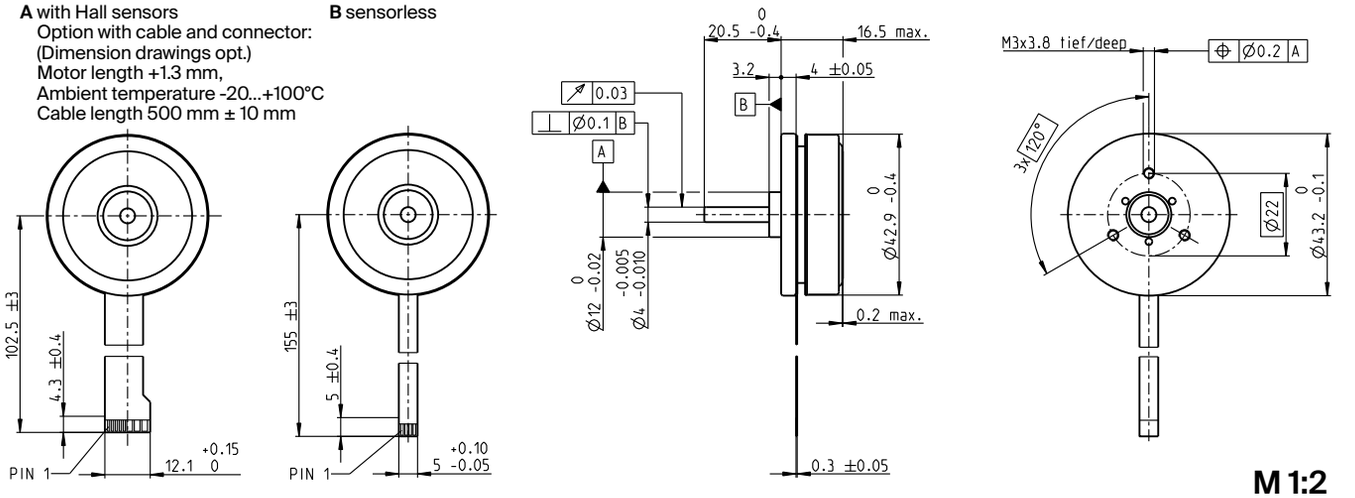
EC 45 flat ∅42.9 mm, brushless, 30 Watt

A with Hall sensors
Option with cable and connector:
(Dimension drawings opt.)
Motor length +1.3 mm,
Ambient temperature -20...+100°C
Cable length 500 mm ± 10 mm

B sensorless



M 1:2

Stock program
Standard program
Special program (on request)

	Part Numbers					
A with Hall sensors	200142		339281		339282	
Option with Cable and Connector	668555		668556		668557	
B sensorless		200189		339283		339284
Motor Data						
Values at nominal voltage						
1 Nominal voltage V	12	12	24	24	36	36
2 No load speed rpm	4370	4350	4360	4380	4750	4760
3 No load current mA	163	163	81.4	73	61.6	55.3
4 Nominal speed rpm	2940	2800	2940	2900	3290	3270
5 Nominal torque (max. continuous torque) mNm	55	54.7	54.8	55.2	66	66.6
6 Nominal current (max. continuous current) A	2.02	2.02	1.01	1.01	0.847	0.849
7 Stall torque[1] mNm	255	219	253	243	380	369
8 Stall current A	10	8.58	4.97	4.77	5.38	5.22
9 Max. efficiency %	76	75	76	77	80	81
Characteristics						
10 Terminal resistance phase to phase Ω	1.2	1.4	4.83	5.03	6.69	6.89
11 Terminal inductance phase to phase mH	0.56	0.56	2.24	2.24	4.29	4.29
12 Torque constant mNm/A	25.5	25.5	51	51	70.6	70.6
13 Speed constant rpm/V	374	374	187	187	135	135
14 Speed/torque gradient rpm/mNm	17.6	20.5	17.7	18.5	12.8	13.2
15 Mechanical time constant ms	17.1	19.9	17.2	17.9	12.4	12.8
16 Rotor inertia gcm²	92.5	92.5	92.5	92.5	92.5	92.5

Specifications

Thermal data

17	Thermal resistance housing-ambient	6.69 K/W
18	Thermal resistance winding-housing	3.92 K/W
19	Thermal time constant winding	11.4 s
20	Thermal time constant motor	295 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+125°C

Mechanical data (preloaded ball bearings)

23	Max. speed		10000 rpm
24	Axial play at axial load	< 5.0 N	0 mm
		> 5.0 N	typ. 0.14 mm
25	Radial play		preloaded
26	Max. axial load (dynamic)		4.8 N
27	Max. force for press fits (static)		53 N
	(static, shaft supported)		1000 N
28	Max. radial load, 5 mm from flange		18 N

Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	75 g

Values listed in the table are nominal.

Connection	with Hall sensors	sensorless
Pin 1	V_{Hall} 4.5...18 VDC	Motor winding 1
Pin 2	Hall sensor 3*	Motor winding 2
Pin 3	Hall sensor 1*	Motor winding 3
Pin 4	Hall sensor 2*	⅄ neutral point
Pin 5	GND	
Pin 6	Motor winding 3	
Pin 7	Motor winding 2	
Pin 8	Motor winding 1	

*Internal pull-up (7..13 kΩ) on V_{Hall}
Wiring diagram for Hall sensors see p. 49

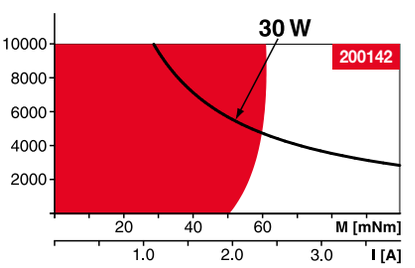
Adapter	Part number	Part number
see p. 514	220300	220310
Connector	**Part number**	**Part number**
TE	1-84953-1	84953-4
Molex	52207-1133	52207-0433

Pin for design with Hall sensors:
FPC, 11-pol, Pitch 1.0 mm, top contact style

[1]Calculation does not include saturation effect (p. 61/168)

Operating Range

n [rpm]



Comments

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.
= Thermal limit.

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

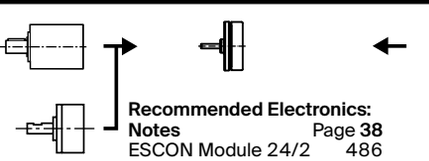
Assigned power rating

maxon Modular System

Details on catalog page 38

Planetary Gearhead
∅42 mm
3 - 15 Nm
Page 398

Spur Gearhead
∅45 mm
0.5 - 2.0 Nm
Page 400



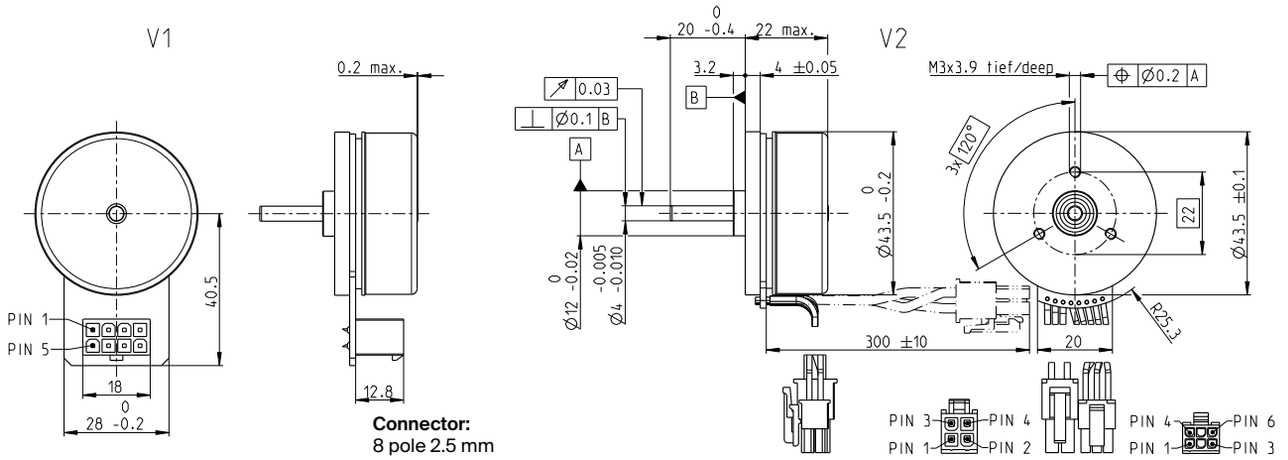
Recommended Electronics:

Notes	Page 38
ESCON Module 24/2	486
ESCON 36/3 EC	487
ESCON Mod. 50/4 EC-S	487
ESCON Module 50/5	487
ESCON 50/5	489
DEC Module 24/2	491
DEC Module 50/5	491
EPOS4 Micro 24/5	495
EPOS4 Mod./Comp. 24/1.5	496
EPOS4 Mod./Comp. 50/5	496
EPOS4 Comp. 24/5 3-axes	497
EPOS4 50/5	501
EPOS2 P 24/5	504

for motor type A:
Encoder MILE
256 - 2048 CPT,
2 channels
Page 446

EC 45 flat ∅43.5 mm, brushless, 50 Watt

NEW



Connector:
8 pole 2.5 mm
z.B. WCON WF2512-HXX

M 1:2

Stock program
Standard program
Special program (on request)

Part Numbers

V1 with Hall sensors	651606	**651607**	651608	**651609**
V2 with Hall sensors and cables	651610	651611	651612	651613

Motor Data						
	Values at nominal voltage					
1	Nominal voltage	V	18	24	36	48
2	No load speed	rpm	5740	6250	6060	5740
3	No load current	mA	277	238	151	104
4	Nominal speed	rpm	4690	5170	5010	4710
5	Nominal torque (max. continuous torque)	mNm	112	91.1	90.9	102
6	Nominal current (max. continuous current)	A	3.68	2.52	1.63	1.27
7	Stall torque[1]	mNm	1190	918	895	1040
8	Stall current	A	40	26	16	13
9	Max. efficiency	%	84.4	82	81.9	83.4
	Characteristics					
10	Terminal resistance phase to phase	Ω	0.447	0.942	2.240	3.610
11	Terminal inductance phase to phase	mH	0.243	0.363	0.868	1.730
12	Torque constant	mNm/A	29.5	36	55.7	78.6
13	Speed constant	rpm/V	324	265	171	121
14	Speed/torque gradient	rpm/mNm	4.910	6.920	6.890	5.580
15	Mechanical time constant	ms	6.940	9.790	9.750	7.890
16	Rotor inertia	gcm²	135	135	135	135

Specifications

Thermal data

17	Thermal resistance housing-ambient	1.57 K/W
18	Thermal resistance winding-housing	8.28 K/W
19	Thermal time constant winding	28.8 s
20	Thermal time constant motor	78.3 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+125°C

Mechanical data (preloaded ball bearings)

23	Max. speed	10 000 rpm
24	Axial play at axial load < 8.0 N	0 mm
	> 8.0 N	0.14 mm
25	Radial play	preloaded
26	Max. axial load (dynamic)	7.2 N
27	Max. force for press fits (static)	53 N
	(static, shaft supported)	1000 N
28	Max. radial load, 5 mm from flange	14.5 N

Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	116.4 g

Values listed in the table are nominal.

Connection V1		**V2** (sensors, AWG 24)
Pin 1	Hall sensor 1*	Hall sensor 1*
Pin 2	Hall sensor 2*	Hall sensor 2*
Pin 3	V_{Hall} 3.5...24 VDC	Hall sensor 3*
Pin 4	Motor winding 3	GND
Pin 5	Hall sensor 3*	V_{Hall} 3.5...24 VDC
Pin 6	GND	N.C.
Pin 7	Motor winding 1	
Pin 8	Motor winding 2	
		V2 (motor, AWG 22)
Pin 1		Motor winding 1
Pin 2		Motor winding 2
Pin 3		Motor winding 3
Pin 4		N.C.

*Internal pull-up (7...13 kΩ) on V_{Hall}
Wiring diagram for Hall sensors see p. 49

Connection cable for V1

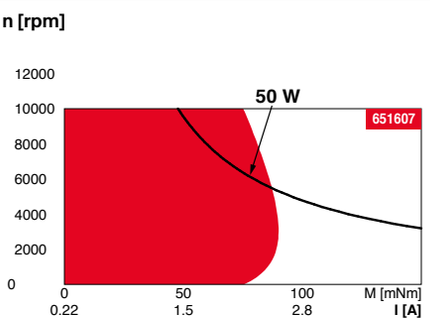
Universal, L = 500 mm	**339380**
to EPOS, L = 500 mm	**354045**

V2

21	Ambient temperature	-20...+100°C

[1]Calculation does not include saturation effect (p. 61/168)

Operating Range



Comments

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.
= Thermal limit.

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

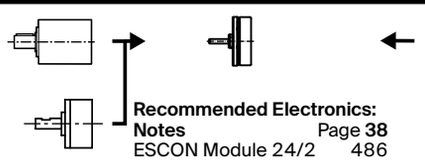
Assigned power rating

maxon Modular System

Details on catalog page 38

Planetary Gearhead
∅42 mm
3 - 15 Nm
Page 398

Spur Gearhead
∅45 mm
0.5 - 2.0 Nm
Page 400



Encoder MILE
256 - 2048 CPT,
2 channels
Page 446

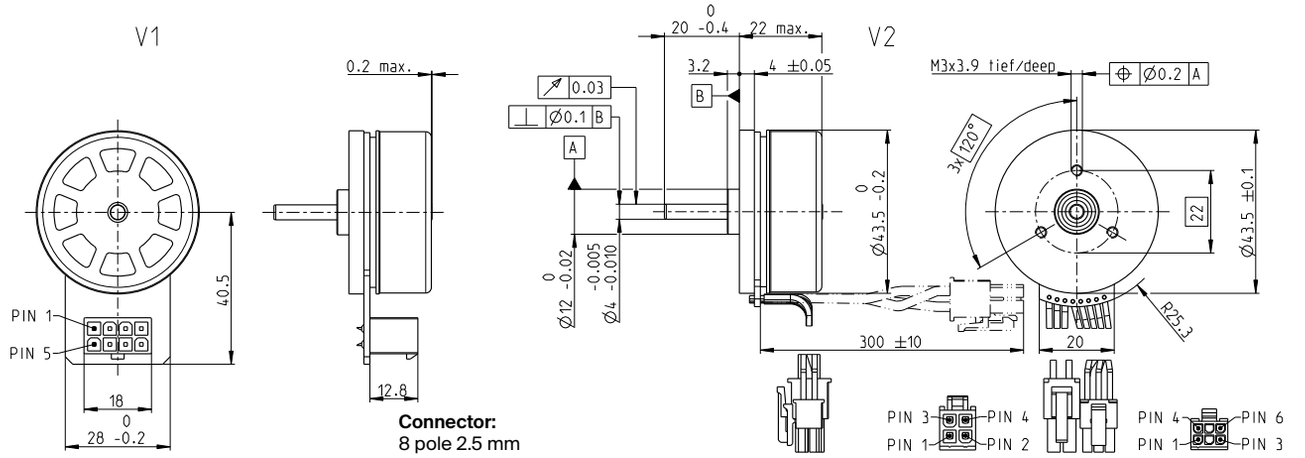
Recommended Electronics:

Notes	Page **38**
ESCON Module 24/2	486
ESCON 36/3 EC	487
ESCON Module 50/5	487
ESCON 50/5	489
DEC Module 24/2	491
DEC Module 50/5	491
EPOS4 Micro 24/5	495
EPOS4 Mod./Comp. 24/1.5	496
EPOS4 Mod./Comp. 50/5	496
EPOS4 Comp. 24/5 3-axes	497
EPOS4 50/5	501
EPOS2 P 24/5	504

EC 45 flat ∅43.5 mm, brushless, 60 Watt

NEW

Open Motor



Connector:
8 pole 2.5 mm
z.B. WCON WF2512-HXX

M 1:2

Stock program
Standard program
Special program (on request)

Part Numbers

V1 with Hall sensors	591476	591477	591478	591479
V2 with Hall sensors and cables	608131	608132	608133	608134

Motor Data									
	Values at nominal voltage								
1	Nominal voltage	V	18	24	36	48			
2	No load speed	rpm	5740	6250	6060	5740			
3	No load current	mA	277	238	151	104			
4	Nominal speed	rpm	4510	4970	4810	4530			
5	Nominal torque (max. continuous torque)	mNm	134	110	109	122			
6	Nominal current (max. continuous current)	A	4.29	2.97	1.91	1.48			
7	Stall torque[1]	mNm	1190	918	895	1040			
8	Stall current	A	40	26	16	13			
9	Max. efficiency	%	84.4	82	81.9	83.4			
	Characteristics								
10	Terminal resistance phase to phase	Ω	0.447	0.942	2.240	3.610			
11	Terminal inductance phase to phase	mH	0.243	0.363	0.868	1.730			
12	Torque constant	mNm/A	29.5	36	55.7	78.6			
13	Speed constant	rpm/V	324	265	171	121			
14	Speed/torque gradient	rpm/mNm	4.910	6.920	6.890	5.580			
15	Mechanical time constant	ms	6.940	9.790	9.750	7.890			
16	Rotor inertia	gcm²	135	135	135	135			

Specifications

Thermal data

17	Thermal resistance housing-ambient	0.268 K/W
18	Thermal resistance winding-housing	7.05 K/W
19	Thermal time constant winding	26.7 s
20	Thermal time constant motor	13.4 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+125°C

Mechanical data (preloaded ball bearings)

23	Max. speed	10 000 rpm
24	Axial play at axial load < 8.0 N	0 mm
	> 8.0 N	0.14 mm
25	Radial play	preloaded
26	Max. axial load (dynamic)	7.2 N
27	Max. force for press fits (static)	53 N
	(static, shaft supported)	1000 N
28	Max. radial load, 5 mm from flange	14.5 N

Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	113.1 g

Values listed in the table are nominal.

Connection V1		**V2** (sensors, AWG 24)
Pin 1	Hall sensor 1*	Hall sensor 1*
Pin 2	Hall sensor 2*	Hall sensor 2*
Pin 3	V_{Hall} 3.5...24 VDC	Hall sensor 3*
Pin 4	Motor winding 3	GND
Pin 5	Hall sensor 3*	V_{Hall} 3.5...24 VDC
Pin 6	GND	N.C.
Pin 7	Motor winding 1	
Pin 8	Motor winding 2	
		V2 (motor, AWG 22)
Pin 1		Motor winding 1
Pin 2		Motor winding 2
Pin 3		Motor winding 3
Pin 4		N.C.

*Internal pull-up (7...13 kΩ) on V_{Hall}
Wiring diagram for Hall sensors see p. 49

Connection cable for V1

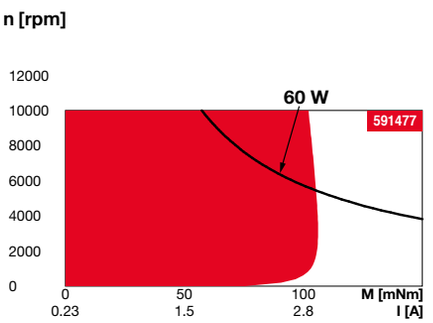
Universal, L = 500 mm	**339380**
to EPOS, L = 500 mm	**354045**

V2

21	Ambient temperature	-20...+100°C

[1]Calculation does not include saturation effect (p. 61/168)

Operating Range



Comments

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.
= Thermal limit.

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

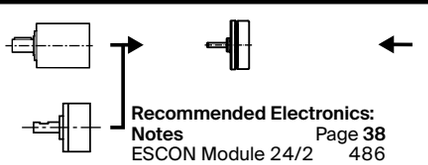
Assigned power rating

maxon Modular System

Details on catalog page 38

Planetary Gearhead
∅42 mm
3 - 15 Nm
Page 398

Spur Gearhead
∅45 mm
0.5 - 2.0 Nm
Page 400



Encoder MILE
256 - 2048 CPT,
2 channels
Page 446

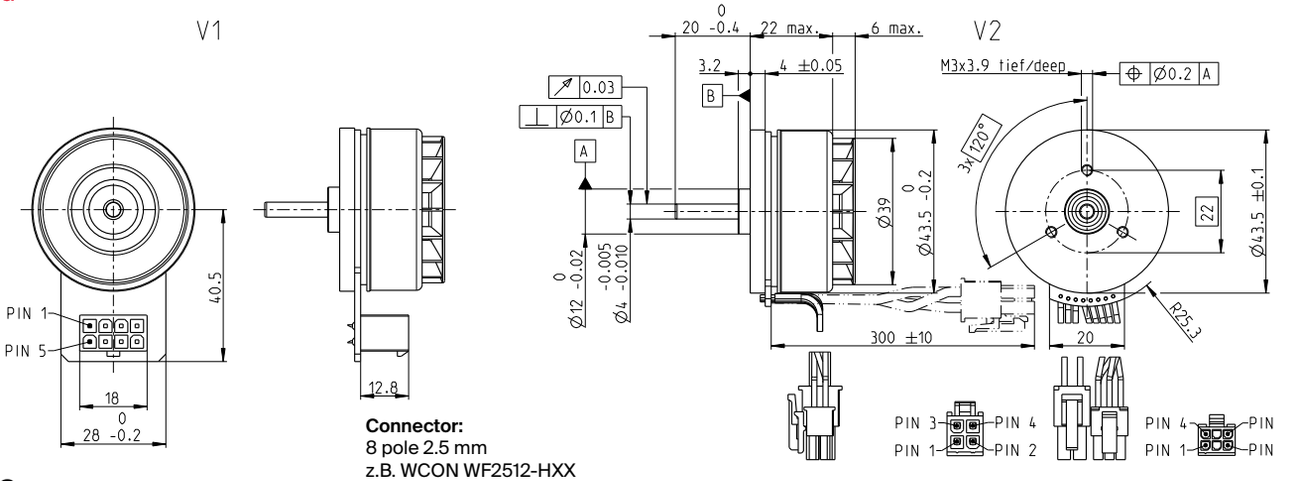
Recommended Electronics:

Notes	Page **38**
ESCON Module 24/2	486
ESCON 36/3 EC	487
ESCON Module 50/5	487
ESCON 50/5	489
DEC Module 24/2	491
DEC Module 50/5	491
EPOS4 Micro 24/5	495
EPOS4 Mod./Comp. 50/5	496
EPOS4 Comp. 24/5 3-axes	497
EPOS4 50/5	501
EPOS2 P 24/5	504

EC 45 flat ∅43.5 mm, brushless, 90 Watt

NEW

Ventilated



Connector:
8 pole 2.5 mm
z.B. WCON WF2512-HXX

M 1:2

Stock program
Standard program
Special program (on request)

Part Numbers

V1 with Hall sensors	608135	**608136**	608137	**608138**
V2 with Hall sensors and cables	608139	608140	608141	608142

Motor Data

	Values at nominal voltage					
1	Nominal voltage	V	18	24	36	48
2	No load speed	rpm	5740	6250	6060	5740
3	No load current	mA	281	242	154	105
4	Nominal speed	rpm	4280	4700	4560	4300
5	Nominal torque (max. continuous torque)	mNm	164	136	135	149
6	Nominal current (max. continuous current)	A	5.08	3.57	2.29	1.76
7	Stall torque[1]	mNm	1190	918	895	1040
8	Stall current	A	40	26	16	13
9	Max. efficiency	%	84.3	81.9	81.8	83.3
	Characteristics					
10	Terminal resistance phase to phase	Ω	0.447	0.942	2.240	3.610
11	Terminal inductance phase to phase	mH	0.243	0.363	0.868	1.730
12	Torque constant	mNm/A	29.5	36	55.7	78.6
13	Speed constant	rpm/V	324	265	171	121
14	Speed/torque gradient	rpm/mNm	4.910	6.920	6.890	5.580
15	Mechanical time constant	ms	6.940	9.790	9.750	7.890
16	Rotor inertia	gcm²	135	135	135	135

Specifications

Thermal data

17	Thermal resistance housing-ambient	0.23 K/W
18	Thermal resistance winding-housing	4.6 K/W
19	Thermal time constant winding	16 s
20	Thermal time constant motor	11.5 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+125°C

Mechanical data (preloaded ball bearings)

23	Max. speed	10 000 rpm
24	Axial play at axial load < 8.0 N	0 mm
	> 8.0 N	0.14 mm
25	Radial play	preloaded
26	Max. axial load (dynamic)	7.2 N
27	Max. force for press fits (static)	53 N
	(static, shaft supported)	1000 N
28	Max. radial load, 5 mm from flange	14.5 N

Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	115.1 g

Values listed in the table are nominal.

Connection V1		**V2** (sensors, AWG 24)
Pin 1	Hall sensor 1*	Hall sensor 1*
Pin 2	Hall sensor 2*	Hall sensor 2*
Pin 3	V_{Hall} 3.5...24 VDC	Hall sensor 3*
Pin 4	Motor winding 3	GND
Pin 5	Hall sensor 3*	V_{Hall} 3.5...24 VDC
Pin 6	GND	N.C.
Pin 7	Motor winding 1	
Pin 8	Motor winding 2	
		V2 (motor, AWG 22)
Pin 1		Motor winding 1
Pin 2		Motor winding 2
Pin 3		Motor winding 3
Pin 4		N.C.

*Internal pull-up (7...13 kΩ) on V_{Hall}
Wiring diagram for Hall sensors see p. 49

Connection cable for V1

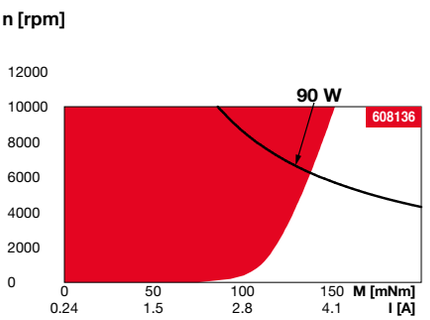
Universal, L = 500 mm	**339380**
to EPOS, L = 500 mm	**354045**

V2

21	Ambient temperature	-20...+100°C

[1]Calculation does not include saturation effect (p. 61/168)

Operating Range



Comments

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.
= Thermal limit.

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

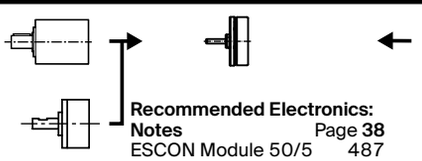
Assigned power rating

maxon Modular System

Details on catalog page 38

Planetary Gearhead
∅42 mm
3 - 15 Nm
Page 398

Spur Gearhead
∅45 mm
0.5 - 2.0 Nm
Page 400



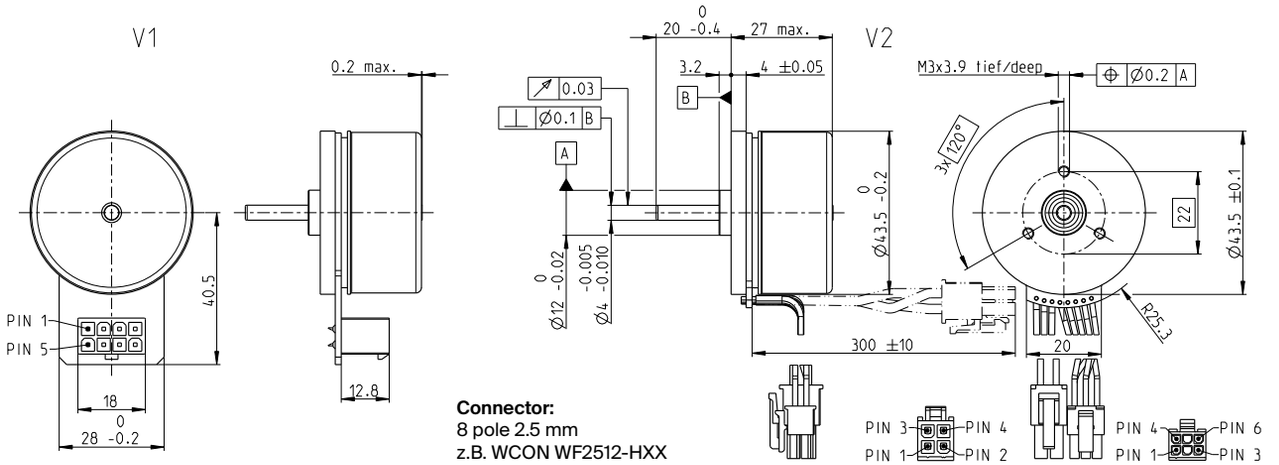
Encoder MILE
256 - 2048 CPT,
2 channels
Page 446

Recommended Electronics:

Notes	Page **38**
ESCON Module 50/5	487
ESCON Module 50/8 (HE)	488
ESCON 50/5	489
DEC Module 50/5	491
EPOS4 Mod./Comp. 50/5	496
EPOS4 Mod./Comp. 50/8	497
EPOS4 Mod./Comp. 50/15	497
EPOS4 50/5	501
EPOS2 P 24/5	504

EC 45 flat ∅43.5 mm, brushless, 70 Watt

NEW



Connector:
8 pole 2.5 mm
z.B. WCON WF2512-HXX

M 1:2

Stock program
Standard program
Special program (on request)

Part Numbers

V1 with Hall sensors	**651614**	651615	651616	**651617**
V2 with Hall sensors and cables	651618	651619	651620	651621

Motor Data (provisional)						
	Values at nominal voltage					
1	Nominal voltage	V	24	36	48	60
2	No load speed	rpm	5600	5930	5580	3720
3	No load current	mA	270	198	135	57
4	Nominal speed	rpm	4750	5080	4750	3010
5	Nominal torque (max. continuous torque)	mNm	134	110	112	143
6	Nominal current (max. continuous current)	A	3.29	1.97	1.41	0.92
7	Stall torque[1]	mNm	1690	1320	1260	1240
8	Stall current	A	42	23	16	8
9	Max. efficiency	%	84.9	82.7	82.6	84.2
	Characteristics					
10	Terminal resistance phase to phase	Ω	0.573	1.560	3.070	7.370
11	Terminal inductance phase to phase	mH	0.301	0.601	1.210	4.270
12	Torque constant	mNm / A	40.4	57	80.8	152
13	Speed constant	rpm / V	236	167	118	62.8
14	Speed / torque gradient	rpm / mNm	3.350	4.580	4.490	3.040
15	Mechanical time constant	ms	6.350	8.680	8.510	5.770
16	Rotor inertia	gcm²	181	181	181	181

Specifications

Thermal data

17	Thermal resistance housing-ambient	2.55 K/W
18	Thermal resistance winding-housing	6.64 K/W
19	Thermal time constant winding	43.1 s
20	Thermal time constant motor	127 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+125°C

Mechanical data (preloaded ball bearings)

23	Max. speed	10 000 rpm
24	Axial play at axial load < 8.0 N	0 mm
	> 8.0 N	0.14 mm
25	Radial play	preloaded
26	Max. axial load (dynamic)	7.2 N
27	Max. force for press fits (static)	53 N
	(static, shaft supported)	1000 N
28	Max. radial load, 5 mm from flange	15.1 N

Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	150.4 g

Values listed in the table are nominal.

Connection V1		**V2** (sensors, AWG 24)
Pin 1	Hall sensor 1*	Hall sensor 1*
Pin 2	Hall sensor 2*	Hall sensor 2*
Pin 3	V_{Hall} 3.5...24 VDC	Hall sensor 3*
Pin 4	Motor winding 3	GND
Pin 5	Hall sensor 3*	V_{Hall} 3.5...24 VDC
Pin 6	GND	N.C.
Pin 7	Motor winding 1	
Pin 8	Motor winding 2	
		V2 (motor, AWG 22)
Pin 1		Motor winding 1
Pin 2		Motor winding 2
Pin 3		Motor winding 3
Pin 4		N.C.

*Internal pull-up (7 ... 13 kΩ) on V_{Hall}
Wiring diagram for Hall sensors see p. 49

Connection cable for V1

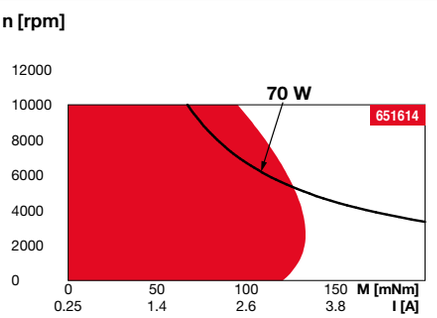
Universal, L = 500 mm	**339380**
to EPOS, L = 500 mm	**354045**

V2

21	Ambient temperature	-20 ... +100°C

[1]Calculation does not include saturation effect (p. 61/168)

Operating Range



Comments

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.
= Thermal limit.

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

Assigned power rating

maxon Modular System

Details on catalog page 38

Planetary Gearhead
∅42 mm
3 - 15 Nm
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Spur Gearhead
∅45 mm
0.5 - 2.0 Nm
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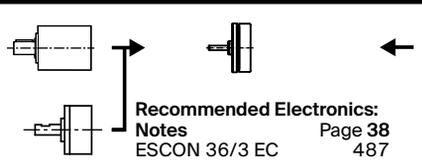

Encoder MILE
256 - 2048 CPT,
2 channels
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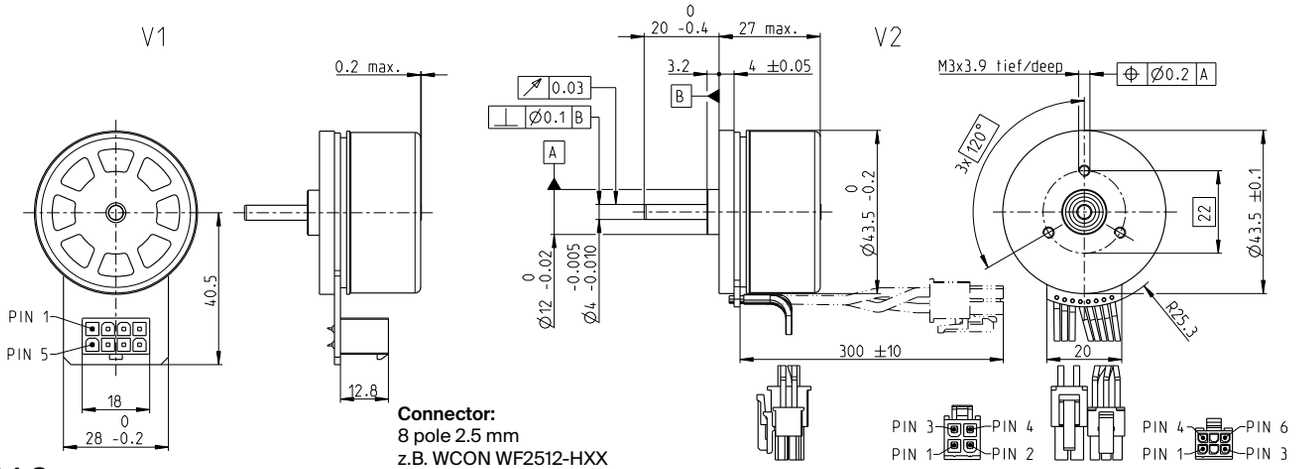
Recommended Electronics:

Notes	Page **38**
ESCON 36/3 EC	487
ESCON Module 50/5	487
ESCON 50/5	489
ESCON 70/10	489
DEC Module 50/5	491
EPOS4 Micro 24/5	495
EPOS4 Mod./Comp. 50/5	496
EPOS4 50/5	501
EPOS2 P 24/5	504

EC 45 flat ∅43.5 mm, brushless, 80 Watt

NEW

Open Motor



Connector:
8 pole 2.5 mm
z.B. WCON WF2512-HXX

M 1:2

Stock program
Standard program
Special program (on request)

Part Numbers

V1 with Hall sensors	**591480**	591481	591482	**591483**
V2 with Hall sensors and cables	608144	608145	608146	608147

Motor Data						
	Values at nominal voltage					
1	Nominal voltage	V	24	36	48	60
2	No load speed	rpm	5600	5930	5580	3720
3	No load current	mA	270	198	135	57
4	Nominal speed	rpm	4560	4870	4560	2890
5	Nominal torque (max. continuous torque)	mNm	167	139	140	170
6	Nominal current (max. continuous current)	A	3.96	2.41	1.71	1.06
7	Stall torque[1]	mNm	1690	1320	1260	1240
8	Stall current	A	42	23	16	8
9	Max. efficiency	%	84.9	82.7	82.6	84.2
	Characteristics					
10	Terminal resistance phase to phase	Ω	0.573	1.560	3.070	7.370
11	Terminal inductance phase to phase	mH	0.301	0.601	1.210	4.270
12	Torque constant	mNm/A	40.4	57	80.8	152
13	Speed constant	rpm/V	236	167	118	62.8
14	Speed/torque gradient	rpm/mNm	3.350	4.580	4.490	3.040
15	Mechanical time constant	ms	6.350	8.680	8.510	5.770
16	Rotor inertia	gcm²	181	181	181	181

Specifications

Thermal data

17	Thermal resistance housing-ambient	1.29 K/W
18	Thermal resistance winding-housing	5.23 K/W
19	Thermal time constant winding	34 s
20	Thermal time constant motor	64.7 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+125°C

Mechanical data (preloaded ball bearings)

23	Max. speed	10 000 rpm
24	Axial play at axial load < 8.0 N	0 mm
	> 8.0 N	0.14 mm
25	Radial play	preloaded
26	Max. axial load (dynamic)	7.2 N
27	Max. force for press fits (static)	53 N
	(static, shaft supported)	1000 N
28	Max. radial load, 5 mm from flange	15.1 N

Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	147.1 g

Values listed in the table are nominal.

Connection V1		**V2** (sensors, AWG 24)
Pin 1	Hall sensor 1*	Hall sensor 1*
Pin 2	Hall sensor 2*	Hall sensor 2*
Pin 3	V_{Hall} 3.5...24 VDC	Hall sensor 3*
Pin 4	Motor winding 3	GND
Pin 5	Hall sensor 3*	V_{Hall} 3.5...24 VDC
Pin 6	GND	N.C.
Pin 7	Motor winding 1	
Pin 8	Motor winding 2	
		V2 (motor, AWG 22)
Pin 1		Motor winding 1
Pin 2		Motor winding 2
Pin 3		Motor winding 3
Pin 4		N.C.

*Internal pull-up (7...13 kΩ) on V_{Hall}
Wiring diagram for Hall sensors see p. 49

Connection cable for V1

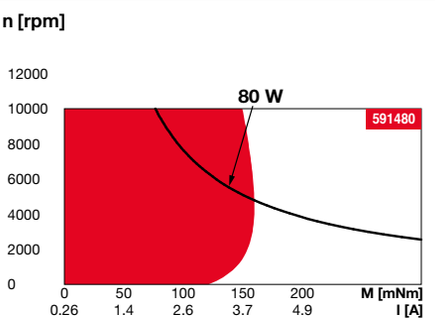
Universal, L = 500 mm	**339380**
to EPOS, L = 500 mm	**354045**

V2

21	Ambient temperature	-20...+100°C

[1]Calculation does not include saturation effect (p. 61/168)

Operating Range



Comments

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.
= Thermal limit.

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

Assigned power rating

maxon Modular System

Details on catalog page 38

Planetary Gearhead
∅42 mm
3 - 15 Nm
Page 398

Spur Gearhead
∅45 mm
0.5 - 2.0 Nm
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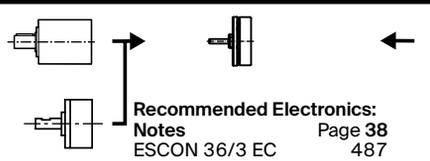

Encoder MILE
256 - 2048 CPT,
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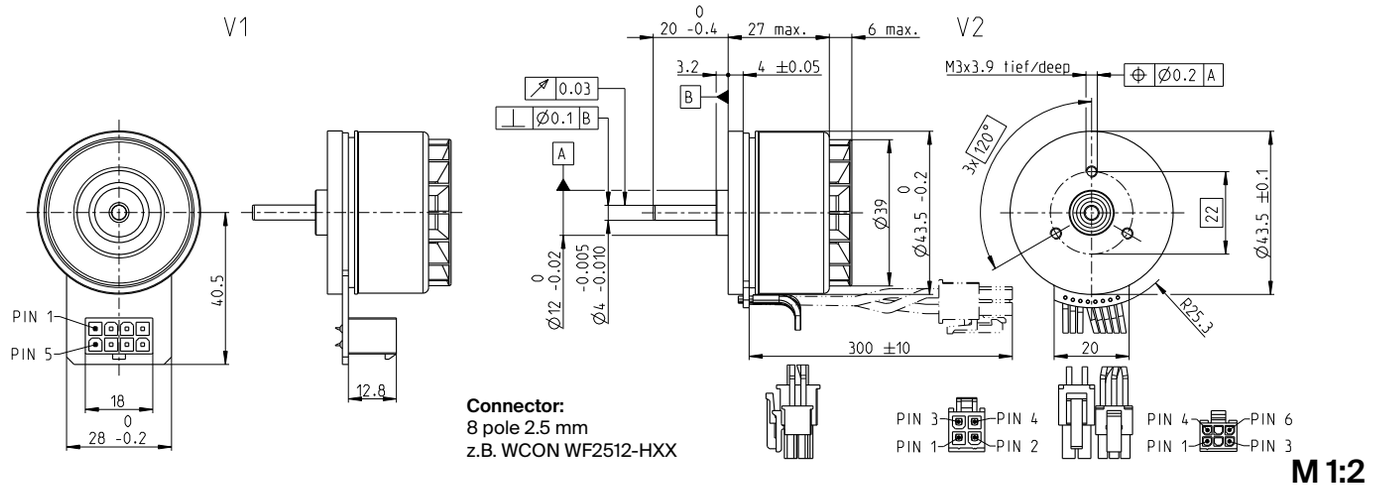
Recommended Electronics:

Notes	Page **38**
ESCON 36/3 EC	487
ESCON Module 50/5	487
ESCON 50/5	489
ESCON 70/10	489
DEC Module 50/5	491
EPOS4 Micro 24/5	495
EPOS4 Mod./Comp. 50/5	496
EPOS4 50/5	501
EPOS2 P 24/5	504

EC 45 flat ∅43.5 mm, brushless, 120 Watt

NEW

Ventilated



Connector:
8 pole 2.5 mm
z.B. WCON WF2512-HXX

M 1:2

Stock program
Standard program
Special program (on request)

Part Numbers

V1 with Hall sensors	**608148**	608149	608150	**608151**
V2 with Hall sensors and cables	608152	608153	608154	608155

Motor Data (provisional)									
	Values at nominal voltage								
1	Nominal voltage	V	24	36	48	60			
2	No load speed	rpm	5600	5930	5580	3720			
3	No load current	mA	277	204	138	58.2			
4	Nominal speed	rpm	4520	4820	4510	2900			
5	Nominal torque (max. continuous torque)	mNm	174	147	146	169			
6	Nominal current (max. continuous current)	A	4.13	2.53	1.78	1.06			
7	Stall torque[1]	mNm	1690	1320	1260	1240			
8	Stall current	A	42	23	16	8			
9	Max. efficiency	%	84.7	82.5	82.4	84.1			
	Characteristics								
10	Terminal resistance phase to phase	Ω	0.573	1.560	3.070	7.370			
11	Terminal inductance phase to phase	mH	0.301	0.601	1.210	4.270			
12	Torque constant	mNm / A	40.4	57	80.8	152			
13	Speed constant	rpm / V	236	167	118	62.8			
14	Speed / torque gradient	rpm / mNm	3.350	4.580	4.490	3.040			
15	Mechanical time constant	ms	6.350	8.680	8.510	5.770			
16	Rotor inertia	gcm²	181	181	181	181			

Specifications

Thermal data

17	Thermal resistance housing-ambient	1.94 K/W
18	Thermal resistance winding-housing	3.86 K/W
19	Thermal time constant winding	25.1 s
20	Thermal time constant motor	97 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+125°C

Mechanical data (preloaded ball bearings)

23	Max. speed	10 000 rpm
24	Axial play at axial load < 8.0 N	0 mm
	> 8.0 N	0.14 mm
25	Radial play	preloaded
26	Max. axial load (dynamic)	7.2 N
27	Max. force for press fits (static)	53 N
	(static, shaft supported)	1000 N
28	Max. radial load, 5 mm from flange	15.1 N

Other specifications

29	Number of pole pairs	8
30	Number of phases	3
31	Weight of motor	149.1 g

Values listed in the table are nominal.

Connection V1		**V2** (sensors, AWG 24)
Pin 1	Hall sensor 1*	Hall sensor 1*
Pin 2	Hall sensor 2*	Hall sensor 2*
Pin 3	V_{Hall} 3.5...24 VDC	Hall sensor 3*
Pin 4	Motor winding 3	GND
Pin 5	Hall sensor 3*	V_{Hall} 3.5...24 VDC
Pin 6	GND	N.C.
Pin 7	Motor winding 1	
Pin 8	Motor winding 2	
		V2 (motor, AWG 22)
Pin 1		Motor winding 1
Pin 2		Motor winding 2
Pin 3		Motor winding 3
Pin 4		N.C.

*Internal pull-up (7 ... 13 kΩ) on V_{Hall}
Wiring diagram for Hall sensors see p. 49

Connection cable for V1

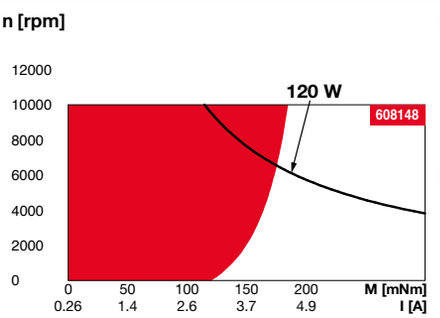
Universal, L = 500 mm	**339380**
to EPOS, L = 500 mm	**354045**

V2

21	Ambient temperature	-20 ... +100°C

[1]Calculation does not include saturation effect (p. 61/168)

Operating Range



Comments

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.
= Thermal limit.

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

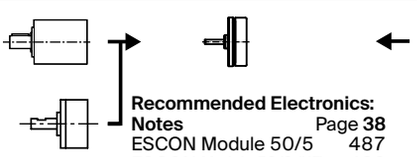
Assigned power rating

maxon Modular System

Details on catalog page 38

Planetary Gearhead
∅42 mm
3 - 15 Nm
Page 398

Spur Gearhead
∅45 mm
0.5 - 2.0 Nm
Page 400



Encoder MILE
256 - 2048 CPT,
2 channels
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Recommended Electronics:

Notes	Page **38**
ESCON Module 50/5	487
ESCON Module 50/8 (HE)	488
ESCON 50/5	489
ESCON 70/10	489
DEC Module 50/5	491
EPOS4 Mod./Comp. 50/5	496
EPOS4 Mod./Comp. 50/8	497
EPOS4 50/5	501
EPOS2 P 24/5	504