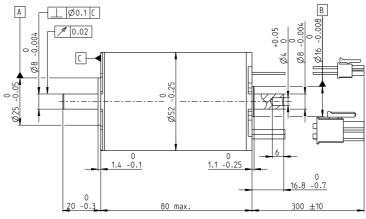
563_EPOS4 Compact 50/8 563_EPOS4 Compact 50/15 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

1on request

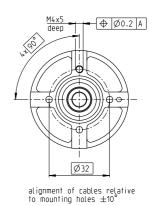
with H

open housing





Part Numbers



M 1:2

Motor Data

1 Nominal voltage 2 No load speed 3 No load current 4 Nominal speed 5 Nominal torque

7 Stall torque 8 Stall current 9 Max. efficiency Characteristics

12 Torque constant 13 Speed constant 14 Speed/torque gradient 15 Mechanical time constant

Stock program Standard program

Special program (on request)

6 Nominal current (max. continuous currer

10 Terminal resistance phase to phase 11 Terminal inductance phase to phase

Values at nominal voltage

lall:	sensors	667060	667061	667062	667063
	V	18	24	36	48
	rpm	4450	4860	5010	5090
	mA	829	707	493	379
	rpm	3770	4140	4280	4370
	mNm	596	612	646	623
nt)	Α	14.7	12.3	8.86	6.55
	mNm	4290	4560	4860	4830
	Α	273	278	232	174
	%	89.1	90	90.8	90.7
	Ω	0.0658	0.0863	0.155	0.276
	mH	0.0826	0.123	0.261	0.45
r	nNm/A	38.2	46.7	68	89.2
	rpm/V	250	204	140	107
rpn	n/mNm	0.43	0.377	0.32	0.331
	ms	0.765	0.671	0.57	0.59

170

gcm² 16 Rotor inertia Specifications Operating Range Thermal data 3.5 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 0.526 K/W 19 Thermal time constant winding 20 Thermal time constant motor 13.7 s 1310 s -40...+100°C 21 Ambient temperature 22 Max. winding temperature +155°C

Mechanical data (preloaded ball bearings)
6000 rpm 23 Max. speed 24 Axial play at axial load < 9.0 N 0 mm 0.14 mm 25 Radial play 26 Max. axial load (dynamic) 27 Max. force for press fite for preloaded 12 N 150 N 6000 N Max. force for press fits (static) (static, shaft supported) 28 Max. radial load, 5 mm from flange 110 N

750 g

170

n [rpm]

250 W 6000 5000 3000 2000 1000 0 400 900 M [mNm] 200 600

170

Continuous operation Continuous operation with reduced thermal resistance Rth2 50% Intermittent operation Assigned power rating

Other specifications

29 Number of pole pairs 30 Number of phases 31 Weight of motor Values listed in the table are nominal.

Connection motor (Cable AWG 16) Motor winding 1 Motor winding 2 Pin 2 Pin 3 black Motor winding 3 white Pin 4 Article number 171692-0104 Connector Molex Connection ensor (Cable AWG 26) vellow Hall sensor 1 brown Hall sensor 2 grey blue Pin 3 Hall sensor 3 GND V_{Hall} 4.5...24 VDC N.C. green Pin 6 **Article number** 430-25-0600 Connector

Wiring diagram for Hall sensors see p. 67

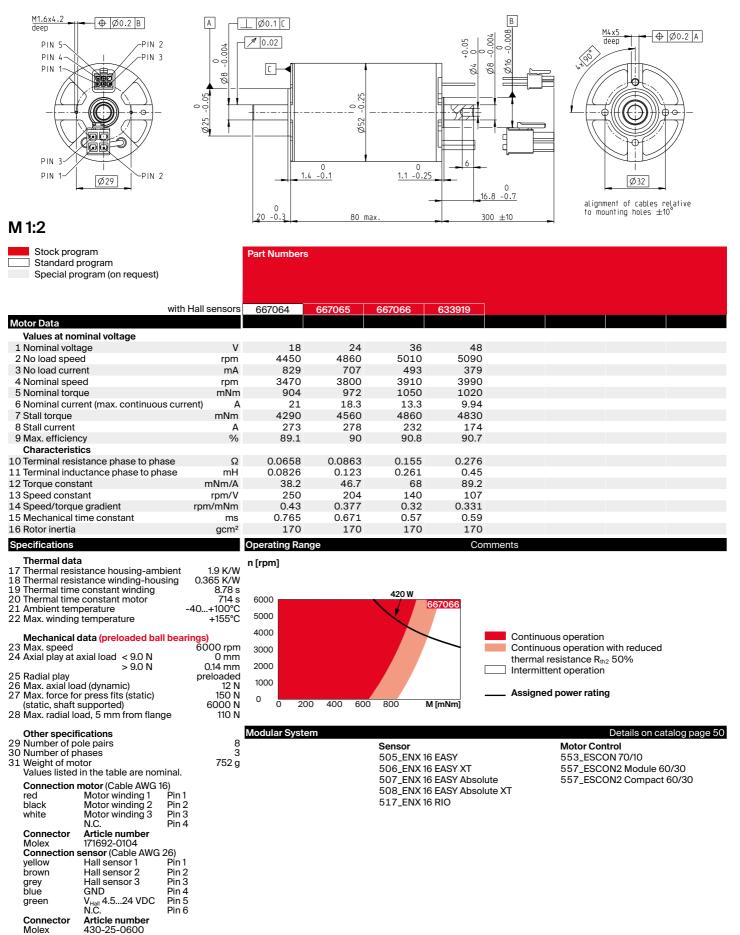
Sensor 505_ENX 16 EASY 506_ENX 16 EASY XT 507_ENX 16 EASY Absolute 508_ENX 16 EASY Absolute XT

517_ENX 16 RIO

170

Motor Control 552_ESCON Module 50/8 HE 553_ESCON 70/10 557_ESCON2 Module 60/30 557_ESCON2 Compact 60/30 563_EPOS4 Module 50/8 563_EPOS4 Module 50/15 565_EPOS4 Compact 50/8 566_EPOS4 Compact 50/15 567_EPOS470/15 568_EPOS4 Disk 60/8 569_EPOS4 Disk 60/12

Details on catalog page 50



Wiring diagram for Hall sensors see p. 67

maxon EC flat

Standard Specification No. 101		88
Terminology explanations		188
EC-flat Program		315-337
EC 9.2 flat Ø10 mm, 0.5 Watt		315
EC 14 flat Ø13.6 mm, 1.5 Watt		316
EC 20 flat Ø20 mm, 2 Watt	IE	317
EC 20 flat Ø20 mm, 5 Watt	ΙE	318
EC 45 flat Ø42.8 mm, 12 Watt		319
EC 45 flat Ø42.9 mm, 30 Watt		320
EC 45 flat Ø43.5 mm, 50 Watt		321
EC 45 flat Ø43.5 mm, 60 Watt, open rotor		322
EC 45 flat Ø43.5 mm, 90 Watt, ventilated		323
EC 45 flat Ø43.5 mm, 70 Watt		324
EC 45 flat Ø43.5 mm, 80 Watt, open rotor		325
EC 45 flat Ø43.5 mm, 120 Watt, ventilated		326
EC 45 flat Ø45 mm, 30 Watt	IE	327
EC 45 flat Ø45 mm, 50 Watt	IE	328
EC 60 flat Ø60 mm, 100 Watt		329
EC 60 flat Ø60 mm, 150 Watt, open rotor		330
EC 60 flat Ø60 mm, 200 Watt, ventilated		331
EC 90 flat Ø90 mm, 160 Watt		332
EC 90 flat Ø90 mm, 220 Watt, open rotor		333
EC 90 flat Ø90 mm, 360 Watt, ventilated		334
EC 90 flat Ø90 mm, 260 Watt		335
EC 90 flat Ø90 mm, 400 Watt, open rotor		336
EC 90 flat Ø90 mm, 600 Watt, ventilated		337

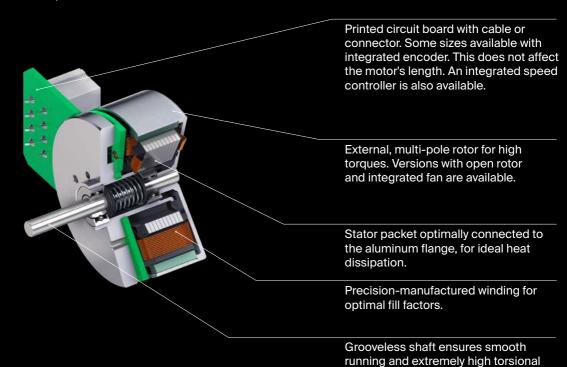


maxon EC flat

maxon flat motors are especially suitable for installation in confined spaces. The brushless motors are designed as internal and external rotors and can reach speeds of up to 20 000 rpm. The simple design makes it possible to automate the manufacturing – which is reflective in the price. maxon's EC flat motors are available with hall sensors, sensorless or with integrated electronics. These motors can also be combined with gearheads and encoders.

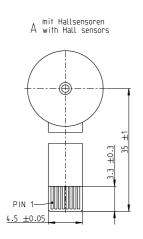
Key data

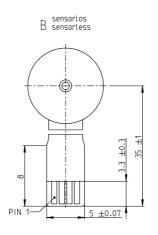
Motor Ø9.2 ... 90 mmMotor length8 ... 39.9 mmPower0.5 ... 600 WNominal torqueup to 1610 mNmMax. permissible speedup to 25 000 rpm

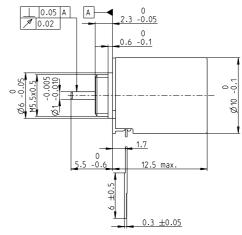


rigidity.

- → Attractive price/performance ratio
- → External, multi-pole rotor for high torques
- Open design, for excellent heat dissipation at higher speeds



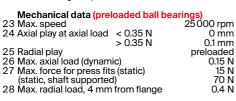


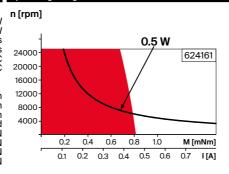


M 2:1

Stock program **Part Numbers** Standard program Special program (on request) A with Hall sensors 624161 624162 624163 **B** sensorless 371119 371120 371122 Motor Data (provisional) Values at nominal voltage 1 Nominal voltage 2 No load speed 13900 13900 15600 rpm 3 No load current mΑ 51.5 34.7 31.1 4 Nominal speed 3950 3620 5240 rpm 5 Nominal torque mNm 0.734 0.702 0.684 6 Nominal current 0.418 0.27 0.222 7 Stall torque¹ 1.01 mNm 1.09 1.1 8 Stall current Α 0.584 0.364 0.332 9 Max. efficiency % 51.9 50.4 50.9 Characteristics 10 Terminal resistance phase to phase Ω 5.14 12.4 18.1 11 Terminal inductance phase to phase mΗ 0.127 0.281 0.4 12 Torque constant mNm/A 1.86 2.77 3.3 3450 2890 13 Speed constant rpm/V 5120 14 Speed/torque gradient rpm/mNm 14100 15400 15800 15 Mechanical time constant 35.1 38.2 39.3 ms gcm² 0.237 0.237 0.237 16 Rotor inertia **Specifications** Comments Operating Range

Thermal data 49.2 K/W 13.2 K/W 1.35 s 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 20 Thermal time constant motor 73.8 s -20...+85°C 21 Ambient temperature 22 Max. winding temperature +100°C



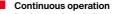


Modular System

3 Gear

3g 418_GP10 K

419_GP10A



In observation of above listed thermal resistance (lines 17 and 18) and an ambient temperature of 25°C, the maximum permissible winding temperature will be reached during continuous operation = thermal limit.

Short term operation

The motor may be briefly overloaded (recurring).

Assigned power rating

Other specifications

29 Number of pole pairs 30 Number of phases 31 Weight of motor

Pin 8

Values listed in the table are nominal.

with Hall sensors Connection sensorless Motor winding 1 Motor winding 2 Pin 1 Pin 2 Motor winding 1 Motor winding 2 Motor winding 3 V_{Hall} 2.5...5.5 VDC GND Pin 3 Motor winding 3 Pin 4 Pin 5 Pin 6 Hall sensor 1 Hall sensor 2 Hall sensor 3

Output signals: CMOS compatible push-pull stage.

Compatible connector:

Part number 52745-0897 Part number 52207-0460 Type Molex SFV8R-2STBE1HLF SFW4R-2STGE1LF FCI

Pin for design with Hall sensors: FPC, 8-pol, Pitch 0.5 mm, top contact style

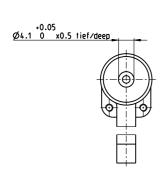
Option: Sleeve bearings in place of ball bearings ation does not include saturation effect (p. 81/188

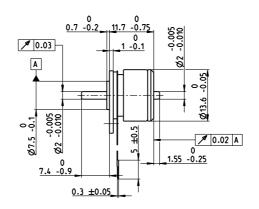
Details on catalog page 54

Motor Control 547_DEC Module 24/2 550_ESCON Module 24/2

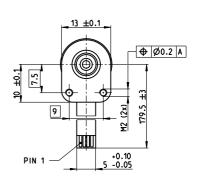
551_ESCON 36/3 EC 551_ESCON Mod. 50/4 EC-S 562_EPOS4 Module 24/1.5

564_EPOS4 Compact 24/1.5





Part Numbers

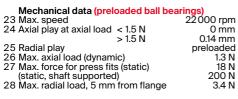


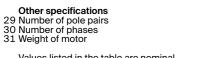
M 1:1

Stock program Standard program Special program (on request)

	sensorless	339251	339252	236679	339253		
Motor Data							
Values at nominal voltage							
1 Nominal voltage	V	6	12	18	24		
2 No load speed	rpm	20000	20100	19900	20000		
3 No load current	mA	156	78.1	51.7	38.9		
4 Nominal speed	rpm	9600	9680	9390	9590		
5 Nominal torque	mNm	1.8	1.83	1.74	1.81		
6 Nominal current (max. continuous curr	ent) A	0.794	0.402	0.256	0.199		
7 Stall torque ¹	mNm	3.79	3.87	3.6	3.8		
8 Stall current	Α	1.5	0.764	0.474	0.374		
9 Max. efficiency	%	49	49	48	49		
Characteristics							
10 Terminal resistance phase to phase	Ω	4.01	15.7	38	64.1		
L1 Terminal inductance phase to phase	mH	0.107	0.428	0.962	1.71		
12 Torque constant	mNm/A	2.53	5.06	7.6	10.1		
13 Speed constant	rpm/V	3770	1890	1260	942		
14 Speed/torque gradient	rpm/mNm	5980	5860	6270	5960		
15 Mechanical time constant	ms	68.9	67.5	72.3	68.6		
16 Rotor inertia	gcm²	1.1	1.1	1.1	1.1		

Operating Range Specifications Thermal data 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 11.6 K/W 11.3 K/W 1.37 s 49.2 s -40...+100°C 20 Thermal time constant motor 21 Ambient temperature 22 Max. winding temperature +125°C





n [rpm] 1.5 W 20000 15000 5000 1.0 2.0 3.0 M [mNm] 0.1 0.2 0.3 0.4 I[A]

Modular System

3 8 g

Continuous operation In observation of above listed thermal resistance (lines 17 and 18) and an ambient temperature of 25°C, the maximum permissible winding temperature will be reached during continuous operation = thermal limit.

Short term operation The motor may be briefly overloaded (recurring).

Assigned power rating

Comments

Values listed in the table are nominal.

Connection
Pin 1 Moto
Pin 2 Moto
Pin 3 Moto
Pin 4 \(\triangle \) ne Motor winding 1 Motor winding 2 Motor winding 3

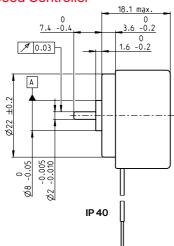
Lineutral point Adapter see p. 579 Part number 220310 Part number 84953-4 52207-0433 Connector Molex

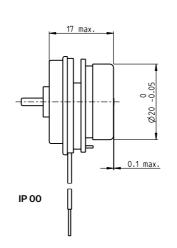
¹Calculation does not include saturation effect (p. 81/188)

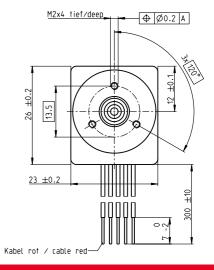
Details on catalog page 54 **Motor Control** 551_ESCON Module 50/4 EC-S

EC 20 flat Ø20 mm, brushless, 2 watt, with integrated electronics

4-Q-Speed Controller







M 1:1

Stock program Standard program Special program (on request)

IP 40 (with cover) IP 00 (without cover)

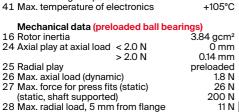
5 wire version		
Enable	Direction	
688690	688691	
688710	688711	

Part Numbers

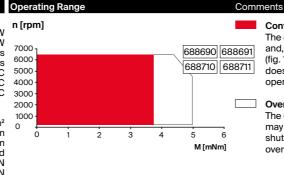
11 N Modular System

Motor Data			
Values at nominal voltage			
1 Nominal voltage	V	24	24
2 No load speed	rpm	6000	6000
3 No load current	mA	14.7	14.7
4 Nominal speed	rpm	6000	6000
5 Nominal torque	mNm	3.55	3.55
6 Nominal current (max. continuous current)	Α	0.208	0.208
33 Max. torque	mNm	6.13	6.13
34 Max. current	Α	0.73	0.73
9 Max. efficiency	%	52	52
Characteristics			
35 Type of control		Speed	Speed
36 Supply voltage +V _{CC}	V	1026.4	1026.4
37 Speed set value input	V	0.3310.78	0.3310.78
38 Scale speed set value input	rpm/V	600	600
39 Speed range	rpm	2006480	2006480
40 Max. acceleration	rpm/s	6000	6000









Continuous operation

The drive can be operated with a speed controller and, taking account of the given thermal resistance (fig. 17 and 18) at an ambient temperature of 25°C, does not exceed the maximum permissible operating temperatures.

Overload range

The drive reaches these operating points. Speed may vary from the set value. The overload protection shuts down the drive in the event of sustained overload.

Values listed in the table are nominal.

Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

 $\begin{array}{lll} \textbf{Connection} & \textbf{5 wire version} \text{ (Cable AWG 28)} \\ \textbf{red} & \textbf{+V}_{\text{CC}} \textbf{10...26.4 VDC} \\ \textbf{black} & \textbf{GND} \\ \end{array}$

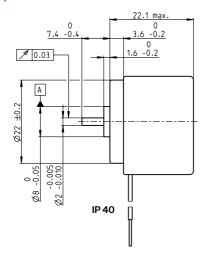
white Speed set value input

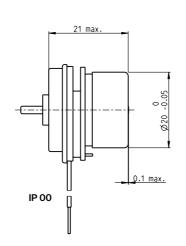
Monitor n (6 pulses per revolution) Disable (Type Enable) or sense of green grey direction (Type Direction)

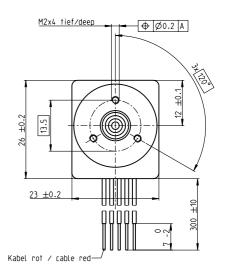
Details on catalog page 54

EC 20 flat Ø20 mm, brushless, 5 watt, with integrated electronics

4-Q-Speed Controller







M 1:1

Stock program Standard program

Special program (on request) IP 40 (with cove

st)	5 wire version		
	Enable	Direction	
IP 40 (with cover)	688692	688693	
IP 00 (without cover)	688712	688713	

Part Numbers

Operating Range

Modular System

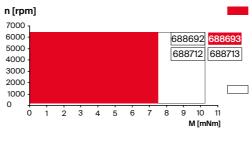
IVIC	lor Dala			
	Values at nominal voltage			
1	Nominal voltage	V	24	24
2	No load speed	rpm	6000	6000
3	No load current	mA	32.9	32.9
4	Nominal speed	rpm	6000	6000
5	Nominal torque	mNm	7.31	7.31
6	Nominal current (max. continuous current)	Α	0.377	0.377
33	Max. torque	mNm	13.2	13.2
34	Max. current	Α	0.73	0.73
9	Max. efficiency	%	54	54
	Characteristics			
35	Type of control		Speed	Speed
36	Supply voltage +V _{CC}	V	1026.4	1026.4
37	Speed set value input	V	0.3310.78	0.3310.78
38	Scale speed set value input	rpm/V	600	600
39	Speed range	rpm	2006480	2006480
40	Max. acceleration	rpm/s	6000	6000

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	10.6 K/W
10 Thormal registeres winding begins	E 22 L/M

5.32 K/W Thermal resistance winding-housing 19 Thermal time constant winding 3.66 s20 Thermal time constant motor 13.9 s -40...+85°C 21 Ambient temperature 22 Max. winding temperature +125°C +105°C 41 Max. temperature of electronics

Mechanical data (preloaded ball bearings)

16 Rotor inertia	5.1 gcm ²
24 Axial play at axial load < 2.0 N	0 mm
> 2.0 N	0.14 mm
25 Radial play	preloaded
26 Max. axial load (dynamic)	1.8 N
27 Max. force for press fits (static)	26 N
(static, shaft supported)	200 N
28 Max. radial load, 5 mm from flange	12 N



Continuous operation

The drive can be operated with a speed controller and, taking account of the given thermal resistance (fig. 17 and 18) at an ambient temperature of 25°C, does not exceed the maximum permissible operating temperatures.

Overload range

The drive reaches these operating points. Speed may vary from the set value. The overload protection shuts down the drive in the event of sustained overload.

Details on catalog page 54

Other specifications

37 g 430_GP 22 A Clockwise (CW) 433_GP 22 C 31 Weight of motor 32 Direction of rotation

Values listed in the table are nominal.

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

Connection 5 wire version (Cable AWG 28)

+V_{cc} 10...26.4 VDC GND

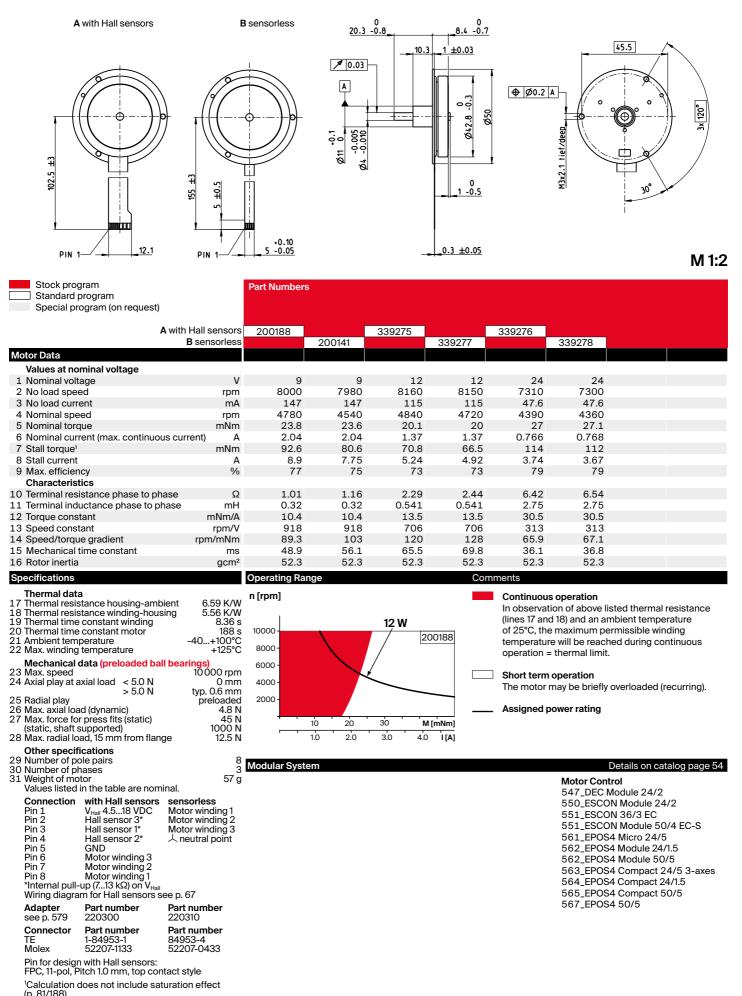
black

white Speed set value input

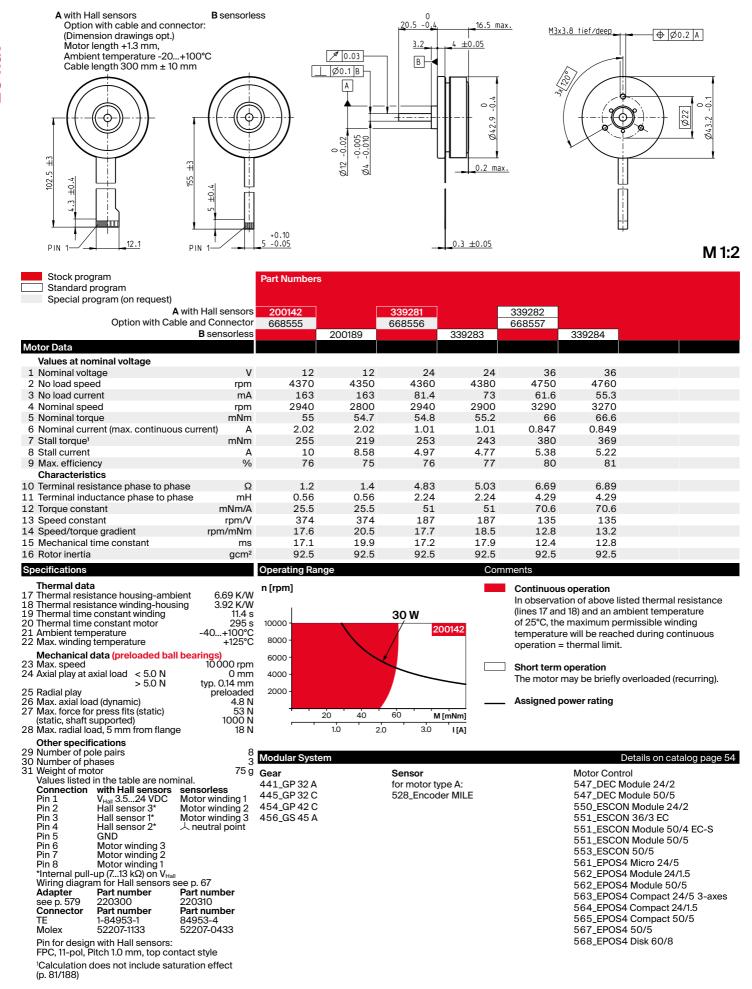
Monitor n (6 pulses per revolution)
Disable (Type Enable) or sense of
direction (Type Direction) green grey

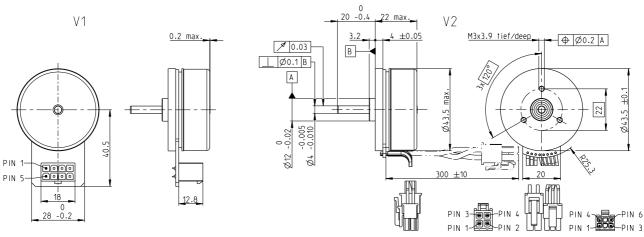
Protective functions

EC 45 flat Ø42.8 mm, brushless, 12 watt

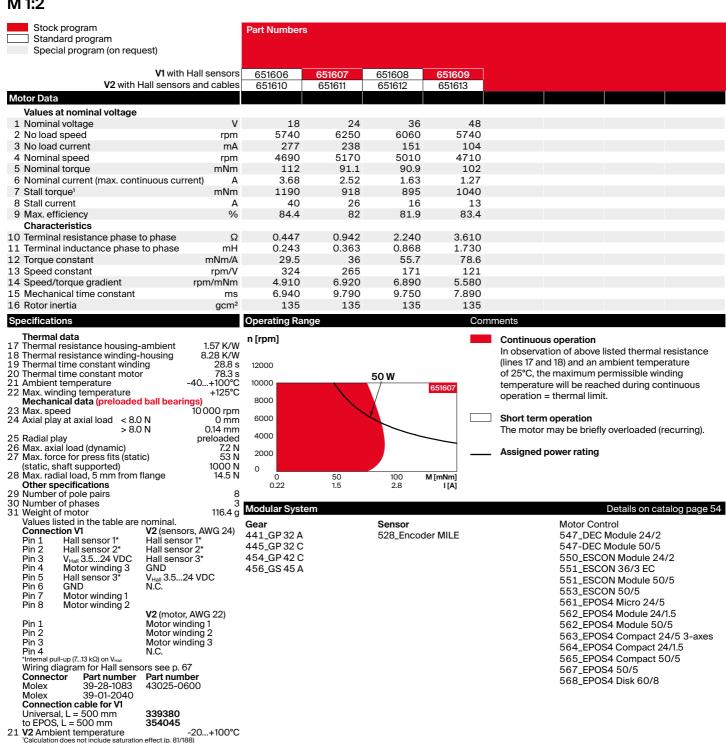


EC 45 flat Ø42.9 mm, brushless, 30 watt



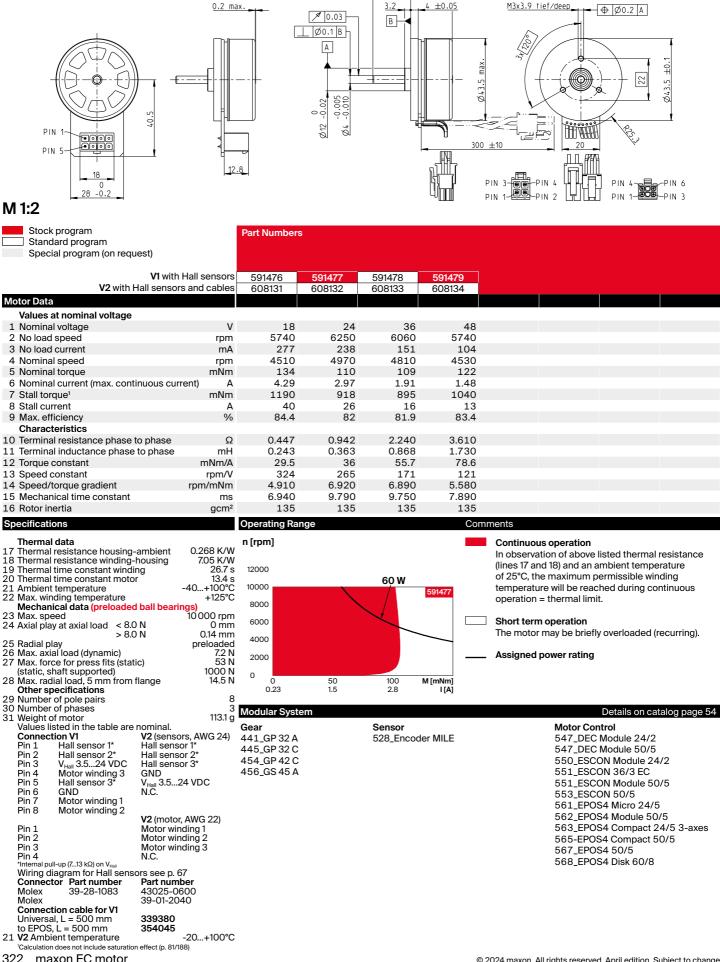


M 1:2



EC 45 flat Ø43.5 mm, brushless, 60 watt

V1

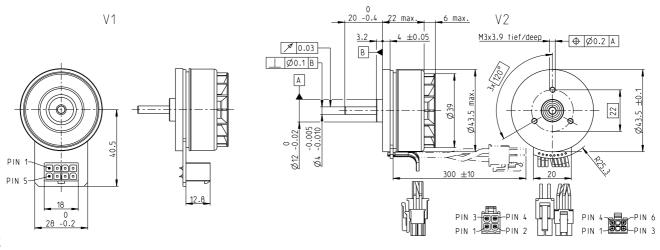


0 20 -0.4

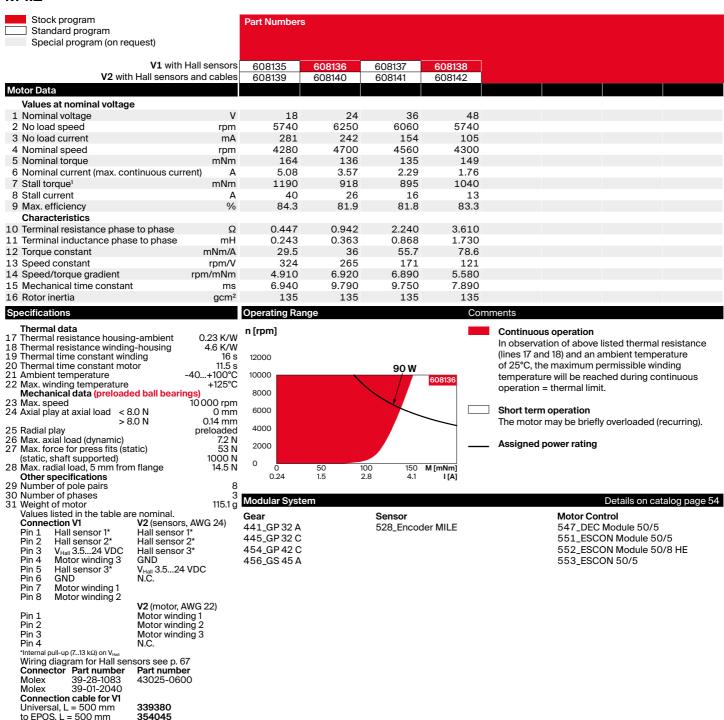
22 max.

٧2

EC 45 flat Ø43.5 mm, brushless, 90 watt



M 1:2



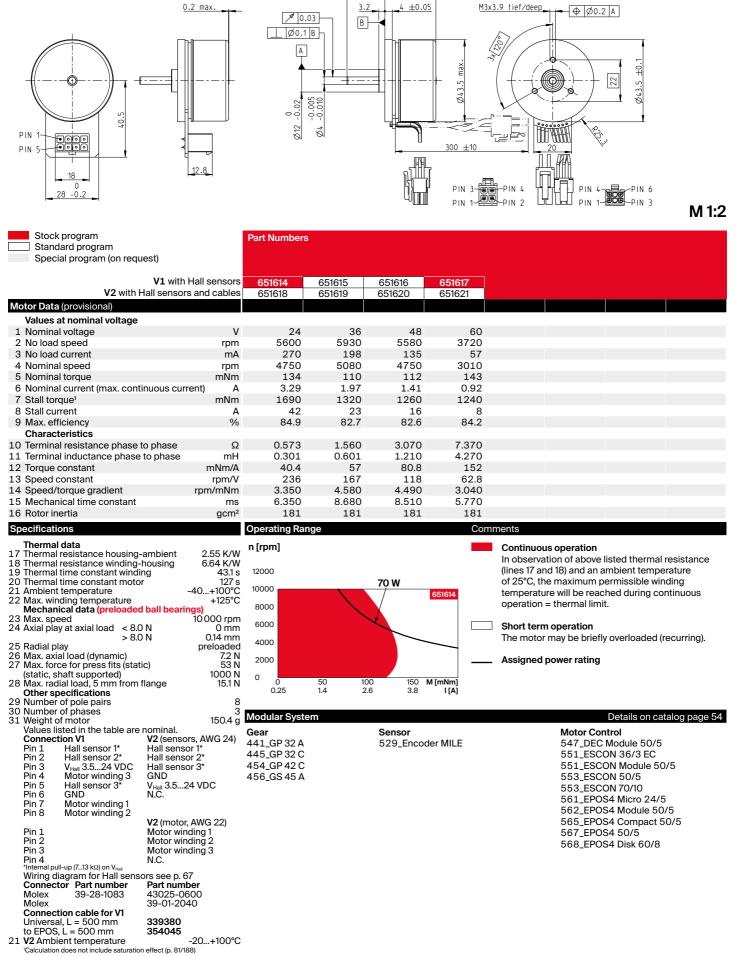
Calculation does not include saturation effect (p. 81/188)

21 V2 Ambient temperature

354045

-20...+100°C

V1

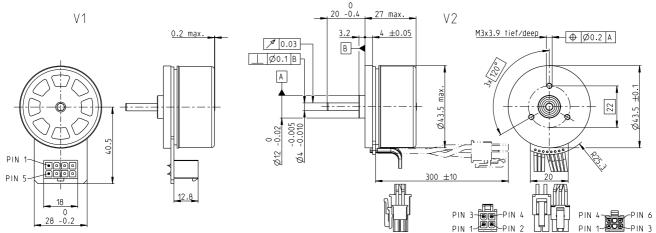


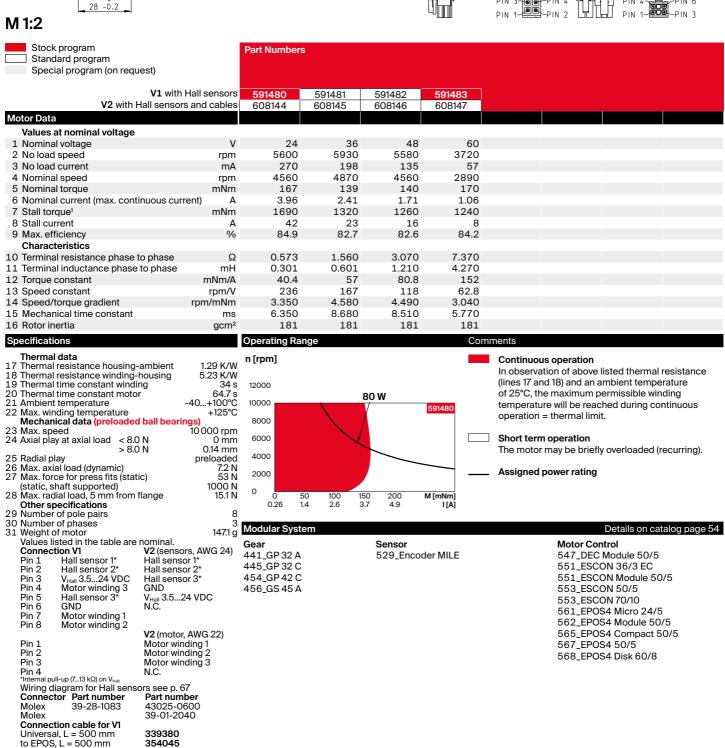
27 max.

٧2

EC 45 flat Ø43.5 mm, brushless, 80 watt

Open Rotor





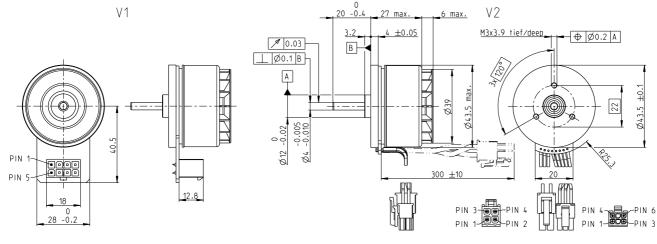
Calculation does not include saturation effect (p. 81/188)

-20...+100°C

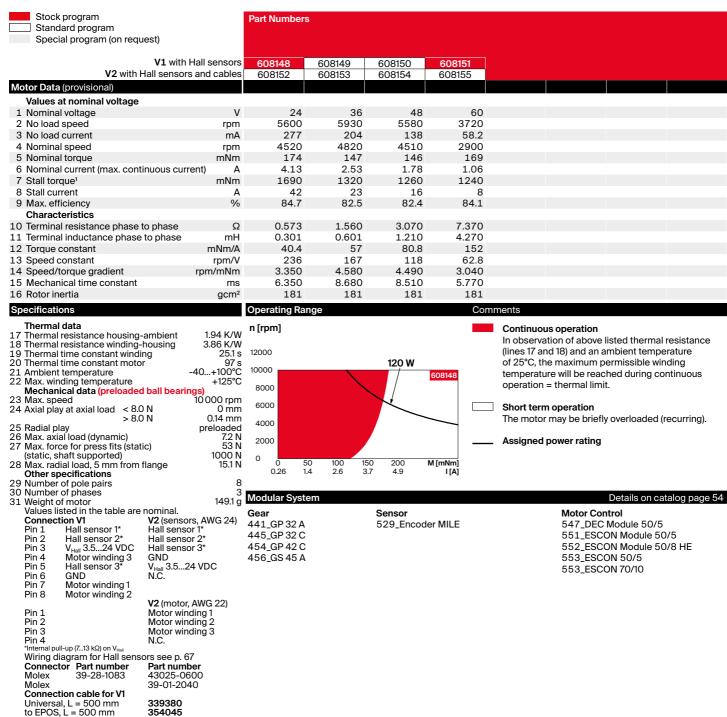
21 V2 Ambient temperature

EC 45 flat Ø43.5 mm, brushless, 120 watt

Ventilated



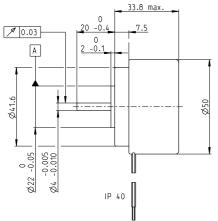
M 1:2

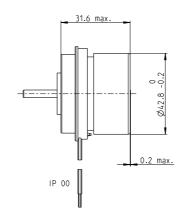


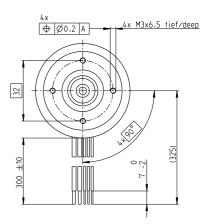
-20...+100°C

EC 45 flat Ø42.8 mm, brushless, 30 watt, with integrated electronics

4-Q-Speed Controller







M 1:2

Stock program Part Numbers Standard program Special program (on request) 5 wire version Direction Enable IP 40 (with cover) 688721 688722 IP 00 (without cover) 688725 688726 Motor Data (provisional) Values at nominal voltage 1 Nominal voltage ٧ 24 24 2 No load speed 6000 6000 6000 6000 rpm 3 No load current mΑ 210 210 210 210 4 Nominal speed 6000 6000 6000 6000 rpm 5 Nominal torque mNm 59.4 89.6 59.4 89.6 6 Nominal current (max. continuous current) 2.06 2.06 3.1 3.1 104 104 104 33 Max. torque mNm 104 34 Max. current 3.62 3.62 3.62 3.62 9 Max. efficiency % 76 76 76 Characteristics 35 Type of control Speed Speed Speed Speed 36 Supply voltage +Vcc ٧ 10...26.4 10...26.4 10...26.4 10...26.4 37 Speed set value input 0.33 ...10.89 0.33...10.89 0.33...10.89 0.33...10.89 V 38 Scale speed set value input rpm/V 600 600 600 600 200. .6480 200...6480 200...6480 .6480 39 Speed range rpm 40 Max. acceleration 6000 6000 6000 6000 rpm/s

Specifications Thermal data 17 Thermal resistance housing-ambient 5.6 (3.12) K/W 18 Thermal resistance winding-housing 7.7 (4.5) K/W 19 Thermal time constant winding 37.6 (22) s 20 Thermal time constant motor 633 (353) s -40...+85°C 21 Ambient temperature 22 Max. winding temperature +125°C 41 Max. temperature of electronics

Max. temperature c...

Mechanical data (preloaded ball bearings)

135 gcm²

70 NI

0 mm 16 Rotor inertia 24 Axial play at axial load < 7.0 N 0.14 mm 25 Radial play preloaded 26 Max. axial load (dynamic) 6.8 N Max. force for press fits (static) 95 N (static, shaft supported)
28 Max. radial load, 5 mm from flange 1000 N 55 N Modular System

Other specifications 226 g 31 Weight of motor 32 Direction of rotation Clockwise (CW) Values listed in the table are nominal.

Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

Connection 5 wire version (Cable AWG 18/24)

+V_{cc} 10...26.4 VDC GND

black

white Speed set value input

green Monitor n (6 pulses per revolution) grey Disable (Type Enable) or sense of direction (Type Direction)

Operating Range Comments n [rpm] 688721 688725 688722 688726 7000 6000 5000 4000 3000 2000 1000 0 10 20 30 40 50 60 70 80 90 100 110

441_GP 32 A

445_GP 32 C 454_GP 42 C

456_GS 45 A

Continuous operation

The drive can be operated with a speed controller and, taking account of the given thermal resistance (fig. 17 and 18) at an ambient temperature of 25°C, does not exceed the maximum permissible operating temperatures.

Overload range

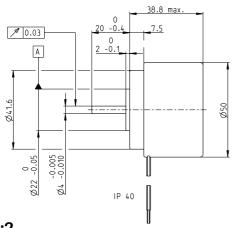
The drive reaches these operating points. Speed may vary from the set value. The overload protection shuts down the drive in the event of sustained overload.

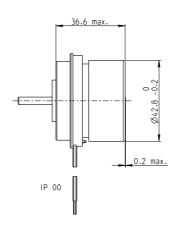
Details on catalog page 54

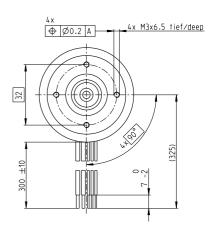
EC 45 flat Ø42.8 mm, brushless, 50 watt, with integrated electronics

Part Numbers

4-Q-Speed Controller







M 1:2

Stock program

Standard program							
Special program (on request)		5 wire version					
		Ena	ble	Direc	tion		
IP 40 (with c	over)	688723		688724			
IP 00 (without c	over)		688727		688728		
Motor Data (provisional)							
Values at nominal voltage							
1 Nominal voltage	V	24	24	24	24		
2 No load speed	rpm	4500	4500	4500	4500		
3 No load current	mΑ	192	192	192	192		
	rpm	4500	4500	4500	4500		
	nNm	82.8	131	82.8	131		
6 Nominal current (max. continuous current)	Α	2.15	3.45	2.15	3.45		
	nNm	149	149	149	149		
34 Max. current	Α	3.86	3.86	3.86	3.86		
9 Max. efficiency	%	76	76	76	76		
Characteristics							
35 Type of control		Speed	Speed	Speed	Speed		
36 Supply voltage +V _{cc}	٧	1026.4	1026.4	1026.4	1026.4		
37 Speed set value input	V	0.3310.89					
	m/V	600	600	600	600		
	rpm	2006480	2006480	2006480	2006480		
40 Max. acceleration rp	om/s	6000	6000	6000	6000		

Specifications Thermal data

5.1 (2.5) K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 6.7 (3.3) K/W 19 Thermal time constant winding 45.1 (10.3) s 256 (124) s -40...+85°C 20 Thermal time constant motor 21 Ambient temperature 22 Max. winding temperature +125°C 41 Max. temperature of electronics +105°C

Mechanical data (preloaded ball bearings)

181 gcm² 0 mm 16 Rotor inertia 24 Axial play at axial load < 7.0 N 0.14 mm > 7.0 N 25 Radial play preloaded 26 Max. axial load (dynamic) 6.8 N 27 Max. force for press fits (static) 95 N (static, shaft supported)
28 Max. radial load, 5 mm from flange 1000 N

Other specifications

31 Weight of motor 32 Direction of rotation 260 g Clockwise (CW)

Values listed in the table are nominal.

Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

Connection 5 wire version (Cable AWG 18/24)

black

white Speed set value input

Monitor n (6 pulses per revolution) Disable (Type Enable) or sense of grey

n [rpm] 688723 688727 **688724** 688728 7000 6000 5000 4000 3000 2000 1000

100

140 160

Continuous operation

The drive can be operated with a speed controller and, taking account of the given thermal resistance (fig. 17 and 18) at an ambient temperature of 25°C, does not exceed the maximum permissible operating temperatures.

Overload range

The drive reaches these operating points. Speed may vary from the set value. The overload protection shuts down the drive in the event of sustained overload.

Details on catalog page 54

63 N Modular System

20 40 60

0

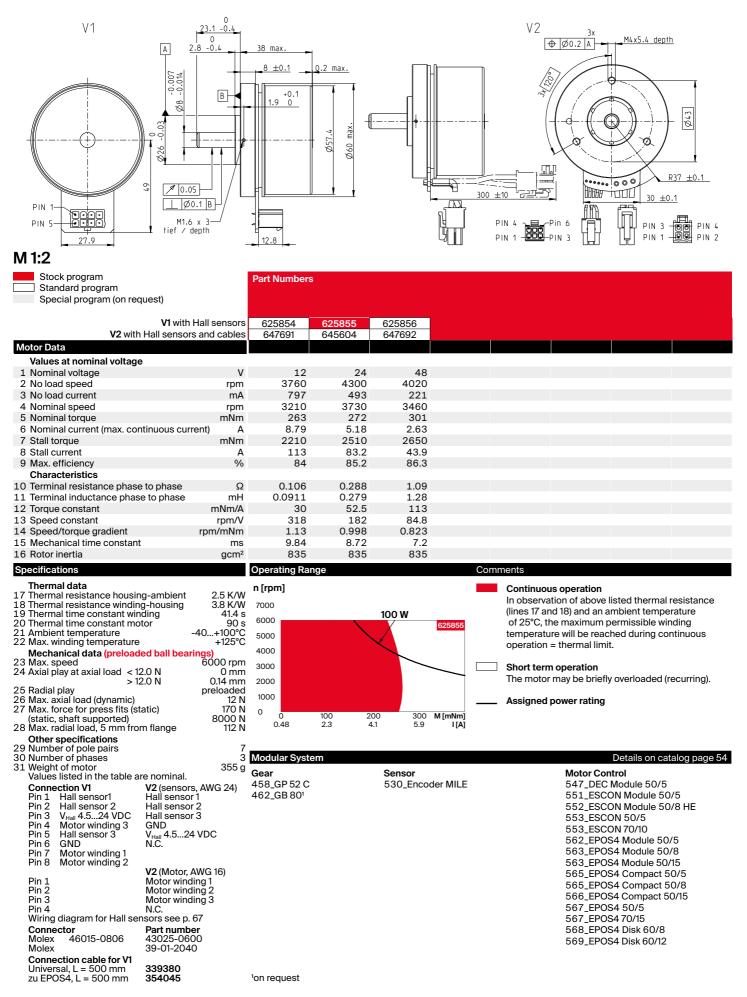
Operating Range

441_GP 32 A 445_GP 32 C 454_GP 42 C

456_GS 45 A

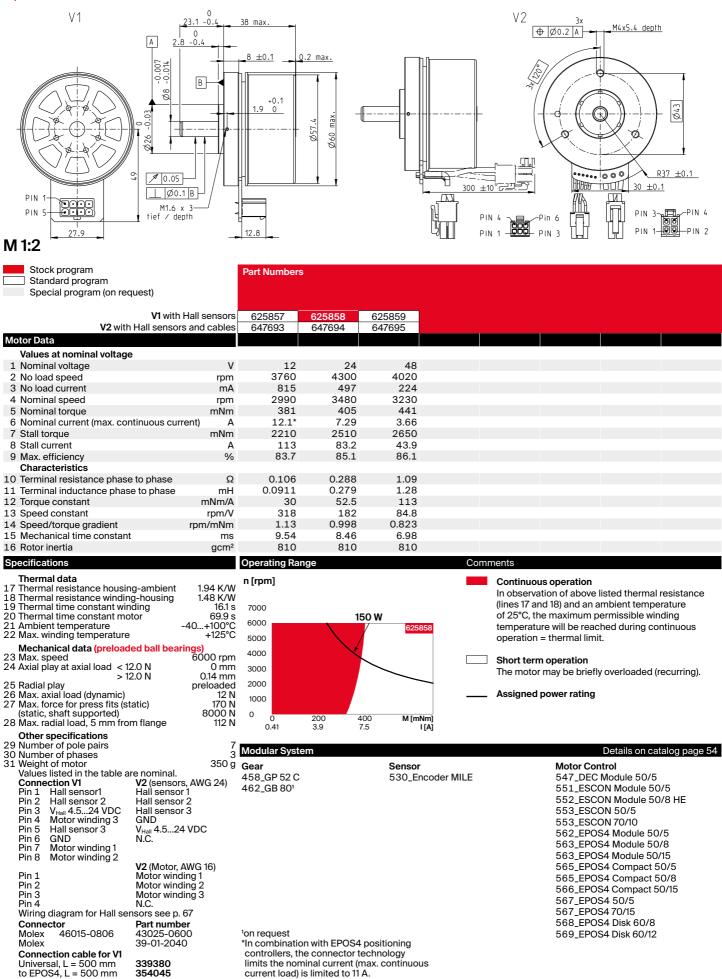
direction (Type Direction)

EC 60 flat Ø60 mm, brushless, 100 watt

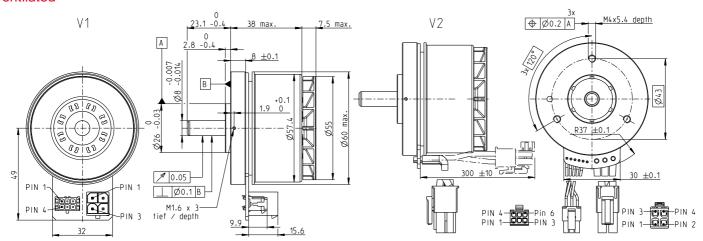


EC 60 flat Ø60 mm, brushless, 150 watt

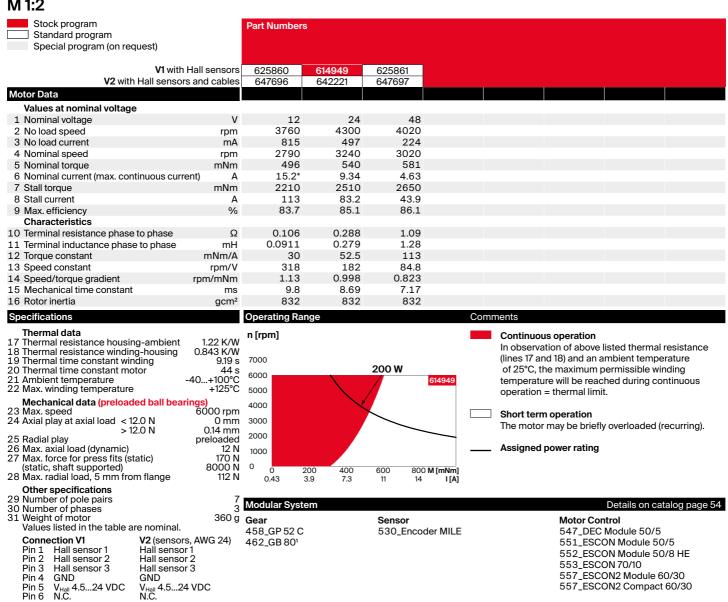
Open Rotor



EC 60 flat Ø60 mm, brushless, 200 watt



M 1:2



on request *625860 and 647696 cannot be combined

with the MILE encoder, because

of the MILE circuit board is 13 A.

the current limit of the connectors

Part number

76829-0104

Pin 1 Pin 2 Pin 3

Molex

Connector

Molex Micro-Fit

Connection cable for V1

for windings, L = 3 m for Hall sensors, L = 3 m

Motor winding 1 Motor winding 2 Motor winding 3

Wiring diagram for Hall sensors see p. 67

V2 (Motor, AWG 14) Motor winding 1

43025-0600

171692-0104

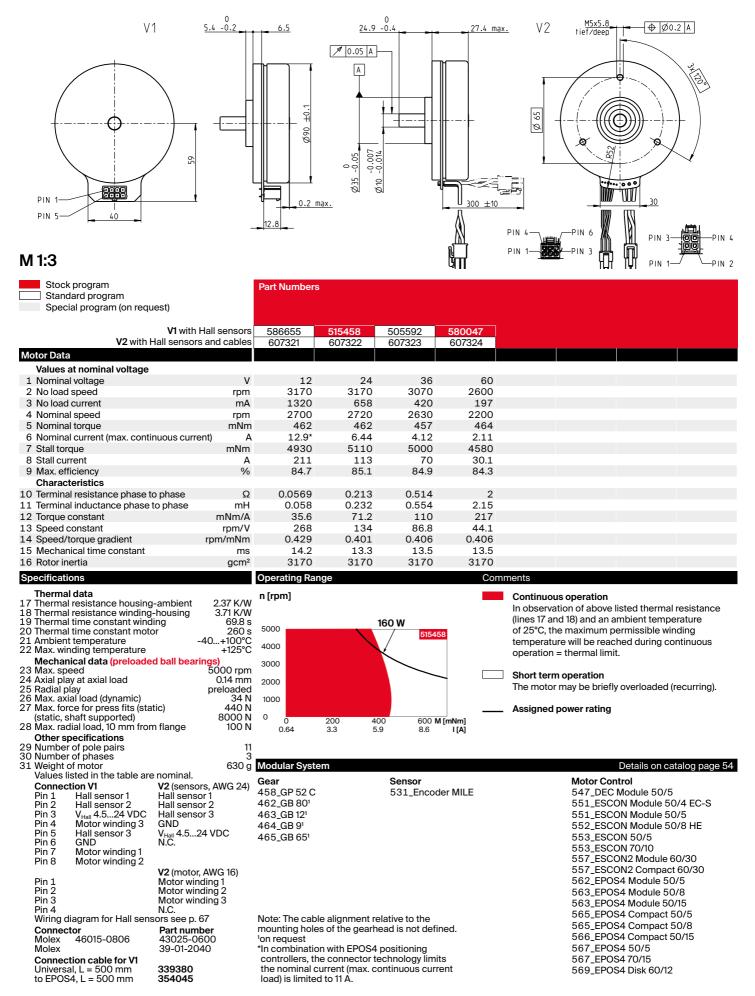
Motor winding 2 Motor winding 3

N.C

520851

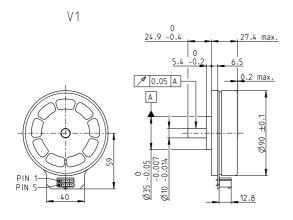
275878

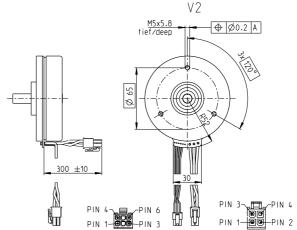
EC 90 flat Ø90 mm, brushless, 160 watt

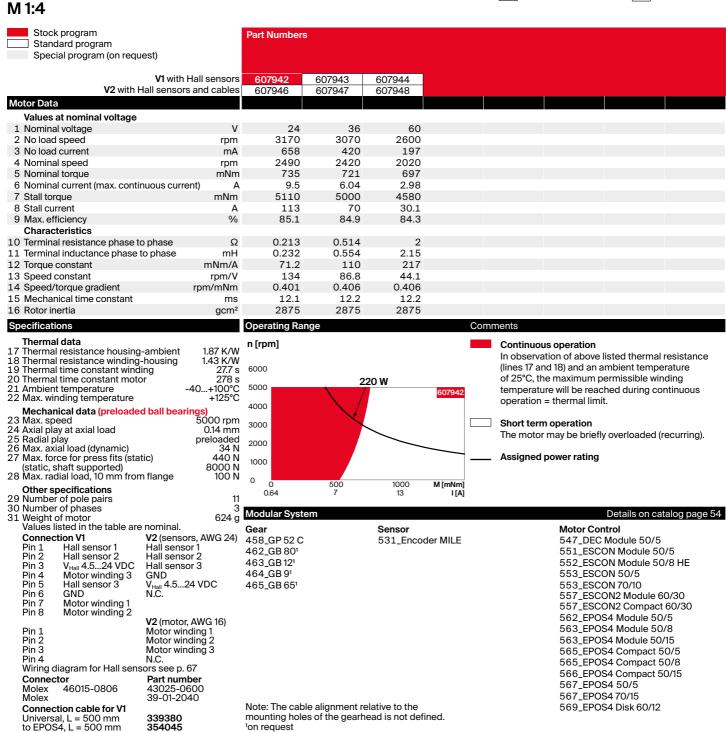


EC 90 flat Ø90 mm, brushless, 220 watt

Open Rotor





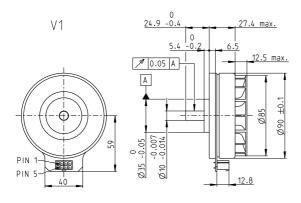


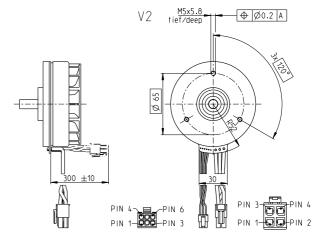
354045

on request

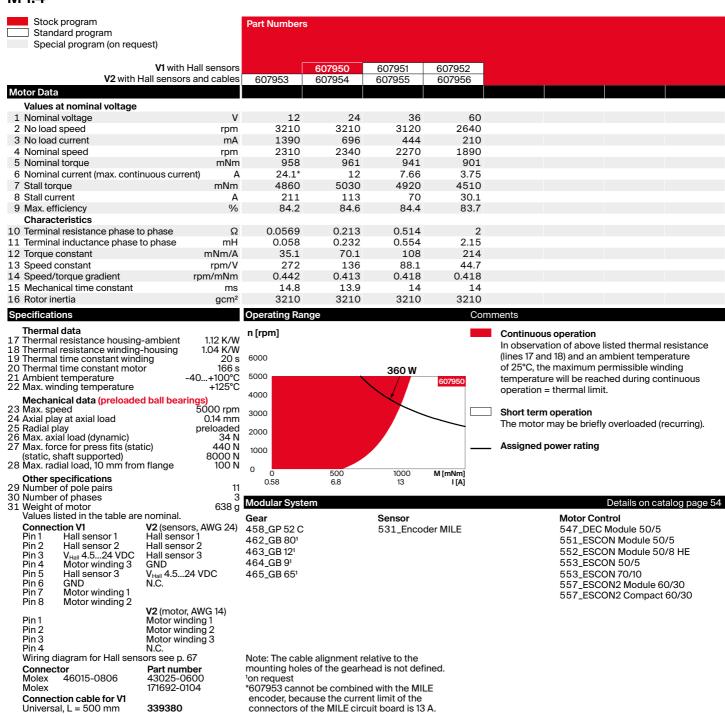
EC 90 flat Ø90 mm, brushless, 360 watt

Ventilated

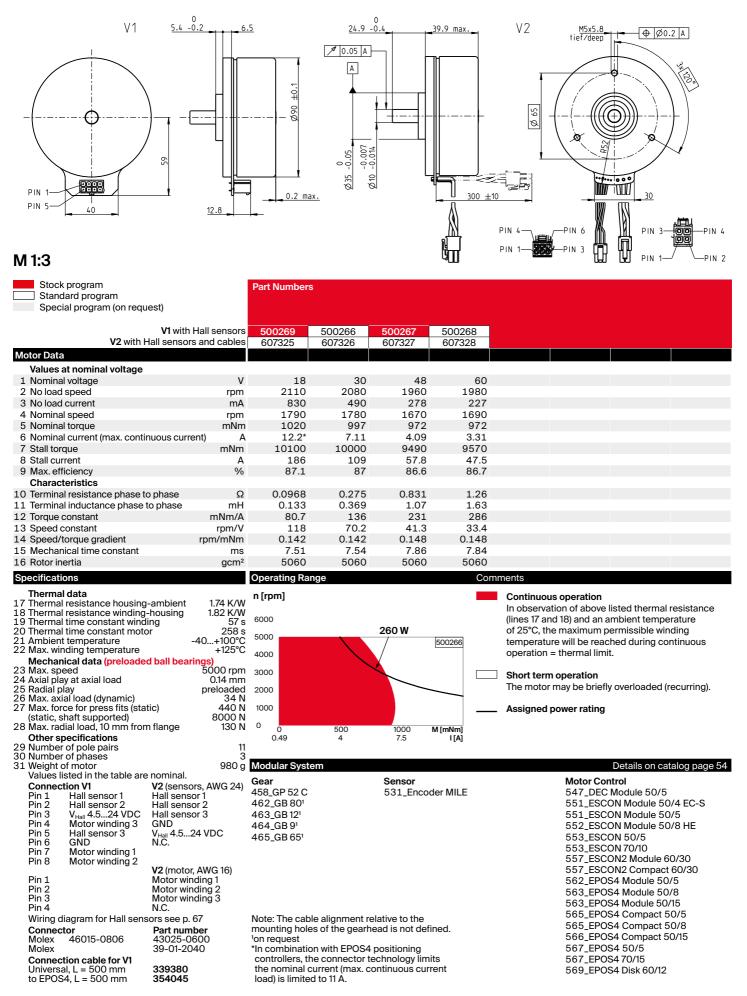




M 1:4

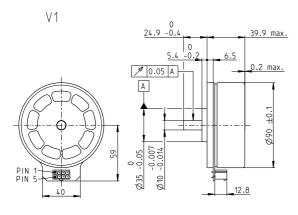


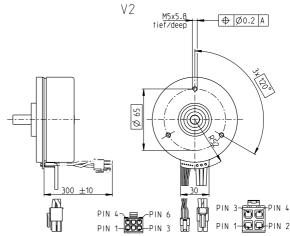
EC 90 flat Ø90 mm, brushless, 260 watt

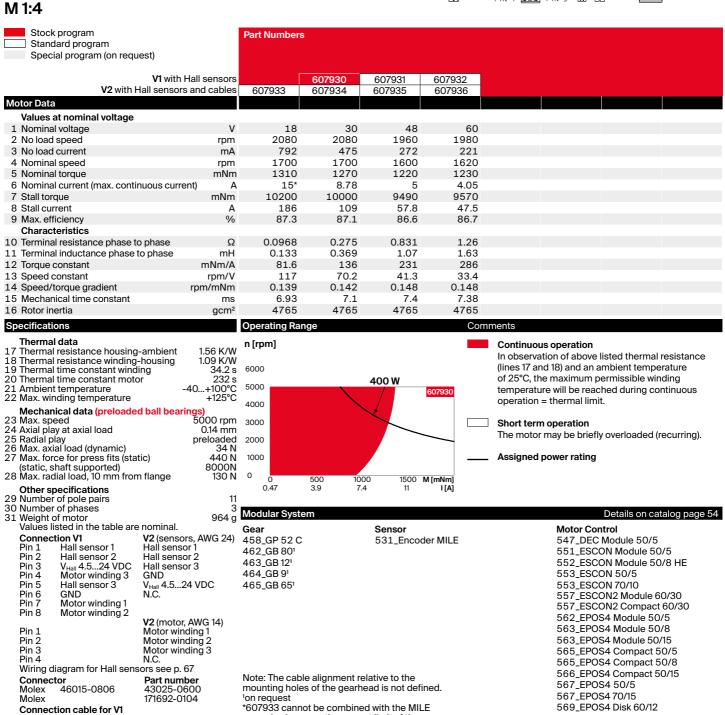


EC 90 flat Ø90 mm, brushless, 400 watt

Open Rotor







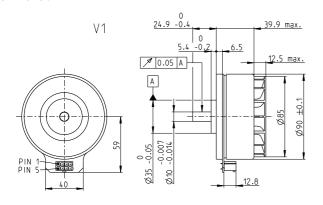
encoder, because the current limit of the

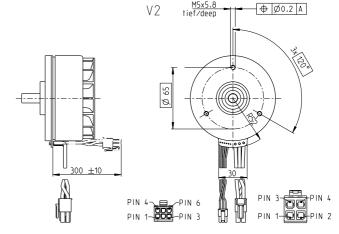
connectors of the MILE circuit board is 13 A

Universal, L = 500 mm to EPOS4, L = 500 mm

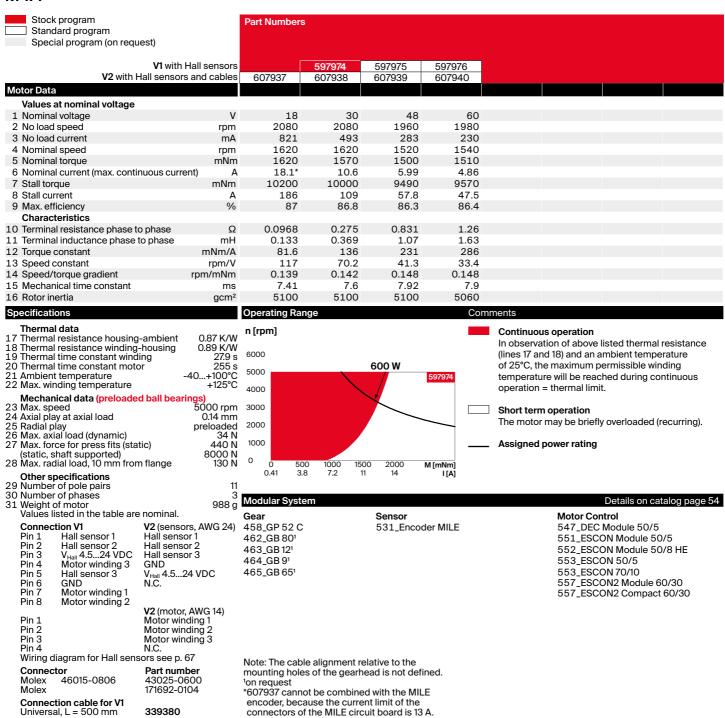
339380 354045

EC 90 flat Ø90 mm, brushless, 600 watt





M 1:4



339380

-		

maxon EC frameless flat

Standard Specification No. 101	88
Terminology explanations	188
EC frameless flat Program	341-346
EC frameless 45 flat Ø43.4 mm, 30 Watt	341
EC frameless 45 flat Ø43.4 mm, 50 Watt	342
EC frameless 45 flat Ø43.4 mm, 70 Watt	343
EC frameless 60 flat Ø60 mm, 100 Watt	344
EC frameless 90 flat Ø90 mm, 160 Watt	345
EC frameless 90 flat Ø90 mm, 260 Watt	346

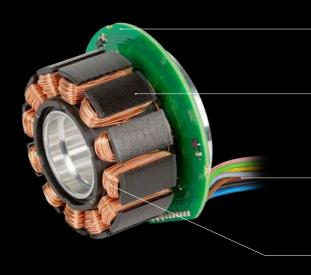


maxon EC frameless flat

Rotor and stator are delivered separately and connected only during the assembly of the components. Frameless motors offer maximum torque density and minimum size, high overload capability, low cogging torque, and enough space for cable glands.

Key data

Motor Ø43 ... 90 mmMotor length20.55 ... 42 mmPower30 ... 260 WNominal torqueup to 1010 mNmMax. permissible speedup to 10 000 rpm



Printed circuit board with cables and integrated Hall sensors.

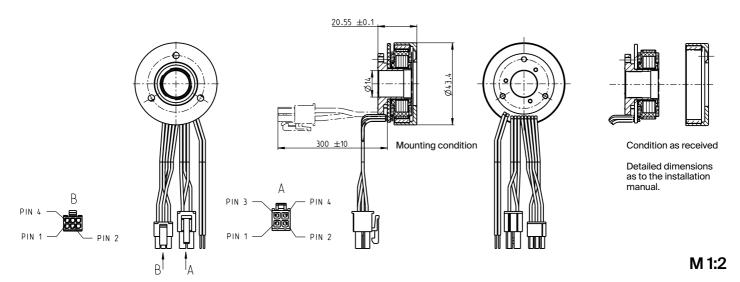
Rotor and stator are delivered as separate parts. Stator packet optimally connected to the aluminum flange, for ideal heat dissipation.

Cables with connectors soldered directly to the printed circuit board to minimize volume.

Precision-manufactured winding for optimal fill factors.

- → High torque density
- → Compact, with plenty of space inside
- → Low operating voltage
- Complete control
- Proven design

EC frameless 45 flat Ø43.4 mm, brushless, 30 watt



Stock program Standard program Special program (on request)		Part Numbers						
with	Hall sensors	548273	574536	574537	574538			
Motor Data								
Values at nominal voltage								
1 Nominal voltage	V	12	18	24	36			
2 No load speed	rpm	4360	4890	4360	4750			
3 No load current	mA	163	129	81.4	61.6			
4 Nominal speed	rpm	2910	3510	2930	3290			
5 Nominal torque	mNm	54.9	57.8	54.7	66			
6 Nominal current (max. continuous cur		2.02	1.63	1.01	0.847			
7 Stall torque	mNm	247	295	251	378			
8 Stall current	Α	9.69	8.61	4.93	5.35			
9 Max. efficiency	%	76.3	77.5	76.5	80.1			
Characteristics								
10 Terminal resistance phase to phase	Ω	1.24	2.09	4.87	6.73			
11 Terminal inductance phase to phase	mH	0.56	0.697	2.24	4.29			
12 Torque constant	mNm/A	25.5	34.3	51	70.6			
13 Speed constant	rpm/V	374	278	187	135			
14 Speed/torque gradient	rpm/mNm	18.2	17	17.9	12.9			
15 Mechanical time constant	ms	28.6	30.8	28.1	20.2			
16 Rotor inertia	gcm ²	150	150	150	150			
Specifications		Operating Ran	ae		Con	nments		

Thermal data n [rpm] 6.73 K/W 3.92 K/W 11.4 s 296 s -40...+100°C 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 19 Thermal time constant winding 12000 20 Thermal time constant motor 21 Ambient temperature 10000 548273 22 Max. winding temperature +125°C 8000 Mechanical data 23 Max. speed 10 000 rpm Continuous operation Other specifications Continuous operation with reduced 8 4000 29 Number of pole pairs 30 Number of phases 31 Weight of motor Weight of rotor thermal resistance R_{th2} 50% 89 g 35 g Intermittent operation 2000 54 g Assigned power rating 80 **M [mNm]** 3 I [A] 20 0.86 40 1.6 Weight of stator 0.15

Values listed in the table are nominal.

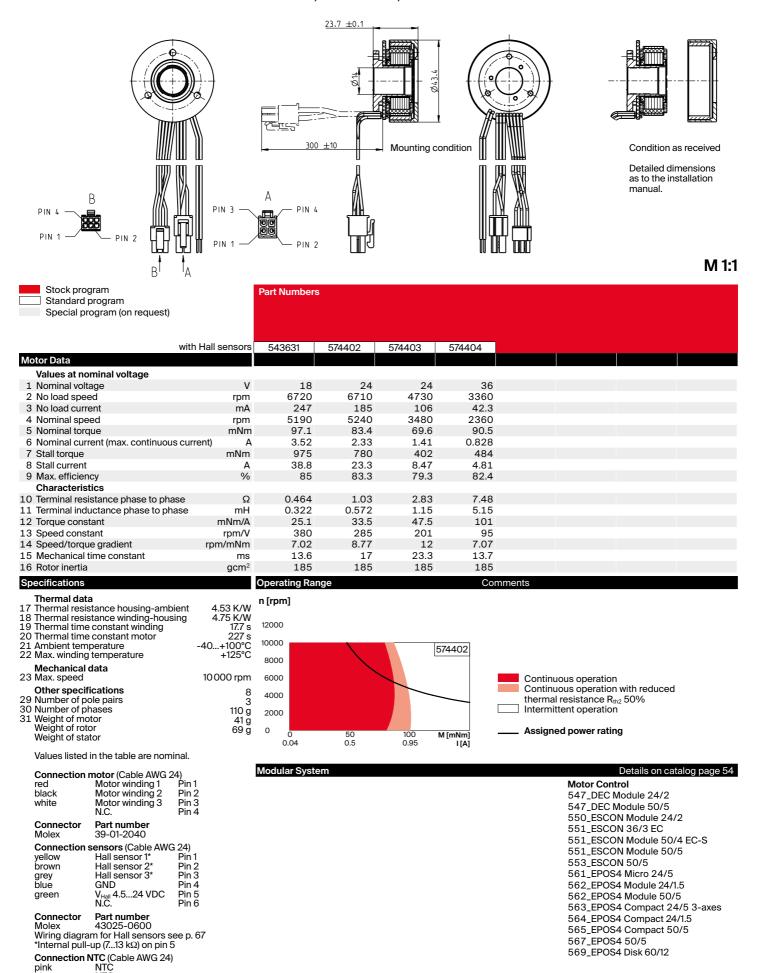
Connection r red black white	motor (Cable AWG 2 Motor winding 1 Motor winding 2 Motor winding 3 N.C.	4) Pin 1 Pin 2 Pin 3 Pin 4
Connector Molex	Part number 39-01-2040	
Connection s yellow brown grey blue green	sensors (Cable AWG Hall sensor 1* Hall sensor 2* Hall sensor 3* GND V _{Hall} 4.524 VDC N.C.	24) Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6
	Part number 43025-0600 m for Hall sensors so up (713 kΩ) on pin 5	

Connection NTC (Cable AWG 24)

Modular System Details on catalog page 54 Motor Control

547_DEC Module 24/2 547_DEC Module 50/5 550_ESCON Module 24/2 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 24/1.5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 564_EPOS4 Compact 24/1.5 565_EPOS4 Compact 50/5 567_EPOS4 50/5 569_EPOS4 Disk 60/12

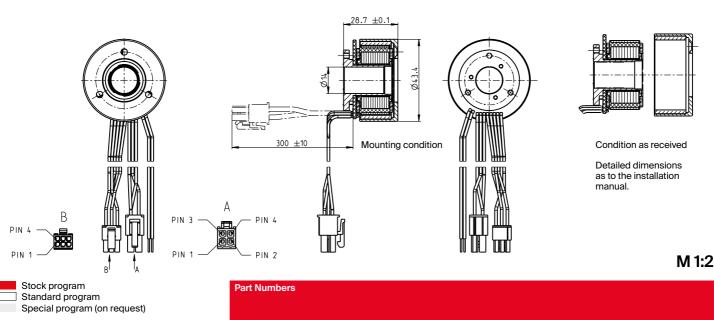
EC frameless 45 flat Ø43.4 mm, brushless, 50 watt



NTC

Resistance 25°C: $5 \text{ k}\Omega \pm 1\%$, beta (25-85°C): 3490 K

EC frameless 45 flat Ø43.4 mm, brushless, 70 watt



with Hall sensors 548270 574035 574036 574037 **Motor Data** Values at nominal voltage 1 Nominal voltage 30 48 2 No load speed rpm 6110 6230 6330 3440 3 No load current mΑ 234 194 166 48.1 4 Nominal speed 4860 4990 5080 2540 rpm 5 Nominal torque mNm 128 112 108 134 6 Nominal current (max. continuous current) 3.21 2.36 0.936 1.93 7 Stall torque 1460 1170 1100 mNm 915 8 Stall current 39.5 25.8 20.7 6.97 9 Max. efficiency % 85.4 83.7 83.2 84.3 Characteristics 10 Terminal resistance phase to phase Ω 0.608 1.16 1.74 6.89 0.966 11 Terminal inductance phase to phase mΗ 0.463 0.691 5.85 mNm/A 36.9 45.1 53.3 131 12 Torque constant 13 Speed constant rpm/V 259 212 72.7 179 14 Speed/torque gradient rpm/mNm 4.26 5.44 5.85 3.82 15 Mechanical time constant 10.7 13.7 14.7 9.6 ms 16 Rotor inertia gcm² 240 240 240 240

Operating Range Specifications Thermal data n [rpm] 17 Thermal resistance housing-ambient 3.56 K/W 18 Thermal resistance winding-housing 19 Thermal time constant winding 4.1 K/W 29.6 s 12000 20 Thermal time constant motor 178 s -40...+100°C 10000 21 Ambient temperature 548270 22 Max. winding temperature +125°C 8000 Mechanical data 23 Max. speed 10 000 rpm Continuous operation Continuous operation with reduced Other specifications 8 4000 29 Number of pole pairs 30 Number of phases thermal resistance R_{th2} 50% 143 g 51 g Intermittent operation 2000 Weight of motor Weight of rotor 92 g Assigned power rating 50 1.5 100 2.7 Weight of stator 0.23 3.9 I[A]

Values listed in the table are nominal.

Connection motor (Cable AWG 24)

Motor winding 1 Pin 1 Motor winding 1 Motor winding 2 Pin 2 Pin 3 black white Motor winding 3 Part number Connector 39-01-2040 Connection sensors (Cable AWG 24) yellow brown Hall sensor 1* Hall sensor 2* Pin 1 Pin 2 Pin 3 Pin 4 grey Hall sensor 3* GND V_{Hall} 4.5...24 VDC N.C. green Part number 43025-0600 Connector Wiring diagram for Hall sensors see p. 67 *Internal pull-up (7...13 $k\Omega$) on pin 5

Connection NTC (Cable AWG 24)

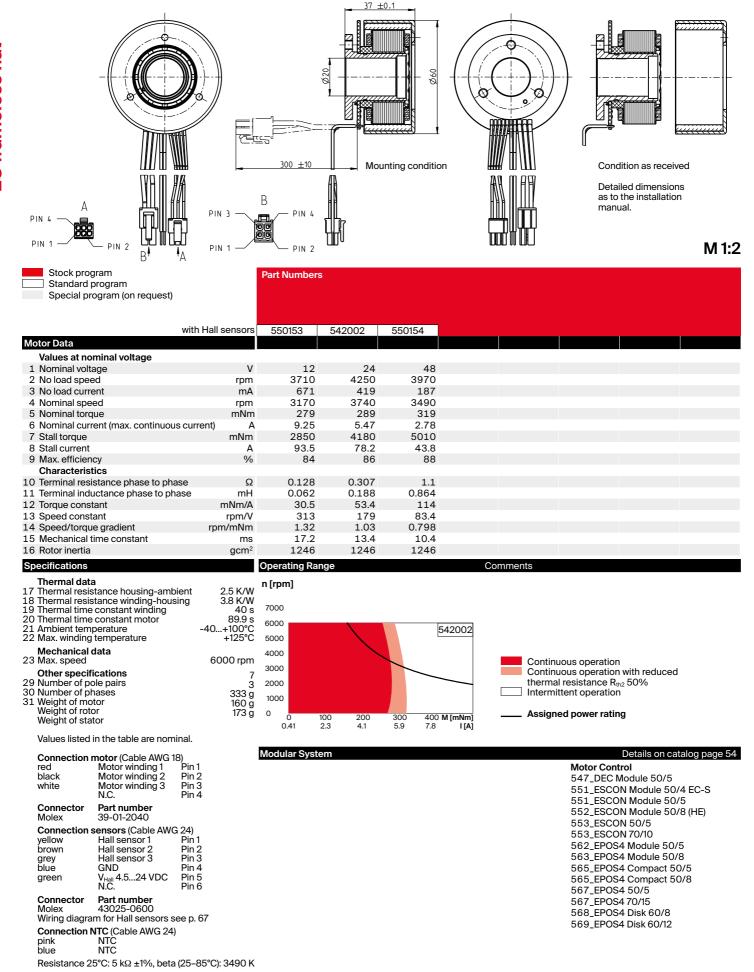
NTC NTC

Resistance 25°C: 5 k Ω ±1%, beta (25–85°C): 3490 K

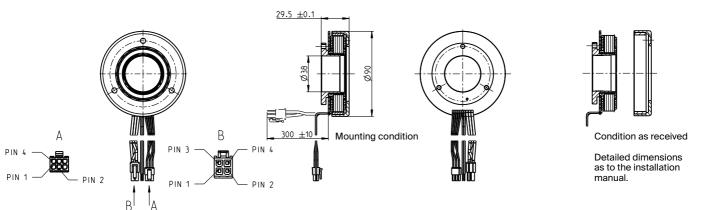
Modular System Details on catalog page 54

Motor Control 547_DEC Module 50/5 551_ESCON 36/3 EC 551_ESCON Module 50/4 EC-S 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 562_EPOS4 Module 50/5 563_EPOS4 Compact 24/5 3-axes 565_EPOS4 Compact 50/5 567_EPOS4 50/5 569_EPOS4 Disk 60/12

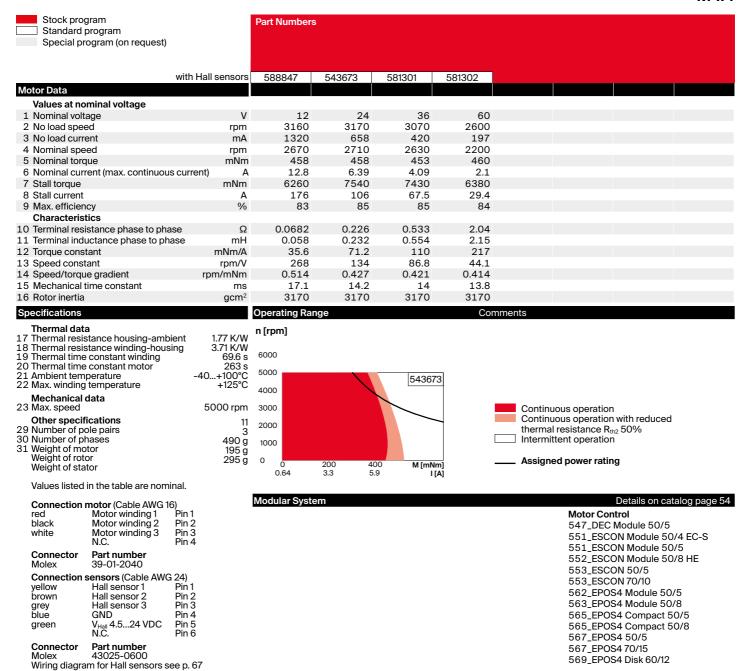
EC frameless 60 flat Ø60 mm, brushless, 100 watt



EC frameless 90 flat Ø90 mm, brushless, 160 watt



M 1:4

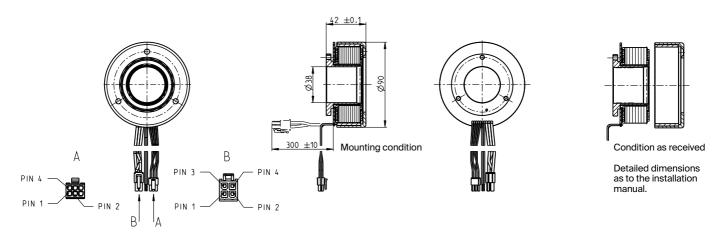


Resistance 25°C: 5 k Ω ±1%, beta (25–85°C): 3490 K

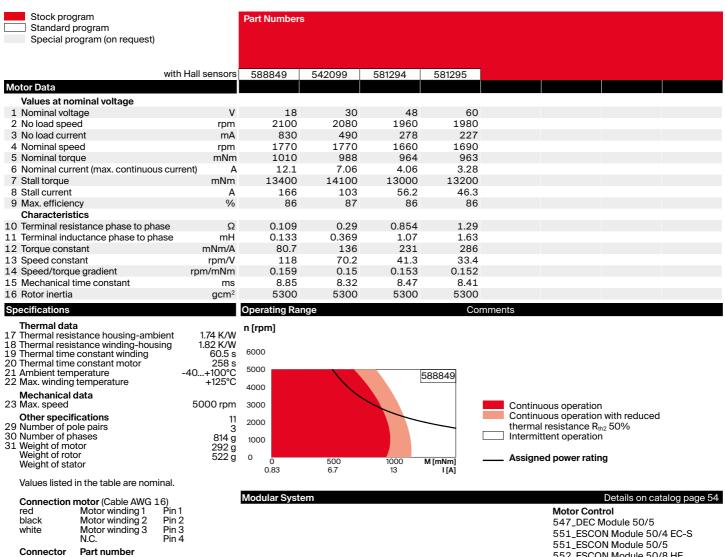
Connection NTC (Cable AWG 24) NTC NTC

pink blue

EC frameless 90 flat Ø90 mm, brushless, 260 watt



M 1:4



red black white	Motor winding 1 Motor winding 2 Motor winding 3 N.C.	Pin 1 Pin 2 Pin 3 Pin 4
Connector Molex	Part number 39-01-2040	
Connection s yellow brown grey blue green	ensors (Cable AWG Hall sensor 1 Hall sensor 2 Hall sensor 3 GND V _{Hall} 4.524 VDC N.C.	24) Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6
Molex	Part number 43025-0600 In for Hall sensors se	ee p. 67
Connection No pink blue	ITC (Cable AWG 24) NTC NTC	

blue NTC Resistance 25°C: 5 k Ω ±1%, beta (25–85°C): 3490 K

551_ESCON Module 50/4 EC-5 551_ESCON Module 50/5 552_ESCON Module 50/8 HE 553_ESCON 50/5 553_ESCON 70/10 562_EPOS4 Module 50/5 563_EPOS4 Module 50/15 563_EPOS4 Module 50/15 565_EPOS4 Compact 50/5 565_EPOS4 Compact 50/15 567_EPOS4 50/5 567_EPOS4 50/5 569_EPOS4 Disk 60/12

EC frameless DT

maxon EC frameless DT

Standard Specification No. 101		88
Terminology explanations		188
EC frameless DT Program		349-356
EC frameless DT 38 S Ø42 mm, 105 Watt	NEW	349
EC frameless DT 38 M Ø42 mm, 100 Watt	NEW	350
EC frameless DT 50 S Ø54 mm, 170 Watt		351
EC frameless DT 50 M Ø54 mm, 150 Watt		352
EC frameless DT 65 S Ø70 mm, 240 Watt		353
EC frameless DT 65 M Ø70 mm, 210 Watt		354
EC frameless DT 85 M Ø90 mm, 450 Watt		355
EC frameless DT 85 L Ø90 mm, 400 Watt		356

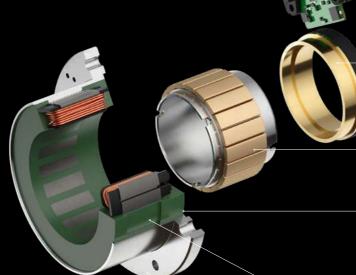


maxon EC frameless DT

Unleash unrivaled torque density and dynamics with the EC frameless DT motor series, which sets a new benchmark in energy efficiency and optimal heat dissipation. The compact design, including a flange and a generous hollow shaft, offers unparalleled engineering freedom and ensures a straightforward installation process. Achieve the utmost precision in positioning with remarkably minimal stutter, which is further improved by the optional high-resolution TSX encoder.



Motor Ø42 ... 90 mmMotor length19 ... 43 mmPower100 ... 450 WNominal torqueup to 2900 mNmMax. permissible speedup to 15 000 rpm



Optional: Integrated encoder with commutation signal for a high degree of positioning accuracy. Rotors and stators are delivered in pairs.

Rotor optimized for minimum rotor inertia with maximum hollow shaft.

NTC sensors directly at the winding head guarantee optimal temperature monitoring.

Potted stator with heat-conducting sealing compound in the mounting flange for optimized heat transfer.

Mounting flange for very easy integration into the customer application.

- → Top torque density
- → Short length, with large hollow shaft
- Excellent heat dissipation
- Outstanding energy efficiency
- Low cogging torque

EC frameless DT 38 S Ø42 mm, brushless, 105 watt

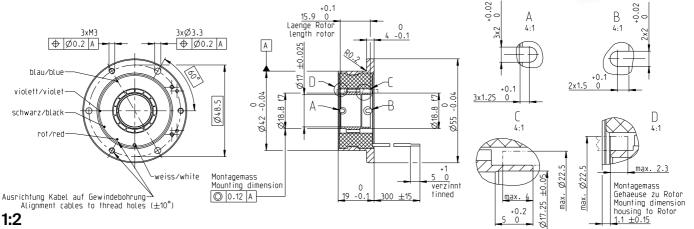
Part Numbers

Operating Range

Modular System

Dynamic Torque





Stock program Standard program Special program (on request)

without Hall sensors 814370 **Motor Data** Values at nominal voltage 1 Nominal voltage 24 2 No load speed rpm 12100 3 No load current mΑ 242 4 Nominal speed 9820 rpm 5 Nominal torque mNm 102 6 Nominal current (max. continuous current) 4.92 7 Stall torque 619 mNm 8 Stall current 151 9 Max. efficiency % 89.8 Characteristics 10 Terminal resistance phase to phase Ω 0.263 11 Terminal inductance phase to phase mΗ 0.182 12 Torque constant mNm/A 18.8 13 Speed constant 508 rpm/V 14 Speed/torque gradient rpm/mNm 7.1 15 Mechanical time constant 0.91 ms 16 Rotor inertia 12.2 gcm²

Thermal data	
17 Thermal resistance housing-ambient	7.28 K/W
18 Thermal resistance winding-housing	0.6 K/W
19 Thermal time constant winding	4.5 s
20 Thermal time constant motor	451 s
21 Ambient temperature	-40+100°C
22 Max. winding temperature	+155°C

Mechanical data 23 Max. speed 15 000 rpm Other specifications

29 Number of pole pairs 30 Number of phases 125 g 12 g 31 Weight of motor Weight of rotor 113 g Weight of stator (stainless steel flange)

Values listed in the table are nominal.

Connection motor (Cable AWG 18) Motor winding 1 black Motor winding 2 Motor winding 3 white

Connection NTC (Cable AWG 24)

NTC NTC purple blue

Resistance 25°C: $5 \text{ k}\Omega \pm 1\%$, beta (25-85°C):

3490 K

Specifications

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

n [rpm] 105 W 15000 814370 10000 5000 7 0 200 M [mNm] 100 150

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

Assigned power rating

520_TSX 38 MAG with Hall sensors

Motor Control 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 50/5 565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

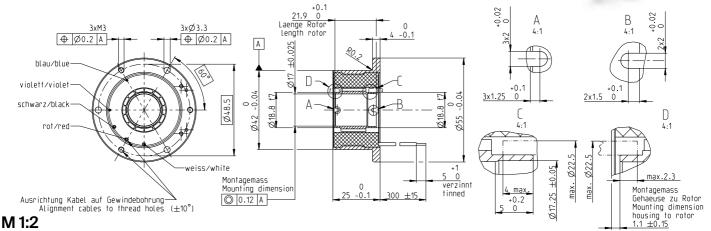
Details on catalog page 54

Aluminum flange (-36 g) on request Without flange: maxon integration on request

EC frameless DT 38 M Ø42 mm, brushless, 100 watt

Dynamic Torque





Stock program Standard program Special program (on request)

Part Numbers

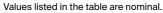
	without	t Hall sensors	800948		
Mo	otor Data				
	Values at nominal voltage				
1	Nominal voltage	V	24		
2	No load speed	rpm	6280		
3	No load current	mA	136		
4	Nominal speed	rpm	5040		
5	Nominal torque	mNm	189		
6	Nominal current (max. continuous cur	rrent) A	4.7		
7	Stall torque	mNm	1110		
8	Stall current	Α	41.3		
9	Max. efficiency	%	90.9		
	Characteristics				
0	Terminal resistance phase to phase	Ω	0.371		
.1	Terminal inductance phase to phase	mH	0.337		
12	Torque constant	mNm/A	36.3		
L3	Speed constant	rpm/V	263		
.4	Speed/torque gradient	rpm/mNm	2.740		
.5	Mechanical time constant	ms	0.573		
6	Rotor inertia	gcm ²	20.3		

gcm² Specifications Thermal data

17 Thermal resistance housing-ambient	6.87 K/W
18 Thermal resistance winding-housing	0.33 K/W
19 Thermal time constant winding	3.38 s
20 Thermal time constant motor	574 s
21 Ambient temperature	-40+100°C
22 Max. winding temperature	+155°C
- ,	



Other specifications 29 Number of pole pairs 30 Number of phases 169 g 31 Weight of motor Weight of rotor 20 g 149 g Weight of stator (stainless steel flange)



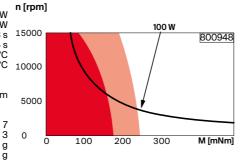
Connection motor (Cable AWG 18) Motor winding 1 black Motor winding 2 Motor winding 3 white Connection NTC (Cable AWG 24)

NTC NTC purple blue

Resistance 25°C: 5 k Ω ±1%, beta (25-85°C): 3490 K

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

Assigned power rating

Sensor 520_TSX 38 MAG with Hall sensors

Details on catalog page 54 **Motor Control** 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 50/5 565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

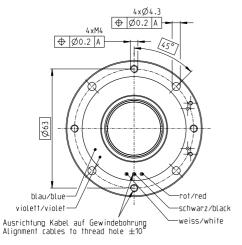
Modular System

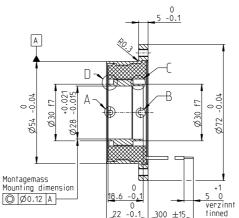
Aluminum flange (-43 g) on request Without flange: maxon integration on request

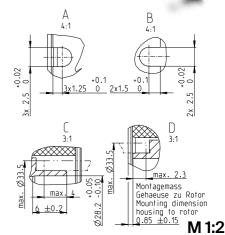
EC frameless DT 50 S Ø54 mm, brushless, 170 watt

Dynamic Torque









Stock program
Standard program
Special program (on request)

Part Numbers

Operating Range

Modular System

without F	laii sensors	734439				
Motor Data						
Values at nominal voltage						
1 Nominal voltage	V	48				
2 No load speed	rpm	6840				
3 No load current	mA	162				
4 Nominal speed	rpm	5640				
5 Nominal torque	mNm	335				
6 Nominal current (max. continuous curre	ent) A	4.57				
7 Stall torque	mNm	2300				
8 Stall current	Α	83.5				
9 Max. efficiency	%	91.4				
Characteristics						
10 Terminal resistance phase to phase	Ω	0.575				
11 Terminal inductance phase to phase	mH	0.432				
12 Torque constant	mNm/A	66.6				
13 Speed constant	rpm/V	143				
14 Speed/torque gradient	rpm/mNm	1.26				
15 Mechanical time constant	ms	0.908				
16 Rotor inertia	gcm ²	70				

Thermal data	
17 Thermal resistance housing-ambient	4.02 K/W
18 Thermal resistance winding-housing	1.4 K/W
19 Thermal time constant winding	15.9 s
20 Thermal time constant motor	453 s
21 Ambient temperature	-40+100°C
22 Max. winding temperature	+155°C

Mechanical data 7000 rpm Other specifications 29 Number of pole pairs 10 30 Number of phases 3 218 g 28 g 31 Weight of motor

Weight of stator (stainless steel flange) Values listed in the table are nominal.

Connection motor (Cable AWG 18) Motor winding 1 black Motor winding 2 Motor winding 3 white

Connection NTC (Cable AWG 24)

NTC NTC purple blue

Weight of rotor

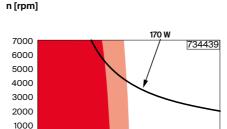
Resistance 25°C: 5 k Ω ±1%, beta (25–85°C):

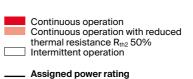
3490 K

Specifications

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.





100 200 300 400 500 600 M [mNm]

Sensor 521_TSX 50 MAG with Hall sensors

Motor Control 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 50/5 565_EPOS4 Compact 50/5 567_EPOS4 50/5 568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

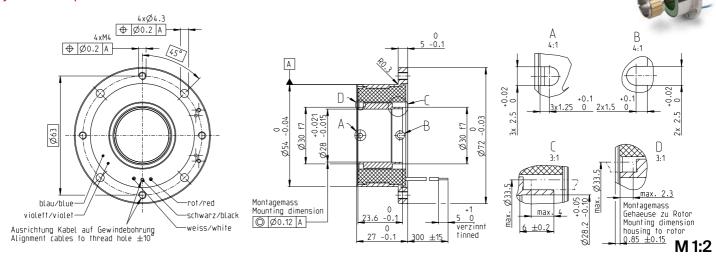
Details on catalog page 54

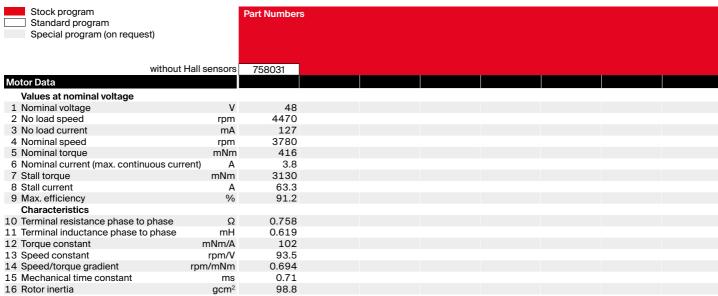
190 g

Aluminum flange (-62 g) on request Without flange: maxon integration on request

EC frameless DT 50 M Ø54 mm, brushless, 150 watt

Dynamic Torque





Specifications Thermal data 5.02 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 0.412 K/W 19 Thermal time constant winding 7.11 s 20 Thermal time constant motor 678 s-40...+100°C 21 Ambient temperature 22 Max. winding temperature +155°C

Mechanical data 23 Max. speed 5000 rpm Other specifications

29 Number of pole pairs 10 30 Number of phases 3 270 g 31 Weight of motor Weight of rotor 40 g 230 g Weight of stator (stainless steel flange)

Values listed in the table are nominal.

Connection motor (Cable AWG 18) Motor winding 1 black Motor winding 2 Motor winding 3 white

Connection NTC (Cable AWG 24)

NTC NTC purple blue

Resistance 25°C: 5 k Ω ±1%, beta (25-85°C): 3490 K

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Operating Range n [rpm]

5000 758031 4000 3000 2000 1000 800 **M [mNm]** 200 400 600

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

Assigned power rating

Sensor 521_TSX 50 MAG with Hall sensors

Motor Control 551_ESCON Module 50/5 553_ESCON 50/5 561_EPOS4 Micro 24/5 CAN 561_EPOS4 Micro 24/5 EtherCAT 562_EPOS4 Module 50/5 565_EPOS4 Compact 50/5 567_EPOS4 50/5

Details on catalog page 54

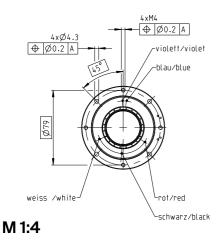
568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

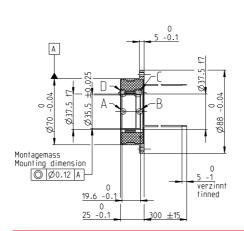
Aluminum flange (-70 g) on request Without flange: maxon integration on request

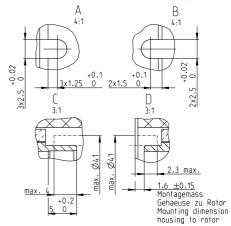
EC frameless DT 65 S Ø70 mm, brushless, 240 watt

Dynamic Torque









Stock program Standard program Special program (on request)

without Hall sensors 783327

Part Numbers

Without	1 1011 361 301 3	103321				
Motor Data						
Values at nominal voltage						
1 Nominal voltage	V	48				
2 No load speed	rpm	4690				
3 No load current	mA	218				
4 Nominal speed	rpm	3930				
5 Nominal torque	mNm	673				
6 Nominal current (max. continuous curr	ent) A	6.27				
7 Stall torque	mNm	5150				
8 Stall current	Α	149				
9 Max. efficiency	%	92.4				
Characteristics						
10 Terminal resistance phase to phase	Ω	0.322				
11 Terminal inductance phase to phase	mH	0.458				
12 Torque constant	mNm/A	97.1				
13 Speed constant	rpm/V	98.3				
14 Speed/torque gradient	rpm/mNm	0.326				
15 Mechanical time constant	ms	0.581				
16 Rotor inertia	gcm²	170				

Thermal data	
17 Thermal resistance housing-ambient	3.65 K/W
18 Thermal resistance winding-housing	0.379 K/W
19 Thermal time constant winding	12.1 s
20 Thermal time constant motor	1330 s
21 Ambient temperature	-40+100°C
22 Max. winding temperature	+155°C

Mechanical data 5000 rpm 23 Max. speed Other specifications

Other specifications	
29 Number of pole pairs	10
30 Number of phases	3
31 Weight of motor	377 g
Weight of rotor	44 g
Weight of stator (stainless steel flange)	333 g
, ,	_

Values listed in the table are nominal.

Connection motor (Cable AWG 18) Motor winding 1 black Motor winding 2 Motor winding 3 white

Connection NTC (Cable AWG 24)

NTC NTC purple blue

Resistance 25°C: 5 k Ω ±1%, beta (25–85°C):

3490 K

Specifications

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.



5000 783327 4000 3000 2000 1000 0 300 600 900 1200 M [mNm]

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

Assigned power rating

Sensor 522_TSX 65 MAG with Hall sensors

Motor Control

552_ESCON Module 50/8 553_ESCON 70/10 563_EPOS4 Module 50/8 566_EPOS4 Compact 50/8 567_EPOS470/15 568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

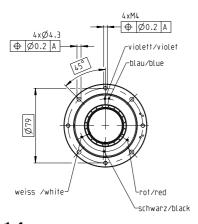
Details on catalog page 54

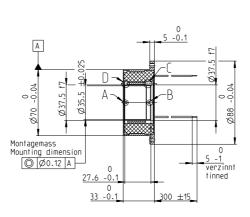
Aluminum flange (-99 g) on request Without flange: maxon integration on request

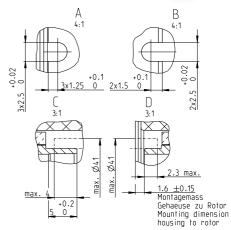
EC frameless DT 65 M Ø70 mm, brushless, 210 watt

Dynamic Torque









M 1:4

Stock program Standard program Special program (on request)

Part Numbers

without Hal	l sensors	783332				
Motor Data						
Values at nominal voltage						
1 Nominal voltage	V	48				
2 No load speed	rpm	2630				
3 No load current	mA	151				
4 Nominal speed	rpm	2200				
5 Nominal torque	mNm	1120				
6 Nominal current (max. continuous current) A	5.91				
7 Stall torque	mNm	7510				
8 Stall current	Α	104				
9 Max. efficiency	%	92.4				
Characteristics						
10 Terminal resistance phase to phase	Ω	0.463				
11 Terminal inductance phase to phase	mΗ	0.774				
12 Torque constant	mNm/A	173				
13 Speed constant	rpm/V	55.1				
14 Speed/torque gradient rp	m/mNm	0.147				
15 Mechanical time constant	ms	0.43				
16 Rotor inertia	gcm ²	275				

Specifications	Operating Range	Comments
Thermal data	n [rpm]	

17 Thermal resistance housing-ambien	t 3.42 K/W
18 Thermal resistance winding-housing	0.207 K/W
19 Thermal time constant winding	9.1 s
20 Thermal time constant motor	1250 s
21 Ambient temperature	-40+100°C
22 Max. winding temperature	+155°C

Mechanical data 23 Max. speed	5000 rpm
Other specifications 29 Number of pole pairs 30 Number of phases	10 3

524 g 71 g 31 Weight of motor Weight of rotor 453 g Weight of stator (stainless steel flange)

Values listed in the table are nominal.

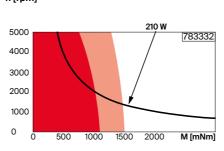
Connection motor (Cable AWG 18) Motor winding 1 black Motor winding 2 Motor winding 3 white

Connection NTC (Cable AWG 24) purple NTC blue NTC

Resistance 25°C: 5 k Ω ±1%, beta (25-85°C): 3490 K

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

Assigned power rating

Sensor 522_TSX 65 MAG with Hall sensors

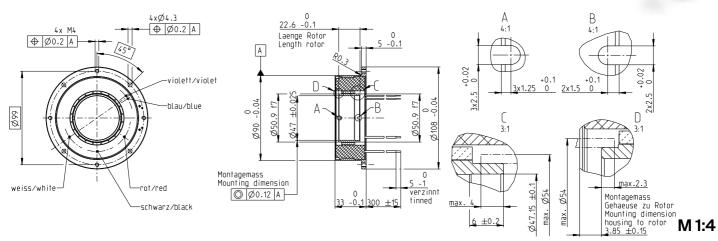
Details on catalog page 54 **Motor Control** 552_ESCON Module 50/8 553_ESCON 70/10 563_EPOS4 Module 50/8 566_EPOS4 Compact 50/8 567_EPOS470/15 568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

Aluminum flange (-121 g) on request Without flange: maxon integration on request

EC frameless DT 85 M Ø90 mm, brushless, 450 watt

Dynamic Torque





Stock program Standard program Special program (on request)

Motor Data

without Hall sensors 740953

Part Numbers

W	Jioi Dala		
	Values at nominal voltage		
1	Nominal voltage	V	48
2	No load speed	rpm	3280
3	No load current	mA	266
4	Nominal speed	rpm	2750
5	Nominal torque	mNm	1810
6	Nominal current (max. continuous current	nt) A	11.6
7	Stall torque	mNm	11900
8	Stall current	Α	305
9	Max. efficiency	%	94.1
	Characteristics		
10	Terminal resistance phase to phase	Ω	0.16
11	Terminal inductance phase to phase	mH	0.367
12	Torque constant	mNm/A	139
13	Speed constant	rpm/V	68.7
14	Speed/torque gradient r	pm/mNm	0.078
15	Mechanical time constant	ms	0.53
16	Rotor inertia	gcm ²	650

Specifications Thermal data 2.35 K/W 17 Thermal resistance housing-ambient 18 Thermal resistance winding-housing 0.3 K/W 21 s 810 s 19 Thermal time constant winding 20 Thermal time constant motor -40...+100°C 21 Ambient temperature 22 Max. winding temperature +155°C

Mechanical data 23 Max. speed 4000 rpm

Other specifications 29 Number of pole pairs 10 30 Number of phases 3 741 g 31 Weight of motor Weight of rotor 98 g 643 g Weight of stator (stainless steel flange)

Values listed in the table are nominal.

Connection motor (Cable AWG 16) Motor winding 1 black Motor winding 2 Motor winding 3 white

Connection NTC (Cable AWG 24)

NTC NTC purple blue

Resistance 25°C: 5 k Ω ±1%, beta (25–85°C):

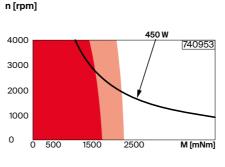
3490 K

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular System

Operating Range



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Intermittent operation

Assigned power rating

Sensor 523_TSX 85 MAG with Hall sensors

Motor Control 553_ESCON 70/10

557_ESCON2 Module 60/30 557_ESCON2 Compact 60/30 563_EPOS4 Module 50/15 567_EPOS4 Compact 50/15

Details on catalog page 54

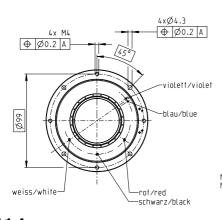
567_EPOS470/15 568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

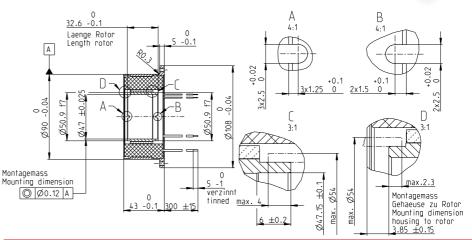
Aluminum flange (-143 g) on request Without flange: maxon integration on request

EC frameless DT 85 L Ø90 mm, brushless, 400 watt

Dynamic Torque







M 1:4

Stock program Standard program Special program (on request)

without Hall sensors 759875 **Motor Data** Values at nominal voltage 1 Nominal voltage 48 2 No load speed rpm 1890 3 No load current mΑ 199 4 Nominal speed 1580 rpm 5 Nominal torque mNm 2900 6 Nominal current (max. continuous current) 10.8 7 Stall torque 18900 mNm 8 Stall current 220 9 Max. efficiency % Characteristics 10 Terminal resistance phase to phase Ω 0.218 11 Terminal inductance phase to phase mΗ 0.632 12 Torque constant mNm/A 242 39.5 13 Speed constant rpm/V 14 Speed/torque gradient rpm/mNm 0.036 15 Mechanical time constant 0.385 ms

Part Numbers

Specifications	Operating Range	Comments

gcm²

1030

Thermal data	
17 Thermal resistance housing-ambient	2.20 K/W
18 Thermal resistance winding-housing	0.205 K/W
19 Thermal time constant winding	20 s
20 Thermal time constant motor	760 s
21 Ambient temperature	-40+100°C
22 Max. winding temperature	+155°C

Mechanical data 23 Max. speed 3000 rpm

Other specifications	
29 Number of pole pairs	10
30 Number of phases	3
31 Weight of motor	1040 g
Weight of rotor	153 g
Weight of stator (stainless steel flange)	887 g

Values listed in the table are nominal.

Connection motor (Cable AWG 16) Motor winding 1 black Motor winding 2 Motor winding 3 white

Connection NTC (Cable AWG 24)

NTC NTC purple blue

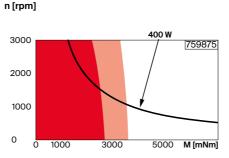
Resistance 25°C: 5 k Ω ±1%, beta (25-85°C):

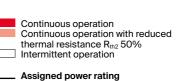
3490 K

16 Rotor inertia

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.





Sensor 523_TSX 85 MAG with Hall sensors

Motor Control 553_ESCON 70/10 557_ESCON2 Module 60/30 557_ESCON2 Compact 60/30 563_EPOS4 Module 50/15 567_EPOS4 Compact 50/15 567_EPOS470/15

Details on catalog page 54

568_EPOS4 Disk 60/8 CAN 568_EPOS4 Disk 60/8 EtherCAT

Modular System

Aluminum flange (-177 g) on request Without flange: maxon integration on request

Compact drive

Screw drive

Compact drives with integrated positioning/speed controller

Terminology explanations	358
IDV December	001 000
IDX Program	361–366
ECX FLAT Program	369-370

Explanation of maxon IDX drives terminology

Dimensional drawings

Presentation of the views according to the projection method E (ISO). All dimensions in [mm].

Drive data

The values were determined for sinusoidal commutation and a drive without additional attachments, such as a brake or gearhead. Additional attachments may change the performance data of the system.

Nominal power supply voltage $\ U_N \ [Volt]$ is the supply voltage at which the nominal values of the drive are achieved. The nominal values (lines 2-7) are based on this voltage. The supply voltage may vary within the range of the nominal operating voltage

Nominal speed n_N [rpm]

is the speed for which the drive is rated. For torques up to the nominal torque, the integrated motor controller is capable of regulating to this speed.

Nominal torque at 25°C (max. continuous torque) [mNm]

and

(line 12).

Nominal torque at 40°C

(max. continuous torque) [mNm]

is the torque generated during operation with the nominal supply voltage and nominal supply current at 25°C/40°C. It is at the limit of the drive's continuous operation range. To prevent the winding from heating up too much, higher torques are only possible for brief periods. The integrated motor controller monitors the winding with a temperature sensor.

5 Nominal supply current at 25°C [A] and

Nominal supply current at 40°C [A]

is the supply current required to reach the nominal torque with the nominal supply voltage at 25°C/40°C.

Maximum speed with nominal supply voltage [rpm]

is the maximum speed the drive can achieve at the nominal supply voltage.

Maximum permissible drive speed

n_{max} [rpm]

is the maximum speed the drive can achieve. The maximum speed can only be achieved if a sufficiently high supply voltage is available. Higher speeds are not permitted.

Maximum torque (short-term)

M_{max} [mNm1

is the torque that the drive can output for short periods of time. The duration depends on the installation and is monitored by the integrated motor controller using temperature sensors.

10 Maximum supply current (short term) Imax [A]

is the maximum current. The supply current is not proportional to the torque, but instead depends on the supply voltage and the operating point.

Rotor moment of inertia J_R [gcm²]

is the mass moment of inertia of the rotor, based on the axis of rotation.

Nominal supply voltage +V_{CC} [V]

shows the permitted range for the supply voltage relative to GND. If the actual voltage is lower than the nominal supply voltage, then the nominal torque and speed cannot be guaranteed. If a brake is attached, then the supply voltage of the brake is considered to be the lower limit (see feature chart).

Mechanical time constant τ_m [ms]

is the time required for the rotor to accelerate from standstill to 63% of its no load speed.

Thermal resistance 14 housing-ambient Rth2 [K/W]

and

Thermal resistance

winding-housing R_{th1} [K/W]

Characteristic values of thermal contact resistance without additional heat sinking. Lines 14 and 15 combined define the maximum heating at a given power loss (load). Thermal resistance R_{th2} on motors with metal flanges can decrease by up to 80% if the motor is coupled directly to a good heat-conducting (e.g. metallic) mounting rather than a plastic panel.

Thermal time constant of winding τ_w [s] and

Thermal time constant of drive τ_s [s] 17

These are the typical response times for temperature changes of the winding and drive. It is noticeable that the drive has a much slower thermal response than the winding. The values have been calculated from the product of the thermal capacity and the given heat resistances. The integrated motor controller monitors the temperatures with temperature sensors.

Ambient temperature [°C]

Operating temperature range. It results from the thermal resistance of the materials and components used, and the viscosity of the bearing lubrication.

Axial play [mm]

On motors that are not preloaded, these are the tolerance limits for the bearing play. A preload cancels out the axial play up to the specified axial force. When load is applied in the direction of the preload force (away from the flange), the axial play is always zero. The length tolerance of the shaft includes the maximum axial play.

20 Radial play [mm]

Radial play is the bearing's radial movement. A spring is utilized to preload the motor's bearings, eliminating radial play up to a given axial load.

Max. axial load [N]

Dynamic: axial loading permissible in operation. If different values apply for traction and thrust, the smaller

Static: maximum axial force that does not cause permanent damage when applied to the front of the shaft at standstill.

Max. radial load [N]

The value is given for a typical distance from the front flange. As the distance increases, this value decreas-

Weight of motor [g] 24

25 Typical noise level [dBA]

is the statistical average of the noise level measured in accordance with the maxon standard (10 cm distance radially to the drive, no-load operation at the given speed.) The drive lies freely on a plastic foam mat in the noise chamber). The acoustic noise level depends on a number of factors, such as component tolerances, and it is greatly influenced by the overall system in which the drive is installed. When the drive is installed in an unfavorable constellation, the noise level may be significantly higher than the noise level of the drive alone. The acoustic noise level is measured and determined during product qualification. In manufacturing, a structure-borne noise test is performed with defined limits. Impermissible deviations can thus be identified.

maxon IDX

Drive with positioning/speed controller

358
361-366
361
362
363
364
365
366

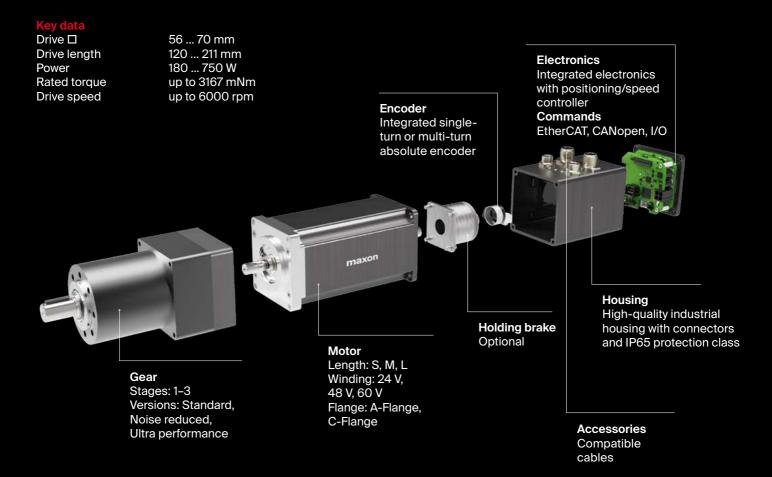




maxon IDX

Drive with positioning/speed controller

A maintenance-free positioning drive with proven components. The compact brushless EC-i motor combined with an EPOS4 positioning controller makes for a highly-dynamic, powerful drive package with field-oriented control (FOC), a high level of efficiency, and maintenance-free components in high-quality industrial housing.

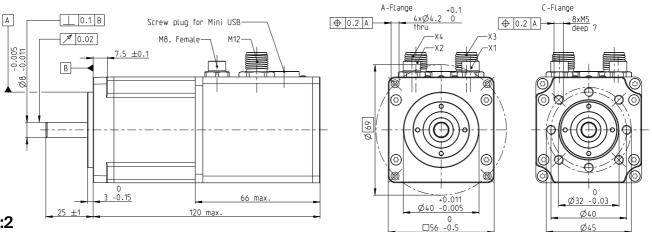


- → High continuous torque
- Outstanding energy efficiency
- Maximum power density
- → Unmatched precision in dynamic motion
- → IP65-protected design
- Easily configured online





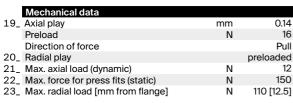


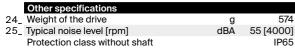


M 1:2

Drive data (provisional)				
1_ Nominal power supply voltage	V	24	48	
2_ Nominal speed	rpm	4400	4500	
3_ Nominal torque at 25°C	mNm	393	450	
4_ Nominal torque at 40°C	mNm	349	399	
5_ Nominal supply current at 25°C	Α	9.0	5.3	
6_ Nominal supply current at 40°C	Α	8.0	4.7	
7_ Maximum speed at nominal voltage	rpm	6000	6000	
8_ Maximum permissible drive speed	rpm	6000	6000	
9_ Maximum torque (short-time)	mNm	775	1546	
10_ Maximum supply current (short-time)	Α	24	24	
11_ Rotor inertia of the drive	gcm ²	107	107	
12_ Nominal supply voltage + V _{CC}	V	1248	1248	
13_ Mechanical time constant	ms	0.82	0.783	

Thermal data		
14_ Thermal resistance housing-ambient	K/W	2.04
15_ Thermal resistance winding-housing	K/W	1.94
16_ Thermal time constant winding	S	38.2
17_ Thermal time constant drive	s	585
18_ Ambient temperature	°C	-30+85





Sensor

ENC single-turn absolute encoder: resolution, bits

EMT multi-turn absolute encoder:

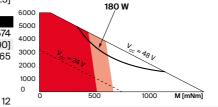
resolution, bits 14 Multi-turn: max. no. of turns 65536

Supply M12, male, 5 poles, L-coded 463_GB 12 M12, male, 12 poles, A-coded **CANopen Input** M8, male, 5 poles, B-coded CANopen Output M8, female, 5 poles, B-coded EtherCAT Input M8, female, 4 poles, A-coded M8, female, 4 poles, A-coded EtherCAT Output

n [rpm] 24-V-system 180 W V_{cc} = 48 V 6000 5000 4000 3000 2000 1000 0

Operating Range

150 n [rpm] 48-V-system



Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
410_GPX 52 A/UP	1-3	integrated ENC	integrated
411_GPX 52 LN	1-3	integrated EMT	
462_GB 80	1		
463_GB 12	1	Accessories	

589_Brake AB 42 S

Compatible cables available online in the configurator

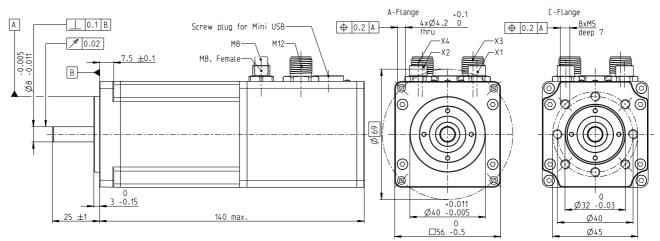
Configuration

Flange front: A-Flange / C-Flange Interface with Positioning/Speed Controller: CANopen/EtherCAT Interface with Speed Controller: I/O Shaft: standard/short



Key Data: 230/256 W, 516 mNm, 6000 rpm



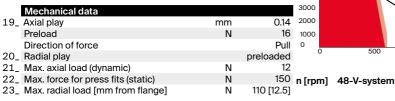


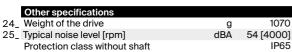
M 1:2

Drive data (provisional)				
1_ Nominal power supply voltage	V	24	48	
2_ Nominal speed	rpm	4477	4500	
3_ Nominal torque at 25°C	mNm	433	516	
4_ Nominal torque at 40°C	mNm	376	458	
5_ Nominal supply current at 25°C	Α	10.0	5.8	
6_ Nominal supply current at 40°C	Α	8.7	5.2	
7_ Maximum speed at nominal voltage	rpm	5227	6000	
8_ Maximum permissible drive speed	rpm	6000	6000	
9_ Maximum torque (short-time)	mNm	948	1498	
10_ Maximum supply current (short-time)	Α	24	24	
11_ Rotor inertia of the drive	gcm ²	170	170	
12_ Nominal supply voltage + V _{cc}	V	1248	1248	
13_ Mechanical time constant	ms	0.654	0.693	

Operating Range

14_ Thermal resistance housing-ambient	K/W	2.47
15_ Thermal resistance winding-housing	K/W	1.16
16_ Thermal time constant winding	s	18.9
17_ Thermal time constant drive	S	1320
18_ Ambient temperature	°C	-30+85





Sensor

ENC single-turn absolute encoder: resolution, bits

EMT multi-turn absolute encoder: resolution, bits

Multi-turn: max. no. of turns

Supply M12, male, 5 poles, L-coded 463_GB 12 M12, male, 12 poles, A-coded **CANopen Input** M8, male, 5 poles, B-coded CANopen Output M8, female, 5 poles, B-coded EtherCAT Input M8, female, 4 poles, A-coded EtherCAT Output M8, female, 4 poles, A-coded

n [rpm] 24-V-system 230 W V₀₀ = 48 V 6000 5000 3000 2000 1000 0

230 W 5000 3000 2000 V_{cc} = 24 V 1000 0

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
410_GPX 52 A/UP	1-3	integrated ENC	integrated
411_GPX 52 LN	1-3	integrated EMT	
462_GB 80	1		
463_GB 12	1	Accessories	

589_Brake AB 42 S

Compatible cables available online in the configurator

Configuration

12

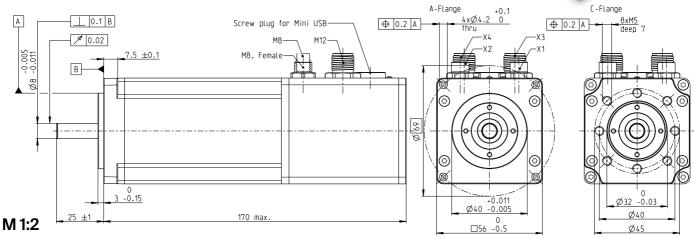
14

65536

Flange front: A-Flange / C-Flange Interface with Positioning/Speed Controller: CANopen/EtherCAT Interface with Speed Controller: I/O Shaft: standard/short



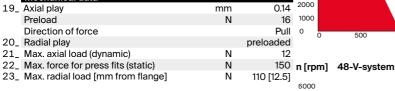


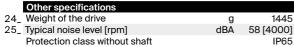


Drive data (provisional)				
1_ Nominal power supply voltage	V	24	48	
2_ Nominal speed	rpm	2724	3500	
3_ Nominal torque at 25°C	mNm	795	779	
4_ Nominal torque at 40°C	mNm	690	690	
5_ Nominal supply current at 25°C	Α	11.4	6.7	
6_ Nominal supply current at 40°C	Α	9.9	6.0	
7_ Maximum speed at nominal voltage	rpm	3110	4925	
8_ Maximum permissible drive speed	rpm	6000	5000	
9_ Maximum torque (short-time)	mNm	1589	2006	
10_ Maximum supply current (short-time)	Α	24	24	
11_ Rotor inertia of the drive	gcm ²	265	265	
12_ Nominal supply voltage + V _{CC}	V	1248	1248	
13_ Mechanical time constant	ms	0.57	0.55	

Operating Range

14_	Thermal resistance housing-ambient	K/W	2.01
15_	Thermal resistance winding-housing	K/W	0.76
16_	Thermal time constant winding	S	20.1
17_	Thermal time constant drive	S	1450
18_	Ambient temperature	°C	-30+85
	Mechanical data		
19_	Axial play	mm	0.14
	Proload	N	16



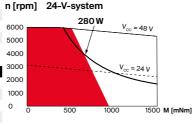


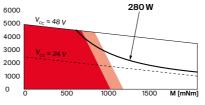
Sensor

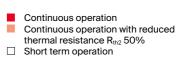
ENC single-turn absolute encoder: resolution, bits

EMT multi-turn absolute encoder: resolution, bits 14 Multi-turn: max. no. of turns 65536

Supply M12, male, 5 poles, L-coded M12, male, 12 poles, A-coded **CANopen Input** M8, male, 5 poles, B-coded CANopen Output M8, female, 5 poles, B-coded EtherCAT Input M8, female, 4 poles, A-coded EtherCAT Output M8, female, 4 poles, A-coded







Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
410_GPX 52 A/UP	1–3	integrated ENC	integrated
411_GPX 52 LN	1-3	integrated EMT	
462_GB 80	1		
463_GB 12	1	Accessories	
		589_Brake AB 42 S	

Compatible cables available online in the configurator

Configuration

12

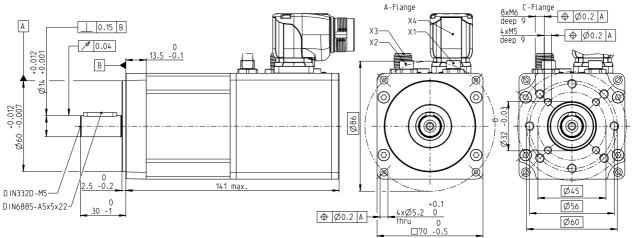
Flange front: A-Flange / C-Flange Interface with Positioning/Speed Controller: CANopen/EtherCAT Interface with Speed Controller: I/O Shaft: standard/short

_





Key Data: 550/641 W, 1530 mNm, 6000 rpm



M 1:3

Drive data (provisional)					
1_ Nominal power supply voltage	V	24	48	60	
2_ Nominal speed	rpm	3870	3800	4000	
3_ Nominal torque at 25°C	mNm	1069	1339	1530	
4_ Nominal torque at 40°C	mNm	928	1163	1329	
5_ Nominal supply current at 25°C	Α	19.7	12.1	11.6	
6_ Nominal supply current at 40°C	Α	17.1	10.5	10.1	
7_ Maximum speed at nominal voltage	rpm	4100	4100	4280	
8_ Maximum permissible drive speed	rpm	6000	5125	4280	
9_ Maximum torque (short-time)	mNm	2208	4416	5290	
10_ Maximum supply current (short-time)	Α	46	46	46	
11_ Rotor inertia of the drive	gcm²	568	568	568	
12_ Nominal supply voltage + V _{cc}	V	1260	1260	1260	
13_ Mechanical time constant	ms	0.598	0.543	0.569	

	Thermal data		
14_	Thermal resistance housing-ambient	K/W	1.76
15_	Thermal resistance winding-housing	K/W	1.07
16_	Thermal time constant winding	s	9.83
17_	Thermal time constant drive	s	1260
18_	Ambient temperature	°C	-30+85

	Mechanical data		
19_	Axial play	mm	0.22
	Preload	N	28
	Direction of force		Pull
20_	Radial play		preloaded
21_	Max. axial load (dynamic)	N	22
22_	Max. force for press fits (static)	N	270
23_	Max. radial load [mm from flange]	N	300 [15]

Other specifications		
24_ Weight of the drive	g	1800
25_ Typical noise level [rpm]	dBA	55 [3000]

Sensor

ENC single-turn absolute encoder: resolution, bits

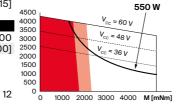
EMT multi-turn absolute encoder: resolution, bits
Multi-turn: max. no. of turns

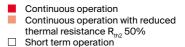
Supply M23, male, 6 poles, N-coded 463_GB 12 I/O's M12, male, 12 poles, A-coded 464_GB 9 CANopen Input M8, male, 5 poles, B-coded 465_GB 65 CANopen Output M8, female, 5 poles, B-coded EtherCAT Input M8, female, 4 poles, A-coded EtherCAT Output M8, female, 4 poles, A-coded

550 W $V_{cc} = 60 \text{ V}$ $V_{cc} = 48 \text{ V}$ $V_{cc} = 36 \text{ V}$

n [rpm] 60-V-system

Operating Range n [rpm] 48-V-system





Modular System		Details on catalog page 42	
Gear	Stages [opt.]	Sensor	Motor Control
412_GPX 70 A/UP	1-2	integrated ENC	integrated
413_GPX 70 LN	1-2	integrated EMT	-
463 GB 12	1	-	

591_Brake AB 60 S

Accessories

Compatible cables available online in the configurator.

Configuration

65536

Flange front: A-Flange/C-Flange Interface with Positioning/Speed Controller: CANopen/EtherCAT Interface with Speed Controller: I/O Angle Power Connector: 0°/90° Shaft: Standard with feather key/small diameter without feather key

IDX 70 M □70 mm, with integrated electronics

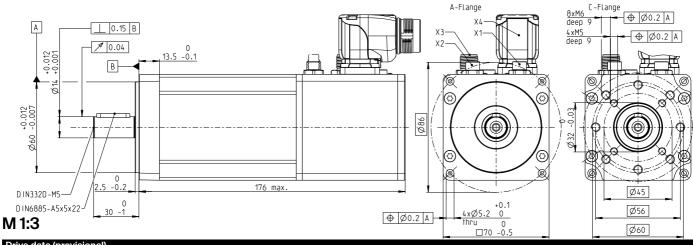
IP65 Drive with Positioning/Speed Controller

Key Data: 650/773 W, 2441 mNm, 4000 rpm









Drive data (provisional)				
1_ Nominal power supply voltage	V	48	60	
2_ Nominal speed	rpm	3038	3022	
3_ Nominal torque at 25°C	mNm	2096	2441	
4_ Nominal torque at 40°C	mNm	1820	2120	
5_ Nominal supply current at 25°C	Α	15.3	14.0	
6_ Nominal supply current at 40°C	Α	13.3	12.2	
7_ Maximum speed at nominal voltage	rpm	3150	3195	
8_ Maximum permissible drive speed	rpm	4000	3195	
9_ Maximum torque (short-time)	mNm	5750	7084	
10_ Maximum supply current (short-time)	Α	46	46	
11_ Rotor inertia of the drive	gcm ²	1050	1050	
12_ Nominal supply voltage + V _{cc}	V	1260	1260	
13_ Mechanical time constant	ms	0.487	0.437	

Operating Range

n [rpm] 60-V-system

i nermai data		
14_ Thermal resistance housing-ambient	K/W	1.41
15_ Thermal resistance winding-housing	K/W	0.642
16_ Thermal time constant winding	s	9.83
17_ Thermal time constant drive	s	1260
18_ Ambient temperature	°C	-30+85

	Mechanical data		
19	_ Axial play	mm	0.22
	Preload	N	28
	Direction of force		Pull
20	_ Radial play		preloaded
21	_ Max. axial load (dynamic)	N	22
22	_ Max. force for press fits (static)	N	270
23	_ Max. radial load [mm from flange]	N	300 [15]



Sensor

ENC single-turn absolute encoder: resolution, bits

EMT multi-turn absolute encoder: resolution, bits 14 Multi-turn: max. no. of turns 65536

Supply M23, male, 6 poles, N-coded M12, male, 12 poles, A-coded 465_GB 65 **CANopen Input** M8, male, 5 poles, B-coded CANopen Output M8, female, 5 poles, B-coded EtherCAT Input M8, female, 4 poles, A-coded EtherCAT Output M8, female, 4 poles, A-coded

n [rpm] 48-V-system 650 W 4000 V_{cc} = 60 V 3500 3000 V_{cc} = 36 V 2000 1500 1000 500 1000 2000 3000 4000 5000 M [mNm]

650 W 3500 V_{cc} = 60 V 3000 V_{cc} = 48 V 2000 V_{cc} = 36 V 1000 500 1000 2000 3000 4000 5000 M [mNm]

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

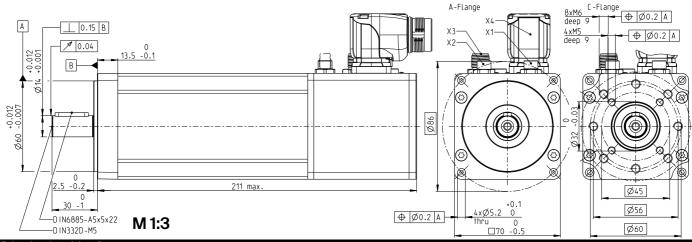
Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
412_GPX 70 A/UP	1-2	integrated ENC	integrated
413_GPX 70 LN	1-2	integrated EMT	
463_GB 12	1		
464_GB9	1	Accessories	
465_GB 65	2	591_Brake AB 60 S	

Compatible cables available online in the configurator.

12

Flange front: A-Flange / C-Flange Interface with Positioning/Speed Controller: CANopen/EtherCAT Interface with Speed Controller: I/O Angle Power Connector: 0°/90° Shaft: Standard with feather key/small diameter without feather key Key Data: 750/831 W, 3167 mNm, 3200 rpm

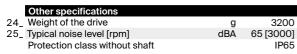




Drive data (provisional)					
1_ Nominal power supply voltage	V	48	60		
2_ Nominal speed	rpm	2424	2505		
3_ Nominal torque at 25°C	mNm	2890	3167		
4_ Nominal torque at 40°C	mNm	2510	2750		
5_ Nominal supply current at 25°C	Α	16.7	15.1		
6_ Nominal supply current at 40°C	Α	14.5	13.1		
7_ Maximum speed at nominal voltage	rpm	2490	2630		
8_ Maximum permissible drive speed	rpm	3200	2630		
9_ Maximum torque (short-time)	mNm	7268	8602		
10_ Maximum supply current (short-time)	Α	46	46		
11_ Rotor inertia of the drive	gcm ²	1534	1534		
12_ Nominal supply voltage + V _{cc}	V	1260	1260		
13_ Mechanical time constant	ms	0.408	0.449		

	mermai data		
14_	Thermal resistance housing-ambient	K/W	0.364
15_	Thermal resistance winding-housing	K/W	1.143
16_	Thermal time constant winding	S	9.84
17_	Thermal time constant drive	S	1620
18_	Ambient temperature	°C	-30+85

	Mechanical data		
19_	Axial play	mm	0.22
	Preload	N	28
	Direction of force		Pull
20_	Radial play		preloaded
21_	Max. axial load (dynamic)	N	22
22_	Max. force for press fits (static)	N	270
23_	Max. radial load [mm from flange]	N	300 [15]



Sensor

ENC single-turn absolute encoder:

EMT multi-turn absolute encoder:

resolution, bits

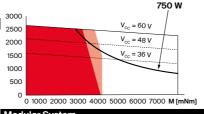
resolution, bits 14 464_GB9 Multi-turn: max. no. of turns 65536 465_GB65 Supply M23, male, 6 poles, N-coded

M12, male, 12 poles, A-coded **CANopen Input** M8, male, 5 poles, B-coded CANopen Output M8, female, 5 poles, B-coded EtherCAT Input M8, female, 4 poles, A-coded EtherCAT Output M8, female, 4 poles, A-coded

n [rpm] 48-V-system 750 W V_{CC} = 60 V 3000 V_{cc} = 48 V 2500 V_{cc} = 36 V 1500 1000 500 0 1000 2000 3000 4000 5000 6000 7000 M [mNm]

n [rpm] 60-V-system

Operating Range



2

Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Details on catalog page 42

Stages [opt.] Sensor **Motor Control** integrated ENC integrated integrated EMT

> Accessories 591_Brake AB 60 S

Compatible cables available online in the configurator.

12

Gear

Flange front: A-Flange / C-Flange Interface with Positioning/Speed Controller: CANopen/EtherCAT Interface with Speed Controller: I/O Angle Power Connector: 0°/90°

Shaft: Standard with feather key/small diameter without feather key

CX FLAT

DC Motor

EC Motor (BLDC Motor)

maxon ECX FLAT

Drive with speed controller

Terminology explanations	358
ECX FLAT Program	369-370
ECX FLAT 32 S Ø32 mm, 50 Watt, High Torque	369
ECX FLAT 32 L Ø32 mm, 80 Watt, High Torque	370



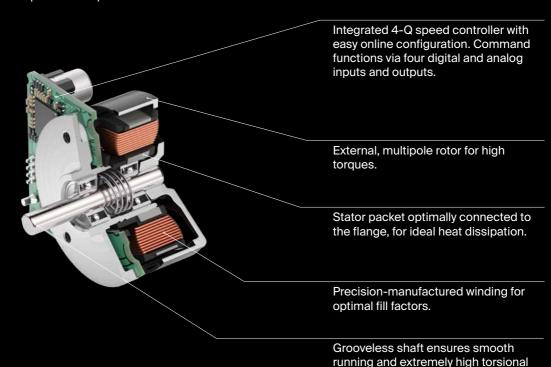
maxon ECX FLAT

Drive with speed controller

The compact brushless ECX FLAT motors with integrated 4-Q speed controller are based on the tried-and-tested high torque motors and are optimized for high torques and confined spaces. The control commands are given via four digital and analog input and outputs with a wide range of functionalities. The ECX FLAT program is fully configurable. Select your mechanical and electrical interface online and configure the functionality of the drive electronics.

Key data

Motor Ø32 mmMotor length17.5 ... 20 mmPower50 ... 80 WNominal torqueup to 74 mNmMax. permissible speedup to 14 000 rpm



rigidity.

- → High continuous torque
- High power density
- Integrated 4-Q speed controller
- Easily configured online

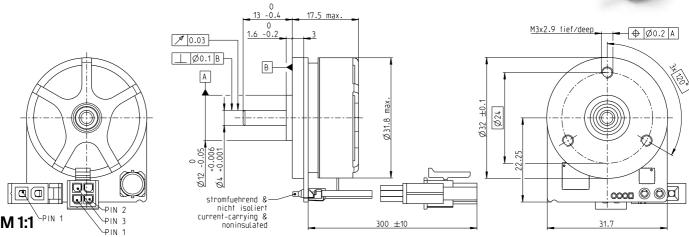
ECX FLAT 32 S Ø32 mm, brushless, with integrated electronics

High Torque, 4-Q-Speed Controller

Key Data: 50 W, 47.8 mNm, 14 000 rpm





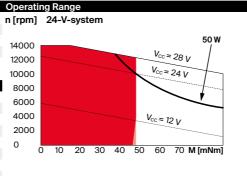


	Drive data				
1_	Nominal power supply voltage	V	24		
2_	Nominal speed	rpm	10000		
3_	Nominal torque at 25°C	mNm	47.8		
5_	Nominal supply current at 25°C	Α	3.04		
7_	Maximum speed at nominal voltage	rpm	12491		
8_	Maximum permissible drive speed	rpm	14000		
9_	Maximum torque (short-time)	mNm	91.4		
10_	Maximum supply current (short-time)	Α	5.28		
11_	Rotor inertia of the drive	gcm²	24.4		
12_	Nominal supply voltage + V _{CC}	V	828		
13_	Mechanical time constant	ms	4.79		
	Speed constant	rpm/V	569		
37_	Speed set value input	V	010		
38_	Scale speed set value input	rpm/V	1000		
	Min. permissible drive speed	rpm	200		
40_	Max. acceleration	rpm/s	20000		

Thermal data		
14_ Thermal resistance housing-ambient	K/W	4.38
15_ Thermal resistance winding-housing	K/W	6.44
16_ Thermal time constant winding	s	20.7
17_ Thermal time constant drive	s	130
18_ Ambient temperature	°C	-25+85

	·		
	Mechanical data		
19_	Axial play at axial load	< 4 N	0 mm
		> 4 N	0.14 mm
	Direction of force		Pull
20_	Radial play		preloaded
21_	Max. axial load (dynamic)	N	4
22_	Max. force for press fits (static)	N	45
	(shaft supported)	N	1000
23_	Max. radial load [mm from flange]	N	12 [5]





Continuous operation Continuous operation with reduced thermal resistance R_{th2} 50% Short term operation

Drive data in the table is nominal data.

Protective functionsOverload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage

Connection, Supply (Cable AWG 20) Pin 1 +V_{cc} 8...28 VDC Pin 2 GND red black Connector Molex 39-01-2020

Connection, I/O's (Cable AWG 28) white green Pin 1 I/O 1 Pin 2 I/O 2

grey 1/03 brown Pin 4 I/O 4 Connector Article number 43025-0400

Modular System			Details on catalog page 42
Gear	Stages [opt.]	Sensor	Motor Control
403_GPX 32 A/C	1-3	integrated	integrated
404_GPX 32 LN/LZ	1-3	•	-
405_GPX 32 HP	2-4		
406_GPX 32 UP	1-4		

Configuration

Shaft, front: Length/shaft shoulder/faces Shaft, rear: Length/shaft shoulder

Motor controller: I/O functionality/system parameters

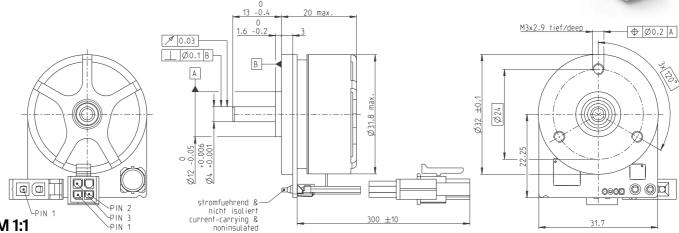
ECX FLAT 32 L Ø32 mm, brushless, with integrated electronics

High Torque, 4-Q-Speed Controller

Key Data: 80 W, 73.9 mNm, 14 000 rpm







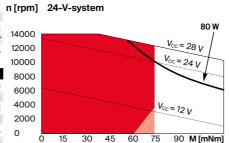
	Drive data		
1	Nominal power supply voltage	V	24
	Nominal speed	rpm	10000
	Nominal torque at 25°C	mNm	73.9
	Nominal supply current at 25°C	A	4.9
	_ Maximum speed at nominal voltage	rpm	13318
	Maximum permissible drive speed	rpm	14000
	Maximum torque (short-time)	mNm	119
	Maximum supply current (short-time)	А	7.2
11	Rotor inertia of the drive	gcm ²	30.7
12	Nominal supply voltage + V _{cc}	V	828
13	Mechanical time constant	ms	3.69
	Speed constant	rpm/V	592
37	Speed set value input	· V	010
38	Scale speed set value input	rpm/V	1000
	Min. permissible drive speed	rpm	200
40	Max. acceleration	rpm/s	20000

Operating Range

Thermal data		
14_ Thermal resistance housing-ambient	K/W	3.01
15_ Thermal resistance winding-housing	K/W	3.73
16_ Thermal time constant winding	s	12.3
17_ Thermal time constant drive	s	107
18_ Ambient temperature	°C	-25+85

_	·		
	Mechanical data		
19_	Axial play at axial load	< 4 N	0 mm
		> 4 N	0.14 mm
	Direction of force		Pull
20_	Radial play		preloaded
21_	Max. axial load (dynamic)	N	4
22_	Max. force for press fits (static)	N	45
	(shaft supported)	N	1000
23_	Max. radial load [mm from flange]	N	12 [5]





Continuous operation
 Continuous operation with reduced thermal resistance R_{th2} 50%
 ☐ Short term operation

Drive data in the table is nominal data.

Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

 $\begin{array}{lll} \textbf{Connection, Supply} & (\texttt{Cable AWG 20}) \\ \text{red} & \texttt{Pin 1} & +\texttt{V}_{\texttt{Cc}} & \texttt{8...28 VDC} \\ \text{black} & \texttt{Pin 2} & \texttt{GND} \\ \textbf{Connector} & \textbf{Article number} \\ \textbf{Molex} & 39-01-2020 \\ \end{array}$

Connection, I/O's (Cable AWG 28)

 white
 Pin 1
 I/O 1

 green
 Pin 2
 I/O 2

 grey
 Pin 3
 I/O 3

 brown
 Pin 4
 I/O 4

 Connector
 Article number

 Molex
 43025-0400

Modular System Details on catalog page					
Gear	Stages [opt.]	Sensor	Motor Control		
403_GPX 32 A/C	1–3	integrated	integrated		

404_GPX 32 LN/LZ 1-3 405_GPX 32 HP 2-4 406_GPX 32 UP 1-4

Configuration

Shaft, front: Length/shaft shoulder/faces Shaft, rear: Length/shaft shoulder

Motor controller: I/O functionality/system parameters

Standard Specification No. 102	89
Terminology explanations	372
GPX Program	374-413
maxon gear	416-460

Precision planetary and spur gearheads

Explanations of maxon terminology gear and screw drive

Dimensional drawings

Presentation of the views according to the projection method E (ISO). All dimensions in [mm].

Mounting in plastic

Screwed connections on motors with plastic flanges require special attention.

Max. tightening torque [Ncm]

A torque screwdriver may be adjusted to this value.

L Active thread depth [mm]

The relation of the thread depth to the thread diameter must be at least 2:1. The screw-in depth must be less than the usable length of the thread!

Gearhead data

Values are based on an ambient temperature of around 25°C (known as cold data).

Kev Data (GPX)

Maximum values identified as key data represent the maximum for all stages/reductions.

Technical data

Max. continuous/intermittent* input speed

It is based on service life considerations. If this value is greatly exceeded, the service life can be shortened, the gear heats up more and more noise is generated.

Temperature range

The temperature range may be extended for some gears to -40°C and +100°C, but in extremely low temperatures, much greater power consumption must be expected. Special lubrication can be supplied on request, even for other temperature ranges.

Radial play

The radial play test value depends heavily on the mounting, measuring point and adjoining force. For this reason, the clearance of the measuring point to the flange is always given. Measurement is always carried out under a test force that is smaller than the maximum radial load.

Max. permissible radial load

Is stated in a specific distance from the gear flange. If it is not specified in stages, radial load is based on a reference speed of 1000 rpm on the gear drive shaft.

Axial play

The value for the axial play of a gear is determined between the two axial end positions of the output shaft. This measurement is determined by the type of bearings and may be zero for preloaded ball bearings and low axial forces. Minimum play is required for any kind of friction bearings otherwise they will jam.

Max. axial load (dynamic)

Corresponds to the permissible axial load of the drive shaft without damaging the gear. Below the given load, axial play can be kept.

Max. permissible pressing force

Corresponds to the force with which, for example, a coupling element may be mounted to the gear drive shaft

1 Reduction ratio

The reduction indicates the ratio by which the speed of the gear output shaft is smaller than the motor speed.

2 Absolute reduction ratio

Provides the reduction as an exact ratio of two natural numbers.

3 Max. motor shaft diameter [mm]

The max. motor shaft diameter is based on the motor pinion's internal diameter.

4 Number of stages

States the number of gear stages engaged in series.

5 Max. continuous torque [Nm]

The continuous torque provides the maximum load permanently applied to the output shaft. If it is exceeded, the service life is significantly shortened.

6 Intermittent* torque [Nm]

The short-time torque is the maximum torque that may be output on the output shaft for a short period of time without damaging it.

7 Efficiency [%]

The specified efficiency is a maximum value that is valid for maximum continuous torque. The efficiency is greatly reduced with very small loads (see diagram). The efficiency is stage-dependent, but is unaffected by the motor speed.

Weight [g]

9 Average backlash no load [°]

Gear backlash is the turning angle of the gear output shaft which, when the input shaft is blocked, the gear output shaft covers when it is turned from one end position to the opposite position. The end positions depend on the torque applied to the output shaft. It should be noted that if the gear output shaft is blocked, based on the reversed reduction ratio, the motor shaft will turn through a much greater angle from stop to stop.

10 Mass inertia [gcm²]

The gear moment of inertia is given at the motor shaft. It is required in order to calculate the additional torque needed for acceleration of the gear components in the case of highly dynamic drives. Variations may arise depending on how lubrication is distributed.

11 Gear length L1 [mm]

L1 describes the gear length down to the motor's axial mount area (reference C in motors).

12 Direction of rotation

The Direction of rotation of our planetary gears is always the same as that of the motor shaft. With spur gears, it depends on the number of stages. With even numbers (i.e. 2, 4, 6, 8), the Direction of rotation is the same, but the opposite if the numbers are odd.

13 Max. transmittable power (continuous) [W]

This value gives the maximum constant output available on the output shaft. If it is exceeded, the service life is considerably shortened.

14 Max. transmittable power (intermittent*) [W]

This value gives the maximum intermittent output available on the output shaft. This range may be used intermittently and repeatedly.

15 Max. overload torque

The maximal permitted torque that can be applied for a short period of time (a few seconds) without destroying the gear. It can be considered as break free torque, for example, to overcome static friction of a mechanically jammed drive.

*intermittent

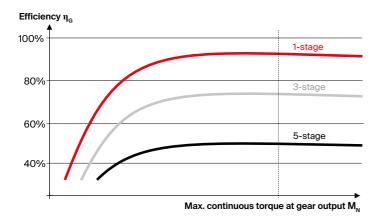
Short-term operation is defined as follows:

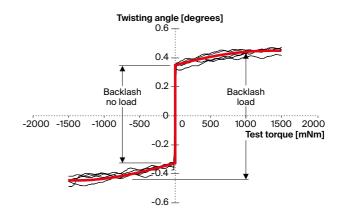
- during 1 second
- during max. 10 % of the operating cycle

If these values are exceeded, a reduced service life must be expected.

Gearhead efficiency as a function of torque (schematic)

Gear play measurement





maxon GPX

Standard Specification No. 102	89
Terminology explanations	372
GPX-Program (can be configured online)	374-413
GPX 4 C Ø4 mm, 0.002–0.015 Nm	374
GPX 6 A Ø6 mm, 0.002–0.03 Nm	375
GPX 8 A Ø8 mm, 0.01–0.1 Nm	376
GPX 10 A Ø10 mm, 0.01–0.15 Nm	377
GPX 12 A/C Ø12 mm, 0.08–0.23 Nm	378
GPX 12 LN/LZ Ø12 mm, 0.06–0.17 Nm	379
GPX 12 HP Ø12 mm, 0.25–0.35 Nm	380
GPX 13 SPEED Ø13 mm, 0.025-0.15 Nm, sterilizable	381
GPX 14 A/C Ø14 mm, 0.16–0.4 Nm	382
GPX 14 LN/LZ Ø14 mm, 0.13–0.3 Nm	383
GPX 14 HP Ø14 mm, 0.3–0.5 Nm	384
GPX 16 A/C Ø16 mm, 0.2–0.6 Nm	385
GPX 16 LN/LZ Ø16 mm, 0.16–0.45 Nm	386
GPX 16 HP Ø16 mm, 0.55–0.9 Nm	387
GPX 16 HP Ø16 mm, 0.4-0.8 Nm, sterilizable NEW	388
GPX 16 SPEED Ø16 mm, 0.045-0.11 Nm, sterilizable	389
GPX 19 A/C Ø19 mm, 0.35–1.05 Nm	390
GPX 19 LN/LZ Ø19 mm, 0.28–0.8 Nm	391
GPX 19 HP Ø19 mm, 0.9–2.0 Nm	392
GPX 19 SPEED Ø19 mm, 0.08-0.2 Nm, sterilizable	393
GPX 22 A/C Ø22 mm, 0.5–2.0 Nm	394
GPX 22 LN/LZ Ø22 mm, 0.4–1.5 Nm	395
GPX 22 HP Ø22 mm, 2.4–3.7 Nm	396
GPX 22 HP Ø22 mm, 0.8–3.3 Nm, sterilizable NEW	397
GPX 22 UP Ø22 mm, 1.0−5.2 Nm	398
GPX 22 SPEED Ø22 mm, 0.11-0.27 Nm, sterilizable	399
GPX 26 A/C Ø26 mm, 0.75–5.0 Nm	400
GPX 26 LN/LZ Ø26 mm, 0.6−4.5 Nm	401
GPX 26 HP Ø26 mm, 3.0–6.3 Nm	402
GPX 32 A/C Ø32 mm, 1.25–6.6 Nm	403
GPX 32 LN/LZ Ø32 mm, 1.0-5.0 Nm	404
GPX 32 HP Ø32 mm, 4.0−9.0 Nm	405
GPX 32 UP Ø32 mm, 2.2–12.6 Nm	406
GPX 37 A Ø37 mm, 2.3−9.3 Nm	407
GPX 37 LN/LZ Ø37 mm, 1.85–9.3 Nm	408
GPX 42 C/UP Ø42 mm, 3.0–35.0 Nm	409
GPX 52 A/UP Ø52 mm, 5.0−45.0 Nm	410
GPX 52 LN Ø52 mm, 4.0−24.0 Nm	411
GPX 70 A/UP Ø70 mm, 10.0−70.0 Nm	412
GPX 70 LN Ø70 mm, 8.0–27.0 Nm	413

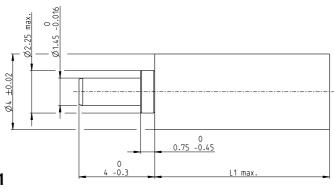


maxon GPX gearheads make an impression with the highest power transmission in a very short compact design. The modular construction and the scaled stages form the basis for a custom made drive solution. High torque, high speed, low noise, low backlash; maxon GPX gearheads fulfill practically all requirements. maxon GPX gearheads can be configured online and are ready for delivery within 11 working days.

© 2024 maxon. All rights reserved.

GPX 4 Ø4 mm, planetary gearhead







M 5:1

Key Data		C Ceramic Version
Max. transmittable power	W	0.17
Max. continuous torque	Nm	0.015
Max. continuous input speed	rpm	20 000
Ambient temperature	°C	-15 +80
Bearing at output		Sleeve bearing

Operating Range (output shaft) C Ceramic Version Intermittent operation Continuous operation 10000 1000

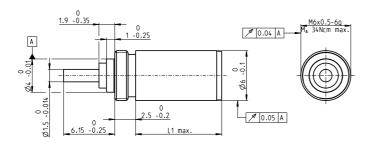
Specifications	C Ce	ramic Version				
Number of stages		2	3	4		
Max. transmittable power (continuous)	W	0.17	0.12	0.08		
Max. transmittable power (intermittent)	W	0.21	0.15	0.10		
Max. continuous torque	Nm	0.002	0.006	0.015		
Max. intermittent torque	Nm	0.003	0.008	0.020		
Max. continuous input speed	rpm	20000	20000	20000		
Max. intermittent input speed	rpm	40000	40000	40000		
Max. efficiency	%	76	70	65		
Average backlash no load	0	3.0	3.3	3.5		
Max. axial load (dynamic)	N	5	5	5		
Max. radial load, 4 mm from flange	N	3	4	4		
Gearhead length L1 ¹	mm	9.3	11.0	12.7		
Weight	g	0.4	0.5	0.6		

Configuration	C Cera	mic Version				
Number of stages		2	3	4		
Reduction Absolute reduction: (see online)	X:1	17	68	280		
Version	Ceramic	Version				
Flange	Standard	d flange				
Shaft	with/with	out flat face				

Modular System		Page
EC motor	№ of stages [opt.]	
ECX SPEED 4 M	2-4	191
ECX SPEED 4 L	2-4	192

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

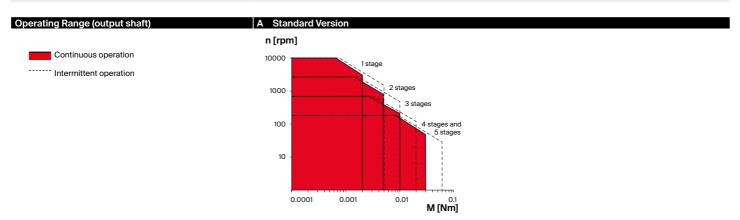
GPX 6 Ø6 mm, planetary gearhead





M 1:2

Key Data	A	A Standard Version
Max. transmittable power	W C	0.6
Max. continuous torque	Nm C	0.03
Max. continuous input speed	rpm 4	40 000
Ambient temperature	°C -	-40 +100
Bearing at output	E	Ball bearing
Bearing at output	Е	Ball bearing



Specifications	Α	Standard Ve	ersion				
Number of stages		1	2	3	4	5	
Max. transmittable power (continuous)	W	0.63	0.39	0.20	0.15	0.04	
Max. transmittable power (intermittent)	W	0.79	0.49	0.25	0.18	0.05	
Max. continuous torque	Nm	0.002	0.005	0.01	0.03	0.03	
Max. intermittent torque	Nm	0.005	0.01	0.02	0.06	0.06	
Max. continuous input speed	rpm	40000	40000	40000	40000	40000	
Max. intermittent input speed	rpm	40000	40000	40000	40000	40000	
Max. efficiency	%	88	77	68	60	52	
Average backlash no load	۰	1.8	2.0	2.2	2.5	2.8	
Max. axial load (dynamic)	N	5	5	5	5	5	
Max. radial load, 5 mm from flange	N	5	6	7	8	8	
Gearhead length L1 ¹	mm	5.3	7.8	10.4	13.0	15.6	
Weight	g	1.7	2.1	2.5	2.9	3.3	

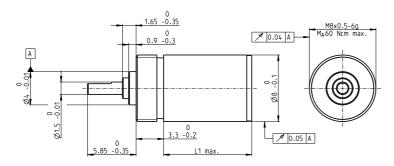
Configuration		A Standard	Version						
Number of stages		1	2	3	4	5			
Reduction Absolute reduction: (see online)	X:1	3.9	15	57	221	854			
Version		Standard							
Flange		Standard flange/flange with centering diameter							
Shaft		Length/flat fac	ce						

Modular System		Page		Page
DC motor	№ of stages [opt.]	EC motor	№ of stages [opt.]	
DCX 6 M	1–5	95 ECX SPEED 6 M	1–5	193-194
		ECX PRIME 6 M	1-5	233

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 8 Ø8 mm, planetary gearhead







M 1:2

Key Data		A Standard Version
Max. transmittable power	W	0.84
Max. continuous torque	Nm	0.1
Max. continuous input speed	rpm	12 000
Ambient temperature	°C	-15 +80
Bearing at output		Ball bearing

erating Range (output shaft)	A Standard Version	
	n [rpm]	n [rpm]
Continuous operation	10000]	10000]
Intermittent operation	1000 1631 100 1024:1 100 10.1 10.1 100 10.1	1000

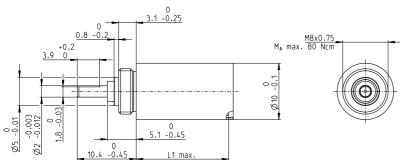
Specifications	A	Standard Vo	ersion						
Number of stages		1	2	2	3	3	4	4	5
Max. transmittable power (continuous)	W	0.840	0.520	0.140	0.390	0.060	0.130	0.040	0.040
Max. transmittable power (intermittent)	W	1.05	0.650	0.180	0.490	0.080	0.160	0.060	0.050
Max. continuous torque	Nm	0.010	0.020	0.008	0.060	0.020	0.080	0.040	0.100
Max. intermittent torque	Nm	0.015	0.030	0.012	0.090	0.030	0.120	0.060	0.150
Max. continuous input speed	rpm	12000	12000	12000	12000	12000	12000	12000	12000
Max. intermittent input speed	rpm	20000	20000	20000	20000	20000	20000	20000	20000
Max. efficiency	%	90	81	76	73	66	65	57	59
Average backlash no load	•	1.8	2.0	2.4	2.2	2.6	2.5	2.8	2.8
Max. axial load (dynamic)	N	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max. radial load, 5 mm from flange	N	5	6	6	7	7	8	8	8
Gearhead length L1 ¹	mm	5.5	8.1	8.3	10.7	11.1	13.3	13.9	15.9
Weight	g	2.6	3.2	3.2	3.8	3.8	4.4	4.4	5.0

Configuration		A Standard	Version						
Number of stages		1	2	2	3	3	4	4	5
Reduction Absolute reduction: (see online)	X:1	4	16	36	64	216	256	1296	1024
Version		Standard							
Flange	:	Standard flang	ge/flange with	centering dia	meter				
Shaft		Length/flat fac	ce						

Modular System		Page		Page
DC motor	Nº of stages [opt.]	EC motor	№ of stages [opt.]	
DCX 8 M	1–5	96 ECX SPEED 8 M	1–5	195-196

[†]This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 10 Ø10 mm, planetary gearhead





N/I 1-1

Key Data	A Standard Version
Max. transmittable power	W 1.6
Max. continuous torque	Nm 0.15
Max. continuous input speed	rpm 12 000
Ambient temperature	°C -40 +80
Bearing at output	Ball bearing

Operating Range (output shaft) Continuous operation Intermittent operation Operating Range (output shaft) A Standard Version Intermittent operation Intermittent operation Operating Range (output shaft) Intermittent operation Intermittent operation Operating Range (output shaft) Operating Range (out

Specifications	Α	Standard Ve	ersion				
Number of stages		1	2	3	4	5	
Max. transmittable power (continuous)	W	1.6	1.2	1.0	0.40	0.10	
Max. transmittable power (intermittent)	W	2.0	1.5	1.3	0.50	0.13	
Max. continuous torque	Nm	0.01	0.03	0.10	0.15	0.15	
Max. intermittent torque	Nm	0.02	0.05	0.15	0.20	0.20	
Max. continuous input speed	rpm	12000	12000	12000	12000	12000	
Max. intermittent input speed	rpm	15000	15000	15000	15000	15000	
Max. efficiency	%	90	81	73	65	59	
Average backlash no load	۰	1.5	1.8	2.0	2.2	2.5	
Max. axial load (dynamic)	N	5	5	5	5	5	
Max. radial load, 5 mm from flange	N	5	10	15	20	25	
Gearhead length L1 ¹	mm	9.9	13.4	16.6	19.8	23.0	
Weight	g	6.7	7.2	7.7	8.2	8.7	

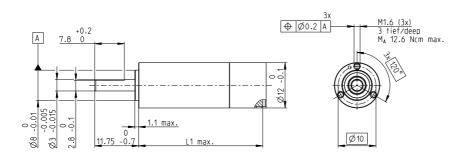
Configuration	A	Standard Ve	rsion					
Number of stages		1	2	3	4	5		
Reduction Absolute reduction: (see online)	X:1	4	16	64	256	1024		
Version	S	Standard						
Flange	S	Standard flange						
Shaft	L	.ength/flat face						

Modular System	F	Page		Page	
DC motor	№ of stages [opt.]	EC motor	№ of stages [opt.]		
DCX 10 S	1–5	97 ECX SPEED 10 M	1–5	197	
DCX 10 L	1–5	98			

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 12 Ø12 mm, planetary gearhead







M 1:1

Key Data	A Standard Version	C Ceramic Version
Max. transmittable power	W 2	2.4
Max. continuous torque	Nm 0.17	0.23
Max. continuous input speed	rpm 16 000	16 000
Ambient temperature	°C -40 +100	-40 +100
Bearing at output	Ball bearing	Ball bearing

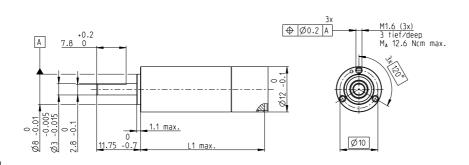
Operating Range (output shaft)	A Standard Version	C Ceramic Version	
	n [rpm]	n [rpm]	
Continuous operation	10000	10000	
Intermittent operation	1000	1 stage 2 stages 100 3 stages 10	1 stage 2 stages 3 stages 4 stages
	0.01	0.01 1 0.01 M [Nm]	0.1 M [Nm]

Specifications		A Standard V	ersion			C Ceramic V	/ersion		
Number of stages		1	2	3	4	1	2	3	4
Max. transmittable continuous power	W	2.0	1.0	0.50	0.25	2.4	1.2	0.60	0.30
Max. transmittable intermittent power	W	2.5	1.25	0.65	0.30	3.0	1.50	0.80	0.40
Max. continuous torque	Nm	0.08	0.11	0.14	0.17	0.11	0.15	0.19	0.23
Max. intermittent torque	Nm	0.10	0.14	0.18	0.21	0.15	0.19	0.24	0.29
Max. continuous input speed	rpm	16000	16000	16000	16000	16000	16000	16000	16000
Max. intermittent input speed	rpm	20000	20000	20000	20000	20000	20000	20000	20000
Max. efficiency	%	90	80	75	65	90	80	75	65
Average backlash no load	۰	1.2	1.5	1.8	2.1	1.2	1.5	1.8	2.1
Max. axial load (dynamic)	N	20	20	20	20	20	20	20	20
Max. radial load, 5 mm from flange	N	30	35	50	50	30	35	50	50
Gearhead length L11	mm	15.5	20.4	25.2	30.1	15.5	20.4	25.2	30.1
Weight	g	11	14	17	19	11	14	17	19

Configuration		A Standard	Version			C Ceramic	Version		
Number of stages		1	2	3	4	1	2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526	0.0, 0.0	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version		Standard/ceramic version/noise reduced/reduced backlash/high power							
Flange		Standard flange/configurable flange							
Shaft		Length/flat fa	ce						

Modular System		Page
DC motor	№ of stages [opt.]	
DCX 12 S	1–4	99
DCX 12 L	1-4	100

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





M 1:1

Key Data		LN Noise Reduced	LZ Backlash Reduced
Max. transmittable power	W	1.6	1
Max. continuous torque	Nm	0.14	0.2
Max. continuous input speed	rpm	16 0 0 0	16 000
Ambient temperature	°C	-40 +85	-40 +100
Bearing at output		Ball bearing	Ball bearing
Typical noise level	dBA	-5 dBA compared to standard configuration	

Operating Range (output shaft)	LN Noise Reduced	LZ Backla	sh Reduced
	n [rpm]	n [rpm]	
Continuous operation	10000	10000	
Intermittent operation			
	1000	1000	<u></u>
		1 stage	
	100	2 stages 100	2 stages
		3 stages	3 stages
	10 -	4 stages 10 -	4 stages
	0.01	0.1 1 0.01	0.1 1
		M [Nm]	M [Nm]

Specifications		LN Noise Red	duced			LZ Backlash Reduced		
Number of stages		1	2	3	4	2	3	4
Max. transmittable continuous power	W	1.6	0.8	0.40	0.20	1.0	0.50	0.25
Max. transmittable intermittent power	W	2.0	1.00	0.50	0.25	1.25	0.65	0.30
Max. continuous torque	Nm	0.06	0.09	0.11	0.14	0.11	0.14	0.17
Max. intermittent torque	Nm	0.08	0.11	0.14	0.18	0.14	0.18	0.21
Max. continuous input speed	rpm	16000	16000	16000	16000	16000	16000	16000
Max. intermittent input speed	rpm	20000	20000	20000	20000	20000	20000	20000
Max. efficiency	%	90	80	75	65	80	75	65
Average backlash no load	۰	1.2	1.5	1.8	2.1	1.35	1.6	1.8
Max. axial load (dynamic)	N	20	20	20	20	20	20	20
Max. radial load, 5 mm from flange	N	30	35	50	50	35	50	50
Gearhead length L11	mm	15.5	20.4	25.2	30.1	20.4	25.2	30.1
Weight	g	11	14	17	19	14	17	19

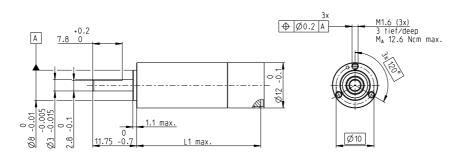
Configuration	LN	Noise R	educed			LZ Ba	acklash Reduced		
Number of stages		1	2	3	4		2	3	4
Reduction X Absolute reduction: (see online)	1	3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526		16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version	Sta	ndard/cer	amic version/r	noise reduced.	/backlash red	luced/hi	gh power		
Flange	Sta	Standard flange/configurable flange							
Shaft	Ler	ngth/flat fa	ice						

Modular System		Page
DC motor	№ of stages [opt.]	
DCX 12 S	1-4	99
DCX 12 L	1-4	100

[†]This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 12 Ø12 mm, planetary gearhead







M 1:1

Key Data		HP High Power
Max. transmittable power	W	2.2
Max. continuous torque	Nm	0.35
Max. continuous input speed	rpm	16000
Ambient temperature	°C	-40 +100
Bearing at output		Ball bearing

Operating Range (output shaft) Intermittent operation Operating Range (output shaft) Intermittent operation Intermittent o

Specifications	HP Hi	gh Power			
Number of stages		2	3	4	
Max. transmittable power (continuous)	W	2.2	1.10	0.60	
Max. transmittable power (intermittent)	W	2.80	1.40	0.80	
Max. continuous torque	Nm	0.25	0.30	0.35	
Max. intermittent torque	Nm	0.30	0.38	0.41	
Max. continuous input speed	rpm	16000	16000	16000	
Max. intermittent input speed	rpm	20000	20000	20000	
Max. efficiency	%	75	65	55	
Average backlash no load	•	1.5	1.8	2.1	
Max. axial load (dynamic)	N	20	20	20	
Max. radial load, 5 mm from flange	N	45	60	60	
Gearhead length L1 ¹	mm	23.4	28.1	33.1	
Weight	g	16	19	21	

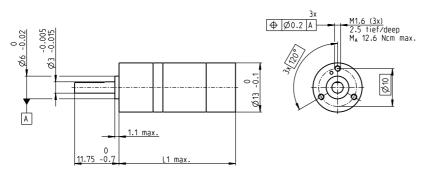
Configuration	HP High	n Power				
Number of stages		2	3	4		
Reduction Absolute reduction: (see online)	X:1	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526		
Version	Standard	/ceramic version/	noise reduced/	backlash reduce	d/high power	
Flange	Standard	flange				
Shaft	Length/fl	at face				

Modular System		Page
DC motor	№ of stages [opt.]	
DCX 12 S	2-4	99
DCX 12 L	2-4	100

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 13 SPEED Ø13 mm, planetary gearhead

Sterilizable





M 1:1

Key Data	Without shaft seal*	With shaft seal*
Max. transmittable power	W 22 (3.2)	22 (3.2)
Max. continuous torque	Nm 0.15	0.15
Max. continuous input speed	rpm 60000	60 000
Ambient temperature	°C -10 +135	-10 +135
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft) Without shaft seal With shaft seal n [rpm] n [rpm] Continuous operation 100000 100000 Intermittent operation 10000 10000 Sterilization information 2 stages Without shaft seal: typically 1000 autoclave cycles With shaft seal: typically 2000 autoclave cycles 1000 1000 100 100 Sterilization with steam $134^{\circ}\text{C} \pm 4^{\circ}\text{C}$ Temperature 135°C Compression pressure up to Rel. humidity 2.3 bar 100% 0.01 0.1 0.01 0.1 M [Nm Cycle length 18 minutes M [Nm]

Specifications		Without shaft	seal*		With shaft sea	al*		
Number of stages		1	2	3	1	2	3	
Max. transmittable continuous power	W	22 (3.2)	11 (1.6)	6 (0.8)	22 (3.2)	11 (1.6)	6 (0.8)	
Max. transmittable intermittent power	W	27 (4)	13 (2)	7 (1)	27 (4)	13 (2)	7 (1)	
Max. continuous torque	Nm	0.025 (0.13)	0.06 (0.16)	0.15 (0.2)	0.025 (0.13)	0.06 (0.16)	0.15 (0.2)	
Max. intermittent torque	Nm	0.030 (0.16)	0.075 (0.2)	0.19 (0.25)	0.030 (0.16)	0.075 (0.2)	0.19 (0.25)	
Max. continuous input speed	rpm	60000	60000	60000	60000	60000	60000	
Max. intermittent input speed	rpm	75000	75000	75000	75000	75000	75000	
Max. efficiency	%	85	80	70	85	80	70	
Average backlash no load	۰	1.2	1.4	1.6	1.2	1.4	1.6	
Max. axial load (dynamic)	N	20	20	20	20	20	20	
Max. radial load, 5 mm from flange	N	10	15	25	10	15	25	
Gearhead length L11	mm	30.8	36.6	42.4	30.8	36.6	42.4	
Weight	g	21	26	30	21	26	30	

Configuration		Without shaft	seal		With shaft se	eal		
Number of stages		1	2	3	1	2	3	
Reduction Absolute reduction: (see online)	X:1	5	25	125	5	25	125	
Version	,	Without shaft	seal/With sha	aft seal				
Flange	!	Standard flang	ge/configurat	ole flange				
Shaft	I	Length/flat fac	ce					

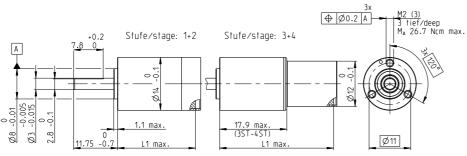
	Page
№ of stages [opt.]	
1-3	198-201
1-3	202-205
	1–3

This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

^{*}Values in parentheses apply in case of reduced speed (according to diagram).

GPX 14 Ø14 mm, planetary gearhead







M 1:1

Key Data	A Standard Version	C Ceramic Version
Max. transmittable power	W 4	4.8
Max. continuous torque	Nm 0.3	0.4
Max. continuous input speed	rpm 16 000	16 000
Ambient temperature	°C -40 +100	-40 + 100
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft)	A Standard Version	·	eramic Version
Continuous operationIntermittent operation	n [rpm]	n [r j	
	1000	100	
	100 -	1 stage 10 2 stages 10	1 stages 2 stages 3 stages
	10 -	4 stages 1	0 - 4 stages
	1	1 M [Nm]	0.01 0.1 1 M [Nm]

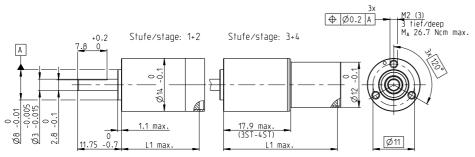
Specifications		A Standard V	ersion			C Ceramic \	/ersion		
Number of stages		1	2	3	4	1	2	3	4
Max. transmittable continuous power	W	4.0	2.0	1.0	0.4	4.8	2.4	1.2	0.5
Max. transmittable intermittent power	W	5.0	2.5	1.25	0.5	6.0	3.0	1.50	0.6
Max. continuous torque	Nm	0.16	0.20	0.25	0.30	0.21	0.27	0.33	0.40
Max. intermittent torque	Nm	0.20	0.25	0.31	0.38	0.26	0.34	0.41	0.50
Max. continuous input speed	rpm	14000	16000	16000	16000	14000	16000	16000	16000
Max. intermittent input speed	rpm	17500	20000	20000	20000	17500	20000	20000	20000
Max. efficiency	%	90	80	75	65	90	80	75	65
Average backlash no load	۰	1.1	1.3	1.45	1.7	1.1	1.3	1.45	1.7
Max. axial load (dynamic)	N	20	20	20	20	20	20	20	20
Max. radial load, 5 mm from flange	N	30	45	60	60	30	45	60	60
Gearhead length L11	mm	15.7	20.8	25.5	30.3	15.7	20.8	25.5	30.3
Weight	g	14	19	21	23	14	19	21	23

Configuration		A Standard	Version			C Ceramic	Version		
Number of stages		1	2	3	4	1	2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526	2.2, 2.2, 2.2	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version		Standard/cer	amic version/	noise reduced	/backlash red	uced/high pov	ver		
Flange		Standard flar	ge/configural	ble flange					
Shaft		Length/flat fa	ice						

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 12 S	3-4	99	ECX SPEED 13 M	1-2 [3-4]	198-199
DCX 12 L	3-4	100	ECX SPEED 13 L	1-2 [3-4]	202-203
DCX 14 L	1-2 [3-4]	101-102			

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 14 Ø14 mm, planetary gearhead





M 1:1

Key Data		LN Noise Reduced	LZ Backlash Reduced
Max. transmittable power	W	3.2	3
Max. continuous torque	Nm	0.24	0.3
Max. continuous input speed	rpm	16000	16 000
Ambient temperature	°C	-40 +85	-40 +100
Bearing at output		Ball bearing	Ball bearing
Typical noise level	dBA	-5 dBA compared to standard configuration	

Operating Range (output shaft)	LN Noise Reduced	LZ Backl	ash Reduced
	n [rpm]	n [rpm]	
Continuous operation	10000	10000]	
Intermittent operation	1000	1000	2 stages 3 stages 4 stages M [Nm]

Specifications		LN Noise Re	duced			LZ Backlash Reduced		
Number of stages	,,	1	2	3	4	2	3	4
Max. transmittable continuous power	W	3.2	1.6	0.8	0.3	2.0	1.0	0.4
Max. transmittable intermittent power	W	4.0	2.0	1.0	0.4	2.5	1.25	0.5
Max. continuous torque	Nm	0.13	0.16	0.20	0.24	0.20	0.25	0.30
Max. intermittent torque	Nm	0.16	0.20	0.25	0.30	0.25	0.31	0.38
Max. continuous input speed	rpm	14000	16000	16000	16000	16000	16000	16000
Max. intermittent input speed	rpm	17500	20000	20000	20000	20000	20000	20000
Max. efficiency	%	90	80	75	65	80	75	65
Average backlash no load	۰	1.1	1.3	1.45	1.7	0.95	1.05	1.2
Max. axial load (dynamic)	N	20	20	20	20	20	20	20
Max. radial load, 5 mm from flange	N	30	45	60	60	45	60	60
Gearhead length L11	mm	15.7	20.8	25.5	30.3	20.8	25.5	30.3
Weight	g	14	19	21	23	19	21	23

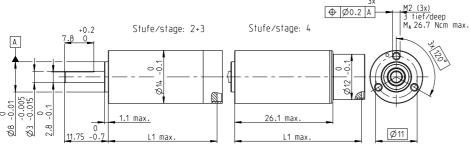
Configuration		N Noise Re	educed			LZ Backlas	sh Reduced		
Number of stages		1	2	3	4		2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526		16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version	5	Standard/cer	amic version/	noise reduced	/backlash red	luced/high po	wer		
Flange	5	Standard flange/configurable flange							
Shaft	L	_ength/flat fa	ce						

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 12 S	3-4	99	ECX SPEED 13 M	1-2 [3-4]	198-199
DCX 12 L	3-4	100	ECX SPEED 13 L	1-2 [3-4]	202-203
DCX 14 I	1-2 [3-4]	101-102			

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 14 Ø14 mm, planetary gearhead







M 1:1

Key Data		HP High Power
Max. transmittable power	W	4.0
Max. continuous torque	Nm	0.50
Max. continuous input speed	rpm	16 0 0 0
Ambient temperature	°C	-40 +100
Bearing at output		Ball bearing

Operating Range (output shaft) Intermittent operation Toology T

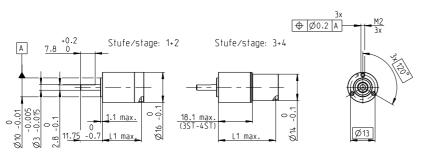
Specifications	Н	P High Power			
Number of stages			2	3	4
Max. transmittable power (continuous)	W		4.0	2.0	0.7
Max. transmittable power (intermittent)	W		5.0	2.5	1.0
Max. continuous torque	Nm		0.30	0.40	0.50
Max. intermittent torque	Nm		0.40	0.50	0.60
Max. continuous input speed	rpm	14	000	16000	16000
Max. intermittent input speed	rpm	17	500	20000	20000
Max. efficiency	%		75	65	55
Average backlash no load	۰		1.3	1.45	1.7
Max. axial load (dynamic)	N		20	20	20
Max. radial load, 5 mm from flange	N		45	70	70
Gearhead length L1 ¹	mm		23.9	29.0	33.7
Weight	g		21	25	27

Configuration	HP Higl	n Power				
Number of stages		2	3	4		
Reduction Absolute reduction: (see online)	X:1	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526		
Version	Standard	/ceramic version/r	noise reduced	/backlash reduced/	high power	
Flange	Standard	flange				
Shaft	l enath/fl	at face				

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 12 S	4	99	ECX SPEED 13 M	2-3 [4]	198-199
DCX 12 L	4	100	ECX SPEED 13 L	2-3 [4]	202-203
DCX 14 L	2-3 [4]	101-102			

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 16 Ø16 mm, planetary gearhead





Key Data	A Standard Version	C Ceramic Version
Max. transmittable power	W 6.5	7.8
Max. continuous torque	Nm 0.45	0.6
Max. continuous input speed	rpm 16 000	16000
Ambient temperature	°C -40 +100	-40 +100
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft)	A Standard Version	C Ceramic Version	
	n [rpm]	n [rpm]	
Continuous operation	10000]	10000]	
Intermittent operation	1000	1000	1 stages 2 stages 3 stages 4 stages M [Nm]

Specifications	Α	Standard Ve	ersion			C Ceramic V	ersion		
Number of stages		1	2	3	4	1	2	3	4
Max. transmittable continuous power	W	6.5	3.2	1.6	0.60	7.8	3.8	1.9	0.7
Max. transmittable intermittent power	W	8.0	4.0	2.0	0.75	10.0	5.0	2.5	1.0
Max. continuous torque	Nm	0.20	0.25	0.35	0.45	0.27	0.33	0.47	0.60
Max. intermittent torque	Nm	0.25	0.35	0.45	0.55	0.33	0.42	0.58	0.75
Max. continuous input speed	rpm	12000	14000	16000	16000	12000	14000	16000	16000
Max. intermittent input speed	rpm	15000	17500	20000	20000	15000	17500	20000	20000
Max. efficiency	%	90	80	75	65	90	80	75	65
Average backlash no load	۰	1.0	1.2	1.3	1.4	1.0	1.2	1.3	1.4
Max. axial load (dynamic)	N	20	20	20	20	20	20	20	20
Max. radial load, 5 mm from flange	N	30	45	70	70	30	45	70	70
Gearhead length L11	mm	15.8	20.7	25.7	30.6	15.8	20.7	25.7	30.6
Weight	g	20	25	27	31	20	25	27	31

Configuration	Α	Standard	l Version			C Ceramic	Version		
Number of stages		1	2	3	4	1	2	3	4
Reduction X Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version	S	tandard/cei	ramic version/	noise reduced/	reduced back	klash/high pov	wer		
Flange	S	tandard flar	nge/configura	ble flange					
Shaft	L	ength/flat fa	ace						

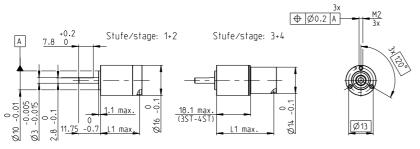
Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 14 L	3-4	101-102	ECX SPEED 13 M	3-4	198-199
DCX 16 S	1-2 [3-4]	103-104	ECX SPEED 13 L	3-4	202-203
DCX 16 L	1-2 [3-4]	105-106	ECX SPEED 16 M	1-2 [3-4]	206-207
DC-max 16 S*	1-2 [3-4]	119-120	ECX SPEED 16 L	1-2 [3-4]	210-211
			ECX PRIME 16 L*	1-2 [3-4]	234

^{*}Limited selection of reduction ratios (see online).

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 16 Ø16 mm, planetary gearhead







Key Data		LN Noise Reduced	LZ Backlash Reduced
Max. transmittable power	W	5.2	3.2
Max. continuous torque	Nm	0.36	0.5
Max. continuous input speed	rpm	16 0 0 0	16 000
Ambient temperature	°C	-40 +85	-40 +100
Bearing at output		Ball bearing	Ball bearing
Typical noise level	dBA	-5 dBA compared to standard configuration	

Operating Range (output shaft)	LN Noise Reduced	LZ E	Backlash Reduced
	n [rpm]	ո [դ	pm]
Continuous operation	10000]	1000	00]
Intermittent operation	1000	1 stage 2 stages 10 3 stages 4 stages 1	

Specifications		LN Noise Re	duced			LZ Backlash Reduced		
Number of stages		1	2	3	4	2	3	4
Max. transmittable continuous power	W	5.2	2.6	1.3	0.5	3.2	1.6	0.6
Max. transmittable intermittent power	W	6.5	3.3	1.6	0.6	4.0	2.0	0.8
Max. continuous torque	Nm	0.16	0.20	0.28	0.36	0.25	0.35	0.45
Max. intermittent torque	Nm	0.20	0.25	0.35	0.45	0.35	0.45	0.55
Max. continuous input speed	rpm	12000	14000	16000	16000	14000	16000	16000
Max. intermittent input speed	rpm	15000	17500	20000	20000	17500	20000	20000
Max. efficiency	%	90	80	75	65	80	75	65
Average backlash no load	۰	1.0	1.2	1.3	1.4	0.8	0.9	1.0
Max. axial load (dynamic)	N	20	20	20	20	20	20	20
Max. radial load, 5 mm from flange	N	30	45	70	70	45	70	70
Gearhead length L1 ¹	mm	15.8	20.7	25.7	30.6	20.7	25.7	30.6
Weight	g	20	25	27	30.6	25	27	30.6

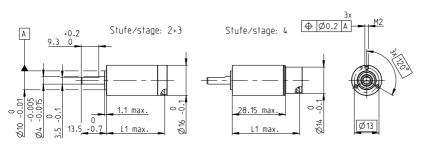
Configuration		LN Noise R	educed			LZ Backlas	h Reduced		
Number of stages		1	2	3	4		2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526		16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version		Standard/cei	ramic version/	noise reduced	/backlash red	uced/high po	wer		
Flange		Standard flar	nge/configural	ole flange					
Shaft		Length/flat fa	ace						

	Page			Page
№ of stages [opt.]		EC motor		
3-4	101-102	ECX SPEED 13 M	3-4	198-199
1-2 [3-4]	103-104	ECX SPEED 13 L	3-4	202-203
1-2 [3-4]	105-106	ECX SPEED 16 M	1-2 [3-4]	206-207
1-2 [3-4]	119-120	ECX SPEED 16 L	1-2 [3-4]	210-211
		ECX PRIME 16 L*	1-2 [3-4]	234
	3-4 1-2 [3-4] 1-2 [3-4]	№ of stages [opt.] 3-4 101-102 1-2 [3-4] 103-104 1-2 [3-4] 105-106	3-4 101-102 ECX SPEED 13 M 1-2 [3-4] 103-104 ECX SPEED 13 L 1-2 [3-4] 105-106 ECX SPEED 16 M 1-2 [3-4] 119-120 ECX SPEED 16 L	№ of stages [opt.] 3-4 101-102 ECX SPEED 13 M 3-4 1-2 [3-4] 103-104 ECX SPEED 13 L 3-4 1-2 [3-4] 105-106 ECX SPEED 16 M 1-2 [3-4] 119-120 ECX SPEED 16 L 1-2 [3-4]

^{*}Limited selection of reduction ratios (see online).

'This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 16 Ø16 mm, planetary gearhead





Key Data		HP High Power
Max. transmittable power	W	8
Max. continuous torque	Nm	0.9
Max. continuous input speed	rpm	16000
Ambient temperature	°C	-40 +100
Bearing at output		Ball bearing

Operating Range (output shaft)	HP High Power
	n [rpm]
Continuous operation	10000 _]
Intermittent operation	
	1000 - 2 stages
	3 stages 10 4 stages
	0.1 1 10 M [Nm]

Specifications	HP	High Power			
Number of stages		2	3	4	
Max. transmittable power (continuous)	W	8.0	4.0	1.5	
Max. transmittable power (intermittent)	W	10.0	4.4	1.5	
Max. continuous torque	Nm	0.55	0.80	0.90	
Max. intermittent torque	Nm	0.70	1.00	1.10	
Max. continuous input speed	rpm	12000	14000	16000	
Max. intermittent input speed	rpm	15000	17500	20000	
Max. efficiency	%	75	65	55	
Average backlash no load	٥	1.2	1.3	1.4	
Max. axial load (dynamic)	N	30	30	30	
Max. radial load, 5 mm from flange	N	80	90	90	
Gearhead length L1 ¹	mm	25.9	30.9	35.7	
Weight	g	31	35	39	

Configuration		HP High Po	ower					
Number of stages			2	3	4			
Reduction Absolute reduction: (see online)	X:1		16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526			
Version		Standard/cei	ramic version/r	noise reduced.	/backlash redu	ced/high po	wer	
Flange		Standard flar	nge					
Shaft		Length/flat fa	ace/cross hole					

	Page			Page
№ of stages [opt.]		EC motor	№ of stages [opt.]	
4	101-102	ECX SPEED 13 M	4	198-199
2-3 [4]	103-104	ECX SPEED 13 L	4	202-203
2-3 [4]	105-106	ECX SPEED 16 M	2-3 [4]	206-207
		ECX SPEED 16 L	2-3 [4]	210-211
		ECX PRIME 16 L*	2-3 [4]	234
	4 2-3 [4]	№ of stages [opt.] 4 101–102 2–3 [4] 103–104	4 101-102 ECX SPEED 13 M 2-3 [4] 103-104 ECX SPEED 13 L 2-3 [4] 105-106 ECX SPEED 16 M ECX SPEED 16 L	№ of stages [opt.] EC motor № of stages [opt.] 4 101-102 ECX SPEED 13 M 4 2-3 [4] 103-104 ECX SPEED 13 L 4 2-3 [4] 105-106 ECX SPEED 16 M 2-3 [4] ECX SPEED 16 L 2-3 [4]

^{*}Limited selection of reduction ratios (see online).

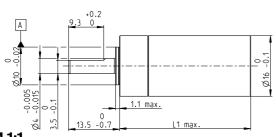
¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

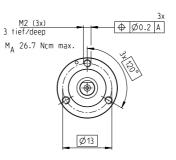
GPX 16 HP Ø16 mm, planetary gearhead













M 1:1

Key Data		With shaft seal
Max. transmittable power	W	16.0
Max. continuous torque	Nm	0.8
Max. continuous input speed	rpm	14000
Ambient temperature	°C	-10 +135
Bearing at output		Ball bearing

Operating Range (output shaft) With shaft seal n [rpm] Continuous operation 10000 Intermittent operation 1000 Sterilization information 2 stages 100 With shaft seal: typically 2000 autoclave cycles 3 stages Sterilization with steam 10 Temperature 134°C ± 4°C 135°C Compression pressure up to 2.3 bar Rel. humidity 100% 0.1 0.01 Cycle length 18 minutes M [Nm]

Specifications	V	With shaft seal			
Number of stages		1	2	3	
Max. transmittable continuous power	W	16.0	8.0	4.0	
Max. transmittable intermittent power	W	20.0	10.0	4.4	
Max. continuous torque	Nm	0.40	0.55	0.80	
Max. intermittent torque	Nm	0.55	0.70	1.0	
Max. continuous input speed	rpm	12000	12000	14000	
Max. intermittent input speed	rpm	15000	15000	17500	
Max. efficiency	%	85	75	65	
Average backlash no load	۰	1.0	1.2	1.3	
Max. axial load (dynamic)	N	30	30	30	
Max. radial load, 5 mm from flange	N	25	35	35	
Gearhead length L1 ¹	mm	27.8	34.7	39.7	
Weight	g	36	43	48	

Configuration	W	ith shaft se	al				
Number of stages		1	2	3			
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6		62, 83, 103, 111, 138, 150, 172, 186, 231			
Version	S	haft seal					
Flange	S	tandard flan	ige				
Shaft	Le	ength/flat fa	ce/cross hole				

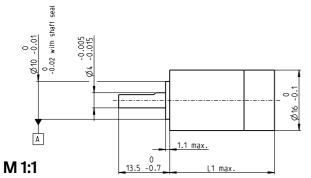
Modular System		Page
EC motor	№ of stages [opt.]	
ECX SPEED 16 M	1–3	208-209
ECX SPEED 16 L	1–3	212-213
ECX PRIME 16 STE*	1–3	235

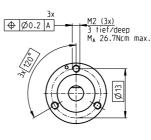
^{*}Limited selection of reduction ratios (see online).

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 16 SPEED Ø16 mm, planetary gearhead

Sterilizable







Key Data	Without shaft seal*	With shaft seal*	
Max. transmittable power	W 42 (5.2)	42 (5.2)	
Max. continuous torque	Nm 0.11 (0.2)	0.11 (0.2)	
Max. continuous input speed	rpm 50 000	50 000	
Ambient temperature	°C -10 +135	-10 +135	
Bearing at output	Ball bearing	Ball bearing	

Operating Range (output shaft) Without shaft seal With shaft seal n [rpm] n [rpm] Continuous operation 100000 100000 Intermittent operation 10000 10000 Sterilization information 1000 1000 Without shaft seal: typically 1000 autoclave cycles With shaft seal: typically 2000 autoclave cycles 100 100 Sterilization with steam $134^{\circ}\text{C} \pm 4^{\circ}\text{C}$ Temperature 135°C 0.1 0.1 Compression pressure up to Rel. humidity 0.01 2.3 bar M [Nm] M [Nm] 555 100% Cycle length 18 minutes

Specifications		Without shaf	t seal*	With shaft se	al*	
Number of stages		1	2	1	2	
Max. transmittable continuous power	W	42 (5.2)	21 (2.6)	42 (5.2)	21 (2.6)	
Max. transmittable intermittent power	W	52 (6.5)	25 (3.3)	52 (6.5)	25 (3.3)	
Max. continuous torque	Nm	0.045 (0.16)	0.11 (0.20)	0.045 (0.16)	0.11 (0.20)	
Max. intermittent torque	Nm	0.055 (0.20)	0.140 (0.25)	0.055 (0.20)	0.140 (0.25)	
Max. continuous input speed	rpm	50000	50000	50000	50000	
Max. intermittent input speed	rpm	70000	70000	70000	70000	
Max. efficiency	%	85	80	85	80	
Average backlash no load	۰	1.4	1.6	1.4	1.6	
Max. axial load (dynamic)	N	30.0	30.0	30.0	30.0	
Max. radial load, 5 mm from flange	N	25.0	35.0	15.0	20.0	
Gearhead length L1 ¹	mm	27.7	35.1	35.3	42.7	
Weight	g	27	35	37	45	

Configuration	Without	shaft seal			With shaft sea	al		
Number of stages		1 2			1	2		
Reduction Absolute reduction: (see online)	X:1 3.9, 5.3,	6.6 16, 21, 26, 28, 35, 44			3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44		
Version	Without	shaft seal/With sha	aft seal					
Flange	Standard	Standard flange						
Shaft	Length/f	at face/cross hole	;					

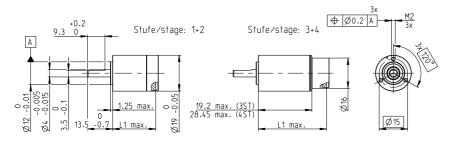
maxon Modular Sys	Page	
maxon EC motor	№ of stages [opt.]	
ECX SPEED 16 M	1-2	208-209
ECX SPEED 16 L	1–2	212-213

This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

^{*}Values in parentheses apply in case of reduced speed (according to diagram).

GPX 19 Ø19 mm, planetary gearhead







M 1:2

Key Data	A Standard Version	C Ceramic Version
Max. transmittable power	W 13	15.5
Max. continuous torque	Nm 0.8	1.1
Max. continuous input speed	rpm 14 000	14 000
Ambient temperature	°C -40 +100	-40 +100
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft)	A Standard Version n [rpm]	C Ceramic Version n [rpm]
Continuous operationIntermittent operation	10000 1000 1000 100 100 100 101 1 stage 2 stages 100 4 stages	10000 10000 10000 10000 10000 11 stage 2 stages 3 stages 4 stages M [Nm]

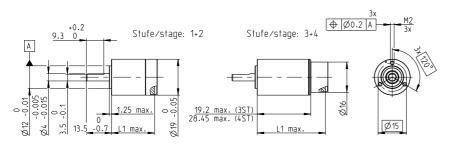
Specifications		A Standard V	ersion			C Ceramic \	ersion		
Number of stages		1	2	3	4	1	2	3	4
Max. transmittable continuous power	W	13.0	6.5	3.2	0.9	15.5	7.8	3.9	1.0
Max. transmittable intermittent power	W	16.2	8.1	4.1	1.1	19.4	9.7	4.9	1.3
Max. continuous torque	Nm	0.35	0.45	0.65	0.80	0.47	0.60	0.86	1.05
Max. intermittent torque	Nm	0.45	0.55	0.80	1.00	0.60	0.75	1.10	1.30
Max. continuous input speed	rpm	10000	12000	14000	14000	10000	12000	14000	14000
Max. intermittent input speed	rpm	12 500	15000	17500	17500	12500	15000	17500	17500
Max. efficiency	%	90	80	75	65	90	80	75	65
Average backlash no load	۰	0.9	1.15	1.25	1.35	0.9	1.15	1.25	1.35
Max. axial load (dynamic)	N	40	40	40	40	40	40	40	40
Max. radial load, 5 mm from flange	N	50	80	90	90	50	80	90	90
Gearhead length L1 ¹	mm	16.7	22.9	27.0	36.2	16.7	22.9	27.0	36.2
Weight	g	30	40	43	55	30	40	43	55

Configuration		A Standard	Version			C Ceramic	Version		
Number of stages		1	2	3	4	1	2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526	3.9, 5.3, 6.6	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version		Standard/ceramic version/noise reduced/backlash reduced/high power							
Flange		Standard flan	ge/configural	ole flange					
Shaft		Length/flat fa	ce/cross hole						

	Page			Page
№ of stages [opt.]		EC motor	№ of stages [opt.]	
3-4	103-104	ECX SPEED 16 M	3-4	206-207
3-4	105-106	ECX SPEED 16 L	3-4	210-211
1-2 [3-4]	107-108	ECX SPEED 19 M	1-2 [3-4]	214-215
3-4	119-120	ECX SPEED 19 L	1-2 [3-4]	218-219
		ECX PRIME 16 L	3–4	234
	3-4 3-4 1-2 [3-4]	№ of stages [opt.] 3-4 103-104 3-4 105-106 1-2 [3-4] 107-108	3-4 103-104 ECX SPEED 16 M 3-4 105-106 ECX SPEED 16 L 1-2 [3-4] 107-108 ECX SPEED 19 M 3-4 119-120 ECX SPEED 19 L	№ of stages [opt.] 3-4 103-104 ECX SPEED 16 M 3-4 105-106 ECX SPEED 16 L 3-4 1-2 [3-4] 107-108 ECX SPEED 19 M 1-2 [3-4] 3-4 119-120 ECX SPEED 19 L 1-2 [3-4]

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 19 Ø19 mm, planetary gearhead





Key Data		LN Noise Reduced	LZ Backlash Reduced
Max. transmittable power	W	10.4	6.5
Max. continuous torque	Nm	0.64	0.8
Max. continuous input speed	rpm	14 000	14 000
Ambient temperature	°C	-40 +85	-40 +100
Bearing at output		Ball bearing	Ball bearing
Typical noise level	dBA	-5 dBA compared to standard configuration	

Operating Range (output shaft)	LN Noise Reduced	LZ Backlash Reduced
	n [rpm]	n [rpm]
Continuous operation	10000	10000]
Intermittent operation	1000 1 stages 2 stages 3 stages 4 stages	1000 100 100 100 100 100 100 100 100 10

Specifications	L	Noise Red	uced		L	Z Backlash Reduced		
Number of stages		1	2	3	4	2	3	4
Max. transmittable continuous power	W	10.4	5.2	2.6	0.7	6.5	3.2	0.9
Max. transmittable intermittent power	W	13.0	6.5	3.2	0.9	8.1	4.1	1.1
Max. continuous torque	Nm	0.28	0.36	0.52	0.64	0.45	0.65	0.80
Max. intermittent torque	Nm	0.35	0.45	0.65	0.80	0.55	0.80	1.00
Max. continuous input speed	rpm	10000	12000	14000	14000	12000	14000	14000
Max. intermittent input speed	rpm	12500	15000	17500	17500	15000	17500	17500
Max. efficiency	%	90	80	75	65	80	75	65
Average backlash no load	۰	0.9	1.15	1.25	1.35	0.8	1.0	1.15
Max. axial load (dynamic)	N	40	40	40	40	40	40	40
Max. radial load, 5 mm from flange	N	50	80	90	90	80	90	90
Gearhead length L11	mm	16.7	22.9	27.0	36.2	22.9	27.0	36.2
Weight	g	30	40	43	55	40	43	55

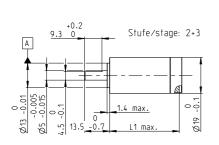
Configuration		LN Noise R	educed			LZ Backlas	sh Reduced		
Number of stages		1	2	3	4		2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526		16, 21, 26, 28, 35	, 62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version		Standard/ceramic version/noise reduced/backlash reduced/high power							
Flange		Standard flange/configurable flange							
Shaft		Length/flat fa	ce/cross hole	•					

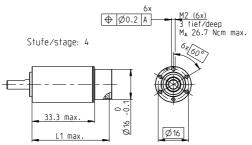
Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 16 S	3-4	103-104	ECX SPEED 16 M	3-4	206-207
DCX 16 L	3-4	105-106	ECX SPEED 16 L	3-4	210-211
DCX 19 S	1-2 [3-4]	107-108	ECX SPEED 19 M	1-2 [3-4]	214-215
DC-max 16 S	3–4	119-120	ECX SPEED 19 L	1-2 [3-4]	218-219
			ECX PRIME 16 L	3–4	234

^{&#}x27;This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 19 Ø19 mm, planetary gearhead

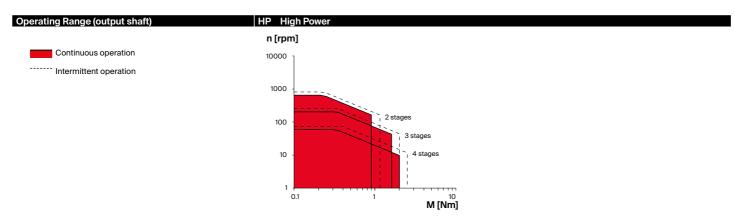








Key Data		HP High Power
Max. transmittable power	W	15
Max. continuous torque	Nm	2
Max. continuous input speed	rpm	14000
Ambient temperature	°C	-40 +100
Bearing at output		Ball bearing



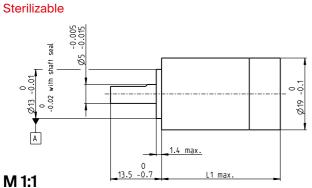
Specifications	HP F	ligh Power			
Number of stages		2	3	4	
Max. transmittable power (continuous)	W	15.0	7.0	2.0	
Max. transmittable power (intermittent)	W	19.0	9.0	3.0	
Max. continuous torque	Nm	0.90	1.60	2.00	
Max. intermittent torque	Nm	1.15	2.00	2.50	
Max. continuous input speed	rpm	10000	12000	14000	
Max. intermittent input speed	rpm	12500	15000	17500	
Max. efficiency	%	75	65	55	
Average backlash no load	•	1.15	1.25	1.35	
Max. axial load (dynamic)	N	40	40	40	
Max. radial load, 5 mm from flange	N	100	120	120	
Gearhead length L1 ¹	mm	30.8	37.0	41.0	
Weight	g	51	61	63	

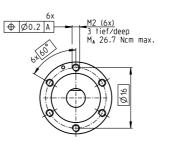
Configuration	HP High Power					
Number of stages	2 3 4					
Reduction X: Absolute reduction: (see online)	1 16, 21, 26, 62, 83, 103, 111, 243, 326, 406, 439, 546, 590, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526					
Version	Standard/ceramic version/noise reduced/backlash reduced/high power					
Flange	Standard flange					
Shaft	Length/flat face/cross hole					

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 16 S	4	103-104	ECX SPEED 16 M	4	206-207
DCX 16 L	4	105-106	ECX SPEED 16 L	4	210-211
DCX 19 S	2-3 [4]	107-108	ECX SPEED 19 M	2-3 [4]	214-215
			ECX SPEED 19 L	2-3 [4]	218-219
			ECX PRIME 16 L	4	234

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 19 SPEED Ø19 mm, planetary gearhead







Key Data	Without shaft seal*	With shaft seal*
Max. transmittable power	W 62 (10.4)	62 (10.4)
Max. continuous torque	Nm 0.2 (0.36)	0.2 (0.36)
Max. continuous input speed	rpm 45000	45000
Ambient temperature	°C -10 +135	-10 +135
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft) Without shaft seal With shaft seal n [rpm] n [rpm] Continuous operation 100000 100000 Intermittent operation 10000 10000 Sterilization information Without shaft seal: typically 1000 autoclave cycles With shaft seal: typically 2000 autoclave cycles 1000 1000 100 100 Sterilization with steam $134^{\circ}\text{C} \pm 4^{\circ}\text{C}$ Temperature 135°C Compression pressure up to Rel. humidity 2.3 bar 555 100% 0.1 0.1 0.01 0.01 M [Nm] Cycle length 18 minutes M [Nm]

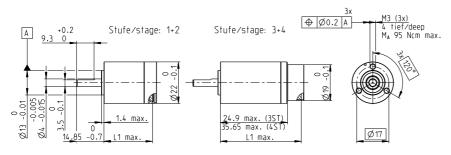
Specifications		Without shaft	seal*	With shaft seal*
Number of stages		1	2	1 2
Max. transmittable continuous power	W	62 (10.4)	31 (5.2)	62 (10.4) 31 (5.2)
Max. transmittable intermittent power	W	77 (13)	38 (6.5)	77 (13) 38 (6.5)
Max. continuous torque	Nm	0.08 (0.28)	0.2 (0.36)	0.08 (0.28) 0.2 (0.36)
Max. intermittent torque	Nm	0.1 (0.35)	0.25 (0.45)	0.1 (0.35) 0.25 (0.45)
Max. continuous input speed	rpm	45000	45 000	45 000 45 000
Max. intermittent input speed	rpm	60000	60000	60000 60000
Max. efficiency	%	85	80	85 80
Average backlash no load	۰	1.4	1.6	1.4 1.6
Max. axial load (dynamic)	N	40.0	40.0	40.0 40.0
Max. radial load, 5 mm from flange	N	50.0	85.0	35.0 55.0
Gearhead length L11	mm	31.4	40.3	39.20 48.10
Weight	g	41	54	56 69

Configuration	Without sl	haft seal	With shaft s	eal	
Number of stages		1 2	1	. 2	
Reduction Absolute reduction: (see online)	X:1 3.9, 5.3, 6	5.6 16, 21, 26, 28, 35, 44	3.9, 5.3, 6.6	3 16, 21, 26, 28, 35, 44	
Version	Without sh	naft seal/With shaft seal			
Flange	Standard	flange			
Shaft	Length/fla	t face/cross hole			

Modular System		Page
EC motor	№ of stages [opt.]	
ECX SPEED 16 M	[3]	206-209
ECX SPEED 16 L	[3]	210-213
ECX SPEED 19 M	1-2	214-217
ECX SPEED 19 L	1-2	218-221

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

^{*}Values in parentheses apply in case of reduced speed (according to diagram).





M 1:2

Key Data	A Standard Version	C Ceramic Version
Max. transmittable power	W 24	30
Max. continuous torque	Nm 1.5	2
Max. continuous input speed	rpm 12000	12000
Ambient temperature	°C -40 +100	-40 +100
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft)	A Standard Version	C Cera	amic Version
	n [rpm]	n [rpn	n]
Continuous operation	10000]	10000]
Intermittent operation			
	1000	1000	
	1 1 stage		1 stage
	100	stages 100	2 stages
		3 stages	3 stages
	10 -	4 stages 10	4 stages
	0.1	10	0.1 1 10
		M [Nm]	M [Nm]

Specifications		A Standard V	ersion			C Ceramic V	ersion		
Number of stages		1	2	3	4	1	2	3	4
Max. transmittable power (continuous)	W	24.0	12.0	6.0	1.6	30.0	15.0	7.0	2.0
Max. transmittable power (intermittent)	W	30.0	15.0	7.5	2.0	38.0	19.0	9.0	2.5
Max. continuous torque	Nm	0.50	0.70	1.20	1.50	0.70	0.90	1.60	2.00
Max. intermittent torque	Nm	0.60	0.90	1.50	1.90	0.80	1.20	2.00	2.50
Max. continuous input speed	rpm	8000	10000	12000	12000	8000	10000	12000	12000
Max. intermittent input speed	rpm	10000	12500	15000	15000	10000	12500	15000	15000
Max. efficiency	%	90	81	74	66	90	81	74	66
Average backlash no load	۰	0.85	1.05	1.2	1.35	0.85	1.05	1.2	1.35
Max. axial load (dynamic)	N	40	40	40	40	40	40	40	40
Max. radial load, 10 mm from flange	N	65	100	120	120	65	100	120	120
Gearhead length L1 ¹	mm	19.9	26.4	32.2	43.0	19.9	26.4	32.2	43.0
Weight	g	45	58	67	89	45	58	67	89

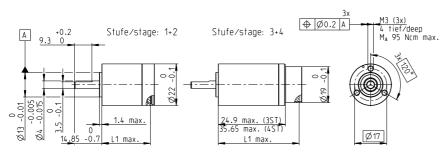
Configuration		A Standard	l Version			C Ceramic	Version		
Number of stages		1	2	3	4	1	2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231		, ,	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	439, 546, 590,
Version		Standard/cei	ramic version/r	noise reduced	/backlash red	uced/high po	wer/ultra perfo	rmance	
Flange		Standard flar	nge/configurab	le flange					
Shaft		Length/flat fa	ace/cross hole						

			. 9		
Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 19 S	3-4	107-108	ECX SPEED 19 M	3-4	214-215
DCX 22 S	1-2 [3-4]	109-110	ECX SPEED 19 L	3-4	218-219
DCX 22 L	1-2 [3-4]	111-112	ECX SPEED 22 M	1-2 [3-4]	222-223
DC-max 22 S*	1-2 [3-4]	121-122	ECX SPEED 22 L	1-2 [3-4]	226-227
			ECX TORQUE 22 M	1-2	239

DCX 22 L 1-2 [3-4] 111-112 ECX SPEED 22 M 1-2 [3-4] 222-223
DC-max 22 S* 1-2 [3-4] 121-122 ECX SPEED 22 L 1-2 [3-4] 226-227
ECX TORQUE 22 M 1-2 239
ECX TORQUE 22 L 1-2 240
ECX TORQUE 22 XL 1-2 241
ECX FLAT 22 S* 1-4 253-254
ECX FLAT 22 L* 1-4 255

^{*}Limited selection of reduction ratios (see online).

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





Key Data		LN Noise Reduced	LZ Backlash Reduced
Max. transmittable power	W	20	12
Max. continuous torque	Nm	1.2	1.5
Max. continuous input speed	rpm	12000	12 0 0 0
Ambient temperature	°C	-40 +85	-40 +100
Bearing at output		Ball bearing	Ball bearing
Typical noise level	dBA	-5 compared to standard configuration	

Operating Range (output shaft)	LN Noise Reduced	LZ Backlash Reduced
	n [rpm]	n [rpm]
Continuous operation	10000]	10000
Intermittent operation	1000 100 100 10 10 10 10 10 10 10 10 10	1000 100 10 10 10 10 10 10 10 1

Specifications	L	.N Noise Red	luced			LZ Backlash Reduced		
Number of stages		1	2	3	4	2	3	4
Max. transmittable power (continuous)	W	20.0	10.0	5.0	1.3	12.0	6.0	1.6
Max. transmittable power (intermittent)	W	25.0	13.0	6.3	1.6	15.0	7.5	2.0
Max. continuous torque	Nm	0.40	0.55	1.00	1.20	0.70	1.20	1.50
Max. intermittent torque	Nm	0.50	0.70	1.25	1.50	0.90	1.50	1.90
Max. continuous input speed	rpm	8000	10000	12000	12000	10000	12000	12000
Max. intermittent input speed	rpm	10000	12500	15000	15000	12500	15000	15000
Max. efficiency	%	90	81	74	66	81	74	66
Average backlash no load	۰	0.85	1.05	1.20	1.35	0.85	1.05	1.2
Max. axial load (dynamic)	N	40	40	40	40	40	40	40
Max. radial load, 10 mm from flange	N	65	100	120	120	100	120	120
Gearhead length L1 ¹	mm	19.9	26.4	32.2	43.0	26.4	32.2	43.0
Weight	g	45	58	67	89	58	67	89

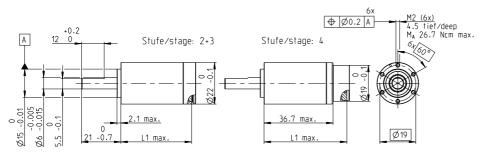
Configuration		LN Noise R	leduced			LZ Backlas	sh Reduced		
Number of stages		1	2	3	4		2	3	4
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526		16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version		Standard/ce	ramic version/	noise reduced	/backlash red	luced/high po	wer/ultra perfo	rmance	
Flange	:	Standard flar	nge/configural	ble flange					
Shaft		Length/flat fa	ace/cross hole	•					

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 19 S	3-4	107-108	ECX SPEED 19 M	3-4	214-215
DCX 22 S	1-2 [3-4]	109-110	ECX SPEED 19 L	3-4	218-219
DCX 22 L	1-2 [3-4]	111-112	ECX SPEED 22 M	1-2 [3-4]	222-223
DC-max 22 S*	1-2 [3-4]	121-122	ECX SPEED 22 L	1-2 [3-4]	226-227
			ECX TORQUE 22 M	1–2	239
			ECX TORQUE 22 L	1–2	240
			ECX TORQUE 22 XL	1–2	241
			ECX FLAT 22 S*	1-4	253-254
			ECX FLAT 22 L*	1-4	255

^{*}Limited selection of reduction ratios (see online).

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 22 Ø22 mm, planetary gearhead





Key Data		HP High Power
Max. transmittable power	W	30
Max. continuous torque	Nm	3.7
Max. continuous input speed	rpm	12000
Ambient temperature	°C	-40 +100
Bearing at output		Ball bearing

Operating Range (output shaft)	HP High Power
	n [rpm]
Continuous operation	10000]
Intermittent operation	
	1000 -
	100 - 2 stages
	3 stages
	10 - 4 stages
	1,
	0.1 1 10 M [Nm]

Specifications	HP F	ligh Power			
Number of stages		2	3	4	
Max. transmittable power (continuous)	W	30.0	15.0	8.0	
Max. transmittable power (intermittent)	W	40.0	20.0	10.0	
Max. continuous torque	Nm	2.40	3.30	3.70	
Max. intermittent torque	Nm	3.00	3.80	4.20	
Max. continuous input speed	rpm	8000	10000	12000	
Max. intermittent input speed	rpm	10000	12500	15000	
Max. efficiency	%	75	65	55	
Average backlash no load	۰	1.05	1.2	1.35	
Max. axial load (dynamic)	N	80	80	80	
Max. radial load, 10 mm from flange	N	145	150	150	
Gearhead length L1 ¹	mm	31.7	38.2	44.0	
Weight	g	73	86	95	

Configuration	HP H	igh Power						
Number of stages		2	3	4				
Reduction Absolute reduction: (see online)	X:1	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526				
Version	Standa	Standard/ceramic version/noise reduced/backlash reduced/high power/ultra performance						
Flange	Standa	rd flange						
Shaft	Length	/flat face/cross hole						

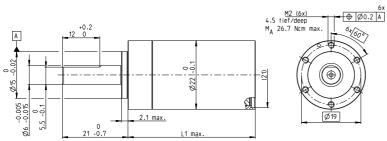
Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 19 S	4	107-108	ECX SPEED 19 M	4	214-215
DCX 22 S	2-3 [4]	109-110	ECX SPEED 19 L	4	218-219
DCX 22 L	2-3 [4]	111-112	ECX SPEED 22 M	2-3 [4]	222-223
			ECX SPEED 22 L	2-3 [4]	226-227
			ECX TORQUE 22 M	2-3	239
			ECX TORQUE 22 L	2-3	240
			ECX TORQUE 22 XL	2-3	241
			ECX FLAT 22 S*	2-4	253-254
			ECX FLAT 22 L*	2-4	255

^{*}Limited selection of reduction ratios (see online).

'This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 22 HP Ø22 mm, planetary gearhead







GPX

M 1:2

Key Data		With shaft seal
Max. transmittable power	W	60
Max. continuous torque	Nm	3.3
Max. continuous input speed	rpm	10000
Ambient temperature	°C	-10 +135
Bearing at output		Ball bearing

Operating Range (output shaft) With shaft seal n [rpm] Continuous operation 10000 Intermittent operation 1000 Sterilization information 100 With shaft seal: typically 2000 autoclave cycles 3 stages Sterilization with steam 10 Temperature 134°C ± 4°C 135°C Compression pressure up to 2.3 bar Rel. humidity 100% M [Nm] Cycle length 18 minutes 0.1

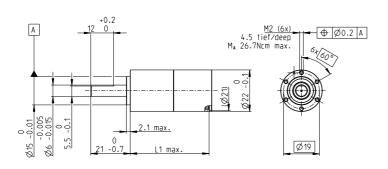
Specifications	W	ith shaft seal			
Number of stages		1	2	3	
Max. transmittable continuous power	W	60	30	15	
Max. transmittable intermittent power	W	80	40	20	
Max. continuous torque	Nm	0.8	2.4	3.3	
Max. intermittent torque	Nm	1.15	3.0	3.8	
Max. continuous input speed	rpm	8000	8000	10000	
Max. intermittent input speed	rpm	10000	10000	12500	
Max. efficiency	%	85	75	65	
Average backlash no load	۰	0.85	1.05	1.2	
Max. axial load (dynamic)	N	80	80	80	
Max. radial load, 10 mm from flange	N	45	75	100	
Gearhead length L11	mm	29.3	39.4	45.9	
Weight	a	79	94	107	

Configuration		With shaft sea	al .						
Number of stages		1	2						
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3, 6.6	16, 21, 26, 28, 35, 44	62, 83, 103, 111, 138, 150, 172, 186, 231					
Version		Shaft seal							
Flange		Standard flange							
Shaft		Length/flat fac	e/cross hole						

Modular System		Page
EC motor	№ of stages [opt.]	
ECX SPEED 22 M	1–3	224-225
ECX SPEED 22 L	1–3	228-229

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.







M 1:2

Key Data		UP Ultra Performance
Max. transmittable power	W	66
Max. continuous torque	Nm	5.2
Max. continuous input speed	rpm	8000
Ambient temperature	°C	-20 +100
Bearing at output		Ball bearing

Operating Range (output shaft) Continuous operation Intermittent operation Operating Range (output shaft) Intermittent operation Intermittent operation Operating Range (output shaft) Intermittent operation Intermittent operation Operating Range (output shaft) Operating Range (output shaft) Operating Range (output shaft) Intermittent operation Operating Range (output shaft) Operatin

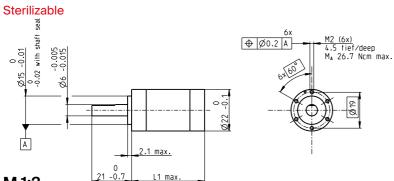
Specifications	U	P Ultra Perfo	ormance			
Number of stages		1	2	3	4	
Max. transmittable continuous power	W	66.0	36.0	20.0	11.0	
Max. transmittable intermittent power	W	82.5	45.0	25.0	14.0	
Max. continuous torque	Nm	1.00	2.90	4.30	5.20	
Max. intermittent torque	Nm	1.25	3.60	5.30	6.50	
Max. continuous input speed	rpm	8000	8000	8000	8000	
Max. intermittent input speed	rpm	10000	10000	10000	10000	
Max. efficiency	%	96	93	90	87	
Average backlash no load	•	0.6	0.7	0.8	0.8	
Max. axial load (dynamic)	N	80	80	80	80	
Max. radial load, 10 mm from flange	N	100	145	150	150	
Gearhead length L1 ¹	mm	22.0	32.0	42.0	52.0	
Weight	g	49	69	87	106	

Configuration	UP Ultra Pe	erformance						
Number of stages	1	2	3	4				
Reduction X:1 Absolute reduction: (see online)	3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526				
Version	Standard/ceramic version/noise reduced/backlash reduced/high power/ultra performance							
Flange	Standard flange							
Shaft	Length/flat fa	ace/cross hole	9					

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 22 S	1-4	109-110	ECX SPEED 22 M	1-4	222-223
DCX 22 L	1-4	111-112	ECX SPEED 22 L	1-4	226-227
			ECX TORQUE 22 M	1-4	239
			ECX TORQUE 22 L	1-4	240
			ECX TORQUE 22 XL	1-4	241
			ECX FLAT 22 S	1-4	253-254
			ECX FLAT 22 L	1-4	255

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 22 SPEED Ø22 mm, planetary gearhead





	4.7
11./1	

Key Data	Without shaft seal	With shaft seal
Max. transmittable power	W 74 (20)	74 (20)
Max. continuous torque	Nm 0.27 (0.55))	0.27 (0.55
Max. continuous input speed	rpm 35 000	35 000
Ambient temperature	°C -10 +135	-10 + 135
Bearing at output	Ball bearing	Ball bearing
· '	, and the second	C C

Operating Range (output shaft) Without shaft seal With shaft seal n [rpm] n [rpm] Continuous operation 10000 10000 Intermittent operation 1000 1000 Sterilization information 100 100 Without shaft seal: typically 1000 autoclave cycles With shaft seal: typically 2000 autoclave cycles 2 stages 3 stages 3 stages 10 10 Sterilization with steam $134^{\circ}\text{C} \pm 4^{\circ}\text{C}$ Temperature 135°C Compression pressure up to Rel. humidity 2.3 bar 555 100% M [Nm] M [Nm] 0.1 0.1 Cycle length 18 minutes

Specifications	,	Without shaft	seal*	With shaft seal*
Number of stages		1	2	1 2
Max. transmittable continuous power	W	74 (20)	37 (10)	74 (20) 37 (10)
Max. transmittable intermittent power	W	92 (25)	46 (13)	92 (25) 46 (13)
Max. continuous torque	Nm	0.11 (0.4)	0.27 (0.55)	0.11 (0.4) 0.27 (0.55)
Max. intermittent torque	Nm	0.14 (0.5)	0.38 (0.7)	0.14 (0.5) 0.38 (0.7)
Max. continuous input speed	rpm	35000	35000	35000 35000
Max. intermittent input speed	rpm	50000	50000	50000 50000
Max. efficiency	%	85	80	85 80
Average backlash no load	۰	1.4	1.6	1.4 1.6
Max. axial load (dynamic)	N	80.0	80.0	80.0
Max. radial load, 10 mm from flange	N	45.0	75.0	30.0 50.0
Gearhead length L11	mm	30.8	40.9	38.6 48.6
Weight	g	65	86	85 106

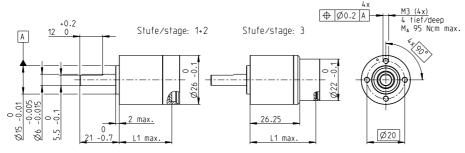
Configuration	Without shaft seal		With shaft seal					
Number of stages	1	2						
Reduction	X:1 3.9, 5.3, 6.6 16, 21,	26,	3.9, 5.3, 6.6	16, 21, 26,				
Absolute reduction: (see online)	28, 35,	44		28, 35, 44				
Version	Without shaft seal/With	shaft seal						
Flange	Standard flange							
Shaft	Length/flat face/cross h	Length/flat face/cross hole						

Modular System		Page
EC motor	№ of stages [opt.]	
ECX SPEED 19 M	[3]	214-217
ECX SPEED 19 L	[3]	218-221
ECX SPEED 22 M	1–2	222-223
ECX SPEED 22 L	1–2	226-227

This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

^{*}Values in parentheses apply in case of reduced speed (according to diagram).







Key Data	A Standard Version	C Ceramic Version
Max. transmittable power	W 48	55
Max. continuous torque	Nm 2.25	3.0
Max. continuous input speed	rpm 8000	8000
Ambient temperature	°C -40 +100	-40 + 100
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft)	A Standard Version	C Cer	amic Version
	n [rpm]	n [rpr	n]
Continuous operation	10000	10000	1
Intermittent operation			
	1000	1000	
		1 stage	1 1 stage
	100 -	2 stages	2 stages
		3 stages	3 stages
	10 -	10	
	0.1 1	10	0.1 1 10
		M [Nm]	M [Nm]

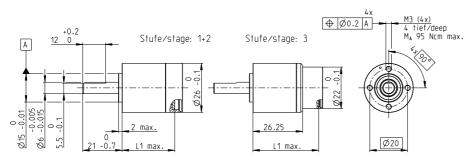
Specifications	Α	Standard Ve	ersion		C Ceramic Ve	rsion		
Number of stages		1	2	3	1	2	3	
Max. transmittable continuous power	W	48	24	12.0	55	30	15.0	
Max. transmittable intermittent power	W	60	30	15.0	70	35	18.0	
Max. continuous torque	Nm	0.75	2.25	4.50	1.00	2.60	5.00	
Max. intermittent torque	Nm	1.10	3.20	6.20	1.50	3.40	6.30	
Max. continuous input speed	rpm	7000	8000	10000	7000	8000	10000	
Max. intermittent input speed	rpm	8750	10000	12500	8750	10000	12500	
Max. efficiency	%	90	78	75	90	78	75	
Average backlash no load	۰	0.75	0.95	1.1	0.75	0.95	1.1	
Max. axial load (dynamic)	N	80	80	80	80	80	80	
Max. radial load, 10 mm from flange	N	95	145	150	95	145	150	
Gearhead length L11	mm	21.3	30.2	35.5	21.3	30.2	35.5	
Weight	g	75	95	105	75	95	105	

Configuration		A Standard	Version			C Ceramic V	ersion		
Number of stages		1	2	3		1	2	3	
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231		3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	
Version		Standard/ceramic version/noise reduced/reduced backlash							
Flange		Standard flange/configurable flange							
Shaft		Length/flat fa	ce/cross hole	!					

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 22 S	3	109-110	ECX SPEED 22 M	3	222-223
DCX 22 L	3	111-112	ECX SPEED 22 L	3	226-227
DCX 26 L	1-2 [3]	113-114	ECX TORQUE 22 M	3	239
DC-max 22 S*	3	121-122	ECX TORQUE 22 L	3	240
DC-max 26 S*	1-2 [3]	123-124	ECX TORQUE 22 XL	3	241

^{*}Limited selection of reduction ratios (see online).

'This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





Key Data		LN Noise Reduced	LZ Backlash Reduced
Max. transmittable power	W	38	24
Max. continuous torque	Nm	1.8	2.3
Max. continuous input speed	rpm	8000	8000
Ambient temperature	°C	-40 +85	-40 + 100
Bearing at output		Ball bearing	Ball bearing
Typical noise level	dBA	-5 compared to standard configuration	

Operating Range (output shaft)	LN Noise Reduced	LZ Backl	ash Reduced
	n [rpm]	n [rpm]	
Continuous operation	10000	10000 ղ	
Intermittent operation			
	1000	1000 -	
		1 stage	
	100 -	2 stages	2 stages
	10 -	10 -	3 stages
	1	1	
	0.1 1	10 0.1 M [Nm]	1 M [Nm]

Specifications	LN	Noise Red	uced		LZ Backlash Reduced
Number of stages		1	2	3	2 3
Max. transmittable continuous power	W	38	19	10.0	24 12.0
Max. transmittable intermittent power	W	48	24	12.0	30 15.0
Max. continuous torque	Nm	0.60	1.80	3.60	2.25 4.50
Max. intermittent torque	Nm	0.75	2.25	4.50	3.20 6.20
Max. continuous input speed	rpm	7000	8000	10000	8000 10000
Max. intermittent input speed	rpm	8750	10000	12500	10000 12500
Max. efficiency	%	90	78	75	78 75
Average backlash no load	۰	0.75	0.95	1.1	0.85 0.9
Max. axial load (dynamic)	N	80	80	80	80 80
Max. radial load, 10 mm from flange	N	95	145	150	145 150
Gearhead length L1 ¹	mm	21.3	30.2	35.5	30.2 35.5
Weight	g	75	95	105	95 105

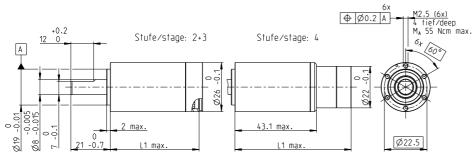
Configuration		LN Noise R	educed			LZ Backlas	h Reduced		
Number of stages		1	2	3			2	3	
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231			16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	
Version		Standard/ceramic version/noise reduced/backlash reduced/high power							
Flange		Standard flange/configurable flange							
Shaft		Length/flat fa	ce/cross hole)					

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 22 S	3	109-110	ECX SPEED 22 M	3	222-223
DCX 22 L	3	111-112	ECX SPEED 22 L	3	226-227
DCX 26 L	1-2 [3]	113-114	ECX TORQUE 22 M	3	239
DC-max 22 S*	3	121-122	ECX TORQUE 22 L	3	240
DC-max 26 S*	1-2 [3]	123-124	ECX TORQUE 22 XL	3	241

^{*}Limited selection of reduction ratios (see online).

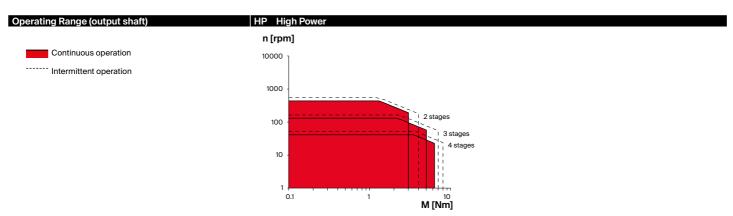
¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.







Key Data		HP High Power
Max. transmittable power	W	60
Max. continuous torque	Nm	6.3
Max. continuous input speed	rpm	10 000
Ambient temperature	°C	-40 +100
Bearing at output		Ball bearing

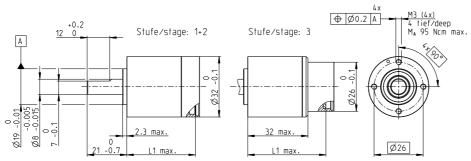


Specifications	HP Hi	gh Power			
Number of stages		2	3	4	
Max. transmittable power (continuous)	W	60	30	15	
Max. transmittable power (intermittent)	W	75	40	20	
Max. continuous torque	Nm	3.0	5.0	6.3	
Max. intermittent torque	Nm	4.0	7.0	8.0	
Max. continuous input speed	rpm	7000	8000	10000	
Max. intermittent input speed	rpm	8750	10000	12500	
Max. efficiency	%	75	65	55	
Average backlash no load	•	0.95	1.1	1.3	
Max. axial load (dynamic)	N	110	110	110	
Max. radial load, 10 mm from flange	N	180	180	180	
Gearhead length L11	mm	38.2	47.1	52.4	
Weight	g	122	144	153	

Configuration	HF	P High Power						
Number of stages		2	3	4				
Reduction Absolute reduction: (see online)	X:1		62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526				
Version	Sta	andard/ceramic version/	noise reduced	/backlash reduced/hi	gh power			
Flange	Sta	Standard flange						
Shaft	Le	ength/flat face/cross hole)					

	Page			Page
№ of stages [opt.]		EC motor	№ of stages [opt.]	
4	109-110	ECX SPEED 22 M	4	222-223
4	111-112	ECX SPEED 22 L	4	226-227
2-3 [4]	113-114	ECX TORQUE 22 M	4	239
		ECX TORQUE 22 L	4	240
		ECX TORQUE 22 XL	4	241
	4	№ of stages [opt.] 4 109-110 4 111-112	4 109-110 ECX SPEED 22 M 4 111-112 ECX SPEED 22 L 2-3 [4] 113-114 ECX TORQUE 22 M ECX TORQUE 22 L	№ of stages [opt.] EC motor № of stages [opt.] 4 109-110 ECX SPEED 22 M 4 4 111-112 ECX SPEED 22 L 4 2-3 [4] 113-114 ECX TORQUE 22 M 4 ECX TORQUE 22 L 4

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





Key Data	A Standard Version	C Ceramic Version
Max. transmittable power	W 100	120
Max. continuous torque	Nm 5	6.6
Max. continuous input speed	rpm 8000	8000
Ambient temperature	°C -40 +100	-40 +100
Bearing at output	Ball bearing	Ball bearing

Operating Range (output shaft)	A Standard Version	C Cer	ramic Version
	n [rpm]	n [rpn	n]
Continuous operation	10000]	10000	1
Intermittent operation			
	1000	1000	1 stage
			2 stages
	100 -	2 stages 100	
			3 stages
	10 -	10	
	0.1	1 10	0.1 1 10
		M [Nm]	M [Nm]

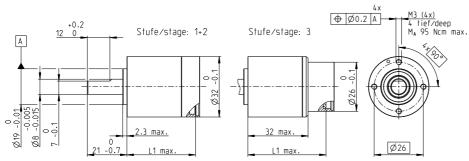
Specifications	Α	Standard Ve	rsion		C Ceramic Ver	sion		
Number of stages		1	2	3	1	2	3	
Max. transmittable continuous power	W	100	50	25	120	60	30	
Max. transmittable intermittent power	W	125	62	31	150	75	37	
Max. continuous torque	Nm	1.25	2.90	5.00	1.60	3.80	6.60	
Max. intermittent torque	Nm	1.60	3.60	6.25	2.00	4.50	8.00	
Max. continuous input speed	rpm	6000	7000	8000	6000	7000	8000	
Max. intermittent input speed	rpm	7500	8750	10000	7500	8750	10000	
Max. efficiency	%	90	78	75	90	78	75	
Average backlash no load	۰	0.55	0.7	0.9	0.55	0.7	0.9	
Max. axial load (dynamic)	N	110	110	110	110	110	110	
Max. radial load, 10 mm from flange	N	160	180	180	160	180	180	
Gearhead length L11	mm	26.7	36.3	43.9	26.7	36.3	43.9	
Weight	g	140	185	230	140	185	230	

Configuration		A Standard	Version			C Ceramic \	/ersion		
Number of stages		1	2	3		1	2	3	
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231		3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	
Version		Standard/cer	amic version/r	noise reduced	l/backlash red	uced/high pow	er/ultra perfo	rmance	
Flange		Standard flange/configurable flange							
Shaft		Length/flat fa	ce/cross hole						

Modular System		Page			Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]		ECX drive	№ of stages [opt.]	
DCX 26 L	3	113-114	ECX FLAT 32 S*	1–3	256-257	ECX FLAT 32 S IE*	1–3	369
DCX 32 L	1-2 [3]	115	ECX FLAT 32 L*	1–3	258	ECX FLAT 32 L IE*	1–3	370
DC-max 26 S*	3	123-124						

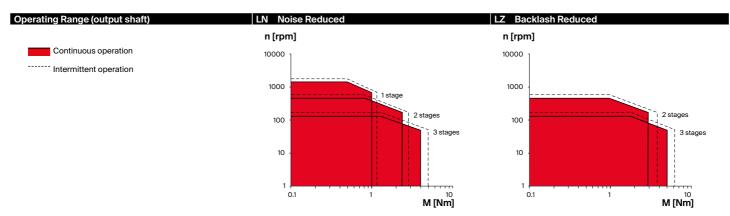
^{*}Limited selection of reduction ratios (see online).

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





Key Data		LN Noise Reduced	LZ Backlash Reduced	
Max. transmittable power	W	80	50	
Max. continuous torque	Nm	4	5	
Max. continuous input speed	rpm	8000	8000	
Ambient temperature	°C	-40 +100	-40 +100	
Bearing at output		Ball bearing	Ball bearing	
Typical noise level	dBA	-5 compared to standard configuration		



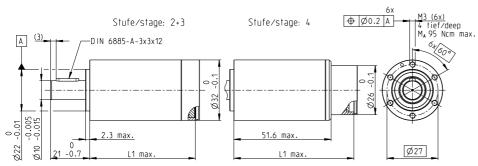
Specifications	L	N Noise Red	uced		LZ Backlash Reduced	
Number of stages		1	2	3	2 3	
Max. transmittable continuous power	W	80	40	20	50 25	
Max. transmittable intermittent power	W	100	50	25	62 31	
Max. continuous torque	Nm	1.00	2.30	4.00	2.90 5.00	
Max. intermittent torque	Nm	1.30	2.90	5.00	3.60 6.25	
Max. continuous input speed	rpm	6000	7000	8000	7000 8000	
Max. intermittent input speed	rpm	7500	8750	10000	8750 10000	
Max. efficiency	%	90	78	75	78 75	
Average backlash no load	0	0.55	0.7	0.9	0.55 0.75	
Max. axial load (dynamic)	N	110	110	110	110 110	
Max. radial load, 10 mm from flange	N	160	180	180	180 180	
Gearhead length L1 ¹	mm	26.7	36.3	43.9	36.3 43.9	
Weight	g	140	185	230	185 230	

Configuration		LN Noise Ro	educed			LZ Backlas	h Reduced		
Number of stages		1	2	3			2	3	
Reduction Absolute reduction: (see online)	X:1	3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231			16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	
Version	;	Standard/cer	amic version/r	noise reduced	/backlash red	luced/high pov	wer/ultra perfo	rmance	
Flange		Standard flange/configurable flange							
Shaft	I	Length/flat fa	ce/cross hole						

Modular System		Page			e			
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]		ECX drive	№ of stages [opt.]	
DCX 26 L	3	113-114	ECX FLAT 32 S*	1–3	256-257	ECX FLAT 32 S IE*	1–3	369
DCX 32 L	1-2 [3]	115	ECX FLAT 32 L*	1–3	258	ECX FLAT 32 L IE*	1–3	370
DC-may 26 S*	- 3	123-124						

^{*}Limited selection of reduction ratios (see online).

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





Key Data	HP High Power	
Max. transmittable power	W 110	
Max. continuous torque	Nm 9	
Max. continuous input speed	rpm 8000	
Ambient temperature	°C -40 +100	
Bearing at output	Ball bearing	

Operating Range (output shaft)	HP High Power
	n [rpm]
Continuous operation	10000 1
Intermittent operation	
	1000 -
	2 stages
	3 stages
	1
	1 10 100 M [Nm]

Specifications	Н	IP High Power				
Number of stages			2	3	4	
Max. transmittable power (continuous)	W	1	10	55	18	
Max. transmittable power (intermittent)	W	1	40	70	25	
Max. continuous torque	Nm	4	00	3.00	9.00	
Max. intermittent torque	Nm	6	00 10	0.00	12.00	
Max. continuous input speed	rpm	60	00 7	000	8000	
Max. intermittent input speed	rpm	75	00 8	750	10000	
Max. efficiency	%		76	65	55	
Average backlash no load	۰		0.7	0.9	1.1	
Max. axial load (dynamic)	N	1	10	110	110	
Max. radial load, 10 mm from flange	N	2	00	250	250	
Gearhead length L11	mm	4	6.3	55.9	63.5	
Weight	g	2	00	220	250	

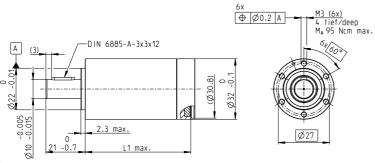
•	-								
Configuration		HP High Po	wer						
Number of stages			2	3	4				
Reduction Absolute reduction: (see online)	X:1		16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526				
Version	;	Standard/ce	ramic version/r	noise reduced.	/backlash redu	uced/high po	wer/ultra perfo	rmance	
Flange	:	Standard flar	nge						
Shaft		enath/flat fa	ce/feather key	ı					

Modular System		Page			Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]		ECX drive	№ of stages [opt.]	
DCX 26 L	4	113-114	ECX FLAT 32 S*	2-4	256-257	ECX FLAT 32 S IE*	2-4	369
DCX 32 L	2-3 [4]	115	ECX FLAT 32 L*	2-4	258	ECX FLAT 32 L IE*	2-4	370

^{*}Limited selection of reduction ratios (see online).

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

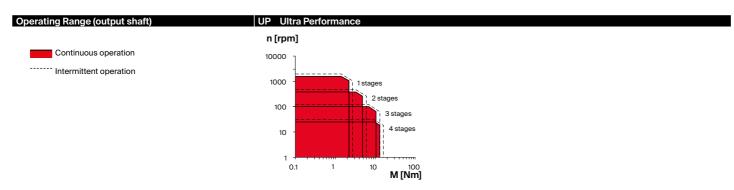






M 1:2

Key Data		UP	Ultra Performance
Max. transmittable power	W	242	
Max. continuous torque	Nm	12.6	
Max. continuous input speed	rpm	600	0
Ambient temperature	°C	-40 .	+100
Bearing at output		Ball I	bearing

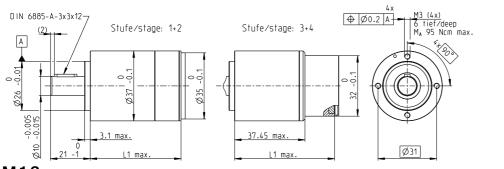


Specifications	UF	P Ultra Perfor	mance		
Number of stages		1	2	3	4
Max. transmittable continuous power	W	242	130	70	25
Max. transmittable intermittent power	W	300	160	85	30
Max. continuous torque	Nm	2.20	4.80	10.40	12.60
Max. intermittent torque	Nm	2.70	6.00	13.00	16.00
Max. continuous input speed	rpm	6000	6000	6000	6000
Max. intermittent input speed	rpm	7500	7500	7500	7500
Max. efficiency	%	96	93	90	87
Average backlash no load	۰	0.4	0.7	0.8	0.8
Max. axial load (dynamic)	N	110	110	110	110
Max. radial load, 10 mm from flange	N	150	200	250	250
Gearhead length L11	mm	32.0	47.0	62.0	77.0
Weight	g	167	231	287	350

Configuration	UP Ultra P	erformance							
Number of stages	1	2	3	4					
Reduction X Absolute reduction: (see online)	(:1 3.9, 5.3	16, 21, 26, 28, 35	62, 83, 103, 111, 138, 150, 172, 186, 231	243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526					
Version	Standard/ce	eramic version/r	noise reduced	/backlash red	uced/high pov	wer/ultra perfo	ormance		
Flange	Standard fla	Standard flange							
Shaft	Length/flat	face/feather ke	у						

Modular System		Page			Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]		ECX drive	№ of stages [opt.]	
DCX 32 L	1–4	115	ECX FLAT 32 S	1–4	256-257	ECX FLAT 32 S IE	1–4	369
			ECX FLAT 32 L	1–4	258	ECX FLAT 32 L IE	1–4	370

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





M 1:2

Key Data		A Standard Version
Max. transmittable power	W	185
Max. continuous torque	Nm s	9.3
Max. continuous input speed	rpm	7000
Ambient temperature	°C -	-40 +100
Bearing at output	1	Ball bearing

Operating Range (output shaft) Continuous operation Intermittent operation Operating Range (output shaft) Operating Range (output shaft) Operating Range (output shaft) Intermittent operation Operating Range (output shaft) Operatin

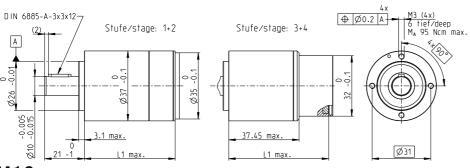
Specifications	Α	Standard Ve	rsion		
Number of stages		1	2	3	
Max. transmittable continuous power	W	185	90	45	
Max. transmittable intermittent power	W	230	115	60	
Max. continuous torque	Nm	2.30	5.40	9.30	
Max. intermittent torque	Nm	2.90	6.80	11.60	
Max. continuous input speed	rpm	5000	6000	7000	
Max. intermittent input speed	rpm	6250	7500	8750	
Max. efficiency	%	90	80	75	
Average backlash no load	۰	0.5	0.6	0.7	
Max. axial load (dynamic)	N	240	240	240	
Max. radial load, 10 mm from flange	N	200	250	250	
Gearhead length L11	mm	35.4	48.3	52.9	
Weight	g	230	310	410	

Configuration		A Standard	Version						
Number of stages		1	2	3					•
Reduction Absolute reduction: (see online)	X:1	3.9	16, 26	62, 83, 103, 111, 138, 150, 172, 186, 231					
Version	:	Standard/noise reduced/reduced backlash							
Flange	:	Standard flange/configurable flange							
Shaft		Length/flat fa	ce/feather ke	y					

Modular System		Page
DC motor	№ of stages [opt.]	
DCX 32 L	3	115
DCX 35 L	1-2	116

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.







Key Data		LN Noise Reduced	LZ Backlash Reduced
Max. transmittable power	W	150	90
Max. continuous torque	Nm	7.4	9.3
Max. continuous input speed	rpm	7000	7000
Ambient temperature	°C	-40 +85	-40 +100
Bearing at output		Ball bearing	Ball bearing
Typical noise level	dBA	-5 dBA compared to standard configuration	

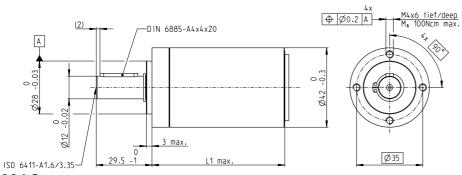
Operating Range (output shaft)	LN Noise Reduced	LZ Backlash Reduced	
Continuous operation	n [rpm]	n [rpm]	
Intermittent operation	1000 2 stages 100 3 stages 10 M [Nm	0 1 10 100	

Specifications	LI	Noise Redu	ıced		LZ Backlash Reduced	
Number of stages		1	2	3	2	3
Max. transmittable continuous power	W	150	75	37	90	45
Max. transmittable intermittent power	W	185	90	45	115	60
Max. continuous torque	Nm	1.85	4.30	7.40	5.40	9.30
Max. intermittent torque	Nm	2.30	5.40	9.20	6.80	11.60
Max. continuous input speed	rpm	5000	6000	7000	6000	7000
Max. intermittent input speed	rpm	6250	7500	8750	7500	8750
Max. efficiency	%	90	80	75	80	75
Average backlash no load	۰	0.5	0.6	0.7	0.4	0.5
Max. axial load (dynamic)	N	240	240	240	240	240
Max. radial load, 10 mm from flange	N	200	250	250	250	250
Gearhead length L1 ¹	mm	35.4	48.3	52.9	48.3	52.9
Weight	g	230	310	410	310	410

Configuration	Lf	Noise R	educed			LZ Backlas	sh Reduced		
Number of stages		1	2	3			2	3	
Reduction Absolute reduction: (see online)	X:1	3.9	16, 26	62, 83, 103, 111, 138, 150, 172, 186, 231			16, 26	62, 83, 103, 111, 138, 150, 172, 186, 231	
Version	St	andard/noi	se reduced/ba	acklash reduc	ed				
Flange	St	Standard flange/configurable flange							
Shaft	Le	ength/flat fa	ace/feather ke	y					

Modular System		Page
DC motor	№ of stages [opt.]	
DCX 32 L	3	115
DCX 35 L	1-2	116

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





M 1:2

Key Data	C Ceramic Version	UP Ultra Performance
Max. transmittable power	W 580	650
Max. continuous torque	Nm 15.0	35.0
Max. continuous input speed	rpm 8000	6000
Ambient temperature	°C -40 +100	-40 + 100
Bearing at output	Ball bearing	Ball bearing

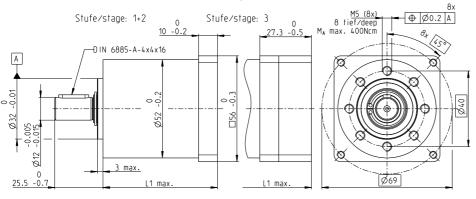
Operating Range (output shaft)	C Ceramic Version	UP Ultra Perfo	rmance
	n [rpm]	n [rpm]	
Continuous operation	10000]	10000]	
Intermittent operation	1000 10 1 1 stage	1000 - 100 - 100 - 100 - 100 M [Nm]	1 stage 2 stages 3 stages 4 stages M [Nm]

Specifications	(C Ceramic Ve	rsion		l	JP Ultra Perfor	rmance		
Number of stages		1	2	3	4	1	2	3	4
Max. transmittable power (continuous)	W	580	240	100	20	650	460	200	40
Max. transmittable power (intermittent)	W	725	300	125	25	820	580	250	50
Max. continuous torque	Nm	3.0	7.5	15.0	15.0	4.5	18.0	32.0	35.0
Max. intermittent torque	Nm	4.5	11.3	22.5	22.5	7.0	24.0	46.0	50.0
Max. continuous input speed	rpm	8000	8000	8000	8000	6000	6000	6000	6000
Max. intermittent input speed	rpm	10000	10000	10000	10000	7500	7500	7500	7500
Max. efficiency	%	90	81	72	64	96	93	90	87
Average backlash no load	۰	0.6	0.8	1.0	1.0	0.3	0.4	0.5	0.6
Max. axial load (dynamic)	N	150	150	150	150	200	200	200	200
Max. radial load, 12 mm from flange	N	120	240	360	360	350	525	750	750
Gearhead length L1 ¹	mm	37.4	51.9	66.4	80.9	48.0	67.0	86.0	104.5
Weight	g	260	360	460	560	400	540	660	790

Configuration		C Ceramic	Version			UP Ultra Perfo	rmance		
Number of stages		1	2	3	4	1	2	3	4
Reduction Absolute reduction: (see online)	X:1	3.5, 4.3	12, 15, 19, 21, 26	43, 53, 66, 74, 81, 113, 126, 156	150, 186, 230, 257, 285, 319, 353, 394, 441, 488, 546, 676, 756, 936		16, 21, 26, 28, 35		243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526
Version		Ceramic version/ultra performance							
Flange		Standard flange							
Shaft		Length/flat face/feather key							

Modular System		Page			Page
DC motor	№ of stages [opt.]		EC motor	№ of stages [opt.]	
DCX 35 L	1-4	116	ECX FLAT 42 S	1-4	259-260
			ECX FLAT 42 M	1-4	261

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.





M 1:2

600
45.0
6000
-40+100
Ball bearing

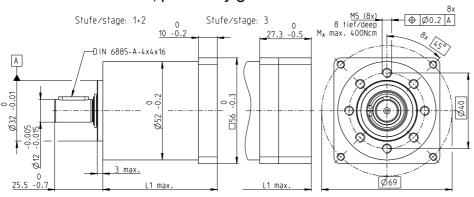
Operating Range (output shaft)	A Standard Version		UP Ultra Performa	ince
	n [rpm]		n [rpm]	
Continuous operation	10000		10000	
Intermittent operation				,
	1000 -	1 stage	1000 -	1 stage
		100030		1 Stage
	100	2 stages	100	2 stages
		3 stages		3 stages
	10 -		10 -	
	1		0.1 1	10 100
	0.1 1	10 100 M [Nm]	0.1 1	M [Nm]

Specifications		A Standard \	/ersion		UP Ultra	Performance		
Number of stages		1	2	3		1 2	3	
Max. transmittable power (continuous)	W	400	200	100	60	00 300	150	
Max. transmittable power (intermittent)	W	500	250	125	7	50 375	188	
Max. continuous torque	Nm	5.0	15.0	30.0	7	.5 22.5	45.0	
Max. intermittent torque	Nm	7.0	23.0	45.0	10	.5 34.5	67.5	
Max. continuous input speed	rpm	6000	6000	6000	600	00 6000	6000	
Max. intermittent input speed	rpm	7500	7500	7500	750	7500	7500	
Max. efficiency	%	95	92	89	9	95 92	89	
Average backlash no load	0	0.5	0.6	0.8	C	.3 0.4	0.5	
Max. axial load (dynamic)	N	200	200	200	20	00 200	200	
Max. permissible radial load, 10 mm from flange	N	420	630	900	4:	20 630	900	
Gearhead length L1 ¹	mm	44	61	78	4	14 61	78	
Weight	g	687	855	1080	69	94 861	1086	

Configuration	A Standard Version		UP Ultra Pe	erformance	
Number of stages	1	2 3	1	2	3
Reduction		, 26, 62, 83, 103, 5, 44 111, 138, 172	3.9, 5.3, 6.6	16, 21, 26, 62, 83, 28, 35, 44 111, 138,	,
Version	Standard/noise reduc	ced/ultra performa	nce		
Flange	Standard flange				
Shaft					

Modular System		Page			Page
EC motor	№ of stages [opt.]	ID	OX drive	№ of stages [opt.]	
IDX 56 S	1-3	245 ID	X 56 S	1-3	361
IDX 56 M	1-3	246 ID	OX 56 M	1-3	362
IDX 56 L	1-3	247 ID	OX 56 L	1-3	363

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.



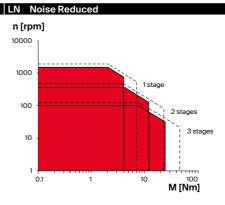


M 1:2

Key Data		LN Noise Reduced
Max. transmittable power	W	320
Max. continuous torque	Nm	24.0
Max. continuous input speed	rpm	6000
Ambient temperature	°C	-20+85
Bearing at output		Ball bearing
Typical noise level	dBA	-5 compared to standard configuration

Operating Range (output shaft)

Continuous operation Intermittent operation



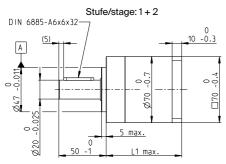
Specifications	L	Noise Rec	duced				
Number of stages		1	2	3			
Max. transmittable power (continuous)	W	320	160	80			
Max. transmittable power (intermittent)	W	400	200	100			
Max. continuous torque	Nm	4.0	12.0	24.0			
Max. intermittent torque	Nm	7.0	23.0	45.0			
Max. continuous input speed	rpm	6000	6000	6000			
Max. intermittent input speed	rpm	7500	7500	7500			
Max. efficiency	%	95	92	89			
Average backlash no load	۰	0.5	0.6	8.0			
Max. axial load (dynamic)	N	200	200	200			
Max. permissible radial load, 10 mm from flange	N	420	630	900			
Gearhead length L1 ¹	mm	44	61	78			
Weight	g	687	861	1143			

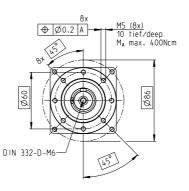
0	LN N.:B			-
Configuration	LN Noise Re	educed		
Number of stages	1	2	3	
Reduction	3.9, 5.3, 6.6	16, 21, 26,	62, 83, 103,	
			111, 138, 172	
		-,,	,,	
Version	Standard/nois	se reduced/u	ıltra performa	nce
Flange	Standard flang	ge		
Shaft				

Modular System	į	Page	Pag	je
EC motor	№ of stages [opt.]	IDX drive	№ of stages [opt.]	
IDX 56 S	1-3	245 IDX 56 S	1-3 36	1
IDX 56 M	1-3	246 IDX 56 M	1-3 36	2
IDX 56 L	1-3	247 IDX 56 L	1-3 36	3

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 70 Ø70 mm, planetary gearhead

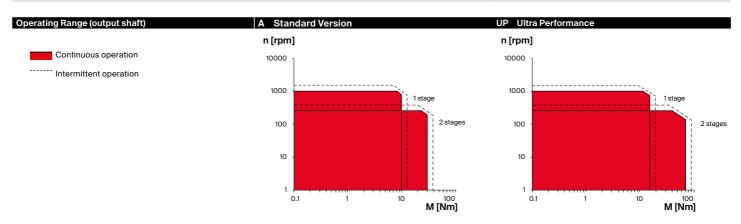






M 1:4

Key Data	A Standard Version	UP Ultra Performance
Max. transmittable power	W 850	1200
Max. continuous torque	Nm 30.0	70.0
Max. continuous input speed	rpm 6000	6000
Ambient temperature	°C -20+100	-20+100
Bearing at output	Ball bearing	Ball bearing



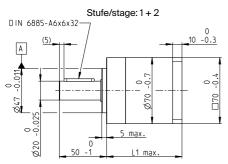
Specifications		A Standard \	/ersion	UP Ultra Perfo	ormance	
Number of s	tages	1	2	1	2	
Max. transmittable power (continuous)	W	850	600	1200	1050	
Max. transmittable power (intermittent)	W	1063	750	1500	1313	
Max. continuous torque	Nm	10.0	30.0	15.0	70.0	
Max. intermittent torque	Nm	12.5	37.5	18.8	87.5	
Max. continuous input speed	rpm	4000	4000	4000	4000	
Max. intermittent input speed	rpm	6000	6000	6000	6000	
Max. efficiency	%	95	92	95	92	
Average backlash no load	۰	0.5	0.5	0.5	0.5	
Max. axial load (dynamic)	N	825	825	825	825	
Max. permissible radial load, 10 mm from flange	N	1000	1200	1000	1200	
Gearhead length L1 ¹	mm	58	80	58	80	
Weight	g	1015	1450	1025	1475	

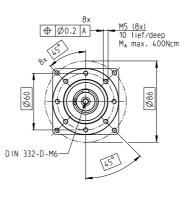
Configuration	A Standard Version	UP Ultra Performance
Number of stages	1 2	1 2
Reduction	3.9, 5.3, 6.6 16, 21, 26, 28, 35, 44	3.9, 5.3, 6.6 16, 21, 26, 28, 35, 44
Version	Standard/noise reduced/u	ltra performance
Flange	Standard flange	
Shaft		

Modular System		Page		Page
EC motor	№ of stages [opt.]	IDX drive	№ of stages [opt.]	
IDX 70 S	1-2	248 IDX 70 S	1-2	364
IDX 70 M	1-2	249 IDX 70 M	1-2	365

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

GPX 70 Ø70 mm, planetary gearhead







M 1:4

Key Data		LN Noise Reduced
Max. transmittable power	W	700
Max. continuous torque	Nm	27.0
Max. continuous input speed	rpm	6000
Ambient temperature	°C	-20+85
Bearing at output		Ball bearing
Typical noise level	dBA	-5 dBA compared to standard configuration

Operating Range (output shaft) LN Noise Reduced n [rpm] Continuous operation 10000 Intermittent operation 1000 100 10 0.1 100 **M [Nm]**

Specifications		LN Noise Re	duced
Numbe	r of stages	1	2
Max. transmittable power (continuous)	W	700	450
Max. transmittable power (intermittent)	W	875	563
Max. continuous torque	Nm	8.0	27.0
Max. intermittent torque	Nm	10.0	34.0
Max. continuous input speed	rpm	4000	4000
Max. intermittent input speed	rpm	6000	6000
Max. efficiency	%	95	92
Average backlash no load	۰	0.5	0.5
Max. axial load (dynamic)	N	825	825
Max. permissible radial load, 10 mm from fl	ange N	1000	1200
Gearhead length L1 ¹	mm	58	80
Weight	g	945	1380

Configuration	LN Noise Reduced
Number of stages	1 2
Reduction	3.9, 5.3, 6.6 16, 21, 26, 28, 35, 44
Version	Standard/noise reduced/ultra performance
Flange	Standard flange
Shaft	

Modular System		Page		Page
EC motor	№ of stages [opt.]	IDX drive	№ of stages [opt.]	
IDX 70 S	1-2	248 IDX 70 S	1-2	364
IDX 70 M	1-2	249 IDX 70 M	1-2	365

¹This length may vary depending on the configuration and choice of motor. The effective length is calculated at the end of the configuration process.

415

maxon gear

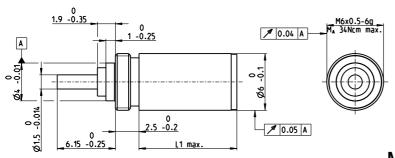
Standard Specification No. 102	89
Terminology explanations	372
maxon gear	416-460
GP 6 A Ø6 mm, 0.002-0.03 Nm	416
GP 8 A Ø8 mm, 0.01–0.1 Nm	417
GP 10 K Ø10 mm, 0.005–0.1 Nm	418
GP 10 A Ø10 mm, 0.01–0.15 Nm	419
GS 12 A Ø12 mm, 0.01–0.03 Nm	420
GP 13 A Ø13 mm, 0.2–0.35 Nm	421
GS 16 K Ø16 mm, 0.01–0.03 Nm	422
GS 16 A Ø16 mm, 0.015-0.04 Nm	423
GS 16 V Ø16 mm, 0.06-0.1 Nm	424
GS 16 VZ Ø16 mm, 0.1 Nm	425
GP 16 A Ø16 mm, 0.1–0.3 Nm	426
GP 16 C Ø16 mm, 0.2-0.6 Nm	427
GP 19 B Ø19 mm, 0.1–0.3 Nm	428
GP 22 B Ø22 mm, 0.1–0.3 Nm	429
GP 22 A Ø22 mm, 0.5–1.0 Nm	430
GP 22 AR Ø22 mm, 0.5 Nm	431
GP 22 C Ø22 mm, 0.5–2.0 Nm	432-433
GP 22 HP Ø22 mm, 2.0–3.4 Nm	434
GP 22 HD Ø22 mm, 2.0–4.0 Nm	435
GS 24 A Ø24 mm, 0.1 Nm	436
GP 26 A Ø26 mm, 0.75–4.5 Nm	437
GS 30 A Ø30 mm, 0.07-0.2 Nm	438
GP 32 BZ Ø32 mm, 0.75–4.5 Nm	439
GP 32 A Ø32 mm, 0.75–4.5 Nm	440-441
GP 32 AR Ø32 mm, 0.75 Nm	442
GP 32 C Ø32 mm, 1.0−6.0 Nm	443-445
GP 32 CR Ø32 mm, 1.0 Nm	446
GP 32 HP Ø32 mm, 4.0–8.0 Nm	447-448
GP 32 HD Ø32 mm, 3.0–8.0 Nm	449
Koaxdrive KD 32 Ø32 mm, 1.0−4.5 Nm	450
GS 38 A Ø38 mm, 0.1–0.6 Nm	451
GP 42 C Ø42 mm, 3.0–15.0 Nm	452-454
GP 42 HD Ø42 mm, 10.0–50.0 Nm	455
GS 45 A Ø45 mm, 0.5–2.0 Nm	456
GP 52 C Ø52 mm, 4.0–30.0 Nm	457-458
GP 62 A Ø62 mm, 6.2–38.5 Nm	459
GP 81 A Ø81 mm, 15.4–92.3 Nm	460



Precision spur- and planetary gearheads matched to maxon motors. Gears are advantageously adapted directly to the desired motors in the delivery plant. The motor pinion is the input gearwheel for the first stage and is rigidly affixed to the motor shaft.

© 2024 maxon. All rights reserved.

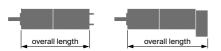
Planetary Gearhead GP 6 A Ø6 mm, 0.002-0.03 Nm



Technical Data	
Planetary Gearhead	straight teeth
Output shaft	stainless steel
Bearing at output	ball bearing
Option	sleeve bearing
Radial play, 5 mm from flange	max. 0.12 mm
Axial play	max. 0.10 mm
Max. axial load (dynamic)	5 N
Max. force for press fits	10 N
Direction of rotation, drive to output	=
Max. continuous input speed	40 000 rpm
Recommended temperature range	-40+100°C
. tarribor or orageo	3 4 5
Max. radial load, 5 mm from flange 5 N 6 N 7 I	N 8N 8N

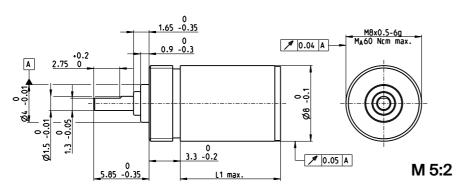
M 5	5:2
-----	-----

	Stock program Standard program		Part Numl	bers			
	Special program (on request)		472919	472920	472921	472229	472922
Gea	rhead Data						
1	Reduction		3.9:1	15:1	57:1	221:1	854:1
2	Absolute reduction		27/7	729/49	19683/343	531441/2401	14348907/16807
_ 3	Max. motor shaft diameter	mm	1	1	1	1	1
4	Number of stages		1	2	3	4	5
5	Max. continuous torque	Nm	0.002	0.005	0.010	0.030	0.030
6	Max. intermittent torque at gear output	Nm	0.005	0.010	0.020	0.060	0.060
7	Max. efficiency	%	88	77	68	60	52
8	Weight	g	1.7	2.1	2.5	2.9	3.3
9	Average backlash no load	•	1.8	2.0	2.2	2.5	2.8
10	Mass inertia	gcm ²	0.001	0.001	0.001	0.001	0.001
11	Gearhead length L1	mm	5.3	7.8	10.4	13.0	15.6



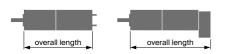
Modular System									, ,			
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	gth [mm] =	Motor len	gth + gearh	nead length +	(sensor/bra	ake) + assem	ibly parts	
RE 6, 0.3 W, A	127 127			21.0 25.0	23.5 27.5	26.1 30.1	28.7 32.7	31.3 35.3				
RE 6, 0.3 W, B	121			25.0	21.5	30.1	32.1	33.3				

Planetary Gearhead GP 8 A Ø8 mm, 0.01-0.1 Nm



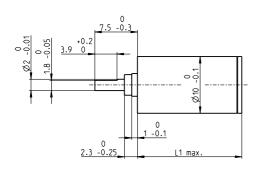
Technical Data								
Planetary Gearhead			straigh	t teeth				
Output shaft	sta	ainless	steel, har	dened				
Bearing at output		ball b	earing					
Radial play, 5 mm from fla	nge		max. 0.0	08 mm				
Axial play	Axial play							
Max. axial load (dynamic)			5 N					
Max. force for press fits			10 N					
Direction of rotation, drive	to ou	tput		=				
Max. continuous input spe	ed		12 00	0 rpm				
Recommended temperate	ure rai	nge	-15	+80°C				
Number of stages 1	2	3	4	5				
Max. radial load, 5 mm								
from flange 5 N	6 N	7 N	8 N	8 N				

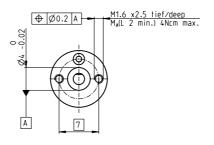
Stock program Standard program			Part Numl	bers								
	Special program (on request)		468999	468998	474124	468997	474127	468996	474129	468995		
Gea	rhead Data											
1	Reduction		4:1	16:1	36:1	64:1	216:1	256:1	1296:1	1024:1	· ·	
2	Absolute reduction		4	16	36	64	216	256	1296	1024		
_3	Max. motor shaft diameter	mm	1	1	0.65	1	0.65	1	0.65	1		
4	Number of stages		1	2	2	3	3	4	4	5		
5	Max. continuous torque	Nm	0.01	0.020	0.008	0.060	0.020	0.080	0.040	0.100		
6	Max. intermittent torque at gear output	Nm	0.015	0.030	0.012	0.090	0.030	0.120	0.060	0.150		
7	Max. efficiency	%	90	81	76	73	66	65	57	59		
8	Weight	g	2.6	3.2	3.2	3.8	3.8	4.4	4.4	5.0		
9	Average backlash no load	0	1.80	2.0	2.4	2.2	2.6	2.50	2.8	2.80		
10	Mass inertia	gcm ²	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004		
11	Gearhead length L1	mm	5.5	8.1	8.3	10.7	11.1	13.3	13.9	15.9		



Page	+ Sensor/Brake	Page					ead length	+ (sensor			
128			22.2	24.8	25.0	27.4	27.8	30.0	30.6	32.6	
128	8 OPT	534	30.4	33.0	33.2	35.6	36.0	38.2	38.8	40.8	
		128 128	128 128	128 22.2 128 25.2	128 22.2 24.8 128 25.2 27.8	128 22.2 24.8 25.0 128 25.2 27.8 28.0	128 22.2 24.8 25.0 27.4 128 25.2 27.8 28.0 30.4	128 22.2 24.8 25.0 27.4 27.8 128 25.2 27.8 28.0 30.4 30.8	128 22.2 24.8 25.0 27.4 27.8 30.0 128 25.2 27.8 28.0 30.4 30.8 33.0	128 22.2 24.8 25.0 27.4 27.8 30.0 30.6 128 25.2 27.8 28.0 30.4 30.8 33.0 33.6	128 22.2 24.8 25.0 27.4 27.8 30.0 30.6 32.6 128 25.2 27.8 28.0 30.4 30.8 33.0 33.6 35.6

Planetary Gearhead GP 10 K ∅10 mm, 0.005–0.1 Nm Plastic Version

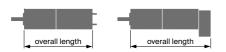




Technical Data	
Planetary Gearhead	straight teeth
Housing	plastic
Output shaft	stainless steel
Bearing at output	sleeve bearing
Radial play, 5 mm from flange	max. 0.14 mm
Axial play	0.02-0.10 mm
Max. axial load (dynamic)	2 N
Max. force for press fits	10 N
Direction of rotation, drive to output	=
Max. continuous input speed	8000 rpm
Recommended temperature range	-15+80°C
Max. radial load, 5 mm from flange	1 N

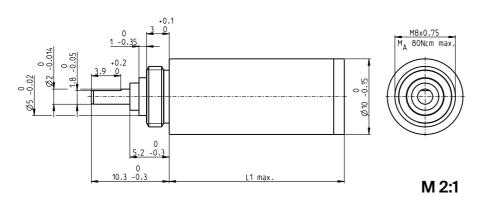
M 3:2

	Stock program Standard program		Part Number	s					
	Special program (on request)		110308	110309	110310	110311	110312		
Gea	rhead Data								
1	Reduction		4:1	16:1	64:1	256:1	1024:1		
2	Absolute reduction		4	16	64	256	1024		
_ 3	Max. motor shaft diameter	mm	1.2	1.2	1.2	1.2	1.2		
4	Number of stages		1	2	3	4	5		
5	Max. continuous torque	Nm	0.005	0.015	0.054	0.100	0.100		
6	Max. intermittent torque at gear output	Nm	0.005	0.015	0.054	0.100	0.100		
7	Max. efficiency	%	90	80	70	60	55		
8	Weight	g	2.1	2.5	2.8	3.2	3.6		
9	Average backlash no load	0	1.8	2.0	2.2	2.5	2.8		
10	Mass inertia	gcm ²	0.004	0.003	0.003	0.003	0.003		
11	Gearhead length L1	mm	10.2	14.3	18.4	22.5	26.6		



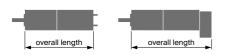
Modular System										
+ Motor	Page	+ Sensor/Brake	Page	Overall lengtl	h [mm] = Moto	r length + gea	rhead length +	+ (sensor/brake)	+ assembly parts	
RE 10, 0.75 W	129/130			27.3	31.4	35.5	39.6	43.7		
RE 10, 0.75 W	130	10 GAMA	501	35.4	39.5	43.6	47.7	51.8		
RE 10, 0.75 W	130	MR	532	33.1	37.2	41.3	45.4	49.5		
RE 10, 1.5 W	131/132			34.9	39.0	43.1	47.2	51.3		
RE 10, 1.5 W	132	10 GAMA	501	43.0	47.1	51.2	55.3	59.4		
RE 10, 1.5 W	132	MR	532	40.7	44.8	48.9	53.0	57.1		
EC 9.2 flat, 0.5 W	315									

Planetary Gearhead GP 10 A Ø10 mm, 0.01-0.15 Nm



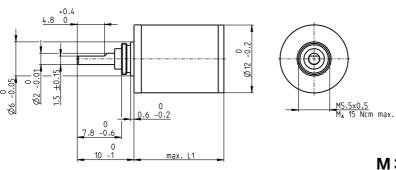
Technical Data				
Planetary Gearhead			straigh	t teeth
Output shaft			stainles	s steel
Bearing at output	pr	eloade	d ball be	arings
Radial play, 5 mm from flang	e		max. 0.0	08 mm
Axial play at axial load	< 2	N		0 mm
	> 2	N	max. 0.0	04 mm
Max. axial load (dynamic)				5 N
Max. force for press fits				10 N
Direction of rotation, drive to	outp	out		=
Max. continuous input speed	d		1200	00 rpm
Recommended temperature	e rang	ge	-40	+80°C
Number of stages 1	2	3	4	5
Max. radial load, 5 mm				
from flange 5 N 10	N	15 N	20 N	25 N

	Stock program Standard program		Part Numb	oers						
	Special program (on request)		218415	218416	218417	218418	218419			
Gea	arhead Data									
1	Reduction		4:1	16:1	64:1	256:1	1024:1			
2	Absolute reduction		4	16	64	256	1024			
3	Max. motor shaft diameter	mm	1.2	1.2	1.2	1.2	1.2			
4	Number of stages		1	2	3	4	5			
5	Max. continuous torque	Nm	0.010	0.030	0.100	0.150	0.150			
6	Max. intermittent torque at gear output	Nm	0.020	0.050	0.150	0.200	0.200			
7	Max. efficiency	%	90	81	73	65	59			
8	Weight	g	6.7	7.2	7.7	8.2	8.7			
9	Average backlash no load	۰	1.5	1.8	2.0	2.2	2.5			
10	Mass inertia g	cm ²	0.005	0.005	0.005	0.005	0.005			
11	Gearhead length L1	mm	10.4	14.1	17.2	20.4	23.5			



+ Motor F													
		+ Sensor/Brake	Page					rhead leng	th + (senso	or/brake) +	 assembly 	parts	
RE 10, 0.75 W 1	129/130			27.5	31.2	34.3	37.5	40.6					
		10 GAMA	501	35.6	39.3	42.4	45.6	48.7					
		MR	532	33.3	37.0	40.1	43.3						
RE 10, 1.5 W 1	131/132			35.1	38.8	41.9	45.1	48.2					
RE 10, 1.5 W 1	132	10 GAMA	501	43.2	46.9	50.0	53.2	56.3					
		MR	532	40.9	44.6		50.9						
	167/168			31.7	35.4		41.7						
EC 9.2 flat, 0.5 W	315			23.0	26.7	29.8	33.0	36.1					

Spur Gearhead GS 12 A \varnothing 12 mm, 0.01-0.03 Nm



Technical Data	
Spur Gearhead	straight teeth
Output shaft st	tainless steel, hardened
Bearing at output	sleeve bearing
Radial play, 6.5 mm from flang	ge max. 0.05 mm
Axial play	0.02-0.12 mm
Max. axial load (dynamic)	2 N
Max. force for press fits	30 N
Max. continuous input speed	8000 rpm
Recommended temperature	range -15+100°C
Extended range as option	-40+100°C
Max. radial load, 6.5 mm from	n flange 2 N

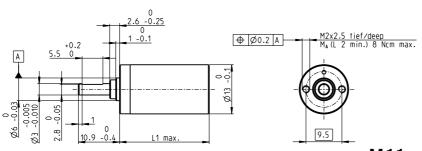
M 3:2

	Stock program Standard program		Part Number	s					
	Special program (on request)		310301	313872	313990	313991	310311	313993	310316
Gea	rhead Data								
1	Reduction		6.4:1	13:1	58:1	141:1	371:1	485:1	3101:1
2	Absolute reduction		403/63	21866/1694	724594/12474	20138716/142884	26782109/72171	624300196/ ₁₂₈₅₉₅₆ 1	1537547853/3720087
3	Max. motor shaft diameter	mm	1.2	1.0	1.0	1.2	1.0	1.2	1.2
	Part Numbers		310302	310304	310307	313992		310313	310317
1	Reduction		9.1:1	22:1	76:1	200:1		900:1	4402:1
2	Absolute reduction		899/99	12493/567	387283/5103	22462414/112266		372178963/413343	25737606749/5845851
3	Max. motor shaft diameter	mm	1.0	1.2	1.2	1.0		1.2	1.0
	Part Numbers			310305	310308	310310		310314	
1	Reduction			31:1	108:1	261:1		1278:1	
2	Absolute reduction			²⁷⁸⁶⁹ / ₈₉₁	863939/8019	12005773/45927		830245379/649539	
3_	Max. motor shaft diameter	mm		1.0	1.0	1.2		1.0	
4	Number of stages		2	3	4	5	5	6	7
5	Max. continuous torque	Nm	0.010	0.015	0.020	0.025	0.025	0.030	0.030
6	Max. intermittent torque at gear output	Nm	0.030	0.035	0.040	0.045	0.045	0.050	0.050
12	Direction of rotation, drive to output		=	≠	=	≠	≠	=	≠
7	Max. efficiency	%	81	73	66	59	59	53	48
8	Weight	g	6.5	7.4	8.3	9.2	9.2	10.1	11
9	Average backlash no load	٥	1	1	1.2	1.2	1.2	1.2	1.5
10	Mass inertia	gcm ²	0.002	0.002	0.002	0.002	0.002	0.002	0.002
11	Gearhead length L1	mm	10	12	14	16	16	18	20



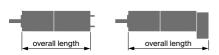
Modular System	_	_	_								
- Motor	Page	+ Sensor/Brake	Page	Overall length							
A-max 12	167/168			31.3	33.3	35.3	37.3	37.3	39.3	41.3	
4-max 12, 0.5 W	168	MR	532	35.4	37.4	39.4	41.4	41.4	43.4	45.4	

Planetary Gearhead GP 13 A Ø13 mm, 0.2-0.35 Nm



Technical Data				
Planetary Gearhead			straigh	t teeth
Output shaft	sta	ainless	steel, ha	rdened
Bearing at output			sleeve b	earing
Radial play, 6 mm from fla	ange		max. 0.0	55 mm
Axial play			0.02-0	10 mm
Max. axial load (dynamic)				8 N
Max. force for press fits				100 N
Direction of rotation, drive	e to ou	tput		=
Max. continuous input sp	eed		800	00 rpm
Recommended temperat	ure ra	nge	-40	+100°C
Number of stages 1	2	3	4	5
Max. radial load, 6 mm				
from flange 8 N	12 N	16 N	20 N	20 N

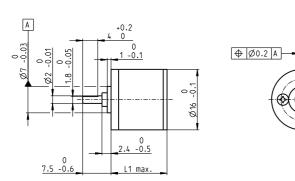
	Stock program Standard program		Part Number					
	Special program (on request)		110313	110314	110315	110316	110317	
Gea	rhead Data							
1	Reduction		4.1:1	17:1	67:1	275:1	1119:1	
2	Absolute reduction		57/14	3249/196	185193/2744	10556001/38416	601692057/537824	
3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5	
	Part Numbers		352365	352366	352367	352368	352369	
1	Reduction		5.1:1	26:1	131:1	664:1	3373:1	
2	Absolute reduction		66/13	4356/169	287496/2197	18974736/28561	1252332576/371293	
_3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5	
4	Number of stages		1	2	3	4	5	
	Max. continuous torque	Nm	0.20	0.20	0.30	0.30	0.35	
6	Max. intermittent torque at gear output	Nm	0.30	0.30	0.45	0.45	0.53	
7	Max. efficiency	%	91	83	75	69	62	
	Weight	g	11	14	17	20	23	
9	Average backlash no load	۰	1.0	1.2	1.5	1.8	2.0	
10	Mass inertia	gcm ²	0.025	0.015	0.015	0.015	0.015	
11	Gearhead length L1* *for A-max 12 is L1 + 0.3 mm	mm	16.0	19.9	23.7	27.6	31.4	



Modular System										
+ Motor	Page	+ Sensor/Brake	Page	Overall length [n	nm] = Motor	length + gear	head length +	- (sensor/brake) + assembly parts	
RE 13	134/136	3		35.4	39.3	43.1	47.0	50.8		
RE 13, 0.75 W	136	13 GAMA	502	43.2	47.1	50.9	54.8	58.6		
RE 13, 0.75 W	136	MR	532	42.5	46.4	50.2	54.1	57.9		
RE 13	138/140)		47.6	51.5	55.3	59.2	63.0		
RE 13, 2 W	140	13 GAMA	502	55.4	59.3	63.1	67.0	70.8		
RE 13, 2 W	140	MR		54.7	58.6	62.4	66.3	70.1		
RE 13, 1.5 W	142/144	1		38.5	42.4	46.2	50.1	53.9		
RE 13, 1.5 W	144	13 GAMA	502	46.5	50.4	54.2	58.1	61.9		
RE 13, 1.5 W	144	MR	532	44.6	48.5	52.3	56.2	60.0		
RE 13, 3 W	146/148	3		50.7	54.6	58.4	62.3	66.1		
RE 13, 3 W	148	13 GAMA	502	58.7	62.6	66.4	70.3	74.1		
RE 13, 3 W	148	MR	532	56.8	60.7	64.5	68.4	72.2		
A-max 12	167/168	3		37.6	41.5	45.3	49.2	53.0		
A-max 12, 0.5 W	168	MR	532	41.7	45.6	49.4	53.3	57.1		

Option Ball Bearing	Part Number	'S			Technical Data
2,6 -0,45	4.1:1 5.1:1 17:1 26:1 67:1	144300 352391 144301 352392 144302	131 : 1 275 : 1 664 : 1 1119 : 1 3373 : 1	352393 144303 352394 144304 352395	Planetary Gearhead straight teeth Output shaft stainless steel, hardened Bearing at output preloaded ball bearings Radial play, 6 mm from flange Axial play at axial load < 5 N 0 mm
					> 5 N max. 0.04 mm Max. axial load (dynamic) 8 N Max. force for press fits 25 N Direction of rotation, drive to output Max. continuous input speed 8000 rpm Recommended temperature range -40+100°C Number of stages 1 2 3 4 5
Gearhead length: L1 + 0.2 mm					Max. radial load, 6 mm from flange 10 N 15 N 20 N 25 N 25 N Gearhead values according to sleeve bearing version

Spur Gearhead GS 16 K ∅16 mm, 0.01–0.03 Nm Plastic Version



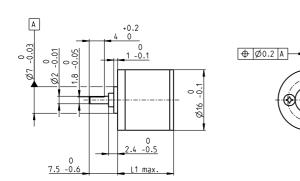
lecillical Data	
Spur Gearhead	straight teeth
Output shaft s	stainless steel, hardened
Bearing at output	sleeve bearing
Radial play, 6.5 mm from flang	ge max. 0.15 mm
Axial play	0.02-0.12 mm
Max. axial load (dynamic)	2 N
Max. force for press fits	15 N
Max. continuous input speed	8000 rpm
Recommended temperature	range -15+80°C
Max. radial load, 6.5 mm from	flange 1 N

	Stock program Standard program Standard program (an equapt)		Part Number	s					
	Special program (on request)		201463	201465	201467	201469	201471	201473	
Ge	arhead Data								
1	Reduction		6.4:1	22:1	76:1	261:1	900:1	3101:1	
2	Absolute reduction		403/63	12493/567	387283/5103	12005773/45927	372178963/413343	11537547853/3720087	
3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5	1.5	
	Part Numbers		207405	207406	207407	207408	207409	207410	
1	Reduction		9.1:1	31:1	108:1	371:1	1278:1	4402:1	
2	Absolute reduction		899/99	27869/891	863939/8019	26782109/72171	830245379/649539	25737606749/5845851	
3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5	1.5	
	Part Numbers		201464	201466	201468	201470	201472	201474	
1	Reduction		12:1	41:1	141:1	485:1	1670:1	5752:1	
2	Absolute reduction		961/81	29791/729	923521/6561	28629151/59049	887503681/531441	27512614111/4782969	
_3	Max. motor shaft diameter	mm	1	1	1	1	1	1	
4	Number of stages		2	3	4	5	6	7	
5	Max. continuous torque	Nm	0.010	0.020	0.030	0.030	0.030	0.030	
6	Max. intermittent torque at gear output	Nm	0.10	0.10	0.10	0.10	0.10	0.10	
12	Direction of rotation, drive to output		=	≠	=	≠	=	≠	
7	Max. efficiency	%	81	73	66	59	53	48	
8	Weight	g	9.0	9.8	10.2	10.7	11.3	11.7	
9	Average backlash no load	٥	1.0	1.0	1.2	1.2	1.5	1.5	
10		cm ²	0.0032	0.0031	0.0031	0.0031	0.0031	0.0031	
11	Gearhead length L1	mm	11.8	12.8	14.8	16.8	18.8	20.8	



Modular System											
+ Motor		+ Sensor/Brake	Page						brake) + asse	mbly parts	
A-max 16	169-172			37.3							
A-max 16	170/172		502	45.4		48.4					
A-max 16	170/172	MR	533	42.3	43.3	45.3	47.3	49.3	51.3		

Spur Gearhead GS 16 A \varnothing 16 mm, 0.015-0.04 Nm

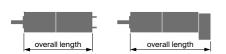


Technical Data	
Spur Gearhead	straight teeth
Output shaft stainle	ess steel, hardened
Bearing at output	sleeve bearing
Radial play, 6.5 mm from flange	max. 0.15 mm
Axial play	0.02-0.12 mm
Max. axial load (dynamic)	2 N
Max. force for press fits	30 N
Max. continuous input speed	8000 rpm
Recommended temperature range	-15+100°C
Extended range as option	-40+100°C
Max. radial load, 6.5 mm from flang	e 2 N

M 1:1

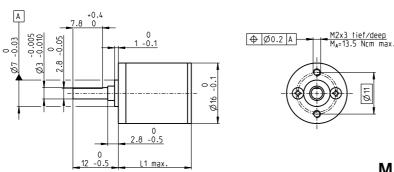
M1.6x2.5 tief/deep M_A = 6.5 Ncm max.

	Stock program Standard program		Part Number	S				
	Special program (on request)		144409	143761	143763	143765	143767	143769
Gea	rhead Data							
1	Reduction		6.4:1	22:1	76:1	261:1	900:1	3101:1
2	Absolute reduction		403/63	12493/567	387283/5103	12005773/45927	372178963/413343	11537547853/3720087
3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5	1.5
	Part Numbers		207834	207835	207836	207837	207838	207839
1	Reduction		9.1:1	31:1	108:1	371:1	1278:1	4402:1
2	Absolute reduction		899/99	27869/891	863939/8019	26782109/72171	830245379/649539	25737606749/5845851
3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5	1.5
	Part Numbers		144410	143762	143764	143766	143768	143770
1	Reduction		12:1	41:1	141:1	485:1	1670:1	5752:1
2	Absolute reduction		961/81	29791/729	923521/6561	28629151/59049	887503681/531441	27512614111/4782969
3	Max. motor shaft diameter	mm	1	1	1	1	1	1
4	Number of stages		2	3	4	5	6	7
5	Max. continuous torque	Nm	0.015	0.025	0.035	0.040	0.040	0.040
6	Max. intermittent torque at gear output	Nm	0.10	0.10	0.10	0.10	0.10	0.10
12	Direction of rotation, drive to output		=	≠	=	≠	=	≠
7	Max. efficiency	%	81	73	66	59	53	48
8	Weight	g	9.0	9.8	10.2	10.7	11.3	11.7
9	Average backlash no load	۰	1.0	1.0	1.2	1.2	1.5	1.5
10	Mass inertia	gcm ²	0.0032	0.0031	0.0031	0.0031	0.0031	0.0031
11	Gearhead length L1	mm	11.8	12.8	14.8	16.8	18.8	20.8



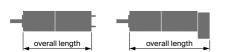
n										
		Page	Overall leng	gth [mm] = Mo	otor length +	gearhead leng	gth + (sensor/	brake) + asse	embly parts	
		502								
170/172	MR	533	42.3	43.3	45.3	47.3	49.3	51.3		
	Page 169-172 170/172		Page + Sensor/Brake Page 169-172 170/172 13 GAMA 502	Page + Sensor/Brake Page Overall leng 169-172 37.3 170/172 13 GAMA 502 45.4	Page + Sensor/Brake Page Overall length [mm] = Mo 169-172 37.3 38.3 170/172 13 GAMA 502 45.4 46.4	Page + Sensor/Brake Page Overall length [mm] = Motor length + 9 169-172 37.3 38.3 40.3 170/172 13 GAMA 502 45.4 46.4 48.4	Page + Sensor/Brake Page Overall length [mm] = Motor length + gearhead length 169-172 37.3 38.3 40.3 42.3 170/172 13 GAMA 502 45.4 46.4 48.4 50.4	Page + Sensor/Brake Page Overall length [mm] = Motor length + gearhead length + (sensor/37.3 38.3 40.3 42.3 44.3 44.3 170/172 13 GAMA 502 45.4 46.4 48.4 50.4 52.4	Page + Sensor/Brake Page Overall length [mm] = Motor length + gearhead length + (sensor/brake) + asset 169-172 37.3 38.3 40.3 42.3 44.3 46.3 170/172 13 GAMA 502 45.4 46.4 48.4 50.4 52.4 54.4	Page + Sensor/Brake Page Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts 169-172 37.3 38.3 40.3 42.3 44.3 46.3 170/172 13 GAMA 502 45.4 46.4 48.4 50.4 52.4 54.4

Spur Gearhead GS 16 V Ø16 mm, 0.06-0.1 Nm Reinforced



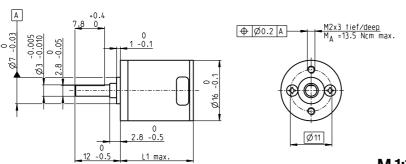
Technical Data				
Spur Gearhead		s	traight	teeth
Output shaft	stainle	ss ste	el, hard	dened
Bearing at output	prelo	aded b	oall bea	arings
Radial play, 6.5 mm from fla	nge	ma	ax. 0.0	2 mm
Axial play at axial load	< 5 N			0 mm
	> 5 N	ma	ax. 0.0	5 mm
Max. axial load (dynamic)				5 N
Max. force for press fits				5 N
Max. continuous input spee	d		800	0 rpm
Recommended temperature	e range		-15+ ⁻	100°C
Extended range as option	1	-	40+	100°C
Number of stages 2 3	4	5	6	7
Max. radial load, 6.5 mm				
from flange 10 N 15 N	20 N	22 N	22 N	22 N

	Stock program Standard program		Part Number	s					
	Special program (on request)		235066	235070	235073	235076	235079	235082	
Gea	rhead Data								
1	Reduction		6.4:1	22:1	76:1	261:1	900:1	3101:1	
2	Absolute reduction		403/63	12493/567	387283/5103	12005773/45927	372178963/413343	11537547853/3720087	
3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5	1.5	
	Part Numbers		235068	235071	235074	235077	235080	235083	
1	Reduction		9.1:1	31:1	108:1	371:1	1278:1	4402:1	
2	Absolute reduction		899/99	27869/891	863939/8019			25737606749/5845851	
3	Max. motor shaft diameter	mm	1.5	1.5	1.5	1.5	1.5		
	Part Numbers		235069	235072	235075	235078	235081	235084	
1	Reduction		12:1	41:1	141:1	485:1	1670:1	5752:1	
2	Absolute reduction		961/81	29791/729	923521/6561	28629151/59049	887503681/531441	27512614111/4782969	
_3	Max. motor shaft diameter	mm	1	1	1	1	1	1	
	Number of stages		2	3	4	5	6	7	
5	Max. continuous torque	Nm	0.06	0.06	0.10	0.10	0.10		
6	Max. intermittent torque at gear output	Nm	0.15	0.15	0.30	0.30	0.30	0.30	
12	Direction of rotation, drive to output		=	≠	=	≠	=	≠	
7	Max. efficiency	%	81	73	66	59	53	48	
8	Weight	g	13.8	14.5	15.8	17.0	17.9	18.5	
9	Average backlash no load	۰	1.0	1.0	1.2	1.2	1.5	1.5	
10	Mass inertia	gcm ²	0.0057	0.0052	0.0035	0.0032	0.0032		
11	Gearhead length L1	mm	14.3	17.3	19.3	21.3	23.3	25.3	



Modular System											
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	th [mm] = Mo	tor length +	gearhead leng	gth + (sensor/	brake) + asse	mbly parts	
A-max 16	169-172			39.8	42.8	44.8	46.8	48.8	50.8		
A-max 16	170/172	13 GAMA	502	47.9	50.9	52.9	54.9	56.9			
A-max 16	170/172	MR	533	44.8	47.8	49.8	51.8	53.8	55.8		

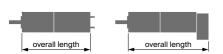
Spur Gearhead GS 16 VZ \varnothing 16 mm, 0.1 Nm Low Backlash



Technical Data				
Spur Gearhead		5	straight	teeth
Output shaft	stainles	ss ste	el, har	dened
Bearing at output	preloa	aded	ball bea	arings
Radial play, 6.5 mm from flai	nge	m	ax. 0.0	2 mm
Axial play at axial load	< 5 N			0 mm
	> 5 N	m	ax. 0.0	5 mm
Max. axial load (dynamic)				5 N
Max. force for press fits				5 N
Max. continuous input speed	b		800	0 rpm
Recommended temperature	range		-15+	
Extended range as option			-40+	100°C
Number of stages		4	5	6
Max. radial load, 6.5 mm				
from flange	2	20 N	22 N	22 N

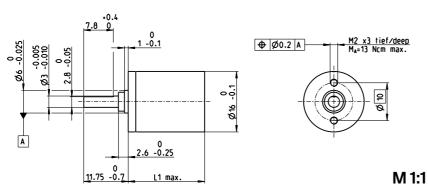
RЛ	1	ю.	1
IVI		•	

	Stock program Standard program		Part Number	s	
	Special program (on request)		327789	327796	327800
Ge	arhead Data				
1	Reduction		76:1	261:1	900:1
2	Absolute reduction		387283/5103	12005773/45927	372178963/413343
3	Max. motor shaft diameter	mm	1.5	1.5	1.5
	Part Numbers		327788	327797	327801
1	Reduction		108:1	371:1	1278:1
2	Absolute reduction		863939/8019	26782109/72171	830245379/649539
3	Max. motor shaft diameter	mm_	1.5	1.5	1.5
	Part Numbers		327790	327799	327802
1	Reduction		141:1	485:1	1670:1
2	Absolute reduction		923521/6561	28629151/59049	887503681/531441
_3	Max. motor shaft diameter	mm	1	1	1
4	Number of stages		4	5	6
5	Max. continuous torque	Nm	0.10	0.10	0.10
6	Max. intermittent torque at gear output	Nm	0.30	0.30	0.30
12	Direction of rotation, drive to output		=	≠	=
7	Max. efficiency	%	62	54	48
8	Weight	g	17.2	18.7	20.2
9	Average backlash no load	۰	0.3	0.45	0.5
10	Mass inertia	gcm ²	0.017	0.014	0.013
11	Gearhead length L1	mm	19.3	21.3	23.3



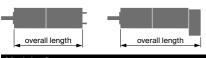
Modular System											
+ Motor		+ Sensor/Brake	Page	Overall leng	gth [mm] = Mo	otor length +	gearhead len	gth + (sensor/	brake) + asse	embly parts	
A-max 16	169-172			44.8							
A-max 16	170/172	13 GAMA	502	52.9	54.9	56.9					
A-max 16	170/172	MR	533	49.8	51.8	53.8					

Planetary Gearhead GP 16 A Ø16 mm, 0.1-0.3 Nm

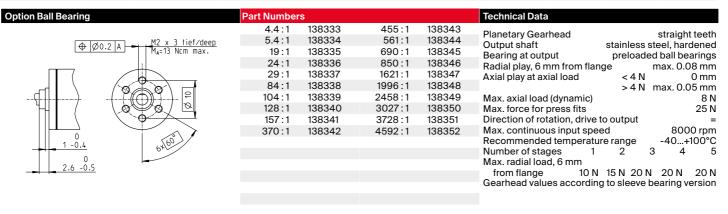


Technical Data									
Planetary Gearhead			straight teeth						
Output shaft	sta	ainless	steel, har	dened					
Bearing at output									
Radial play, 6 mm from flar	nge		max. 0.0	06 mm					
Axial play			0.02-0.	10 mm					
Max. axial load (dynamic)				8 N					
Max. force for press fits				100 N					
Direction of rotation, drive	to o	utput		=					
Max. continuous input spe	ed		800	00 rpm					
Recommended temperatu	ire r	ange	-30+	-100°C					
Extended range as option	on		-40+	-100°C					
Number of stages 1 Max. radial load, 6 mm	2	3	4	5					
•	2 N	16 N	20 N	20 N					

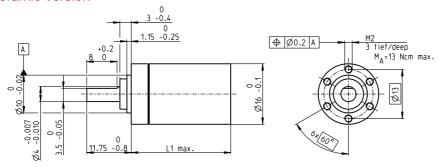
	Stock program Standard program		Part Number	s						
	Special program (on request)		110321	110322	110323	118186	110324	134782	110325	134785
Gea	rhead Data									
1	Reduction		4.4:1	19:1	84:1	157:1	370:1	690:1	1621:1	3027:1
2	Absolute reduction		⁵⁷ / ₁₃	3249/169	185193/2197	19683/125	10556001/28561	1121931/1625	601692057/371293	63950067/21125
3	Max. motor shaft diameter	mm_	2	2	2	1.5	2	2	2	2
	Part Numbers		118184	134777	134778		134780	118187	134783	134786
1	Reduction		5.4:1	24:1	104:1		455:1	850:1	1996:1	3728:1
2	Absolute reduction		²⁷ / ₅	1539/65	87723/845		5000211/10985	531441/625	285012027/142805	30292137/8125
3	Max. motor shaft diameter	mm	1.5	2	2		2	1.5	2	2
	Part Numbers			118185	134779		134781		134784	118188
1	Reduction			29:1	128:1		561:1		2458:1	4592:1
2	Absolute reduction			729/25	41553/325		2368521/4225		135005697/54925	14348907/3125
3	Max. motor shaft diameter	mm		1.5	2		2		2	1.5
4	Number of stages		1	2	3	3	4	4	5	5
5	Max. continuous torque	Nm	0.10	0.15	0.20	0.20	0.25	0.25	0.30	0.30
6	Max. intermittent torque at gear output	Nm	0.150	0.225	0.300	0.300	0.375	0.375	0.450	0.450
7	Max. efficiency	%	90	81	73	73	65	65	59	59
8	Weight	g	20	23	27	27	31	31	35	35
9	Average backlash no load	0	1.4	1.6	2.0	2.0	2.4	2.4	3.0	3.0
10	Mass inertia	gcm ²	0.07	0.05	0.05	0.04	0.05	0.05	0.05	0.05
11	Gearhead length L1	mm	15.5	19.1	22.7	22.7	26.3	26.3	29.9	29.9



Modular System											
+ Motor	Page	+ Sensor/Brake	Page	Overall length [m	nm] = Motor	length + gear	head length -	- (sensor/bral	(e) + assemb	ly parts	
RE 16, 2 W	149			37.9	41.5	45.1	45.1	48.7	48.7	52.3	52.3
RE 16, 2 W	149	MR	533	43.6	47.2	50.8	50.8	54.4	54.4	58.0	58.0
RE 16, 3.2 W	150/151			56.0	59.6	63.2	63.2	66.8	66.8	70.4	70.4
RE 16, 3.2 W	151	13 GAMA	502	62.1	65.7	69.3	69.3	72.9	72.9	76.5	76.5
RE 16, 3.2 W	151	MR	533	61.0	64.6	68.2	68.2	71.8	71.8	75.4	75.4
RE 16, 4.5 W	152/153			59.0	62.6	66.2	66.2	69.8	69.8	73.4	73.4
RE 16, 4.5 W	153	13 GAMA	502	65.2	68.8	72.4	72.4	76.0	76.0	79.6	79.6
RE 16, 4.5 W	153	MR	533	64.0	67.6	71.2	71.2	74.8	74.8	78.4	78.4
A-max 16	169-172			41.0	44.6	48.2	48.2	51.8	51.8	55.4	55.4
A-max 16	170/172	13 GAMA	502	49.1	52.7	56.3	56.3	59.9	59.9	63.5	63.5
A-max 16	170/172	MR	533	46.0	49.6	53.2	53.2	56.8	56.8	60.4	60.4
EC-max 16, 5 W	275			39.6	43.2	46.8	46.8	50.4	50.4	54.0	54.0
EC-max 16, 5 W	275	16 EASY/XT/Abs.	505/507	49.8	53.4	57.0	57.0	60.6	60.6	64.2	64.2
EC-max 16, 5 W	275	16 EASY Abs. XT	508	50.3	53.9	57.5	57.5	61.1	61.1	64.7	64.7
EC-max 16, 2-wire	276			49.1	52.7	56.3	56.3	59.9	59.9	63.5	63.5
EC-max 16, 8 W	277			51.6	55.2	58.8	58.8	62.4	62.4	66.0	66.0
EC-max 16, 8 W	277	16 EASY/XT/Abs.	505/507	61.8	65.4	69.0	69.0	72.6	72.6	76.2	76.2
EC-max 16, 8 W	277	16 EASY Abs. XT	508	62.3	65.9	69.5	69.5	73.1	73.1	76.7	76.7

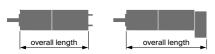


Planetary Gearhead GP 16 C Ø16 mm, 0.2-0.6 Nm Ceramic Version



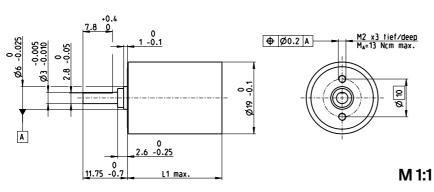
Technical Data				
Planetary Gearhead			straigh	t teeth
Output shaft	stainle	ss ste	el, har	dened
Bearing at output	prelo	aded	ball be	arings
Radial play, 6 mm from flang	je	m	nax. 0.0	08 mm
Axial play at axial load	< 4 N			0 mm
	> 4 N	m	nax. 0.0)5 mm
Max. axial load (dynamic)				12 N
Max. force for press fits				100 N
Direction of rotation, drive to	output			=
Max. continuous input speed	d		1200	0 rpm
Recommended temperature	e range		-40+	-100°C
Number of stages 1	2	3	4	5
Max. radial load, 6 mm				
from flange 20 N 40	N 60	N	80 N	80 N

	Stock program Standard program		Part Number	s						
	Special program (on request)		416328	407883	416391	401954	328699	416028	416188	414453
Gea	arhead Data									
1	Reduction		4.4:1	19:1	84:1	157:1	370:1	690:1	1621:1	3027:1
2	Absolute reduction		57/13	3249/169	185193/2197	19683/125	10556001/28561	1121931/1625	601692057/371293	63950067/2112
3	Max. motor shaft diameter	mm	2_	2	2	1.5	2	1.5	2	2
	Part Numbers		416500	416499	416385		416115	415807	415893	415476
1	Reduction		5.4:1	24:1	104:1		455:1	850:1	1996:1	3728:1
2	Absolute reduction		27/5	1539/65	87723/845		5000211/10985	531441/625	285012027/142805	30292137/812
3	Max. motor shaft diameter	mm	1.5	1.5	2		2	1.5	2	1.5
	Part Numbers			416428	402672		416097		415786	409316
1	Reduction			29:1	128:1		561:1		2458:1	4592:1
2	Absolute reduction			729/25	41553/325		2368521/4225		135005697/54925	14348907/312
3	Max. motor shaft diameter	mm		1.5	1.5		2		2	1.5
4	Number of stages		1	2	3	3	4	4	5	5
5	Max. continuous torque	Nm	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6
6	Max. intermittent torque at gear output	Nm	0.3	0.45	0.6	0.6	0.75	0.75	0.9	0.9
7	Max. efficiency	%	90	81	73	73	65	65	59	59
8	Weight	g	22	25	29	29	33	33	37	37
9	Average backlash no load	۰	1.4	1.6	2	2	2.4	2.4	3	3
10	Mass inertia	gcm ²	0.07	0.05	0.05	0.04	0.05	0.04	0.05	0.0
11	Gearhead length L1	mm	18.1	23.2	26.8	26.8	30.4	30.4	33.9	33.9



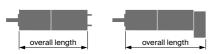
+ Motor	Page	+ Sensor/Brake	Page	Overall length [mm] = Motor	length + gear	head length -	+ (sensor/bra	ke) + assemb	ly parts	
RE 16, 2 W	149			40.5	45.6	49.2	49.2	52.8	52.8	56.3	56.3
RE 16, 2 W	149	MR	533	46.2	51.3	54.9	54.9	58.5	58.5	62.0	62.0
RE 16, 3.2 W	150/151			58.6	63.7	67.3	67.3	70.9	70.9	74.4	74.4
RE 16, 3.2 W	151	13 GAMA	502	64.7	69.8	73.4	73.4	77.0	77.0	80.5	80.5
RE 16, 3.2 W	151	MR	533	63.6	68.7	72.3	72.3	75.9	75.9	79.4	79.4
RE 16, 4.5 W	152/153			61.6	66.7	70.3	70.3	73.9	73.9	77.4	77.4
RE 16, 4.5 W	153	13 GAMA	502	67.8	72.9	76.5	76.5	80.1	80.1	83.6	83.6
RE 16, 4.5 W	153	MR	533	66.6	71.7	75.3	75.3	78.9	78.9	82.4	82.4
A-max 16	169-172			43.6	48.7	52.3	52.3	55.9	55.9	59.4	59.4
A-max 16	170/172	13 GAMA	502	67.8	72.9	76.5	76.5	80.1	80.1	83.6	83.6
A-max 16	170/172	MR	533	48.6	53.7	57.3	57.3	60.9	60.9	64.4	64.4
EC-max 16, 5 W	275			42.1	47.3	50.9	50.9	54.4	54.4	57.9	57.9
EC-max 16, 5 W	275	16 EASY/XT/Abs.	505/507	52.3	57.5	61.1	61.1	64.6	64.6	68.1	68.1
EC-max 16, 5 W	275	16 EASY Abs. XT	508	52.8	58.0	61.6	61.6	65.1	65.1	68.6	68.6
EC-max 16, 8 W	277			54.1	59.3	62.9	62.9	66.4	66.4	69.9	69.9
EC-max 16, 8 W	277	16 EASY/XT/Abs.	505/507	64.3	69.5	73.1	73.1	76.6	76.6	80.1	80.1
EC-max 16, 8 W	277	16 EASY Abs. XT	508	64.8	70.0	73.6	73.6	77.1	77.1	80.6	80.6

Planetary Gearhead GP 19 B Ø19 mm, 0.1-0.3 Nm

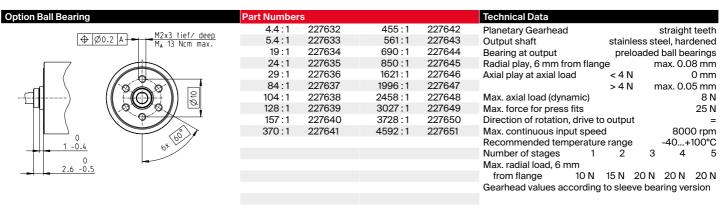


Technical Data						
Planetary Gearhead			straigh	t teeth		
Output shaft	stainle	ss st	steel, hardened			
Bearing at output		8	leeve b	earing		
Radial play, 6 mm from flang	ge	r	max. 0.0)8 mm		
Axial play		(0.02-0.	12 mm		
Max. axial load (dynamic)				8 N		
Max. force for press fits				100 N		
Direction of rotation, drive to	output			=		
Max. continuous input speed	d		800	0 rpm		
Recommended temperature	erange		-30+	100°C		
Extended range as option			-40+	100°C		
Number of stages 1	2	3	4	5		
Max. radial load, 6 mm						
from flange 8 N 12	N 16	N	20 N	20 N		

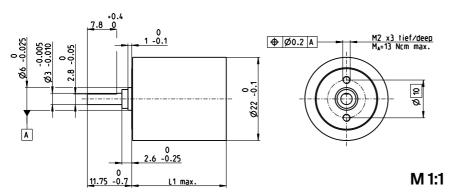
	Stock program Standard program Special program (on request)		Part Number	s						
	Special program (on request)		149039	149041	149044	149047	149048	149051	149053	149056
Gea	rhead Data									
1	Reduction		4.4:1	19:1	84:1	157:1	370:1	690:1	1621:1	3027:1
2	Absolute reduction		57/13	3249/169	185193/2197	19683/125	10556001/28561	1121931/1625	601692057/371293	63950067/21125
3	Max. motor shaft diameter	mm	2_	2	2	1.5	2	2,	2	2
	Part Numbers		149040	149042	149045		149049	149052		149057
1	Reduction		5.4:1	24:1	104:1		455:1	850:1	1996:1	3728:1
2	Absolute reduction		²⁷ / ₅	1539/65	87723/845		5000211/10985	531441/625	285012027/142805	30292137/8125
3	Max. motor shaft diameter	mm	1.5	2	2	_	2	1.5	2	2
	Part Numbers			149043	149046		149050		149055	149058
1	Reduction			29:1	128:1		561:1		2458:1	4592:1
2	Absolute reduction			729/25	41553/325		2368521/4225		135005697/54925	14348907/3125
3	Max. motor shaft diameter	mm		1.5	2		2		2	1.5
4			1	2	3	3	4	4	5	5
5	Max. continuous torque	Nm	0.10	0.15	0.20	0.20	0.25	0.25	0.30	0.30
6	Max. intermittent torque at gear output	Nm	0.150	0.225	0.300	0.300	0.375	0.375	0.450	0.450
7	Max. efficiency	%	90	81	73	73	65	65	59	59
8	Weight	g	26	31	36	36	41	41	46	46
9	Average backlash no load	۰	1.4	1.6	2.0	2.0	2.4	2.4	3.0	3.0
10	Mass inertia	gcm ²	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05
11	Gearhead length L1	mm	15.9	19.5	23.1	23.1	26.7	26.7	30.3	30.3



Modular System													
+ Motor	Page	+ Sensor/Brake	Page	Overall length [r	Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts								
A-max 19	173/174	4		44.9	48.5	52.1	52.1	55.7	55.7	59.3	59.3		
A-max 19, 1.5 W	174	13 GAMA	502	52.4	56.0	59.6	59.6	63.2	63.2	66.8	66.8		
A-max 19, 1.5 W	174	MR	533	50.0	53.6	57.2	57.2	60.8	60.8	64.4	64.4		
A-max 19, 2.5 W	175/176	3		47.5	51.1	54.7	54.7	58.3	58.3	61.9	61.9		
A-max 19, 2.5 W	176	13 GAMA	502	55.0	58.6	62.2	62.2	65.8	65.8	69.4	69.4		
A-max 19, 2.5 W	176	MR	533	51.8	55.4	59.0	59.0	62.6	62.6	66.2	66.2		



Planetary Gearhead GP 22 B Ø22 mm, 0.1-0.3 Nm



Technical Data													
Planetary Gearhead			straight	teeth									
Housing				steel									
Output shaft	sta	ainless	steel, hard	dened									
Bearing at output			sleeve be	earing									
Radial play, 6 mm from flang	. ,,												
Axial play			0.02-0.1	0 mm									
Max. axial load (dynamic)				8 N									
Max. force for press fits				100 N									
Direction of rotation, drive to	o ou	ıtput		=									
Max. continuous input spee	d		800	0 rpm									
Recommended temperature	e ra	nge	-30+	100°C									
Extended range as option	1		-40+	100°C									
Number of stages 1	2	3	4	5									
Max. radial load, 6 mm													
from flange 8 N 12	N	16 N	20 N	20 N									

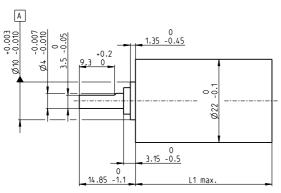
	Stock program Standard program Special program (on request)		Part Number							
			110355	110356	110357	118653	110358	134772	110359	134775
Gea	arhead Data									
1	Reduction		4.4:1	19:1	84:1	157:1	370:1	690:1	1621:1	3027:1
2	Absolute reduction		⁵⁷ / ₁₃	3249/169	185193/2197	19683/125	10556001/28561	1121931/1625	601692057/371293	63950067/21125
3	Max. motor shaft diameter	mm	2	2	2	1.5	2	2	2	2
	Part Numbers		118651	134767	134768		134770	118654	134773	134776
1	Reduction		5.4:1	24:1	104:1		455:1	850:1	1996:1	3728:1
2	Absolute reduction		27/5	1539/65	87723/845		5000211/10985	531441/625	285012027/142805	30292137/8125
3	Max. motor shaft diameter	mm	1.5	2_	2		2	1.5	2	2
	Part Numbers			118652	134769		134771		134774	118655
1	Reduction			29:1	128:1		561:1		2458:1	4592:1
2	Absolute reduction			729/25	41553/325		2368521/4225		135005697/54925	14348907/3125
3	Max. motor shaft diameter	mm		1.5	2		2		2	1.5
4	Number of stages		1	2	3	3	4	4	5	5
5	Max. continuous torque	Nm	0.10	0.15	0.20	0.20	0.25	0.25	0.30	0.30
6	Max. intermittent torque at gear output	Nm	0.150	0.225	0.300	0.300	0.375	0.375	0.450	0.450
7	Max. efficiency	%	90	81	73	73	65	65	59	59
7		% g	90 39	81 48	73 57	73 57	65 65	65 65	59 73	59 73
7	Max. efficiency									
7	Max. efficiency Weight	g	39	48	57	57	65	65	73	73

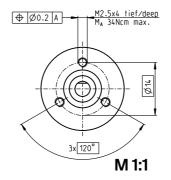


+ Motor	Page	+ Sensor/Brake	Page	Overall length	n [mm] = Mot	or length + g	earhead lengt	th + (sensor/b	rake) + assem	bly parts	
A-max 22	177-180			47.9	51.5	55.1	55.1	58.7	58.7	62.3	62.3
A-max 22	178/180	13 GAMA	502	55.0	58.6	62.2	62.2	65.8	65.8	69.4	69.4
A-max 22	178/180	MR	533	52.9	56.5	60.1	60.1	63.7	63.7	67.3	67.3

Option Ball Bearing	Part Number	's			Technical Data
Option Ball Bearing	4.4:1 5.4:1 19:1 24:1 29:1 84:1 104:1	144137 144138 144139 144140 144141 144142 144143	455:1 561:1 690:1 850:1 1621:1 1996:1 2458:1	144147 144148 144149 144150 144151 144152 144153	Planetary Gearhead straight teeth Housing steel Output shaft stainless steel, hardened Bearing at output preloaded ball bearings Radial play, 6 mm from flange max. 0.08 mm Axial play at axial load < 4 N 0 mm Max. axial load (dynamic) > 4 N max. 0.05 mm
	128:1 157:1 370:1	144144 144145 144146	3027:1 3728:1 4592:1	144154 144155 144156	Max. force for press fits 25 N Direction of rotation, drive to output Max. continuous input speed 8000 rpm Recommended temperature range -40+100°C Number of stages 1 2 3 4 5 Max. radial load, 6 mm from flange 10 N 15 N 20 N 20 N 20 N Gearhead values according to sleeve bearing version

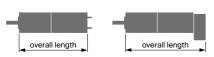
Planetary Gearhead GP 22 A Ø22 mm, 0.5-1.0 Nm





Technical Data		
Planetary Gearhead		straight teeth
Output shaft	stainless	s steel, hardened
Bearing at output		ball bearing
Option		sleeve bearing
Radial play, 10 mm from flan	ge	max. 0.2 mm
Axial play		max. 0.2 mm
Max. axial load (dynamic)		100 N
Max. force for press fits		100 N
Direction of rotation, drive to	output	=
Max. continuous input speed	d	6000 rpm
Recommended temperature	e range	-40+100°C
Number of stages 1	2 :	3 4 5
Max. radial load, 10 mm		
from flange 30 N 50	N 55 N	N 55 N 55 N

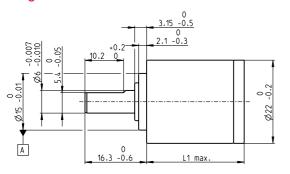
	Stock program		Part Nun	nbers									
	Standard program Special program (on request)												
			134156	134158	134163	134168	134172	110340	134183	134186	134190	134195	134203
	rhead Data												
1	Reduction		3.8:1	14:1	53:1	104:1	198:1	370:1	590:1		1386:1		
2	Absolute reduction		15/4	225/16	3375/64	87723/845	50625/256	10556001/28561	59049/100	759375/1024	158340015/114244	285012027/142805	1594323/500
3	Max. motor shaft diameter	nm	4	4	4	3.2	4	3.2	4	4	3.2	3.2	4
	Part Numbers		110337	134159	134164	134169	134173	134178	134184	134187	134193	134198	134204
1	Reduction		4.4:1	16:1	62:1	109:1	231:1	389:1	690:1	867:1	1460:1	2102:1	3728:1
2	Absolute reduction		⁵⁷ / ₁₃	855/52	12825/208	2187/20	192375/832	263169/676	1121931/1625	2885625/3328	3947535/2704	7105563/3380	30292137/8125
3	Max. motor shaft diameter	nm	3.2	3.2	3.2	4	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Part Numbers		134157	110338	134165	134170	134174	134180	134185	134188	134196	134200	134205
1	Reduction		5.4:1	19:1	72:1	128:1	270:1	410:1	850:1	1014:1	1538:1	2214:1	4592:1
2	Absolute reduction		27/5	3249/169	48735/676	41553/325	731025/2704	6561/16	531441/625	10965375/10816	98415/64	177147/80	14348907/3125
3	Max. motor shaft diameter	nm	2.5	3.2	3.2	3.2	3.2	4	2.5	3.2	4	4	2.5
	Part Numbers			134160	134166	134171	134176	134179		134191	110341	134199	
1	Reduction			20:1	76:1	157:1	285:1	455:1		1068:1	1621:1	2458:1	
2	Absolute reduction			81/4	1215/16	19683/125	18225/64	5000211/10985		273375/256	601692057/371293	135005697/54925	
3	Max. motor shaft diameter	nm		4	4	2.5	4	3.2		4	3.2	3.2	
	Part Numbers			134161	110339		134175	134181		134189	134194	134201	
1	Reduction			24:1	84:1		316:1	479:1		1185:1	1707:1	2589:1	
2	Absolute reduction			1539/65	185193/2197		2777895/8788	124659/260		41668425/35152	15000633/8788	3365793/1300	
3		nm		3.2	3.2		3.2	3.2		3.2	3.2	3.2	
	Part Numbers			134162	134167		134177	134182		134192	134197	134202	
1	Reduction			29:1	89:1		333:1	561:1		1249:1	1798:1	3027:1	
2	Absolute reduction			729/25	4617/52			2368521/4225		1038825/832			
3	Max. motor shaft diameter	nm		2.5	3.2		3.2	3.2		3.2	3.2	3.2	
4	Number of stages		1	2	3	3	4	4	4	5		5	5
5	•	١m	0.5	0.5	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6		١m	0.8	0.8	1.2	1.2	1.6	1.6	1.6	1.6	1.6	1.6	1.6
7		%	84	70	59	59	49	49	49	42	42	42	42
8	Weight	g	42	55	68	68	81	81	81	94	94	94	94
9	Average backlash no load	9	1.0	1.2	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
10	Mass inertia qc	m ²	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11		nm	22.6	29.4	36.2	36.2	43.0	43.0	43.0	49.8	49.8	49.8	49.8

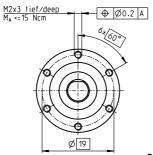


Modular System														
+ Motor	Page	+ Sensor/Brake	Page	Overall le	ngth [mm] = Motor	length + (gearhead	length + (sensor/br	ake) + ass	embly pa	rts	
A-max 19	173/174			51.6	58.4	65.2	65.2	72.0	72.0	72.0	78.8	78.8	78.8	78.8
A-max 19, 1.5 W	174	13 GAMA	502	59.1	65.9	72.7	72.7	79.5	79.5	79.5	86.3	86.3	86.3	86.3
A-max 19, 1.5 W	174	MR	533	56.7	63.5	70.3	70.3	77.1	77.1	77.1	83.9	83.9	83.9	83.9
A-max 19, 2.5 W	175/176			54.2	61.0	67.8	67.8	74.6	74.6	74.6	81.4	81.4	81.4	81.4
A-max 19, 2.5 W	176	13 GAMA	502	61.7	68.5	75.3	75.3	82.1	82.1	82.1	88.9	88.9	88.9	88.9
A-max 19, 2.5 W	176	MR	533	58.5	65.3	72.1	72.1	78.9	78.9	78.9	85.7	85.7	85.7	85.7
A-max 22	177-180			54.6	61.4	68.2	68.2	75.0	75.0	75.0	81.8	81.8	81.8	81.8
A-max 22		13 GAMA	502	61.7	68.5	75.3	75.3	82.1	82.1	82.1	88.9	88.9	88.9	88.9
A-max 22	178/180	MR	533	59.6	66.4	73.2	73.2	80.0	80.0	80.0	86.8	86.8	86.8	86.8
EC-max 22, 12 W	278			57.4	64.2	71.0	71.0	77.8	77.8	77.8	84.6	84.6	84.6	84.6
EC-max 22, 12 W	278	16 EASY/XT/Abs.	505/507	67.0	73.8	80.6	80.6	87.4	87.4	87.4	94.2	94.2	94.2	94.2
EC-max 22, 12 W	278	16 EASY Abs. XT	508	67.5	74.3	81.1	81.1	87.9	87.9	87.9	94.7	94.7	94.7	94.7
EC-max 22, 12 W	278	AB 20	582	93.0	99.8	106.6	106.6	113.4	113.4	113.4	120.2	120.2	120.2	120.2
EC-max 22, 25 W	279			73.9	80.7	87.5	87.5	94.3	94.3	94.3	101.1	101.1	101.1	101.1
EC-max 22, 25 W	278	16 EASY/XT/Abs.	505/507	83.5	90.3	97.1	97.1	103.9	103.9	103.9	110.7	110.7	110.7	110.7
EC-max 22, 25 W	278	16 EASY Abs. XT	508	84.0	90.8	97.6	97.6	104.4	104.4	104.4	111.2	111.2	111.2	111.2
EC-max 22, 25 W	279	AB 20	582	109.5	116.3	123.1	123.1	129.9	129.9	129.9	136.7	136.7	136.7	136.7
EC 20 flat, IE, IP 00				39.7	46.5	53.3	53.3	60.1	60.1	60.1	66.9	66.9	66.9	66.9
EC 20 flat, IE, IP 00				43.7	50.5	57.3	57.3	64.1	64.1	64.1	70.9	70.9	70.9	70.9
EC 20 flat, IE, IP 40	318			44.8	51.6	58.4	58.4	65.2	65.2	65.2	72.0	72.0	72.0	72.0

Planetary Gearhead GP 22 AR Ø22 mm, 0.5 Nm

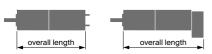
for high radial loads





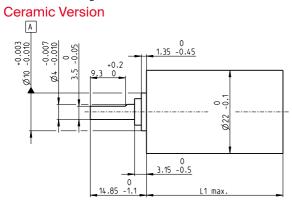
Technical Data	
Planetary Gearhead	straight teeth
Output shaft	stainless steel
Bearing at output	ball bearing
Radial play, 10 mm from flange	max. 0.2 mm
Axial play	max. 0.1 mm
Max. axial load (dynamic)	100 N
Max. force for press fits	100 N
Direction of rotation, drive to output	=
Max. continuous input speed	6000 rpm
Recommended temperature range	-30+100°C
Max. radial load, 10 mm	
from flange	70 N

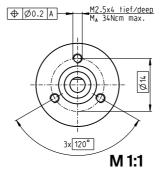
	Stock program Standard program		Part Numl	bers						
	Special program (on request)		462695	438992	462696					
Gea	arhead Data									
1	Reduction		3.8:1	4.4:1	5.4:1					
2	Absolute reduction		15/4	⁵⁷ /13	27/5					
3	Max. motor shaft diameter	mm	4	3.2	2.5					
4	Number of stages		1	1	1					
5	Max. continuous torque	Nm	0.5	0.5	0.5					
6	Max. intermittent torque at gear output	Nm	0.8	0.8	0.8					
7	Max. efficiency	%	90	90	90					
8	Weight	g	44	44	44					
9	Average backlash no load	۰	1.0	1.0	1.0					
10	Mass inertia	gcm ²	0.5	0.38	0.25					
11	Gearhead length L1	mm	25.8	25.8	25.8					



Modular System	D	O (D	D	0	H. F	Matant		le e e el le	H. C.				
+ Motor	Page	+ Sensor/Brake	Page	Overall leng			th + gear	head leng	gth + (sens	or/brake)	+ assemb	ly parts	
RE 25, 20 W	155			68.9	68.9	68.9							
RE 25, 20 W	155	HED_5540	536	89.7	89.7	89.7							
RE 25, 20 W	155	DCT 22	542	91.2	91.2	91.2							
RE 25, 20 W	155	AB 28	585	103.0	103.0	103.0							
RE 25, 20 W	155	HED_5540/AB 28	536/585		120.2	120.2							
EC-max 22, 25 W	279			74.4	74.4	74.4							
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505/507		84.0	84.0							
EC-max 22, 25 W	279	16 EASY Abs. XT	508	84.5	84.5	84.5							
EC-max 22, 25 W	279	AB 20	582	110.0	110.0	110.0							

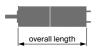
Planetary Gearhead GP 22 C Ø22 mm, 0.5-2.0 Nm





Technical Data				
Planetary Gearhead		st	raigh	t teeth
Output shaft	stainles	s stee	l, har	dened
Bearing at output		- 1	ball b	earing
Radial play, 10 mm from flan	ge	m	ax. 0	.2 mm
Axial play		m	ax. 0	.2 mm
Max. axial load (dynamic)				100 N
Max. force for press fits				100 N
Direction of rotation, drive to	output			=
Max. continuous input speed	d		800	0 rpm
Recommended temperature	e range	-4	40+	100°C
Number of stages 1	2	3	4	5
Max. radial load, 10 mm				
from flange 30 N 50	N 55	N 5	5 N	55 N

	Stock program ☐ Standard program		Part Nun	nbers									
	Special program (on request)		143971	143974	143980	143986	143990	143996	144002	144004	144011	144017	144023
Gea	arhead Data												
1	Reduction		3.8:1	14:1	53:1	104:1	198:1	370:1	590:1	742:1	1386:1	1996:1	3189:1
2	Absolute reduction		15/4	225/16	3375/64	87723/845	50625/256	10556001/28561	59049/100	759375/1024	158340015/114244	285012027/142805	1594323/50
3	Max. motor shaft diameter	mm	4	4	4	3.2	4	3.2	4	4	3.2	3.2	4
	Part Numbers		143972	143975	143981	143987	143991	143997	144003	144006	144012	144018	144024
1	Reduction		4.4:1	16:1	62:1	109:1	231:1	389:1	690:1	867:1	1460:1	2102:1	3728:1
2	Absolute reduction		57/13	855/52	12825/208	2187/20	192375/832	263169/676	1121931/1625	2885625/3328	3947535/2704	7105563/3380	30292137/812
3	Max. motor shaft diameter	mm	3.2	3.2	3.2	4	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Part Numbers		143973	143976	143982	143988	143992	143998	144005	144007	144013	144019	144025
1	Reduction		5.4:1	19:1	72:1	128:1	270:1	410:1	850:1	1014:1		2214:1	
2	Absolute reduction		27/5	3249/169	48735/676	41553/325	731025/2704	6561/16	531441/625	10965375/10816	98415/64	177147/80	14348907/312
3	Max, motor shaft diameter	mm	2.5	3.2	3.2	3.2	3.2	4	2.5	3.2	4	4	2.5
	Part Numbers			143977	143983	143989	143993	143999		144008	144014	144020	
1	Reduction			20:1	76:1	157:1	285:1	455:1		1068:1	1621:1	2458:1	
2	Absolute reduction			81/4	1215/16	19683/125	18225/64	5000211/10985		273375/256	601692057/371293	135005697/54925	
3	Max. motor shaft diameter	mm		4	4	2.5	4	3.2		4	3.2	3.2	
	Part Numbers			143978	143984		143994	144000		144009	144015	144021	
1	Reduction			24:1	84:1		316:1	479:1		1185:1	1707:1	2589:1	
2	Absolute reduction			1539/65	185193/2197		2777895/8788	124659/260		41668425/35152	15000633/8788	3365793/1300	
3	Max. motor shaft diameter	mm		3.2	3.2		3.2	3.2		3.2	3.2	3.2	
	Part Numbers			143979	143985		143995	144001		144010	144016	144022	
1	Reduction			29:1	89:1		333:1	561:1		1249:1	1798:1	3027:1	
2	Absolute reduction			729/25	4617/52		69255/208	2368521/4225		1038825/832	373977/208	63950067/21125	
3	Max. motor shaft diameter	mm		2.5	3.2		3.2	3.2		3.2	3.2	3.2	
4	Number of stages		1	2	3	3	4	4	4	5			
5	Max. continuous torque	Nm	0.5	0.6	1.2	1.2	1.8	1.8	1.8	2.0		2.0	2.0
6	Max. intermittent torque at gear output	Nm	0.8	0.9	1.9	1.9	2.7	2.7	2.7	3.0	3.0	3.0	3.0
7	Max. efficiency	%	84	70	59	59	49	49	49	42	42	42	42
8	Weight	g	42	55	68	68	81	81	81	94		94	94
9	Average backlash no load	٥	1.0	1.2	1.6	1.6	2.0	2.0	2.0	2.0		2.0	2.0
10	Mass inertia	gcm ²	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4		0.4	0.4
11	Gearhead length L1*	mm	25.4	32.2	39.0	39.0	45.8	45.8	45.8	52.6		52.6	52.6
	*L1 is-2.8 mm for calculating the overall length											0	



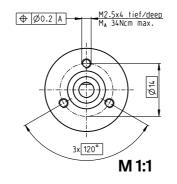




Modular System														
+ Motor	Page + Sensor/Brake Page Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts													
A-max 19	173/174			51.6	58.4	65.2	65.2	72.0	72.0	72.0	78.8	78.8	78.8	78.8
A-max 19, 1.5 W	174	13 GAMA	502	59.1	65.9	72.7	72.7	79.5	79.5	79.5	86.3	86.3	86.3	86.3
A-max 19, 1.5 W	174	MR	533	56.7	63.5	70.3	70.3	77.1	77.1	77.1	83.9	83.9	83.9	83.9
A-max 19, 2.5 W	175/176			54.2	61.0	67.8	67.8	74.6	74.6	74.6	81.4	81.4	81.4	81.4
A-max 19, 2.5 W	176	13 GAMA	502	61.7	68.5	75.3	75.3	82.1	82.1	82.1	88.9	88.9	88.9	88.9
A-max 19, 2.5 W	176	MR	533	58.5	65.3	72.1	72.1	78.9	78.9	78.9	85.7	85.7	85.7	85.7
A-max 22	177-180			54.6	61.4	68.2	68.2	75.0	75.0	75.0	81.8	81.8	81.8	81.8
A-max 22	178/180	13 GAMA	502	61.7	68.5	75.3	75.3	82.1	82.1	82.1	88.9	88.9	88.9	88.9
A-max 22	178/180	MR	533	59.6	66.4	73.2	73.2	80.0	80.0	80.0	86.8	86.8	86.8	86.8

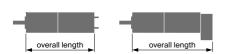
Planetary Gearhead GP 22 C Ø22 mm, 0.5-2.0 Nm

L1 max.



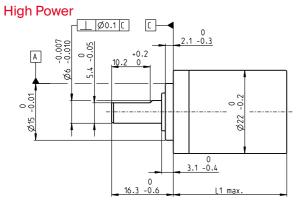
Technical Data				
Planetary Gearhead			straigh	t teeth
Output shaft	sta	inless st	teel, har	dened
Bearing at output			ball b	earing
Radial play, 10 mm from fla	nge		max. 0	.2 mm
Axial play			max. 0	.2 mm
Max. axial load (dynamic)				100 N
Max. force for press fits				100 N
Direction of rotation, drive	to o	utput		=
Max. continuous input spe	ed		800	0 rpm
Recommended temperatu	re ra	ange	-40+	100°C
Number of stages 1	2	3	4	5
Max. radial load, 10 mm				
from flange 30 N 50	NC	55 N	55 N	55 N

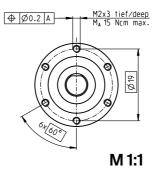
	Stock program Standard program		Part Nun	nbers									
	Special program (on request)		143971	143974	143980	143986	143990	143996	144002	144004	144011	144017	144023
Gea	rhead Data		110071	110011	110000	110000	110000	110000	111002	111001	111011	111011	111020
	Reduction		3.8:1	14:1	53:1	104:1	198:1	370:1	590:1	742 · 1	1386:1	1996:1	3189.1
	Absolute reduction		15/4	225/16	3375/64	87723/845		10556001/28561	59049/100		158340015/114244		
_	Max. motor shaft diameter	mm	4	4	4	3.2	4		4	4	3.2	3.2	4
	Part Numbers		143972	143975	143981	143987	143991	143997	144003	144006			144024
1	Reduction		4.4:1	16:1	62:1	109:1	231:1	389:1	690:1		1460:1		
	Absolute reduction		57/13	855/52	12825/208	2187/20	192375/832	263169/676			3947535/2704		
3	Max, motor shaft diameter	mm	3.2	3.2	3.2	4	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Part Numbers		143973	143976	143982	143988	143992	143998	144005	144007	144013	144019	144025
1	Reduction		5.4:1	19:1	72:1	128:1	270:1	410:1			1538:1	2214:1	4592:1
2	Absolute reduction		27/5	3249/169	48735/676	41553/325	731025/2704	6561/16	531441/625	10965375/10816	98415/64	177147/80	14348907/3125
3	Max. motor shaft diameter	mm	2.5	3.2	3.2	3.2	3.2	4	2.5	3.2	4	4	2.5
	Part Numbers			143977	143983	143989	143993	143999		144008	144014	144020	
1	Reduction			20:1	76:1	157:1	285:1	455:1		1068:1	1621:1	2458:1	
2	Absolute reduction			81/4	1215/16	19683/125	18225/64	5000211/10985		273375/256	601692057/371293	135005697/54925	
3	Max. motor shaft diameter	mm		4	4	2.5	4	3.2		4	3.2	3.2	
	Part Numbers			143978	143984		143994	144000		144009	144015	144021	
1	Reduction			24:1	84:1		316:1	479:1		1185:1	1707:1	2589:1	
2	Absolute reduction			1539/65	185193/2197		2777895/8788	124659/260		41668425/35152	15000633/8788	3365793/1300	
3	Max. motor shaft diameter	mm		3.2	3.2		3.2	3.2		3.2	3.2	3.2	
	Part Numbers			143979	143985		143995	144001		144010	144016	144022	
1	Reduction			29:1	89:1		333:1	561:1			1798:1		
2	Absolute reduction			729/25	4617/52			2368521/4225		1038825/832	373977/208	63950067/21125	
_3	Max. motor shaft diameter	mm		2.5	3.2		3.2	3.2		3.2	3.2	3.2	
4	Number of stages		1	2	3	3	4	4	4	5	5	5	5
5	Max. continuous torque	Nm	0.5	0.6	1.2	1.2	1.8	1.8	1.8	2.0	2.0	2.0	2.0
6	Max. intermittent torque at gear output	Nm	0.8	0.9	1.9	1.9	2.7	2.7	2.7	3.0	3.0	3.0	3.0
7	Max. efficiency	%	84	70	59	59	49	49	49	42	42	42	42
	Weight	g	42	55	68	68	81	81	81	94	94	94	94
9	Average backlash no load	۰	1.0	1.2	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
10		cm ²	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11	Gearhead length L1* *for EC-max 16 L1 is-2.8 mm	mm	25.4	32.2	39.0	39.0	45.8	45.8	45.8	52.6	52.6	52.6	52.6



Page	+ Sensor/Brake	Page	Overall le	ngth [mm] = Motor	length +	gearhead	length + (:	sensor/br	ake) + ass	embly pa	rts	
277			58.7	65.5	72.3	72.3	79.1	79.1	79.1	85.9	85.9	85.9	85.9
277	16 EASY/XT/Abs.	505/507	68.9	75.7	82.5	82.5	89.3	89.3	89.3	96.1	96.1	96.1	96.1
277	16 EASY Abs. XT	508	69.4	76.2	83.0	83.0	89.8	89.8	89.8	96.6	96.6	96.6	96.6
278			57.5	64.3	71.1	71.1	77.9	77.9	77.9	84.7	84.7	84.7	84.7
278	16 EASY/XT/Abs.	505/507	67.1	73.9	80.7	80.7	87.5	87.5	87.5	94.3	94.3	94.3	94.3
278	16 EASY Abs. XT	508	67.6	74.4	81.2	81.2	88.0	88.0	88.0	94.8	94.8	94.8	94.8
278	AB 20	582	93.1	99.9	106.7	106.7	113.5	113.5	113.5	120.3	120.3	120.3	120.3
279			74.0	80.8	87.6	87.6	94.4	94.4	94.4	101.2	101.2	101.2	101.2
278	16 EASY/XT/Abs.	505/507	83.6	90.4	97.2	97.2	104.0	104.0	104.0	110.8	110.8	110.8	110.8
278	16 EASY Abs. XT	508	84.1	90.9	97.7	97.7	104.5	104.5	104.5	111.3	111.3	111.3	111.3
279	AB 20	582	109.6	116.4	123.2	123.2	130.0	130.0	130.0	136.8	136.8	136.8	136.8
317			39.7	46.5	53.3	53.3	60.1	60.1	60.1	66.9	66.9	66.9	66.9
317			40.8	47.6	54.4	54.4	61.2	61.2	61.2	68.0	68.0	68.0	68.0
318			43.7	50.5	57.3	57.3	64.1	64.1	64.1	70.9	70.9	70.9	70.9
318			44.8	51.6	58.4	58.4	65.2	65.2	65.2	72.0	72.0	72.0	72.0
CA C	277 277 278 278 278 278 278 279 278 278 278 279 317 317	16 EASY/XT/Abs. 277 16 EASY Abs. XT 278 16 EASY Abs. XT 278 16 EASY/XT/Abs. 278 16 EASY Abs. XT 278 AB 20 279 16 EASY/XT/Abs. 278 16 EASY/XT/Abs. 16 EASY Abs. XT AB 20 317 317 318	277 16 EASY/XT/Abs. 505/507 277 16 EASY Abs. XT 508 278 AB 20 582 279 278 16 EASY/XT/Abs. 505/507 278 16 EASY Abs. XT 508 279 AB 20 582 317 317	277 16 EASY/XT/Abs. 505/507 68.9 277 16 EASY Abs. XT 508 69.4 278 16 EASY/XT/Abs. 505/507 67.1 278 16 EASY/XT/Abs. 505/507 67.6 278 16 EASY Abs. XT 508 67.6 278 AB 20 582 93.1 279 74.0 278 16 EASY/XT/Abs. 505/507 83.6 278 16 EASY Abs. XT 508 84.1 279 AB 20 582 109.6 317 39.7 317 40.8 318 43.7	277 16 EASY/XT/Abs. 505/507 68.9 75.7 277 16 EASY Abs. XT 508 69.4 76.2 278 57.5 64.3 278 16 EASY/XT/Abs. 505/507 67.1 73.9 278 16 EASY Abs. XT 508 67.6 74.4 278 AB 20 582 93.1 99.9 279 74.0 80.8 278 16 EASY/XT/Abs. 505/507 83.6 90.4 278 16 EASY Abs. XT 508 84.1 90.9 279 AB 20 582 109.6 116.4 317 39.7 46.5 317 40.8 47.6 318 43.7 50.5	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 278 16 EASY Abs. XT 508 69.4 76.2 83.0 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 278 16 EASY Abs. XT 508 67.6 74.4 81.2 278 AB 20 582 93.1 99.9 106.7 279 74.0 80.8 87.6 278 16 EASY/XT/Abs. 505/507 83.6 90.4 97.2 278 16 EASY Abs. XT 508 84.1 90.9 97.7 279 AB 20 582 109.6 116.4 123.2 317 39.7 46.5 53.3 317 40.8 47.6 54.4 318 43.7 50.5 57.3	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 82.5 277 16 EASY Abs. XT 508 69.4 76.2 83.0 83.0 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 80.7 278 16 EASY Abs. XT 508 67.6 74.4 81.2 81.2 278 AB 20 582 93.1 99.9 106.7 106.7 279 74.0 80.8 87.6 87.6 278 16 EASY/XT/Abs. 505/507 83.6 90.4 97.2 97.2 278 16 EASY Abs. XT 508 84.1 90.9 97.7 97.7 279 AB 20 582 109.6 116.4 123.2 123.2 317 39.7 46.5 53.3 53.3 317 40.8 47.6 54.4 54.4 318 43.7 50.5 57.3 57.3	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 82.5 89.3 277 16 EASY Abs. XT 508 69.4 76.2 83.0 83.0 89.8 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 80.7 87.5 278 16 EASY Abs. XT 508 67.6 74.4 81.2 81.2 88.0 278 AB 20 582 93.1 99.9 106.7 106.7 113.5 279 74.0 80.8 87.6 87.6 94.4 278 16 EASY/XT/Abs. 505/507 83.6 90.4 97.2 97.2 104.0 278 16 EASY Abs. XT 508 84.1 90.9 97.7 97.7 104.5 279 AB 20 582 109.6 116.4 123.2 123.2 130.0 317 39.7 46.5 53.3 53.3 60.1 318 43.7 50.5 57.3 57.3 64.1	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 82.5 89.3 89.3 277 16 EASY Abs. XT 508 69.4 76.2 83.0 83.0 89.8 89.8 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 80.7 87.5 87.5 278 16 EASY Abs. XT 508 67.6 74.4 81.2 88.0 88.0 278 AB 20 582 93.1 99.9 106.7 106.7 113.5 113.5 279 74.0 80.8 87.6 87.6 94.4 94.4 278 16 EASY/XT/Abs. 505/507 83.6 90.4 97.2 97.2 104.0 104.0 278 16 EASY/Abs. XT 508 84.1 90.9 97.7 97.7 104.5 104.5 279 AB 20 582 109.6 116.4 123.2 123.2 130.0 130.0 317 40.8 47.6 54.4 54.4 61.2 61.2 318 43.7 50.5	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 82.5 89.3 89.3 89.3 277 16 EASY Abs. XT 508 69.4 76.2 83.0 83.0 89.8 89.8 89.8 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 87.5 87	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 82.5 89.3 89.3 89.3 96.1 277 16 EASY Abs. XT 508 69.4 76.2 83.0 83.0 89.8 89.8 89.8 96.6 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 87.5 87.5 87.5 94.3 278 16 EASY Abs. XT 508 67.6 74.4 81.2 88.0 88.0 88.0 94.8 278 AB 20 582 93.1 99.9 106.7 106.7 113.5 113.5 113.5 120.3 279 74.0 80.8 87.6 87.6 94.4 94.4 94.4 101.2 278 16 EASY/XT/Abs. 505/507 83.6 90.4 97.2 97.2 104.0 104.0 104.0 110.8 279 AB 20 582 109.6 116.4 123.2 123.2 130.0 130.0 130.0 130.0 130.0 136.8 317 40.8 47.6 54.4	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 82.5 89.3 89.3 89.3 96.1 96.1 277 16 EASY Abs. XT 508 69.4 76.2 83.0 83.0 89.8 89.8 89.8 96.6 96.6 278 505/507 67.1 73.9 80.7 87.5 87.5 87.5 94.3 94.7 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 87.5 87.5 87.5 94.3 94.3 278 16 EASY Abs. XT 508 67.6 74.4 81.2 88.0 88.0 88.0 94.8 94.8 278 AB 20 582 93.1 99.9 106.7 106.7 113.5 113.5 113.5 120.3 120.3 279 74.0 80.8 87.6 87.6 94.4 94.4 94.4 101.2 101.2 278 16 EASY/XT/Abs. 505/507 83.6 90.4 97.2 97.2 104.0 104.0 104.0 110.8 110.8	277 16 EASY/XT/Abs. 505/507 68.9 75.7 82.5 82.5 89.3 89.3 89.3 96.1 96.1 96.1 277 16 EASY Abs. XT 508 69.4 76.2 83.0 83.0 89.8 89.8 89.8 96.6 96.6 96.6 278 16 EASY/XT/Abs. 505/507 67.1 73.9 80.7 87.5 87.5 87.5 94.3 94.3 94.3 278 16 EASY Abs. XT 508 67.6 74.4 81.2 80.7 87.5 87.5 94.3 94.3 94.3 278 16 EASY Abs. XT 508 67.6 74.4 81.2 81.2 88.0 88.0 94.8 94.8 94.8 278 AB 20 582 93.1 99.9 106.7 106.7 113.5 113.5 113.5 120.3 120.3 120.3 279 74.0 80.8 87.6 87.6 94.4 94.4 94.4 101.2 101.2 101.2 278 16 EASY/XT/Abs. 505/507 83.6 90.4

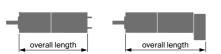
Planetary Gearhead GP 22 HP Ø22 mm, 2.0-3.4 Nm





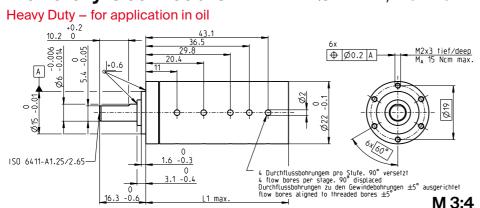
Technical Data				
Planetary Gearhead			straigh	nt teeth
Output shaft	st	ainless	steel, ha	rdened
Bearing at output			ball b	earing
Radial play, 10 mm from	flange		max. 0).2 mm
Axial play			max.	0.1 mm
Max. axial load (dynamic	:)			100 N
Max. force for press fits				100 N
Direction of rotation, driv	e to ou	utput		=
Max. continuous input sp	peed		1200	00 rpm
Recommended tempera	ature ra	nge	-40	+100°C
Number of stages	1	2	3	4
Max. radial load, 10 mm				
from flange	55 N	85 N	100 N	110 N

	Stock program Standard program		Part Nun	nbers									
	Special program (on request)		370683	370687	370690	370776	370780	370783	370792	370797	370802	370807	
Gea	arhead Data (provisional)												
1	Reduction		3.8:1	14:1	20:1	53:1	76:1	104:1	198:1	316:1	410:1	590:1	
2	Absolute reduction		15/4	225/16	81/4	3375/64	1215/16	87723/845	50625/256	2777895/8788	6561/16	59049/100	
3	Max. motor shaft diameter	mm	4	4	4	4	4		4	3.2	4	4	
	Part Numbers		370685	370688	370691	370778	370781	370784	370794	370799	370803	370808	
1	Reduction		4.4:1	16:1	24:1	62:1	84:1	109:1	231:1	333:1	455:1	690:1	
2	Absolute reduction		⁵⁷ /13	855/52		12825/208	185193/2197		192375/832		5000211/10985		
3	Max. motor shaft diameter	mm		3.2	3.2	3.2	3.2		3.2			3.2	
	Part Numbers		370686	370689	370692	370779		370785	370795	370800	370805	370809	
1	Reduction		5.4:1	19:1	29:1	72:1	89:1		270:1	370:1	479:1	850:1	
2	Absolute reduction		27/5	3249/169								531441/625	
3	Max. motor shaft diameter	mm	2.5	3.2	2.5	3.2	3.2		3.2		-	2.5	
	Part Numbers							370786	370796		370806		
1	Reduction							157:1	285:1	389:1	561:1		
2	Absolute reduction							19683/125	18225/64		2368521/4225		
3	Max. motor shaft diameter	mm						2.5	4				
4			1	2	_	3	_	_	4		•	4	
5	Max. continuous torque	Nm	2	2.4		3	3	3	3.4			3.4	
6	Max. intermittent torque at gear output	Nm	2.5	3	3	3.5	3.5	3.5	3.8	3.8	3.8	3.8	
7	Max. efficiency	%	84	70		59	59	59	49	49	49	49	
8	Weight	g	51	64		78	78		91	91	91	91	
9	Average backlash no load	۰	1.0	1.2	1.2	1.6	1.6		2.0	2.0	2.0	2.0	
10	Mass inertia	gcm ²	0.6	0.4	0.4	0.4	0.4		0.4	0.4	0.4	0.4	
11	Gearhead length L1	mm	25.3	32.3	32.3	39.0	39.0	39.0	45.7	45.7	45.7	45.7	



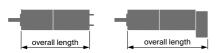
Modular System														
+ Motor	Page	+ Sensor/Brake	Page	Overall le	ngth [mm] = Motor	length +	gearhead	length + (sensor/br	ake) + ass	embly pa	rts	
EC-max 22, 12 W	278		-	57.4	64.4	64.4	71.1	71.1	71.1	77.8	77.8	77.8	77.8	
EC-max 22, 12 W	278	16 EASY/XT/Abs.	505/507	67.0	74.0	74.0	80.7	80.7	80.7	87.4	87.4	87.4	87.4	
EC-max 22, 12 W	278	16 EASY Abs. XT	508	67.5	74.5	74.5	81.2	81.2	81.2	87.9	87.9	87.9	87.9	
EC-max 22, 12 W	278	AB 20	582	93.0	100.0	100.0	106.7	106.7	106.7	113.4	113.4	113.4	113.4	
EC-max 22, 25 W	279			73.9	80.9	80.9	87.6	87.6	87.6	94.3	94.3	94.3	94.3	
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505/507	83.5	90.5	90.5	97.2	97.2	97.2	103.9	103.9	103.9	103.9	
EC-max 22, 25 W	279	16 EASY Abs. XT	508	84.0	91.0	91.0	97.7	97.7	97.7	104.4	104.4	104.4	104.4	
EC-max 22, 25 W	279	AB 20	582	109.5	116.5	116.5	123.2	123.2	123.2	129.9	129.9	129.9	129.9	
EC-4pole 22, 90 W	287			74.0	81.0	81.0	87.7	87.7	87.7	94.4	94.4	94.4	94.4	
EC-4pole 22, 90 W	287	22 EMT	516	99.8	106.8	106.8	113.5	113.5	113.5	120.2	120.2	120.2	120.2	
EC-4pole 22, 90 W	287	16 EASY/XT/Abs.	505/507	86.2	93.2	93.2	99.9	99.9	99.9	106.6	106.6	106.6	106.6	
EC-4pole 22, 90 W	287	16 EASY Abs. XT	508	86.7	93.7	93.7	100.4	100.4	100.4	107.1	107.1	107.1	107.1	
EC-4pole 22, 90 W	287	16 RIO	517	84.7	91.7	91.7	98.4	98.4	98.7	105.1	105.1	105.1	105.1	
EC-4pole 22, 120 W	288			91.4	98.4	98.4	105.1	105.1	105.1	111.8	111.8	111.8	111.8	
EC-4pole 22, 120 W	288	22 EMT	516	117.2	124.2	124.2	130.9	130.9	130.9	137.6	137.6	137.6	137.6	
EC-4pole 22, 120 W	288	16 EASY/XT/Abs.	505/507	103.6	110.6	110.6	117.3	117.3	117.3	124.0	124.0	124.0	124.0	
EC-4pole 22, 120 W	1 288	16 EASY Abs. XT	508	104.1	111.1	111.1	117.8	117.8	117.8	124.5	124.5	124.5	124.5	
EC-4pole 22, 120 W	288	16 RIO	517	102.1	109.1	109.1	115.8	115.8	115.8	122.5	122.5	122.5	122.5	

Planetary Gearhead GP 22 HD Ø22 mm, 2.0-4.0 Nm



Technical Data				
Planetary Gearhead			straigh	t teeth
Output shaft	sta	ainless s	teel, har	dened
Bearing at output			ball b	earing
Radial play, 10 mm from flan	ge		max. C).2 mm
Axial play			max. (0.1 mm
Max. axial load (dynamic)				100 N
Max. force for press fits				100 N
Direction of rotation, drive to	ou	ıtput		=
Max. continuous input speed	b		11'00	00 rpm
Recommended temperature	e ra	nge	-55+	200°C
Extended range as option			-55+	260°C
Number of stages 1	2	3	4	5
Max. radial load, 10 mm				
from flange 55 N 85	Ν	100 N	110 N	110 N

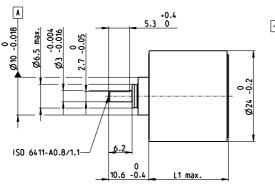
						ı	VI 3:4						
	Stock program Standard program		Part Nun	nbers									
	Special program (on request)		410657	410637	410558	416698	409667	416709	416738	416211	416747	416753	416760
Gea	arhead Data (provisional)												
	Reduction		3.8:1	14:1	53:1	104:1	198:1	370:1	561:1	742:1	1386:1	1798:1	3027:1
2	Absolute reduction		15/4	225/16	3375/64	87723/845	50625/256	10556001/28561	2368521/4225	759375/1024	158340015/114244	373977/208	63950067/21125
3	Max. motor shaft diameter	mm	4	4	4	3.2	4	3.2	3.2	4	3.2	3.2	3.2
	Part Numbers		416684	416686	416693	416699	416703	416710	416739	416742	416748	416754	416762
1	Reduction		4.4:1	16:1	62:1	109:1	231:1	389:1	590:1	867:1	1460:1	1996:1	3189:1
2	Absolute reduction		57/13	855/52	12825/208	2187/20	192375/832	263169/676	59049/100	2885625/3328	3947535/2704	285012027/142805	1594323/500
3	Max. motor shaft diameter	mm	3.2	3.2	3.2	4	3.2	3.2	4	3.2	3.2	3.2	4
	Part Numbers			416687	416694	416701	416704	416711	416740	416743	416749	416756	416763
1	Reduction			19:1	72:1	128:1	270:1	410:1			1538:1	2102:1	3728:1
2	Absolute reduction			3249/169	48735/676	41553/325	731025/2704	6561/16	1121931/1625	10965375/10816	98415/64	7105563/3380	30292137/8125
_ 3	Max. motor shaft diameter	mm		3.2	3.2	3.2	3.2	4	3.2	3.2	4.0	3.2	3.2
	Part Numbers			416688	416695		416706	416736		416744	416751	416757	
1	Reduction			20:1	76:1		285:1	455:1			1621:1		
2	Absolute reduction			81/4	1215/16		18225/64	5000211/10985		273375/256	601692057/371293	177147/80	
3	Max. motor shaft diameter	mm		4	4		4	3.2		4	3.2	4	
	Part Numbers			416689	416696		416707	416737		416745	416752		
1	Reduction			24:1	84:1		316:1	479:1			1707:1		
2	Absolute reduction			1539/65	185193/2197		2777895/8788	124659/260		41668425/35152		135005697/54925	
3	Max. motor shaft diameter	mm		3.2	3.2		3.2	3.2		3.2	3.2	3.2	
	Part Numbers				416697		416708			416746		416759	
1	Reduction				89:1		333:1			1249:1		2589:1	
2	Absolute reduction				4617/52		69255/208			1038825/832		3365793/1300	
3	Max. motor shaft diameter	mm			3.2		3.2			3.2		3.2	
4	Number of stages		1	2	3	3	4	4	4	5	5	5	5
5	Max. continuous torque	Nm	2	2.4	3	3	3.4	3.4	3.4	4	4	4	4
6	Max. intermittent torque at gear output	Nm	2.5	3	3.5	3.5	3.8	3.8	3.8	4.4	4.4	4.4	4.4
15	Max. overload torque ¹⁾	Nm	6	9	12	12	12	12	12	12	12	12	12
7	Max. efficiency	%		87	78	78	65	65	65	52	52	52	52
8	Weight	g	46	65	82	82	96	96	96	110	110	110	110
9	Average backlash no load	۰	1.0	1.2	1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5	2.5
10	Mass inertia	gcm ²		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11	Gearhead length L1	mm	20.6	29.7	38.2	38.2	45.0	45.0	45.0	51.8	51.8	51.8	51.8
13	Max. transmittable power (continuous)	W	160	100	40	40	20	20	20	6	6	6	6
14 1) Red	Max. transmittable power (intermittent)	W	240	150	60	60	30	30	30	9	9	9	9

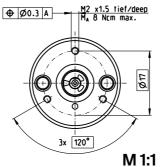


Modulal System														
+ Motor	Page	+ Sensor/Brake	Page	Overall le	ngth [mm] = Motor	length +	gearhead	length + (sensor/br	ake) + ass	embly pa	rts	
EC 22, 240 W, A	266			110.5	119.5	128.0	128.0	135.0	135.0	135.0	141.5	141.5	141.5	141.5
EC 22, 240 W, B	266			98.1	107.5	116.0	116.0	122.4	122.4	122.4	129.5	129.5	129.5	129.5

Application	Important Notice
General	This gearhead has been designed for applications
 extreme temperature applications 	in oil and is only equipped with minimum lubrication.
 vibration tested according to MIL-STD810F/ 	Therefore it is not permitted to use it under normal air
Jan2000 Fig. 514.5C-10	conditions.
 operation in oil and high pressure 	
Oil & Gas Industry	
 oil, gas and geothermal wells 	

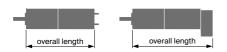
Spur Gearhead GS 24 A Ø24 mm, 0.1 Nm





Technical Data	
Spur Gearhead	straight teeth
Housing	plastic
Output shaft	stainless steel, hardened
Bearing at output	sleeve bearing
Radial play, 8 mm from flang	e max. 0.038 mm
Axial play	0.03-0.30 mm
Max. axial load (dynamic)	8 N
Max. force for press fits	500 N
Max. continuous input speed	d 4000 rpm
Recommended temperature	e range -15+80°C
Max. radial load, 8 mm from	flange 5 N

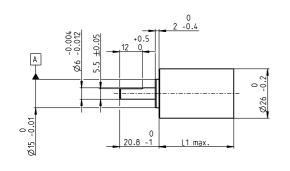
Stock program Standard program		Part Number	s						
Special program (on reques	st)	110480	110481	110482	110483	110484	110485	110486	
Gearhead Data									
1 Reduction		7.2:1	20:1	32:1	64:1	131:1	199:1	325:1	
2 Absolute reduction		93/13	753424/38025	923521/28561	837/13	212629/1625	887503681/4455516	14070001/43264	
3 Max. motor shaft diameter	mm	2	2	2	2	2	2	2	
4 Number of stages		2	4	4	4	4	6	6	
5 Max. continuous torque	Nm	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
6 Max. intermittent torque at ge	ear output Nm	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
12 Direction of rotation, drive to	output	=	=	=	=	=	=	=	
7 Max. efficiency	%	81	66	66	66	66	53	53	
8 Weight	g	25	28	28	28	28	30	30	
9 Average backlash no load	•	1.0	2.0	2.0	2.0	2.0	3.0	3.0	
10 Mass inertia	gcm ²	0.008	0.01	0.008	0.007	0.006	0.008	0.006	
11 Gearhead length L1*	mm	16.5	20.2	20.2	20.2	20.2	24	24	
*L1 for A-max 22 L1 is -2.8 mm									

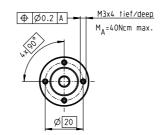


Modular System

Modular System											
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	gth [mm] = Mo	tor length + g	earhead leng	th + (sensor/l	orake) + asser	mbly parts	
A-max 19	173/174		-	45.5		49.2	49.2	49.2	53.0	53.0	
A-max 19, 1.5 W		13 GAMA	502	53.0		56.7	56.7	56.7	60.5	60.5	
A-max 19, 1.5 W	174	MR	533	50.6	54.3	54.3	54.3	54.3	58.1	58.1	
A-max 19, 2.5 W	176			48.1		51.8	51.8	51.8	55.6	55.6	
A-max 19, 2.5 W		13 GAMA	502	55.6		59.3	59.3	59.3	63.1	63.1	
A-max 19, 2.5 W	176	MR	533	52.4		56.1	56.1	56.1	59.9	59.9	
A-max 22	177-180		555	45.7		49.4	49.4	49.4	53.2	53.2	
A-max 22	178/180		502	52.8		56.5	56.5	56.5	60.3	60.3	
A-max 22	178/180		533	50.7		54.4	54.4	54.4	58.2	58.2	
A-111dX 22	170/100	IVIT	555	50.7	54.4	54.4	54.4	54.4	36.2	36.2	

Planetary Gearhead GP 26 A Ø26 mm, 0.75-4.5 Nm

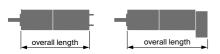




Technical Data			
Planetary Gearhead		straigh	nt teeth
Output shaft	stainless	steel, ha	rdened
Bearing at output	preload	ed ball be	earings
Radial play, 5 mm from flang	je	max.	0.1 mm
Axial play at axial load	< 6 N		0 mm
	> 6 N	max. 0).4 mm
Max. axial load (dynamic)			120 N
Max. force for press fits			120 N
Direction of rotation, drive to	output		=
Max. continuous input speed	d		00 rpm
Recommended temperature	e range	-30	+100°C
Extended range as option		-40	+100°C
Number of stages	1	2	3
Max. radial load, 12 mm			
from flange	70 N	110 N	140 N

	-	
N/I		-,
IVI		_

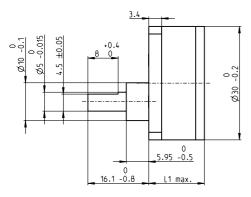
	Stock program Standard program		Part Numl	bers								
	Special program (on request)		406757	406762	406764	406767	406128	406769	406770	406771	406092	
Gea	rhead Data											
1	Reduction		5.2:1	19:1	27:1	35:1	71:1	100:1	139:1	181:1	236:1	
2	Absolute reduction		⁵⁷ / ₁₁	3591/187	3249/121	1539/44	226233/3179	204687/2057	185193/1331	87723/484	41553/176	
3	Max. motor shaft diameter	mm	3	3	3	3	3	3	3	3	3	
4	Number of stages		1	2	2	2	3	3	3	3	3	
5	Max. continuous torque	Nm	0.75	2.25	2.25	2.25	4.5	4.5	4.5	4.5	4.5	
6	Max. intermittent torque at gear output	Nm	1.1	3.2	3.2	3.2	6.2	6.2	6.2	6.2	6.2	
7	Max. efficiency	%	90	80	80	80	70	70	70	70	70	
8	Weight	g	53	77	77	77	93	93	93	93	93	
9	Average backlash no load	۰	0.5	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	
10	Mass inertia	gcm ²	0.96	0.54	0.54	0.54	0.31	0.31	0.31	0.31	0.31	
11	Gearhead length L1	mm	23.4	32.9	32.9	32.9	39.5	39.5	39.5	39.5	39.5	
13	Max. transmittable power (continuous)	W	60	35	35	35	20	20	20	20	20	
14	Max. transmittable power (intermittent)	W	90	50	50	50	30	30	30	30	30	

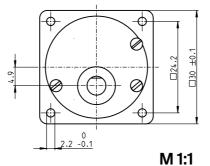


Modular System

+ Motor	Page	+ Sensor/Brake	Page	Overall len	gth [mm] =	Motor ler	ngth + gear	head lengt	h + (senso	r/brake) +	assembly p	oarts	
RE 25	154/156			78.0	87.5	87.5	87.5	94.1	94.1	94.1	94.1	94.1	
RE 25	154/156	HED_5540	535/537	98.8	108.3	108.3	108.3	114.9	114.9	114.9	114.9	114.9	
RE 25	154/156	DCT 22	542	100.3	109.8	109.8	109.8	116.4	116.4	116.4	116.4	116.4	
RE 25, 20 W	155			66.5	76.0	76.0	76.0	82.6	82.6	82.6	82.6	82.6	
RE 25, 20 W	155	HED_5540	536	87.3	96.8	96.8	96.8	103.4	103.4	103.4	103.4	103.4	
RE 25, 20 W	155	DCT 22	542	88.8	98.3	98.3	98.3	104.9	104.9	104.9	104.9	104.9	
RE 25, 20 W	155	AB 28	585	100.6	110.1	110.1	110.1	116.7	116.7	116.7	116.7	116.7	
RE 25, 20 W	155	HED_5540/AB 28	536/585	117.8	127.3	127.3	127.3	133.9	133.9	133.9	133.9	133.9	
RE 25, 20 W	156	AB 28	585	112.1	121.6	121.6	121.6	128.2	128.2	128.2	128.2	128.2	
RE 25, 20 W	156	HED_5540/AB 28	537/585	129.3	138.8	138.8	138.8	145.4	145.4	145.4	145.4	145.4	
A-max 26	181-184			68.2	77.7	77.7	77.7	84.3	84.3	84.3	84.3	84.3	
A-max 26		13 GAMA	502	75.3	84.8	84.8	84.8	91.4	91.4	91.4	91.4	91.4	
A-max 26	181-184	HED_5540	536/538	86.6	96.1	96.1	96.1	102.7	102.7	102.7	102.7	102.7	

Spur Gearhead GS 30 A \varnothing 30 mm, 0.07-0.2 Nm

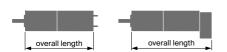




Technical Data	
Spur Gearhead	straight teeth
Output shaft	stainless steel
Shaft diameter as option	8 mm
Bearing at output	sleeve bearing
Radial play, 5 mm from flange	max. 0.1 mm
Axial play	0.03-0.2 mm
Max. axial load (dynamic)	15 N
Max. force for press fits	400 N
Max. continuous input speed	5000 rpm
Recommended temperature range	-5+80°C
Max. radial load, 5 mm from flange	35 N

Option: Low-noise version

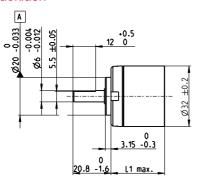
Stock program Standard program	Part Num	bers					
Special program (on request)	110445	110446	110447	110448	110449	110450	
Gearhead Data							
1 Reduction	15	1 30:1	60:1	100:1	200:1	500:1	
2 Absolute reduction		.5 30	60	100	200	500	
3 Max. motor shaft diameter n	ım	2 2	2	2	2	2	
4 Number of stages		3 3	4	4	5	6	
5 Max. continuous torque N	m 0.0	0.07	0.10	0.10	0.20	0.20	
6 Max. intermittent torque at gear output N	m 0.2	21 0.21	0.30	0.30	0.60	0.60	
12 Direction of rotation, drive to output		≠ ≠	=	=	≠	=	
7 Max. efficiency	% 7	'3 73	66	66	60	53	
8 Weight	g 4	10 40	45	45	50	55	
9 Average backlash no load	° 1	.0 1.0	1.5	1.5	2.0	2.5	
10 Mass inertia gci	n ² 0.3	.7 0.14	0.12	0.10	0.10	0.10	
11 Gearhead length L1 m	m 23	.0 23.0	25.5	25.5	30.5	30.5	

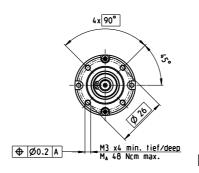


- Motor		+ Sensor/Brake	Page	Overall lengtl		77.4 77.4 82.4 82.4										
-max 26	181-184			67.8	67.8	70.3	70.3	75.3	75.3							
-max 26	182-184	13 GAMA	502	74.9	74.9	77.4	77.4	82.4	82.4							
-max 26		HED_5540	502 536/538	86.2	86.2	88.7	88.7	93.7	93.7							

Planetary Gearhead GP 32 BZ Ø32 mm, 0.75-4.5 Nm

Low Backlash





Technical Data			
Planetary Gearhead		straigh	nt teeth
Output shaft	stainless	steel, ha	rdened
Bearing at output		ball b	pearing
Radial play, 5 mm from flang	ge	max.	0.1 mm
Axial play		max. (0.7 mm
Max. axial load (dynamic)			120 N
Max. force for press fits			120 N
Direction of rotation, drive to	output		=
Max. continuous input spee	d	40	00 rpm
Recommended temperature	e range	-40	+100°C
Number of stages	1	2	3
Max. radial load, 12 mm			
from flange	70 N	110 N	130 N

M 1:2

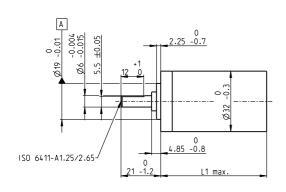
	Stock program Standard program	Part Numbers										
	Special program (on request)		358975	351942	358331	357988	358335	358385	358512	358513	358515	358516
Gea	arhead Data											
1	Reduction		3.7:1	5.2:1	19:1	27:1	35:1	71:1	100:1	139:1	181:1	236:1
2	Absolute reduction		63/17	57/11	3591/187	3249/121	1539/44	226233/3179	204687/2057	185193/1331	87723/484	41553/176
3	Max. motor shaft diameter	mm	5.5	3	3	3	3	3	3	3	3	3
4	Number of stages		1	1	2	2	2	3	3	3	3	3
5	Max. continuous torque	Nm	0.75	0.75	2.25	2.25	2.25	4.5	4.5	4.5	4.5	4.5
	Max. continuous torque within the preloading	Nm	0.5	0.5	1.1	1.1	1.1	1.7	1.7	1.7	1.7	1.7
6	Max. intermittent torque at gear output	Nm	1.1	1.1	3.2	3.2	3.2	6.2	6.2	6.2	6.2	6.2
7	Max. efficiency	%	85	85	80	80	80	70	70	70	70	70
8	Weight	g	150	150	190	190	190	240	240	240	240	240
9	Average backlash no load	۰	0.15	0.15	0.35	0.35	0.35	0.5	0.5	0.5	0.5	0.5
10	Mass inertia e	gcm ²	1.25	1.25	0.75	0.75	0.75	0.7	0.7	0.7	0.7	0.7
11	Gearhead length L1* *for EC 32 L1 is + 6.4 mm, for RE 30 L1 is + 1.0 mm	mm	33.5	33.5	43.6	43.6	43.6	53.1	53.1	53.1	53.1	53.1

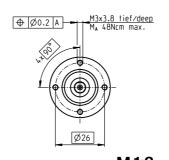




+ Motor	Page	+ Sensor/Brake	Page	Overall ler	ngth [mm]		ength + ge	arhead ler	igth + (sen	sor/brake)) + assemb	oly parts	
RE 25	154/156			88.1	88.1	98.2	98.2	98.2	107.7	107.7	107.7	107.7	107.7
RE 25		HED_5540	535/537	108.9	108.9	119.0	119.0	119.0	128.5	128.5	128.5	128.5	128.5
RE 25	154/156	DCT 22	542	110.4	110.4	120.5	120.5	120.5	130.0	130.0	130.0	130.0	130.0
RE 25, 20 W	155			76.6	76.6	86.7	86.7	86.7	96.2	96.2	96.2	96.2	96.2
RE 25, 20 W	155	HED_5540	536/537	97.4	97.4	107.5	107.5	107.5	117.0	117.0	117.0	117.0	117.0
RE 25, 20 W	155	DCT 22	542	98.9	98.9	109.0	109.0	109.0	118.5	118.5	118.5	118.5	118.5
RE 25, 20 W	155	AB 28	585	110.7	110.7	120.8	120.8	120.8	130.3	130.3	130.3	130.3	130.3
RE 25, 20 W	155	HED_5540/AB 28	536/585	127.9	127.9	138.0	138.0	138.0	147.5	147.5	147.5	147.5	147.5
RE 25, 20 W	156	AB 28	585	122.2	122.2	132.3	132.3	132.3	141.8	141.8	141.8	141.8	141.8
RE 25, 20 W	156	HED_5540/AB 28	535/585	139.4	139.4	149.5	149.5	149.5	159.0	159.0	159.0	159.0	159.0
RE 30, 60 W	158			102.6	102.6	112.7	112.7	112.7	122.2	122.2	122.2	122.2	122.2
RE 30, 60 W	158	HED_5540	535/537	123.4	123.4	133.5	133.5	133.5	143.0	143.0	143.0	143.0	143.0
RE 35, 90 W	159			104.6	104.6	114.7	114.7	114.7	124.2	124.2	124.2	124.2	124.2
RE 35, 90 W	159	HED_5540	535/537	125.3	125.3	135.4	135.4	135.4	144.9	144.9	144.9	144.9	144.9
RE 35, 90 W	159	DCT 22	542	122.7	122.7	132.8	132.8	132.8	142.3	142.3	142.3	142.3	142.3
RE 35, 90 W	159	AB 28	585	140.7	140.7	150.8	150.8	150.8	160.3	160.3	160.3	160.3	160.3
RE 35, 90 W	159	HEDS 5540/AB 28	535/585	157.9	157.9	168.0	168.0	168.0	177.5	177.5	177.5	177.5	177.5
A-max 26	181-184			78.3	78.3	88.4	88.4	88.4	97.9	97.9	97.9	97.9	97.9
A-max 26		13 GAMA	502	85.4	85.4	95.5	95.5	95.5	105.0	105.0	105.0	105.0	105.0
A-max 26	181-184	HED_5540	536/538	96.7	96.7	106.8	106.8	106.8	116.3	116.3	116.3	116.3	116.3
A-max 32	185			96.5	96.5	106.6	106.6	106.6	116.1	116.1	116.1	116.1	116.1
A-max 32	186			95.1	95.1	105.2	105.2	105.2	114.7	114.7	114.7	114.7	114.7
A-max 32	186	HED_5540	536/538	115.9	115.9	126.0	126.0	126.0	135.5	135.5	135.5	135.5	135.5
EC 32, 80 W	267			100.2	100.2	110.3	110.3	110.3	119.8	119.8	119.8	119.8	119.8
EC 32, 80 W	267	HED_5540	536/538	118.6	118.6	128.7	128.7	128.7	138.2	138.2	138.2	138.2	138.2
EC 32, 80 W	267	Res 26	543	120.3	120.3	130.4	130.4	130.4	139.9	139.9	139.9	139.9	139.9

Planetary Gearhead GP 32 A Ø32 mm, 0.75-4.5 Nm



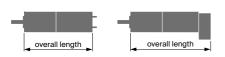


Planetary Gearhead straight teeth Output shaft stainless steel Shaft diameter as option Bearing at output ball bearing Radial play, 5 mm from flange max. 0.14 mm Axial play max. 0.4 mm Max. axial load (dynamic) 120 N Max. force for press fits 120 N Direction of rotation, drive to output 6000 rpm Max. continuous input speed Recommended temperature range -40...+100°C Number of stages 1 4 Max. radial load, 10 mm from flange 90 N 140 N 200 N 220 N 220 N

M 1:2 From flange 90 Option: Low-noise version

Standard program	Part Numbers												
Special program (on request)	166155	166158	166163	166164	166169	166174	166179	166184	166187	1661			
Gearhead Data													

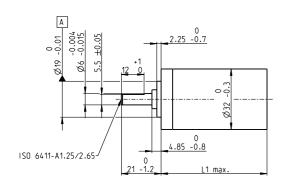
	Special program (on request)		166155	166158	166163	166164	166169	166174	166179	166184	166187	166192	166197	166202
Gea	arhead Data													
1	Reduction		3.7:1	14:1	33:1	51:1	111:1	246:1	492:1	762:1	1181:1	1972:1	2829:1	
2	Absolute reduction		26/7	676/49	⁵²⁹ / ₁₆	17576/343	13824/125	421824/1715	86112/175	19044/25	10123776/8575	8626176/4375	495144/175	109503/25
3	Max. motor shaft diameter	mm	6	6	3	6	4	4	3	3	4	4	3	3
	Part Numbers		166156			166165	166170						166198	
1	Reduction		4.8:1	18:1									3052:1	
2	Absolute reduction		24/5	624/35		16224/245	6877/56	101062/343	331776/625	36501/40	2425488/1715	536406/245	1907712/625	839523/160
3	Max. motor shaft diameter	mm	4	4		4	3	3	4	3	3	3	3	3
	Part Numbers			166160			166171						166199	
1	Reduction		5.8:1	21:1				318:1					3389:1	
2	Absolute reduction		23/4	²⁹⁹ / ₁₄		3887/49	3312/25	389376/1225	20631/35	279841/256	9345024/6125	2066688/875	474513/140	6436343/1024
3	Max. motor shaft diameter	mm	3	3		3	3	4	3	3		3	3	3
	Part Numbers			166161		166167	166172	166177	166182				166200	
1	Reduction			23:1			159:1		636:1		1694:1			
2	Absolute reduction			576/25		14976/175		359424/875	79488/125				457056/125	
3	Max. motor shaft diameter	mm		4		4	3	4	3		3	4		
	Part Numbers			166162				166178					166201	
1	Reduction			28:1			190:1	456:1	706:1		1828:1			
2	Absolute reduction			138/5		3588/35	12167/64		158171/224				3637933/896	
3	Max. motor shaft diameter	mm		3		3	3	3	3		3	3	3	
4			1	2	2	3	3	4	4	4	5	5	5	5
5	Max. continuous torque	Nm	0.75	2.25	2.25	4.50	4.50	4.50	4.50	4.50		4.50		4.50
6	Max. intermittent torque at gear output	Nm	1.1	3.4	3.4	6.5	6.5		6.5	6.5		6.5		6.5
7	Max. efficiency	%	80	75	75	70	70	60	60	60	50	50		50
8	Weight	g	118	162	162	194	194	226	226	226	258	258	258	258
9	Average backlash no load	۰	0.7	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
10		gcm ²	1.5	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
11	Gearhead length L1	mm	26.5	36.4	36.4	43.1	43.1	49.8	49.8	49.8	56.5	56.5	56.5	56.5

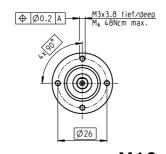




Modular System															
+ Motor	Page	+ Sensor/Brake	Page	Overall	ength [r	mm] = M	otor leng	gth + gea	rhead le	ngth + (s	ensor/b	rake) + as	sembly	parts	
RE 25	154/156			81.1	91.0	91.0	97.7	97.7	104.4	104.4	104.4	111.1	111.1	111.1	111.1
RE 25	154/156	HED_5540	535/537	101.9	111.8	111.8	118.5	118.5	125.2	125.2	125.2	131.9	131.9	131.9	131.9
RE 25	154/156	DCT 22	542	103.4	113.3	113.3	120.0	120.0	126.7	126.7	126.7	133.4	133.4	133.4	133.4
RE 25, 20 W	155			69.6	79.5	79.5	86.2	86.2	92.9	92.9	92.9	99.6	99.6	99.6	99.6
RE 25, 20 W	155	HED_5540	536	90.4	100.3	100.3	107.0	107.0	113.7	113.7	113.7	120.4	120.4	120.4	120.4
RE 25, 20 W	155	DCT 22	542	91.9	101.8	101.8	108.5	108.5	115.2	115.2	115.2	121.9	121.9	121.9	121.9
RE 25, 20 W	155	AB 28	585	103.7	113.6	113.6	120.3	120.3	127.0	127.0	127.0	133.7	133.7	133.7	133.7
RE 25, 20 W	155	HED_5540/AB 28	536/585	120.9	130.8	130.8	137.5	137.5	144.2	144.2	144.2	150.9	150.9	150.9	150.9
RE 25, 20 W	156	AB 28	585	115.2	125.1	125.1	131.8	131.8	138.5	138.5	138.5	145.2	145.2	145.2	145.2
RE 25, 20 W	156	HED_5540/AB 28	535/585	132.4	142.3	142.3	149.0	149.0	155.7	155.7	155.7	162.4	162.4	162.4	162.4
RE 30, 15 W	157			94.6	104.5	104.5	111.2	111.2	117.9	117.9	117.9	124.6	124.6	124.6	124.6
RE 30, 15 W	157	HED_5540	535/537	115.4	125.3	125.3	132.0	132.0	138.7	138.7	138.7	145.4	145.4	145.4	145.4
RE 30, 60 W	158			94.6	104.5	104.5	111.2	111.2	117.9	117.9	117.9	124.6	124.6	124.6	124.6
RE 30, 60 W	158	HED_5540	535/537	115.4	125.3	125.3	132.0	132.0	138.7	138.7	138.7	145.4	145.4	145.4	145.4
RE 35, 90 W	159			97.6	107.5	107.5	114.2	114.2	120.9	120.9	120.9	127.6	127.6	127.6	127.6
RE 35, 90 W	159	HED_5540	535/537	118.3	128.2	128.2	134.9	134.9	141.6	141.6	141.6	148.3	148.3	148.3	148.3
RE 35, 90 W	159	DCT 22	542	115.7	125.6	125.6	132.3	132.3	139.0	139.0	139.0	145.7	145.7	145.7	145.7
RE 35, 90 W	159	AB 28	585	133.7	143.6	143.6	150.3	150.3	157.0	157.0	157.0	163.7	163.7	163.7	163.7
RE 35, 90 W	159	HEDS 5540/AB 28	535/585	150.9	160.8	160.8	167.5	167.5	174.2	174.2	174.2	180.9	180.9	180.9	180.9

Planetary Gearhead GP 32 A Ø32 mm, 0.75-4.5 Nm





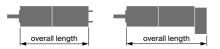
Technical Data Planetary Gearhead straight teeth Output shaft stainless steel Shaft diameter as option 8 mm Bearing at output ball bearing Radial play, 5 mm from flange max. 0.14 mm Axial play max. 0.4 mm Max. axial load (dynamic) 120 N Max. force for press fits 120 N Direction of rotation, drive to output 6000 rpm Max. continuous input speed Recommended temperature range -40...+100°C Number of stages 1 Max. radial load, 10 mm 4 from flange 90 N 140 N 200 N 220 N 220 N

M 1:2

Option: Low-noise version

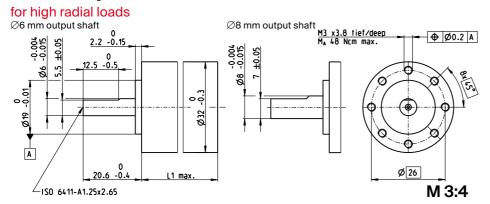
Stock program
Standard program
Special program (on request)

Part Nu	mbers										
166155	166158	166163	166164	166169	166174	166179	166184	166187	166192	166197	166202
166156	166159		166165	166170	166175	166180	166185	166188	166193	166198	166203
166157	166160		166166	166171	166176	166181	166186	166189	166194	166199	166204
	166161		166167	166172	166177	166182		166190	166195	166200	
	166162		166168	166173	166178	166183		166191	166196	166201	



Modular System															
+ Motor Page + Sensor/Brake Page Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts															
A-max 26	182/184		502	78.4	88.3	88.3	95.0	95.0				108.4			108.4
A-max 26	181-184			71.3	81.2	81.2	87.9	87.9	94.6	94.6	94.6	101.3	101.3	101.3	101.3
A-max 26		HED_5540	536/538	89.7	99.6	99.6	106.3	106.3	113.0				119.7		119.7
A-max 32	185		000,000	89.5	99.4	99.4	106.1	106.1	112.8					119.5	119.5
A-max 32	186			88.1	98.0	98.0	104.7	104.7	111.4			118.1			
A-max 32	186	HED 5540	536/538		118.8	118.8		125.5	132.2				138.9		138.9
EC 32, 80 W	267			86.6	96.5	96.5	103.2	103.2		109.9	109.9	116.6	116.6	116.6	116.6
EC 32, 80 W	267	HED_5540	536	105.0								135.0			135.0
EC 32, 80 W	267	Res 26	543	106.7	116.6	116.6	123.3	123.3	130.0		130.0	136.7			136.7
EC-max 30, 40 W	280	1.00 20	0.0	68.6	78.5	78.5	85.2	85.2	91.9	91.9	91.9	98.6	98.6	98.6	98.6
EC-max 30, 40 W	279	16 EASY/XT/Abs.	505/507	79.7	89.6	89.6	96.3	96.3	103.0	103.0	103.0	109.7	109.7	109.7	109.7
EC-max 30, 40 W	279	16 EASY Abs. XT	508	80.2	90.1	90.1	96.8	96.8	103.5	103.5	103.5	110.2	110.2	110.2	
EC-max 30, 40 W	280	HEDL 5540	539	89.2	99.1	99.1	105.8	105.8	112.5	112.5	112.5	119.2	119.2	119.2	119.2
EC-max 30, 40 W	280	AB 20	582	104.2	114.1	114.1	120.8	120.8	127.5	127.5	127.5	134.2			134.2
EC-max 30, 40 W	280	HEDL 5540/AB20	539/582		134.7	134.7	141.4	141.4	148.1	148.1		154.8		154.8	154.8
EC-max 30, 60 W	281		000,002	90.6	100.5	100.5	107.2	107.2	113.9	113.9	113.9		120.6	120.6	120.6
EC-max 30, 60 W	281	16 EASY/XT/Abs.	505/507	101.7	111.6	111.6	118.3	118.3	125.0	125.0	125.0	131.7	131.7	131.7	131.7
EC-max 30, 60 W	281	16 EASY Abs. XT	508	102.2		112.1		118.8	125.5	125.5	125.5			132.2	
EC-max 30, 60 W	281	HEDL 5540	539	111.2	121.1	121.1	127.8	127.8	134.5	134.5	134.5	141.2	141.2	141.2	141.2
EC-max 30, 60 W	281	AB 20	582	126.2	136.1	136.1	142.8	142.8	149.5	149.5	149.5	156.2	156.2	156.2	156.2
EC-max 30, 60 W	281	HEDL 5540/AB20	539/582		156.7	156.7	163.4	163.4	170.1	170.1		176.8	176.8	176.8	176.8
EC 45 flat, 30 W, A	320		000,002	43.1	53.0	53.0	59.7	59.7	66.4	66.4	66.4	73.1	73.1	73.1	73.1
EC 45 flat, 30 W, cable				44.4	54.3	54.3	61.0	61.0	67.7	67.7	67.7	74.4	74.4	74.4	74.4
EC 45 flat, 30 W, A	320	MILE	529	45.2	55.1	55.1	61.8	61.8	68.5	68.5	68.5	75.2	75.2	75.2	75.2
EC 45 flat, 50 W, A	321			48.6	58.5	58.5	65.2	65.2	71.9	71.9	71.9	78.6	78.6	78.6	78.6
EC 45 flat, 50 W, A	321	MILE	529	49.2	59.1	59.1	65.8	65.8	72.5	72.5	72.5	79.2	79.2	79.2	79.2
EC 45 flat, 60 W, A	322		020	48.6	58.5	58.5	65.2	65.2	71.9	71.9	71.9	78.6	78.6	78.6	78.6
EC 45 flat, 60 W, A	322	MILE	529	49.4	59.3	59.3	66.0	66.0	72.7	72.7	72.7	79.4	79.4	79.4	79.4
EC 45 flat, 90 W, A	323		020	54.6	64.5	64.5	71.2	71.2	77.9	77.9	77.9	84.6	84.6	84.6	84.6
EC 45 flat, 90 W, A	323	MILE	529	55.4	65.3	65.3	72.0	72.0	78.7	78.7	78.7	85.4	85.4	85.4	85.4
EC 45 flat, 70 W, A	324		020	53.6	63.5	63.5	70.2	70.2	76.9	76.9	76.9	83.6	83.6	83.6	83.6
EC 45 flat, 70 W, A	324	MILE	529	55.0	64.9	64.9	71.6	71.6	78.3	78.3	78.3	85.0	85.0	85.0	85.0
EC 45 flat, 80 W, A	325	WIILE	020	53.6	63.5	63.5	70.2	70.2	76.9	76.9	76.9	83.6	83.6	83.6	83.6
EC 45 flat, 80 W, A	325	MILE	529	54.4	64.3	64.3	71.0	71.0	77.7	77.7	77.7	84.4	84.4	84.4	84.4
EC 45 flat, 120 W, A		WIILE	020	59.6	69.5	69.5	76.2	76.2	82.9	82.9	82.9	89.6	89.6	89.6	89.6
EC 45 flat, 120 W, A		MILE	529	60.4	70.3	70.3	77.0	77.0	83.7	83.7	83.7	90.4	90.4	90.4	90.4
EC 45 flat, IE, IP 00		IVIILL	023	62.4	72.3	72.3	79.0	79.0	85.7	85.7	85.7	92.4	92.4	92.4	92.4
EC 45 flat, IE, IP 40				64.6	74.5	74.5	81.2	81.2	87.9	87.9	87.9	94.6	94.6	94.6	94.6
EC 45 flat, IE, IP 00				67.4	77.3	77.3	84.0	84.0	90.7	90.7	90.7	97.4	97.4	97.4	97.4
EC 45 flat, IE, IP 40				69.6	79.5	79.5	86.2	86.2	92.9	92.9	92.9	99.6	99.6	99.6	99.6
10 mai, i_, ii +0	020			00.0	1 0.0	1 0.0	00.2	00.2	02.0	02.0	02.0	00.0	00.0	00.0	00.0

Planetary Gearhead GP 32 AR Ø32 mm, 0.75 Nm



Technical Data		
Planetary Gearhead	straiç	ght teeth
Output shaft	stainle	ess steel
Bearing at output	ball	bearing
Radial play, 5 mm from flange	max. (0.14 mm
Axial play	max	. 0.1 mm
Max. axial load (dynamic)		120 N
Max. force for press fits		120 N
Direction of rotation, drive to output		=
Max. continuous input speed	60	000 rpm
Recommended temperature range	-40	+100°C
Output shaft diameter	6 mm	8 mm
Max. radial load, 10 mm		
from flange	140 N	120 N

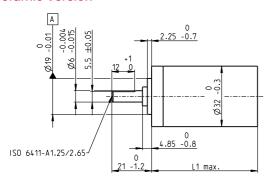
	Stock program Standard program Special program (on request)		Part Number	rs 425861	425860		
Gea	rhead Data		423002	723001	423000		
1	Reduction	·	3.7:1	4.8:1	5.8:1	·	
2	Absolute reduction		26/7	24/5	23/4		
3	Max. motor shaft diameter	mm	6	4	3		
	Output shaft diameter	mm	6	6	6		
	Part Numbers		425901	425899	425898		
1	Reduction		3.7:1	4.8:1	5.8:1		
2	Absolute reduction		26/7	24/5	23/4		
3	Max. motor shaft diameter	mm	6	4	3		
	Output shaft diameter	mm	8	8	8		
4	Number of stages		1	1	1		
5	Max. continuous torque	Nm	0.75	0.75	0.75		
6	Max. intermittent torque at gear output	Nm	1.1	1.1	1.1		
7	Max. efficiency	%	90	90	90		
8	Weight	g	111	111	111		
9	Average backlash no load	۰	0.7	0.7	0.7		
10	Mass inertia	gcm ²	1.6	0.9	0.6		
11	Gearhead length L1	mm	26.2	26.2	26.2		

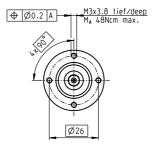


- Motor	Page	+ Sensor/Brake	Page	Overall length	1 [mm] = 10101	tor iengtn + g	gearhead length + (sei	isor/brake) + a	assembiy pa	πs
RE 30, 60 W	158		_	94.3	94.3	94.3		·		
RE 30, 60 W	158	HED_5540	535/537	115.1	115.1	115.1				
RE 35, 90 W	159			97.3	97.3	97.3				
RE 35, 90 W	159	HED_5540	535/537	118.0	118.0	118.0				
RE 35, 90 W	159	DCT 22	542	115.4	115.4	115.4				
RE 35, 90 W	159	AB 28	585	133.4	133.4	133.4				
RE 35, 90 W	159	HED_5540/AB 28	535/585		150.5	150.5				
C 32, 80 W	267			86.3	86.3	86.3				
C 32, 80 W	267	HED_5540	536/538	104.7	104.7	104.7				
C 32, 80 W	267	Res 26	543	106.4	106.4	106.4				

Planetary Gearhead GP 32 C Ø32 mm, 1.0-6.0 Nm

Ceramic Version





١л	1	. 2
VI		-

Technical Data	
Planetary Gearhead	straight teeth
Output shaft	stainless steel
Shaft diameter as option	8 mm
Bearing at output	ball bearing
Radial play, 5 mm from flange	max. 0.14 mm
Axial play	max. 0.4 mm
Max. axial load (dynamic)	120 N
Max. force for press fits	120 N
Direction of rotation, drive to output	=
Max. continuous input speed	8000 rpm
Recommended temperature range	-40+100°C
Number of stages 1 2 3	4 5
Max. radial load, 10 mm	
from flange 90 N 140 N 200 N	220 N 220 N

• Continue I and mains described

	Stock program Standard program		Part Nu	mbers										
	Special program (on request)		166930	166933	66938	166939	166944	166949	166954	166959	166962	166967	166972	166977
Gea	rhead Data													
1	Reduction		3.7:1	14:1	33:1	51:1	111:1	246:1	492:1	762:1	1181:1	1972:1	2829:1	4380:1
2	Absolute reduction		26/7	676/49	529/16	17576/343	13824/125	421824/1715	86112/175	19044/25	10123776/8575	8626176/4375	495144/175	109503/25
3	Max. motor shaft diameter	mm	6	6	3	6	4	4	3	3	4	4	3	3
	Part Numbers		166931	166934		166940	166945	166950	166955	166960	166963	166968	166973	166978
1	Reduction		4.8:1	18:1		66:1	123:1	295:1	531:1	913:1	1414:1	2189:1	3052:1	5247:1
2	Absolute reduction		24/5	624/35		16224/245	6877/56	101062/343	331776/625	36501/40	2425488/1715	536406/245	1907712/625	839523/160
3	Max. motor shaft diameter	mm	4	4		4	3		4	3	3	3	3	3
	Part Numbers		166932	166935		166941	166946	166951	166956	166961	166964	166969	166974	166979
1	Reduction		5.8:1	21:1				318:1						
2	Absolute reduction		23/4	299/14		3887/49	3312/25	389376/1225	20631/35	279841/256	9345024/6125	2066688/875	474513/140	6436343/1024
_ 3	Max. motor shaft diameter	mm	3	3		3	3	4	3	3	4	3	3	3
	Part Numbers			166936				166952			166965			
1	Reduction			23:1		86:1		411:1	636:1		1694:1			
2	Absolute reduction			576/25		14976/175	¹⁵⁸⁷ /10	359424/875	79488/125		1162213/686	7962624/3125	457056/125	
3	Max. motor shaft diameter	mm		4		4	3	4	3		3	4	3	
	Part Numbers			166937				166953	166958		166966			
1	Reduction			28:1			190:1		706:1		1828:1			
2	Absolute reduction			138/5		3588/35	12167/64	89401/196	158171/224		2238912/1225	2056223/784	3637933/896	
3	Max. motor shaft diameter	mm		3		3	3	3	3		3	3	3	
4	Number of stages		1	2	2	3	3	4	4	4	5	5	5	5
5	Max. continuous torque	Nm	1	3	3	6	6	6	6	6	6	6	6	6
6	Max. intermittent torque at gear output	Nm	1.25	3.75	3.75	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
7	Max. efficiency	%	80	75	75	70	70	60	60	60	50	50	50	50
8	Weight	g	118	162	162	194	194	226	226	226	258	258	258	258
9	Average backlash no load	۰	0.7	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
10	Mass inertia	gcm ²	1.5	0.8	8.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
11	Gearhead length L1	mm	26.5	36.4	36.4	43.1	43.1	49.8	49.8	49.8	56.5	56.5	56.5	56.5



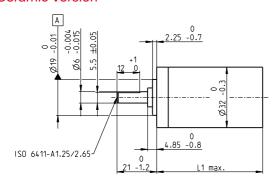


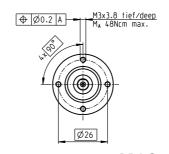


Modular System															
+ Motor	Page	+ Sensor/Brake	Page	Overall	length [r	nm] = M	otor leng	jth + gea	rhead le	ngth + (s	ensor/br	ake) + as	ssembly	parts	
RE 25, 10 W	154			81.1	91.0	91.0	97.7	97.7	104.4	104.4	104.4	111.1	111.1	111.1	111.1
RE 25, 10 W	154	HED_5540	535/537	101.9	111.8	111.8	118.5	118.5	125.2	125.2	125.2	131.9	131.9	131.9	131.9
RE 25, 10 W	154	DCT 22	542	103.4	113.3	113.3	120.0	120.0	126.7	126.7	126.7	133.4	133.4	133.4	133.4
RE 25, 20 W	155			69.6	79.5	79.5	86.2	86.2	92.9	92.9	92.9	99.6	99.6	99.6	99.6
RE 25, 20 W	155	HED_5540	535-537	90.4	100.3	100.3	107.0	107.0	113.7	113.7	113.7	120.4	120.4	120.4	120.4
RE 25, 20 W	155	DCT 22	542	91.9	101.8	101.8	108.5	108.5	115.2	115.2	115.2	121.9	121.9	121.9	121.9
RE 25, 20 W	155	AB 28	585	103.7	113.6	113.6	120.3	120.3	127.0	127.0	127.0	133.7	133.7	133.7	133.7
RE 25, 20 W	155	HEDS 5540/AB 28	535/585	120.9	130.8	130.8	137.5	137.5	144.2	144.2	144.2	150.9	150.9	150.9	150.9
RE 25, 20 W	156	AB 28	585	115.2	125.1	125.1	131.8	131.8	138.5	138.5	138.5	145.2	145.2	145.2	145.2
RE 25, 20 W	156	HEDS 5540/AB 28	535/585	132.4	142.3	142.3	149.0	149.0	155.7	155.7	155.7	162.4	162.4	162.4	162.4
RE 30, 60 W	158			94.6	104.5	104.5	111.2	111.2	117.9	117.9	117.9	124.6	124.6	124.6	124.6
RE 30, 60 W	158	HED_5540	535/537	115.4	125.3	125.3	132.0	132.0	138.7	138.7	138.7	145.4	145.4	145.4	145.4
RE 35, 90 W	159			97.6	107.5	107.5	114.2	114.2	120.9	120.9	120.9	127.6	127.6	127.6	127.6
RE 35, 90 W	159	HED_5540	535/537	118.3	128.2	128.2	134.9	134.9	141.6	141.6	141.6	148.3	148.3	148.3	148.3
RE 35, 90 W	159	DCT 22	542	115.7	125.6	125.6	132.3	132.3	139.0	139.0	139.0	145.7	145.7	145.7	145.7
RE 35, 90 W	159	AB 28	585	133.7	143.6	143.6	150.3	150.3	157.0	157.0	157.0	163.7	163.7	163.7	163.7
RE 35, 90 W	159	HEDS 5540/AB 28	535/585	150.9	160.8	160.8	167.5	167.5	174.2	174.2	174.2	180.9	180.9	180.9	180.9
A-max 26	181-184			71.3	81.2	81.2	87.9	87.9	94.6	94.6	94.6	101.3	101.3	101.3	101.3
A-max 26	182/184	13 GAMA	502	78.4	88.3	88.3	95.0	95.0	101.7	101.7	101.7	108.4	108.4	108.4	108.4
A-max 26	181-184	HED_5540	536/538	89.7	99.6	99.6	106.3	106.3	113.0	113.0	113.0	119.7	119.7	119.7	119.7
A-max 32, 20 W	185			89.5	99.4	99.4	106.1	106.1	112.8	112.8	112.8	119.5	119.5	119.5	119.5
A-max 32, 20 W	186			88.1	98.0	98.0	104.7	104.7	111.4	111.4	111.4	118.1	118.1	118.1	118.1
A-max 32, 20 W	186	HED_5540	536/538	108.9	118.8	118.8	125.5	125.5	132.2	132.2	132.2	138.9	138.9	138.9	138.9
EC 32, 80 W	267			86.6	96.5	96.5	103.2	103.2	109.9	109.9	109.9	116.6	116.6	116.6	116.6
EC 32, 80 W	267	HED_5540	536/538	105.0	114.9	114.9	121.6	121.6	128.3	128.3	128.3	135.0	135.0	135.0	135.0
EC 32, 80 W	267	Res 26	543	106.7	116.6	116.6	123.3	123.3	130.0	130.0	130.0	136.7	136.7	136.7	136.7
EC-max 22, 25 W	279			75.1	85.0	85.0	91.7	91.7	98.4	98.4	98.4	105.1	105.1	105.1	105.1
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505/507	84.7	94.6	94.6	101.3	101.3	108.0	108.0	108.0	114.7	114.7	114.7	114.7
EC-max 22, 25 W	279	16 EASY Abs. XT	508	85.2	95.1	95.1	101.8	101.8	108.5	108.5	108.5	115.2	115.2	115.2	115.2
EC-max 22, 25 W	279	AB 20	582	110.7	120.6	120.6	127.3	127.3	134.0	134.0	134.0	140.7	140.7	140.7	140.7
EC-max 30, 40 W	280			68.6	78.5	78.5	85.2	85.2	91.9	91.9	91.9	98.6	98.6	98.6	98.6

Planetary Gearhead GP 32 C Ø32 mm, 1.0-6.0 Nm

Ceramic Version





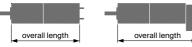
Planetary Gearhead straight teeth Output shaft stainless steel Shaft diameter as option Bearing at output ball bearing Radial play, 5 mm from flange max. 0.14 mm Axial play max. 0.4 mm Max. axial load (dynamic) 120 N Max. force for press fits 120 N Direction of rotation, drive to output 8000 rpm Max. continuous input speed Recommended temperature range -40...+100°C Number of stages 1 4 Max. radial load, 10 mm from flange 90 N 140 N 200 N 220 N 220 N

M 1:2

Ontion: Low-noise vers

Stock program
Standard program
Special program (on request)

Part Nu	Part Numbers												
166930	166933	166938	166939	166944	166949	166954	166959	166962	166967	166972	166977		
166931	166934		166940	166945	166950	166955	166960	166963	166968	166973	166978		
166932	166935		166941	166946	166951	166956	166961	166964	166969	166974	166979		
	166936		166942	166947	166952	166957		166965	166970	166975			
	166937		166943	166948	166953	166958		166966	166971	166976			

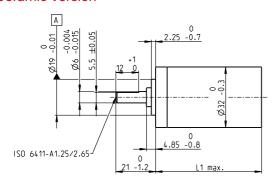


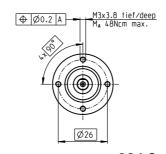


		P													
Modular System															
+ Motor	Page	+ Sensor/Brake	Page	Overall I		-	-	-				•	-		
EC-max 30, 40 W	280	16 EASY/XT/Abs.	505-507	79.7	89.6	89.6	96.3	96.3	103.0	103.0		109.7	109.7		
EC-max 30, 40 W	280	16 EASY Abs. XT	508	80.2	90.1	90.1	96.8	96.8	103.5	103.5	103.5				110.2
EC-max 30, 40 W	280	HEDL 5540	539	89.2	99.1	99.1	105.8	105.8	112.5	112.5			119.2		119.2
EC-max 30, 40 W	280	AB 20	582	104.2	114.1	114.1	120.8	120.8	127.5	127.5	127.5	134.2		134.2	134.2
EC-max 30, 40 W	280	HEDL 5540/AB 20	539/582		134.7	134.7	141.4	141.4	148.1	148.1	148.1	154.8	154.8	154.8	154.8
EC-max 30, 60 W	281			90.6	100.5	100.5	107.2		113.9			120.6	120.6		120.6
EC-max 30, 60 W	281	16 EASY/XT/Abs.	505-507	101.7	111.6	111.6	118.3	118.3	125.0	125.0	125.0	131.7	131.7	131.7	131.7
EC-max 30, 60 W	281	16 EASY Abs. XT	508	102.2		112.1	118.8	118.8	125.5	125.5	125.5	132.2		132.2	132.2
EC-max 30, 60 W	281	HEDL 5540	539	111.2	121.1	121.1	127.8	127.8	134.5	134.5	134.5	141.2	141.2	141.2	141.2
EC-max 30, 60 W	281	AB 20	582	126.2		136.1			149.5	149.5		156.2			
EC-max 30, 60 W	281	HEDL 5540/AB 20	539/582		156.7	156.7	163.4	163.4	170.1	170.1	170.1	176.8	176.8	176.8	176.8
EC-4pole 22, 90 W	287	00 5147	510	75.2	85.1	85.1	91.8	91.8	98.5	98.5	98.5		105.2	105.2	105.2
EC-4pole 22, 90 W	287	22 EMT	516	101.0	110.9	110.9	117.6	117.6	124.3	124.3	124.3	131.0	131.0	131.0	131.0
EC-4pole 22, 90 W	287	16 EASY/XT/Abs.	505-507	87.4	97.3	97.3	104.0	104.0	110.7	110.7		117.4	117.4	117.4	117.4
EC-4pole 22, 90 W	287	16 EASY Abs. XT	508	87.9	97.8	97.8	104.5	104.5	111.2	111.2		117.9	117.9	117.9	117.9
EC-4pole 22, 90 W	287	16 RIO	517	85.9	95.8	95.8	102.5	102.5	109.2	109.2		115.9	115.9	115.9	115.9
EC-4pole 22, 120 W	288	OO EMT	F10	92.6	102.5	102.5	109.2	109.2	115.9	115.9	115.9	122.6	122.6	122.6	122.6
EC-4pole 22, 120 W	288 288	22 EMT 16 EASY/XT/Abs.	516 505-507	118.4 104.8	128.3 114.7	128.3 114.7	135.0 121.4	135.0 121.4	141.7 128.1	141.7	141.7 128.1	148.4 134.8	148.4 134.8	148.4 134.8	148.4 134.8
EC-4pole 22, 120 W	288	16 EASY Abs. XT	508	105.3	115.3	115.3			128.6	128.1 128.6				135.3	
EC-4pole 22, 120 W EC-4pole 22, 120 W	288	16 RIO	517	103.3	113.3	113.3	119.9	119.9	126.6	126.6	126.6	133.3	133.3	133.3	133.3
EC-4pole 22, 120 W EC-4pole 30, 100 W	289	IO RIO	517	73.6	83.5	83.5	90.2	90.2	96.9	96.9	96.9	103.6	103.6	103.6	103.6
EC-4pole 30, 100 W	289	16 EASY/XT/Abs.	505-507	87.5	97.4	97.4		104.1	110.8	110.8	110.8	117.5	117.5	117.5	117.5
EC-4pole 30, 100 W	289	16 EASY Abs. XT	508	88.0	97.9	97.4	104.1	104.1	111.3	111.3	111.3	118.0	118.0	118.0	118.0
EC-4pole 30, 100 W	289	22 EMT	516	101.5	111.4	111.4	118.1	118.1	124.8	124.8	124.8	131.5	131.5	131.5	131.5
EC-4pole 30, 100 W	289	16 RIO	517	86.0	95.9	95.9	102.6	102.6	109.3	109.3	109.3	116.0	116.0	116.0	116.0
EC-4pole 30, 100 W	289	AB 20	582	109.8	119.7	119.7	126.4	126.4	133.1	133.1	133.1	139.8	139.8	139.8	139.8
EC-4pole 30, 100 W	289	16 EASY/XT/Abs./AB 20		123.9	133.8	133.8	140.5	140.5	147.2	147.2	147.2	153.9	153.9	153.9	153.9
EC-4pole 30, 100 W	289	16 EASY Abs. XT/AB 20		124.4	134.3	134.3	141.0	141.0	147.7	147.7	147.7	154.4	154.4	154.4	154.4
EC-4pole 30, 100 W	289	22 EMT/AB 20	516/582		150.9	150.9	157.6	157.6	164.3		164.3		171.0	171.0	171.0
EC-4pole 30, 100 W	289	16 RIO/AB 20	517/582		132.3	132.3	139.0	139.0	145.7	145.7	145.7	152.4	152.4	152.4	152.4
EC-4pole 30, 200 W	291	10 1(10)/12 20	0117002	90.6	100.5	100.5	107.2	107.2	113.9	113.9	113.9	120.6	120.6	120.6	120.6
EC-4pole 30, 200 W	291	16 EASY/XT/Abs.	505-507		114.4		121.1	121.1	127.8	127.8	127.8		134.5	134.5	134.5
EC-4pole 30, 200 W	291	16 EASY Abs. XT	508	105.0	114.9	114.9	121.6	121.6	128.3	128.3	128.3	135.0	135.0	135.0	135.0
EC-4pole 30, 200 W	291	22 EMT	516	118.5	128.4	128.4	135.1	135.1	141.8	141.8	141.8	148.5	148.5	148.5	148.5
EC-4pole 30, 200 W	291	16 RIO	517	103.0	112.9	112.9	119.6	119.6	126.3	126.3	126.3	133.0	133.0	133.0	133.0
EC-4pole 30, 200 W	291	AB 20	582	126.8	136.7	136.7	143.4	143.4	150.1	150.1	150.1	156.8	156.8	156.8	156.8
EC-4pole 30, 200 W	291	16 EASY/XT/Abs./AB 20	505/582	140.9	150.8	150.8	157.5	157.5	164.2	164.2	164.2	170.9	170.9	170.9	170.9
EC-4pole 30, 200 W	291	16 EASY Abs. XT/AB 20		141.4	151.3	151.3	158.0	158.0	164.7	164.7	164.7	171.4	171.4	171.4	171.4
EC-4pole 30, 200 W	291	22 EMT/AB 20	516/582	158.0	167.9	167.9	174.6	174.6	181.3	181.3	181.3	188.0	188.0	188.0	188.0
EC-4pole 30, 200 W	291	16 RIO/AB 20	517/582	139.4	149.3	149.3	156.0	156.0	162.7	162.7	162.7	169.4	169.4	169.4	169.4
EC-i 30, 20 W	297			68.6	78.5	78.5	85.2	85.2	91.9	91.9	91.9	98.6	98.6	98.6	98.6
EC-i 30, 30 W	298			68.8	78.7	78.7	85.4	85.4	92.1	92.1	92.1	98.8	98.8	98.8	98.8
EC-i 30, 30 W	298	22 EMT	516	96.8	106.7	106.7	113.4	113.4	120.1	120.1	120.1	126.8	126.8	126.8	126.8
EC-i 30, 30 W	298	16 EASY/Abs.	505-507	80.5	90.4	90.4	97.1	97.1	103.8	103.8	103.8	110.5	110.5	110.5	110.5
EC-i 30, 30 W	298	16 RIO	517	79.0	88.9	88.9	95.6	95.6	102.3	102.3	102.3	109.0	109.0	109.0	109.0
EC-i 30, 45 W	299			68.8	78.7	78.7	85.4	85.4	92.1	92.1	92.1	98.8	98.8	98.8	98.8
EC-i 30, 45 W	299	22 EMT	516	96.8	106.7	106.7	113.4	113.4	120.1	120.1	120.1	126.8	126.8	126.8	126.8
EC-i 30, 45 W	299	16 EASY/Abs.	505-508	80.5	90.4	90.4	97.1	97.1	103.8	103.8	103.8	110.5	110.5	110.5	110.5
EC-i 30, 45 W	299	16 RIO	517	79.0	88.9	88.9	95.6	95.6	102.3	102.3	102.3	109.0	109.0	109.0	109.0
EC-i 30, 50 W	300			90.8	100.7	100.7	107.4	107.4	114.1	114.1	114.1	120.8	120.8	120.8	120.8
EC-i 30, 50 W	300	22 EMT	516	118.8	128.7	128.7	135.4	135.4	142.1	142.1	142.1	148.8	148.8	148.8	148.8
EC-i 30, 50 W	300	16 EASY/Abs.	505-508	102.5	112.4	112.4	119.1	119.1	125.8	125.8	125.8	132.5	132.5	132.5	132.5
EC-i 30, 50 W	300	16 RIO	517	101.0	110.9	110.9	117.6	117.6	124.3	124.3	124.3	131.0	131.0	131.0	131.0

Planetary Gearhead GP 32 C Ø32 mm, 1.0-6.0 Nm

Ceramic Version





Technical Data	
Planetary Gearhead	straight teeth
Output shaft	stainless steel
Shaft diameter as option	8 mm
Bearing at output	ball bearing
Radial play, 5 mm from flange	max. 0.14 mm
Axial play	max. 0.4 mm
Max. axial load (dynamic)	120 N
Max. force for press fits	120 N
Direction of rotation, drive to output	=
Max. continuous input speed	8000 rpm
Recommended temperature range	-40+100°C
Number of stages 1 2 3	4 5
Max. radial load, 10 mm	
from flange 90 N 140 N 200 N	220 N 220 N

M 1:2

Option: Low-noise version

Stock program
Standard program
Special program (on request)

	Part Numbers												
ſ	166930	166933	166938	166939	166944	166949	166954	166959	166962	166967	166972	166977	
1	166931	166934		166940	166945	166950	166955	166960	166963	166968	166973	166978	
ſ	166932	166935		166941	166946	166951	166956	166961	166964	166969	166974	166979	
ı		166936		166942	166947	166952	166957		166965	166970	166975		
۱		166937		166943	166948	166953	166958		166966	166971	166976		

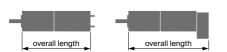


Modular System															
+ Motor	Page	+ Sensor/Brake	Page	Overall I	length [n	nm] = Mo	otor lengt	h + gear	head len	gth + (se	nsor/bra	ke) + ass	embly pa	arts	
EC-i 30, 75 W	301			90.8	100.7	100.7	107.4	107.4	114.1	114.1	114.1	120.8	120.8	120.8	120.8
EC-i 30, 75 W	301	22 EMT	516	118.8	128.7	128.7	135.4	135.4	142.1	142.1	142.1	148.8	148.8	148.8	148.8
EC-i 30, 75 W	301	16 EASY/Abs.	505-508	102.5	112.4	112.4	119.1	119.1	125.8	125.8	125.8	132.5	132.5	132.5	132.5
EC-i 30, 75 W	301	16 RIO	517	101.0	110.9	110.9	117.6	117.6	124.3	124.3	124.3	131.0	131.0	131.0	131.0
EC-i 40, 50 W	302			58.3	68.2	68.2	74.9	74.9	81.6	81.6	81.6	88.3	88.3	88.3	88.3
EC-i 40, 50 W	302	22 EMT	516	86.3	96.2	96.2	102.9	102.9	109.6	109.6	109.6	116.3	116.3	116.3	116.3
EC-i 40, 50 W	302	TSX 40 MAG/RIO	524-525	70.0	79.9	79.9	86.6	86.6	93.3	93.3	93.3	100.0	100.0	100.0	100.0
EC-i 40, 50 W	302	16 EASY/Abs.	505-508	70.0	79.9	79.9	86.6	86.6	93.3	93.3	93.3	100.0	100.0	100.0	100.0
EC-i 40, 50 W	302	16 RIO	517	72.8	82.7	82.7	89.4	89.4	96.1	96.1	96.1	102.8	102.8	102.8	102.8
EC-i 40, 70 W	304			68.3	78.2	78.2	84.9	84.9	91.6	91.6	91.6	98.3	98.3	98.3	98.3
EC-i 40, 70 W	304	22 EMT	516	96.3	106.2	106.2	112.9	112.9	119.6	119.6	119.6	126.3	126.3	126.3	126.3
EC-i 40, 70 W	304	TSX 40 MAG/RIO	524-525	80.0	89.9	89.9	96.6	96.6	103.3	103.3	103.3	110.0	110.0	110.0	110.0
EC-i 40, 70 W	304	16 EASY/Abs.	505-508	80.0	89.9	89.9	96.6	96.6	103.3	103.3	103.3	110.0	110.0	110.0	110.0
EC-i 40, 70 W	304	16 RIO	517	82.8	92.7	92.7	99.4	99.4	106.1	106.1	106.1	112.8	112.8	112.8	112.8
EC 45 flat, 30 W, A	320			43.1	53.0	53.0	59.7	59.7	66.4	66.4	66.4	73.1	73.1	73.1	73.1
EC 45 flat, 30 W, cable	e 320			44.4	54.3	54.3	61.0	61.0	67.7	67.7	67.7	74.4	74.4	74.4	74.4
EC 45 flat, 30 W, A	320	MILE	529	45.2	55.1	55.1	61.8	61.8	68.5	68.5	68.5	75.2	75.2	75.2	75.2
EC 45 flat, 50 W, A	321			48.6	58.5	58.5	65.2	65.2	71.9	71.9	71.9	78.6	78.6	78.6	78.6
EC 45 flat, 50 W, A	321	MILE	529	49.2	59.1	59.1	65.8	65.8	72.5	72.5	72.5	79.2	79.2	79.2	79.2
EC 45 flat, 60 W, A	322			48.6	58.5	58.5	65.2	65.2	71.9	71.9	71.9	78.6	78.6	78.6	78.6
EC 45 flat, 60 W, A	322	MILE	529	49.4	59.3	59.3	66.0	66.0	72.7	72.7	72.7	79.4	79.4	79.4	79.4
EC 45 flat, 90 W, A	323			54.6	64.5	64.5	71.2	71.2	77.9	77.9	77.9	84.6	84.6	84.6	84.6
EC 45 flat, 90 W, A	323	MILE	529	55.4	65.3	65.3	72.0	72.0	78.7	78.7	78.7	85.4	85.4	85.4	85.4
EC 45 flat, 70 W, A	324			53.6	63.5	63.5	70.2	70.2	76.9	76.9	76.9	83.6	83.6	83.6	83.6
EC 45 flat, 70 W, A	324	MILE	529	55.0	64.9	64.9	71.6	71.6	78.3	78.3	78.3	85.0	85.0	85.0	85.0
EC 45 flat, 80 W, A	325			53.6	63.5	63.5	70.2	70.2	76.9	76.9	76.9	83.6	83.6	83.6	83.6
EC 45 flat, 80 W, A	325	MILE	529	54.4	64.3	64.3	71.0	71.0	77.7	77.7	77.7	84.4	84.4	84.4	84.4
EC 45 flat, 120 W, A	326			59.6	69.5	69.5	76.2	76.2	82.9	82.9	82.9	89.6	89.6	89.6	89.6
EC 45 flat, 120 W, A	326	MILE	529	60.4	70.3	70.3	77.0	77.0	83.7	83.7	83.7	90.4	90.4	90.4	90.4
EC 45 flat, IE, IP 00	327			62.4	72.3	72.3	79.0	79.0	85.7	85.7	85.7	92.4	92.4	92.4	92.4
EC 45 flat, IE, IP 40	327			64.6	74.5	74.5	81.2	81.2	87.9	87.9	87.9	94.6	94.6	94.6	94.6
EC 45 flat, IE, IP 00	328			67.4	77.3	77.3	84.0	84.0	90.7	90.7	90.7	97.4	97.4	97.4	97.4
EC 45 flat, IE, IP 40	328			69.6	79.5	79.5	86.2	86.2	92.9	92.9	92.9	99.6	99.6	99.6	99.6

Planetary Gearhead GP 32 CR Ø32 mm, 1.0 Nm

Technical Data		
Planetary Gearhead	straig	ht teeth
Output shaft	stainle	ss steel
Bearing at output	ball	bearing
Radial play, 5 mm from flange	max. (0.14 mm
Axial play	max.	0.1 mm
Max. axial load (dynamic)		120 N
Max. force for press fits		120 N
Direction of rotation, drive to output		=
Max. continuous input speed	80	000 rpm
Recommended temperature range	-40	.+100°C
Output shaft diameter	6 mm	8 mm
Max. radial load, 10 mm		
from flange	140 N	120 N

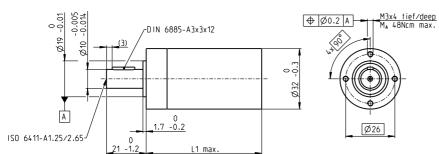
					141 0.
	Stock program Standard program		Part Number	rs	
	Special program (on request)		425240	425241	425242
Gea	arhead Data				
1	Reduction		3.7:1	4.8:1	5.8:1
2	Absolute reduction		26/7	24/5	23/4
3	Max. motor shaft diameter	mm	6	4	3
	Output shaft diameter	mm	6	6	6
	Part Numbers		413746	425160	425161
1	Reduction		3.7:1	4.8:1	5.8:1
2	Absolute reduction		26/7	24/5	23/4
3	Max. motor shaft diameter	mm	6	4	3
	Output shaft diameter	mm	8	8	8
4	Number of stages		1	1	1
5	Max. continuous torque	Nm	1.0	1.0	1.0
6	Max. intermittent torque at gear output	Nm	1.25	1.25	1.25
7	Max. efficiency	%	90	90	90
8	Weight	g	111	111	111
9	Average backlash no load	•	0.7	0.7	0.7
10	Mass inertia	gcm ²	1.6	0.9	0.6
11	Gearhead length L1	mm	26.2	26.2	26.2



Modular System										
+ Motor	Page	+ Sensor/Brake	Page	Overall length	[mm] = Mot	or length + g	earhead length + (sei	nsor/brake) + a	assembly part	s
RE 30, 60 W	158			94.3	94.3	94.3				
RE 30, 60 W	158	HED_5540	535/537	115.1	115.1	115.1				
RE 35, 90 W	159			97.3	97.3	97.3				
RE 35, 90 W	159	HED_5540	535/537	118.0	118.0	118.0				
RE 35, 90 W	159	DCT 22	542	115.4	115.4	115.4				
RE 35, 90 W	159	AB 28	585	133.4	133.4	133.4				
RE 35, 90 W	159	HED_5540/AB 28	535/585		150.5	150.5				
EC 32, 80 W	267			86.3	86.3	86.3				
EC 32, 80 W	267	HED_5540	536/538		104.7	104.7				
EC 32, 80 W	267	Res 26	543	106.4	106.4	106.4				

Planetary Gearhead GP 32 HP Ø32 mm, 4.0-8.0 Nm

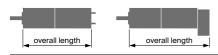
High Power



Technical Data			
Planetary Gearhead		straig	ht teeth
Output shaft		stainle	ss steel
Bearing at output		ball	bearing
Radial play, 10 mm from flan	ige	max. C).14 mm
Axial play		max.	0.4 mm
Max. axial load (dynamic)			120 N
Max. force for press fits			120 N
Direction of rotation, drive to	output		=
Max. continuous input spee	d	80	00 rpm
Recommended temperature	e range	-40	+100°C
Number of stages	2	3	4
Max. radial load, 10 mm			
from flange	200 N	250 N	300 N

M 1:2

	Stock program Standard program		Part Numbe	rs					
	Special program (on request)		320247	326663	326664	326668	326672	324947	324952
Gea	arhead Data								
1	Reduction		14:1	33:1	51:1	111:1	190:1	456:1	706:1
2	Absolute reduction		676/49	529/16	17576/343	13824/125	456976/2401	89401/196	158171/224
3	Max. motor shaft diameter	mm	6	3	6	4	6	3	3
	Part Numbers		326659		326665	326669	324942	324948	324953
1	Reduction		18:1		66:1	123:1	246:1	492:1	762:1
2	Absolute reduction		624/35		16224/245	6877/56	421824/1715	86112/175	19044/25
3	Max. motor shaft diameter	mm	6		6	3	6	6	4
	Part Numbers		326660		326666	326670	324944	324949	324954
1	Reduction		21:1		79:1	132:1	295:1	531:1	913:1
2	Absolute reduction		²⁹⁹ /14		3887/49	3312/25	101062/343	331776/625	36501/40
3	Max. motor shaft diameter	mm	6	_	6	4	6	4	3
	Part Numbers		326661		326667	326671	324945	324950	
1	Reduction		23:1		86:1	159:1	318:1	589:1	
2	Absolute reduction		576/25		14976/175	¹⁵⁸⁷ / ₁₀	389376/1225	20631/35	
3	Max. motor shaft diameter	mm	4	_	6	3	6	6	
	Part Numbers		326662		320297		324946	324951	
1	Reduction		28:1		103:1		411:1	636:1	
2	Absolute reduction		138/5		3588/35		359424/875	79488/125	
3	Max. motor shaft diameter	mm	4		6		6	4	
4			2	2	3	3	4	4	4
5	Max. continuous torque	Nm	4	4	8	8	8	8	8
6	Max. intermittent torque at gear output	Nm	6	6	12	12	12	12	12
7	Max. efficiency	%	75	75	70	70	60	60	60
8	Weight	g	178	178	213	213	249	249	249
9	Average backlash no load	•	0.8	0.8	1.0	1.0	1.0	1.0	1.0
10	Mass inertia	gcm ²	1.6	0.5	1.5	0.7	1.5	1.5	0.7
11	Gearhead length L1	mm	48.3	48.3	55.0	55.0	61.7	61.7	61.7

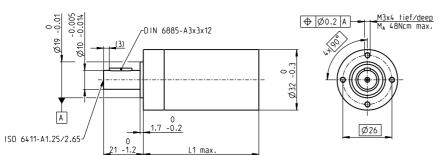




Modular System										
+ Motor	Page	+ Sensor/Brake	Page	Overall length	[mm] = Mot	tor length + ge	earhead leng	th + (sensor/	brake) + ass	embly parts
RE 35, 90 W	159			119.4	119.4	126.1	126.1	132.8	132.8	132.8
RE 35, 90 W	159	HED_ 5540	535/537	140.1	140.1	146.8	146.8	153.5	153.5	153.5
RE 35, 90 W	159	DCT 22	542	137.5	137.5	144.2	144.2	150.9	150.9	150.9
RE 35, 90 W	159	AB 28	585	155.5	155.5	162.2	162.2	168.9	168.9	168.9
RE 35, 90 W	159	HEDS 5540/AB 28	535/585	172.7	172.7	179.4	179.4	186.1	186.1	186.1
EC-max 30, 40 W	280			90.4	90.4	97.1	97.1	103.8	103.8	103.8
EC-max 30, 40 W	280	16 EASY/XT/Abs.	505-507	101.5	101.5	108.2	108.2	114.9	114.9	114.9
EC-max 30, 40 W	280	16 EASY Abs. XT	508	102.0	102.0	108.7	108.7	115.4	115.4	115.4
EC-max 30, 40 W	280	HEDL 5540	539	111.0	111.0	117.7	117.7	124.4	124.4	124.4
EC-max 30, 40 W	280	AB 20	582	126.0	126.0	132.7	132.7	139.4	139.4	139.4
EC-max 30, 40 W	280	HEDL 5540/AB 20	539/582	146.6	146.6	153.3	153.3	160.0	160.0	160.0
EC-max 30, 60 W	281			112.4	112.4	119.1	119.1	125.8	125.8	125.8
EC-max 30, 60 W	281	16 EASY/XT/Abs.	505/507	123.5	123.5	130.2	130.2	136.9	136.9	136.9
EC-max 30, 60 W	281	16 EASY Abs. XT	508	124.0	124.0	130.7	130.7	137.4	137.4	137.4
EC-max 30, 60 W	281	HEDL 5540	539	133.0	133.0	139.7	139.7	146.4	146.4	146.4
EC-max 30, 60 W	281	AB 20	582	148.0	148.0	154.7	154.7	161.4	161.4	161.4
EC-max 30, 60 W	281	HEDL 5540/AB 20	539/582	168.6	168.6	175.3	175.3	182.0	182.0	182.0
EC-4pole 30, 100 W	289			95.4	94.5	102.1	102.1	108.8	108.8	108.8
EC-4pole 30, 100 W	289	22 EMT	516	123.3	123.3	130.0	130.0	136.7	136.7	136.7
EC-4pole 30, 100 W	289	16 EASY/XT/Abs.	505-507	109.3	109.3	116.0	116.0	122.7	122.7	122.7
EC-4pole 30, 100 W	289	16 EASY Abs. XT	508	109.8	109.8	116.5	116.5	123.2	123.7	123.7
EC-4pole 30, 100 W	289	16 RIO	517	107.8	107.8	114.5	114.5	121.2	121.2	121.2
EC-4pole 30, 100 W	289	AB 20	582	131.6	131.6	138.3	138.3	145.0	145.0	145.0
EC-4pole 30, 100 W	289	22 EMT/AB20	516/582	162.8	162.8	169.5	169.5	176.2	176.2	176.2
EC-4pole 30, 100 W	289	16 EASY/XT/Abs./AB 20			145.7	152.4	152.4	159.1	159.1	159.1
EC-4pole 30, 100 W	289	16 EASY Abs. XT/AB 20		146.2	146.2	152.9	152.9	159.6	159.6	159.6
EC-4pole 30, 100 W	289	16 RIO/AB 20	517/582	144.2	144.2	150.9	150.9	157.6	157.6	157.6
EC-4pole 30, 200 W	291			112.4	112.4	119.1	119.1	125.8	125.8	125.8
EC-4pole 30, 200 W	291	22 EMT	516	140.3	140.3	147.0	147.0	153.7	153.7	153.7
EC-4pole 30, 200 W	291	16 EASY/XT/Abs.	505-507	126.3	126.3	133.0	133.0	139.7	139.7	139.7
EC-4pole 30, 200 W	291	16 EASY Abs. XT	508	126.8	126.8	133.5	133.5	140.2	140.2	140.2

Planetary Gearhead GP 32 HP Ø32 mm, 4.0-8.0 Nm

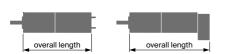
High Power



Technical Data			
Planetary Gearhead		straig	ht teeth
Output shaft		stainle	ss steel
Bearing at output		ball	bearing
Radial play, 10 mm from flan	ge	max. C).14 mm
Axial play		max.	0.4 mm
Max. axial load (dynamic)			120 N
Max. force for press fits			120 N
Direction of rotation, drive to	output		=
Max. continuous input speed	d	80	00 rpm
Recommended temperature	e range	-40	+100°C
Number of stages	2	3	4
Max. radial load, 10 mm			
from flange	200 N	250 N	300 N

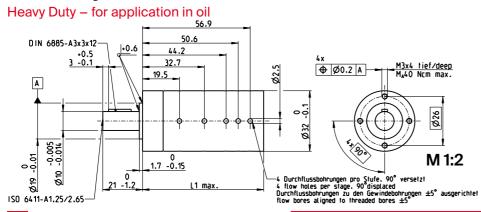
M 1:2

	Stock program Standard program		Part Numbe	rs					
	Special program (on request)		320247	326663	326664	326668	326672	324947	324952
ear	rhead Data								
1	Reduction		14:1	33:1	51:1	111:1	190:1	456:1	706:1
2	Absolute reduction		676/49	⁵²⁹ /16	17576/343	13824/125	456976/2401	89401/196	158171/224
3	Max. motor shaft diameter	mm	6	3	6	4	6	3	3
	Part Numbers		326659		326665	326669	324942	324948	324953
1	Reduction	_	18:1		66:1	123:1	246:1	492:1	762:1
2	Absolute reduction		624/35		16224/245	6877/56	421824/1715	86112/175	19044/25
3	Max. motor shaft diameter	mm	6		6	3	6	6	4
	Part Numbers		326660		326666	326670	324944	324949	324954
1	Reduction		21:1		79:1	132:1	295:1	531:1	913:1
2	Absolute reduction		²⁹⁹ / ₁₄		3887/49	3312/25	101062/343	331776/625	36501/40
3	Max. motor shaft diameter	mm_	6		6	4	6	4	3
	Part Numbers		326661		326667	326671	324945	324950	
1	Reduction		23:1		86:1	159:1	318:1	589:1	
2	Absolute reduction		576/25		14976/175	1587/10	389376/1225	20631/35	
3	Max. motor shaft diameter	mm_	4	_	6	3	6	6	
	Part Numbers		326662		320297		324946	324951	
1	Reduction		28:1		103:1		411:1	636:1	
2	Absolute reduction		138/5		3588/35		359424/875	79488/125	
3	Max. motor shaft diameter	mm	4		6		6	4	
	Number of stages		2	2	3	3	4	4	4
	Max. continuous torque	Nm	4	4	8	8	8	8	8
6	Max. intermittent torque at gear output	Nm	6	6	12	12	12	12	12
7	Max. efficiency	%	75	75	70	70	60	60	60
	Weight	g	178	178	213	213	249	249	249
	Average backlash no load	۰	0.8	0.8	1.0	1.0	1.0	1.0	1.0
	Mass inertia	gcm ²	1.6	0.5	1.5	0.7	1.5	1.5	0.7
1	Gearhead length L1	mm	48.3	48.3	55.0	55.0	61.7	61.7	61.7



Modular System											
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	th [mm] = M	otor length +	gearhead ler	ngth + (senso	r/brake) + ass	sembly parts	
EC-4pole 30, 200 W	291	16 RIO	517	124.8	124.8	131.5	131.5	138.2	138.2	138.2	
EC-4pole 30, 200 W	291	AB 20	582	148.6	148.6	155.3	155.3	162.0	162.0	162.0	
EC-4pole 30, 200 W	291	22 EMT/AB 20	516/582	179.8	179.8	186.5	186.5	193.2	193.2	193.2	
EC-4pole 30, 200 W	291	16 EASY/XT/Abs./AB 20	505/582	162.7	162.7	169.4	169.4	176.1	176.1	176.1	
EC-4pole 30, 200 W	291	16 EASY Abs. XT/AB 20	508/582	163.2	163.2	169.9	169.9	176.6	176.6	176.6	
EC-4pole 30, 200 W	291	16 RIO/AB 20	517/582	161.2	161.2	167.9	167.9	174.6	174.6	174.6	

Planetary Gearhead GP 32 HD Ø32 mm, 3.0-8.0 Nm



Technical Data	
Planetary Gearhead	straight teeth
Output shaft	stainless steel
Bearing at output	ball bearing
Radial play, 10 mm from flange	max. 0.14 mm
Axial play	max. 0.4 mm
Max. axial load (dynamic)	120 N
Max. force for press fits	120 N
Direction of rotation, drive to output	=
Max. continuous input speed	< 8000 rpm
Recommended temperature range	-55+200°C
Extended range as option	-55+260°C
Number of stages 1 2 3	4 5
Max. radial load, 10 mm	
from flange 120 N 200 N 250 N	300 N 300 N

	Stock program
	Standard program
	Special program (on request)
Gea	rhead Data (provisional)
1	Reduction

	Stock program Standard program		Part Numbers												
	Special program (on request)		526077	526080	526086	526092	526095	526101	526106	526112	526117	526123			
Gea	arhead Data (provisional)														
1	Reduction		3.7:1	14:1	51:1	123:1	190:1	492:1	707:1	1694:1	2548:1	4060:1			
2	Absolute reduction		26/7	676/49	17576/343	6877/56	456976/2401	86112/175 11	881376/16807	1162213/686	7962624/3125	3637933/896			
3	Max. motor shaft diameter	mm	6	6	6	3	6	6	6	6	4	6			
	Part Numbers		526078	526081	526087	526093	526096	526102	526107	526113	526118	526124			
1	Reduction		4.8:1	18:1	66:1	132:1	246:1	531:1	914:1	1828:1	2623:1	4380:1			
2	Absolute reduction		24/5	624/35	16224/245	3312/25	421824/1715	331776/625	10967424/12005	2238912/1225	2056223/784	109503/25			
3	Max. motor shaft diameter	mm	4	6	6	4	6	4	6	6	6	4			
	Part Numbers		526079*	526082	526088	526094*	526097	526103	526108	526114	526119	526125			
1	Reduction		5.8:1	21:1	79:1	159:1	295:1	589:1		1972:1	2829:1	5247:1			
2	Absolute reduction		23/4	299/14	3887/49	1587/10	101062/343	20631/35	2627612/2401	8626176/4375	495144/175	839523/160			
3	Max. motor shaft diameter	mm	3	6	6	3	6	6	6	4	6	4			
	Part Numbers			526083	526089		526098	526104	526109	526115	526120	526126*			
1	Reduction			23:1	86:1		318:1	636:1			3052:1				
2	Absolute reduction			576/25	14976/175		389376/1225	79488/125	10123776/8575	536406/245	1907712/625	6436343/1024			
3	Max. motor shaft diameter	mm		4	6		6	4	6	6	4	3			
	Part Numbers			526084	526090		526099	526105	526110	526116	526121				
1	Reduction			28:1	103:1		411:1	762:1		2362:1	3389:1				
2	Absolute reduction			138/5	3588/35		359424/875	19044/25	2425488/1715	2066688/875	474513/140				
3		mm		4	6		6	4	6	6	6				
	Part Numbers			526085*	526091		526100		526111		526122				
1	Reduction			33:1	111:1		456:1		1526:1		3656:1				
2	Absolute reduction			⁵²⁹ / ₁₆	13824/125		89401/196		9345024/6125		457056/125				
3	Max. motor shaft diameter	mm		3	4		6		4		4				
4	· · · · · · · · · · · · · · · · · · ·		1	2	3	3	4	4	-	5	5	5			
5	Max. continuous torque	Nm	3	4	8	8	8	8	8	8	8	8			
6	Max. intermittent torque at gear output	Nm	4.5	6	12	12	12	12	12	12	12	12			
15	Max. overload torque ¹	Nm	9	12	24	24	24	24	24	24	24	24			
7	Max. efficiency	%	95	87	78	78	65	65	53	53	53	53			
8	Weight	g	176	234	277	277	309	309	340	340	340	340			
9	Average backlash no load	۰	0.7	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
10	Mass inertia	gcm ²	1.59	1.59	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45			
11	Gearhead length L1	mm	32.9	45.3	55.1	55.1	61.6	61.6	68.1	68.1	68.1	68.1			
13	Max. transmittable power (continuous)	W	320	200	80	80	40	40	12	12	12	12			
14 1 Redu	Max. transmittable power (intermittent)	W	480	300	120	120	60	60	18	18	18	18			



Modular System													
+ Motor Pa	age	+ Sensor/Brake	Page	Overall len	gth [mm] :	= Motor le	ngth + gea	rhead leng	gth + (sens	sor/brake)	+ assemb	ly parts	
EC-4pole 32 HD oil, A 2	93			194.0	206.5	216.5	216.5	223.0	223.0	229.5	229.5	229.5	229.5
EC-4pole 32 HD oil, B 29	93			174.0	186.5	196.5	196.5	203.0	203.0	209.5	209.5	209.5	209.5

*Overall length + 2 mm

General

- extreme temperature applications

Oil & Gas Industry

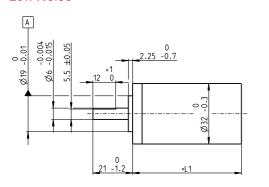
- oil, gas and geothermal wells

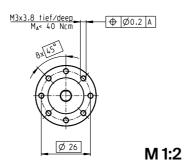
This gearhead has been designed for applications in oil and is only equipped with minimum lubrication. Therefore it is not permitted to use it under normal air conditions.

⁻ vibration tested according to MIL-STD810F/ Jan2000 Fig. 514.5C-10

⁻ operation in oil and high pressure

Low Noise

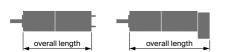




Technical Data Planetary Gearhead special toothing Output shaft stainless steel Bearing at output ball bearing Radial play, 5 mm from flange max. 0.14 mm Axial play max. 0.4 mm Max. axial load (dynamic) 120 N Max. force for press fits 120 N Direction of rotation, drive to output 8000 rpm Max. continuous input speed Recommended temperature range Number of stages Max. radial load, 10 mm 90 N 140 N 200 N from flange

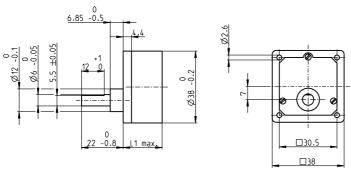
Option: higher reduction ratio on request

	Stock program		Part Numb	ers							
	Standard program		· arerrams	0.0							
	Special program (on request)		354722	354725	354962	354730	354731	354734	354737	354963	354742
Gea	arhead Data				i						
1	Reduction		11:1	41:1	82:1	158:1	152:1	253:1	392:1	705:1	1091:1
2	Absolute reduction		11/1	286/7	408/5	⁷⁹² / ₅	7436/49	6336/25	9792/25	9867/14	17457/16
7	Max. efficiency	%	78	70	65	61	63	63	59	55	55
10	Mass inertia	gcm ²	0.65	0.60	0.60	0.35	0.60	0.60	0.35	0.35	0.22
	Part Numbers	Ŭ	354723	354726	354728	354744	354732	354735	354738	354740	
1	Reduction		17:1	53:1	98:1	190:1	196:1	304:1	455:1	760:1	
2	Absolute reduction		17/1	264/5	391/4	759/4	6864/35	1518/5	22308/49	19008/25	
7	Max. efficiency	%	72	70	65	65	63	63	55	55	
10	Mass inertia	gcm ²	0.38	0.60	0.35	0.35	0.60	0.60	0.22	0.22	
	Part Numbers		354724	354727	354729		354733	354736	354739	354741	
1	Reduction		33:1	63:1	123:1		235:1	364:1	588:1	911:1	
2	Absolute reduction		33/1	442/7	858/7		11492/49	⁵⁸¹⁹ / ₁₆	20592/35	4554/5	
7	Max. efficiency	%	68	70	61		63	63	59	55	
10	Mass inertia	gcm ²	0.65	0.60	0.22		0.60	0.60	0.35	0.22	
3	Max. motor shaft diameter	mm	3	3	3	3	3	3	3	3	3
4	Number of stages		1	2	2	2	3	3	3	3	3
5	Max. continuous torque	Nm	1	3.5	3.5	3.5	4.5	4.5	4.5	4.5	4.5
6	Max. intermittent torque at gear output	Nm	1.25	4.4	4.4	4.4	6.5	6.5	6.5	6.5	6.5
8	Weight	g	130	230	230	230	262	262	262	262	262
9	Average backlash no load	۰	3.5	1	1	1	1	1	1	1	1
11	Gearhead length L1	mm	40.7	57.9	57.9	57.9	67.6	67.6	67.6	67.6	67.6



Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall lengt	h [mm] = M	lotor length	+ gearhead	length + (se	nsor/brake)	+ assembly	parts	
RE 25	154/156			95.3	112.5	112.5	112.5	122.2	122.2	122.2	122.2	122.2
RE 25	154/156	HED_5540	535/537	116.1	133.3	133.3	133.3	143.0	143.0	143.0	143.0	143.0
RE 25	154/156	DCT 22	542	117.6	134.8	134.8	134.8	144.5	144.5	144.5	144.5	144.5
RE 25, 20 W	155			83.8	101.0	101.0	101.0	110.7	110.7	110.7	110.7	110.7
RE 25, 20 W	155	HED_5540	536/537	104.6	121.8	121.8	121.8	131.5	131.5	131.5	131.5	131.5
RE 25, 20 W	155	DCT 22	542	106.1	123.3	123.3	123.3	133.0	133.0	133.0	133.0	133.0
RE 25, 20 W	155	AB 28	585	117.9	135.1	135.1	135.1	144.8	144.8	144.8	144.8	144.8
RE 25, 20 W	155	HED_5540/AB 28	536/585	135.1	152.3	152.3	152.3	162.0	162.0	162.0	162.0	162.0
RE 30, 60 W	158			108.8	126.0	126.0	126.0	135.7	135.7	135.7	135.7	135.7
RE 30, 60 W	158	HEDL 5540	537	129.6	146.8	146.8	146.8	156.5	156.5	156.5	156.5	156.5
EC-max 22, 12 W	278			72.8	89.9	89.9	89.9	99.6	99.6	99.6	99.6	99.6
EC-max 22, 12 W	278	16 EASY/XT/Abs.	505/507	82.4	99.5	99.5	99.5	109.2	109.2	109.2	109.2	109.2
EC-max 22, 12 W	278	16 EASY Abs. XT	508	82.9	100.0	100.0	100.0	109.7	109.7	109.7	109.7	109.7
EC-max 22, 12 W	278	AB 20	582	108.4	125.5	125.5	125.5	135.2	135.2	135.2	135.2	135.2
EC-max 22, 25 W	279			89.3	106.4	106.4	106.4	116.1	116.1	116.1	116.1	116.1
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505/507	89.9	116.0	116.0	116.0	125.7	125.7	125.7	125.7	125.7
EC-max 22, 25 W	279	16 EASY Abs. XT	508	90.4	116.5	116.5	116.5	126.2	126.2	126.2	126.2	126.2
EC-max 22, 25 W	279	AB 20	582	124.9	142.0	142.0	142.0	151.7	151.7	151.7	151.7	151.7
EC-max 30, 40 W	280			82.8	99.9	99.9	99.9	109.6	109.6	109.6	109.6	109.6
EC-max 30, 40 W	280	16 EASY/XT/Abs.	505/507	93.9	111.0	111.0	111.0	120.7	120.7	120.7	120.7	120.7
EC-max 30, 40 W	280	16 EASY Abs. XT	508	94.4	111.5	111.5	111.5	121.2	121.2	121.2	121.2	121.2
EC-max 30, 40 W	280	HEDL 5540	539	103.4	120.5	120.5	120.5	130.2	130.2	130.2	130.2	130.2
EC-max 30, 40 W	280	AB 20	582	118.4	135.5	135.5	135.5	145.2	145.2	145.2	145.2	145.2
EC-max 30, 40 W	280	HEDL 5540/AB 20	539/582	139.0	156.1	156.1	156.1	165.8	165.8	165.8	165.8	165.8
EC-max 30, 60 W	281			104.8	121.9	121.9	121.9	131.6	131.6	131.6	131.6	131.6
EC-max 30, 60 W	281	16 EASY/XT/Abs.	505/507	115.9	133.0	133.0	133.0	142.7	142.7	142.7	142.7	142.7
EC-max 30, 60 W	281	16 EASY Abs. XT	508	116.4	133.5	133.5	133.5	143.2	143.2	143.2	143.2	143.2
EC-max 30, 60 W	281	HEDL 5540	539	125.4	142.5	142.5	142.5	152.2	152.2	152.2	152.2	152.2
EC-max 30, 60 W	281	AB 20	582	140.4	157.5	157.5	157.5	167.2	167.2	167.2	167.2	167.2
EC-max 30, 60 W	281	HEDL 5540/AB 20	539/582	161.0	178.1	178.1	178.1	187.8	187.8	187.8	187.8	187.8

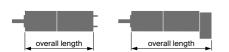
Spur Gearhead GS 38 A Ø38 mm, 0.1-0.6 Nm



Technical Data					
Spur Gearhead		straigh	t teeth		
Output shaft		stainles	s steel		
Bearing at output		sleeve b	earing		
Radial play, 12 mm from flange		max. 0	0.1 mm		
Axial play		0.03-0	.2 mm		
Max. axial load (dynamic)		30 N			
Max. force for press fits		500 N			
Max. continuous input speed		500	00 rpm		
Recommended temperature range	9	-5	+80°C		
Number of stages 1 2	3	4	5		
Max. radial load, 12 mm					
from flango 50 N 50 N 5	ОΝ	50 N	50 N		

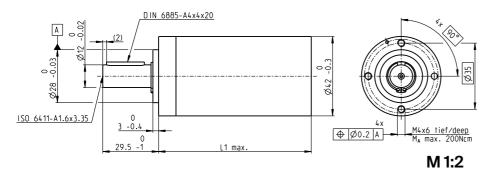
M 1:2

Stock program Standard program		Part Num	bers								
Special program (on request)		110451	110452	110453	110454	110455	110456	110457	110458	110459	
Gearhead Data											
1 Reduction		6:1	10:1	18:1	30:1	60:1	100:1	200:1	500:1	900:1	
2 Absolute reduction		6	10	18	30	60	100	200	500	900	
3 Max. motor shaft diameter	mm	3	3	3	3	3	3	3	3	3	
4 Number of stages		2	2	3	3	4	4	5	6	6	
5 Max. continuous torque	Nm	0.1	0.1	0.2	0.2	0.3	0.3	0.6	0.6	0.6	
6 Max. intermittent torque at gear output	Nm	0.3	0.3	0.6	0.6	0.9	0.9	1.8	1.8	1.8	
L2 Direction of rotation, drive to output		=	=	≠	≠	=	=	≠	=	=	
7 Max. efficiency	%	81	81	73	73	66	66	59	53	53	
8 Weight	g	55	55	60	60	65	65	70	75	75	
9 Average backlash no load	0	1.0	1.0	1.5	1.5	2.0	2.0	2.5	3.0	3.0	
LO Mass inertia	gcm ²	0.7	0.6	0.4	0.4	0.3	0.3	0.2	0.2	0.2	
L1 Gearhead length L1*	mm	20.6	20.6	23.1	23.1	25.6	25.6	28.1	30.6	30.6	
*for EC 32 flat L1 is + 2.0 mm											



		Page	Overall len	gth [mm]	Motor ler	ngth + gear	head lengt	h + (senso	r/brake) +	assembly p	oarts	
181-184			65.4	65.4	67.9	67.9	70.4	70.4	72.9	75.4	75.4	
182-184	13 GAMA	502	72.5	72.5	75.0	75.0	77.5	77.5	80.0	82.5	82.5	
182-184	HED_ 5540	536/538	83.8	83.8	86.3	86.3	88.8	88.8	91.3	93.8	93.8	
185			83.6	83.6	86.1	86.1	88.6	88.6	91.1	93.6	93.6	
186			82.2	82.2	84.7	84.7	87.2	87.2	89.7	92.2	92.2	
186	HED_ 5540	536/538	103.0	103.0	105.5	105.5	108.0	108.0	110.5	113.0	113.0	
	181-184 182-184 182-184 185 186	181-184 182-184 13 GAMA 182-184 HED_ 5540 185 186	181-184 182-184 13 GAMA 502 182-184 HED_ 5540 536/538 185 186	181-184 65.4 182-184 13 GAMA 502 72.5 182-184 HED_ 5540 536/538 83.8 185 83.6 186 82.2	181-184 65.4 65.4 182-184 13 GAMA 502 72.5 72.5 182-184 HED_ 5540 536/538 83.8 83.8 185 83.6 83.6 83.6 186 82.2 82.2	181-184 65.4 65.4 67.9 182-184 13 GAMA 502 72.5 72.5 75.0 182-184 HED_ 5540 536/538 83.8 83.8 86.3 185 83.6 83.6 86.1 186 82.2 82.2 84.7	181-184 65.4 65.4 67.9 67.9 182-184 13 GAMA 502 72.5 72.5 75.0 75.0 182-184 HED_5540 536/538 83.8 83.8 86.3 86.3 185 83.6 83.6 86.1 86.1 186 82.2 82.2 84.7 84.7	181-184 65.4 65.4 67.9 67.9 70.4 182-184 13 GAMA 502 72.5 72.5 75.0 75.0 77.5 182-184 HED_ 5540 536/538 83.8 83.8 86.3 86.3 88.8 185 83.6 83.6 86.1 86.1 88.6 186 82.2 82.2 84.7 84.7 87.2	181-184 65.4 65.4 67.9 67.9 70.4 70.4 182-184 13 GAMA 502 72.5 72.5 75.0 75.0 77.5 77.5 182-184 HED_ 5540 536/538 83.8 83.8 86.3 86.3 88.8 88.8 185 83.6 83.6 86.1 86.1 88.6 88.6 186 82.2 82.2 84.7 84.7 87.2 87.2	181-184 65.4 65.4 67.9 67.9 70.4 70.4 72.9 182-184 13 GAMA 502 72.5 72.5 75.0 75.0 77.5 77.5 80.0 182-184 HED_5540 536/538 83.8 83.8 86.3 86.3 88.8 88.8 91.3 185 83.6 83.6 86.1 86.1 88.6 88.6 91.1 186 82.2 82.2 84.7 84.7 87.2 87.2 89.7	181-184 65.4 65.4 67.9 67.9 70.4 70.4 72.9 75.4 182-184 13 GAMA 502 72.5 72.5 75.0 75.0 77.5 77.5 80.0 82.5 182-184 HED_ 5540 536/538 83.8 83.8 86.3 86.3 88.8 88.8 91.3 93.8 185 83.6 83.6 86.1 86.1 88.6 88.6 91.1 93.6 186 82.2 82.2 84.7 84.7 87.2 87.2 89.7 92.2	181-184 65.4 65.4 67.9 67.9 70.4 70.4 72.9 75.4 75.4 182-184 13 GAMA 502 72.5 72.5 75.0 75.0 77.5 77.5 80.0 82.5 82.5 182-184 HED_ 5540 536/538 83.8 83.8 86.3 86.3 88.8 88.8 91.3 93.8 185 83.6 83.6 86.1 86.1 88.6 88.6 91.1 93.6 93.6 186 82.2 82.2 84.7 84.7 87.2 87.2 89.7 92.2 92.2

Planetary Gearhead GP 42 C Ø42 mm, 3.0-15.0 Nm Ceramic Version



Technical Data				
Planetary Gearhead			straigl	ht teeth
Output shaft			stainles	ss steel
Bearing at output		oreload	ed ball b	earings
Radial play, 12 mm from	flange		max. 0.	.06 mm
Axial play at axial load	<	5 N		0 mm
	>	· 5 N	max.	0.3 mm
Max. axial load (dynamic	c)			150 N
Max. force for press fits	;			300 N
Direction of rotation, dri	ive to οι	utput		=
Max. continuous input s	speed		80	00 rpm
Recommended temper	ature ra	nge	-40	+100°C
Number of stages Max. radial load, 12 mm	1	2	3	4
from flange	120 N	240 N	360 N	360 N

	141
Stock program	Part Numbers

	Standard program		Part Nur	nbers								
	Special program (on request)		203113	203115	203119	203120	203124	203129	203128	203133	203137	203141
Gea	arhead Data											
1	Reduction		3.5:1	12:1	26:1	43:1	81:1	156:1	150:1		441:1	756:1
2	Absolute reduction		7/2	49/4	26	343/8	2197/27	156	2401/16	15379/54	441	756
10	Mass inertia	gcm ²	14	15	9.1	15	9.4	9.1	15	15	14	14
3	Max. motor shaft diameter	mm	10	10	8	10	8	8	10	10	10	10
	Part Numbers				260552*	203121					203138	203142
1	Reduction		4.3:1	15:1	36:1	53:1	91:1		186:1	319:1	488:1	936:1
2	Absolute reduction		13/3	91/6	36/1	637/12	91	216/1	4459/24	637/2	4394/9	936
10	Mass inertia	gcm ²	9.1	15	5.0	15	15	5.0	15	15	9.4	9.1
3	Max. motor shaft diameter	mm	8	10	4	10	10	4	10	10	8	8
	Part Numbers						203126		203131			260554*
1	Reduction		6:1	19:1		66:1			230:1	353:1		1296:1
2	Absolute reduction		%	169/9		1183/18	338/3		8281/36	28561/81	546	1296/1
10	Mass inertia	gcm ²	4.9	9.4		15	9.4		15	9.4	14	5.0
3	Max. motor shaft diameter	mm	4	8		10	8		10	8	10	4
	Part Numbers			203118			203127				203140	
1	. to adotto.			21:1		74:1			257:1			
2	Absolute reduction			21		147/2	126		1029/4	1183/3	676	
10	Mass inertia	gcm ²		14		15	14		15	15	9.1	
_ 3	Max. motor shaft diameter	mm		10		10	10		10	10	8	
4	Number of stages		1	2	2	3	3	3	4	4	4	4
5	Max. continuous torque	Nm	3.0	7.5	7.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0
6	Max. intermittent torque at gear output	Nm	4.5	11.3	11.3	22.5	22.5	22.5	22.5	22.5	22.5	22.5
7	Max. efficiency	%	90	81	81	72	72	72	64	64	64	64
8	Weight	g	260	360	360	460	460	460	560	560	560	560
9	Average backlash no load		0.6	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	Gearhead length L1**	mm	41.0	55.5	55.5	70.0	70.0	70.0	84.5	84.5	84.5	84.5
	*no combination with EC 45 (150/250 W) and EC-i 40 **for EC 45 flat L1 is -3.6 mm											

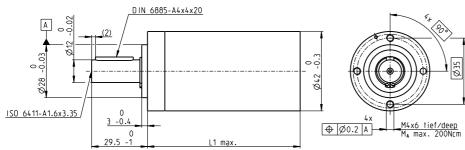






Modular System															
+ Motor	Page	+ Sensor	Page	Brake	Page	Overall le	ength [m	m] = Mot	or length	+ gearhe	ad length	ı + (sensc	r/brake) -	+ assemb	oly parts
RE 35, 90 W	159					112.1	126.6	126.6	141.1	141.1	141.1	155.6	155.6	155.6	155.6
RE 35, 90 W	159	HED_5540	535/537			132.8	147.3	147.3	161.8	161.8	161.8	176.3	176.3	176.3	176.3
RE 35, 90 W	159	DCT 22	542			130.2	144.7	144.7	159.2	159.2	159.2	173.7	173.7	173.7	173.7
RE 35, 90 W	159			AB 28	585	148.2	162.7	162.7	177.2	177.2	177.2	191.7	191.7	191.7	191.7
RE 35, 90 W	159	HED_5540	535/537	AB 28	585	165.4	179.9	179.9	194.4	194.4	194.4	208.9	208.9	208.9	208.9
RE 40, 150 W	161					112.1	126.6	126.6	141.1	141.1	141.1	155.6	155.6	155.6	155.6
RE 40, 150 W	161	HED_5540	535/538			132.8	147.3	147.3	161.8	161.8	161.8	176.3	176.3	176.3	176.3
RE 40, 150 W	161	HEDL9140	540			166.2	180.7	180.7	195.2	195.2	195.2	209.7	209.7	209.7	209.7
RE 40, 150 W	161			AB 28	585	148.2	162.7	162.7	177.2	177.2	177.2	191.7	191.7	191.7	191.7
RE 40, 150 W	161			AB 28	586	156.2	170.7	170.7	185.2	185.2	185.2	199.7	199.7	199.7	199.7
RE 40, 150 W	161	HED_5540	535/538	AB 28	585	165.4	179.9	179.9	194.4	194.4	194.4	208.9	208.9	208.9	208.9
RE 40, 150 W	161	HEDL9140	540	AB 28	586	176.7	191.2	191.2	205.7	205.7	205.7	220.2	220.2	220.2	220.2
EC 40, 170 W	268					121.1	135.6	135.6	150.1	150.1	150.1	164.6	164.6	164.6	164.6
EC 40, 170 W	268	HED_5540	536/538			144.5	159.0	159.0	173.5	173.5	173.5	188.0	188.0	188.0	188.0
EC 40, 170 W	268	Res 26	543			148.3	162.8	162.8	177.3	177.3	177.3	191.8	191.8	191.8	191.8
EC 40, 170 W	268			AB 32	587	163.8	178.3	178.3	192.8	192.8	192.8	207.3	207.3	207.3	207.3
EC 40, 170 W	268	HED_5540	536/538	AB 32	587	182.2	196.7	196.7	211.2	211.2	211.2	225.7	225.7	225.7	225.7
EC 45, 150 W	269					152.3	166.8	166.8	181.3	181.3	181.3	195.8	195.8	195.8	195.8
EC 45, 150 W	269	HEDL9140	540			167.9	182.4	182.4	196.9	196.9	196.9	211.4	211.4	211.4	211.4
EC 45, 150 W	269	Res 26	543			152.3	166.8	166.8	181.3	181.3	181.3	195.8	195.8	195.8	195.8
EC 45, 150 W	269			AB 28	586	159.7	174.2	174.2	188.7	188.7	188.7	203.2	203.2	203.2	203.2
EC 45, 150 W	269	HEDL9140	540	AB 28	586	176.7	191.2	191.2	205.7	205.7	205.7	220.2	220.2	220.2	220.2
EC 45, 250 W	270					185.1	199.6	199.6	214.1	214.1	214.1	228.6	228.6	228.6	228.6
EC 45, 250 W	270	HEDL9140	540			200.7	215.2	215.2	229.7	229.7	229.7	244.2	244.2	244.2	244.2
EC 45, 250 W	270	Res 26	543			185.1	199.6	199.6	214.1	214.1	214.1	228.6	228.6	228.6	228.6
EC 45, 250 W	270			AB 28	586	192.5	207.0	207.0	221.5	221.5	221.5	236.0	236.0	236.0	236.0
EC 45, 250 W	270	HEDL9140	540	AB 28	586	209.5	224.0	224.0	238.5	238.5	238.5	253.0	253.0	253.0	253.0

Planetary Gearhead GP 42 C Ø42 mm, 3.0−15.0 Nm Ceramic Version



Technical Data				
Planetary Gearhead			straigl	nt teeth
Output shaft			stainles	ss steel
Bearing at output	ŗ	oreloade	ed ball b	earings
Radial play, 12 mm from	flange		max. 0.	06 mm
Axial play at axial load	<	5 N		0 mm
	>	5 N	max.	0.3 mm
Max. axial load (dynamic	:)			150 N
Max. force for press fits				300 N
Direction of rotation, driv	ve to ou	ıtput		=
Max. continuous input s	peed		80	00 rpm
Recommended tempera	ature ra	nge	-40	+100°C
Number of stages	1	2	3	4
Max. radial load, 12 mm				
from flange	120 N	240 N	360 N	360 N

N	Л	1	. つ
ľ	VI		:2

	Stock program Standard program		Part Nur	nbers								
	Special program (on request)		203113	203115	203119	203120	203124	203129	203128	203133	203137	203141
Gea	arhead Data											
1	Reduction		3.5:1	12:1	26:1	43:1	81:1	156:1	150:1	285:1	441:1	756:1
2	Absolute reduction		7/2	49/4	26	343/8	2197/27	156	2401/16	15379/54	441	756
10	Mass inertia	gcm ²	14	15	9.1	15	9.4	9.1	15	15	14	14
3	Max. motor shaft diameter	mm	10	10	8	10	8	8	10	10	10	10
	Part Numbers		203114	203116	260552*	203121	203125	260553*	203130	203134	203138	203142
1	Reduction		4.3:1	15:1	36:1	53:1	91:1	216:1	186:1	319:1	488:1	936:1
2	Absolute reduction		13/3	91/6	36/1	637/12	91	216/1	4459/24	637/2	4394/9	936
10	Mass inertia	gcm ²	9.1	15	5.0	15	15	5.0	15	15	9.4	9.1
3	Max. motor shaft diameter	mm	8	10	4	10	10	4	10	10	8	8
	Part Numbers		260551*	203117		203122	203126		203131	203135		
1	Reduction		6:1	19:1		66:1	113:1		230:1	353:1	546:1	1296:1
2	Absolute reduction		6/1	169/9		1183/18	338/3		8281/36	28561/81	546	1296/1
10	Mass inertia	gcm ²	4.9	9.4		15	9.4		15	9.4	14	5.0
3	Max. motor shaft diameter	mm	4	8		10	8		10	8	10	4
	Part Numbers			203118		203123	203127			203136		
1	Reduction			21:1		74:1	126:1		257:1	394:1	676:1	
2	Absolute reduction			21		147/2	126		1029/4	1183/3	676	
10	Mass inertia	gcm ²		14		15	14		15	15	9.1	
3	Max. motor shaft diameter	mm		10		10	10		10	10	8	
4	Number of stages		1	2	2	3	3	3	4	4	4	4
5	Max. continuous torque	Nm	3.0	7.5	7.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0
6	Max. intermittent torque at gear output	Nm	4.5	11.3	11.3	22.5	22.5	22.5	22.5	22.5	22.5	22.5
7	Max. efficiency	%	90	81	81	72	72	72	64	64	64	64
8	Weight	g	260	360	360	460	460	460	560	560	560	560
9	Average backlash no load	0	0.6	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	Gearhead length L1**	mm	41.0	55.5	55.5	70.0	70.0	70.0	84.5	84.5	84.5	84.5
	*no combination with EC 45 (150/250 W) and EC-i 40 **for EC 45 flat L1 is -3.6 mm											

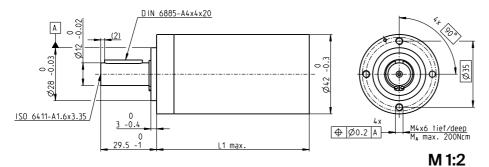




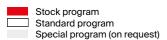


Modular System															
+ Motor	Page	+ Sensor	Page	Brake	Page	Overall le	ength [mi	m] = Moto	or length	+ gearhe	ad length	+ (senso	r/brake) -	- assemb	ly parts
EC-max 30, 60 W	281					105.1	119.6	119.6	134.1	134.1	134.1	148.6	148.6	148.6	148.6
EC-max 30, 60 W	281	16 EASY/XT/Abs.	505/507			116.2	130.7	130.7	145.2	145.2	145.2	159.7	159.7	159.7	159.7
EC-max 30, 60 W	281	16 EASY Abs. XT	508			116.7	131.2	131.2	145.7	145.7	145.7	160.2	160.2	160.2	160.2
EC-max 30, 60 W	281	HEDL 5540	539			125.7	140.2	140.2	154.7	154.7	154.7	169.2	169.2	169.2	169.2
EC-max 30, 60 W	281			AB 20	582	140.7	155.2	155.2	169.7	169.7	169.7	184.2	184.2	184.2	184.2
EC-max 30, 60 W	281	HEDL 5540	539	AB 20	582	161.3	175.8	175.8	190.3	190.3	190.3	204.8	204.8	204.8	204.8
EC-max 40, 70 W	282					99.1	113.6	113.6	128.1	128.1	128.1	142.6	142.6	142.6	142.6
EC-max 40, 70 W	282	16 EASY/XT/Abs.	505/507			110.0	124.5	124.5	139.0	139.0	139.0	153.5	153.5	153.5	153.5
EC-max 40, 70 W	282	16 EASY Abs. XT	508			110.5	125.0	125.0	139.5	139.5	139.5	154.0	154.0	154.0	154.0
EC-max 40, 70 W	282	HEDL 5540	539			122.5	137.0	137.0	151.5	151.5	151.5	166.0	166.0	166.0	166.0
EC-max 40, 70 W	282			AB 28	584	133.5	148.0	148.0	162.5	162.5	162.5	177.0	177.0	177.0	177.0
EC-max 40, 70 W	282	HEDL 5540	539	AB 28	584	151.8	166.3	166.3	180.8	180.8	180.8	195.3	195.3	195.3	195.3
EC-max 40, 120 W	283					129.1	143.6	143.6	158.1	158.1	158.1	172.6	172.6	172.6	172.6
EC-max 40, 120 W	283	16 EASY/XT/Abs.	505/507			140.0	154.5	154.5	169.0	169.0	169.0	183.5	183.5	183.5	183.5
EC-max 40, 120 W	283	16 EASY Abs. XT	508			140.5	155.0	155.0	169.5	169.5	169.5	184.0	184.0	184.0	184.0
EC-max 40, 120 W	283	HEDL 5540	539			152.5	167.0	167.0	181.5	181.5	181.5	196.0	196.0	196.0	196.0
EC-max 40, 120 W	283			AB 28		163.5	178.0	178.0	192.5	192.5	192.5	207.0	207.0	207.0	207.0
EC-max 40, 120 W	283	HEDL 5540	539	AB 28		181.8	196.3	196.3	210.8	210.8	210.8	225.3	225.3	225.3	225.3
EC-4pole 30, 100 W	289					88.1	102.6	102.6	117.1	117.1	117.1	131.6	131.6	131.6	131.6
EC-4pole 30, 100 W	289	22 EMT	516			116.0	130.5	130.5	145.0	145.0	145.0	159.5	159.5	159.5	159.5
EC-4pole 30, 100 W	289	16 EASY/XT/Abs.	505-507			102.0	116.5	116.5	131.0	131.0	131.0	145.5	145.5	145.5	145.5
EC-4pole 30, 100 W	289	16 EASY Abs. XT	508			102.5	117.0	117.0	131.5	131.5	131.5	146.0	146.0	146.0	146.0
EC-4pole 30, 100 W	289	16 RIO	517			100.5	115.0	115.0	129.5	129.5	129.5	144.0	144.0	144.0	144.0
EC-4pole 30, 100 W	289			AB 20	582	124.3	138.8	138.8	153.3	153.3	153.3	167.8	167.8	167.8	167.8
EC-4pole 30, 100 W	289	22 EMT	516	AB 20	582	155.5	170.0	170.0	184.5	184.5	184.5	199.0	199.0	199.0	199.0
EC-4pole 30, 100 W	289	16 EASY/XT/Abs.	505-507	AB 20	582	138.4	152.9	152.9	167.4	167.4	167.4	181.9	181.9	181.9	181.9
EC-4pole 30, 100 W	289	16 EASY Abs. XT	508	AB 20	582	138.9	153.4	153.4	167.9	167.9	167.9	182.4	182.4	182.4	182.4
EC-4pole 30, 100 W	289	16 RIO	517	AB 20	582	136.9	151.4	151.4	165.9	165.9	165.9	180.4	180.4	180.4	180.4

Planetary Gearhead GP 42 C Ø42 mm, 3.0−15.0 Nm Ceramic Version



Technical Data				
Planetary Gearhead			straigl	nt teeth
Output shaft			stainles	ss steel
Bearing at output	ŗ	reloade	ed ball b	earings
Radial play, 12 mm from	flange		max. 0.	06 mm
Axial play at axial load	<	5 N		0 mm
	>	5 N	max.	0.3 mm
Max. axial load (dynamic	c)			150 N
Max. force for press fits				300 N
Direction of rotation, dri	ve to ou	tput		=
Max. continuous input s	peed		80	00 rpm
Recommended tempera	ature ra	nge	-40	+100°C
Number of stages	1	2	3	4
Max. radial load, 12 mm				
from flange	120 N	240 N	360 N	360 N



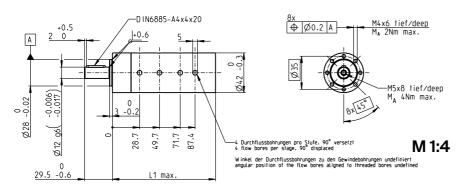
	: ⊢			
overall length		over	all length	

Part No	umbers								
203113	203115	203119	203120	203124	203129	203128	203133	203137	203141
203114	203116	260552*	203121	203125	260553*	203130	203134	203138	203142
260551*	203117		203122	203126		203131	203135	203139	260554*
	203118		203123	203127		203132	203136	203140	

*no combination with EC 45 (150/250 W) and EC-i 40 **for EC 45 flat L1 is -3.6 mm

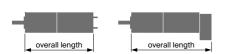
Modular System															
+ Motor	Page	+ Sensor	Page	Brake	Page	Overall le	ength [mi	n] = Mot	or length	+ gearhe	ad length	ı + (sensc	or/brake)	+ asseml	bly parts
EC-4pole 30, 200 W	291					105.1	119.6	119.6	134.1	134.1	134.1	148.6	148.6	148.6	148.6
EC-4pole 30, 200 W	291	22 EMT	516			133.0	147.5	147.5	162.0	162.0	162.0	176.5	176.5	176.5	176.5
EC-4pole 30, 200 W	291	16 EASY/XT/Abs.	505-507			119.0	133.5	133.5	148.0	148.0	148.0	162.5	162.5	162.5	162.5
EC-4pole 30, 200 W	291	16 EASY Abs. XT	508			119.5	134.0	134.0	148.5	148.5	148.5	163.0	163.0	163.0	163.0
EC-4pole 30, 200 W	291	16 RIO	517			117.5	132.0	132.0	146.5	146.5	146.5	161.0	161.0	161.0	161.0
EC-4pole 30, 200 W	291			AB 20	582	141.3	155.8	155.8	170.3	170.3	170.3	184.8	184.8	184.8	184.8
EC-4pole 30, 200 W	291	22 EMT	516	AB 20	582	172.5	187.0	187.0	201.5	201.5	205.1	216.0	261.0	216.0	216.0
EC-4pole 30, 200 W	291	16 EASY/XT/Abs.	505-507	AB 20	582	155.4	169.9	169.9	184.4	184.4	184.4	198.9	198.9	198.9	198.9
EC-4pole 30, 200 W	291	16 EASY Abs. XT	508	AB 20	582	155.9	170.4	170.4	184.9	184.9	184.9	199.4	199.4	199.4	199.4
EC-4pole 30, 200 W	291	16 RIO	517	AB 20	582	153.9	168.4	168.4	182.9	182.9	182.9	197.4	197.4	197.4	197.4
EC-i 40, 50 W	302/303					67.1	81.6	81.6	96.1	96.1	96.1	110.6	110.6	110.6	110.6
EC-i 40, 50 W	302/303	22 EMT	516			95.1	109.6	109.6	124.1	124.1	124.1	138.6	138.6	138.6	138.6
EC-i 40, 50 W	302/303	TSX 40 MAG/RIO	524-525			78.8	93.3	93.3	107.8	107.8	107.8	122.3	122.3	122.3	122.3
EC-i 40, 50 W	302/303	16 EASY/Abs.	505/507			78.8	93.3	93.3	107.8	107.8	107.8	122.3	122.3	122.3	122.3
EC-i 40, 50 W	302/303	16 RIO	517			81.6	96.1	96.1	110.6	110.6	110.6	125.1	125.1	125.1	125.1
EC-i 40, 70 W	304/305					77.1	91.6	91.6	106.1	106.1	106.1	120.6	120.6	120.6	120.6
EC-i 40, 70 W	304/305	22 EMT	516			105.1	119.6	119.6	134.1	134.1	134.1	148.6	148.6	148.6	148.6
EC-i 40, 70 W	304/305	TSX 40 MAG/RIO	524-525			88.8	103.8	103.8	117.8	117.8	117.8	132.3	132.3	132.3	132.3
EC-i 40, 70 W	304/305	16 EASY/Abs.	505/507			88.8	103.3	103.3	117.8	117.8	117.8	132.3	132.3	132.3	132.3
EC-i 40, 70 W	304/305	16 RIO	517			91.6	106.1	106.1	120.6	120.6	120.6	135.1	135.1	135.1	135.1
EC-i 40, 100 W	306					97.1	111.6	111.6	126.1	126.1	126.1	140.6	140.6	140.6	140.6
EC-i 40, 100 W	306	22 EMT	516			125.1	139.6	139.6	154.1	154.1	154.1	168.6	168.6	168.6	168.6
EC-i 40, 100 W	306	TSX 40 MAG/RIO	524-525			108.8	123.3	123.3	137.8	137.8	137.8	152.3	152.3	152.3	152.3
EC-i 40, 100 W	306	16 EASY/XT/Abs.	505/507			108.8	123.3	123.3	137.8	137.8	137.8	152.3	152.3	152.3	152.3
EC-i 40, 100 W	306	16 EASY Abs. XT	508			109.3	123.8	123.8	138.3	138.3	138.3	152.8	152.8	152.8	152.8
EC-i 40, 100 W	306	16 RIO	517			111.6	126.1	126.1	140.6	140.6	140.6	155.1	155.1	155.1	155.1
EC-i 40, 130 W	307					131.9	146.4	146.4	160.9	160.9	160.9	175.4	175.4	175.4	175.4
EC-i 40, 130 W	307	22 EMT	516			159.9	174.4	174.4	188.9	188.9	188.9	203.4	203.4	203.4	203.4
EC-i 40, 130 W	307	TSX 40 MAG/RIO	524-525			143.6	158.1	158.1	172.6	172.6	172.6	187.1	187.1	187.1	187.1
EC-i 40, 130 W	307	16 EASY/XT/Abs.	505/507			143.6	158.1	158.1	172.6	172.6	172.6	187.1	187.1	187.1	187.1
EC-i 40, 130 W	307	16 EASY Abs. XT	508			144.1	158.6	158.6	173.1	173.1	173.1	187.6	187.6	187.6	187.6
EC-i 40, 130 W	307	16 RIO	517			146.4	160.9	160.9	175.4	175.4	175.4	189.9	189.9	189.9	189.9
EC 45 flat, 30 W	320					53.9	68.4	68.4	82.9	82.9	82.9	97.4	97.4	97.4	97.4
EC 45 flat, 30 W, cable	320					55.2	69.7	69.7	84.2	84.2	84.2	98.7	98.7	98.7	98.7
EC 45 flat, 30 W	320	MILE	528			56.1	70.6	70.6	85.3	85.3	85.3	99.6	99.6	99.6	99.6
EC 45 flat, 50 W	321					59.5	74.0	74.0	88.5	88.5	88.5	103.0	103.0	103.0	103.0
EC 45 flat, 50 W	321	MILE	528			60.3	74.8	74.8	89.3	89.3	89.3	103.8	103.8	103.8	103.8
EC 45 flat, 60 W	322					59.5	74.0	74.0	88.5	88.5	88.5	103.0	103.0	103.0	103.0
EC 45 flat, 60 W	322	MILE	528			60.3	74.8	74.8	89.3	89.3	89.3	103.8	103.8	103.8	103.8
EC 45 flat, 90 W	323					65.5	80.0	80.0	94.5	94.5	94.5	109.0	109.0	109.0	109.0
EC 45 flat, 90 W	323	MILE	528			66.3	80.8	80.8	95.3	95.3	95.3	109.8	109.8	109.8	109.8
EC 45 flat, 70 W	324					64.5	79.0	79.0	93.5	93.5	93.5	108.0	108.0	108.0	108.0
EC 45 flat, 70 W	324	MILE	528			65.3	79.8	79.8	94.3	94.3	94.3	108.8	108.8	108.8	108.8
EC 45 flat, 80 W	325					64.5	79.0	79.0	93.5	93.5	93.5	108.0	108.0	108.0	108.0
EC 45 flat, 80 W	325	MILE	528			65.3	79.8	79.8	94.3	94.3	94.3	108.8	108.8	108.8	108.8
EC 45 flat, 120 W	326					70.5	85.0	85.0	99.5	99.5	99.5	114.0	114.0	114.0	114.0
EC 45 flat, 120 W	326	MILE	528			71.3	85.8	85.8	100.3	100.3	100.3	114.8	114.8	114.8	114.8
EC 45 flat, IE, IP 00	327	_				72.7	87.2	87.2	101.7	101.7	101.7	116.2	116.2		116.2
EC 45 flat, IE, IP 40	327					74.9	89.4	89.4	103.9	103.9	103.9	118.4	118.4	118.4	118.4
EC 45 flat, IE, IP 00	328					77.7	92.2	92.2	106.7	106.7	106.7	121.2			121.2
EC 45 flat, IE, IP 40	328					79.9	94.4	94.4	108.9	108.9	108.9	123.4	123.4	123.4	123.4
10 mat, 1L, 11 70	525					. 5.5	U T. T	5-77	100.0	100.0	100.0				120.7

Planetary Gearhead GP 42 HD Ø42 mm, 10.0–50.0 Nm Heavy Duty – for application in oil



Technical Data				
Planetary Gearhead			straigh	nt teeth
Output shaft			stainles	s steel
Bearing at output			ball b	pearing
Radial play, 12 mm from	flange		max. 0.	05 mm
Axial play			max. (0.2 mm
Max. axial load (dynamic	:)			250 N
Max. force for press fits				450 N
Direction of rotation, driv	ve to out	tput		=
Max. continuous input s	peed		< 800	OO rpm
Recommended tempera	ature rar	nge	-55+	-200°C
Extended range as op	tion		-55+	-260°C
Number of stages	1	2	3	4
Max. radial load, 12 mm				
from flange	250 N	480 N	720 N	720 N

	Stock program Standard program		Part Numbers	;					
	Special program (on request)		454742	454744	454745	476936	454280	476945	476949
Gea	rhead Data (provisional)								
1	Reduction	-	3.5:1	12:1	43:1	81:1	150:1	285:1	441:1
2	Absolute reduction		7/2	49/4	343/8	2197/27	²⁴⁰¹ / ₁₆	15379/54	441/1
10	Mass inertia	gcm ²	17.5	29	35.5	23.9	41.3	33.1	30.6
3	Max. motor shaft diameter	mm	10	10	10	8	10	8	10
	Part Numbers		476927	476928	476933	476937	476942	476946	476950
1	Reduction		4.3:1	15:1	53:1	91:1	186:1	319:1	488:1
2	Absolute reduction		13/3	91/6	637/12	91/1	4459/24	637/2	4394/9
10	Mass inertia	gcm ²	11.1	23.3	31.8	25.4	37.6	34.2	26.3
3	Max. motor shaft diameter	mm	8	8	10	8	10	10	8
	Part Numbers			476929	476934	476938	476943	476947	476951
1	Reduction			19:1	66:1	113:1	230:1	353:1	546:1
2	Absolute reduction			169/9	1183/18	338/3	8281/36	28561/81	546/1
10	Mass inertia	gcm ²		19.1	28.1	21.2	36.6	28.9	28.1
3	Max. motor shaft diameter	mm		8	8	8	10	8	8
	Part Numbers				454746		476944	476948	476952
1	Reduction				74:1		257:1	394:1	676:1
2	Absolute reduction				147/2		1029/4	1183/3	676/1
10	Mass inertia	gcm ²			28.2		37.6	30.4	23.9
3	Max. motor shaft diameter	mm			10		10	8	8
4	Number of stages		1	2	3	3	4	4	4
5	Max. continuous torque	Nm	10	20	40	40	50	50	50
6	Max. intermittent torque at gear output	Nm	15	30	60	60	75	75	75
15	Max. overload torque ¹	Nm	20	40	80	80	100	100	100
7	Max. efficiency	%	95	87	78	78	65	65	65
8	Weight	g	430	600	710	710	780	780	780
9	Average backlash no load	°	0.6	0.8	0.8	1.0	1.0	1.0	1.0
11	Gearhead length L1	mm	57.7	79.9	102.2	102.2	116.9	116.9	116.9
13	Max. transmittable power (continuous)	W	2000	880	300	300	62	62	62
14	Max. transmittable power (intermittent)	W	3000	1320	450	450	93	93	93
1 Red	iced expected life span								



Modular System										
+ Motor	Page	+ Sensor/Brake	Page	Overall length [n	nm] = Motor l	ength + gearh	ead length + (sensor/brake)	+ assembly pa	arts
EC-4pole 32 HD oil, A	293			221.3	243.5	265.8	265.8	280.5	280.5	280.5
EC-4pole 32 HD oil, B	293			201.3	223.5	245.8	245.8	260.5	260.5	260.5

General

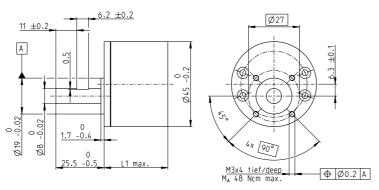
- extreme temperature applications
- vibration tested according to MIL-STD810F/ Jan2000 Fig. 514.5C-10
- operation in oil and high pressure

Oil & Gas Industry

- oil, gas and geothermal wells

This gearhead has been designed for applications in oil and is only equipped with minimum lubrication. Therefore it is not permitted to use it under normal air conditions.

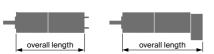
Spur Gearhead GS 45 A \varnothing 45 mm, 0.5-2.0 Nm



Technical Data							
Spur Gearhead			straigh	nt teeth			
Output shaft	teel, hai	rdened					
Bearing at output	ball b	earing					
Radial play, 10 mm from fla	max. 0	.15 mm					
Axial play	0.02-0.2 mm						
Max. axial load (dynamic)	Max. axial load (dynamic)						
Max. force for press fits				60 N			
Max. continuous input spe-	ed			00 rpm			
Recommended temperatu	re ra	nge	-15	+80°C			
Number of stages 2	3	4	5	6			
Max. radial load, 10 mm							
from flange 120 N 180	N	190 N	190 N	190 N			

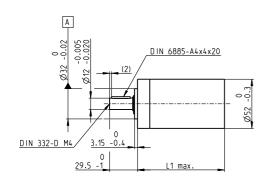
		-	
N	л		•-
ıv	,,		-4

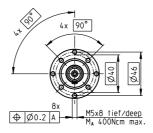
	Stock program Standard program		Part Numbers	;			
	Special program (on request)		678432	678440	678527	678531	678539
Gea	rhead Data						
1	Reduction		5:1	18:1	61:1	212:1	732:1
2	Absolute reduction		51/10	459/26	20655/338	125862/595	492790/673
10	Mass inertia	gcm ²	3.7	1.6	1.0	0.8	0.8
3	Max. motor shaft diameter	mm	3	3	3	3	3
	Part Numbers		678433	678438	678528	678532	678540
1	Reduction		7:1	26:1	89:1	310:1	1072:1
2	Absolute reduction		209/28	9405/364	66632/745	183281/592	307572/287
10	Mass inertia	gcm ²	3.1	1.4	1.0	0.8	0.8
3	Max. motor shaft diameter	mm	3	3	3	3	3
	Part Numbers		678434	678436	678529	678533	678541
1	Reduction		9:1	32:1	111:1	385:1	1334:1
2	Absolute reduction		2295/247	8523/265	334/3	173808/451	198769/149
10	Mass inertia	gcm ²	2.1	1.4	0.6	0.5	0.4
3	Max. motor shaft diameter	mm	3	3	3	3	3
	Part Numbers		678435	678437	678530	678536	678542
1	Reduction	,	14:1	47:1	163:1	564:1	1952:1
2	Absolute reduction		2475/182	6221/132	141157/861	161880/287	1929023/988
10	Mass inertia	gcm ²	2.2	0.9	0.5	0.5	0.4
3	Max. motor shaft diameter	mm	3	3	3	3	3
4	Number of stages		2	3	4	5	6
5	Max. continuous torque	Nm	0.5	2.0	2.0	2.0	2.0
6	Max. intermittent torque at gear output	Nm	0.75	2.5	2.5	2.5	2.5
12	Direction of rotation, drive to output		=	≠	=	≠	=
7	Max. efficiency	%	87	76	66	59	53
8	Weight	g	113	113	125	140	149
9	Average backlash no load	٥	1.6	2.0	2.4	2.8	3.2
11	Gearhead length L1*	mm	24.2	24.2	26.9	30.4	33.8
	*for EC 45 flat, IE, L1 is max. + 4.0 mm						



+ Motor	Page	+ Sensor/Brake	Page	Overall length [m	nm] = Motor le	ength + gearhe	ead length + (s	sensor/brake) + as	sembly parts
EC 45 flat, 30 W	320			40.7	40.7	43.4	46.9	50.3	
EC 45 flat, 30 W, cable	320			42.0	42.0	44.7	48.2	51.6	
EC 45 flat, 30 W	320	MILE	528	42.9	42.9	45.6	49.1	52.5	
EC 45 flat, 50 W	321			46.3	46.3	49.0	52.5	55.9	
EC 45 flat, 50 W	321	MILE	528	47.1	47.1	49.8	53.3	56.7	
EC 45 flat, 60 W	322			46.3	46.3	49.0	52.5	55.9	
EC 45 flat, 60 W	322	MILE	528	47.1	47.1	49.8	53.3	56.7	
EC 45 flat, 90 W	323			52.3	52.3	55.0	58.5	61.9	
EC 45 flat, 90 W	323	MILE	528	53.1	53.1	55.8	59.3	62.7	
EC 45 flat, 70 W	324			51.3	51.3	54.0	57.5	60.9	
EC 45 flat, 70 W	324	MILE	528	52.1	52.1	54.8	58.3	61.7	
EC 45 flat, 80 W	325			51.3	51.3	54.0	57.5	60.9	
EC 45 flat, 80 W	325	MILE	528	52.1	52.1	54.8	58.3	61.7	
C 45 flat, 120 W	326			57.3	57.3	60.0	63.5	66.9	
EC 45 flat, 120 W	326	MILE	528	58.1	58.1	60.8	64.3	67.7	
EC 45 flat, IE, IP 00	327			59.9	59.9	62.6	66.1	69.5	
EC 45 flat, IE, IP 40	327			62.1	62.1	64.8	68.3	71.7	
EC 45 flat, IE, IP 00	328			64.9	64.9	67.6	71.1	74.5	
EC 45 flat, IE, IP 40	328			67.1	67.1	69.8	73.3	76.7	

Planetary Gearhead GP 52 C ∅52 mm, 4.0–30.0 Nm Ceramic Version





Technical Data					
Planetary Gearhead			straig	ht teeth	
Output shaft	stainless steel				
Bearing at output		preload	ed ball b	earings	
Radial play, 12 mm fro	max. 0.	.06 mm			
Axial play at axial load		0 mm			
		> 5 N	max.	0.3 mm	
Max. axial load (dynar		200 N			
Max. force for press f	its			500 N	
Direction of rotation,	drive to c	output		=	
Max. continuous inpu	t speed		60	00 rpm	
Recommended temp	erature r	ange	-15.	+80°C	
Extended range as	option		-40	+100°C	
Number of stages	1	2	3	4	
Max. radial load, 12 m	m				
from flange	420 N	630 N	900 N	900 N	

	Stock program Standard program Special program (on request)		Part Numbers									
	Special program (or request)		223080	223083	223089	223094	223097	223104	223109			
Gea	arhead Data											
1	Reduction		3.5:1	12:1	43:1	91:1	150:1	319:1	546:1			
2	Absolute reduction		7/2	49/4	343/8	91	2401/16	637/2	546			
10	Mass inertia	gcm ²	20.7	17.6	17.3	16.7	17.3	16.8	16.4			
3	Max. motor shaft diameter	mm	10	10	10	10	10	10	10			
	Part Numbers		223081	223084	223090	223095	223099	223105	223110			
1	Reduction		4.3:1	15:1	53:1	113:1	186:1	353:1	676:1			
2	Absolute reduction		13/3	91/6	637/12	338/3	4459/24	28561/81	676			
10	Mass inertia	gcm ²	12	16.8	17.2	9.3	17.3	9.4	9.1			
3	Max. motor shaft diameter	mm	8	10_	10	8	10	8	8			
	Part Numbers			223085	223091	223096	223101	223106	223111			
1	Reduction			19:1	66:1	126:1	230:1	394:1	756:1			
2	Absolute reduction			169/9	1183/18	126	8281/36	1183/3	756			
10	Mass inertia	gcm ²		9.5	16.7	16.4	16.8	16.7	16.4			
3	Max. motor shaft diameter	mm		8	10	10	10	10	10			
	Part Numbers			223086	223092	223098	223102	223107	223112			
1	Reduction			21:1	74:1	156:1	257:1	441:1	936:1			
2	Absolute reduction			21	147/2	156	1029/4	441	936			
10	Mass inertia	gcm ²		16.5	17.2	9.1	17.3	16.5	9.1			
3	Max. motor shaft diameter	mm		10	10	8	10	10	8			
	Part Numbers			223087	223093		223103	223108				
1	Reduction			26:1	81:1		285:1	488:1				
2	Absolute reduction			26	2197/27		15379/54	4394/9				
10	Mass inertia	gcm ²		9.1	9.4		16.7	9.4				
3	Max. motor shaft diameter	mm		8	8		10	8				
4	Number of stages		1	2	3	3	4	4	4			
5	Max. continuous torque	Nm	4	15	30	30	30	30	30			
6	Max. intermittent torque at gear output	Nm	6	22.5	45	45	45	45	45			
7	Max. efficiency	%	91	83	75	75	68	68	68			
8	Weight	g	460	620	770	770	920	920	920			
9	Average backlash no load	۰	0.6	0.8	1.0	1.0	1.0	1.0	1.0			
11	Gearhead length L1	mm	49.0	65.0	78.5	78.5	92.0	92.0	92.0			

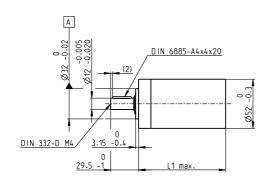


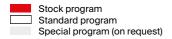


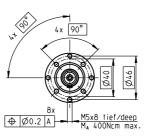


Modular System												
+ Motor	Page	+ Sensor	Page	Brake	Page	Overall length [mm] = Moto	r length + gea	arhead lengtl	n + (sensor/b	rake) + asser	nbly parts
RE 40, 150 W	161					120.1	136.1	149.6	149.6	163.1	163.1	163.1
RE 40, 150 W	161	HED_ 5540	535/538			140.8	156.8	170.3	170.3	183.8	183.8	183.8
RE 40, 150 W	161	HEDL 9140	540			174.1	190.1	203.6	203.6	217.1	217.1	217.1
RE 40, 150 W	161			AB 28	585	156.2	172.2	185.7	185.7	199.2	199.2	199.2
RE 40, 150 W	161			AB 28	586	164.2	180.2	193.7	193.7	207.2	207.2	207.2
RE 40, 150 W	161	HED_ 5540	535/538	AB 28	585	173.4	189.4	202.9	202.9	216.4	216.4	216.4
RE 40, 150 W	161	HEDL 9140	540	AB 28	586	184.6	200.6	214.1	214.1	227.6	227.6	227.6
RE 50, 200 W	162					157.1	173.1	186.6	186.6	200.1	200.1	200.1
RE 50, 200 W	162	HED_5540	536/538			177.8	193.8	207.3	207.3	220.8	220.8	220.8
RE 50, 200 W	162	HEDL 9140	541			219.5	235.5	249.0	249.0	262.5	262.5	262.5
RE 50, 200 W	162			AB 44	590	219.5	235.5	249.0	249.0	262.5	262.5	262.5
RE 50, 200 W	162	HEDL 9140	541	AB 44	590	232.5	248.5	262.0	262.0	275.5	275.5	275.5
EC 40, 170 W	268					129.1	145.1	158.6	158.6	172.1	172.1	172.1
EC 40, 170 W	268	HED_5540	536/538			152.5	168.5	182.0	182.0	195.5	195.5	195.5
EC 40, 170 W	268	Res 26	543			156.3	172.3	185.8	185.8	199.3	199.3	199.3
EC 40, 170 W	268			AB 32	587	171.8	187.8	201.3	201.3	214.8	214.8	214.8
EC 40, 170 W	268	HED_5540	536/538	AB 32	587	190.2	206.2	219.7	219.7	233.2	233.2	233.2
EC 45, 150 W	269					160.3	176.3	189.8	189.8	203.3	203.3	203.3
EC 45, 150 W	269	HEDL 9140	540			175.9	191.9	205.4	205.4	218.9	218.9	218.9
EC 45, 150 W	269	Res 26	543			160.3	176.3	189.8	189.8	203.3	203.3	203.3
EC 45, 150 W	269			AB 28	586	167.7	183.7	197.2	197.2	210.7	210.7	210.7
EC 45, 150 W	269	HEDL 9140	540	AB 28	586	184.7	200.7	214.2	214.2	227.7	227.7	227.7
EC 45, 250 W	270					193.1	209.1	222.6	222.6	236.1	236.1	236.1
EC 45, 250 W	270	HEDL 9140	540			208.7	224.7	238.2	238.2	251.7	251.7	251.7
EC 45, 250 W	270	Res 26	543			193.1	209.1	222.6	222.6	236.1	236.1	236.1

Planetary Gearhead GP 52 C ∅52 mm, 4.0–30.0 Nm Ceramic Version



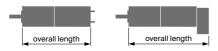




М	1	-⊿
IVI		

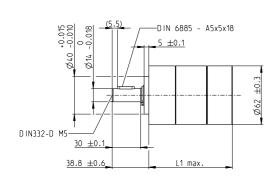
Technical Data					
Planetary Gearhead				straigl	nt teeth
Output shaft		stainles	ss steel		
Bearing at output		preloa	ade	ed ball b	earings
Radial play, 12 mm fro	m flang	е		max. 0.	06 mm
Axial play at axial load			0 mm		
		> 5 N		max. (0.3 mm
Max. axial load (dynar			200 N		
Max. force for press f	its				500 N
Direction of rotation, of	drive to	output			=
Max. continuous inpu	t speed			60	00 rpm
Recommended temp	erature	range		-15	.+80°C
Extended range as	option			-40	+100°C
Number of stages	1		2	3	4
Max. radial load, 12 m	m				
from flange	420 N	630	N	900 N	900 N

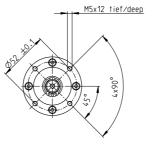
Part Number	ers					
223080	223083	223089	223094	223097	223104	223109
223081	223084	223090	223095	223099	223105	223110
	223085	223091	223096	223101	223106	223111
	223086	223092	223098	223102	223107	223112
	223087	223093		223103	223108	



Modular System + Motor	Dogg	ı Concer	Dogo	Droke	Doco	Overell length	[mm] Mat	rlongth	orboad lan-t	h . /oonoo://-	roko) : cos -	mblu nort-
	Page	+ Sensor	Page	Brake	Page	Overall length						
EC 45, 250 W	270	11551 0110	5.40	AB 28	586	200.5	216.5	230.0	230.0	243.5	243.5	243.5
EC 45, 250 W	270	HEDL 9140	540	AB 28	586	217.5	233.5	247.0	247.0	260.5	260.5	260.5
EC-max 40, 120 W						137.1	153.1	166.6	166.6	180.1	180.1	180.1
EC-max 40, 120 W		16 EASY/XT/Abs.				148.0	164.0	177.5	177.5	191.0	191.0	191.0
EC-max 40, 120 W		16 EASY Abs. XT				148.5	164.5	178.0	178.0	191.5	191.5	191.5
EC-max 40, 120 W		HEDL 5540	539			160.5	176.5	190.0	190.0	203.5	203.5	203.5
EC-max 40, 120 W				AB 28	584	171.5	187.5	201.0	201.0	214.5	214.5	214.5
EC-max 40, 120 W		HEDL 5540	539	AB 28	584	189.8	205.8	219.3	219.3	232.8	232.8	232.8
EC-i 52, 180 W	308					129.1	145.1	158.6	158.6	172.1	172.1	172.1
EC-i 52, 180 W	308	22 EMT	516			157.1	173.1	186.6	186.6	200.1	200.1	200.1
EC-i 52, 180 W	308	TSX 40 MAG/RIC				140.8	156.8	170.3	170.3	183.8	183.8	183.8
EC-i 52, 180 W	308	16 EASY/Abs.	505/507			142.8	158.8	172.3	172.3	185.8	185.8	185.8
EC-i 52, 180 W	308	16 RIO	517			142.8	158.8	172.3	172.3	185.8	185.8	185.8
EC-i 52, 200 W	309					159.1	175.1	188.6	188.6	202.1	202.1	202.1
EC-i 52, 200 W	309	22 EMT	516			187.1	203.1	216.6	216.6	230.1	230.1	230.1
EC-i 52, 200 W	309	TSX 40 MAG/RIC	524-525	5		170.8	186.8	200.3	200.3	213.8	213.8	213.8
EC-i 52, 200 W	309	16 EASY/XT/Abs.	505-507			172.8	188.8	202.3	202.3	215.8	215.8	215.8
EC-i 52, 200 W	309	16 EASY Abs. XT	508			173.3	189.3	202.8	202.8	216.3	216.3	216.3
EC-i 52, 200 W	309	16 RIO	517			172.8	188.8	202.3	202.3	215.8	215.8	215.8
EC 60 flat, 100 W	329					89.8	105.8	119.3	119.3	132.8	132.8	132.8
EC 60 flat, 100 W	329	MILE	528			90.8	106.8	120.3	120.3	133.8	133.8	133.8
EC 60 flat, 150 W	330					89.8	105.8	119.3	119.3	132.8	132.8	132.8
EC 60 flat, 150 W	330	MILE	528			90.8	106.8	120.3	120.3	133.8	133.8	133.8
EC 60 flat, 200 W	331		020			97.6	113.6	127.1	127.1	140.6	140.6	140.6
EC 60 flat, 200 W	331	MILE	528			98.6	114.6	128.1	128.1	141.6	141.6	141.6
EC 90 flat, 160 W	332	IVIILL	020			74.5	90.5	103.5	103.5	117.0	117.0	117.0
EC 90 flat, 160 W	332	MILE	531			75.0	91.0	104.0	104.0	117.5	117.5	117.5
EC 90 flat, 220 W	333	IVIILL	001			74.5	90.5	103.5	103.5	117.0	117.0	117.0
EC 90 flat, 220 W	333	MILE	531			75.0	91.0	104.0	104.0	117.5	117.5	117.5
EC 90 flat, 360 W	334	IVIILL	331			87.0	103.0	116.0	116.0	129.5	129.5	129.5
EC 90 flat, 360 W	334	MILE	531			87.5	103.5	116.5	116.5	130.0	130.0	130.0
EC 90 flat, 260 W	335	IVIILL	331			87.0	103.0	116.0	116.0	129.5	129.5	129.5
EC 90 flat, 260 W	335	MILE	531			87.5	103.5	116.5	116.5	130.0	130.0	130.0
EC 90 flat, 200 W	336	IVIILL	331			87.0	103.0	116.0	116.0	129.5	129.5	129.5
EC 90 flat, 400 W	336	MILE	531			87.5	103.5		116.5	130.0		130.0
		IVIILE	331					116.5			130.0	
EC 90 flat, 600 W	337	MILE	E 2 1			99.5	115.5	128.5	128.5	142.0	142.0	142.0
EC 90 flat, 600 W	337	MILE	531			100.0	116.0	129.0	129.0	142.5	142.5	142.5

Planetary Gearhead GP 62 A Ø62 mm, 6.2-38.5 Nm

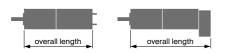




Technical Data					
Planetary Gearhead		straigh	nt teeth		
Output shaft		steel			
Bearing at output		ball l	pearing		
Radial play, 7 mm from flange	9	max. 0.	08 mm		
Axial play		max. 1.	28 mm		
Max. force for press fits		1000 N			
Direction of rotation, drive to	output		=		
Max. continuous input speed		3000 rpm			
Recommended temperature	range	-30	+120°C		
Number of stages	2	3			
Max. radial load, 24 mm					
from flange	240 N	360 N	520 N		
Max. axial load (dynamic)	70 N	100 N	150 N		

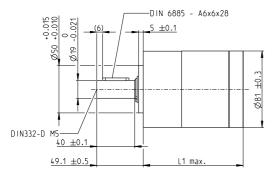
M 1:4

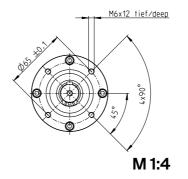
	Stock program Standard program Special program (on request)		Part Numb	pers							
			701923	701924	701925	701926	701927	701928	701929	701930	701931
Gea	arhead Data										
1	Reduction		5.2:1	19:1	27:1	35:1	71:1	100:1	139:1	181:1	236:1
2	Absolute reduction		⁵⁷ /11	3591/187	3249/121	1539/44	226223/3179	204687/2057	185193/1331	87723/484	41553/176
_ 3	Max. motor shaft diameter	mm	8	8	8	8	8	8	8	8	8
4	Number of stages		1	2	2	2	3	3	3	3	3
5	Max. continuous torque	Nm	6.2	19.2	19.2	19.2	38.5	38.5	38.5	38.5	38.5
6	Max. intermittent torque at gear output	Nm	9.2	28.5	28.5	28.5	57.7	57.7	57.7	57.7	57.7
7	Max. efficiency	%	80	75	75	75	70	70	70	70	70
8	Weight	g	848	1167	1167	1167	1472	1472	1472	1472	1472
9	Average backlash no load	۰	0.65	0.7	0.7	0.7	0.75	0.75	0.75	0.75	0.75
10	Mass inertia	gcm ²	46.34	44.73	44.23	40.06	44.61	44.17	44.15	40.02	39.92
11	Gearhead length L1	mm	71.9	88.8	88.8	88.8	105.8	105.8	105.8	105.8	105.8



Modular System														
+ Motor	Page	+ Sensor	Page	Brake	Page	Overall leng	gth [mm] =	Motor leng	jth + gearhe	ead length	+ (sensor/b	rake) + ass	embly parts	3
RE 50, 200 W	162					180.0	196.9	196.9	196.9	213.9	213.9	213.9	213.9	213.9
RE 50, 200 W	162	HEDS 5540	536			200.7	217.6	217.6	217.6	234.6	234.6	234.6	234.6	234.6
RE 50, 200 W	162	HEDL 5540	538			200.7	217.6	217.6	217.6	234.6	234.6	234.6	234.6	234.6
RE 50, 200 W	162	HEDL 9140	541			242.4	259.3	259.3	259.3	276.3	276.3	276.3	276.3	280.3
RE 50, 200 W	162			AB 44	590	242.4	259.3	259.3	259.3	276.3	276.3	276.3	276.3	280.3
RE 50, 200 W	162	HEDL 9140	541	AB 44	590	255.4	272.3	272.3	272.3	289.3	289.3	289.3	289.3	289.3
EC 45, 250 W	270					216.0	232.9	232.9	232.9	249.9	249.9	249.9	249.9	249.9
EC 45, 250 W	270	HEDL 9140	540			231.6	248.5	248.5	248.5	265.5	265.5	265.5	265.5	265.5
EC 45, 250 W	270	Res 26	543			216.0	232.9	232.9	232.9	249.9	249.9	249.9	249.9	249.9
EC 45, 250 W	270			AB 28	586	223.4	240.3	240.3	240.3	257.3	257.3	257.3	257.3	257.3
EC 45, 250 W	270	HEDL 9140	540	AB 28	586	240.4	257.3	257.3	257.3	274.3	274.3	274.3	274.3	274.3

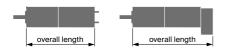
Planetary Gearhead GP 81 A Ø81 mm, 15.4-92.3 Nm





Technical Data						
Planetary Gearhead		straight teeth				
Output shaft	steel					
Bearing at output	ball	bearing				
Radial play, 8 mm from flang	max	. 0.1 mm				
Axial play	max. 1.28 mm					
Max. force for press fits	1500 N					
Direction of rotation, drive to	output		=			
Max. continuous input speed	d	3000 rpm				
Recommended temperature	e range	-30+120°C				
Number of stages	2					
Max. radial load, 29 mm						
from flange	400 N	600 N	1000 N			
Max. axial load (dynamic)	80 N	120 N	200 N			

	Stock program Standard program		Part Numbers								
	Special program (on request)	701932	701933	701934	701935	701936	701937				
Gea	arhead Data										
1	Reduction		3.7:1	14:1	25:1	51:1	93:1	308:1			
2	Absolute reduction		63/17	3969/289	1701/68	250047/4913	107163/1156	19683/64			
_ 3	Max. motor shaft diameter	mm	14	14	14	14	14	14			
4	Number of stages		1	2	2	3	3	3			
5	Max. continuous torque	Nm	15.4	46.2	46.2	92.3	92.3	92.3			
6	Max. intermittent torque at gear output	Nm	23.1	69.2	69.2	138.5	138.5	138.5			
7	Max. efficiency	%	80	75	75	70	70	70			
8	Weight	g	1902	2624	2624	3336	3336	3336			
9	Average backlash no load	0	0.5	0.55	0.55	0.6	0.6	0.6			
10	Mass inertia	gcm ²	192.86	183.6	90.29	182.92	90.9	88.48			
11	Gearhead length L1	mm	91.9	113.6	113.6	135.2	135.2	135.2			



Modular System											
+ Motor	Page	+ Sensor	Page	Brake	Page	Overall length [mm]	= Motor length	n + gearhead leng	gth + (sensor/bra	ake) + assembly	parts
RE 65, 250 W	163					223.40	245.10	245.10	266.70	266.70	266.70
RE 65, 250 W	163	HEDS 5540	536			249.30	271.00	271.00	292.60	292.60	292.60
RE 65, 250 W	163	HEDL 5540	538			249.30	271.00	271.00	292.60	292.60	292.60
RE 65, 250 W	163	HEDL 9140	541			279.50	301.20	301.20	322.80	322.80	322.80
RE 65, 250 W	163			AB 44	590	279.50	301.20	301.20	322.80	322.80	322.80
RE 65, 250 W	163	HEDL 9140	541	AB 44	590	297.50	319.20	319.20	340.80	340.80	340.80
EC 60, 400 W	271					269.30	291.00	291.00	312.60	312.60	312.60
EC 60, 400 W	271	HEDL 9140	540			269.30	291.00	291.00	312.60	312.60	312.60
EC 60, 400 W	271	Res 26	543			269.30	291.00	291.00	312.60	312.60	312.60
EC 60, 400 W	271			AB 41	588	282.90	304.60	304.60	326.20	326.20	326.20
EC 60, 400 W	271	HEDL 9140	540	AB 41	588	306.90	328.60	328.60	350.20	350.20	350.20

parvalux right angle gear



Standard Specification No. 102	89	
Terminology explanations		
parvalux right angle gear programm		462-465
GB 80, Composite, 6.0–8.0 Nm	NEW	462
GB 12, Bronze, 30.0 Nm	NEW	463
GB 9, Composite, 50.0 Nm	NEW	464
GB 65. Steel/bronze, 120.0 Nm	NEW	465

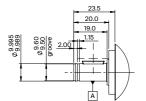


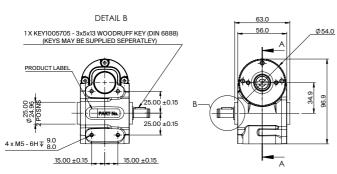
Parvalux angular gearheads – optimally matched to maxon motors. High torque and impressive power density with an extremely compact design, all made possible by the worm gear technology.

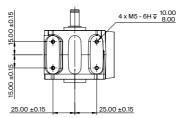
More Parvalux products at www.parvalux.com

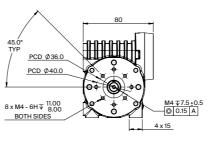
© 2024 maxon. All rights reserved.

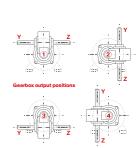












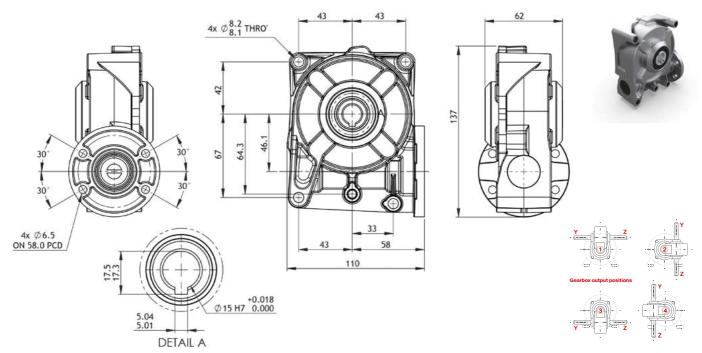
Key Data	Composite version
Max. continuous torque	Nm 8
Ambient temperature	°C -30+130
Max. continuous input speed	rpm 4000
Gearhead length ¹	mm 80
Bearing at output	Ball bearing
Weight	kg 0.7

Specifications		Compos	ite versio	n
Part numbers (special program on request)		812954	848376	848379
Reduction	X:1	15.5	30	60
Number of stages		1	1	1
Max. continuous torque	Nm	8	8	6
Max. intermittent torque	Nm	13	13	10
Max. continuous input speed	rpm	4000	4000	4000
Max. intermittent input speed	rpm	5000	5000	5000
Max. efficiency	%	77	70	54
Average backlash no load	arc.min	10-25	10-25	10-25
Max. axial load (dynamic)	N	150	150	150
Max. permissible radial load, 12 mm from flange	N	500	500	500

Configuration	Composite version
Configuration Gearhead position to motor	Composite version 4 positions, all at 90°

Modular System		Notes
EC Motor	Page	¹ Additional length required for the mounting
IDX 56	245-247	adapter.
EC-i 52	308-309	
EC 60 flat	329-331	
EC 90 flat	332-337	
IDX drive		
IDX 56	361-363	

Bronze Version



Key Data	Bronze version
Max. continuous torque	Nm 30
Ambent temperature	°C -30+130
Max. continuous input speed	rpm 4000
Gearhead length ¹	mm 110
Bearing at output	Ball bearing
Weight	kg 1.5

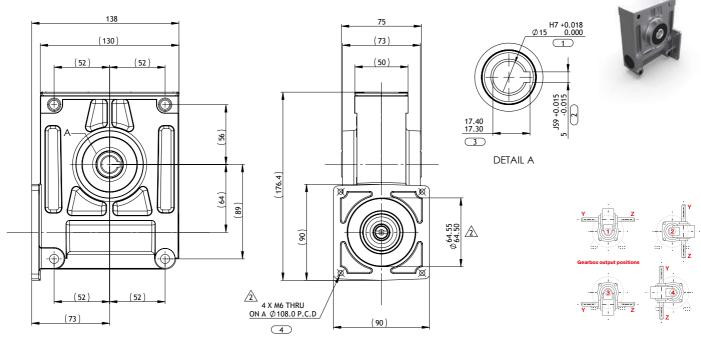
Specifications		Bronze v	ersion	
Part numbers (special program on request)		735900	735901	735902
Reduction	X:1	15	30	60
Number of stages		1	1	1
Max. continuous torque	Nm	30	30	30
Max. intermittent torque	Nm	48	48	48
Max. continuous input speed	rpm	4000	4000	4000
Max. intermittent input speed	rpm	5000	5000	5000
Max. efficiency	%	75	65	50
Average backlash no load	arc.min	10-25	10-25	10-25
Max. axial load (dynamic)	N	600	600	600
Max. permissible radial load, 12 mm from flange	N	800	800	800

Configuration	Bronze version	
Configuration Gearhead position to motor	4 positions, all at 90°	

Modular System		Notes
EC Motor IDX 56 IDX 70 S, M EC-i 52 EC 90 flat	Page 245-247 248-249 308-309 332-337	'Additional length required for the mounting adapter. Standard shaft Ø25, length 50 mm with 8 mm keyway 735903
IDX drive IDX 56 IDX 70 S, M	361-363 364-365	
IDX 7 0 0, WI	304-303	

NEW

Composite Version



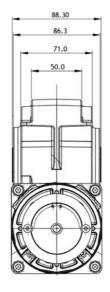
Key Data	Composite version	
Max. continuous torque	Nm 50	
Ambient temperature	°C -30+130	
Max. continuous input speed	rpm 4000	
Gearhead length ¹	mm 138	
Bearing at output	Ball bearing	
Weight	kg 2.3	

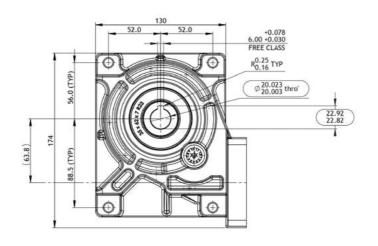
Specifications		Composi	ite versio	n
Part numbers (special program on request)		735894	735895	735896
Reduction	X:1	15	30	60
Number of stages		1	1	1
Max. continuous torque	Nm	50	50	50
Max. intermittent torque	Nm	80	80	80
Max. continuous input speed	rpm	4000	4000	4000
Max. intermittent input speed	rpm	5000	5000	5000
Max. efficiency	%	85	75	65
Average backlash no load	arc.min	10-25	10-25	10-25
Max. axial load (dynamic)	N	600	600	600
Max. permissible radial load, 12 mm from flange	N	800	800	800

Configuration Gearhead position to motor	Composite version 4 positions, all at 90°	
Gearhead position to motor	4 positions, all at 90°	

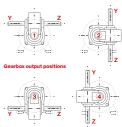
Modular System	n	Notes
EC Motor	Page	¹ Additional length required for the mounting
EC 90 flat	332-337	adapter.
IDX 70	248-250	Standard shaft ∅25, length 50 mm with
		8 mm keyway 735898
IDX drive		
IDX 70	364-366	

Steel/Bronze Version









Key Data	Steel/Bronze Version
Max. continuous torque	Nm 120
Ambient temperature	°C -30+120
Max. continuous input speed	rpm 4000
Gearhead length ¹	mm 130
Bearing at output	Ball bearing
Weight	kg 3.5

Specifications	:	Steel/Bro	onze Ver	sion
Part numbers (special program on request)		848390	848392	848393
Reduction	X:1	80	120	160
Number of stages		2	2	2
Max. continuous torque	Nm	120	120	120
Max. intermittent torque	Nm	300	300	300
Max. continuous input speed	rpm	4000	4000	4000
Max. intermittent input speed	rpm	5000	5000	5000
Max. efficiency	%	70	60	55
Average backlash no load	arc.min	35	35	35
Max. axial load (dynamic)	N	1000	1000	1000
Max. permissible radial load, 12 mm from flange	N	3000	3000	3000

Steel/Bronze Version	
4 positions, all at 90°	
	Steel/Bronze Version 4 positions, all at 90°

Modular System	1	Notes
EC Motor	Page	¹ Additional length required for the mounting
EC 90 flat	332-337	adapter.
IDX 70	248-250	
IDX drive		
IDX 70	364-366	

-		

maxon screw drive

Standard Specification No. 102	89
Important considerations	456
maxon screw drive	469-489
GP 6 S Ø6 mm, metric lead screw	469
GP 6 S Ø6 mm, metric lead screw, ceramic	470
GP 8 S Ø8 mm, metric lead screw	471
GP 8 S Ø8 mm, metric lead screw, ceramic	472
GP 16 S Ø16 mm, ball screw	473
GP 16 S Ø16 mm, metric lead screw	474
GP 16 S Ø16 mm, metric lead screw, ceramic	475
GP 22 S Ø22 mm, ball screw	476
GP 22 S Ø22 mm, metric lead screw	477
GP 32 S Ø32 mm, ball screw	478-480
GP 32 S Ø32 mm, metric lead screw	481-483
GP 32 S Ø32 mm, trapezoidal lead screw	484-486
Options	487-489



Compact, easy to configure linear actuators as part of a complete system with integrated thrust bearing for high axial loads. Versions available with metric lead screw, trapezoidal lead screw or ball screw.

© 2024 maxon. All rights reserved.

Screw Drive Basics

Design

- Screw, directly implemented in the gearhead
- Radial bearing
- Axial bearing
- Planetary gearhead 0-4 stages
- Motor
- Encode



The particular type of screw required must first be established before a screw drive can be designed. Every type of screw has different characteristics and a number of specific limits. These limits are taken into account in the technical data.

Ball screw:

- highly efficient
- not self-locking
- high load capacity

Metric lead screw:

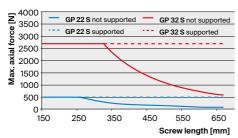
- self-locking
- low costs

Trapezoidal lead screw:

- same as metric lead screw
- higher load capacity than metric lead screw

For the calculation of the feed force acceleration and friction forces as well as gravity have to be taken into consideration. Exceeding the maximum permissible load must be avoided, as this damages the screw. The maximum permissible feed force is displayed for standard screws. For longer screws, the permissible feed force can be limited by the critical compressive force of the screw. In this case, supporting the end of the screw may be necessary.

Limitation for ball screws



Torque

The required torque of the screw M_o [mNm] is calculated with the feed force F_{i} [N] (load), the thread lead p[mm] and the efficiency of the screw η_1 .

$$M_a = \frac{F_L \cdot \rho}{2 \cdot \pi \cdot \eta_1}$$

In combination with the gearhead, the required motor torque M_{mot} [mNm] is:

$$M_{mot} = \frac{F_a \cdot p}{2 \cdot \pi \cdot i \cdot \eta}$$

Where i is the gearhead reduction ratio and η the efficiency of the complete screw drive.

Technical Data

The "Technical Data" block contains generally applicable data on screw, nut and gearhead. These are independent of the gearhead reduction ratio.

Length

The data sheets show the screw drives with the standard lengths. Other lengths are available as an option in 5 mm steps up to a given maximum length. Please give detailed requirements for special lengths.

Max. efficiency/mass inertia

The values stated refer to the screw alone (without gearhead). The values with gearhead are given in the "Gearhead data" main data field.

Standard screw drives are supplied with a thread nut. Flange or cylinder nuts are also available as an option. See details with corresponding reference number on page 487.

Bearing

The output stage and the screw are supported by preloaded axial bearings. This means that the high axial forces can be absorbed directly by the gearhead without additional support.

Speed and feed velocity

Feed velocity v_L [mm/s] is linked to output speed n[rpm] by the lead p [mm].

$$V_L = \frac{p \cdot r}{60}$$

In combination with the gearhead, the motor speed n_{mot} [rpm] is:

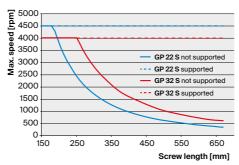
$$n_{mot} = \frac{v_L \cdot 60 \cdot p}{p}$$

Where i is the gearhead reduction ratio and p the screw lead.

The screw speed is limited by the resonance frequency of the screw and for ball screws additionally by the ball return system.

In addition, the maximum permissible speed of the gearhead has to be considered.

Max, speed at ball screws



Explanation

Max. efficiency

The given efficiency is a maximum value that applies when loaded with maximum feed force. Efficiency falls sharply with very small loads. The stated value refers to the complete screw drive (gearhead and screw).

20 Max. feed velocity

Specifies the maximum permissible feed velocity.

21 Max. feed force (continuous)

Is the maximum permissible feed force which may be continuously applied. Exceeding this value results in a reduced service life.

22 Max. feed force (intermittent)

Is the maximum permissible feed force which may be intermittently applied. "Intermittently" is defined

- during max. 1 second
- during max. 10% of operation

Exceeding these values results in a reduced

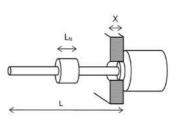
23 Mechanical positioning accuracy

In this value, following factors are taken into consideration:

- backlash of the gearhead
- accuracy of the screw
- axial play of the nut

The maximum possible stroke depends on the length of the screw L [mm]. The length of the nut L_N [mm] and the thickness of its mounting plate X [mm] must be taken into consideration.

Stroke = $L - (L_N + X + stroke reserve + Opt. FLEX-GEAR-$ SPINO6)



Mounting and safety instructions

Using a ball screw with a flange nut, the mounting through a hole is only possible with the optional rectangular mounting flange.

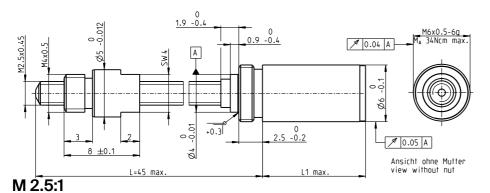
The ball screw nut may never be removed. As the balls are preloaded remounting would be impossible.

The screw may never block during operation, as this could damage the screw nut or gearhead.

Service life crucially depends on the precision with which the gear is fixed to the screw nut. Eccentricities and angle errors sometimes result in massive radial loading which must never exceed the given maximum

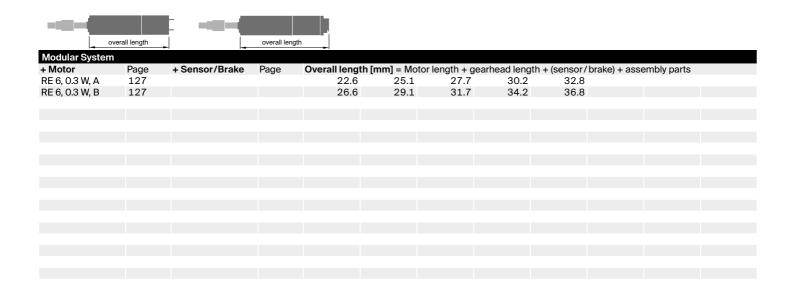
Additional information can be found in the maxon online shop at the item under downloads.

Screw Drive GP 6 S Ø6 mm, metric lead screw

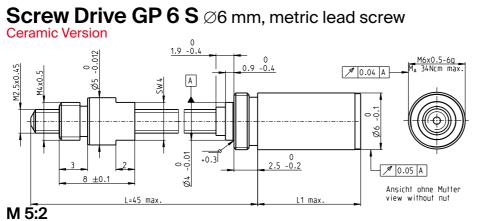


Technical Data					
Screw		M2.5 x 0	0.45, st	tainless	steel
Standard length				4	5 mm
Special length (5	mm step	os)		max. 80	o mm
Nut (standard)				threa	id nut
Material				br	onze*
Axial play				< 0.08	3 mm
Planetary gearhead			5	straight	teeth
Bearing				ball be	aring
Radial play, 5 mm	from fla	nge		< 0.1	2 mm
Axial play				prelo	aded
Max. continuous i	nput sp	eed		12000	rpm (
Recommended ten	nperatur	e range	•	-15+	80°C
Max. axial load (stat	ic)1				10 N
Number of stages	1	2	3	4	5
Max. radial load,					
5 mm from flange	5 N	5 N	5 N	5 N	5 N
•					

	Standard program		Part Numbe	rs					
	Special program (on request)	, , , ,			428756	420663	428755		
Scr	ew Drive Data								
1	Reduction		3.9:1	15:1	57:1	221:1	854:1		
2	Absolute reduction		27/7	729/49	19683/343	531441/2401	1438907/16807		
20	Max. feed velocity ¹	mm/s	15	10	2.6	0.7	0.2		
21	lax. feed force (continuous) ¹ N		2	3	4	6	10		
22	Max. feed force (intermittent) ¹	,		8	12	15	15		
4	Number of stages		1	2	3	4	5		
7	Max. efficiency gearhead incl. screw	%	28	24	21	19	16		
8	Weight ¹	g	2.9	3.3	3.7	4.1	4.5		
9	Average backlash no load	۰	1.8	2.0	2.2	2.5	2.8		
23	Mechanical positioning accuracy ¹	mm	0.106	0.107	0.107	0.107	0.108		
10	31		0.001	0.001	0.001	0.001	0.001		
11			6.9	9.4	12.0	14.5	17.1		
1 bas	¹ based on screw length 45 mm								

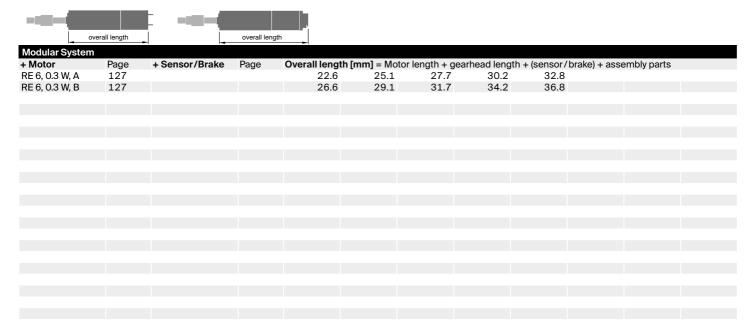


^{*}Note: This spindle nut contains leaded bronze for functional reasons. This product therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The screw drives may therefore only be used for devices that are not subject to this directive.

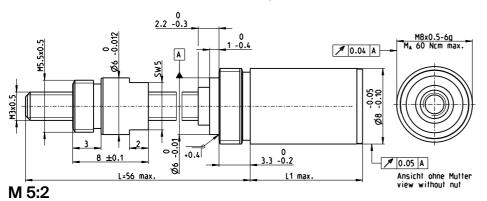


	N	/12.5 x C).45, ce	ramic
			4	5 mm
mm step	os)		max. 80	o mm
			threa	ad nut
		st	ainless	steel
			< 0.079	9 mm
		5	straight	teeth
			ball be	
from fla	nge		< 0.1	2 mm
				aded
nput sp	eed		12000	rpm C
nperatur	e range	Э	-15+	-80°C
ic)1				10 N
1	2	3	4	5
5 N	5 N	5 N	5 N	5 N
	from fla nput sp nperatur ic) ¹ 1	from flange nput speed nperature range ic) 1 2	st steps) st steps from flange nput speed nperature range ic) 1 2 3	mm steps) max. 8 threa stainless < 0.07 straight ball be from flange nput speed nperature range ic) 1 2 3 4

	Standard program			Part Numbers						
	Special program (on request)	437380	437379	437378	437377	437375				
Sci	Screw Drive Data									
1	Reduction		3.9:1	15:1	57:1	221:1	854:1			
2	Absolute reduction		27/7	729/49	19683/343	531441/2401	1438907/16807			
20	Max. feed velocity ¹	mm/s	25	10	2.6	0.7	0.2			
21	Max. feed force (continuous) ¹ N		2	3	5	7	11			
22	Max. feed force (intermittent) ¹			10	15	15	15			
4	Number of stages		1	2	3	4	5			
7	Max. efficiency gearhead incl. screw	%	39	34	30	27	23			
8	Weight ¹	g	2.9	3.3	3.7	4.1	4.5			
9	Average backlash no load	۰	1.8	2.0	2.2	2.5	2.8			
23	0 Mass inertia gearhead incl. screw ¹ gcm ²		0.081	0.082	0.082	0.082	0.083			
10			0.001	0.001	0.001	0.001	0.001			
11			6.9	9.4	12.0	14.5	17.1			
1 bas	sed on screw length 45 mm									

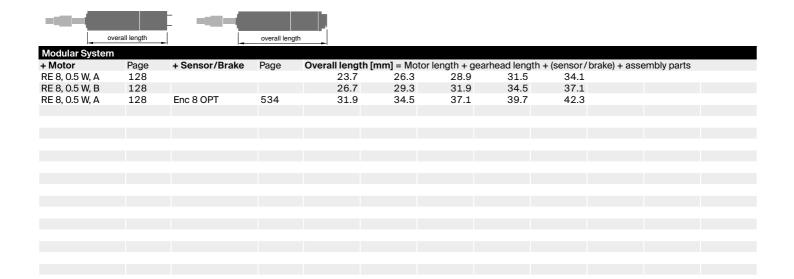


Screw Drive GP 8 S Ø8 mm, metric lead screw



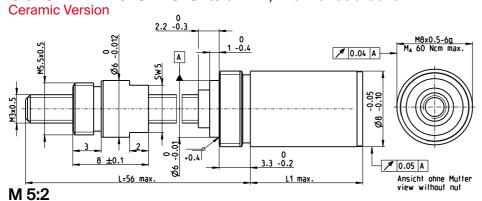
Technical Data				
Screw	M3	3 x 0.5, s	stainles	s steel
Standard length				56 mm
Special length (5 mm st	teps)		max. 10	00 mm
Nut (standard)			thre	ead nut
Material			b	ronze*
Axial play			< (0.1 mm
Planetary gearhead			straigh	t teeth
Bearing			ball b	earing
Radial play, 5 mm from	flange		< 0.0	08 mm
Axial play			pre	oaded
Max. continuous input s	speed		1200	00 rpm
Recommended temperat	ture ran	ge	-15	+80°C
Max. axial load (static)1				25 N
Number of stages	1 2	3	4	5
Max. radial load,				
5 mm from flange 5 N	1 5 N	5 N	5 N	5 N

	Standard program		Part Numbers							
	Special program (on request)			473644	473645	473646	473647			
Scre	ew Drive Data									
1 F	Reduction		4:1	16:1	64:1	256:1	1024:1			
2 A	Absolute reduction		4/1	16/1	64/1	256/1	1024/1			
20 N	Max. feed velocity ¹	mm/s	15	6.3	1.6	0.4	0.1			
21 N	Max. feed force (continuous) ¹	N	3	6	9	14	22			
22 N	Max. feed force (intermittent) ¹	N	8	18	27	27	27			
4 N	Number of stages		1	2	3	4	5			
7 N	Max. efficiency gearhead incl. screw	%	27	24	22	19	17			
8 V	Weight ¹	g	6.3	6.9	7.5	8.1	8.7			
9 A	Average backlash no load	0	1.8	2.0	2.2	2.5	2.8			
23 N	Mechanical positioning accuracy ¹	mm	0.112	0.112	0.112	0.112	0.113			
10 N	Mass inertia gearhead incl. screw ¹ gcm ² Gearhead length L1 mm		0.005	0.004	0.004	0.004	0.004			
11 0			7.0	9.6	12.2	14.8	17.4			
1 base	d on screw length 56 mm									



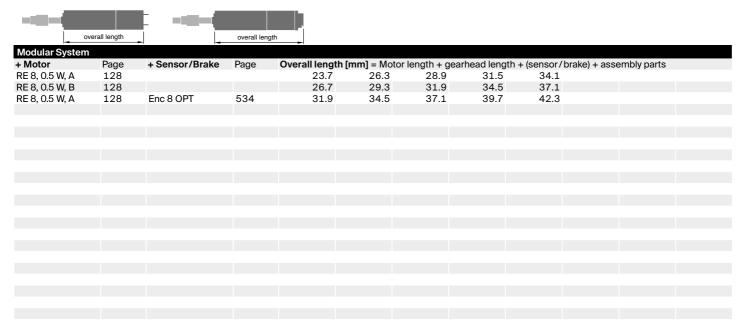
^{*}Note: This spindle nut contains leaded bronze for functional reasons. This product therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The screw drives may therefore only be used for devices that are not subject to this directive.

Screw Drive GP 8 S Ø8 mm, metric lead screw Ceramic Version

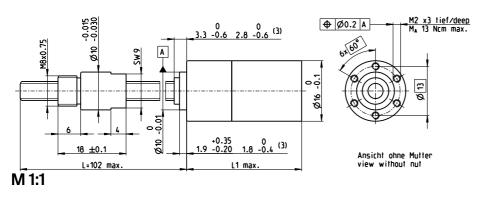


Technical Data					
Screw			МЗх	0.5, ce	ramic
Standard length				5	6 mm
Special length (5	mm step	os)	r	nax. 10	0 mm
Nut (standard)				threa	ad nut
Material			st	ainless	steel
Axial play				< 0.0	9 mm
Planetary gearhead			5	traight	teeth
Bearing				ball be	aring
Radial play, 5 mm	from fla	nge		< 0.0	8 mm
Axial play				prelo	aded
Max. continuous i	nput sp	eed		12000	0 rpm
Recommended ten	nperatur	e range		-15+	-80°C
Max. axial load (stat	ic)1				25 N
Number of stages	1	2	3	4	5
Max. radial load,					
5 mm from flange	5 N	5 N	5 N	5 N	5 N

Standard program		Part Numbers						
Special program (on request)	473636	473637	473639	473640	473641			
Screw Drive Data (provisional)								
1 Reduction	4:1	16:1	64:1	256:1	1024:1			
2 Absolute reduction	4/1	16/1	64/1	256/1	1024/1			
20 Max. feed velocity ¹ mr	n/s 25	6.3	1.6	0.4	0.1			
21 Max. feed force (continuous) ¹	N 3	7	11	17	27			
22 Max. feed force (intermittent) ¹	N 14	22	32	32	32			
4 Number of stages	1	2	3	4	5			
7 Max. efficiency gearhead incl. screw	% 38	34	31	28	25			
8 Weight ¹	g 6.3	6.9	7.5	8.1	8.7			
9 Average backlash no load	° 1.8	2.0	2.2	2.5	2.8			
23 Mechanical positioning accuracy ¹ r	nm 0.087	0.087	0.087	0.087	0.088			
10 Mass inertia gearhead incl. screw ¹ go	m ² 0.005	0.004	0.004	0.004	0.004			
11 Gearhead length L1 r	nm 7.0	9.6	12.2	14.8	17.4			
¹ based on screw length 56 mm								



Screw Drive GP 16 S Ø16 mm, ball screw



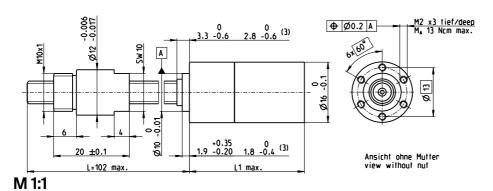
Technical Data						
Screw	Ø	5 x 2, s	tainless	steel		
Standard length	Standard length					
Special length (5	mm ste	ps)	r	nax. 20	0 mm	
Nut (standard)				thre	ad nut	
Material			X46Cı	r13, har	dened	
Axial play				< 0.0	01 mm	
Planetary gearhead				straight	teeth	
Bearing		ball b	earing/	axial be	earing	
Radial play, 6 mm	from fla	ange		< 0.0	8 mm	
Axial play				prelo	oaded	
Max. continuous i	nput sp	eed ²			0 rpm	
Recommended ten	nperatu	re rang	е	-15	+80°C	
Max. axial load (stat	tic)1				500 N	
Number of stages	0	1	2	3	4	
Max. radial load,						
6 mm from flange	20 N	40 N	60 N	80 N	80 N	

Stock program Standard program		Part Numbe	rs				
Special program (on request)		424221	424222	424223	424219	424224	
Screw Drive Data (provisional)		424221	424222	424223	424219	424224	
1 Reduction		1:1	4.4:1	19:1	84:1	370:1	
2 Absolute reduction		У.	57/13	3249/169	185193/2197	10556001/28561	
20 Max. feed velocity ¹	mm/s	150	90.9	21.1	4.8	1.1	
21 Max. feed force (continuous) ¹	N	54	64	104	171	280	
22 Max. feed force (intermittent) ¹	N	149	176	287	403	403	
Part Numbers			424731	424733	424745	424749	
1 Reduction			5.4:1	24:1	104:1	455:1	
2 Absolute reduction			²⁷ / ₅	1539/65	87723/845	5000211/10985	
20 Max. feed velocity ¹	mm/s		74.1	16.7	3.8	0.9	
21 Max. feed force (continuous) ¹	N		69	113	184	300	
22 Max. feed force (intermittent) ¹	N		189	311	403	403	
Part Numbers				424744	424747	424750	
1 Reduction				29:1	128:1	561:1	
2 Absolute reduction				729/25	41553/325	2368521/4225	
20 Max. feed velocity ¹	mm/s			13.8	3.1	0.7	
21 Max. feed force (continuous) ¹	N			120	197	322	
22 Max. feed force (intermittent) ¹	N			331	403	403	
Part Numbers				001	424748	424751	
1 Reduction					157:1	690:1	
2 Absolute reduction					19683/125	1121931/1625	
20 Max. feed velocity ¹	mm/s				2.5	0.6	
21 Max. feed force (continuous) ¹	N				211	345	
22 Max. feed force (intermittent) ¹	N				403	403	
Part Numbers						424752	
1 Reduction						850:1	
Absolute reduction						531441/625	
20 Max. feed velocity ¹	mm/s					0.5	
21 Max. feed force (continuous) ¹	N					370	
22 Max. feed force (intermittent) ¹	N					403	
4 Number of stages		0	1	2	3	4	
7 Max. efficiency gearhead incl. screw	%	93	87	79	71	63	
8 Weight ¹	g	52	58	61	65	69	
Average backlash no load	0	1.0	1.4	1.6	2.0	2.4	
23 Mechanical positioning accuracy ¹	mm	0.039	0.041	0.042	0.044	0.046	
10 Mass inertia gearhead incl. screw ¹	gcm ²	0.23	0.11	0.05	0.05	0.05	
11 Gearhead length L1	mm	19.2	22.3	27.4	31.0	34.6	
based on screw length 102 mm (standard leng			3 for reduction 1:		02.0	0 1.0	



				-						
Modular System										
+ Motor	Page	+ Sensor/Brake	Page						e) + assembly parts	
RE 16, 2 W	149			41.6	44.7	49.8	53.4	57.0		
RE 16, 2 W	149	MR	533	47.3	50.4	55.5	59.1	62.7		
RE 16, 3.2 W	150/151			59.7	62.8	67.9	71.5	75.1		
RE 16, 3.2 W	151	13 GAMA	502	65.8	68.9	74	77.6	81.2		
RE 16, 3.2 W	151	MR	533	64.7	67.8	72.9	76.5	80.1		
RE 16, 4.5 W	152/153			62.7	65.8	70.9	74.5	78.1		
RE 16, 4.5 W	153	13 GAMA	502	68.9	72.0	77.1	80.7	84.3		
RE 16, 4.5 W	153	MR	533	67.7	70.8	75.9	79.5	83.1		
A-max 16	169-172			-	47.8	52.9	56.5	60.1		
A-max 16	170/172	13 GAMA	502	-	55.9	61.0	64.6	68.2		
A-max 16	170/172	MR	533	-	52.8	57.9	61.5	65.1		
EC-max 16, 5 W	275			-	46.4	51.5	55.1	58.7		
EC-max 16, 5 W	275	16 EASY/XT/Abs.	505-507	-	56.6	61.7	65.3	68.9		
EC-max 16, 5 W	275	16 EASY Abs. XT	508	-	57.1	62.2	65.8	69.4		
EC-max 16, 8 W	277			-	58.4	63.5	67.1	70.7		
EC-max 16, 8 W	277	16 EASY/XT/Abs.	505-507	-	68.6	73.7	77.3	80.9		
EC-max 16, 8 W	277	16 EASY Abs. XT	508	_	69.1	74.2	77.8	81.4		

Screw Drive GP 16 S Ø16 mm, metric lead screw



Technical Data					
Screw		N	16 x 1, s	tainless	s steel
Standard length				10)2 mm
Special length (5	mm ste	ps)	r	nax. 20	0 mm
Nut (standard)				thre	ad nut
Material				bı	ronze*
Axial play				< 0.13	4 mm
Planetary gearhead				straight	t teeth
Bearing		ball b	earing/	axial be	earing
Radial play, 6 mm	from fla	ange		< 0.0	18 mm
Axial play				prel	oaded
Max. continuous i	input sp	eed ²			0 rpm
Recommended ten	nperatu	re rang	е	-15	+80°C
Max. axial load (stat	tic)1				500 N
Number of stages	0	1	2	3	4
Max. radial load,					
6 mm from flange	20 N	40 N	60 N	80 N	80 N

	Stock program Standard program		Part Number	rs					
	Special program (on request)		424231	424232	424233	424234	424235		
Scr	rew Drive Data (provisional)						12 1200		
1	Reduction		1:1	4.4:1	19:1	84:1	370:1		
2	Absolute reduction		1/1	57/13	3249/169	185193/2197	10556001/28561		
	Max, feed velocity ¹	mm/s	50.0	45.5	10.5	2.4	0.5		
21	Max. feed force (continuous) ¹	N	35	37	60	98	160		
	Max. feed force (intermittent) ¹	N	134	138	224	315	315		
	Part Numbers			424797	424798	424800	424806		
1	Reduction	-		5.4:1	24:1	104:1	455:1		
2	Absolute reduction			²⁷ / ₅	1539/65	87723/845	5000211/10985		
20	Max. feed velocity ¹	mm/s		37.0	8.3	1.9	0.4		
	Max. feed force (continuous) ¹	N		39	64	105	172		
	Max. feed force (intermittent) ¹	N		148	243	315	315		
	Part Numbers				424799	424803	424807		
1	Reduction				29:1	128:1	561:1	•	
	Absolute reduction				729/25	41553/325	2368521/4225		
20	Max, feed velocity ¹	mm/s			6.9	1.6	0.4		
	Max. feed force (continuous) ¹	N			69	112	184		
	Max. feed force (intermittent) ¹	N			258	315	315		
	Part Numbers					424804	424808	<u> </u>	
1	Reduction					157:1	690:1		
	Absolute reduction					19683/125	1121931/1625		
20	Max. feed velocity ¹	mm/s				1.3	0.3		
	Max. feed force (continuous) ¹	N				120	197		
	Max. feed force (intermittent) ¹	N				315	315		
	Part Numbers						424809		
1	Reduction						850:1		
	Absolute reduction						531441/625		
20	Max. feed velocity ¹	mm/s					0.2		
21	Max. feed force (continuous) ¹	N					211		
	Max. feed force (intermittent) ¹	N					315		
4	Number of stages		0	1	2	3	4		
7	Max. efficiency gearhead incl. screw	%	28	27	24	22	19		
	Weight ¹	g	55	61	64	68	72		
9	Average backlash no load	,	1.0	1.4	1.6	2.0	2.4		
23	Mechanical positioning accuracy ¹	mm	0.166	0.167	0.167	0.169	0.170		
10	Mass inertia gearhead incl. screw ¹	gcm ²	0.23	0.11	0.05	0.05	0.05		
11	Gearhead length L1	mm	19.2	22.3	27.4	31.0	34.6		
	•			for reduction 1:					

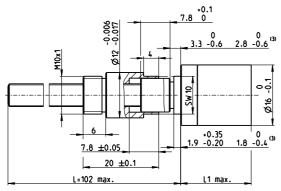
overall length	overall length
Modular System	

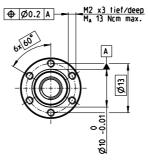
+ Motor	Page	+ Sensor/Brake	Page	Overall length [n	nm] = Motor	length + gear	head length -	(sensor/brake)	+ assembly parts	
RE 16, 2 W	149			41.6	44.7	49.8	53.4	57.0		
RE 16, 2 W	149	MR	533	47.3	50.4	55.5	59.1	62.7		
RE 16, 3.2 W	150/151			59.7	62.8	67.9	71.5	75.1		
RE 16, 3.2 W	151	13 GAMA	502	65.8	68.9	74	77.6	81.2		
RE 16, 3.2 W	151	MR	533	64.7	67.8	72.9	76.5	80.1		
RE 16, 4.5 W	152/153			62.7	65.8	70.9	74.5	78.1		
RE 16, 4.5 W	153	13 GAMA	502	68.9	72.0	77.1	80.7	84.3		
RE 16, 4.5 W	153	MR	533	67.7	70.8	75.9	79.5	83.1		
A-max 16	169-172			_	47.8	52.9	56.5	60.1		
A-max 16	170/172	13 GAMA	502	-	55.9	61.0	64.6	68.2		
A-max 16	170/172	MR	533	-	52.8	57.9	61.5	65.1		
EC-max 16, 5 W	275			-	46.4	51.5	55.1	58.7		
EC-max 16, 5 W	275	16 EASY/XT/Abs.	505-507	-	56.6	61.7	65.3	68.9		
EC-max 16, 5 W	275	16 EASY Abs. XT	508	-	57.1	62.2	65.8	69.4		
EC-max 16, 8 W	277			-	58.4	63.5	67.1	70.7		
EC-max 16, 8 W	277	16 EASY/XT/Abs.	505-507	-	68.6	73.7	77.3	80.9		
EC-max 16, 8 W	277	16 EASY Abs. XT	508	_	69.1	74.2	77.8	81.4		

*Note: This spindle nut contains leaded bronze for functional reasons. This product therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The screw drives may therefore only be used for devices that are not subject to this directive.

Screw Drive GP 16 S Ø16 mm, metric lead screw

Ceramic Version





Ansicht ohne Mutter view without nut

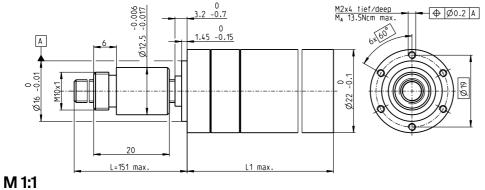
Technical Data M6 x 1, ceramic Standard length Special length (5 mm steps) Nut (standard) 102 mm max. 200 mm thread nut Material X8CrNiS18-9 Axial play < 0.134 mm Planetary gearhead straight teeth Bearing ball bearing < 0.08 mm preloaded 12 000 rpm -15...+80°C Radial play, 6 mm from flange Axial play
Max. continuous input speed² Recommended temperature range Max. axial load (static)1 500 N 3 Number of stages Max. radial load, M 1:1 6 mm from flange 20 N 40 N 60 N 80 N 80 N

-									33.1 33.1 33
	Stock program Standard program		Part Number	·s					
	Special program (on request)		424241	424242	424243	424244	424245		
Sc	rew Drive Data (provisional)								
1	Reduction	'"	1:1	4.4:1	19:1	84:1	370:1		
2			И	57/13	3249/169	185193/2197	10556001/28561		
20	Max. feed velocity ¹	mm/s	50.0	45.5	10.5	2.4	0.5		
	Max. feed force (continuous) ¹	N	44	46	74	122	200		
	Max. feed force (intermittent)1	N	134	138	224	315	315		
	Part Numbers	<u> </u>		424811	424812	424814	424819		
1	Reduction			5.4:1	24:1	104:1	455:1	•	•
2	Absolute reduction			27/5	1539/65	87723/845	5000211/10985		
20		mm/s		37.0	8.3	1.9	0.4		
21		N		49	80	131	215		
	Max. feed force (intermittent) ¹	N		148	243	315	315		
	Part Numbers	<u> </u>			424813	424815	424820		
1	Reduction				29:1	128:1	561:1		
2					729/25	41553/325	2368521/4225		
20	Max. feed velocity ¹	mm/s			6.9	1.6	0.4		
21		N			86	141	230		
	Max. feed force (intermittent) ¹	N			258	315	315		
	Part Numbers			-		424818	424821		
1	Reduction					157:1	690:1		
2						19683/125	1121931/1625		
20	Max. feed velocity ¹	mm/s				1.3	0.3		
21	•	N				150	246		
	Max. feed force (intermittent) ¹	N				315	315		
	Part Numbers						424822		
1	Reduction						850:1		
2	Absolute reduction						531441/625		
20	Max. feed velocity ¹	mm/s					0.2		
21		N					264		
22		N					315		
4			0	1	2	3	4		
7	Max. efficiency gearhead incl. screw	%	41	38	34	31	28		
8	Weight ¹	g	55	61	64	68	72		
9	Average backlash no load	•	1.0	1.4	1.6	2.0	2.4		
23	Mechanical positioning accuracy ¹	mm	0.166	0.167	0.167	0.169	0.170		
10		gcm ²	0.23	0.11	0.05	0.05	0.05		
11		mm	19.2	22.3	27.4	31.0	34.6		
¹ba	sed on screw length 102 mm (standard length)	² for reduction 1:1 =		for reduction 1:					



+ Motor	Page	+ Sensor/Brake	Page	Overall length [mm] = Motor	length + gear	head length -	- (sensor/brake) + assembly parts	
RE 16, 2 W	149			41.6	44.7	49.8	53.4	57.0		
RE 16, 2 W	149	MR	533	47.3	50.4	55.5	59.1	62.7		
RE 16, 3.2 W	150/151			59.7	62.8	67.9	71.5	75.1		
RE 16, 3.2 W	151	13 GAMA	502	65.8	68.9	74	77.6	81.2		
RE 16, 3.2 W	151	MR	533	64.7	67.8	72.9	76.5	80.1		
RE 16, 4.5 W	152/153			62.7	65.8	70.9	74.5	78.1		
RE 16, 4.5 W	153	13 GAMA	502	68.9	72.0	77.1	80.7	84.3		
RE 16, 4.5 W	153	MR	533	67.7	70.8	75.9	79.5	83.1		
A-max 16	169-172			-	47.8	52.9	56.5	60.1		
A-max 16	170/172	13 GAMA	502	-	55.9	61.0	64.6	68.2		
A-max 16	170/172	MR	533	_	52.8	57.9	61.5	65.1		
EC-max 16, 5 W	275			-	46.4	51.5	55.1	58.7		
EC-max 16, 5 W	275	16 EASY/XT/Abs.	505-507	_	56.6	61.7	65.3	68.9		
EC-max 16, 5 W	275	16 EASY Abs. XT	508	-	57.1	62.2	65.8	69.4		
EC-max 16, 8 W	277			-	58.4	63.5	67.1	70.7		
EC-max 16, 8 W	277	16 EASY/XT/Abs.	505-507	-	68.6	73.7	77.3	80.9		
EC-max 16, 8 W	277	16 EASY Abs. XT	508	-	69.1	74.2	77.8	81.4		

Screw Drive GP 22 S Ø22 mm, ball screw

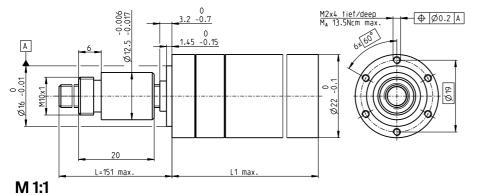


Technical Data					
Screw		Ø	6 x 2, s	stainles	s steel
Standard length				1	51 mm
Special length (5	mm ste	eps)	1	max. 30	00 mm
Nut (standard)				thre	ad nut
Material			100C	R6, har	dened
Axial play				< 0.	01 mm
Planetary gearhead				straigh	t teeth
Bearing	ball b	earing	thrust/	roller b	earing
Radial play, 5 mm	from fla	ange		< 0.0	05 mm
Axial play					oaded
Max. continuous i	nput sp	peed ²		800	00 rpm
Recommended terr	peratu	re rang	e	-15	+80°C
Max. axial load (stat	ic)1				500 N
Number of stages	0	1	2	3	4
Max. radial load,					
15 mm from flange	80 N	80 N	130 N	180 N	180 N

	Stock program		Part Numb	ers							
	Standard program										
	Special program (on request)		363863	363864	363867	363871	363872	363877	363882	363887	363892
Sc	rew Drive Data		000000	00000 :	00000.	000011	0000.2	0000	000002	00000:	000002
1			1:1	3.8:1	14:1	29:1	53:1	89:1	198:1	333:1	479:1
2	Absolute reduction		1/1	15/4	225/16	729/25	3375/64	4617/52	50625/256	69255/208	124659/260
20	Max. feed velocity ¹	mm/s	150	70	19	9.2	5.0	3.0	1.3	0.8	0.6
21	Max. feed force (continuous) ¹	N	77	100	154	196	240	285	372	443	500
22	Max. feed force (intermittent) ¹	N	183	236	365	465	500	500	500	500	500
	Part Numbers		100	363865	364041		363873	363878	363883	363888	363893
1	Reduction			4.4:1	16:1		62:1	104:1	231:1	370:1	561:1
2	Absolute reduction			57/13	885/52		12825/208	87723/845	192375/832		2368521/4225
20	Max. feed velocity ¹	mm/s		61	17		4.3	2.6	1.2	0.7	0.5
21	Max. feed force (continuous) ¹	N		105	161		253	300	392	458	500
22	Max. feed force (intermittent) ¹	N		248	381		500	500	500	500	500
	Part Numbers			363866	363868		363874	363879	363884	363889	363894
1				5.4:1	19:1		72:1	109:1	270:1	389:1	590:1
2	Absolute reduction			²⁷ / ₅	3249/169		48735/676	2187/20	731025/2704	263169/676	59049/100
20	Max. feed velocity ¹	mm/s		49	14		3.7	2.4	1.0	0.7	0.5
21	Max. feed force (continuous) ¹	N		112	170		266	305	413	466	500
	Max. feed force (intermittent) ¹	N		266	404		500	500	500	500	500
	Part Numbers				363869		363875	363880	363885	363890	363895
1	Reduction				20:1		76:1	128:1	285:1	410:1	690:1
2	Absolute reduction				81/4		1215/16	41553/325	18225/64	6561/16	1121931/1625
20	Max. feed velocity ¹	mm/s			13		3.5	2.1	0.9	0.7	0.4
21	Max. feed force (continuous)1	N			173		270	322	420	474	500
22	Max. feed force (intermittent) ¹	N			411		500	500	500	500	500
	Part Numbers				363870		363876	363881	363886	363891	363896
1	Reduction				24:1		84:1	157:1	316:1	455:1	850:1
2	Absolute reduction				1539/65		185193/2197	19683/125	2777895/8788	5000211/10985	531441/625
20	Max. feed velocity ¹	mm/s			11		3.2	1.7	0.8	0.6	0.3
21	Max. feed force (continuous)1	N			184		280	345	435	491	500
22	Max. feed force (intermittent) ¹	N			437		500	500	500	500	500
4	Number of stages		0	1	2	2	3	3	4	4	4
7	Max. efficiency gearhead incl. screw	%	96	81	67	67	57	57	47	47	47
8	Weight ¹	g	103	103	115	115	128	128	141	141	141
9	Average backlash no load	0	1.0	1.0	1.2	1.2	1.6	1.6	2.0	2.0	2.0
23	Mechanical positioning accuracy ¹	mm	0.039	0.039	0.040	0.040	0.042	0.042	0.044	0.044	0.044
10	Mass inertia gearhead incl. screw ¹	gcm ²	10	1.0	0.4	0.4	0.3	0.3	0.3	0.3	0.3
11	Gearhead length L1	mm	38.0	38.0	44.8	44.8	51.6	51.6	58.4	58.4	58.4
1 bas	sed on screw length 151 mm (standard length)	² for reduction 1:1 =	4500 rpm								

Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall lengt	h [mm] = M	otor length -	+ gearhead	length + (se	nsor/brake)	+ assembly	y parts	
A-max 19	173-176			-	64.2	71.0	71.0	77.8	77.8	84.6	84.6	84.6
A-max 19, 1.5 W	174	13 GAMA	502	_	71.7	78.5	78.5	85.3	85.3	92.1	92.1	92.1
A-max 19, 1.5 W	174	MR	533	_	69.3	76.1	76.1	82.9	82.9	89.7	89.7	89.7
A-max 19, 2.5 W	175/176			-	66.8	73.6	73.6	80.4	80.4	87.2	87.2	87.2
A-max 19, 2.5 W	176	13 GAMA	502	-	74.3	81.1	81.1	87.9	87.9	94.7	94.7	94.7
A-max 19, 2.5 W	176	MR	533	-	71.1	77.9	77.9	84.7	84.7	91.5	91.5	91.5
A-max 22	177-180			_	67.2	74.0	74.0	80.8	80.8	87.6	87.6	87.6
A-max 22	178/180	13 GAMA	502	-	74.3	81.1	81.1	87.9	87.9	94.7	94.7	94.7
A-max 22	178/180	MR	533	_	72.2	79.0	79.0	85.8	85.8	92.6	92.6	92.6
EC-max 16, 8 W	277			-	71.3	78.1	78.1	84.9	84.9	91.7	91.7	91.7
EC-max 16, 8 W	277	16 EASY/XT/Abs.	505-507	-	81.5	88.3	88.3	95.1	95.1	101.9	101.9	101.9
EC-max 16, 8 W	277	16 EASY Abs. XT	508	-	82.0	88.8	88.8	95.6	95.6	102.4	102.4	102.4
EC-max 22, 12 W	278			_	70.1	76.9	76.9	83.7	83.7	90.5	90.5	90.5
EC-max 22, 12 W	278	16 EASY/XT/Abs.	505-507	_	79.7	86.5	86.5	93.3	93.3	100.1	100.1	100.1
EC-max 22, 12 W	278	16 EASY Abs. XT	508	-	80.2	87.0	87.0	93.8	93.8	100.6	100.6	100.6
EC-max 22, 12 W	278	AB 20	582	-	105.7	112.5	112.5	119.3	119.3	126.1	126.1	126.1
EC-max 22, 25 W	279			86.6	86.6	93.4	93.4	100.2	100.2	107.0	107.0	107.0
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505-507	96.2	96.2	103.0	103.0	109.8	109.8	116.6	116.6	116.6
EC-max 22, 25 W	279	16 EASY Abs. XT	508	96.7	96.7	103.5	103.5	110.3	110.3	117.1	117.1	117.1
EC-max 22, 25 W	279	AB 20	582	122.2	122.2	129.0	129.0	135.8	135.8	142.6	142.6	142.6

Screw Drive GP 22 S Ø22 mm, metric lead screw

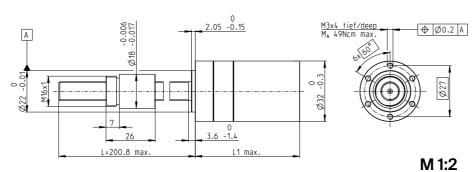


Technical Data									
Screw		N	M6 x 1, stainless steel						
Standard length									
Special length (5	mm ste	ps)	max. 300 mm						
Nut (standard)				thre	ad nut				
Material				ı	oronze				
Axial play				< 0.00	08 mm				
Planetary gearhead				straigh					
Bearing	ball b	earing	thrust/	roller b	earing				
Radial play, 5 mm	from fla	ange		< 0.0)5 mm				
Axial play				preloaded					
Max. continuous i					00 rpm				
Recommended terr	nperatu	re rang	je	-15	+80°C				
Max. axial load (stat	ic)1				550 N				
Number of stages	0	1	2	3	4				
Max. radial load,									
15 mm from flange	80 N	80 N	130 N	180 N	180 N				

	Stock program Standard program		Part Numb	ers							
	Special program (on request)		363826	363827	363830	363834	363835	363840	363845	363850	363855
Scr	ew Drive Data			ĺ				Ì	ĺ	Ì	
1	Reduction		1:1	3.8:1	14:1	29:1	53:1	89:1	198:1	333:1	479:1
2	Absolute reduction		1/1	15/4	²²⁵ / ₁₆	729/25	3375/64	4617/52	50625/256	69255/208	124659/260
20	Max. feed velocity1	mm/s	101	35	9.5	4.6	2.5	1.5	0.7	0.4	0.3
21	Max. feed force (continuous)1	N	42	60	92	118	144	171	223	266	300
22	Max. feed force (intermittent) ¹	N	118	167	259	330	350	350	350	350	350
	Part Numbers			363828	364040		363836	363841	363846	363851	363856
1	Reduction			4.4:1	16:1		62:1	104:1	231:1	370:1	561:1
2	Absolute reduction			⁵⁷ /13	885/52		12825/208	87723/845	192375/832	10556001/28561	2368521/4225
20	Max. feed velocity ¹	mm/s		30	8.3		2.2	1.3	0.6	0.4	0.2
21	Max. feed force (continuous) ¹	N		63	97		152	180	235	275	316
22	Max. feed force (intermittent) ¹	N		176	270		350	350	350	350	350
	Part Numbers			363829	363831		363837	363842	363847	363852	363857
1	Reduction	-		5.4:1	19:1		72:1	109:1	270:1	389:1	590:1
2	Absolute reduction			27/5	3249/169		48735/676	2187/20	731025/2704	263169/676	59049/100
20	Max. feed velocity ¹	mm/s		25	7.0		1.9	1.2	0.5	0.3	0.2
21	Max. feed force (continuous)1	N		67	102		159	183	248	280	321
22	Max. feed force (intermittent) ¹	N		188	286		350	350	350	350	350
	Part Numbers				363832		363838	363843	363848	363853	363858
1	Reduction				20:1		76:1	128:1	285:1	410:1	690:1
2	Absolute reduction				81/4		1215/16	41553/325	18225/64	6561/16	1121931/1625
20	Max. feed velocity ¹	mm/s			6.7		1.8	1.0	0.5	0.3	0.2
21	Max. feed force (continuous) ¹	N			104		162	193	252	285	339
22	Max. feed force (intermittent) ¹	N			291		350	350	350	350	350
	Part Numbers				363833		363839	363844	363849	363854	363859
	Reduction				24:1		84:1	157:1	316:1	455:1	850:1
2	Absolute reduction				1539/65		185193/2197	19683/125	2777895/8788	5000211/10985	531441/625
20	Max. feed velocity ¹	mm/s			5.6		1.6	0.8	0.4	0.3	0.2
21	Max. feed force (continuous) ¹	N			111		168	207	261	295	350
22	Max. feed force (intermittent) ¹	N			310		350	350	350	350	350
4	Number of stages		0	1	2	2	3	3	4	4	4
7	Max. efficiency gearhead incl. screw	%	42	35	29	29	25	25	20	20	20
8	Weight ¹	g	103	103	116	116	128	128	141	141	141
9	Average backlash no load	۰	1.0	1.0	1.2	1.2	1.6	1.6	2.0	2.0	2.0
23	Mechanical positioning accuracy ¹	mm	0.034	0.034	0.034	0.034	0.034	0.034	0.037	0.037	0.037
10	Mass inertia gearhead incl. screw ¹	gcm²	10	1.0	0.4	0.4	0.3	0.3	0.3	0.3	0.3
11	Gearhead length L1	mm	38.0	38.0	44.8	44.8	51.6	51.6	58.4	58.4	58.4
¹bas	ed on screw length 151 mm (standard length)	² for reduction 1:1 =	6088 rpm								

Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall lengt	h [mm] = M	otor length	+ gearhead	length + (se	nsor/brake)	+ assembly	/ parts	
A-max 19	173-176		Ū	_	64.2	71.0	71.0	77.8	77.8	84.6	84.6	84.6
A-max 19, 1.5 W	174	13 GAMA	502	-	71.7	78.5	78.5	85.3	85.3	92.1	92.1	92.1
A-max 19, 1.5 W	174	MR	533	_	69.3	76.1	76.1	82.9	82.9	89.7	89.7	89.7
A-max 19, 2.5 W	175/176			-	66.8	73.6	73.6	80.4	80.4	87.2	87.2	87.2
A-max 19, 2.5 W	176	13 GAMA	502	-	74.3	81.1	81.1	87.9	87.9	94.7	94.7	94.7
A-max 19, 2.5 W	176	MR	533	-	71.1	77.9	77.9	84.7	84.7	91.5	91.5	91.5
A-max 22	177-180			-	67.2	74.0	74.0	80.8	80.8	87.6	87.6	87.6
A-max 22	178/180	13 GAMA	502	-	74.3	81.1	81.1	87.9	87.9	94.7	94.7	94.7
A-max 22	178/180	MR	533	-	72.2	79.0	79.0	85.8	85.8	92.6	92.6	92.6
EC-max 16, 8 W	277			-	71.3	78.1	78.1	84.9	84.9	91.7	91.7	91.7
EC-max 16, 8 W	277	16 EASY/XT/Abs.	505-507	-	81.5	88.3	88.3	95.1	95.1	101.9	101.9	101.9
EC-max 16, 8 W	277	16 EASY Abs. XT	508	-	82.0	88.8	88.8	95.6	95.6	102.4	102.4	102.4
EC-max 22, 12 W	278			-	70.1	76.9	76.9	83.7	83.7	90.5	90.5	90.5
EC-max 22, 12 W	278	16 EASY/XT/Abs.	505-507	-	79.7	86.5	86.5	93.3	93.3	100.1	100.1	100.1
EC-max 22, 12 W	278	16 EASY Abs. XT	508	_	80.2	87.0	87.0	93.8	93.8	100.6	100.6	100.6
EC-max 22, 12 W	278	AB 20	582	-	105.7	112.5	112.5	119.3	119.3	126.1	126.1	126.1
EC-max 22, 25 W	279			86.6	86.6	93.4	93.4	100.2	100.2	107.0	107.0	107.0
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505-507	96.2	96.2	103.0	103.0	109.8	109.8	116.6	116.6	116.6
EC-max 22, 25 W	279	16 EASY Abs. XT	508	96.7	96.7	103.5	103.5	110.3	110.3	117.1	117.1	117.1
EC-max 22, 25 W	279	AB 20	582	122.2	122.2	129.0	129.0	135.8	135.8	142.6	142.6	142.6

Screw Drive GP 32 S Ø32 mm, ball screw



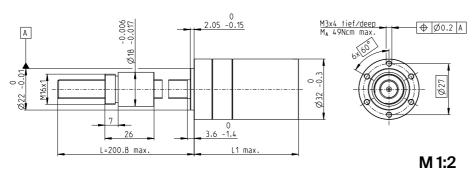
Technical Data					
Screw		Ø10	x 2, sta	inless s	teel
Standard length				200.8	mm
Special length (5 r	nm step	s)	ma	ax. 600	mm
Nut (standard)				thread	l nut
Material			100CR6	3, harde	ned
Axial play				< 0.01	mm
Planetary gearhead			st	raight te	eeth
Bearing	ball be	aring/tl	nrust ro	ller bea	
Radial play, 5 mm	from flar	nge		< 0.05	mm
Axial play				preloa	ded
Max. continuous in	nput spe	ed ²		8000	
Recommended tem	perature	range		-15+8	0°C
Max. axial load (stati	c) ¹			270	00 N
Number of stages	0	1	2	3	4
Max. radial load,					
15 mm from flange 2	200 N 20	00 N 35	50 N 40	00 N 40	00 N

							10 11111111011	ii nango zo	70 N 200 N	00014-0	011 10011
	Stock program		Part Num	hers							
	Standard program		. artivain	DCIS							
	Special program (on request)		363970	363971	363974	363979	363980	363985	363990	363995	364000
Scre	ew Drive Data		000010	000011	000071	000010	000000		000000	000000	001000
	Reduction	-	1:1	3.7:1	14:1	33:1	51:1	111:1	246:1	492:1	762:1
2	Absolute reduction		1/1	26/7	676/49	529/16	17576/343	13824/125	421824/1715	86112/175	19044/25
20	Max. feed velocity ¹	mm/s	133	72	19	8.1	5.2	2.4	1.1	0.5	0.3
21	Max. feed force (continuous) ¹	N	386	474	739	983	1137	1473	1921	2420	2700
	Max. feed force (intermittent) ¹	N	1023	1255	1956	2604	2700	2700	2700	2700	2700
	Part Numbers		1020	363972	363975	2001	363981	363986	363991	363996	364001
	Reduction			4.8:1	18:1		66:1	123:1	295:1	531:1	913:1
	Absolute reduction			24/5	624/35		16224/245	6877/56	101062/343	331776/625	36501/40
20	Max. feed velocity ¹	mm/s		56	15		4.0	2.2	0.9	0.5	0.3
21	Max. feed force (continuous) ¹	N		517	803		1239	1524	2041	2482	2700
	Max. feed force (intermittent) ¹	N		1369	2127		2700	2700	2700	2700	2700
	Part Numbers			363973	363976		363982	363987	363992	363997	364002
	Reduction	ı		5.8:1	21:1		79:1	132:1	318:1	589:1	1093:1
2	Absolute reduction			23/4	299/14		3887/49	3312/25	389376/1225	20631/35	279841/256
20	Max. feed velocity ¹	mm/s		46	13		3.4	2.0	0.8	0.5	0.2
21	Max. feed force (continuous) ¹	N		551	846		1315	1561	2092	2569	2700
	Max. feed force (intermittent) ¹	N		1458	2239		2700	2700	2700	2700	2700
	Part Numbers				363977		363983	363988	363993	363998	
1	Reduction				23:1		86:1	159:1	411:1	636:1	
2	Absolute reduction				576/25		14976/175	1587/10	359424/875	79488/125	
20	Max. feed velocity ¹	mm/s			12		3.1	1.7	0.6	0.4	
21	Max. feed force (continuous)1	N			872		1353	1661	2279	2636	
22	Max. feed force (intermittent) ¹	N			2308		2700	2700	2700	2700	
	Part Numbers				363978		363984	363989	363994	363999	
1	Reduction				28:1		103:1	190:1	456:1	706:1	
2	Absolute reduction				138/5		3588/35	12167/64	89401/196	158171/224	
20	Max. feed velocity ¹	mm/s			9.5		2.6	1.4	0.6	0.4	
21	Max. feed force (continuous) ¹	N			931		1437	1762	2359	2700	
22	Max. feed force (intermittent) ¹	N			2465		2700	2700	2700	2700	
4	Number of stages		0	1	2	2	3	3	4	4	4
7	Max. efficiency gearhead incl. screw	%	94	75	71	71	66	66	56	56	56
8	Weight ¹	g	304	304	331	331	359	359	387	387	387
9	Average backlash no load	٥	0.7	0.7	0.8	0.8	1.0	1.0	1.0	1.0	1.0
23	Mechanical positioning accuracy ¹	mm	0.037	0.037	0.037	0.037	0.039	0.039	0.039	0.039	0.039
10	Mass inertia gearhead incl. screw ¹	gcm²	42.3	4.2	0.9	0.9	0.7	0.7	0.7	0.7	0.7
11	Gearhead length L1	mm	51.0	51.0	57.7	57.7	64.4	64.4	71.1	71.1	71.1
1 base	ed on screw length 200.8 mm (standard length)	² for reduction 1:1 = 4000 r	pm								

Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall len	gth [mm] =	Motor len	gth + gearl	nead length	ı + (sensor	/brake) + as	ssembly pa	ırts
RE 25	154/156			105.6	105.6	112.3	112.3	119.0	119.0	125.7	125.7	125.7
RE 25	154/156	HED_5540	535/537	126.4	126.4	133.1	133.1	139.8	139.8	146.5	146.5	146.5
RE 25	154/156	DCT 22	542	127.9	127.9	134.6	134.6	141.3	141.3	148.0	148.0	148.0
RE 25, 20 W	155			94.1	94.1	100.8	100.8	107.5	107.5	114.2	114.2	114.2
RE 25, 20 W	155	HED_5540	535/537	114.9	114.9	121.6	121.6	128.3	128.3	135.0	135.0	135.0
RE 25, 20 W	155	DCT 22	542	116.4	116.4	123.1	123.1	129.8	129.8	136.5	136.5	136.5
RE 25, 20 W	155	AB 28	585	128.2	128.2	134.9	134.9	141.6	141.6	148.3	148.3	148.3
RE 25, 20 W	155	HED_5540/AB 28	535/585	145.4	145.4	152.1	152.1	158.8	158.8	165.5	165.5	165.5
RE 25, 20 W	156	AB 28	585	139.7	139.7	146.4	146.4	153.1	153.1	159.8	159.8	159.8
RE 25, 20 W	156	HED_5540/AB 28	535/585	156.9	156.9	163.6	163.6	170.3	170.3	177.0	177.0	177.0
RE 30, 60 W	158			119.1	119.1	125.8	125.8	132.5	132.5	139.2	139.2	139.2
RE 30, 60 W	158	HED_5540	535/537	139.9	139.9	146.6	146.6	153.3	153.3	160.0	160.0	160.0

Continuation of the modular system on pages 481 and 484.

Screw Drive GP 32 S Ø32 mm, ball screw



Technical Data			I
Screw	Ø10 x 2,	, stainless stee	I
Standard length		200.8 mm	ı
Special length (5 mm steps)		max. 600 mm	ì
Nut (standard)		thread nut	t
Material	100	CR6, hardened	ı
Axial play		< 0.01 mm	ì
Planetary gearhead		straight teeth	ì
		st roller bearing	J
Radial play, 5 mm from flang	je	< 0.05 mm	ì
Axial play		preloaded	ı
Max. continuous input spee	d²	8000 rpm	
Recommended temperature r	ange	-15+80°C	;
Max. axial load (static) ¹		2700 N	ı
Number of stages 0	1 :	2 3 4	ŀ
Max. radial load,			
15 mm from flange 200 N 200	N 350 N	N 400 N 400 N	ı

Stock program Standard program
Special program (on request)

Part Num	bers							
363970	363971	363974	363979	363980	363985	363990	363995	364000
	363972	363975		363981	363986	363991	363996	364001
	363973	363976		363982	363987	363992	363997	364002
		363977		363983	363988	363993	363998	
		363978		363984	363989	363994	363999	

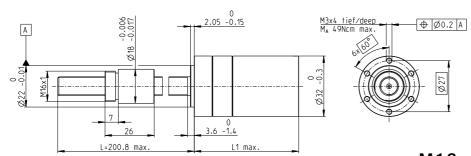






Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	gth [mm] :	= Motor leng	gth + gearh	ead length	+ (sensor/	brake) + as	sembly pa	rts
RE 35, 90 W	159			122.1	122.1	128.8	128.8	135.5	135.5	142.2	142.2	142.2
RE 35, 90 W	159	HED_5540	535/537	142.8	142.8	149.5	149.5	156.2	156.2	162.9	162.9	162.9
RE 35, 90 W	159	DCT 22	542	140.2	140.2	146.9	146.9	153.6	153.6	160.3	160.3	160.3
RE 35, 90 W	159	AB 28	585	158.2	158.2	164.9	164.9	171.6	171.6	178.3	178.3	178.3
RE 35, 90 W	159	HEDS 5540/AB 28	535/585	175.4	175.4	182.1	182.1	188.8	188.8	195.5	195.5	195.5
A-max 26	181-184			-	95.8	102.5	102.5	109.2	109.2	115.9	115.9	115.9
A-max 26	182-184	- 13 GAMA	502	_	102.9	109.6	109.6	116.3	116.3	123.0	123.0	123.0
A-max 26	182-184	HED_5540	536/538	-	114.2	120.9	120.9	127.6	127.6	134.3	134.3	134.3
A-max 32	185			_	114.0	120.7	120.7	127.4	127.4	134.1	134.1	134.1
A-max 32	186			-	112.6	119.3	119.3	126.0	126.0	132.7	132.7	132.7
A-max 32	186	HED_5540	535/537	-	133.4	140.1	140.1	146.8	146.8	153.5	153.5	153.5
EC 32, 80 W	267			111.1	111.1	117.8	117.8	124.5	124.5	131.2	131.2	131.2
EC 32, 80 W	267	Res 26	543	131.2	131.2	137.9	137.9	144.6	144.6	151.3	151.3	151.3
EC-max 22, 25 W	279			-	99.6	106.3	106.3	113.0	113.0	119.7	119.7	119.7
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505-507	_	109.2	115.9	115.9	122.6	122.6	129.3	129.3	129.3
EC-max 22, 25 W	279	16 EASY Abs. XT	508	_	109.7	116.4	116.4	123.1	123.1	129.8	129.8	129.8
EC-max 22, 25 W	279	AB 20	582	-	135.2	141.9	141.9	148.6	148.6	155.3	155.3	155.3
EC-max 30, 40 W	280			-	93.1	99.8	99.8	106.5	106.5	113.2	113.2	113.2
EC-max 30, 40 W	280	16 EASY/XT/Abs.	505-507	-	104.2	110.9	110.9	117.6	117.6	124.3	124.3	124.3
EC-max 30, 40 W	280	16 EASY Abs. XT	508	-	104.7	111.4	111.4	118.1	118.1	124.8	124.8	124.8
EC-max 30, 40 W	280	HEDL 5540	537	-	113.7	120.4	120.4	127.1	127.1	133.8	133.8	133.8
EC-max 30, 40 W	280	AB 20	582	-	128.7	135.4	135.4	142.1	142.1	148.8	148.8	148.8
EC-max 30, 40 W	280	HEDL 5540/AB 20	537/582	-	149.3	156.0	156.0	162.7	162.7	169.4	169.4	169.4
EC-max 30, 60 W	281			115.1	115.1	121.8	121.8	128.5	128.5	135.2	135.2	135.2
EC-max 30, 60 W	281	16 EASY/XT/Abs.	505-507	126.2	126.2	132.9	132.9	139.6	139.6	146.3	146.3	146.3
EC-max 30, 60 W	281	16 EASY Abs. XT	508	126.7	126.7	133.4	133.4	140.1	140.1	146.8	146.8	146.8
EC-max 30, 60 W	281	HEDL 5540	538	135.7	135.7	142.4	142.4	149.1	149.1	155.8	155.8	155.8
EC-max 30, 60 W	281	AB 20	582	150.7	150.7	157.4	157.4	164.1	164.1	170.8	170.8	170.8
EC-max 30, 60 W	281	HEDL 5540/AB 20	539/582	171.3	171.3	178.0	178.0	184.7	184.7	191.4	191.4	191.4
EC-4pole 22, 90 W	287			99.7	99.7	106.4	106.4	113.1	113.1	119.8	119.8	119.8
EC-4pole 22, 90 W	287	22 EMT	516	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-4pole 22, 90 W	287	16 EASY/XT/Abs.	505-507	111.9	111.9	118.6	118.6	125.3	125.3	132.0	132.0	132.0
EC-4pole 22, 90 W	287	16 EASY Abs. XT	508	112.4	112.4	119.1	119.1	125.8	125.8	132.5	132.5	132.5
EC-4pole 22, 90 W	287	16 RIO	517	110.4	110.4	117.1	117.1	123.8	123.8	130.5	130.5	130.5
EC-4pole 22, 120 W	288			117.1	117.1	123.8	123.8	130.5	130.5	137.2	137.2	137.2
EC-4pole 22, 120 W	288	22 EMT	516	142.9	142.9	149.6	149.6	156.3	156.3	163.0	163.0	163.0
EC-4pole 22, 120 W	288	16 EASY/XT/Abs.	505-507	129.3	129.3	136.0	136.0	142.7	142.7	149.4	149.4	149.4
EC-4pole 22, 120 W	288	16 EASY Abs. XT	508	129.8	129.8	136.5	136.5	143.2	143.2	149.9	149.9	149.9
EC-4pole 22, 120 W	288	16 RIO	517	127.8	127.8	134.5	134.5	141.2	141.2	147.9	147.9	147.9

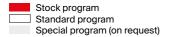
Screw Drive GP 32 S Ø32 mm, ball screw



Technical Data Ø10 x 2, stainless steel Screw Standard length 200.8 mm Special length (5 mm steps) Nut (standard) max. 600 mm thread nut Material 100CR6, hardened Axial play < 0.01 mm Planetary gearhead straight teeth ball bearing/thrust roller bearing Bearing Radial play, 5 mm from flange Axial play Max. continuous input speed² Recommended temperature range < 0.05 mm preloaded 8000 rpm -15...+80°C 2700 N Max. axial load (static)1 Number of stages 3 Max. radial load,

M 1:2

15 mm from flange 200 N 200 N 350 N 400 N 400 N

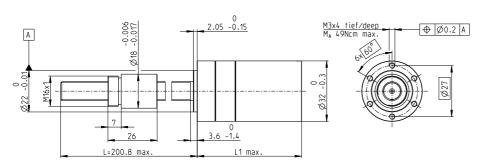


Part Num	bers							
363970	363971	363974	363979	363980	363985	363990	363995	364000
	363972	363975		363981	363986	363991	363996	364001
	363973	363976		363982	363987	363992	363997	364002
		363977		363983	363988	363993	363998	
		363978		363984	363989	363994	363999	



Overallier	igiri	- Overall left										
Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall len	gth [mm] :	= Motor leng	gth + gearh	ead length	+ (sensor/	'brake) + as	sembly pa	rts
EC-4pole 30, 100 W	289		_	98.1	98.1	104.8	104.8	111.5	111.5	118.2	118.2	118.2
EC-4pole 30, 100 W	289	16 EASY/XT/Abs.	505-507	112.0	112.0	118.7	118.7	125.4	125.4	132.1	132.1	132.1
EC-4pole 30, 100 W	289	16 EASY Abs. XT	508	112.5	112.5	119.2	119.2	125.9	125.9	132.6	132.6	132.6
EC-4pole 30, 100 W	289	22 EMT	516	126.0	126.0	132.7	132.7	139.4	139.4	146.1	146.1	146.1
EC-4pole 30, 100 W	289	16 RIO	517	110.5	110.5	117.2	117.2	123.9	123.9	130.6	130.6	130.6
EC-4pole 30, 100 W	289	AB 20	583	134.3	134.3	141.0	141.0	147.7	147.7	154.4	154.4	154.4
EC-4pole 30, 100 W	289	16 EASY/XT/Abs./AB 20	505/583		148.4	155.1	155.1	161.8	161.8	168.5	168.5	168.5
EC-4pole 30, 100 W	289	16 EASY Abs. XT/AB 20			148.9	155.6	155.6	162.3	162.3	169.0	169.0	169.0
EC-4pole 30, 100 W	289	22 EMT/AB 20	516/583		165.5	172.2	172.2	178.9	178.9	185.6	185.6	185.6
EC-4pole 30, 100 W	289	16 RIO/AB 20	517/583		146.9	153.6	153.6	160.3	160.3	167.0	167.0	167.0
EC-4pole 30, 200 W	291	10 100/AB 20	0177000	115.1	115.1	121.8	121.8	128.5	128.5	135.2	135.2	135.2
EC-4pole 30, 200 W	291	16 EASY/XT/Abs.	505-507	129.0	129.0	135.7	135.7	142.4	142.4	149.1	149.1	149.1
EC-4pole 30, 200 W	291	16 EASY Abs. XT	508	129.5	129.5	136.2	136.2	142.9	142.9	149.6	149.6	149.6
EC-4pole 30, 200 W	291	22 EMT	516	143.0	143.0	149.7	149.7	156.4	156.4	163.1	163.1	163.1
EC-4pole 30, 200 W	291	16 RIO	517	127.5	127.5	134.2	134.2	140.9	140.9	147.6	147.6	147.6
EC-4pole 30, 200 W	291	AB 20	583	151.3	151.3	158.0	158.0	164.7	164.7	171.4	171.4	171.4
EC-4pole 30, 200 W	291	16 EASY/XT/Abs./AB 20			165.4	172.1	172.1	178.8	178.8	185.5	185.5	185.5
EC-4pole 30, 200 W	291	16 EASY Abs. XT/AB 20			165.9	172.1	172.1	179.3	179.3	186.0	186.0	186.0
EC-4pole 30, 200 W	291	22 EMT/AB 20	516/583		182.5	189.2	189.2	195.9	195.9	202.6	202.6	202.6
EC-4pole 30, 200 W	291	16 RIO/AB 20	517/583		163.9	170.6	170.6	177.3	177.3	184.0	184.0	184.0
EC-i 30, 30 W	298	10 KIO/AB 20	3177303	93.3	93.3	100.0	100.0	106.7	106.7	113.4	113.4	113.4
EC-i 30, 30 W	298	22 EMT	516	121.3	121.3	128.0	128.0	134.7	134.7	141.4	141.4	141.4
EC-i 30, 30 W	298	16 EASY/Abs.	505-507	105.0	105.0	111.7	111.7	118.4	118.4	125.1	125.1	125.1
EC-i 30, 30 W	298	16 RIO	517	103.5	103.5	110.2	110.2	116.9	116.9	123.6	123.6	123.6
EC-i 30, 45 W	299	10 KIO	317	93.3	93.3	100.0	100.0	106.7	106.7	113.4	113.4	113.4
EC-i 30, 45 W	299	22 EMT	516	121.3	121.3	128.0	128.0	134.7	134.7	141.4	141.4	141.4
EC-i 30, 45 W	299	16 EASY/Abs.	505-507	105.0	105.0	111.7	111.7	118.4	118.4	125.1	125.1	125.1
EC-i 30, 45 W	299	16 RIO	517	103.5	103.5	110.2	110.2	116.9	116.9	123.6	123.6	123.6
EC-i 30, 50 W	300	10 1110	317	115.3	115.3	122.0	122.0	128.7	128.7	135.4	135.4	135.4
EC-i 30, 50 W	300	22 EMT	516	143.3	143.3	150.0	150.0	156.7	156.7	163.4	163.4	163.4
EC-i 30, 50 W	300	16 EASY/Abs.	505-507	127.0	127.0	133.7	133.7	140.4	140.4	147.1	147.1	147.1
EC-i 30, 50 W	300	16 RIO	517	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-i 30, 75 W	301	10 1110	317	115.3	115.3	122.0	122.0	128.7	128.7	135.4	135.4	135.4
EC-i 30, 75 W	301	22 EMT	516	143.3	143.3	150.0	150.0	156.7	156.7	163.4	163.4	163.4
EC-i 30, 75 W	301	16 EASY/Abs.	505-507	127.0	127.0	133.7	133.7	140.4	140.4	147.1	147.1	147.1
EC-i 30, 75 W	301	16 RIO	517	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-i 40, 50 W	302	10 1110	017	82.7	82.7	89.4	89.4	96.1	96.1	102.8	102.8	102.8
EC-i 40, 50 W	302	22 EMT	516	110.7	110.7	117.4	117.4	124.1	124.1	130.8	130.8	130.8
EC-i 40, 50 W	302	TSX 40 MAG/RIO	524-525	94.4	82.7	89.4	89.4	96.1	96.1	102.8	102.8	102.8
EC-i 40, 50 W	302	16 EASY/Abs.	505-507	94.4	94.4	101.1	101.1	107.8	107.8	114.5	114.5	114.5
EC-i 40, 50 W	302	16 RIO	517	97.2	97.2	103.9	103.9	110.6	110.6	117.3	117.3	117.3
EC-i 40, 70 W	304	IO MIO	017	92.7	92.7	99.4	99.4	106.1	106.1	112.8	112.8	112.8
EC-i 40, 70 W	304	22 EMT	516	120.7	120.7	127.4	127.4	134.1	134.1	140.8	140.8	140.8
EC-i 40, 70 W	304	TSX 40 MAG/RIO	524-525	104.4	104.4	111.1	111.1	117.8	117.8	124.5	124.5	124.5
EC-i 40, 70 W	304	16 EASY/Abs.	505-507	104.4	104.4	111.1	111.1	117.8	117.8	124.5	124.5	124.5
EC-i 40, 70 W	304	16 RIO	517	107.2	107.2	113.9	113.9	120.6	120.6	127.3	127.3	127.3
LO 170, 10 W	007	10 1110	311	101.2	101.2	110.0	110.0	120.0	120.0	121.0	121.0	121.0

Screw Drive GP 32 S Ø32 mm, metric lead screw



Technical Data Screw M10 x 1, stainless steel Standard length Special length (5 mm steps) Nut (standard) Material 200.8 mm max. 600 mm thread nut bronze Axial play < 0.008 mm Planetary gearhead straight teeth Bearing ball bearing/thrust roller bearing Radial play, 5 mm from flange < 0.05 mm Axial play
Max. continuous input speed²
Recommended temperature range preloaded 8000 rpm -15...+80°C Max. axial load (static)1 2700 N Number of stages Max. radial load, 15 mm from flange 200 N 200 N 350 N 400 N 400 N

M 1:2

	Stock program Standard program		Part Numl	oers							
	Special program (on request)		363900	363901	363904	363909	363910	363915	363920	363925	363930
Sci	ew Drive Data										
	Reduction		1:1	3.7:1	14:1	33:1	51:1	111:1	246:1	492:1	762:1
2	Absolute reduction		1/1	26/7	676/49	529/16	17576/343	13824/125	421824/1715	86112/175	19044/25
20	Max. feed velocity ¹	mm/s	100	36	9.5	4.0	2.6	1.2	0.5	0.3	0.2
21	Max. feed force (continuous) ¹	N	183	257	400	533	616	798	1040	1311	1350
22	Max. feed force (intermittent) ¹	N	455	638	995	1324	1350	1350	1350	1350	1350
	Part Numbers			363902	363905		363911	363916	363921	363926	363931
1	Reduction			4.8:1	18:1		66:1	123:1	295:1	531:1	913:1
2	Absolute reduction			24/5	624/35		16224/245	6877/56	101062/343	331776/625	36501/40
20	Max. feed velocity ¹	mm/s		28	7.4		2.0	1.1	0.5	0.3	0.1
21	Max. feed force (continuous) ¹	N		280	435		671	826	1105	1345	1350
22	Max. feed force (intermittent) ¹	N		696	1082		1350	1350	1350	1350	1350
	Part Numbers			363903	363906		363912	363917	363922	363927	363932
1	Reduction			5.8:1	21:1		79:1	132:1	318:1	589:1	1093:1
2	Absolute reduction			23/4	299/14		3887/49	3312/25	389376/1225	20631/35	279841/256
20	Max. feed velocity ¹	mm/s		23	6.3		1.7	1.0	0.4	0.2	0.1
21	Max. feed force (continuous) ¹	N		298	458		712	845	1133	1350	1350
22	Max. feed force (intermittent) ¹	N		742	1139		1350	1350	1350	1350	1350
	Part Numbers				363907		363913	363918	363923	363928	
1	Reduction			,	23:1		86:1	159:1	411:1	636:1	
2	Absolute reduction				576/25		14976/175	1587/10	359424/875	79488/125	
20	Max. feed velocity ¹	mm/s			5.8		1.6	0.8	0.3	0.2	
21	Max. feed force (continuous) ¹	N			472		733	899	1234	1350	
22	Max. feed force (intermittent) ¹	N			1174		1350	1350	1350	1350	
	Part Numbers				363908		363914	363919	363924	363929	
1	Reduction				28:1		103:1	190:1	456:1	706:1	
2	Absolute reduction				138/5		3588/35	12167/64	89401/196	158171/224	
20	Max. feed velocity ¹	mm/s			4.8		1.3	0.7	0.3	0.2	
21	Max. feed force (continuous) ¹	N			504		778	955	1278	1350	
22	Max. feed force (intermittent) ¹	N			1253		1350	1350	1350	1350	
4	Number of stages		0	1	2	2	3	3	4	4	4
7	Max. efficiency gearhead incl. screw	%	27	22	20	20	19	19	16	16	16
8	Weight ¹	g	304	304	331	331	359	359	387	387	387
9	Average backlash no load	۰	0.7	0.7	0.8	0.8	1.0	1.0	1.0	1.0	1.0
23	Mechanical positioning accuracy ¹	mm	0.033	0.033	0.033	0.033	0.034	0.034	0.034	0.034	0.034
10	Mass inertia gearhead incl. screw ¹	gcm²	43.3	3.0	0.9	0.9	0.7	0.7	0.7	0.7	0.7
11	Gearhead length L1	mm	51.0	51.0	57.7	57.7	64.4	64.4	71.1	71.1	71.1

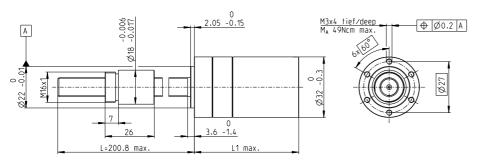






+ Motor	Page	+ Sensor/Brake	Page	Overall len	gth [mm] =	 Motor len 	gth + gearl	head length	+ (sensor	/brake) + as	ssembly pa	ırts
RE 25	154/156			105.6	105.6	112.3	112.3	119.0	119.0	125.7	125.7	125.7
RE 25	154/156	HED_5540	535/537	126.4	126.4	133.1	133.1	139.8	139.8	146.5	146.5	146.5
RE 25	154/156	DCT 22	542	127.9	127.9	134.6	134.6	141.3	141.3	148.0	148.0	148.0
RE 25, 20 W	155			94.1	94.1	100.8	100.8	107.5	107.5	114.2	114.2	114.2
RE 25, 20 W	155	HED_5540	535/537	114.9	114.9	121.6	121.6	128.3	128.3	135.0	135.0	135.0
RE 25, 20 W	155	DCT 22	542	116.4	116.4	123.1	123.1	129.8	129.8	136.5	136.5	136.5
RE 25, 20 W	155	AB 28	585	128.2	128.2	134.9	134.9	141.6	141.6	148.3	148.3	148.3
RE 25, 20 W	155	HED_5540/AB 28	535/585	145.4	145.4	152.1	152.1	158.8	158.8	165.5	165.5	165.5
RE 25, 20 W	156	AB 28	585	139.7	139.7	146.4	146.4	153.1	153.1	159.8	159.8	159.8
RE 25, 20 W	156	HED_5540/AB 28	535/585	156.9	156.9	163.6	163.6	170.3	170.3	177.0	177.0	177.0
RE 30, 60 W	158			119.1	119.1	125.8	125.8	132.5	132.5	139.2	139.2	139.2
RE 30, 60 W	158	HED_5540	535/537	139.9	139.9	146.6	146.6	153.3	153.3	160.0	160.0	160.0

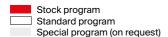
Screw Drive GP 32 S Ø32 mm, metric lead screw



Technical Data Screw M10 x 1, stainless steel Standard length 200.8 mm Special length (5 mm steps) max. 600 mm Nut (standard) Material thread nut bronze Axial play < 0.008 mm Planetary gearhead straight teeth Bearing ball bearing/thrust roller bearing Radial play, 5 mm from flange < 0.05 mm Axial play
Max. continuous input speed²
Recommended temperature range preloaded 8000 rpm -15...+80°C Max. axial load (static)1 2700 N Number of stages Max. radial load,

M 1:2

15 mm from flange 200 N 200 N 350 N 400 N 400 N



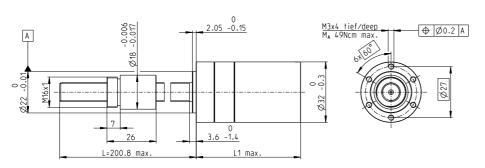
Part Num	bers							
363900	363901	363904	363909	363910	363915	363920	363925	363930
	363902	363905		363911	363916	363921	363926	363931
	363903	363906		363912	363917	363922	363927	363932
		363907		363913	363918	363923	363928	
		363908		363914	363919	363924	363929	





overall leng	gth	overall len	gth									
Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	th [mm] –	Motor lend	nth _ goarh	ead length	+ (concor/	hraka) ± as	eamhly na	rte
RE 35, 90 W	159	T Selisoi / Di ake	raye	122.1	122.1	128.8	128.8	135.5	135.5	142.2	142.2	142.2
RE 35, 90 W	159	HED_5540	535/537		142.8	149.5	149.5	156.2	156.2	162.9	162.9	162.9
RE 35, 90 W	159	DCT 22	542	140.2	140.2	146.9	146.9	153.6	153.6	160.3	160.3	160.3
,	159	AB 28	585	158.2	158.2	164.9		171.6	171.6	178.3	178.3	178.3
RE 35, 90 W RE 35, 90 W	159	HEDS 5540/AB 28	535/585		175.4	182.1	164.9 182.1	188.8	188.8	195.5	195.5	176.3
A-max 26	181-184		333/363		95.8	102.1	102.1	109.2	109.2	115.9	115.9	
		13 GAMA	502	_	102.9	102.5	102.5	116.3		123.0	123.0	115.9
A-max 26 A-max 26		HED_5540	536/538		114.2	120.9	120.9	127.6	116.3 127.6	134.3	134.3	123.0 134.3
A-max 32	185	HED_5540	330/336	_	114.2	120.9	120.9	127.4	127.4	134.3	134.3	134.3
A-max 32	186			_	112.6	119.3		126.0	126.0		134.1	134.1
A-max 32	186	HED_5540	535/537		133.4	140.1	119.3 140.1	146.8	146.8	132.7 153.5	153.5	153.5
	267	_	535/537		129.5	136.2		142.9	142.9	149.6		
EC 32, 80 W	267	HED_5540	543		131.2	137.9	136.2	144.6	144.6		149.6	149.6
EC 32, 80 W EC-max 22, 25 W	279	Res 26	543	131.2	99.6	106.3	137.9 106.3	113.0	113.0	151.3 119.7	151.3 119.7	151.3 119.7
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505-507	-	109.2	115.9	115.9	122.6	122.6	129.3	129.3	129.3
EC-max 22, 25 W	279		508	-	109.2	116.4	116.4	123.1	123.1	129.3	129.3	129.3
,		16 EASY Abs. XT	582	-								
EC-max 22, 25 W EC-max 30, 40 W	279 280	AB 20	362	_	135.2 93.1	141.9 99.8	141.9 99.8	148.6 106.5	148.6 106.5	155.3 113.2	155.3 113.2	155.3 113.2
EC-max 30, 40 W	280	16 EASY/XT/Abs.	505-507		104.2	110.9	110.9	117.6	117.6	124.3	124.3	124.3
EC-max 30, 40 W	280		508		104.2	111.4	111.4	117.6	117.6	124.3	124.3	124.3
EC-max 30, 40 W	280	16 EASY Abs. XT HEDL 5540	539	-	113.7	120.4	120.4	127.1	127.1	133.8	133.8	133.8
,			582	_	128.7			142.1	142.1			148.8
EC-max 30, 40 W EC-max 30, 40 W	280	AB 20	539/582		149.3	135.4 156.0	135.4	162.7	162.7	148.8	148.8 169.4	
	280 281	HEDL 5540/AB 20	539/562	- 115.1		121.8	156.0		128.5	169.4	135.2	169.4 135.2
EC-max 30, 60 W EC-max 30, 60 W	281	16 EASY/XT/Abs.	505-507	126.2	115.1 126.2	132.9	121.8 132.9	128.5 139.6	139.6	135.2 146.3	146.3	146.3
EC-max 30, 60 W	281	16 EASY Abs. XT	508	126.2	126.2	133.4	133.4	140.1	140.1	146.8	146.8	146.8
EC-max 30, 60 W	281	HEDL 5540	538	135.7	135.7	142.4	142.4	140.1	140.1	155.8	155.8	155.8
EC-max 30, 60 W	281	AB 20	582	150.7	150.7	157.4	157.4	164.1	164.1	170.8	170.8	170.8
EC-max 30, 60 W	281	HEDL 5540/AB 20	539/582		171.3	178.0	178.0	184.7	184.7	191.4	191.4	191.4
EC-4pole 22, 90 W	287	TIEDE 3340/AB 20	339/302	99.7	99.7	106.4	106.4	113.1	113.1	119.8	119.8	119.8
EC-4pole 22, 90 W	287	22 EMT	516	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-4pole 22, 90 W	287	16 EASY/XT/Abs.	505-507		111.9	118.6	118.6	125.3	125.3	132.0	132.0	132.0
EC-4pole 22, 90 W	287	16 EASY Abs. XT	508	112.4	112.4	119.1	119.1	125.8	125.8	132.5	132.5	132.5
EC-4pole 22, 90 W	287	16 RIO	517	110.4	110.4	117.1	117.1	123.8	123.8	130.5	130.5	130.5
EC-4pole 22, 90 W	287	HEDL	539	121.2	121.2	127.9	127.9	134.6	134.6	141.3	141.3	141.3
EC-4pole 22, 120 W	288	TIEDE	559	117.1	117.1	123.8	123.8	130.5	130.5	137.2	137.2	137.2
EC-4pole 22, 120 W	288	22 EMT	516	142.9	142.9	149.6	149.6	156.3	156.3	163.0	163.0	163.0
EC-4pole 22, 120 W	288	16 EASY/XT/Abs.	505-507		129.3	136.0	136.0	142.7	142.7	149.4	149.4	149.4
EC-4pole 22, 120 W	288	16 EASY Abs. XT	508	129.8	129.8	136.5	136.5	143.2	143.2	149.9	149.9	149.9
EC-4pole 22, 120 W	288	16 RIO	517	127.8	127.8	134.5	134.5	141.2	141.2	147.9	147.9	147.9
EC-4pole 22, 120 W	288	HEDL	539	138.6	138.6	145.3	145.3	152.0	152.0	158.7	158.7	158.7
EC-4pole 30, 100 W	289	TIEBE	000	98.1	98.1	104.8	104.8	111.5	111.5	118.2	118.2	118.2
EC-4pole 30, 100 W	289	16 EASY/XT/Abs.	505-507		112.0	118.7	118.7	125.4	125.4	132.1	132.1	132.1
EC-4pole 30, 100 W	289	16 EASY Abs. XT	508	112.5	112.5	119.2	119.2	125.9	125.9	132.6	132.6	132.6
EC-4pole 30, 100 W	289	22 EMT	516	126.0	126.0	132.7	132.7	139.4	139.4	146.1	146.1	146.1
EC-4pole 30, 100 W	289	16 RIO	534	110.5	110.5	117.2	117.2	123.9	123.9	130.6	130.6	130.6
EC-4pole 30, 100 W	289	HEDL	539	118.7	118.7	125.4	125.4	132.1	132.1	138.8	138.8	138.8
EC-4pole 30, 100 W	289	AB 20	583	134.3	134.3	141.0	141.0	147.7	147.7	154.4	154.4	154.4
EC-4pole 30, 100 W	289	16 EASY/XT/Abs./AB 20	516/583		148.4	155.1	155.1	161.8	161.8	168.5	168.5	168.5
EC-4pole 30, 100 W	289		508/583		148.9	155.1	155.1	162.3	162.3	169.0	169.0	169.0
EC-4pole 30, 100 W	289	22 EMT/AB 20	516/583	165.5	165.5	172.2	172.2	178.9	178.9	185.6	185.6	185.6
EC-4pole 30, 100 W	289	16 RIO/AB 20	534/583		146.9	153.6	153.6	160.3	160.3	167.0	167.0	167.0
EC-4pole 30, 100 W	289	HEDL/AB 20	539/583		154.9	161.6	161.6	168.3	168.3	175.0	175.0	175.0
_0 -poic 00, 100 W	200	. ILDLIAD 20	303/303	107.0	107.0	101.0	101.0	100.0	100.0	1, 0.0	1, 0.0	11 0.0

Screw Drive GP 32 S Ø32 mm, metric lead screw



rechnical Data			
Screw	M10 x 1,	stainless	steel
Standard length		200.8	3 mm
Special length (5 mm steps)		max. 600) mm
Nut (standard)		threa	d nut
Material		br	ronze
Axial play		< 0.008	3 mm
Planetary gearhead		straight	teeth
Bearing ball bear	ing/thrus	t roller be	aring
Radial play, 5 mm from flang	e	< 0.05	5 mm
Axial play		prelo	aded
Max. continuous input speed	d ²	8000	
Recommended temperature ra	ange	-15+	80°C
Max. axial load (static) ¹		27	'00 N
Number of stages 0	1 2	2 3	4
Max. radial load,			
15 mm from flange 200 N 200	N 350 N	I 400 N 4	00 N

M 1:2

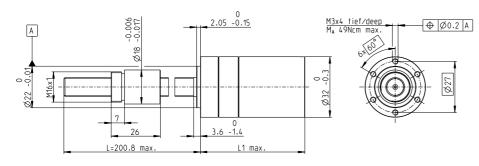
Stock program Standard program Special program (on request)

Part Num	bers							
363900	363901	363904	363909	363910	363915	363920	363925	363930
	363902	363905		363911	363916	363921	363926	363931
	363903	363906		363912	363917	363922	363927	363932
		363907		363913	363918	363923	363928	
		363908		363914	363919	363924	363929	



overall le	ngth	overallien	igtn									
Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	gth [mm] =	Motor leng	gth + gearh	ead length	+ (sensor/	'brake) + as	sembly pa	rts
EC-4pole 30, 200 W	291			115.1	115.1	121.8	121.8	128.5	128.5	135.2	135.2	135.2
EC-4pole 30, 200 W	291	16 EASY/XT/Abs.	505-507		129.0	135.7	135.7	142.4	142.4	149.1	149.1	149.1
EC-4pole 30, 200 W	291	16 EASY Abs. XT	508	129.5	129.5	136.2	136.2	142.9	142.9	149.6	149.6	149.6
EC-4pole 30, 200 W	291	22 EMT	516	143.0	143.0	149.7	149.7	156.4	156.4	163.1	163.1	163.1
EC-4pole 30, 200 W	291	16 RIO	534	127.5	127.5	134.2	134.2	140.9	140.9	147.6	147.6	147.6
EC-4pole 30, 200 W	291	HEDL	539	135.7	135.7	142.4	142.4	149.1	149.1	155.8	155.8	155.8
EC-4pole 30, 200 W	291	AB 20	583	151.3	151.3	158.0	158.0	164.7	164.7	171.4	171.4	171.4
EC-4pole 30, 200 W	291	16 EASY/XT/Abs./AB 20	516/583	165.4	165.4	172.1	172.1	178.8	178.8	185.5	185.5	185.5
EC-4pole 30, 200 W	291	16 EASY Abs. XT/AB 20	508/583	165.9	165.9	172.6	172.6	179.3	179.3	186.0	186.0	186.0
EC-4pole 30, 200 W	291	22 EMT/AB 20	516/583		182.5	189.2	189.2	195.9	195.9	202.6	202.6	202.6
EC-4pole 30, 200 W	291	16 RIO/AB 20	534/583	163.9	163.9	170.6	170.6	177.3	177.3	184.0	184.0	184.0
EC-4pole 30, 200 W	291	HEDL/AB 20	537/583		171.9	178.6	178.6	185.3	185.3	192.0	192.0	192.0
EC-i 30, 30 W	298			93.3	93.3	100.0	100.0	106.7	106.7	113.4	113.4	113.4
EC-i 30, 30 W	298	22 EMT	516	121.3	121.3	128.0	128.0	134.7	134.7	141.4	141.4	141.4
EC-i 30, 30 W	298	16 EASY/Abs.	505-507	105.0	105.0	111.7	111.7	118.4	118.4	125.1	125.1	125.1
EC-i 30, 30 W	298	16 RIO	534	103.5	103.5	110.2	110.2	116.9	116.9	123.6	123.6	123.6
EC-i 30, 30 W	298	HEDL	538	114.0	114.0	120.7	120.7	127.4	127.4	134.1	134.1	134.1
EC-i 30, 45 W	299			93.3	93.3	100.0	100.0	106.7	106.7	113.4	113.4	113.4
EC-i 30, 45 W	299	22 EMT	516	121.3	121.3	128.0	128.0	134.7	134.7	141.4	141.4	141.4
EC-i 30, 45 W	299	16 EASY/Abs.	505-507	105.0	105.0	111.7	111.7	118.4	118.4	125.1	125.1	125.1
EC-i 30, 45 W	299	16 RIO	534	103.5	103.5	110.2	110.2	116.9	116.9	123.6	123.6	123.6
EC-i 30, 45 W	299	HEDL	538	114.0	114.0	120.7	120.7	127.4	127.4	134.1	134.1	134.1
EC-i 30, 50 W	300			115.3	115.3	122.0	122.0	128.7	128.7	135.4	135.4	135.4
EC-i 30, 50 W	300	22 EMT	516	143.3	143.3	150.0	150.0	156.7	156.7	163.4	163.4	163.4
EC-i 30, 50 W	300	16 EASY/Abs.	505-507	127.0	127.0	133.7	133.7	140.4	140.4	147.1	147.1	147.1
EC-i 30, 50 W	300	16 RIO	534	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-i 30, 50 W	300	HEDL	538	136.0	136.0	142.7	142.7	149.4	149.4	156.1	156.1	156.1
EC-i 30, 75 W	301			115.3	115.3	122.0	122.0	128.7	128.7	135.4	135.4	135.4
EC-i 30, 75 W	301	22 EMT	516	143.3	143.3	150.0	150.0	156.7	156.7	163.4	163.4	163.4
EC-i 30, 75 W	301	16 EASY/Abs.	505-507	127.0	127.0	133.7	133.7	140.4	140.4	147.1	147.1	147.1
EC-i 30, 75 W	301	16 RIO	534	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-i 30, 75 W	301	HEDL	538	136.0	136.0	142.7	142.7	149.4	149.4	156.1	156.1	156.1
EC-i 40, 50 W	302			82.7	82.7	89.4	89.4	96.1	96.1	102.8	102.8	102.8
EC-i 40, 50 W	302	22 EMT	516	110.7	110.7	117.4	117.4	124.1	124.1	130.8	130.8	130.8
EC-i 40, 50 W	302	TSX 40 MAG/RIO	524-525	94.4	82.7	89.4	89.4	96.1	96.1	102.8	102.8	102.8
EC-i 40, 50 W	302	16 EASY/Abs.	505-507	94.4	94.4	101.1	101.1	107.8	107.8	114.5	114.5	114.5
EC-i 40, 50 W	302	16 RIO	534	97.2	97.2	103.9	103.9	110.6	110.6	117.3	117.3	117.3
EC-i 40, 50 W	302	HEDL	538	105.7	105.7	112.4	112.4	119.1	119.1	125.8	125.8	125.8
EC-i 40, 70 W	304			92.7	92.7	99.4	99.4	106.1	106.1	112.8	112.8	112.8
EC-i 40, 70 W	304	22 EMT	516	120.7	120.7	127.4	127.4	134.1	134.1	140.8	140.8	140.8
EC-i 40, 70 W	304	TSX 40 MAG/RIO	524-525	104.4	104.4	111.1	111.1	117.8	117.8	124.5	124.5	124.5
EC-i 40, 70 W	304	16 EASY/Abs.	505-507	104.4	104.4	111.1	111.1	117.8	117.8	124.5	124.5	124.5
EC-i 40, 70 W	304	16 RIO	534	107.2	107.2	113.9	113.9	120.6	120.6	127.3	127.3	127.3
EC-i 40, 70 W	304	HEDL	538	115.7	115.7	122.4	122.4	129.1	129.1	135.8	135.8	135.8

Screw Drive GP 32 S Ø32 mm, trapezoidal lead screw



Technical Data TR10 x 2, stainless steel Standard length Special length (5 mm steps) Nut (standard) 200.8 mm max. 600 mm thread nut Material bronze Axial play < 0.008 mm Planetary gearhead straight teeth ball bearing/thrust roller bearing from flange < 0.05 mm preloaded aput speed² 8000 rpm perature range -15...+80°C Bearing Radial play, 5 mm from flange Axial play
Max. continuous input speed² Recommended temperature range Max. axial load (static)1 2700 N Number of stages Max. radial load,

M 1:2

15 mm from flange 200 N 200 N 350 N 400 N 400 N

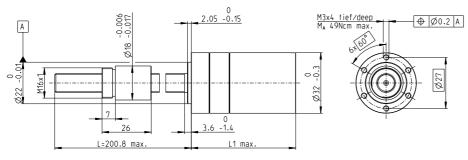
	Stock program Standard program		Part Num	bers							
	Special program (on request)		363936	363937	363940	363945	363946	363951	363956	363961	363966
Scr	ew Drive Data										
1	Reduction		1:1	3.7:1	14:1	33:1	51:1	111:1	246:1	492:1	762:1
2	Absolute reduction		1/1	26/7	676/49	529/16	17576/343	13824/125	421824/1715	86112/175	19044/25
20	Max. feed velocity ¹	mm/s	186	72	19	8.1	5.2	2.4	1.1	0.5	0.3
21	Max. feed force (continuous)1	N	216	296	462	614	710	921	1200	1512	1530
22	Max. feed force (intermittent) ¹	N	528	723	1127	1500	1530	1530	1530	1530	1530
	Part Numbers			363938	363941		363947	363952	363957	363962	363967
1	Reduction			4.8:1	18:1		66:1	123:1	295:1	531:1	913:1
2	Absolute reduction			24/5	624/35		16224/245	6877/56	101062/343	331776/625	36501/40
20	Max. feed velocity ¹	mm/s		56	15		4.0	2.2	0.9	0.5	0.3
21	Max. feed force (continuous)1	N		323	502		774	953	1275	1530	1530
22	Max. feed force (intermittent) ¹	N		789	1226		1530	1530	1530	1530	1530
	Part Numbers			363939	363942		363948	363953	363958	363963	363968
1	Reduction			5.8:1	21:1		79:1	132:1	318:1	589:1	1093:1
2	Absolute reduction			23/4	²⁹⁹ /14		3887/49	3312/25	389376/1225	20631/35	279841/256
20	Max. feed velocity ¹	mm/s		46	13		3.4	2.0	0.8	0.5	0.2
21	Max. feed force (continuous) ¹	N		344	529		822	975	1308	1530	1530
22	Max. feed force (intermittent) ¹	N		840	1291		1530	1530	1530	1530	1530
	Part Numbers				363943		363949	363954	363959	363964	
1	Reduction				23:1		86:1	159:1	411:1	636:1	
2	Absolute reduction				576/25		14976/175	¹⁵⁸⁷ / ₁₀	359424/875	79488/125	
20	Max. feed velocity ¹	mm/s			12		3.1	1.7	0.6	0.4	
21	Max. feed force (continuous) ¹	N			545		846	1038	1424	1530	
	Max. feed force (intermittent) ¹	N			1330		1530	1530	1530	1530	
	Part Numbers				363944		363950	363955	363960	363965	
	Reduction				28:1		103:1	190:1	456:1	706:1	
2	Absolute reduction				138/5		3588/35	12167/64	89401/196	158171/224	
20	Max. feed velocity ¹	mm/s			9.5		1.3	0.7	0.3	0.2	
21	Max. feed force (continuous) ¹	N			582		898	1101	1475	1530	
_22	Max. feed force (intermittent) ¹	N			1420		1530	1530	1530	1530	
	Number of stages		0	1	2	2	3	3	4	4	4
7	Max. efficiency gearhead incl. screw	%	47	38	35	35	33	33	28	28	28
8	Weight ¹	g	304	304	331	331	359	359	387	387	387
9	Average backlash no load	0	0.7	0.7	8.0	0.8	1.0	1.0	1.0	1.0	1.0
23	Mechanical positioning accuracy ¹	mm	0.035	0.035	0.035	0.035	0.037	0.037	0.037	0.037	0.037
10	Mass inertia gearhead incl. screw ¹	gcm ²	42.3	2.4	0.9	0.9	1.0	1.0	1.0	1.0	1.0
11	Gearhead length L1	mm	51.0	51.0	57.7	57.7	64.4	64.4	71.1	71.1	71.1
1 base	ed on screw length 200.8 mm (standard length)	² for reduction 1:1 = 5569 r	pm								





+ Motor	Page	+ Sensor/Brake	Page	Overall ler	igth [mm] :	= Motor len	igth + gear	head lengtl	h + (sensor	/brake) + as	ssembly pa	irts
RE 25	154/156			105.6	105.6	112.3	112.3	119.0	119.0	125.7	125.7	125.7
RE 25	154/156	HED_5540	535/537	126.4	126.4	133.1	133.1	139.8	139.8	146.5	146.5	146.5
RE 25	154/156	DCT 22	542	127.9	127.9	134.6	134.6	141.3	141.3	148.0	148.0	148.0
RE 25, 20 W	155			94.1	94.1	100.8	100.8	107.5	107.5	114.2	114.2	114.2
RE 25, 20 W	155	HED_5540	535/537	114.9	114.9	121.6	121.6	128.3	128.3	135.0	135.0	135.0
RE 25, 20 W	155	DCT 22	542	116.4	116.4	123.1	123.1	129.8	129.8	136.5	136.5	136.5
RE 25, 20 W	155	AB 28	585	128.2	128.2	134.9	134.9	141.6	141.6	148.3	148.3	148.3
RE 25, 20 W	155	HED_5540/AB 28	535/585	145.4	145.4	152.1	152.1	158.8	158.8	165.5	165.5	165.5
RE 25, 20 W	156	AB 28	585	139.7	139.7	146.4	146.4	153.1	153.1	159.8	159.8	159.8
RE 25, 20 W	156	HED_5540/AB 28	535/585	156.9	156.9	163.6	163.6	170.3	170.3	177.0	177.0	177.0
RE 30, 60 W	158			119.1	119.1	125.8	125.8	132.5	132.5	139.2	139.2	139.2
RE 30, 60 W	158	HED_5540	535/537	139.9	139.9	146.6	146.6	153.3	153.3	160.0	160.0	160.0

Screw Drive GP 32 S Ø32 mm, trapezoidal lead screw



Technical Data TR10 x 2, stainless steel Standard length Special length (5 mm steps) Nut (standard) 200.8 mm max. 600 mm thread nut Material bronze Axial play < 0.008 mm Planetary gearhead straight teeth ball bearing/thrust roller bearing rom flange < 0.05 mm Bearing Radial play, 5 mm from flange Axial play
Max. continuous input speed² preloaded 8000 rpm -15...+80°C Recommended temperature range Max. axial load (static)1 2700 N 2 Number of stages Max. radial load, 15 mm from flange 200 N 200 N 350 N 400 N 400 N

M 1:2

Stock program Standard program Special program (on request)

Part Num	bers							
363936	363937	363940	363945	363946	363951	363956	363961	363966
	363938	363941		363947	363952	363957	363962	363967
	363939	363942		363948	363953	363958	363963	363968
		363943		363949	363954	363959	363964	
		363944		363950	363955	363960	363965	

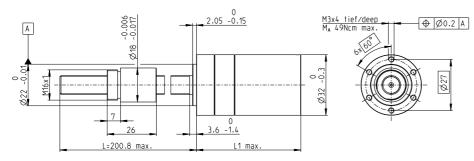






Madulas Custam	-	H-	-									
Modular System + Motor	Page	+ Sensor/Brake	Page	Overall len	ath [mm] :	Motor lend	ath + gearh	ead length	+ (sensor/	brake) + as	sembly pa	rts
RE 35, 90 W	159	. Conson, Drano	. ago	122.1	122.1	128.8	128.8	135.5	135.5	142.2	142.2	142.2
RE 35, 90 W	159	HED_5540	535/537		142.8	149.5	149.5	156.2	156.2	162.9	162.9	162.9
RE 35, 90 W	159	DCT 22	542	140.2	140.2	146.9	146.9	153.6	153.6	160.3	160.3	160.3
RE 35, 90 W	159	AB 28	585	158.2	158.2	164.9	164.9	171.6	171.6	178.3	178.3	178.3
RE 35, 90 W	159	HEDS 5540/AB 28	535/585		175.4	182.1	182.1	188.8	188.8	195.5	195.5	195.5
A-max 26	181-184		000,000	-	95.8	102.5	102.5	109.2	109.2	115.9	115.9	115.9
A-max 26	182-184	13 GAMA	502	-	102.9	109.6	109.6	116.3	116.3	123.0	123.0	123.0
A-max 26	182-184		536	-	110.2	116.9	116.9	123.6	123.6	130.3	130.3	130.3
A-max 26		HED_5540	536/538		114.2	120.9	120.9	127.6	127.6	134.3	134.3	134.3
A-max 32	185			-	114.0	120.7	120.7	127.4	127.4	134.1	134.1	134.1
A-max 32	186			_	112.6	119.3	119.3	126.0	126.0	132.7	132.7	132.7
A-max 32	186	HED_5540	535/537	-	133.4	140.1	140.1	146.8	146.8	153.5	153.5	153.5
EC 32, 80 W	267	HED_5540	535/537	129.5	129.5	136.2	136.2	142.9	142.9	149.6	149.6	149.6
EC 32, 80 W	267	Res 26	543	131.2	131.2	137.9	137.9	144.6	144.6	151.3	151.3	151.3
EC-max 22, 25 W	279			_	99.6	106.3	106.3	113.0	113.0	119.7	119.7	119.7
EC-max 22, 25 W	279	16 EASY/XT/Abs.	505-507	-	109.2	115.9	115.9	122.6	122.6	129.3	129.3	129.3
EC-max 22, 25 W	279	16 EASY Abs. XT	508	_	109.7	116.4	116.4	123.1	123.1	129.8	129.8	129.8
EC-max 22, 25 W	279	AB 20	582	-	135.2	141.9	141.9	148.6	148.6	155.3	155.3	155.3
EC-max 30, 40 W	280			-	93.1	99.8	99.8	106.5	106.5	113.2	113.2	113.2
EC-max 30, 40 W	280	16 EASY/XT/Abs.	505-507	-	104.2	110.9	110.9	117.6	117.6	124.3	124.3	124.3
EC-max 30, 40 W	280	16 EASY Abs. XT	508	-	104.7	111.4	111.4	118.1	118.1	124.8	124.8	124.8
EC-max 30, 40 W	280	HEDL 5540	538	-	113.7	120.4	120.4	127.1	127.1	133.8	133.8	133.8
EC-max 30, 40 W	280	AB 20	582	-	128.7	135.4	135.4	142.1	142.1	148.8	148.8	148.8
EC-max 30, 40 W	280	HEDL 5540/AB 20	538/582	-	149.3	156.0	156.0	162.7	162.7	169.4	169.4	169.4
EC-max 30, 60 W	281			115.1	115.1	121.8	121.8	128.5	128.5	135.2	135.2	135.2
EC-max 30, 60 W	281	16 EASY/XT/Abs.	505-507		126.2	132.9	132.9	139.6	139.6	146.3	146.3	146.3
EC-max 30, 60 W	281	16 EASY Abs. XT	508	126.7	126.7	133.4	133.4	140.1	140.1	146.8	146.8	146.8
EC-max 30, 60 W	281	HEDL 5540	538	135.7	135.7	142.4	142.4	149.1	149.1	155.8	155.8	155.8
EC-max 30, 60 W	281	AB 20	582	150.7	150.7	157.4	157.4	164.1	164.1	170.8	170.8	170.8
EC-max 30, 60 W	281	HEDL 5540/AB 20	539/582		171.3	178.0	178.0	184.7	184.7	191.4	191.4	191.4
EC-4pole 22, 90 W	287			99.7	99.7	106.4	106.4	113.1	113.1	119.8	119.8	119.8
EC-4pole 22, 90 W	287	22 EMT	516	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-4pole 22, 90 W	287	16 EASY/XT/Abs.	505-507	111.9	111.9	118.6	118.6	125.3	125.3	132.0	132.0	132.0
EC-4pole 22, 90 W	287	16 EASY Abs. XT	508	112.4	112.4	119.1	119.1	125.8	125.8	132.5	132.5	132.5
EC-4pole 22, 90 W	287	16 RIO	517	110.4	110.4	117.1	117.1	123.8	123.8	130.5	130.5	130.5
EC-4pole 22, 90 W	287	HEDL	539	121.2	121.2	127.9	127.9	134.6	134.6	141.3	141.3	141.3
EC-4pole 22, 120 W	288	00 51 5	5 40	117.1	117.1	123.8	123.8	130.5	130.5	137.2	137.2	137.2
EC-4pole 22, 120 W	288	22 EMT	516	142.9	142.9	149.6	149.6	156.3	156.3	163.0	163.0	163.0
EC-4pole 22, 120 W	288	16 EASY/XT/Abs.	505-507	129.3	129.3	136.0	136.0	142.7	142.7	149.4	149.4	149.4
EC-4pole 22, 120 W	288	16 EASY Abs. XT	508	129.8	129.8	136.5	136.5	143.2	143.2	149.9	149.9	149.9
EC-4pole 22, 120 W	288	16 RIO	517	127.8	127.8	134.5	134.5	141.2	141.2	147.9	147.9	147.9
EC-4pole 22, 120 W	288	HEDL	539	138.6	138.6	145.3	145.3	152.0	152.0	158.7	158.7	158.7
EC-4pole 30, 100 W	289	16 FACV/VT/Abo	505-507	98.1	98.1	104.8	104.8	111.5	111.5	118.2	118.2	118.2
EC-4pole 30, 100 W	289	16 EASY/XT/Abs.			112.0	118.7	118.7	125.4	125.4	132.1	132.1	132.1
EC-4pole 30, 100 W	289	16 EASY Abs. XT	508	112.5	112.5	119.2	119.2	125.9	125.9	132.6	132.6	132.6
EC-4pole 30, 100 W EC-4pole 30, 100 W	289 289	22 EMT 16 RIO	516 517	126.0 110.5	126.0 110.5	132.7 117.2	132.7 117.2	139.4 123.9	139.4 123.9	146.1 130.6	146.1 130.6	146.1 130.6
EC-4pole 30, 100 W	289	HEDL	539	110.5	110.5	125.4	125.4	132.1	132.1	130.6	130.6	130.6
EC-4pole 30, 100 W	289	AB 20	583	134.3	134.3	141.0	141.0	147.7	132.1	154.4	154.4	154.4
EC-4pole 30, 100 W	289	16 EASY/XT/Abs./AB 20	505/583		148.4	155.1	155.1	161.8	161.8	168.5	168.5	168.5
EC-4pole 30, 100 W EC-4pole 30, 100 W	289	16 EASY Abs. XT/AB 20	505/583		148.4	155.1	155.1	162.3	162.3	169.0	169.0	169.0
EC-4pole 30, 100 W	289	22 EMT/AB 20	516/583		165.5	172.2	172.2	178.9	178.9	185.6	185.6	185.6
EC-4pole 30, 100 W	289	16 RIO/AB 20	517/583	146.9	146.9	153.6	153.6	160.3	160.3	167.0	167.0	167.0
EC-4pole 30, 100 W	289	HEDL/AB 20	539/583		154.9	161.6	161.6	168.3	168.3	175.0	175.0	175.0
LO-TPOIG 50, 100 W	203	TILDLIAD 20	000/000	104.3	104.9	101.0	101.0	100.0	100.0	110.0	175.0	11 0.0

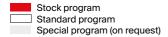
Screw Drive GP 32 S Ø32 mm, trapezoidal lead screw



Technical Data					
Screw		TR10 x	2, sta	inless s	steel
Standard length				200.8	mm
Special length (5 m	ım step	s)	ma	ax. 600	mm
Nut (standard)				threac	l nut
Material				bro	onze
Axial play			<	< 0.008	mm
Planetary gearhead				raight te	
Bearing	ball be	aring/th	rust ro	ller bea	iring
Radial play, 5 mm f	rom flar	nge		< 0.05	mm
Axial play				preloa	ided
Max. continuous in	put spe	ed ²		8000	
Recommended temp	erature	range		-15+8	30°C
Max. axial load (station	c) ¹			270	00 N
Number of stages	0	1	2	3	4
Max. radial load.					

M 1:2

15 mm from flange 200 N 200 N 350 N 400 N 400 N



Part Num	Part Numbers									
363936	363937	363940	363945	363946	363951	363956	363961	363966		
	363938	363941		363947	363952	363957	363962	363967		
	363939	363942		363948	363953	363958	363963	363968		
		363943		363949	363954	363959	363964			
		363944		363950	363955	363960	363965			



overall len	gth	overall len	gth									
Modular System												
+ Motor	Page	+ Sensor/Brake	Page	Overall leng	th [mm] =	Motor leng	gth + gearh	ead length	+ (sensor/	brake) + as	sembly pai	ts
EC-4pole 30, 200 W	291			115.1	115.1	121.8	121.8	128.5	128.5	135.2	135.2	135.2
EC-4pole 30, 200 W	291	16 EASY/XT/Abs.	505-507		129.0	135.7	135.7	142.4	142.4	149.1	149.1	149.1
EC-4pole 30, 200 W	291	16 EASY Abs. XT	508	129.5	129.5	136.2	136.2	142.9	142.9	149.6	149.6	149.6
EC-4pole 30, 200 W	291	22 EMT	516	143.0	143.0	149.7	149.7	156.4	156.4	163.1	163.1	163.1
EC-4pole 30, 200 W	291	16 RIO	517	127.5	127.5	134.2	134.2	140.9	140.9	147.6	147.6	147.6
EC-4pole 30, 200 W	291	HEDL	539	135.7	135.7	142.4	142.4	149.1	149.1	155.8	155.8	155.8
EC-4pole 30, 200 W	291	AB 20	583	151.3	151.3	158.0	158.0	164.7	164.7	171.4	171.4	171.4
EC-4pole 30, 200 W	291	16 EASY/XT/Abs./AB 20	505/583		165.4	172.1	172.1	178.8	178.8	185.5	185.5	185.5
EC-4pole 30, 200 W	291	16 EASY Abs. XT/AB 20	508/583	165.9	165.9	172.6	172.6	179.3	179.3	186.0	186.0	186.0
EC-4pole 30, 200 W	291	22 EMT/AB 20	516/583		182.5	189.2	189.2	195.9	195.9	202.6	202.6	202.6
EC-4pole 30, 200 W	291	16 RIO/AB 20	508/583		163.9	170.6	170.6	177.3	177.3	184.0	184.0	184.0
EC-4pole 30, 200 W	291	HEDL/AB 20	539/583		171.9	178.6	178.6	185.3	185.3	192.0	192.0	192.0
EC-i 30, 30 W	298	TIEDE/AD 20	000,000	93.3	93.3	100.0	100.0	106.7	106.7	113.4	113.4	113.4
EC-i 30, 30 W	298	22 EMT	516	121.3	121.3	128.0	128.0	134.7	134.7	141.4	141.4	141.4
EC-i 30, 30 W	298	16 EASY/Abs.	505-507	105.0	105.0	111.7	111.7	118.4	118.4	125.1	125.1	125.1
EC-i 30, 30 W	298	16 RIO	517	103.5	103.5	110.2	110.2	116.9	116.9	123.6	123.6	123.6
EC-i 30, 30 W	298	HEDL	537	114.0	114.0	120.7	120.7	127.4	127.4	134.1	134.1	134.1
EC-i 30, 45 W	299	11202	001	93.3	93.3	100.0	100.0	106.7	106.7	113.4	113.4	113.4
EC-i 30, 45 W	299	22 EMT	516	121.3	121.3	128.0	128.0	134.7	134.7	141.4	141.4	141.4
EC-i 30, 45 W	299	16 EASY/Abs.	505-507		105.0	111.7	111.7	118.4	118.4	125.1	125.1	125.1
EC-i 30, 45 W	299	16 RIO	517	103.5	103.5	110.2	110.2	116.9	116.9	123.6	123.6	123.6
EC-i 30, 45 W	299	HEDL	537	114.0	114.0	120.7	120.7	127.4	127.4	134.1	134.1	134.1
EC-i 30, 50 W	300	TIEDE	001	115.3	115.3	122.0	122.0	128.7	128.7	135.4	135.4	135.4
EC-i 30, 50 W	300	22 EMT	516	143.3	143.3	150.0	150.0	156.7	156.7	163.4	163.4	163.4
EC-i 30, 50 W	300	16 EASY/Abs.	505-507	127.0	127.0	133.7	133.7	140.4	140.4	147.1	147.1	147.1
EC-i 30, 50 W	300	16 RIO	517	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-i 30, 50 W	300	HEDL	537	136.0	136.0	142.7	142.7	149.4	149.4	156.1	156.1	156.1
EC-i 30, 75 W	301			115.3	115.3	122.0	122.0	128.7	128.7	135.4	135.4	135.4
EC-i 30, 75 W	301	22 EMT	516	143.3	143.3	150.0	150.0	156.7	156.7	163.4	163.4	163.4
EC-i 30, 75 W	301	16 EASY/Abs.	505-507		127.0	133.7	133.7	140.4	140.4	147.1	147.1	147.1
EC-i 30, 75 W	301	16 RIO	517	125.5	125.5	132.2	132.2	138.9	138.9	145.6	145.6	145.6
EC-i 30, 75 W	301	HEDL	537	136.0	136.0	142.7	142.7	149.4	149.4	156.1	156.1	156.1
EC-i 40, 50 W	302			82.7	82.7	89.4	89.4	96.1	96.1	102.8	102.8	102.8
EC-i 40, 50 W	302	22 EMT	516	110.7	110.7	117.4	117.4	124.1	124.1	130.8	130.8	130.8
EC-i 40, 50 W	302	TSX 40 MAG/RIO	524-525	94.4	82.7	89.4	89.4	96.1	96.1	102.8	102.8	102.8
EC-i 40, 50 W	302	16 EASY/Abs.	505-507		94.4	101.1	101.1	107.8	107.8	114.5	114.5	114.5
EC-i 40, 50 W	302	16 RIO	517	97.2	97.2	103.9	103.9	110.6	110.6	117.3	117.3	117.3
EC-i 40, 50 W	302	HEDL	537	105.7	105.7	112.4	112.4	119.1	119.1	125.8	125.8	125.8
EC-i 40, 70 W	304	TIEDE	001	92.7	92.7	99.4	99.4	106.1	106.1	112.8	112.8	112.8
EC-i 40, 70 W	304	22 EMT	516	120.7	120.7	127.4	127.4	134.1	134.1	140.8	140.8	140.8
EC-i 40. 70 W	304	TSX 40 MAG/RIO	524-525	104.4	104.4	111.1	111.1	117.8	117.8	124.5	124.5	124.5
EC-i 40, 70 W	304	16 EASY/Abs.	505-507		104.4	111.1	111.1	117.8	117.8	124.5	124.5	124.5
EC-i 40, 70 W	304	16 RIO	517	107.2	107.2	113.9	113.9	120.6	120.6	127.3	127.3	127.3
EC-i 40, 70 W	304	HEDL	537	115.7	115.7	122.4	122.4	129.1	129.1	135.8	135.8	135.8
	00 T		301	110.7	110.1	166.7	122.7	120.1	120.1	100.0	100.0	100.0

Screw Drive Options

to GP8S Option to GP 6 S Without specification, the screw is supplied in the standard Without specification, the screw is supplied in the standard Special length length 45 mm. Special lengths can be ordered in 5 mm steps length 56 mm. Special lengths can be ordered in 5 mm steps Reference FLEX-GEAR-SPIN02/03 up to the stated maximum length. up to the stated maximum length. FLEX-GEAR-SPIN04/05 Configurable length Configurable length Screw end Reference FLEX-GEAR-SPIN06 In order to support the end of the screw by an additional bearing, it can be delivered according to the illustration. Customer specific screw ends on request. 2.5 2 Flange nut Reference FLEX-GEAR-SPIN08 Flange nut instead of the standard thread nut. Low backlash ball screw nut Not available for GP 8 S. Not available for GP 6 S. Reference FLEX-GEAR-SPIN09 Ansicht ohne Mutter / view without nut Ansicht ohne Mutter / view without nut 2xØ1.8 Rectangular mounting flange Reference FLEX-GEAR-SPIN10 Screw drive with rectangular mounting flange allows mounting from the gearhead side.

Screw Drive Options

to GP 22 S Option to GP 16 S Without specification, the screw is supplied in the standard Without specification, the screw is supplied in the standard Special length length 102 mm. Special lengths can be ordered in 5 mm steps length 151 mm. Special lengths can be ordered in 5 mm steps Reference FLEX-GEAR-SPIN02/03 up to the stated maximum length. up to the stated maximum length. FLEX-GEAR-SPIN04/05 Configurable length Configurable length Screw end Reference FLEX-GEAR-SPIN06 In order to support the end of the screw by an additional bearing, it can be delivered according to the illustration. Customer specific screw ends on request. 18 *1 60° 4 x Ø2.9 4 x Ø3.4 Flange nut Reference FLEX-GEAR-SPIN08 Flange nut instead of the standard thread nut. 010 -0.015 *1 010 -0.030 012 -0.017 If using a ball screw, the rectangular mounting flange (FLEX-GEAR-SPIN10) must be used. Ø18 *1 Kugelumlaufspindel / Ball screw *2 Metrische Spindel / Metric lead screw Axial play is almost eliminated through increased preloading Low backlash ball screw nut Not available for GP 16 S. of the ball screw nut. Although, the increased load can lead to Reference FLEX-GEAR-SPIN09 greater wear. Ansicht ohne Mutter / Rectangular mounting flange Reference FLEX-GEAR-SPIN10 Screw drive with rectangular mounting flange allows mounting from the On request. gearhead side. If using a ball screw with flange nut,

the rectangular assembly flange

must be used for mounting.

□30

Screw Drive Options

Option

to GP 32 S

Special length Reference FLEX-GEAR-SPIN02/03

Without specification, the screw is supplied in the standard length 200.8 mm. Special lengths can be ordered in $5\,\mbox{mm}$ steps up to the stated maximum length.

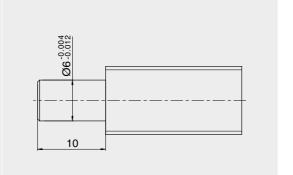
FLEX-GEAR-SPIN04/05

Configurable length

Screw end Reference FLEX-GEAR-SPIN06

In order to support the end of the screw by an additional bearing, it can be delivered according to the

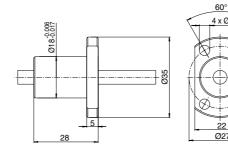
Customer specific screw ends on request.



Flange nut Reference FLEX-GEAR-SPIN08

Flange nut instead of the standard thread nut.

If using a ball screw, the rectangular mounting flange (FLEX-GEAR-SPIN10) must be used.



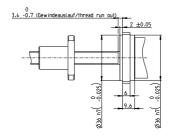
Low backlash ball screw nut Reference FLEX-GEAR-SPIN09

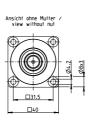
Axial play is almost eliminated through increased preloading of the ball screw nut. Although, the increased load can lead to greater wear.

Rectangular mounting flange Reference FLEX-GEAR-SPIN10

Screw drive with rectangular mounting flange allows mounting from the gearhead side.

If using a ball screw with flange nut, the rectangular assembly flange must be used for mounting.





-		

For your personal notes

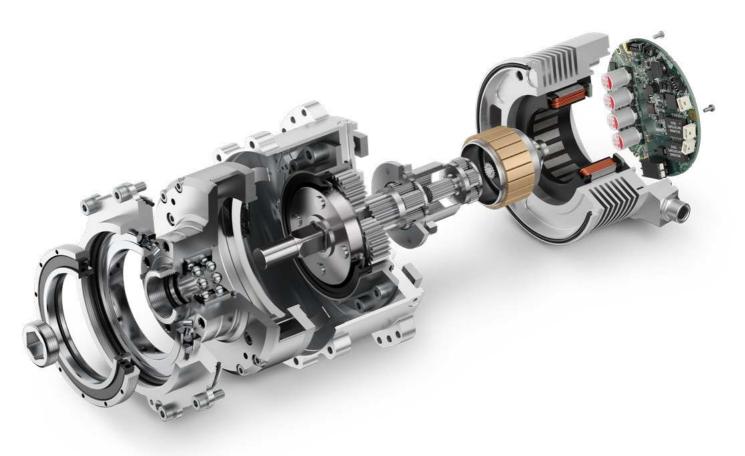
sensol

Inductive, magnetic, and optical encoders, DC tachos and resolvers

Standard Specification No. 103	89
ENX Program	494-517
TSX Program	520-525
sensor Program	528-543

We can change the game

Customized drive system





maxon ENX

Standard Specification No. 103	89
Inductive encoders	494-495
ENX 22 MILE 1024 CPT, 2 channel	494
ENX 32 MILE 2048 CPT, 2 channel	495
ENX 42 MILE 2048 CPT, 2 channel NEW	496
Magnetic encoders	497-516
ENX 4 MAG 1-256 CPT, 3 channel	497
ENX 6 MAG 1-256 CPT, 3 channel	498
ENX 8 MAG 1-256 CPT, 3 channel	499
ENX 10 MAG INT 1-256 CPT, 3 channel NEW	500
ENX 10 GAMA 12 CPT, 2 channel	501
ENX 13 GAMA 16 CPT, 2 channel	502
ENX 10 EASY/QUAD 1-1024 CPT, 3/2 channel	503
ENX 10 EASY XT 1-1024 CPT, 3 channel	504
ENX 16 EASY 1-1024 CPT, 3 channel	505
ENX 16 EASY XT 1-1024 CPT, 3 channel	506
ENX 16 EASY Absolute 4096 steps per turn	507
ENX 16 EASY Absolute XT 4096 steps per turn	508
ENX 8 EASY INT 1-1024 CPT, 3 channel	509
ENX 8 EASY INT Absolute 4096 steps per turn	510
ENX 13 EASY INT 1-1024 CPT, 4096 steps per turn	511
ENX 16 EASY INT 1-1024 CPT, 4096 steps per turn	512
ENX 19 EASY INT 1-1024 CPT, 4096 steps per turn	513
ENX 22 EASY INT 1-1024 CPT, 4096 steps per turn	514-515
ENX 22 EMT 65 536 turns, Multi Turn	516
Optical Encoder	517
ENX 16 RIO 512-65 536 CPT, 3 channel	517



maxon ENX encoders make an impression with their robust design and high signal quality. The 3-channel encoders with differential signals guarantee interference-free function even under the very high load, and the optical RIO encoder delivers the highest resolution in a small space. maxon ENX encoders can be configured online and are ready for delivery within 11 working days.

© 2024 maxon. All rights reserved.

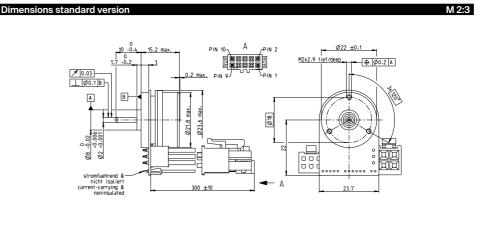


Key data	ENX 22 MILE incremental	
Number of channels	2	
Max. counts per turn	1024	
Encoder length L	mm 1.2	
Ambient temperature	°C -40+100	
Weight	g 10 g	

Selection criteria	ENX 22 MILE incremental	
Speed and rotation direction detection		·
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		
■ suitable ▲ suitable to a limited extent ● r	ot suitable	

Specifications		ENX 22 MILE incremental	
Supply voltage V _{cc}	V	5V ± 10%	
Typical current draw	mA	15	
Max. operating frequency	kHz	1000	
Max. speed	rpm	14000	
Connector		10-pin 2.54 mm multipoint connector (IEC/EN 60603-I3 / DIN41651) Pin 1 not connected Pin 2 V _{CC} Pin 3 GND Pin 4 not connected Pin 5 channel Ā Pin 6 channel Ā Pin 7 channel B Pin 8 channel B Pin 9 not connected Pin 10 not connected	1 9 2 10

modular system	Page [
EC FLAT	
ECX FLAT 22 S	253
ECX FLAT 22 S High Torque	254
ECX FLAT 22 L	255



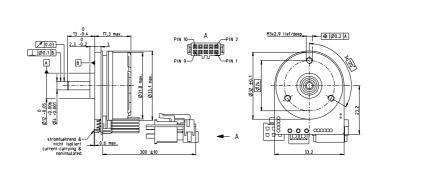


Key data		ENX 32 MILE incremental
Number of channels		2
Max. counts per turn		2048
Encoder length L	mm	1.1
Ambient temperature	°C	-40+100
Weight	g	10

Selection criteria	ENX 32 MILE incremental	
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		
suitable A suitable to a limited extent	act suitable	

Specifications	ENX 32 MILE incremental	
Supply voltage V _{cc}	V 5V ± 10%	
Typical current draw	mA 15	
Max. operating frequency	kHz 1000	
Max. speed	rpm 10 000	
Connector	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 not connected Pin 2 V _{CC} Pin 3 GND Pin 4 not connected Pin 5 channel Ā Pin 6 channel A Pin 7 channel B Pin 8 channel B Pin 9 not connected Pin 10 not connected	1 9 2 10

modular system	Page Dimensi	ons standard version
EC motor		
ECX FLAT 32 S	256	
ECX FLAT 32 S High Torque	257	
ECX FLAT 32 L High Torque	258	9
		7 0.03 23 -0.2 2.3 -0.2
		A B
		
		80.00
		- 212
		4 S
		stromfuehrend &
		current-carrying & noninsulated





M 1:2



Key data		ENX 42 MILE	incremental	
Number of channels		2		
Max. counts per turn		2048		
Encoder length L	mm	1.1		
Ambient temperature	°C	-40+100		
Weight	g	10		

Selection criteria	ENX 42 MILE incremental	
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		
Cost effective	-	
■ suitable 🔺 suitable to a limited extent •	not suitable	

Specifications	ENX 42 MILE	ncremental	
Supply voltage V _{cc}	V 5V ± 10%		
Typical current draw	mA 15		
Max. operating frequency	kHz 1000		
Max. speed	rpm 10 000		
Connector	10-pin 2.54 mm (IEC/EN 60603 Pin 1 not co Pin 2 V _{cc} Pin 3 GND Pin 4 not co Pin 5 chann Pin 6 chann Pin 7 chann Pin 8 chann Pin 9 not co Pin 10 not co	nnected Innected Innected Innected Innected Innected	1 9 2 10

modular system	Page Dime	nsions standard version	
EC motor	rage Diffic	isions standard version	_
ECX FLAT 42 S	259		
ECX FLAT 42 S High Torque	260		
ECX FLAT 42 M High Torque	261	0 22.3 max. 63x2.9 tiet/deco 6 00.2 A	
		1.75 - 0.2 A	
		PH 10 PH 10 PH 1 PH 10 PH 1 PH 10 PH	26.15



Key data		ENX 4 MAG incremental, commutation signal	
Number of channels		3	
Max. counts per turn		256	
Additional length at motor	mm	2.7	
Ambient temperature	°C	-40100	
Weight	g	1	

Selection criteria	ENX 4 MAG incremental, commutation signal
Speed and rotation direction detection	
Speed and position control	
Compact and robust design	
High resolution	
Cost effective	
suitable A suitable to a limited extent	not suitable

Specifications ENX 4 MAG incremental, commutation signal	
Supply voltage V _{cc} V 3.03.6	
Typical current draw mA 13	
Max. operating frequency kHz 500	
Max. Speed rpm 100 000	
Connection ³ FPC, 12 pole, pitch 0.5 mm Pin 1 W1 Pin 2 W2 Pin 3 W3 Pin 4 GND Pin 5 V _{CC} Pin 6 channel A Pin 7 channel B Pin 8 channel I Pin 9 H1 Pin 10 H2 Pin 11 H3 Pin 12 do not connect ¹ Output signal: CMOS compatible Output current per channel: ±4 mA	

Configuration	ENX 4 MAG incremental, commutation signal	
Counts per turn ²	1256	

modular system	Page Dimensio	ns standard version	M 1:1 Notes
EC motor ECX SPEED 4 M ECX SPEED 4 L	191 192	6.25 50 ±1 50 9H 70 9H 7	 Applying voltage to these pins may destroy the encoder. maxon controllers require a resolution of at least 16 counts per turn. H1, index and angle zero are aligned with angle commutation zero (see p. 64). Compatible connector: Molex 52745-1297, TE 1-1734839-2 Adapter 498157 required for all maxon controllers Please note: max. continuous current 0.5 A
			Further technical details can be found in the product information in the online shop under Downloads.

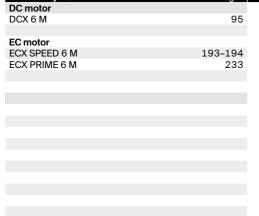


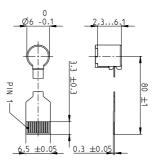
Key data	ENX 6 MAG incremental	ENX 6 MAG incremental, commutation signal
Number of channels	3	3
Max. counts per turn	256	256
Additional length at motor ⁴	mm 6.2	0.02.1
Ambient temperature	°C -40100	-40100
Weight	g 1	1

	_
▲	▲
	<u> </u>

Specifications	ENX 6 MAG incremental	ENX 6 MAG incremental, commutation signal
Supply voltage V _{cc}	V 3.03.6	3.03.6
Typical current draw	mA 13	13
Max. operating frequency	kHz 500	500
Max. Speed	rpm 100 000	100 000
Connection ³	FPC, 12 pole, pitch 0.5 mm Pin 1 Motor+ Pin 2 Motor- Pin 3 not connected Pin 4 GND Pin 5 V _{cc} Pin 6 channel A Pin 7 channel B Pin 8 channel I Pin 9-12 do not connect¹ Output signal: CMOS compatible Output current per channel: ±4 mA	FPC, 12 pole, pitch 0.5 mm Pin 1 W1 Pin 2 W2 Pin 3 W3 Pin 4 GND Pin 5 V _{cc} Pin 6 channel A Pin 7 channel B Pin 8 channel I Pin 9 H1 Pin 10 H2 Pin 11 H3 Pin 12 do not connect¹ Output signal: CMOS compatible Output current per channel: ±4 mA
Configuration	ENX 6 MAG incremental	ENX 6 MAG incremental, commutation signal
Counts per turn ²	1256	1256

modular system	Page	Dimensions standard version	M 1:1	Notes
DC motor				¹ Applying voltage to these pins may destroy the
DCX 6 M	95			encoder.
				² maxon controllers require a resolution of at least
EC motor		0 0 1	2.3 4.1	16 counts per turn.





- ³ H1, index and angle zero are aligned with angle commutation zero (see p. 64).
- ⁴ The additional length or total length of a motorencoder combination can be found on the respective dimensional drawing.

Compatible connector:

Molex 52745-1297, TE 1-1734839-2

Adapter 498157 required for all maxon controllers

Please note: max. continuous current 0.5 A

Further technical details can be found in the product information in the online shop under Downloads.



Key Data	ENX 8 MAG incremental	ENX 8 MAG incremental, commutation signal
Number of channels	3	3
Max. counts per turn	256	256
Additional length at motor	mm 7.0	1.0
Ambient temperature	°C -40100	-40100
Weight	g 1	1

Selection criteria	ENX 8 MAG incremental	ENX 8 MAG incremental, commutation signal
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		▲
Cost effective		
■ suitable suitable to a limited extent ●	not suitable	

Specifications Supply voltage V _{cc} Typical current draw Max. operating frequency Max. Speed Connection ³	V 3.03.6 mA 13 kHz 500 rpm 100 000 FPC, 12 pole, pitch 0.5 mm Pin 1 Motor+ Pin 2 Motor- Pin 3 not connected Pin 4 GND Pin 5 V _{cc} Pin 6 channel A Pin 7 channel B Pin 8 channel I Pin 9-12 do not connect ¹ Output signal: CMOS compatible Output current per channel: ±4 mA	ENX 8 MAG incremental, commutation signal 3.03.6 13 500 100 000 FPC, 12 pole, pitch 0.5 mm Pin 1 W1 Pin 2 W2 Pin 3 W3 Pin 4 GND Pin 5 V _{CC} Pin 6 channel A Pin 7 channel B Pin 8 channel I Pin 9 H1 Pin 10 H2 Pin 11 H3 Pin 12 do not connect¹ Output signal: CMOS compatible Output current per channel: ±4 mA
Configuration Counts per turn ²	ENX 8 MAG incremental 1256	ENX 8 MAG incremental, commutation signal 1256

modular system	Page Dime	ensions standard version	M 1:1 Notes
DC motor DCX 8 M	96	0	¹ Applying voltage to these pins may destroy the
DCX 8 IVI	90	Ø8 -Ŏ.15.8	encoder. ² maxon controllers require a resolution of at least
EC motor			16 counts per turn.
ECX SPEED 8 M	195-196		³ H1, index and angle zero are aligned with angle commutation zero (see p. 64).
			Compatible connector:
		I I	Molex 52745-1297, TE 1-1734839-2
		3 ± 80 ±	Adapter 498157 required for all maxon controllers
		0.3	Please note: max. continuous current 0.5 A
		6.5 ±0.050.3 ±0.09	Eurther technical details can be found in the product information in the online shop under Downloads.





Key data		ENX 10 MAG INT incremental, commutation signal
Number of channels		3
Max. counts per turn		256
Additional length at motor	mm	0 (integrated into motor)
Ambient temperature	℃	-40100
Weight	g	2

Selection criteria	ENX 10 MAG INT incremental, commutation signal
Speed and rotation direction detection	
Speed and position control	
Compact and robust design	
High resolution	
Cost effective	
■ suitable	not suitable

Specifications	ENX 10 MAG INT incremental, commutation signal	
Supply voltage V _{cc}	V 3.36.0	
Typical current draw	mA 13	
Max. operating frequency	kHz 500	
Max. Speed	rpm 100 000	
Connection ³	FPC	
	Pin 1 W1	
	Pin 2 W2	
	Pin 3 W3	
	Pin 4 GND	
	Pin 5 V _{CC}	
	Pin 6 channel A	
	Pin 7 channel B	
	Pin 8 channel I	
	Pin 9 H1	
	Pin 10 H2	
	Pin 11 H3	
	Pin 12 do not connect ¹	
	Output signal: CMOS compatible	
	Output current per channel: ±4 mA	

Configuration	ENX 10 MAG INT incremental, commutation signal	
Counts per turn ²	1256	

modular system EC motor ECX SPEED 10 M	Page Dimer	sions standard version (5.5) 12.5 ±0.1 0.3	(4.25) (8.60) (8.60) (9.60) (9.60) (9.60) (9.60)	¹ Notes ¹ Applying voltage to these pins may destroy the encoder. ² maxon controllers require a resolution of at least 16 counts per turn. ³ H1, index and angle zero are aligned with angle commutation zero (see p. 64). Maximum permissible continuous current in the flexprint cables to W1, W2, W3: 24-pole, 0.5 mm pitch, e.g., Molex 52207-2460 Adapter from flexprint cable to screw terminal, part no.: 804420
				Further technical details can be found in the product information in the online shop under Downloads.



Key data		GAMA incremental	
Number of channels		2	
Counts per turn ¹		12	
Encoder length L ²	mm	8.0	
Ambient temperature	°C	-20105	
Weight	g	<5	

Selection criteria	GAMA incremental	
Speed and rotation direction detection		
Speed and position control	▲	
Compact and robust design		
High resolution	▲	
Cost effective		
■ suitable ▲ suitable to a limited extent ●	not suitable	

Specifications	GAMA incremental	GAMA Radiation resistance
Supply voltage V _{cc}	V 5 ± 0.5	
ypical current draw	mA 9.5	The GAMA encoder type is resistant
Max. operating frequency	kHz 24	to ionizing radiation
Max. Speed	rpm 60 000	
Connector	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 Motor + Pin 2 V _{cc} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor - Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 10 not connected Output signal: TTL compatible, push-pull Output current per channel: ± 10 mA	Tested with a Co60 radiation source (gamma radiation) at up to 18 krad/h and a maximum radiation dose (TID) of 500 krad.

Configurations	GAMA incremental	
Connector	6-pin, 10-pin	
Cable length	mm 50, 100, 150, 200, 300, 500	

maxon modular system	Page Dimen	sions standard version M	/ 1:1 Notes
DC motor			¹ maxon controllers require a resolution of at
RE 10, 0.75 W	130		least 16 counts per turn.
RE 10, 1.5 W	132		² The length shown here refers only
		PIN 2— PIN 1	
			mounted on a motor, or the effective length of a
			motor/encoder combination, can be found on
	010		the respective dimensional drawing.
	<u> </u>		
			Maximum permissible cable/plug continuous
			current: 1.2 A.
	-	PIN 10	
			Ordering information: For motors that cannot
		150 ±10	be configured online, use the part number 714457
			when ordering the ENX 10 GAMA.
			Further technical details can be found in the product
			information in the online shop under Downloads.



Key data		GAMA incremental	
Number of channels	2	2	
Counts per turn	1	16	
Encoder length L1	mm 7	7.09.0	
Ambient temperature	°C -	-20105	
Weight	g ·	<5	

Selection criteria	GAMA incremental	
Speed and rotation direction detection		
Speed and position control	▲	
Compact and robust design		
High resolution	▲	
Cost effective		

Specifications	G	GAMA incremental	GAMA Radiation resistance
Supply voltage V _{cc}	V 5	5 ± 0.5	
Typical current draw	mA 9.	0.5	The GAMA encoder type is resistant
Max. operating frequency	kHz 2	24	to ionizing radiation
Max. Speed	rpm 6	0000	
Connector	(III P P P P P P P	O-pin 2.54 mm multipoint connector IEC/EN 60603-13 / DIN41651) Pin 1 Motor + Pin 2 V _{cc} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor - Pin 7 not connected Pin 9 not connected Pin 9 not connected Pin 10 not connected	Tested with a Co60 radiation source (gamma radiation) at up to 18 krad/h and a maximum radiation dose (TID) of 500 krad.

Pin 1 Motor + maximum radiation dose (TID) of 500 kra Pin 2 V _{CC} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor – Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 9 not connected Pin 10 not connected Output signal: TTL compatible, push-pull	Specifications	GAMA incremental	GAMA Radiation resistance
Max. operating frequency Max. Speed Connector Tested with a Co60 radiation source (IEC/EN 60603-13 / DIN41651) Pin 1 Motor + Pin 2 V _{cc} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor - Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 9 not connected Pin 10 not connected Pin 10 not connected Output signal: TTL compatible, push-pull	Supply voltage V _{cc}	V 5 ± 0.5	
Max. operating frequency Max. Speed Connector 10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 Motor + Pin 2 V _{CC} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor - Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 9 not connected Pin 10 not connected Pin 10 not connected Output signal: TTL compatible, push-pull	Typical current draw	mA 9.5	
Connector 10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 Motor + Pin 2 V _{CC} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor - Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 10 not connected Pin 10 not connected Pin 10 not connected Output signal: TTL compatible, push-pull	Max. operating frequency	kHz 24	to ionizing radiation
(IEC/EN 60603-13 / DIN41651) (gamma radiation) at up to 18 krad/h and Pin 1 Motor + maximum radiation dose (TID) of 500 kra Pin 2 V _{CC} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor - Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 10 not connected Output signal: TTL compatible, push-pull	Max. Speed	rpm 60 000	
Output current per channel: ± 10 mA	Connector	(IEC/EN 60603-13 / DIN41651) Pin 1 Motor + Pin 2 V _{CC} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 Motor - Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 10 not connected	(gamma radiation) at up to 18 krad/h and a maximum radiation dose (TID) of 500 krad.

Configurations	GAMA incremental	
Connector	6-pin, 10-pin	
Cable length	mm 50, 100, 150, 200, 300, 500	

maxon modular system DC motor DC-max 16 S DC-max 22 S DC-max 26 S RE 13 RE 16 A-max 16 A-max 19 A-max 22 A-max 26	Page 119-120 121-122 123-124 133-148 149-153 169-172 173-176 177-180 181-184	Pin 2 79 Pin 10 150 ±10	—Pin 1	Notes ¹ The length shown here refers only to the encoder. The additional length when mounted on a motor, or the effective length of a motor/encoder combination can be found on the respective dimensional drawing Maximum permissible cable/plug continuous current 1.2 A. Ordering information: For motors that cannot be configured online, use the part number 714445 when ordering the ENX 13 GAMA.
				Further technical details can be found in the product information in the online shop under Downloads.



Key data		EASY incremental Differential	QI	UAD incremental
Number of channels	;	3	2	
Max. counts per turn		1024	1	
Encoder length L⁴	mm	8.5	9.0	0
Ambient temperature	°C -	-40+100	-4	0+100
Weight	g	<5	<5	5

Selection criteria	EASY incremental differential	QUAD incremental	
Speed and rotation direction detection			
Speed and position control		•	
Compact and robust design			
High resolution		•	
Cost effective			
■ suitable ▲ suitable to a limited extent ●	not suitable		

Specifications	EASY incremental differential	QUAD incremental
Supply voltage Vcc	V 5 ±0.5	3.0-24
Typical current draw	mA 22	5.5
Max. operating frequency	kHz 1600	2
Max. Speed	rpm 30000	30000
Connector	10-pin 1.27 mm multipoint connector e.g. Samtec FFSD series Pin 1 do not connect¹ (BiSS-C Data) Pin 2 V _{CC} Pin 3 GND Pin 4 do not connect¹ (BiSS-C CLK) Pin 5 channel Ā Pin 6 channel A Pin 7 channel B Pin 8 channel B Pin 9 channel I Pin 10 channel I Output signal: EIA-Standard RS 422 Output current per channel: ± 20 mA	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 not connected Pin 2 V _{CC} Pin 3 channel A Pin 4 channel B Pin 5 GND Pin 6 not connected Pin 7 not connected Pin 7 not connected Pin 8 not connected Pin 9 not connected Pin 10 not connected

Configuration	EASY incremental differential	QUAD incremental
Counts per turn ²	11024	1
Electrical connection	Flat band cable / flexible cable FFC ³	Connector 6-pin, 10-pin
Cable length mm	50, 100, 150, 200, 300, 500, 1000 / FFC3: 138 mm	50, 100, 150, 200, 300, 500, 1000
Alignment of cable outlet in relation to motor flange °	15	15

modular syster	m		Page	Dimensions standard configuration	M 1:1 Notes
DC motor DCX 16 S DCX 16 L DCX 19 S DCX 22 S DCX 22 L DCX 26 L DCX 32 L DCX 35 L DC-max 16 S DC-max 26 S	103-104 105-106 107-108 109-110 111-112 113-114 115 116 119 121 123-124	EC motor ECX PRIME 16 L	234-235	8.5/9	 Applying voltage to these pins can destroy the encoder. maxon controllers require a resolution of at least 16 counts per turn. FFC cable: 0.5 mm pitch, possible matching connector Molex 52745-1097; adapter 506579 required for maxon controllers. For attachment to DCX motors: plus 2-4 mm thick intermediate plate.
					Further technical details can be found in the producinformation in the online shop under Downloads.



Key data		EASY incremental single-ended
Number of channels		3
Max. counts per turn		1024
Encoder length L ²	mm	8.5
Ambient temperature	°C	-55+125
Weight	g	<5

Selection criteria	EASY incremental single-ended	
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		
Cost effective	<u> </u>	

Specifications	EASY incremental single-ended
Supply voltage V _{cc} V	V 5±0.5
Typical current draw mA	A 22
Max. operating frequency kHz	z 1600
Max. Speed rpm	n 30000
Connector	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 not connected Pin 2 V _{cc} Pin 3 GND Pin 4 not connected Pin 5 not connected Pin 6 channel A Pin 7 not connected Pin 8 channel B Pin 9 not connected Pin 10 channel I Output signal: TTL compatible Output current per channel: + 10 mA

Configuration		EASY incremental single-ended	
Counts per turn ¹		11024	
Cable length	mm	300	
Alignment of cable outlet in	relation to motor flange °	15	

modular syste	em	Page	Dimensions standard configuration	M 1:1 Notes
DC motor		EC motor		¹ maxon controllers require a resolution of at least
DCX 10 S	97	ECX PRIME 16 L 234-235		16 counts per turn.
DCX 10 L	98			² For attachment to DCX motors: plus 2-4 mm thick
DCX 12 S	99		_ 8.5 _	intermediate plate.
DCX 12 L	100			into integrate plate.
DCX 14 L	101-102			
DCX 16 S	103-104			
DCX 16 L	105-106			
DCX 19 S	107-108			
DCX 22 S	109-110		I_{μ}	
DCX 22 L	111-112			
DCX 26 L	113-114			
DCX 32 L	115			
DCX 35 L	116			
DOX 33 L	110			
				Further technical details can be found in the product
				information in the online shop under Downloads.
				information in the origine shop under bownloads.





Key data	EASY incremental differential	
Number of channels	3	
Max. counts per turn	1024	
Encoder length L ²	mm 8.5	
Ambient temperature	°C -40+100	
Weight	g 7	

Selection criteria	EASY incremental differential	
Speed and rotation direction detection	· •	
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		
■ suitable ▲ suitable to a limited extent ● not	suitable	

Specifications		EASY incremental differential	
Supply voltage V _{CC}	V	5 ±0.5	
Typical current draw	mΑ	22	
Max. operating frequency	kHz	1600	
Max. Speed	rpm	30 000	
Connector		10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 not connected Pin 2 $V_{\rm cc}$ Pin 3 GND Pin 4 not connected Pin 5 channel $\overline{\rm A}$ Pin 6 channel $\overline{\rm A}$ Pin 7 channel $\overline{\rm B}$ Pin 8 channel $\overline{\rm B}$ Pin 9 channel $\overline{\rm I}$ Pin 10 channel I Output signal: EIA-Standard RS 422 Output current per channel: ± 20 mA	1 9 2 10

Variants		For configurable units	Non-configurable units					
Part Number		depends on configuration	499356	499357	499358	499359	499360	499361
Counts per turn ¹		11024	128	256	500	512	1000	1024
Cable length	mm	50, 100, 150, 200, 300, 500, 1000	300	300	300	300	300	300
Alignment of cable outlet in relation	on to motor flange °	15 (pitch)	0	0	0	0	0	0

modular syste		Page	Dimensions standard version	M 1:1 Notes
DC motor DCX 16 S DCX 16 L DCX 19 S DCX 22 S DCX 22 L DCX 26 L DCX 32 L DCX 35 L DC-max 26 S	EC motor 103-104 EC-max 16 105-106 EC-max 22 107-108 EC-max 30 109-110 EC-max 40 111-112 EC-4pole 22 113-114 EC-4pole 30 115 EC-i 30 116 EC-i 40 123-124 EC-i 52 ECX PRIME 16 L	275/277 278-279 280-281 282-283 287-288 289/291 298-301 302-307 308-311 234-235	8.5	 ¹ maxon controllers require a resolution of at least 16 counts per turn. ² Length given excludes any intermediate plate for mounting on a motor. The effective total length of a motor-encoder combination can be found on the respective dimensional drawing.
				Further technical details can be found in the produc information in the online shop under Downloads.

maxon sensor 505



Key Data		EASY incremental differential	
Number of channels		3	
Max. counts per turn		1024	
Encoder length L ²	mm	8.5	
Ambient temperature	°C	-55+125	
Weight	g	7	

Selection criteria	EASY incremental differential	
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		

Specifications	EASY incremental differential	
Supply voltage V _{cc} V	5 ±0.5	
	22	
Max. operating frequency kHz	1600	
Max. Speed rpm	30000	
Connector	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 not connected Pin 2 V _{CC} Pin 3 GND Pin 4 not connected Pin 5 channel Ā Pin 6 channel Ā Pin 7 channel B Pin 8 channel B Pin 9 channel Ī Pin 10 channel I Output signal: EIA-Standard RS 422 Output current per channel: ±20 mA	10 9

Variants		For configurable units	Non-co	nfigurable	units			
Part Number		depends on configuration	584776	606052	577614	542079	577671	530965
Counts per turn ¹		11024	128	256	500	512	1000	1024
Cable length	mm	500, 1000, 1500	500	500	500	500	500	500
Alignment of cable outlet in relat	ion to motor flange °	15 (pitch)	0	0	0	0	0	0

DCX 16 L 105-106 DCX 19 S 107-108 DCX 22 S 109-110 DCX 22 L 111-112 DCX 26 L 113-114 DCX 32 L 115	EC motor EC-max 16 EC-max 22 EC-max 30 EC-max 40 EC-4pole 22 EC-4pole 30 EC-i 30 EC-i 40 EC-i 52 ECX PRIME 16 L	Page 275/277 278-279 280-281 282-283 287-288 289/291 298-301 302-307 308-311 234-235	Dimensions standard version M1:	Notes maxon controllers require a resolution of at least 16 counts per turn. Length given excludes any intermediate plate for mounting on a motor. The effective total length of a motor-encoder combination can be found on the respective dimensional drawing.
				Further technical details can be found in the produc information in the online shop under Downloads.



Key Data		EASY absolute	
Steps per turn		4096	
Resolution (bit single turn)		12	
Encoder length L ¹	mm	8.5	
Ambient temperature	°C	-40+100	
Weight	g	7	

Selection criteria	EASY absolute		
Speed and rotation direction detection			
Speed and position control	•		
Compact and robust design			
High resolution	•		
Cost effective	-		
■ suitable ▲ suitable to a limited extent ● ı	not suitable		

Specifications	EASY absolute		
0 1 1: 1/	 - 0-		

Specifications		EASY absolute		
Supply voltage V _{cc}	V	5 ±0.5		
Typical current draw	mA			
Max. Speed	rpm	25000		
Connector		10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) Pin 1 Data Pin 2 V_{cc} Pin 3 GND Pin 4 CLK Pin 5 do not connect² (\overline{A}) Pin 6 do not connect² (\overline{B}) Pin 7 do not connect² (\overline{B}) Pin 8 do not connect² (\overline{B}) Pin 9 do not connect² (\overline{B}) Pin 10 do not connect² (\overline{B})	1 9 2	
Variants		For configurable units		Non-configurable units

Variants	For configurable units	Non-co	nfigurable units
Part Number	depending on configuration	488783	488782
Signal protocol	BiSS-C, SSI	BiSS-C	SSI
Cable length mm	50, 100, 150, 200, 300, 500, 1000	300	300
Alignment of cable outlet in relation to motor flange °	15 (pitch)	0	0

modular syster	m		Page	Dimensions standard version	M 1:1 Notes
DC motor DCX 16 S DCX 16 L DCX 19 S DCX 22 S DCX 22 L DCX 26 L DCX 35 L DCX 35 L	103-104 105-106 107-108 109-110 111-112 113-114 115	EC-max 22 EC-max 30 EC-max 40 EC-4pole 22 EC-4pole 30 EC-i 30 EC-i 40	275/277 278-279 280-281 282-283 287-288 289/291 298-301 302-307 308-311 234-235	8.5	Adapter EASY Absolute 488167 (required for all maxon controllers). ¹ Length given excludes any intermediate plate for mounting on a motor. The effective total length of a motor-encoder combination can be found on the respective dimensional drawing. ² Applying voltage to these pins may destroy the encoder.
					Further technical details can be found in the product information in the online shop under Downloads.







Key Data		EASY absolute Differential	
Steps per turn		4096	
Resolution (bit single turn)		12	
Encoder length L1	mm	9.0	
Ambient temperature	°C	-55+125	
Weight	a	7	

Selection criteria	EASY absolute Differential	
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		

Specifications		EASY absolute differential				
Supply voltage V _{cc}	V	5 ±0.25				
Typical current draw	mA	22				
Max. Speed	rpm	30 000				
Connector		10-pin 1.5 mm multipoint connector Molex Clik-Mate (503149) Pin 1 not connected Pin 2 not connected Pin 3 not connected Pin 4 not connected Pin 5 CLK Pin 6 CLK\ Pin 7 Data Pin 8 Data\ Pin 9 GND Pin 10 V _{CC} Output signal: EIA-Standard RS 422 Output current per channel: ±20 mA	1 9 10			
Variants		For configurable units		Non-co	nfigurable units	
Part Number		depends on configuration		588632	588631	
Signal protocol		BiSS-C, SSI		BiSS-C	SSI	
Cable length	mm	500, 1000		500	500	
Alignment of cable outlet in relation to m	notor flange °	15 (pitch)		0	0	

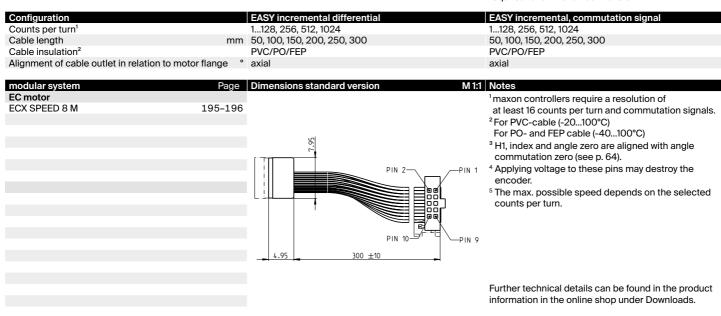
modular sys	stem		Page	Dimensions standard version M	1:1 Notes
DC motor		EC motor			¹ Length given excludes any intermediate plate for
DCX 16 S	103-104	EC-max 16	275/277		mounting on a motor. The effective total length of
DCX 16 L	105-106	EC-max 22	278-279		a motor-encoder combination can be found on the
DCX 19 S	107-108	EC-max 30	280-281	9 =	respective dimensional drawing.
DCX 22 S	109-110	EC-max 40	282-283		,
DCX 22 L	111-112	EC-4pole 22	287-288	4	
DCX 26 L	113-114	EC-4pole 30	289/291		
DCX 32 L	115	EC-i 30	298-301	- 	
DCX 35 L	116	EC-i 40	302-307		
		EC-i 52	308-311		
		ECX PRIME 16 L	234-235	<u> </u>	
				пп	
				╙╌┈┸┝┲╣	
					From the control of t
					Further technical details can be found in the product information in the online shop under Downloads.



Key data	EASY incremental differential	EASY incremental, commutation signal
Number of channels	3	3
Max. counts per turn	1024	1024
Encoder length L	mm 0 (integrated into motor)	O (integrated into motor)
Ambient temperature ²	°C -20100 (-40100)	-20100 (-40100)
Weight	g <4	<4

Selection criteria	EASY incremental differential	EASY incremental, commutation signal
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		
■ suitable ▲ suitable to a limited extent ●	not suitable	

upply voltage Vcc ypical current draw lax. operating frequency lax. Speed ⁵ connector ³	mA kHz	EASY incremental differential 5 ± 0.5 17 500 30 000 - 80 000 10-pin 1.27 mm multipoint connector e.g. Samtec FFSD series Pin 1 do not connect ⁴ (BiSS-C Data) Pin 2 V_{cc} Pin 3 GND Pin 4 do not connect ⁴ (BiSS-C CLK) Pin 5 channel \overline{A} Pin 6 channel \overline{A} Pin 7 channel \overline{B} Pin 8 channel \overline{B} Pin 8 channel \overline{B} Pin 9 channel \overline{I} Pin 10 channel \overline{I} Output signal: EIA-Standard RS 422 Output current per channel: \pm 20 mA	EASY incremental, commutation signal 5 ± 0.5 17 500 30 000 - 80 000 10-pin 1.27 mm multipoint connector e.g. Samtec FFSD series Pin 1 do not connect ⁴ (BiSS-C Data) Pin 2 V _{cc} Pin 3 GND Pin 4 do not connect ⁴ (BiSS-C CLK) Pin 5 H1 Pin 6 channel A Pin 7 H2 Pin 8 channel B Pin 9 H3 Pin 10 channel I Output signal: CMOS compatible Output current per channel: + 20 mA Adapter Micromotor (ArtNo. 498157) required for all maxon controllers.
configuration		EASY incremental differential	EASY incremental, commutation signal
Counts per turn ¹		1128, 256, 512, 1024	1128, 256, 512, 1024
	mm	50, 100, 150, 200, 250, 300	50, 100, 150, 200, 250, 300 PVC/PO/FEP
cable length cable insulation ²		PVC/PO/FEP	





Key data	EASY absolute	EASY absolute, Commutation signal
Steps per turn	4096	4096
Resolution (bit single turn)	12	12
Encoder length L	mm 0 (integrated into motor)	O (integrated into motor)
Ambient temperature ¹	°C -20100 (-40100)	-20100 (-40100)
Weight	g <4	<4

Specifications Supply voltage V _{cc}		EASY absolute 5 ±0.5		EASY absolute, commutation signal 5 ±0.5	
Typical current draw	mA			17	
Max. Speed Connector ²	rpm	80 000 10-pin 1.27 mm multipoint connector e.g. Samtec FFSD series Pin 1 Data Pin 2 V _{cc} Pin 3 GND Pin 4 CLK Pin 5 do not connect³ (Ā) Pin 6 do not connect³ (Ā) Pin 7 do not connect³ (B) Pin 8 do not connect³ (B) Pin 9 do not connect³ (I) Pin 10 do not connect³ (I) Output signal: CMOS compatible Output current per channel: + 20 mA Adapter EASY Absolute (Part number 48 required for all maxon controllers.	2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10	80 000 10-pin 1.27 mm multipoint connector e.g. Samtec FFSD series Pin 1 Data Pin 2 V _{cc} Pin 3 GND Pin 4 CLK Pin 5 H1 Pin 6 do not connect³ (A) Pin 7 H2 Pin 8 do not connect³ (B) Pin 9 H3 Pin 10 do not connect³ (I) Output signal: CMOS compatible Output current per channel: + 20 mA	2 10
Configuration		EASY absolute		EASY absolute, commutation signal	
Signal protocol		BiSS-C, SSI		BiSS-C, SSI	
Cable length	mm	50, 100, 150, 200, 250, 300		50, 100, 150, 200, 250, 300	
Cable insulation ¹		PVC/PO/FEP		PVC/PO/FEP	

Cable insulation ¹		PVC/PO/FEP	PVC	/PO/FEP
Alignment of cable outlet in rela	ation to motor flange °	axial	axia	
modular system	Page	Dimensions standard version	M 1:1 Note	es
EC motor ECX SPEED 8 M	195-196	PIN PIN 300 ±10	For ² H1, cor ³ App end	PVC-cable (-20100°C) PO- and FEP cable (-40100°C) index and angle zero are aligned with angle mutation zero (see p. 64). plying voltage to these pins may destroy the coder.
				ner technical details can be found in the product
			infor	mation in the online shop under Downloads.

ENX 13 EASY INT Encoder Ø13 mm, 1...1024 CPT/4096 steps, Single Turn

Sterilizable, integrated into motor



Key data	EASY incremental differential	EASY Absolute
Number of channels	3	
Max. counts per turn	1024	
Steps per turn		4096
Resolution (bit single turn)		12
Encoder length L	mm 0 (integrated into motor)	0 (integrated into motor)
Ambient temperature	°C -40125	-40125
Mojaht	g .E	-5

Selection criteria	EASY incremental differential	EASY Absolute	
Speed and rotation direction detection			
Speed and position control		•	
Compact and robust design			
High resolution			
Cost effective			

■ suitable ▲ suitable to a limited extent ● not suitable

Specifications		EASY incremental differential		EASY Absolute
Supply voltage V _{cc}	V	5 ± 0.5		5 ± 0.5
Typical current draw	mA	22		22
Max. operating frequency	kHz	4000		
Max. Speed	rpm	200 000		200 000
Connector ²		$\begin{array}{llll} 10\text{-pin} \ 2.54 \ \text{mm} \ \text{multipoint connector} \\ \text{(IEC/EN } 60603\text{-}13 \ \text{/ DIN } 41651) \\ \text{cable AWG } 28 \\ \text{Pin} & 1 & \text{not connected} \\ \text{Pin} & 2 & \text{(black)} & \text{V}_{\text{cc}} \\ \text{Pin} & 3 & \text{(brown)} & \text{GND} \\ \text{Pin} & 4 & \text{not connected} \\ \text{Pin} & 5 & \text{(red)} & \text{channel } \overline{A} \\ \text{Pin} & 6 & \text{(orange)} & \text{channel } \overline{A} \\ \text{Pin} & 7 & \text{(yellow)} & \text{channel } \overline{B} \\ \text{Pin} & 8 & \text{(green)} & \text{channel } \overline{B} \\ \text{Pin} & 9 & \text{(blue)} & \text{channel } \overline{I} \\ \text{Pin} & 10 & \text{(violet)} & \text{channel } I \\ \text{Output signal: EIA-Standard RS } 422 \\ \text{Output current per channel: } \pm 20 \ \text{mA} \\ \end{array}$	9 10 2	without connector cable AWG 28 green Data black V _{cc} brown GND yellow CLK Output signal: CMOS compatible Output current per channel: + 20 mA
Configuration		EASY incremental differential		EASY Absolute
Counts per turn ¹		11024		
Signal protocol				BiSS-C, SSI
Cable length	mm	200, 500		200, 500
Et a state a successive than				

modular system EC motor ECX SPEED 13 M ECX SPEED 13 L	Page Sterili 198-201 202-205	zation information Typically 1000 autoclave cycles Sterilization with steam Temperature Compression pressure up to Rel. humidity Cycle length The connector is not sterilizable and needs to be removed first.	+134 ± 4°C 2.3 bar 100% 18 minutes	Notes 1 maxon controllers require a resolution of at least 16 counts per turn and commutation signals. 2 H1, index and angle zero are aligned with angle commutation zero (see p. 64).
---	-------------------------------	--	---	---

Further technical details can be found in the product information in the online shop under Downloads.

cable length/pin connection/connector

Electric connection

ENX 16 EASY INT Encoder Ø16 mm, 1...1024 CPT/4096 steps, Single Turn

Sterilizable, integrated into motor



Key Data	EASY incremental differential	EASY Absolute
-	2	LAST Absolute
Number of channels	ა	
Max. counts per turn	1024	
Steps per turn		4096
Resolution (bit single turn)		12
Encoder length L	mm -1 (integrated into motor)	-1 (integrated into motor)
Ambient temperature	°C -40125	-40125
Weight	g <5	<5

Selection criteria	EASY incremental differential	EASY Absolute	
Speed and rotation direction detection			
Speed and position control			
Compact and robust design			
High resolution			
Cost effective			

Specifications	EASY incremental differential	EASY Absolute
Supply voltage Vcc	V 5 ± 0.5	5 ± 0.5
Typical current draw	mA 22	22
Max. operating frequency	kHz 4000	
Max. Speed	rpm 200 000	200 000
Connector ²	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) cable AWG 28 Pin 1 not connected Pin 2 (black) V _{CC} Pin 3 (brown) GND Pin 4 not connected Pin 5 (red) channel Ā Pin 6 (orange) channel Ā Pin 7 (yellow) channel B Pin 8 (green) channel B Pin 9 (blue) channel Ī Pin 10 (violet) channel I	without connector cable AWG 28 green Data black V _{cc} brown GND yellow CLK
	Output signal: EIA-Standard RS 422 Output current per channel: ± 20 mA	Output signal: CMOS compatible Output current per channel + 20 mA

Configuration	EASY incremental differential	EASY Absolute
Counts per turn ¹	11024	
Signalprotokoll		BiSS-C, SSI
Cable length	mm 200, 500	200, 500
Electric connection		cable length/pin connection/connector

Sterilization with steam Temperature +134 ± 4°C Compression pressure up to Rel. humidity Cycle length 18 minutes The connector is not sterilizable and needs to be removed first. 2 H1, index and angle zero are aligned with angle commutation zero (see p. 64).	Electric connection				cable length/pin connection/connector
EC motor ECX SPEED 16 M 206-209 ECX SPEED 16 L 210-213 Typically 1000 autoclave cycles Sterilization with steam Temperature +134 ± 4°C Compression pressure up to 2.3 bar Rel. humidity 100% Cycle length 18 minutes The connector is not sterilizable and needs to be removed first.					
ECX SPEED 16 M 206–209 ECX SPEED 16 L 210–213 Typically 1000 autoclave cycles Sterilization with steam Temperature Compression pressure up to Rel. humidity Cycle length Rel. humidity The connector is not sterilizable and needs to be removed first. Typically 1000 autoclave cycles at least 16 counts per turn and commutation signals 2 H1, index and angle zero are aligned with angle commutation zero (see p. 64).	Modular System	Page Ster	ilization information		Notes
Further technical details can be found in the product	ECX SPEED 16 M	206-209 135°	Typically 1000 autoclave cycles Sterilization with steam Temperature Compression pressure up to Rel. humidity Cycle length The connector is not sterilizable	+134 ± 4°C 2.3 bar 100% 18 minutes	 maxon controllers require a resolution of at least 16 counts per turn and commutation signals H1, index and angle zero are aligned with angle
Further technical details can be found in the product					
information in the online shop under Downloads.					Further technical details can be found in the product information in the online shop under Downloads.

ENX 19 EASY INT Encoder Ø19 mm, 1...1024 CPT/4096 steps, Single Turn

Sterilizable, integrated into motor





Key Data	EASY incremental differential	EASY Absolute
Number of channels	3	
Max. counts per turn	1024	
Steps per turn		4096
Resolution (bit single turn)		12
Encoder length L	mm -1.4 (integrated into motor)	-1.4 (integrated into motor)
Ambient temperature	°C -40125	-40125
Weight	a <5	<5

Selection criteria	EASY incremental differential	EASY Absolute	
Speed and rotation direction detection			
Speed and position control		•	
Compact and robust design			
High resolution			
Cost effective			

Specifications	EASY incremental differential	EASY Absolute
Supply voltage V _{cc}	V 5 ± 0.5	5 ± 0.5
Typical current draw	mA 22	22
Max. operating frequency	kHz 4000	
Max. Speed	rpm 200000	200000
Connector ²	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) cable AWG 26	without connector 9 10 cable AWG 26
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2 green Data black V _{cc} brown GND yellow CLK
	Output signal: EIA-Standard RS 422 Output current per channel: ± 20 mA	Output signal: CMOS compatible Output current per channel + 20 mA

Configuration	EASY incremental differential	EASY Absolute
Counts per turn ¹	11024	
Signalprotokoll		BiSS-C, SSI
Cable length	mm 200, 500	200, 500
Electric connection		cable length/pin connection/connector

Cable length	mm 2	200, 500		200, 500
Electric connection				cable length/pin connection/connector
modular system	Page S	Sterilization information		Notes
EC motor ECX SPEED 19 M ECX SPEED 19 L	214-217 218-221	Typically 1000 autoclave cycles Sterilization with steam Temperature Compression pressure up to Rel. humidity Cycle length The connector is not sterilizabl and needs to be removed first.	+134 ± 4°C 2.3 bar 100% 18 minutes	 ¹ maxon controllers require a resolution of at least 16 counts per turn and commutation signals. ² H1, index and angle zero are aligned with angle commutation zero (see p. 64).
				Further technical details can be found in the product
				information in the online shop under Downloads.

ENX 22 EASY INT Encoder Ø22 mm, 1...1024 CPT/4096 steps, Single Turn

BISS INTERFACE CERTIFIED

Sterilizable, integrated into motor



Key data	EASY incremental differential	EASY Absolute
Number of channels	3	
Max. counts per turn	1024	
Steps per turn		4096
Resolution (bit single turn)		12
Encoder length L	mm -1.5 (integrated into motor)	-1.5 (integrated into motor)
Ambient temperature	°C -40125	-40125
Weight	g <5	<5

EASY incremental differential	EASY Absolute	
	•	
	•	
	EASY incremental differential	EASY incremental differential EASY Absolute

Specifications	EASY incremental differential	EASY Absolute
Supply voltage V _{cc}	V 5 ± 0.5	5 ± 0.5
Typical current draw	mA 22	22
Max. operating frequency	kHz 4000	
Max. Speed	rpm 200 000	200 000
Connector ²	10-pin 2.54 mm multipoint connector (IEC/EN 60603-13 / DIN41651) cable AWG 26 Pin 1 not connected Pin 2 (black) V _{cc} Pin 3 (brown) GND Pin 4 not connected Pin 5 (red) channel Ā Pin 6 (orange) channel A Pin 7 (yellow) channel B Pin 8 (green) channel B Pin 9 (blue) channel Ī	without connector 9 10 cable AWG 26 2 green Data black V _{cc} brown GND yellow CLK
	Pin 10 (violet) channel I Output signal: EIA-Standard RS 422 Output current per channel: ± 20 mA	Output signal: CMOS compatible Output current per channel + 20 mA

Configuration	EASY incremental differential	EASY Absolute
Counts per turn ¹	11024	
Signalprotokoll		BiSS-C, SSI
Cable length	mm 200, 500	200, 500
Electric connection		cable length/pin connection/connector

Electric connection			cable length/pin connection/connector
modular system EC motor ECX SPEED 22 M ECX SPEED 22 L ECX TORQUE 22 M ECX TORQUE 22 L ECX TORQUE 22 L	Page Ster 222-225 135° 550	+134 ± 4°C 2.3 bar 100% 18 minutes	Notes 1 maxon controllers require a resolution of at least 16 counts per turn and commutation signals. 2 H1, index and angle zero are aligned with angle commutation zero (see p. 64). Further technical details can be found in the product information in the online shop under Downloads.

ENX 22 EASY INT Encoder Ø22 mm, 1024 CPT/4096 steps, Single Turn

Integrated into motor





Key data		EASY incremental and absolute	
Number of channels		3	
Counts per turn		1024	
Steps per turn		4096	
Resolution (bit single turn)		12	
Encoder length L	mm	0 (integrated into motor)	
Ambient temperature	°C	-40125	

Selection criteria	EASY incremental and absolute	
Speed and rotation direction detection		·
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		
■ suitable 🔺 suitable to a limited extent 🔸 not	suitable	

Specifications	EASY incremental and absolute
Supply voltage V _{cc}	V 5 ± 0.5
Typical current draw	mA 22
Max. operating frequency	kHz 4000
Max. Speed	rpm 200 000
Connector ¹ M12, male, A-coded	Pin 1 GND (ground) Pin 2 Motor NTC Pin 3 + V _{CC} Pin 4 channel A Pin 5 channel Ī Pin 6 channel B Pin 7 channel B Pin 8 channel I Pin 9 Motor NTC Pin 10 channel B Pin 11 Data_out Pin 12 Data_out Pin 12 Data_out Pin 13 CLK_in Pin 14 CLK_in Pin 15 Hall 3 Pin 16 Hall 1 Pin 17 Hall 2 Pin 5 Pin 10 Pin 10 Pin 10 Pin 11 Pin 17 Pin 17 Pin 18 Pin 19 Pi
	Output signal: EIA-Standard RS 422 Output current per channel: ± 20 mA

Configuration	EASY incremental and absolute	
Signalprotokoll	BiSS-C, SSI	

modular system	Page	Notes
EC motor		¹ Connecting cables available in Online Configurator.
IDX 56	245-247	
IDX 70	248-250	
		Further technical details can be found in the product information in the online shop under Downloads.
2024 mayon All rights reconved	April adition Subject to abanda	mayon sensor 5



Key data		EMT absolute differential	
Multi-turn: max. no. of turns		65 536	
Multi-turn: resolution	bits	16	
Single-turn: steps per turns		131072	
Single-turn: resolution	bits	17	
Encoder length L1	mm	22.7	
Ambient temperature	°C	-40+105	
Weight	g	25	

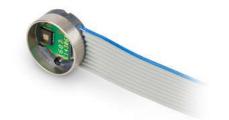
Selection criteria	EMT absolute differential	
Multi-turn detection		
Detection of speed and rotation direction		
Speed and position control		
Compact and robust design		
High resolution		
Economical	▲	

suitable	suitable to a limited extent	not suitable

Specifications		EMT for DCX, EC-4pole ar	nd EC-i	EMT integrated into IDX	
Supply voltage V _{cc}	٧	5 ± 0.5		5 ± 0.5	
Typical current draw	mA	90		90	
Max. speed	rpm	12000		12 000	
Data encoding		Binary		Binary	
Min. clock frequency CLK	MHz	BiSS-C: 0.08	SSI: 0.3	BiSS-C: 0.08	SSI: 0.3
Max. clock frequency CLK	MHz	BiSS-C: 5	SSI: 1	BiSS-C: 5	SSI: 1
Timeout	μs	BiSS-C: 18	SSI: 7	BiSS-C: 18	SSI: 7
Setup time after Power On	S	Max. 0.1		Max. 0.1	
Moment of inertia of pulse disk	gmm²	≤ 1.55		≤ 1.55	
Plug manufacturer JST Plug type no. BM08B-NSHSS -TBT Matching connector type no. NSHR-08V-S		Pin 1 GND Pin 2 do not connect Pin 3 do not connect Pin 4 Data+/SLO+ Pin 5 Data-/SLO- Pin 6 CLK-/MA- Pin 7 CLK+/MA+ Pin 8 V _{CC} Output signals: EIA standa Output current per channe		Pin 1 GND Pin 2 Motor NTC Pin 3 +V _{cc} Pin 9 Motor NTC Pin 11 Data-/SLO- Pin 12 Data+/SLO+ Pin 13 CLK+/MA+ Pin 14 CLK-/MA- Other pins not connected Output signals: EIA standa Output current per channe	

EMT absolute differential	
BiSS-C, SSI	'
İ	Dicc C CCI

maxon modular system DC motor DCX 22 DCX 26 L DCX 32 L DCX 35 L EC motor IDX 56 IDX 70 EC-4pole 22 EC-4pole 30 EC-i 30 EC-i 40 EC-i 52	Page E 109-112 113-114	Dimensions of standard configuration	 M1:2 Additional information The length shown here refers to the encoder. An additional intermediate plate is required for motor mounting. For more detailed information, see the combined dimensional drawing. EC motors: The angle value 0 is calibrated to the commutation phase of coil 1 (equates to Hall signal 1 for motors with Hall sensors, block commutation), see p. 64. Ordering information: For motors that cannot be configured online, the part numbers 711113 (BiSS-C) and 711112 (SSI) must be used when ordering.
		Connecting cable 300 mm for EMT to EPOS4 708590	Further technical details can be found in the product information in the online shop under Downloads.



Key Data		RIO incremental, optical	
Number of channels		3	
Max. counts per turn		65 536	
Encoder length L ²	mm	7.0	
Ambient temperature	°C	-40+100	
Weight	g	15	

Selection criteria	RIO incremental, optical	
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
ligh resolution		
Cost effective		

Specifications	RIO incremental, optical
Supply voltage V _{CC} V	5 ±10%
	50
Max. operating frequency kHz	3125
Max. Speed ¹ rpm	40 000
Connection	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

Variants		for configurable units	for non-	configura	able units			
Part Number		depending on configuration	575826	575827	575828	575829	575830	
Counts per turn		51265 536 (in steps of 256)	1024	4096	8192	16384	32768	
Cable length	mm	50, 100, 150, 200, 300, 500, 1000	300	300	300	300	300	
Alignment of cable outlet in relation	to motor flange °	15 (pitch)	0	0	0	0	0	

modular sys DC motor DCX 16 S DCX 16 L DCX 19 S DCX 22 S DCX 22 L DCX 26 L DCX 32 L DCX 35 L	103-104 105-106 107-108 109-110 111-112	EC-i 40	Page 287-288 289/291 298-301 302-307 308-311 234-235	Dimensions standard version	Notes For counts per turn >4096 per turn, the maximum speed is reduced, limited by the maximum count frequency. Length given excludes any intermediate plate for mounting on a motor. The effective total length of a motor-encoder combination can be found on the respective dimensional drawing.
					Further technical details can be found in the product information in the online shop under Downloads.

maxon TSX

Standard Specification No. 103		89
Magnetic encoders		520-525
TSX 38 MAG 1792 CPT, 2 channel	NEW	520
TSX 50 MAG 2560 CPT, 2 channel		521
TSX 65 MAG 2560 CPT, 2 channel		522
TSX 85 MAG 2560 CPT, 2 channel		523
TSX 40 MAG 1792-2048 CPT, 2 channel	NEW	524
Optical Encoder		
TSX 40 RIO 1-524 288 CPT, 21 Bits, 3 channel	NEW	525



maxon off-axis TSX encoders are characterized by their robust design and high signal quality. This enables the use of through shafts and offers enormous design freedom. These devices have to be fitted to the motors at the supplying factory, as the installation process is fine-tuned to the respective motor.

enx.maxongroup.com

© 2024 maxon. All rights reserved.



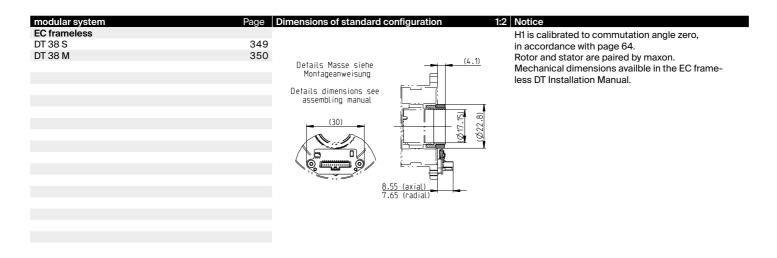


Key data		TSX 38 MAG incremental, commutation signal	
Number of channels		2	
Max. counts per turn		1792	
Encoder length L (axial)	mm	8.55	
Encoder length L (radial)	mm	7.65	
Ambient temperature	°C	-40 +105	
Weight	g	11	

Selection criteria	15X 38 MAG Increr	mental, commutation signal
Speed and rotation direction detection	_	
Speed and position control	-	
Compact and robust design	•	
High resolution	<u> </u>	
Cost effective	=	
suitable A suitable to a limited extent	not suitable	

Supply voltage V _{CC} V 5V ± 0.5 5V ± 0.5 Typical current draw mA 18 18 Max. operating frequency kHz 500 500 Max elec. speed rpm 14 000 14 000 Axial plug manufacturer Molex Pin 1 NTC- Pin 1 V _{CC} Axial plug manufacturer Part no. 501331-1407 Pin 2 NTC+ Pin 3 Ā* Radial plug manufacturer Part no. SM14B-NSHSS-TB Pin 3 N.C. Pin 3 Ā* Radial plug Part no. SM14B-NSHSS-TB Pin 4 H3 Pin 5 B* Pin 5 H2 Pin 5 B* Pin 6 H1 Pin 6 B* Pin 7 Not connect Pin 7 Not connect Pin 7 Not connect Pin 9 B* Pin 9 H1 Pin 9 H1 Pin 10 B* Pin 11 A* Pin 12 N.C. Pin 13 GND Pin 12 N.C. Pin 14 NTC- *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			1		1	
Typical current draw	Specifications			cable outlet		lial cable outlet
Max. operating frequency kHz 500 500 Max elec. speed rpm 14 000 14 000 Axial plug manufacturer Molex Pin 1 NTC- Pin 1 V _{CC} Axial plug manufacturer Part no. 501331-1407 Pin 2 NTC+ Pin 2 GND Radial plug Part no. SM14B-NSHSS-TB Pin 3 N.C. Pin 3 Ā* Part no. SM14B-NSHSS-TB Pin 4 H3 Pin 4 A* Pin 5 H2 Pin 5 B* Pin 6 H1 Pin 6 B* Pin 7 Not connect Pin 8 Not connect Pin 9 B* Pin 9 H1 Pin 10 H2 Pin 11 H3 Pin 13 GND Pin 14 NTC- Pin 14 V _{CC} Pin 14 NTC- Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA	Supply voltage V _{cc}	V	5V ± 0.5		5V ± 0.5	
Max elec. speed rpm 14 000 Axial plug manufacturer Molex Pin 1 NTC- Pin 1 V _{CC} Axial plug Part no. 501331-1407 Pin 2 NTC+ Pin 2 GND Radial plug manufacturer JST Pin 3 N.C. Pin 3 Ā* Radial plug Part no. SM14B-NSHSS-TB Pin 4 H3 Pin 4 A* Pin 6 H1 Pin 5 B* Pin 7 Not connect Pin 7 Not connect Pin 8 Not connect Pin 8 Not connect Pin 1 A* Pin 1 H3 Pin 1 A* <td< td=""><td>Typical current draw</td><td>mA</td><td>18</td><td></td><td>18</td><td></td></td<>	Typical current draw	mA	18		18	
Axial plug manufacturer Axial plug Manufacturer Radial plug manufacturer Part no. SM14B-NSHSS-TB Pin 1 5 H2 Pin 6 H1 Pin 7 Not connect Pin 7 Not connect Pin 8 Not connect Pin 9 B* Pin 10 B* Pin 11 A* Pin 12 A* Pin 12 A* Pin 13 GND Pin 13 GND Pin 14 V _{CC} *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA	Max. operating frequency	kHz	500		500	
Axial plug	Max elec. speed	rpm	14 000		14 000	
Axial plug	Axial plug manufacturer	Molex	Pin 1 NTC-		Pin 1 V _{cc}	
Radial plug Part no. SM14B-NSHSS-TB Pin 4 H3 Pin 5 H2 Pin 6 H1 Pin 6 B* Pin 7 Not connect Pin 8 Not connect Pin 8 Not connect Pin 9 H1 Pin 10 H2 Pin 11 A* Pin 12 A* Pin 12 A* Pin 13 GND Pin 14 V _{CC} *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA	Axial plug	Part no. 501331-1407	Pin 2 NTC+		Pin 2 GŇD	
Pin 5 H2 Pin 6 H1 Pin 6 B* Pin 7 Not connect Pin 8 Not connect Pin 9 B* Pin 10 B* Pin 11 A* Pin 12 Ā* Pin 13 GND Pin 13 GND Pin 14 V _{CC} *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA	Radial plug manufacturer	JST	Pin 3 N.C.		Pin 3 Ā*	
Pin 6 H1 Pin 6 B* Pin 7 Not connect Pin 7 Not connect Pin 8 Not connect 1 Pin 9 B* Pin 9 H1 Pin 10 B* Pin 10 H2 Pin 11 A* Pin 11 H3 Pin 12 A* Pin 12 N.C. Pin 13 GND Pin 13 NTC+ Pin 14 V _{CC} Pin 14 NTC- *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA	Radial plug	Part no. SM14B-NSHSS-TB	Pin 4 H3		Pin 4 A*	
Pin 7 Not connect Pin 7 Not connect Pin 8 Not connect 1 Pin 8 Not connect Pin 9 B* Pin 9 H1 Pin 10 B* Pin 10 H2 Pin 11 A* Pin 11 H3 Pin 12 A* Pin 12 N.C. Pin 13 GND Pin 13 NTC+ Pin 14 V _{CC} Pin 14 NTC- *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA	, -		Pin 5 H2		Pin 5 B*	
Pin 8 Not connect Pin 9 B* Pin 10 \overline{\text{Pin 9 H1}} Pin 10 H2 Pin 11 A* Pin 12 \overline{\text{R}} Pin 13 GND Pin 13 GND Pin 14 V _{CC} *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 6 H1		Pin 6 B*	
Pin 9 B* Pin 10 B Pin 10 B Pin 11 A* Pin 12 A Pin 12 A Pin 13 GND Pin 13 NTC+ Pin 14 V _{CC} *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 7 Not connect		Pin 7 Not connect	
Pin 10 B* Pin 11 A* Pin 11 H3 Pin 12 A* Pin 12 N.C. Pin 13 GND Pin 13 NTC+ Pin 14 V _{CC} *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 8 Not connect	1	Pin 8 Not connect	
Pin 11 A* Pin 12 Ā* Pin 12 N.C. Pin 13 GND Pin 13 NTC+ Pin 14 V _{CC} Pin 14 NTC- *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 9 B*		Pin 9 H1	14
Pin 12 Ā* Pin 12 N.C. Pin 13 GND Pin 13 NTC+ Pin 14 V _{CC} Pin 14 NTC- *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 10 B*	14	Pin 10 H2	
Pin 13 GND Pin 13 NTC+ Pin 14 V _{CC} Pin 14 NTC- *Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 11 A*	PIK .	Pin 11 H3	
Pin 14 \rmV_{cc} Pin 14 NTC- *Output signal: EIA-Standard RS 422/Output current per channel: \pm 20 mA			Pin 12 Ā*		Pin 12 N.C.	
*Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 13 GND		Pin 13 NTC+	
*Output signal: EIA-Standard RS 422/Output current per channel: ± 20 mA			Pin 14 V _{oc}		Pin 14 NTC-	
· ·				ard RS 422/Output current p		
300 mm compatible cable adaptor for EPOS4: 708583 EPOS4 Disk: 865360 EPOS4: 708586 EPOS4 Disk: 865359	300 mm compatible cable	adaptor for	EPOS4: 708583	EPOS4 Disk: 865360	EPOS4: 708586	EPOS4 Disk: 865359
ESCON: 708584 ESCON: 708587						

Variants	TSX 38 MAG with an axial cable outlet	TSX 38 MAG with an radial cable outlet	
Part Number	836549	836550	





Key data		TSX 50 MAG incremental, commutation signal
Number of channels		2
Max. counts per turn		2560
Encoder length L (axial)	mm	8.55
Encoder length L (radial)	mm	7.65
Ambient temperature	°C	-40 +105
Weight	g	19

Selection criteria	TSX 50 MAG incremental, commutation signal
Speed and rotation direction detection	
Speed and position control	
Compact and robust design	
High resolution	
Cost effective	
■ suitable 🔺 suitable to a limited extent • r	ot suitable

Charifications		TOY EO MAC with an axia	l and la autlat	TCV EO MAC with an radi	al aabla autlat
Specifications	V	TSX 50 MAG with an axia	cable outlet	TSX 50 MAG with an radi	al cable outlet
Supply voltage V _{cc}		5V ± 0.5		5V ± 0.5	
Typical current draw	mA			18	
Max. operating frequency		500		500	
Max. electrical speed	rpm	10 000		10 000	
Axial connector manufactu	rer Molex	Pin 1 NTC-		Pin 1 V _{cc}	
Axial connector	part no. 501331-1407	Pin 2 NTC+		Pin 2 GND	
Radial connector manufact	urer JST	Pin 3 N.C.		Pin 3 A*	
Radial connector	part no. SM14B-NSHSS-TB	Pin 4 H3		Pin 4 A*	
		Pin 5 H2		Pin 5 B*	
		Pin 6 H1		Pin 6 B*	
		Pin 7 Not connect		Pin 7 Not connect	
		Pin 8 Not connect		Pin 8 Not connect	
		Pin 9 B*		Pin 9 H1	14
		Pin 10 B*	14	Pin 10 H2	
		Pin 11 A*	PIK .	Pin 11 H3	
		Pin 12 Ā*		Pin 12 N.C.	
		Pin 13 GND		Pin 13 NTC+	
		Pin 14 V _{cc}		Pin 14 NTC-	
		CC	ard RS 422/Output current p		
Additional 300 mm adapte	r cable for	EPOS4: 708583	EPOS4 Disk: 865360	EPOS4: 708586	EPOS4 Disk: 865359
, lacilional 550 mm adapto		ESCON: 708584	2. 00. 2.3.4 00000	ESCON: 708587	2. 55 . 2.51. 66666

Variants	TSX 50 MAG with an axial cable outlet	TSX 50 MAG with an radial cable outlet
Part Number	732076	732837

modular system EC frameless DT 50 S DT 50 M	351 352 Details M Montage Details dir assembl	dasse siehe eanweisung mensions see ing manual 32) 8.55 (axial) 7.65 (radial)	H1 is calibrated to commutation angle zero, in accordance with page 64. Rotor and stator are paired by maxon. Mechanical dimensions available in the EC frameless DT assembly instruction.



Key data		TSX 65 MAG with an axial cable outlet
Number of channels		2
Max. counts per turn		2560
Encoder length L (axial)	mm	8.55
Encoder length L (radial)	mm	7.65
Ambient temperature	°C	-40 +105
Weight	g	28

Selection criteria	TSX 65 MAG with an axial cable outlet	
Speed and rotation direction detection		
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		

Specifications		TSX 65 MAG with an axia	al cable outlet	TSX 65 MAG with an r	adial cable outlet
Supply voltage V _{cc}	V	5V ± 0.5		5V ± 0.5	
Typical current draw	mA	18		18	
Max. operating frequency	kHz	500		500	
Max. electrical speed	rpm	10 000		10 000	
Axial connector manufacture	er Molex	Pin 1 NTC-		Pin 1 V _{cc}	
Axial connector	part no. 501331-1407	Pin 2 NTC+		Pin 2 GND	
Radial connector manufactu	ırer JST	Pin 3 N.C.		Pin 3 Ā*	
Radial connector	part no. SM14B-NSHSS-TB	Pin 4 H3		Pin 4 A*	
		Pin 5 H2		Pin 5 B*	
		Pin 6 H1		Pin 6 B*	
		Pin 7 Not connect		Pin 7 Not connect	
		Pin 8 Not connect	1	Pin 8 Not connect	
		Pin 9 B*	14	Pin 9 H1	14
		Pin 10 B*	14	Pin 10 H2	
		Pin 11 A*	FILE	Pin 11 H3	4
		Pin 12 Ā*		Pin 12 N.C.	
		Pin 13 GND		Pin 13 NTC+	
		Pin 14 V _{cc}		Pin 14 NTC-	
			lard RS 422/Output current p	er channel: ± 20 mA	
Additional 300 mm adapter	cable for	EPOS4: 708583	EPOS4 Disk: 865360	EPOS4: 708586	EPOS4 Disk: 865359
		ESCON: 708584		ESCON: 708587	

Variants	TSX 65 MAG with an axial cable outlet	TSX 65 MAG with an radial cable outlet
Part Number	805430	805431

modular system EC frameless	Page Dimensions of s	andard configuration	1:2 Notice H1 is calibrated to commutation angle zero,
DT 65 S DT 65 M	353 354 Details Masse Montageanwe Details dimensi assembling m	isung ons see lanual (955)	in accordance with page 64. Rotor and stator are paired by maxon. Mechanical dimensions available in the EC frameless DT assembly instruction.



Key data		TSX 85 M	IAG incremental, commutation sign	nal
Number of channels		2		
Max. counts per turn		2560		
Encoder length L (axial)	mm	8.55		
Encoder length L (radial)	mm	7.65		
Ambient temperature	°C	-40 +10	05	
Weight	g	58		

Selection criteria	TSX 85 MAG incremental, commutation signal
Speed and rotation direction detection	
Speed and position control	
Compact and robust design	
High resolution	
Cost effective	
■ suitable 🔺 suitable to a limited extent 🔸 no	ot suitable

pecifications	TSX 85 MAG with an axial cable outlet	TSX 85 MAG with an radial cable outlet
ipply voltage V _{cc} V	5V ± 0.5	5V ± 0.5
	. 18	18
ax. operating frequency kHz	500	500
ax. electrical speed rpm	10 000	10 000
kial connector manufacturer Moley	Pin 1 NTC-	Pin 1 V _{cc}
rial connector part no. 501331-1407	Pin 2 NTC+	Pin 2 GND
adial connector manufacturer JST	Pin 3 N.C.	Pin 3 A*
adial connector part no. SM14B-NSHSS-TE	Pin 4 H3	Pin 4 A*
	Pin 5 H2	Pin 5 B*
	Pin 6 H1	Pin 6 B*
	Pin 7 Not connect	Pin 7 Not connect
	Pin 8 Not connect 1	Pin 8 Not connect
	Pin 9 B*	Pin 9 H1 14
	Pin 10 B*	Pin 10 H2
	Pin 11 A*	Pin 11 H3
	Pin 12 Ā*	Pin 12 N.C.
	Pin 13 GND	Pin 13 NTC+
	Pin 14 V _{cc}	Pin 14 NTC-
	*Output signal: EIA-Standard RS 422/Output current p	per channel: ± 20 mA
dditional 300 mm adapter cable for	EPOS4/ESCON2: 708583 EPOS4 Disk: 865360	EPOS4/ESCON2: 708586 EPOS4 Disk: 865359
	ESCON: 708584	ESCON: 708587
riants	TSX 85 MAG with an axial cable outlet	TSX 85 MAG with an radial cable outlet

Part Number		805434		505435
modular system	Page	Dimensions of standard configuration 1:	:2	Notice
EC frameless		.		I II is calibrated to commutation and a zoro

EC frameless DT 85 S 355 DT 85 M 356 Details Masse siehe Montageanweisung Details dimensions see assembling manual (3.0) 8.55 (axial) 7.65 (radial) H1 is calibrated to commutation angle zero, in accordance with page 64. Rotor and stator are paired by maxon. Mechanical dimensions available in the EC frameless DT assembly instruction.	modular system Page	Dimensions of standard configuration 1:2	Notice
	EC frameless DT 85 S 355	Details Masse siehe Montageanweisung Details dimensions see assembling manual (30) 8.55 (axial)	in accordance with page 64. Rotor and stator are paired by maxon. Mechanical dimensions available in the





Key data	1	TSX MAG incremental, commutation signal	
Number of channels	2	2	
Max. counts per turn ¹	1	1792; 2048	
Encoder length L	mm 1	11.7	
Ambient temperature	°C -	-40 +105	
Weight	a 1	18	

Speed and rotation direction detection	TSX MAG incremental, commutation signal	
Speed and position control		
Compact and robust design		
High resolution		
Cost effective		

Specifications		Axial cable outlet	Radial cable outlet
Supply voltage V _{cc}	V	5V ± 0.5	5V ± 0.5
Typical current draw	mA	18	18
Max. operating frequency	kHz	500	500
Max elec. speed	rpm	14 000/12 500 (for 7pp/8pp motors)	
Axial plug manufacturer	Molex	Pin 1 NTC-	Pin 1 V _{cc}
Axial plug	Part no. 501331-1407	Pin 2 NTC+	Pin 2 GŇD
Radial plug manufacturer	JST	Pin 3 N.C.	Pin 3 A*
Radial plug	Part no. SM14B-NSHSS-TB	Pin 4 H3	Pin 4 A*
		Pin 5 H2	Pin 5 B̄*
		Pin 6 H1	Pin 6 B*
		Pin 7 Not connect	Pin 7 Not connect
		Pin 8 Not connect	Pin 8 Not connect
		Pin 9 B*	Pin 9 H1
		Pin 10 B*	Pin 10 H2
		Pin 11 A*	Pin 11 H3
		Pin 12 Ā*	Pin 12 N.C.
		Pin 13 GND	Pin 13 NTC+
		Pin 14 V _{cc}	Pin 14 NTC-
		*Output signal: EIA-Standard RS 422/Output curren	t per channel: ± 20 mA
300 mm compatible cable	adaptor for	EPOS4/ESCON2: 708583 EPOS4 Disk: 865360	EPOS4/ESCON2: 708586 EPOS4 Disk: 865359
·	•	ESCON: 708584	FSCON: 708587

ESCON: 708584 ESCON: 708587

Variants		Axial cable outlet		Radial cable ou	tlet
Part Number		850477	850476	732071	687759
Cable outlet		Axial	Axial	Radial	Radial
Counts per turn	CPT	1792	2048	1792	2048
For use with motors		EC-i 40	EC-i 40 ² ; EC-i 52	EC-i 40	EC-i 40 ² ; EC-i 52
Housing		closed ³		closed ³	

Housing	CIOSE	ed	closed
modular system EC motor EC-i 40 EC-i 52		ensions of standard configuration	1:2 Notice H1 is calibrated to commutation angle zero, in accordance with page 64. ¹1792 counts for 7pp motors and 2048 counts for 8pp motors. ²Only for EC-i 40 130 W. ³Through shaft with open housing on request. You can find more information in the maxon online shop under Downloads.



1...524 288 counts / 21 bit



Key data		TSX RIO incremental and absolute	
Number of channels		3	
Max. counts per turn	CPT	1524288	
Steps per turn		12097152	
Resolution (bit single turn)		121	
Encoder length	mm	11.7	
Ambient temperature	°C	-40 +105	
Weight	g	16	

TSX RIO incremental and absolute	
	<u> </u>

Specifications		Axial cable outlet		Radial cable outlet	
Supply voltage V _{cc}	V	5V ± 0.5		5V ± 0.5	
Typical current draw	mA	60		60	
Max. operating frequency	MHz	6.67		6.67	
Max. electrical speed	rpm	150042000		150042000	
Axial connector manufactur	rer Molex	Pin 1 NTC-		Pin 1 V _{CC}	
Axial connector	part no. 501331-1407	Pin 2 NTC+		Pin 2 GŇD	
Radial connector manufactor	urer JST	Pln 3 DATA/ (SLO/)		Pin 3 A	
Radial connector	part no. SM14B-NSHSS-TB	Pin 4 DATA (SLO)		Pin 4 A	
		Pin 5 CLK/ (MA/)		Pin 5 B	
		Pin 6 CLK (MA)		Pin 6 B	
		Pin 7 I		Pin 7 Ī	
		Pin 8 Ī	1	Pin 8 I	
		Pin 9 B		Pin 9 CLK (MA)	14
		Pin 10 B	14	Pin 10 CLK/ (MA/)	
		Pin 11 A	Will a series	Pin 11 DATA (SLO)	
		Pin 12 A		Pin 12 DATA/ (SLÓ/)	
		Pin 13 GND		Pin 13 NTC+	
		Pin 14 V _{cc}		Pin 14 NTC-	
		Output signal: EIA-Star	ndard RS 422	Output signal: EIA-Stand	lard RS 422
		Output current per cha	nnel: ± 20 mA	Output current per chani	nel: ± 20 mA
Additional 300 mm adapter	r cable for	EPOS4: 708582	EPOS4 Disk: 865363	EPOS4: 708585	EPOS4 Disk: 865362

Variants		Axial cable outlet		Radial cable outlet	
Part number		850587	850586	779667	746421
Cable outlet		Axial	Axial	Radial	Radial
Max. counts per turn ¹	CPT	32768	32768	32768	32768
Resolution (bit single turn) ¹		19	19	19	19
Signal protocol		Biss-C	SSI	Biss-C	SSI

modular system EC frameless EC-i 40 EC-i 52	Page Dim 302-307 308-309	ensions of standard configuration Ø 40 111.7	The angle "zero" and the index are aligned with commutation angle zero in accordance with page 64. Wiring diagram for Hall sensors see page 65. With resolutions higher than 19-bit or 32768 counts per turn, the encoder is no longer «noise-free». See product information. Other resolutions available upon request. You can find more information in the maxon online shop under Downloads.
---	--------------------------	--	---

maxon sensor

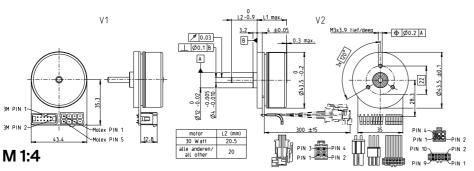
Standard Specification No. 103	89
Inductive encoders	528-531
Encoder MILE 256-2048 CPT, 2 channel	528-529
Encoder MILE 512-4096 CPT, 2 channel	530
Encoder MILE 512-6400 CPT, 2 channel	531
Magnetic encoders	532-533
Encoder MR 16-32 CPT, 2 channel	532-533
Optical encoders	534-541
Encoder 8 OPT 50 CPT, 2 channel	534
Encoder HEDS 5540 500 CPT, 3 channel	535-536
Encoder HEDL 5540 500 CPT, 3 channel	537-539
Encoder HEDL 9140 500 CPT, 3 channel	540-541
DC Tacho/Resolver	542-543
DC-Tacho DCT 22 0.52 V	542
Resolver Res 26 10 V	543

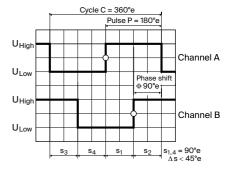


Robust encoders, DC tachometers, and resolvers with high accuracy and high signal resolution. Due to resonance, these are mainly mounted on motors with a continuous shaft. The assembly requires adjustment to the motors and may only be done in the delivery plant.

© 2024 maxon. All rights reserved.

Encoder MILE 256–2048 CPT, 2 channels, with line driver Integrated into motor





			Direction	or rotation cw (defi	inition cw p. 88)
Stock program Standard program		Article Numbers	s		
Special program (on request)	V1 with connector	673024	673025	673026	673027
	V2 with cable and connector	673028	673029	673030	673031
Туре					
Counts per turn		256	512	1024	2048
Number of channels		2	2	2	2
Max. operating frequency (kHz)		1000	1000	1000	1000
Max. speed (rpm)		10000	10000	10000	10000



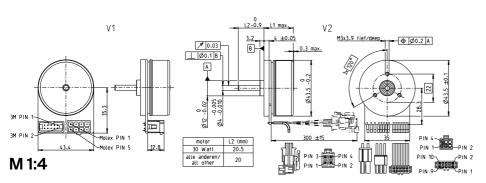


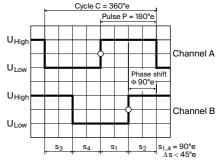


Modular System											
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length L1 max. [mm] / • see Gearhead					
EC 45 flat, 30 W, A	320					18.6	18.6	18.6	18.6		
EC 45 flat, 30 W, A	320	GP 32, 0.75-4.5 Nm	441			•	•	•	•		
EC 45 flat, 30 W, A	320	GP 32, 1.0 - 6.0 Nm	445			•	•	•	•		
EC 45 flat, 30 W, A	320	GP 42, 3.0 - 15.0 Nm	454			•	•	•	•		
EC 45 flat, 30 W, A	320	GS 45, 0.5 - 2.0 Nm	456			•	•	•	•		
EC 45 flat, 50 W, A	321					22.6	22.6	22.6	22.6		
EC 45 flat, 50 W, A	321	GP 32, 0.75 - 4.5 Nm	441			•	•	•	•		
EC 45 flat, 50 W, A	321	GP 32, 1.0 - 6.0 Nm	445			•	•	•	•		
EC 45 flat, 50 W, A	321	GP 42, 3.0 - 15.0 Nm	454			•	•	•	•		
EC 45 flat, 50 W, A	321	GS 45, 0.5 - 2.0 Nm	456			•	•	•	•		
EC 45 flat, 60 W, A	322					22.8	22.8	22.8	22.8		
EC 45 flat, 60 W, A	322	GP 32, 0.75 - 4.5 Nm	441			•	•	•	•		
EC 45 flat, 60 W, A	322	GP 32, .1.0 - 6.0 Nm	445			•	•	•	•		
EC 45 flat, 60 W, A	322	GP 42, 3.0 - 15.0 Nm	454			•	•	•	•		
EC 45 flat, 60 W, A	322	GS 45, 0.5 - 2.0 Nm	456			•	•	•	•		
EC 45 flat, 90 W, A	323					28.8	28.8	28.8	28.8		
EC 45 flat, 90 W, A	323	GP 32, 0.75 - 4.5 Nm	441			•	•	•	•		
EC 45 flat, 90 W, A	323	GP 32, 1.0 - 6.0 Nm	445			•	•	•	•		
EC 45 flat, 90 W, A	323	GP 42, 3.0 - 15.0 Nm	454			•	•	•	•		
EC 45 flat, 90 W, A	323	GS 45, 0.5 - 2.0 Nm	456			•	•	•	•		
, ,											

Supply voltage V _{Cc} 5 V ± 10% Typical current draw 15 mA Connection V1 Typical current draw 15 mA Connection V2 Sensors (AWG 24) Pin 1 Hall sensor 1 Pin 2 Hall sensor 2 Pin 3 V _{1 mat} 4.518 VDC Pin 4 Motor winding 3 Pin 5 V _{1 mat} 4.518 VDC Pin 6 N.C. Pin 5 V _{1 mat} 4.518 VDC Pin 1 N.C. Pin 1 N.C. Pin 2 Sensors (AWG 24) Pin 1 Hall sensor 2 Pin 3 Hall sensor 3 Pin 6 Motor winding 3 Pin 5 V _{1 mat} 4.518 VDC Pin 6 N.C. Pin 6 N.C. Pin 1 N.C. Pin 1 N.C. Pin 2 Sensors (AWG 24) Pin 1 Hall sensor 2 Pin 3 Hall sensor 3 Pin 2 Hall sensor 3 Pin 6 SMD Pin 5 V _{1 mat} 4.518 VDC Pin 6 N.C. Pin 6 N.C. Pin 1 N.C. Pin 1 N.C. Pin 1 N.C. Pin 2 SMD Pin 1 N.C. Pin 2 V ₂ Pin 3 Hall sensor 3 Pin 6 Notor winding 2 Pin 3 Motor winding 2 Pin 1 Motor winding 2 Pin 1 N.C. Pin 2 V ₂ Pin 1 N.C. Pin 2 V ₂ Pin 1 N.C. Pin 2 V ₂ Pin 3 Hall sensor 3 Pin 6 N.C. Pin 5 V ₂ Pin 1 N.C. Pin 1 N.C. Pin 2 V ₂ Pin 1 N.C. Pin 2 V ₂ Pin 1 N.C. Pin 3 GND Pin 4 N.C. Pin 2 V ₂ Pin 3 Hall sensor 3 Pin 4 N.C. Pin 3 Motor winding 2 Pin 3 Motor winding 2 Pin 3 Motor winding 3 Pin 4 N.C. Pin 1 N.C. Pin 2 V ₂ Pin 1 N.C. Pin 2 V ₂ Pin 1 N.C. Pin 3 GND Pin 4 N.C. Pin 2 V ₂ Pin 3 Hall sensor 3 Pin 4 N.C. Pin 1 N.C. Pin 3 Motor winding 2 Pin 3

Encoder MILE 256–2048 CPT, 2 channels, with line driver Integrated into motor

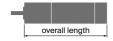




Direction of rotation cw (definition cw p. 67)

Stock program Standard program		Article Numbers					
Special program (on request)	V1 with connector	673024	673025	673026	673027		
	V2 with cable and connector	673028	673029	673030	673031		
Type							
Counts per turn		256	512	1024	2048		
Number of channels		2	2	2	2		
Max. operating frequency (kHz)		1000	1000	1000	1000		
Max. speed (rpm)		10000	10000	10000	10000		

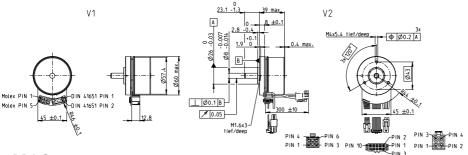


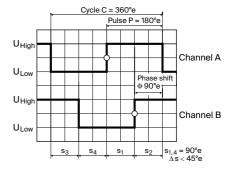


Modular System										
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length L1 max. [mm] / • see Gearhead				
EC 45 flat, 70 W, A	324		-			28.4	28.4	28.4	28.4	
EC 45 flat, 70 W, A	324	GP 32, 0.75 - 4.5 Nm	441			•	•	•	•	
EC 45 flat, 70 W, A	324	GP 32, 1.0 - 6.0 Nm	445			•	•	•	•	
EC 45 flat, 70 W, A	324	GP 42, 3.0 - 15.0 Nm	454			•	•	•	•	
EC 45 flat, 70 W, A	324	GS 45, 0.5 - 2.0 Nm	456			•	•	•	•	
EC 45 flat, 80 W, A	325					27.8	27.8	27.8	27.8	
EC 45 flat, 80 W, A	325	GP 32, 0.75 - 4.5 Nm	441			•	•	•	•	
EC 45 flat, 80 W, A	325	GP 32, 1.0 - 6.0 Nm	445			•	•	•	•	
EC 45 flat, 80 W, A	325	GP 42, 3.0 - 15.0 Nm	454			•	•	•	•	
EC 45 flat, 80 W, A	325	GS 45, 0.5 - 2.0 Nm	456			•	•	•	•	
EC 45 flat, 120 W, A	326					33.8	33.8	33.8	33.8	
EC 45 flat, 120 W, A	326	GP 32, 0.75 - 4.5 Nm	441			•	•	•	•	
EC 45 flat, 120 W, A	326	GP 32, 1.0 - 6.0 Nm	445			•	•	•	•	
EC 45 flat, 120 W, A	326	GP 42, 3.0 - 15.0 Nm	454			•	•	•	•	
EC 45 flat, 120 W, A	326	GS 45, 0.5 - 2.0 Nm	456			•	•	•	•	

Technical Data		Pin Allocation		Pin Allocation
Supply voltage V_{cc} Typical current draw Output signal CM Signal rise time (typically, at C_L = 25 pF, R_L = 1 k Ω , 25 °C) Signal fall time (typically, at C_L = 25 pF, R_L = 1 k Ω , 25 °C) Operating temperature range Moment of inertia of code wheel Output current per channel Open collector output of the Hall sensor with integrated pull-up resistor	$10 \text{ k}\Omega \pm 20\%$	Connection VI Motor + Sensors Pin 1 Hall sensor 1 Pin 2 Hall sensor 2 Pin 3 V _{Hall} 4.518 VDC Pin 4 Motor winding 3 Pin 5 Hall sensor 3 Pin 6 GND Pin 7 Motor winding 1 Pin 8 Motor winding 2 Encoder Pin 1 N.C. Pin 2 V _{CC} Pin 3 GND Pin 4 N.C.	Connection V2 Sensors (AWG 24) Pin 1 Hall sensor 1 Pin 2 Hall sensor 2 Pin 3 Hall sensor 3 Pin 4 GND Pin 5 V _{Hall} 4.518 VDC Pin 6 N.C. Motor (AWG 22) Pin 1 Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 Not connected Encoder (AWG 28) Pin 1 N.C.	Pin Allocation Line receiver Recommended IC's: - MC 3486 - SN 75175 - AM 26 LS 32 Channel A Channel B Channel B Channel B
•	$10 \text{ k}\Omega \pm 20\%$			Channel B Channel B
Additional information can be found under 'Downloads' in the maxon online s	shop.		DIIV 41031/EN 00003-13	Opt. terminal resistance R = typical 120 Ω Capacitor C \geq 0.1 nF per m line length

Encoder MILE 512–4096 CPT, 2 channels, with line driver Integrated into motor





M 1:6

Direction of rotation cw (definition cw p. 88)

				•	
Stock program Standard program Special program (on request)		Part Numbers			
Special program (or request)	V1 with connector	651156	651163	651166	651168
	V2 with cable and connector	421985	421986	421987	421988
ре					
Counts per turn		512	1024	2048	4096
Number of channels		2	2	2	2
Max. operating frequency (kHz)		1000	1000	1000	1000
Max. speed (rpm)		6000	6000	6000	6000

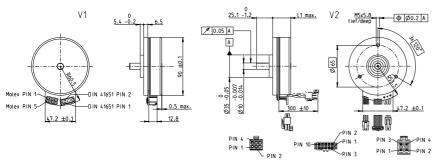


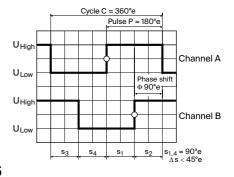


Modular System										
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length L1 ma	ax. [mm] / • see	Gearhead		
EC 60 flat, 100 W	329					39.0	39.0	39.0	39.0	
EC 60 flat, 100 W	329	GP 52, 4 - 30 Nm	458			•	•	•	•	
EC 60 flat, 100 W	329	GB 80	462			•	•	•	•	
EC 60 flat, 150 W	330					39.0	39.0	39.0	39.0	
EC 60 flat, 150 W	330	GP 52, 4 - 30 Nm	458			•	•	•	•	
EC 60 flat, 150 W	330	GB 80	462			•	•	•	•	
EC 60 flat, 200 W	331					46.5	46.5	46.5	46.5	
EC 60 flat, 200 W	331	GP 52, 4 - 30 Nm	458			•	•	•	•	
EC 60 flat, 200 W	331	GB 80	462			•	•	•	•	

Technical Data	Pin Allocation	Connection example
Supply voltage V_{CC} 5 V \pm 10 Typical current draw 15 m Output signal CMOS compatit Signal rise time (typically, at $C_L = 25$ pF, $R_L = 1$ k Ω , 25 °C) 100 Signal fall time (typically, at $C_L = 25$ pF, $R_L = 1$ k Ω , 25 °C) 100 Operating temperature range -40+100 Moment of inertia of code wheel \leq 13 gcl Output current per channel max. 4 m Open collector output of the Hall sensors with integrated pull-up resistor 10 k Ω \pm 20 Wiring diagram for Hall sensors see p. 67	A Motor + Sensors Sensors (AWG 28)	Line receiver Recommended IC's: - MC 3486 - SN 75175 - AM 26 LS 32 Channel A Channel B Channel B
Additional information can be found under 'Downloads' in the maxon online shop.		Opt. terminal resistance R = typical 120 Ω Capacitor C \geq 0.1 nF per m line length

Encoder MILE 512–6400 CPT, 2 channels, with line driver Integrated into motor





M 1:6

Direction of rotation cw (definition cw p. 88)

Stock program Standard program	Part Numbers								
Special program (on request)	V1 with connector 621796 621789 621795 621790 621794 6					621791	621793	621792	
	V2 with cable and connector	607517	607510	607516	607511	607515	607512	607514	607513
Туре									
Counts per turn		512	800	1024	1600	2048	3200	4096	6400
Number of channels		2	2	2	2	2	2	2	2
Max. operating frequency (kHz)		1000	1000	1000	1000	1000	1000	1000	1000
Max. speed (rpm)		5000	5000	5000	5000	5000	5000	5000	5000



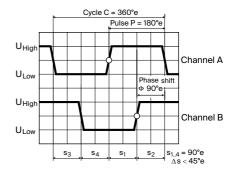


Modular System													
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length L1 max. [mm] / • see Gearhead							
EC 90 flat, 160 W	332		. 0			28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
EC 90 flat, 160 W	332	GP 52, 4.0 - 30.0 Nm	458			•	•	•	•	•	•	•	•
EC 90 flat, 160 W	332	GB 80/12/9/65, 6.0 - 120.0 Nm	462-465			•	•	•	•	•	•	•	•
EC 90 flat, 220 W	333					28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
EC 90 flat, 220 W	333	GP 52, 4.0 - 30.0 Nm	458			•	•	•	•	•	•	•	•
EC 90 flat, 220 W	333	GB 80/12/9/65, 6.0 - 120.0 Nm	462-465			•	•	•	•	•	•	•	•
EC 90 flat, 360 W	334					40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
EC 90 flat, 360 W	334	GP 52, 4.0 - 30.0 Nm	458			•	•	•	•	•	•	•	•
EC 90 flat, 360 W	334	GB 80/12/9/65, 6.0 - 120.0 Nm	462-465			•	•	•	•	•	•	•	•
EC 90 flat, 260 W	335					40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
EC 90 flat, 260 W	335	GP 52, 4.0 - 30.0 Nm	458			•	•	•	•	•	•	•	•
EC 90 flat, 260 W	335	GB 80/12/9/65, 6.0 - 120.0 Nm	462-465			•	•	•	•	•	•	•	•
EC 90 flat, 400 W	336					40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
EC 90 flat, 400 W	336	GP 52, 4.0 - 30.0 Nm	458			•	•	•	•	•	•	•	•
EC 90 flat, 400 W	336	GB 80/12/9/65, 6.0 - 120.0 Nm	462-465			•	•	•	•	•	•	•	•
EC 90 flat, 600 W	337					53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
EC 90 flat, 600 W	337	GP 52, 4.0 - 30.0 Nm	458			•	•	•	•	•	•	•	•
EC 90 flat, 600 W	337	GB 80/12/9/65, 6.0 - 120.0 Nm	462-465			•	•	•	•	•	•	•	•

Technical Data		Pin Allocation		Connection example
Supply voltage V _{CC} Typical current draw	5 V ± 10% 15 mA	Connection V1 Motor + Sensors	Connection V2 Sensors (AWG 24)	Line receiver Recommended IC's:
Output signal driver used: Signal rise and fall times	CMOS compatible	Pin 1 Hall sensor 1 Pin 2 Hall sensor 2 Pin 3 V _{Hall} 3.518 VDC Pin 4 Motor winding 3	Pin 1 Hall sensor 1 Pin 2 Hall sensor 2 Pin 3 Hall sensor 3 Pin 4 GND	Page Control
(typically, at $C_L = 25$ pF, $R_L = 1$ k Ω , 25 °C Operating temperature range Moment of inertia of code wheel	C) 100 ns -40+100°C ≤ 65 gcm²	Pin 5 Hall sensor 3 Pin 6 GND Pin 7 Motor winding 1 Pin 8 Motor winding 2	Pin 5 V _{Hall} 3.518 VDC Pin 6 NTC* Motor (AWG 16)	Channel A O
Output current per channel Open collector output of the Hall sens with integrated pull-up resistor	max. 4 mA	Encoder	Pin 1 Motor winding 1 Pin 2 Motor winding 2 Pin 3 Motor winding 3 Pin 4 Not connected	Channel B Q — — — — — — — — — — — — — — — — — —
Wiring diagram for Hall sensors see p		Pin 1 N.C. Pin 2 V _{cc} Pin 3 GND Pin 4 N.C. Pin 5 Channel A	Encoder (AWG 28) Pin 1 N.C. Pin 2 V _{cc} Pin 3 GND Pin 4 N.C.	Channel B Channe
		Pin 6 Channel A Pin 7 Channel B Pin 8 Channel B Pin 9 Do not connect Pin 10 Do not connect	Pin 5 Channel Ā Pin 6 Channel A Pin 7 Channel B Pin 8 Channel B Pin 9 Do not connect Pin 10 Do not connect	Warning: This motor with temperature sensor must not be connected directly to the Hall sensor matching connector of a maxon controller. The contact of the NTC would have to be removed from
Additional information can be for a		Pin type: 46015-0806 Molex DIN 41651/EN 60603-13	43025-0600 Molex 39-01-2040 Molex DIN 41651/EN 60603-13	the Hall sensor in this case.
Additional information can be found under 'Downloads' in the maxon online	e shop.	*NTC resistance 25°C: 5 kΩ ± 1%	, beta (25-85°C): 3490 K	Opt. terminal resistance R = typical 120 Ω Capacitor C \geq 0.1 nF per m line length

Encoder MR Type S, 16 CPT, 2 channels





Direction of rotation cw (definition cw p. 88)

Stock program
Standard program
Special program (on request)

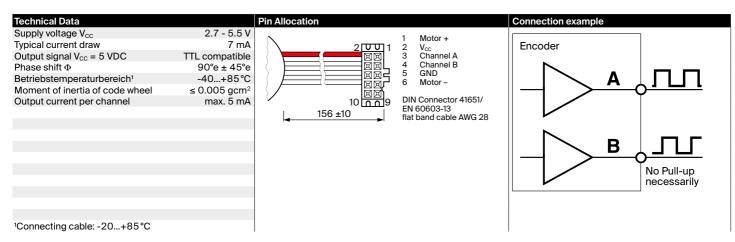
Part Numbers 201933 224702

Type	
Counts per turn 16	16
Number of channels 2	2
Max. operating frequency (kHz) 8	8
Max. speed (rpm) 30 000 30	000



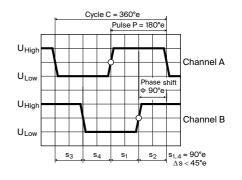


Modular System											
+ Motor	Page	+ Gearhead	Page	Ø Enc [mm]	Overall le	ngth [m	m] / • see	Gearhe	ead		
RE 10, 0.75 W	130			10	22.8						
RE 10, 0.75 W	130	GP 10, 0.005 - 0.15 Nm	418/419	10	•						
RE 10, 1.5 W	132			10	30.4						
RE 10, 1.5 W	132	GP 10, 0.005 - 0.15 Nm	418/419	10	•						
RE 13, 0.75 W	135			13		26.3					
RE 13, 0.75 W	136			13		28.7					
RE 13, 0.75 W	136	GP 13, 0.2 - 0.35 Nm	421	13		•					
RE 13, 2 W	139			13		38.5					
RE 13, 2 W	140			13		40.9					
RE 13, 2 W	140	GP 13, 0.2 - 0.35 Nm	421	13		•					
RE 13, 1.5 W	143			13		28.4					
RE 13, 1.5 W	144			13		30.8					
RE 13, 1.5 W	144	GP 13, 0.2 - 0.35 Nm	421	13		•					
RE 13, 3 W	147			13		40.6					
RE 13, 3 W	148			13		43.0					
RE 13, 3 W	148	GP 13, 0.2 - 0.35 Nm	421	13		•					
A-max 12, 0.5 W	168			12	25.3						
A-max 12, 0.5 W	168	GP 10, 0.01 - 0.15 Nm	419	12	•						
A-max 12, 0.5 W	168	GS 12, 0.01 - 0.03 Nm	420	12	•						
A-max 12, 0.5 W	168	GP 13, 0.2 - 0.35 Nm	421	12	•						



Encoder MR Type M, 32 CPT, 2 channels





Direction of rotation cw (definition cw p. 88)

Stock program
Standard program
Special program (on request)

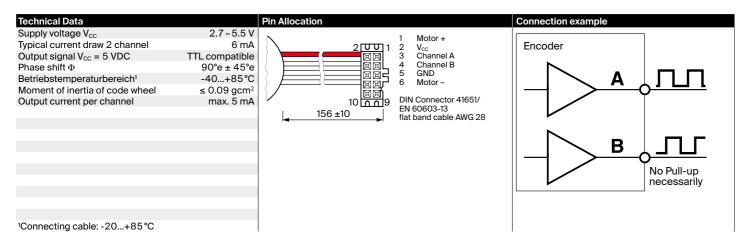
Part Numbers
201935

		201933	
E	Гуре		
	Counts per turn	32	
	Number of channels	2	
	Max. operating frequency (kHz)	8	
	Max. speed (rpm)	15000	



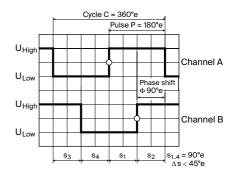


- Motor	Page	+ Gearhead	Page	Ø Fnc [mm]	Overall length [mm] / • see	Gearhead	
RE 16, 2 W	149	T GCallicau	i age	16	28.0	Gearrieau	
RE 16, 2 W	149	GP 16, 0.1 - 0.6 Nm	426/427	16	28.0		
,		GP 16 S	473-475	16			
RE 16, 2 W	149 151	GP 10 3	473-475	16	45.4		
RE 16, 3.2 W		GP 16. 0.1 - 0.6 Nm	426/427	16	45.4		
RE 16, 3.2 W	151	,			•		
RE 16, 3.2 W	151	GP 16 S	473-475	16	•		
RE 16, 4.5 W	153	0010 01 0011	400/407	16	48.4		
RE 16, 4.5 W	153	GP 16, 0.1 - 0.6 Nm	426/427	16	•		
RE 16, 4.5 W	153	GP 16 S	473-475	16	•		
A-max 16	170/172			16	30.4		
A-max 16		GS 16, 0.01 - 0.1 Nm	422-425	16	•		
A-max 16		GP 16, 0.1 - 0.3 Nm	426	16	•		
A-max 16	170/172	GP 16 S	473-475	16	•		
A-max 19, 1.5 W	174			19	34.0		
A-max 19, 1.5 W	174	GP 19, 0.1 - 0.3 Nm	428	19	•		
A-max 19, 1.5 W	174	GP 22, 0.5 - 2.0 Nm	432	19	•		
A-max 19, 1.5 W	174	GS 24, 0.1 Nm	436	19	•		
A-max 19, 1.5 W	174	GP 22 S	476/477	19	•		
A-max 19, 2.5 W	176			19	35.8		
A-max 19, 2.5 W	176	GP 19, 0.1 - 0.3 Nm	428	19	•		
A-max 19, 2.5 W	176	GP 22, 0.5 - 2.0 Nm	432	19	•		
A-max 19, 2.5 W	176	GS 24, 0.1 Nm	436	19	•		
A-max 19, 2.5 W	176	GP 22 S	476/477	19	•		
A-max 22	178/180			22	36.9		
A-max 22		GP 22, 0.1 - 0.3 Nm	429	22	•		
A-max 22		GP 22, 0.5 - 2.0 Nm	429-432	22	•		
4-max 22		GS 24, 0.1 Nm	436	22	•		
4-max 22	178/180	,	476/477	22	•		
-IIIGA ZZ	110/100	UI 22 3	710/411	44	•		



Encoder 8 OPT 50 CPT, 2 channels





Direction of rotation cw (definition cw p. 88)

Stock program
Standard program
Special program (on request)

Type (provisional)

Max. operating frequency (kHz)

473594	
50	

Part Numbers

2

15

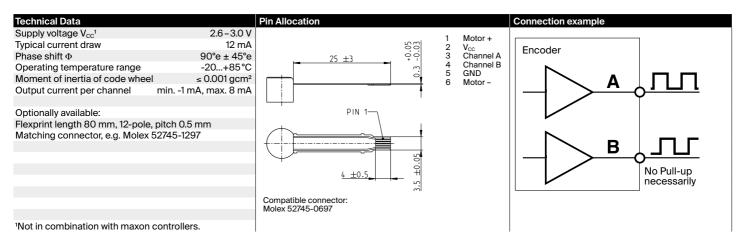
18000

Max. speed (rpm)

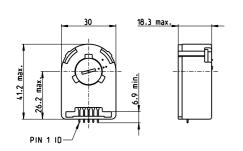
Counts per turn Number of channels



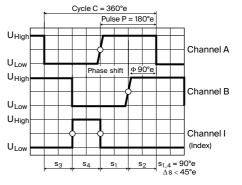
overall length	ļ.—	overali length						
Modular System								
+ Motor	Page	+ Gearhead	Page	Ø Enc [mm]	Overall length [mm] / •:	see Gearhead		
RE 8, 0.5 W, A	128	OD 0 001 01N	417	8	24.2			
RE 8, 0.5 W, A RE 8, 0.5 W, A	128 128	GP 8, 0.01 - 0.1 Nm GP 8 S	417 471-472	8	•			
RE 0, U.5 W, A	120	GF 0 3	4/1-4/2	0	•			



Encoder HEDS 5540 500 CPT, 3 channels







Direction of rotation cw (definition cw p. 88)

Stock program
Standard program
Special program (on request)

Standard program	rarramsoro			
Special program (on request)	110511	110513	110515	110517
Туре				
Counts per turn	500	500	500	500
Number of channels	3	3	3	3
Max. operating frequency (kHz)	100	100	100	100
Max. speed (rpm)	12000	12000	12000	12000
Shaft diameter (mm)	3	4	6	8

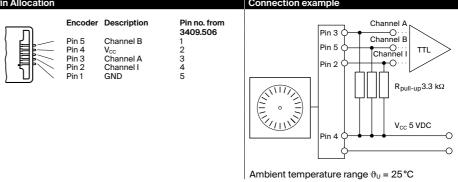




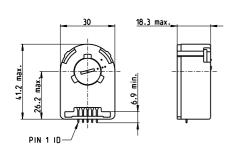


+ Motor Page + Gearhead Page + Brake Page Overall length [mm] / ● see Gearhead RE 25 154/156 75.3 RE 25 154/156 GP 26, 0.75-4.5 Nm 437 RE 25 154/156 GP 32, 0.75-6.0 Nm 439-443 RE 25 154/156 KD 32, 1.0-4.5 Nm 450 RE 25, 20 W 156 GP 32 S RE 25, 20 W 156 GP 26, 0.75-4.5 Nm 437 RE 25, 20 W 156 GP 32, 0.75-6.0 Nm 439-443 AB 28 RE 25, 20 W 156 GP 32, 0.75-6.0 Nm 439-443 AB 28 RE 25, 20 W 156 GP 32 S 478-486 AB 28 RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440 RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440 RE 30, 60 W 158 GP 32, 0.75-6.0 Nm 439-446 RE 30, 60 W 158 GP 32 S 478-486	
RE 25	
RE 25, 20 W 156	
RE 25, 20 W 156 GP 26, 0.75-4.5 Nm 437 AB 28 585 RE 25, 20 W 156 GP 32, 0.75-6.0 Nm 439-443 AB 28 585 RE 25, 20 W 156 KD 32, 1.0-4.5 Nm 450 AB 28 585 RE 25, 20 W 156 GP 32 S 478-486 AB 28 585 RE 30, 15 W 157 88.8 RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440 RE 30, 60 W 158 GP 32, 0.75-6.0 Nm 439-446 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450	
RE 25, 20 W 156 GP 32, 0.75-6.0 Nm 439-443 AB 28 585 RE 25, 20 W 156 KD 32, 1.0-4.5 Nm 450 AB 28 585 RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440 RE 30, 60 W 158 GP 32, 0.75-6.0 Nm 439-446 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450	
RE 25, 20 W 156 KD 32, 1.0-4.5 Nm 450 AB 28 585 RE 25, 20 W 156 GP 32 S 478-486 AB 28 585 RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440 RE 30, 60 W 158 GP 32, 0.75-6.0 Nm 439-446 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450	
RE 25, 20 W 156 GP 32 S 478-486 AB 28 585 RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440 RE 30, 60 W 158 GP 32, 0.75-6.0 Nm 439-446 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450	
RE 30, 15 W 157 88.8 RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440 RE 30, 60 W 158 GP 32, 0.75-6.0 Nm 439-446 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450	
RE 30, 15 W 157 GP 32, 0.75-4.5 Nm 440	
RE 30, 60 W 158 RE 30, 60 W 158 GP 32, 0.75-6.0 Nm 439-446 RE 30, 60 W 158 KD 32, 1.0-4.5 Nm 450	
RE 30, 60 W 158 GP 32, 0.75 - 6.0 Nm 439 - 446 PE 30, 60 W 158 KD 32, 1.0 - 4.5 Nm 450	
RE 30, 60 W 158 KD 32, 1.0 - 4.5 Nm 450	
RE 30, 60 W 158 GP 32 S 478-486	
RE 35, 90 W 159 91.7	
RE 35, 90 W 159 GP 32, 0.75 - 8.0 Nm 439 - 447	
RE 35, 90 W 159 GP 42, 3.0 - 15 Nm 452	
RE 35, 90 W 159 GP 32 S 478-486	
RE 35, 90 W 159 AB 28 585 124.3	
RE 35, 90 W 159 GP 32, 0.75 - 8.0 Nm 439 - 447 AB 28 585	
RE 35, 90 W 159 GP 42, 3.0 - 15 Nm 452 AB 28 585 •	
RE 35, 90 W 159 GP 32 S 478-486 AB 28 585	
RE 40, 25 W 160 91.7	
RE 40, 150 W 161	
RE 40, 150 W 161 GP 42, 3.0 - 15 Nm 452	
RE 40, 150 W 161 GP 52, 4.0 - 30 Nm 457	
RE 40, 150 W 161 AB 28 585 124.3	
RE 40, 150 W 161 GP 42, 3.0 - 15 Nm 452 AB 28 585	
RE 40, 150 W 161 GP 52, 4.0 - 30 Nm 457 AB 28 585	

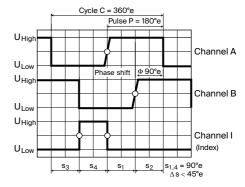
Technical Data		Pin Allocation	
Supply voltage V _{CC}	5 V ± 10%		Forest
Typical current draw	55 mA		Encod
Output signal	TTL compatible		Pin 5
Phase shift Φ	90°e ± 45°e		Pin 4
Signal rise time			Pin 3
(typically, at $C_1 = 25 \text{ pF}, R_1 = 2.7 \text{ kg}$	Ω, 25°C) 180 ns	5 \	Pin 2 Pin 1
Signal fall time			FIIII
(typically, at $C_L = 25$ pF, $R_L = 2.7$ ks	Ω, 25°C) 40 ns		
Index pulse width (nominal)	90°e		
Operating temperature range	-40+100°C		
Moment of inertia of code wheel	≤ 0.6 gcm ²		
Max. angular acceleration	250 000 rad s ⁻²		
Output current per channel	min1 mA, max. 5 mA		
The index signal I is synchronized	d with channel A or B.		



Encoder HEDS 5540 500 CPT, 3 channels







Direction of rotation cw (definition cw p. 88)

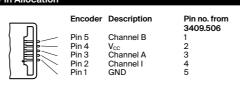
Stock program
Standard program
Special program (on request)

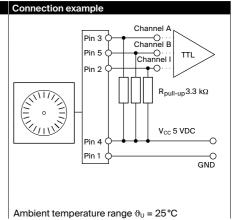
Stock program Standard program	Part Numbers				
Special program (on request)	110511	110513	110515	110517	
Туре					
Counts per turn	500	500	500	500	
Number of channels	3	3	3	3	
Max. operating frequency (kHz)	100	100	100	100	
Max. speed (rpm)	12000	12000	12000	12000	
Shaft diameter (mm)	3	4	6	8	

Modular System										
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] /	ana Coarboad			
RE 25, 20 W	155	T Gearrieau	raye	T DI ake	raye	63.8	see Gearrieau			
RE 25, 20 W	155	GP 26, 0.75-4.5 Nm	437			03.0				
RE 25, 20 W	155	GP 32, 0.75-4.5 Nm	439							
RE 25, 20 W	155	GP 32, 0.75-6.0 Nm	440/443			•				
RE 25, 20 W	155	KD 32, 1.0 - 4.5 Nm	450							
RE 25, 20 W	155	GP 32 S	478-486							
- / -	155	GP 32 S	478-486		585	04.2				
RE 25, 20 W		OD 00 OF N==	401	AB 28	585	94.3				
RE 25, 20 W	155	GP 22, 0.5 Nm	431	4 D 00	505	•				
RE 25, 20 W	155	GP 26, 0.75 - 4.5 Nm	437	AB 28	585	•				
RE 25, 20 W	155	GP 32, 0.75 - 4.5 Nm	439	AB 28	585	•				
RE 25, 20 W	155	GP 32, 0.75 - 6.0 Nm	440/443		585	•				
RE 25, 20 W	155	KD 32, 1.0 - 4.5 Nm	450	AB 28	585	•				
RE 25, 20 W	155	GP 32 S	478-486	AB 28	585	•				
RE 50, 200 W	162								128.7	
RE 50, 200 W	162	GP 52, 4-30 Nm	457						•	
RE 50, 200 W	162	GP 62, 6.2-38.5 Nm	459						•	
RE 65, 250 W	163								157.3	
RE 65, 250 W	163	GP 81, 15.4 - 92.3 Nm	460						•	
A-max 26	181-184					63.5				
A-max 26		GP 26, 0.75 - 4.5 Nm	437			•				
A-max 26		GS 30, 0.07-0.2 Nm	438			•				
A-max 26	181-184	GP 32, 0.75 - 4.5 Nm	439			•				
A-max 26		GP 32, 0.75 - 6.0 Nm	441/443			•				
A-max 26	181-184	GS 38, 0.1-0.6 Nm	451			•				
A-max 26	181-184	GP 32 S	478-486			•				
A-max 32	186						82.3			
A-max 32	186	GP 32, 0.75-6.0 Nm	439-445				•			
A-max 32	186	GS 38, 0.1-0.6 Nm	451				•			
A-max 32	186	GP 32 S	478-486				•			
EC 32, 80 W	267						78.4			
EC 32, 80 W	267	GP 32, 0.75-6.0 Nm	439-446				•			
EC 32, 80 W	267	GP 32 S	478-486				•			
EC 40, 170 W	268						1	03.4		
EC 40, 170 W	268	GP 42, 3.0-15 Nm	452					•		
EC 40, 170 W	268	GP 52, 4.0-30 Nm	457					•		
,		,								

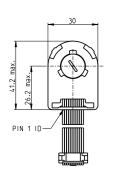
Technical Data			I
Supply voltage V _{CC}	5	V ± 10%	
Typical current draw		55 mA	
Output signal	TTL co	mpatible	
Phase shift Φ	90	°e ± 45°e	
Signal rise time			
(typically, at $C_L = 25 \text{ pF}$, $R_L = 2.7 \text{ k}$	Ω, 25°C)	180 ns	
Signal fall time			
(typically, at $C_L = 25 \text{ pF}$, $R_L = 2.7 \text{ k}$	Ω, 25°C)	40 ns	
Index pulse width		90°e	
Operating temperature range	-40	+100°C	
Moment of inertia of code wheel	≤	0.6 gcm ²	
Max. angular acceleration	2500	00 rad s ⁻²	
Output current per channel	min1 mA, m	nax. 5 mA	

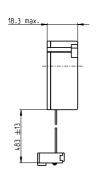
The index signal I is synchronized with channel A or B.



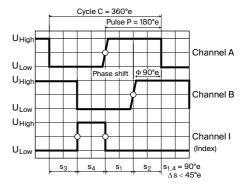


Encoder HEDL 5540 500 CPT, 3 channels, with line driver RS 422









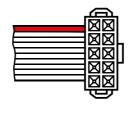
Direction of rotation cw (definition cw p. 88)

Stock program Standard program	Part Numbers					
Special program (on request)	110512	110514	110516	110518		
Туре						
Counts per turn	500	500	500	500		
Number of channels	3	3	3	3		
Max. operating frequency (kHz)	100	100	100	100		
Max. speed (rpm)	12000	12000	12000	12000		
Shaft diameter (mm)	3	4	6	8		



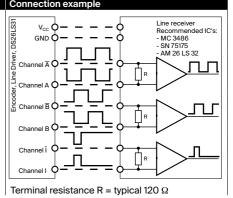
Modular System								
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] / • see	e Gearhead	
RE 25	154/156	1				75.3		
RE 25	154/156	GP 26/GP 32	437/439			•		
RE 25	154/156	KD 32, 1.0 - 4.5 Nm	450			•		
RE 25	154/156	GP 32, 0.75 - 6.0 Nm	440/443			•		
RE 25	154/156	GP 32 S	478-486			•		
RE 25, 20 W	155					63.8		
RE 25, 20 W	155	GP 22, 0.5 Nm	431			•		
RE 25, 20 W	155	GP 26/GP 32	437/439			•		
RE 25, 20 W	155	KD 32, 1.0 - 4.5 Nm	450			•		
RE 25, 20 W	155	GP 32, 0.75 - 6.0 Nm	440/443			•		
RE 25, 20 W	155	GP 32 S	478-486			•		
RE 25, 20 W	155			AB 28	585	94.3		
RE 25, 20 W	155	GP 26/GP 32	437/439	AB 28	585	•		
RE 25, 20 W	155	KD 32, 1.0 - 4.5 Nm	450	AB 28	585	•		
RE 25, 20 W	155	GP 32, 0.75 - 6.0 Nm	440/443	AB 28	585	•		
RE 25, 20 W	155	GP 32 S	478-486	AB 28	585	•		
RE 25, 20 W	156			AB 28	585	105.8		
RE 25, 20 W	156	GP 26/GP 32	437/439	AB 28	585	•		
RE 25, 20 W	156	KD 32, 1.0 - 4.5 Nm	450	AB 28	585	•		
RE 25, 20 W	156	GP 32, 0.75 - 6.0 Nm	440/443	AB 28	585	•		
RE 25, 20 W	156	GP 32 S	478-486	AB 28	585	•		
RE 30, 15 W	157					88.8		
RE 30, 15 W	157	GP 32, 0.75 - 4.5 Nm	440			•		
RE 30, 60 W	158					88.8		
RE 30, 60 W	158	GP 32, 0.75 - 6.0 Nm	439-446			•		
RE 30, 60 W	158	KD 32, 1.0 - 4.5 Nm	450			•		
RE 30, 60 W	158	GP 32 S	478-486			•		
RE 35, 90 W	159					9	91.7	
RE 35, 90 W	159	GP 32, 0.75 - 8.0 Nm	439-448				•	
RE 35, 90 W	159	GP 42, 3.0 - 15.0 Nm	452				•	
RE 35, 90 W	159	GP 32 S	478-486				•	
RE 35, 90 W	159			AB 28	585	124.3		
RE 35, 90 W	159	GP 32, 0.75 - 8.0 Nm	439-448	AB 28	585	•		
RE 35, 90 W	159	GP 42, 3.0 - 15.0 Nm	452	AB 28	585	•		
RE 35, 90 W	159	GP 32 S	479-486	AB 28	585	•		

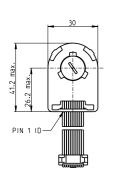
Technical Data		Pin Allocation
Supply voltage V _{cc}	5 V ± 10%	
Typical current draw	55 mA	
Output signal	EIA Standard RS 422	
driver used:	DS26LS31	
Phase shift Φ	90°e ± 45°e	
Signal rise time		
(typically, at $C_L = 25$ pF, $R_L = 2.7$ k Ω	2, 25°C) 180 ns	
Signal fall time		
(typically, at $C_L = 25$ pF, $R_L = 2.7$ k Ω	2, 25°C) 40 ns	
Index pulse width	90°e	
Operating temperature range	-40+100°C	
Moment of inertia of code wheel	≤ 0.6 gcm ²	
Max. angular acceleration	250 000 rad s ⁻²	
Output current per channel	± 20 mA	
The index signal I is synchronized	with channel A or B.	

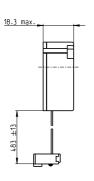


- 1 N.C.
 2 V_{CC}
 3 GND
 4 N.C.
 5 Channel Ā
 6 Channel B
 8 Channel B
 9 Channel I (Index)
 10 Channel I (Index)

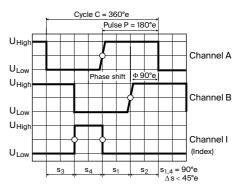
Pin type DIN 41651/ EN 60603-13 flat band cable AWG 28











Direction of rotation cw (definition cw p. 88)

Stock program
Standard program

Counts per turn Number of channels Max. operating frequency (kHz)

Max. speed (rpm) Shaft diameter (mm)

Standard program
Special program (on request)

Part Numbers			
110512	110514	110516	110518
500	500	500	500
3	3	3	3
100	100	100	100
12000	12000	12000	12000
3	4	6	8

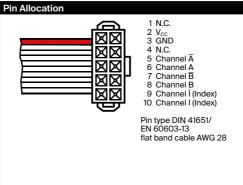


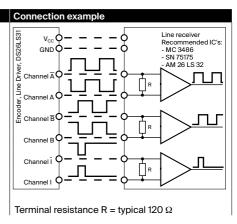




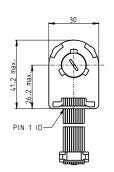
Modular System										
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] / • see Gearhe	ead		
RE 40, 25 W	160						91.7			
RE 40, 150 W	161						91.7			
RE 40, 150 W	161	GP 42, 3.0 - 15.0 Nm	452				•			
RE 40, 150 W	161	GP 52, 4.0 - 30.0 Nm	457				•			
RE 40, 150 W	161			AB 28	585	124.3				
RE 40, 150 W	161	GP 42, 3.0 - 15.0 Nm	452	AB 28	585	•				
RE 40, 150 W	161	GP 52, 4.0 - 30.0 Nm	457	AB 28	585	•				
RE 50, 200 W	162								128.7	
RE 50, 200 W	162	GP 52, 4.0 - 30.0 Nm	457						•	
RE 50, 200 W	162	GP 62, 6.2 - 38.5 Nm	459						•	
RE 65, 250 W	163								157.3	
RE 65, 250 W	163	GP 81, 15.4-92.3 Nm	460						•	
A-max 26	181-184	•				63.5				
A-max 26	181-184	GP 26, 0.75 - 4.5 Nm	437			•				
A-max 26	181-184	GS 30/GP 32	438/441			•				
A-max 26	181-184	GP 32, 0.75 - 6.0 Nm	441/443			•				
A-max 26	181-184	GS 38, 0.1 - 0.6 Nm	451			•				
A-max 26	181-184	GP 32 S	478-486			•				
A-max 32	186						82.3			
A-max 32	186	GP 32, 0.75 - 6.0 Nm	439-443				•			
A-max 32	186	GS 38, 0.1 - 0.6 Nm	451				•			
A-max 32	186	GP 32 S	478-486				•			
EC 32, 80 W	267						78.4			
EC 32, 80 W	267	GP 32, 0.75 - 6.0 Nm	439-446				•			
EC 32, 80 W	267	GP 32 S	478-486				•			
EC 40, 170 W	268							103.4		
EC 40, 170 W	268	GP 42, 3.0 - 15.0 Nm	452					•		
EC 40, 170 W	268	GP 52, 4.0 - 30.0 Nm	457					•		
EC-max 30, 40 W	280						62.7			
EC-max 30, 40 W	280	GP 32, 0.75 - 4.5 Nm	441				•			
EC-max 30, 40 W	280	GP 32, 1.0 - 8.0 Nm	442/447				•			
EC-max 30, 40 W	280	KD 32, 1.0 - 4.5 Nm	450				•			
EC-max 30, 40 W	280	GP 32 S	478-486				•			

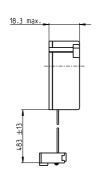
Technical Data	
Supply voltage V _{cc}	5 V ± 10%
Typical current draw	55 mA
Output signal	EIA Standard RS 422
driver used:	DS26LS31
Phase shift Φ	90°e ± 45°e
Signal rise time	
(typically, at $C_L = 25 \text{ pF}$, $R_L = 2.7 \text{ k}\Omega$	2, 25°C) 180 ns
Signal fall time	
(typically, at $C_L = 25 \text{ pF}$, $R_L = 2.7 \text{ k}\Omega$	2, 25°C) 40 ns
Index pulse width	90°e
Operating temperature range	-40+100°C
Moment of inertia of code wheel	≤ 0.6 gcm ²
Max. angular acceleration	250 000 rad s ⁻²
Output current per channel	± 20 mA
The index signal I is synchronized	with channel A or B.



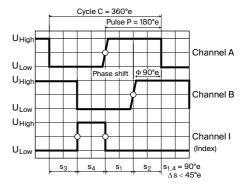


Encoder HEDL 5540 500 CPT, 3 channels, with line driver RS 422









Direction of rotation cw (definition cw p. 88)

Stock program
Standard program
Special program (on request)

Standard program					
Special program (on request)	110512	110514	110516	110518	
Туре					
Counts per turn	500	500	500	500	
Number of channels	3	3	3	3	
Max. operating frequency (kHz)	100	100	100	100	
Max. speed (rpm)	12000	12000	12000	12000	
Shaft diameter (mm)	3	4	6	8	

Part Numbers

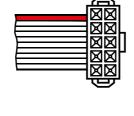






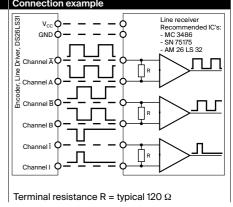
Modular System									
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [[mm] / • see Gearhead		
EC-max 30, 40 W	280			AB 20	582		98.2		
EC-max 30, 40 W	280	GP 32, 0.75 - 4.5 Nm	441	AB 20	582		•		
EC-max 30, 40 W	280	GP 32, 1.0 - 8.0 Nm	444/447	AB 20	582		•		
EC-max 30, 40 W	280	KD 32, 1.0 - 4.5 Nm	450	AB 20	582		•		
EC-max 30, 40 W	280	GP 32 S	478-486	AB 20	582		•		
EC-max 30, 60 W	281						84.7		
EC-max 30, 60 W	281	GP 32, 0.75 - 4.5 Nm	441				•		
EC-max 30, 60 W	281	GP 32, 1.0 - 8.0 Nm	444/447				•		
EC-max 30, 60 W	281	KD 32, 1.0 - 4.5 Nm	450				•		
EC-max 30, 60 W	281	GP 42, 3.0 - 15.0 Nm	453				•		
EC-max 30, 60 W	281	GP 32 S	478-486				•		
EC-max 30, 60 W	281			AB 20	582		120.2		
EC-max 30, 60 W	281	GP 32, 0.75 - 4.5 Nm	441	AB 20	582		•		
EC-max 30, 60 W	281	GP 32, 1.0 - 8.0 Nm	444/447	AB 20	582		•		
EC-max 30, 60 W	281	KD 32, 1.0 - 4.5 Nm	450	AB 20	582		•		
EC-max 30, 60 W	281	GP 42, 3.0 - 15.0 Nm	453	AB 20	582		•		
EC-max 30, 60 W	281	GP 32 S	478-486	AB 20	582		•		
EC-max 40, 70 W	282							81.4	
EC-max 40, 70 W	282	GP 42, 3.0 - 15.0 Nm	453					•	
EC-max 40, 70 W	282			AB 28	584			110.7	
EC-max 40, 70 W	282	GP 42, 3.0 - 15.0 Nm	453	AB 28	584			•	
EC-max 40, 120 W	283							111.4	
EC-max 40, 120 W		GP 42, 3.0 - 15.0 Nm	453					•	
EC-max 40, 120 W		GP 52, 4.0 - 30.0 Nm	458					•	
EC-max 40, 120 W				AB 28	584			140.7	
EC-max 40, 120 W		GP 42, 3.0 - 15.0 Nm	453	AB 28	584			•	
EC-max 40, 120 W	283	GP 52, 4.0 - 30.0 Nm	458	AB 28	584			•	

Technical Data			Pin Allocation
Supply voltage V _{cc}		5 V ± 10%	
Typical current draw		55 mA	
Output signal	EIA Stan	dard RS 422	
driver used:		DS26LS31	—
Phase shift Φ		90°e ± 45°e	
Signal rise time			
(typically, at $C_L = 25 \text{ pF}$, $R_L = 2.7 \text{ k}\Omega$	2, 25°C)	180 ns	
Signal fall time			
(typically, at $C_L = 25$ pF, $R_L = 2.7$ kΩ	2, 25°C)	40 ns	
Index pulse width		90°e	
Operating temperature range	-	-40+100°C	
Moment of inertia of code wheel		≤ 0.6 gcm ²	
Max. angular acceleration	25	0 000 rad s ⁻²	
Output current per channel		± 20 mA	



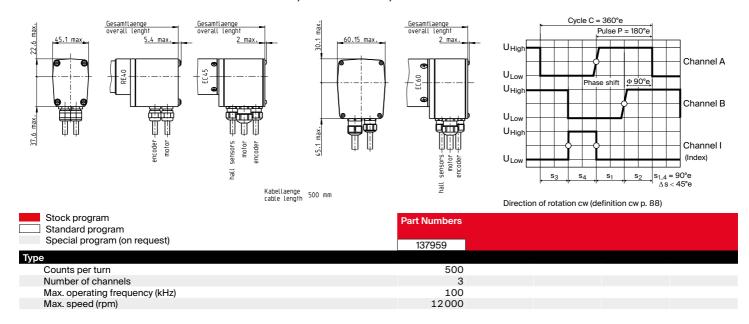
1 N.C.
2 V_{CC}
3 GND
4 N.C.
5 Channel Ā
6 Channel Ā
7 Channel B
8 Channel B
9 Channel I (Index)
10 Channel I (Index)

Pin type DIN 41651/ EN 60603-13 flat band cable AWG 28



The index signal I is synchronized with channel A or B.

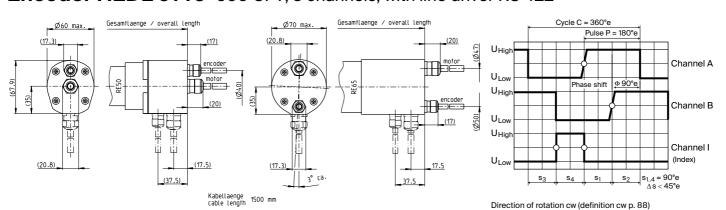
Encoder HEDL 9140 500 CPT, 3 channels, with line driver RS 422



overall length		overall length					
Modular System	1						
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] / • see Gearhead	
RE 40, 150 W	161					125.1	
RE 40, 150 W	161	GP 42, 3 - 15 Nm	452			•	
RE 40, 150 W	161	GP 52, 4 - 30 Nm	457			•	
RE 40, 150 W	161			AB 28	585-586	3 135.6	
RE 40, 150 W	161	GP 42, 3 - 15 Nm	452	AB 28	585-586	•	
RE 40, 150 W	161	GP 52, 4 - 30 Nm	457	AB 28	585-586	•	
EC 45, 150 W	269					126.8	
EC 45, 150 W	269	GP 42, 3 - 15 Nm	452			•	
EC 45, 150 W	269	GP 52, 4 - 30 Nm	457			•	
EC 45, 150 W	269			AB 28	586	135.6	
EC 45, 150 W	269	GP 42, 3 - 15 Nm	452	AB 28	586	•	
EC 45, 150 W	269	GP 52, 4 - 30 Nm	457	AB 28	586	•	
EC 45, 250 W	270					159.6	
EC 45, 250 W	270	GP 42, 3 - 15 Nm	452			•	
EC 45, 250 W	270	GP 52, 4 - 30 Nm	457-458			•	
EC 45, 250 W	270	GP 62, 6.2 - 38.5 Nm	459			•	
EC 45, 250 W	270			AB 28	586	168.4	
EC 45, 250 W	270	GP 42, 3 - 15 Nm	452	AB 28	586	•	
EC 45, 250 W	270	GP 52, 4 - 30 Nm	457-458	AB 28	586	•	
EC 45, 250 W	270	GP 62, 6.2 - 38.5 Nm	459	AB 28	586	•	
EC 60, 400 W	271					177.3	
EC 60, 400 W	271	GP 81, 15.4 - 92.3 Nm	460			•	
EC 60, 400 W	271			AB 41	588	214.9	
EC 60, 400 W	271	GP 81, 15.4 - 92.3 Nm	460	AB 41	588	•	

Technical Data		Pin Allocation	Connection example
Supply voltage V_{cc} Typical current draw Output signal driver used: Phase shift Φ Signal rise time (typically, at $C_L=25$ pF, $R_L=11$ k Ω , 25 Signal fall time (typically, at $C_L=25$ pF, $R_L=11$ k Ω , 25 Index pulse width Operating temperature range Moment of inertia of code wheel Max. angular acceleration Output current per channel	,	Cable white = 2 V_{CC} 5 VDC Cable brown = 3 GND Cable green = 5 Channel \overline{A} Cable yellow = 6 Channel A Cable pink = 8 Channel B Cable pink = 8 Channel A Cable pink = 7 Channel A Cable brown = 9 Channel A Cable brown = 10 Channel A Cable size 8 × 0.25 mm ²	Line receiver Recommended IC's: -MC 3486 -SN 75175 -AM 26 LS 32 Channel A Channel B Channel B Channel I Channel I Channel I
The index signal I is synchronized wit	th channel A or B.		Terminal resistance R = typical 120 Ω

Encoder HEDL 9140 500 CPT, 3 channels, with line driver RS 422

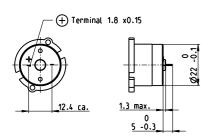


				 ,	
Stock program Standard program		Part Numbers			
Special program (on request)	cable outlet axial	386051	386001		
	cable outlet radial	386053	386002		
Туре					
Counts per turn		500	500		
Number of channels		3	3		
Max. operating frequency (kHz)		100	100		
Max. speed (rpm)		12000	12000		

-	-
overall length	overall length

-								
Modular System								
+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] /	• see Gearhead	
RE 50, 200 W	162					170.4		
RE 50, 200 W	162	GP 52, 4 - 30 Nm	457			•		
RE 50, 200 W	162	GP 62, 6.2 - 38.5 Nm	459			•		
RE 50, 200 W	162			AB 44	590	183.4		
RE 50, 200 W	162	GP 52, 4 - 30 Nm	457	AB 44	590	•		
RE 50, 200 W	162	GP 62, 6.2 - 38.5 Nm	459	AB 44	590	•		
RE 65, 250 W	163						187.5	
RE 65, 250 W	163	GP 81, 15.4 - 92.3 Nm	460				•	
RE 65, 250 W	163			AB 44	590		205.5	
RE 65, 250 W	163	GP 81, 15.4 - 92.3 Nm	460	AB 44	590		•	

Technical Data		Pin Allocation	Connection example
Supply voltage V _{CC}	5 V ± 10%	Encoder	Line receiver
Typical current draw	55 mA	Cable white = V_{CC} 5 VDC	Recommended IC's:
Output signal El	IA Standard RS 422	Cable brown = GND	GND O O - MC 3486 - SN 75175
driver used:	DS26LS31	Cable green = Channel A Cable yellow = Channel A	- AM 26 LS 32
Phase shift Φ	90°e ± 45°e	Cable grey = Channel B	
Signal rise time		Cable pink = Channel B	
(typically, at $C_L = 25$ pF, $R_L = 11$ k Ω , 25	5°C) 180 ns	Cable blue = Channel I (Index)	Channel A O
Signal fall time		Cable red = Channel I (Index) Cable size 8 × 0.25 mm ²	
(typically, at $C_L = 25$ pF, $R_L = 11$ k Ω , 25			
Index pulse width	90°e	Motor	
Operating temperature range	-40+85°C	Cable white = Motor + Cable brown = Motor -	Channel B O
Moment of inertia of code wheel	≤ 0.6 gcm ²	Cable size 2 × 1.0 mm ²	
Max. angular acceleration	250 000 rad s ⁻²		Channel i O = O R
Output current per channel	± 20 mA		Channel I O I R
Protection to	IP54		Granieri y = = = = y v
The index signal I is synchronized wi	ith channel A or B.		Terminal resistance R = typical 120 Ω





Important Information

- Tacho with moving coil, maxon system.
- Tacho with precious metal commutation.
- To establish total inertia add motor and tacho inertias.
- With the output shaft turning CW as seen from the mounting surface, the tacho output voltage will be positive at the + terminal.
- A high impedance load is recommended at tacho terminals.
- The tacho current should be kept low.
- The indicated resonance frequency refers to the motor-tacho rotor system.

Stock program Standard program	Part Numbers			
Special program (on request)	118909	118910		
Туре				
Shaft diameter (mm)	3	4		

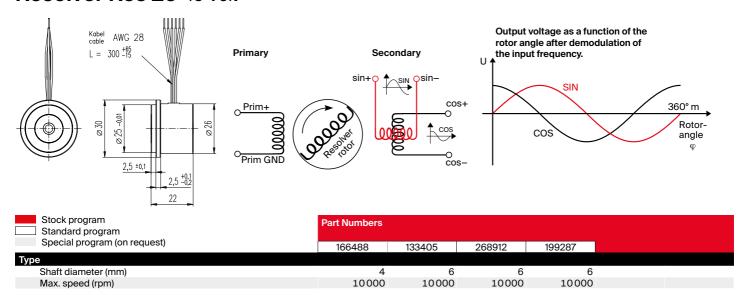




Madulas Cuatara							
Modular System	Dana	. Occubered	Deser	0			_
+ Motor	Page	+ Gearhead	Page	Overall length [mm] / • see Ge	arnead		
RE 25	154/156			76.8			
RE 25	154/156	GP 26, 0.75 - 4.5 Nm	437	•			
RE 25	154/156	GP 32, 0.75 - 4.5 Nm	439/440	•			
RE 25	154/156	GP 32, 1.0 - 6.0 Nm	443	•			
RE 25	154/156	KD 32, 1.0 - 4.5 Nm	450	•			
RE 25	154/156	GP 32 S	478-486	•			
RE 25, 20 W	155			65.3			
RE 25, 20 W	155	GP 22, 0.5 - 1.0 Nm	430	•			
RE 25, 20 W	155	GP 26, 0.75 - 4.5 Nm	437	•			
RE 25, 20 W	155	GP 32, 0.75 - 4.5 Nm	439/440	•			
RE 25, 20 W	155	GP 32, 0.75 - 6.0 Nm	443	•			
RE 25, 20 W	155	KD 32, 1.0 - 4.5 Nm	450	•			
RE 25, 20 W	155	GP 32 S	478-486	•			
RE 35, 90 W	159			89.1			
RE 35, 90 W	159	GP 32, 0.75 - 6.0 Nm	439-446		•		
RE 35, 90 W	159	GP 32, 4.0 - 8.0 Nm	447				
RE 35, 90 W	159	GP 42, 3.0 - 15 Nm	452	•)		
RE 35, 90 W	159	GP 32 S	478-486)		
,							

Technical Data				Connection example
Output voltage per 1000 rpm	0.52 V	Max. current	10 mA	
Terminal resistance tacho	37.7 Ω	Tolerance of the output voltage	± 15%	180 Ω
Typical peak to peak ripple	≤6%	Rotor inertia (tacho only)	< 3 gcm ²	
Ripple frequency per turn	14	Resonance frequency with motors on p. 154-1	156 > 2 kHz	$ (\mathbf{T}) $ $ 1 k\Omega $ $\stackrel{\longrightarrow}{=} 0.1 \mu F$
Linear voltage tolerance, 500 to 5000 rpm	± 0.2%	with motors on p. 159	> 4.5 kHz	lacksquare
Linear voltage tolerance with 10 kΩ load resistance	± 0.7%	Temperature range	-20 +65°C	
Polarity error	± 0.1%			
Temperature coefficient of EMF (magnet)		Option: Pigtails in place of solder terminals.		<u> </u>
Temperature coefficient of coil resistance	+0.4%/°C			$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000} \frac{1}{1000} = \frac{1}{1000} \times 1000 \times 1000 \times 10000 \times 10000 \times 10000 \times 1000 \times 10000 \times 1000 \times 1000 \times 1000 \times 1000 \times 1000 \times 1000 \times$
				$U_{\rm pc}$
				Resonance frequency Motor winding-Tacho winding f _a ≥ 4 kHz
				resonance frequency motor winding facile winding i _R = + ki iz

Resolver Res 26 10 Volt





- Motor	Page	+ Gearhead	Page	Overall length [mm] /	see Gearhead			
C 32, 80 W	267		3 3	80.1				
C 32, 80 W	267	GP 32, 0.75 - 6.0 Nm	439-446	•				
C 32, 80 W	267	GP 32 S	478-486	•				
C 40, 170 W	268				107.2			
C 40, 170 W	268	GP 42, 3.0 - 15 Nm	452		•			
C 40, 170 W	268	GP 52, 4.0 - 30 Nm	457		•			
C 45, 150 W	269	·				111.2		
C 45, 150 W	269	GP 42, 3.0 - 15 Nm	452			•		
C 45, 150 W	269	GP 52, 4.0 - 30 Nm	457			•		
C 45, 250 W	270					144.0		
C 45, 250 W	270	GP 42, 3.0 - 15 Nm	452			•		
C 45, 250 W	270	GP 52, 4.0 - 30 Nm	457-458			•		
C 45, 250 W	270	GP 62, 6.2 - 38.5 Nm	459			•		
C 60, 400 W	271						177.3	
C 60, 400 W	271	GP 81, 15.4 - 92.3 Nm	460				•	

Technical Data		Pin Allocation		
Input voltage	10 V peak, 10 kHz		EC 32/EC 40	EC 45/EC 60
Transmission ratio	0.5	Prim +	red/white	white
Electrical error	± 10 minutes	Prim GND	yellow/white	brown
Rotor inertia	6 gcm ²	cos + sin +	red	green
Weight	40 g	COS -	yellow schwarz	yellow grey
Operating temperature range	-55 +155°C	sin -	blue	pink

maxon motor & motion control

1-Q-EC servoamplifier	546-547
ESCON servo controllers	548-553
ESCON2 servo controllers	NEW 554-557
Positioning control units EPOS4	558-569
MACS Motion Controller	570-576
Summary motor control	577
Summary motor control Accessories	578-579
Summary motion control	580



Various 4-quadrant PWM servo controllers for permanent magnetactivated brushed DC motors and brushless EC motors meet all requirements in terms of performance and functionality. Thanks to the fast current controller and dynamic speed controller, outstanding control characteristics are achieved. Combined with maxon high-dynamic motors and Master Controllers, the positioning controllers constitute complete solutions for highly demanding Motion Control applications.

1-Q-EC Amplifier Summary

The basic function of EC motors electronics is the electronic commutation of the motor winding.

sensors. A further distinction is made between Direction reverse via digital signal. open or closed loop speed control.

Simple speed controls are possible with Hall 1-Q amplifier functions in motor operation.

DEC Module 24/2 1-Q-EC Amplifier



The DEC Module 24/2 (Digital EC Controller) is a 1-quadrant amplifier for controlling EC motors with Hall sensors with a maximum output of 48 watts.

Technical data page 537.

Operating modes

Digital speed control or open loop speed control operation can be preset by a digital

Excellent price-performance ratio

Reasonably priced 1-Q-EC amplifier optimized for OEM applications in small applian-

OEM Module

Miniaturized open electronics board. Two connector arrays arranged in a 2.54 mm (0.1") pattern support easy connectivity and integration into the motherboard.

Functionality

Direction of rotation preset by a digital signal. The motor shaft can be enabled or disabled. Adjustable maximum current limitation. Set value speed input through external analog voltage. Status indicator with "Ready"-Out-

Protection circuit

The power amplifier is protected against thermal overload and the control inputs against overvoltage.

DEC Module 24/2

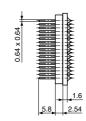
Connections

Male header Pitch

8 + 9 = 17 poles2.54 mm

DEC Module 24/2 367661

17.78



Dimensions in [mm]

DEC Module 50/5 1-Q-EC Amplifier



The DEC Module 50/5 (Digital EC Controller) is a 1-quadrant amplifier for controlling EC motors with Hall sensors with a maximum output of 250 watts.

Technical data page 537.

Operating modes

Digital speed control or open loop speed control operation can be preset by a digital signal.

Excellent price-performance ratio

Reasonably priced 1-Q-EC amplifier optimised for OEM applications in small appliances.

OEM Module

Miniaturized open electronics board. Connector arrays arranged in a 2.54 mm (0.1") pattern support easy connectivity and integration into the motherboard.

Functionality

Direction of rotation preset by a digital signal. The motor shaft can be enabled or disabled. Adjustable maximum current limitation. Set value speed input through external analog voltage. Speed can be monitored through the speed monitor output. Status indicator with "Ready"-Output.

Protection circuit

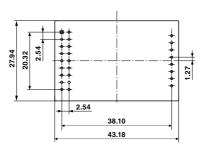
The power amplifier is protected against thermal overload and the control inputs against overvoltage.

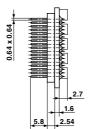
DEC Module 50/5

Connections

Male header 1 2 rows, 2 x 9 poles Male header 2 1 row, 8 poles Pitch 2.54 mm

DEC Module 50/5 380200





Dimensions in [mm]

1-Q-EC Amplifier Data





DEC Module 24/2 1-Q-EC Amplifier 1-quadrant amplifier for controlling EC motors with Hall sensors with a maximum output of 48 watts.

DEC Module 50/5 1-Q-EC Amplifier 1-quadrant amplifier for controlling EC motors with Hall sensors with a maximum output of 250 watts.

	DEC Module 24/2	DEC Module 50/5
EC motors up to (continuous / maximum)	48 W / 72 W	250 W / 500 W
Sensors		
	Digital Hall Sensors	Digital Hall Sensors
Operating mode		
	Speed controller (closed and open loop)	Speed controller (closed and open loop)
Electrical data		
Operating voltage V _{CC}	8 - 24 VDC (optional 5.0 VDC)	6 - 50 VDC (optional 5.0 VDC)
Max. output voltage	V _{CC}	0.95 x V _{cc}
Max. output current I _{max}	3 A	10 A
Continuous output current I _{cont}	2 A	5 A
Switching frequency of power stage	46.8 kHz	46.8 kHz
Max. speed (1 pole pair)	80 000 rpm	80 000 rpm
Input		
Set value	"Speed" 0+5 V (1024 steps)	"Speed" 0+5 V (1024 steps)
Current limit	"Current Limit" external resistor against GND	"Current Limit" external resistor against GND
Enable	"Enable" +2.424 V	"Enable" +2.450 V
Direction	"Direction" +2.424 V	"Direction" +2.450 V
Output		
Monitor		"Monitor n", digital (5 V)
Status reading "Ready"	"Ready", digital (5 V)	"Ready", digital (5 V)
Voltage outputs		
Hall sensors supply voltage V _{CC} Hall	+5 VDC, max. 35 mA	+5 VDC, max. 35 mA
Possible adjustments	Input "Mode 0" and "Mode 1"	Input "Mode 0" and "Mode 1"
Protective functions		
Blockage protection	Motor current limitation if motor shaft is blocked for longer than 1.5 s	Motor current limitation if motor shaft is blocked for longer than 1.5 s
Thermal protection of power stage	T > 95°C	T > 100°C
Under- / Overvoltage protection	Switches off when V_{cc} < 6.5 V or V_{cc} > 30 V	Switches off when $V_{CC} < 6 \text{ V}$ or $V_{CC} > 56 \text{ V}$
Ambient temperature and humidity range		
Operation	-10+45°C	-10+45°C
Storage	-40+85°C	-40+85°C
No condensation	2080%	2080%
Mechanical data		
Weight	Approx. 4 g	Approx. 9 g
Dimensions (L x W x H)	24.2 x 20.38 x 12.7 mm (see page 536)	43.18 x 27.94 x 12.7 mm (see page 536)
Mounting	mountable on socket terminal strips pitch 2.54 mm	mountable on socket terminal strips pitch 2.54 mm
Connections	See page 536	See page 536
Part numbers		
	367661 DEC Module 24/2 1-Q-EC Amplifier	380200 DEC Module 50/5 1-Q-EC Amplifier

|--|

370652 DEC Module Eva-Board

370652 DEC Module Eva-Board

ESCON Overview

The ESCON servo controllers are small-sized, powerful 4-quadrant PWM servo controller for the highly efficient control of permanent magnet-activated DC motors.

The featured operating modes - speed control (closed loop), speed control (open loop), and current control - meet the highest requirements. The ESCON servo controllers are designed being commanded by an analog set

value and features extensive analog and digital I/O functionality and are being configured via USB interface using the graphical user interface "ESCON Studio".

















Depending on the ESCON variant, the following motor types can be operated

- DC motor: Permanent-magnet DC motor
- EC motor: Brushless, electronically commutated permanent-magnet DC motor (BLDC) with and without Hall sensors.

Various operating modes allow an adaptable use in a wide range of drive systems

- Current controller: The current controller compares the actual motor current (torque) with the applied set value. In case of deviation, the motor current is dynamically readjusted.
- Speed controller (closed loop): The closed loop speed controller compares the actual speed signal with the applied set value. In case of deviation, the speed is dynamically readjusted.
- Speed controller (open loop): The open loop speed controller feeds the motor with a voltage proportional to the applied speed set value. Changes in load are compensated using the IxR methodology.

Speed measurement by

- Digital incremental encoder: The encoders deliver simple square signals for further processing. Their impulses are counted to determine the speed. Channels A and B are phaseshifted signals, which are being compared to determine the direction of rotation.
- DC tacho: The DC tacho delivers a speedproportional analog voltage.
- Available Hall sensors: The Hall sensors deliver six different combinations of switching impulses per electrical turn which are counted to determine speed. They also deliver phaseshifted signals that are being compared to determine the direction of rotation.
- Sensorless EC: The speed is determined by the progression of the induced voltage. The electronics evaluates the zero crossing of the induced voltage (EMF).

To the numerous inputs and outputs, various functionalities can be assigned to.

Set value (speed or current), current limitation, as well as offset can be assigned as follows.

- Analog value: The value is defined by an analog voltage set via external or internal potentiometer.
- PWM value: The value is defined by fixed frequency and amplitude. The desired change is achieved by variation of the duty cycle of 10...90%.
- RC Servo Value: The value is set with a signal pulse with a duration of 1.0...2.0 ms.
- Fixed value: The value is defined by a fixed preset value.
- 2 fixed values: Value 1 is defined by a fixed preset value 1. Value 2 is defined by a fixed preset value 2. A digital input is used to switch between the two preset values.

Various functionalities are available to enable the power stage.

- Enable: Enables or disables the power stage.
- Enable & Direction: Enables or disables the power stage and determines the motor shaft's direction of rotation.

Software

Installation Program: ESCON Setup Graphical User Interface: ESCON Studio

- √ Startup Wizard
- √ Regulation Tuning
- √ Diagnostic
- √ Firmware Update
- ✓ Controller Monitor
- ✓ Parameters
- ✓ Data Recording
- ✓ Online Help

Language: German, English, French, Italian, Spanish, Japanese, Chinese

Operating System: Windows 10, Windows 8, Windows 7, Windows XP SP3

Communication interface: USB 2.0/3.0 (full speed)

Easy startup

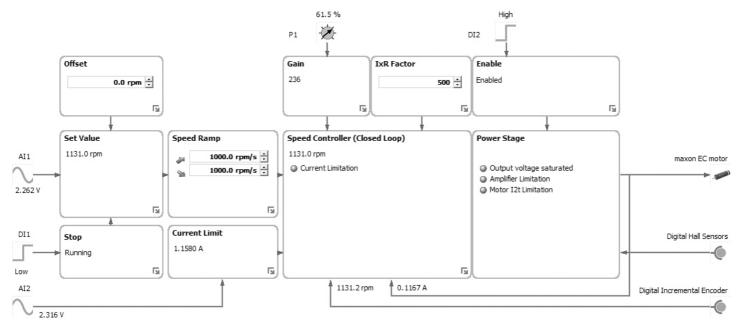
Startup and parameterization are performed using the intuitive graphical user interface "ESCON Studio" with the help of simple to use, menu-guided wizards. The following wizards are available: Startup, Regulation Tuning, Firmware Update, Controller Monitor, Parameters, Data Recording, and Diagnostics.

Protective equipment

The servo controller has protective circuits against overcurrent, excess temperature, under- and overvoltage, against voltage transients, and against short-circuits in the motor cable. Furthermore it is equipped with protected digital inputs and outputs and an adjustable current limitation for protecting the motor and the load. The motor current and the actual speed of the motor shaft can be monitored by means of the analog output voltage.

Comprehensive documentation

Using the "Feature Comparison Chart", the suitable ESCON servo controller can easily be determined. The "Hardware Reference" comprises the specifications of the hardware in detail. The documents "Firmware Version" and "Release Notes" describe changes and improvements of firmware and software. In addition, the graphical user interface "ESCON Studio" features a comprehensive online help.



ESCON Studio (Controller Monitor)

- Enable CW: Enables or disables the power stage in direction of rotation-dependent sense. The rotor can only turn clockwise (CW).
- Enable CCW: Enables or disables the power stage in direction of rotation-dependent sense. The rotor can only turn counterclockwise (CCW).
- Enable CW & CCW: Enables or disables the power stage in direction of rotation-dependent sense. The rotor can only turn in defined direction. The signals are interlocked against each other.

The ramp function permits controlled acceleration/deceleration of the motor shaft in both, open loop and closed loop speed controller mode

- Analog ramp: The ramp is defined by a variable analog value.
- Fixed ramp: The ramp is defined by a fixed preset value.

Stop: The motor shaft decelerates with preset speed ramp until complete standstill.

Ready: The Ready signal can be used to transmit the operational status (respectively fault) to a superior control.

Speed and Current Comparator: The digital output is set depending on the actual value.

- Limit: The digital output is set as soon as the preset value is reached. It remains set as long as the value is exceeded.
- Range: The digital output is set as soon as the preset value range is reached. It remains set as long as the value remains in range.
- Deviation: The digital output is set as soon as the preset value deviation (based on the set value) is in range.

With the integrated potentiometers the additional following functions can be adjusted

- Current Gain: Adjustment of the current controller gain.
- Speed Gain: Adjustment of the speed controller gain.
- IxR Factor: The voltage drop caused by terminal resistance will be compensated in the range of [0...1000...2000].

Analog outputs allow monitoring of

- Actual current: Actually measured motor winding current.
- Actual current averaged: Actually measured motor winding current filtered by first order digital low-pass filter with a cut-off frequency of 5 Hz.

- Actual speed: Actually measured motor speed.
- Actual speed averaged: Actually measured motor speed filtered by 1st order digital lowpass filter with a cut-off frequency of 5 Hz.
- **Demand Current: Demanded motor winding** current.
- Demand Speed: Demanded motor speed.
- Temperature Power Stage: Actually measured power stage temperature.
- Fixed value: The output voltage is said fixed to the preset value.

Accesso	ries ESCON (not included in delivery)															
404404	ESCON 36/2 DC Connector Set		2	✓	O	(ر ا	S		Ŋ	α		븯	Ω.		0
425255	ESCON 36/3 EC Connector Set		24/		2 DC	√ L	/3 E	습		50/5	50/8		Σ Σ	50/5		70/10
403962	DC Motor Cable			✓	36/2	Š	36/	4 E					20%			
403964	I/O Cable 7core (analog I/O's)		Module	✓	123	√	2	50/4		Module	ali po M			409510		22969
403965	I/O Cable 6core (digital I/O's)			✓	H	✓	4533				2		Module	6		22
275934	Encoder Cable		23	✓	4031		414	Module		25	22		§	✓	✓	4
403957	Power Cable		46602	✓	•	✓	•			4387	280		3			
403968	USB Type A - micro B Cable	✓	4	✓		✓		446925	✓	4	√ <u>κ</u>	✓	286137	✓	✓	
418719	Adapter BLACK FPC11poles					✓		691					ဥ႙			
418723	Adapter BLUE FPC8poles					✓		4								
418721	Adapter GREEN FPC8poles					✓										
486400	ESCON Module 24/2 Motherboard	✓														
438779	ESCON Module Motherboard								✓							
586048	ESCON Module 50/8 Motherboard										✓	✓				
450237	ESCON Module Motherboard Sensorless							✓								
586142	ESCON Module 50/8 Thermal Pad										✓					





	ESCON Module 24/2	ESCON 36/2 DC
DC motors up to (continuous / maximum)	48 W / 144 W	72 W / 144 W
EC motors up to (continuous / maximum)	48 W / 144 W	-
Sensors		
	Digital Incremental Encoder	Digital Incremental Encoder
	(2 channel with or without Line Driver)	(2 channel with or without Line Driver)
	DC Tacho	DC Tacho
	Without sensor (DC motors)	Without sensor (DC motors)
	Digital Hall Sensors (EC motors)	-
Operating mode		
	Current controller (torque control),	Current controller (torque control),
Electrical details	Speed controller (closed and open loop)	Speed controller (closed and open loop)
Electrical data	10 04 1/100	10, 001/00
Nominal operating voltage V _{CC}	10 - 24 VDC	10 - 36 VDC
Max. output voltage	0.98 x V _{cc}	0.98 x V _{cc}
Max. output current	6 A (<4 s)	4 A (<60 s)
Continuous output current	2 A	2 A
Pulse width modulation frequency	53.6 kHz	53.6 kHz
Sampling rate PI current controller	53.6 kHz	53.6 kHz
Sampling rate PI speed controller	5.36 kHz	5.36 kHz
Max. efficiency	92%	95%
Max. speed (DC)	limited by max. speed (motor) and max. output voltage (controller)	limited by max. speed (motor) and max. output voltage (controller)
Max. speed (EC; 1 pole pair)	150 000 rpm	-
Built-in motor choke	-	300 μH / 2 A
Inputs/Outputs		
Hall sensor signals	H1, H2, H3	-
Encoder signals	A, A B, B\	A, A B, B\
Max. encoder input frequency differential	1 MHz	1 MHz
(single-ended)	(100 kHz)	(100 kHz)
Potentiometers	-	1
Digital inputs	2	2
Digital inputs/outputs	2	2
Analog inputs	2	2
Resolution, Range, Circuit	12-bit, -10+10 V, differential	12-bit, -10+10 V, differential
Analog outputs	2	2
Resolution, Range, Max. output current	12-bit, -4+4 V, 1 mA	12-bit, -4+4 V, 1 mA
Auxiliary voltage output	+5 VDC (IL ≤10 mA)	+5 VDC (IL ≤10 mA)
Hall sensor supply voltage	+5 VDC (IL ≤30 mA)	
Encoder supply voltage	+5 VDC (IL ≤70 mA)	+5 VDC (IL ≤70 mA)
Status Indicators	Operation: green LED / Error: red LED	Operation: green LED / Error: red LED
Environmental conditions	00 0000	00 4500
Temperature - Operation	-30+60°C	-30+45°C
Temperature – Extended range	+60+80°C; Derating: -0.100 A/°C	+45+81°C; Derating: -0.056 A/°C
Temperature – Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data	A	A
Weight	Approx. 7 g	Approx. 30 g
Dimensions (L x W x H)	35.6 x 26.7 x 12.7 mm	55.0 x 40.0 x 16.1 mm
Mounting holes	Plugable (socket headers with 2.54 mm pitch)	for screws M2.5
Part numbers	400000 50000000	400440 F000N 00/0 D0
	466023 ESCON Module 24/2	403112 ESCON 36/2 DC
	Order accessories separately, from page 578	Order accessories separately, from page 578

ESCON Data







ESCON 36/3 EC	ESCON Module 50/4 EC-S	ESCON Module 50/5
	-	250 W / 750 W
97 W / 324 W	200 W / 600 W	250 W / 750 W
Sensors		
-	-	Digital Incremental Encoder
		(2 channel with or without Line Driver)
-	-	DC Tacho
-	Without sensor (EC motors)	Without sensor (DC motors)
Digital Hall Sensors (EC motors)	-	Digital Hall Sensors (EC motors)
Operating mode		
Current controller (torque control),		Current controller (torque control),
Speed controller (closed and open loop)	Speed controller (closed and open loop)	Speed controller (closed and open loop)
Electrical data		
10 - 36 VDC	10 - 50 VDC	10 - 50 VDC
0.98 x V _{cc}	0.96 x V _{cc}	0.98 x V _{cc}
9 A (<4 s)	12 A (<30 s)	15 A (<20 s)
2.7 A	4 A	5 A
53.6 kHz	53.6 kHz	53.6 kHz
53.6 kHz	-	53.6 kHz
5.36 kHz	5.36 kHz	5.36 kHz
95%	97%	98%
-	-	limited by max. speed (motor) and max. output
		voltage (controller)
150 000 rpm	120 000 rpm	150 000 rpm
3 x 47 μH / 2.7 A	-	-
Inputs/Outputs		
H1, H2, H3	-	H1, H2, H3
-	-	A, A B, B\
-	-	1 MHz
		(100 kHz)
1	1	1
2	2	2
2	2	2
2	2	2
12-bit, -10+10 V, differential	12-bit, -10+10 V, differential	12-bit, -10+10 V, differential
2	2 10 hit 4 + 4 / 1 m A	2
12-bit, -4+4 V, 1 mA +5 VDC (IL ≤10 mA)	12-bit, -4+4 V, 1 mA +5 VDC (IL ≤110 mA)	12-bit, -4+4 V, 1 mA +5 VDC (IL ≤10 mA)
+5 VDC (IL ≤10 IIIA) +5 VDC (IL ≤30 mA)	+5 VDC (IL STIOTIIA)	+5 VDC (IL ≤10 MA)
+5 VDC (IL \$30 IIIA)	-	+5 VDC (IL ≤50 MA)
Operation: green LED / Error: red LED	Operation: green LED / Error: red LED	Operation: green LED / Error: red LED
Environmental conditions	Operation, green LED7 Enoi, red LED	Operation, green LED / Enoi, red LED
-30+45°C	-30+45°C	-30+45°C
+45+78°C; Derating: -0.082 A/°C	+45+65°C; Derating: -0.200 A/°C	+45+75°C; Derating: -0.167 A/°C
-40+85°C	-40+85°C	-40+85°C
590%	590%	590%
Mechanical data	J3U70	J30 /0
Approx. 36 g	Approx 11 a	Approx. 12 g
55.0 x 40.0 x 19.8 mm	Approx. 11 g 43.2 x 31.8 x 12.7 mm	43.2 x 31.8 x 12.7 mm
for screws M2.5	Plugable (socket headers with 2.54 mm pitch)	Plugable (socket headers with 2.54 mm pitch)
Part numbers	Flugable (Socket fleaders with 2.54 min pitch)	Flugable (Socket fleaders With 2.54 mm pitch)
414533 ESCON 36/3 EC	446925 ESCON Module 50/4 EC-S	438725 ESCON Module 50/5
Order accessories separately, from page 578	Order accessories separately, from page 578	Order accessories separately, from page 578
order accessories separately, from page 376	Order accessories separately, norn page 376	Order accessories separately, Itolii page 376





	ESCON Module 50/8	ESCON Module 50/8 HE						
DC motors up to (continuous / maximum)	400 W / 750 W	400 W / 750 W						
EC motors up to (continuous / maximum)	400 W / 750 W	400 W / 750 W						
Sensors								
	Digital Incremental Encoder	Digital Incremental Encoder						
	(2 channel with or without Line Driver)	(2 channel with or without Line Driver)						
	DC Tacho	DC Tacho						
	Without sensor (DC motors)	Without sensor (DC motors)						
	Digital Hall Sensors (EC motors)	Digital Hall Sensors (EC motors)						
Operating mode								
	Current controller (torque control), Speed controller (closed and open loop)	Current controller (torque control), Speed controller (closed and open loop)						
Electrical data	Speed controller (closed and open loop)	speed controller (closed and open loop)						
Nominal operating voltage V _{CC}	10 - 50 VDC	10 - 50 VDC						
Max. output voltage	0.98 x V _{cc}	0.98 x V _{cc}						
Max. output current	15 A (<20 s)	15 A (<20 s)						
Continuous output current	8 A	8 A						
Pulse width modulation frequency	53.6 kHz	53.6 kHz						
Sampling rate PI current controller	53.6 kHz	53.6 kHz						
Sampling rate PI speed controller	5.36 kHz	5.36 kHz						
Max. efficiency	99%	99%						
Max. speed (DC)	limited by max. speed (motor) and max. output	limited by max. speed (motor) and max. outpu						
1/(/	voltage (controller)	voltage (controller)						
Max. speed (EC; 1 pole pair)	150 000 rpm	150 000 rpm						
Built-in motor choke	-	-						
Inputs/Outputs								
Hall sensor signals	H1, H2, H3	H1, H2, H3						
Encoder signals	A, A B, B\	A, A B, B\						
Max. encoder input frequency differential	1 MHz	1 MHz						
(single-ended)	(100 kHz)	(100 kHz)						
Potentiometers	-	-						
Digital inputs	2	2						
Digital inputs/outputs	2	2						
Analog inputs	2	2						
Resolution, Range, Circuit	12-bit, -10+10 V, differential	12-bit, -10+10 V, differential						
Analog outputs	2	2						
Resolution, Range, Max. output current	12-bit, -4+4 V, 1 mA	12-bit, -4+4 V, 1 mA						
Auxiliary voltage output	+5 VDC (IL ≤10 mA)	+5 VDC (IL ≤10 mA)						
Hall sensor supply voltage	+5 VDC (IL ≤30 mA)	+5 VDC (IL ≤30 mA)						
Encoder supply voltage	+5 VDC (IL ≤70 mA)	+5 VDC (IL ≤70 mA)						
Status Indicators	Operation: green LED / Error: red LED	Operation: green LED / Error: red LED						
Environmental conditions								
Temperature - Operation	-40+45°C	-40+65°C						
Temperature – Extended range	+45+85°C; Derating: see device reference	+65+92°C; Derating: see device reference						
Temperature - Storage	-40+85°C	-40+85°C						
Humidity (condensation not permitted)	590%	590%						
Mechanical data								
Weight	Approx. 16 g	Approx. 84 g						
Dimensions (L x W x H)	53.3 x 37.5 x 14.5 mm	53.3 x 37.5 x 30.6 mm						
Mounting holes	Plugable (socket headers with 2.54 mm pitch)	Plugable (socket headers with 2.54 mm pitch)						
Part numbers	50070 5000NM + + 50/0	500107 F000NM / 1 50/01/5						
	532872 ESCON Module 50/8	586137 ESCON Module 50/8 HE						
	Order accessories separately, from page 578	Order accessories separately, from page 578						

ESCON Data





	ESCON 50/5	ESCON 70/10
DC motors up to (continuous / maximum)	250 W / 750 W	700 W / 2100 W
EC motors up to (continuous / maximum)	250 W / 750 W	700 W / 2100 W
Sensors		
	Digital Incremental Encoder	Digital Incremental Encoder
	(2 channel with or without Line Driver)	(2 channel with or without Line Driver)
	DC Tacho	DC Tacho
	Without sensor (DC motors)	Without sensor (DC motors)
	Digital Hall Sensors (EC motors)	Digital Hall Sensors (EC motors)
Operating mode		
	Current controller (torque control),	Current controller (torque control),
	Speed controller (closed and open loop)	Speed controller (closed and open loop)
Electrical data		
Nominal operating voltage V _{cc}	10 - 50 VDC	10 - 70 VDC
Max. output voltage	0.98 x V _{CC}	0.95 x V _{cc}
Max. output current	15 A (<20 s)	30 A (<20 s)
Continuous output current	5 A	10 A
Pulse width modulation frequency	53.6 kHz	53.6 kHz
Sampling rate PI current controller	53.6 kHz	53.6 kHz
Sampling rate PI speed controller	5.36 kHz	5.36 kHz
Max. efficiency	95%	98%
Max. speed (DC)	limited by max. speed (motor) and max. output	limited by max. speed (motor) and max. output
, ,	voltage (controller)	voltage (controller)
Max. speed (EC; 1 pole pair)	150 000 rpm	150 000 rpm
Built-in motor choke	3 x 30 µH / 5 A	3 x 15 µH / 10 A
Inputs/Outputs	·	·
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B\	A, A B, B\
Max. encoder input frequency differential	1 MHz	1 MHz
(single-ended)	(100 kHz)	(100 kHz)
Potentiometers	2	2
Digital inputs	2	2
Digital inputs/outputs	2	2
Analog inputs	2	2
Resolution, Range, Circuit	12-bit, -10+10 V, differential	12-bit, -10+10 V, differential
Analog outputs	2	2
Resolution, Range, Max. output current	12-bit, -4+4 V, 1 mA	12-bit, -4+4 V, 1 mA
Auxiliary voltage output	+5 VDC (IL ≤10 mA)	+5 VDC (IL ≤10 mA)
Hall sensor supply voltage	+5 VDC (IL ≤30 mA)	+5 VDC (IL ≤30 mA)
Encoder supply voltage	+5 VDC (IL ≤70 mA)	+5 VDC (IL ≤70 mA)
Status Indicators	Operation: green LED / Error: red LED	Operation: green LED / Error: red LED
Environmental conditions		5 10 10 10 10 10 10 10 10 10 10 10 10 10
Temperature – Operation	-30+45°C	-30+45°C
Temperature - Extended range	+45+85°C; Derating: -0.111 A/°C	+45+82°C; Derating: -0.270 A/°C
Temperature - Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data		
Weight	Approx. 204 g	Approx. 259 g
Dimensions (L x W x H)	115 x 75.5 x 24 mm	125 x 78.5 x 27 mm
Mounting holes	for screws M4	for screws M4
	IOI SCIEVVS IVIT	IOI JOI ENA INIT
Part numbers		
Part numbers	409510 FSCON 50/5	422969 ESCON 70/10
Part numbers	409510 ESCON 50/5 Order accessories separately, from page 578	422969 ESCON 70/10 Order accessories separately, from page 578



CANOPER



Modules

Ready-to-connect units







Easy-to-use







Graphical User Interface

The ESCON2 product line from maxon consists of compact, powerful 4-quadrant PWM servo controllers. Their high power density provides flexibility for use with brushed DC motors and brushless EC motors (BLDC) up to 1,800 W continuous power with various feedback options, such as Hall sensors, incremental encoders, and absolute encoders in a variety of drive applications. The ESCON2 servo controllers are specially designed for commanding and controlling on the basis of analog and digital set values and for use as slave nodes in a CANopen network. They also boast extensive analog and digital I/O functionality. The latest technologies, such as field-oriented control (FOC) and feed-forward acceleration/velocity control in combination with the highest cycle rates, enable sophisticated yet user-friendly motion control, even if the position sensor resolution is limited. The Motion Studio graphical user interface, available free of charge, enables fast configuration, convenient monitoring and analysis, and automated tuning of all drive systems.

Modules

Robotic, analysis, and handing systems require compact integration of a large number of energy-efficient drives, combined with highly dynamic controllers and a linked bus system.

With the ESCON2 Modules, Micro¹ and Nano¹, modular multi-axis systems can be set-up using CANopen¹ without needing high investment in development.

Ready-to-connect units

A variety of ready-to-connect controllers in various power classes and designs of the ESCON2 product line provide attractive economical options for easy integration in mechanical and equipment engineering.

Motion Studio software

The Motion Studio software is available free of charge and provides intuitive tools and wizards that make commissioning easy. It provides a basic overview of the functionality of ESCON2 servo controllers and offers a wide range of configuration and command options. The package is rounded out by analysis tools, such as Data Recorder or I/O Monitor.

I/O functionality

ESCON2 features a comprehensive set of analog and digital inputs and outputs for process control in standalone mode. For example, set values and offsets for current and speed can be used as switchable fixed values, PWM values, or analog values in command operations. Control signals for activation, direction, stop, ramps,

and limit switches can also be incorporated, as can feedback signals (analog/digital) for current, speed, and the actual device status.

I/O current mode (IOCM)

The configured inputs deliver the set value current and the target torque. The current control loop runs on the ESCON2.

I/O velocity mode (IOVM)

The configured inputs deliver the velocity demand value. The speed controller with inner current control loop runs on the ESCON2.

CANopen¹

As a standardized motion control slave, ES-CON2 can easily be integrated into the system manager tools and motion libraries of various PLC manufacturers. The data exchange and command functions make use of the CiA® 402 protocol (Device Profile for Drives and Motion Control).

Cyclic Synchronous Torque (CST)1

The master executes the path planning and sends the target torque cyclically and synchronously to the ESCON2 via the network. The torque/current control loop runs on the ESCON2. The ESCON2 sends the sensor measurements for the actual speed and current values to the

ESCON2 features

- Very high power density
- Optimized efficiency
- Extensive I/O functionality
- Sinusoidal commutation (FOC)
- Current and velocity controller with high performance even if the position sensor resolution is limited
- Configurable protective functions for controller and drive
- I/O standalone mode or CANopen¹ slave in accordance with CiA 301, 402, 305; alternatively, can be configured and receive commands via USB or RS232 serial interface1
- Easy to configure and commission with Motion Studio GUI
- All software components are available for freeFull documentation and outstanding support













master. This forms the basis for a higher-level PID position control loop, which is closed in the master.

Cyclic Synchronous Velocity (CSV) 1

The master executes the path planning and sends the target speed cyclically and synchronously via the network to the ESCON2 on which the speed control loop is running. The ESCON2 sends the sensor measurements for the actual speed and current values to the master. This forms the basis for a higher-level PI position control loop, which is closed in the master.

Profile velocity mode (PVM)¹

In profile velocity mode, the drive is moved with a defined set speed and ramp profiles. It keeps the speed constant until a new target speed is

Sinusoidal commutation (FOC)

The signals from the Hall sensors or encoders are used in the ESCON2 to generate sinusoidal motor currents using field-oriented control (FOC). As a result, the motor runs smoothly and precisely.

Feed-forward speed control

The combination of feedback and feed forward control provides ideal motion behavior. Feed forward control reduces control error. The ESCON2 supports feed-forward acceleration and speed control.

Custom persistent memory

Four objects are available for saving applicationspecific values. For example, axis number or identification.

Protection

The ESCON2 has extensive, configurable protective circuits against overcurrent, excess temperature, under- and overvoltage, voltage transients, short-circuits in the motor cable, as well as protection in the event of feedback signal loss. An adjustable current limitation protects the motor and load.

Motor temperature sensor (NTC)1

A temperature sensor can be connected directly to the ESCON2 and incorporated into the system as motor protection.

Control of holding brakes¹

The control of holding brakes can be integrated in the device status management. Delay times for switching on and off can be individually configured.

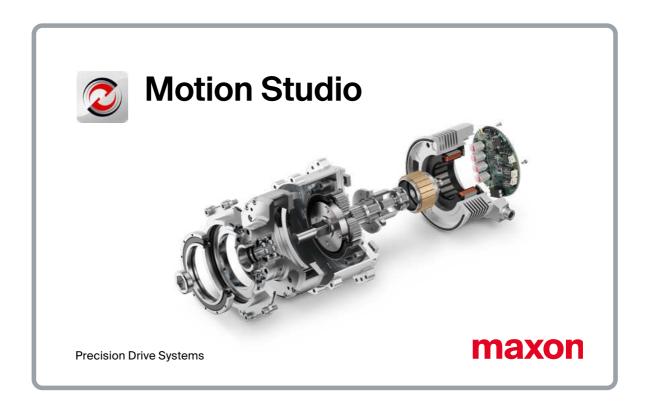
¹In preparation

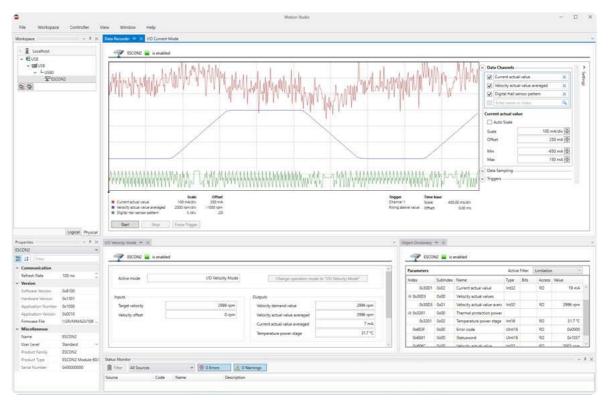
Accessories ESCON2 (not included in delivery)				
783729 ESCON2 CB 60/30	✓	30		30
802197 ESCON2 Module 60/30 Thermal Pad	✓	8		90
816161 ESCON2 Module 60/30 Heat Spreader	✓	e 6		
520858 CAN-CAN Cable		Ē	✓	bac
520857 CAN-COM Cable		Module	✓	ompact
275934 Encoder Cable			✓	ŏ
275878 Hall Sensor Cable		ŏ	✓	Š
846645 Motion Connector Set Highest Current		ESCON2	✓	S
520851 Motor Cable High Current		_	✓	S
838460 Motor Cable Highest Current		783722	✓	34
847301 NTC Cable		783	✓	837
275829 Power Cable		•	✓	22
838459 Power Cable Highest Current			✓	
520854 Signal Cable 7core			✓	
520853 Signal Cable 8core			✓	
838461 USB Type A-Type C cable			✓	
845854 USB Type C-Type C cable			✓	





- Intuitive configuration and commissioning
- Auto tuning and system optimization
- Monitoring and analysis
- Help









ESCON2 Module 60/30

ESCON2 Compact 60/30

	Commands via I/O or CANopen Slave ¹	Commands via I/O or CANopen Slave ¹
Electrical data		
Operating voltage V _{cc}	10 - 60 VDC	10 - 60 VDC
Logic supply voltage V _C (optional)	10 - 60 VDC	10 - 60 VDC
Max. output voltage	0.95 x V _{CC}	0.95 x V _{CC}
Max. output current I _{max}	60 A (<4 s)	60 A (<4 s)
Continuous output current I _{cont}	30 A	30 A
Switching frequency of power stage	50 kHz	50 kHz
Sampling rate of PI current controller	50 kHz (20 μs)	50 kHz (20 μs)
Sampling rate of PI speed controller	10 kHz (100 µs)	10 kHz (100 µs)
Max. speed (1 pole pair)	120 000 rpm (sinusoidal)	120 000 rpm (sinusoidal)
Built-in motor choke per phase	-	0.47 µH / 30 A
nputs		, , , , , , , , , , , , , , , , , , ,
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B\ (max. 6.67 MHz)	A, A B, B\ (max. 6.67 MHz)
Sensor signals	Clock ¹ , Data ¹	Clock ¹ , Data ¹
Digital inputs	4	4
Digital inputs "High-speed"	4	4
Analog inputs	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)
CAN ID	configurable with external wiring ¹	configurable with DIP switch 151
Outputs	•	•
Digital outputs	2	2
Digital outputs "High-speed"	1	1
Analog outputs	2 (12-bit resolution, -4+4 V, max. 1 mA)	2 (12-bit resolution, -4+4 V, max. 1 mA)
Encoder voltage output Hall sensor voltage output	5 VDC, max. 145 mA	5 VDC, max. 145 mA
Auxiliary voltage output	3.3 VDC, max. 20 mA	-
Communication interfaces		
CAN	yes ¹	yes¹
RS232	yes ¹	-
JSB	yes	yes
ndicator		
_ED green = READY, red= ERROR	External LEDs required	yes
Environmental conditions		
Temperatrue - Operation	-30+25°C	-30+25°C
「emperature - Extended Range	2575°C; Derating: -0.506 A/°C	2575°C; Derating: -0.506 A/°C
Femperature – Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data		
Veight	approx. 19 g	approx. 128 g
Dimensions (L x W x H)	67.0 x 43.0 x 7.8 mm	93.5 x 46.0 x 41.0 mm
Mounting	Pluggable and M2.5 screws	M3 screws
Part numbers		
	783722 ESCON2 Module 60/30	783734 ESCON2 Compact 60/30
Accessories		
	235811 DSR 70/30 Shunt regulator	235811 DSR 70/30 Shunt regulator
	Order accessories separately, see page 579	Order accessories separately, see page 57

EPOS4 Positioning Controllers Overview

Modules Ready-to-connect units Micro Module Compact CAN Compact EtherCAT Encased housing / Disk **EPOS4 Micro** FPOS4 Module **EPOS4 Compact EPOS4 Compact** FPOS4 24/5 CAN 24/1.5 24/1.5 CAN 24/1.5 EtherCAT 50/5 **EPOS4** Compact **EPOS4 Micro EPOS4 Module EPOS4** Compa EPOS4 24/5 EtherCAT 50/5 50/5 CAN 50/5 EtherCAT 70/15 **EPOS4 Module** EPOS4 Compac **EPOS4** Compac **EPOS4 Disk** 50/8 50/8 CAN 50/8 EtherCAT 60/8 CAN **EPOS4 Module EPOS4** Compac **EPOS4 Compact EPOS4 Disk** 50/15 50/15 CAN 50/15 FtherCAT 60/8 FtherCAT **EPOS4** Compact **EPOS4** Disk 60/12 CAN 24/5 EtherCAT 3-axes FPOS4 Disk 60/12 EtherCAT

maxon EPOS4 products are small, completely digital, intelligent positioning controllers. Their high power density provides high flexibility for use with brushed DC and brushless EC (BLDC) motors up to approx. 1050 W with various feedback options such as Hall sensors, incremental encoders and absolute encoders, in a variety of drive applications.

Modules

Robotic, analysis and handing systems require compact integration of a large number of energyefficient drives, combined with highly dynamic controllers and a linked bus system.

With the established EPOS4 Module and Micro, modular multi-axis systems can be set up using CANopen or EtherCAT, without needing high investment in development.

Ready-to-connect units

For prototypes and small batches, the large variety of ready-to-connect controllers, available in various power classes and designs, provide attractive, economical options for using EPOS4 products in your application.

Motion Studio

The Motion Studio software, which is available free of charge, includes intuitive tools and wizards that make commissioning easy. It provides a basic overview of the EPOS4 functions and a command option. Analysis tools such as the Data Recorder or Command Analyzer supplement the features in Motion Studio.

CANopen / EtherCAT

As a standardized motion control slave, EPOS4 can easily be integrated into the system manager tools and motion libraries of various PLC manufacturers. The data exchange and command functions make use of the CiA® 402 protocol (Device Profile for Drives and Motion Control)

Cyclic Synchronuous Position (CSP)

The master executes the path planning and sends the target position cyclically and synchronously to the EPOS4 via the network. The position control loop runs on the EPOS4. The EPOS4 sends the measured actual position, speed and current values to the master.

Cyclic Synchronuous Velocity (CSV)

The master executes the path planning and sends the target speed cyclically and synchronously to the EPOS4 via the network. The speed control loop runs on the EPOS4. The EPOS4 sends the measured actual position, speed and

current values to the master. The CSV mode is commonly used if a PI position control loop is closed via the master.

Cyclic Synchronuous Torque (CST)

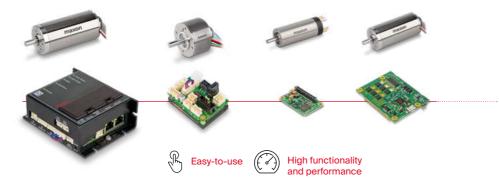
The master executes the path planning and sends the target torque cyclically and synchronously to the EPOS4 via the network. The torque (current) control loop runs on the EPOS4. The FPOS4 sends the measured actual position speed and current values to the master. The CST mode is commonly used if a PID position control loop is closed via the master.

Point-to-point

The "Profile Position Mode" moves the position of the motor axis from point A to point B. Positioning is in relation to the axis Home position (absolute) or the actual axis position (relative).

Position and velocity control with feed forward

The combination of feedback and feed forward control provides ideal motion behavior. Feed forward control reduces control error. EPOS4 supports feed forward acceleration and speed control.



Speed control

In the Profile Velocity Mode, the motor axis is moved with a defined set speed. The motor axis keeps the speed constant until a new speed set value is given.

Homing

The Homing Mode is used for referencing to a specific mechanical position. There is a wide variety of methods available.

Feedback options and dual loop

Two different encoder signals can be evaluated simultaneously. This allows dual-loop control, which can be tuned automatically to compensate for mechanical backlash and elasticity. A wide range of sensors is permitted: digital incremental encoders, analog incremental encoders (sin/cos), and SSI absolute encoders.

Protection

The positioning controller has protective circuits against overcurrent, excess temperature, underand overvoltage, voltage transients, shortcircuits in the motor cable, and against feedback signal loss. An adjustable current limitation protects the motor and load.

Safe Torque Off (STO)

With this safety feature based on IEC61800-5-2 (not certified), the drive can be brought to a safe state at any time from two independent digital inputs. The supply of torque-generating power is interrupted.

The state can be monitored via an additional digital output. The inputs and outputs are optically isolated.

Capture Inputs (Touch Probe)

The digital inputs can be configured so that the actual position value is stored whenever a positive or negative edge occurs at an input.

Trigger Output (Position Compare)

The digital outputs can be configured to that a digital signal is sent at a selectable position value (on request).

Control of Holding Brakes

Control of holding brakes can be integrated in the device status management. The delay times can be individually configured for switching on

Supplementary information for technical data page 561-567.

Operating modes/Control

Cyclic Synchronous Position (CSP) Cyclic Synchronous Velocity (CSV) Cyclic Synchronous Torque (CST)

Profile Position, Profile Velocity and Homing Mode

Speed and Acceleration Feed Forward Sinusoidal or Block Commutation for EC motors

Alternative set value input via analog commands

Dual-loop Position and Speed Control

Communication/Configuration

Communication via CANopen and/or USB 2.0/3.0 and/or RS232

EtherCAT (CoE)

USB to CAN and RS232 to CAN gateway

Inputs/Outputs

STO (Safe Torque Off) inputs and outputs, optically isolated, not certified

Free digital inputs, configurable e.g. for limit/ reference switches

Free digital outputs, configurable e.g. for brake Free analog inputs, configurable

Free analog ouputs, configurable

Available software

Motion Studio

Windows DLL (32-/64-bit) with programming examples

Linux shared object library (X86 32-/64-bit, ARMv6/v7/v8 32-bit, ARMv8 64-bit for Raspberry Pi and BeagleBone) with programming examples

Firmware

Available documentation

Feature Chart Hardware Reference Firmware Specification

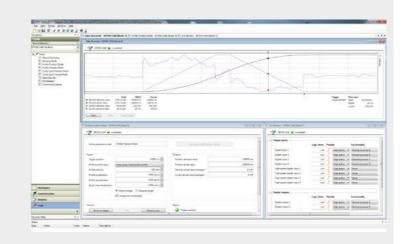
Communication Guide

Application Notes

EPOS4 performance characteristics

- Maximum power density.
- Convincing control performance even with highly dynamic motors.
- Comprehensive feedback options.
- Diverse I/O connection options for peripherals.
- Uncompromising protective features for controller and drive.
- Configuration and communication via CANopen (CiA 301, 402, 305), RS232, USB, or EtherCAT. IEC 61158 type 12 EtherCAT slave: CoE (CAN application layer over EtherCAT) compliant with IEC 61800-7 profile type 1 (CiA 402). Easy integration into existing EtherCAT systems. Can be connected to a network of other EtherCAT units.
- Easy commissioning via Motion Studio GUI and intuitive tools.
- Libraries and programming examples for efficient integration in a wide variety of systems.
- All software components are freely available at any time.
- Full documentation and outstanding support.

The complete package for your motion control solution with added value.



EPOS4 Positioning Controllers Overview

















Accessories EPOS4 Module & Micro (not included in delivery)											
403968 USB Type A - micro B Cable		3	₽	✓	ī.	✓	/5	✓	8	✓	5
536997 EPOS4 CB 24/1.5 CAN	6	3	EtherCAT	✓	4		20		20/		20/
620048 EPOS4 CB 24/1.5 EtherCAT	ŗ	2	tþe	✓	<u>e</u> 2		a P		<u>He</u>		<u>o</u>
534133 EPOS4 CB 50/5 CAN		Ž	5		Module	✓	Module		Module		Modu
620044 EPOS4 CB 50/5 EtherCAT		5	24/		ŝ	✓	Σ		= 1		ĭ
520884 EPOS4 CB Power CAN		<u>≥</u>	9		30		130	✓	384	✓	4383
604594 EPOS4 CB Power EtherCAT	6	322	Βic		99		341	✓	<u>8</u>	✓	
581245 EPOS4 EtherCAT Card	6	Š		✓ (a)	53	✓ (a)	53	✓ (a)	2	✓ (a)	50
638677 EPOS4 EB Micro		ó √	1221								
659508 EPOS4 MB Micro EtherCAT 3-axes		✓	654								
590738 EPOS4 Module SMT socket 2 x 23 poles			w w	✓		✓					
677324 EPOS4 Micro SMT socket 2 x 40 poles	✓	✓									

(a) with matching motherboard

(a) with matering motherboard																						
Accessories EPOS4 Compact & Encase	ed hou	sin	g (not i	incl	uded i	in d	leliver	у)														
520858 CAN-CAN Cable		98	✓	CAN		Α	✓	z		₽	✓	z		Ħ	✓	Ā		₽	✓	/2	✓	5
520857 CAN-COM Cable		axe	✓			5	✓	ပ		δ	✓	S		δ	✓	S		rCAT	✓	50	✓	70/15
275934 Encoder Cable		က်	✓	1.5	✓	EtherC/	✓	2/2	✓	EtherCAT	✓	50/8	✓	EtherCAT	✓	/15	✓	Ether	✓	47	✓	32
520859 EPOS4 Connector Set		Ä	✓	24/	✓	2 E	✓	t 50,	✓	12	✓	t 50	✓	8 E	✓	50	✓	2 E	✓	460	✓	4385
581245 EPOS4 EtherCAT Card		er(ਹ		Ę		ac		20/		ac		20/1		ğ		3/15	✓	54	✓	297
691408 EPOS4 MB 3-axes Conn. Set	✓	E		Compa		24		E		; ;		E		ct 5		npg		t 5(
422827 Ethernet Cable	✓	/2		Ö	✓	pact		S	✓	bac		ပိ	✓	pac		Com	✓	ompact	✓		✓	
275878 Hall Sensor Cable	✓	24		4		omp	✓	18	✓	Compa	✓	0885	✓	Compa	✓		✓	Ē	✓		✓	
275851 Motor Cable	✓	act		4671		S	✓	171	✓	ŭ	✓	80	✓	Ö 8	✓	20886	✓	ပိ	✓		✓	
520851 Motor Cable High Current		μ		546		92		25		60		22		298	✓	52	✓	299			✓	
275829 Power Cable	✓ (b)	S		47		80				62809	√ (b)		√ (b)	05	√ (b)		√ (b)	52	✓		√ (b)	
520850 Power Cable High Current	√ (c)	19				62				9	√ (c)		√ (c)	9	√ (c)		√ (c)	9			√ (c)	
520856 RS232-COM Cable		45	✓				✓				✓				✓				✓		✓	
520852 Sensor Cable 5 x 2core	✓	689	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
520854 Signal Cable 7core	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
520853 Signal Cable 8core	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
520860 STO Idle Connector X9			✓ (i)		✓ (i)		✓ (i)		✓ (i)		✓ (i)		✓ (i)		✓ (i)		✓ (i)		✓ (i)		✓ (i)	
403968 USB Type A - micro B Cable	✓		√		1		✓		✓		✓		✓		✓		✓		✓		√	

(b) optional for separate logic supply (c) mandatory for supply of power stage (i) included

Accessories EPOS4 Disk (not included in delivery)								
710928 Brake Cable	✓	3 ✓	₽	√ Z	✓ SS	√ 4	· 🗸	ပ္က
710931 CAN-CAN Cable		Z V	5	✓ VA		į į		SSC
710932 CAN-COM Cable	✓	SK 6U/8	t e	√ 5	✓ NAC	i e		¥
751388 CAN ix Industrial Type B Plug	1	9	8 E	✓ 8	√ C	2 8		erC
696285 Encoder Cable	✓		õ	√	√ 5	60/12 EtherCAT	✓	EtherCAT
710926 EPOS4 Disk Connector Set		₹	Disk 60/8 EtherCAT	5 Disk 60/12	√ &	√ S	√	12
710934 EtherCAT-COM Cable				~		^ ∧ Disk	✓	60/12
710933 EtherCAT-EtherCAT Cable		V V	72	887	6	✓	✓	Disk
748166 EtherCAT ix Industrial Type A Plug	'	✓	6887	9	8	√	✓	
275878 Hall Sensor Cable			68	✓	√ §	> > > 588777	✓	709862
696284 Hall Sensor Cable	✓	✓		✓	✓	✓	✓	360
710930 Motor Cable High Current				✓	✓	✓	✓	7
696283 Power & Motor Cable	✓	✓						
710929 Power Cable High Current				✓	✓	✓	✓	
696286 Sensor Cable 3x2core	✓	✓		✓	✓	✓	✓	
520852 Sensor Cable 5x2core				✓	✓	✓	✓	
696288 Signal Cable 7core	✓	✓		✓	✓	✓	✓	
696287 Signal Cable 8core	✓	✓		✓	✓	✓	✓	
696289 USB Type A - Micro-Lock Cable	✓	✓		✓	✓	✓	✓	



EPOS4 Micro 24/5 CAN

Miniaturized OEM positioning controller module, designed for use with brushed DC motors dule, designed for use with brushed DC motors with encoders and brushless EC motors (BLDC) with encoders and brushless EC motors (BLDC) with Hall sensors and encoders up to 120 W/360 W.



EPOS4 Micro 24/5 EtherCAT

Miniaturized OEM positioning controller mowith Hall sensors and encoders up to 120 W/360 W.

	120 W/360 W.	120 W/360 W.
Controller version		
	CANopen Slave	EtherCAT Slave
Electrical data		
Operating voltage V _{cc}	10 - 24 VDC	10 - 24 VDC
_ogic supply voltage V _C (optional)	10 - 24 VDC	10 - 24 VDC
Max. output voltage	0.9 x V _{cc}	0.9 x V _{cc}
Max. output current I _{max}	15 A (<10 s)	15 A (<10 s)
Continuous output current I _{cont}	5 A	5 A
Switching frequency of power stage	50 kHz	50 kHz
Sampling rate of PI current controller	25 kHz (40 μs)	25 kHz (40 μs)
Sampling rate of PI speed controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Sampling rate of PID position controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Max. speed (1 pole pair)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)
Built-in motor choke per phase	<u>-</u>	_
nputs		
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)
Sensor signals	Clock, Data	Clock, Data
Digital inputs	4 (logic level)	4 (logic level)
Digital inputs "High-speed"	1	1
	2 (12-bit resolution, -10+10 V)	•
Analog inputs	, ,	2 (12-bit resolution, -10+10 V)
CAN ID / DEV ID	configurable with external wiring	-
Outputs		•
Digital outputs	2	2
Digital outputs "High-speed"	1	1
Analog outputs	1 (12-bit resolution, -4+4 V, max. 1 mA)	1 (12-bit resolution, -4+4 V, max. 1 mA)
Encoder voltage output	+5 VDC, max. 115 mA	+5 VDC, max. 115 mA
Hall sensor voltage output	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA
Auxiliary voltage output	-	-
nterfaces		
CAN	high; low (max. 1 Mbit/s)	-
EtherCAT	-	100 Mbit/s (Full Duplex)
RS232	RxD; TxD (max. 115 200 bit/s)	-
JSB 2.0/3.0	Data+; Data- (Full Speed)	Data+; Data- (Full Speed)
ndicator		
_ED green = READY, red= ERROR	Green LED, red LED	Green LED, red LED
Environmental conditions		
Temperature - Operation	-30+45°C	-30+40°C
Temperature - Extended Range	+45+70°C; Derating: -0.200 A/°C	+40+60°C; Derating: -0.25 A/°C
Femperature – Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data		
Veight	approx. 6 g	approx. 7 g
Dimensions (L x W x H)	32.0 x 22.0 x 7.0 mm	36.5 x 27.0 x 7.0 mm
Mounting	M2 screws	M2 screws
Part numbers		
	638328 EPOS4 Micro 24/5 CAN	654731 EPOS4 Micro 24/5 EtherCAT
	COSCIO EL COLLINICIO EN CONTR	CO OZ EL COTIMICIO ZATO ELHOTORI
Accessories		
Accessories	309687 DSR 50/5 Shunt regulator	309687 DSR 50/5 Shunt regulator











EPOS4 Module 24/1.5

OEM position control module, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 36/108 Watt.



EPOS4 Module 50/5

OEM position control module, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 250/750 Watt.

Cantuallan vancian	chedders up to 50/100 watt.	chedders up to 2007700 watt.
Controller version	CANopen Slave with EtherCAT option	CANopen Slave with EtherCAT option
Electrical data		
Operating voltage V _{cc}	10 - 24 VDC	10 - 50 VDC
Logic supply voltage V _C (optional)	10 - 24 VDC	10 - 50 VDC
Max. output voltage	0.9 x V _{cc}	0.9 x V _{cc}
Max. output current I _{max}	4.5 A (<30 s)	15 A (<3 s)
Continuous output current I _{cont}	1.5 A	5 A
Switching frequency of power stage	100 kHz	50 kHz
Sampling rate of PI current controller	25 kHz (40 μs)	25 kHz (40 μs)
Sampling rate of PI speed controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Sampling rate of PID position controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Max. speed (1 pole pair)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)
Built-in motor choke per phase	-	-
Inputs		
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)
Sensor signals	A, A B, B I, I Clock, Clock Data, Data\	A, A B, B I, I Clock, Clock Data, Data\
Oction digitals	A, A, B, B, I, I, Clock, Clock, Data, Data	A, A, B, B, I, I, I, Olock, Olock, Data, Data
Digital inputs	4 (logic level)	4 (logic level)
Digital inputs "High-speed"	4, differential	4, differential
Analog inputs	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)
CAN ID / DEV ID	configurable with external wiring	configurable with external wiring
Outputs	comigurable man oxiomal mining	comigarable man external mining
Digital outputs	2	2
Digital outputs "High-speed"	1, differential	1, differential
Analog outputs	2 (12-bit resolution, -4+4 V, max. 1 mA)	2 (12-bit resolution, -4+4 V, max. 1 mA)
Encoder voltage output	+5 VDC, max. 70 mA	+5 VDC, max. 70 mA
Hall sensor voltage output	+5 VDC, max. 30 mA	+5 VDC, max. 70 mA
Auxiliary voltage output	+5 VDC, max. 145 mA	+5 VDC, max. 145 mA
Interfaces	+5 VDC, Illax. I+5 IIIA	+5 VDC, 111ax. 145 111A
CAN	high: low/max 1 Mhit/s)	high; low (max. 1 Mbit/s)
EtherCAT	high; low (max. 1 Mbit/s)	- · · · · · · · · · · · · · · · · · · ·
EllierCAI	Optional 581245 EPOS4 EtherCAT Card available	Optional 581245 EPOS4 EtherCAT Card available
RS232	RxD; TxD (max. 115 200 bit/s)	RxD; TxD (max. 115 200 bit/s)
USB 2.0/3.0	Data+; Data- (Full Speed)	Data+; Data- (Full Speed)
Indicator		
LED green = READY, red= ERROR	Green LED, red LED	Green LED, red LED
Environmental conditions		
Temperature - Operation	-30+60°C	-30+45°C
Temperature - Extended Range	+60+73°C; Derating: -0.115 A/°C	+45+75°C; Derating: -0.167 A/°C
Temperature - Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data		
Weight	approx. 17 g	approx. 17 g
Dimensions (L x W x H)	53.8 x 38.8 x 11.1 mm	53.8 x 38.8 x 11.1 mm
Mounting	Socket header 1.27 mm or M2.5 screws	Socket header 1.27 mm or M2.5 screws
Part numbers		
	536630 EPOS4 Module 24/1.5	534130 EPOS4 Module 50/5
Accessories		
	309687 DSR 50/5 Shunt regulator	309687 DSR 50/5 Shunt regulator
	Order accessories separately, see page 578	Order accessories separately, see page 578



EPOS4 Module 50/8

OEM position control module, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 400/1500 Watt.



EPOS4 Module 50/15

OEM position control module, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 750/1500 Watt.



EPOS4 Compact 24/5 EtherCAT 3-axes

Ready-to-install 3-axis compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 120/360 W per axis.

Controller version		
CANopen Slave with EtherCAT option	CANopen Slave with EtherCAT option	EtherCAT Slave
Electrical data		
10 - 50 VDC	10 - 50 VDC	10 - 24 VDC
10 - 50 VDC	10 - 50 VDC	10 - 24 VDC
0.9 x V _{CC}	0.9 x V _{cc}	0.9 x V _{CC}
30 A (<5 s)	30 A (<60 s)	15 A (<10 s) per axis
8 A	15 A	5 A per axis
50 kHz	50 kHz	50 kHz
25 kHz (40 μs)	25 kHz (40 μs)	25 kHz (40 μs)
2.5 kHz (400 µs)	2.5 kHz (400 µs)	2.5 kHz (400 µs)
2.5 kHz (400 µs)	2.5 kHz (400 µs)	2.5 kHz (400 µs)
50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)
-	-	-
Inputs		
H1, H2, H3	H1, H2, H3	H1, H2, H3 per axis
A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)	111, 112, 110 per axis
	A, A B, B I, I Clock, Clock Data, Data\	A A) P P) I I) Clock Clock) Data Data)
A, A B, B I, I Clock, Clock Data, Data\	A, A B, B I, I Clock, Clock Data, Data\	A, A B, B I, I Clock, Clock Data, Data\ per axis
4 (logic level)	4 (logic level)	4 (level switchable: logic/PLC) per axis
4, differential	4, differential	-
2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V) per axis
configurable with external wiring	configurable with external wiring	
Outputs	Ţ Ţ	
2	2	2 per axis
1, differential	1, differential	=
2 (12-bit resolution, -4+4 V, max. 1 mA)	2 (12-bit resolution, -4+4 V, max. 1 mA)	1 (12-bit resolution, -4+4 V, max. 1 mA) per axis
+5 VDC, max. 70 mA	+5 VDC, max. 70 mA	+5 VDC, max. 100 mA per axis
+5 VDC, max. 30 mA	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA per axis
+5 VDC, max. 145 mA	+5 VDC, max. 145 mA	10 12 0, max. 00 m. por ax.
Interfaces	10120,	
high; low (max. 1 Mbit/s)	high; low (max. 1 Mbit/s)	_
Optional 581245 EPOS4 EtherCAT Card	Optional 581245 EPOS4 EtherCAT Card	100 Mbit/s (Full Duplex)
available	available	Too Motor (Fall Baptox)
RxD; TxD (max. 115 200 bit/s)	RxD; TxD (max. 115 200 bit/s)	-
Data+; Data- (Full Speed)	Data+; Data- (Full Speed)	Data+; Data- (Full Speed) per axis
Indicator	Jaia., Jaia (Fair Speed)	zata:, zata (. a.: opoca) po. axio
Green LED. red LED	Green LED, red LED	Green LED, red LED
Environmental conditions	G. 66 115, 164 115	G. 66.1 <u>115</u> , 164 <u>115</u>
-30+45°C	-30+25°C	-30+25°C
+45+77°C; Derating: -0.250 A/°C	+25+77°C; Derating: -0.288 A/°C	+25+50°C; Derating: -0.200 A/°C
-40+85°C	-40+85°C	-40+85°C
590%	590%	590%
Mechanical data		
approx. 23 g	approx. 70 g	approx. 85 g
59.5 x 46.0 x 14.1 mm	59.5 x 62.0 x 16.4 mm	90.0 x 56.0 x 29.0 mm
Socket header 2.54 mm or M2.5 screws	Socket header 2.54 mm or M3 screws	M2.5 screws
Part numbers	TI THE COLOR OF TH	
504384 EPOS4 Module 50/8	504383 EPOS4 Module 50/15	684519 EPOS4 Compact 24/5 EtherCAT
55 100 FEI 55 FINOGUIO 50/6	22 12 00 1 Modalo 00/10	3-axes
Accessories		
235811 DSR 70/30 Shunt regulator	235811 DSR 70/30 Shunt regulator	235811 DSR 70/30 Shunt regulator
Order accessories separately, see page 578	Order accessories separately, see page 578	Order accessories separately, see page 578











EPOS4 Compact 24/1.5 CAN

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 36/108 Watt.



EPOS4 Compact 24/1.5 EtherCAT

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 36/108 Watt.

	checkers up to oor roo watt.	chooders up to contoo watt.
Controller version	CANopen Slave	EtherCAT Slave
Electrical data		
Operating voltage V _{cc}	10 - 24 VDC	10 - 24 VDC
Logic supply voltage V _C (optional)	10 - 24 VDC	10 - 24 VDC
Max. output voltage	0.9 x V _{cc}	0.9 x V _{cc}
Max. output current I _{max}	4.5 A (<30 s)	4.5 A (<30 s)
Continuous output current I _{cont}	1.5 A	1.5 A
Switching frequency of power stage	100 kHz	100 kHz
Sampling rate of PI current controller	25 kHz (40 μs)	25 kHz (40 μs)
Sampling rate of PI speed controller	2.5 kHz (400 μs)	2.5 kHz (400 µs)
Sampling rate of PID position controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Max. speed (1 pole pair)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)
Built-in motor choke per phase	94 μH / 1.5 A	100 μH / 1.5 A
Inputs	·	·
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)
Sensor signals	A, A B, B I, I Clock, Clock Data, Data\	A, A B, B I, I Clock, Clock Data, Data\
Digital inputs	4 (level switchable: logic/PLC)	4 (level switchable: logic/PLC)
Digital inputs "High-speed"	4, differential	4, differential
Analog inputs	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)
CAN ID / DEV ID	configurable with DIP switch 15	configurable with DIP switch 15
Outputs	_	•
Digital outputs	2	2
Digital outputs "High-speed"	1, differential	1, differential
Analog outputs	2 (12-bit resolution, -4+4 V, max. 1 mA)	2 (12-bit resolution, -4+4 V, max. 1 mA)
Encoder voltage output	+5 VDC, max. 70 mA	+5 VDC, max. 70 mA
Hall sensor voltage output	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA
Auxiliary voltage output	+5 VDC, max. 145 mA	+5 VDC, max. 145 mA
Interfaces		
CAN	high; low (max. 1 Mbit/s)	-
EtherCAT	<u> </u>	100 Mbit/s (Full Duplex)
RS232	RxD; TxD (max. 115 200 bit/s)	-
USB 2.0/3.0	Data+; Data- (Full Speed)	Data+; Data- (Full Speed)
Indicator	, , ,	, , ,
LED green = READY, red= ERROR	Green LED, red LED	Green LED, red LED
Environmental conditions		
Temperature - Operation	-30+45°C	-30+45°C
Temperature - Extended Range	+45+70°C; Derating: -0.060 A/°C	+45+70°C; Derating: -0.060 A/°C
Temperature – Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data		
Weight	approx. 58 g	approx. 78 g
Dimensions (L x W x H)	55.0 x 40.0 x 31.1 mm	55.0 x 56.5 x 31.7 mm
Mounting	M2.5 screws	M2.5 screws
Part numbers		
	546714 EPOS4 Compact 24/1.5 CAN	628092 EPOS4 Compact 24/1.5 EtherCAT
Accessories	'	
	309687 DSR 50/5 Shunt regulator	309687 DSR 50/5 Shunt regulator
	Order accessories separately, see page 578	Order accessories separately, see page 578
		1 . 2/ 1



EPOS4 Compact 50/5 CAN

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 250/750 Watt.



EPOS4 Compact 50/5 EtherCAT

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 250/750 Watt.



EPOS4 Compact 50/8 CAN

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 400/1500 Watt.

CANopen Slave EtherCAT Slave CANopen Slave	
CAROPER GIAVE EMICIOAT GIAVE CAROPER GIAVE	
Electrical data	
10 - 50 VDC 10 - 50 VDC 10 - 50 VDC	
10 - 50 VDC 10 - 50 VDC 10 - 50 VDC	
$0.9 \times V_{CC}$ $0.9 \times V_{CC}$ $0.9 \times V_{CC}$	
15 A (<3 s) 30 A (<5 s)	
5 A 5 A 8 A	
50 kHz 50 kHz	
25 kHz (40 μs) 25 kHz (40 μs) 25 kHz (40 μs)	
2.5 kHz (400 μs) 2.5 kHz (400 μs) 2.5 kHz (400 μs)	
2.5 kHz (400 μs) 2.5 kHz (400 μs) 2.5 kHz (400 μs)	
50 000 rpm (sinusoidal), 100 000 rpm (block) 50 000 rpm (sinusoidal), 100 000 rpm (block) 50 000 rpm (sinusoidal), 100 000	rpm (block)
9.4 µH / 5 A 2.2 µH / 15 A	
Inputs	
H1, H2, H3 H1, H2, H3 H1, H2, H3	
A, A B, B I, I\ (max. 6.25 MHz) A, A B, B I, I\ (max. 6.25 MHz) A, A B, B I, I\ (max. 6.25 MHz)	
A, A B, B I, I Clock, Clock Data, Data\ A, A B, B I, I Clock, Clock Data, Data\ A, A B, B I, I Clock, Clock Data	ia, Data\
4 (level switchable: logic/PLC) 4 (level switchable: logic/PLC) 4 (level switchable: logic/PLC)	
4, differential 4, differential 4, differential	
2 (12-bit resolution, -10+10 V) 2 (12-bit resolution, -10+10 V) 2 (12-bit resolution, -10+10 V)	
configurable with DIP switch 15 configurable with DIP switch 15 configurable with DIP switch 15	
Outputs	
2 2 2	
1, differential 1, differential 1, differential	
2 (12-bit resolution, -4+4 V, max. 1 mA) 2 (12-bit resolution, -4+4 V, max. 1 mA) 2 (12-bit resolution, -4+4 V, max. 1 mA)	. 1 mA)
+5 VDC, max. 70 mA +5 VDC, max. 70 mA +5 VDC, max. 70 mA	
+5 VDC, max. 30 mA +5 VDC, max. 30 mA +5 VDC, max. 30 mA	
+5 VDC, max. 145 mA +5 VDC, max. 145 mA +5 VDC, max. 145 mA	
Interfaces	
high; low (max. 1 Mbit/s) – high; low (max. 1 Mbit/s)	
- 100 Mbit/s (Full Duplex) -	
RxD; TxD (max. 115 200 bit/s) – RxD; TxD (max. 115 200 bit/s)	
Data+; Data- (Full Speed) Data+; Data- (Full Speed) Data+; Data- (Full Speed)	
Indicator	
Green LED, red LED Green LED, red LED Green LED, red LED	
Environmental conditions	
-30+25°C -30+45°C	
+25+70°C; Derating: -0.111 A/°C +25+70°C; Derating: -0.111 A/°C +45+77°C; Derating: -0.250 A/°C	D
-40+85°C -40+85°C -40+85°C	
590% 590%	
Mechanical data	
approx. 58 g approx. 76 g approx. 86 g	
55.0 x 40.0 x 31.1 mm 55.0 x 56.5 x 31.7 mm 59.5 x 58.5 x 33.0 mm	
M2.5 screws M2.5 screws M2.5 screws	
M2.5 screws M2.5 screws M2.5 screws Part numbers	
Part numbers	AN
Part numbers	CAN
Part numbers 628094 EPOS4 Compact 50/5 EtherCAT 520885 EPOS4 Compact 50/8 C	











EPOS4 Compact 50/8 EtherCAT

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 400/1500 Watt.



EPOS4 Compact 50/15 CAN

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 750/1500 Watt.

	encoders up to 400/1500 watt.	encoders up to 750/1500 watt.
Controller version	EtherCAT Slave	CANopen Slave
Electrical data	Etheroal olave	OANOPON Olave
Operating voltage V _{CC}	10 - 50 VDC	10 - 50 VDC
Logic supply voltage V _C (optional)	10 - 50 VDC	10 - 50 VDC
Max. output voltage	0.9 x V _{cc}	0.9 x V _{CC}
Max. output current I _{max}	30 A (<5 s)	30 A (<60 s)
Continuous output current I _{cont}	8 A	15 A
Switching frequency of power stage	50 kHz	50 kHz
Sampling rate of PI current controller	25 kHz (40 μs)	25 kHz (40 µs)
Sampling rate of PI speed controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Sampling rate of PID position controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Max. speed (1 pole pair)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)
Built-in motor choke per phase		
	2.2 μH / 15 A	2.2 μH / 15 A
Inputs	111 110 110	14 110 110
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)
Sensor signals	A, A B, B I, I Clock, Clock Data, Data\	A, A B, B I, I Clock, Clock Data, Data\
Digital inputs	4 (level switchable: logic/PLC)	4 (level switchable: logic/PLC)
Digital inputs "High-speed"	4, differential	4, differential
Analog inputs	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)
CAN ID / DEV ID	configurable with DIP switch 15	configurable with DIP switch 15
Outputs		
Digital outputs	2	2
Digital outputs "High-speed"	1, differential	1, differential
Analog outputs	2 (12-bit resolution, -4+4 V, max. 1 mA)	2 (12-bit resolution, -4+4 V, max. 1 mA)
Encoder voltage output	+5 VDC, max. 70 mA	+5 VDC, max. 70 mA
Hall sensor voltage output	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA
Auxiliary voltage output	+5 VDC, max. 145 mA	+5 VDC, max. 145 mA
Interfaces		
CAN	-	high; low (max. 1 Mbit/s)
EtherCAT	100 Mbit/s (Full Duplex)	-
RS232	-	RxD; TxD (max. 115 200 bit/s)
USB 2.0/3.0	Data+; Data- (Full Speed)	Data+; Data- (Full Speed)
Indicator		
LED green = READY, red= ERROR	Green LED, red LED	Green LED, red LED
Environmental conditions		
Temperature - Operation	-30+45°C	-30+25°C
Temperature - Extended Range	+45+77°C; Derating: -0.250 A/°C	+25+77°C; Derating: -0.288 A/°C
Temperature - Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data		
Weight	approx. 100 g	approx. 126 g
Dimensions (L x W x H)	59.5 x 79.5 x 35.7 mm	59.5 x 65.5 x 35.1 mm
Mounting	M2.5 screws	M3 screws
Part numbers		
	605298 EPOS4 Compact 50/8 EtherCAT	520886 EPOS4 Compact 50/15 CAN
Accessories		
	235811 DSR 70/30 Shunt regulator	235811 DSR 70/30 Shunt regulator
	Order accessories separately, see page 578	Order accessories separately, see page 578
	oraci accessories separately, see page 070	orasi accessories separately, see page or o



EPOS4 Compact 50/15 EtherCAT

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 750/1500 Watt.



EPOS4 50/5

Positioning controller in a robust housing, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 250/750 Watt.



EPOS4 70/15

Positioning controller in a robust housing, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 1050/2100 Watt.

Controller version		
EtherCAT Slave	CANopen Slave with EtherCAT option	CANopen Slave with EtherCAT option
Electrical data		
10 - 50 VDC	10 - 50 VDC	10 - 70 VDC
10 - 50 VDC	10 - 50 VDC	10 - 70 VDC
0.9 x V _{cc}	0.9 x V _{CC}	0.9 x V _{CC}
30 A (<60 s)	15 A (<15 s)	30 A (<60 s)
15 A	5 A	15 A
50 kHz	50 kHz	50 kHz
25 kHz (40 μs)	25 kHz (40 μs)	25 kHz (40 μs)
2.5 kHz (400 μs)	2.5 kHz (400 μs)	2.5 kHz (400 μs)
2.5 kHz (400 μs)	2.5 kHz (400 μs)	2.5 kHz (400 μs)
50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)
2.2 μH / 15 A	15 μH / 5 A	15 μH / 15 A
Inputs		
H1, H2, H3	H1, H2, H3	H1, H2, H3
A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)
A, A B, B I, I Clock, Clock Data, Data\	A, A B, B I, I Clock, Clock Data, Data\	A, A B, B I, I Clock, Clock Data, Data\
4 (level switchable: logic/PLC)	4 (level switchable: logic/PLC)	4 (level switchable: logic/PLC)
4, differential	4, differential	4, differential
2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)
configurable with DIP switch 15	configurable with DIP switch 15	configurable with DIP switch 15
Outputs		
2	2	2
1, differential	1, differential	1, differential
2 (12-bit resolution, -4+4 V, max. 1 mA)	2 (12-bit resolution, -4+4 V, max. 1 mA)	2 (12-bit resolution, -4+4 V, max. 1 mA)
+5 VDC, max. 70 mA	+5 VDC, max. 70 mA	+5 VDC, max. 70 mA
+5 VDC, max. 30 mA	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA
+5 VDC, max. 145 mA	+5 VDC, max. 145 mA	+5 VDC, max. 145 mA
Interfaces		
-	high; low (max. 1 Mbit/s)	high; low (max. 1 Mbit/s)
100 Mbit/s (Full Duplex)	Optional 581245 EPOS4 EtherCAT Card available	Optional 581245 EPOS4 EtherCAT Card available
-	RxD; TxD (max. 115 200 bit/s)	RxD; TxD (max. 115 200 bit/s)
Data+; Data- (Full Speed)	Data+; Data- (Full Speed)	Data+; Data- (Full Speed)
Indicator		
Green LED, red LED	Green LED, red LED	Green LED, red LED
Environmental conditions		
-30+25°C	-30+50°C	-30+50°C
+25+77°C; Derating: -0.288 A/°C	+50+80°C; Derating: -0.167 A/°C	+50+85°C; Derating: -0.429 A/°C
-40+85°C	-40+85°C	-40+85°C
590%	590%	590%
Mechanical data		
approx. 140 g	approx. 206 g	approx. 372 g
59.5 x 79.5 x 37.8 mm	105.0 x 83.0 x 38.7 mm	125.0 x 94.5 x 38.7 mm
M3 screws	Flange for M4-screws	Flange for M4-screws
Part numbers		
605299 EPOS4 Compact 50/15 EtherCAT	546047 EPOS4 50/5	594385 EPOS4 70/15
Accessories		
235811 DSR 70/30 Shunt regulator	309687 DSR 50/5 Shunt regulator	235811 DSR 70/30 Shunt regulator
Order accessories separately, see page 578	Order accessories separately, see page 578	Order accessories separately, see page 578











EPOS4 Disk 60/8 CAN

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 480/1440 Watt.



EPOS4 Disk 60/8 EtherCAT

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 480/1440 Watt.

	encoders up to 460/1440 watt.	encoders up to 460/1440 Watt.
Controller version	CANopen Slave	EtherCAT Slave
Electrical data	OANOPOII Olave	Edition of old ve
Operating voltage V _{CC}	12 - 60 VDC	12 - 60 VDC
Logic supply voltage V_C (optional)	12 - 60 VDC	12 - 60 VDC
Max. output voltage	0.9 x V _{CC}	0.9 x V _{CC}
Max. output current I _{max}	24 A (<10 s)	24 A (<10 s)
Continuous output current I _{cont}	8 A	8 A
Switching frequency of power stage	50 kHz	50 kHz
Sampling rate of PI current controller	25 kHz (40 μs)	25 kHz (40 μs)
Sampling rate of Produced controller	2.5 kHz (400 μs)	2.5 kHz (400 µs)
Sampling rate of PT speed controller	2.5 kHz (400 μs)	2.5 kHz (400 µs)
Max. speed (1 pole pair)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block
Built-in motor choke per phase	-	-
nputs	14 10 10	14 110 110
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)
Sensor signals	Clock, Clock Data, Data\	Clock, Clock Data, Data\
Digital inputs	4 (logic level)	4 (logic level)
Digital inputs "High-speed"	1, differential	1, differential
Analog inputs	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)
CAN ID / DEV ID	Configurable with DIP switch 14	Configurable with DIP switch 14
Outputs		
Digital outputs	2	2
Digital outputs "High-speed"	1, differential	1, differential
Analog outputs	1 (12-bit resolution, -4+4 V, max. 1 mA)	1 (12-bit resolution, -4+4 V, max. 1 mA)
Encoder voltage output	+5 VDC, max. 70 mA	+5 VDC, max. 70 mA
Hall sensor voltage output	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA
Auxiliary voltage output	+5 VDC, max. 145 mA	+5 VDC, max. 145 mA
nterfaces		
CAN	high; low (max. 1 Mbit/s)	-
EtherCAT	-	100 Mbit/s (Full Duplex)
RS232	-	-
USB 2.0/3.0	Data+; Data- (Full Speed)	Data+; Data- (Full Speed)
Indicator	Jaia , Jaia (Cam oposa)	zata:, zata (. a.: opeou)
LED green = READY, red= ERROR	Green LED, red LED	Green LED, red LED
Environmental conditions	G. 00.1 <u></u> 2, 100 <u></u> 2	G. 66 112, 164 112
Temperature – Operation	-30+45°C	-30+35°C
Temperature - Extended Range	+45+75°C; Derating: -0.267 A/°C	+35+65°C; Derating: -0.267 A/°C
Temperature - Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data	00070	00070
	approx 24 g	approx 26 g
Weight Dimensions (L x W x H)	approx. 24 g 60.0 x 60.0 x 22.0 mm	approx. 26 g 60.0 x 60.0 x 22.0 mm
Mounting	M2 screws	M2 screws
Part numbers		
	C00770 FDOC4 District ON OAM	COC770 FDOCA Dial- 00/0 Fth 0AT
	688770 EPOS4 Disk 60/8 CAN	688772 EPOS4 Disk 60/8 EtherCAT
Accessories		
Accessories	688770 EPOS4 Disk 60/8 CAN 235811 DSR 70/30 Shunt regulator Order accessories separately, see page 578	688772 EPOS4 Disk 60/8 EtherCAT 235811 DSR 70/30 Shunt regulator Order accessories separately, see page 578



EPOS4 Disk 60/12 CAN

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 720/2160 Watt.



EPOS4 Disk 60/12 EtherCAT

Ready-to-install compact solution, designed for use with brushed DC motors with encoders or brushless EC motors with Hall sensors and encoders up to 720/2160 Watt.

O antina lla manamatan	chedders up to 720/2100 Watt.	chedders up to 120/2100 watt.
Controller version	CANopen Slave	EtherCAT Slave
Electrical data		
Operating voltage V _{cc}	12 - 60 VDC	12 - 60 VDC
Logic supply voltage V _c (optional)	12 - 60 VDC	12 - 60 VDC
Max. output voltage	0.9 x V _{cc}	0.9 x V _{cc}
Max. output current I _{max}	36 A (<5 s)	36 A (<5 s)
Continuous output current I _{cont}	12 A	12 A
Switching frequency of power stage	50 kHz	50 kHz
Sampling rate of PI current controller	25 kHz (40 μs)	25 kHz (40 μs)
Sampling rate of PI speed controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Sampling rate of PID position controller	2.5 kHz (400 µs)	2.5 kHz (400 µs)
Max. speed (1 pole pair)	50 000 rpm (sinusoidal), 100 000 rpm (block)	50 000 rpm (sinusoidal), 100 000 rpm (block)
Built-in motor choke per phase	-	-
Inputs		
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A B, B I, I\ (max. 6.25 MHz)	A, A B, B I, I\ (max. 6.25 MHz)
Sensor signals	Clock, Clock Data, Data\	Clock, Clock Data, Data\
Digital inputs	4 (logic level)	4 (logic level)
Digital inputs "High-speed"	1, differential	1, differential
Analog inputs	2 (12-bit resolution, -10+10 V)	2 (12-bit resolution, -10+10 V)
CAN ID / DEV ID	Configurable with DIP switch 14	Configurable with DIP switch 14
Outputs	_	_
Digital outputs	2	2
Digital outputs "High-speed"	1, differential	1, differential
Analog outputs	1 (12-bit resolution, -4+4 V, max. 1 mA)	1 (12-bit resolution, -4+4 V, max. 1 mA)
Encoder voltage output	+5 VDC, max. 70 mA	+5 VDC, max. 70 mA
Hall sensor voltage output	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA
Auxiliary voltage output	+5 VDC, max. 145 mA	+5 VDC, max. 145 mA
Interfaces	,	,
CAN	high; low (max. 1 Mbit/s)	-
EtherCAT	-	100 Mbit/s (Full Duplex)
RS232	-	=
USB 2.0/3.0	Data+; Data- (Full Speed)	Data+; Data- (Full Speed)
Indicator		(op ===,
LED green = READY, red= ERROR	Green LED, red LED	Green LED, red LED
Environmental conditions	,	,
Temperature - Operation	-30+50°C	-30+45°C
Temperature - Extended Range	+50+75°C; Derating: -0.480 A/°C	+45+70°C; Derating: -0.480 A/°C
Temperature - Storage	-40+85°C	-40+85°C
Humidity (condensation not permitted)	590%	590%
Mechanical data		
Weight	approx. 43 g	approx. 45 g
Dimensions (L x W x H)	90.0 x 90.0 x 27.6 mm	90.0 x 90.0 x 27.6 mm
Mounting	M3 screws	M3 screws
Part numbers		
	688775 EPOS4 60/12 CAN	688777 Disk 60/12 EtherCAT
	709859 EPOS4 60/12 CAN SSC	709862 Disk 60/12 EtherCAT SSC
Accessories		
	235811 DSR 70/30 Shunt regulator	235811 DSR 70/30 Shunt regulator
	Order accessories separately, see page 578	Order accessories separately, see page 578

Multi-Axis Motion Controller Summary

CANopen

Solutions optimized for less complex or cost-sensitive applications:

- MicroMACS6
- MiniMACS
- MiniMACS6-AMP-4/50/10





Ether CAT. CRNopen







EtherCAT. CRNopon

Solutions for high flexibility:

- MiniMACS6-AMP-4/50/10-IF1
- MACS5
- Variants with integrated amplifiers (50 V/up to 10 A/30 A) and various encoder inputs (also absolute)

Solutions for highest performance:

- MasterMACS
- Most powerful Motion Controller
- Synchronization of up to 32 axes
- Various fieldbus interfaces (Ethernet, 2 x CANopen, EtherCAT master, EtherCAT slave, Profinet on request etc.)



MicroMACS6 Data

Programmable Motion Controller



MicroMACS6

Ultra-compact, freely programmable multi-axis controller with optional BLE (Bluetooth Low Energy) interface.

Controller versions	CANIGRAM Mantau/Claus Ethaniat Chandalan
	CANopen Master/Slave, Ethernet, Standalone with APOSS® win
Features	WILLI APO33° WILL
Motion features	Trapezoidal, jerk limited, CAM, synchronous
	travel, path, kinematics
Profile generator cycle	1 kHz (1 ms)
Sampling rate of PID positioning controller with	-
speed and acceleration feed-forward control	-
Maximum number of axes	6
Web server (visualization)	-
Expandable memory	-
Electrical data	
Logic supply voltage V _c	8 - 28 VDC
Inputs	
Digital inputs	6 (PLC 9.030 VDC or Logic 2.030 VDC)
Analog inputs	2 (12-bit resolution, 010 V, 1 kHz)
Hall sensor signals	-
CAN-ID (CAN node identification)	configurable with DIP switch
Output	
Digital output	4 (24 VDC, 100 mA, max. 5 kHz PWM)
Analog output	-
Encoder voltage output	-
Interfaces	
Profinet	-
CAN	2 high; low (max. 1 Mbit/s)
BLE (Bluetooth Low Energy)	optional (available soon)
EtherCAT-Master / EtherCAT-Slave	-
Ethernet	1 (TCP/IP, max. 100 Mbit/s)
USB 2.0	1 (Data+; Data-)
Encoder inputs	
Digital incremental	-
SSI absolute	-
Analog incremental (sin/cos)	-
Hiperface/EnDat	-
Encoder outputs	
Encoder TTL outputs	-
Indicator	
LEDs	3 (status) / Ethernet
Display	-
Environmental conditions	
Temperature - Operation	0+40°C
Temperature - Storage	-20+85°C
Humidity (condensation not permitted)	2080%
Mechanical data	
Weight	ca. 80 g
Dimensions (L x W x H)	55 x 40 x 21 mm

MicroMACS6

Compact and powerful

The MicroMACS6 is a high-performance, ultracompact, freely programmable multi-axis controller without power output stages.

One Ethernet and two independent CAN interfaces are available for commanding up to 6 power stages. The axes can be set up individually or as a kinematics group. Four PWM outputs are available for use with ESCON controllers.

An optional BLE (Bluetooth Low Energy) board expands the controller, making it possible to communicate with the controller via a smartphone app.

Note: BLE option available soon

MiniMACS Data

Programmable Motion Controller



MiniMACS

The MiniMACS controllers are fully programmable Motion Controllers. They are suitable for less complex applications that still require compact dimensions.

Controller versions	CANopen Master/Slave, Ethernet, Standalone
	with APOSS® win
Features	T
Motion features	Trapezoidal, jerk limited, CAM, synchronous travel
Profile generator cycle	1 kHz (1 ms)
Sampling rate of PID positioning controller with speed and acceleration feed-forward control	1 kHz (1ms)
Maximum number of axes	3
Web server (visualization)	-
Expandable memory	-
Electrical data	
Logic supply voltage V _C	18 - 30 VDC
Inputs	
Digital inputs	16 (PLC level)
Analog inputs	6 (12-bit resolution, 010 V); alternative analog option IO1 or IO2 (see MACS5)
Hall sensor signals	-
CAN-ID (CAN node identification)	configurable with DIP switch
Output	
Digital output	14 (max. 100 mA per output)
Analog output	option IO1
Configurable with DIP switch	+5 VDC, max. 200 mA
Interfaces	
Profinet	-
CAN	1 high; low (max. 1 Mbit/s)
RS232 / RS485	-
EtherCAT-Master / EtherCAT-Slave	-
Ethernet	1
USB 2.0	1 Data+; Data- (Full Speed)
Encoder inputs	1
Digital incremental	1 (differential, max. 5 MHz)
Hiperface/EnDat	-
Encoder outputs	
Encoder TTL outputs	-
Indicator	
LEDs	37 (status, USB, IO)
Display	-
Environmental conditions	
Temperature - Operation	0+40°C
Temperature - Storage	-20+85°C
Humidity (condensation not permitted)	2080%
Mechanical data	
Weight	500 / 300 g (DIN/compact housing)
Dimensions (L x W x H)	108 x 108 x 67 / 116 (98) x 98 x 42 mm
Mounting	DIN mounting / compact housing

«There is no drive challenge that can't be solved»

Benefit from our expertise in control solutions for state-of-the-art drive technology in devices, machinery, and systems. With our products, complex challenges like highly dynamic multiaxis positioning or synchronization can be solved in a cost-effective and efficient manner. Our use of the licensefree APOSS® motion control programming language provides the versatility required to adapt our controllers perfectly to your needs.

In addition to standard products, we also offer the development of OEM custom solutions in the field of control technology and power electronics, as well as consulting and engineering services. Cost-optimized solutions and applicationspecific custom functions.

001607 MiniMACS DIN mounting 3ax 001586 MiniMACS Compact housing 3ax

Ordering Information: Please contact your maxon sales engineer

MACS5 Data

Programmable Motion Controller



MACS5 series

The MACS5 series Motion Controllers represent a flexible product series offering high-performance computing power, six encoder inputs and various options such as integrated ampli-

	fiers.
Controller versions	
Controller Versions	CANopen Master/Slave, EtherCAT Master/ Slave, Ethernet, Standalone with APOSS® win
Features	
Motion features	Trapezoidal, jerk limited, CAM, synchronous travel, path
Profile generator cycle	1 kHz (1 ms)
Sampling rate of PID positioning controller with speed and acceleration feed-forward control	1 kHz (1 ms)
Maximum number of axes	6
Web server (visualization)	yes
Expandable memory	SD-Card
Electrical data	
Logic supply voltage V _C	18 - 30 VDC
Inputs	
Digital inputs	16 (PLC level, 8 latch capable)
Analog inputs	6 (12-bit resolution, 010 V); alternative analog option IO1 or IO2
Hall sensor signals	yes (uses one encoder input)
CAN-ID (CAN node identification)	configurable with DIP switch
Output	ormigurable mar bir omtorr
Digital output	8 (max. 100 mA per output)
Analog output	Option IO1
Encoder voltage output	+5 VDC, max. 200 mA per output, total 1 A
Interfaces	+0 VDO, max. 200 ma per output, total ra
Profinet	_
CAN	2 high; low (max. 1 Mbit/s)
RS232 / RS485	1x RxD; TxD / 1x Data+; Data-
EtherCAT-Master / EtherCAT-Slave	1/1 (optional)
Ethernet	1
USB 2.0	1 Data+; Data- (Full Speed)
Encoder inputs	max. 6
Digital incremental	6 (differential, max. 5 MHz)
SSI absolute	3 (39 kHz5 MHz)
Analog incremental (sin/cos)	3 (max. 150 kHz)
Hiperface/EnDat	- (max. 100 km2)
Encoder outputs	
Encoder TTL outputs	3 (max. 625 kHz)
Indicator	5 (Max. 626 KHZ)
LEDs	32 (status, USB, EtherCAT, IO)
Environmental conditions	02 (otatao, 000, EthoroAi, 10)
Temperature - Operation	0+40°C
Temperature - Storage	-20+85°C
Humidity (condensation not permitted)	2080%
Mechanical data	200070
Weight	
•••	ca 800 g
Dimensions (L x W x H)	ca. 800 g
Dimensions (L x W x H) Mounting	ca. 800 g 140 x 108 x 65 mm DIN mounting, standard rail mounting

Options

EtherCAT-Interface IF1
Internal plug-in module EtherCAT slave (CoE
FoE) max. 100 Mbit/s
Analog Option IO1
1 analog input (12-bit resolution, -10+10 V,

max. 1 kHz) ±10 V reference voltage (max. 20 mA) 3 analog output (12-bit resolution, -10...+10 V, max. 20 mA, max. 1 kHz)

Analog Option IO2 6 analog input (14-bit resolution, 0...10 V, $\pm 10 \text{ V}$ reference voltage (nominal 7 mA, max. 35 mA)

001718 MACS5 6ax

MiniMACS6-AMP-4/50/10-IF1 Data **Programmable Motion Controller**



MiniMACS6-AMP-4/50/10 OEM

Freely programmable, compact multi-axis motion controller with integrated high-performance power stages, without housing.



MiniMACS6-AMP-4/50/10

Freely programmable, compact multi-axis motion controller with integrated high-performance power stages.



MiniMACS6-AMP-4/50/10-IF1

Freely programmable, compact multi-axis motion controller with integrated high-performance power stages and a network option card (Ethernet/EtherCAT/ProfiNet in planning).

Slave
one with
nronous
A
otal 1 A

Operating voltage V_{CC}: 12 - 60 VDC 6 DC / 4 EC (BLDC) / 3 stepper motors / Twin Mode / Chopper Max. output voltage: 0.9 x V_{CC} Max. output current (per axis) I_{cont}: 10 A I_{max}: 30 A Switching frequency of power stage: 48 kHz Sampling rate of PI current controller: 24 kHz Sampling rate of PI speed controller: 8 kHz (125 µs) Sampling rate of PID positioning controller:

Product variants

1 kHz (1 ms)

Order no. 001755 MiniMACS6-AMP-4/50/10 Order no. 001756 MiniMACS6-AMP-4/50/10

Order no. 001757 MiniMACS6-AMP-4/50/ 10-IF1 EtherCAT

Order no. 001784 MiniMACS6-AMP-4/50/10-IF1 Ethernet

Ordering Information: Please contact your maxon sales engineer

MasterMACS Data **Programmable Motion Controller**



MasterMACS

Rounds off the Motion Controller portfolio with the highest computing power and multiple integrated bus interfaces as standard.

	grated bus interfaces as standard.
Controller versions	
	CANopen Master/Slave, EtherCAT Master, EtherCAT Slave, Ethernet, Standalone with APOSS® win
Features	
Motion features	Trapezoidal, jerk limited, CAM, synchronous travel, path, kinematics
Profile generator cycle	1 kHz (1 ms)
Sampling rate of PID positioning controller with speed and acceleration feed-forward control	1 kHz (1 ms)
Maximum number of axes	32
Web server (visualization)	yes
Expandable memory	SD-Card
Electrical data	
Logic supply voltage V _C	18 - 30 VDC
Inputs	
Digital inputs	10 (PLC level)
Analog inputs	-
Hall sensor signals	-
CAN-ID (CAN node identification)	configurable with DIP switch
Output	
Digital output	4 (max. 100 mA per output)
Analog output	-
Encoder voltage output	+5 VDC, max. 200 mA
Profinet	on request
Interfaces	
CAN	2 high; low (max. 1 Mbit/s)
RS232 / RS485	1 x RxD; TxD / 1 x Data+; Data-
EtherCAT-Master / EtherCAT-Slave	1/1
Ethernet	1
USB 2.0	1 Data+; Data- (Full Speed)
Encoder inputs	1
Digital incremental	1 (differential, max. 5 MHz)
Hiperface/EnDat	-
Encoder outputs	
Encoder TTL outputs	-
Indicator	10 (
LEDs	10 (status, USB, EtherCAT)
Display	Option
Environmental conditions	0 4000
Temperature - Operation	0+40°C
Temperature – Storage	-20+85°C
Humidity (condensation not permitted)	2080%
Mechanical data	E00 / 200 a /DIN/compact haveing)
Weight	500 / 300 g (DIN/compact housing)
Dimensions (L x W x H) Mounting	108 x 108 x 67 / 125 (108) x 98 x 42 mm
MOUDUDO	DIN mounting / compact housing

001725 MasterMACS DIN 32 ax

001728 MasterMACS compact housing 32ax

Data logger/web server

For development and analysis purposes, it is frequently helpful to collect, prepare and output data on drive systems.

Our MACS controllers provide easy options for high-performance data storage, be it on an internal SD card or via a connected PC tool. Relevant data can be recorded on a per-event basis or for long-term observation.

This data can be read out and analyzed at a later time. This flexibility makes it possible to use the MasterMACS purely as data collectors. An integrated web server provides the option of performing analysis and configuration via remote diagnostics.

Programmable Motion Controllers Application development

APOSS® win

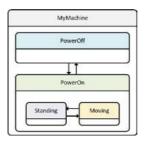
APOSS® enables simplified implementation of complex motion control applications. The programming is performed in the high-level languages C, which has been supplemented with very powerful, specific motion control commands.

```
** State Definitions
                                                                     Satingual I FORMER INDUT, SM_INDUT BISING, id. SIG_FORMER_ON);
Satingual I FORMER INDUT, SM_INDUT FAILDING, id. SIG_FORMER_OTF);
Satingual I FORMER_INDUT, SM_INDUT_BISING, id. SIG_FORMER_OTF);
Satingual I FORMER_INDUT, SM_INUT_BISING, id. SIG_FORMER_OTF);
Satingual INDUT_BISING, INDUT_BISING, id. SIG_FORMER_OTF);
SATINGUAL INDUT_BISING, INDUT_BISING, ID. STAT_FORMER_OTF);
SATINGUAL INDUT_BISING, ID. SIG_FORMER_OTF, INDUT_BISING, ID. STAT_FORMER_OTF, INDUT_BISING, Id. SIG_FORMER_OTF, INDUT_BISING, INDUT_BISING, ID. SIG_FORMER_OTF, INDUT_BISING, INDUT_BISI
                                                                                          print("Enter Power Off State");
                                 SIG_POWER_ON = Smirans (PowerOn - Standing):
                                                                                                 DigOutput | O_BRAKE_OUTPUT, C_RELEASE_BRAKE);
print | "Switch Power_ON");
                                                                                            AxisControl(id,OFF);
DigOutput(O_BRAKE_OUTPUT,C_ENABLE_BRAKE);
print("Dwitch Power_OFF");
                               SIG_POWER_OFF - SmTrane(PowerOff);
                            SmState Moving (
SIG_EMTRY = { print("State -> Moving");}
SIG_TARGET_REACHED = (
                               SmState Standing (
SIG_RETRY = ( print("State -> Standing");)
                                                SIG_START_POS - HoveNextPosition;
```

APOSS® IDE - Application Engineering

State machines

The development of extensive software systems requires a structured and modular procedure. It is essential to have an appropriate system architecture, including its components and the interfaces to the subsystems and system environment.



APOSS® makes it possible to create programs by means of hierarchical state machines. Thus comprehensive applications can be structured and developed in a transparent and serviceable way. Several state machines can be called up and processed in parallel.

Motion control functions

Comprehensive positioning and synchronization tasks are initiated with APOSS® using simple commands [e.g. AxisPosAbsStart(); AxisPosRelStart(); SyncPos(); SyncVel();] and processed independently in the background.

- Jerk-limited positioning

Profile motion with limited jerking. Jerk limiting can be individually defined for all four acceleration phases. Jerk-limited motion can be changed dynamically during the motion.

- CAM profiles

Each axis can travel along an own CAM profile. CAM profiles can be combined in any way desired and dynamically calculated. CAM segments can be splines, polynomials up to the fifth order or straight lines.

- Path motion

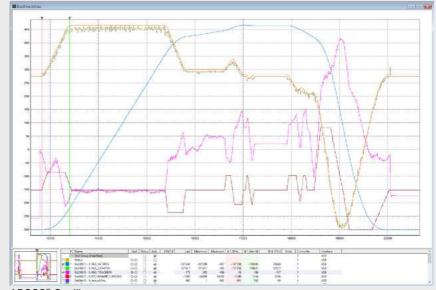
Path motion can be performed with constant or with maximum path speed, for any number of axes

Synchronization tasks

Axis motion synchronized with a master axis, position synchronization, speed synchronization or position synchronization with marker correction. Each axis can be synchronized with another mas-

- Kinematics

Synchronization of several axes in a 2- or 3-dimensional Cartesian coordinate system. Various kinematic models are available, for example a SCARA or DELTA model.



APOSS® Oscilloscope

Summary motor control

4-Q Servoco	ontroller			Page
ESCON		466023	ESCON Module 24/2, for DC/EC motors, speed control (open loop/closed loop), current control, 2/6 A, 10–24 VDC	550
		403112	ESCON 36/2 DC, for DC motors, speed control (open loop/closed loop), current control, 2/4 A, 10–36 VDC	550
		414533	ESCON 36/3 EC, for EC motors, speed control (open loop/closed loop), current control, 2.7/9 A, 10–36 VDC	551
		446925	ESCON Module 50/4 EC-S, for sensorless EC motors, speed control (open loop/closed loop), 4/12 A, 10-50 VDC	551
		438725	ESCON Module 50/5, for DC/EC motors, speed control (open loop/closed loop), current control, 5/15 A, 10–50 VDC	551
		532872	ESCON Module 50/8, for DC/EC motors, speed control (open loop/closed loop), current control, 8/15 A, 10-50 VDC	552
		586137	ESCON Module 50/8 HE, for DC/EC motors, speed control (open loop/closed loop), current control, 8/15 A, 10–50 VDC	552
		409510	ESCON 50/5, for DC/EC motors, speed control (open loop/closed loop), current control, 5/15 A, 10–50 VDC	553
		422969	ESCON 70/10, for DC/EC motors, speed control (open loop/closed loop), current control, 10/30 A, 10-70 VDC	553
ESCON2	NEW	783722	ESCON2 Module 60/30, for DC/EC motors, servo controller, 30/60 A, 10-60 VDC	557
	NEW	783734	ESCON2 Compact 60/30, for DC/EC motors, servo controller, 30/60 A, 10-60 VDC	557

4-Q-DC Servoamplifier

NRND LSC 250521 LSC 30/2, linear 4-Q-Servoamplifier 30 V/2 A in module housing

1-Q-EC Amplifier			
DEC	367661	DEC Module 24/2, digital 1-Q-EC Amplifier 24 V/2 A, speed control, OEM module	547
	380200	DEC Module 50/5, digital 1-Q-EC Amplifier 50 V/5 A, speed control, OEM module	547
NRND	230572	DEC 50/5, digital 1-Q-EC Amplifier 50 V/5 A, speed control, current control, PWM operation	

4-Q-EC Servoamplifier

NRND 205679 DES 50/5, digital 4-Q-EC Servoamplifier 50 V/5 A, sinusoidal commutation

EPOS4	control unit		EPOS4 Micro 24/5 CAN, digital positioning controller, 5 A, 10–24 VDC	561
PU54			EPOS4 Micro 24/5 CAN, digital positioning controller, 5 A, 10–24 VDC EPOS4 Micro 24/5 EtherCAT, digital positioning controller, 5 A, 10–24 VDC	561
			EPOS4 Module 24/1.5, digital positioning controller, 1.5 A, 10–24 VDC	562
			EPOS4 Module 2471.5, digital positioning controller, 1.5 A, 10–24 VDC EPOS4 Module 50/5, digital positioning controller, 5 A, 10–50 VDC	562
			EPOS4 Module 50/8, digital positioning controller, 8 A, 10–50 VDC EPOS4 Module 50/8, digital positioning controller, 8 A, 10–50 VDC	563
			EPOS4 Module 50/15, digital positioning controller, 5 A, 10–50 VDC	563
			EPOS4 Compact 24/5 EtherCAT 3-axes, digital positioning controller, 3 x 5 A, 10-24 VDC	563
			EPOS4 Compact 24/1.5 CAN, digital positioning controller, 1.5 A, 10–24 VDC	564
			EPOS4 Compact 24/1.5 EtherCAT, digital positioning controller, 1.5 A, 10–24 VDC	564
			EPOS4 Compact 50/5 CAN, digital positioning controller, 1.3 A, 10–24 VDC	565
			EPOS4 Compact 50/5 CAN, digital positioning controller, 5 A, 10–50 VDC EPOS4 Compact 50/5 EtherCAT, digital positioning controller, 5 A, 10–50 VDC	565
			EPOS4 Compact 50/8 CAN, digital positioning controller, 8 A, 10–50 VDC	565
			EPOS4 Compact 50/8 EtherCAT, digital positioning controller, 8 A, 10–50 VDC	565
			EPOS4 Compact 50/15 CAN, digital positioning controller, 15 A, 10–50 VDC	566
			EPOS4 Compact 50/15 EtherCAT, digital positioning controller, 15 A, 10–50 VDC	567
			EPOS4 50/5, digital positioning controller, 5 A, 10–50 VDC	567
			EPOS4 70/15, digital positioning controller, 15 A, 10-70 VDC	567
			EPOS4 Disk 60/8 CAN, digital positioning controller, 8 A, 12–60 VDC	568
			EPOS4 Disk 60/8 EtherCAT, digital positioning controller, 8 A, 12–60 VDC	568
			EPOS4 Disk 60/12 CAN, digital positioning controller, 12 A, 12-60 VDC	569
			EPOS4 Disk 60/12 CAN SSC, digital positioning controller, 12 A, 12-60 VDC	569
			EPOS4 Disk 60/12 EtherCAT, digital positioning controller, 12 A, 12–60 VDC	569
			EPOS4 Disk 60/12 EtherCAT SSC, digital positioning controller, 12 A, 12–60 VDC	569
POS2	NRND		EPOS2 24/2 for EC motors, digital positioning controller, 2 A, 9–24 VDC	
	NRND	390003	EPOS2 24/2 for DC/EC motors, digital positioning controller, 2 A, 9–24 VDC	
	NRND	390438	EPOS2 24/2 for DC motors, digital positioning controller, 2 A, 9–24 VDC	
	NRND	530239	EPOS2 24/2 for DC(X) motors, digital positioning controller, 2 A, 9–24 VDC	
	NRND	360665	EPOS2 Module 36/2 OEM positioning controller plug-in module, 2 A, 11-36 VDC	
	NRND	392159	EPOS2 Module 24/3 OEM positioning controller plug-in module, 3 A, 11–24 VDC	
	NRND	367676	EPOS2 24/5, digital positioning controller, 5 A, 11–24 VDC	
	NRND	347717	EPOS2 50/5, digital positioning controller, 5 A, 11–50 VDC	
	NRND	375711	EPOS2 70/10, digital positioning controller, 10 A, 11–70 VDC	
MAXPOS	NRND	447293	MAXPOS 50/5, digital positioning controller, 5 A, 10–50 VDC	

Summary motor control Accessories

Cable	710928	Brake Cable (length 3 m) to 688770, 688772, 688775, 709859, 688777, 709862
NRND	275926	CAN-CAN Cable (length 3 m) to 347717, 361435, 367676, 375711, 390003
	520858	CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734
		CAN-CAN Cable (length 3 m) to 688770, 688775, 709859
NRND		CAN-COM Cable (length 3 m) to 347717, 361435, 367676, 375711, 390003
		CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734
		CAN-COM Cable (length 3 m) to 688770, 688775, 709859
NRND		CAN-Y Cable (length 3 m) to 390003
IDNID		DC Motor Cable (length 1.5 m) to 403112
NRND	275934	DC Motor Cable (length 3 m) to 390003 Encoder Cable (length 3 m) to 347717, 361435, 367676, 375711, 380264, 390003, 390438, 403112, 409510, 422969, 438779, 447293, 486400, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 783734
	696285	Encoder Cable (length 3 m) to 688770, 688772, 688775, 709859, 688777, 709862
	710934	EtherCAT-COM Cable (length 3 m) to 688772, 688777, 709862
	710933	EtherCAT-EtherCAT Cable (length 3 m) to 688772, 688777, 709862
	422827	Ethernet Cable (length 2 m) to 001755, 001756, 001757, 001784, 447293, 546047, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 684519
		Hall Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 447293, 520884, 520885, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519, 688775, 709859, 688777, 709862, 783734
		Hall Sensor Cable (length 3 m) to 688770, 688772, 688775, 709859, 688777, 709862
		I/O Cable 6core (length 1.5 m) for digital I/Os to 403112, 414533
		I/O Cable 7core (length 1.5 m) for analog I/Os to 403112, 414533
		Motor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 447293, 520885, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519
		Motor Cable High Current (length 3 m) to 520884, 520886, 594385, 604594, 605299, 783734
15147	710930	Motor Cable High Current (length 3 m) to 688775, 709859, 688777, 709862
IEW	838460	Motor Cable Highest Current (length 3 m) to 783734
IRND	302948	,
IEW		NTC Cable (length 3 m) to 783734
		Power & Motor Cable (length 3 m) to 688770, 688772
	403957 275829	
	520850	Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 447293, 520884, 520885, 520886, 546047 594385, 604594, 605298, 605299, 684519, 783734 Power Cable High Current (length 3 m) to 520884, 520885, 520886, 594385, 604594, 605298, 605299, 684519
	710929	Power Cable High Current (length 3 m) to 688775, 709859, 688777, 709862
NEW	838459	Power Cable Highest Current (length 3 m) to 783734
NEW NRND	275900	RS232-COM Cable (length 3 m) to 347717, 361435, 367676, 375711, 390003
VICIND	520856	RS232-COM Cable (length 3 m) to 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734
	696286	Sensor Cable 3x2core (length 3 m) to 688770, 688775, 709859, 688777, 709862
NRND		Sensor Cable 5x2core (length 3 m) to 447293
VICIND		Sensor Cable 5x2core (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536907, 541718, 546047, 5467 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 684519, 688775, 709859, 688777, 709862, 783734
NRND	451291	Signal Cable 12core (length 3 m) to 447293
NRND	275932	Signal Cable 16core (length 3 m) to 347717, 361435, 367676, 375711, 390003
NRND	378173	Signal Cable 3x2core (length 3m) to 375711
NRND	350390	Signal Cable 4x2core (length 3 m) to 347717
NRND	300586	Signal Cable 6x2core (length 3 m) to 347717, 375711
	520854	Signal Cable 7core (length 3 m) for analog I/Os with 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594 605298, 605299, 620044, 620048, 628092, 628094, 684519, 783734
	696288	Signal Cable 7core (length 3 m) to 688770, 688772, 688775, 709859, 688777, 709862
	520853	Signal Cable 8core (length 3 m) for digital I/Os and STO with 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 684519, 783734
		Signal Cable 8core (length 3 m) to 447293
NRND		
	696287	
	696287	Signal Cable 8core (length 3 m) to 688770, 688772, 688775, 709859, 688777, 709862 USB Type A - B Cable (length 3 m) to 347717, 361435
	696287 350392	USB Type A - B Cable (length 3 m) to 347717, 361435 USB Type A - micro B Cable (length 1.5 m) to 001755, 001756, 001757, 001784, 403112, 409510, 414533, 422969, 438725, 446925, 447293, 466023, 504383, 504384, 520885, 520886, 534130, 536630, 541718, 546047, 546714, 594385, 605298, 605299, 628092, 628094,
	696287 350392 403968	USB Type A - B Cable (length 3 m) to 347717, 361435 USB Type A - micro B Cable (length 1.5 m) to 001755, 001756, 001757, 001784, 403112, 409510, 414533, 422969, 438725, 446925, 447293 466023, 504383, 504384, 520885, 520886, 534130, 536630, 541718, 546047, 546714, 594385, 605298, 605299, 628092, 628094, 684519
NRND	696287 350392 403968 696289	USB Type A - B Cable (length 3 m) to 347717, 361435 USB Type A - micro B Cable (length 1.5 m) to 001755, 001756, 001757, 001784, 403112, 409510, 414533, 422969, 438725, 446925, 447293, 466023, 504383, 504384, 520885, 520886, 534130, 536630, 541718, 546047, 546714, 594385, 605298, 605299, 628092, 628094, 684519 USB Type A - Micro-Lock Cable (length 1.5 m) to 688770, 688772, 688775, 709859, 688777, 709862
NRND NRND NRND NRND NEW	696287 350392 403968	USB Type A - B Cable (length 3 m) to 347717, 361435 USB Type A - micro B Cable (length 1.5 m) to 001755, 001756, 001757, 001784, 403112, 409510, 414533, 422969, 438725, 446925, 447293, 466023, 504383, 504384, 520885, 520886, 534130, 536630, 541718, 546047, 546714, 594385, 605298, 605299, 628092, 628094, 684519 USB Type A - Micro-Lock Cable (length 1.5 m) to 688770, 688772, 688775, 709859, 688777, 709862 USB Type A - mini B Cable (length 3 m) to 367676, 375711, 390438, 380264, 390003

Motor choke

 $347919 \quad \text{Choke module, 3 x 0.1 mH, 10.0 A, L x W x H (90 x 70 x 49.7 mm) with screw type terminal block}$

Summary motor control Accessories

Oammaakan	Cod		
Connector		202007	EDOS2 24/2 Connector Set to 200002
	NRND NRND		EPOS2 24/2 Connector Set to 390003 EPOS2 24/5 Connector Set to 367676
	NRND		EPOS2 50/5 Connector Set to 347717
	NRND		EPOS2 70/10 Connector Set to 37/7/1
	MINIO		EPOS4 Connector Set to 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094
		710926	EPOS4 Disk Connector Set to 688770, 688772, 688775, 709859, 688777, 709862
			EPOS4 MB Micro EtherCAT 3-axes Connector Set to 659508, 684519
			ESCON 36/2 DC Connector Set to 403112
		425255	ESCON 36/3 EC Connector Set to 414533
	NEW	846645	ESCON2 Motion Connector Set Highest Current to 783734, 783729
	NRND	451746	MAXPOS 50/5 Connector Set to 447293
dapter			
		220310	Adapter 4-pole flexprint connector to 4-pole screw terminal, for use with EC micro motors without Hall sensors
			Adapter 6-pole flexprint connector to 6-pole screw terminal, for use with encoder 8 OPT
			Adapter 8-pole flexprint connector to 8-pole screw terminal, for use with motors ECX 6, ECX 8, EC 9.2 flat
			Adapter 10-pole flexprint connector to pin header (DIN 41651), for use with ENX 10 EASY with FFC cable
	NEW		Adapter 11-pole flexprint connector to 8-pole screw terminal, for use with motors EC 10/13, ECX 10, EC 20/32/45 flat Adapter 24-pole flexprint connector to screw terminal, for use with encoder ENX 10 MAG INT
	IAFAA		Adapter Micromotor for use with motors DCX 6/8 and ECX 4/6/8 with encoder (flexprint connector) or cable version
			Adapter 10-pole spring contact strip (DIN 41651) to 8-pole screw terminal
			Adapter 10-pole pin header (DIN 41651) to 10-pole screw terminal
			Adapter encoder connector 2.54 mm pitch to 2.54 mm pitch (DIN 41651) with spring terminal for motor connections
		405120	Adapter encoder connector 1.27 mm pitch to 2.54 mm pitch (DIN 41651) with spring terminal for motor connections
		549609	Adapter encoder connector 1.27 mm pitch to 2.54 mm pitch (DIN 41651)
		488167	Adapter EASY Absolute to 6-pole screw terminal for use with encoder ENX 10/16 EASY Absolute
			Adapter BLACK FPC11poles, for use with motors ECX 10, EC 10/13, EC 20/32/45 flat with 380264 and 414533
			Adapter BLUE FPC8poles, for use with motors ECX 6, ECX 8, EC 9.2 flat with 380264 and 414533
		693573	Adapter Cable Encoder CLIK-Mate to DIN 41651 for use with 659508, 684519
Accessorie	es		
		586142	ESCON Module 50/8 Thermal Pad
	NEW	802197	ESCON2 Module 60/30 Thermal Pad
	NEW		ESCON2 Module 60/30 Heat Spreader
			EPOS4 Module SMT socket 2 x 23 poles, matching connector for PCB designs suitable for 536630, 534130
			EPOS4 Micro SMT socket 2 x 40 poles, matching connector for PCB designs suitable for 638328, 654731
			EPOS4 Disk EtherCAT ix Industrial Type A plug, for use with 688772, 688777, 709862 EPOS4 Disk CAN ix Industrial Type B plug, for use with 688770, 688775, 709859
N	(Indiana		
hunt regu	llators	309687	DSR 50/5, shunt regulator 27 VDC and 56 VDC (selectable), P _{max} 300 W, P _{cont} 10 W
		235811	DSR 70/30, shunt regulator 12–75 VDC (adjustable), P _{max} 475 W, P _{cont} 25 W, module housing 180 x 103 x 26 mm
	, Eva boards		ards, Connector boards
EC			DEC Module Evaluation Board, with switch, LED, potentiometer etc., for use with 367661 and 380200
SCON		486400	ESCON Module 24/2 Motherboard with pluggable screw terminal block, for use with 466023
		438779	,
			ESCON Module 50/8 Motherboard with pluggable screw terminal block, for use with 532872, 586137
00010	NIE'A/	450237	· · · · · · · · · · · · · · · · · · ·
SCON2	NEW	783729	
POS2	NRND	363407	
POS4	NRND	361435 604594	
.FU34		520884	
		620044	, ,
		534133	, , ,
			EPOS4 CB 24/1.5 EtherCAT, connector board including STO Idle Connector, compatible with 536630
			EPOS4 CB 24/1.5 CAN, connector board including STO Idle Connector, compatible with 536630
			EPOS4 EB Micro, Evaluation Board compatible with 638328, 654731
			EPOS4 MB Micro EtherCAT 3-axes, Motherboard compatible with 654731
xtension (Cards		
EPOS4		581245	EPOS4 EtherCAT Card for use with 536630, 546047, 534130, 504384, 504383, 594385

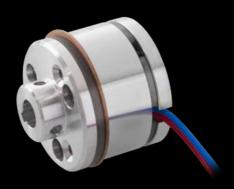
Summary motion control

MACS5 6ax	001710	MACCE for positioning and symphronizing up to 6 avec 200 = 4, 24 VDC
MAGGG GGA		MACS5 6ax for positioning and synchronizing up to 6 axes, 200 mA, 24 VDC
		MACS5-AMP1 6ax for positioning and synchronizing up to 6 axes, 12 - 50 VDC, 20A
	001451	MACS5-AMP2 6ax control unit with integrated high-power stages, 12 - 50 VDC, 50A
MiniMACS	001607	MiniMACS DIN housing 3ax for positioning and synchronizing up to 3 axes, 100 mA, 24 VDC
	001586	MiniMACS compact housing 3ax for positioning and synchronizing up to 3 axes, 100 mA, 24 VDC
MasterMACS	001563	MasterMACS DIN 4ax for high-precision synchronization of several axes, 200 mA, 24 VDC
	001716	MasterMACS DIN 10ax for high-precision synchronization of several axes, 200 mA, 24 VDC
	001724	MasterMACS DIN 20ax for high-precision synchronization of several axes, 200 mA, 24 VDC
	001725	MasterMACS DIN 32ax for high-precision synchronization of several axes, 200 mA, 24 VDC
	001565	MasterMACS compact housing 4ax for high-precision synchronization of several axes, 200 mA, 24 VDC
	001726	
		MasterMACS compact housing 20ax for high-precision synchronization of several axes, 200 mA, 24 VDC
	001728	
MiniMACS6-	001755	MiniMACS6-AMP-4/50/10 motion controller with integrated high-power amplifiers, 1260 VDC, 4 x 10 Arms
AMP-4/50/10	001750	MINIMACCO AMP A/FO/HO OFM modion controllers with interest at 11 to 12 control of 10 c
		MiniMACS6-AMP-4/50/10 OEM motion controller with integrated high-power amplifiers, 1260 VDC, 4 x 10 Arms
	001757	3 Pr. 1 Pr. 1, 1 Pr.
	001784	with integrated high-power amplifiers, iz60 VDC, 4 X 10 Afms
MicroMACS6	001794	MicroMACS6 freely programmable and ultra-compact motion controller with optional BLE interface, 8 - 28 VDC
Accessories	001610	MasterMACS connector set for 001563 001716 001724 001725 001565 001726 001727 001728
Accessories		MasterMACS connector set for 001563, 001716, 001724, 001725, 001565, 001726, 001727, 001728 MiniMACS connector set for 001607, 001586
Accessories	001611	
	001611	MiniMACS connector set for 001607, 001586
	001611	MiniMACS connector set for 001607, 001586
	001611 001772	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734
	001611 001772 275829	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734
	001611 001772 275829 520857 520858	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718,
	001611 001772 275829 520857 520858 520853	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 Signal Cable 8core (length 3 m) for digital I/Os and STO with 001755, 001756, 001757, 001784, 520884, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 68451
	001611 001772 275829 520857 520858 520853	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 Signal Cable 8core (length 3 m) for digital I/Os and STO with 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 68451 783734 Signal cable, 10 core, for 001755, 001756, 001757, 001784 Power cable, high current, for 001755, 001756, 001757, 001784
	001611 001772 275829 520857 520858 520853	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 Signal Cable 8core (length 3 m) for digital I/Os and STO with 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 68451 783734 Signal cable, 10 core, for 001755, 001756, 001757, 001784 Power cable, high current, for 001755, 001756, 001757, 001784
	001611 001772 275829 520857 520858 520853 696837 699485	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 Signal Cable 8core (length 3 m) for digital I/Os and STO with 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 68451783734 Signal cable, 10 core, for 001755, 001756, 001757, 001784 Power cable, high current, for 001755, 001756, 001757, 001784 Motor Cable (length 3 m) to 001755, 001756, 001757, 001784 Motor Cable (length 3 m) to 001755, 001756, 001757, 001784 Hall Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520885, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519 Hall Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293,
	001611 001772 275829 520857 520858 520853 696837 699485 275851 275878	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 Signal Cable 8core (length 3 m) for digital I/Os and STO with 001755, 001756, 001757, 001784, 520884, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 68451783734 Signal cable, 10 core, for 001755, 001756, 001757, 001784 Power cable, high current, for 001755, 001756, 001757, 001784 Motor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519 Hall Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519 Hall Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519, 68877, 709862, 783734 Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520886, 534133, 5341718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519, 68877, 709862, 783734 Sensor Cable (length 3 m) to 001755, 001756, 001756, 001757, 001784, 520884, 520886, 534133, 536907, 541718
Accessories	001611 001772 275829 520857 520858 520853 696837 699485 275851 275878	MiniMACS connector set for 001607, 001586 MiniMACS6-AMP-4/50/10 connector set for 001755, 001756, 001757, 001784 Power Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520885, 520886, 546047, 594385, 604594, 605298, 605299, 684519, 783734 CAN-COM Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 CAN-CAN Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 783734 Signal Cable 8core (length 3 m) for digital I/Os and STO with 001755, 001756, 001757, 001784, 520884, 520884, 520885, 520886, 534133, 536997, 541718, 546047, 546714, 594385, 604594, 605298, 605299, 620044, 620048, 628092, 628094, 68451783734 Signal cable, 10 core, for 001755, 001756, 001757, 001784 Power cable, high current, for 001755, 001756, 001757, 001784 Motor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519 Hall Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519 Hall Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 347717, 361435, 367676, 375711, 407582, 447293, 520884, 520886, 534133, 541718, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519 Sensor Cable (length 3 m) to 001755, 001756, 001757, 001784, 520884, 520886, 534133, 536907, 541715, 546047, 594385, 604594, 605298, 605299, 620044, 628094, 684519, 688777, 709859, 688777, 709862, 783734

581

maxon accessories

Brake AB 20 24 VDC, 0.1 Nm	582-583
Brake AB 28 24 VDC, 0.4 Nm	584-586
Brake AB 32 24 VDC, 0.4 Nm	587
Brake AB 41 24 VDC, 2.0 Nm	588
Brake AB 42 S 24 VDC, 1.4 Nm	589
Brake AB 44 24 VDC, 2.5 Nm	590
Brake AB 60 S 24 VDC, 5.0 Nm	591
End caps	592
ECX 13 Connection cable	593
ECX 16 Connection cable	594
ECX 19 Connection cable	595
ECX 22 Connection cable	596



Useful parts complete maxon's full range of drive technology products. Brakes may only be assembled with motors in the delivery plant.

© 2024 maxon. All rights reserved.



Important Information

- Permanent magnet single-face brake for DC (dry operation). Braking in unpowered condition.
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- Schematic image: does not necessarily reflect the delivery state.

Part Numbers

301212 301213

Special program (on request)







overall length	. (overall length						
Modular System								
+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Ø AB [mm]	Overall length [mm] /	• see Gearhead
EC-max 22, 12 W	278				. 0	22	67.6	
EC-max 22, 12 W	278	GP 22, 0.5 - 1.0 Nm	430			22	•	
EC-max 22, 12 W	278	GP 22, 0.5 - 3.4 Nm	433-434			22	•	
EC-max 22, 12 W	278	KD 32, 1.0 - 4.5 Nm	450			22	•	
EC-max 22, 12 W	278	GP 22 S	476/477			22	•	
EC-max 22, 25 W	279					22	84.1	
EC-max 22, 25 W	279	GP 22, 0.5 - 1.0 Nm	430			22	•	
EC-max 22, 25 W	279	GP 22, 0.5 - 2.0 Nm	433			22	•	
EC-max 22, 25 W	279	GP 22, 0.5 - 3.4 Nm	434			22	•	
EC-max 22, 25 W	279	GP 32, 1.0 - 6.0 Nm	443-444			22	•	
EC-max 22, 25 W	279	KD 32, 1.0 - 4.5 Nm	450			22	•	
EC-max 22, 25 W	279	GP 22 S	476/477			22	•	
EC-max 22, 25 W	279	GP 32 S	478-486			22	•	
EC-max 30, 40 W	280					30	77.6	
EC-max 30, 40 W	280	GP 32, 0.75 - 4.5 Nm	441			30		
EC-max 30, 40 W	280	GP 32, 1.0 - 8.0 Nm	445/447			30		•
EC-max 30, 40 W	280	KD 32, 1.0 - 4.5 Nm	450			30		•
EC-max 30, 40 W	280	GP 32 S	478-486			30		•
EC-max 30, 40 W	280	G. 52 5		HEDL 5540	537-539	30	98.2	2
EC-max 30, 40 W	280	GP 32, 0.75 - 4.5 Nm	441	HEDL 5540	537-539			
EC-max 30, 40 W	280	GP 32, 1.0 - 8.0 Nm		HEDL 5540	537-539			
EC-max 30, 40 W	280	KD 32, 1.0 - 4.5 Nm	450	HEDL 5540	537-539			•
EC-max 30, 40 W	280	GP 32 S		HEDL 5540	537-539			
EC-max 30, 60 W	281	G1 02 0	470 400	TIEDE 00-10	007 000	30	99.6	
EC-max 30, 60 W	281	GP 32, 0.75 - 4.5 Nm	441			30		
EC-max 30, 60 W	281	GP 32, 1.0 - 8.0 Nm	444/447			30		•
EC-max 30, 60 W	281	KD 32, 1.0 - 4.5 Nm	450			30		•
EC-max 30, 60 W	281	GP 42, 3.0 - 15.0 Nm	453			30		
EC-max 30, 60 W	281	GP 32 S	478-486			30		
EC-max 30, 60 W	281	G1 02 0	470 400	HEDL 5540	537-539	30	120.2	
EC-max 30, 60 W	281	GP 32, 0.75 - 4.5 Nm	441	HEDL 5540	537-539			•
EC-max 30, 60 W	281	GP 32, 1.0 - 8.0 Nm		HEDL 5540	537-539			
EC-max 30, 60 W	281	KD 32, 1.0 - 4.5 Nm	450	HEDL 5540	537-539			
EC-max 30, 60 W	281	GP 42, 3.0 - 15.0 Nm	453	HEDL 5540	537-539			
EC-max 30, 60 W	281	GP 32 S		HEDL 5540	537-539			
EC-4pole 30, 100 W	289	ui 323	T10-400	TILDE 3340	331-339	30	83.2	
EC-4pole 30, 100 W	289	GP 32, 1.0 - 6.0 Nm	444			30		•
EC-4pole 30, 100 W	289	GP 32, 4.0 - 8.0 Nm	447			30		
EC-4pole 30, 100 W	289	GP 42, 3.0 - 15.0 Nm	453			30		
EC-4pole 30, 100 W	289	GP 32 S	478-486			30		
EC-4pole 30, 100 W	289	UI 323	-10-400	22 EMT	516	30	114.4	
EC-4pole 30, 100 W	289	GP 32, 1.0 - 6.0 Nm	444	22 EMT	516	30	114.4	
EC-4pole 30, 100 W	289	GP 32, 4.0 -8.0 Nm	447	22 EMT	516	30		
EC-4pole 30, 100 W	289	GP 42, 3.0 - 15.0	453	22 EMT	516	30		
EC-4pole 30, 100 W	289	GP 32 S	478-486		516	30		
LO-4pole 30, 100 W	209	GI 323	T10-400	ZZ LIVI I	310	30	•	=

Technical Data					Pin Allocation	
Holding torque	0.1 Nm	Nominal voltage, sr	moothed	24 VDC ±10%	Cable (AWG 26)	Designation
Mass inertia	1.8 gcm ²	Resistance		$R_{20} = 227 \Omega \pm 6\%$	red	U _{Brake} + 24 VDC
Max. speed	49 000 rpm	Duty cycle		100%	blue	U _{Brake} GND
Weight	29 g	Reaction time	 Coupling 	≤ 12 ms		
Ambient temperature range	-40+100°C		- Opening	< 16 ms	Min. cable length	350 mm

Brake AB 20 24 VDC, 0.1 Nm



Important Information

- Permanent magnet single-face brake for DC (dry operation). Braking in unpowered condition.
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- Schematic image: does not necessarily reflect the delivery state.

Part Numbers

301212 301213

Stock program Standard program

Special program (on request)





overall length	-	overall length					
Modular System							
- Motor	Page	+ Gearhead	Page	+ Sensor	Page	Ø AB [mm]	Overall length [mm] / • see Gearhead
C-4pole 30, 100 W	289			16 EASY/XT/Abs.	507	30	97.3
C-4pole 30, 100 W	289	GP 32, 1.0 - 6.0 Nm	444	16 EASY/XT/Abs.	507	30	•
C-4pole 30, 100 W	289	GP 32, 4.0 - 8.0 Nm	447	16 EASY/XT/Abs.	507	30	•
C-4pole 30, 100 W	289	GP 42, 3.0 - 15.0 Nm	453-454	16 EASY/XT/Abs.	507	30	•
C-4pole 30, 100 W	289	GP 32 S	478-486	16 EASY/XT/Abs.	507	30	•
C-4pole 30, 100 W	289	GP 32, 1.0 - 6.0 Nm	444	16 EASY Abs. XT	508	30	•
C-4pole 30, 100 W	289	GP 32 S	478-486	16 EASY Abs. XT	508	30	•
C-4pole 30, 100 W	289			16 EASY Abs. XT	508	30	97.8
C-4pole 30, 100 W	289	GP 32, 4.0 - 8.0 Nm	447	16 EASY Abs. XT	508	30	•
C-4pole 30, 100 W	289	GP 42, 3.0 - 15.0 Nm	453-454	16 EASY Abs. XT	508	30	•
C-4pole 30, 100 W	289			16 RIO	517	30	95.8
C-4pole 30, 100 W	289	GP 32, 1.0 - 6.0 Nm	444	16 RIO	517	30	•
C-4pole 30, 100 W	289	GP 32, 4.0 - 8.0 Nm	447	16 RIO	517	30	•
C-4pole 30, 100 W	289	GP 42, 3.0 - 15.0 Nm	453-454	16 RIO	517	30	•
C-4pole 30, 100 W	289	GP 32 S	478-486	16 RIO	517	30	•
C-4pole 30, 200 W	291					30	100.2
C-4pole 30, 200 W	291	GP 32, 1.0 - 6.0 Nm	444			30	•
C-4pole 30, 200 W	291	GP 32, 4.0 - 8.0 Nm	448			30	•
C-4pole 30, 200 W	291	GP 42, 3.0 - 15.0 Nm	453-454			30	•
C-4pole 30, 200 W	291	GP 32 S	478-486			30	•
C-4pole 30, 200 W	291			22 EMT	516	30	131.4
C-4pole 30, 200 W	291	GP 32, 1.0 - 6.0 Nm	444	22 EMT	516	30	•
C-4pole 30, 200 W	291	GP 32, 4.0 - 8.0 Nm	448	22 EMT	516	30	•
C-4pole 30, 200 W	291	GP 42, 3.0 - 15.0 Nm	453-454		516	30	•
C-4pole 30, 200 W	291	GP 32 S	478-486		516	30	•
C-4pole 30, 200 W	291			16 EASY/XT/Abs.		30	114.3
C-4pole 30, 200 W	291	GP 32, 1.0 - 6.0 Nm	444	16 EASY/XT/Abs.		30	•
C-4pole 30, 200 W	291	GP 32, 4.0 - 8.0 Nm	448	16 EASY/XT/Abs.		30	•
C-4pole 30, 200 W	291	GP 42, 3.0 - 15.0 Nm		16 EASY/XT/Abs.		30	•
C-4pole 30, 200 W	291	GP 32 S		16 EASY/XT/Abs.		30	
C-4pole 30, 200 W	291	G. 02 0	.10 100	16 EASY Abs. XT		30	114.8
C-4pole 30, 200 W	291	GP 32, 1.0 - 6.0 Nm	444	16 EASY Abs. XT		30	•
C-4pole 30, 200 W	291	GP 32, 4.0 - 8.0 Nm	448	16 EASY Abs. XT		30	•
C-4pole 30, 200 W	291	GP 42, 3.0 - 15.0 Nm		16 EASY Abs. XT		30	•
C-4pole 30, 200 W	291	GP 32 S	478-486			30	•
C-4pole 30, 200 W	291	G. 02 0	.70 400	16 RIO	517	30	112.8
C-4pole 30, 200 W	291	GP 32, 1.0 - 6.0 Nm	444	16 RIO	517	30	112.0
C-4pole 30, 200 W	291	GP 32, 4.0 - 8.0 Nm	448	16 RIO	517	30	
. ,	291	GP 42, 3.0 - 15.0 Nm			517	30	
C-4pole 30, 200 W	2 J I	G: 72, 0.0 - 10.0 MIII		16 RIO	517	30	•

Technical Data					Pin Allocation	
Holding torque	0.1 Nm	Nominal voltage, s	moothed	24 VDC ±10%	Cable (AWG 26)	Designation
Mass inertia	1.8 gcm ²	Resistance		$R_{20} = 227 \Omega \pm 6\%$	red	U _{Brake} + 24 VDC
Max. speed	49 000 rpm	Duty cycle		100%	blue	U _{Brake} GND
Weight	29 g	Reaction time	 Coupling 	≤ 12 ms		
Ambient temperature range	-40+100°C		Opening	≤ 16 ms	Min. cable length	350 mm

Brake AB 28 24 VDC, 0.4 Nm



Important Information

• It is possible to lower the voltage applied to the brake after it has been energized, for the purpose of reducing heat loss.

• Permanent magnet — single-face brake for DC (dry operation). Braking in unpowered condition.

• Holding brake, prevents rotation of the shaft at standstill or with turned off motor power. • Not suitable for dynamic braking.

• Schematic image: does not necessarily reflect the delivery state.

Part Numbers

301215

Stock program Standard program

Special program (on request)



Modular System



+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Ø AB [mm]	Overall length [mm] / • see Gearhead
EC-max 40, 70 W	282					40	92.4
EC-max 40, 70 W	282	GP 42, 3 - 15 Nm	453-454			40	•
EC-max 40, 70 W	282	,		HEDL 5540	539	40	110.7
EC-max 40, 70 W	282	GP 42, 3 - 15 Nm	453-454	HEDL 5540	539	40	•
EC-max 40, 120 W	283	,				40	122.4
EC-max 40, 120 W	283	GP 42, 3.0 - 15.0 Nm	453-454			40	•
EC-max 40, 120 W	283	GP 52, 4 - 30 Nm	458			40	•
EC-max 40, 120 W	283	G. 62, 1 66 iiii	.00	HEDL 5540	539	40	140.7
EC-max 40, 120 W	283	GP 42, 3.0 - 15.0 Nm	453-454	HEDL 5540	539	40	•
EC-max 40, 120 W	283	GP 52, 4 - 30 Nm	458	HEDL 5540	539	40	•
20 1110/10, 120 11	200	ar 62, 1 66 14m	100	TIEDE 00 TO	000	10	

Technical Data					Pin Allocation	
Holding torque	0.4 Nm	Nominal voltage, sr	moothed	24 VDC ±10%	Cable (AWG 26)	Designation
Mass inertia	10 gcm ²	Resistance		$R_{20} = 92.5 \Omega \pm 6\%$	red	U _{Brake} + 24 VDC
Max. speed	16 000 rpm	Duty cycle		100%	blue	U _{Brake} GND
Weight	0.05 kg	Reaction time	 Coupling 	≤ 13 ms		
Ambient temperature range	-5+85°C		 Opening 	≤ 27 ms	Min. cable length	350 mm

Brake AB 28 24 VDC, 0.4 Nm



Stock program Standard program Special program (on request)

Important Information

- Permanent magnet single-face brake for DC (dry operation). Braking in unpowered condition.
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- It is possible to lower the voltage applied to the brake after it has been energized, for the purpose of reducing heat loss.
- Schematic image: does not necessarily reflect the delivery state.

Part Numbers

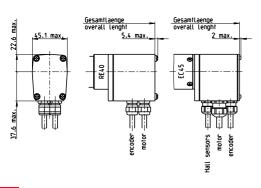
228384 228387





Modular System										
+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Ø AB [mm]	Overall length	n [mm] / • see G	earhead	
RE 25, 20 W	155					40	77.1			
RE 25, 20 W	155	GP 22, 0.5 Nm	431			40	•			
RE 25, 20 W	155	GP 26, 0.75 - 4.5 Nm	437			40	•			
RE 25, 20 W	155	GP 32, 0.75 - 4.5 Nm	439			40	•			
RE 25, 20 W	155	GP 32, 0.75 - 4.5 Nm	440-441			40	•			
RE 25, 20 W	155	GP 32, 1.0 - 6.0 Nm	443/450			40	•			
RE 25, 20 W	155	GP 32 S	478-486			40	•			
RE 25, 20 W	155			HED_5540	535/537	40		94.3		
RE 25, 20 W	155	GP 22, 0.5 Nm	431	HED_5540	535/537	40		•		
RE 25, 20 W	155	GP 26, 0.75 - 4.5 Nm	437	HED_5540	535/537	40		•		
RE 25, 20 W	155	GP 32, 0.75 - 4.5 Nm	439	HED_5540	535/537	40		•		
RE 25, 20 W	155	GP 32, 0.75 - 4.5 Nm	440-441	HED_5540	535/537	40		•		
RE 25, 20 W	155	GP 32, 1.0 - 6.0 Nm	443/450	HED_5540	535/537	40		•		
RE 25, 20 W	155	GP 32 S	478-486	HED_5540	535/537	40		•		
RE 25, 20 W	156			_		40	88.6			
RE 25, 20 W	156	GP 26, 0.75 - 4.5 Nm	437			40	•			
RE 25, 20 W	156	GP 32, 0.75 - 4.5 Nm	439			40	•			
RE 25, 20 W	156	GP 32, 0.75 - 4.5 Nm	440-441			40	•			
RE 25, 20 W	156	GP 32, 1.0 - 6.0 Nm	443/450			40	•			
RE 25, 20 W	156	GP 32 S	478-486			40	•			
RE 25, 20 W	156			HED_5540	535/537	40		105.8		
RE 25, 20 W	156	GP 26, 0.75-4.5 Nm	437	HED_5540	535/537	40		•		
RE 25, 20 W	156	GP 32, 0.4 - 2.0 Nm	439	HED_5540	535/537	40		•		
RE 25, 20 W	156	GP 32, 0.75 - 4.5 Nm	440-441	HED_5540	535/537	40		•		
RE 25, 20 W	156	GP 32, 1.0 - 6.0 Nm	443/450	HED_5540	535/537	40		•		
RE 25, 20 W	156	GP 32 S	478-486	HED 5540	535/537	40		•		
RE 35, 90 W	159	J. 22 2				40	107.1			
RE 35, 90 W	159	GP 32, 0.75 - 6.0 Nm	439-446			40	•			
RE 35, 90 W	159	GP 32, 4.0 - 8.0 Nm	447-448			40	•			
RE 35, 90 W	159	GP 42, 3 - 15 Nm	452-454			40	•			
RE 35, 90 W	159	,		HED_5540	535/537	40		124.3		
RE 35, 90 W	159	GP 32, 0.75 - 6.0 Nm	439-446	HED_5540	535/537	40		•		
RE 35, 90 W	159	GP 32, 4.0 - 8.0 Nm	447-448	HED_5540	535/537	40		•		
RE 35, 90 W	159	GP 42, 3 - 15 Nm	452-454	_	535/537	40		•		
RE 35, 90 W	159	GP 32 S	478-486	_		40	•			
RE 35, 90 W	159	GP 32 S	478-486	HED_5540	535/537	40		•		
RE 40, 150 W	161					45	107.1			
RE 40, 150 W	161	GP 42, 3 - 15 Nm	452-454			45	•			
RE 40, 150 W	161	GP 52, 4 - 30 Nm	457-458			45	•			
RE 40, 150 W	161			HED_5540	535/538	45		124.3		
RE 40, 150 W	161	GP 42, 3 - 15 Nm	452-454		535/538	45		•		
RE 40, 150 W	161	GP 52, 4 - 30 Nm	457-458	HED_5540	535/538	45		•		
		,		_						

Technical Data					Pin Allocation	
Holding torque	0.4 Nm	Nominal voltage, sr	moothed	24 VDC ±10%	Cable (AWG 26)	Designation
Mass inertia	10 gcm ²	Resistance		$R_{20} = 92.5 \Omega \pm 6\%$	red	U _{Brake} + 24 VDC
Max. speed	16 000 rpm	Duty cycle		100%	blue	U _{Brake} GND
Weight	0.05 kg	Reaction time	 Coupling 	≤ 13 ms	red	Motor+
Ambient temperature range	-5+85°C		- Opening	≤ 27 ms	black	Motor-
					Min. cable length	350 mm





Important Information

- Permanent magnet single-face brake for DC (dry operation). Braking in unpowered condition.
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- It is possible to lower the voltage applied to the brake after it has been energized, for the purpose of reducing heat loss.
- Schematic image: does not necessarily reflect the delivery state.

Part Numbers

228389 228390

Stock program
Standard program
Special program (on request)

Type

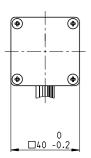


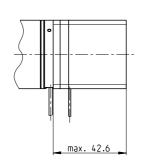


-		• •						
Modular System								
+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • s	ee Gearhead	
RE 40, 150 W	161					115.1		
RE 40, 150 W	161	GP 42, 3 - 15 Nm	452-454			•		
RE 40, 150 W	161	GP 52, 4 - 30 Nm	457-458			•		
RE 40, 150 W	161			HEDL 9140	540-541	135.6		
RE 40, 150 W	161	GP 42, 3 - 15 Nm	452-454	HEDL 9140	540-541	•		
RE 40, 150 W	161	GP 52, 4 - 30 Nm	457-458	HEDL 9140	540-541	•		
EC 45, 150 W	269					118.6		
EC 45, 150 W	269	GP 42, 3 - 15 Nm	452-454			•		
EC 45, 150 W	269	GP 52, 4 - 30 Nm	457-458			•		
EC 45, 150 W	269			HEDL 9140	540-541	135.6		
EC 45, 150 W	269	GP 42, 3 - 15 Nm	452-454	HEDL 9140	540-541	•		
EC 45, 150 W	269	GP 52, 4 - 30 Nm	457-458	HEDL 9140	540-541	•		
EC 45, 250 W	270					151.4		
EC 45, 250 W	270	GP 42, 3 - 15 Nm	453-454			•		
EC 45, 250 W	270	GP 52, 4 - 30 Nm	457-458			•		
EC 45, 250 W	270	GP 62, 6.2-38.5 Nm	459			•		
EC 45, 250 W	270			HEDL 9140	540-541	168.4		
EC 45, 250 W	270	GP 42, 3 - 15 Nm	453-454	HEDL 9140	540-541	•		
EC 45, 250 W	270	GP 52, 4 - 30 Nm	457-458	HEDL 9140	540-541	•		
EC 45, 250 W	270	GP 62, 6.2-38.5 Nm	459	HEDL 9140	540-541	•		

Technical Data					Pin Allocation		
Holding torque	0.4 Nm	Nominal voltage,	smoothed	24 VDC ±10%		from motor	r clamp Designation
Mass inertia	10 gcm ²	Resistance		$R_{20} = 92.5 \Omega \pm 6\%$		RE 40	
Max. speed	16 000 rpm	Duty cycle		100%	Cable green	(AWG 20)	U _{Brake} + 24 VDC
Weight	0.05 kg	Reaction time	 Coupling 	≤ 13 ms	Cable yellow	(AWG 20)	U_{Brake} GND
Ambient temperature range	-5+85°C		 Opening 	≤ 27 ms		EC 45	
					Cable No 4	(AWG 18)	U _{Brake} + 24 VDC
					Cable No 5	(AWG 18)	$U_{Brake}GND$
					Min. cable leng	gth	500 mm

Brake AB 32 24 VDC, 0.4 Nm







Important Information

- Permanent magnet single-face brake for DC (dry operation). Braking in unpowered condition.
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- It is possible to lower the voltage applied to the brake after it has been energized, for the purpose of reducing heat loss.

Stock program Standard program Special program (on request)

Part Numbers

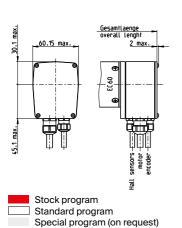
392335





Modular System										
+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Overall leng	th [mm] / • see (Gearhead		
EC 40, 170 W	268					122.7				
EC 40, 170 W	268	GP 42, 3 - 15 Nm	452-454			•				
EC 40, 170 W	268	GP 52, 4 - 30 Nm	457-458			•				
EC 40, 170 W	268			HED_5540	536/538	141.1				
EC 40, 170 W	268	GP 42, 3 - 15 Nm	152-153	HED_5540		•				
EC 40, 170 W	268	GP 52, 4 - 30 Nm		HED_5540		•				
LC 40, 170 W	200	G1 32, 4 - 30 Mill	-	TILD_0040	000/000	_				

Technical Data					Pin Allocation	
Holding torque	0.4 Nm	Nominal voltage, si	moothed	24 VDC ±10%	Cable (AWG 24)	Designation
Mass inertia	19 gcm ²	Resistance		$R_{20} = 100 \Omega \pm 7\%$	red	U _{Brake} + 24 VDC
Max. speed	10 000 rpm	Duty cycle		100%	blue	U _{Brake} GND
Weight	0.1 kg	Reaction time	 Coupling 	≤ 13 ms		
Ambient temperature range	-40+100°C		Opening	≤ 24 ms	Min. cable length	350 mm





Important Information

- Permanent magnet single-face brake for DC (dry operation). Braking in unpowered condition.
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.

Part Numbers

228998

Part N







+ Motor Page + Gearhead Page + Sensor Page Overall length [mm] / • see Gearhead EC 60, 400 W 271 GP 81, 15.4 - 92.3 Nm 460 • • EC 60, 400 W 271 HEDL 9140 540 214.9	+ Motor Page + Gearhead Page + Sensor Page Overall length [mm] / • see Gearhead EC 60, 400 W 271 GP 81, 15.4-92.3 Nm 460 • • EC 60, 400 W 271 HEDL 9140 540 214.9	Modular System								
EC 60, 400 W 271	EC 60, 400 W 271 190.9 EC 60, 400 W 271 GP 81, 15.4-92.3 Nm 460 • • • • • • • • • • • • • • • • • • •	+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • s	ee Gearhead	
EC 60, 400 W 271 GP 81, 15.4-92.3 Nm 460 EC 60, 400 W 271 HEDL 9140 540 214.9	EC 60, 400 W 271 GP 81, 15.4 - 92.3 Nm 460 EC 60, 400 W 271 HEDL 9140 540 214.9	EC 60, 400 W	271					190.9		
EC 60, 400 W 271 HEDL 9140 540 214.9	EC 60, 400 W 271 HEDL 9140 540 214.9	EC 60, 400 W	271	GP 81, 15.4 - 92.3 Nm	460			-		
EC 60, 400 W 271 GP 81, 15.4-92.3 Nm 460 HEDL 9140 540 •	EC 60, 400 W 271 GP 81, 15.4-92.3 Nm 460 HEDL 9140 540 •	EC 60, 400 W	271			HEDL 9140	540	214.9		
		EC 60, 400 W	271	GP 81, 15.4 - 92.3 Nm	460	HEDL 9140	540	•		

Technical Data					Pin Allocation	on	
Holding torque	2.0 Nm	Nominal voltage, smoothe	d	24 VDC -10 +6%		from motor clamp	Designation
Mass inertia	45 gcm ²	Resistance		$R_{20} = 72 \Omega \pm 7\%$	Cable red	No 4 (AWG 16)	U _{Brake} + 24 VDC
Max. speed	10 000 rpm	Duty cycle		100%	Cable black	No 5 (AWG 16)	U _{Brake} GND
Weight	0.18 kg	Reaction time	- Coupling	≤ 2 ms			
Ambient temperature range	-5+85°C		- Opening	≤ 25 ms	Min. cable le	ngth	500 mm

Brake AB 42 S 24 VDC, 1.4 Nm



Stock program Standard program

Special program (on request)

Part Numbers

Important Information

Spring-loaded brake – single-disc brake with two friction surfaces for direct current. Braked in

unpowered condition (dry operation). • Holding brake, prevents rotation of the shaft at standstill or with turned off motor power. • Not suitable for dynamic braking. • Not backlash-free (±1° max.).

x drives

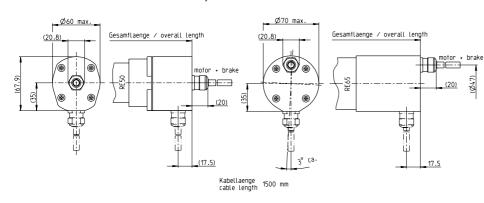




Modular System						
Drive	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • see Gearhead
OX 56 S	361					online
DX 56 S	361	GPX 52	410-411			online
DX 56 S	361	GB 80	462			online
DX 56 S	361	GB 12	463			online
DX 56 M	362	GD 12	100			online
OX 56 M	362	GPX 52	410-411			online
DX 56 M	362	GB 80	462			online
DX 56 M	362	GB 12	463			online
DX 56 L	363	GD 12	403			online
DX 56 L	363	GPX 52	410-411			online
OX 56 L	363	GB 80	462			online
DX 56 L	363	GB 12	463			online
Motor	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • see Gearhead
DX 56 S	245					online
DX 56 S	245	GPX 52	410-411			online
DX 56 S	245	GB 80	462			online
DX 56 S	245	GB 12	463			online
DX 56 M	246					online
DX 56 M	246	GPX 52	410-411			online
DX 56 M	246	GB 80	462			online
DX 56 M	246	GB 12	463			online
DX 56 L	247					online
DX 56 L	247	GPX 52	410-411			online
DX 56 L	247	GB 80	462			online
DX 56 L	247	GB 12	463			online
5X 00 L	271	GD IZ	400			Offilia

Technical Data					Pin Allocation
Holding torque	1.4 Nm	Nominal voltage, sm	noothed	24 VDC -10 +5%	online
Mass inertia	6.1 gcm ²	Resistance		$R_{20} = 82.6 \Omega + 10\%$	
Max. speed	8000 rpm	Duty cycle		100%	
Weight	0.14 kg	Reaction time	 Coupling 	≤ 30 ms	
Ambient temperature range	-40+120°C		Opening	≤ 85 ms	

Brake AB 44 24 VDC, 2.5 Nm



Important Information

- Permanent magnet single-face brake for DC (dry operation). Braking in unpowered condition.
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- It is possible to lower the voltage applied to the brake after it has been energized, for the purpose of reducing heat loss.
- Protection: IP54

Stock program
Standard program
Special program (on request)

Cable output axial Cable output radial

Part Numbers

386052 385999
386054 386000

Туре



Modular System								
+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Overall length	[mm] / • see Gearhead	
RE 50, 200 W	162		_		-	170.4		
RE 50, 200 W	162	GP 52, 4 - 30 Nm	457-458			•		
RE 50, 200 W	162	GP 62, 6.2-38.5 Nm	459			•		
RE 50, 200 W	162			HEDL 9140	541	183.4		
RE 50, 200 W	162	GP 52, 4 - 30 Nm	457-458	HEDL 9140	541	•		
RE 50, 200 W	162	GP 62, 6.2-38.5 Nm	459	HEDL 9140	541	•		
RE 65, 250 W	163						187.5	
RE 65, 250 W	163	GP 81, 15.4 - 92.3 Nm	460				•	
RE 65, 250 W	163			HEDL 9140	541		205.5	
RE 65, 250 W	163	GP 81, 15.4 - 92.3 Nm	460	HEDL 9140	541		•	
,		,						

Technical Data					Pin Allocation	
Holding torque	2.5 Nm	Nominal voltage, sm	oothed	24 VDC ±10%	Cable (AWG 18)	Designation
Mass inertia	90 gcm ²	Resistance		$R_{20} = 64 \Omega \pm 7\%$	white	Motor+
Max. speed	10 000 rpm	Duty cycle		100%	brown	Motor-
Weight	0.19 kg	Reaction time	 Coupling 	≤ 20 ms	green	U _{Brake} + 24 VDC
Ambient temperature range	-40+100°C		Opening	≤ 35 ms	yellow	U _{Brake} GND
					Min. cable length	1490 mm

Brake AB 60 S 24 VDC, 5.0 Nm



Stock program Standard program Special program (on request)

Important Information

- Spring-loaded brake single-disc brake with two friction surfaces for direct current. Braked in unpowered condition (dry operation).
- Holding brake, prevents rotation of the shaft at standstill or with turned off motor power.
- Not suitable for dynamic braking.
- Not backlash-free (±1° max.).

Part Numbers x drives

	ı
overall length	

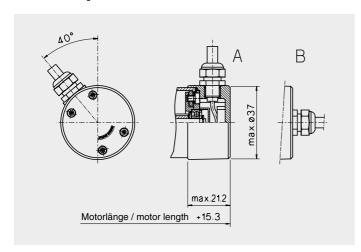


+ Drive	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • see Gearhead
IDX 70 S	364				_	online
IDX 70 S	364	GPX 70	412-413			online
IDX 70 S	364	GB 12	463			online
IDX 70 S	364	GB9	464			online
IDX 70 S	364	GB 65	465			online
IDX 70 M	365					online
IDX 70 M	365	GPX 70	412-413			online
IDX 70 M	365	GB 12	463			online
IDX 70 M	365	GB9	464			online
IDX 70 M	365	GB 65	465			online
IDX 70 L	366					online
IDX 70 L	366	GB9	464			online
IDX 70 L	366	GB 65	465			online

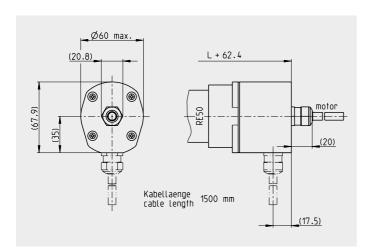
+ Motor	Page	+ Gearhead	Page	+ Sensor	Page	Overall length [mm] / • see Gearhead		
IDX 70 S	248					online		
IDX 70 S	248	GPX 70	412-413			online		
IDX 70 S	248	GB 12	463			online		
IDX 70 S	248	GB9	464			online		
IDX 70 S	248	GB 65	465			online		
IDX 70 M	249					online		
IDX 70 M	249	GPX 70	412-413			online		
IDX 70 M	249	GB 12	463			online		
IDX 70 M	249	GB 9	464			online		
IDX 70 M	249	GB 65	465			online		
IDX 70 L	250					online		
IDX 70 L	250	GB9	464			online		
IDX 70 L	250	GB 65	465			online		

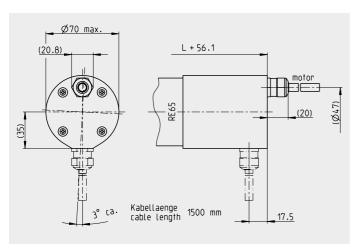
Technical Data					Pin Allocation
Holding torque	5 Nm	Nominal voltage, sm	oothed	24 VDC -10+5%	online
Mass inertia	25 gcm ²	Resistance		$R_{20} = 41.16 \Omega 0+10\%$	
Max. speed	8800 rpm	Duty cycle		100%	
Weight	480 g	Reaction time	 Coupling 	≤ 75 ms	
Ambient temperature range	-40+120°C		 Opening 	≤ 75 ms	

End Caps



Α В ≤ 21,3 L + 15.3





End cap for maxon DC motor RE 35

Details for motor see page 159

- Plastic housing
- Protection to IP54
- With 500 mm cable, AWG 20 (2 × 0.5 mm²) other lengths on request!
- Radial or axial cable outlet
- Assembly only by maxon. The shaft must be shortened.

Pin Allocation

Cable No. Color Motor black + Pol 2 - Pol black

Part Numbers

137235 End cap with radial cable outlet (500 mm) 137234 В End cap with axial cable outlet (500 mm)

End cap for maxon DC motor RE 40

Details for motor see page 161

- Plastic housing
- Protection to IP54
- With 500 mm cable, AWG 20 (2 × 0.5 mm²) other lengths on request!
- Radial or axial cable outlet
- Assembly only by maxon motor. The shaft must be shortened.

Pin Allocation

Cable No. Color Motor black + Pol 2 black - Pol

Part Numbers

End cap with radial cable outlet (500 mm) 232341 Α 232343 End cap with axial cable outlet (500 mm)

End cap for maxon DC motor RE 50

Details for motor see page 162

- · Aluminium housing
- Protection to IP54
- With 1500 mm cable, AWG 18 (2 × 1.0 mm²) other lengths on request!
- Radial or axial cable outlet
- Assembly only by maxon motor.

Pin Allocation

Color Cable No. Motor + Pol white - Pol 2 brown

Part Numbers

End cap with radial cable outlet (1500 mm) 386056 Α 386055 В End cap with axial cable outlet (1500 mm)

End cap for maxon DC motor RE 65

Details for motor see page 163

- · Aluminium housing
- Protection to IP54
- With 1500 mm cable, AWG 18 ($2 \times 1.0 \text{ mm}^2$) other lengths on request!
- Radial or axial cable outlet
- · Assembly only by maxon motor.

Pin Allocation

Cable No. Color Motor white + Pol brown - Pol

Part Numbers

386004 End cap with radial cable outlet (1500 mm) 386003 В End cap with axial cable outlet (1500 mm)

ECX 13 connecting cable

ECX 13 connecting cable

The connecting cable fits ECX 13 that are configured with a pin and external thread. Details about the motor can be found on pages 198–205 and online at www.maxongroup.com.

Characteristics:

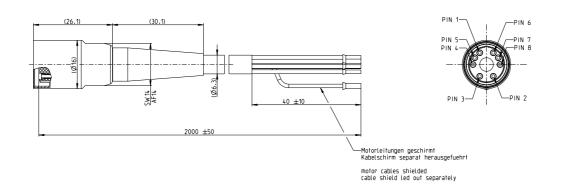
- Steel housing
- Withstands 1000 sterilization cycles in the autoclave
- Silicone outer shell
- PTFE cable insulation
- · Electrical conductors with cable end sleeves
- A motor cables shielded. The shielding is fitted with heat shrink tubing and cable end sleeve.

Part number Cable version

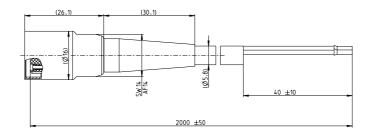
585750 ECX 13 connecting cable, type A: for motors with Hall sensors or for versions with encoders 592191 ECX 13 connecting cable, type B: for motors without Hall sensors and without encoders

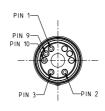
595698 ECX 13 connector set (without cable)

Α



В





Cable and pin assignment, type A				
	Color	Pin		
AWG 22	red	1		
	black	2		
	white	3		
AWG 26	orange	4		
	blue	5		
	yellow	6		
	brown	7		
	grey	8		
	pink	no pin		
	purple	no pin		
	green	no pin		

Cable and pin assignment, type B					
	Color	Pin			
AWG 22	red	1			
	black	2			
	white	3			
AWG 26	pink	9			
	purple	10			

ECX 16 connecting cable

ECX 16 connecting cable

The connecting cable fits ECX 16 that are configured with a pin and external thread. Details about the motor can be found on pages 206-213 and online at www.maxongroup.com.

Characteristics:

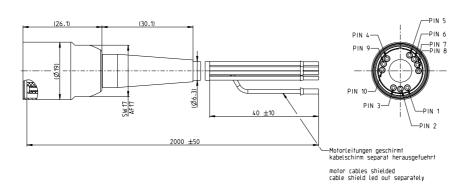
- · Steel housing
- Withstands 1000 sterilization cycles in the autoclave
- Silicone outer shell
- · PTFE cable insulation
- · Electrical conductors with cable end sleeves
- A motor cables shielded. The shielding is fitted with heat shrink tubing and cable end sleeve.

Part number Cable version

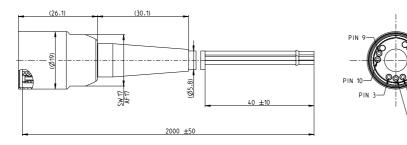
584532 ECX 16 connecting cable, type A: for motors with Hall sensors or for versions with encoders 592194 ECX 16 connecting cable, type B: for motors without Hall sensors and without encoders

595697 ECX 16 connector set (without cable)

Α



В



Cable and pin assignment, type A				
	Color	Pin		
AWG 22	red	1		
	black	2		
	white	3		
AWG 26	orange	4		
	blue	5		
	yellow	6		
	brown	7		
	grey	8		
	pink	9		
	purple	10		
	green	no pin		

Cable and pin assignment, type B					
	Color	Pin			
AWG 22	red	1			
	black	2			
	white	3			
AWG 26	pink	9			
	purple	10			

ECX 19 connecting cable

ECX 19 connecting cable

The connecting cable fits ECX 19 that are configured with a pin and external thread. Details about the motor can be found on pages $214\hbox{--}221$ and online at www.maxongroup.com.

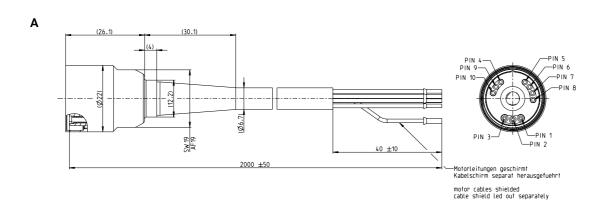
Characteristics:

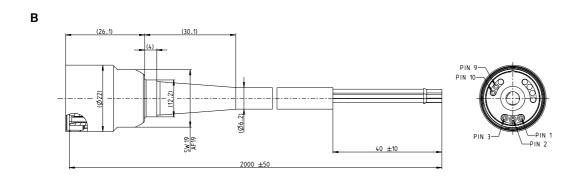
- Steel housing
- Withstands 1000 sterilization cycles in the autoclave
- Silicone outer shell
- PTFE cable insulation
- · Electrical conductors with cable end sleeves
- A motor cables shielded. The shielding is fitted with heat shrink tubing and cable end sleeve.

Part number Cable version

589852 ECX 19 connecting cable, type A: for motors with Hall sensors or for versions with encoders 589892 ECX 19 connecting cable, type B: for motors without Hall sensors and without encoders

551012 ECX 19 connector set (without cable)





Cable and pin assignment, type A				
-	Color	Pin		
AWG 20	red	1		
	black	2		
	white	3		
AWG 26	orange	4		
	blue	5		
	yellow	6		
	brown	7		
	grey	8		
	pink	9		
	purple	10		
	green	no pin		

Cable and pin assignment, type B				
	Color	Pin		
AWG 20	red	1		
	black	2		
	white	3		
AWG 26	pink	9		
	purple	10		

ECX 22 connecting cable

ECX 22 connecting cable

The connecting cable fits ECX 22 that are configured with a pin and external thread. Details about the motor can be found on pages 222-229 und online auf www.maxongroup.com.

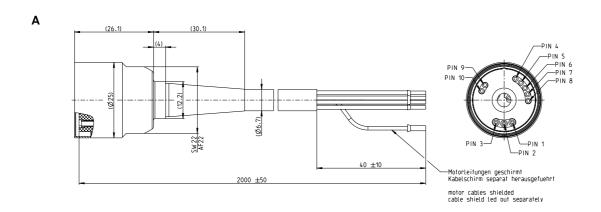
Characteristics:

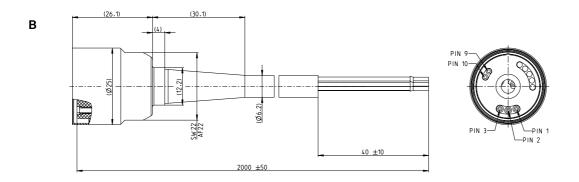
- Steel housing
- Withstands 1000 sterilization cycles in the autoclave
- Silicone outer shell
- PTFE cable insulation
- · Electrical conductors with cable end sleeves
- A motor cables shielded. The shielding is fitted with heat shrink tubing and cable end sleeve.

Part number Cable version

574625 ECX 22 connecting cable, type ${\bf A}$: for motors with Hall sensors or for versions with encoders 592061 ECX 22 connecting cable, type B: for motors without Hall sensors and without encoders

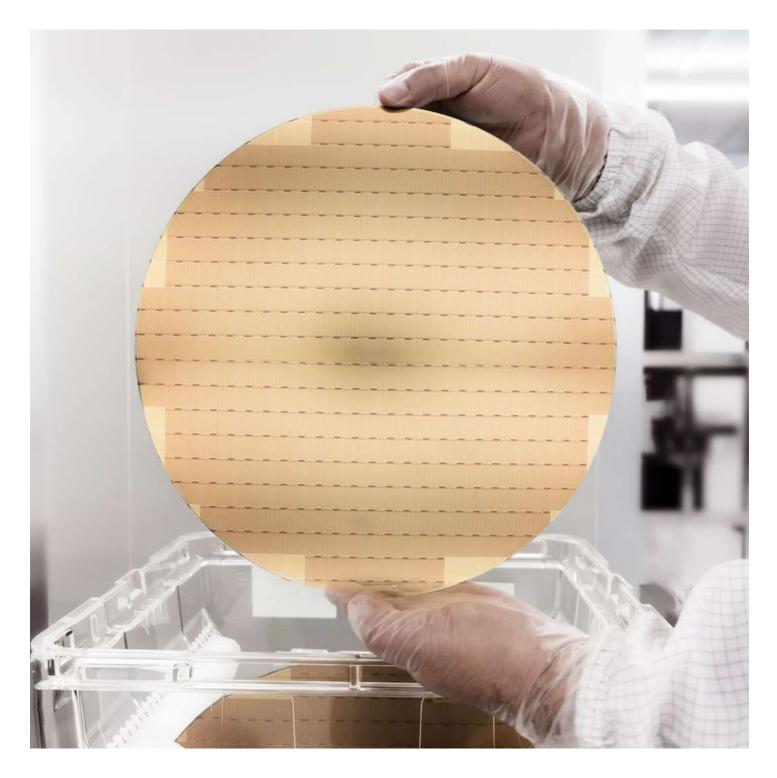
595696 ECX 22 connector set (without cable)





Cable and pin assignment, type A					
	Color	Pin			
AWG 20	red	1			
	black	2			
	white	3			
AWG 26	orange	4			
	blue	5			
	yellow	6			
	brown	7			
	grey	8			
	pink	9			
	purple	10			
	green	no pin			

Cable and pin assignment, type B						
	Color	Pin				
AWG 20	red	1				
	black	2				
	white	3				
AWG 26	pink	9				
	purple	10				



Drive technologies and systems for the semiconductor industry

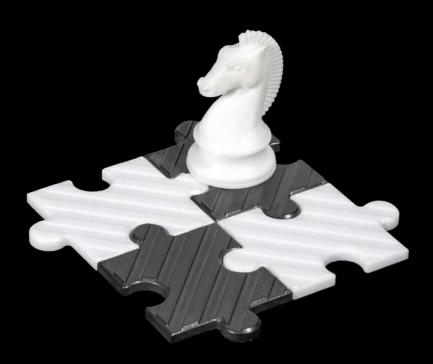
As a provider of high-precision drive solutions, maxon is an ideal partner to the semi-conductor industry. maxon offers turnkey drive components as well as development and manufacturing services which give the equipment and machine manufacturers access to customized drive systems for peak performance. www.maxongroup.com



ceramic

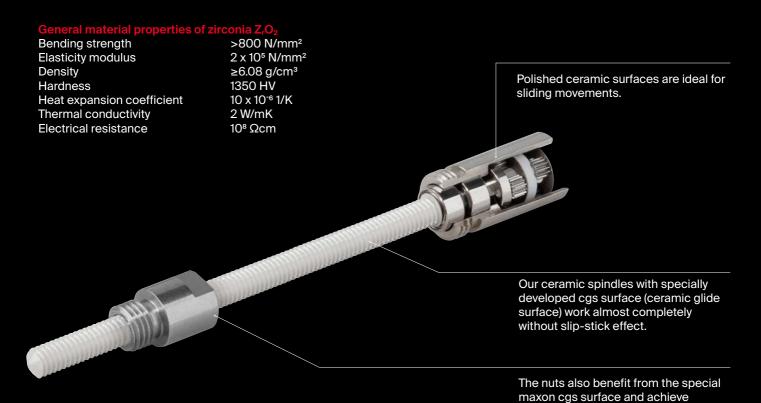
maxon ceramic

A unique material	601
Fields of application	602-605
Procedures and manufacturing process	606
System-specific nuts	607
Ceramic standard components	608-609



maxon ceramic

High performance industrial ceramic is used primarily for applications where customary materials would fail. maxon ceramic products include: precision screws, axles and shafts, customer-specific components for microtechnology, and scratchresistant housing components.



significantly longer life spans.

- → Extremely high wear resistance and hardness
- → Excellent sliding characteristics
- → High mechanical strength
- → Long service life
- → High temperature resistance

600 © 2024 maxon. All rights reserved.

A unique material

Ceramics are used where all other materials fail.

At the Sexau location in the southwest of Germany, maxon develops and manufactures customerspecific CIM (Ceramic Injection Molding) parts. Our development and engineering department has more than 30 years of experience in powder injection molding, use cutting-edge CAD technology and make use of the finite element calculation method. CIM enables maxon to manufacture highly complex ceramic molds - with unique precision and high quality.

ceramic.maxongroup.com



The benefits of ceramic as material

- → Extremely high wear resistance and hardness
- → Excellent sliding characteristics
- High mechanical strength
- → Long service life
- > High temperature resistance
- > Excellent insulation properties
- → High corrosion resistance and chemical stability
- → Biocompatible
- > Low specific weight

Our fields of application

Watch technology

Components for mechanical clockwork

In clockwork, the tiny mechanical parts have to be machined with utmost precision for the clock to run reliably. With ceramic components, the meshing parts maintain precision over life spans never achieved before.

Ceramic components for automatic watches.

- > Highest precision
- > Unprecedented life spans
- High wear resistance
- Reliable series production
- → Absolutely non-magnetic





Precise and long-lasting

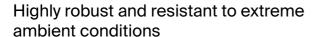


Measuring technology

Sensor housing for a flow meter

Ceramic resists harsh conditions. As a sensor housing, ceramic shows resistance against high temperatures, abrasive dust in the mass flow and chemically aggressive condensate. The low heat conductance protects the electronics inside of the sensor. This passive behavior toward electric and magnetic fields makes it possible to use electronic sensors.

- → High resistance against external conditions
- Low heat conductance
- Passive behavior toward electric and magnetic fields
- Maintenance and follow-up costs are avoided
- Absolutely non-magnetic





Audio technology

Housing for high-tech in-ear headphones

Scratch-resistant ceramic for the headphone housing ensures a long service life and makes it comfortable to wear.





Ceramic surfaces feature scratch-resistance and shine. As a result of its low heat conductance, ceramic feels warm and pleasant. The continuous development of our polishing and shaping processes combines aesthetic design and functionality in a very special way. Ceramic housings protect the high-quality technical components inside and give the products a long-lasting high-quality exterior.

- Perfect surface finish
- Scratch resistance for a long service life
- Low heat conductance for pleasant wearing
- Optimal acoustic properties

Audio technology

Bearing for high-end record player

To get the perfect sound experience, there can be no compromises: All factors have to harmonize perfectly. Special challenges such as magnetic fields and precise radial run-out can be mastered easily by using ceramics. The demands in the high-end sector are extremely high: Highest precision and quality have utmost priority in the material selection, processing and surface finishing. Seamless cooperation based on trust is the perfect prerequisite for first-class high-end products.





A ceramic magnetic bearing provides optimal conditions for sampling the record's groove without any interference.

- → Absolutely non-magnetic
- Perfect surface finish
- → High wear resistance



Industrial automation

Elements for industrial machines

Machine and system availability is of utmost importance in the industry. This is precisely where ceramic shines, featuring hardness, strength, wear resistance, and outstanding sliding characteristics. This is particularly true of maxon ceramic spindles with the ceramic glide surface (cgs). Sleeves, guides, axles, and shafts are other typical applications for ceramic. The chemically resistant, non-magnetic material can be used in applications where other materials reach their limits.

Ceramic offers the hardness, strength, wear resistance and sliding characteristics that are sought after in industrial automation.



- High wear resistance
- → High hardness
- → Excellent sliding characteristics
- → Extreme strength

Medical

Insulation components for endoscopes

Medical technology places exceptionally high requirements on the materials used in the medical devices (e.g. endoscopes): Only excellent, visually perfect and reliable components are accepted. Additionally, the materials have to be biocompatible and resistant against body fluids.

- → Perfect surface finish
- → Biocompatibility
- Low heat conductance
- → Extreme robustness





Ceramic insulation components are highly valued in endoscopic applications: They are biocompatible and robust.



Drive technology

Spindles for extreme conditions

Applications in salt water require robust and corrosion-resistant materials.

In drive technology, customary materials can reach their limits in some applications. For example, customized underwater drives require material that is resistant to salt water. Here our ceramic spindles shine: They are corrosion-resistant, robust, wear resistant and simultaneously offer high efficiency.

The maxon cgs (ceramic glide surface) ceramic spindles feature:

- → Operation almost completely without slip-stick effect
- → Smooth-running
- → High hardness
- > Extraordinary high service life
- → High wear resistance
- High efficiency



Procedures and manufacturing process

A range of procedures for manufacturing high-quality ceramic products ensure top results.











					·
CIM process ¹	Powder	Feedstock	Injection molding	Solvent debindering	Thermal debindering & sintering
Compression molding procedures	Powder		Compression molding		Sintering
Additive manufacturing	Powder	Suspension	LCM process ²		Thermal debindering & sintering

¹Ceramic injection molding ²Lithography-based ceramic manufacturing

Zirconia ZrO₂

Highly resistant to mechanical stress

Zirconia is a high-performance industrial ceramic. It is used primarily for applications where traditional materials would

Special characteristics of zirconia:

- High wear resistance and hardness
- Excellent sliding characteristics
- High mechanical strength
- > High temperature resistance
- Excellent insulation properties
- → High corrosion resistance and chemical stability; largely acid and alkali resistant
- Elasticity modulus and heat expansion coefficient similar to steel
- → Biocompatible and hypoallergenic
- Low specific weight

Aluminum oxide Al₂O₃

Highly resistant to thermal stress

Aluminum oxide is frequently used as insulation in electrical devices.

Special characteristics of aluminum oxide:

- → High temperature resistance
- Good thermal conductivity
- Average mechanical strength
- > Low coefficient of thermal expansion
- High corrosion resistance and chemical stability; largely acid and alkali resistant
- → Good hardness
- Low specific weight

General material properties

>800 N/mm² Bending strength Elasticity modulus 2 x 105 N/mm2 Density ≥6.08 g/cm3 Hardness 1350 HV 10 x 10⁻⁶ 1/K Heat expansion coefficient Thermal conductivity 2 W/ mK $10^{10} \, \Omega cm$ Electrical resistance

General material properties

>350 N/mm² Bending strength Elasticity modulus 3.5 x 10⁵ N/mm² Density ≥3.98 g/cm3 Hardness 2000 HV ≥5 x 10⁻⁶ 1/K Heat expansion coefficient 25 W/ mK Thermal conductivity $10^{15} \, \Omega cm$ Electrical resistance



System-specific nuts

The right nut for each application

In combination with ceramic screws, nuts are available in steel, brass, bronze or plastic. For applications with very high demands to the life span, we use CVD-coated steel nuts. The nuts benefit from the special maxon cgs surface of the screws, this results in significantly longer life spans than those offered by metal screws.

For backlash-free applications, we offer preloaded nuts. For applications with strong magnetic or electric fields, plastic nuts are preferred. In applications involving movements with little load, the nuts may be operated without the lubricant.

Individual solutions

In addition to our standard program, we also offer screws and nuts tailored to your application needs. We provide screws with fine thread, special leads, as well as doublethread screws. A customer-specific integration with your bearing system is also possible. Please contact us if you are interested in learning more.

Additive Manufacturing of Ceramic Components

Process Flow



















CAD-Design

Binder and Ceramic Powder

Mixing to slurry

3D Print

Green Part

Cleaning, Debinding,

Part

Finishing Part (Grinding, Polishing...)

Final Products

Technical data		
Tank capicity	mm ³	300 x 300 x 100
Lateral resolution	μm	70
Vertical resolution	μm	25
Manufacturing tolerances		ISO 2768mk
Minimum bore diameter	mm	0.5
Minimum/maximum wall thickness	mm	0.3 - max. 4
Materials		
Currently available materials		ZrO_2 , Al_2O_3
Other materials possible after consultation and technical		Zr8Y, Silicium Nitride, ATZ, ZTA, Cordierite,
clarification		Hydroxyapatite (HAP), Tricalcium phosphate (TCP)

Necessary data for technical clarification

Drawings and STEP, STL, Solid Works or ProEngineer PRT

Ceramic standard components **Spindles**

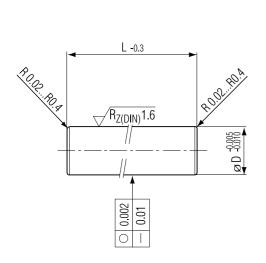


G	Color	Part No.	D	A max.	L max.	F1	F2	Pitch	(Y) max.
M2	white	426634	2.0	18	102	0.3	0.3	0.4	120
M2.5	white	426707	2.5	18	132	0.3	0.3	0.45	150
МЗ	white	426715	3.0	18	132	0.4	0.4	0.5	150
M4	white	426717	4.0	18	132	0.5	0.5	0.7	150
M5	white	426730	5.0	18	132	0.6	0.6	0.8	150
M6	white	426740	6.0	18	232	0.7	0.7	1.0	250
М8	white	426763	8.0	18	232	0.8	0.8	1.25	250

Larger diameters and lengths upon request.

Various spindle geometries/thread profiles are possible (trapezoidal screws, fine thread, buttress thread). The possible colors are white and gray.

Ceramic standard components Axes





Ø D	L = 6.4	L = 7.4	L = 10.6	L = 13.8	L = 15	L = 35	L = 40	L = 60	L = 70
0.8	255900	255901	255902	255903	255904	255905	348501	348502	348503
1.0	255892	255893	255894	255895	255896	255898	348498	348499	348500
1.5	255884	255885	255886	255887	255888	255889	255890	255792	255793
2.0	255873	348693	255875	255876	255877	255879	255880	255881	255882
2.5	143825	255866	255867	255868	255869	255870	255871	346621	348288
3.0	255857	255858	255859	255860	255861	255862	255863	346619	346620
4.0	255846	166875	857744	255849	255850	255851	255853	255854	255791
5.0	255834	255835	255836	255837	255838	255839	255840	255841	255842
5.5	255819	255820	255786	857764	255825	255826	255827	255828	255830
6.0	255807	255808	255809	255810	255811	255812	255813	255814	255815

Min. 0.5 mm diameter, max. 12 mm diameter. Other diameters and lengths can be produced individually.

For your personal notes

Founded in Switzerland, available Worldwide

maxon international **Headquarters**

maxon international ltd.

Brünigstrasse 220 6072 Sachseln Switzerland

Phone: +41 (0) 41 666 15 00 info@maxongroup.com

www.maxongroup.com

maxon **Divisions**

maxon ceramic

maxon motor GmbH Untere Ziel 1 79350 Sexau Germany

Phone: +49 (0) 7641 9114 0 +49 (0) 7641 9114 14 Fax: E-mail: ceramic.de@maxongroup.com

ceramic.maxongroup.de

Member of maxon Group

Parvalux Electric Motors Ltd

Parvalux House 2 Technology Road Poole, BH177DA **United Kingdom**

+44 (0) 1202 512575 sales@parvalux.com

www.parvalux.com

zub machine control AG

Buzibachstrasse 31 6023 Rothenburg Switzerland

+41 (0) 41 541 50 40 info.zub@maxongroup.com motioncontrol.maxongroup.com

maxon bikedrive

Eichistrasse 3 6055 Alpnach Dorf Switzerland

+41 (0) 41 662 95 00 E-mail: info@maxonbikedrive.com

www.maxonbikedrive.com

maxon

Manufacturing Companies

maxon motor ag

Brünigstrasse 220 6072 Sachseln Switzerland

Phone: +41 (0) 41 666 15 00 info@maxongroup.com

www.maxongroup.com

maxon motor GmbH

Untere Ziel 1 79350 Sexau Germany

Phone: +49 (0) 7641 9114 0 +49 (0) 7641 9114 14 Fax:

maxon motor hungary kft

Tartu u. 4. 8200 Veszprém

Hungary

Phone: +36 88 886 000 Fax: +36 88 806 009 E-mail: info.hu@maxongroup.com

maxon motor manufacturing Co., Ltd.

26, Yongwon 3-gil

Seongnam-myeon, Dongnam-gu Cheonan, South Korea 31246 Phone: +82 (41) 908 3330 +82 (41) 908 8880 Fax: info.kr@maxongroup.com

www.maxongroup.co.kr

maxon France

201 – 715 rue du Chat Botté

01700 Beynost

France Phone:

+33/472 - 018 300 Fax: +33/472 - 018 309 contact.fr@maxongroup.com E-mail:

www.maxongroup.fr

maxon motor benelux by

Josink Kolkweg 38 7545 PR Enschede Netherlands

Phone: +31 53 744 07 44

sales.nl@maxongroup.com

www.maxongroup.nl

maxon precision motors, inc.

125 Dever Drive Taunton, MA 02780

USA +1/508 - 677 0520 Phone: +1/508 - 677 0530 info.us@maxongroup.com

www.maxongroup.us

maxon motor (Suzhou) Co., Ltd.

5F, Block 1, No. 1128, East Jiangxing Road, Wujiang Economic Developing Zone, 215200 Suzhou, Jiangsu Province

China

+86/512-8207 9287 Phone: +86/512-8207 9761 Fax: E-mail: info.cn@maxongroup.com www.maxongroup.com.cn

maxon

Labs

maxon innovation Lab

EPFL Innovation Park, Building F

1015 Lausanne Switzerland

Phone: +41 (0) 41 662 95 93

E-mail: olivier.chappuis@maxongroup.com

www.maxongroup.com

maxon Lab HSLU T&A

Technikumstrasse 21 6048 Horw Switzerland

Phone: +41(0)413493090

E-mail: antonios.papaemmanouil@hslu.ch

www.maxongroup.com

maxon international technology ag Zurich Lab

Hagenholzstrasse 83 B, 3. OG 8050 Zurich

Switzerland

robotech@maxongroup.com E-mail:

www.maxongroup.com

Screw drive



Austria, Hungary, Slovenia, Romania, Croatia, Serbia, Bulgaria Kwapil & Co GmbH Kammelweg 9

1210 Wien Austria

Phone: Fax: E-mail:

+43/1 - 278 85 85 +43/1 - 278 85 86 verkauf@kwapil.com

www.kwapil.com

Czech Republic, Slovakia

Kwapil & Co. Gesellschaft m.b.H. Hlavní 1054/131 624 00 Brno

Czech Republic

Phone: +420 541 211 538 sales@kwapil.com E-mail:

www.kwapil.cz

Denmark

DJ Stork Drives ApS Naverland 2, 10. 2600 Glostrup Denmark

+45 8988 2416 Phone:

Mobile: +45 5353 5051 ulrik.eriksen@storkdrives.com E-mail:

www.storkdrives.com

Finland, Estonia, Latvia, Lithuania

Stork Drives OY Hakastaronkatu 15 as. 11 241 30 Salo

Finland

+358 45 11 06 433 Phone:

jyrki.leinonen@storkdrives.fi E-mail: www.storkdrives.fi

maxon France

201 - 715 rue du Chat Botté

01700 Bevnost

France

France

Phone: +33/472 - 018 300 +33/472 - 018 309 Fax:

contact.fr@maxongroup.com E-mail:

www.maxongroup.fr

Germany

maxon motor gmbh Truderinger Strasse 210 81825 München

Germany

+49/89 - 42 04 93 -0 Phone: E-mail: sales.de@maxongroup.com

www.maxongroup.de

maxon motor uk Ltd. maxon House

Hogwood Lane, Finchampstead

Berkshire, RG40 4QW

Great Britain

+44 (0) 1189 733337 Phone: Fax: +44 (0) 1189 737472 E-mail: sales.uk@maxongroup.com

www.maxongroup.co.uk

Israel

maxon motor Israel Ltd. Leshem Industrial Park 6 P.O. Box 3094

Caesarea 3079870

Israel

+972 74 749 0888 Phone: sales.il@maxongroup.com E-mail:

www.maxongroup.com

Italy

maxon motor italia S.r.l. Società Unipersonale Via Sirtori 35

20017 Rho MI

Italy

Phone: +39 02 93580588 +39 02 93580473 Fax:

sales.it@maxongroup.com www.maxongroup.it

Netherlands, Belgium, Luxembourg

maxon motor benelux by Josink Kolkweg 38 7545 PR Enschede Netherlands

+3153 744 07 44

sales.nl@maxongroup.com

www.maxongroup.nl

Norway

DJ Stork Drives AS Garverivegen 6 2740 Roa Norway

+47/6199 3001 Phone:

Mobile: +47/9400 2990 arve.stensrud@storkdrives.com

www.storkdrives.com

Poland

maxon Polska sp. z o.o.

Poznań Technology and Industry Park 28 Czerwca 1956 r. 404

61-441 Poznań

Poland

Phone: +48 618 800 830

sprzedaz@maxongroup.com

www.maxongroup.pl

Spain, Portugal

maxon motor ibérica S.A.U. C/ Polo Norte nº 9 28850 Torrejón de Ardoz

Spain

Phone: +34 916 564 973

E-mail: info.es@maxongroup.com

www.maxongroup.es

Sweden, Iceland

Stork Drives AB Box 1158

Solna Strandväg 116

171 54 Solna Sweden

Phone: +46/8 - 635 60 00

Fax: +46/8 - 635 60 01 info@storkdrives.se E-mail:

www.storkdrives.se

Switzerland

maxon Switzerland ag Eichistrasse 3 6055 Alpnach Dorf

Switzerland +41 (0) 41 662 95 95

sales.ch@maxongroup.com

www.maxongroup.ch

maxon Sales Agents

South Africa

DNH Technologies P.O. Box 31151 1684 Kyalami South Africa

+27 11 468 2722 Fax-Mail: +27 86 509 6714 info@dnhtrade.co.za

www.dnhtrade.co.za

Ensatek Mühendislik Otomsyon Sanayi Ticaret

Limited Şirketi

Cevizli Mah. Mustafa Kemal Cad. No: 66/B Kat: 13 D: 88 34865 Kartal/İstanbul

Turkey

+90 216 510 88 64 Phone:

Mobile: +90 545 610 50 10 ensatek@ensatek.com.tr

www.ensatek.com.tr

America

USA (East Coast) maxon precision motors, inc. 125 Dever Drive Taunton, MA 02780

USA

+1/508 - 677 0520 Phone: +1/508 - 677 0530 Fax: E-mail: info.us@maxongroup.com

www.maxongroup.us

USA (West Coast)

maxon precision motors, inc. 2860 Zanker Rd, Suite 107 San Jose, CA 95134

USA

Phone: +1/650-524-8822 +1/650-372-9395 Fax: info.us@maxongroup.com E-mail:

www.maxongroup.us

Mexico

maxon México Av. de las Américas 1501 Col. Providencia C.P. 44630 Guadalajara, Jalisco Mexico

+52 81 2188 1940

ventas.mx@maxongroup.com

www.maxongroup.com.mx

maxon Sales Agents

Brazil

Treffer Ltda. Av. Protásio de Oliveira Penna 366 / 101 Cep 30575-360 Bairro Buritis Belo Horizonte - MG

Brazil

Phone: +55 31 3378 6222 +55 31 3378 6222 Fax: motores@treffer.com.br www.treffer.com.br

Canada

Electromate Inc. 6221 Highway 7 Unit #15

Vaughan, Ontario L4H 0K8

Canada

Phone: +1/8777378698 Fax: +1/877 737 8699 E-mail: sales@electromate.com

www.electromate.com

Australia

Australia, New Zealand

maxon motor australia Pty Ltd Unit 1, 12-14 Beaumont Road Mount Kuring-Gai NSW 2080

Australia

+61294577477 Phone:

E-mail: sales.au@maxongroup.com

www.maxongroup.net.au

maxon Manufacturing Companies

Switzerland

(Headquarters) South Korea USA Germany France China Hungary Netherlands Great Britain

maxon Sales Companies

Austria Iceland Portugal Australia India Romania Benelux Indonesia Serbia Bulgaria Ireland Sweden China Israel Switzerland Croatia Italy Slovakia Czech Republic Japan Singapore Denmark Latvia Slovenia Estonia Lithuania South Korea Finland Mexico Spain France New Zealand Taiwan Germany Norway USA **Great Britain** Philippines

maxon Sales Agents

Hungary

Brazil Malaysia Turkey Canada South Africa Vietnam Hong Kong Thailand

Poland

613

maxon Sales Companies and Sales Agents

Asia

China

maxon motor (Suzhou) Co., Ltd. 5F, Block 1, No. 1128, East Jiangxing Road, Wujiang Economic Developing Zone, 215200 Suzhou, Jiangsu Province China

Phone: +86/512-8207 9287
Fax: +86/512-8207 9761
E-mail: sales.cn@maxongroup.com

www.maxongroup.com.cn

India

maxon precision motor India Pvt. Ltd. Niran Arcade, No. 563/564 New BEL Road, RMV 2nd Stage

Bangalore - 560 094

India

Phone: +91 80417 34132 Fax: +91 80416 12703

E-mail: sales.in@maxongroup.com

www.maxongroup.in

Japan

maxon japan corporation 5-1-15 Shinjuku Shinjuku-Ku Tokyo 160-0022

Japan

Phone: +81/3 - 3350 42 61 Fax: +81/3 - 3350 42 30 E-mail: sales.jp@maxongroup.com

www.maxongroup.co.jp

South Korea

maxon motor Korea Co., Ltd. 27, Banpo-daero 14-gil, Seocho-gu, Seoul, South Korea 06652

Phone: +82 2 3486 3441
Fax: +82 2 3486 8836
E-mail: info.kr@maxongro

E-mail: info.kr@maxongroup.com www.maxongroup.co.kr www.maxongroup.co.kr

Singapore, Indonesia, Philippines

maxon motor SEA Pte. Ltd. 33 Ubi Ave 3 #08-40 Singapore 408868 Phone: +65/6950 4628

E-Mail: admin.sg@maxongroup.com

www.maxongroup.sg

Taiwan

maxon motor Taiwan Co. Ltd. 6F.-7 No. 16, Lane 609, Sec. 5 Chongxin Rd., Sanchong Dist., New Taipei City 241

New Taipei City 2 Taiwan (R.O.C.)

Phone: +886-2-2999-3558
Fax: +886-2-2999-7268
E-mail: sales.tw@maxongroup.com

www.maxongroup.com.tw

maxon Sales Agents

Hong Kong

Servo Dynamics (H.K.) Ltd.

Rm. 1504, 15/F, Yuen Long Trading Centre,

33 Wang Yip Street West, Yuen Long, N.T., Hong Kong. Phone: +852/2409 9986

Fax: +852/24097872

E-mail: sales@servodynamics.com.hk

Malaysia

Servo Engineering Sdn. Bhd.

No. 15 G, Ground Floor, Highway Center,

Jalan 51/205, 46050 Petaling Jaya, Selangor Darul Ehsan

Malaysia

Phone: +603-7782 3540 Fax: +603-7784 1013 E-mail: sales-rfq@servo.my

www.servo.com.my

Thailand

Servo Dynamics (Thailand) Co. LTD 52/210 Moo 2, Soi Wadnamdaeng, Srinakarin Rd. 10540 Bangkaew Bangplee Samutprakarn

Thailand

Phone: +66 2 753 56 25 Fax: +66 2 753 56 50 E-mail: dmk@servoline.com

www.servoline.com

Vietnam

Servo Dynamics Engineering Co.,Ltd.

4/1B Luong Dinh Cua St., W.Binh Khanh, Dist 2, Ho Chi Minh City

Vietnam

Phone: +84 28 3740 2128 Fax: +84 28 3740 2129

E-mail: sales@servodynamics.com.vn

www.servodynamics.com.vn

www.maxongroup.com

Precision Drive Systems