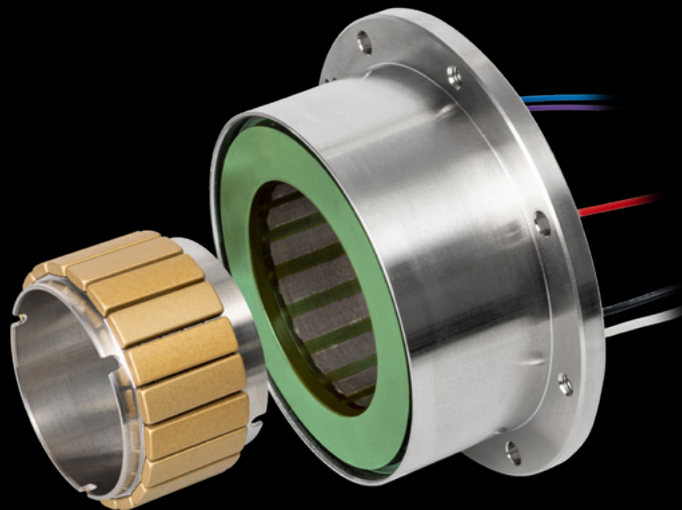


Frameless BLDC Motors

Frameless BLDC motors consist of a separate stator and rotor. They are the perfect solution for applications with a high degree of system integration, as they can be built directly into customer-specific designs—including individual adaptations such as bearings or cable routing. This makes frameless motors indispensable in systems engineering, robotics, and complex high-end applications. Frameless motors require additional know-how during integration, which maxon provides with comprehensive support. For anyone seeking maximum freedom in design, this is the solution for highest efficiency and performance.



Frameless BLDC Motors

Maximum torque integrated directly into your application

Standard specification no. 101	100
Terminology explanations	240
EC frameless DT	243-252
EC frameless HT	255-260

Explanations maxon terminology for frameless BLDC motors

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 [V]

is the applied voltage between two powered phases in block commutation. See page 73 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 n_0 [rpm] $\pm 10\%$

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 I_0 [mA] $\pm 50\%$

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. In extended operation, the motor heats up and the no load friction and no load current decrease.

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°C ambient temperature in continuous operation with I_N . I_N decreases as speed increases due to additional losses in the lamination.

7 Stall torque M_H [mNm]

For ironless windings, this is the calculated load torque that brings the shaft to a standstill at nominal voltage. For windings with an iron core, this is the measured value, as they are subject to the saturation effect.

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_A cannot often be reached due to the amplifier's current limits.

9 Max. efficiency $\eta_{\max}$ [%]

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 [Ω]

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_n [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 $\pm 20\%$).

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 91).

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]

and

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

The specified values depend to a great extent on the installation situation of the drive and the heat dissipation. maxon typically measures the contact resistances with the drive mounted on a plastic panel. In some cases, the values are determined on a metal plate, which is specified in the data sheet. For drives with metal flanges, thermal resistance R_{th2} can decrease by up to 80% when the drive is mounted on a heat-conducting (metallic) mount instead of plastic.

19 Thermal time constant winding τ_w [s]

and

20 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.

Frameless BLDC Motors

Standard specification no. 101	100
Terminology explanations	240

EC frameless DT 38 S Ø42 mm, 110 Watt		243
EC frameless DT 38 M Ø42 mm, 240 Watt		244
EC frameless DT 50 S Ø50 mm, 230 Watt	NEW	245
EC frameless DT 50 S Ø54 mm, 220 Watt		246
EC frameless DT 50 M Ø50 mm, 220 Watt	NEW	247
EC frameless DT 50 M Ø54 mm, 210 Watt		248
EC frameless DT 65 S Ø70 mm, 290 Watt		249
EC frameless DT 65 M Ø70 mm, 375 Watt		250
EC frameless DT 85 M Ø90 mm, 570 Watt		251
EC frameless DT 85 L Ø90 mm, 680 Watt		252

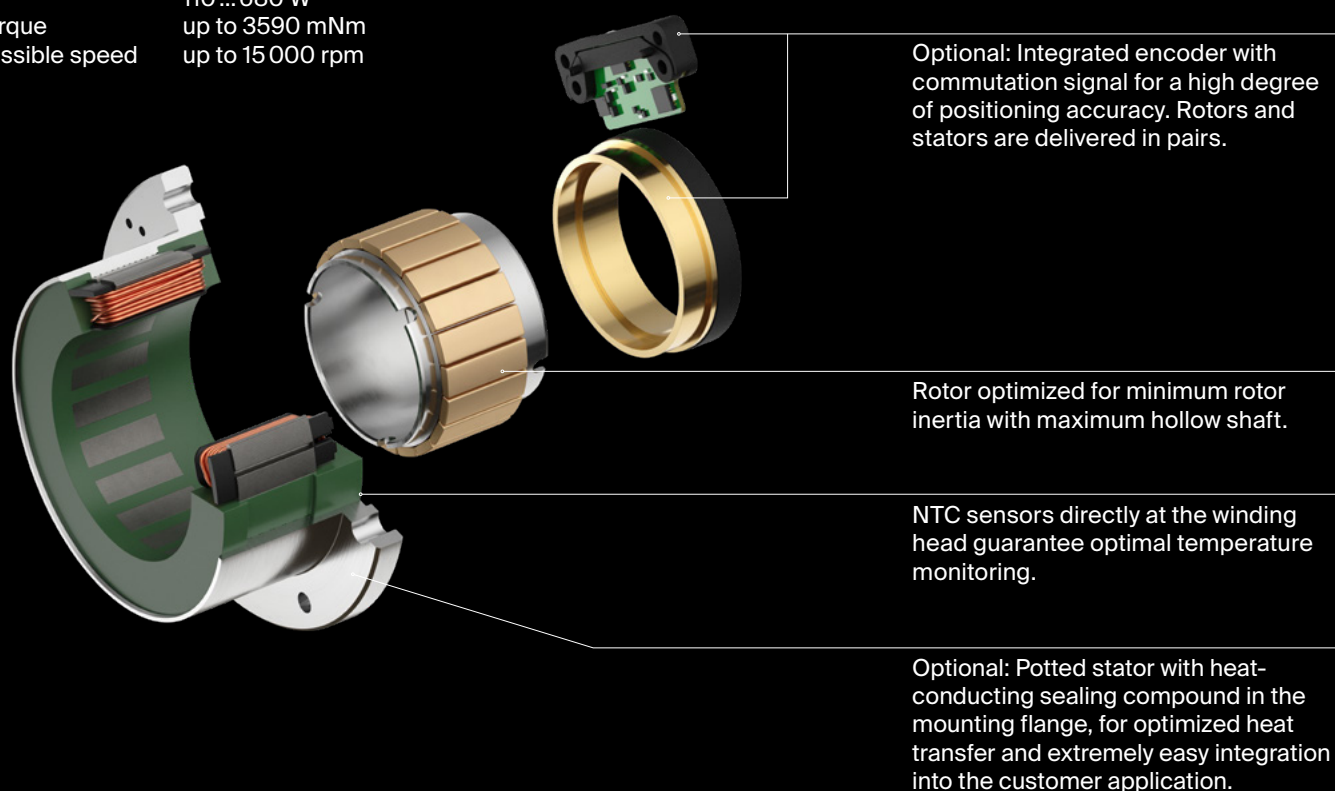
EC frameless HT		
EC frameless HT 60 S Ø60 mm, 240 Watt	NEW	255
EC frameless HT 60 M Ø60 mm, 250 Watt	NEW	256
EC frameless HT 76 S Ø76 mm, 315 Watt	NEW	257
EC frameless HT 76 M Ø76 mm, 430 Watt	NEW	258
EC frameless HT 90 S Ø90 mm, 500 Watt	NEW	259
EC frameless HT 90 M Ø90 mm, 620 Watt	NEW	260

EC frameless DT

The EC frameless DT motor range offers high torque density and dynamics combined with excellent energy efficiency. The compact design with a generously sized hollow shaft provides great design freedom for integration. An additional mounting flange simplifies installation and removal, while optimized heat dissipation is supported by additional sealing compound. For maximum compactness and reliability, maxon can integrate the motor directly into customer-specific housings.

Key data

Motor Ø	42...90 mm
Motor length	18...43 mm
Power	110...680 W
Nominal torque	up to 3590 mNm
Max. permissible speed	up to 15 000 rpm

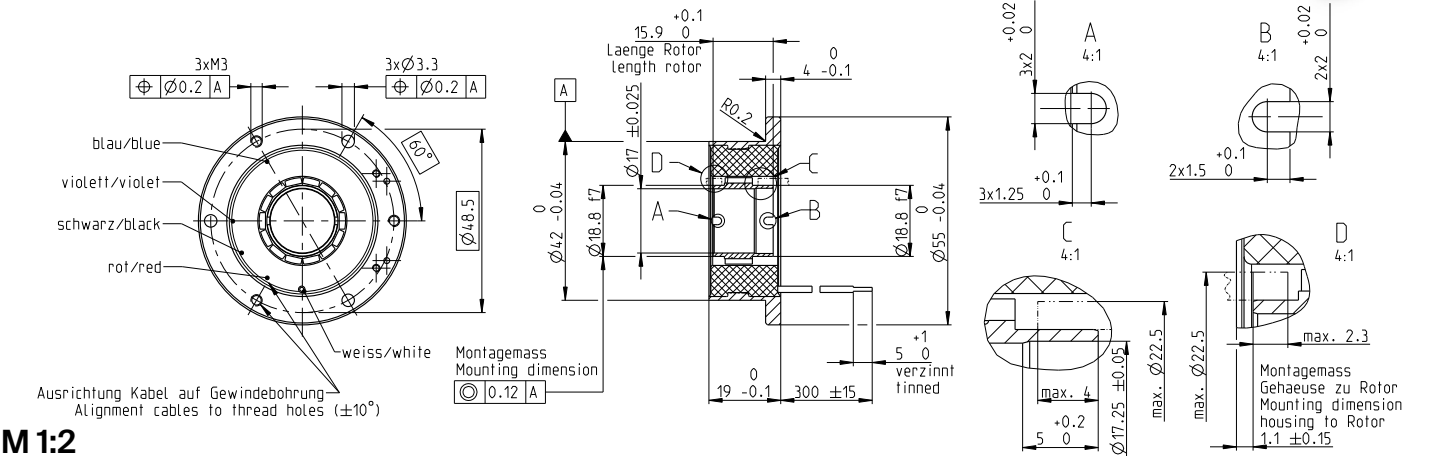


- Top torque density
- Short length, with large hollow shaft
- Excellent heat dissipation
- Outstanding energy efficiency
- Low cogging torque

EC frameless DT 38 S Ø42 mm, brushless, 110 W
Dynamic Torque, potted in mounting flange



Frameless BLDC Motors

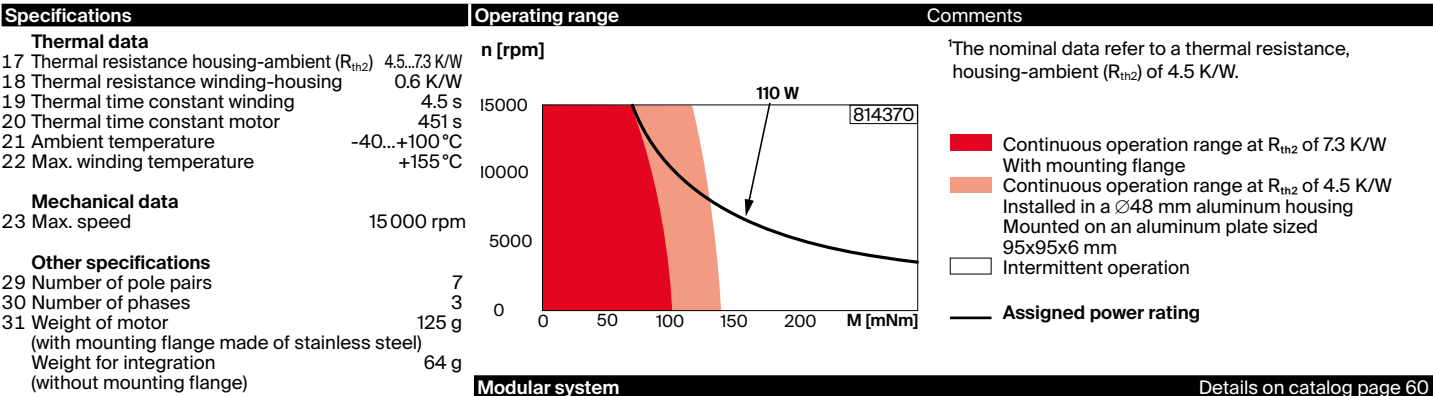


M 1:2

- Stock program
- Standard program
- Special program (on request)

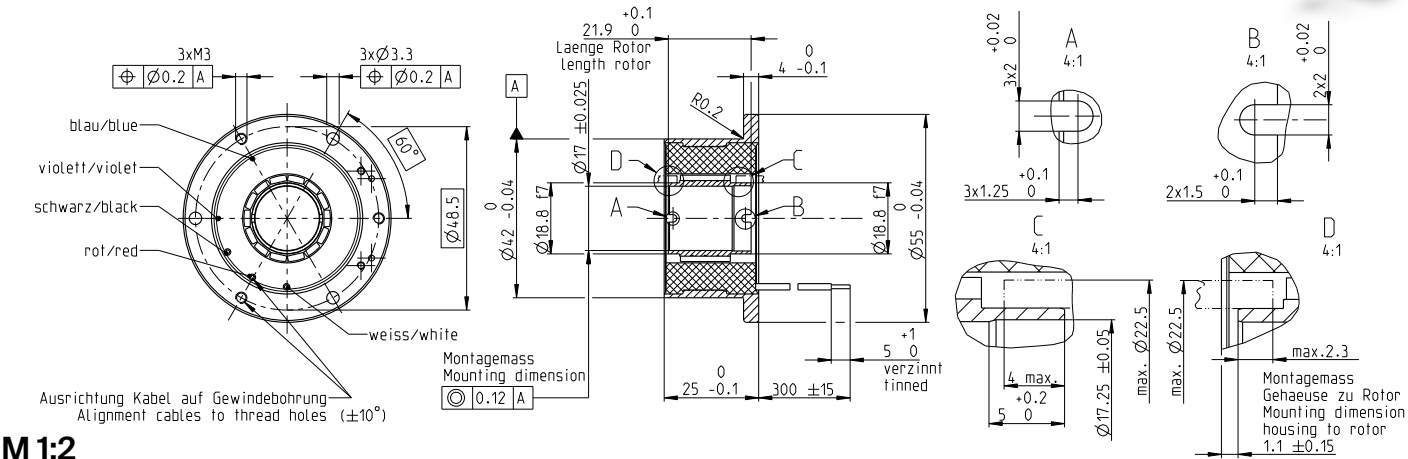
Part numbers

sensorless		814370							
Motor data ¹									
Values at nominal voltage									
1 Nominal voltage	V	24							
2 No load speed	rpm	12 400							
3 No load current	mA	261							
4 Nominal speed	rpm	9430							
5 Nominal torque	mNm	134							
6 Nominal current (max. continuous current)	A	6.3							
7 Stall torque	mNm	641							
8 Stall current	A	89.9							
9 Max. efficiency	%	89.5							
Characteristics									
10 Terminal resistance phase to phase	Ω	0.267							
11 Terminal inductance phase to phase	mH	0.182							
12 Torque constant	mNm/A	18.2							
13 Speed constant	rpm/V	524							
14 Speed/torque gradient	rpm/mNm	7.7							
15 Mechanical time constant	ms	0.98							
16 Rotor inertia	gcm ²	12.2							



Modular system		Details on catalog page 60	
Values listed in the table are nominal.			
Connection motor (Cable AWG 18) red Motor winding 1 black Motor winding 2 white Motor winding 3		Sensors 427_TSX 38 MAG with commutation signals	
Connection NTC (Cable AWG 24) purple NTC blue NTC Resistance 25°C: 5 kΩ ±1%, beta (25–85°C): 3490 K		Control Electronics 447_ESCON2 Micro 60/5 454_EPOS4 Micro 24/5 CAN 454_EPOS4 Micro 24/5 EtherCAT 455_EPOS4 Module 50/5 458_EPOS4 Compact 50/5 461_EPOS4 50/5 462_EPOS4 Disk 60/8 CAN 463_EPOS4 Disk 60/8 EtherCAT	
Comment For Torque control data, refer to "Installation Manual" available on maxon online shop.		Variants maxon integration into customer housing on request. Other coil designs on request.	

EC frameless DT 38 M Ø42 mm, brushless, 240 watt
Dynamic Torque, potted in mounting flange

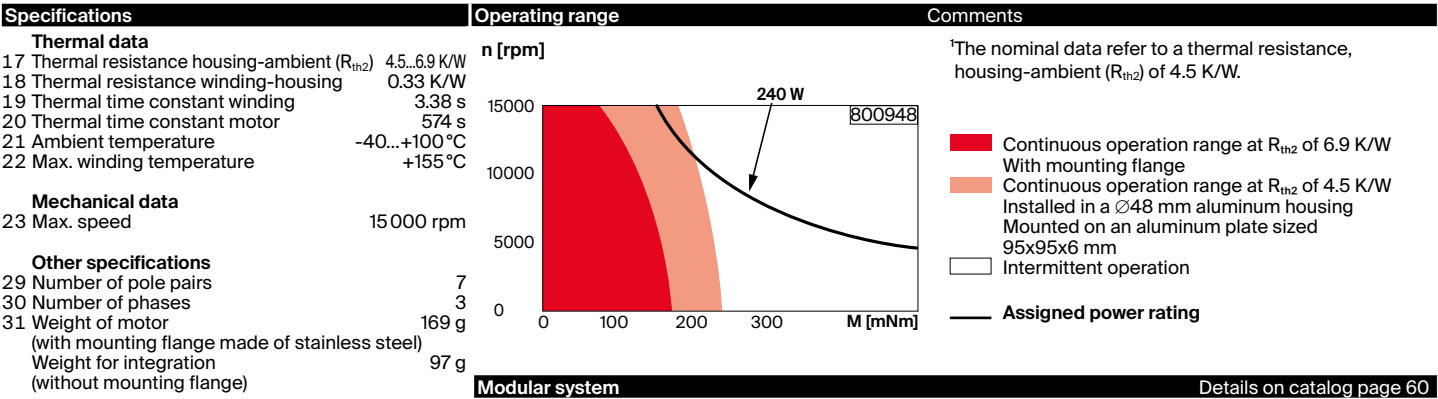


M 1:2

- Stock program
- Standard program
- Special program (on request)

Part numbers

sensorless		800948						
Motor data ¹								
Values at nominal voltage								
1	Nominal voltage	V	24					
2	No load speed	rpm	6290					
3	No load current	mA	147					
4	Nominal speed	rpm	4830					
5	Nominal torque	mNm	237					
6	Nominal current (max. continuous current)	A	5.8					
7	Stall torque	mNm	1150					
8	Stall current	A	63.8					
9	Max. efficiency	%	90.6					
Characteristics								
10	Terminal resistance phase to phase	Ω	0.376					
11	Terminal inductance phase to phase	mH	0.312					
12	Torque constant	mNm/A	36.2					
13	Speed constant	rpm/V	264					
14	Speed/torque gradient	rpm/mNm	2.740					
15	Mechanical time constant	ms	0.583					
16	Rotor inertia	gcm ²	20.3					



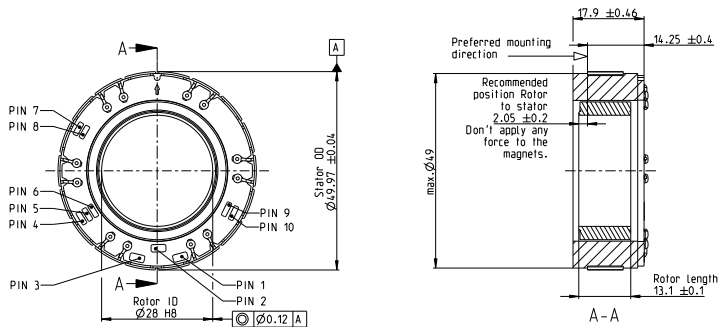
Modular system		Details on catalog page 60	
Values listed in the table are nominal.			
Connection motor (Cable AWG 18) red Motor winding 1 black Motor winding 2 white Motor winding 3		Sensors 427_TSX 38 MAG with commutation signals	
Connection NTC (Cable AWG 24) purple NTC blue NTC Resistance 25°C: 5 kΩ ±1%, beta (25–85°C): 3490 K		Control Electronics 447_ESCON2 Micro 60/5 454_EPOS4 Micro 24/5 CAN 454_EPOS4 Micro 24/5 EtherCAT 455_EPOS4 Module 50/5 458_EPOS4 Compact 50/5 461_EPOS4 50/5 462_EPOS4 Disk 60/8 CAN 463_EPOS4 Disk 60/8 EtherCAT	
Comment For Torque control data, refer to "Installation Manual" available on maxon online shop.		Variants maxon integration into customer housing on request. Other coil designs on request.	

EC frameless DT 50 S Ø50 mm, brushless, 230 watt

Dynamic Torque

NEW

Frameless BLDC Motors

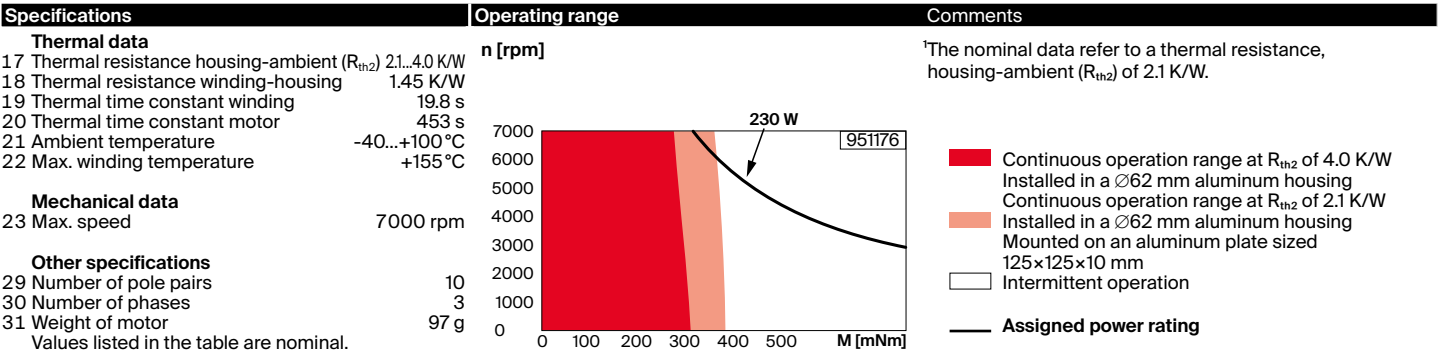


M 2:3

- Stock program
- Standard program
- Special program (on request)

Part numbers

with Hall sensors		951176							
Motor data ¹ (provisional)									
Values at nominal voltage									
1	Nominal voltage	V	48						
2	No load speed	rpm	6650						
3	No load current	mA	150						
4	Nominal speed	rpm	5830						
5	Nominal torque	mNm	364						
6	Nominal current (max. continuous current)	A	6.28						
7	Stall torque	mNm	1890						
8	Stall current	A	81.2						
9	Max. efficiency	%	91.6						
Characteristics									
10	Terminal resistance phase to phase	Ω	0.591						
11	Terminal inductance phase to phase	mH	0.384						
12	Torque constant	mNm/A	68.5						
13	Speed constant	rpm/V	139						
14	Speed/torque gradient	rpm/mNm	1.200						
15	Mechanical time constant	ms	0.881						
16	Rotor inertia	gcm ²	70						



- Connection motor**
- Pin 1 Motor winding 1
 - Pin 2 Motor winding 2
 - Pin 3 Motor winding 3

- Commutation**
- Pin 4 Hall sensors 1
 - Pin 5 Hall sensors 2
 - Pin 6 Hall sensors 3
 - Pin 7 GND
 - Pin 8 V_{hall} 4.5...24 VDC

- Connection NTC**
- Pin 9 NTC
 - Pin 10 NTC

Resistance 25°C: 5 kΩ ±1%, beta (25–85°C): 3490 K

Comment
For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

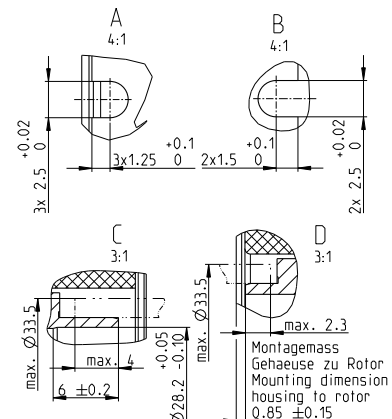
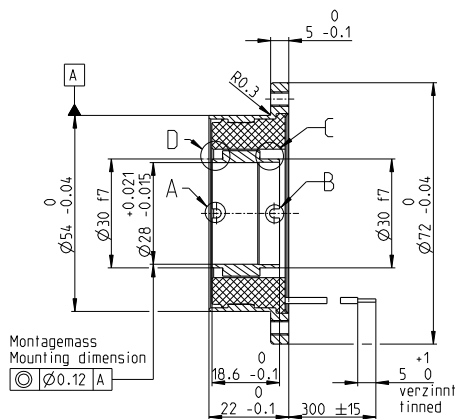
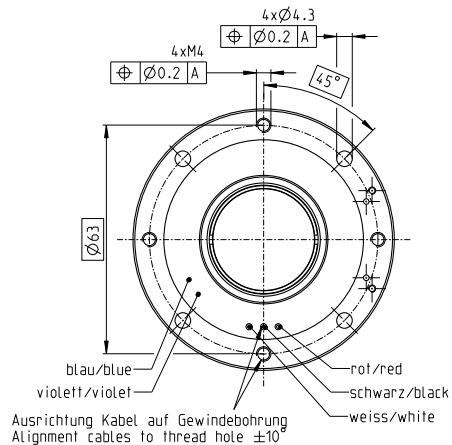
Details on catalog page 60

- Control Electronics**
- 447_ESCON2 Micro 60/5
 - 449_ESCON2 Compact 60/5
 - 454_EPOS4 Micro 24/5 CAN
 - 454_EPOS4 Micro 24/5 EtherCAT
 - 455_EPOS4 Module 50/5
 - 458_EPOS4 Compact 50/5
 - 461_EPOS4 50/5
 - 462_EPOS4 Disk 60/8

Variants

Other coil designs on request.

EC frameless DT 50 S Ø54 mm, brushless, 220 watt
Dynamic Torque, potted in mounting flange

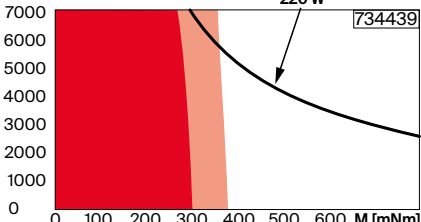


M 2:3

- Stock program
- Standard program
- Special program (on request)

Part numbers

sensorless		734439						
Motor data¹								
Values at nominal voltage								
1	Nominal voltage	V	48					
2	No load speed	rpm	6650					
3	No load current	mA	150					
4	Nominal speed	rpm	5510					
5	Nominal torque	mNm	368					
6	Nominal current (max. continuous current)	A	4.9					
7	Stall torque	mNm	1890					
8	Stall current	A	81.2					
9	Max. efficiency	%	91.6					
Characteristics								
10	Terminal resistance phase to phase	Ω	0.591					
11	Terminal inductance phase to phase	mH	0.384					
12	Torque constant	mNm/A	68.5					
13	Speed constant	rpm/V	139					
14	Speed/torque gradient	rpm/mNm	1.2					
15	Mechanical time constant	ms	0.881					
16	Rotor inertia	gcm²	70					

Specifications	Operating range	Comments
Thermal data	n [rpm]	¹ The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 2.4 K/W.
17 Thermal resistance housing-ambient (R_{th2}) 2.4...4.0 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		
23 Max. speed 7000 rpm		
Other specifications		
29 Number of pole pairs 10		
30 Number of phases 3		
31 Weight of motor (with mounting flange made of stainless steel) 218 g		
Weight for integration (without mounting flange) 116 g		
		■ Continuous operation range at R_{th2} of 4.0 K/W With mounting flange ■ Continuous operation range at R_{th2} of 2.4 K/W Installed in a $\varnothing 62$ mm aluminum housing Mounted on an aluminum plate sized 125x125x10 mm □ Intermittent operation — Assigned power rating
Modular system		Details on catalog page 60

Values listed in the table are nominal.

Connection motor (Cable AWG 18)

red	Motor winding 1
black	Motor winding 2
white	Motor winding 3

Connection NTC (Cable AWG 24)
purple NTC
blue NTC
Resistance 25 °C: 5 kΩ ±1%, beta (25–85 °C):
3490 K

Comment
For Torque control data, refer to "Installation Manual" available on maxon online shop.

Sensors
428_TSX 50 MAG with
commutation signals

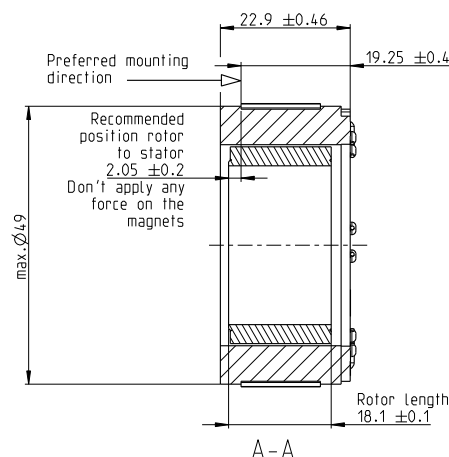
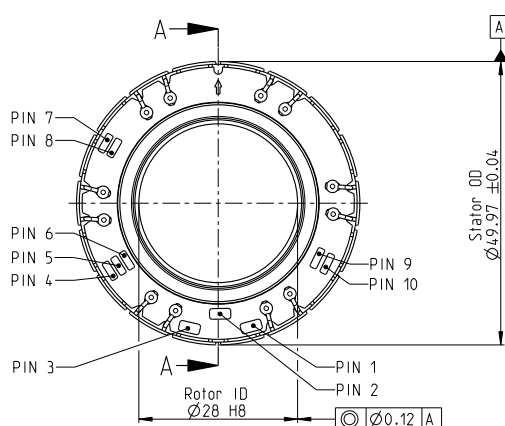
Control Electronics
447_ESCON2 Micro 60/5
454_EPOS4 Micro 24/5 CAN
454_EPOS4 Micro 24/5 EtherCAT
455_EPOS4 Module 50/5
458_EPOS4 Compact 50/5
461_EPOS4 50/5
462_EPOS4 Disk 60/8 CAN
463_EPOS4 Disk 60/8 EtherCAT

Variants

maxon integration into customer housing on request.
Other coil designs on request.

Dynamic Torque

Frameless BLDC Motors



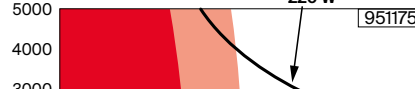
- Stock program
- Standard program
- Special program (on request)

Part numbers

with Hall sensors	951175
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Motor data' (provisional)		951175						
Values at nominal voltage								
1 Nominal voltage	V	48						
2 No load speed	rpm	4330						
3 No load current	mA	109						
4 Nominal speed	rpm	3750						
5 Nominal torque	mNm	522						
6 Nominal current (max. continuous current)	A	5.85						
7 Stall torque	mNm	2770						
8 Stall current	A	64.2						
9 Max. efficiency	%	91.9						
Characteristics								
10 Terminal resistance phase to phase	Ω	0.748						
11 Terminal inductance phase to phase	mH	0.571						
12 Torque constant	mNm/A	105						
13 Speed constant	rpm/V	90.7						
14 Speed/torque gradient	rpm/mNm	0.644						
15 Mechanical time constant	ms	0.666						
16 Rotor inertia	acm ²	98.8						

Specifications	Operating range	Comments
Thermal data		
17 Thermal resistance housing-ambient (R_{th2}) 1.9...5.0 K/W		
18 Thermal resistance winding-housing 1.39 K/W		
19 Thermal time constant winding 25.5 s		
20 Thermal time constant motor 678 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 10		
30 Number of phases 3		
31 Weight of motor 159 g		



[†]The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 1.9 K/W.

- Continuous operation range at R_{th2} of 5.0 K/W
Installed in a $\varnothing 62$ mm aluminum housing
- Continuous operation range at R_{th2} of 1.9 K/W
Installed in a $\varnothing 62$ mm aluminum housing
Mounted on an aluminum plate sized 125x125x10 mm
- Intermittent operation

Assigned power rating

Values listed in the table are nominal.

Connection motor

Pin 1	Motor winding 1
Pin 2	Motor winding 2
Pin 3	Motor winding 3

Commutation

Pin 4	Hall sensors 1
Pin 5	Hall sensors 2
Pin 6	Hall sensors 3
Pin 7	GND
Pin 8	V _{hall} 4.5...24 VDC

Connection NTC

Connection NTC	
Pin 9	NTC
Pin 10	NTC

Resistance 25°C: 5 kΩ ±1%, beta (25–85 °C): 3490 K

Comment

Comment
For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Details on catalog page 60

Control Electronics

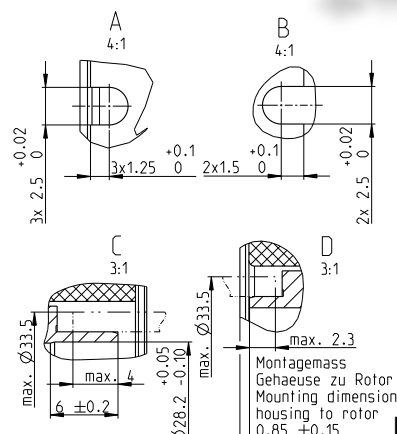
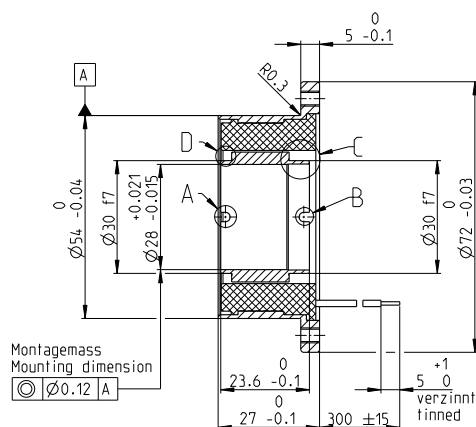
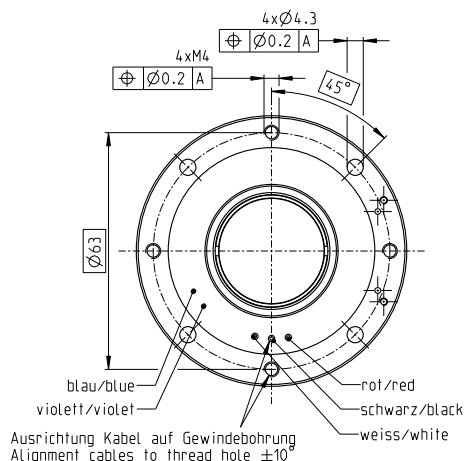
447_ESCON2 Micro 60/5
449_ESCON2 Compact 60/5
454_EPOS4 Micro 24/5 CAN
454_EPOS4 Micro 24/5 EtherCAT
455_EPOS4 Module 50/5
458_EPOS4 Compact 50/5
461_EPOS4 50/5
462_EPOS4 Disk 60/8

Variants

Other coil designs on request.

EC frameless DT 50 M Ø54 mm, brushless, 210 watt

Dynamic Torque, potted in mounting flange



M 2:3

- Stock program
- Standard program
- Special program (on request)

Part numbers

sensorless		758031						
Motor data¹								
Values at nominal voltage								
1	Nominal voltage	V	48					
2	No load speed	rpm	4330					
3	No load current	mA	109					
4	Nominal speed	rpm	3490					
5	Nominal torque	mNm	600					
6	Nominal current (max. continuous current)	A	5.16					
7	Stall torque	mNm	2770					
8	Stall current	A	64.2					
9	Max. efficiency	%	91.9					
Characteristics								
10	Terminal resistance phase to phase	Ω	0.748					
11	Terminal inductance phase to phase	mH	0.571					
12	Torque constant	mNm/A	105					
13	Speed constant	rpm/V	90.7					
14	Speed/torque gradient	rpm/mNm	0.644					
15	Mechanical time constant	ms	0.67					
16	Rotor inertia	acm²	98.8					

Specifications	Operating range	Comments
Thermal data 17 Thermal resistance housing-ambient (R_{th2}) 2.8...5.0 K/W 18 Thermal resistance winding-housing (R_{th1}) 0.412 K/W 19 Thermal time constant winding 7.11 s 20 Thermal time constant motor 678s 21 Ambient temperature -40...+100 °C 22 Max. winding temperature +155 °C	n [rpm] 	†The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 2.8 K/W.
Mechanical data 23 Max. speed rpm		Continuous operation range at R_{th2} of 5.0 K/W With mounting flange Continuous operation range at R_{th2} of 2.8 K/W Installed in a Ø62 mm aluminum housing Mounted on an aluminum plate sized 125×125×10 mm Intermittent operation Assigned power rating
Other specifications 29 Number of pole pairs 10 30 Number of phases 3 31 Weight of motor 270 g (with mounting flange made of stainless steel) Weight for integration 156 g (without mounting flange)	M [mNm]	
Modular system		Details on catalog page 60

Values listed in the table are nominal.

Connection motor (Cable AWG 18)

red Motor	winding 1
black Motor	winding 2
white Motor	winding 3

Connection NTC (Cable AWG 24)

Connection NTC (Cable AWG 24)
purple NTC
blue NTC
Resistance 25°C: 5 kΩ ±1%, beta (25–85°C):
3490 K

Comment

Comment
For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Sensors

428_T SX 50 MAG with
commutation signals

Control Electronics

447_ESCON2 Micro 60/5
454_EPOS4 Micro 24/5 CAN
454_EPOS4 Micro 24/5 EtherCAT
455_EPOS4 Module 50/5
458_EPOS4 Compact 50/5
461_EPOS4 50/5
462_EPOS4 Disk 60/8 CAN
463_EPOS4 Disk 60/8 EtherCAT

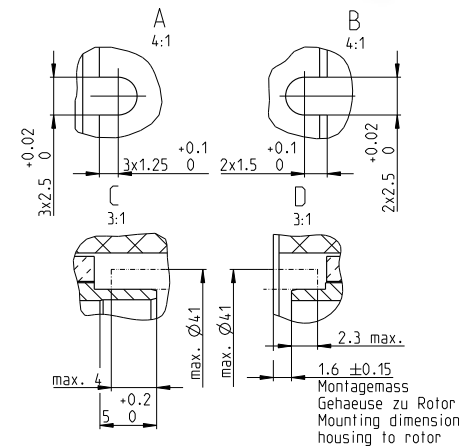
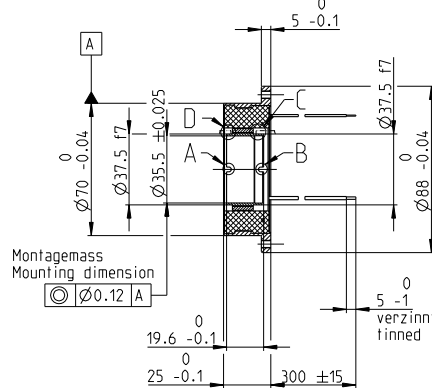
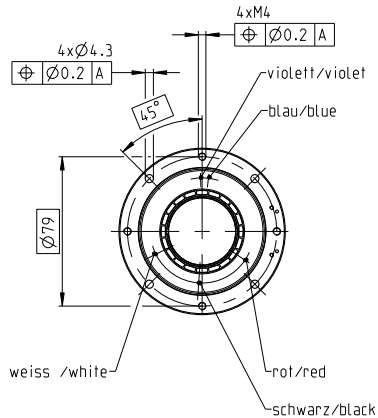
Variants

maxon integration into customer housing on request.
Other coil designs on request.

Dynamic Torque, potted in mounting flange



Frameless BLDC Motors



M 1:4

-  Stock program
-  Standard program
-  Special program (on request)

Part numbers

sensorless		783327							
Motor data¹									
Values at nominal voltage									
1	Nominal voltage	V	48						
2	No load speed	rpm	4570						
3	No load current	mA	204						
4	Nominal speed	rpm	3590						
5	Nominal torque	mNm	978						
6	Nominal current (max. continuous current)	A	8.48						
7	Stall torque	mNm	4080						
8	Stall current	A	145						
9	Max. efficiency	%	92.6						
Characteristics									
10	Terminal resistance phase to phase	Ω	0.332						
11	Terminal inductance phase to phase	mH	0.458						
12	Torque constant	mNm/A	99.7						
13	Speed constant	rpm/V	95.8						
14	Speed/torque gradient	rpm/mNm	0.319						
15	Mechanical time constant	ms	0.569						
16	Rotor inertia	gcm²	170						

Specifications

Thermal data

- | | | |
|----|--|---------------|
| 17 | Thermal resistance housing-ambient (R_{th2}) | 1.6...3.6 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 |

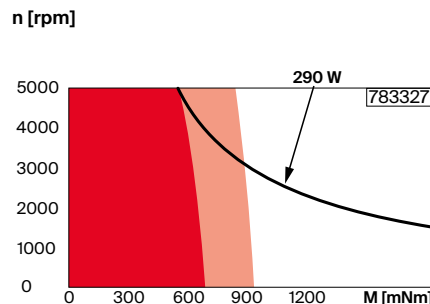
Mechanical data

- 23 Max. speed 5000 rpm

Other specifications

- | | | |
|----|---|-------|
| 29 | Number of pole pairs | 10 |
| 30 | Number of phases | 3 |
| 31 | Weight of motor
(with mounting flange made of stainless steel) | 377 g |
| | Weight for integration
(without mounting flange) | 219 g |

Operating range



Comments

¹The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 1.6 K/W.

-  Continuous operation range at R_{th2} of 3.6 K/W
With mounting flange
 -  Continuous operation range at R_{th2} of 1.6 K/W
Installed in a $\varnothing 78$ mm aluminum housing
Mounted on an aluminum plate sized
160x160x10 mm
 -  Intermittent operation
-  **Assigned power rating**

Modular system

Values listed in the table are nominal.

Connection motor (Cable AWG 18)

- | | |
|-------|-----------------|
| red | Motor winding 1 |
| black | Motor winding 2 |
| white | Motor winding 3 |

Connection NTC (Cable AWG 24)

- Connection NTC (Cable AWG 24)
 purple NTC
 blue NTC
 Resistance 25°C: 5 kΩ ±1%, beta (25–85°C):
 3490 K

Comment

Comment
For Torque control data, refer to "Installation Manual" available on maxon online shop.

Sensors

429_T SX 65 MAG with
commutation signals

Control Electronics

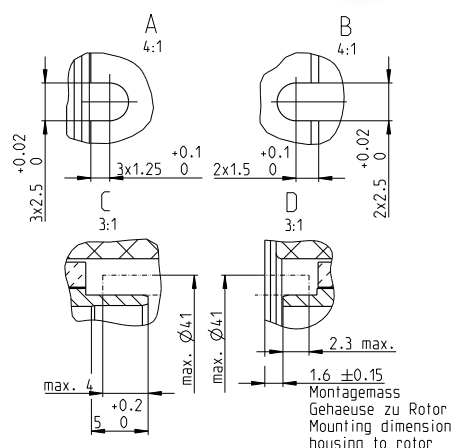
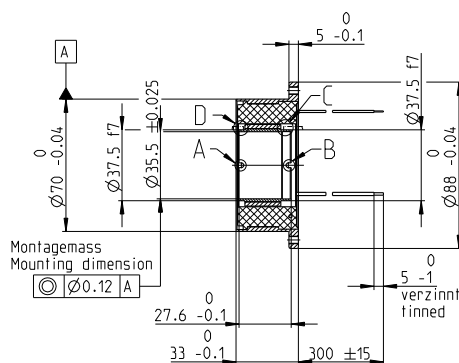
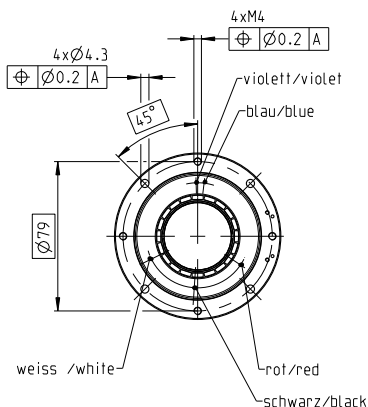
Details on catalog page 60

- 447_ESCON2 Micro 60/5
448_ESCON2 Module 60/12
449_ESCON2 Compact 60/12
455_EPOS4 Module 50/8
459_EPOS4 Compact 50/8
462_EPOS4 70/15
462_EPOS4 Disk 60/8 CAN
463_EPOS4 Disk 60/8 EtherCAT

Variants

maxon integration into customer housing on request.
Other coil designs on request.

EC frameless DT 65 M Ø70 mm, brushless, 375 watt
Dynamic Torque, potted in mounting flange



M 1:4

-  Stock program
 Standard program
 Special program (on request)

Part numbers

sensorless		783332						
Motor data¹								
Values at nominal voltage								
1	Nominal voltage	V	48					
2	No load speed	rpm	2590					
3	No load current	mA	150					
4	Nominal speed	rpm	2050					
5	Nominal torque	mNm	1500					
6	Nominal current (max. continuous current)	A	7.56					
7	Stall torque	mNm	5660					
8	Stall current	A	103					
9	Max. efficiency	%	92.4					
Characteristics								
10	Terminal resistance phase to phase	Ω	0.466					
11	Terminal inductance phase to phase	mH	0.779					
12	Torque constant	mNm/A	176					
13	Speed constant	rpm/V	54.2					
14	Speed/torque gradient	rpm/mNm	0.143					
15	Mechanical time constant	ms	0.41					
16	Rotor inertia	acm²	275					

Specifications	Operating range	Comments
Thermal data 17 Thermal resistance housing-ambient (R_{th2}) 1.6...3.4 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	n [rpm] 	†The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 1.6 K/W.
Mechanical data 23 Max. speed 5000 rpm		Continuous operation range at R_{th2} of 3.4 K/W With mounting flange Continuous operation range at R_{th2} of 1.6 K/W Installed in a $\varnothing 78$ mm aluminum housing Mounted on an aluminum plate sized 160x160x10 mm Intermittent operation Assigned power rating
Other specifications 29 Number of pole pairs 10 30 Number of phases 3 31 Weight of motor 524 g (with mounting flange made of stainless steel) Weight for integration 332 g (without mounting flange)	M [mNm]	
	Modular system	Details on catalog page 6

Values listed in the table are nominal.

Connection motor (Cable AWG 18)

red	Motor winding 1
black	Motor winding 2
white	Motor winding 3

Connection NTC (Cable AWG 24)

Resistance 25°C: 5 k Ω $\pm$ 1%, beta (25–85°C): 3490 K

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Sensors

429_T SX 65 MAG with
commutation signals

Control Electronics

447_ESCON2 Micro 60/5
448_ESCON2 Module 60/12
449_ESCON2 Compact 60/12
455_EPOS4 Module 50/8
459_EPOS4 Compact 50/8
462_EPOS4 70/15
462_EPOS4 Disk 60/8 CAN
463_EPOS4 Disk 60/8 EtherCAT

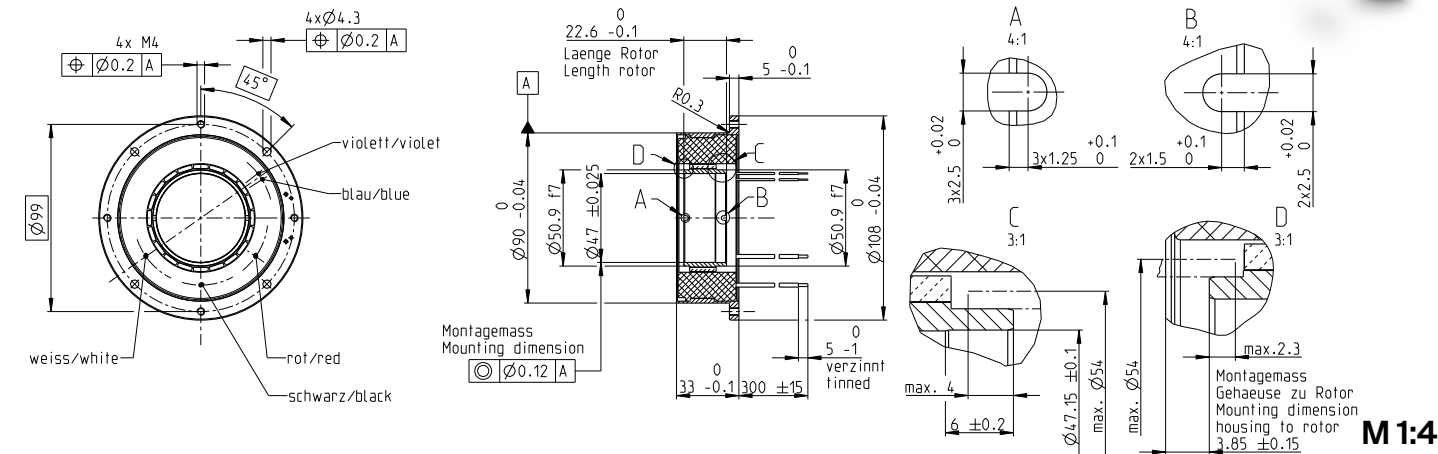
Variants

maxon integration into customer housing on request.
Other coil designs on request.

EC frameless DT 85 M Ø90 mm, brushless, 570 watt
Dynamic Torque, potted in mounting flange



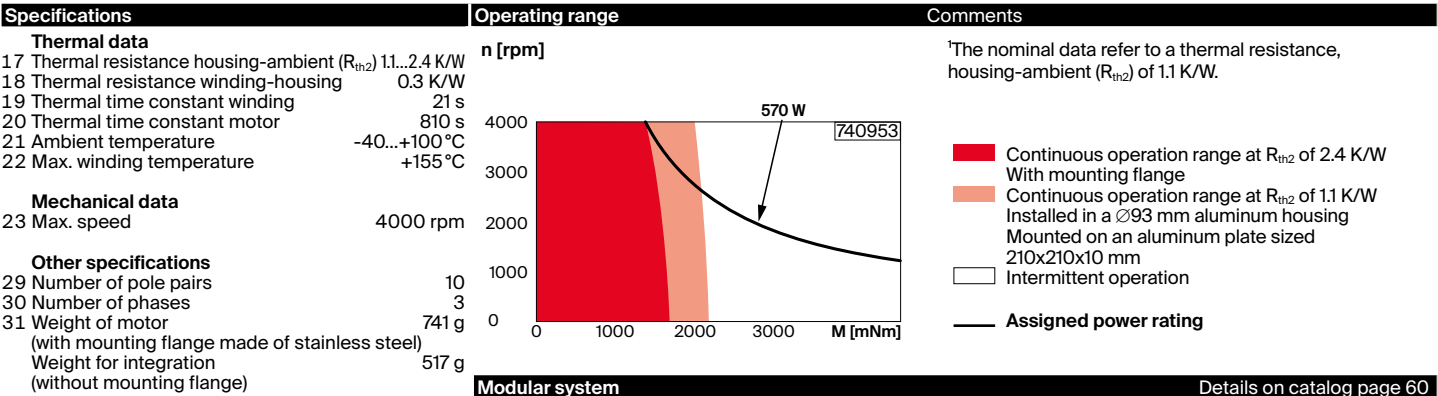
Frameless BLDC Motors



- Stock program
- Standard program
- Special program (on request)

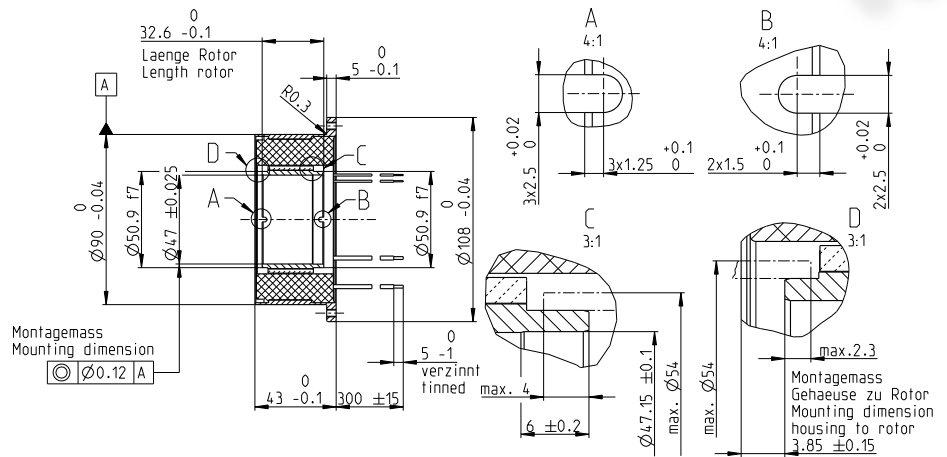
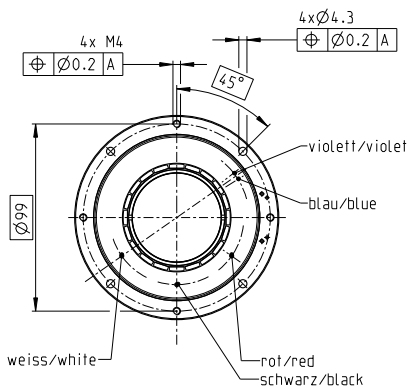
Part numbers	
sensorless	740953

Motor data ¹	
Values at nominal voltage	
1 Nominal voltage	V 48
2 No load speed	rpm 3410
3 No load current	mA 283
4 Nominal speed	rpm 2760
5 Nominal torque	mNm 2190
6 Nominal current (max. continuous current)	A 14.3
7 Stall torque	mNm 11500
8 Stall current	A 306
9 Max. efficiency	% 93.9
Characteristics	
10 Terminal resistance phase to phase	Ω 0.16
11 Terminal inductance phase to phase	mH 0.367
12 Torque constant	mNm/A 134
13 Speed constant	rpm/V 71.4
14 Speed/torque gradient	rpm/mNm 0.084
15 Mechanical time constant	ms 0.57
16 Rotor inertia	gcm ² 650



Modular system		Details on catalog page 60
Values listed in the table are nominal.	Sensors 430_TSX 85 MAG with commutation signals	Control Electronics 447_ESCON2 Micro 60/5 448_ESCON2 Module 60/30 449_ESCON2 Compact 60/12 450_ESCON2 Compact 60/30 456_EPOS4 Module 50/15 460_EPOS4 Compact 50/15 462_EPOS4 70/15 462_EPOS4 Disk 60/8 CAN 463_EPOS4 Disk 60/8 EtherCAT 463_EPOS4 Disk 60/12 CAN 463_EPOS4 Disk 60/12 EtherCAT
Connection motor (Cable AWG 16) red Motor winding 1 black Motor winding 2 white Motor winding 3		
Connection NTC (Cable AWG 24) purple NTC blue NTC Resistance 25°C: 5 kΩ ±1%, beta (25–85°C): 3490 K		
Comment For Torque control data, refer to "Installation Manual" available on maxon online shop.	Variants maxon integration into customer housing on request. Other coil designs on request.	

EC frameless DT 85 L Ø90 mm, brushless, 680 watt



M 1:4

- Stock program
- Standard program
- Special program (on request)

Part numbers

sensorless		759875						
Motor data¹								
Values at nominal voltage								
1	Nominal voltage	V	48					
2	No load speed	rpm	1920					
3	No load current	mA	204					
4	Nominal speed	rpm	1560					
5	Nominal torque	mNm	3590					
6	Nominal current (max. continuous current)	A	13.4					
7	Stall torque	mNm	18600					
8	Stall current	A	220					
9	Max. efficiency	%	93.9					
Characteristics								
10	Terminal resistance phase to phase	Ω	0.218					
11	Terminal inductance phase to phase	mH	0.586					
12	Torque constant	mNm/A	238					
13	Speed constant	rpm/V	40.2					
14	Speed/torque gradient	rpm/mNm	0.037					
15	Mechanical time constant	ms	0.398					
16	Rotor inertia	gcm²	1030					

Specifications	Operating range	Comments
Thermal data 17 Thermal resistance housing-ambient (R_{th2}) 1.0...2.2 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	n [rpm] 	†The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 1.0 K/W.
Mechanical data 23 Max. speed 3000 rpm		Continuous operation range at R_{th2} of 2.2 K/W With mounting flange Continuous operation range at R_{th2} of 1.1 K/W Installed in a $\varnothing 93$ mm aluminum housing Mounted on an aluminum plate sized 210x210x10 mm Intermittent operation
Other specifications 29 Number of pole pairs 10 30 Number of phases 3 31 Weight of motor (with mounting flange made of stainless steel) 1040 g Weight for integration (without mounting flange) 765 g		Assigned power rating
Modular system		Details on catalog page 60

Values listed in the table are nominal.

Connection motor (Cable AWG 16)

red	Motor winding 1
black	Motor winding 2
white	Motor winding 3

Connection NTC (Cable AWG 24)

Connection NTC (Cable AWG 24)
purple NTC
blue NTC
Resistance 25°C: 5 kΩ ±1%, beta (25–85°C):
3490 K

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Sensors

430_T SX 85 MAG with
commutation signals

Control Electronics

447_ESCON2 Micro 60/5
448_ESCON2 Module 60/30
449_ESCON2 Compact 60/12
450_ESCON2 Compact 60/30
456_EPOS4 Module 50/15
460_EPOS4 Compact 50/15
462_EPOS4 70/15
462_EPOS4 Disk 60/8 CAN
463_EPOS4 Disk 60/8 EtherCAT
463_EPOS4 Disk 60/12 CAN
463_EPOS4 Disk 60/12 EtherCAT

Variants

maxon integration into customer housing on request.
Other coil designs on request.

For your personal notes

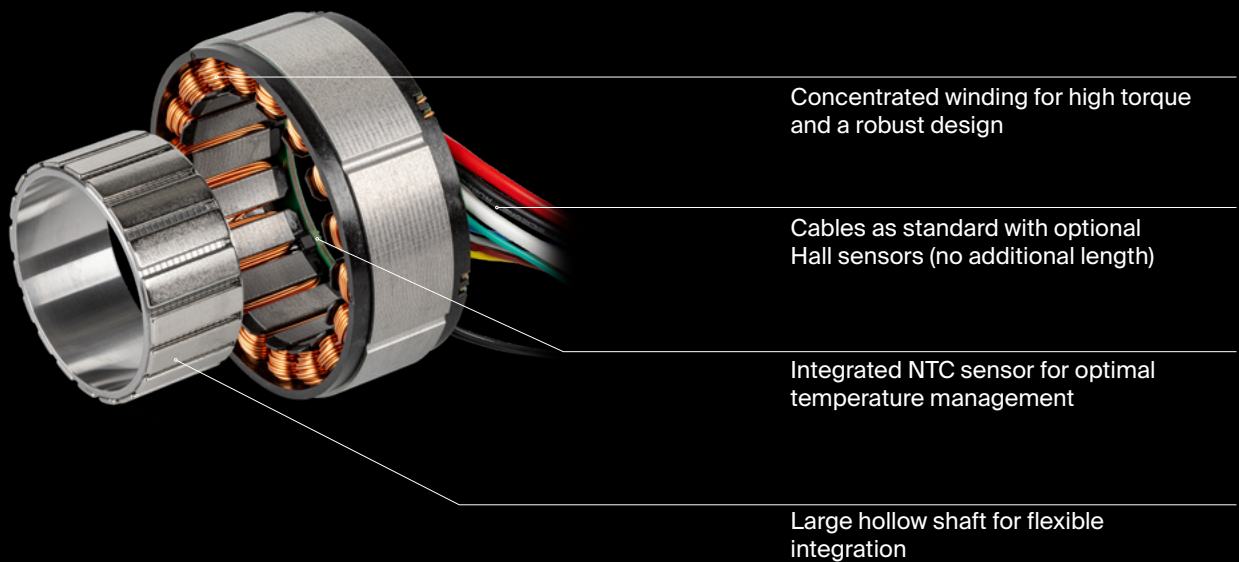
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EC frameless HT

The EC frameless HT motor range provides high torque in a compact and light frameless design and is a versatile and cost-efficient solution. The short axial length enables very compact system designs, while the optimized electromagnetic layout delivers minimal cogging torque and smooth, precise motion in a wide variety of applications.

Key data

Motor Ø	60...90 mm
Motor length	21...35.4 mm
Power	250...670 W
Nominal torque	up to 2770 mNm
Max. permissible speed	8000 rpm



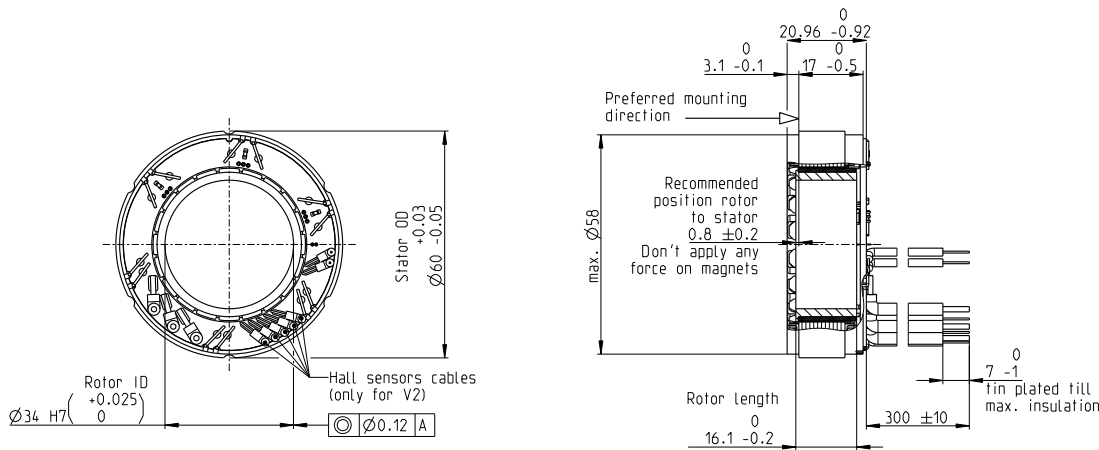
- High torque density
- Good price-performance ratio
- Short length with large hollow shaft
- Low cogging torque

EC frameless HT 60 S Ø60 mm, brushless, 250 watt

High Torque

NEW

Frameless BLDC Motors



M 1:2

- Stock program
- Standard program
- Special program (on request)

Part numbers	
V1 sensorless	968343
V2 with Hall sensors	935979

Motor data ¹ (provisional)			
Values at nominal voltage			
1 Nominal voltage	V	48	
2 No load speed	rpm	5530	
3 No load current	mA	275	
4 Nominal speed	rpm	4590	
5 Nominal torque	mNm	472	
6 Nominal current (max. continuous current)	A	5.3	
7 Stall torque	mNm	2580	
8 Stall current	A	95.2	
9 Max. efficiency	%	89.4	
Characteristics			
10 Terminal resistance phase to phase	Ω	0.504	
11 Terminal inductance phase to phase	mH	0.45	
12 Torque constant	mNm/A	82.1	
13 Speed constant	rpm/V	116	
14 Speed/torque gradient	rpm/mNm	0.699	
15 Mechanical time constant	ms	1.05	
16 Rotor inertia	gcm ²	141	

Specifications	Operating range	Comments
Thermal data 17 Thermal resistance housing-ambient 2.1...4.4 K/W 18 Thermal resistance winding-housing (R _{th1}) 1.99 K/W 19 Thermal time constant winding 37.9 s 20 Thermal time constant motor 196 s 21 Ambient temperature -40...+100°C 22 Max. winding temperature +155°C	n [rpm] 8000 rpm 6000 4000 2000 0 0 200 400 600 800 M [mNm]	¹ The nominal data refer to a thermal resistance, housing-ambient (R _{th2}) of 2.1 K/W. Continuous operation range at R _{th2} of 4.4 K/W Installed in a Ø73 mm aluminum housing Continuous operation range at R _{th2} of 2.1 K/W Installed in a Ø73 mm aluminum housing Mounted on an aluminum plate sized 150x150x6 mm Intermittent operation Assigned power rating
Mechanical data 23 Max. speed 8000 rpm		
Other specifications 29 Number of pole pairs 10 30 Number of phases 3 31 Weight of motor 183 g		

Values listed in the table are nominal.

Connection motor (cable AWG 16)		
V1	V2	
red Motor winding 1	Motor winding 1	
black Motor winding 2	Motor winding 2	
white Motor winding 3	Motor winding 3	
Commutation (cable AWG 26)		
yellow Hall sensors 1		
brown Hall sensors 2		
grey Hall sensors 3		
blue GND		
green V _{hall} 4.5...24 VDC		

Connection NTC (cable AWG 26)
black NTC
black NTC
Resistance 25 °C: 10 kΩ ±1%, beta (25–85 °C): 3480 K

Comment
For Torque control data, refer to "Installation Manual" available on maxon online shop.

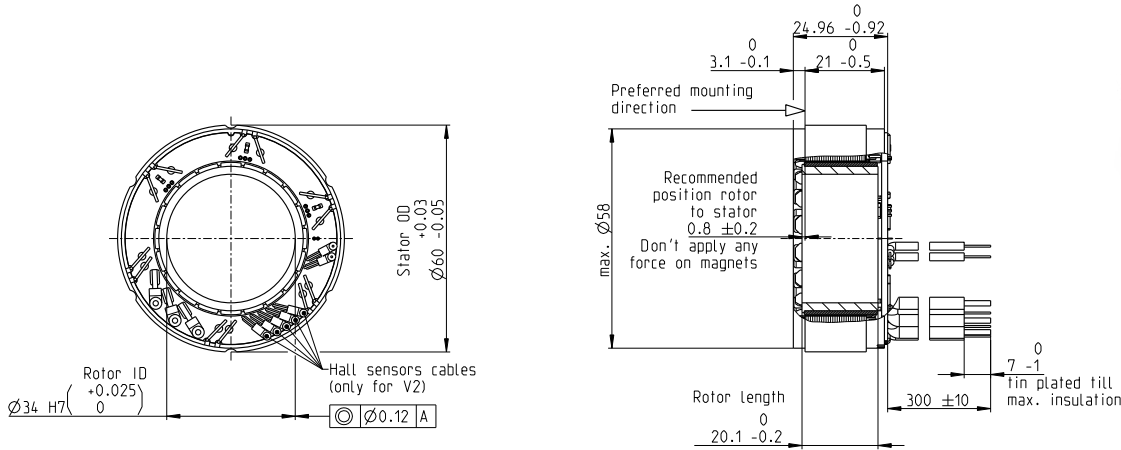
Modular system Details on catalog page 60

- Control Electronics**
447_ESCON2 Micro 60/5
449_ESCON2 Compact 60/5
454_EPOS4 Micro 24/5 CAN
454_EPOS4 Micro 24/5 EtherCAT
455_EPOS4 Module 50/5
458_EPOS4 Compact 50/5
461_EPOS4 50/5
462_EPOS4 Disk 60/8

Variants
Other coil designs on request.

EC frameless HT 60 M Ø60 mm, brushless, 270 watt
High Torque

NEW



M 1:2

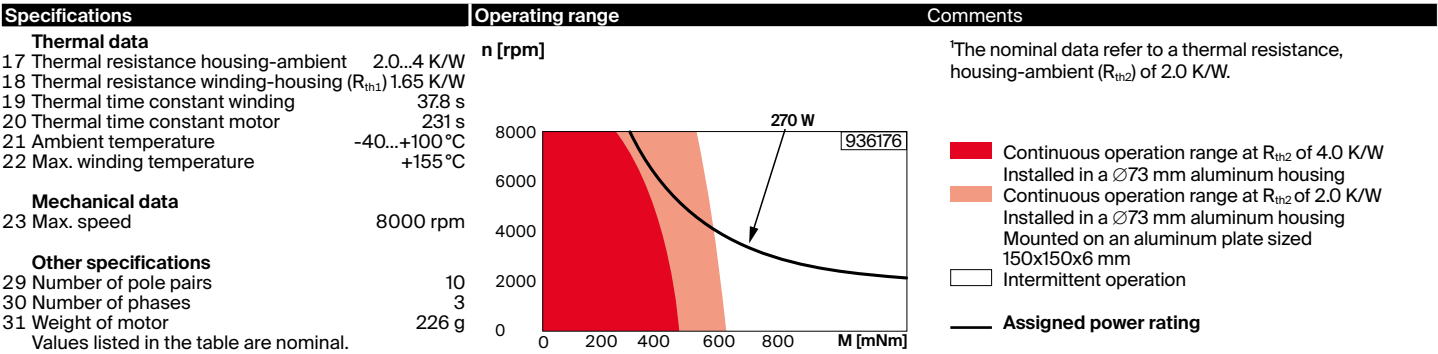
- Stock program
- Standard program
- Special program (on request)

Part numbers

V1 sensorless	968345
V2 with Hall sensors	936176

Motor data¹ (provisional)

Values at nominal voltage		
1 Nominal voltage	V	48
2 No load speed	rpm	4640
3 No load current	mA	252
4 Nominal speed	rpm	3850
5 Nominal torque	mNm	613
6 Nominal current (max. continuous current)	A	5.74
7 Stall torque	mNm	3460
8 Stall current	A	96.9
9 Max. efficiency	%	90.0
Characteristics		
10 Terminal resistance phase to phase	Ω	0.495
11 Terminal inductance phase to phase	mH	0.47
12 Torque constant	mNm/A	98.0
13 Speed constant	rpm/V	97.4
14 Speed/torque gradient	rpm/mNm	0.492
15 Mechanical time constant	ms	0.913
16 Rotor inertia	gcm ²	177



Connection motor (cable AWG 16)

	V1	V2
red	Motor winding 1	Motor winding 1
black	Motor winding 2	Motor winding 2
white	Motor winding 3	Motor winding 3

Commutation (cable AWG 26)

yellow	Hall sensors 1
brown	Hall sensors 2
grey	Hall sensors 3
blue	GND
green	V _{hall} 4.5...24 VDC

Connection NTC (cable AWG 26)

black NTC
black NTC
Resistance 25 °C: 10 kΩ ±1%, beta (25–85 °C): 3480 K

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Details on catalog page 60

Control Electronics

- 447_ESCON2 Micro 60/5
- 449_ESCON2 Compact 60/5
- 454_EPOS4 Micro 24/5 CAN
- 454_EPOS4 Micro 24/5 EtherCAT
- 455_EPOS4 Module 50/5
- 458_EPOS4 Compact 50/5
- 461_EPOS4 50/5
- 462_EPOS4 Disk 60/8

Variants

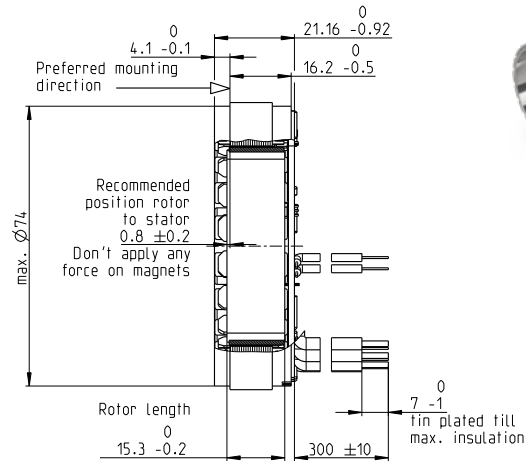
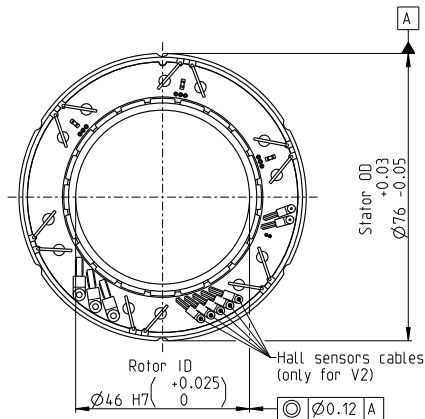
Other coil designs on request.

EC frameless HT 76 S Ø76 mm, brushless, 340 watt

High Torque

NEW

Frameless BLDC Motors



M 1:2

- Stock program
- Standard program
- Special program (on request)

Part numbers

V1 sensorless 968360
V2 with Hall sensors 934887

Motor data¹ (provisional)

Values at nominal voltage

1	Nominal voltage	V	48
2	No load speed	rpm	4130
3	No load current	mA	286
4	Nominal speed	rpm	3330
5	Nominal torque	mNm	883
6	Nominal current (max. continuous current)	A	7.08
7	Stall torque	mNm	4380
8	Stall current	A	145
9	Max. efficiency	%	91.2

Characteristics

10	Terminal resistance phase to phase	Ω	0.331
11	Terminal inductance phase to phase	mH	0.57
12	Torque constant	mNm/A	110
13	Speed constant	rpm/V	86.8
14	Speed/torque gradient	rpm/mNm	0.261
15	Mechanical time constant	ms	0.821
16	Rotor inertia	gcm ²	300

Specifications

Thermal data

17	Thermal resistance housing-ambient	1.6...3.5 K/W
18	Thermal resistance winding-housing (R_{th1})	1.65 K/W
19	Thermal time constant winding	55.7 s
20	Thermal time constant motor	1420 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+155°C

Mechanical data

23	Max. speed	7000 rpm
----	------------	----------

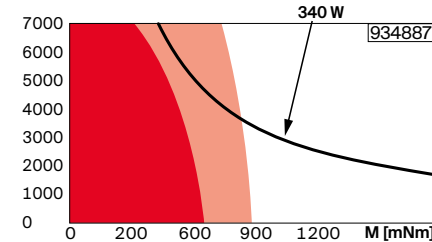
Other specifications

29	Number of pole pairs	10
30	Number of phases	3
31	Weight of motor	253 g

Values listed in the table are nominal.

Operating range

n [rpm]



Comments

¹The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 1.6 K/W.

- Continuous operation range at R_{th2} of 3.5 K/W
Installed in a $\varnothing 89$ mm aluminum housing
- Continuous operation range at R_{th2} of 1.6 K/W
Installed in a $\varnothing 89$ mm aluminum housing
Mounted on an aluminum plate sized 190x190x10 mm
- Intermittent operation
- Assigned power rating

Connection motor (cable AWG 16)

	V1	V2
red	Motor winding 1	Motor winding 1
black	Motor winding 2	Motor winding 2
white	Motor winding 3	Motor winding 3

Commutation (cable AWG 26)

yellow	Hall sensors 1
brown	Hall sensors 2
grey	Hall sensors 3
blue	GND
green	V _{hall} 4.5...24 VDC

Connection NTC (cable AWG 26)

black	NTC
black	NTC
Resistance 25°C: 10 k Ω $\pm$ 1%, beta (25-85°C): 3480 K	

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Details on catalog page 60

Control Electronics

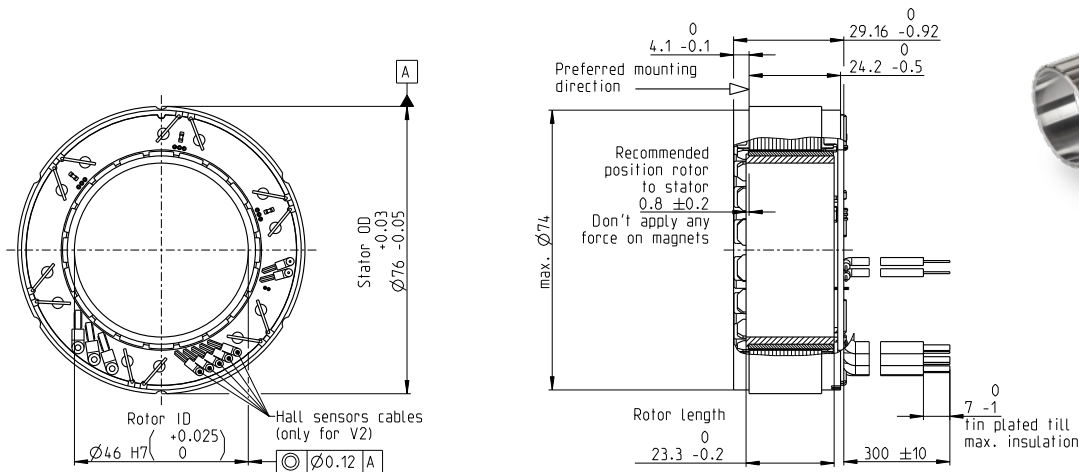
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- 448_ESCON2 Module 60/12
- 449_ESCON2 Compact 60/5
- 449_ESCON2 Compact 60/12
- 450_ESCON2 60/12
- 455_EPOS4 Module 50/8
- 459_EPOS4 Compact 50/8
- 462_EPOS4 70/15
- 462_EPOS4 Disk 60/8

Variants

Other coil designs on request.

EC frameless HT 76 M Ø76 mm, brushless, 500 watt
High Torque

NEW



M 1:2

- Stock program
- Standard program
- Special program (on request)

Part numbers	
V1 sensorless	968369
V2 with Hall sensors	934928

Motor data ¹ (provisional)			
Values at nominal voltage			
1 Nominal voltage	V	48	
2 No load speed	rpm	3750	
3 No load current	mA	411	
4 Nominal speed	rpm	3180	
5 Nominal torque	mNm	1270	
6 Nominal current (max. continuous current)	A	9.65	
7 Stall torque	mNm	7000	
8 Stall current	A	223	
9 Max. efficiency	%	91.5	
Characteristics			
10 Terminal resistance phase to phase	Ω	0.215	
11 Terminal inductance phase to phase	mH	0.337	
12 Torque constant	mNm/A	122	
13 Speed constant	rpm/V	78.6	
14 Speed/torque gradient	rpm/mNm	0.14	
15 Mechanical time constant	ms	0.673	
16 Rotor inertia	gcm ²	461	

Specifications	Operating range	Comments
Thermal data 17 Thermal resistance housing-ambient 1.5...2.9 K/W 18 Thermal resistance winding-housing (R _{th1}) 1.26 K/W 19 Thermal time constant winding 54 s 20 Thermal time constant motor 1320 s 21 Ambient temperature -40...+100°C 22 Max. winding temperature +155°C	n [rpm] 7000 rpm 10 3 376 g	¹ The nominal data refer to a thermal resistance, housing-ambient (R _{th2}) of 1.5 K/W. Continuous operation range at R _{th2} of 2.9 K/W Installed in a Ø89 mm aluminum housing Continuous operation range at R _{th2} of 1.5 K/W Installed in a Ø89 mm aluminum housing Mounted on an aluminum plate sized 190x190x10 mm Intermittent operation Assigned power rating
Mechanical data 23 Max. speed 7000 rpm		
Other specifications 29 Number of pole pairs 10 30 Number of phases 3 31 Weight of motor 376 g		

Values listed in the table are nominal.

Connection motor (cable AWG 16)

	V1	V2
red	Motor winding 1	Motor winding 1
black	Motor winding 2	Motor winding 2
white	Motor winding 3	Motor winding 3

Commutation (cable AWG 26)

yellow	Hall sensors 1
brown	Hall sensors 2
grey	Hall sensors 3
blue	GND
green	V _{hall} 4.5...24 VDC

Connection NTC (cable AWG 26)

black	NTC
black	NTC
Resistance 25°C: 10 kΩ ±1%, beta (25–85°C): 3480 K	

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Details on catalog page 60

Control Electronics

- 447_ESCON2 Micro 60/5
- 448_ESCON2 Module 60/12
- 449_ESCON2 Compact 60/5
- 449_ESCON2 Compact 60/12
- 450_ESCON2 60/12
- 455_EPOS4 Module 50/8
- 459_EPOS4 Compact 50/8
- 462_EPOS4 70/15
- 462_EPOS4 Disk 60/8

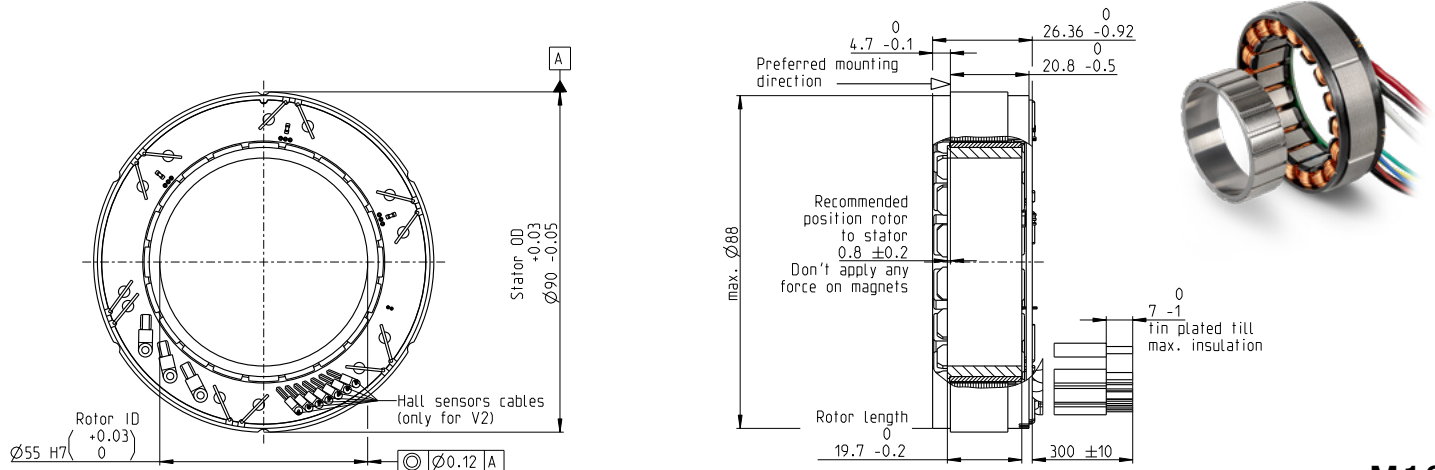
Variants

Other coil designs on request.

EC frameless HT 90 S Ø90 mm, brushless, 550 watt

High Torque

NEW



M 1:2

- Stock program
- Standard program
- Special program (on request)

Part numbers

V1 sensorless	968397
V2 with Hall sensors	937587

Motor data¹ (provisional)

Values at nominal voltage

1	Nominal voltage	V	48
2	No load speed	rpm	3050
3	No load current	mA	391
4	Nominal speed	rpm	2590
5	Nominal torque	mNm	1800
6	Nominal current (max. continuous current)	A	11.1
7	Stall torque	mNm	7740
8	Stall current	A	267
9	Max. efficiency	%	92.4

Characteristics

10	Terminal resistance phase to phase	Ω	0.18
11	Terminal inductance phase to phase	mH	0.36
12	Torque constant	mNm/A	149
13	Speed constant	rpm/V	63.9
14	Speed/torque gradient	rpm/mNm	0.077
15	Mechanical time constant	ms	0.66
16	Rotor inertia	gcm ²	823

Specifications

Thermal data

17	Thermal resistance housing-ambient	14...26 K/W
18	Thermal resistance winding-housing (R _{th1})	1.41 K/W
19	Thermal time constant winding	74.4 s
20	Thermal time constant motor	315 s
21	Ambient temperature	-40...+100°C
22	Max. winding temperature	+155°C

Mechanical data

23	Max. speed	5000 rpm
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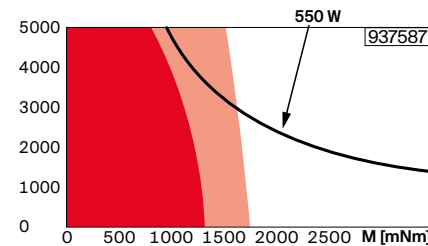
Other specifications

29	Number of pole pairs	10
30	Number of phases	3
31	Weight of motor	460

Values listed in the table are nominal.

Operating range

n [rpm]



Comments

¹The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 1.4 K/W.

- Continuous operation range at R_{th2} of 2.6 K/W
Installed in a Ø103 mm aluminum housing
- Continuous operation range at R_{th2} of 1.4 K/W
Installed in a Ø103 mm aluminum housing
Mounted on an aluminum plate sized 225x225x10 mm
- Intermittent operation
- Assigned power rating

Connection motor (cable AWG 14)

	V1	V2
red	Motor winding 1	Motor winding 1
black	Motor winding 2	Motor winding 2
white	Motor winding 3	Motor winding 3

Commutation (cable AWG 26)

yellow	Hall sensors 1
brown	Hall sensors 2
grey	Hall sensors 3
blue	GND
green	V _{hall} 4.5...24 VDC

Connection NTC (cable AWG 26)

black	NTC
black	NTC
Resistance 25°C: 10 kΩ ±1%, beta (25-85°C): 3480 K	

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Details on catalog page 60

Control Electronics

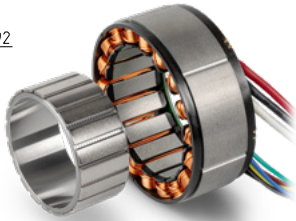
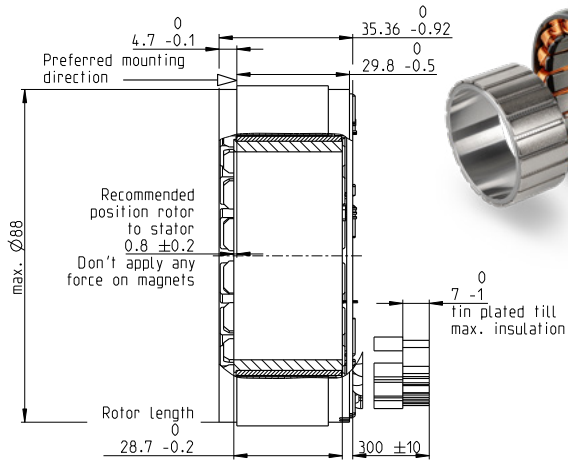
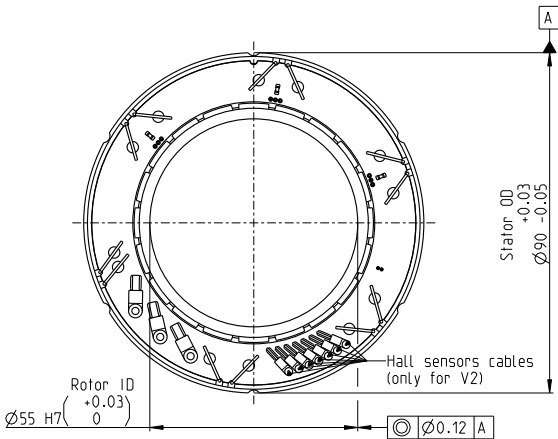
- 448_ESCON2 Module 60/30
- 449_ESCON2 Compact 60/12
- 450_ESCON2 Compact 60/30
- 450_ESCON2 60/12
- 456_EPOS4 Module 50/15
- 457_EPOS4 Module 60/20 STO
- 460_EPOS4 Compact 50/15
- 461_EPOS4 Compact 60/20 STO
- 462_EPOS4 70/15
- 463_EPOS4 Disk 60/12

Variants

Other coil designs on request.

EC frameless HT 90 M Ø90 mm, brushless, 670 watt
High Torque

NEW



M 1:2

- Stock program
- Standard program
- Special program (on request)

Part numbers

V1 sensorless	968407
V2 with Hall sensors	937612

Motor data¹ (provisional)

Values at nominal voltage		
1 Nominal voltage	V	48
2 No load speed	rpm	2490
3 No load current	mA	479
4 Nominal speed	rpm	2130
5 Nominal torque	mNm	2770
6 Nominal current (max. continuous current)	A	14.0
7 Stall torque	mNm	10600
8 Stall current	A	321
9 Max. efficiency	%	92.4
Characteristics		
10 Terminal resistance phase to phase	Ω	0.149
11 Terminal inductance phase to phase	mH	0.325
12 Torque constant	mNm/A	183
13 Speed constant	rpm/V	52.2
14 Speed/torque gradient	rpm/mNm	0.043
15 Mechanical time constant	ms	0.537
16 Rotor inertia	gcm ²	1200

Specifications

Thermal data	
17 Thermal resistance housing-ambient	1.0...2.3 K/W
18 Thermal resistance winding-housing (R _{th1})	1.08 K/W
19 Thermal time constant winding	77.7 s
20 Thermal time constant motor	341 s
21 Ambient temperature	-40...+100°C
22 Max. winding temperature	+155°C

Mechanical data

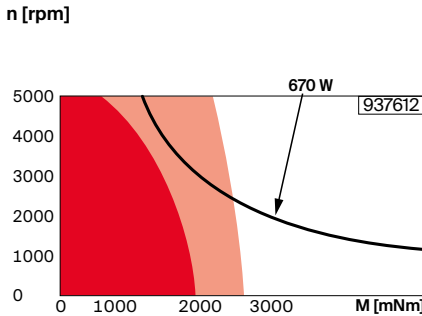
23 Max. speed	5000 rpm
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Other specifications

29 Number of pole pairs	10
30 Number of phases	3
31 Weight of motor	649 g

Values listed in the table are nominal.

Operating range



Comments

¹The nominal data refer to a thermal resistance, housing-ambient (R_{th2}) of 1.0 K/W.

- Continuous operation range at R_{th2} of 2.3 K/W
Installed in a Ø103 mm aluminum housing
- Continuous operation range at R_{th2} of 1.0 K/W
Installed in a Ø103 mm aluminum housing
Mounted on an aluminum plate sized 225x225x10 mm
- Intermittent operation
- Assigned power rating

Connection motor (cable AWG 14)

	V1	V2
red	Motor winding 1	Motor winding 1
black	Motor winding 2	Motor winding 2
white	Motor winding 3	Motor winding 3

Commutation (cable AWG 26)

yellow	Hall sensors 1
brown	Hall sensors 2
grey	Hall sensors 3
blue	GND
green	V _{hall} 4.5...24 VDC

Connection NTC (cable AWG 26)

black	NTC
black	NTC
Resistance 25°C: 10 kΩ ±1%, beta (25-85°C): 3480 K	

Comment

For Torque control data, refer to "Installation Manual" available on maxon online shop.

Modular system

Details on catalog page 60

Control Electronics

- 448_ESCON2 Module 60/12
- 448_ESCON2 Module 60/30
- 449_ESCON2 Compact 60/12
- 450_ESCON2 Compact 60/30
- 450_ESCON2 60/12
- 456_EPOS4 Module 50/15
- 457_EPOS4 Module 60/20 STO
- 460_EPOS4 Compact 50/15
- 461_EPOS4 Compact 60/20 STO
- 462_EPOS4 70/15
- 463_EPOS4 Disk 60/12

Variants

Other coil designs on request.

For your personal notes

[illegible]