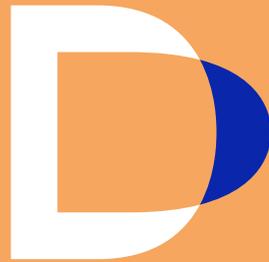


2023/24
Product
Catalogue



Delta Line

Moving together

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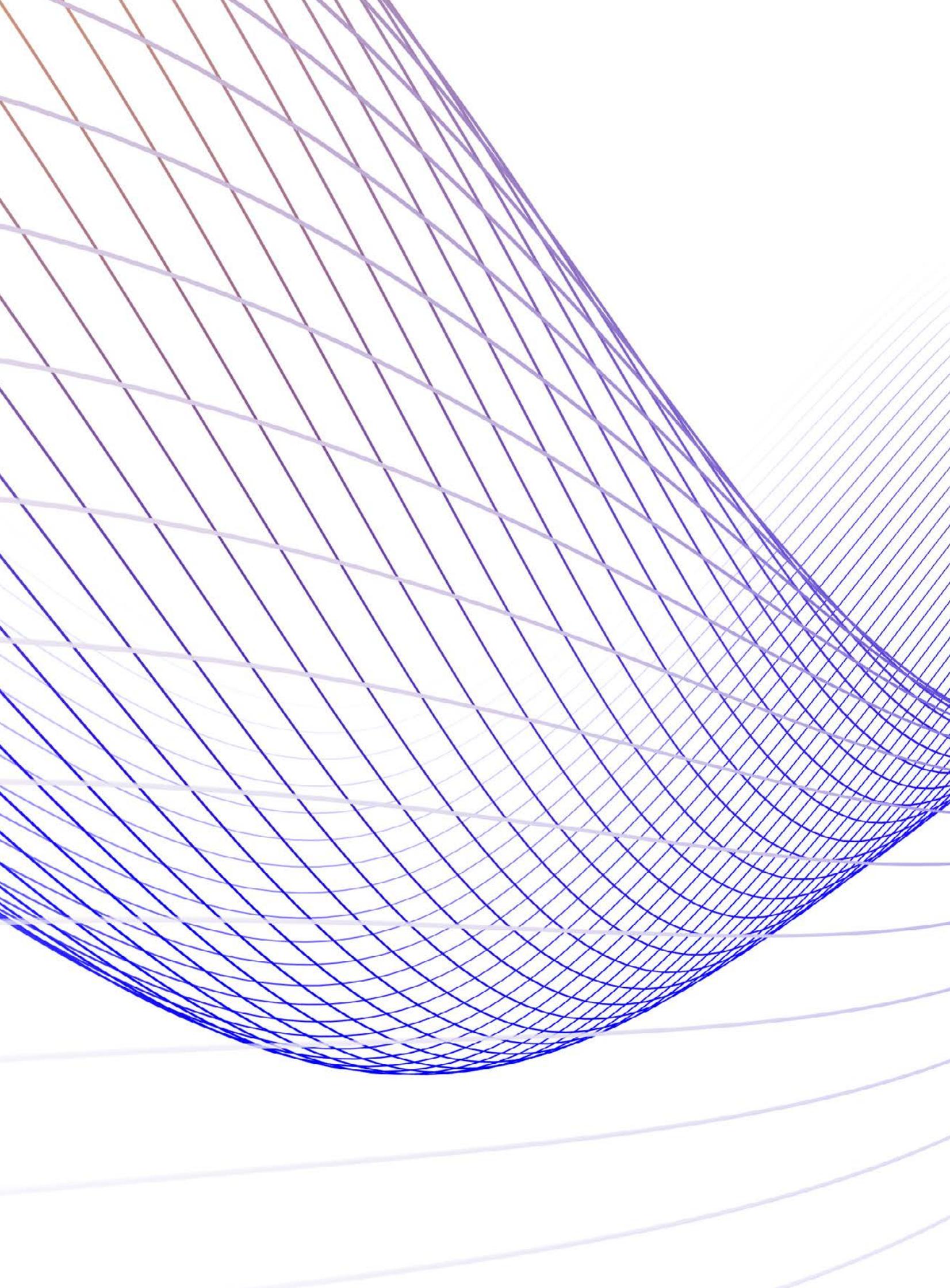
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makes sense only
for large orders?

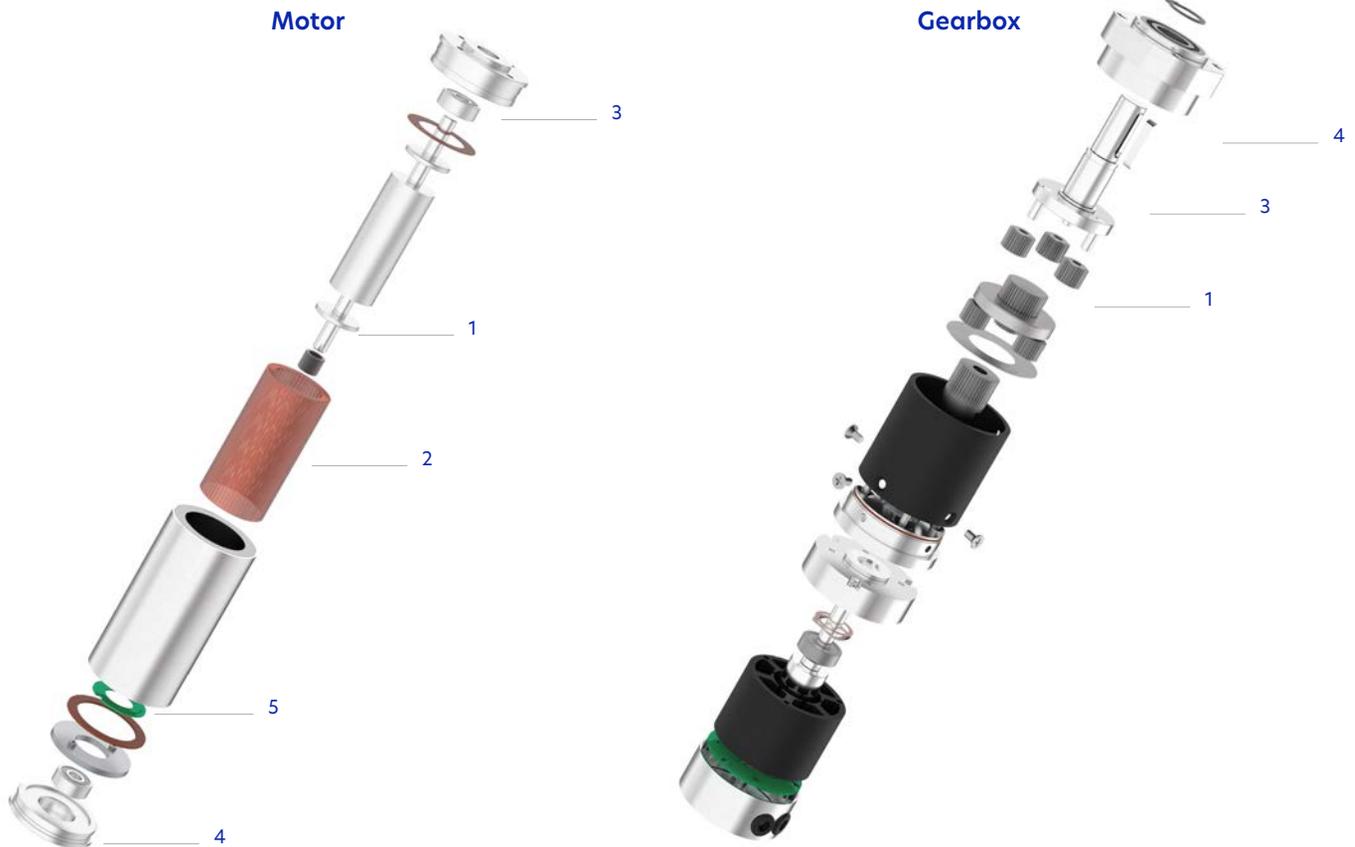
Who said that customization

A custom solution can often be, not just technically more satisfying, but also more cost-effective - no matter what the volume of your order is - because it is focused on your real needs.

Possible customizations

1. Shaft
Length
Diameter
Surface: D-cut, cross-bore, Key
Shape: hollow, female threads
Output component: pinions, gear, pulley
2. Winding
Nominal voltage
Current
Speed
Temperature range

3. Special Ball Bearings
4. Special Front / Rear Flange
5. Cables & Connectors
Length
Hose
Special Connectors

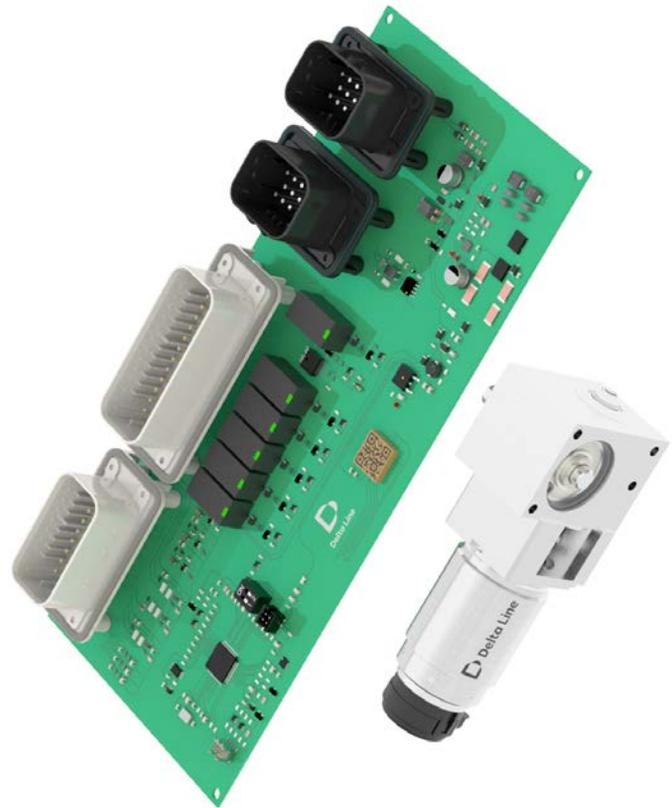
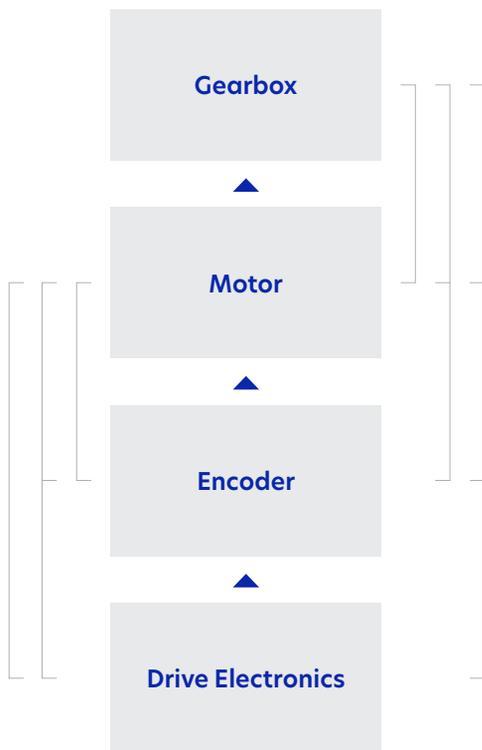


on motors and gearboxes: shaft range, windings, connector types, bearings.

1. Variation of standard

Customization Capabilities

Our design team
can operate at
3 levels



between motors, encoders, gearboxes,
drive electronics.

adapted to specific project needs and
using bespoke components.

**2. Modular motion
system assembly**

**3. Fully customized
motion solutions
and drives design
customization**



Sector
Robotics

Challenges
develop a high-power motion system with 3 axis output respecting narrow space and low noise requirements

Solution
optimised coil BLDC motor with customized 1-stage and 3-axis output gearbox

A



Sector
Agriculture

Challenges
develop an IP protected high precision motion system to allow simultaneous distribution of multiple products in the soil

Solution
flat BLDC motor combined with a customized multi-speed 3-axis output gearbox (each axe able to rotate at different speed)

B

Some of our customizations

tell us your challenge
and we will solve it



Sector

Robotics

Challenges

develop a low cost modular motorization solution, respecting space and IP protection constraints

Solution

BLDC motor combined with a spur gear reducer with tailor made IP proof plastic moulded housing which enables direct wheel assembly

C



Sector

Packaging industry

Challenges

develop an efficient long service life complete motion system with perpendicular exit, allowing to be used in multiple positions

Solution

BLDC motor with integrated drive controller, 2-stage planetary gearbox ending with a crown gear reducer with angular exit shaft on the same axis as the complete unit allowing cost efficiency due to its high versatility

D

We have more than 4.500 delighted customers in Healthcare, Agriculture, Intralogistic, Security & Access, Industrial, Textile, Robotics and other sectors.

4.500 customers

We have manufacturing facilities, engineering and commercial teams in Europe, China, and North America.

Worldwide

We have more than 650 employees and a turnover of ~€120M, growing since 2008.

**650 employees
120M Euro turnover**



Brands

one trusted source of
sub-3kW motion control
components and systems

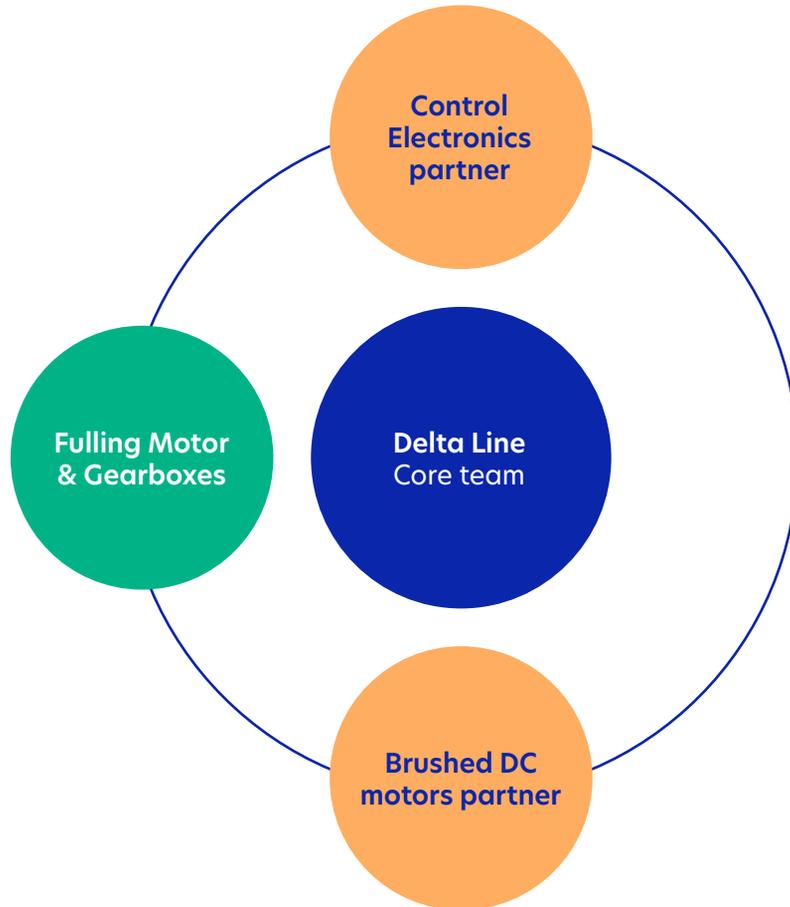
Delta Line Group

two carefully selected contract manufacturing partners

- **Contract manufacturing**
- **Co-owned manufacturing**

a lean cross-functional central team, which leads all projects

- **Core team**



- _ Agility and flexibility of a small company
- _ Comprehensive portfolio of technologies
- _ Attractive quality/price ratio
- _ Manufacturing flexibility and control

with many advantages

A unique structure



a Delta Line company

- **Part of the Delta Line Group since 2010**
- **Established in 2001**, Changzhou Fulling Motor Co. is a German-Swiss-Chinese joint venture
- Specialized in **stepper motors, DC brushless motors and gearboxes** design and manufacturing
- Based in Changzhou, China, employing more than **600 workers**
- **30'000 sqm manufacturing** facilities with cutting edge equipment
- More than **5 Million motors and gearboxes** produced yearly
- **ISO9001** and **ISO14001** certified by TUV Germany
- All products **RoHS compliant** and **CE certified**



Delta Line

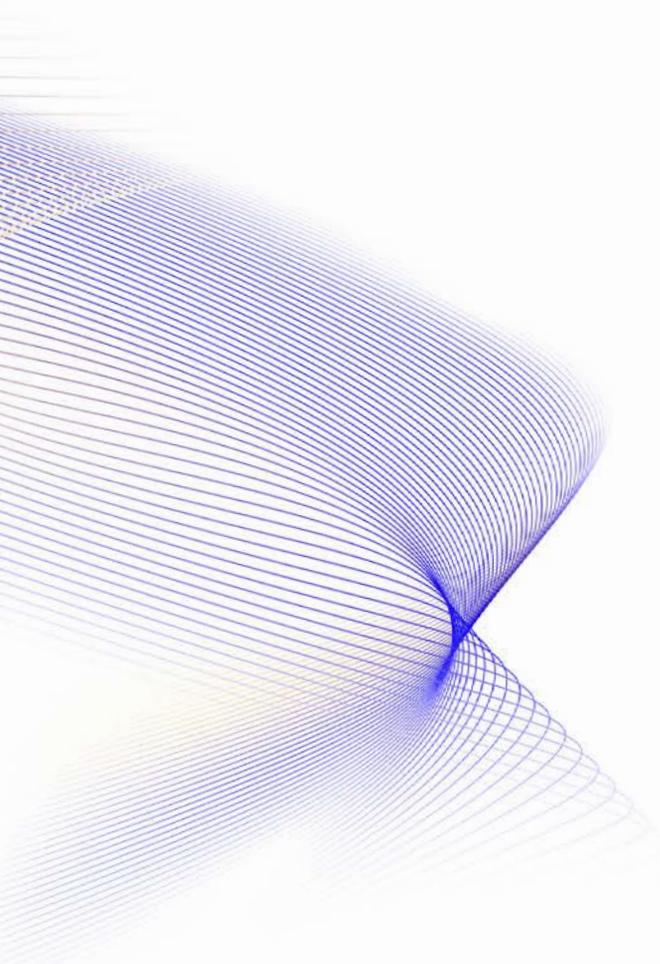
- **Established in 1983**, Delta Line is a Swiss based motion systems provider
- Headquartered in Lamone, Switzerland the company has an **extensive footprint in Europe and North America**
- **Specialized in custom solution design and manufacturing** through its own production and assembly facilities in Switzerland
- Wide portfolio of DC motors, motors with electronics, drives/controllers and gearboxes

we market our products
under **Delta Line** and
Fulling Motor

Our brands

Be it a need for a simple standard product or a co-designed fully customized motion system.

We want to be your trusted advisor and supplier when it comes to integrating **motion solutions** into your application.



1. **Attention of a family company with functional capabilities of a large one**
2. **Supply & Quality you can trust**
3. **Flexible and Cost-effective solutions through collaborative engineering and efficient customizations**
4. **One-stop motion supplier: wide technology portfolio and manufacturing control**

Your benefits



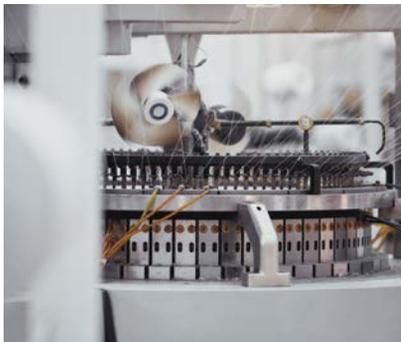
Powered hand tools
 X-Ray & Oncology equipment
 Liquid analyzers
 Pumps (Manufacturers)
 Laboratory equipment

Healthcare



Fertiliser distribution systems
 Harvesting machines
 Precision seed drills
 Hydraulic equipment replacement
 Milking systems (Robotics)
 Feeding robots

Agriculture



Knitting & embroidery machines
 Spinning machines
 Yarn preparation machines

Textile



Pedestrian & Passenger security
 Physical access management
 Vehicular access
 Observation security

Security & Access



AGV (Automated guided vehicles)
 Collaborative robots
 Lawn mower robots
 Service Robots
 AMR (Autonomous Mobile Robot)

Robotics

Market expertise



Storage Systems (conveyor system)
AGV Automated Guided Vehicles
AMR Autonomous Mobile Robots
Logistic shuttles
Warehouse pick & place systems

Intralogistic & warehousing



Packaging & Labelling
Powered hand tools
Pumps (Manufacturers)
Welding Equipment
Pick and Place machines
Industrial analysers

Industrial

Brushed DC motors

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Brushless DC motors

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To see our full range please visit our website:



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Brushed DC



Coreless
motors

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Permanent Magnet
motors

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Brushed DC Motors

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	Torque* (mNm)	27
08DC16N -PM	0,6	28
10DC17...25N -PM	0,9...2	29
12DC19...28N -PM	1,9...3,9	31
16DC25P -PM/G	3,8...4,8	33
16DC26...40N -PM/G	5...11,3	35
22DC32P -PM/G	8,5...12,6	39
22DC34...47N -PM/G	10,7...30,5	41
26DC44P -PM/G	20,8...28,8	45
26DC57N -PM/G	32,9...59,1	47
32DC72N -G	89,4...123	49
35DC70N -G	77,7...138	50
Permanent Magnet DC motors - NEW		
	Torque* (Nm)	53
42DI	0,038...0,057	54
52DI	0,09...0,22	55
63DI	0,18...0,27	56

* Rated Torque

Term	
N. of pole	Areas of a motor where a magnetic pole is generated either by a permanent magnet or by passing current through the coils of a winding.
N. of phase	A group of electrically connected coils.
Rated Voltage	The voltage at which rated torque is generated with the motor at ambient temperature.
Rated Speed	The approximate motor speed at its rated torque point.
Rated Torque	The maximum torque, at rated speed, the motor can produce on a continuous basis, without exceeding the thermal rating of the motor.
Max. Peak Torque	The maximum torque a motor can produce for short periods of time, before irreversible demagnetization of the motor's magnets occurs.
Stall Torque	Is the calculated load torque that causes the shaft to stop at nominal voltage. Rising motor temperatures reduce stall torque.
Torque constant	The ratio of a motor's output torque to the motor's input power.
Speed Constant	Shows the ideal no load speed per 1 volt of applied voltage. Friction losses not taken into account.
Rated Current	The approximate amount of current the motor will draw at its rated torque point.
Max. Peak Current	The current drawn by the motor when delivering peak torque.
No-load speed	Is the speed at which the unloaded motor runs with the rated voltage applied. It is approximately proportional to the applied voltage.
Stall Current	Is the quotient from nominal voltage and the motor's terminal resistance. Stall current is equivalent to stall torque.
No-Load Current	The current consumption of the motor at rated voltage and under no-load conditions. This value varies proportionally to speed and is influenced by temperature
Motor regulation	This value is a key performance indicator of a motor, indicating the amount of torque the motor can produce for a certain temperature rise (Joule losses). A lower number indicates a better power density.
Line to Line resistance	This is the phase resistance measured for the completed motor at room temperature. It includes solder, wire and (if present) connector resistances. In motors with very low resistance, the line to line resistance may differ significantly from the internal resistance.
Line to Line Inductance	This is the motor phase inductance measured with an inductance meter at 1000 Hz.
Rotor Inertia	Is the mass moment of inertia of the rotor, based on the axis of rotation.
Max. efficiency	Is the calculated load torque that brings the shaft to standstill at nominal voltage. It also doesn't always denote the optimal operating point.
Mechanical time constant	Is the time required for the rotor to accelerate from standstill to 63% of its no load speed.
Length	Total motor length.
Weight	Total motor mass.
Ambient temperature ball/sleeve bearings	Operating temperature range. This derives from the heat reliability of the materials used and viscosity of bearing lubrication.
Max. winding temperature	Maximum permissible winding temperature.
Max. speed	Is the maximum recommended speed based on thermal and mechanical perspectives. A reduced service life can be expected at higher speeds.
Axial Play	Axial shaft displacement occurring during a reversal of an axial force on the shaft.
Max. Radial Force/Load	Maximum force that can be applied to the shaft in the radial direction (any direction perpendicular to the motor shaft axis).
Max. Axial force	Maximum force that can be applied to the shaft in the axial direction (in the same axis as or parallel to the motor shaft axis).
Protection Class	IP (or "Ingress Protection") ratings are defined in international standard EN 60529 (British BS EN 60529:1992, European IEC 60509:1989). They are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt etc) and moisture.
Insulation Class	The electrical insulation system for wires and other wire-wound electrical components is divided into different classes by temperature and temperature rise. The electrical insulation system is sometimes referred to as insulation class or thermal classification.

Glossary

Product families

Brushed DC Coreless motors

Brushed PMDC motors

Brushed DC motors have long been a driving force in the world of electrical engineering, offering a robust and reliable solution for a wide range of applications. These motors utilize a simple yet ingenious design that sets them apart from their counterparts. The motor's properties are determined by the magnetic circuit at the stator (permanent magnet material, air gap, ...) and the coil at the rotor (windings, copper density), however the main advantages of Brushed DC motor technology is to be found in the simple construction and control, the attractive cost, and the higher starting torque.

These motors are called "brushed" because they use physical brushes and a commutator mechanism to control the flow of current through the motor windings. The commutator physically contacts the brushes, which are connected to opposite poles of the power source. The rotation's direction, clockwise and/or counterclockwise, can be reversed easily by reversing the polarity of the brushes, i.e., reversing the leads on the battery. In our portfolio we carry two options in terms of brushes:

More suitable for applications requiring higher power and higher current, in start/stop operations and in combination with electronic controls.

Graphite brushes

In combination with precious metal commutators, this design ensures constant low contact resistance and is often used in low-current applications with very low electromagnetic interferences.

Precious metal brushes

The Coreless - or Ironless - self-supporting coil is the central element of our Coreless Brushed DC motors. The coreless construction significantly reduces the mass and inertia of the rotor, so very rapid acceleration and deceleration rates are possible. This specific construction also means no iron losses and no cogging, giving coreless designs significantly higher efficiencies (up to 90 percent) than traditional Ironcore DC motors. Brushed DC coreless motors ripple torque is extremely low, which provides very smooth motor rotation with minimal vibration and noise.

Coreless DC motors are used extensively in medical applications, including prosthetics, small pumps (such as insulin pumps), laboratory equipment, and X-ray machines. Their ability to handle fast, dynamic moves also makes them ideal for use in robotic applications.

Coreless technology

PMDC motors, also known as permanent magnet motors, harness the strength of magnets to deliver exceptional performance. By incorporating permanent magnets into their design, these motors eliminate the need for a separate field winding, resulting in a more compact and efficient solution.

The key advantage of PMDC motors lies in their high power-to-size ratio. The presence of permanent magnets ensures strong magnetic fields, leading to increased torque and power output. This makes PMDC motors an excellent choice for applications where space is limited, without compromising on performance, and offer an ideal solution for all those customers that still want to rely on a well-established and trusted technology that provides easy-to-operate, long lasting and high torque capacity motors.

Additionally, our PMDC motors, are well suited to operate in harsh environmental conditions thanks to IP54 protection and F insulation class. The graphite commutation system with an optional EMC filter serves to reduce brush and collector wear and can significantly extend motor life.

Permanent Magnet technology

Technical introduction

Composition	
1	Flange
2	Permanent magnet
3	Housing (magnetic return)
4	Shaft
5	Winding
6	Commutator plate
7	Commutator
8	Graphite brushes
9	Cover
10	Electrical connection
11	Ball bearing





Brushed DC
Coreless motors

Advantages at a glance

- No cogging
- High efficiency
- Low starting voltage

Developed with a highly efficient ironless motor winding technology, this range offers compact, light and powerful drives with low inertia. Our brushed coreless DC motors deliver superior torque density and very high acceleration performances. Ranging from micro coreless 8mm diameter motors to larger 35mm solutions, these motors can be assembled with precious metal or graphite brushes.

Brushed DC Coreless motors	Torque* (mNm)	
08DC16N-PM	0,61...0,64	28
10DC17N-PM	0,91...0,99	29
10DC25N-PM	1,94...2,05	30
12DC19N-PM	1,88...1,95	31
12DC28N-PM	2,88...3,89	32
16DC25P-PM	3,8...4,06	33
16DC25P-G	3,71...4,76	34
16DC26N-PM	4,99...5,36	35
16DC26N-G	5,36...5,45	36
16DC40N-PM	5,06...10,8	37
16DC40N-G	8,58...11,3	38
22DC32P-PM	8,54...10,4	39
22DC32P-G	11,5...12,6	40
22DC34N-PM	10,7...14,7	41
22DC34N-G	14...15,3	42
22DC47N-PM	14,1...29,5	43
22DC47N-G	27...30,5	44
26DC44P-PM	20,8...28,8	45
26DC44P-G	26,3...28,3	46
26DC57N-PM	32,9...52,3	47
26DC57N-G	46,9...59,1	48
32DC72N-G	89,4...123	49
35DC70N-G	77,7...138	50

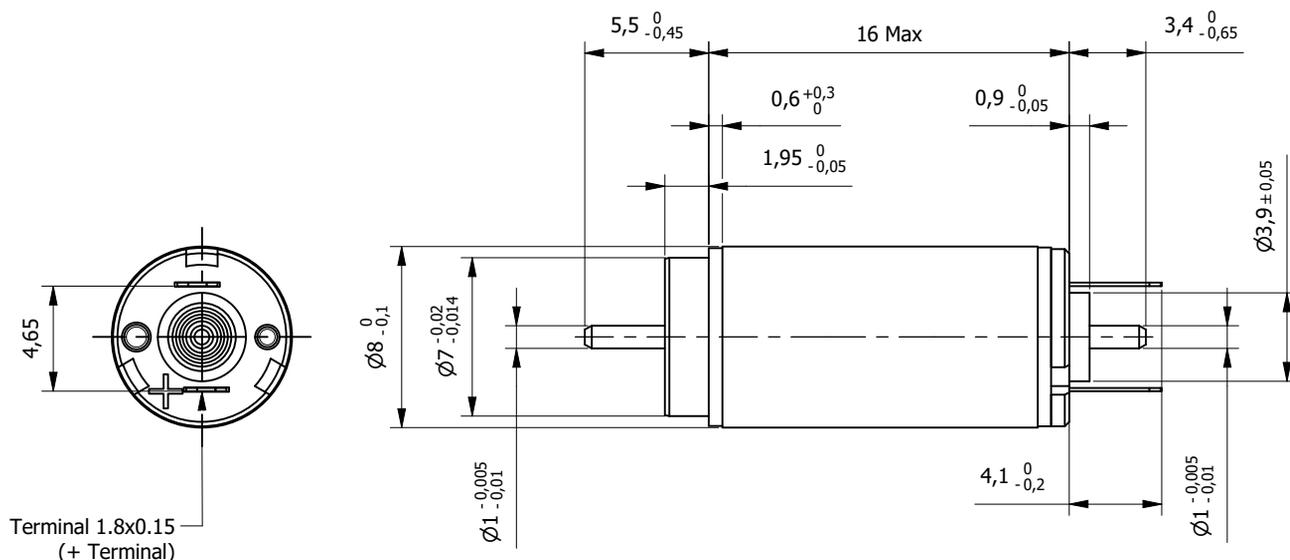
* Rated Torque

Brushed DC Coreless Motor 08DC16N-PM

Ø 8mm

Precious Metal brushes

0,6mNm

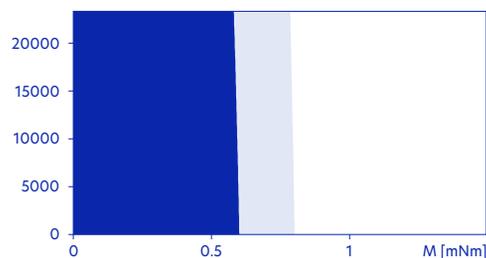


Product also available with ball bearings

Specification				
Model		...4129	...5892	
1	Rated Voltage	V	6	12
2	Rated Speed	rpm	4190	5800
3	Rated Torque	mNm	0,641	0,614
4	Stall Torque	mNm	1,05	1,13
5	Torque Constant	mNm/A	5,08	8,71
6	Motor Regulation	10 ³ /Nms	1123,8	1215,3
7	Rated Current	A	0,13	0,073
8	Stall Current	A	0,207	0,13
9	No-load Current	mA	4,51	2,74
10	No-load Speed	rpm	11000	12900
11	Line to Line Resistance	Ω	29	92,2
12	Line to Line Inductance	mH	0,094	0,276
13	Rotor Inertia	gcm ²	0,037	0,035
14	Max. Efficiency	%	73	74
15	Mechanical Time Constant	ms	4,18	4,28
16	Length (L)	mm	16	16
17	Weight	g	4,4	4,4

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	17300rpm
Radial play	0,012mm
Axial play	0,02 to 0,1mm
Max. Radial force (5mm from flange)	0,4N
Max. Axial force	0,1N
Max. Force for Press fit	10N

Operating range: Winding 6V



- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

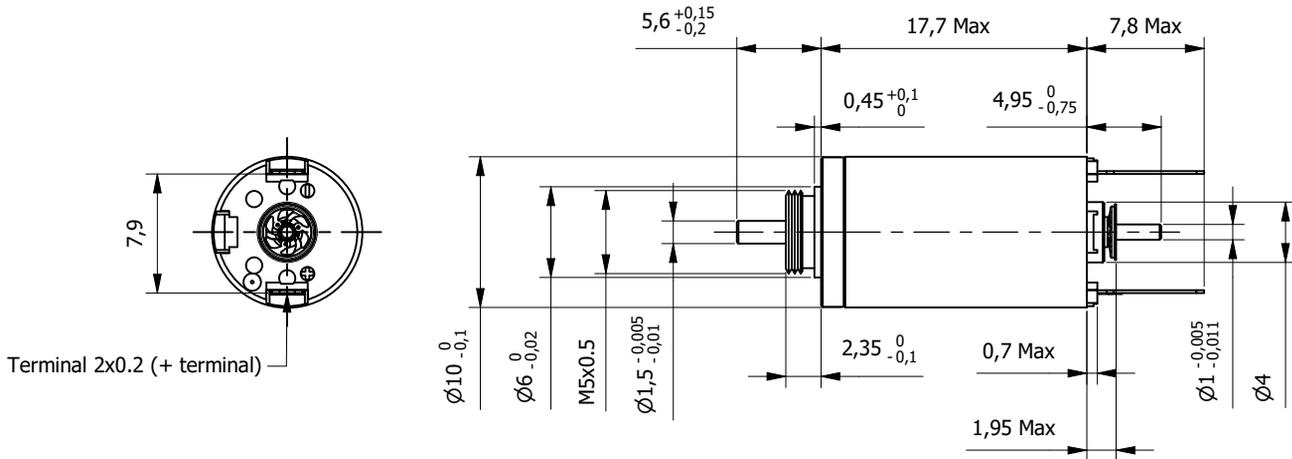
Brushed DC Coreless Motor 10DC17N-PM

Precious Metal brushes

Ø 10mm

0,9 to 1mNm

Brushed DC

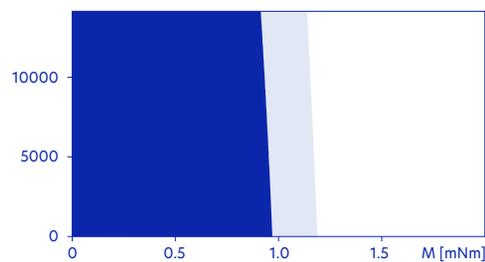


Product also available with ball bearings

Specification		...4604	...3319	...3874	
1	Rated Voltage	V	3	6	12
2	Rated Speed	rpm	4690	3310	3890
3	Rated Torque	mNm	0,948	0,993	0,905
4	Stall Torque	mNm	1,54	1,46	1,37
5	Torque Constant	mNm/A	2,07	4,74	8,53
6	Motor Regulation	10 ³ /Nms	942,8	867,9	1029,4
7	Rated Current	A	0,49	0,223	0,114
8	Stall Current	A	0,742	0,307	0,16
9	No-load Current	mA	43,8	18,2	10,5
10	No-load Speed	rpm	13000	11400	12500
11	Line to Line Resistance	Ω	4,04	19,5	74,9
12	Line to Line Inductance	mH	0,051	0,268	0,868
13	Rotor Inertia	gcm ²	0,077	0,081	0,071
14	Max. Efficiency	%	58	58	56
15	Mechanical Time Constant	ms	7,19	7,03	7,26
16	Length (L)	mm	17,7	17,7	17,7
17	Weight	g	6,3	6,3	6,3

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	14300rpm
Radial play	0,015mm
Axial play	0 to 0,15mm
Max. Radial force (5mm from flange)	0,8N
Max. Axial force	0,1N
Max. Force for Press fit	30N

Operating range: Winding 4.5V



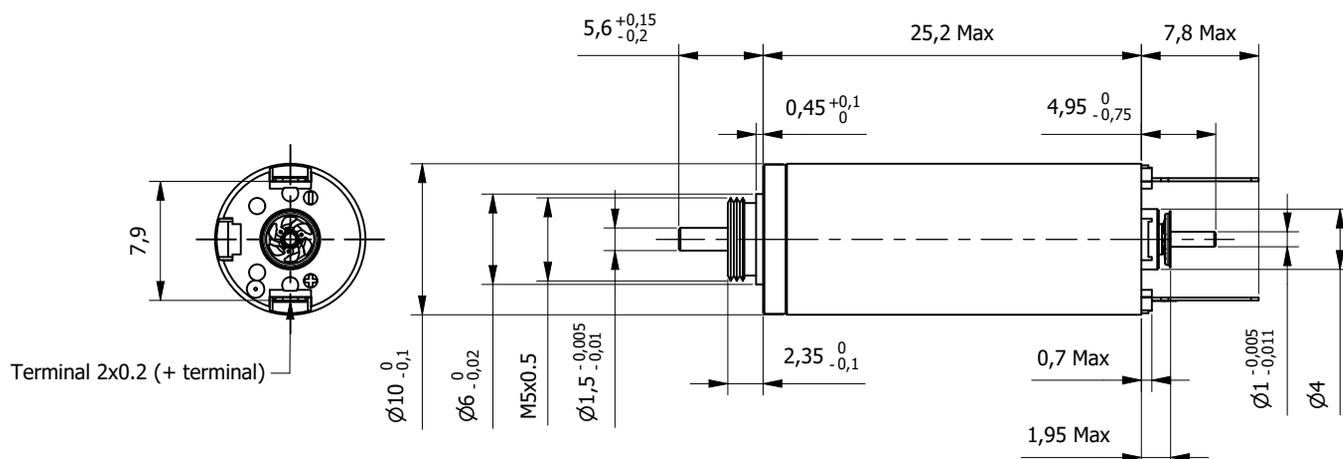
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 10DC25N-PM

Precious Metal brushes

Ø 10mm

1,9 to 2mNm

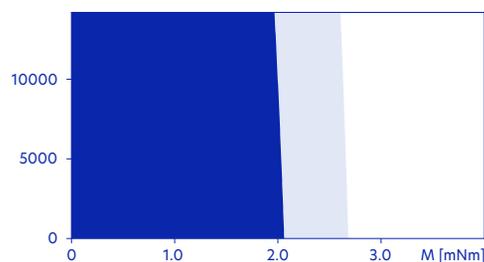


Product also available with ball bearings

Specification			...6901	...6606	...5927
1	Rated Voltage	V	3	6	12
2	Rated Speed	rpm	6930	6640	5980
3	Rated Torque	mNm	2,05	1,94	2,03
4	Stall Torque	mNm	4,81	4,32	4,36
5	Torque Constant	mNm/A	2,31	4,61	10
6	Motor Regulation	10 ³ /Nms	269,9	301,1	273,0
7	Rated Current	A	0,922	0,436	0,211
8	Stall Current	A	2,09	0,937	0,439
9	No-load Current	mA	38,7	19,3	8,71
10	No-load Speed	rpm	12200	12200	11300
11	Line to Line Resistance	Ω	1,44	6,4	27,3
12	Line to Line Inductance	mH	0,02	0,078	0,362
13	Rotor Inertia	gcm ²	0,132	0,119	0,13
14	Max. Efficiency	%	75	74	74
15	Mechanical Time Constant	ms	3,57	3,58	3,59
16	Length (L)	mm	25,2	25,2	25,2
17	Weight	g	11	11	11

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	14300rpm
Radial play	0,015mm
Axial play	0 to 0,15mm
Max. Radial force (5mm from flange)	0,8N
Max. Axial force	0,1N
Max. Force for Press fit	30N

Operating range: Winding 4.5V



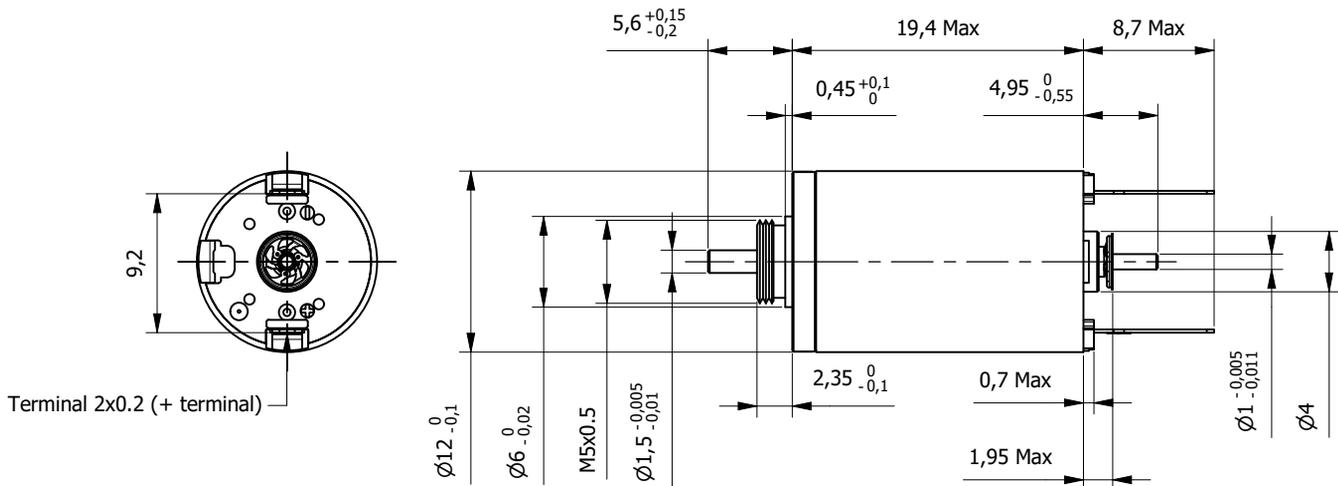
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 12DC19N-PM

Precious Metal brushes

Ø 12mm

1,9mNm



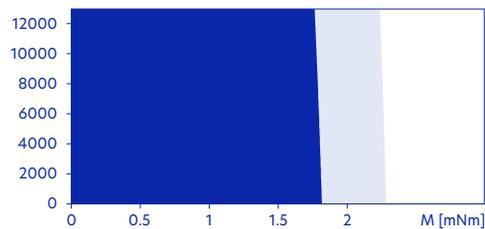
Brushed DC

Product also available with ball bearings

Specification		...3702	...3810	...3646	
1	Rated Voltage	V	3	6	12
2	Rated Speed	rpm	3760	3870	3620
3	Rated Torque	mNm	1,92	1,95	1,88
4	Stall Torque	mNm	3,35	3,46	3,21
5	Torque Constant	mNm/A	3,06	6,12	12,3
6	Motor Regulation	10 ³ /Nms	292,6	283	304,1
7	Rated Current	A	0,655	0,332	0,159
8	Stall Current	A	1,09	0,566	0,261
9	No-load Current	mA	31,8	15,9	7,88
10	No-load Speed	rpm	9090	9100	9020
11	Line to Line Resistance	Ω	2,74	10,6	46
12	Line to Line Inductance	mH	0,072	0,29	1,17
13	Rotor Inertia	gcm ²	0,286	0,293	0,275
14	Max. Efficiency	%	69	70	69
15	Mechanical Time Constant	ms	8,37	8,31	8,33
16	Length (L)	mm	19,4	19,4	19,4
17	Weight	g	11	11	11

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	13000rpm
Radial play	0,015mm
Axial play	0 to 0,15mm
Max. Radial force (5mm from flange)	0,8N
Max. Axial force	0,1N
Max. Force for Press fit	30N

Operating range: Winding 4.5V



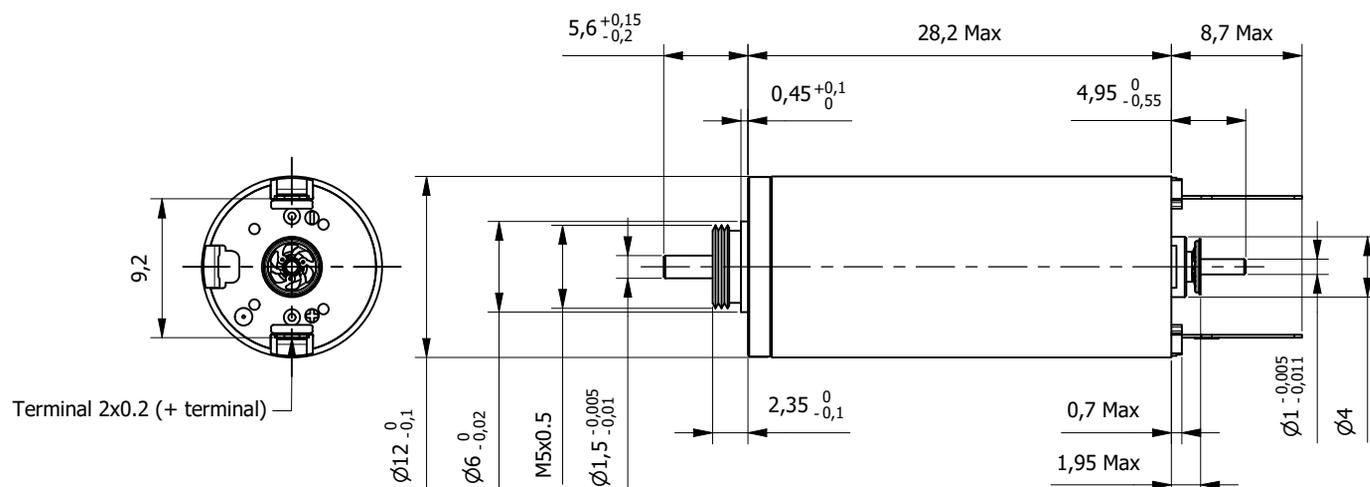
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 12DC28N-PM

Ø 12mm

Precious Metal brushes

2,9 to 3,9mNm

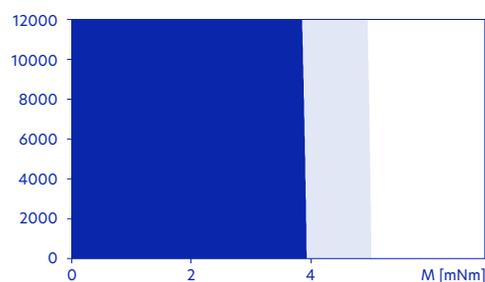


Product also available with ball bearings

Specification					
Model		...6209	...5503	...5514	
1	Rated Voltage	V	3	6	12
2	Rated Speed	rpm	6230	5540	5560
3	Rated Torque	mNm	2,88	3,88	3,89
4	Stall Torque	mNm	9,9	10,5	10,6
5	Torque Constant	mNm/A	3,22	6,44	12,9
6	Motor Regulation	10 ³ /Nms	94,0	88,7	87,7
7	Rated Current	A	0,924	0,616	0,309
8	Stall Current	A	3,08	1,63	0,824
9	No-load Current	mA	31,3	15,7	7,83
10	No-load Speed	rpm	8810	8810	8810
11	Line to Line Resistance	Ω	0,975	3,68	14,6
12	Line to Line Inductance	mH	0,031	0,125	0,502
13	Rotor Inertia	gcm ²	0,484	0,496	0,498
14	Max. Efficiency	%	81	82	82
15	Mechanical Time Constant	ms	4,55	4,4	4,38
16	Length (L)	mm	28,2	28,2	28,2
17	Weight	g	16	16	16

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	12000rpm
Radial play	0,015mm
Axial play	0 to 0,15mm
Max. Radial force (5mm from flange)	0,8N
Max. Axial force	0,1N
Max. Force for Press fit	30N

Operating range: Winding 4.5V



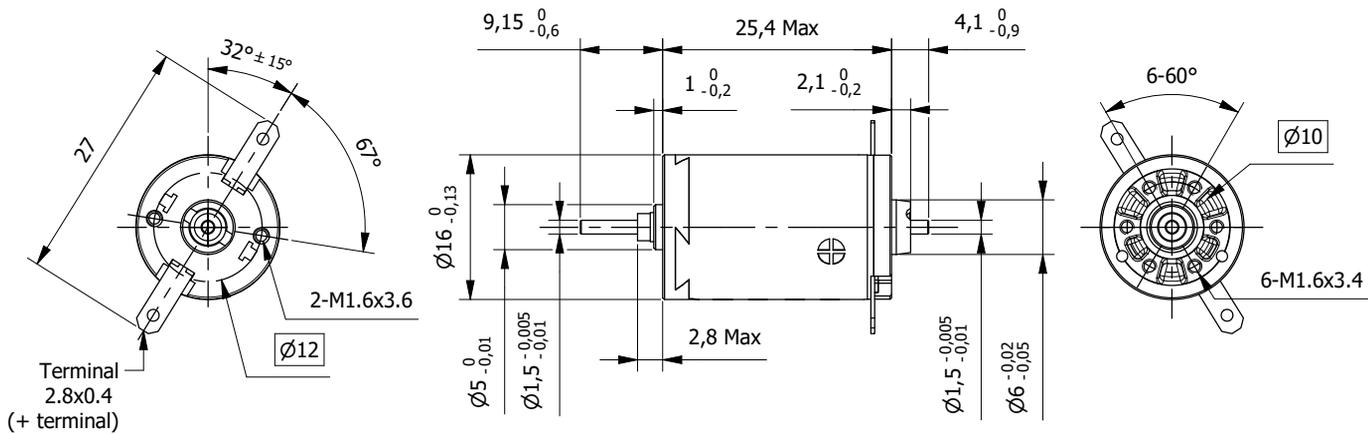
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC25P-PM

Precious Metal brushes

Ø 16mm

3,8 to 4,1mNm

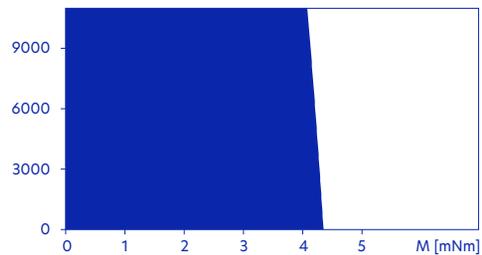


Product also available with ball bearings

Specification		...4804	...4319	...4283	
1	Rated Voltage	V	6	12	24
2	Rated Speed	rpm	4830	4390	4210
3	Rated Torque	mNm	4,06	3,92	3,8
4	Stall Torque	mNm	10,5	9,44	8,75
5	Torque Constant	mNm/A	7,19	15	30,3
6	Motor Regulation	10 ³ /Nms	79,3	84,9	90,6
7	Rated Current	A	0,577	0,267	0,128
8	Stall Current	A	1,46	0,629	0,289
9	No-load Current	mA	14,7	6,9	3,4
10	No-load Speed	rpm	7890	7560	7470
11	Line to Line Resistance	Ω	4,1	19,1	83,2
12	Line to Line Inductance	mH	0,14	0,61	2,49
13	Rotor Inertia	gcm ²	1,12	1,05	0,994
14	Max. Efficiency	%	81	80	80
15	Mechanical Time Constant	ms	8,87	8,92	9
16	Length (L)	mm	25,4	25,4	25,4
17	Weight	g	23,3	23,3	23,3

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +65°C
Max. Winding Temperature	+85°C
Max. Speed	11000rpm
Radial play	0,012mm
Axial play	0,05 to 0,15mm
Max. Radial force (5mm from flange)	1,4N
Max. Axial force	0,8N
Max. Force for Press fit	35N

Operating range: Winding 12V



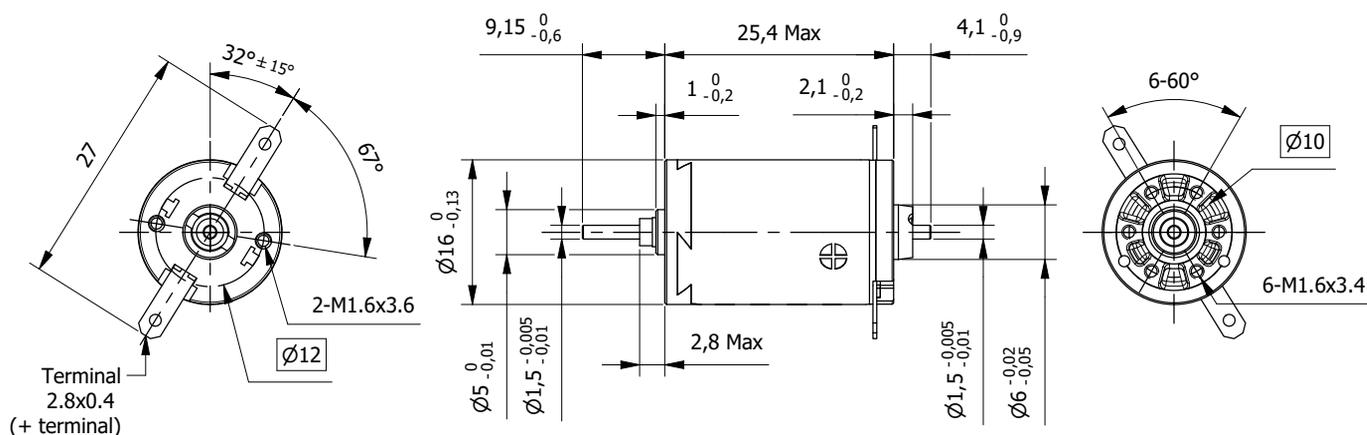
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC25P-G

Ø 16mm

Graphite brushes

3,7 to 4,8mNm

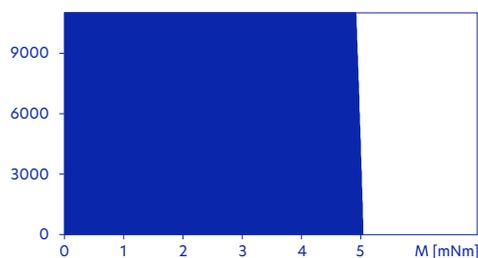


Product also available with ball bearings

Specification					
Model		...6702	...6211	...6537	
1	Rated Voltage	V	6	12	24
2	Rated Speed	rpm	6770	6200	6580
3	Rated Torque	mNm	3,71	4,31	4,76
4	Stall Torque	mNm	12,1	11,9	14,4
5	Torque Constant	mNm/A	5,62	11,2	22,5
6	Motor Regulation	$10^3/Nms$	88,3	90,9	74,1
7	Rated Current	A	0,72	0,413	0,227
8	Stall Current	A	2,15	1,05	0,64
9	No-load Current	mA	67,3	33,6	16,8
10	No-load Speed	rpm	9870	9860	9920
11	Line to Line Resistance	Ω	2,79	11,4	37,5
12	Line to Line Inductance	mH	0,086	0,343	1,37
13	Rotor Inertia	gcm ²	1	0,993	1,16
14	Max. Efficiency	%	68	68	71
15	Mechanical Time Constant	ms	8,85	8,92	8,57
16	Length (L)	mm	25,4	25,4	25,4
17	Weight	g	23,1	23,1	23,1

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+125°C
Max. Speed	11000rpm
Radial play	0,012mm
Axial play	0,05 to 0,15mm
Max. Radial force (5mm from flange)	1,4N
Max. Axial force	0,8N
Max. Force for Press fit	35N

Operating range: Winding 24V



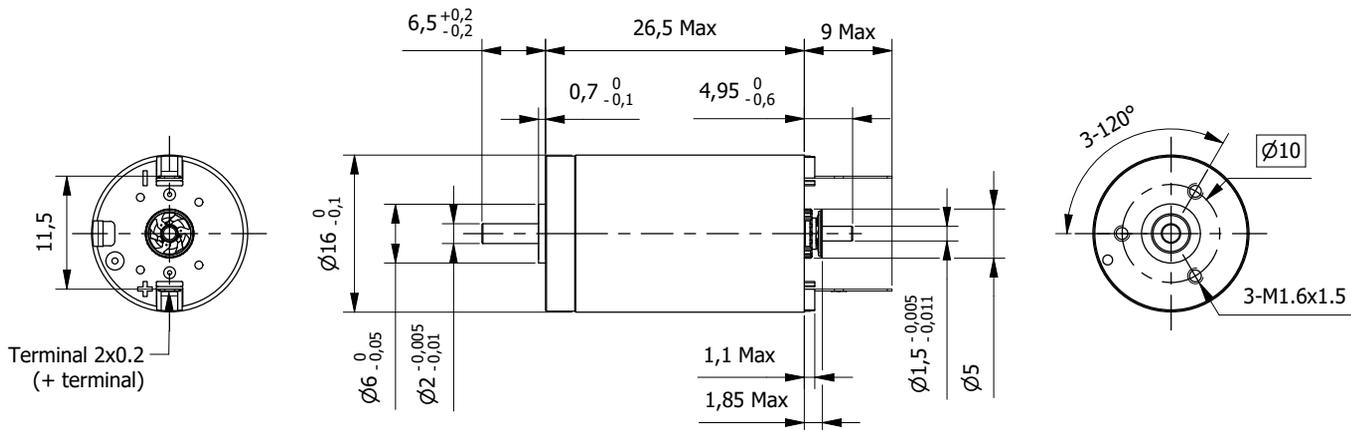
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC26N-PM

Precious Metal brushes

Ø 16mm

5 to 5,4mNm

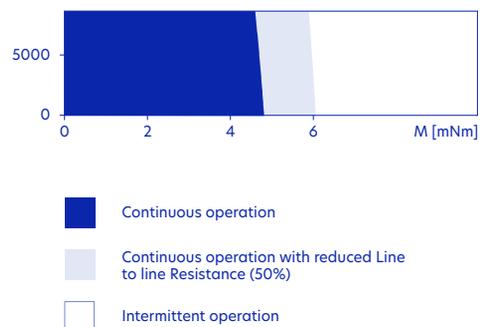


Product also available with ball bearings

Specification		...3301	...3704	...3319	...3283	
1	Rated Voltage	V	3	6	12	24
2	Rated Speed	rpm	3350	3760	3320	3200
3	Rated Torque	mNm	5,15	5,36	5,19	4,99
4	Stall Torque	mNm	11,1	12,6	11,2	10,4
5	Torque Constant	mNm/A	4,45	8,53	18	36
6	Motor Regulation	10 ³ /Nms	60,6	55,8	59,3	64,1
7	Rated Current	A	1,2	0,65	0,299	0,144
8	Stall Current	A	2,49	1,48	0,624	0,289
9	No-load Current	mA	44,6	23,4	11	5,51
10	No-load Speed	rpm	6320	6610	6260	6250
11	Line to Line Resistance	Ω	1,2	4,06	19,2	83,1
12	Line to Line Inductance	mH	0,036	0,131	0,581	2,32
13	Rotor Inertia	gcm ²	1	1,08	1,03	0,96
14	Max. Efficiency	%	75	77	75	74
15	Mechanical Time Constant	ms	6,09	6,05	6,11	6,17
16	Length (L)	mm	26,5	26,5	26,5	26,5
17	Weight	g	26	26	26	26

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	8680rpm
Radial play	0,015mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	2N
Max. Axial force	0,1N
Max. Force for Press fit	60N

Operating range: Winding 12V

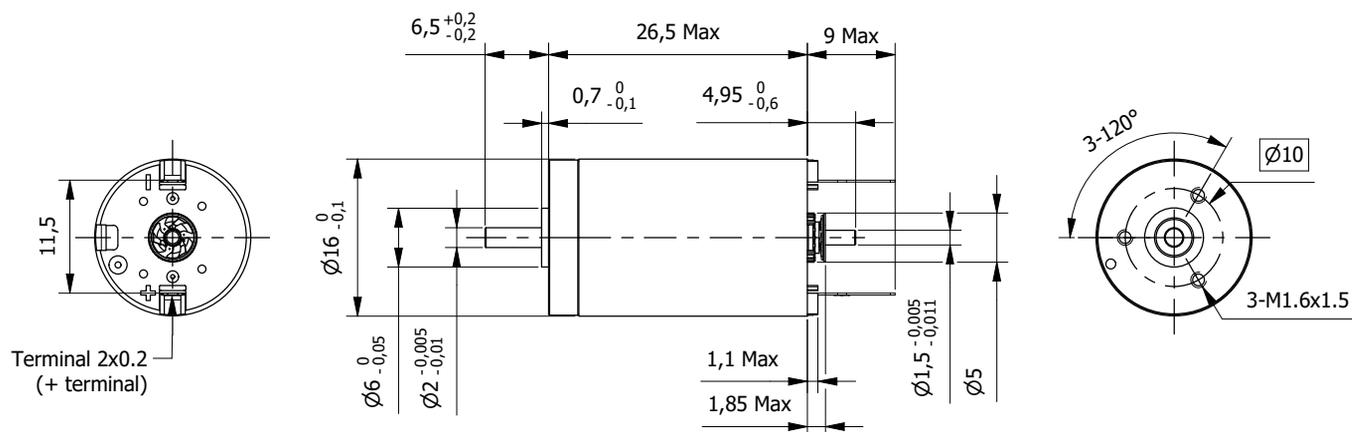


Brushed DC Coreless Motor 16DC26N-G

Ø 16mm

Graphite brushes

5,4mNm

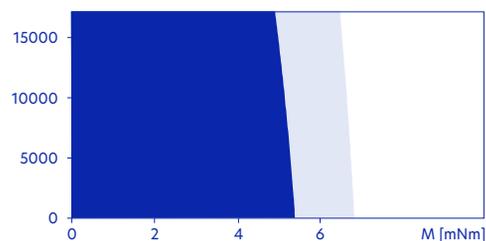


Product also available with ball bearings

Specification			...9401	...9804	...9419
1	Rated Voltage	V	6	12	24
2	Rated Speed	rpm	9400	9850	9430
3	Rated Torque	mNm	5,45	5,36	5,43
4	Stall Torque	mNm	21,3	22,6	21,7
5	Torque Constant	mNm/A	4,45	8,53	17,8
6	Motor Regulation	10 ³ /Nms	63,1	62,3	62,2
7	Rated Current	A	1,28	0,662	0,321
8	Stall Current	A	4,79	2,65	1,22
9	No-load Current	mA	63,9	35,4	16,8
10	No-load Speed	rpm	12700	13200	12700
11	Line to Line Resistance	Ω	1,25	4,53	19,7
12	Line to Line Inductance	mH	0,036	0,131	0,569
13	Rotor Inertia	gcm ²	1	1,08	1,02
14	Max. Efficiency	%	78	76	78
15	Mechanical Time Constant	ms	6,35	6,74	6,32
16	Length (L)	mm	26,5	26,5	26,5
17	Weight	g	26	26	26

Characteristics		
Item		
Ambient Temperature Sleeve bearings		-30°C to +100°C
Max. Winding Temperature		+125°C
Max. Speed		17000rpm
Radial play		0,015mm
Axial play		0 to 0,2mm
Max. Radial force (5mm from flange)		2N
Max. Axial force		0,1N
Max. Force for Press fit		60N

Operating range: Winding 12V



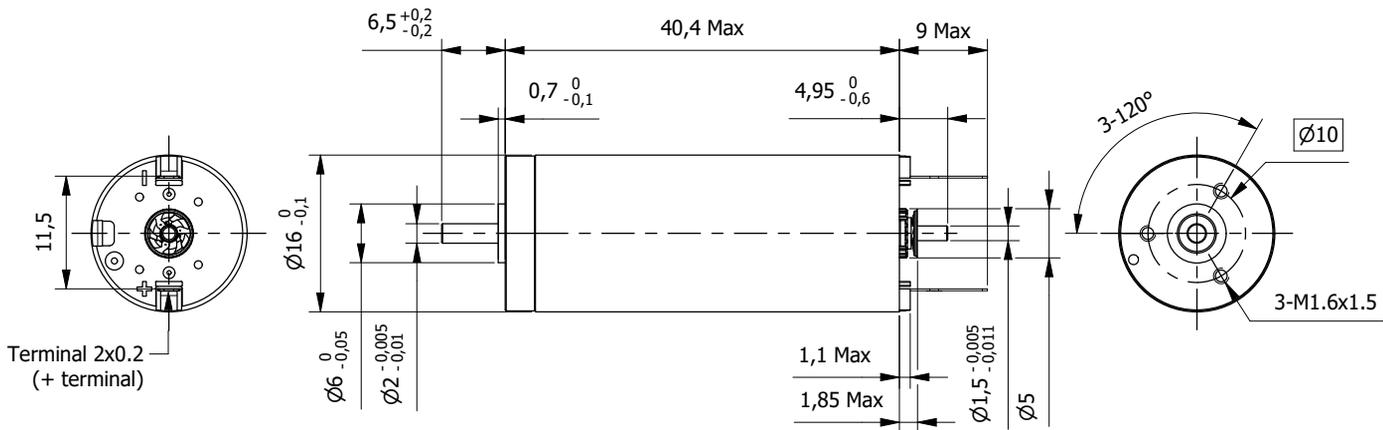
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC40N-PM

Precious Metal brushes

Ø 16mm

5 to 10,8mNm

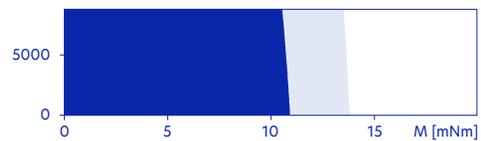


Product also available with ball bearings

Specification		...5403	...4901	...4405	...4622	
1	Rated Voltage	V	3	6	12	24
2	Rated Speed	rpm	5450	4920	4490	4630
3	Rated Torque	mNm	5,06	10	10,8	10,7
4	Stall Torque	mNm	34,4	39,3	36,6	36,6
5	Torque Constant	mNm/A	4,44	8,59	17,8	34,7
6	Motor Regulation	10 ³ /Nms	19,7	17,8	18,4	18,9
7	Rated Current	A	1,2	1,2	0,625	0,316
8	Stall Current	A	7,73	4,57	2,06	1,06
9	No-load Current	mA	62,5	32,6	15,6	8,05
10	No-load Speed	rpm	6400	6620	6400	6560
11	Line to Line Resistance	Ω	0,388	1,31	5,82	22,7
12	Line to Line Inductance	mH	0,026	0,096	0,411	1,56
13	Rotor Inertia	gcm ²	2,18	2,36	2,28	2,23
14	Max. Efficiency	%	83	84	83	83
15	Mechanical Time Constant	ms	4,29	4,2	4,19	4,23
16	Length (L)	mm	40,4	40,4	40,4	40,4
17	Weight	g	42	42	42	42

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	8680rpm
Radial play	0,015mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	2N
Max. Axial force	0,1N
Max. Force for Press fit	60N

Operating range: Winding 9V



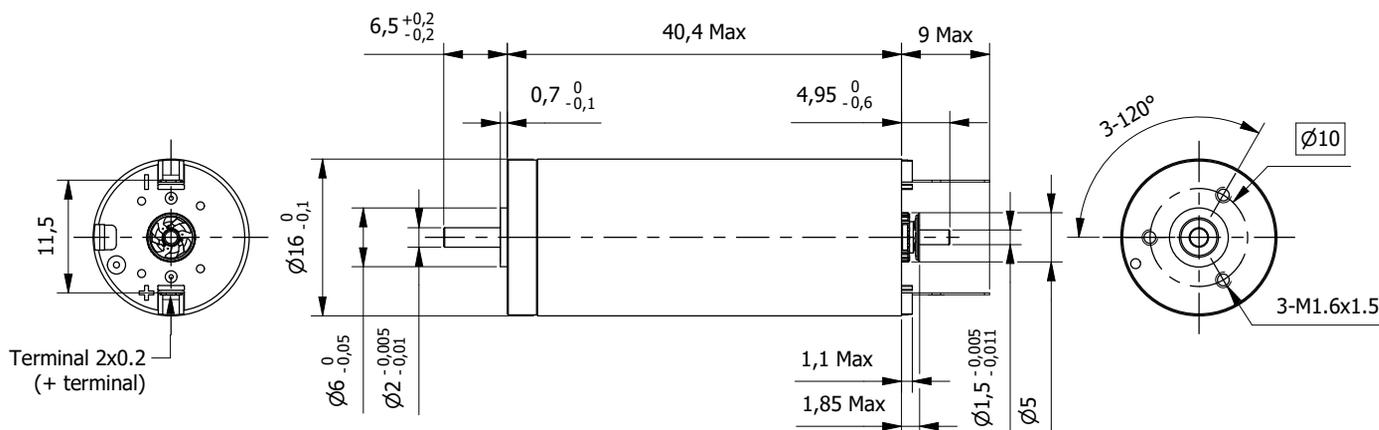
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC40N-G

Graphite brushes

Ø 16mm

8,6 to 11,3mNm

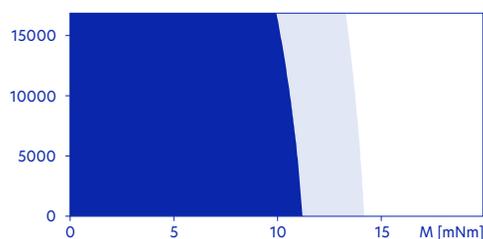


Product also available with ball bearings

Specification		...11004	...10701	...10606	
1	Rated Voltage	V	6	12	24
2	Rated Speed	rpm	11000	10700	10600
3	Rated Torque	mNm	8,58	10,4	11,3
4	Stall Torque	mNm	61,8	63,3	68,5
5	Torque Constant	mNm/A	4,44	8,59	17,8
6	Motor Regulation	10 ³ /Nms	21,9	22,1	19,7
7	Rated Current	A	2	1,24	0,651
8	Stall Current	A	13,9	7,37	3,85
9	No-load Current	mA	73,5	38,6	18,4
10	No-load Speed	rpm	12800	13200	12800
11	Line to Line Resistance	Ω	0,431	1,63	6,23
12	Line to Line Inductance	mH	0,026	0,096	0,411
13	Rotor Inertia	gcm ²	2,18	2,36	2,28
14	Max. Efficiency	%	85	83	86
15	Mechanical Time Constant	ms	4,77	5,21	4,48
16	Length (L)	mm	40,4	40,4	40,4
17	Weight	g	42	42	42

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +100°C
Max. Winding Temperature	+125°C
Max. Speed	15000rpm
Radial play	0,015mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	2N
Max. Axial force	0,1N
Max. Force for Press fit	60N

Operating range: Winding 12V



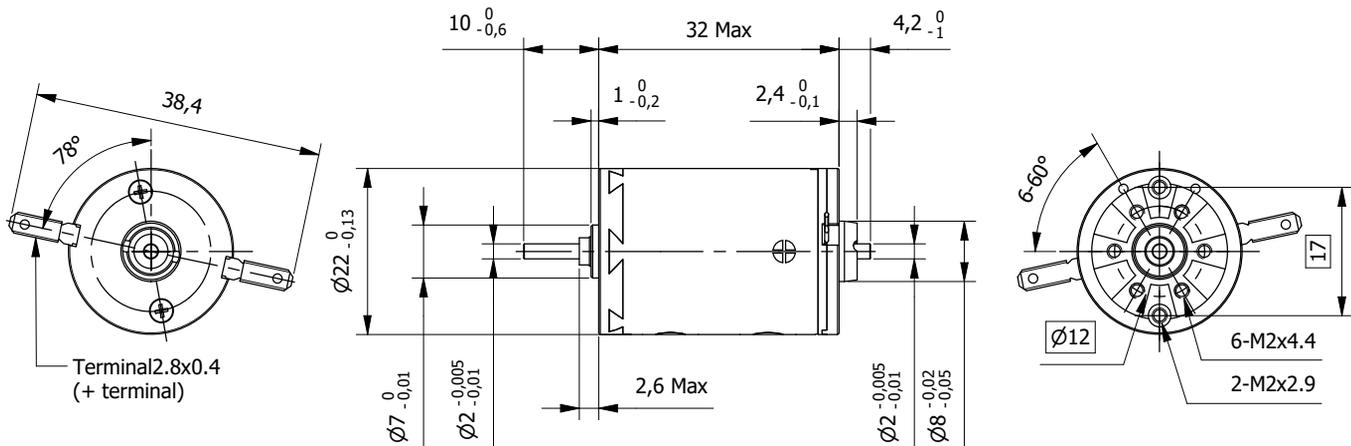
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC32P-PM

Precious Metal brushes

Ø 22mm

8,5 to 10,4mNm

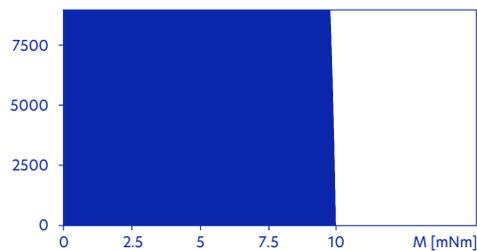


Product also available with ball bearings

Specification		...4201	...4206	...3433	
1	Rated Voltage	V	6	12	24
2	Rated Speed	rpm	4280	4240	3440
3	Rated Torque	mNm	8,54	10,3	10,4
4	Stall Torque	mNm	39	36,9	33,3
5	Torque Constant	mNm/A	10,4	19,3	44,8
6	Motor Regulation	10 ³ /Nms	14,8	16,9	16,6
7	Rated Current	A	0,84	0,543	0,236
8	Stall Current	A	3,75	1,91	0,721
9	No-load Current	mA	20,8	11,7	4,62
10	No-load Speed	rpm	5480	5890	5090
11	Line to Line Resistance	Ω	1,6	6,28	33,3
12	Line to Line Inductance	mH	0,119	0,413	2,21
13	Rotor Inertia	gcm ²	5,7	4,98	5,05
14	Max. Efficiency	%	87,5	85,2	84,9
15	Mechanical Time Constant	ms	8,44	8,36	8,39
16	Length (L)	mm	32	32	32
17	Weight	g	53,8	53,8	53,8

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +65°C
Max. Winding Temperature	+85°C
Max. Speed	9000rpm
Radial play	0,012mm
Axial play	0,05 to 0,15mm
Max. Radial force (5mm from flange)	2,8N
Max. Axial force	1N
Max. Force for Press fit	80N

Operating range: Winding 12V



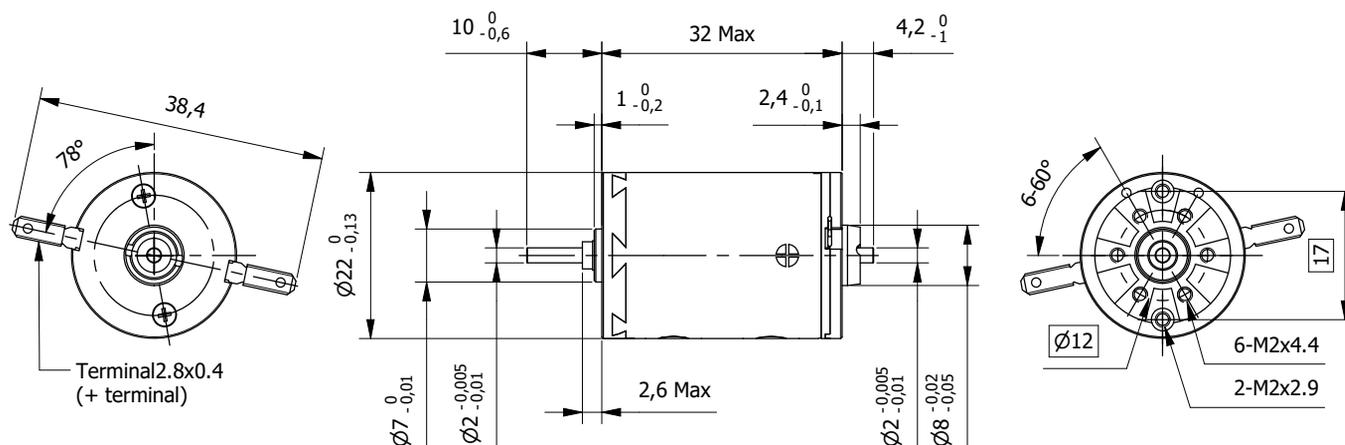
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC32P-G

Graphite brushes

Ø 22mm

11,5 to 12,6mNm

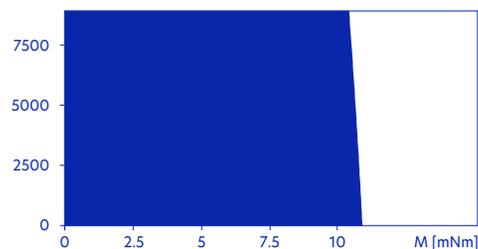


Product also available with ball bearings

Specification			...4901	...5203	...5316
1	Rated Voltage	V	6	12	24
2	Rated Speed	rpm	4950	5240	5350
3	Rated Torque	mNm	11,5	12,6	11,8
4	Stall Torque	mNm	42,4	49,4	44,6
5	Torque Constant	mNm/A	7,88	15,8	30,8
6	Motor Regulation	10 ³ /Nms	17,9	15,3	17,5
7	Rated Current	A	1,52	0,825	0,398
8	Stall Current	A	5,39	3,14	1,45
9	No-load Current	mA	58,8	29,5	15,1
10	No-load Speed	rpm	7030	7140	7330
11	Line to Line Resistance	Ω	1,11	3,83	16,6
12	Line to Line Inductance	mH	0,069	0,274	1,05
13	Rotor Inertia	gcm ²	5,07	5,57	4,69
14	Max. Efficiency	%	76	80	80
15	Mechanical Time Constant	ms	9,09	8,57	8,2
16	Length (L)	mm	32	32	32
17	Weight	g	53,8	53,8	53,8

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+125°C
Max. Speed	9000rpm
Radial play	0,012mm
Axial play	0,05 to 0,15mm
Max. Radial force (5mm from flange)	2,8N
Max. Axial force	1N
Max. Force for Press fit	80N

Operating range: Winding 12V



- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

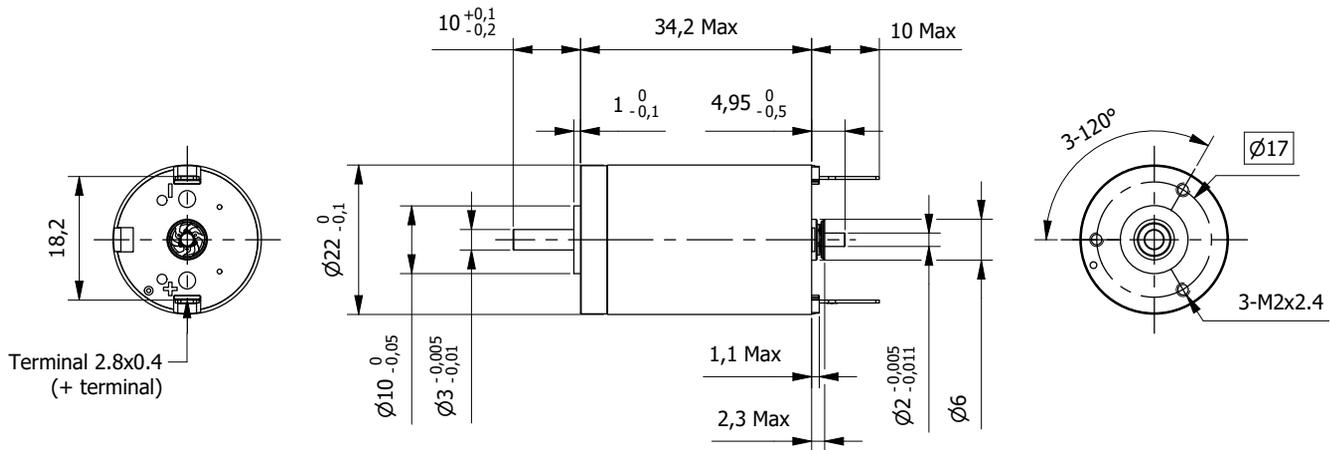
Brushed DC Coreless Motor 22DC34N-PM

Precious Metal brushes

Ø 22mm

10,7 to 14,7mNm

Brushed DC

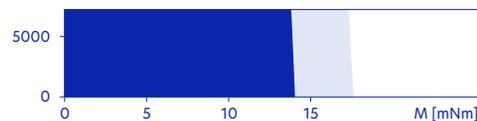


Product also available with ball bearings

Specification		...4901	...4603	...4716	...4276	
1	Rated Voltage	V	6	12	24	48
2	Rated Speed	rpm	4960	4670	4700	4240
3	Rated Torque	mNm	10,7	14,7	13,6	13,6
4	Stall Torque	mNm	53,7	59,7	52,7	48,6
5	Torque Constant	mNm/A	9,18	18,4	35,9	77,2
6	Motor Regulation	10 ³ /Nms	12,1	10,9	12,6	12,8
7	Rated Current	A	1,2	0,817	0,388	0,18
8	Stall Current	A	5,85	3,25	1,47	0,63
9	No-load Current	mA	39,2	19,6	10,1	4,55
10	No-load Speed	rpm	6200	6200	6340	5890
11	Line to Line Resistance	Ω	1,02	3,69	16,3	76,2
12	Line to Line Inductance	mH	0,058	0,231	0,881	4,08
13	Rotor Inertia	gcm ²	5,05	5,55	4,67	4,84
14	Max. Efficiency	%	84	85	84	84
15	Mechanical Time Constant	ms	6,14	6,07	5,93	6,19
16	Length (L)	mm	34,2	34,2	34,2	34,2
17	Weight	g	66	66	66	66

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	7160rpm
Radial play	0,02mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	3N
Max. Axial force	0,1N
Max. Force for Press fit	80N

Operating range: Winding 18V



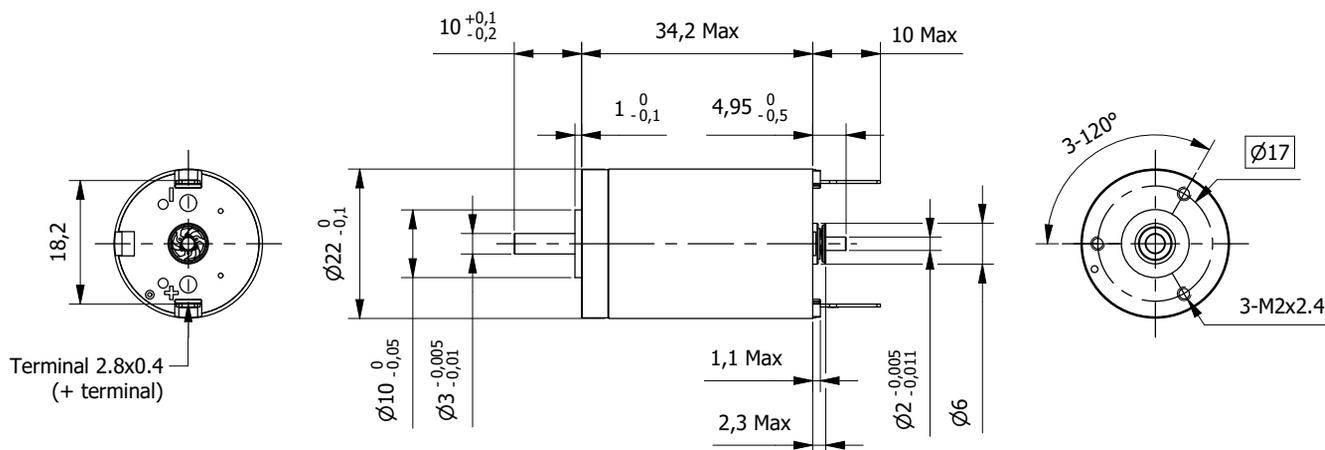
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC34N-G

Graphite brushes

Ø 22mm

14 to 15,3mNm

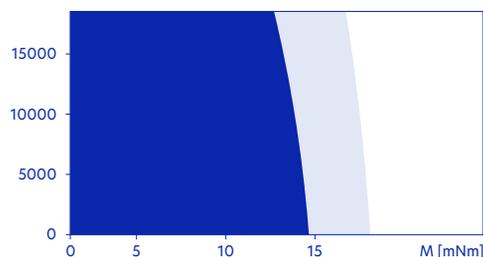


Product also available with ball bearings

Specification			...9702	...10701	...10803	...10916
1	Rated Voltage	V	6	12	24	48
2	Rated Speed	rpm	9700	10700	10800	10900
3	Rated Torque	mNm	14,4	14,6	15,3	14
4	Stall Torque	mNm	101	108	120	104
5	Torque Constant	mNm/A	5,01	9,18	18,4	35,9
6	Motor Regulation	10 ³ /Nms	11,8	12,1	10,9	12,9
7	Rated Current	A	3	1,65	0,869	0,406
8	Stall Current	A	20,2	11,8	6,51	2,9
9	No-load Current	mA	126	71,7	35,9	18,5
10	No-load Speed	rpm	11400	12400	12400	12700
11	Line to Line Resistance	Ω	0,297	1,02	3,69	16,6
12	Line to Line Inductance	mH	0,017	0,058	0,231	0,881
13	Rotor Inertia	gcm ²	5,27	5,05	5,55	4,67
14	Max. Efficiency	%	85	85	86	84
15	Mechanical Time Constant	ms	6,23	6,12	6,07	6,01
16	Length (L)	mm	34,2	34,2	34,2	34,2
17	Weight	g	66	66	66	66

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +100°C
Max. Winding Temperature	+125°C
Max. Speed	18000rpm
Radial play	0,02mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	3N
Max. Axial force	0,1N
Max. Force for Press fit	80N

Operating range: Winding 18V



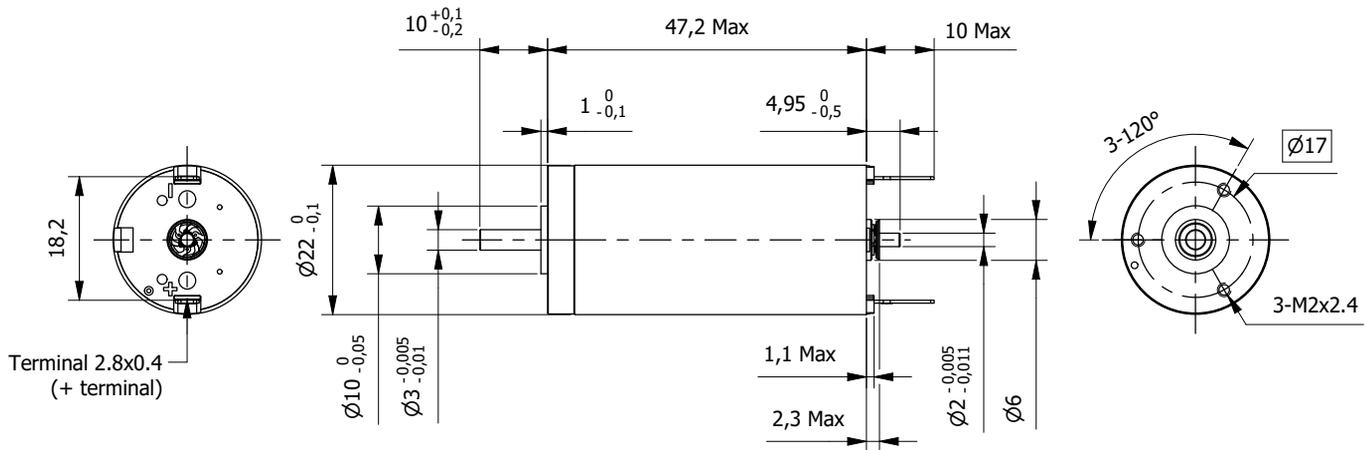
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC47N-PM

Precious Metal brushes

Ø 22mm

14,1 to 29,5mNm

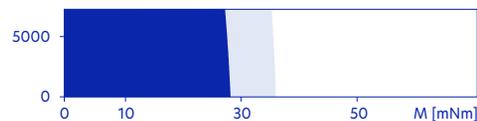


Product also available with ball bearings

Specification		...5303	...4001	...4007	...4129	
1	Rated Voltage	V	6	12	24	48
2	Rated Speed	rpm	5380	4000	4070	4180
3	Rated Torque	mNm	14,1	29,5	29,2	27,8
4	Stall Torque	mNm	170	150	150	140
5	Torque Constant	mNm/A	9,73	22,9	45,2	87,6
6	Motor Regulation	10 ³ /Nms	3,6	3,5	3,5	3,9
7	Rated Current	A	1,5	1,3	0,655	0,322
8	Stall Current	A	17,5	6,54	3,31	1,6
9	No-load Current	mA	51	20	10,2	5,36
10	No-load Speed	rpm	5870	4980	5060	5220
11	Line to Line Resistance	Ω	0,343	1,84	7,25	29,9
12	Line to Line Inductance	mH	0,035	0,192	0,746	2,8
13	Rotor Inertia	gcm ²	9,06	9	8,85	8,12
14	Max. Efficiency	%	89	89	89	89
15	Mechanical Time Constant	ms	3,28	3,14	3,14	3,17
16	Length (L)	mm	47,2	47,2	47,2	47,2
17	Weight	g	95	95	95	95

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	7160rpm
Radial play	0,02mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	3N
Max. Axial force	0,1N
Max. Force for Press fit	80N

Operating range: Winding 18V



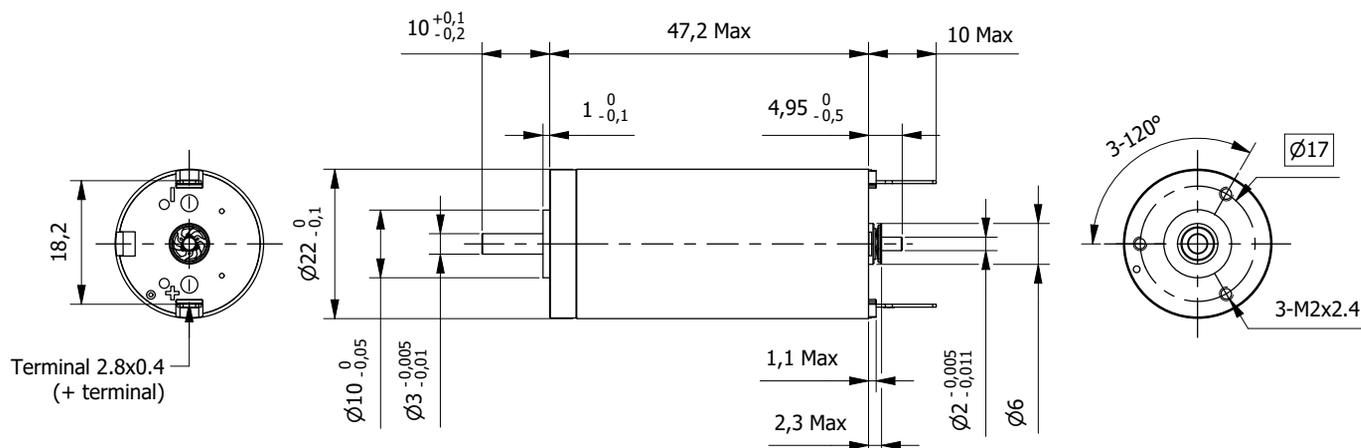
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC47N-G

Graphite brushes

Ø 22mm

27 to 30,5mNm

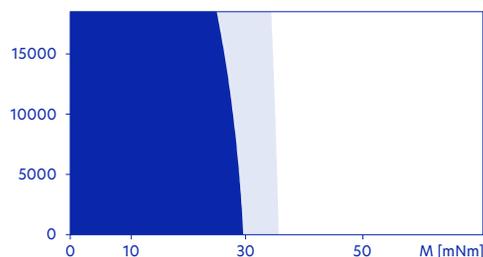


Product also available with ball bearings

Specification		...11401	...10703	...9007	
1	Rated Voltage	V	9	12	48
2	Rated Speed	rpm	11400	10700	9020
3	Rated Torque	mNm	27	30,5	30,3
4	Stall Torque	mNm	371	348	294
5	Torque Constant	mNm/A	6,95	9,73	45,2
6	Motor Regulation	10 ³ /Nms	3,5	3,5	3,6
7	Rated Current	A	4	3,21	0,687
8	Stall Current	A	53,4	35,8	6,5
9	No-load Current	mA	118	81,8	16,2
10	No-load Speed	rpm	12300	11700	10100
11	Line to Line Resistance	Ω	0,168	0,335	7,39
12	Line to Line Inductance	mH	0,018	0,035	0,746
13	Rotor Inertia	gcm ²	9,37	9,06	8,85
14	Max. Efficiency	%	90	91	90
15	Mechanical Time Constant	ms	3,27	3,21	3,2
16	Length (L)	mm	47,2	47,2	47,2
17	Weight	g	95	95	95

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +100°C
Max. Winding Temperature	+125°C
Max. Speed	18000rpm
Radial play	0,02mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	3N
Max. Axial force	0,1N
Max. Force for Press fit	80N

Operating range: Winding 18V



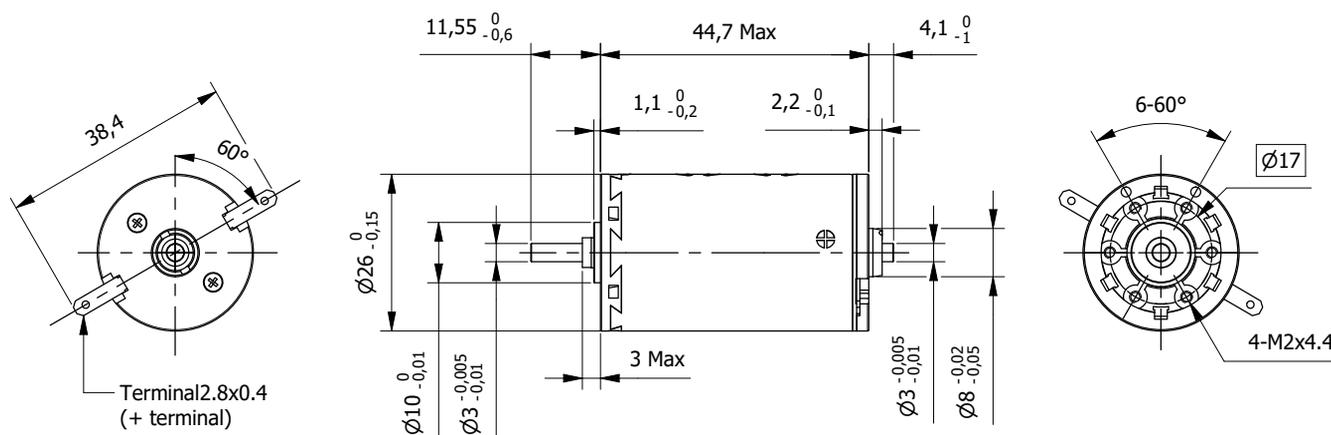
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 26DC44P-PM

Ø 26mm

Precious Metal brushes

20,8 to 28,8mNm

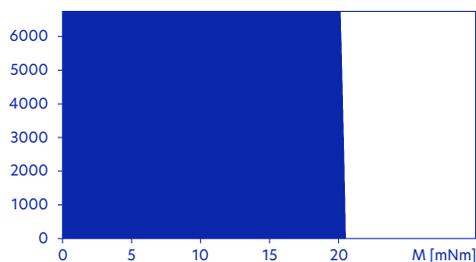


Product also available with ball bearings

Specification		...3702	...3409	
1	Rated Voltage	V	12	24
2	Rated Speed	rpm	3790	3450
3	Rated Torque	mNm	20,8	28,8
4	Stall Torque	mNm	140	138
5	Torque Constant	mNm/A	25,6	52,2
6	Motor Regulation	10 ³ /Nms	3,3	3,3
7	Rated Current	A	0,84	0,564
8	Stall Current	A	5,49	2,64
9	No-load Current	mA	271	13,2
10	No-load Speed	rpm	4460	4370
11	Line to Line Resistance	Ω	2,19	9,08
12	Line to Line Inductance	mH	0,278	1,16
13	Rotor Inertia	gcm ²	14,9	15,2
14	Max. Efficiency	%	87	87
15	Mechanical Time Constant	ms	4,99	5,06
16	Length (L)	mm	44,7	44,7
17	Weight	g	120	120

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +65°C
Max. Winding Temperature	+85°C
Max. Speed	6700rpm
Radial play	0,012mm
Axial play	0,1 to 0,2mm
Max. Radial force (5mm from flange)	5,5N
Max. Axial force	1,7N
Max. Force for Press fit	80N

Operating range: Winding 12V



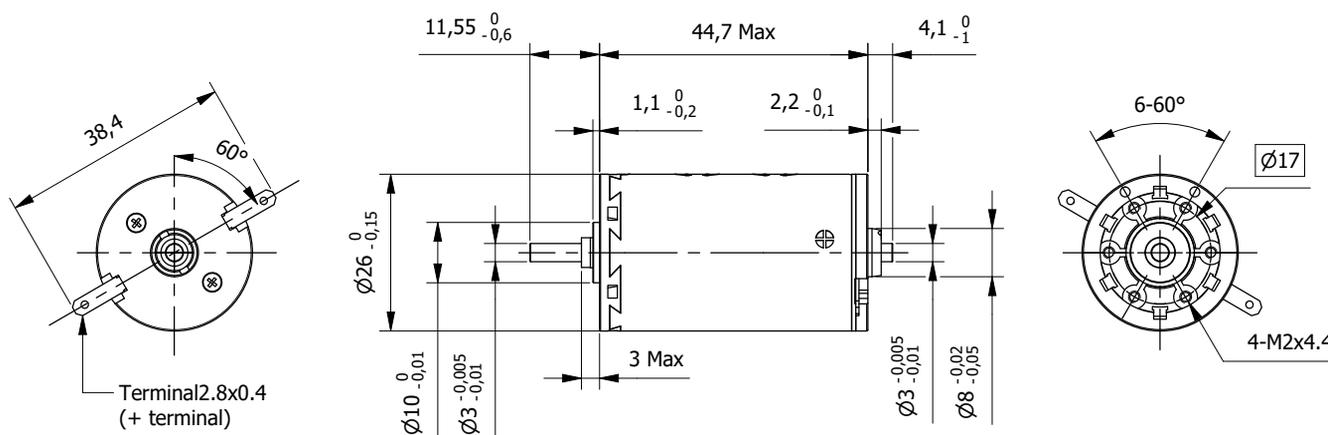
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 26DC44P-G

Ø 26mm

Graphite brushes

26,3 to 28,3mNm

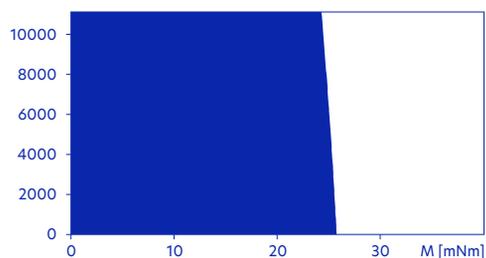


Product also available with ball bearings

Specification		...8102	...7809	
1	Rated Voltage	V	24	48
2	Rated Speed	rpm	8100	7840
3	Rated Torque	mNm	26,3	28,3
4	Stall Torque	mNm	287	277
5	Torque Constant	mNm/A	25,6	52,2
6	Motor Regulation	10 ³ /Nms	3,3	3,3
7	Rated Current	A	1,08	0,567
8	Stall Current	A	11,2	5,31
9	No-load Current	mA	53	25,7
10	No-load Speed	rpm	8920	8730
11	Line to Line Resistance	Ω	2,14	9,04
12	Line to Line Inductance	mH	0,278	1,16
13	Rotor Inertia	gcm ²	14,9	15,2
14	Max. Efficiency	%	87	87
15	Mechanical Time Constant	ms	4,89	5,04
16	Length (L)	mm	44,7	44,7
17	Weight	g	120	120

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	11000rpm
Radial play	0,012mm
Axial play	0,1 to 0,2mm
Max. Radial force (5mm from flange)	5,5N
Max. Axial force	1,7N
Max. Force for Press fit	80N

Operating range: Winding 24V



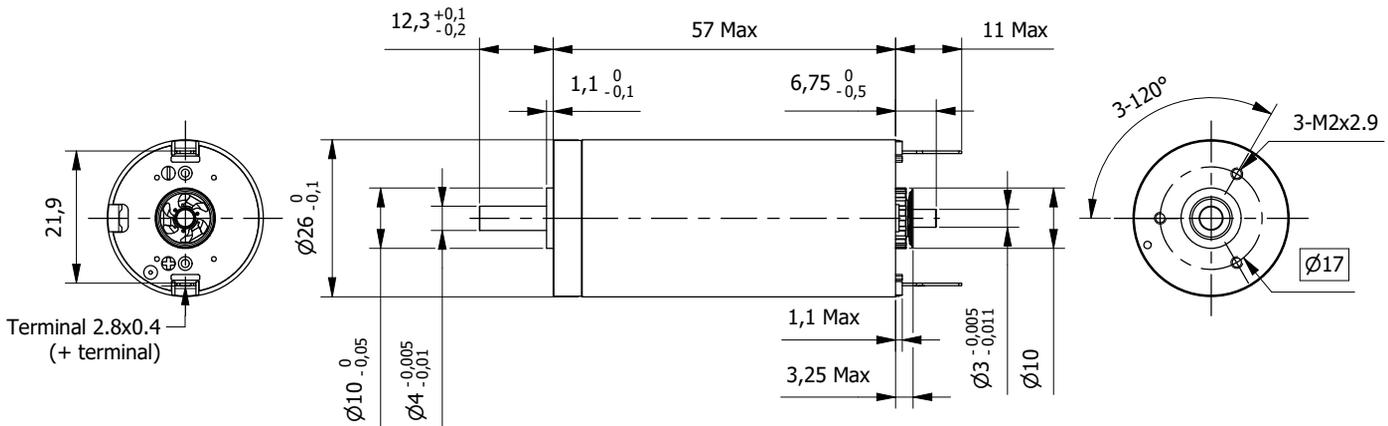
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 26DC57N-PM

Precious Metal brushes

Ø 26mm

32,9 to 52,3mNm

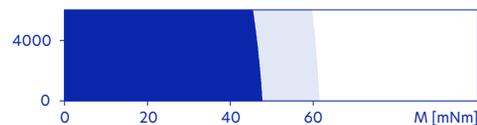


Product also available with ball bearings

Specification		...5003	...4606	...4602	...4511	
1	Rated Voltage	V	9	12	24	48
2	Rated Speed	rpm	5060	4690	4600	4570
3	Rated Torque	mNm	32,9	46,1	52,3	50,3
4	Stall Torque	mNm	384	384	384	355
5	Torque Constant	mNm/A	15,5	21,4	42,9	85,8
6	Motor Regulation	10 ³ /Nms	1,5	1,5	1,5	1,5
7	Rated Current	A	2,2	2,2	1,25	0,599
8	Stall Current	A	24,8	17,9	8,95	4,14
9	No-load Current	mA	80,5	56,8	28,4	14,2
10	No-load Speed	rpm	5530	5330	5330	5320
11	Line to Line Resistance	Ω	0,363	0,671	2,68	11,6
12	Line to Line Inductance	mH	0,067	0,129	0,514	2,06
13	Rotor Inertia	gcm ²	21,3	21,4	21,2	19,7
14	Max. Efficiency	%	89	89	89	89
15	Mechanical Time Constant	ms	3,23	3,13	3,09	3,11
16	Length (L)	mm	57	57	57	57
17	Weight	g	170	170	170	170

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +85°C
Max. Winding Temperature	+100°C
Max. Speed	5900rpm
Radial play	0,02mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	5,5N
Max. Axial force	0,1N
Max. Force for Press fit	80N

Operating range: Winding 18V



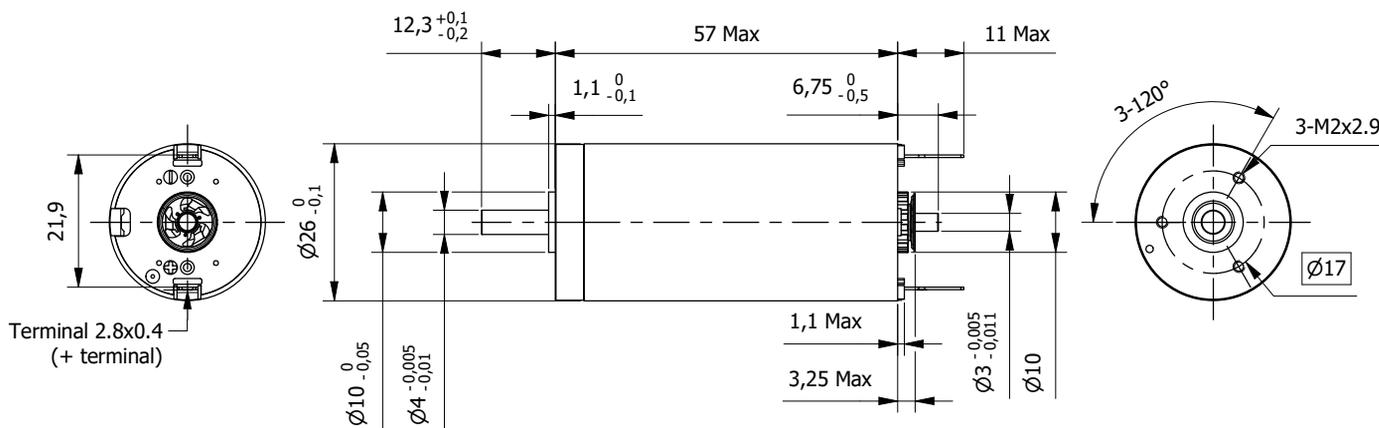
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 26DC57N-G

Graphite brushes

Ø 26mm

46,9 to 59,1mNm

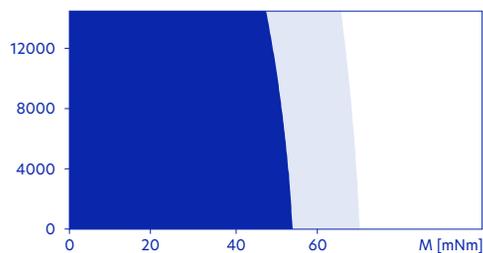


Product also available with ball bearings

Specification			...9402	...9607	...9702
1	Rated Voltage	V	12	24	48
2	Rated Speed	rpm	9460	9690	9730
3	Rated Torque	mNm	46,9	57,8	59,1
4	Stall Torque	mNm	532	695	697
5	Torque Constant	mNm/A	10,7	21,4	42,9
6	Motor Regulation	10 ³ /Nms	2,1	1,6	1,6
7	Rated Current	A	4,5	2,76	1,41
8	Stall Current	A	49,7	32,4	16,2
9	No-load Current	mA	131	65,7	32,9
10	No-load Speed	rpm	10600	10700	10700
11	Line to Line Resistance	Ω	0,242	0,74	2,95
12	Line to Line Inductance	mH	0,032	0,129	0,514
13	Rotor Inertia	gcm ²	21,4	21,4	21,2
14	Max. Efficiency	%	88	91	91
15	Mechanical Time Constant	ms	4,5	3,45	3,4
16	Length (L)	mm	57	57	57
17	Weight	g	170	170	170

Characteristics	
Item	
Ambient Temperature Sleeve bearings	-30°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	8600rpm
Radial play	0,02mm
Axial play	0 to 0,2mm
Max. Radial force (5mm from flange)	5,5N
Max. Axial force	0,1N
Max. Force for Press fit	80N

Operating range: Winding 18V



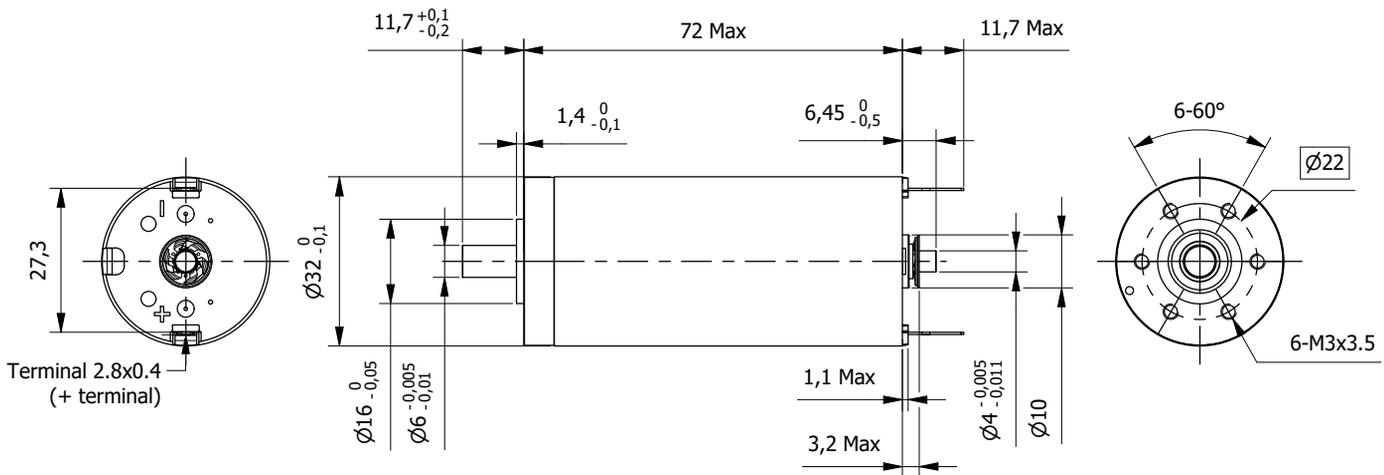
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 32DC72N-G

Graphite brushes

Ø 32mm

89,4 to 123mNm

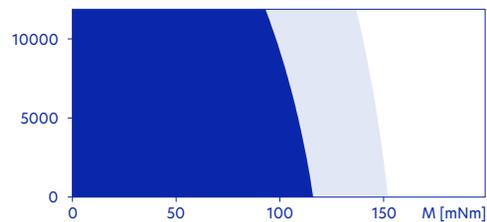


Brushed DC

Specification		...6501	...7703	...7201	
1	Rated Voltage	V	12	24	48
2	Rated Speed	rpm	6560	7710	7260
3	Rated Torque	mNm	89,4	108	123
4	Stall Torque	mNm	1730	1980	2000
5	Torque Constant	mNm/A	15,6	27,3	58,5
6	Motor Regulation	10 ³ /Nms	0,4	0,4	0,4
7	Rated Current	A	6	4,12	2,17
8	Stall Current	A	111	72,5	34,2
9	No-load Current	mA	274	164	75,2
10	No-load Speed	rpm	7120	8270	7780
11	Line to Line Resistance	Ω	0,108	0,331	1,4
12	Line to Line Inductance	mH	0,034	0,103	0,473
13	Rotor Inertia	gcm ²	77,6	72,8	75,9
14	Max. Efficiency	%	85	88	90
15	Mechanical Time Constant	ms	3,44	3,24	3,11
16	Length (L)	mm	72	72	72
17	Weight	g	325	325	325

Characteristics	
Item	
Ambient Temperature Ball bearings	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	11300rpm
Radial play	0,02mm
Axial play	0 to 0,1mm
Max. Radial force (5mm from flange)	65,3N
Max. Axial force	7N
Max. Force for Press fit	22,6N

Operating range: Winding 36V



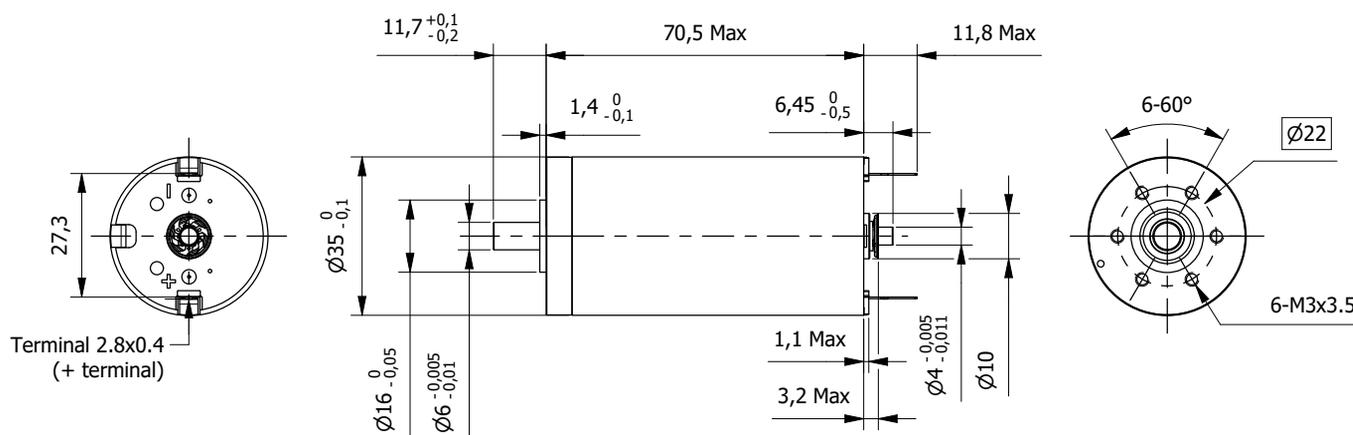
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 35DC70N-G

Ø 35mm

Graphite brushes

77,7 to 138mNm



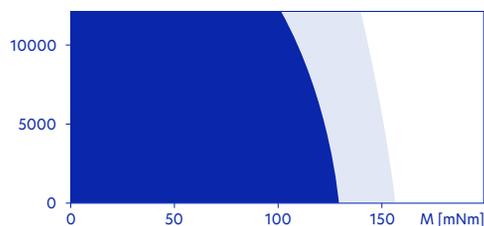
Specification

Model	...	...7607	...7103	...6101	
1	Rated Voltage	V	12	24	48
2	Rated Speed	rpm	7610	7160	6140
3	Rated Torque	mNm	77,7	121	138
4	Stall Torque	mNm	2080	2030	1860
5	Torque Constant	mNm/A	13,7	29,3	68,3
6	Motor Regulation	10 ³ /Nms	0,4	0,4	0,4
7	Rated Current	A	6	4,26	2,08
8	Stall Current	A	152	69,3	27,3
9	No-load Current	mA	320	146	58,6
10	No-load Speed	rpm	8130	7720	6670
11	Line to Line Resistance	Ω	0,079	0,346	1,76
12	Line to Line Inductance	mH	0,026	0,121	0,658
13	Rotor Inertia	gcm ²	99,5	96,6	99,5
14	Max. Efficiency	%	85	89	90
15	Mechanical Time Constant	ms	4,21	3,91	3,76
16	Length (L)	mm	70,5	70,5	70,5
17	Weight	g	385	385	385

Characteristics

Item	
Ambient Temperature Ball bearings	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	12300rpm
Radial play	0,02mm
Axial play	0 to 0,1mm
Max. Radial force (5mm from flange)	65,3N
Max. Axial force	7N
Max. Force for Press fit	22,6N

Operating range: Winding 36V



- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation



Brushed DC

Permanent Magnet motors

Advantages at a glance

High power-to-size ratio
Easy to operate
Extended motor life

Permanent Magnet DC motors - NEW

	Torque* (Nm)	
42DI	0,038...0,057	54
52DI	0,09...0,22	55
63DI	0,18...0,27	56

The key advantage of PMDC motors lies in their high power-to-size ratio. The presence of permanent magnets ensures strong magnetic fields, leading to increased torque and power output. This makes PMDC motors an excellent choice for applications where space is limited, without compromising on performance, and offer an ideal solution for all those customers that still want to rely on a well-established and trusted technology that provides easy-to-operate, long lasting and high torque capacity motors.

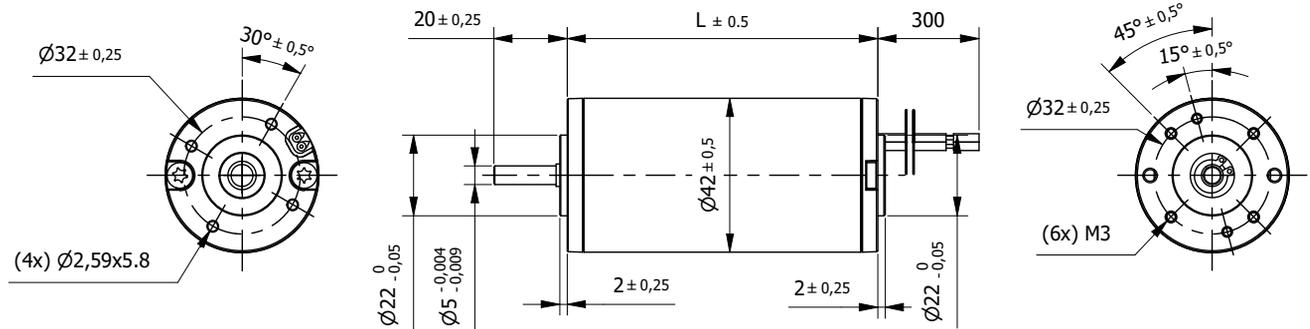
* Rated Torque

Brushed PMDC Motor 42DI

Permanent Magnet

Ø 42mm

0,038 - 0,057Nm



Specification			...70-G3002	...70-G3007	...70-G3035	...85-G3001	...85-G3005	...85-G3021
1	Rated Voltage	V	12	24	48	12	24	48
2	Rated Speed	rpm	3000	3000	3000	3000	3000	3000
3	Rated Torque	Nm	0,038	0,038	0,038	0,057	0,057	0,057
4	Peak Torque	Nm	0,06	0,06	0,06	0,09	0,09	0,09
5	Stall Torque	Nm	0,13	0,14	0,14	0,27	0,27	0,27
6	Torque Constant	Nm/A	0,03	0,05	0,11	0,029	0,06	0,12
7	Speed Constant	rpm/V	354,6	175,1	84	340	165	84
8	Rated Current	A	1,60	0,78	0,38	2,16	1,06	0,53
9	Stall Current	A	5,3	2,78	1,35	9,6	4,64	2,3
10	No-load Current	A	0,28	0,15	0,038	0,22	0,11	0,05
11	No-load Speed	rpm	4091	4006	4115	4128	4064	4064
12	Line to Line Resistance	Ω	2,09	7,02	35,5	1,25	5,17	20,8
13	Rotor Inertia	gcm ²	100	100	100	140	140	140
14	Max. Efficiency	%	71	71	71	77	77	77
15	Length (L)	mm	70	70	70	85	85	85
16	Weight	Kg	0,39	0,39	0,39	0,52	0,52	0,52

Characteristics

Item	
Ambient Temperature Ball Bearings	40°
Radial Load (15 mm from front flange)	350 N
Protection Class	IP54
Insulation Class	F

Connection

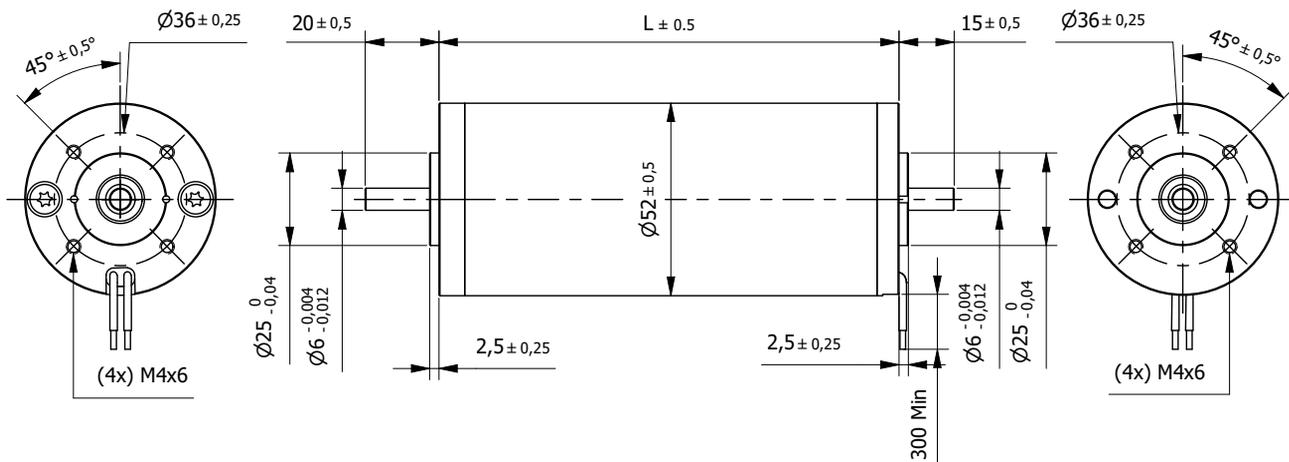
n°	Color	Gauge	Function
1	Black	UL1569 AWG22	(V-)
2	Red	UL1569 AWG22	(V+)

Brushed PMDC Motor 52DI

Permanent Magnet

Ø 52mm

0,09 - 0,22Nm



Brushed DC

Specification			...95-G3001	...95-G3002	...95-G3007	...125-G3000	...125-G3001	...125-G3003
1	Rated Voltage	V	12	24	48	12	24	48
2	Rated Speed	rpm	3000	3000	3000	3000	3000	3000
3	Rated Torque	Nm	0,09	0,09	0,09	0,22	0,22	0,22
4	Peak Torque	Nm	0,15	0,15	0,15	0,35	0,35	0,35
5	Stall Torque	Nm	0,45	0,5	0,56	1	1,1	1
6	Torque Constant	Nm/A	0,021	0,06	0,12	0,031	0,056	0,1
7	Speed Constant	rpm/V	294	154,9	76,7	307	161,8	80,8
8	Rated Current	A	3,60	1,7	0,9	7,6	3,9	2,2
9	Stall Current	A	19	9,8	5	35,6	19	9,5
10	No-load Current	A	0,46	0,51	0,2	0,37	0,4	0,16
11	No-load Speed	rpm	3550	3561	3547	3760	3840	3838
12	Line to Line Resistance	Ω	0,63	1,93	6,69	0,33	0,94	3,42
13	Rotor Inertia	gcm ²	233	233	233	570	570	570
14	Max. Efficiency	%	76	78	71	79	80	80
15	Length (L)	mm	95	95	95	125	125	125
16	Weight	Kg	0,85	0,85	0,85	1,16	1,16	1,16

Characteristics	
Item	
Ambient Temperature Ball Bearings	40°
Radial Load (15 mm from front flange)	90 N
Protection Class	IP54
Insulation Class	F

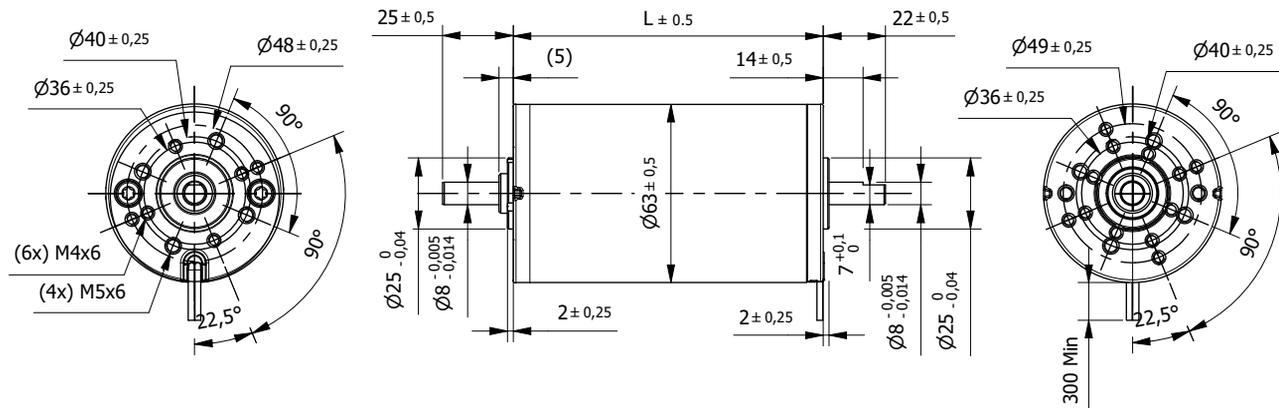
Connection			
n°	Color	Gauge	Function
1	Black	UL3266 AWG18	(V-)
2	Red	UL3266 AWG18	(V+)

Brushed PMDC Motor 63DI

Permanent Magnet

Ø 63mm

0,18 - 0,27Nm



Specification			...95-G3000	...95-G3002	...95-G3005	...125-G3000	...125-G3001	...125-G3002
1	Rated Voltage	V	12	24	48	12	24	48
2	Rated Speed	rpm	3000	3000	3000	3000	3000	3000
3	Rated Torque	Nm	0,18	0,18	0,18	0,27	0,27	0,27
4	Peak Torque	Nm	0,3	0,3	0,3	0,45	0,45	0,45
5	Stall Torque	Nm	1,9	0,7	0,8	2,4	1,65	2,2
6	Torque Constant	Nm/A	0,03	0,06	0,12	0,03	0,06	0,1
7	Speed Constant	rpm/V	301	151,7	76,5	287	150,9	75,4
8	Rated Current	A	6,40	3,00	1,6	9,1	4,7	2,4
9	Stall Current	A	64	11,8	6,9	75	27,9	19,2
10	No-load Current	A	0,64	0,3	0,15	0,53	0,31	0,18
11	No-load Speed	rpm	3581	3591	3621	3521	3617	3613
12	Line to Line Resistance	Ω	0,19	1,65	5,13	0,16	0,59	2,3
13	Rotor Inertia	gcm ²	740	740	740	930	930	930
14	Max. Efficiency	%	79	84	84	81	81	85
15	Length (L)	mm	95	95	95	125	125	125
16	Weight	Kg	0,85	0,85	0,85	1,16	1,16	1,16

Characteristics

Item	
Ambient Temperature Ball Bearings	40°
Radial Load (15 mm from front flange)	150 N
Protection Class	IP54
Insulation Class	F

Connection

n°	Color	Gauge	Function
1	Black	UL3266 AWG16	(V-)
2	Red	UL3266 AWG16	(V+)

Brushless DC



Slotless motors -
SBL series
Standard

p.103



Slotless motors -
EC series
High Performance

p.111



Slotted motors -
BL series
Standard

p.69



Slotted motors -
EC series
High Performance

p.87



Slotted motors -
CBL series
Economy

p.93



Motors
with Encoder

p.129



Flat motors

p.135



Flat motors
with Encoder

p.147



Frameless
motors

p.153

Brushless DC motors

BLDC Slotted motors - BL Standard series		Torque* (Nm)	69
22BL		0,008...0,02	70
28BL		0,005...0,05	71
33BL		0,022...0,05	72
40BL		0,043...0,083	73
42BL - square - 8pole		0,063...0,25	74
42BLA - square - 10pole		0,07...0,36	75
42BLB - square - 6pole		0,064...0,43	76
42RBL		0,02...0,15	77
57BL - 4pole		0,055...0,44	78
57BLA - 6pole		0,2...0,8	79
57BLB - square		0,3...0,6	80
70BLS		0,5...1,5	81
80BLS		0,9...3	82
86BLC		0,4...2,22	83
86BLS		0,35...2,1	84
BLDC Slotted motors - EC High Performance series		Torque* (Nm)	87
22EC43...82N		0,03...0,08	88
BLDC Slotted motors - CBL Economy series		Torque* (Nm)	93
24CBL30		0,006	94
28CBL		0,028...0,05	95
36CBL		0,015...0,09	96
38CBL58		0,07	97
42CBL		0,068...0,15	98
48CBL68		0,18	99
BLDC Slotless motors - SBL Standard series		Torque* (Nm)	103
10SBL19		0,0005	104
14SBL45		0,004	105
16SBL		0,002...0,009	106
22SBL		0,006...0,025	107
28SBL		0,018...0,06	108
40SBL		0,2...0,25	109
BLDC Slotless motors - EC High Performance series		Torque* (Nm)	111
16EC24...36P		0,003...0,008	112
16EC40...56NS		0,007...0,016	114
22EC32P		0,010...0,011	116
22EC44NS		0,018...0,02	117
22EC48P		0,023	118
22EC48T		0,043...0,045	119
22EC60NS		0,027...0,029	120
22EC66T		0,055	121
30EC42P		0,034	122
30EC47T		0,069...0,073	123
30EC64P		0,061...0,064	124
30EC64T		0,093...0,096	125
40EC58...88P		0,09...0,21	126
BLDC motors with Encoder		Torque* (Nm)	129
42SVA		0,062...0,25	130
57SVA		0,3...0,6	131
86SVA		0,4...1,6	132
BLDC Flat motors		Torque* (Nm)	135
20BLW14		0,008	136
32BLW18		0,025	137
45BLW16		0,055	138
45BLW Connector		0,05...0,13	139
45BLW Wires		0,05...0,13	140
60BLWA38		0,5	141
60BLW40		0,3	142
60BLW40 - IP54		0,3	143
90BLW		0,46...0,96	144
BLDC Flat motors with Encoder		Torque* (Nm)	147
45BLW29-E		0,13	148
60BLW42-E		0,29	149
90BLW42-E		0,96	150
BLDC Frameless motors		Torque* (Nm)	153
38BLF - NEW		0,1	154
50BLF		0,3...0,5	155
70BLF		0,55...1	156
85BLF		1,2...2	157
115BLF		3,9...9,5	158

* Rated Torque

Term	
N. of pole	Areas of a motor where a magnetic pole is generated either by a permanent magnet or by passing current through the coils of a winding.
N. of phase	A group of electrically connected coils.
Rated Voltage	The voltage at which rated torque is generated with the motor at ambient temperature.
Rated Speed	The approximate motor speed at its rated torque point.
Rated Torque	The maximum torque, at rated speed, the motor can produce on a continuous basis, without exceeding the thermal rating of the motor.
Max. Peak Torque	The maximum torque a motor can produce for short periods of time, before irreversible demagnetization of the motor's magnets occurs.
Torque constant	The ratio of a motor's output torque to the motor's input power
Rated Current	The approximate amount of current the motor will draw at its rated torque point.
Max. Peak Current	The current drawn by the motor when delivering peak torque
No-load speed	Is the speed at which the unloaded motor runs with the rated voltage applied. It is approximately proportional to the applied voltage.
No-Load Current	The current consumption of the motor at rated voltage and under no-load conditions. This value varies proportionally to speed and is influenced by temperature
Motor regulation	This value is a key performance indicator of a motor, indicating the amount of torque the motor can produce for a certain temperature rise (Joule losses). A lower number indicates a better power density.
Line to Line resistance	This is the phase resistance measured for the completed motor at room temperature. It includes solder, wire and (if present) connector resistances. In motors with very low resistance, the line to line resistance may differ significantly from the internal resistance.
Line to Line Inductance	This is the motor phase inductance measured with an inductance meter at 1000 Hz.
Rotor Inertia	Is the mass moment of inertia of the rotor, based on the axis of rotation.
Max. efficiency	Is the calculated load torque that brings the shaft to standstill at nominal voltage. It also doesn't always denote the optimal operating point.
Mechanical time constant	Is the time required for the rotor to accelerate from standstill to 63% of its no load speed.
Length	Total motor length.
Weight	Total motor mass.
Hall Effect angle	Phase angle at which hall sensors are positioned from each other.
Shaft run out	Is the geometric tolerance that specifies the run-out fluctuation of a target's feature when the target (part) is rotated on an axis (specified straight line).
Insulation class	The electrical insulation system for wires and other wire-wound electrical components is divided into different classes by temperature and temperature rise. The electrical insulation system is sometimes referred to as insulation class or thermal classification.
Ambient temperature ball bearings	Operating temperature range. This derives from the heat reliability of the materials used and viscosity of bearing lubrication.
Max. winding temperature	Maximum permissible winding temperature.
Max. speed	Is the maximum recommended speed based on thermal and mechanical perspectives. A reduced service life can be expected at higher speeds.
Protection class	IP (or "Ingress Protection") ratings are defined in international standard EN 60529 (British BS EN 60529:1992, European IEC 60509:1989). They are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt etc) and moisture.
Radial Play	The shaft displacement perpendicular to the shaft due to a side force applied perpendicular to the shaft axis.
Axial Play	Axial shaft displacement occurring during a reversal of an axial force on the shaft.
Max. Radial force	Maximum force that can be applied to the shaft in the radial direction (any direction perpendicular to the motor shaft axis).
Max. Axial force	Maximum force that can be applied to the shaft in the axial direction (in the same axis as or parallel to the motor shaft axis).
Dielectric strength	A dielectric test (also known as hipot or high potential test) is performed on all motors under 500V phases to the housing and during 5 seconds after voltage ramp up. Maximum allowed leakage is 1mA
Insulation resistance	The measurement of insulation resistance is carried out by means of a megohmmeter - high resistance range ohmmeter. DC voltage is applied between the windings and the ground of the motor.

Glossary

Product families

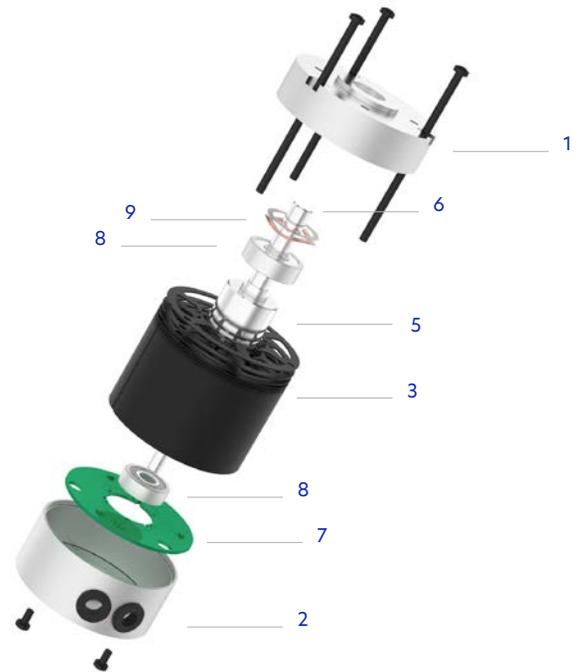
- Brushless DC Slotted motors
- Brushless DC Slotless motors
- Brushless DC motors with Encoder
- Brushless DC Flat motors
- Brushless DC Frameless motors

Brushless motors offer several advantages over brushed DC motors, including high torque to weight ratio, more torque per watt (increased efficiency), increased reliability, reduced noise, longer lifetime (no brush and commutator erosion), elimination of ionizing sparks from the commutator, and an overall reduction of electromagnetic interference (EMI). With no windings on the rotor, they are not subjected to centrifugal forces, and because the windings are supported by the housing, they can be cooled by conduction, requiring no airflow inside the motor for cooling. This in turn means that the motor's internals can be entirely enclosed and protected from dirt or other foreign matter.

Composition

- | | |
|---|--------------------------|
| 1 | Flange |
| 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) |

BLDC Slotted motor



Brushless Slotted motors are particularly suitable for high speeds. The air gap in a slotted motor is smaller than the air gap in a slotless design (which must accommodate the self-supported winding assembly). This means that the flux density is higher in a slotted motor, and torque production is more effective and efficient.

Brushless DC Slotted motors

The slotless stator design originated with the goal to deliver smooth-running performance and eliminate cogging, which is an unwanted characteristic especially in slower-running applications (less than 500 rpm). Our slotless motors are typically designed with sinusoidal torque output that produces negligible distortion. Slotless motors have a larger rotor diameter than slotted construction for the same outside motor diameter, and will generate a higher inertia, as well as accommodating more magnet material for greater torque.

Brushless DC Slotless motors

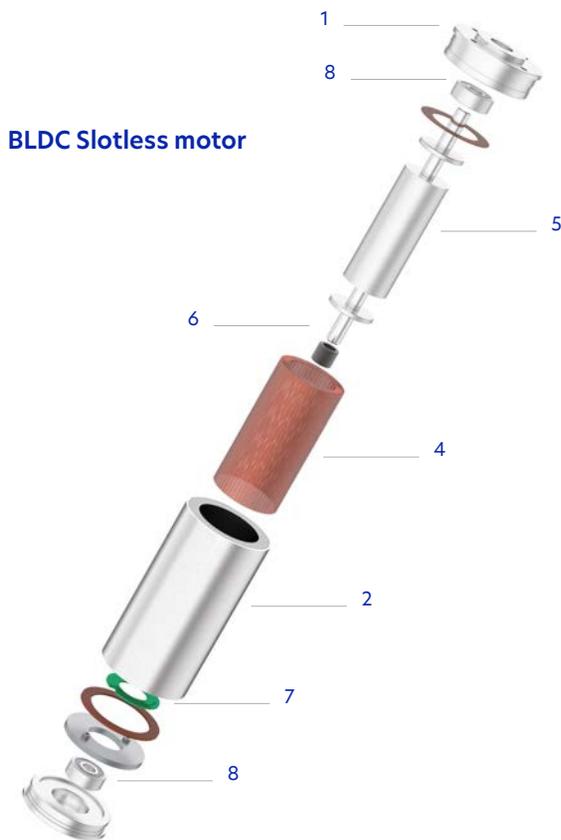
Our flat brushless DC motors have an extremely flat design, ranging from 14 to 40mm. The specific design gives these products an exceptional power to volume ratio, while keeping them very light and compact. Thanks to a high number of poles (starting at 8 till 22 poles), these motors offer very good control also at low speed, as well as a smooth and precise speed control.

Brushless DC Flat motors

One of the latest additions to our range, these motors allow for maximum integration with your assembly. Frameless motors reduce waste and redundancy by eliminating the need for additional mounting supports, plates, or brackets. Stator and rotor can be seamlessly incorporated into the system, reducing size without sacrificing performance and avoiding designing the application to fit the motor.

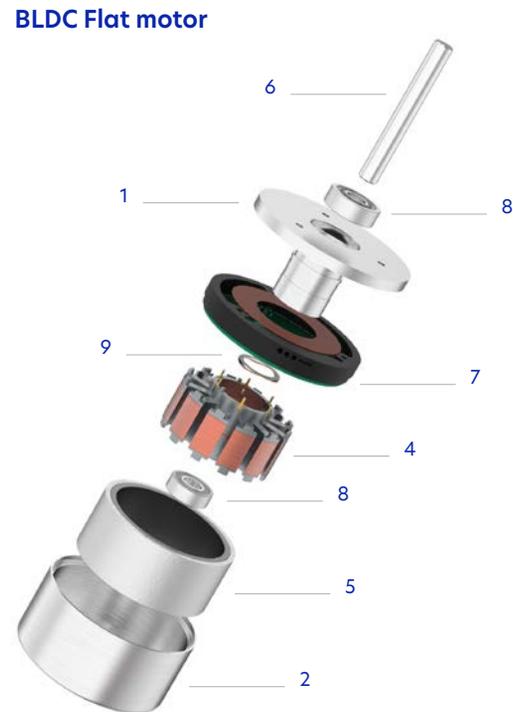
Brushless DC Frameless motors

Technical introduction



Our BLDC slotted motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested by the system. The presence of an encoder is highly recommended when it is critical to know the status of the motor (both position and speed) in every instant.

Brushless DC motors with Encoder



In order to energize the correct stator winding, the rotor position must be known. This is the job of the Hall effect sensors—to monitor the rotor's position. BLDC motors typically have three Hall effect sensors mounted either to the stator or to the rotor, and use what is known as six-step commutation. When the rotor passes a sensor, it produces either a high or a low signal to indicate which rotor pole (N or S) has passed.

Hall sensors

All our motors use only Neodymium rare earth magnets. Both bonded and sintered version are used depending on power and motor type. In specific cases other type of magnet can be integrated.

Magnets



Slotted motors -
BL series
Standard

p.69



Slotted motors -
EC series
High Performance

p.87



Slotted motors -
CBL series
Economy

p.93

Brushless DC **Slotted motors**

Advantages at a glance

Low cogging
 Higher inertia
 High speed

The air gap in a Brushless Slotted DC motor is smaller than the air gap in a slotless design (which must accommodate the self-supported winding assembly). This means that the flux density is higher in a slotted motor, and torque production is more effective and efficient.

BLDC Slotted motors - BL Standard series	Torque* (Nm)	69
22BL	0,008...0,02	70
28BL	0,005...0,05	71
33BL	0,022...0,05	72
40BL	0,043...0,083	73
42BL - square - 8pole	0,063...0,25	74
42BLA - square - 10pole	0,07...0,36	75
42BLB - square - 6pole	0,064...0,43	76
42RBL	0,02...0,15	77
57BL - 4pole	0,055...0,44	78
57BLA - 6pole	0,2...0,8	79
57BLB - square	0,3...0,6	80
70BLS	0,5...1,5	81
80BLS	0,9...3	82
86BLC	0,4...2,22	83
86BLS	0,35...2,1	84

BLDC Slotted motors - EC High Performance series	Torque* (Nm)	87
22EC43N	0,03	88
22EC58N	0,05	89
22EC82N	0,08	90

BLDC Slotted motors - CBL Economy series	Torque* (Nm)	93
24CBL30	0,006	94
28CBL	0,028...0,05	95
36CBL	0,015...0,09	96
38CBL58	0,07	97
42CBL	0,068...0,15	98
48CBL68	0,18	99

* Rated Torque

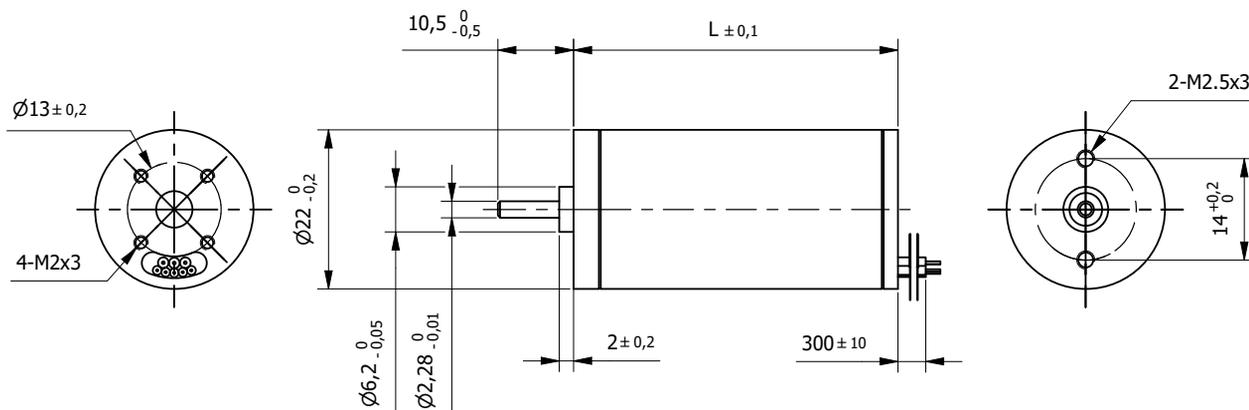


BLDC Slotted motors

BL series - Standard

BLDC Slotted motors - BL Standard series	Torque* (Nm)	
22BL	0,008...0,02	70
28BL	0,005...0,05	71
33BL	0,022...0,05	72
40BL	0,043...0,083	73
42BL - square - 8pole	0,063...0,25	74
42BLA - square - 10pole	0,07...0,36	75
42BLB - square - 6pole	0,064...0,43	76
42RBL	0,02...0,15	77
57BL - 4pole	0,055...0,44	78
57BLA - 6pole	0,2...0,8	79
57BLB - square	0,3...0,6	80
70BLS	0,5...1,5	81
80BLS	0,9...3	82
86BLC	0,4...2,22	83
86BLS	0,35...2,1	84

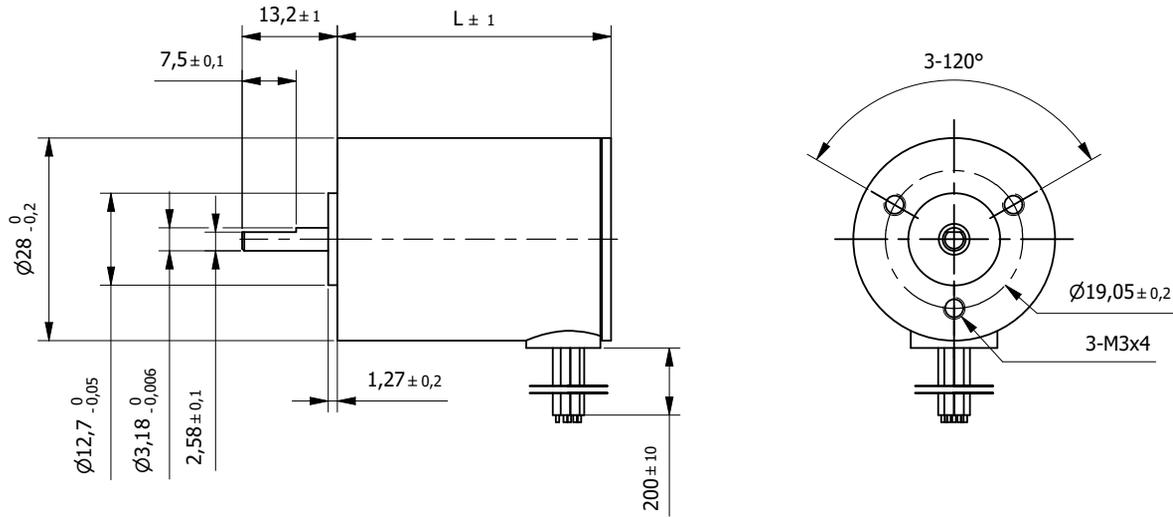
* Rated Torque



Specification			
Model		22BL45	22BL70
1	n° of Pole	8	8
2	n° of Phase	3	3
3	Rated Voltage	V	24
4	Rated Speed	rpm	4600
5	Rated Torque	Nm	0,008
6	Max. Peak Torque	Nm	0,024
7	Torque Constant	Nm/A	0,030
8	Rated Current	A	0,26
9	Max. Peak Current	A	1,1
10	No-Load Current	mA	150
11	Line to Line Resistance	Ω	23
12	Line to Line Inductance	mH	6,2
13	Rotor Inertia	gcm ²	0,66
14	Length (L)	mm	45
15	Weight	Kg	0,07

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	10N
Max. Axial force	2N
Dielectric strength (for 1 sec.)	360 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1430 AWG28	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Orange		Hall B
4	Brown		Hall C
5	White		GND Hall
6	Green	UL1430 AWG26	Phase U
7	Red		Phase V
8	Black		Phase W

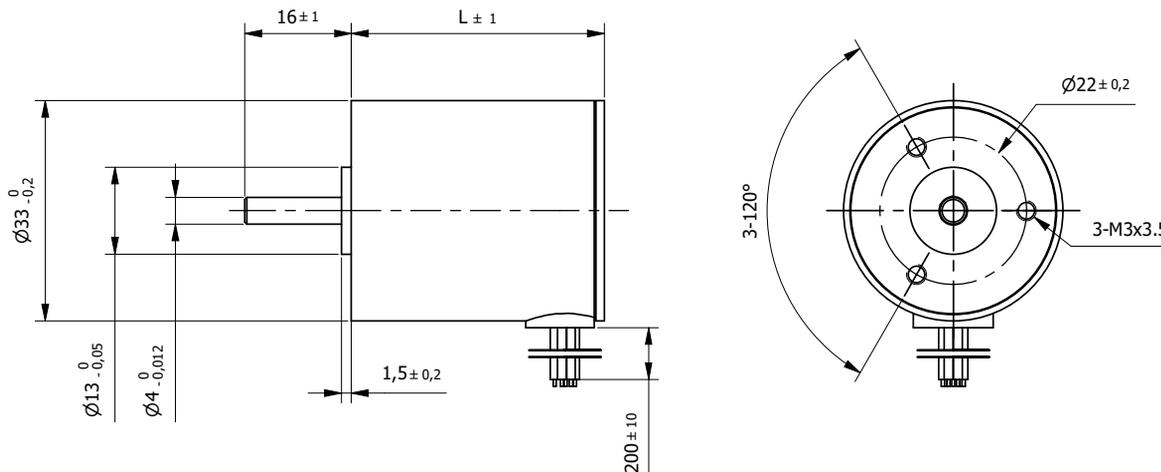


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

Specification		28BL26	28BL38	28BL77
1	n° of Pole	4	4	4
2	n° of Phase	3	3	3
3	Rated Voltage	V	15	24
4	Rated Speed	rpm	8000	3100
5	Rated Torque	Nm	0,005	0,016
6	Max. Peak Torque	Nm	0,015	0,048
7	Torque Constant	Nm/A	0,014	0,024
8	Rated Current	A	0,35	0,67
9	Max. Peak Current	A	1,3	2
10	No-Load Current	mA	200	200
11	Line to Line Resistance	Ω	8,2	7,4
12	Line to Line Inductance	mH	2,3	2
13	Rotor Inertia	gcm ²	2,35	3,69
14	Length (L)	mm	26	38
15	Weight	Kg	0,06	0,082

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	10N
Max. Axial force	2N
Dielectric strength (for 1 min.)	360 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Orange		Hall B
4	Brown		Hall C
5	White		GND Hall
6	Green		Phase U
7	Red		Phase V
8	Black		Phase W

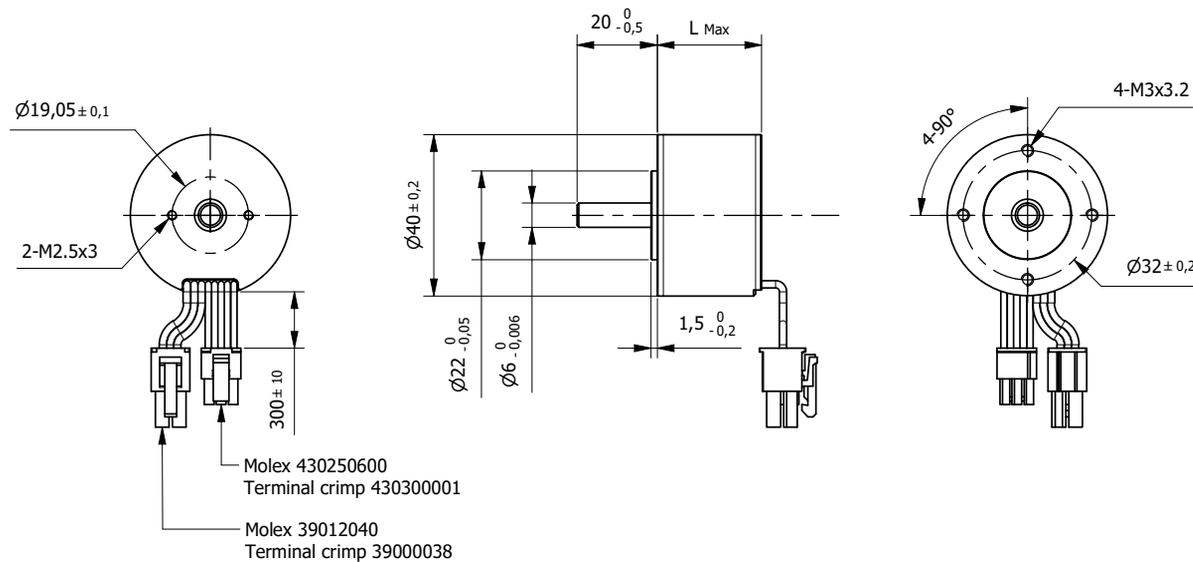


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

Specification		33BL38	33BL80
1	n° of Pole	4	4
2	n° of Phase	3	3
3	Rated Voltage	V 24	24
4	Rated Speed	rpm 3000	7800
5	Rated Torque	Nm 0,022	0,05
6	Max. Peak Torque	Nm 0,066	0,15
7	Torque Constant	Nm/A 0,046	0,023
8	Rated Current	A 0,48	2,17
9	Max. Peak Current	A 1,45	4,8
10	No-Load Current	mA 100	450
11	Line to Line Resistance	Ω 14,2	0,86
12	Line to Line Inductance	mH 7	0,55
13	Rotor Inertia	gcm ² 7,95	23,55
14	Length (L)	mm 38	80
15	Weight	Kg 0,085	0,2

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	10N
Max. Axial force	2N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1007 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Orange	|	Hall B
4	Brown	|	Hall C
5	White	|	GND Hall
6	Green	UL1007 AWG22	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

Specification		40BL26-12V	40BL26-24V	40BL36-18V	40BL36-36V	
1	n° of Pole	14	14	14	14	
2	n° of Phase	3	3	3	3	
3	Rated Voltage	V	12	24	18	36
4	Rated Speed	rpm	9660	10300	8230	8740
5	Rated Torque	Nm	0,043	0,052	0,069	0,083
6	Max. Peak Torque	Nm	0,12	0,16	0,21	0,25
7	Torque Constant	Nm/A	0,009	0,017	0,017	0,034
8	Rated Current	A	5,06	3,06	4,06	2,44
9	Max. Peak Current	A	13,4	9,35	12,3	7,5
10	No-Load Current	mA	522	285	354	192
11	Line to Line Resistance	Ω	0,28	0,5	0,34	0,84
12	Line to Line Inductance	mH	0,11	0,39	0,18	0,64
13	Rotor Inertia	gcm ²	10,5	10,5	24,2	24,2
14	Length (L)	mm	26	26	36	36
15	Weight	Kg	0,17	0,17	0,24	0,24

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	F
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,15mm
Max. Radial force (5mm from flange)	15N
Max. Axial force	5N
Dielectric strength (for 1 sec.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

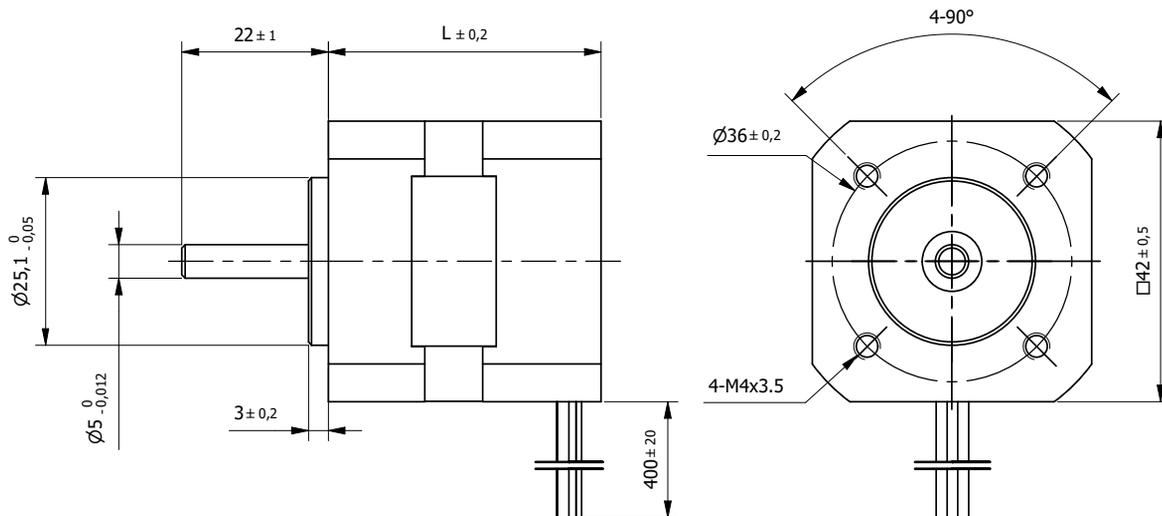
Connection			
Pin n°	Color	Gauge	Function
1	Red	UL1332 AWG20	Phase U
2	Black		Phase V
3	White		Phase W
1	Yellow	UL1332 AWG26	Hall A
2	Brown		Hall B
3	Gray		Hall C
4	Blue		GND Hall Sensor Ground
5	Green		Vcc Hall Sensor +5 to +24 Vdc

Brushless Slotted Motor 42BL

8-pole

□ 42mm

0,063 - 0,25Nm



BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

Specification		42BL41	42BL61	42BL81	42BL100
1	n° of Pole	8	8	8	8
2	n° of Phase	3	3	3	3
3	Rated Voltage	V	24	24	24
4	Rated Speed	rpm	4000	4000	4000
5	Rated Torque	Nm	0,063	0,125	0,185
6	Max. Peak Torque	Nm	0,19	0,38	0,56
7	Torque Constant	Nm/A	0,035	0,036	0,036
8	Rated Current	A	1,79	3,47	5,14
9	Max. Peak Current	A	6	10,8	15,5
10	No-Load Current	mA	200	240	400
11	Line to Line Resistance	Ω	1,5	0,8	0,43
12	Line to Line Inductance	mH	2,1	1,2	0,71
13	Rotor Inertia	gcm ²	24	48	72
14	Length (L)	mm	41	61	100
15	Weight	Kg	0,3	0,45	0,65

Characteristics

Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection

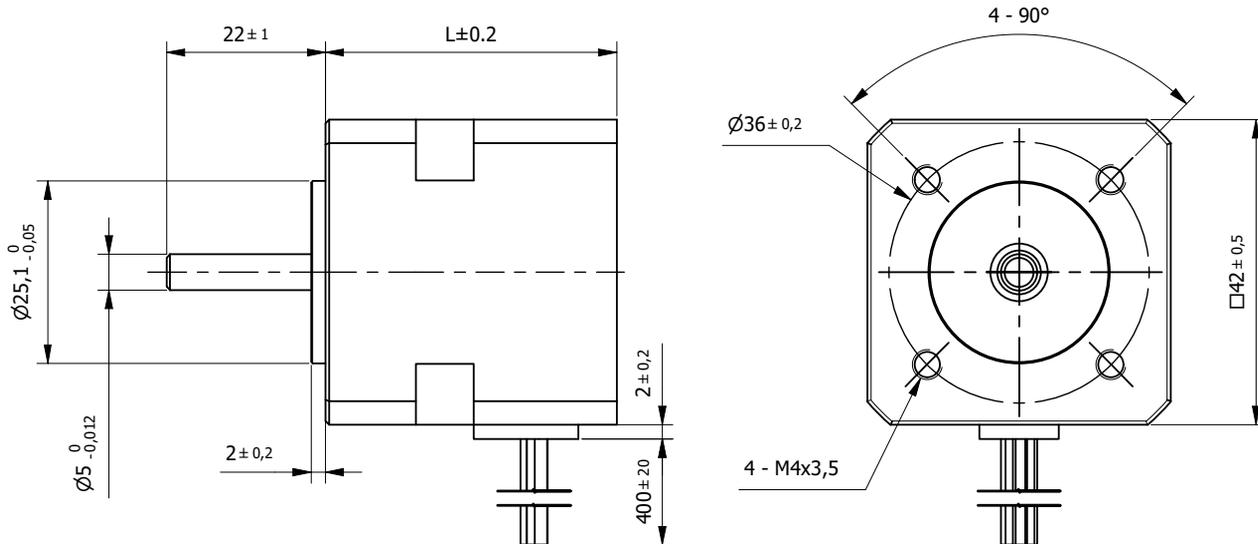
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

Brushless Slotted Motor 42BLA

10-pole

□ 42mm

0,07 - 0,36Nm



BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

Specification						
Model		42BLA01	42BLA02	42BLA03	42BLA04	
1	n° of Pole	10	10	10	10	
2	n° of Phase	3	3	3	3	
3	Rated Voltage	V	24	24	24	
4	Rated Speed	rpm	3000	3000	3000	
5	Rated Torque	Nm	0,07	0,16	0,26	0,36
6	Max. Peak Torque	Nm	0,21	0,48	0,78	1,08
7	Torque Constant	Nm/A	0,055	0,059	0,058	0,057
8	Rated Current	A	1,27	2,71	4,48	6,32
9	Max. Peak Current	A	4	8,3	13,5	19
10	No-Load Current	mA	220	450	430	490
11	Line to Line Resistance	Ω	2,6	1,1	0,7	0,48
12	Line to Line Inductance	mH	1,83	0,96	0,58	0,44
13	Rotor Inertia	gcm ²	48	101	154	207
14	Length (L)	mm	40,3	60,3	80,3	100,3
15	Weight	Kg	0,26	0,45	0,65	0,85

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

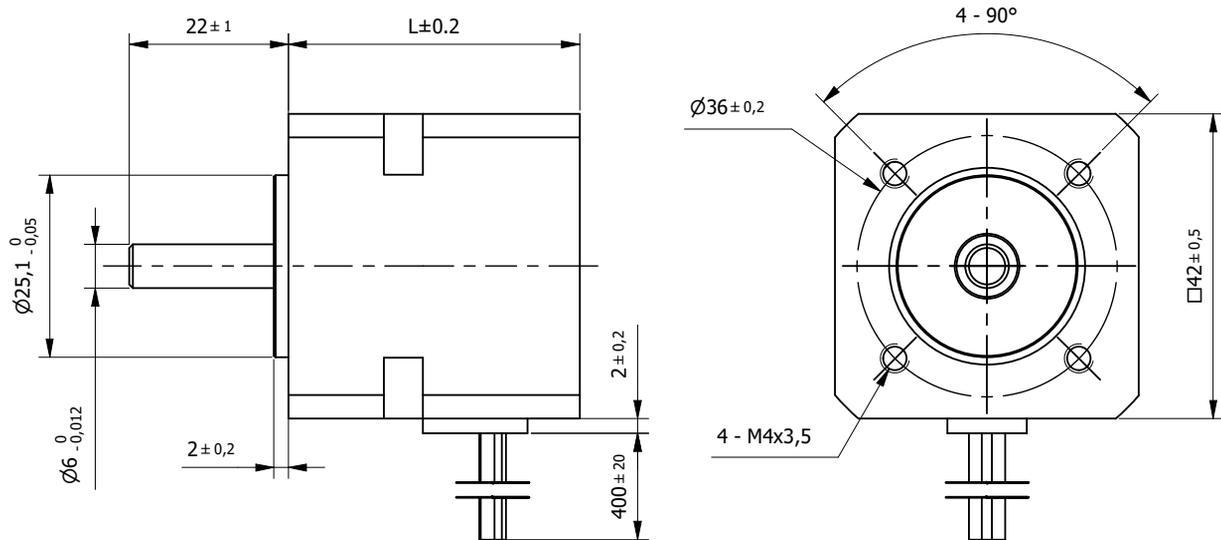
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

Brushless Slotted Motor 42BLB

6-pole

□ 42mm

0,064 - 0,43Nm



BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

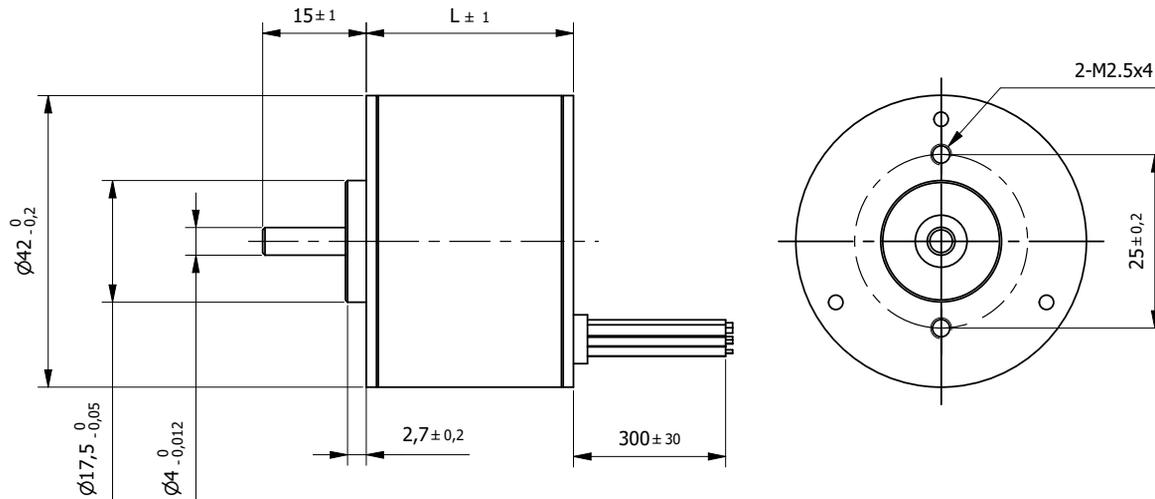
Specification		42BLB01	42BLB02	42BLB03	42BLB04
1	n° of Pole	6	6	6	6
2	n° of Phase	3	3	3	3
3	Rated Voltage	V	24	24	24
4	Rated Speed	rpm	3000	3000	3000
5	Rated Torque	Nm	0,064	0,17	0,3
6	Max. Peak Torque	Nm	0,19	0,51	0,9
7	Torque Constant	Nm/A	0,057	0,058	0,062
8	Rated Current	A	1,12	2,93	4,84
9	Max. Peak Current	A	3,5	9	14,5
10	No-Load Current	mA	160	270	330
11	Line to Line Resistance	Ω	3,6	1,05	0,54
12	Line to Line Inductance	mH	1,8	0,75	0,45
13	Rotor Inertia	gcm ²	80	100	120
14	Length (L)	mm	40,3	60,3	80,3
15	Weight	Kg	0,4	0,6	0,8

Characteristics

Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection

Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

Specification		42RBL30	42RBL60	42RBL85
1	n° of Pole	8	8	8
2	n° of Phase	3	3	3
3	Rated Voltage	24	24	24
4	Rated Speed	4000	4200	4000
5	Rated Torque	0,02	0,06	0,15
6	Max. Peak Torque	0,06	0,17	0,45
7	Torque Constant	0,039	0,041	0,04
8	Rated Current	0,50	1,4	3,5
9	Max. Peak Current	1,5	4,2	11,2
10	No-Load Current	<0,4	<0,4	<0,4
11	Line to Line Resistance	5,9	1,6	0,71
12	Line to Line Inductance	5,1	1,94	0,86
13	Rotor Inertia	15,6	33	84
14	Length (L)	30	60	85
15	Weight	0,25	0,4	0,7

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	15N
Max. Axial force	10N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

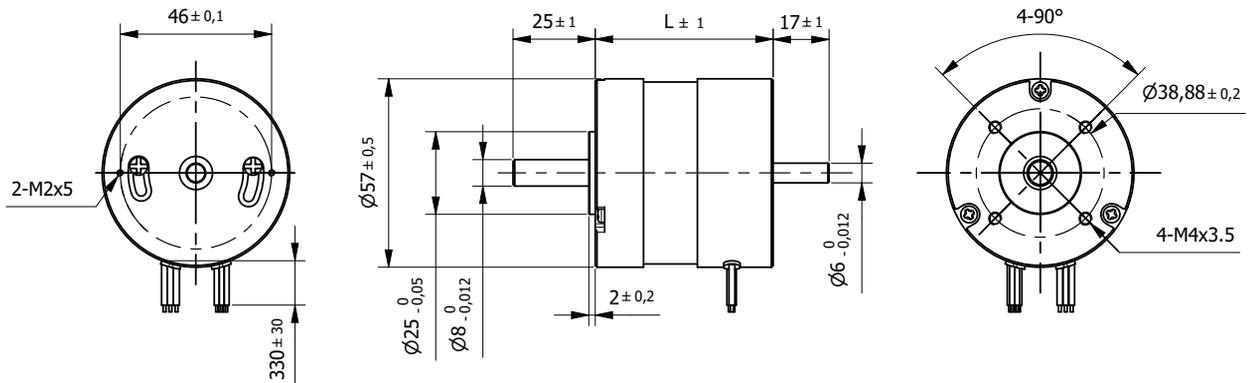
Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1007 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Orange		Hall B
4	Brown		Hall C
5	White		GND Hall
6	Green	UL1007 AWG22	Phase U
7	Red		Phase V
8	Black		Phase W

Brushless Slotted Motor 57BL

4-pole

Ø 57mm

0,055 - 0,44Nm



Specification						
Model		57BL45	57BL54	57BL74	57BL94	57BL116
1	n° of Pole	4	4	4	4	4
2	n° of Phase	3	3	3	3	3
3	Rated Voltage	V	36	36	36	36
4	Rated Speed	rpm	4000	4000	4000	4000
5	Rated Torque	Nm	0,055	0,11	0,22	0,33
6	Max. Peak Torque	Nm	0,16	0,39	0,7	1
7	Torque Constant	Nm/A	0,052	0,061	0,06	0,065
8	Rated Current	A	1,06	1,8	3,67	5,08
9	Max. Peak Current	A	3,5	6,8	12	16
10	No-Load Current	mA	240	300	400	450
11	Line to Line Resistance	Ω	4,1	1,5	0,58	0,45
12	Line to Line Inductance	mH	10	4,4	2	1,5
13	Rotor Inertia	gcm ²	30	75	119	173
14	Length (L)	mm	43,6	53,6	73,6	93,6
15	Weight	Kg	0,33	0,44	0,72	0,95

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (460g load)	0,025mm
Axial play (4000g load)	0,025mm
Max. Radial force (10mm from flange)	75N
Max. Axial force	15N
Dielectric strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

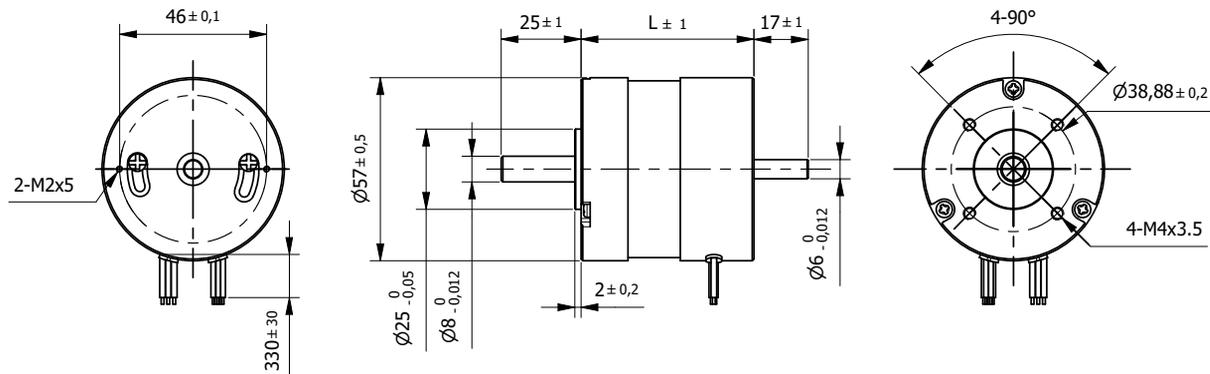
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

Brushless Slotted Motor 57BLA

6-pole

Ø 57mm

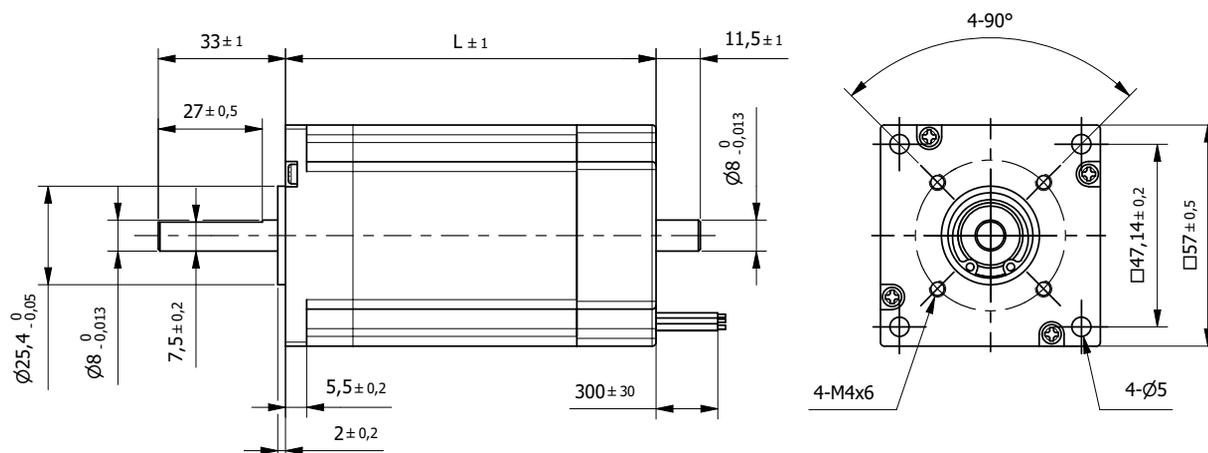
0,2 - 0,8Nm



Specification					
Model		57BLA01	57BLA02	57BLA03	57BLA04
1	n° of Pole	6	6	6	6
2	n° of Phase	3	3	3	3
3	Rated Voltage	36	36	36	36
4	Rated Speed	4000 rpm	4000	4000	4000
5	Rated Torque	0,2 Nm	0,4	0,6	0,8
6	Max. Peak Torque	0,6 Nm	1,2	1,8	2,4
7	Torque Constant	0,07 Nm/A	0,07	0,06	0,07
8	Rated Current	2,86 A	5,71	10	11,43
9	Max. Peak Current	8,6 A	16	29	35
10	No-Load Current	350 mA	400	580	240
11	Line to Line Resistance	0,95 Ω	0,4	0,25	0,2
12	Line to Line Inductance	1,2 mH	0,55	0,4	0,25
13	Rotor Inertia	275 gcm ²	375	250	693
14	Length (L)	53,6 mm	73,6	93,6	113,6
15	Weight	0,76 kg	1	1,25	1,52

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (460g load)	0,025mm
Axial play (4000g load)	0,025mm
Max. Radial force (20mm from flange)	115N
Max. Axial force	45N
Dielectric strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

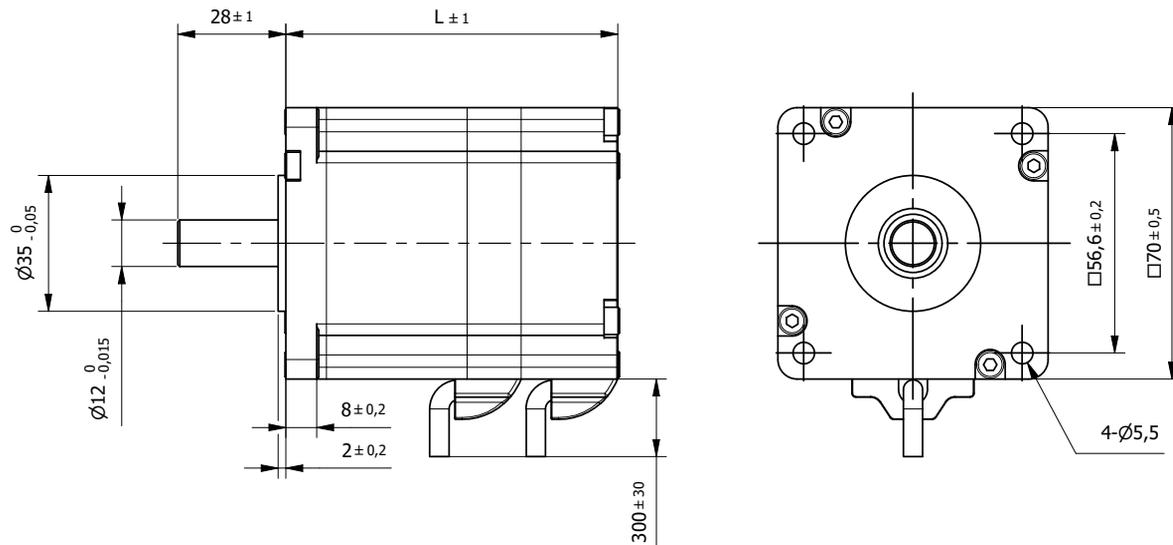
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1332 AWG18	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



Specification				
Model		57BLB40	57BLB60	57BLB80
1	n° of Pole	8	8	8
2	n° of Phase	3	3	3
3	Rated Voltage	V	36	36
4	Rated Speed	rpm	3000	3000
5	Rated Torque	Nm	0,3	0,45
6	Max. Peak Torque	Nm	0,9	1,35
7	Torque Constant	Nm/A	0,08	0,08
8	Rated Current	A	3,75	5,63
9	Max. Peak Current	A	12,3	18,2
10	No-Load Current	mA	400	550
11	Line to Line Resistance	Ω	1,2	0,8
12	Line to Line Inductance	mH	1,2	0,8
13	Rotor Inertia	gcm ²	210	320
14	Length (L)	mm	76	96
15	Weight	Kg	0,8	1

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,025mm
Axial play (4000g load)	0,025mm
Max. Radial force (10mm from flange)	115N
Max. Axial force	45N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL3265 AWG28	Vcc Hall +5 to +24 Vdc
2	Yellow	|	Hall A
3	Blue	|	Hall B
4	Purple	|	Hall C
5	Black	|	GND Hall
6	Red	UL1430 AWG18	Phase U
7	Blue	|	Phase V
8	Black	|	Phase W

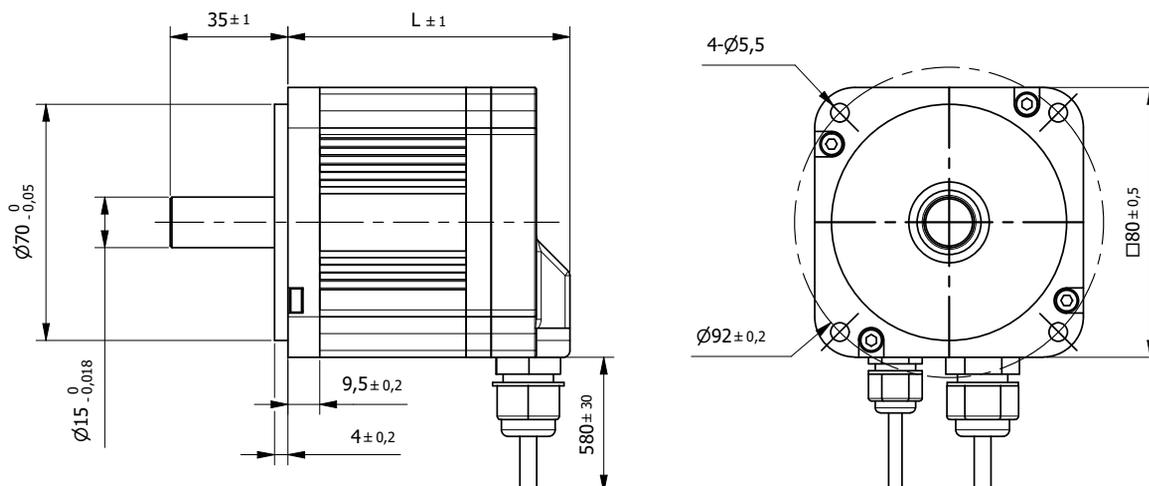


BE Version: Rear shaft 13mm - 2x M2.5 on a diameter 46mm

Specification					
Model		70BLS86	70BLS116	70BLS136	
1	n° of Pole	8	8	8	
2	n° of Phase	3	3	3	
3	Rated Voltage	V	48	48	48
4	Rated Speed	rpm	3000	3000	3000
5	Rated Torque	Nm	0,5	1	1,5
6	Max. Peak Torque	Nm	1,5	3	4,5
7	Torque Constant	Nm/A	0,12	0,12	0,12
8	Rated Current	A	4,17	8,33	12,5
9	Max. Peak Current	A	13	26	38
10	No-Load Current	mA	600	600	600
11	Line to Line Resistance	Ω	0,6	0,3	0,22
12	Line to Line Inductance	mH	1,4	0,7	0,55
13	Rotor Inertia	gcm ²	200	400	600
14	Length (L)	mm	86	116	136
15	Weight	Kg	1,3	2,1	2,9

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (20mm from flange)	115N
Max. Axial force	45N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL2464 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL2464 AWG16	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



BE Version: Rear shaft 13mm - 2x M2.5 on a diameter 46mm

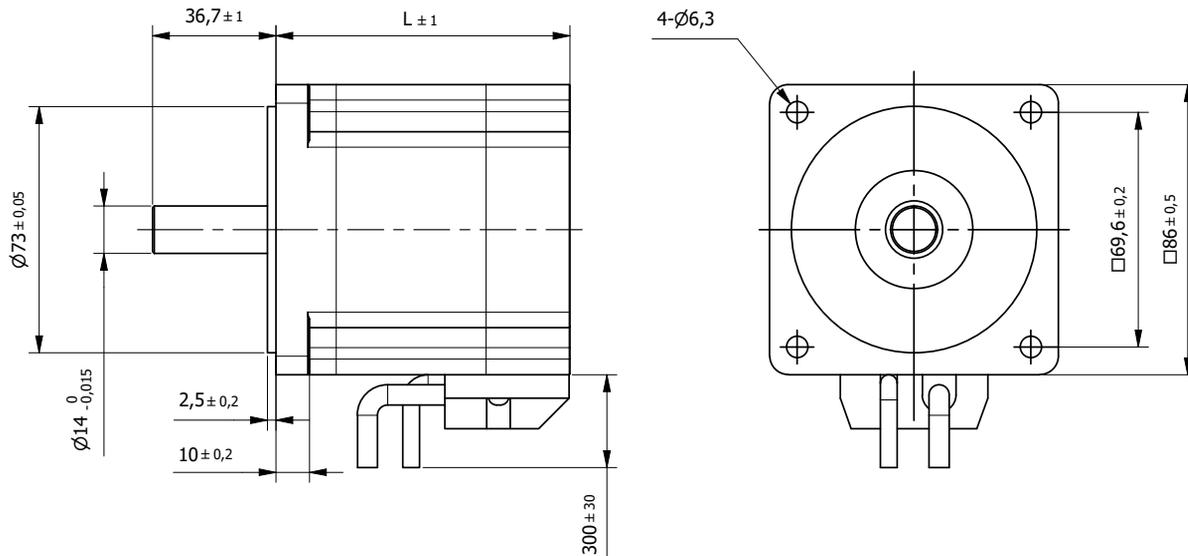
Specification		80BLS84	80BLS105	80BLS120	80BLS125
1	n° of Pole	8	8	8	8
2	n° of Phase	3	3	3	3
3	Rated Voltage	V 48	48	48	48
4	Rated Speed	rpm 3000	3000	3000	3000
5	Rated Torque	Nm 0,9	1,7	2,2	3
6	Max. Peak Torque	Nm 2,5	5	6,5	8,5
7	Torque Constant	Nm/A 0,118	0,113	0,109	0,111
8	Rated Current	A 7,63	15,04	20,18	27,03
9	Max. Peak Current	A 22	45	61	78
10	No-Load Current	mA 500	700	1000	1500
11	Line to Line Resistance	Ω 0,25	0,1	0,07	0,057
12	Line to Line Inductance	mH 1,3	0,6	0,4	0,3
13	Rotor Inertia	gcm ² 544	1020	1360	1900
14	Length (L)	mm 84	105	120	140
15	Weight	Kg 1,6	2	2,5	2,9

Characteristics

Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	F
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (20mm from flange)	115N
Max. Axial force	45N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection

Lead n°	Color	Gauge	Function
1	Red	UL1332 AWG22	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL3135 AWG14	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

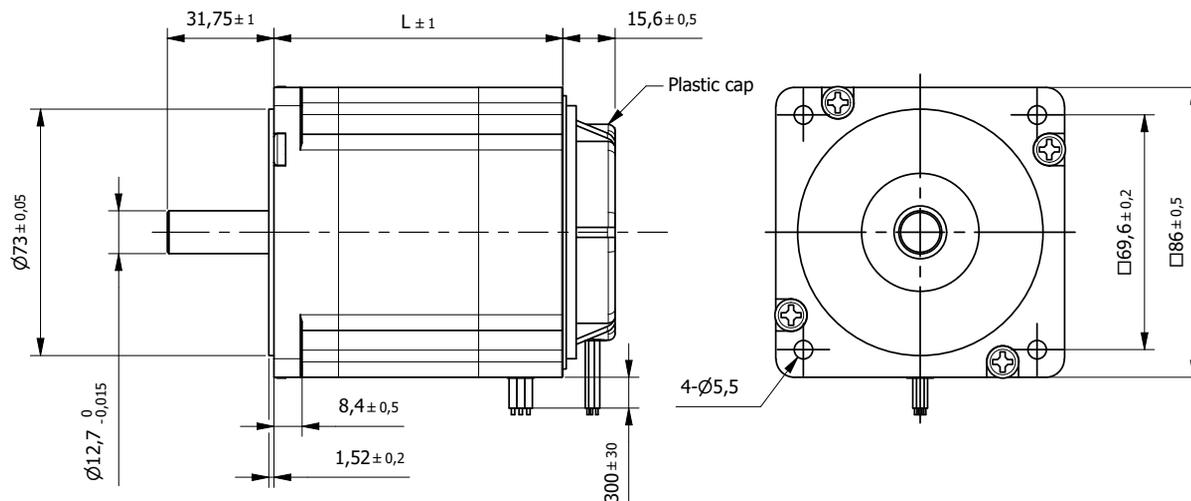


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 46mm

Specification		86BLC64	86BLC77	86BLC105	86BLC125
1	n° of Pole	8	8	8	8
2	n° of Phase	3	3	3	3
3	Rated Voltage	48	48	48	48
4	Rated Speed	3000	3000	3000	3000
5	Rated Torque	0,4	0,8	1,6	2,22
6	Max. Peak Torque	1,2	2,4	4,8	6,66
7	Torque Constant	0,122	0,149	0,135	0,131
8	Rated Current	3,28	5,37	11,85	16,95
9	Max. Peak Current	11	17,5	37	52
10	No-Load Current	380	550	860	1200
11	Line to Line Resistance	1	0,34	0,14	0,1
12	Line to Line Inductance	1,4	0,6	0,36	0,24
13	Rotor Inertia	400	800	1600	2400
14	Length (L)	64	77	105	125
15	Weight	1,5	1,85	2,7	4

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (400g load)	0,08mm
Max. Radial force (20mm from flange)	220N
Max. Axial force	45N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG24	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1332 AWG16	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



BE Version: Rear shaft 13mm - 2x M2.5 on a diameter 46mm

Specification		86BLS58	86BLS71	86BLS98	86BLS125
1	n° of Pole	8	8	8	8
2	n° of Phase	3	3	3	3
3	Rated Voltage	V 48	48	48	48
4	Rated Speed	rpm 3000	3000	3000	3000
5	Rated Torque	Nm 0,35	0,7	1,4	2,1
6	Max. Peak Torque	Nm 1,05	2,1	4,2	6,3
7	Torque Constant	Nm/A 0,116	0,124	0,127	0,128
8	Rated Current	A 3,02	5,65	11,02	16,41
9	Max. Peak Current	A 9,5	20	33	56
10	No-Load Current	mA 540	800	1450	1640
11	Line to Line Resistance	Ω 0,9	0,34	0,16	0,1
12	Line to Line Inductance	mH 2,6	1	0,5	0,31
13	Rotor Inertia	gcm ² 400	800	1600	2400
14	Length (L)	mm 58	71	98	125
15	Weight	Kg 1,6	2,12	3,15	4,2

Characteristics

Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (20mm from flange)	220N
Max. Axial force	60N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection

Lead n°	Color	Gauge	Function
1	Red	UL1332 AWG22	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1332 AWG18	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

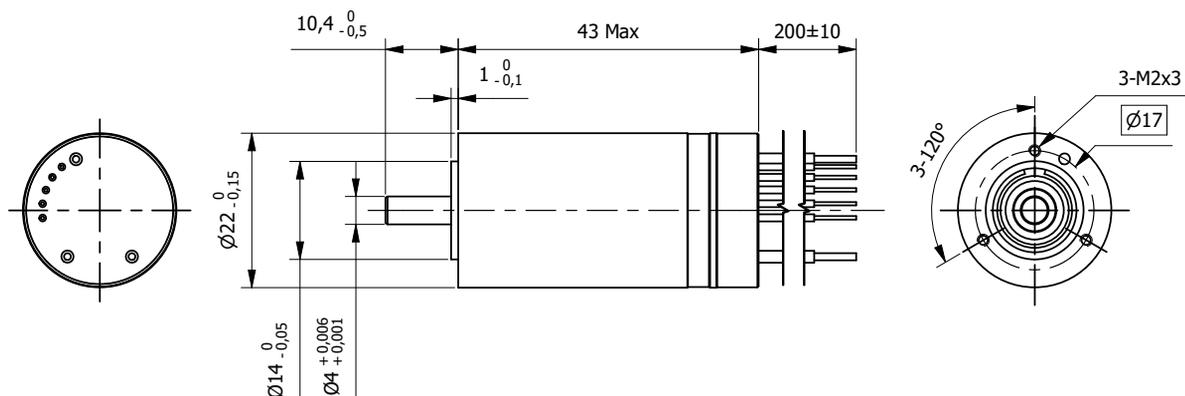


BLDC Slotted motors

EC series - High Performance

BLDC Slotted motors - EC High Performance series	Torque* (Nm)	
22EC43N	0,03	88
22EC58N	0,05	89
22EC82N	0,08	90

* Rated Torque

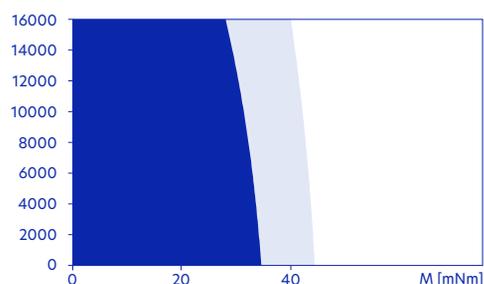


Specification			
Model		...13107	...10903
1	n° of Pole	8	8
2	n° of Phase	3	3
3	Rated Voltage	V 24	48
4	Rated Speed	rpm 13100	10900
5	Rated Torque	mNm 28,6	32,4
6	Stall Torque	mNm 466	461
7	Torque Constant	mNm/A 14,8	34,9
8	Motor Regulation	10 ³ /Nms 3,5	3
9	Rated Current	A 1,88	0,885
10	Stall Current	A 31,50	13,2
11	No-load Current	mA 145	56,5
12	No-load Speed	rpm 15300	13000
13	Line to Line Resistance	Ω 0,763	3,63
14	Line to Line Inductance	mH 0,428	2,38
15	Rotor Inertia	gcm ² 1,72	1,72
16	Max. Efficiency	% 87,1	87,5
17	Mechanical Time Constant	ms 0,599	0,512
18	Length (L)	mm 43	43
19	Weight	g 82,1	82,1

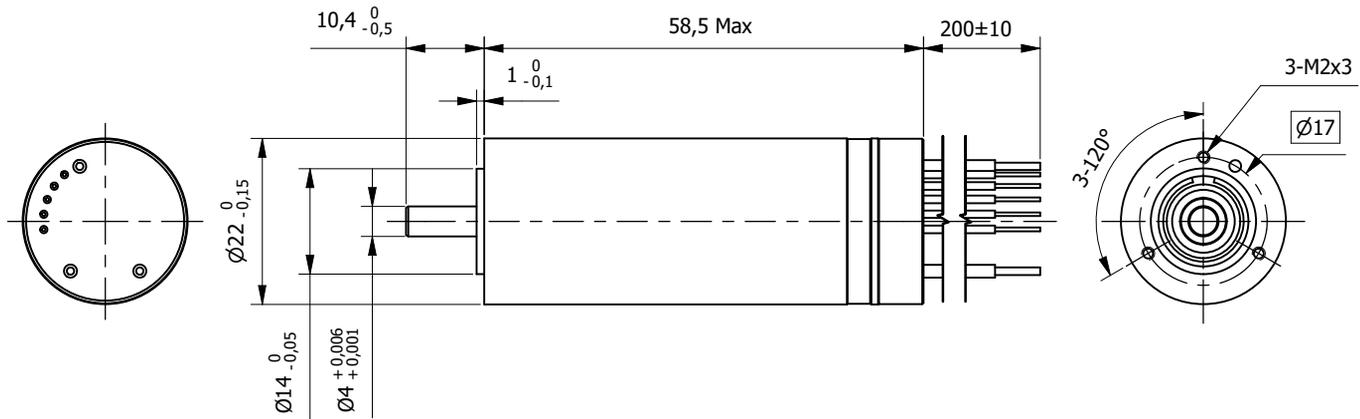
Characteristics	
Item	
Ambient Temperature Ball bearings	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	16000rpm
Radial play	preloaded
Axial play	0 to 0,24mm
Max. Radial force (5mm from flange)	22N
Max. Axial force	4N
Max. Force for Press fit	110N

Connection			
Lead n°	Color	Gauge	Function
1	Red	AWG18	Phase 1
2	Black		Phase 2
3	White		Phase 3
4	Orange	AWG26	Vcc Hall 5 ±0,5V
5	Blue		GND Hall
6	Yellow		Hall 1
7	Brown		Hall 2
8	Grey		Hall 3

Operating range: Winding 24V



- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

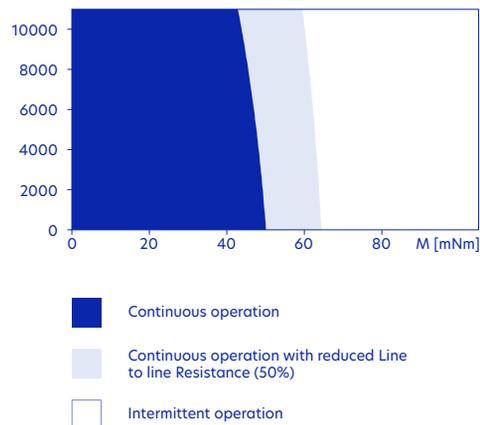


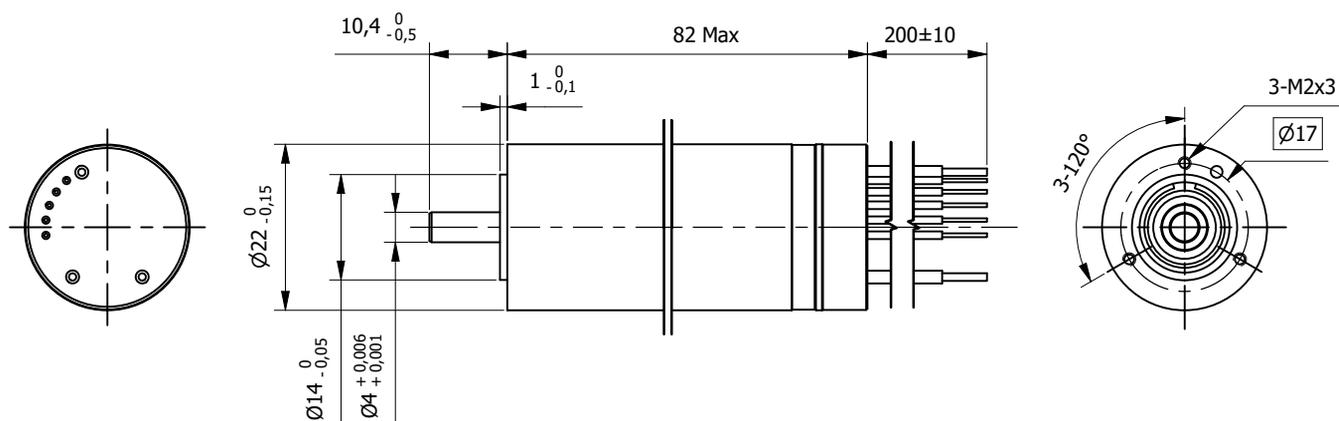
Specification		...7902	...8807	...9302
1	n° of Pole	8	8	8
2	n° of Phase	3	3	3
3	Rated Voltage	V	12	24
4	Rated Speed	rpm	7930	8850
5	Rated Torque	mNm	45,7	48,1
6	Stall Torque	mNm	528	684
7	Torque Constant	mNm/A	12,1	22
8	Motor Regulation	10 ³ /Nms	1,9	1,6
9	Rated Current	A	3,7	2,13
10	Stall Current	A	43,6	31,1
11	No-load Current	mA	224	129
12	No-load Speed	rpm	9380	10300
13	Line to Line Resistance	Ω	0,275	0,771
14	Line to Line Inductance	mH	0,148	0,49
15	Rotor Inertia	gcm ²	3,06	3,06
16	Max. Efficiency	%	86,4	87,7
17	Mechanical Time Constant	ms	0,575	0,488
18	Length (L)	mm	58,5	58,5
19	Weight	g	113	113

Characteristics	
Item	
Ambient Temperature Ball bearings	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	11000rpm
Radial play	preloaded
Axial play	0 to 0,24mm
Max. Radial force (5mm from flange)	29N
Max. Axial force	4N
Max. Force for Press fit	110N

Connection			
Lead n°	Color	Gauge	Function
1	Red	AWG18	Phase 1
2	Black		Phase 2
3	White		Phase 3
4	Orange	AWG26	Vcc Hall 5 ±0,5V
5	Blue		GND Hall
6	Yellow		Hall 1
7	Brown		Hall 2
8	Grey		Hall 3

Operating range: Winding 24V



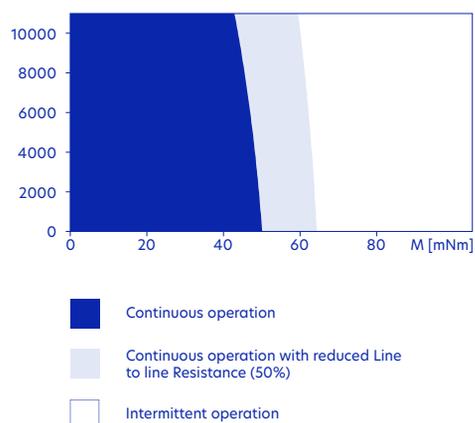


Specification				
Model		...5001	...5304	
1	n° of Pole	8	8	
2	n° of Phase	3	3	
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	5000	5320
5	Rated Torque	mNm	77,5	79,9
6	Stall Torque	mNm	730	832
7	Torque Constant	mNm/A	37,7	71,6
8	Motor Regulation	10 ³ /Nms	0,9	0,8
9	Rated Current	A	2,01	1,09
10	Stall Current	A	19,4	11,6
11	No-load Current	mA	96,8	52
12	No-load Speed	rpm	6030	6350
13	Line to Line Resistance	Ω	1,24	4,13
14	Line to Line Inductance	mH	0,798	2,88
15	Rotor Inertia	gcm ²	4,97	4,97
16	Max. Efficiency	%	86,5	87,2
17	Mechanical Time Constant	ms	0,434	0,401
18	Length (L)	mm	82	82
19	Weight	g	162	162

Characteristics	
Item	
Ambient Temperature Ball bearings	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	8000rpm
Radial play	preloaded
Axial play	0 to 0,24mm
Max. Radial force (5mm from flange)	33N
Max. Axial force	4N
Max. Force for Press fit	110N

Connection			
Lead n°	Color	Gauge	Function
1	Red	AWG18	Phase 1
2	Black		Phase 2
3	White		Phase 3
4	Orange	AWG26	Vcc Hall 5 ±0,5V
5	Blue		GND Hall
6	Yellow		Hall 1
7	Brown		Hall 2
8	Grey		Hall 3

Operating range: Winding 24V



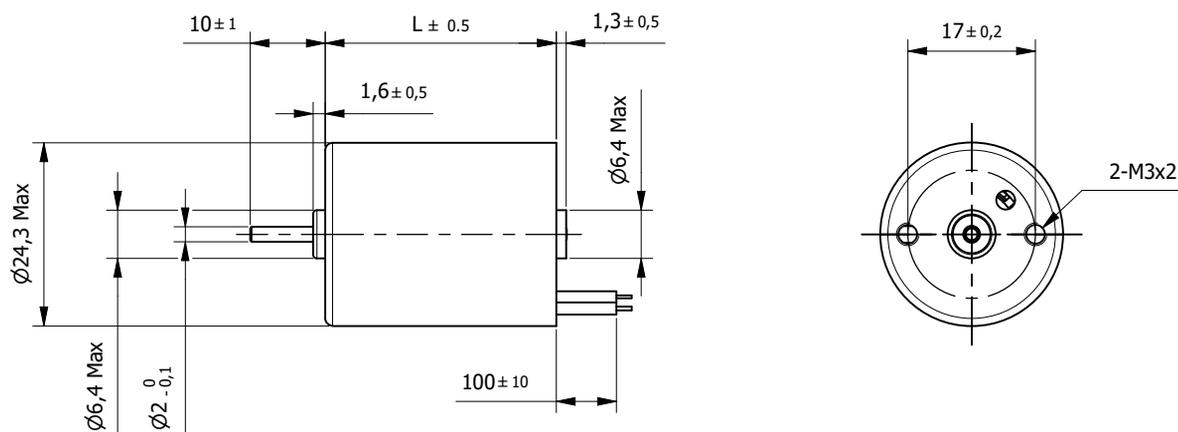


BLDC Slotted motors

CBL series - Economy

BLDC Slotted motors - CBL Economy series	Torque* (Nm)	
24CBL30	0,006	94
28CBL	0,028...0,05	95
36CBL	0,015...0,09	96
38CBL58	0,07	97
42CBL	0,068...0,15	98
48CBL68	0,18	99

* Rated Torque



Motor with Sleeve Bearings

Specification		
Model	24CBL30	
1	n° of Pole	12
2	n° of Phase	3
3	Rated Voltage	V 12
4	Rated Speed	rpm 4000
5	Rated Torque	Nm 0,006
6	Max. Peak Torque	Nm 0,017
7	Torque Constant	Nm/A 0,02
8	Rated Current	A 0,3
9	Max. Peak Current	A 0,9
10	No-Load Current	mA 200
11	Line to Line Resistance	Ω 7,3
12	Line to Line Inductance	mH 1,7
13	Rotor Inertia	gcm ² 2,3
14	Length (L)	mm 30,8
15	Weight	Kg 0,04

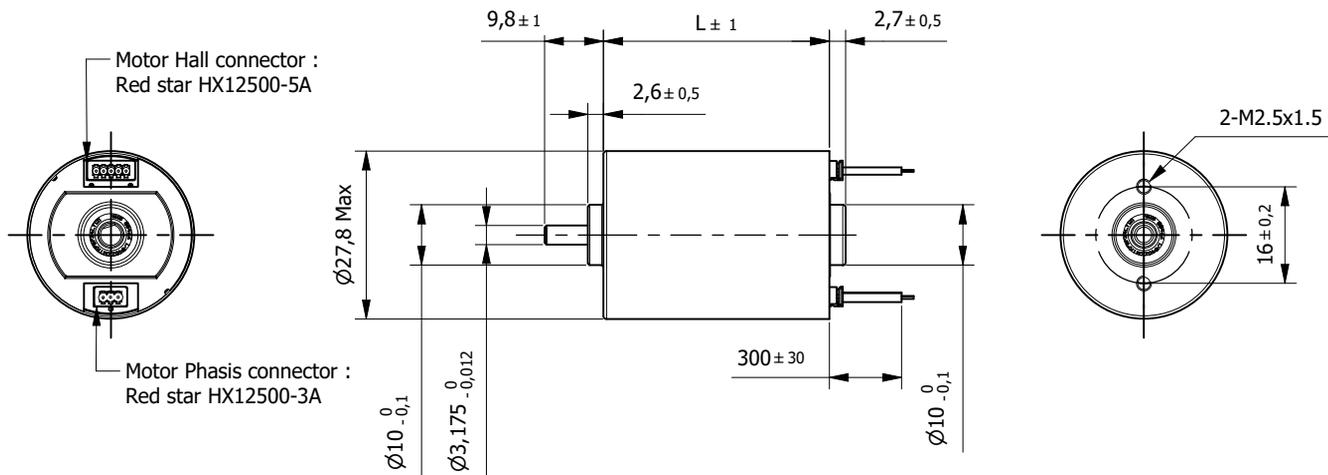
Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (@4N)	0,025mm
Axial play (@4N)	0,2mm
Max. Radial force (10mm from flange)	5N
Max. Axial force	2N
Dielectric strength (for 1 sec.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG28	VCC Hall +5 to +24VDC
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG26	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

Brushless Slotted Motor 28CBL

Ø 28mm

0,028 - 0,05Nm

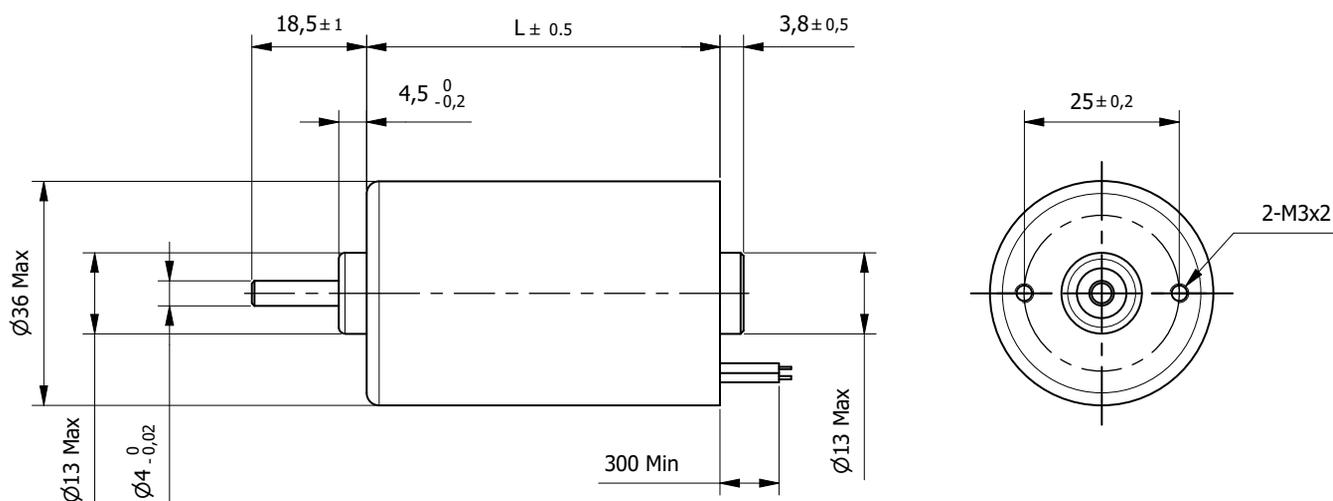


Brushless DC

Specification			
Model		28CBL38	28CBL48
1	n° of Pole	8	8
2	n° of Phase	3	3
3	Rated Voltage	V 24	24
4	Rated Speed	rpm 4000	4500
5	Rated Torque	Nm 0,028	0,05
6	Max. Peak Torque	Nm 0,084	0,072
7	Torque Constant	Nm/A 0,043	0,036
8	Rated Current	A 0,75	1,4
9	Max. Peak Current	A 2,3	2
10	No-Load Current	mA 300	140
11	Line to Line Resistance	Ω 5,7	2,5
12	Line to Line Inductance	mH 2,48	1,2
13	Rotor Inertia	gcm ² 5,8	7,3
14	Length (L)	mm 38	48
15	Weight	Kg 0,095	0,12

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	5N
Max. Axial force	2N
Dielectric strength (for 1 sec.)	650 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1061 AWG28	VCC Hall +5 to +24VDC
2	Blue	|	Hall A
3	Orange	|	Hall B
4	Brown	|	Hall C
5	White	|	GND Hall
6	Green	UL1061 AWG26	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



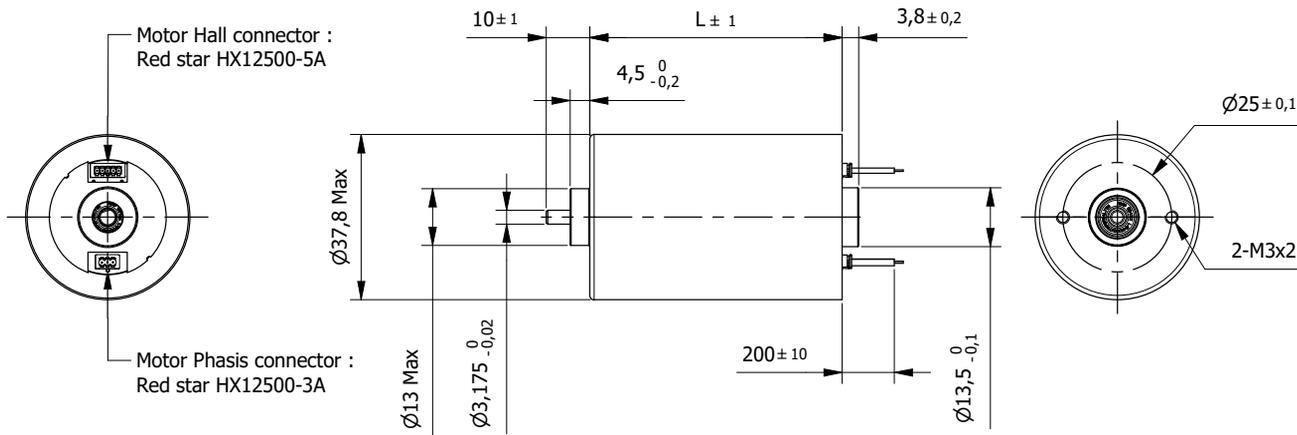
Specification		36CBL30	36CBL40	36CBL50	36CBL57	36CBL60	36CBL65	
1	n° of Pole	8	8	8	8	8	8	
2	n° of Phase	3	3	3	3	3	3	
3	Rated Voltage	V	24	24	24	24	24	
4	Rated Speed	rpm	4800	4800	4800	4500	4800	
5	Rated Torque	Nm	0,015	0,035	0,055	0,07	0,08	0,09
6	Max. Peak Torque	Nm	0,045	0,11	0,165	0,21	0,24	0,27
7	Torque Constant	Nm/A	0,03	0,035	0,036	0,04	0,035	0,036
8	Rated Current	A	0,5	1	1,5	1,8	2,3	2,5
9	Max. Peak Current	A	1,3	3	4,5	5,3	7	7,5
10	No-Load Current	mA	150	230	250	500	220	400
11	Line to Line Resistance	Ω	5,2	2	1,2	1,05	0,95	0,88
12	Line to Line Inductance	mH	3,3	1,9	1,2	1	0,85	0,8
13	Rotor Inertia	gcm ²	6	12	22	27	30	32
14	Length (L)	mm	30	40	50	57	60	65
15	Weight	Kg	0,12	0,16	0,23	0,25	0,27	0,28

Characteristics

Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	15N
Max. Axial force	10N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection

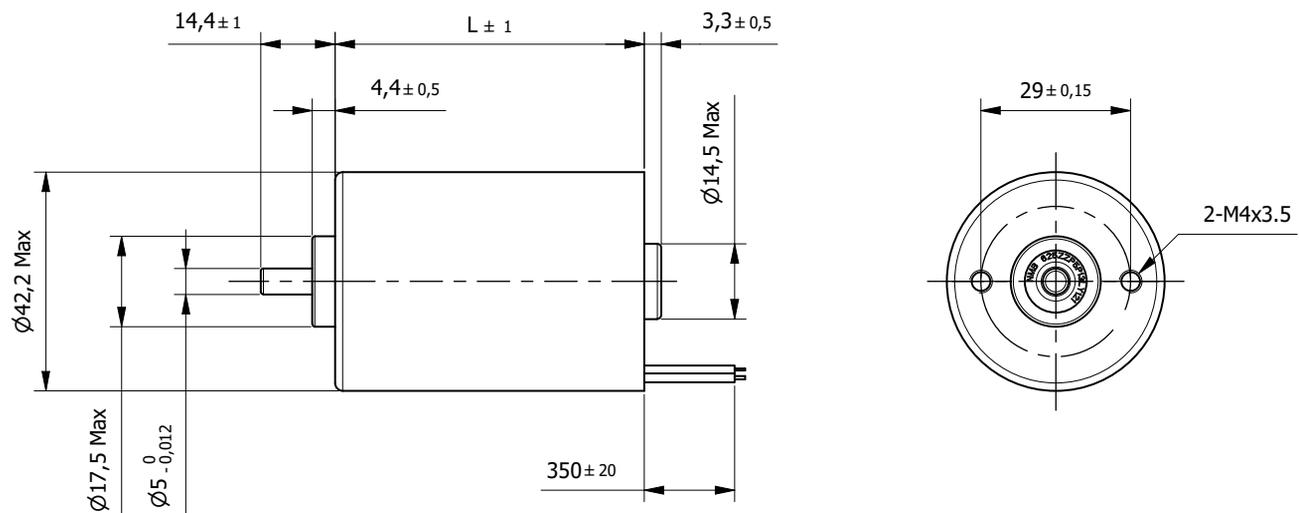
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	VCC Hall +5 to +24VDC
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG24	Phase U
7	Brown	|	Phase V
8	Orange	|	Phase W



Specification		
Model	38CBL58	
1	n° of Pole	4
2	n° of Phase	3
3	Rated Voltage	V 24
4	Rated Speed	rpm 4000
5	Rated Torque	Nm 0,07
6	Max. Peak Torque	Nm 0,21
7	Torque Constant	Nm/A 0,044
8	Rated Current	A 1,7
9	Max. Peak Current	A 5,1
10	No-Load Current	mA 200
11	Line to Line Resistance	Ω 2
12	Line to Line Inductance	mH 1,5
13	Rotor Inertia	gcm ² 16
14	Length (L)	mm 58
15	Weight	Kg 0,24

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	15N
Max. Axial force	10N
Dielectric strength (for 1 sec.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

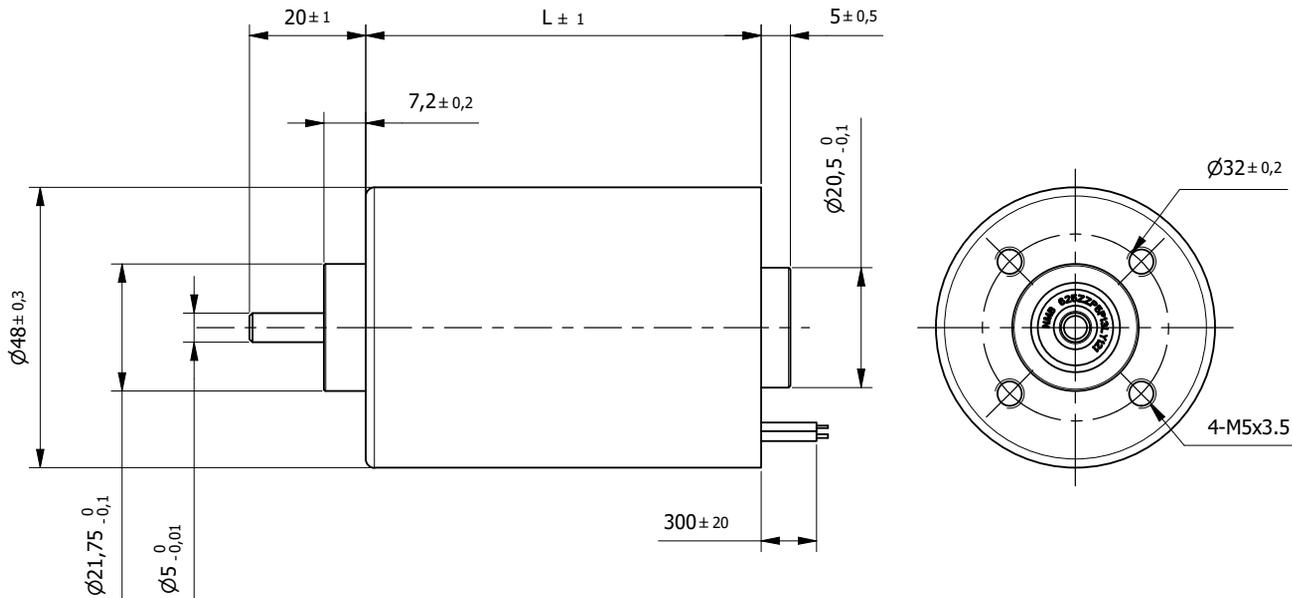
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	VCC Hall +5 to +24VDC
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG22	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



Specification					
Model		42CBL60	42CBLA60	42CBL66	
1	n° of Pole	8	8	8	
2	n° of Phase	3	3	3	
3	Rated Voltage	V	24	24	
4	Rated Speed	rpm	5900	3200	4000
5	Rated Torque	Nm	0,068	0,12	0,15
6	Max. Peak Torque	Nm	0,2	0,36	0,45
7	Torque Constant	Nm/A	0,032	0,054	0,04
8	Rated Current	A	2,13	2,1	3,75
9	Max. Peak Current	A	6,6	6,3	11,2
10	No-Load Current	mA	430	300	400
11	Line to Line Resistance	Ω	0,66	1,2	0,75
12	Line to Line Inductance	mH	0,63	1,6	0,8
13	Rotor Inertia	gcm ²	44	44	55
14	Length (L)	mm	60	60	66
15	Weight	Kg	0,35	0,35	0,44

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	25N
Max. Axial force	15N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	VCC Hall +5 to +24VDC
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1332 AWG22	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



Specification		
Model	48CBL68	
1	n° of Pole	10
2	n° of Phase	3
3	Rated Voltage	V 24
4	Rated Speed	rpm 3000
5	Rated Torque	Nm 0,18
6	Max. Peak Torque	Nm 0,3
7	Torque Constant	Nm/A 0,058
8	Rated Current	A 3
9	Max. Peak Current	A 5
10	No-Load Current	mA 500
11	Line to Line Resistance	Ω 0,7
12	Line to Line Inductance	mH 0,7
13	Rotor Inertia	gcm ² 80
14	Length (L)	mm 68
15	Weight	Kg 0,5

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	30N
Max. Axial force	20N
Dielectric strength (for 1 sec.)	650 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	VCC Hall +5 to +24VDC
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



Slotless motors -
SBL series
Standard

p.103



Slotless motors -
EC series
High Performance

p.111

Brushless DC **Slotless motors**

Advantages at a glance

- Low cogging
- Lower inertia
- High speed

The primary benefit of our slotless DC motor ironless coil construction, is the reduction of cogging torque and results in a motor with very smooth running characteristics. Torque production is predictable and highly controllable, because in the absence of these uncontrolled disturbances (i.e. cogging torque), motor torque production is directly related to the current supplied to the winding.

Since there's no iron core, inductance is very low and current can get into the stator windings very quickly, making slotless motors good for applications that require high acceleration and dynamic response.

BLDC Slotless motors - SBL Standard series	Torque* (Nm)	103
10SBL19	0,0005	104
14SBL45	0,004	105
16SBL	0,002...0,009	106
22SBL	0,006...0,025	107
28SBL	0,018...0,06	108
40SBL	0,2...0,25	109

BLDC Slotless motors - EC High Performance series	Torque* (Nm)	111
16EC24P	0,003	112
16EC36P	0,008	113
16EC40NS	0,007	114
16EC56NS	0,015...0,016	115
22EC32P	0,010...0,011	116
22EC44NS	0,018...0,02	117
22EC48P	0,023	118
22EC48T	0,043...0,045	119
22EC60NS	0,027...0,029	120
22EC66T	0,055	121
30EC42P	0,034	122
30EC47T	0,069...0,073	123
30EC64P	0,061...0,064	124
30EC64T	0,093...0,096	125
40EC58P	0,09...0,094	126
40EC88P	0,21	127

*Rated Torque

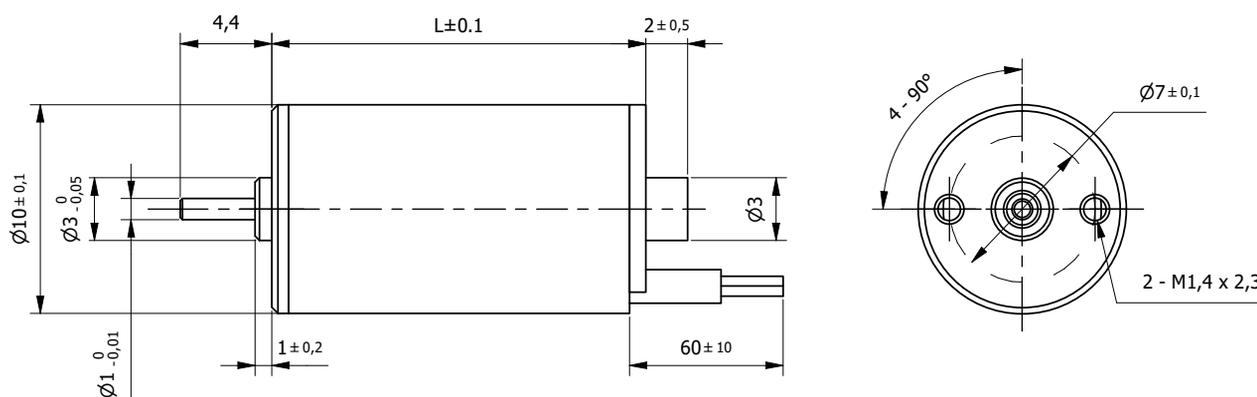


BLDC Slotless motors

SBL series - Standard

BLDC Slotless motors - SBL Standard series	Torque* (Nm)	
10SBL19	0,0005	104
14SBL45	0,004	105
16SBL	0,002...0,009	106
22SBL	0,006...0,025	107
28SBL	0,018...0,06	108
40SBL	0,2...0,25	109

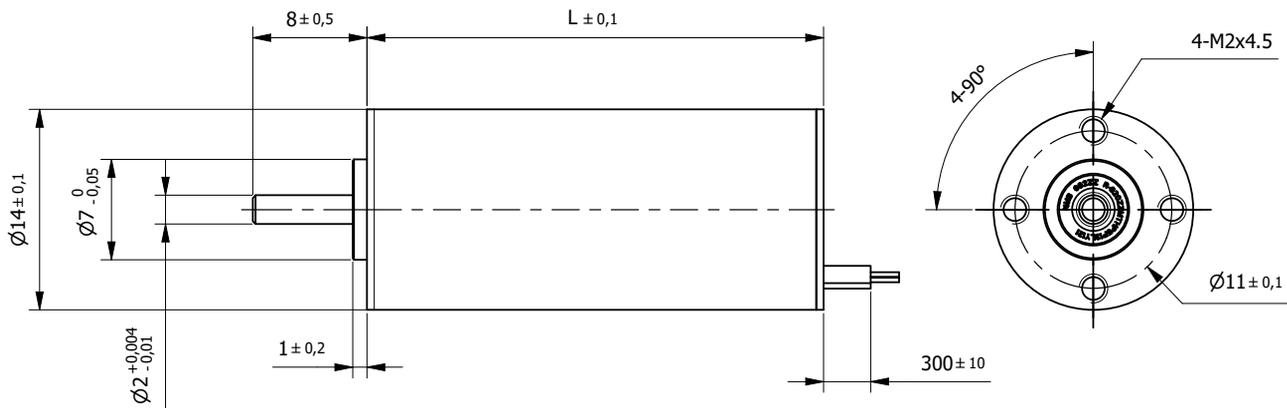
* Rated Torque



Specification		
Model	10SBL19	
1	n° of Pole	2
2	n° of Phase	3
3	Rated Voltage	V 3,7
4	Rated Speed	rpm 7000
5	Rated Torque	Nm 0,0005
6	Max. Peak Torque	Nm 0,001
7	Torque Constant	Nm/A 0,00235
8	Rated Current	A 0,2
9	Max. Peak Current	A 0,4
10	No-Load Current	A 0,05
11	Line to Line Resistance	Ω 4,82
12	Line to Line Inductance	mH 0,08
13	Rotor Inertia	gcm ² 0,05
14	Length (L)	mm 19,4
15	Weight	g 10

Characteristics	
Item	
Hall Effect Angle	120°
Insulation Class	B 130°C
Protection Class	IP40
Radial play (max. 4N)	0,02mm
Axial play (max. 4N)	0,14mm
Max. Radial force (5mm from flange)	3N
Max. Axial force	2N
Dielectric strength (for 1 sec.)	360 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

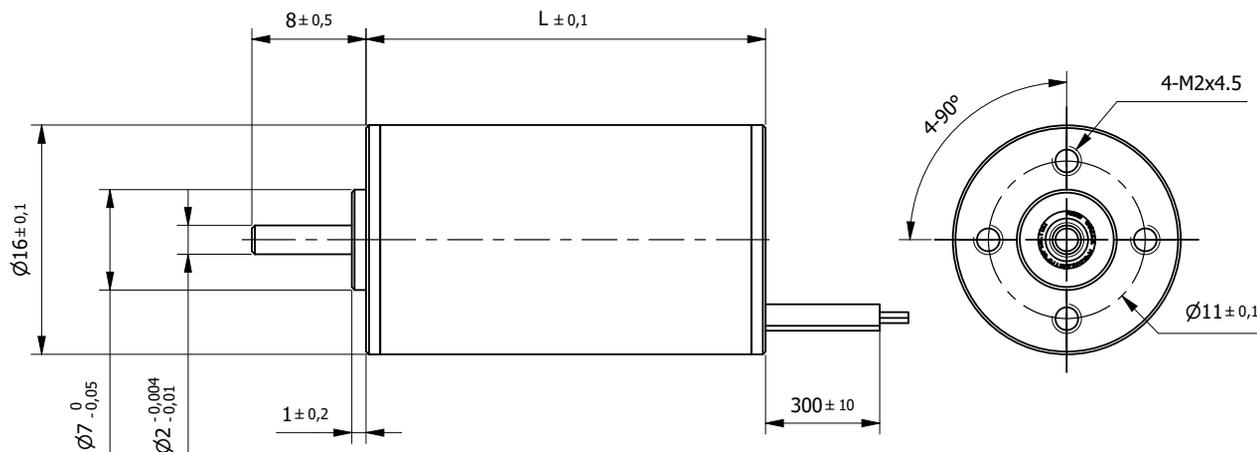
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG28	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG26	Phase U
7	Red		Phase V
8	Black		Phase W



Specification		
Model	14SBL45	
1	n° of Pole	2
2	n° of Phase	3
3	Rated Voltage	V 6
4	Rated Speed	rpm 10000
5	Rated Torque	Nm 0,004
6	Max. Peak Torque	Nm 0,011
7	Torque Constant	Nm/A 0,005
8	Rated Current	A 0,8
9	Max. Peak Current	A 2,4
10	No-Load Current	A 0,1
11	Line to Line Resistance	Ω 1,3
12	Line to Line Inductance	mH 0,06
13	Rotor Inertia	gcm ² 0,34
14	Length (L)	mm 36
15	Weight	Kg 0,065

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (max. 4N)	0,025mm
Axial play (max. 4N)	0,3mm
Max. Radial force (10mm from flange)	15N
Max. Axial force	5N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

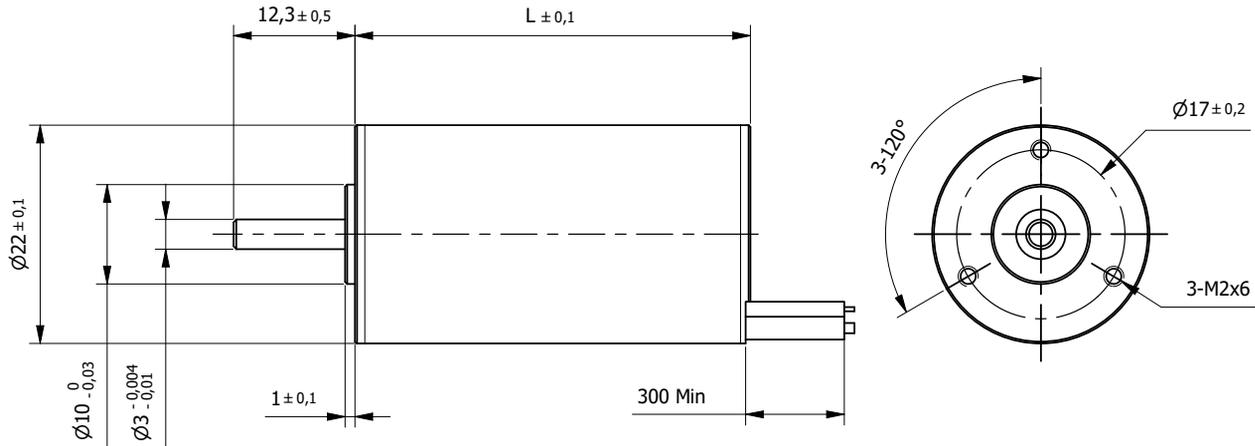
Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1332 AWG26	Phase U
2	Red		Phase V
3	Black		Phase W



Specification				
Model		16SBL28	16SBL40	16SBL56
1	n° of Pole	2	2	2
2	n° of Phase	3	3	3
3	Rated Voltage	V	12	24
4	Rated Speed	rpm	22000	25000
5	Rated Torque	Nm	0,002	0,004
6	Max. Peak Torque	Nm	0,005	0,012
7	Torque Constant	Nm/A	0,004	0,007
8	Rated Current	A	0,38	0,54
9	Max. Peak Current	A	1,2	1,7
10	No-Load Current	mA	100	200
11	Line to Line Resistance	Ω	5,4	6,6
12	Line to Line Inductance	mH	0,17	0,21
13	Rotor Inertia	gcm ²	0,4	0,66
14	Length (L)	mm	28	40
15	Weight	Kg	0,029	0,042

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (360g load)	0,025mm
Axial play (1000g load)	0,3mm
Max. Radial force (10mm from flange)	15N
Max. Axial force	5N
Dielectric strength (for 1 sec.)	360 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1430 AWG26	Phase U
2	Red	|	Phase V
3	Black	|	Phase W

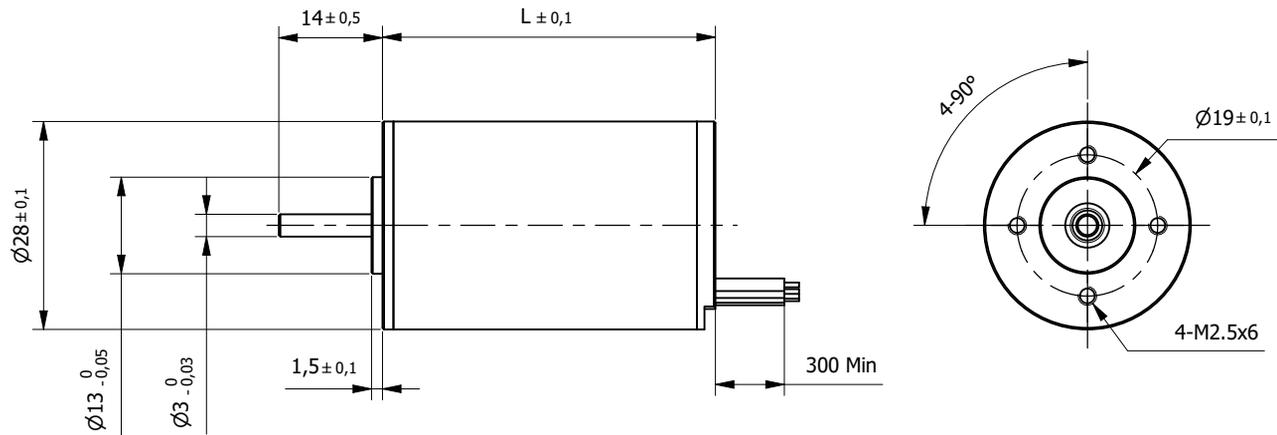


Available with or without Hall Sensors

Specification				
Model		22SBL40	22SBL60	22SBL70
1	n° of Pole	2	2	2
2	n° of Phase	3	3	3
3	Rated Voltage	24	36	24
4	Rated Speed	rpm 35000	32000	22000
5	Rated Torque	Nm 0,006	0,021	0,025
6	Max. Peak Torque	Nm 0,018	0,063	0,075
7	Torque Constant	Nm/A 0,006	0,008	0,007
8	Rated Current	A 1,1	3,8	3,5
9	Max. Peak Current	A 3,2	7,6	10,5
10	No-Load Current	mA 400	<500	350
11	Line to Line Resistance	Ω 2	1	0,75
12	Line to Line Inductance	mH 0,13	0,07	0,07
13	Rotor Inertia	gcm ² 1	3,2	4,5
14	Length (L)	mm 40	60	70
15	Weight	Kg 0,04	0,15	0,2
16	Length with Hall Sensors	mm 48	68	78

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	5N
Max. Axial force	2N
Dielectric strength (for 1 sec.)	360 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG28	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG26	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

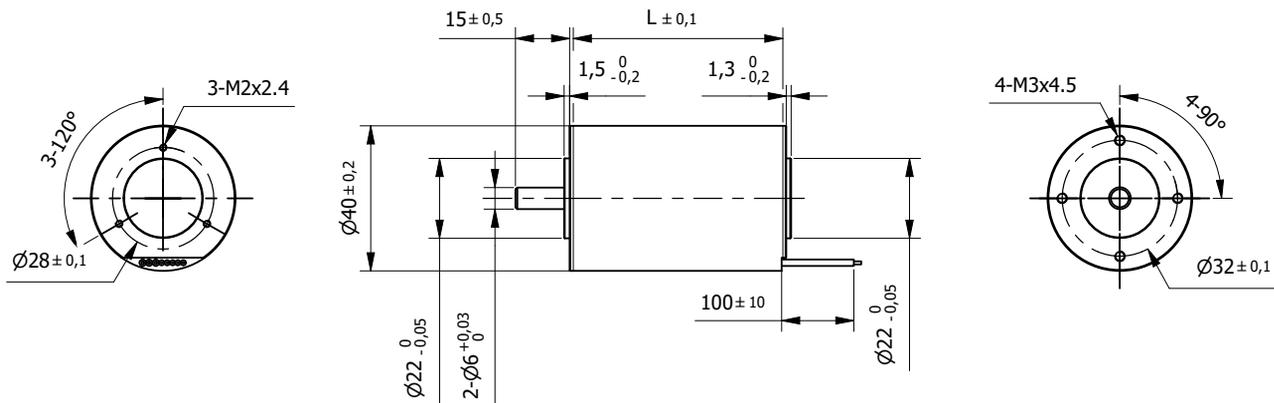


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm
Available with or without Hall Sensors

Specification				
Model		28SBL44	28SBL66	28SBL80
1	n° of Pole	2	2	2
2	n° of Phase	3	3	3
3	Rated Voltage	V	24	24
4	Rated Speed	rpm	8000	14000
5	Rated Torque	Nm	0,018	0,054
6	Max. Peak Torque	Nm	0,055	0,162
7	Torque Constant	Nm/A	0,023	0,015
8	Rated Current	A	0,8	3,53
9	Max. Peak Current	A	2,5	11
10	No-Load Current	mA	200	400
11	Line to Line Resistance	Ω	4,2	0,6
12	Line to Line Inductance	mH	0,42	0,064
13	Rotor Inertia	gcm ²	8,8	16,2
14	Length (L)	mm	34	56
15	Weight	Kg	0,14	0,23
16	Length with Hall Sensors	mm	44	66

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (1000g load)	0,2mm
Max. Radial force (10mm from flange)	5N
Max. Axial force	2N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG28	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG26	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm
Available with or without Hall Sensors

Specification			
Model		40SBL65	40SBL85
1	n° of Pole	4	4
2	n° of Phase	3	3
3	Rated Voltage	V	24
4	Rated Speed	rpm	8000
5	Rated Torque	Nm	0,2
6	Max. Peak Torque	Nm	0,6
7	Torque Constant	Nm/A	0,026
8	Rated Current	A	8
9	Max. Peak Current	A	24
10	No-Load Current	mA	500
11	Line to Line Resistance	Ω	0,21
12	Line to Line Inductance	mH	0,037
13	Rotor Inertia	gcm ²	85
14	Length with Hall Sensors (L)	mm	65
15	Weight	Kg	0,4
16	Length w/o Hall Sensors	mm	55

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	F
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	AF R250-SY 0,15mm AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall U
3	Green		Hall V
4	White		Hall W
5	Black		Hall GND
6	Yellow	UL1332 AWG18	Phase U
7	Red		Phase V
8	Black		Phase W

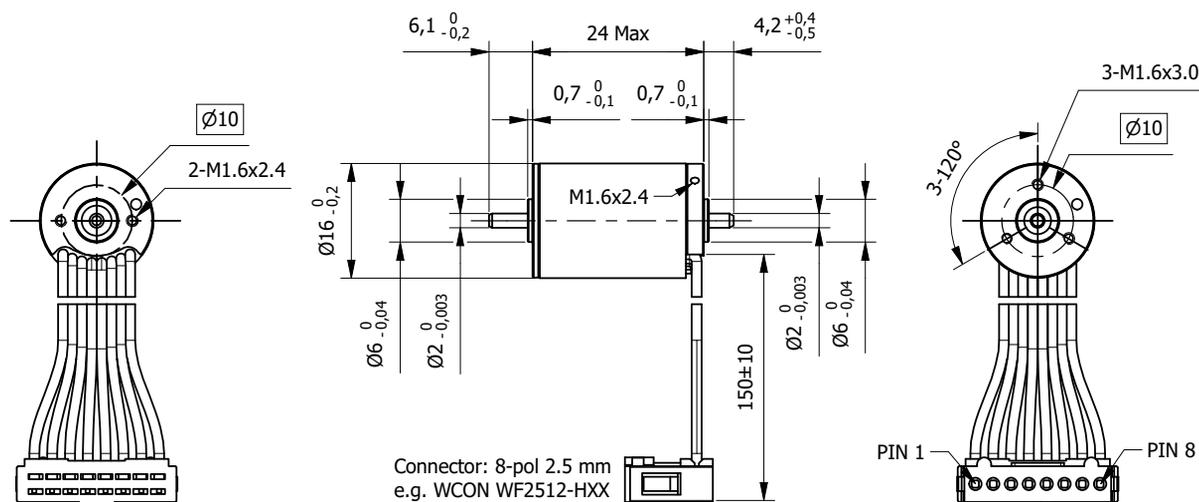


BLDC Slotless motors

EC series - High Performance

BLDC Slotless motors - EC High Performance series	Torque* (Nm)	
16EC24P	0,003	112
16EC36P	0,008	113
16EC40NS	0,007	114
16EC56NS	0,015...0,016	115
22EC32P	0,010...0,011	116
22EC44NS	0,018...0,02	117
22EC48P	0,023	118
22EC48T	0,043...0,045	119
22EC60NS	0,027...0,029	120
22EC66T	0,055	121
30EC42P	0,034	122
30EC47T	0,069...0,073	123
30EC64P	0,061...0,064	124
30EC64T	0,093...0,096	125
40EC58P	0,09...0,094	126
40EC88P	0,21	127

* Rated Torque

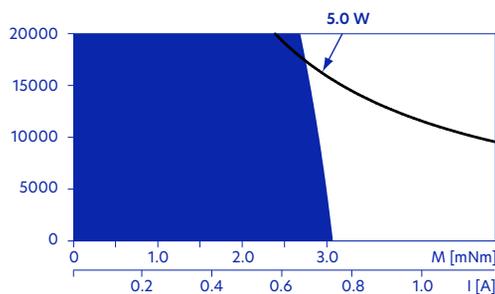


Specification			
Model		...5604	...5815
1	n° of Pole	2	2
2	n° of Phase	3	3
3	Rated Voltage	V	6
4	Rated Speed	rpm	5690
5	Rated Torque	mNm	3,2
6	Stall Torque	mNm	5,79
7	Torque Constant	mNm/A	3,9
8	Motor Regulation	10 ³ /Nms	265,6
9	Rated Current	A	0,903
10	Stall Current	A	1,4
11	No-load Current	mA	120
12	No-load Speed	rpm	13500
13	Line to Line Resistance	Ω	4,04
14	Line to Line Inductance	mH	0,063
15	Rotor Inertia	gcm ²	0,428
16	Max. Efficiency	%	53
17	Mechanical Time Constant	ms	11,4
18	Length (L)	mm	24
19	Weight	g	36

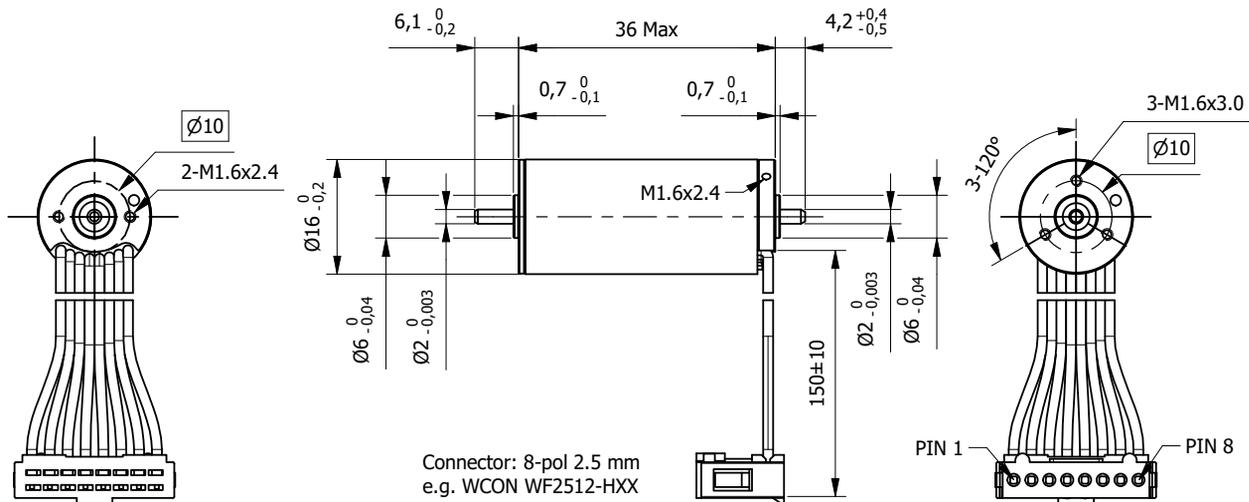
Characteristics	
Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	20000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	6N
Max. Axial force	1N
Max. Force for Press fit	18N

Connection			
Pin n°	Color	Gauge	Function
1	Brown	AWG24	Phase 1
2	Red		Phase 2
3	Orange		Phase 3
4	Yellow		Vcc Hall 3 to 24 Vdc
5	Green		GND Hall
6	Blue		Hall 1
7	Violet		Hall 2
8	Grey		Hall 3

Operating range: Winding 6V



Continuous operation
 Intermittent operation
 Assigned Power Rating

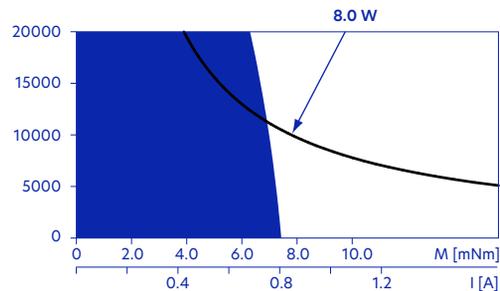


Specification		Model	...7101	...7305	...7320
1	n° of Pole		2	2	2
2	n° of Phase		3	3	3
3	Rated Voltage	V	6	12	24
4	Rated Speed	rpm	7120	7300	7350
5	Rated Torque	mNm	7,66	8,02	8,19
6	Stall Torque	mNm	19,2	21,1	22
7	Torque Constant	mNm/A	4,61	9,32	18,7
8	Motor Regulation	$10^3/Nms$	67,8	61	58,6
9	Rated Current	A	1,76	0,909	0,461
10	Stall Current	A	4,17	2,27	1,17
11	No-load Current	mA	130	64,2	31,9
12	No-load Speed	rpm	12000	11900	11900
13	Line to Line Resistance	Ω	1,44	5,3	20,5
14	Line to Line Inductance	mH	0,034	0,14	0,566
15	Rotor Inertia	gcm ²	0,85	0,85	0,85
16	Max. Efficiency	%	69	70	71
17	Mechanical Time Constant	ms	5,75	5,18	4,95
18	Length (L)	mm	36	36	36
19	Weight	g	52	52	52

Characteristics	
Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	20000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	6N
Max. Axial force	1N
Max. Force for Press fit	18N

Connection			
Pin n°	Color	Gauge	Function
1	Brown	AWG24	Phase 1
2	Red		Phase 2
3	Orange		Phase 3
4	Yellow		Vcc Hall 3 to 24 Vdc
5	Green		GND Hall
6	Blue		Hall 1
7	Violet		Hall 2
8	Grey		Hall 3

Operating range: Winding 12V

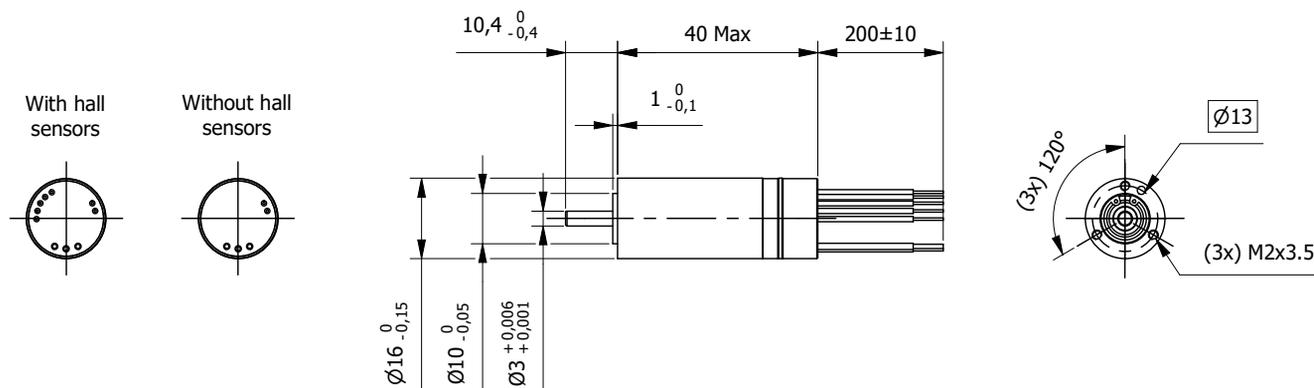


Brushless Slotless Motor 16EC40NS

High Speed

Ø 16mm

7,2 to 7,5mNm

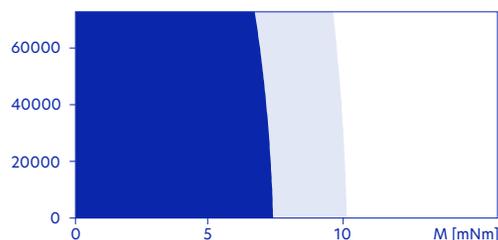


Specification		Model	...50805	...54008	...52201	...52203
1	n° of Pole		2	2	2	2
2	n° of Phase		3	3	3	3
3	Rated Voltage	V	18	24	36	48
4	Rated Speed	rpm	50800	54000	52200	52200
5	Rated Torque	mNm	7,53	7,21	7,4	7,44
6	Stall Torque	mNm	109	111	113	115
7	Torque Constant	mNm/A	3,09	3,9	6,04	8,06
8	Motor Regulation	10 ³ /Nms	53,6	55,3	52,6	51,6
9	Rated Current	A	2,67	2,05	1,35	1,01
10	Stall Current	A	35,1	28,5	18,8	14,3
11	No-load Current	mA	276	227	143	107
12	No-load Speed	rpm	55100	58300	56400	56400
13	Line to Line Resistance	Ω	0,512	0,841	1,92	3,35
14	Line to Line Inductance	mH	0,030	0,047	0,113	0,201
15	Rotor Inertia	gcm ²	0,812	0,812	0,812	0,812
16	Max. Efficiency	%	83,5	83,4	83,7	83,8
17	Mechanical Time Constant	ms	4,36	4,5	4,26	4,19
18	Length (L)	mm	40	40	40	40
19	Weight	g	50	50	50	50

Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	70000rpm
Radial play	preloaded
Axial play	0 to 0,29mm
Max. Radial force (5mm from flange)	10N
Max. Axial force	1,5N
Max. Force for Press fit	60N

Connection		
Color	Gauge	Function
Red	AWG22	Phase 1
Black		Phase 2
White		Phase 3
Orange	AWG26	Vcc Hall 3 to 24 Vdc
Blue		GND Hall
Yellow		Hall 1
Brown		Hall 2
Grey		Hall 3
Purple		NTC

Operating range: Winding 36V



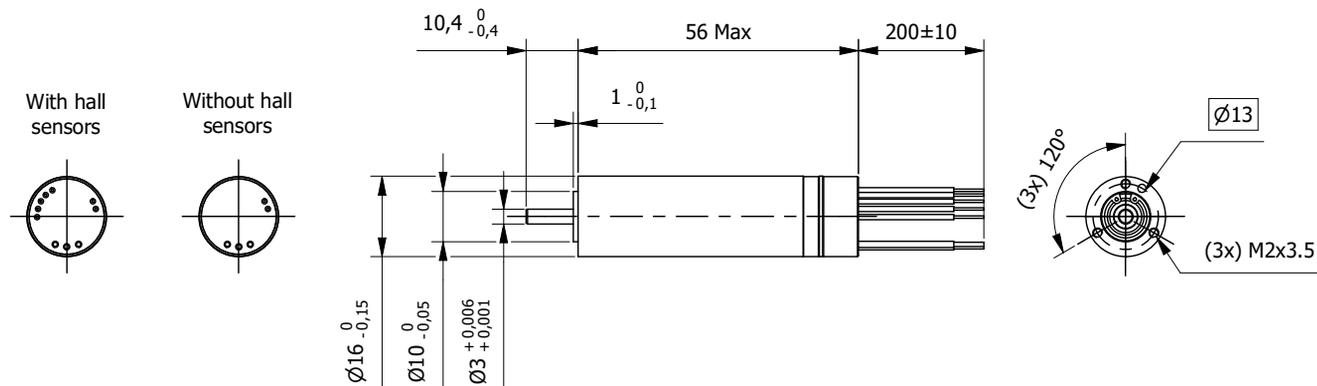
- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

Brushless Slotless Motor 16EC56NS

High Speed

Ø 16mm

14,7 to 16mNm



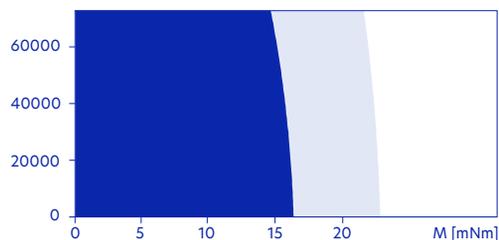
Brushless DC

Specification		...61201	...61602	...61804	...61808	
1	n° of Pole	2	2	2	2	
2	n° of Phase	3	3	3	3	
3	Rated Voltage	V	18	24	36	48
4	Rated Speed	rpm	61200	61600	61800	61800
5	Rated Torque	mNm	15,4	16	15,4	14,7
6	Stall Torque	mNm	346	407	414	396
7	Torque Constant	mNm/A	2,65	3,53	5,3	7,07
8	Motor Regulation	10 ³ /Nms	19,7	16,7	16,4	17,2
9	Rated Current	A	6,2	4,82	3,1	2,24
10	Stall Current	A	131	115	78,1	56
11	No-load Current	mA	459	344	230	172
12	No-load Speed	rpm	64600	64600	64600	64600
13	Line to Line Resistance	Ω	0,138	0,208	0,461	0,858
14	Line to Line Inductance	mH	0,008	0,014	0,032	0,057
15	Rotor Inertia	gcm ²	1,2	1,2	1,2	1,2
16	Max. Efficiency	%	88,7	89,5	89,6	89,4
17	Mechanical Time Constant	ms	2,35	2	1,97	2,06
18	Length (L)	mm	56	56	56	56
19	Weight	g	72,6	72,6	72,6	72,6

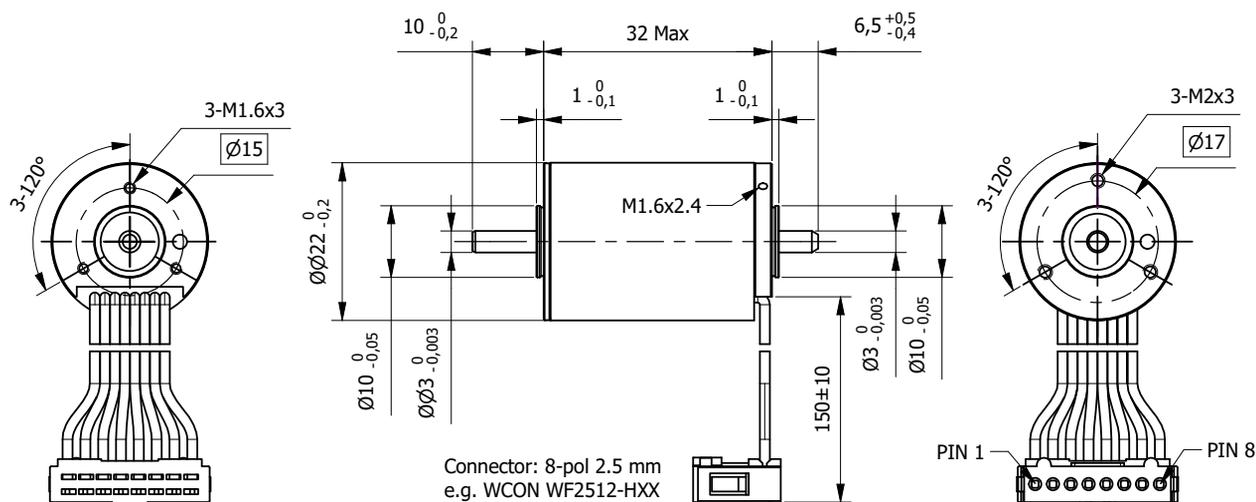
Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	70000rpm
Radial play	preloaded
Axial play	0 to 0,29mm
Max. Radial force (5mm from flange)	10N
Max. Axial force	1,5N
Max. Force for Press fit	60N

Connection		
Color	Gauge	Function
Red	AWG22	Phase 1
Black	|	Phase 2
White	|	Phase 3
Orange	AWG26	Vcc Hall 3 to 24 Vdc
Blue	|	GND Hall
Yellow	|	Hall 1
Brown	|	Hall 2
Grey	|	Hall 3
Purple	|	NTC

Operating range: Winding 36V



- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

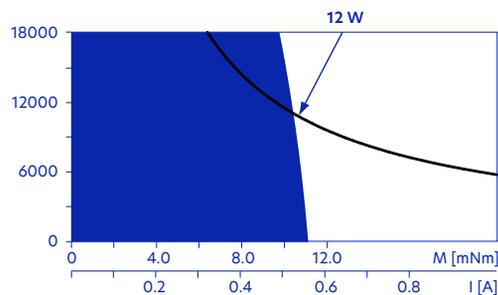


Specification		...7908	...8003	...8212	
1	n° of Pole	2	2	2	
2	n° of Phase	3	3	3	
3	Rated Voltage	V	6	12	24
4	Rated Speed	rpm	7920	8040	8250
5	Rated Torque	mNm	11	10,2	10,8
6	Stall Torque	mNm	33,9	31,3	35,1
7	Torque Constant	mNm/A	4,61	9,02	18,1
8	Motor Regulation	10 ³ /Nms	38,4	42,5	37,8
9	Rated Current	A	2,61	1,25	0,657
10	Stall Current	A	7,36	3,47	1,94
11	No-load Current	mA	301	155	77,3
12	No-load Speed	rpm	11900	12100	12100
13	Line to Line Resistance	Ω	0,816	3,46	12,4
14	Line to Line Inductance	mH	0,032	0,121	0,488
15	Rotor Inertia	gcm ²	2,25	2,25	2,25
16	Max. Efficiency	%	65	63	65
17	Mechanical Time Constant	ms	8,63	9,56	8,47
18	Length (L)	mm	32	32	32
19	Weight	g	83	83	83

Characteristics	
Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	18000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	16N
Max. Axial force	3,5N
Max. Force for Press fit	53N

Connection			
Pin n°	Color	Gauge	Function
1	Brown	AWG24	Phase 1
2	Red		Phase 2
3	Orange		Phase 3
4	Yellow		Vcc Hall 3 to 24 Vdc
5	Green		GND Hall
6	Blue		Hall 1
7	Violet		Hall 2
8	Grey		Hall 3

Operating range: Winding 24V

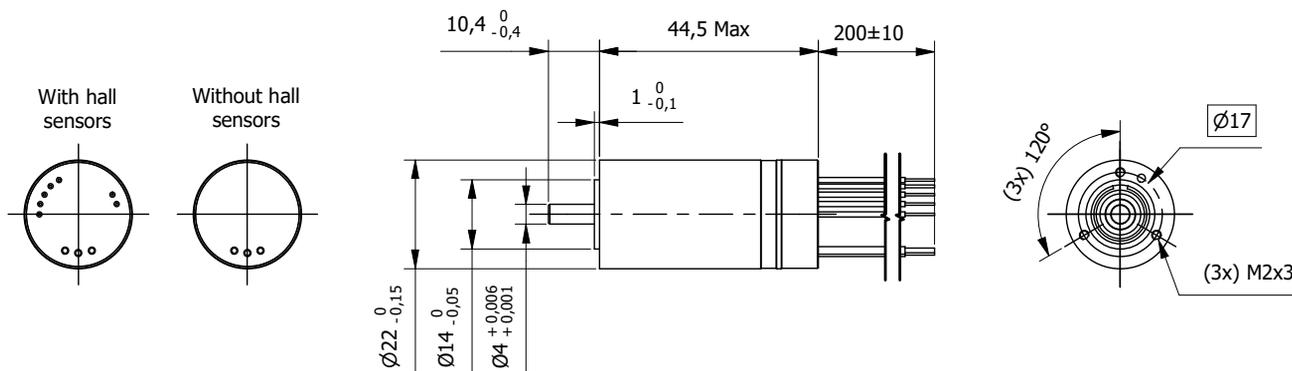


Brushless Slotless Motor 22EC44NS

High Speed

Ø 22mm

18,3 to 20,3mNm



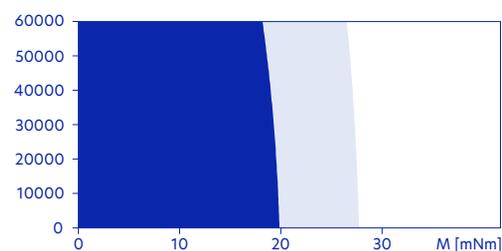
Brushless DC

Specification		...48201	...55601	...53004	...49909
1	n° of Pole	2	2	2	2
2	n° of Phase	3	3	3	3
3	Rated Voltage	V 18	24	36	48
4	Rated Speed	rpm 48200	55600	53000	49900
5	Rated Torque	mNm 20,3	20,1	20	18,3
6	Stall Torque	mNm 454	549	537	425
7	Torque Constant	mNm/A 3,37	3,93	6,18	8,7
8	Motor Regulation	10 ³ /Nms 11,7	11,1	10,8	13,0
9	Rated Current	A 6,28	5,36	3,4	2,21
10	Stall Current	A 135	140	87	48,8
11	No-load Current	mA 324	302	186	128
12	No-load Speed	rpm 50900	58100	55500	52500
13	Line to Line Resistance	Ω 0,133	0,172	0,414	0,983
14	Line to Line Inductance	mH 0,010	0,013	0,033	0,065
15	Rotor Inertia	gcm ² 2,15	2,15	2,15	2,15
16	Max. Efficiency	% 90,6	91	91,1	90,2
17	Mechanical Time Constant	ms 2,53	2,39	2,33	2,79
18	Length (L)	mm 44,5	44,5	44,5	44,5
19	Weight	g 98	98	98	98

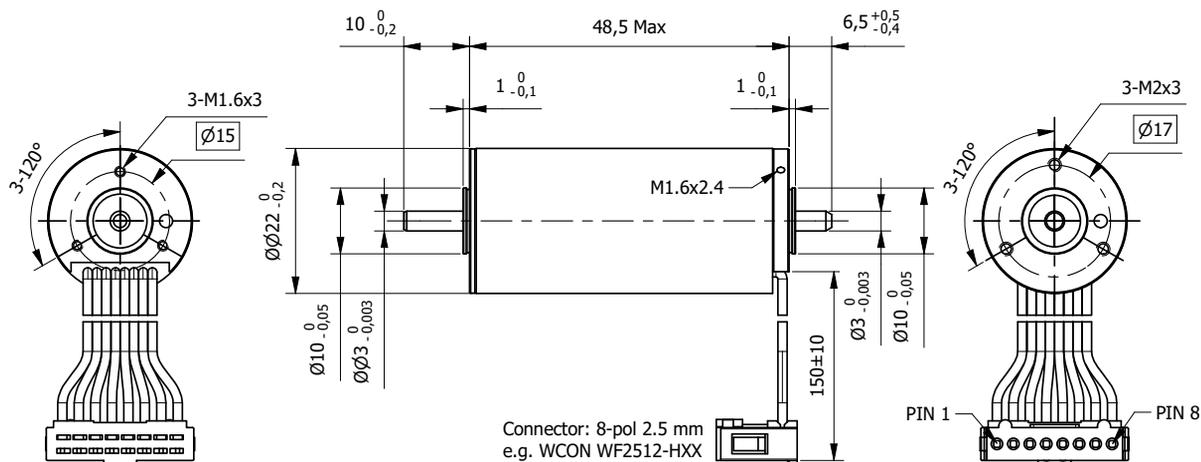
Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	60000rpm
Radial play	preloaded
Axial play	0 to 0,24mm
Max. Radial force (5mm from flange)	16N
Max. Axial force	4N
Max. Force for Press fit	110N

Connection		
Color	Gauge	Function
Red	AWG18	Phase 1
Black	|	Phase 2
White	|	Phase 3
Orange	AWG26	Vcc Hall 3 to 24 Vdc
Blue	|	GND Hall
Yellow	|	Hall 1
Brown	|	Hall 2
Grey	|	Hall 3
Purple	|	NTC

Operating range: Winding 36V



- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

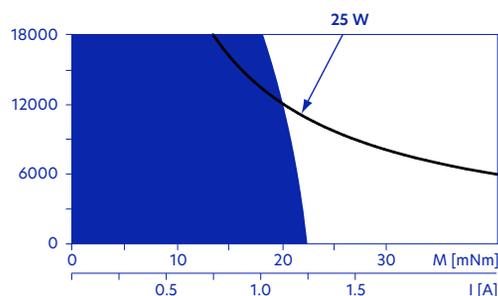


Specification		...9809	...10403	...10513
1	n° of Pole	2	2	2
2	n° of Phase	3	3	3
3	Rated Voltage	V 12	24	48
4	Rated Speed	rpm 9800	10400	10500
5	Rated Torque	mNm 23	22,7	23,2
6	Stall Torque	mNm 114	121	127
7	Torque Constant	mNm/A 9,1	17,4	34,8
8	Motor Regulation	10 ³ /Nms 11,5	11,4	10,8
9	Rated Current	A 2,71	1,4	0,716
10	Stall Current	A 12,6	6,97	3,66
11	No-load Current	mA 226	121	60,4
12	No-load Speed	rpm 12400	12900	12900
13	Line to Line Resistance	Ω 0,955	3,44	13,1
14	Line to Line Inductance	mH 0,05	0,182	0,729
15	Rotor Inertia	gcm ² 4,45	4,45	4,45
16	Max. Efficiency	% 76	76	77
17	Mechanical Time Constant	ms 5,14	5,06	4,82
18	Length (L)	mm 48,5	48,5	48,5
19	Weight	g 110	110	110

Characteristics	
Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	18000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	16N
Max. Axial force	3,5N
Max. Force for Press fit	60N

Connection			
Pin n°	Color	Gauge	Function
1	Brown	AWG24	Phase 1
2	Red		Phase 2
3	Orange		Phase 3
4	Yellow		Vcc Hall 3 to 24 Vdc
5	Green		GND Hall

Operating range: Winding 24V



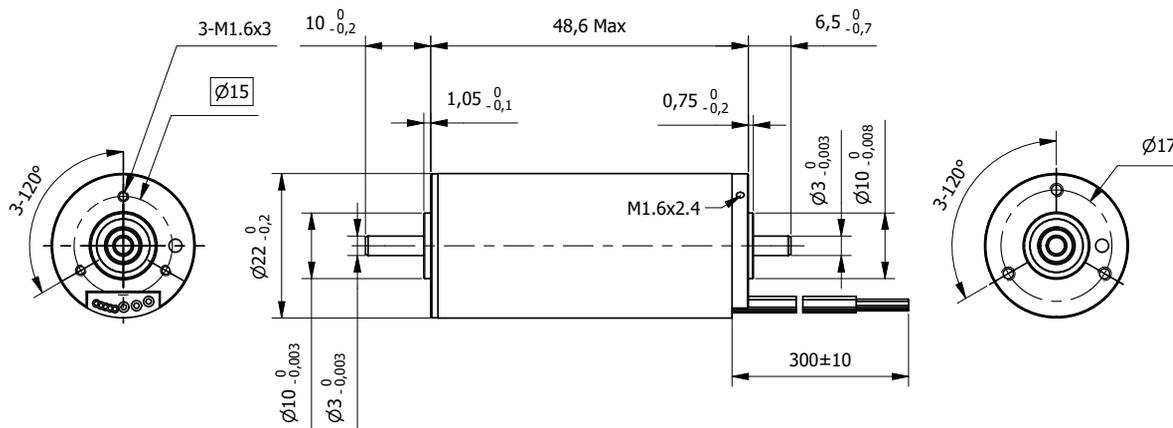
- Continuous operation
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 22EC48T

High Torque

Ø 22mm

42,6 to 45,1mNm



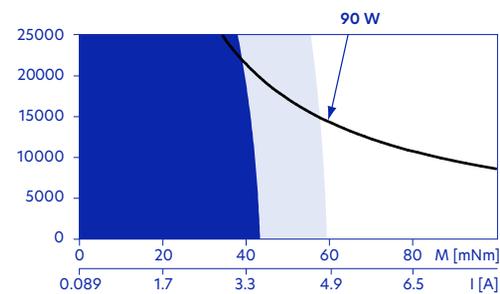
Brushless DC

Specification				
Model	...15005	...14902		
1	n° of Pole	4	4	
2	n° of Phase	3	3	
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	15000	14900
5	Rated Torque	mNm	45,1	42,6
6	Stall Torque	mNm	639	586
7	Torque Constant	mNm/A	14	28,1
8	Motor Regulation	10 ³ /Nms	2,7	2,9
9	Rated Current	A	3,34	1,58
10	Stall Current	A	45,5	20,9
11	No-load Current	mA	164	81,8
12	No-load Speed	rpm	16300	16300
13	Line to Line Resistance	Ω	0,527	2,3
14	Line to Line Inductance	mH	0,051	0,201
15	Rotor Inertia	gcm ²	5,54	5,54
16	Max. Efficiency	%	89	88
17	Mechanical Time Constant	ms	1,48	1,62
18	Length (L)	mm	48,6	48,6
19	Weight	g	125	125

Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	25000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	16N
Max. Axial force	4N
Max. Force for Press fit	53N

Connection			
Lead n°	Color	Gauge	Function
1	Red	AWG20	Phase 1
2	White		Phase 3
3	Black		Phase 2
4	Red/Grey	AWG26	Hall 1
5	Black/Grey		Hall 2
6	White/Grey		Hall 3
7	Green		Vcc Hall 3 to 24 Vdc
8	Blue		GND Hall

Operating range: Winding 24V



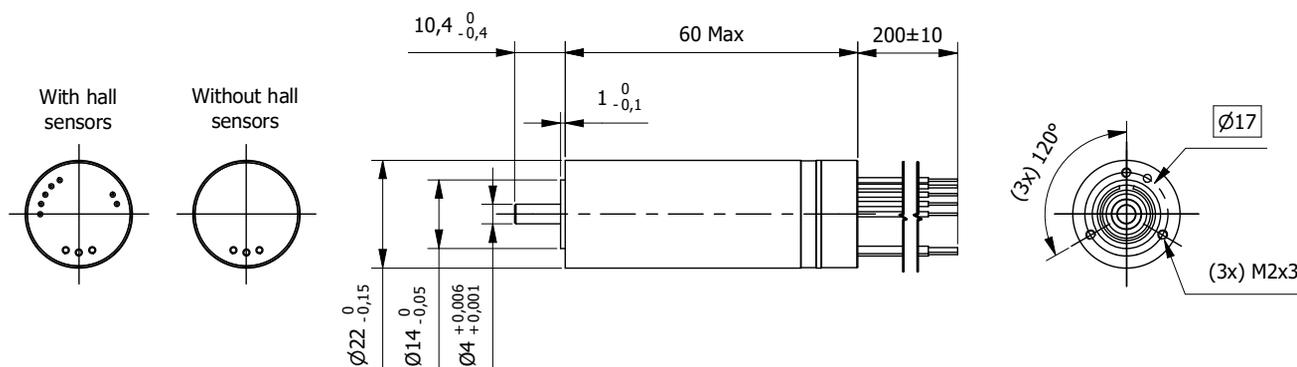
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 22EC60NS

High Speed

Ø 22mm

27,4 to 29,3mNm

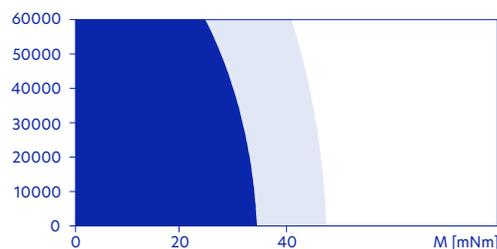


Specification		...47801	...49904	...50903
1	n° of Pole	2	2	2
2	n° of Phase	3	3	3
3	Rated Voltage	V 24	36	48
4	Rated Speed	rpm 47800	49900	50900
5	Rated Torque	mNm 29,1	29,3	27,4
6	Stall Torque	mNm 1080	1290	1230
7	Torque Constant	mNm/A 4,63	6,68	8,74
8	Motor Regulation	10 ³ /Nms 4,8	4,2	4,5
9	Rated Current	A 6,67	4,67	3,36
10	Stall Current	A 233	193	141
11	No-load Current	mA 432	307	238
12	No-load Speed	rpm 49400	51400	52400
13	Line to Line Resistance	Ω 0,103	0,187	0,341
14	Line to Line Inductance	mH 0,009	0,019	0,032
15	Rotor Inertia	gcm ² 3,94	3,94	3,94
16	Max. Efficiency	% 91,7	92,3	92
17	Mechanical Time Constant	ms 1,9	1,65	1,76
18	Length (L)	mm 60	60	60
19	Weight	g 140	140	140

Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	60000rpm
Radial play	preloaded
Axial play	0 to 0,24mm
Max. Radial force (5mm from flange)	16N
Max. Axial force	4N
Max. Force for Press fit	110N

Connection		
Color	Gauge	Function
Red	AWG18	Phase 1
Black		Phase 2
White		Phase 3
Orange	AWG26	Vcc Hall 3 to 24 Vdc
Blue		GND Hall
Yellow		Hall 1
Brown		Hall 2
Grey		Hall 3
Purple		NTC

Operating range: Winding 36V



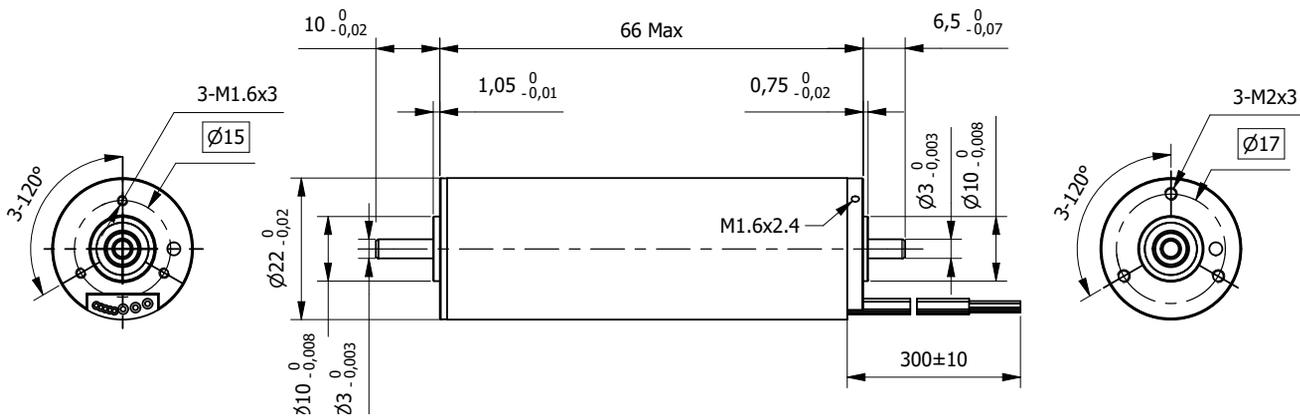
- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

Brushless Slotless Motor 22EC66T

High Torque

Ø 22mm

54,5 to 54,6mNm



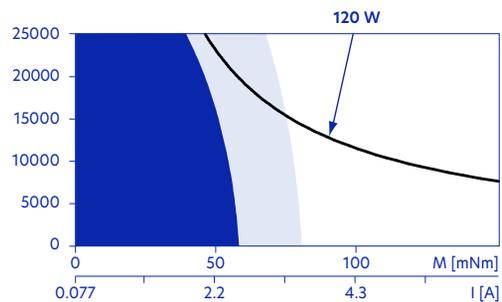
Brushless DC

Specification		...15803	...15801
1	n° of Pole	4	4
2	n° of Phase	3	3
3	Rated Voltage	V 24	48
4	Rated Speed	rpm 15800	15800
5	Rated Torque	mNm 54,6	54,5
6	Stall Torque	mNm 954	1020
7	Torque Constant	mNm/A 13,5	27,1
8	Motor Regulation	10 ³ /Nms 1,9	1,7
9	Rated Current	A 4,21	2,1
10	Stall Current	A 70,4	37,7
11	No-load Current	mA 223	112
12	No-load Speed	rpm 16900	16900
13	Line to Line Resistance	Ω 0,341	1,27
14	Line to Line Inductance	mH 0,031	0,123
15	Rotor Inertia	gcm ² 8,91	8,91
16	Max. Efficiency	% 89	90
17	Mechanical Time Constant	ms 1,65	1,54
18	Length (L)	mm 66	66
19	Weight	g 175	175

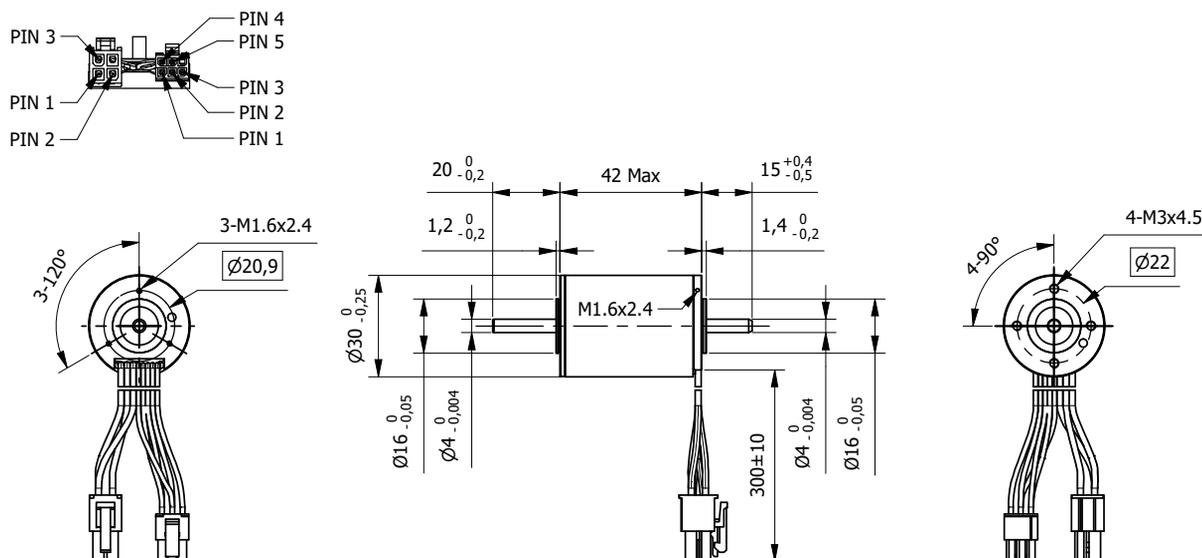
Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	25000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	16N
Max. Axial force	4N
Max. Force for Press fit	53N

Connection			
Lead n°	Color	Gauge	Function
1	Red	AWG20	Phase 1
2	White		Phase 3
3	Black		Phase 2
4	Red/Grey	AWG26	Hall 1
5	Black/Grey		Hall 2
6	White/Grey		Hall 3
7	Green		Vcc Hall 3 to 24 Vdc
8	Blue		GND Hall

Operating range: Winding 48V



- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

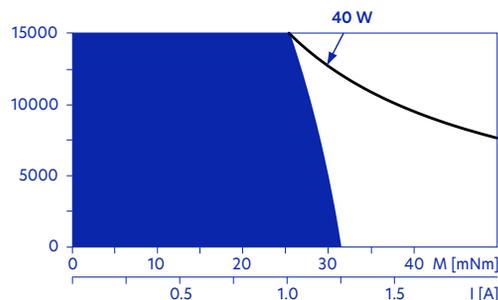


Specification			
Model		...7203	...7214
1	n° of Pole	2	2
2	n° of Phase	3	3
3	Rated Voltage	V 24	48
4	Rated Speed	rpm 7220	7210
5	Rated Torque	mNm 33,8	33,4
6	Stall Torque	mNm 160	157
7	Torque Constant	mNm/A 24,3	48,6
8	Motor Regulation	10 ³ /Nms 6,2	6,3
9	Rated Current	A 1,49	0,738
10	Stall Current	A 6,57	3,24
11	No-load Current	mA 123	61,4
12	No-load Speed	rpm 9250	9250
13	Line to Line Resistance	Ω 3,65	14,8
14	Line to Line Inductance	mH 0,31	1,24
15	Rotor Inertia	gcm ² 11	11
16	Max. Efficiency	% 75	75
17	Mechanical Time Constant	ms 6,81	6,9
18	Length (L)	mm 42	42
19	Weight	g 195	195

Characteristics	
Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	15000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	25N
Max. Axial force	5N
Max. Force for Press fit	98N

Connection				
Pin n°	Color	Connector	Gauge	Function
1	Red	Molex 39-01-2040	AWG20	Phase 1
2	Black			Phase 2
3	White			Phase 3
1	Yellow	Molex 430-25-0600	AWG26	Hall 1
2	Brown			Hall 2
3	Grey			Hall 3
4	Blue			GND Hall
5	Green			Vcc Hall 3 to 24 Vdc

Operating range: Winding 24V

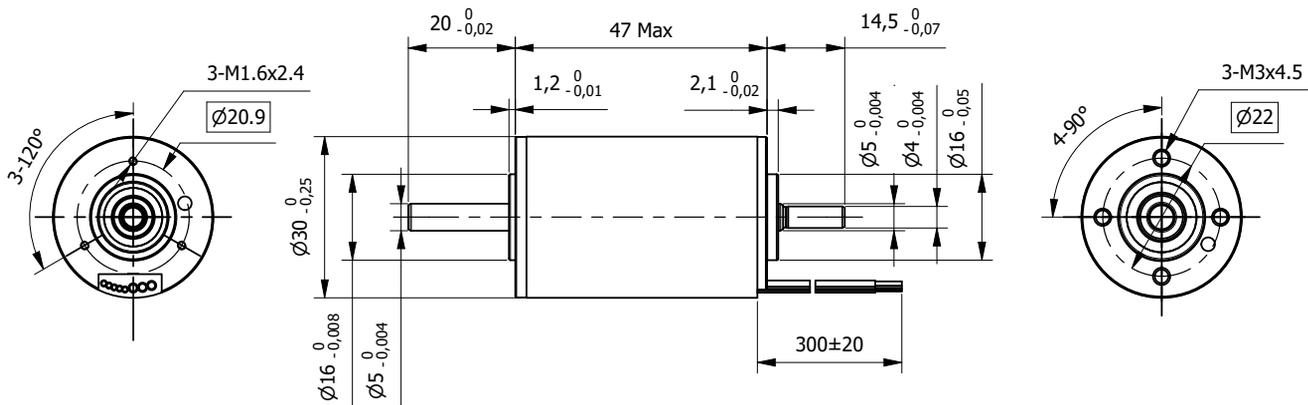


Brushless Slotless Motor 30EC47T

High Torque

Ø 30mm

68,8 to 73,4mNm

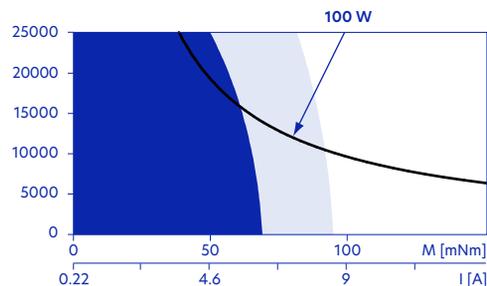


Specification		...16302	...16408
1	n° of Pole	4	4
2	n° of Phase	3	3
3	Rated Voltage	V 24	48
4	Rated Speed	rpm 16300	16400
5	Rated Torque	mNm 68,8	73,4
6	Stall Torque	mNm 1270	1500
7	Torque Constant	mNm/A 13,1	26,1
8	Motor Regulation	10 ³ /Nms 1,4	1,2
9	Rated Current	A 5,56	2,95
10	Stall Current	A 96,9	57,4
11	No-load Current	mA 379	189
12	No-load Speed	rpm 17500	17500
13	Line to Line Resistance	Ω 0,248	0,836
14	Line to Line Inductance	mH 0,030	0,118
15	Rotor Inertia	gcm ² 18,3	18,3
16	Max. Efficiency	% 88,2	89,1
17	Mechanical Time Constant	ms 2,65	2,24
18	Length (L)	mm 47	47
19	Weight	g 210	210

Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	25000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	25N
Max. Axial force	5,5N
Max. Force for Press fit	73N

Connection			
Lead n°	Color	Gauge	Function
1	Black	AWG18	Phase 2
2	White		Phase 3
3	Red		Phase 1
4	Black/Grey	AWG26	Hall 2
5	Blue		GND Hall
6	Green		Vcc Hall 3 to 24 Vdc
7	Red/Grey		Hall 1
8	White/Grey		Hall 3

Operating range: Winding 24V

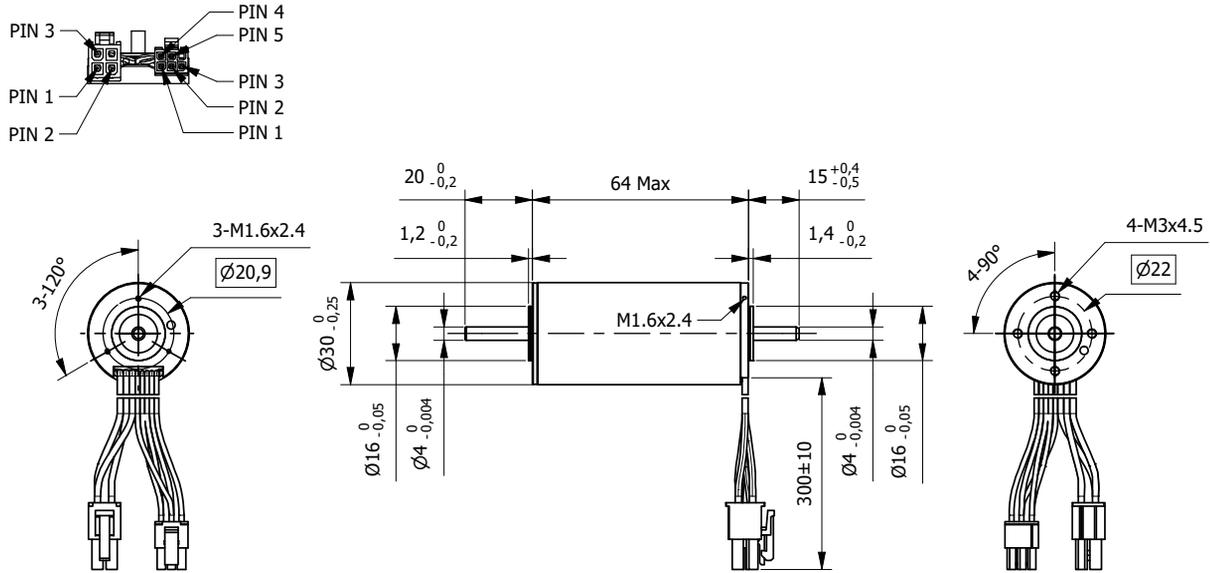


- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 30EC64P

Ø 30mm

60,7 to 64,1mNm



Specification

Model	...8001	...8104
1 n° of Pole	2	2
2 n° of Phase	3	3
3 Rated Voltage	V 24	48
4 Rated Speed	rpm 8040	8130
5 Rated Torque	mNm 60,7	64,1
6 Stall Torque	mNm 458	519
7 Torque Constant	mNm/A 24,3	48,6
8 Motor Regulation	10 ³ /Nms 2,2	1,9
9 Rated Current	A 2,66	1,4
10 Stall Current	A 18,8	10,7
11 No-load Current	mA 191	95,4
12 No-load Speed	rpm 9340	9350
13 Line to Line Resistance	Ω 1,27	4,49
14 Line to Line Inductance	mH 0,143	0,573
15 Rotor Inertia	gcm ² 21,9	21,9
16 Max. Efficiency	% 81	82
17 Mechanical Time Constant	ms 4,73	4,17
18 Length (L)	mm 64	64
19 Weight	g 305	305

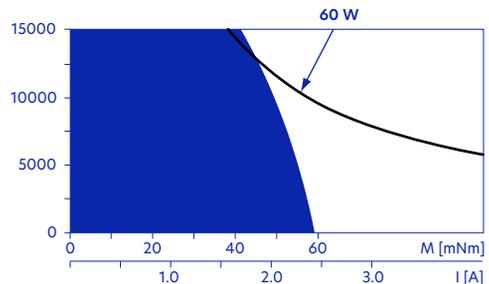
Characteristics

Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	15000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	25N
Max. Axial force	5N
Max. Force for Press fit	98N

Connection

Pin n°	Color	Connector	Gauge	Function
1	Red	Molex 39-01-2040	AWG20	Phase 1
2	Black	|	|	Phase 2
3	White	|	|	Phase 3
1	Yellow	Molex 430-25-0600	AWG26	Hall 1
2	Brown	|	|	Hall 2
3	Grey	|	|	Hall 3
4	Blue	|	|	GND Hall
5	Green	|	|	Vcc Hall 3 to 24 Vdc

Operating range: Winding 24V



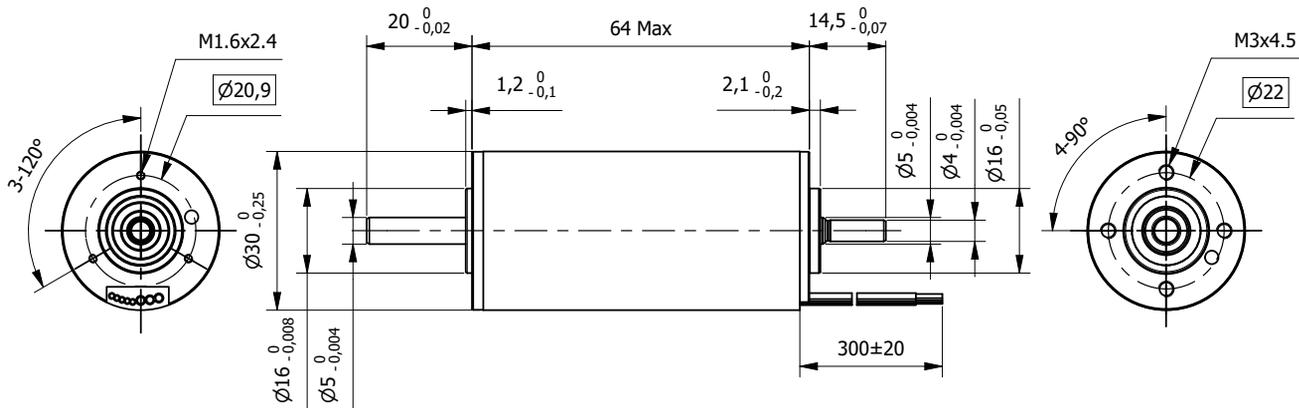
- Continuous operation
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 30EC64T

High Torque

Ø 30mm

92,9 to 95,6mNm



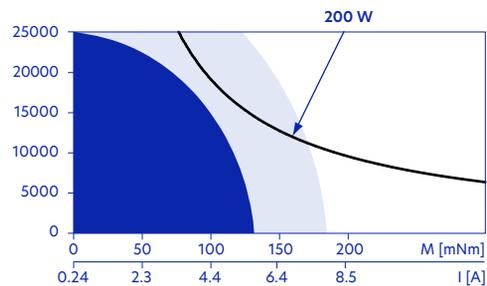
Brushless DC

Specification				
Model		...16101	...16003	
1	n° of Pole	4	4	
2	n° of Phase	3	3	
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	16100	16000
5	Rated Torque	mNm	95,6	92,9
6	Stall Torque	mNm	3240	3430
7	Torque Constant	mNm/A	13,7	27,6
8	Motor Regulation	10 ³ /Nms	0,5	0,5
9	Rated Current	A	7,61	3,68
10	Stall Current	A	236	124
11	No-load Current	mA	723	356
12	No-load Speed	rpm	16700	16500
13	Line to Line Resistance	Ω	0,102	0,386
14	Line to Line Inductance	mH	0,016	0,065
15	Rotor Inertia	gcm ²	33,3	33,3
16	Max. Efficiency	%	90	90
17	Mechanical Time Constant	ms	1,8	1,69
18	Length (L)	mm	64	64
19	Weight	g	300	300

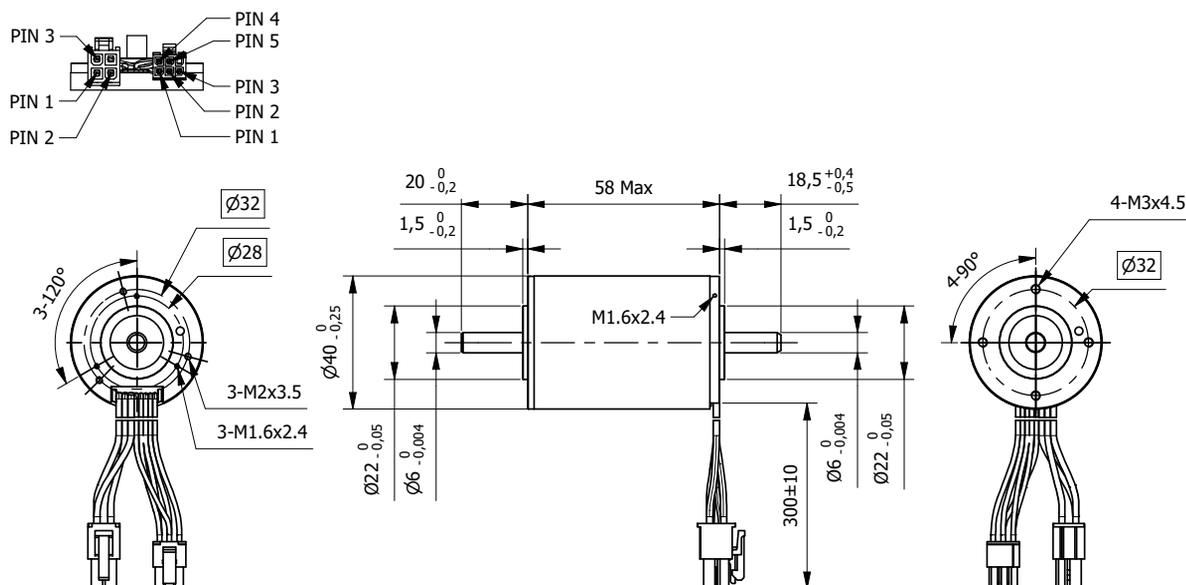
Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	25000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	25N
Max. Axial force	5,5N
Max. Force for Press fit	73N

Connection			
Lead n°	Color	Gauge	Function
1	Black	AWG18	Phase 2
2	White		Phase 3
3	Red		Phase 1
4	Black/Grey	AWG26	Hall 2
5	Blue		GND Hall
6	Green		Vcc Hall 3 to 24 Vdc

Operating range: Winding 48V



- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation
- Assigned Power Rating

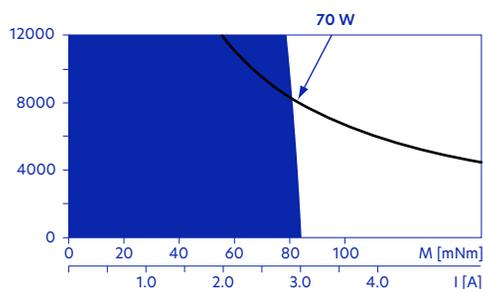


Specification		...6501	...7603
1	n° of Pole	2	2
2	n° of Phase	3	3
3	Rated Voltage	V 24	48
4	Rated Speed	rpm 6520	7610
5	Rated Torque	mNm 89,6	94,2
6	Stall Torque	mNm 497	636
7	Torque Constant	mNm/A 28	50
8	Motor Regulation	10 ³ /Nms 1,7	1,5
9	Rated Current	A 3,44	2,02
10	Stall Current	A 17,8	12,7
11	No-load Current	mA 292	173
12	No-load Speed	rpm 8040	9030
13	Line to Line Resistance	Ω 1,35	3,78
14	Line to Line Inductance	mH 0,186	0,592
15	Rotor Inertia	gcm ² 51,2	51,2
16	Max. Efficiency	% 77	79
17	Mechanical Time Constant	ms 8,82	7,73
18	Length (L)	mm 58	58
19	Weight	g 460	460

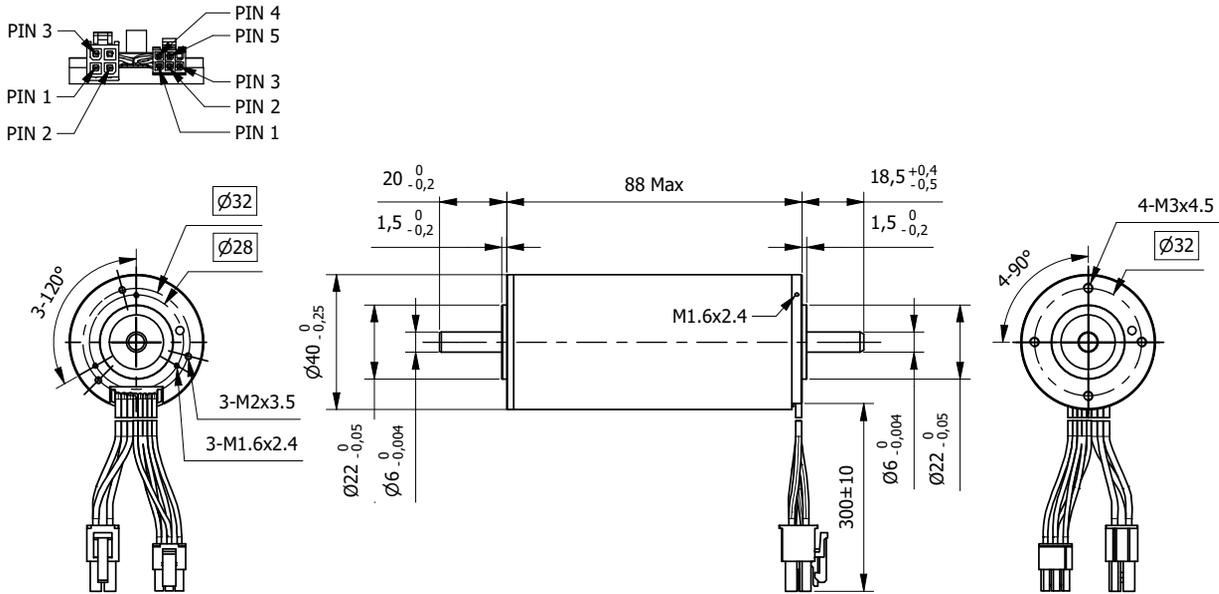
Characteristics	
Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	12000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	80N
Max. Axial force	8N
Max. Force for Press fit	211N

Connection				
Pin n°	Color	Connector	Gauge	Function
1	Red	Molex 39-01-2040	AWG20	Phase 1
2	Black			Phase 2
3	White			Phase 3
1	Yellow	Molex 430-25-0600	AWG26	Hall 1
2	Brown			Hall 2
3	Grey			Hall 3
4	Blue			GND Hall
5	Green			Vcc Hall 3 to 24 Vdc

Operating range: Winding 24V



- Continuous operation
- Intermittent operation
- Assigned Power Rating

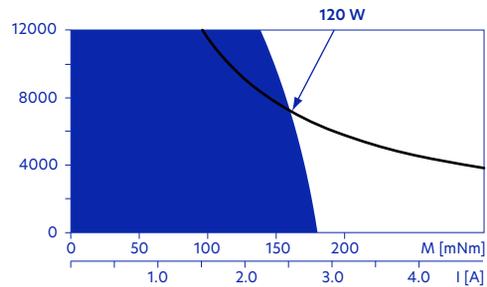


Specification			
Model	...2607		
1	n° of Pole		2
2	n° of Phase		3
3	Rated Voltage	V	48
4	Rated Speed	rpm	2670
5	Rated Torque	mNm	211
6	Stall Torque	mNm	838
7	Torque Constant	mNm/A	126
8	Motor Regulation	10 ³ /Nms	0,5
9	Rated Current	A	1,74
10	Stall Current	A	6,68
11	No-load Current	mA	72,8
12	No-load Speed	rpm	3610
13	Line to Line Resistance	Ω	7,19
14	Line to Line Inductance	mH	1,6
15	Rotor Inertia	gcm ²	101
16	Max. Efficiency	%	80
17	Mechanical Time Constant	ms	4,61
18	Length (L)	mm	88
19	Weight	g	720

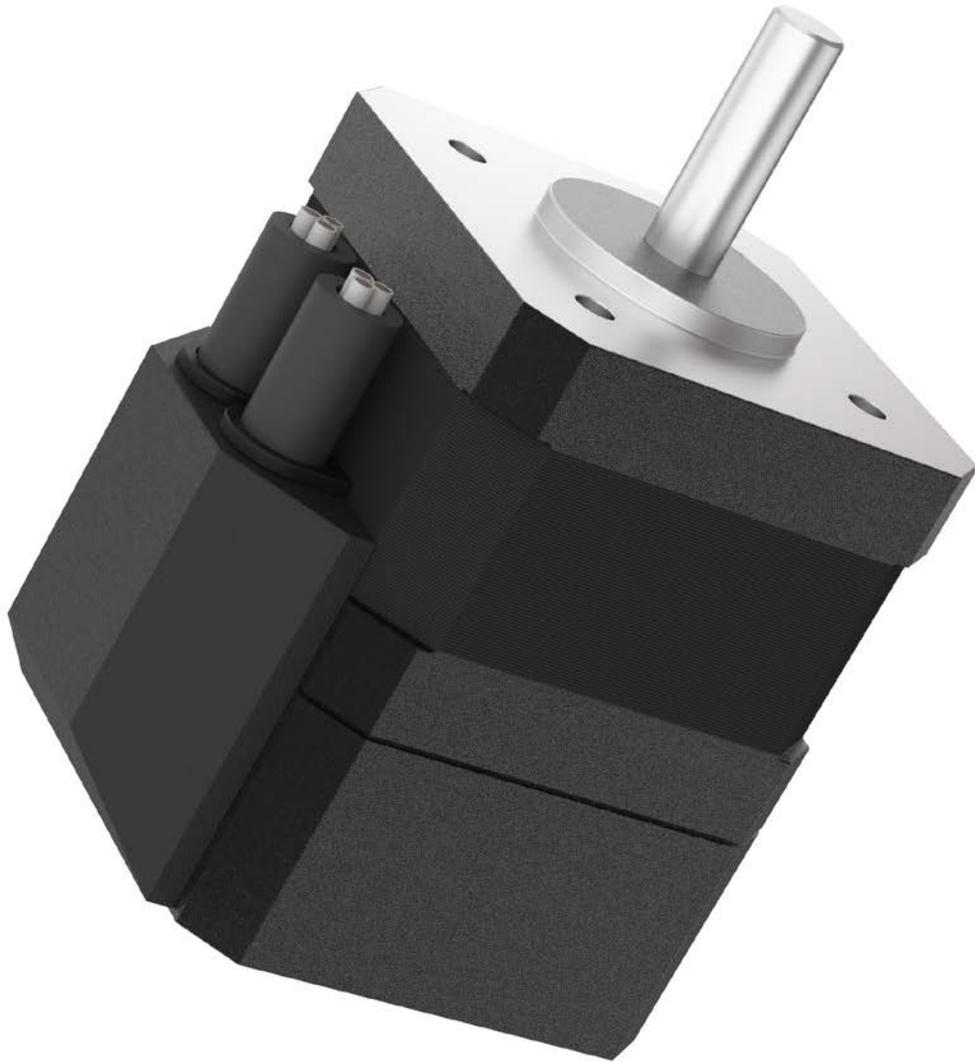
Characteristics	
Item	
Ambient Temperature	-40°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	12000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	80N
Max. Axial force	8N
Max. Force for Press fit	211N

Connection				
Pin n°	Color	Connector	Gauge	Function
1	Red	Molex 39-01-2040	AWG20	Phase 1
2	Black			Phase 2
3	White			Phase 3
1	Yellow	Molex 430-25-0600	AWG26	Hall 1
2	Brown			Hall 2
3	Grey			Hall 3
4	Blue			GND Hall
5	Green			Vcc Hall 3 to 24 Vdc

Operating range: Winding 48V



- Continuous operation
- Intermittent operation
- Assigned Power Rating



Brushless DC
Motors with Encoder

Advantages at a glance
Compact size
Low speed operation
Complete closed loop system

BLDC motors with Encoder	Torque* (Nm)	
42SVA	0,062...0,25	130
57SVA	0,3...0,6	131
86SVA	0,4...1,6	132

Our BLDC slotted motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested by the system. The presence of an encoder is highly recommended when it is critical to know the status of the motor (both position and speed) in every instant.

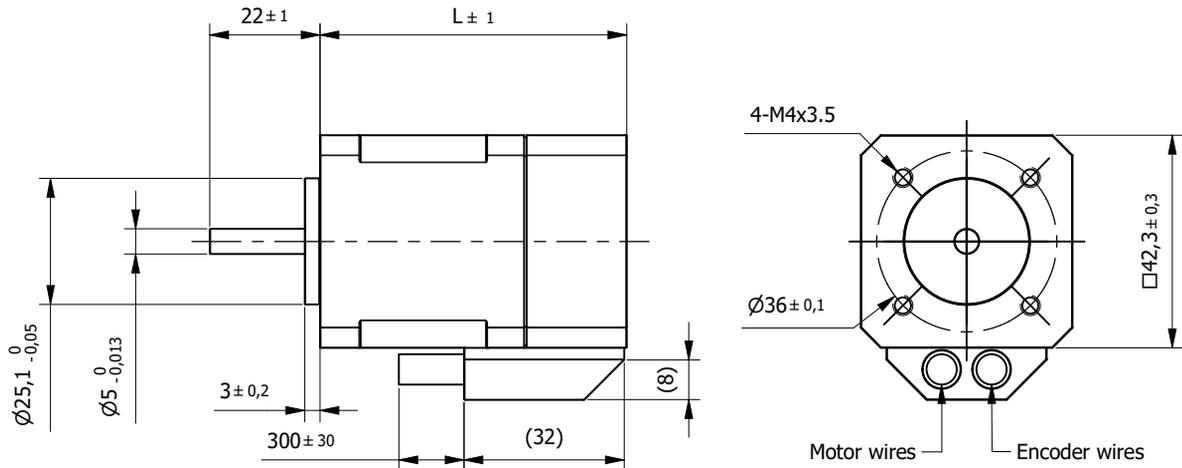
*Rated Torque

Brushless Slotted Motor 42SVA

with Encoder

□ 42mm

0,062 - 0,25Nm



Specification		...61-018E	...81-035E	...101-048E	...121-071E
1	n° of Pole	8	8	8	8
2	n° of Phase	3	3	3	3
3	Rated Voltage	V 24	24	24	24
4	Rated Speed	rpm 4000	4000	4000	4000
5	Rated Torque	Nm 0,062	0,125	0,185	0,25
6	Max. Peak Torque	Nm 0,19	0,38	0,56	0,75
7	Torque Constant	Nm/A 0,035	0,036	0,038	0,036
8	Rated Current	A 1,8	3,5	4,9	6,9
9	Max. Peak Current	A 5,4	10,6	14,7	20,8
10	No-Load Current	mA 200	240	400	450
11	Line to Line Resistance	Ω 1,5	0,8	0,43	0,3
12	Line to Line Inductance	mH 2,1	1,2	0,71	0,5
13	Rotor Inertia	gcm ² 24	48	72	96
14	Length (L)	mm 61,3	81,3	101,3	121,3
15	Weight	Kg 0,3	0,45	0,65	0,8

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP54
Max. Radial force (10mm from flange)	28 N
Max. Axial force	10 N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm
* 3-channel encoder or other types on request	

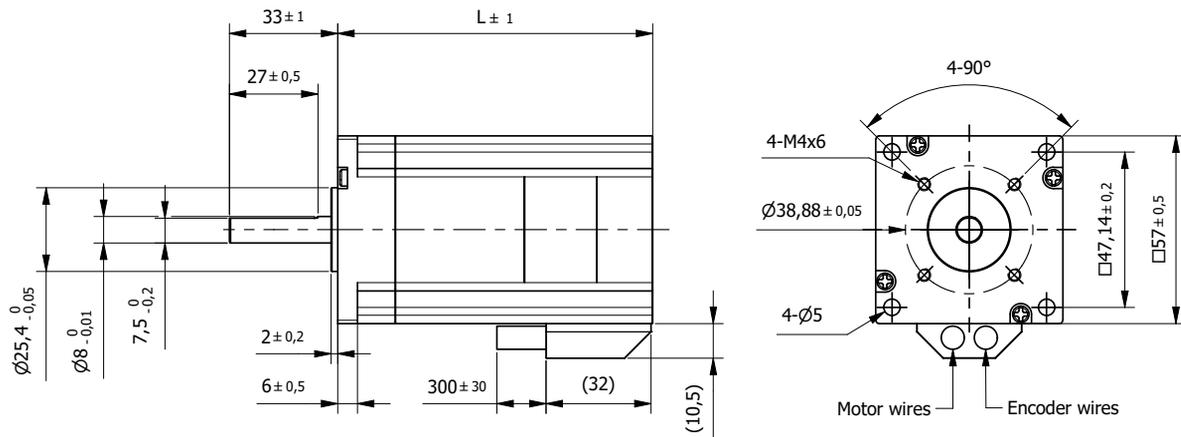
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Red/White	AWG26	GND
2	Red	|	VCC:+5VDC
3	Blue	|	EA-
4	Blue/Black	|	EA+
5	Black	|	EB-
6	Black/White	|	EB+
7	Brown	|	HALL A
8	Orange	|	HALL B
9	Yellow	|	HALL C
Motor			
1	Yellow	AWG18	Phase U
2	Red	|	Phase V
3	Black	|	Phase W

Brushless Slotted Motor 57SVA

with Encoder

□ 57mm

0,3 - 0,6Nm



Brushless DC

Specification		...96-040E	...116-056E	...136-075E
1	n° of Pole	8	8	8
2	n° of Phase	3	3	3
3	Rated Voltage	V	36	36
4	Rated Speed	rpm	3000	3000
5	Rated Torque	Nm	0,3	0,45
6	Max. Peak Torque	Nm	0,8	1,1
7	Torque Constant	Nm/A	0,075	0,08
8	Rated Current	A	4,0	5,625
9	Max. Peak Current	A	12	13,8
10	No-Load Current	mA	450	550
11	Line to Line Resistance	Ω	1,2	0,8
12	Line to Line Inductance	mH	1,2	0,8
13	Rotor Inertia	gcm ²	210	320
14	Length (L)	mm	96	116
15	Weight	Kg	1	1,3

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP54
Max. Radial force (10mm from flange)	115N
Max. Axial force	45 N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm
* 3-channel encoder or other types on request	

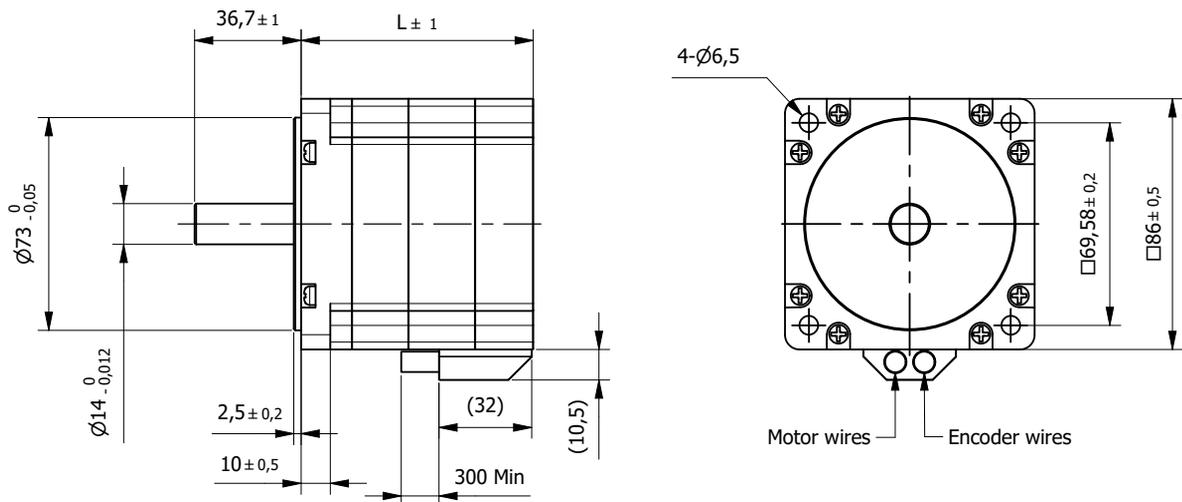
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Red/White	AWG26	GND
2	Red		VCC:+5VDC
3	Blue		EA-
4	Blue/Black		EA+
5	Black		EB-
6	Black/White		EB+
7	Brown		HALL A
8	Orange		HALL B
9	Yellow		HALL C
Motor			
1	Yellow	AWG18	Phase U
2	Red		Phase V
3	Black		Phase W

Brushless Slotted Motor 86SVA

with Encoder

□ 86mm

0,4 - 1,6Nm



Specification		...80-033E	...93-062E	...121-119E
1	n° of Pole	8	8	8
2	n° of Phase	3	3	3
3	Rated Voltage	V 48	48	48
4	Rated Speed	rpm 3000	3000	3000
5	Rated Torque	Nm 0,4	0,8	1,6
6	Max. Peak Torque	Nm 1,2	2,4	4,8
7	Torque Constant	Nm/A 0,122	0,13	0,135
8	Rated Current	A 3,3	6,154	11,852
9	Max. Peak Current	A 9,8	17	35,6
10	No-Load Current	mA 380	550	860
11	Line to Line Resistance	Ω 1	0,45	0,14
12	Line to Line Inductance	mH 1,4	0,75	0,36
13	Rotor Inertia	gcm ² 400	800	1600
14	Length (L)	mm 80	93	121
15	Weight	Kg 1,5	1,85	2,7

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP54
Max. Radial force (20mm from flange)	220N
Max. Axial force	65 N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm
* 3-channel encoder or other types on request	

Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Red/White	AWG26	GND
2	Red	|	VCC:+5VDC
3	Blue	|	EA-
4	Blue/Black	|	EA+
5	Black	|	EB-
6	Black/White	|	EB+
7	Brown	|	HALL A
8	Orange	|	HALL B
9	Yellow	|	HALL C
Motor			
1	Yellow	AWG16	Phase U
2	Red	|	Phase V
3	Black	|	Phase W



Brushless DC
Flat motors

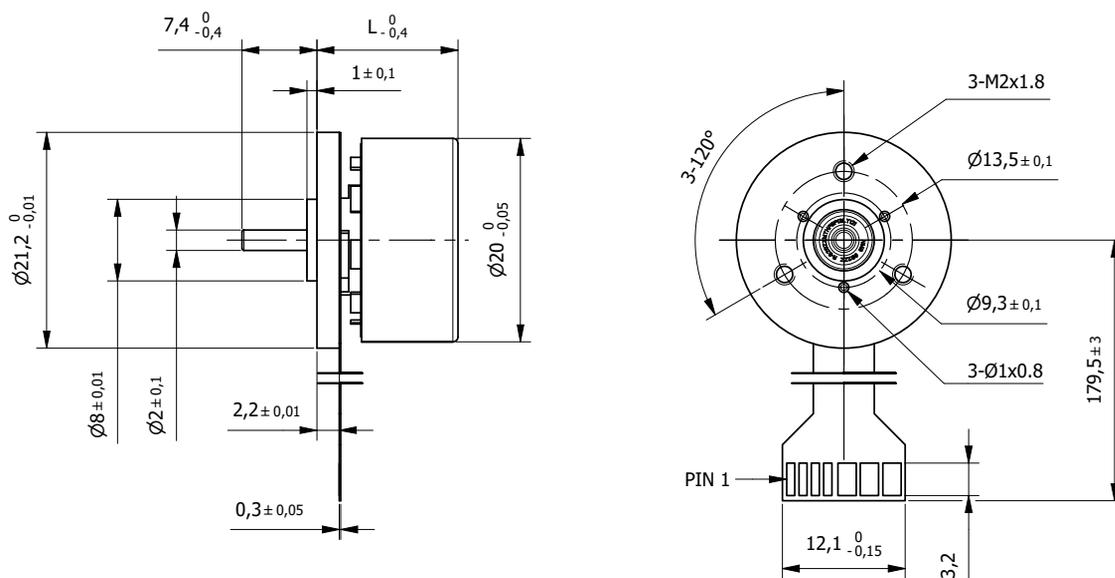
Advantages at a glance

- Very compact size
- Exceptional power to volume ratio
- Good control at low speed

Our flat brushless DC motors have an extremely flat design, ranging from 14 to 40mm. The specific design gives these products an exceptional power to volume ratio, while keeping them very light and compact. Thanks to a high number of poles (starting at 8 till 22 poles), these motors offer very good control also at low speed, as well as a smooth and precise speed control.

BLDC Flat motors	Torque* (Nm)	
20BLW14	0,008	136
32BLW18	0,025	137
45BLW16	0,055	138
45BLW Connector	0,05...0,13	139
45BLW Wires	0,05...0,13	140
60BLWA38	0,5	141
60BLW40	0,3	142
60BLW40 - IP54	0,3	143
90BLW	0,46...0,96	144

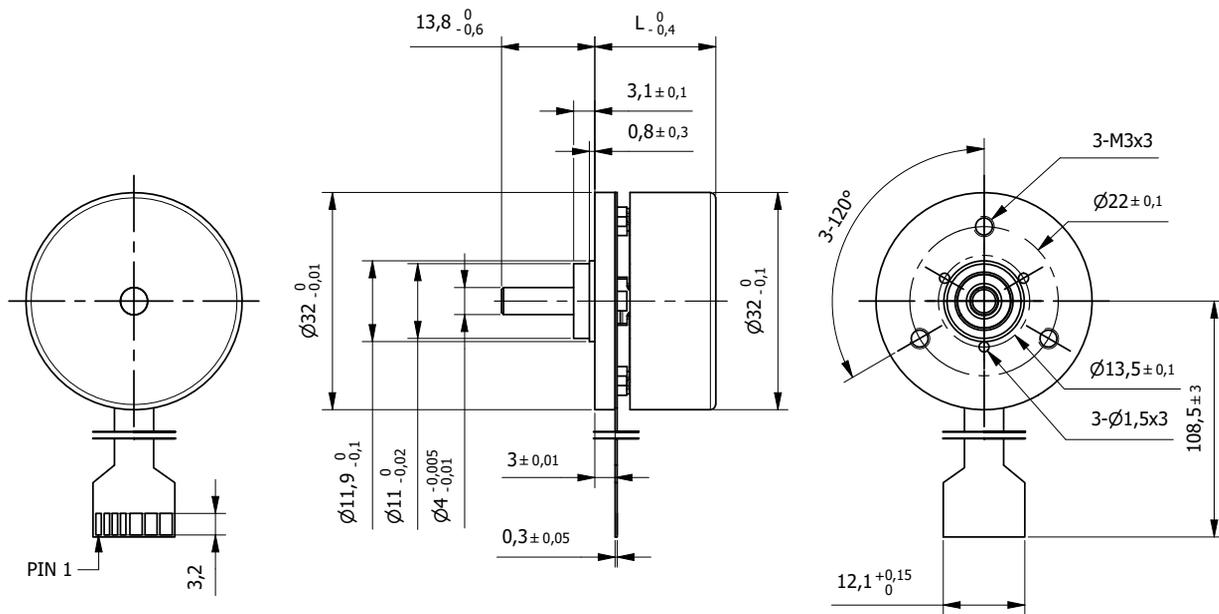
*Rated Torque



Specification		20BLW14-12V	20BLW14-24V
1	n° of Pole	8	8
2	n° of Phase	3	3
3	Rated Voltage	V	12
4	Rated Speed	rpm	5170
5	Rated Torque	Nm	0,008
6	Max. Peak Torque	Nm	0,019
7	Torque Constant	Nm/A	0,012
8	Rated Current	A	0,63
9	Max. Peak Current	A	1,62
10	No-Load Current	mA	230
11	Line to Line Resistance	Ω	6,9
12	Line to Line Inductance	mH	0,7
13	Rotor Inertia	gcm ²	5,1
14	Length (L)	mm	14
15	Weight	Kg	0,023

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	5N
Max. Axial force	2N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection		
Pin n°	Connector	Function
1	FPC cable	Vcc Hall +5 Vdc
2	|	Hall C
3	|	Hall A
4	|	Hall B
5	|	GND Hall
6	|	Phase W
7	|	Phase V
8	|	Phase U



Specification		32BLW18-9V	32BLW18-12V	32BLW18-24V	32BLW18-48V	
1	n° of Pole	8	8	8	8	
2	n° of Phase	3	3	3	3	
3	Rated Voltage	V	9	12	24	48
4	Rated Speed	rpm	2100	2800	2760	2950
5	Rated Torque	Nm	0,025	0,025	0,026	0,025
6	Max. Peak Torque	Nm	0,075	0,075	0,075	0,075
7	Torque Constant	Nm/A	0,023	0,025	0,051	0,096
8	Rated Current	A	1,09	1	0,51	0,26
9	Max. Peak Current	A	3,4	3,2	1,7	0,97
10	No-Load Current	mA	290	190	100	90
11	Line to Line Resistance	Ω	3	3	13	53
12	Line to Line Inductance	mH	1,6	1,9	7,7	28
13	Rotor Inertia	gcm ²	35	35	35	35
14	Length (L)	mm	17,9	17,9	17,9	17,9
15	Weight	Kg	0,05	0,05	0,05	0,05

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,03mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,06mm
Max. Radial force (10mm from flange)	14N
Max. Axial force	4N
Dielectric strength (for 1 min.)	250 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

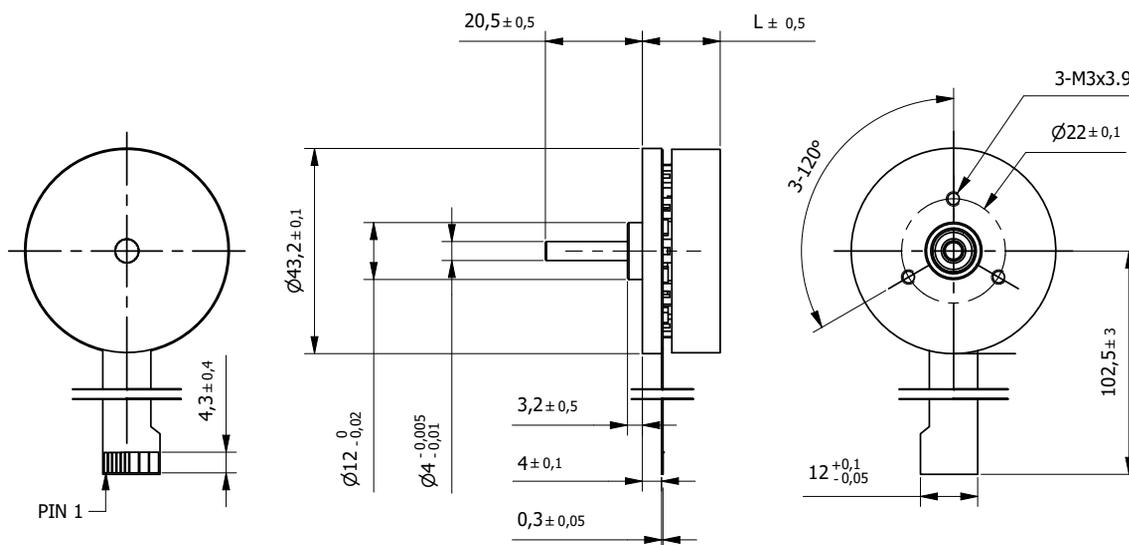
Connection		
Pin n°	Connector	Function
1	FPC cable	Vcc Hall +5 Vdc
2	|	Hall C
3	|	Hall A
4	|	Hall B
5	|	GND Hall
6	|	Phase W
7	|	Phase V
8	|	Phase U

Brushless Flat Motor 45BLW16

Flat Ribbon Cable

Ø 45mm

0,055Nm



Specification		
Model	45BLW16	
1	n° of Pole	16
2	n° of Phase	3
3	Rated Voltage	V 12
4	Rated Speed	rpm 2910
5	Rated Torque	Nm 0,055
6	Max. Peak Torque	Nm 0,16
7	Torque Constant	Nm/A 0,026
8	Rated Current	A 2,12
9	Max. Peak Current	A 6,3
10	No-Load Current	mA 320
11	Line to Line Resistance	Ω 0,9
12	Line to Line Inductance	mH 0,34
13	Rotor Inertia	gcm ² 92,5
14	Length (L)	mm 16
15	Weight	Kg 0,08

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,03mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

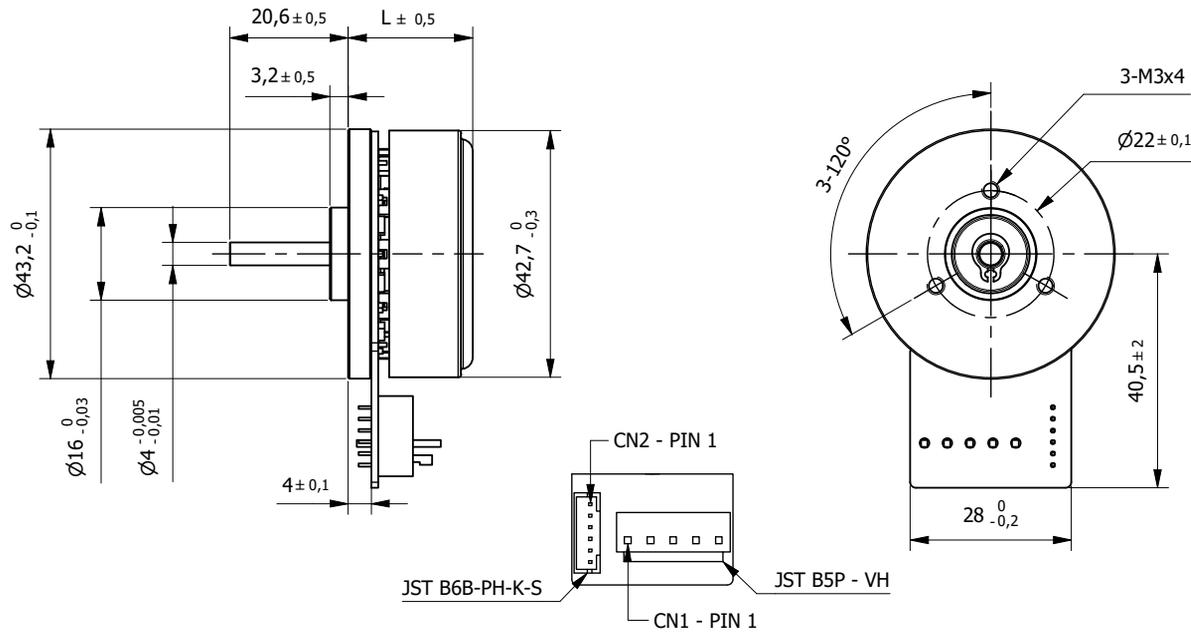
Connection		
Pin n°	Connector	Function
1	FPC cable	Vcc Hall +4,5 to 24 Vdc
2	|	Hall C
3	|	Hall A
4	|	Hall B
5	|	GND Hall
6	|	Phase W
7	|	Phase V
8	|	Phase U

Brushless Flat Motor 45BLW

Connector

Ø 45mm

0,05 - 0,13Nm



Brushless DC

Specification		45BLW18	45BLW21	45BLW27
1	n° of Pole	16	16	16
2	n° of Phase	3	3	3
3	Rated Voltage	24	24	24
4	Rated Speed	5000 rpm	5260	4840
5	Rated Torque	0,05 Nm	0,084	0,13
6	Max. Peak Torque	0,15 Nm	0,25	0,39
7	Torque Constant	0,031 Nm/A	0,033	0,037
8	Rated Current	1,61 A	2,55	3,51
9	Max. Peak Current	4,8 A	7	10
10	No-Load Current	250 mA	390	430
11	Line to Line Resistance	1,83 Ω	0,8	0,61
12	Line to Line Inductance	0,59 mH	0,33	0,27
13	Rotor Inertia	100 gcm ²	135	180
14	Length (L)	18 mm	21	27
15	Weight	0,08 Kg	0,12	0,15

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,03mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

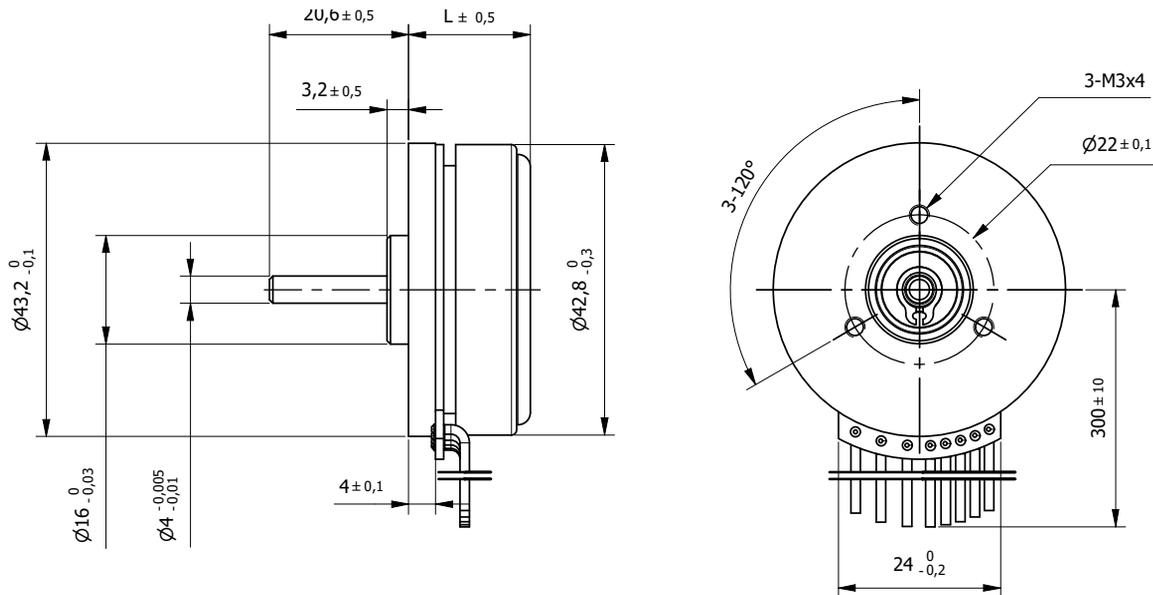
Connection		
Pin n°	Connector	Function
1	JST B5P-VH	GND
2	|	Phase W
3	|	Phase V
4	|	Phase U
5	|	GND
1	JST B6B-PH-K-S	GND
2	|	+5V DC
3	|	Hall A
4	|	Hall B
5	|	Hall C
6	|	GND

Brushless Flat Motor 45BLW

Wires

Ø 45mm

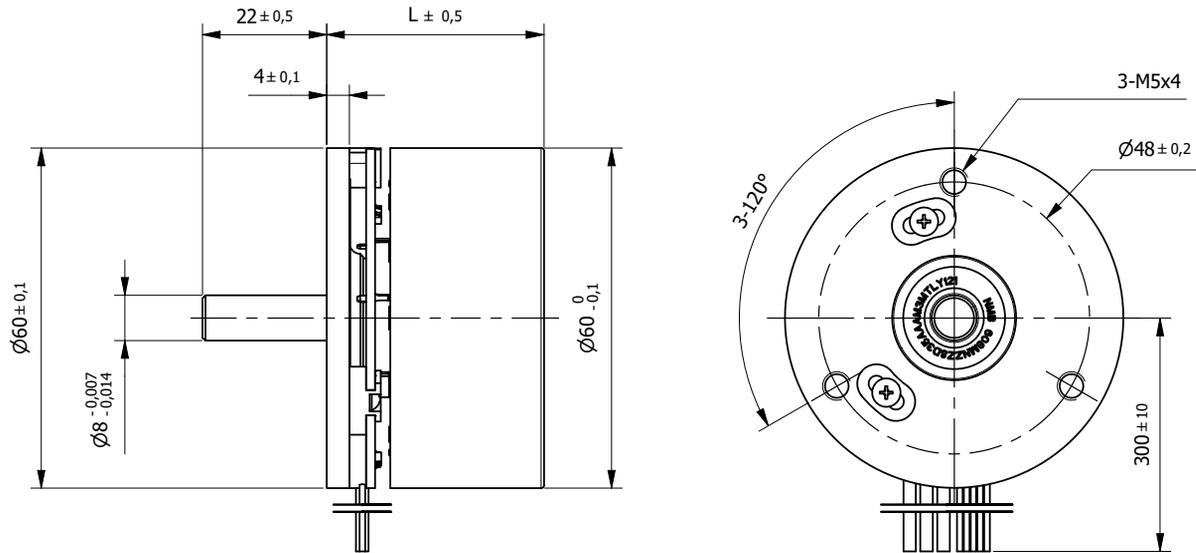
0,05 - 0,13Nm



Specification					
Model		45BLW18	45BLW21	45BLW27	
1	n° of Pole	16	16	16	
2	n° of Phase	3	3	3	
3	Rated Voltage	V	24	24	
4	Rated Speed	rpm	5000	5260	4840
5	Rated Torque	Nm	0,05	0,084	0,13
6	Max. Peak Torque	Nm	0,15	0,25	0,39
7	Torque Constant	Nm/A	0,031	0,033	0,037
8	Rated Current	A	1,61	2,55	3,51
9	Max. Peak Current	A	4,8	7	10
10	No-Load Current	mA	250	380	430
11	Line to Line Resistance	Ω	1,83	0,8	0,61
12	Line to Line Inductance	mH	0,59	0,33	0,27
13	Rotor Inertia	gcm ²	99	135	180
14	Length (L)	mm	18	21	27
15	Weight	Kg	0,08	0,12	0,15

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,03mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

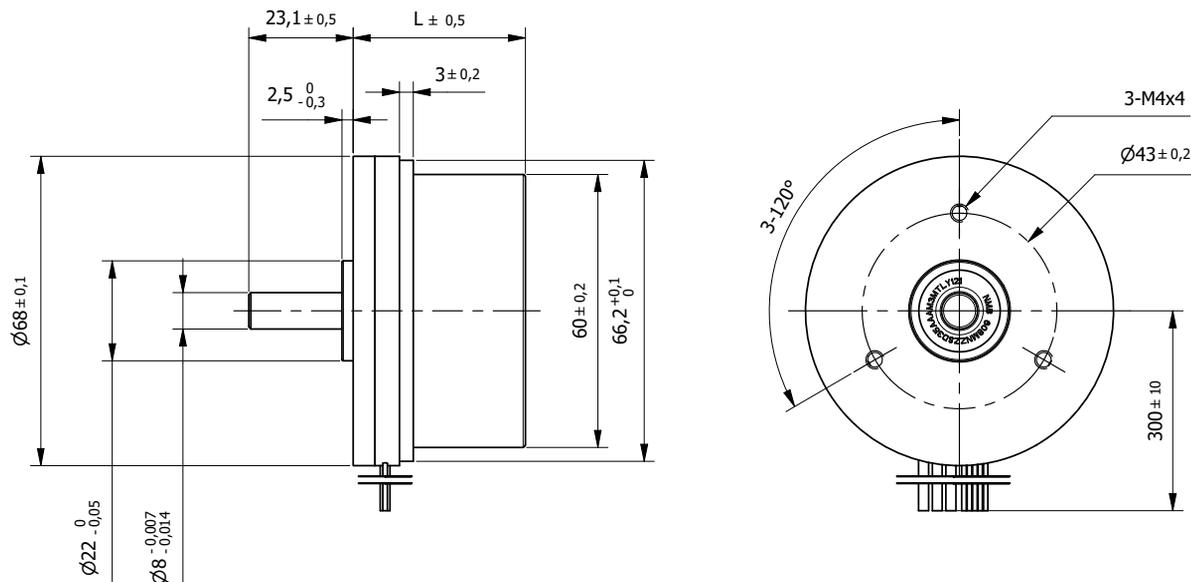
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG24	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Grey		Phase U
7	Brown		Phase V
8	Yellow		Phase W



Specification		
Model	60BLWA38	
1	n° of Pole	14
2	n° of Phase	3
3	Rated Voltage	V 48
4	Rated Speed	rpm 3400
5	Rated Torque	Nm 0,5
6	Max. Peak Torque	Nm 1,5
7	Torque Constant	Nm/A 0,108
8	Rated Current	A 4,6
9	Max. Peak Current	A 14
10	No-Load Current	mA 500
11	Line to Line Resistance	Ω 0,59
12	Line to Line Inductance	mH 0,6
13	Rotor Inertia	gcm ² 1100
14	Length (L)	mm 38
15	Weight	Kg 0,5

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	55N
Max. Axial force	12N
Dielectric strength (for 1 sec.)	600 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1332 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1007 AWG20	Phase U
7	Brown	|	Phase V
8	Orange	|	Phase W



Specification			
Model		60BLW40-24V	60BLW40-48V
1	n° of Pole	14	14
2	n° of Phase	3	3
3	Rated Voltage	V	24
4	Rated Speed	rpm	3700
5	Rated Torque	Nm	0,3
6	Max. Peak Torque	Nm	0,9
7	Torque Constant	Nm/A	0,05
8	Rated Current	A	6
9	Max. Peak Current	A	18
10	No-Load Current	mA	800
11	Line to Line Resistance	Ω	0,3
12	Line to Line Inductance	mH	0,3
13	Rotor Inertia	gcm ²	1500
14	Length (L)	mm	38
15	Weight	Kg	0,5

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	55N
Max. Axial force	12N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

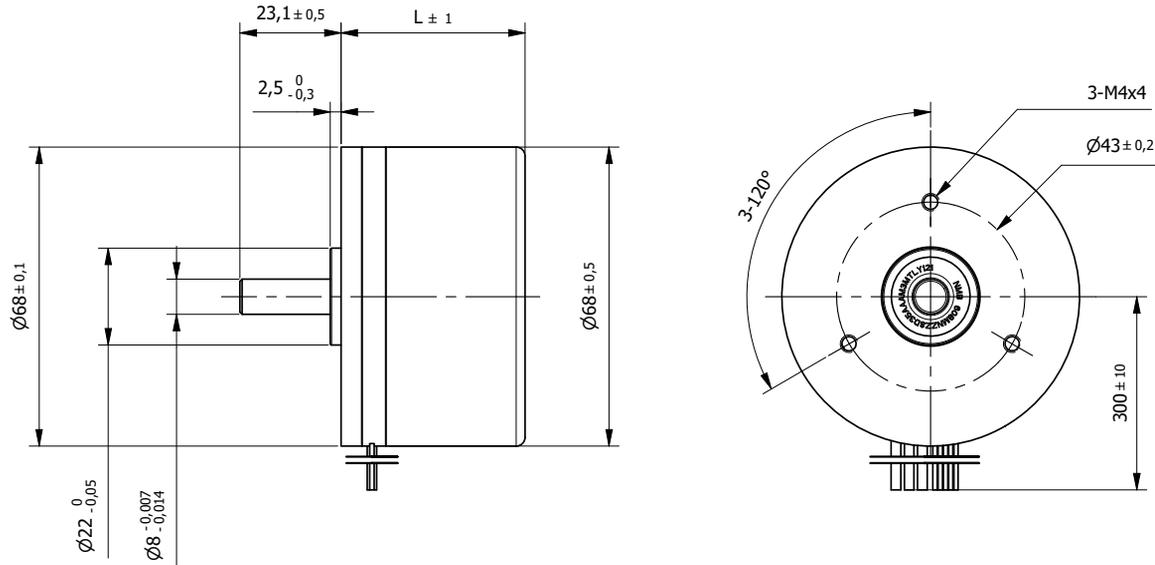
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG18	Phase U
7	Red	|	Phase V
8	Black	|	Phase W

Brushless Flat Motor 60BLW40

IP54

Ø 68mm

0,3Nm

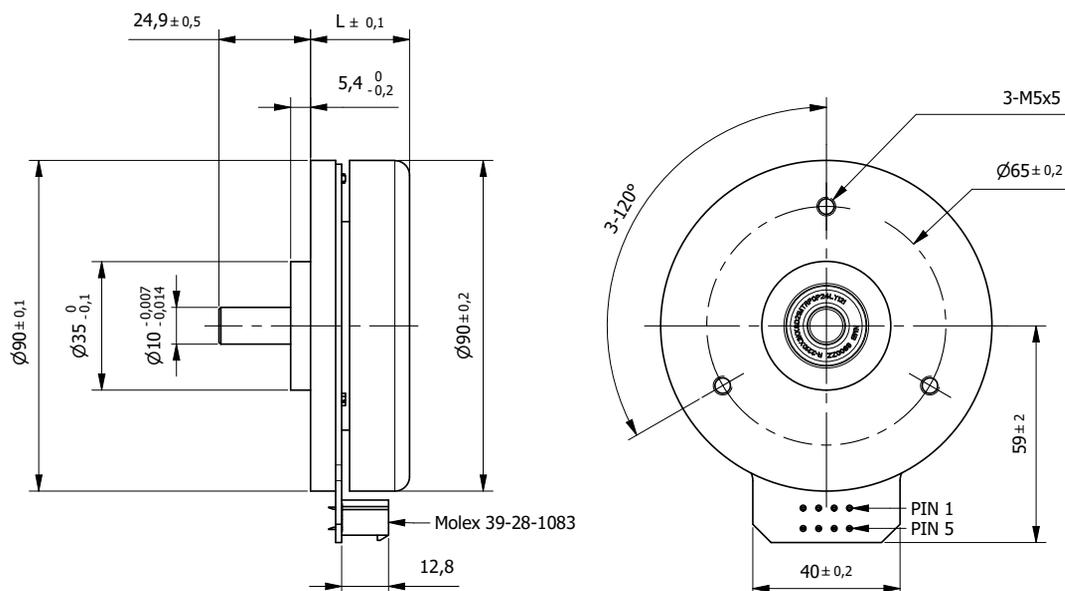


Brushless DC

Specification			
Model		60BLW40-24V-IP	60BLW40-48V-IP
1	n° of Pole	14	14
2	n° of Phase	3	3
3	Rated Voltage	V 24	48
4	Rated Speed	rpm 3700	3700
5	Rated Torque	Nm 0,3	0,3
6	Max. Peak Torque	Nm 0,9	0,9
7	Torque Constant	Nm/A 0,05	0,1
8	Rated Current	A 6	3
9	Max. Peak Current	A 18	9
10	No-Load Current	mA 800	400
11	Line to Line Resistance	Ω 0,3	1,1
12	Line to Line Inductance	mH 0,3	1,4
13	Rotor Inertia	gcm ² 1500	1500
14	Length (L)	mm 42	42
15	Weight	Kg 0,5	0,5

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP54
Radial play (450g load)	0,02mm
Axial play (450g load)	0,14mm
Max. Radial force (10mm from flange)	55N
Max. Axial force	12N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue	|	Hall A
3	Green	|	Hall B
4	White	|	Hall C
5	Black	|	GND Hall
6	Yellow	UL1430 AWG18	Phase U
7	Red	|	Phase V
8	Black	|	Phase W



Specification		...27-24V	...27-36V	...27-48V	...27-60V	...40-48V
1	n° of Pole	22	22	22	22	22
2	n° of Phase	3	3	3	3	3
3	Rated Voltage	V	24	36	48	60
4	Rated Speed	rpm	2720	2510	1610	2200
5	Rated Torque	Nm	0,457	0,56	0,533	0,46
6	Max. Peak Torque	Nm	1,8	1,8	1,8	1,8
7	Torque Constant	Nm/A	0,067	0,11	0,22	0,21
8	Rated Current	A	6,82	5,09	2,42	2,19
9	Max. Peak Current	A	23	14,5	7,5	7,5
10	No-Load Current	mA	650	420	300	260
11	Line to Line Resistance	Ω	0,21	0,5	2,1	2
12	Line to Line Inductance	mH	0,19	0,5	2	1,8
13	Rotor Inertia	gcm ²	3000	3000	3000	3000
14	Length (L)	mm	27	27	27	40
15	Weight	Kg	0,6	0,6	0,6	0,6

Characteristics

Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,02mm
Axial play (450g load)	0,08mm
Max. Radial force (10mm from flange)	110N
Max. Axial force	45N
Dielectric strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection

Pin n°	Connector	Function
3	Molex 39-28-1083	Vcc Hall +5 to +24 Vdc
1		Hall A
2		Hall B
5		Hall C
6		GND Hall
7		Phase U
8		Phase V
4		Phase W



Brushless DC

Flat motors with Encoder

Advantages at a glance
Very compact size
Exceptional power to volume ratio
Complete closed loop system

BLDC Flat motors with Encoder	Torque* (Nm)	
45BLW29-E	0,13	148
60BLW42-E	0,29	149
90BLW42-E	0,96	150

Our BLDC Flat motors are equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested by the system. The presence of an encoder is highly recommended when is critical to know the status of the motor (both position and speed) in every instant.

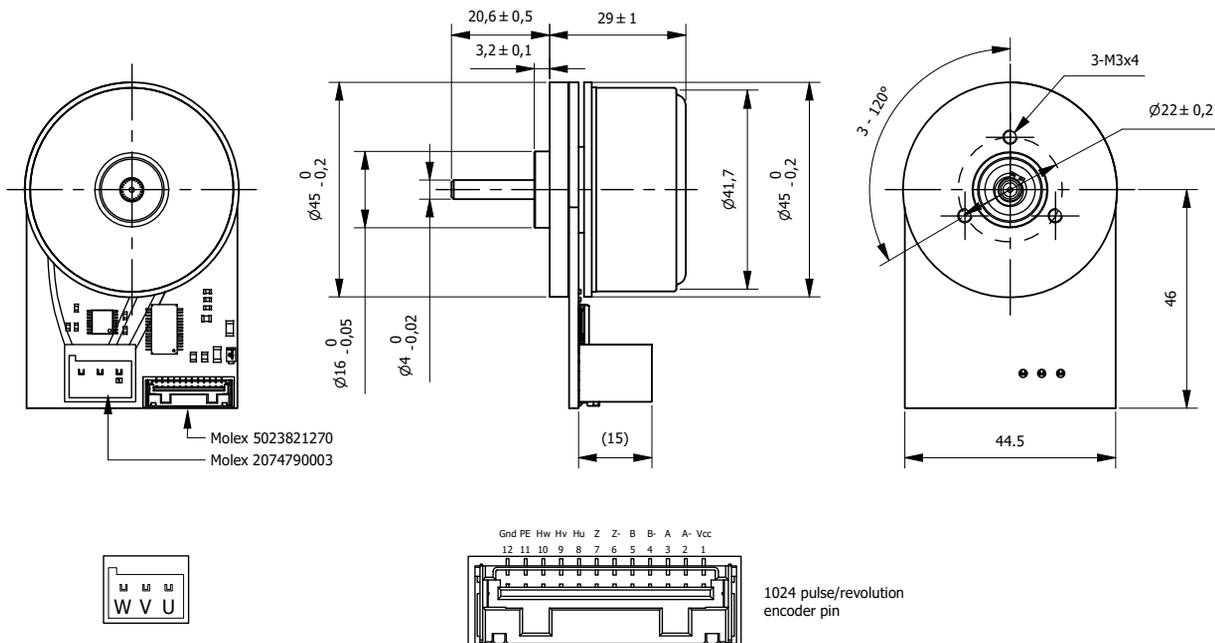
*Rated Torque

Brushless Flat Motor 45BLW29-E

with Encoder

Ø 45mm

0,13Nm



Specification		
Model	45BLW29-E	
1	n° of Pole	16
2	n° of Phase	3
3	Rated Voltage	V 24
4	Rated Speed	rpm 4840
5	Rated Torque	Nm 0,13
6	Max. Peak Torque	Nm 0,39
7	Torque Constant	Nm/A 0,037
8	Rated Current	A 3,5
9	Max. Peak Current	A 10
10	No-Load Current	mA 500
11	Line to Line Resistance	Ω 0,56
12	Line to Line Inductance	mH 0,27
13	Rotor Inertia	gcm ² 181
14	Length (L)	mm 29
15	Weight	Kg 0,16

Characteristics	
Item	
Encoder Type*	Magnetic - Incremental 1024 CPR / 3 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (at 4N)	0,02mm
Axial play (at 4N)	0,14mm
Max. Radial force (10mm from flange)	28N
Max. Axial force	10N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
*programmable	

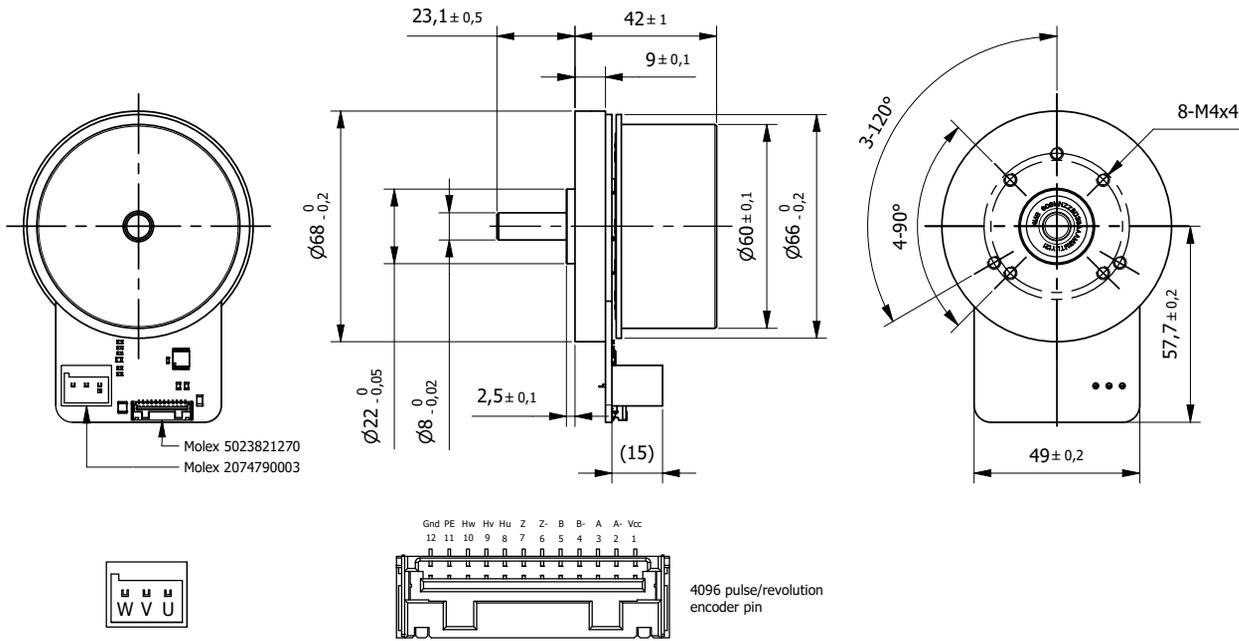
Connection	
Pin n°	Function
Feedback	
1	VCC
2	EA-
3	EA
4	EB-
5	EB
6	EZ-
7	EZ
8	HALL A
9	HALL B
10	HALL C
11	PE
12	GND
Motor	
1	Phase U
2	Phase V
3	Phase W

Brushless Flat Motor 60BLW42-E

with Encoder

Ø 60mm

0,29Nm



Brushless DC

Specification		
Model	60BLW42-E	
1	n° of Pole	14
2	n° of Phase	3
3	Rated Voltage	V 24
4	Rated Speed	rpm 3500
5	Rated Torque	Nm 0,29
6	Max. Peak Torque	Nm 0,87
7	Torque Constant	Nm/A 0,05
8	Rated Current	A 5,8
9	Max. Peak Current	A 17
10	No-Load Current	mA 700
11	Line to Line Resistance	Ω 0,25
12	Line to Line Inductance	mH 0,22
13	Rotor Inertia	gcm ² 1000
14	Length (L)	mm 42
15	Weight	Kg 0,5

Characteristics	
Item	
Encoder Type*	Magnetic - Incremental 4096 CPR / 3 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (at 4N)	0,02mm
Axial play (at 4N)	0,08mm
Max. Radial force (10mm from flange)	55N
Max. Axial force	12N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
*programmable	

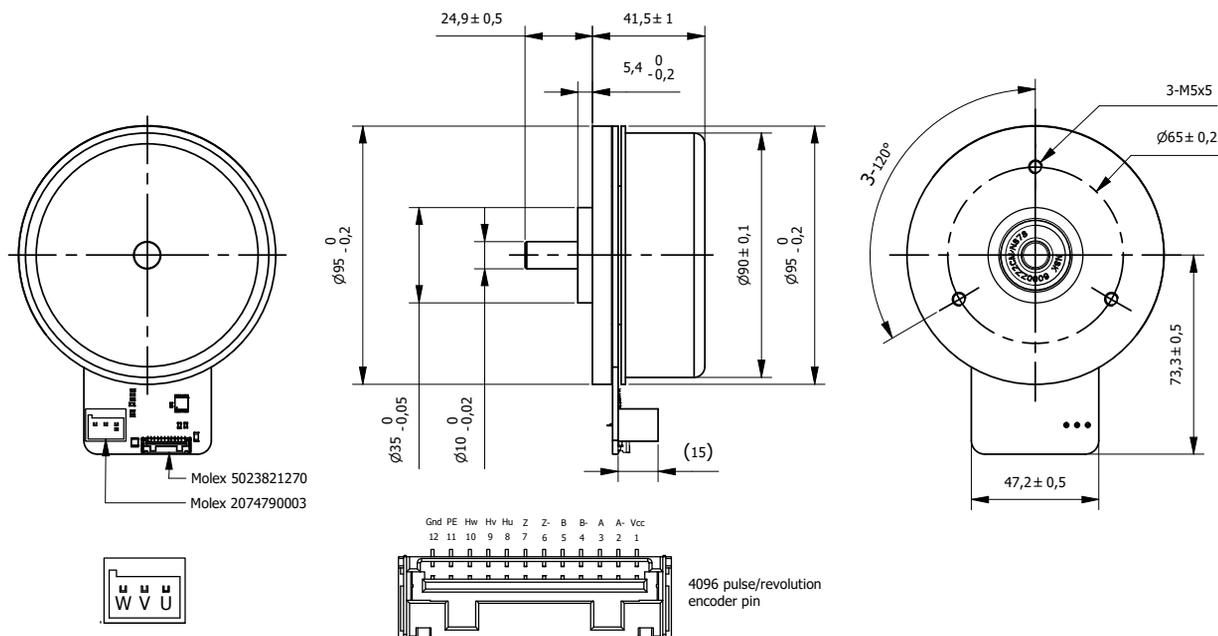
Connection	
Pin n°	Function
Feedback	
1	VCC
2	EA-
3	EA
4	EB-
5	EB
6	EZ-
7	EZ
8	HALL A
9	HALL B
10	HALL C
11	PE
12	GND
Motor	
1	Phase U
2	Phase V
3	Phase W

Brushless Flat Motor 90BLW42-E

with Encoder

Ø 90mm

0,96Nm



Specification		
Model	90BLW42-E	
1	n° of Pole	22
2	n° of Phase	3
3	Rated Voltage	V 48
4	Rated Speed	rpm 1670
5	Rated Torque	Nm 0,96
6	Max. Peak Torque	Nm 3
7	Torque Constant	Nm/A 0,23
8	Rated Current	A 4,3
9	Max. Peak Current	A 13
10	No-Load Current	mA 400
11	Line to Line Resistance	Ω 0,53
12	Line to Line Inductance	mH 0,71
13	Rotor Inertia	gcm ² 5000
14	Length (L)	mm 41,5
15	Weight	Kg 1,2

Characteristics	
Item	
Encoder Type*	Magnetic - Incremental 4096 CPR / 3 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (at 4N)	0,02mm
Axial play (at 4N)	0,08mm
Max. Radial force (10mm from flange)	110N
Max. Axial force	45N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
*programmable	

Connection	
Pin n°	Function
Feedback	
1	VCC
2	EA-
3	EA
4	EB-
5	EB
6	EZ-
7	EZ
8	HALL A
9	HALL B
10	HALL C
11	PE
12	GND
Motor	
1	Phase U
2	Phase V
3	Phase W



Brushless DC
Frameless motors

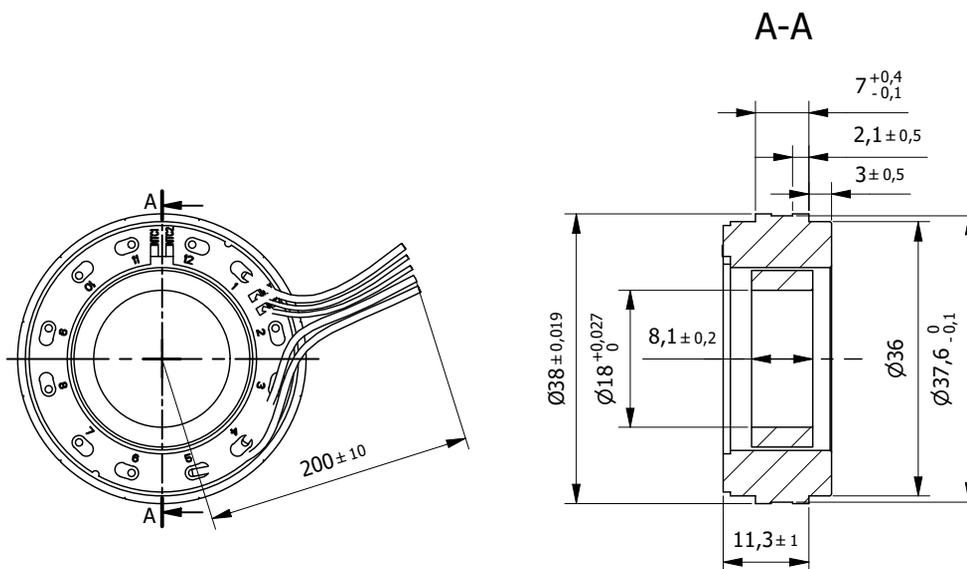
Advantages at a glance

- Maximum integration options
- High torque
- Low weight

One of the latest additions to our range, these motors allow for maximum integration with your assembly. Frameless motors reduce waste and redundancy by eliminating the need for additional mounting supports, plates, or brackets. Stator and rotor can be seamlessly incorporated into the system, reducing size without sacrificing performance and avoiding designing the application to fit the motor.

BLDC Frameless motors	Torque* (Nm)	
38BLF - NEW	0,1	154
50BLF	0,3...0,5	155
70BLF	0,55...1	156
85BLF	1,2...2	157
115BLF	3,9...9,5	158

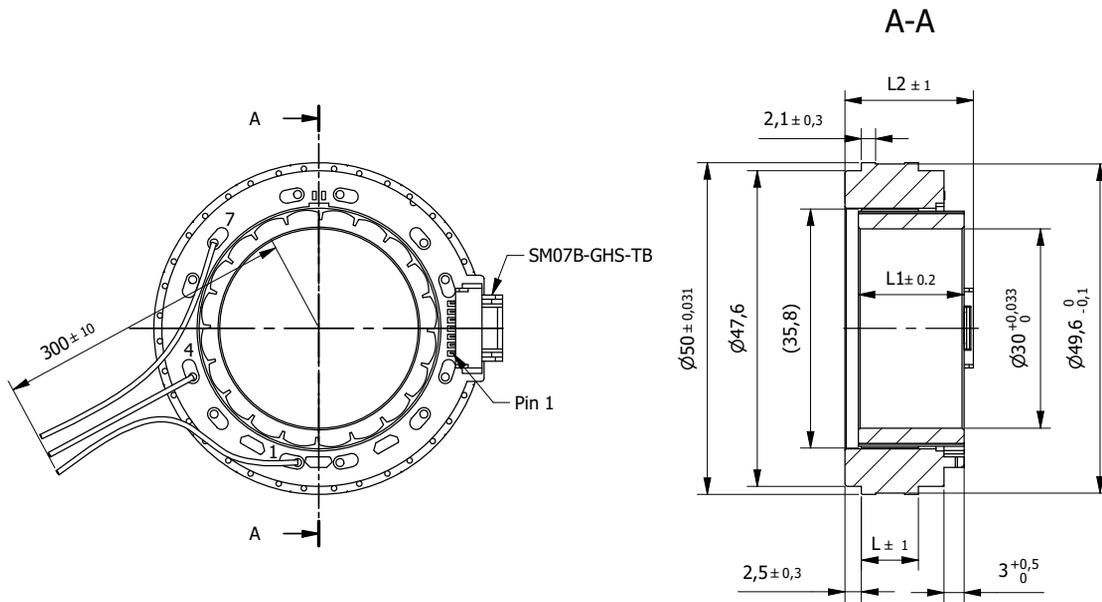
*Rated Torque



Specification		
Model	38BLF07	
1	n° of Pole	14
2	n° of Phase	3
3	Rated Voltage	V 24
4	Rated Speed	rpm 8000
5	Rated Torque	Nm 0,1
6	Max. Peak Torque	Nm 0,3
7	Torque Constant	Nm/A 0,025
8	Rated Current	A 4,5
9	Max. Peak Current	A 13,5
10	No-Load Current	mA 500
11	Line to Line Resistance	Ω 0,365
12	Line to Line Inductance	mH 0,32
13	Rotor Inertia	gcm ² 9,7
14	Length	mm 7
15	Weight	Kg 0,057

Characteristics	
Item	
Hall Effect Angle	120°
Insulation Class	B
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating ambient temperature	-20°C to +50°C

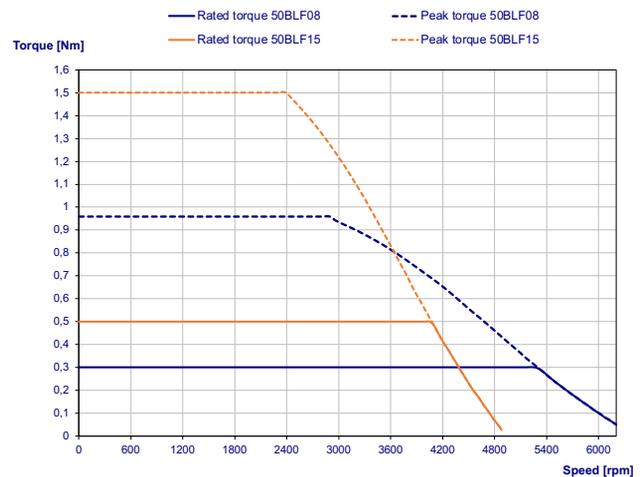
Connection		
Color	Gauge (Thermistor)	Function
Blue	UL1061 AWG26	NTC 1
Red		NTC 2
Color	Gauge	Function
Yellow	UL1332 AWG20	Phase U
Red		Phase V
Black		Phase W

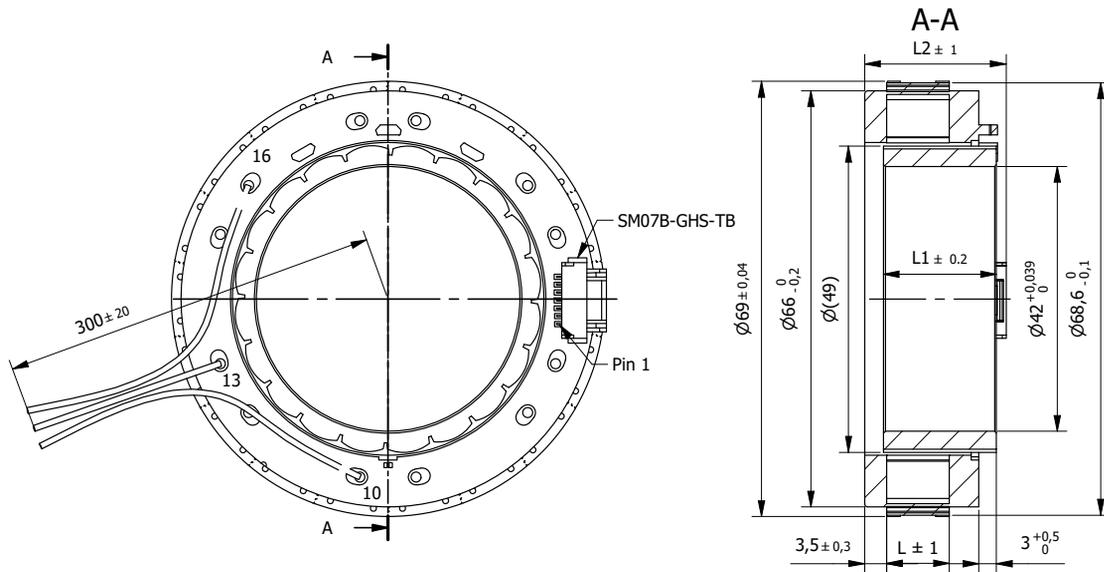


Specification			
Model		50BLF08	50BLF15
1	n° of Pole	20	20
2	n° of Phase	3	3
3	Rated Voltage	V	48
4	Rated Speed	rpm	5000
5	Rated Torque	Nm	0,3
6	Max. Peak Torque	Nm	0,96
7	Torque Constant	Nm/A	0,09
8	Rated Current	A	3,6
9	Max. Peak Current	A	11,6
10	No-Load Current	mA	400
11	Line to Line Resistance	Ω	0,93
12	Line to Line Inductance	mH	0,45
13	Rotor Inertia	gcm ²	90
14	Length (L)	mm	8,6
15	Length (L1)	mm	16
16	Length (L2)	mm	20
17	Weight	Kg	0,096

Characteristics	
Item	
Hall Effect Angle	120°
Insulation Class	B
Dielectric strength (for 1 sec.)	1000 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating ambient temperature	-20°C to +50°C

Connection		
Pin n°	Connector (optional)	Function
1	SM07B-GHS-TB	NTC 2
2		NTC 1
3		GND Hall
4		Hall A
5		Hall B
6		Hall C
7		Vcc Hall +5V
Color	Gauge	Function
Yellow	AGR-TR AWG20	Phase U
Red		Phase V
Black		Phase W

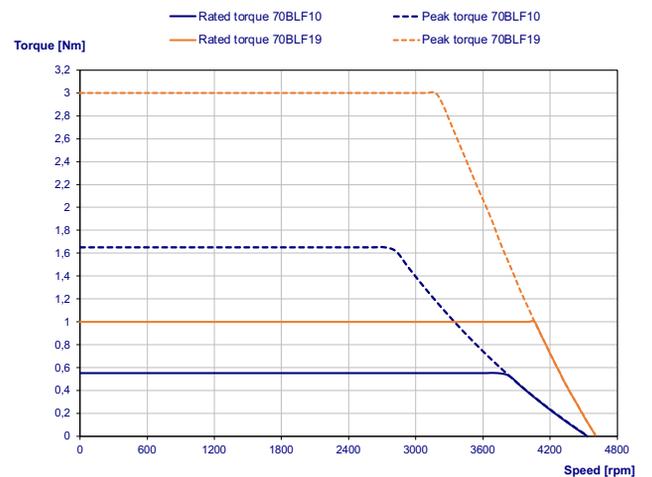


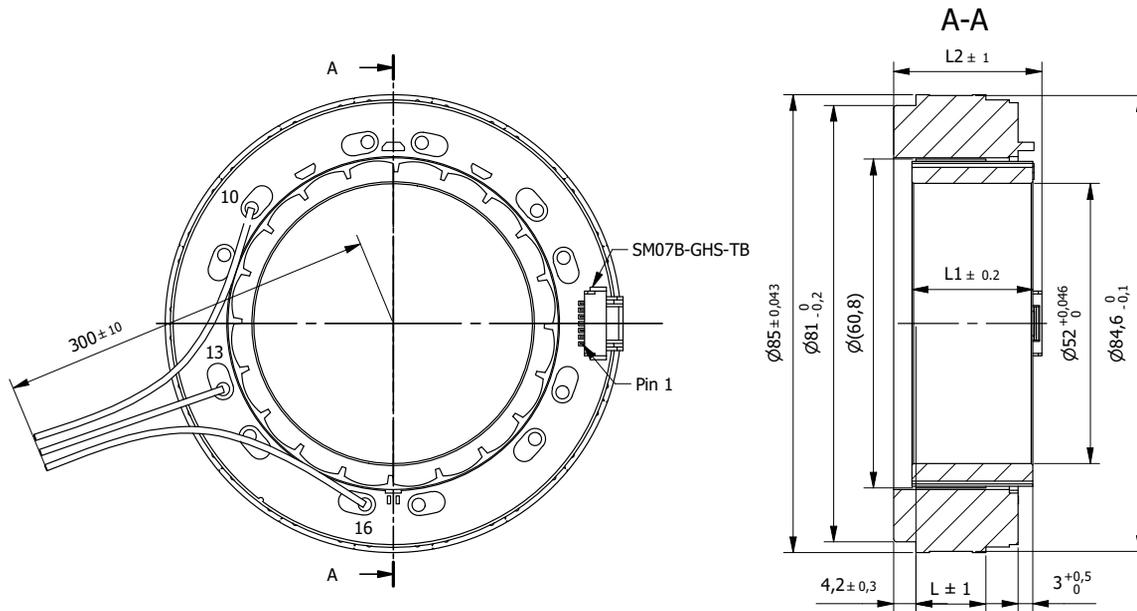


Specification			
Model		70BLF10	70BLF19
1	n° of Pole	20	20
2	n° of Phase	3	3
3	Rated Voltage	V	48
4	Rated Speed	rpm	3650
5	Rated Torque	Nm	0,55
6	Max. Peak Torque	Nm	1,65
7	Torque Constant	Nm/A	0,12
8	Rated Current	A	5,1
9	Max. Peak Current	A	15,5
10	No-Load Current	mA	400
11	Line to Line Resistance	Ω	0,38
12	Line to Line Inductance	mH	0,33
13	Rotor Inertia	gcm ²	333
14	Length (L)	mm	10
15	Length (L1)	mm	18
16	Length (L2)	mm	23,5
17	Weight	Kg	0,21

Characteristics	
Item	
Hall Effect Angle	120°
Insulation Class	B
Dielectric strength (for 1 sec.)	1000 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating ambient temperature	-20°C to +50°C

Connection		
Pin n°	Connector (optional)	Function
1	SM07B-GHS-TB	NTC 2
2		NTC 1
3		GND Hall
4		Hall A
5		Hall B
6		Hall C
7		Vcc Hall +5V
Color	Gauge	Function
Yellow	AGR-TR AWG18	Phase U
Red		Phase V
Black		Phase W

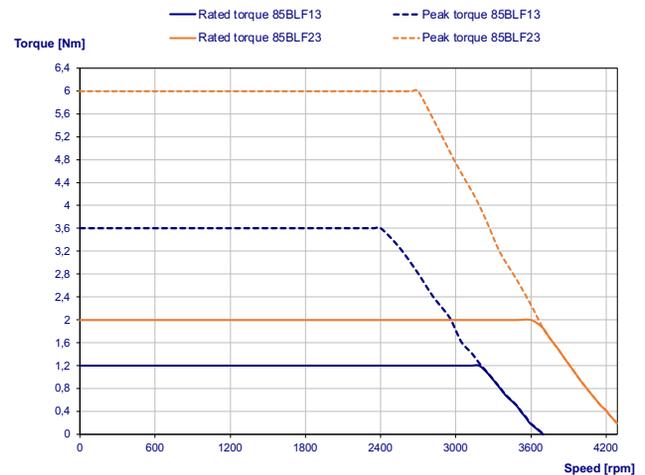


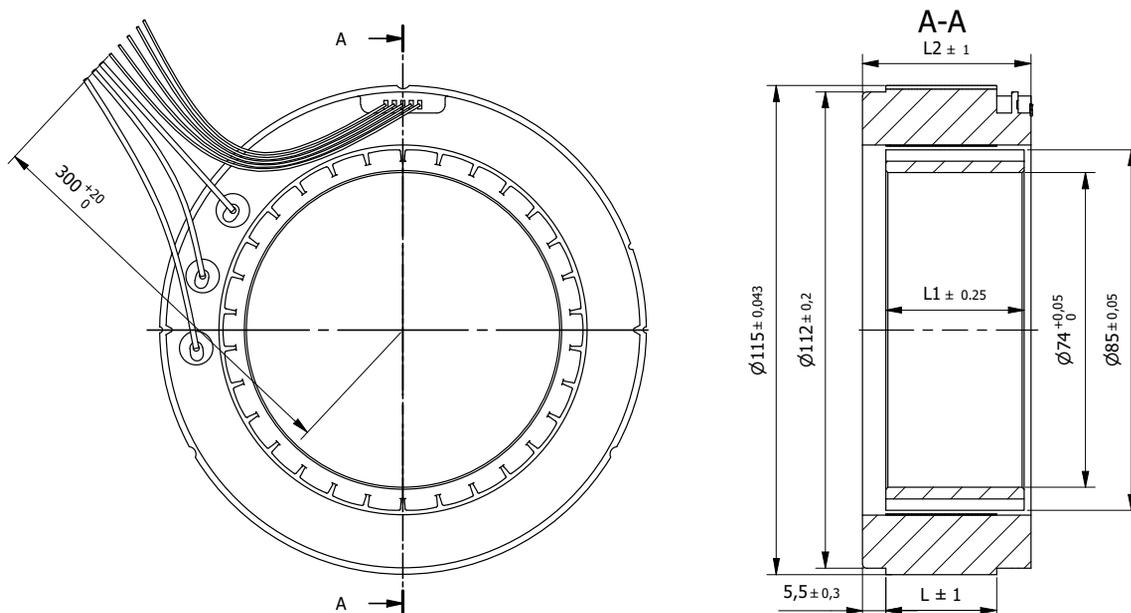


Specification			
Model		85BLF13	85BLF23
1	n° of Pole	20	20
2	n° of Phase	3	3
3	Rated Voltage	V	48
4	Rated Speed	rpm	2950
5	Rated Torque	Nm	1,2
6	Max. Peak Torque	Nm	3,6
7	Torque Constant	Nm/A	0,15
8	Rated Current	A	8,6
9	Max. Peak Current	A	25,8
10	No-Load Current	mA	600
11	Line to Line Resistance	Ω	0,33
12	Line to Line Inductance	mH	0,3
13	Rotor Inertia	gcm ²	971
14	Length (L)	mm	13
15	Length (L1)	mm	22,5
16	Length (L2)	mm	27,5
17	Weight	Kg	0,39

Characteristics	
Item	
Hall Effect Angle	120°
Insulation Class	B
Dielectric strength (for 1 sec.)	1000 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating ambient temperature	-20°C to +50°C

Connection		
Pin n°	Connector (optional)	Function
1	SM07B-GHS-TB	NTC 2
2		NTC 1
3		GND Hall
4		Hall A
5		Hall B
6		Hall C
7		Vcc Hall +5V
Color	Gauge	Function
Yellow	AGR-TR AWG16	Phase U
Red		Phase V
Black		Phase W

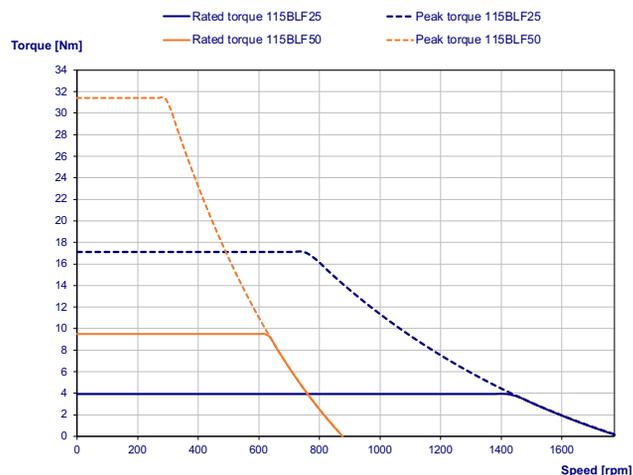




Specification			
Model		115BLF25	115BLF50
1	n° of Pole	30	30
2	n° of Phase	3	3
3	Rated Voltage	V	48
4	Rated Speed	rpm	1400
5	Rated Torque	Nm	3,9
6	Max. Peak Torque	Nm	12,7
7	Torque Constant	Nm/A	0,293
8	Rated Current	A	14,1
9	Max. Peak Current	A	49
10	No-Load Current	mA	1400
11	Line to Line Resistance	Ω	0,23
12	Line to Line Inductance	mH	0,25
13	Rotor Inertia	gcm ²	5150
14	Length (L)	mm	25
15	Length (L1)	mm	32,7
16	Length (L2)	mm	39
17	Weight	Kg	1,1

Characteristics	
Item	
Hall Effect Angle	120°
Insulation Class	B
Dielectric strength (for 1 sec.)	1000 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating ambient temperature	-20°C to +50°C

Connection		
Color	Gauge (hall optional)	Function
Red	UL2464 AWG26	Vcc Hall +5V
Blue	|	Hall W
Green	|	Hall V
White	|	Hall U
Black	|	GND Hall
Color	Gauge	Function
Yellow	AGR-TR AWG18	Phase U
Red	|	Phase V
Black	|	Phase W



Brushless Servomotors



Low voltage
Servomotors

p.169



Medium voltage
Servomotors

p.177

Brushless **Servomotors**

Technical introduction		166
Low voltage - Brushless DC Servomotors		
38SV - 48VDC	Torque* (Nm)	169
38SV - 48VDC	0,16...0,32	170
60SV - 48VDC	0,64...1,27	171
80SV - 48VDC	2,39...3,18	172
100SV - 48VDC	3,18...4,77	173
110SV - 48VDC	4,77...6,37	174
130SV - 48VDC	9,55...14,3	175
Medium voltage - Brushless AC Servomotors		
38SV - 220VAC	Torque* (Nm)	177
38SV - 220VAC	0,16...0,32	178
60SV - 220VAC	0,64...1,27	179
80SV - 220VAC	2,39...3,18	180
100SV - 220VAC	3,18...4,77	181
110SV - 220VAC	4,77...6,37	182
130SV - 220VAC	9,55...14,3	183

* Rated Torque

Term	
N. of pole	Areas of a motor where a magnetic pole is generated either by a permanent magnet or by passing current through the coils of a winding.
N. of phase	A group of electrically connected coils.
Nominal Voltage	The voltage at which nominal torque is generated with the motor at ambient temperature.
Rated Power	Mechanical power available at the motor output shaft while turning at its rated speed, applying its rated torque
Rated Speed	The approximate motor speed at its rated torque point.
No-load speed	Is the speed at which the unloaded motor runs with the rated voltage applied. It is approximately proportional to the applied voltage.
Rated Torque	The maximum torque, at rated speed, the motor can produce on a continuous basis, without exceeding the thermal rating of the motor.
Max. Peak Torque	The maximum torque a motor can produce for short periods of time, before irreversible demagnetization of the motor's magnets occurs.
Torque constant	The ratio of a motor's output torque to the motor's input power
Rated Current	The approximate amount of current the motor will draw at its rated torque point.
Max. Peak Current	The current drawn by the motor when delivering peak torque
No-Load Current	The current consumption of the motor at nominal voltage and under no-load conditions. This value varies proportionally to speed and is influenced by temperature
Back EMF constant	The constant corresponding to the relationship between the induced voltage in the rotor and the speed of rotation.
Line to Line resistance	This is the phase resistance measured for the completed motor at room temperature. It includes solder, wire and (if present) connector resistances. In motors with very low resistance, the line to line resistance may differ significantly from the internal resistance.
Line to Line Inductance	This is the motor phase inductance measured with an inductance meter at 1000 Hz.
Rotor Inertia	"Is the mass moment of inertia of the rotor, based on the axis of rotation."
Length	Total motor length.
Weight	Total motor mass.
Insulation class	The electrical insulation system for wires and other wire-wound electrical components is divided into different classes by temperature and temperature rise. The electrical insulation system is sometimes referred to as insulation class or thermal classification.
Radial Play	The shaft displacement perpendicular to the shaft due to a side force applied perpendicular to the shaft axis.
Axial Play	Axial shaft displacement occurring during a reversal of an axial force on the shaft.
Max. Radial force	Maximum force that can be applied to the shaft in the radial direction (any direction perpendicular to the motor shaft axis).
Max. Axial force	Maximum force that can be applied to the shaft in the axial direction (in the same axis as or parallel to the motor shaft axis).
Dielectric strength	A dielectric test (also known as hipot or high potential test) is performed on all motors under 500V phases to the housing and during 5 seconds after voltage ramp up. Maximum allowed leakage is 1mA
Insulation resistance	The measurement of insulation resistance is carried out by means of a megohmmeter - high resistance range ohmmeter. DC voltage is applied between the windings and the ground of the motor.

Glossary

Product families

BLDC Low voltage Servomotors

BLAC Medium voltage
Servomotors

Brushless Servomotors are a specific subset of Brushless motors intended for applications where precise positioning and/or high speeds are the goals. These motors are designed for fast and accurate response in highly dynamic applications where following trajectories and positioning quickly and precisely are key criteria.

Our Servomotors have a higher torque density than our BLDC slotted motors and are made for high performance applications where the most power in the smallest package size is critical. We've optimized the windings in our Servomotors for standard selections in both low voltage, typically 48VDC, and medium voltage, typically 220VAC.

Various encoder feedback options are available for our Servomotors, based on the needs of the application. Options include incremental encoders, with a variety of resolutions, and absolute encoders, both single-turn and multi-turn.

The motors are IP65 rated as standard so that they can be used in a wide variety of environments without concern.

IP65

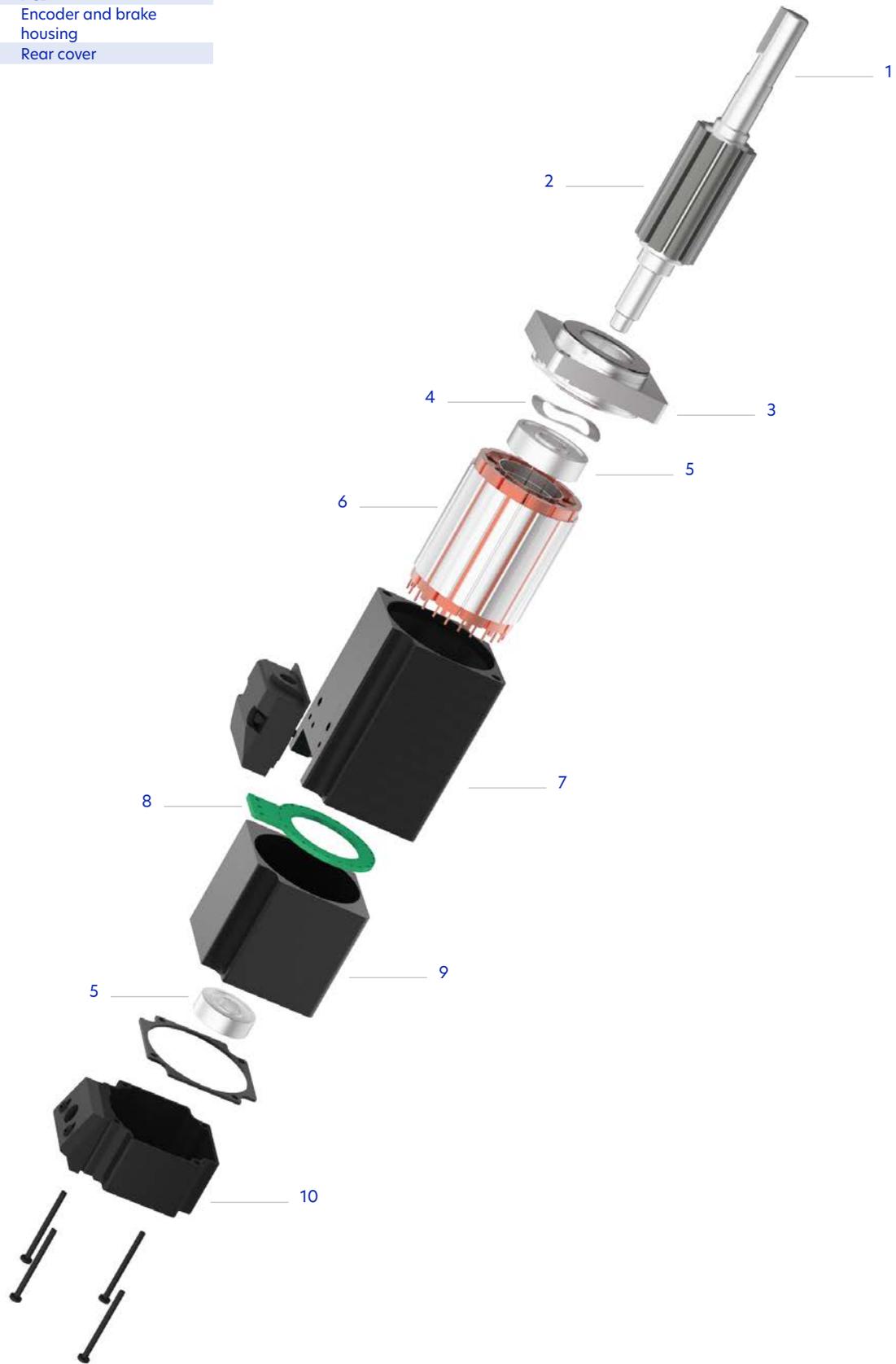
A brake, matched to the power output of the motor, is also an option on all models.

Optional brake

Our Servomotors offer high performance, optimized for your system voltage and feedback requirements, in a robust package.

Technical introduction

Composition	
1	Shaft
2	Permanent magnet
3	Flange
4	Spring (bearing preload)
5	Ball bearing
6	Stator
7	Stator housing
8	PCB
9	Encoder and brake housing
10	Rear cover





BLDC Servomotors
Low voltage

Low voltage - Brushless DC Servomotors	Torque* (Nm)	
38SV - 48VDC	0,16...0,32	170
60SV - 48VDC	0,64...1,27	171
80SV - 48VDC	2,39...3,18	172
100SV - 48VDC	3,18...4,77	173
110SV - 48VDC	4,77...6,37	174
130SV - 48VDC	9,55...14,3	175

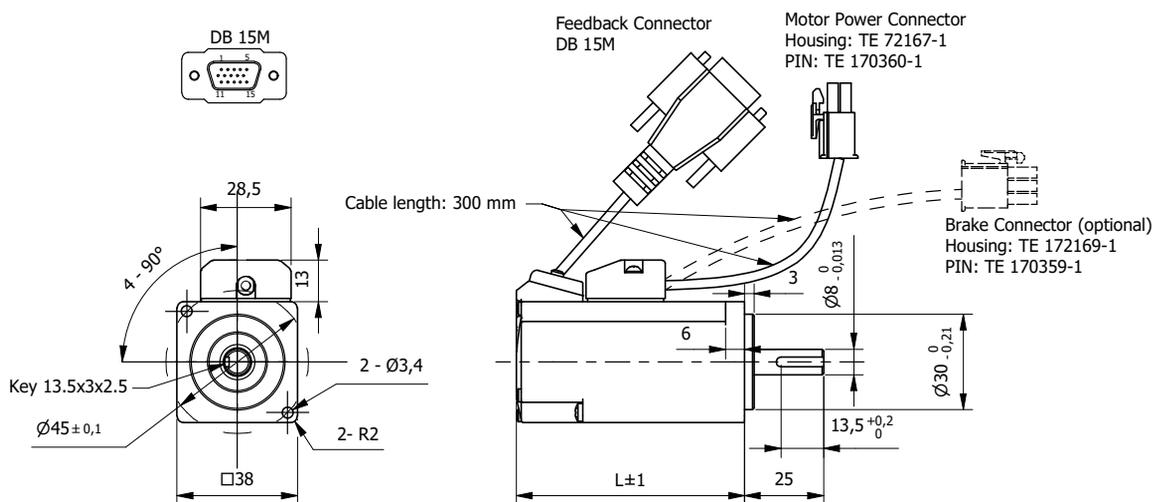
* Rated Torque

Brushless DC Servomotor 38SV-48VDC

Low voltage - IP65

□ 38mm

0,16 to 0,32Nm



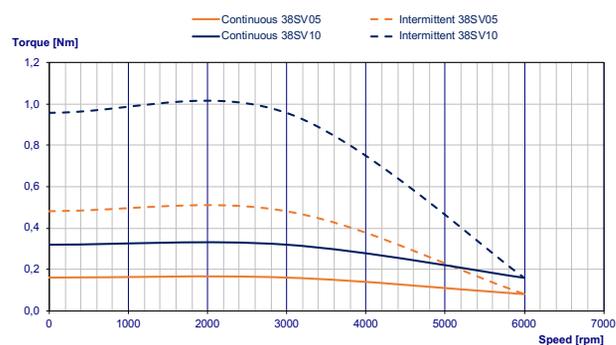
Note: optional brake

Specification		38SV05-48V-30EA1	38SV05-48V-30EA2	38SV10-48V-30EA1	38SV10-48V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VDC 48	48	48	48
4	Rated power	W 50	50	100	100
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 6800 ±10%	6800 ±10%	6800 ±10%	6800 ±10%
7	Rated Torque	Nm 0,16	0,16	0,32	0,32
8	Max. Peak Torque	Nm 0,48	0,48	0,96	0,96
9	Torque Constant	Nm/A 0,083	0,083	0,083	0,083
10	Rated Current	A 2,1	2,1	4,3	4,3
11	Max. Peak Current	A 6,3	6,3	12,9	12,9
12	No-Load Current	A 0,2	0,2	0,4	0,4
13	Back EMF constant	V/kRPM 5	5	5	5
14	Line to Line Resistance	Ω 2,2 ±10%	2,2 ±10%	0,88 ±10%	0,88 ±10%
15	Line to Line Inductance	mH 1,8 ±20%	1,8 ±20%	0,78 ±20%	0,78 ±20%
16	Rotor Inertia	Kgcm ² 0,024	0,035	0,05	0,05
17	Brake		24VDC - 0,35Nm		24VDC - 0,35Nm
18	Length (L)	mm 72	106	88	122
19	Weight	Kg 0,4	0,65	0,5	0,75

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,14 mm
Max. Radial force (14mm from flange)	69N
Max. Axial force	59N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute (single-turn, BiSS): 17bit, 16bit

Connection					
Pin	Color	Function	Pin	Color	Function
Feedback					
1	RD	+5V	9	WH	W+
2	BK	GND	10	GY	V+
4	BR	U+	11	YL/BK	Z-
5	BR/BK	U-	12	OR/BK	B-
6	YL	Z+	13	GN/BK	A-
7	OR	B+	14	WH/BK	W-
8	GN	A+	15	GY/BK	V-
Power					
1	YL	U	3	BK	W
2	RD	V	4	YL/GN	PE
Brake					
1	RD	Brake1	2	WH	Brake2

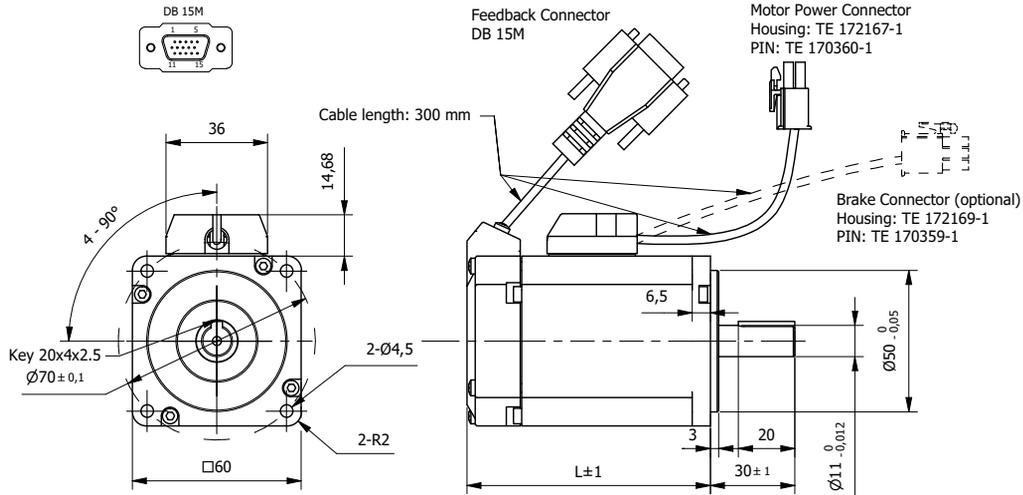


Brushless DC Servomotor 60SV-48VDC

Low voltage - IP65

□ 60mm

0,64 to 1,27Nm



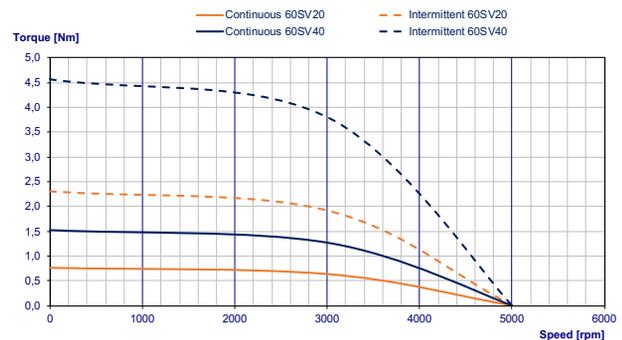
Note: optional brake

Specification		60SV20-48V-30EA1	60SV20-48V-30EA2	60SV40-48V-30EA1	60SV40-48V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VDC 48	48	48	48
4	Rated power	W 200	200	400	400
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 5200 ±10%	5200 ±10%	5200 ±10%	5200 ±10%
7	Rated Torque	Nm 0,64	0,64	1,27	1,27
8	Max. Peak Torque	Nm 1,92	1,92	3,81	3,81
9	Torque Constant	Nm/A 0,107	0,107	0,107	0,107
10	Rated Current	A 6	6	12	12
11	Max. Peak Current	A 18	18	36	36
12	No-Load Current	A 0,6	0,6	<1	<1
13	Back EMF constant	V/kRPM 6,5	6,5	6,5	6,5
14	Line to Line Resistance	Ω 0,38 ±10%	0,38 ±10%	0,23 ±10%	0,23 ±10%
15	Line to Line Inductance	mH 0,68 ±20%	0,68 ±20%	0,3 ±20%	0,3 ±20%
16	Rotor Inertia	Kgcm2 0,15	0,15	0,25	0,25
17	Brake		24VDC - 1,5Nm		24VDC - 1,5Nm
18	Length (L)	mm 86,5	123	106	142,5
19	Weight	Kg 0,95	1,35	1,35	1,85

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,14 mm
Max. Radial force (20mm from flange)	245N
Max. Axial force	98N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute
	(single-turn, BiSS): 17bit, 16bit

Connection					
Pin	Color	Function	Pin	Color	Function
Feedback					
1	RD	+5V	9	WH	W+
2	BK	GND	10	GY	V+
4	BR	U+	11	YL/BK	Z-
5	BR/BK	U-	12	OR/BK	B-
6	YL	Z+	13	GN/BK	A-
7	OR	B+	14	WH/BK	W-
8	GN	A+	15	GY/BK	V-
Power					
1	YL	U	3	BK	W
2	RD	V	4	YL/GN	PE
Brake					
1	RD	Brake1	2	WH	Brake2

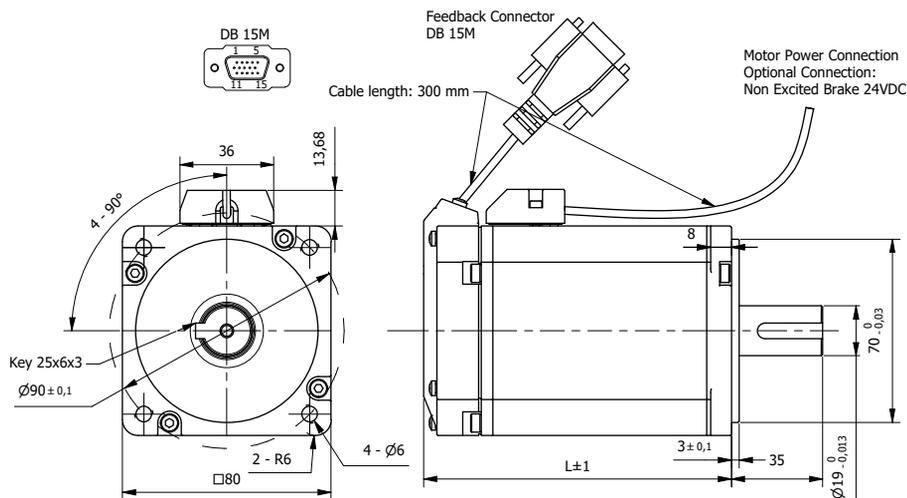


Brushless DC Servomotor 80SV-48VDC

Low voltage - IP65

□ 80mm

2,39 to 3,18Nm



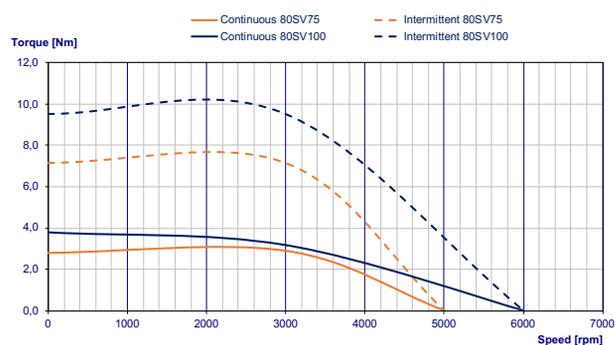
Note: optional brake

Specification		80SV75-48V-30EA1	80SV75-48V-30EA2	80SV100-48V-30EA1	80SV100-48V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VDC 48	48	48	48
4	Rated power	W 750	750	1000	1000
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 5000 ±10%	5000 ±10%	5000 ±10%	5000 ±10%
7	Rated Torque	Nm 2,39	2,39	3,18	3,18
8	Max. Peak Torque	Nm 7,17	7,17	9,54	9,54
9	Torque Constant	Nm/A 0,113	0,113	0,113	0,113
10	Rated Current	A 21,0	21,0	28,0	28,0
11	Max. Peak Current	A 63	63	84	84
12	No-Load Current	A 2	2	2	2
13	Back EMF constant	V/kRPM 6,8	6,8	6,8	6,8
14	Line to Line Resistance	Ω 0,064 ±10%	0,064 ±10%	0,043 ±10%	0,043 ±10%
15	Line to Line Inductance	mH 0,2 ±20%	0,2 ±20%	0,138 ±20%	0,138 ±20%
16	Rotor Inertia	Kgcm2 1,56	1,68	2,22	2,34
17	Brake		24VDC - 3,2Nm		24VDC - 3,2Nm
18	Length (L)	mm 118	155	135	171
19	Weight	Kg 2,5	3,2	3,2	3,9

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,08 mm
Max. Radial force (20mm from flange)	392N
Max. Axial force	147N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute (single-turn, BiSS): 17bit, 16bit

Connection					
Pin	Color	Function	Pin	Color	Function
Feedback					
1	RD	+5V	9	GY	W+
2	BK	GND	10	WH	V+
4	BR	U+	11	YL/BK	Z-
5	BR/BK	U-	12	GN/BK	B-
6	YL	Z+	13	OR/BK	A-
7	GN	B+	14	GY/BK	W-
8	OR	A+	15	WH/BK	V-
Power - connector options available					
	YL	U	BK	W	
	RD	V	YL/GN	PE	
Brake - connector options available					
	RD	+24V	WH	GND	

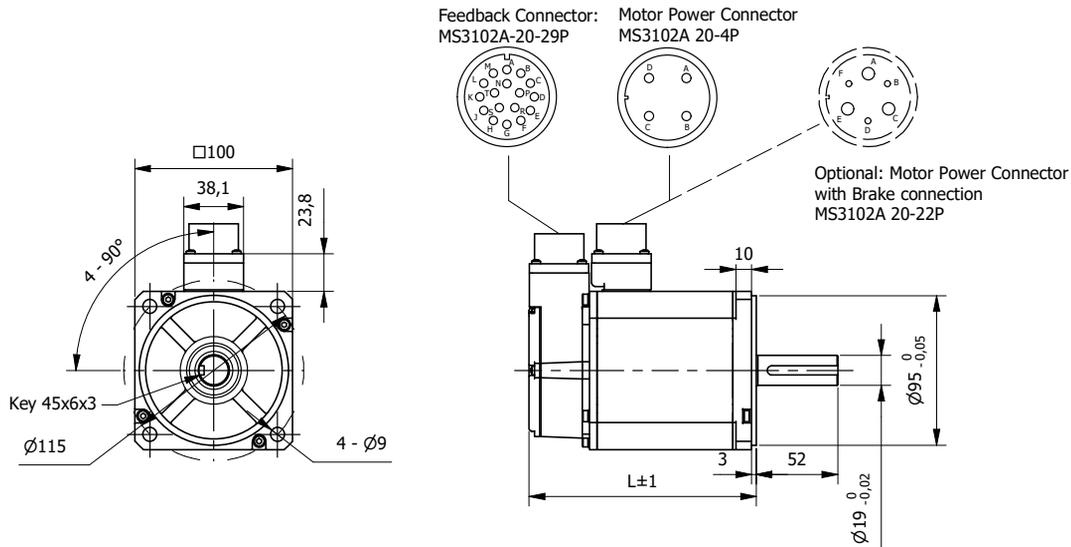


Brushless DC Servomotor 100SV-48VDC

Low voltage - IP65

□ 100mm

3,18 to 4,77Nm

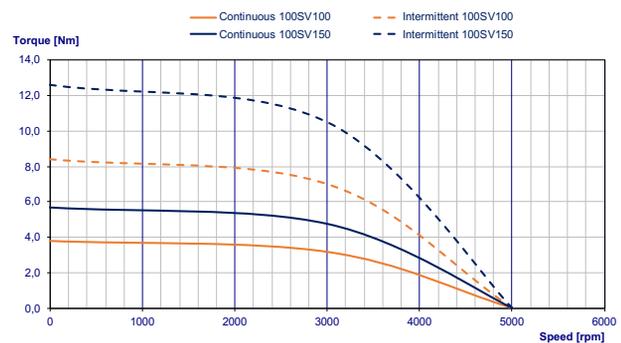


Specification		100SV100-48V-30EA1	100SV100-48V-30EA2	100SV150-48V-30EA1	100SV150-48V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VDC 48	48	48	48
4	Rated power	W 1000	1000	1500	1500
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 5000 ±10%	5000 ±10%	5000 ±10%	5000 ±10%
7	Rated Torque	Nm 3,18	3,18	4,77	4,77
8	Max. Peak Torque	Nm 7	7	10,5	10,5
9	Torque Constant	Nm/A 0,1	0,1	0,11	0,11
10	Rated Current	A 31,8	31,8	43,4	43,4
11	Max. Peak Current	A 70	70	95,5	95,5
12	No-Load Current	A 0,8	0,8	0,8	0,8
13	Back EMF constant	V/kRPM 6,18	6,18	6,48	6,48
14	Line to Line Resistance	Ω 0,02 ±10%	0,02 ±10%	0,015 ±10%	0,015 ±10%
15	Line to Line Inductance	mH 0,2 ±20%	0,2 ±20%	0,15 ±20%	0,15 ±20%
16	Rotor Inertia	Kgcm2 1,3	1,67	1,84	2,21
17	Brake		24VDC - 10Nm		24VDC - 10Nm
18	Length (L)	mm 142	177	164	199
19	Weight	Kg 3,73	4,73	4,7	5,7

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,08 mm
Max. Radial force (20mm from flange)	490N
Max. Axial force	196N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin	Function	Pin	Function
Feedback			
A	+5V	J	U+
B	GND	K	U-
C	A+	L	V+
D	A-	M	V-
E	B+	N	W+
F	B-	P	W-
G	Z+	R	PE
H	Z-		
Power			
A	U	B	V
C	W	D	GND
Optional: Power & Brake			
A	U	B	Brake 1
C	V	D	Brake 2
E	W		

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute
	(single-turn, BiSS): 17bit, 16bit

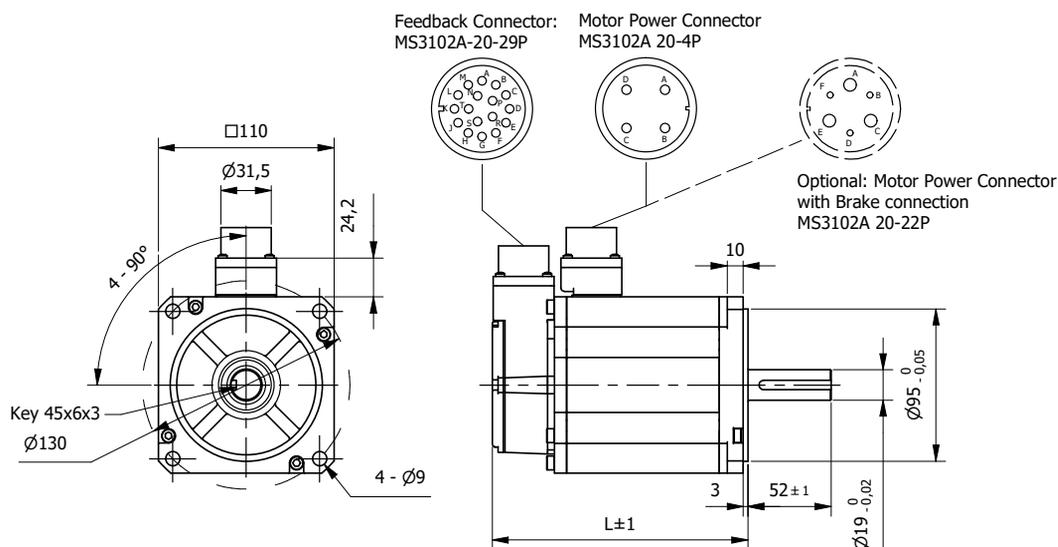


Brushless DC Servomotor 110SV-48VDC

Low voltage - IP65

□ 110mm

4,77 to 6,37Nm



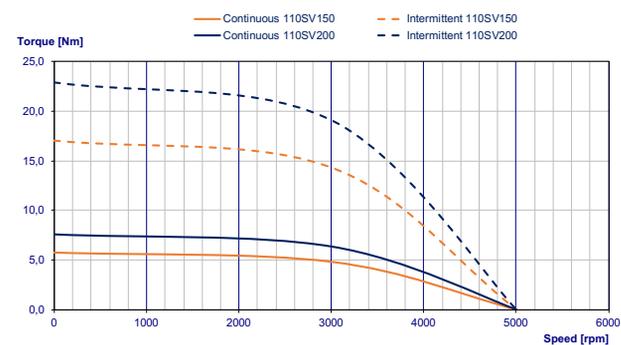
Note: optional brake

Specification		110SV150-48V-30EA1	110SV150-48V-30EA2	110SV200-48V-30EA1	110SV200-48V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VDC 48	48	48	48
4	Rated power	W 1500	1500	2000	2000
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 5000 ±10%	5000 ±10%	5000 ±10%	5000 ±10%
7	Rated Torque	Nm 4,77	4,77	6,37	6,37
8	Max. Peak Torque	Nm 14,3	14,3	19,1	19,1
9	Torque Constant	Nm/A 0,11	0,11	0,11	0,11
10	Rated Current	A 43,0	43,0	58,0	58,0
11	Max. Peak Current	A 130	130	174	174
12	No-Load Current	A 0,8	0,8	0,8	0,8
13	Back EMF constant	V/kRPM 6,35	6,35	6,63	6,63
14	Line to Line Resistance	Ω 0,01 ±10%	0,01 ±10%	0,009 ±10%	0,009 ±10%
15	Line to Line Inductance	mH 0,16 ±20%	0,16 ±20%	0,145 ±20%	0,145 ±20%
16	Rotor Inertia	Kgcm ² 3,1	3,47	4,1	4,47
17	Brake		24VDC - 10Nm		24VDC - 10Nm
18	Length (L)	mm 156,5	192	173,5	209
19	Weight	Kg 5,2	6,2	6,9	7,9

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,08 mm
Max. Radial force (20mm from flange)	630N
Max. Axial force	315N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR Magnetic Incremental: 2500 CPR Magnetic Absolute (single-turn, BiSS): 17bit, 16bit

Connection			
Pin	Function	Pin	Function
Feedback			
A	+5V	J	U+
B	GND	K	U-
C	A+	L	V+
D	A-	M	V-
E	B+	N	W+
F	B-	P	W-
G	Z+	R	PE
H	Z-		
Power			
A	U	B	V
C	W	D	GND
Optional: Power & Brake			
A	U	B	Brake 1
C	V	D	Brake 2
E	W		

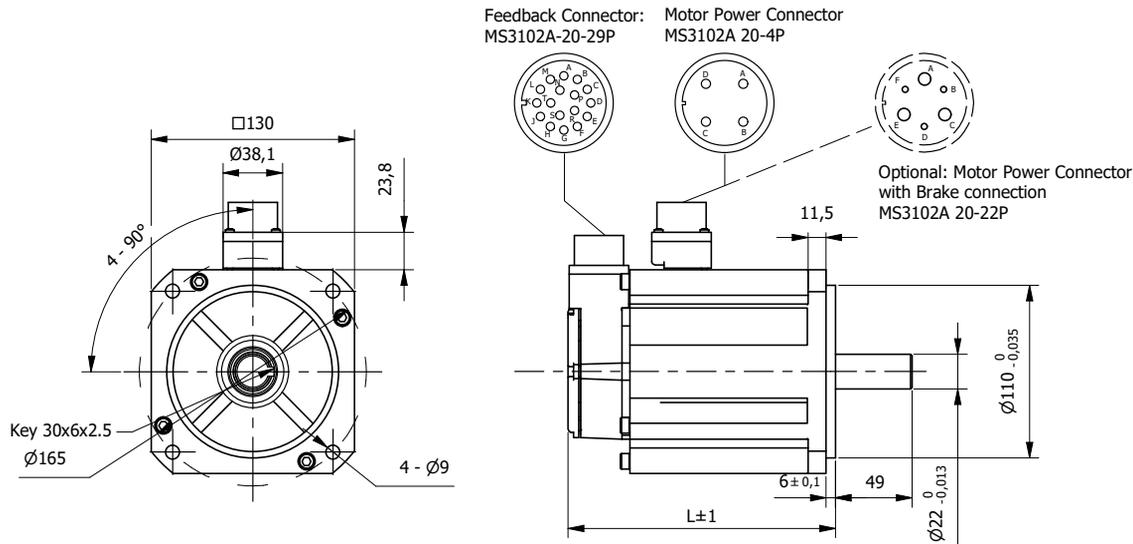


Brushless DC Servomotor 130SV-48VDC

Low voltage - IP65

□ 130mm

9,55 to 14,3Nm



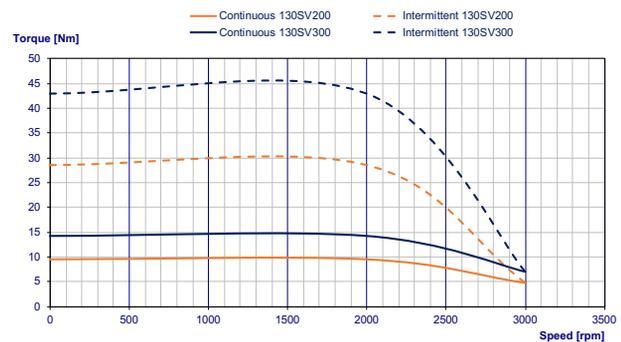
Note: optional brake

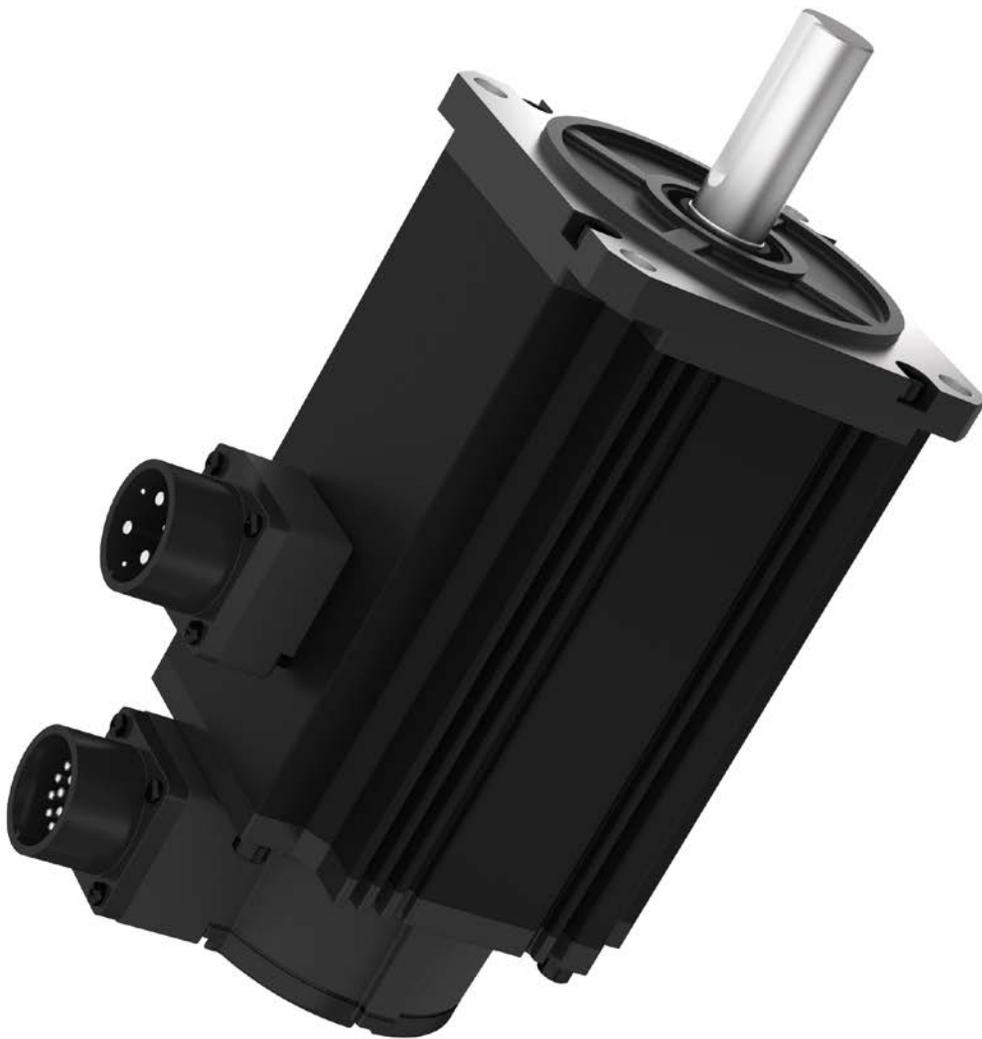
Specification		130SV200-48V-30EA1	130SV200-48V-30EA2	130SV300-48V-30EA1	130SV300-48V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VDC 48	48	48	48
4	Rated power	W 2000	2000	3000	3000
5	Rated Speed	RPM 2000	2000	2000	2000
6	No-load Speed	RPM 3000 ±10%	3000 ±10%	3000 ±10%	3000 ±10%
7	Rated Torque	Nm 9,55	9,55	14,3	14,3
8	Max. Peak Torque	Nm 28,65	28,65	42,9	42,9
9	Torque Constant	Nm/A 0,2	0,2	0,2	0,2
10	Rated Current	A 52,9	52,9	79,3	79,3
11	Max. Peak Current	A 158,7	158,7	237,9	237,9
12	No-Load Current	A <6	<6	<8	<8
13	Back EMF constant	V/kRPM 12	12	12	12
14	Line to Line Resistance	Ω 0,025 ±10%	0,025 ±10%	0,016 ±10%	0,016 ±10%
15	Line to Line Inductance	mH 0,14 ±20%	0,14 ±20%	0,1 ±20%	0,1 ±20%
16	Rotor Inertia	Kgcm ² 14	15,2	19,9	20,2
17	Brake		24VDC - 16Nm		24VDC - 16Nm
18	Length (L)	mm 165	193	193	221
19	Weight	Kg 7,5	10	12,7	15,2

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,12 mm
Max. Radial force (30mm from flange)	490N
Max. Axial force	196N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin	Function	Pin	Function
Feedback			
A	+5V	J	U+
B	GND	K	U-
C	A+	L	V+
D	A-	M	V-
E	B+	N	W+
F	B-	P	W-
G	Z+	R	PE
H	Z-		
Power			
A	U	B	V
C	W	D	GND
Optional: Power & Brake			
A	U	B	Brake 1
C	V	D	Brake 2
E	W		

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR Magnetic Incremental: 2500 CPR Magnetic Absolute (single-turn, BiSS): 17bit, 16bit





BLAC Servomotors
Medium voltage

Medium voltage - Brushless AC Servomotors	Torque* (Nm)	
38SV - 220VAC	0,16...0,32	178
60SV - 220VAC	0,64...1,27	179
80SV - 220VAC	2,39...3,18	180
100SV - 220VAC	3,18...4,77	181
110SV - 220VAC	4,77...6,37	182
130SV - 220VAC	9,55...14,3	183

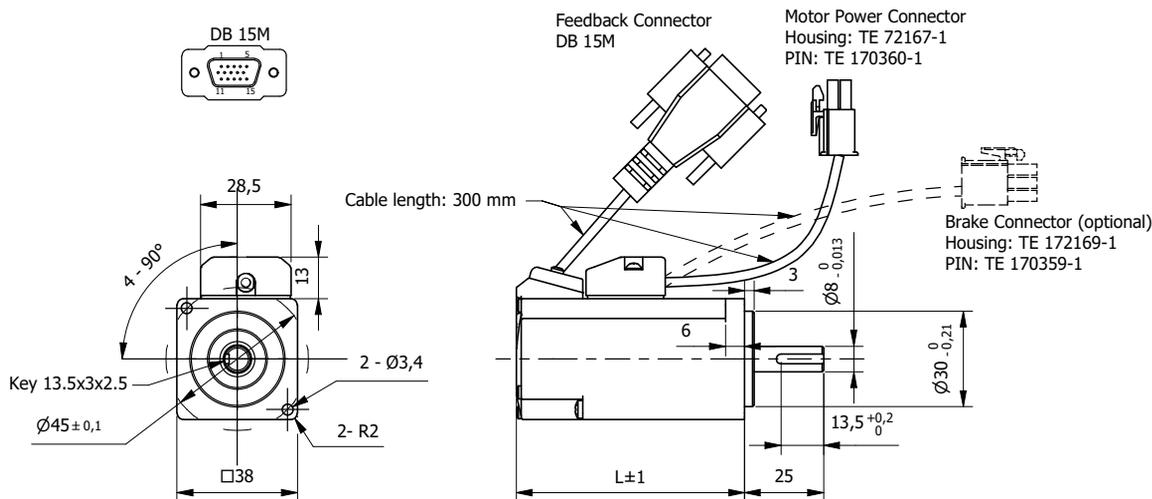
* Rated Torque

Brushless AC Servomotor 38SV-220VAC

Medium voltage - IP65

□ 38mm

0,16 to 0,32Nm



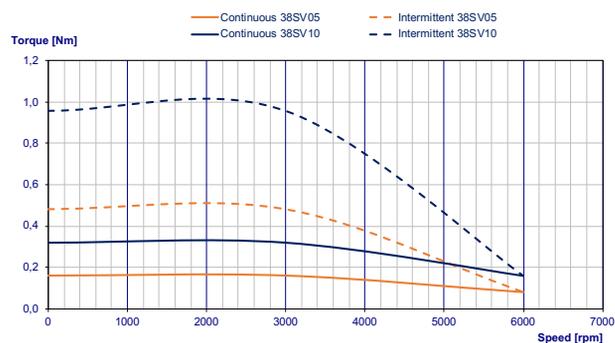
Note: optional brake

Specification		38SV05-220V-30EA1	38SV05-220V-30EA2	38SV10-220V-30EA1	38SV10-220V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VAC 220	VAC 220	VAC 220	VAC 220
4	Rated power	W 50	W 50	W 100	W 100
5	Rated Speed	RPM 3000	RPM 3000	RPM 3000	RPM 3000
6	No-load Speed	RPM 10500 ±10%	RPM 10500 ±10%	RPM 10500 ±10%	RPM 10500 ±10%
7	Rated Torque	Nm 0,16	Nm 0,16	Nm 0,32	Nm 0,32
8	Max. Peak Torque	Nm 0,48	Nm 0,48	Nm 0,96	Nm 0,96
9	Torque Constant	Nm/A 0,032	Nm/A 0,032	Nm/A 0,034	Nm/A 0,034
10	Rated Current	A 0,5	A 0,5	A 1,0	A 1,0
11	Max. Peak Current	A 1,5	A 1,5	A 3	A 3
12	No-Load Current	A 0,1	A 0,1	A 0,1	A 0,1
13	Back EMF constant	V/kRPM 21	V/kRPM 21	V/kRPM 21	V/kRPM 21
14	Line to Line Resistance	Ω 33 ±10%	Ω 33 ±10%	Ω 17,5 ±10%	Ω 17,5 ±10%
15	Line to Line Inductance	mH 24 ±20%	mH 24 ±20%	mH 12,4 ±20%	mH 12,4 ±20%
16	Rotor Inertia	Kgcm ² 0,024	Kgcm ² 0,034	Kgcm ² 0,04	Kgcm ² 0,05
17	Brake		24VDC - 0,35Nm		24VDC - 0,35Nm
18	Length (L)	mm 72	mm 106	mm 88	mm 122
19	Weight	Kg 0,4	Kg 0,65	Kg 0,5	Kg 0,75

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,14 mm
Max. Radial force (14mm from flange)	69N
Max. Axial force	59N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute (single-turn, BiSS): 17bit, 16bit

Connection					
Pin	Color	Function	Pin	Color	Function
Feedback					
1	RD	+5V	9	WH	W+
2	BK	GND	10	GY	V+
4	BR	U+	11	YL/BK	Z-
5	BR/BK	U-	12	OR/BK	B-
6	YL	Z+	13	GN/BK	A-
7	OR	B+	14	WH/BK	W-
8	GN	A+	15	GY/BK	V-
Power					
1	YL	U	3	BK	W
2	RD	V	4	YL/GN	PE
Brake					
1	RD	Brake1	2	WH	Brake2

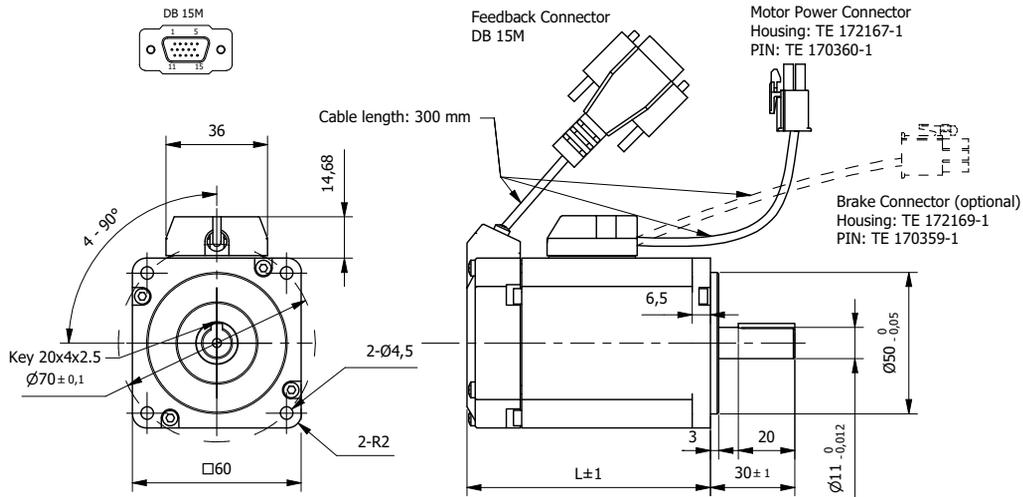


Brushless AC Servomotor 60SV-220VAC

Medium voltage - IP65

□ 60mm

0,64 to 1,27Nm



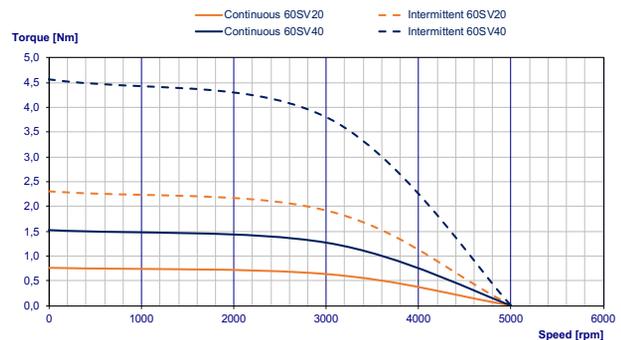
Note: optional brake

Specification		60SV20-220V-30EA1	60SV20-220V-30EA2	60SV40-220V-30EA1	60SV40-220V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VAC 220	220	220	220
4	Rated power	W 200	200	400	400
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 6400 ±10%	6400 ±10%	6900 ±10%	6900 ±10%
7	Rated Torque	Nm 0,64	0,64	1,27	1,27
8	Max. Peak Torque	Nm 1,92	1,92	3,81	3,81
9	Torque Constant	Nm/A 0,53	0,53	0,53	0,53
10	Rated Current	A 1	1	2,4	2,4
11	Max. Peak Current	A 3,6	3,6	7,2	7,2
12	No-Load Current	A 0,6	0,6	0,3	0,3
13	Back EMF constant	V/kRPM 32	32	32	32
14	Line to Line Resistance	Ω 9,35 ±10%	9,35 ±10%	3,46 ±10%	3,46 ±10%
15	Line to Line Inductance	mH 17 ±20%	17 ±20%	7,14 ±20%	7,14 ±20%
16	Rotor Inertia	Kgcm2 0,15	0,15	0,25	0,25
17	Brake		24VDC - 1,5Nm		24VDC - 1,5Nm
18	Length (L)	mm 79,5	116	99	135,5
19	Weight	Kg 0,9	1,3	1,3	1,8

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,14 mm
Max. Radial force (20mm from flange)	245N
Max. Axial force	98N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute
	(single-turn, BiSS): 17bit, 16bit

Connection					
Pin	Color	Function	Pin	Color	Function
Feedback					
1	RD	+5V	9	WH	W+
2	BK	GND	10	GY	V+
4	BR	U+	11	YL/BK	Z-
5	BR/BK	U-	12	OR/BK	B-
6	YL	Z+	13	GN/BK	A-
7	OR	B+	14	WH/BK	W-
8	GN	A+	15	GY/BK	V-
Power					
1	YL	U	3	BK	W
2	RD	V	4	YL/GN	PE
Brake					
1	RD	Brake1	2	WH	Brake2

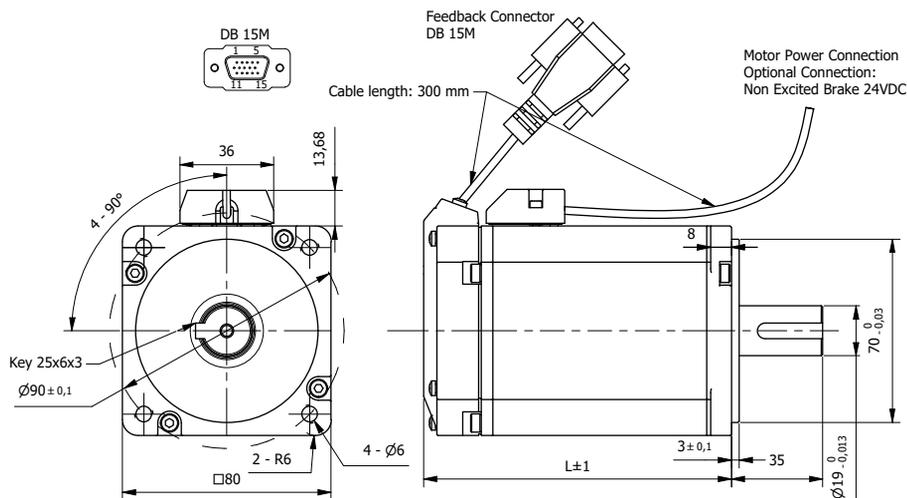


Brushless AC Servomotor 80SV-220VAC

Medium voltage - IP65

□ 80mm

2,39 to 3,18Nm



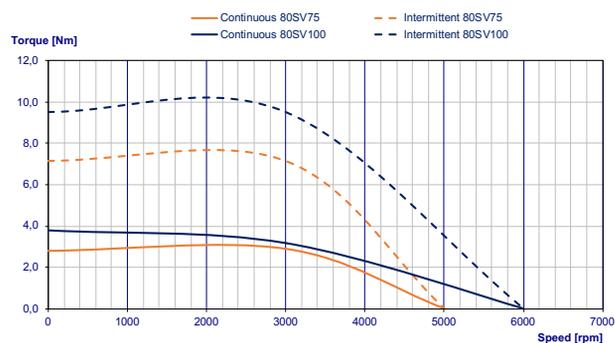
Note: optional brake

Specification		80SV75-220V-30EA1	80SV75-220V-30EA2	80SV100-220V-30EA1	80SV100-220V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VAC 220	220	220	220
4	Rated power	W 750	750	1000	1000
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 6000 ±10%	6000 ±10%	6000 ±10%	6000 ±10%
7	Rated Torque	Nm 2,39	2,39	3,18	3,18
8	Max. Peak Torque	Nm 7,17	7,17	9,54	9,54
9	Torque Constant	Nm/A 0,6	0,6	0,6	0,6
10	Rated Current	A 4,4	4,4	5,9	5,9
11	Max. Peak Current	A 13,2	13,2	17,9	17,9
12	No-Load Current	A 0,6	0,6	0,7	0,7
13	Back EMF constant	V/kRPM 36	36	36	36
14	Line to Line Resistance	Ω 1,77 ±10%	1,77 ±10%	0,885 ±10%	0,885 ±10%
15	Line to Line Inductance	mH 5,6 ±20%	5,6 ±20%	3,67 ±20%	3,67 ±20%
16	Rotor Inertia	Kgcm2 1,56	1,6	2,22	2,3
17	Brake		24VDC - 3,2Nm		24VDC - 3,2Nm
18	Length (L)	mm 112	149	129	165
19	Weight	Kg 2,5	3,1	3,2	3,8

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,08 mm
Max. Radial force (20mm from flange)	392N
Max. Axial force	147N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute (single-turn, BiSS): 17bit, 16bit

Connection					
Pin	Color	Function	Pin	Color	Function
Feedback					
1	RD	+5V	9	GY	W+
2	BK	GND	10	WH	V+
4	BR	U+	11	YL/BK	Z-
5	BR/BK	U-	12	GN/BK	B-
6	YL	Z+	13	OR/BK	A-
7	GN	B+	14	GY/BK	W-
8	OR	A+	15	WH/BK	V-
Power - connector options available					
	YL	U	BK	W	
	RD	V	YL/GN	PE	
Brake - connector options available					
	RD	+24V	WH	GND	

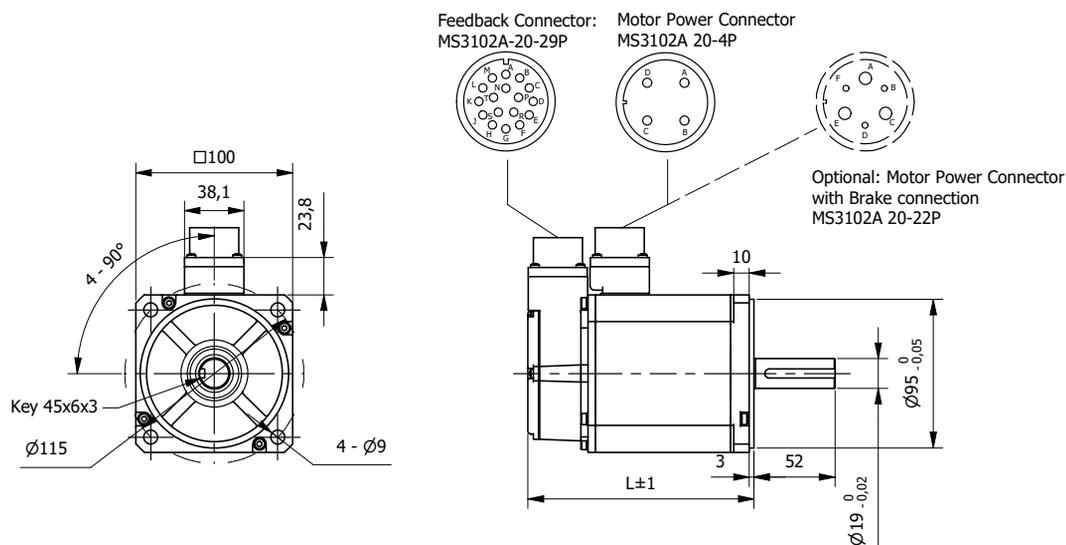


Brushless AC Servomotor 100SV-220VAC

Medium voltage - IP65

□ 100mm

3,18 to 4,77Nm



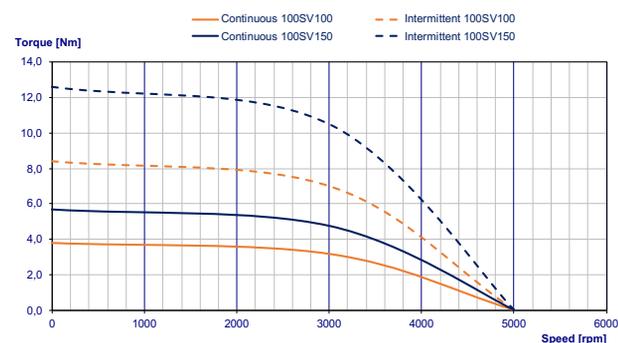
Note: optional brake

Specification		100SV100-220V-30EA1	100SV100-220V-30EA2	100SV150-220V-30EA1	100SV150-220V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VAC 220	220	220	220
4	Rated power	W 1000	1000	1500	1500
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 5000 ±10%	5000 ±10%	5000 ±10%	5000 ±10%
7	Rated Torque	Nm 3,18	3,18	4,77	4,77
8	Max. Peak Torque	Nm 7	7	10,5	10,5
9	Torque Constant	Nm/A 0,63	0,63	0,63	0,63
10	Rated Current	A 5,0	5,0	7,5	7,5
11	Max. Peak Current	A 11	11	16,7	16,7
12	No-Load Current	A 0,8	0,8	0,8	0,8
13	Back EMF constant	V/kRPM 38	38	38	38
14	Line to Line Resistance	Ω 0,82 ±10%	0,82 ±10%	0,54 ±10%	0,54 ±10%
15	Line to Line Inductance	mH 7,4 ±20%	7,4 ±20%	5,2 ±20%	5,2 ±20%
16	Rotor Inertia	Kgcm ² 1,3	1,67	1,84	2,21
17	Brake		24VDC - 10Nm		24VDC - 10Nm
18	Length (L)	mm 137	172	159	194
19	Weight	Kg 3,73	4,73	4,7	5,7

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,08 mm
Max. Radial force (20mm from flange)	490N
Max. Axial force	196N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin	Function	Pin	Function
Feedback			
A	+5V	J	U+
B	GND	K	U-
C	A+	L	V+
D	A-	M	V-
E	B+	N	W+
F	B-	P	W-
G	Z+	R	PE
H	Z-		
Power			
A	U	B	V
C	W	D	GND
Optional: Power & Brake			
A	U	B	Brake 1
C	V	D	Brake 2
E	W		

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute
	(single-turn, BiSS): 17bit, 16bit

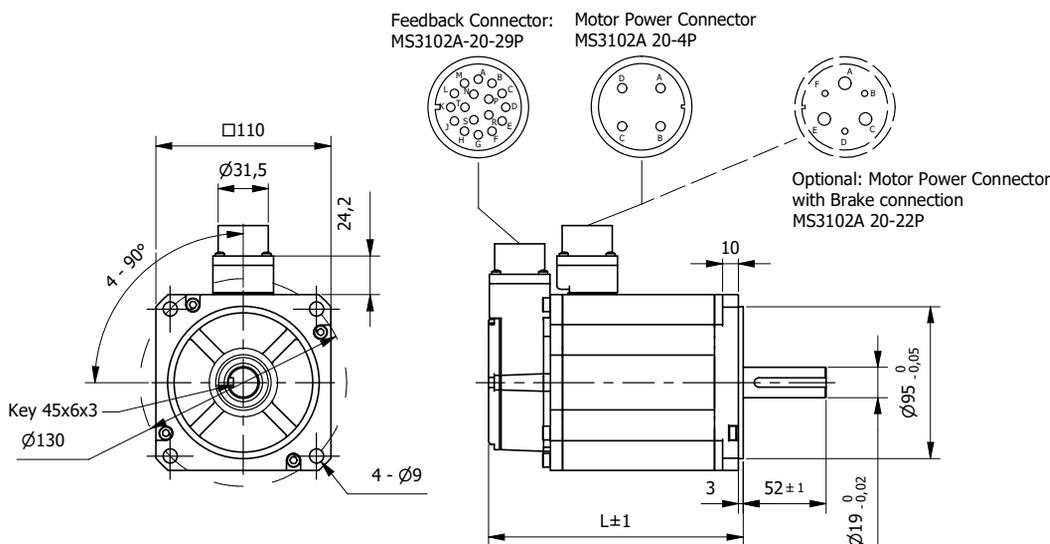


Brushless AC Servomotor 110SV-220VAC

Medium voltage - IP65

□ 110mm

4,77 to 6,37Nm



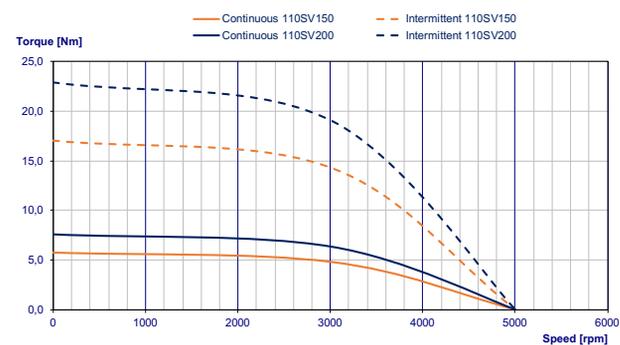
Note: optional brake

Specification		110SV150-220V-30EA1	110SV150-220V-30EA2	110SV200-220V-30EA1	110SV200-220V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VAC 220	220	220	220
4	Rated power	W 1500	1500	2000	2000
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 5000 ±10%	5000 ±10%	5000 ±10%	5000 ±10%
7	Rated Torque	Nm 4,77	4,77	6,37	6,37
8	Max. Peak Torque	Nm 14,3	14,3	19,1	19,1
9	Torque Constant	Nm/A 0,63	0,63	0,63	0,63
10	Rated Current	A 7,6	7,6	10,1	10,1
11	Max. Peak Current	A 22,8	22,8	30,3	30,3
12	No-Load Current	A 0,8	0,8	0,8	0,8
13	Back EMF constant	V/kRPM 38,1	38,1	38,1	38,1
14	Line to Line Resistance	Ω 0,36 ±10%	0,36 ±10%	0,29 ±10%	0,29 ±10%
15	Line to Line Inductance	mH 5,6 ±20%	5,6 ±20%	4,8 ±20%	4,8 ±20%
16	Rotor Inertia	Kgcm ² 3,1	3,47	4,1	4,47
17	Brake		24VDC - 10Nm		24VDC - 10Nm
18	Length (L)	mm 151,5	187	168,5	204
19	Weight	Kg 5	6	6,7	7,7

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,08 mm
Max. Radial force (20mm from flange)	630N
Max. Axial force	315N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR Magnetic Incremental: 2500 CPR Magnetic Absolute (single-turn, BiSS): 17bit, 16bit

Connection			
Pin	Function	Pin	Function
Feedback			
A	+5V	J	U+
B	GND	K	U-
C	A+	L	V+
D	A-	M	V-
E	B+	N	W+
F	B-	P	W-
G	Z+	R	PE
H	Z-		
Power			
A	U	B	V
C	W	D	GND
Optional: Power & Brake			
A	U	B	Brake 1
C	V	D	Brake 2
E	W		

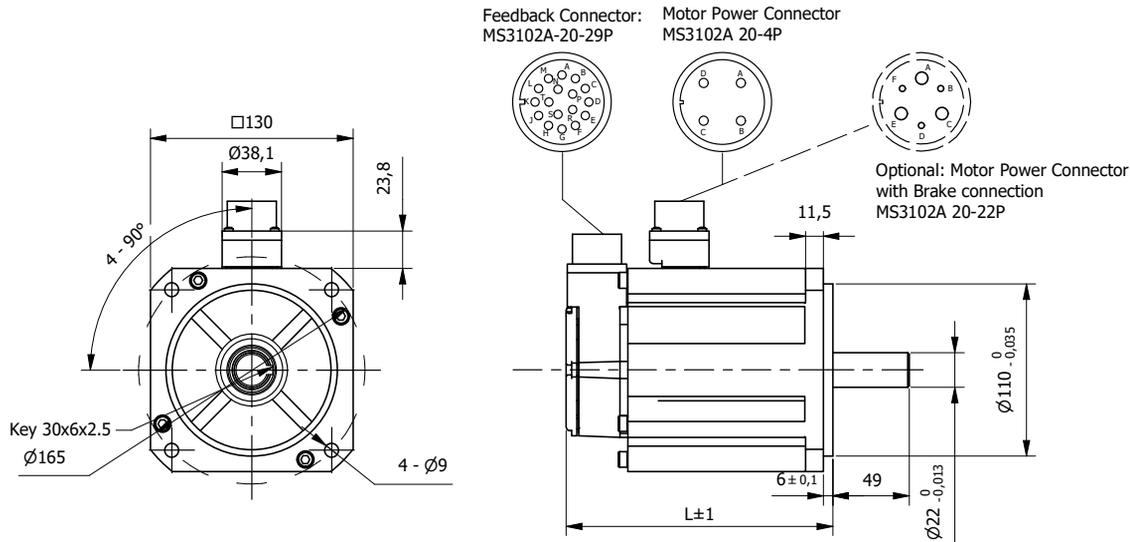


Brushless AC Servomotor 130SV-220VAC

Medium voltage - IP65

□ 130mm

9,55 to 14,3Nm



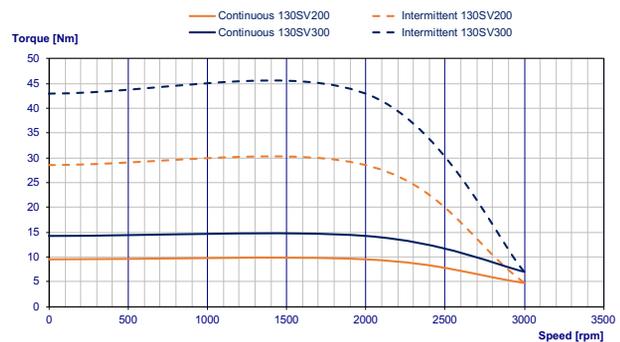
Note: optional brake

Specification		130SV200-220V-30EA1	130SV200-220V-30EA2	130SV300-220V-30EA1	130SV300-220V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VAC 220	220	220	220
4	Rated power	W 2000	2000	3000	3000
5	Rated Speed	RPM 2000	2000	2000	2000
6	No-load Speed	RPM 3200 ±10%	3200 ±10%	3200 ±10%	3200 ±10%
7	Rated Torque	Nm 9,55	9,55	14,3	14,3
8	Max. Peak Torque	Nm 28,65	28,65	42,9	42,9
9	Torque Constant	Nm/A 1,12	1,12	1,12	1,12
10	Rated Current	A 9,3	9,3	14,0	14,0
11	Max. Peak Current	A 27,9	27,9	42	42
12	No-Load Current	A <1	<1	<1,4	<1,4
13	Back EMF constant	V/kRPM 68	68	68	68
14	Line to Line Resistance	Ω 0,8 ±10%	0,8 ±10%	0,5 ±10%	0,5 ±10%
15	Line to Line Inductance	mH 4,2 ±20%	4,2 ±20%	3 ±20%	3 ±20%
16	Rotor Inertia	Kgcm ² 14	15,2	19,9	20,2
17	Brake		24VDC - 16Nm		24VDC - 16Nm
18	Length (L)	mm 150	178	178	206
19	Weight	Kg 7	9,5	11,7	14,2

Characteristics	
Item	
Insulation Class	F 155°C
Protection Class	IP65
Radial play (max. 4N)	0,02 mm
Axial play (max. 4N)	0,12 mm
Max. Radial force (30mm from flange)	490N
Max. Axial force	196N
Dielectric strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin	Function	Pin	Function
Feedback			
A	+5V	J	U+
B	GND	K	U-
C	A+	L	V+
D	A-	M	V-
E	B+	N	W+
F	B-	P	W-
G	Z+	R	PE
H	Z-		
Power			
A	U	B	V
C	W	D	GND
Optional: Power & Brake			
A	U	B	Brake 1
C	V	D	Brake 2
E	W		

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute
	(single-turn, BiSS): 17bit, 16bit



Motors with Controller



Stepper motors
with Motion
controller



Servomotors
with Motion
controller



BLDC motors
with Speed
controller



BLDC motors
with Motion
controller

Motors with integrated Controller

Integrated motors are a popular choice for engineers because they save space, reduce costs and complexity.

Our engineers are always creating new and exciting products, so it's hard to list them all here.

To see our full range please visit our website:



www.delta-line.com

Term	
N. of pole	Areas of a motor where a magnetic pole is generated either by a permanent magnet or by passing current through the coils of a winding.
N. of phase	A group of electrically connected coils.
Rated Voltage	The voltage at which rated torque is generated with the motor at ambient temperature.
Operating Voltage	Describes the range of the permissible supply voltage
Rated Speed	The approximate motor speed at its rated torque point.
Rated Torque	The maximum torque, at rated speed, the motor can produce on a continuous basis, without exceeding the thermal rating of the motor.
Max. Peak Torque	The maximum torque a motor can produce for short periods of time, before irreversible demagnetization of the motor's magnets occurs.
Torque constant	The ratio of a motor's output torque to the motor's input power
Rated Current	The approximate amount of current the motor will draw at its rated torque point.
Max. Peak Current	The current drawn by the motor when delivering peak torque
No-Load Current	The current consumption of the motor at rated voltage and under no-load conditions. This value varies proportionally to speed and is influenced by temperature
Line to Line resistance	This is the phase resistance measured for the completed motor at room temperature. It includes solder, wire and (if present) connector resistances. In motors with very low resistance, the line to line resistance may differ significantly from the internal resistance.
Line to Line Inductance	This is the motor phase inductance measured with an inductance meter at 1000 Hz.
Rotor Inertia	Is the mass moment of inertia of the rotor, based on the axis of rotation.
Length	Total motor length.
Weight	Total motor mass.
Hall Effect angle	Phase angle at which hall sensors are positioned from each other.
Shaft run out	Is the geometric tolerance that specifies the run-out fluctuation of a target's feature when the target (part) is rotated on an axis (specified straight line).
Insulation class	The electrical insulation system for wires and other wire-wound electrical components is divided into different classes by temperature and temperature rise. The electrical insulation system is sometimes referred to as insulation class or thermal classification.
IP rate	IP (or "Ingress Protection") ratings are defined in international standard EN 60529 (British BS EN 60529:1992, European IEC 60509:1989). They are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt etc) and moisture.
Radial Play	The shaft displacement perpendicular to the shaft due to a side force applied perpendicular to the shaft axis.
Axial Play	Axial shaft displacement occurring during a reversal of an axial force on the shaft.
Max. Radial force	Maximum force that can be applied to the shaft in the radial direction (any direction perpendicular to the motor shaft axis).
Max. Axial force	Maximum force that can be applied to the shaft in the axial direction (in the same axis as or parallel to the motor shaft axis).
Dielectric strength	A dielectric test (also known as hipot or high potential test) is performed on all motors under 500V phases to the housing and during 5 seconds after voltage ramp up. Maximum allowed leakage is 1mA
Insulation resistance	The measurement of insulation resistance is carried out by means of a megohmmeter - high resistance range ohmmeter. DC voltage is applied between the windings and the ground of the motor.

Glossary

Product families

BLDC motors with Speed Controller

BLDC motors with Motion Controller

Servomotors with Motion Controller

Stepper motors with Motion Controller

Delta Line's motors with integrated drive and control electronics have provided machine builders with unprecedented design flexibility thanks to their compact size, high efficiency, and excellent reliability. Available as Brushless DC, Servomotors and Stepper motors, these smart motors eliminate the need for a separate drive and therefore the need to run motor power and feedback cables to an external controller. The significant reduction in cabling also simplifies integration and improves efficiency, reliability and electrical noise, which helps to keep encoder signals "clean," free from electromagnetic interference and provides a complete motor solution in a single, easy-to-integrate device.

The compact integration of the speed controller reduces space requirements and simplifies installation and start-up, opening a wide range of application areas. The integrated electronics facilitate speed control by means of a PID controller. The direction of rotation can be changed via a separate switching input.

BLDC motor with integrated Speed Controller

Our slotted BLDC motors with integrated controller offer the compactness of a standard motor together with all the features of our drives. These motors have digital inputs and outputs and an analogue input, and can be also equipped with several Fieldbuses such as: CANopen, Modbus RTU, EtherCAT, Modbus TCP/IP, Profinet, Powerlink, IO-Link, Ethernet/IP. To reach top performances, a single turn magnetic encoder can also be fully integrated. Several of our models are IP65 rated as standard so that they can be used in a wide variety of environments without concern.

BLDC motor with integrated Motion Controller

Our Servo Motors with integrated controller offer the compactness of a standard Servo motor together with all the features of our drives. The servomotors use rare earth neodymium-iron-boron permanent magnet rotors and provide features of low inertia, high torque density, high peak torques, low noise and low current consumption. These motors have digital inputs and outputs and an analogue input and can be also equipped with RS485 Modbus-RTU, CANopen, Modbus-TCP or Ethercat fieldbuses. All of our models are IP65 rated as standard so that they can be used in a wide variety of environments without concern.

Servomotors with integrated Motion Controller

Our stepper motors with integrated electronics use stepless control technology for 65,536 microsteps per revolution and offer encoder options such as magnetic incremental, single-turn absolute, or multi-turn absolute, to meet a wide range of applications. Communication options include CANopen, Modbus RTU, EtherCAT, Modbus TCP/IP, Profinet, Powerlink, IO-Link and Ethernet/IP, so the motors can be easily connected to any industrial network.

With a smart stepper motor, designers and machine builders can achieve cost savings of 20 to 40 percent over a conventional stepper motor with separate drive and controller. Several of our models are IP65 rated, so they can be used in a wide range of environments where moisture or water spray is present.

Stepper motor with integrated Motion Controller

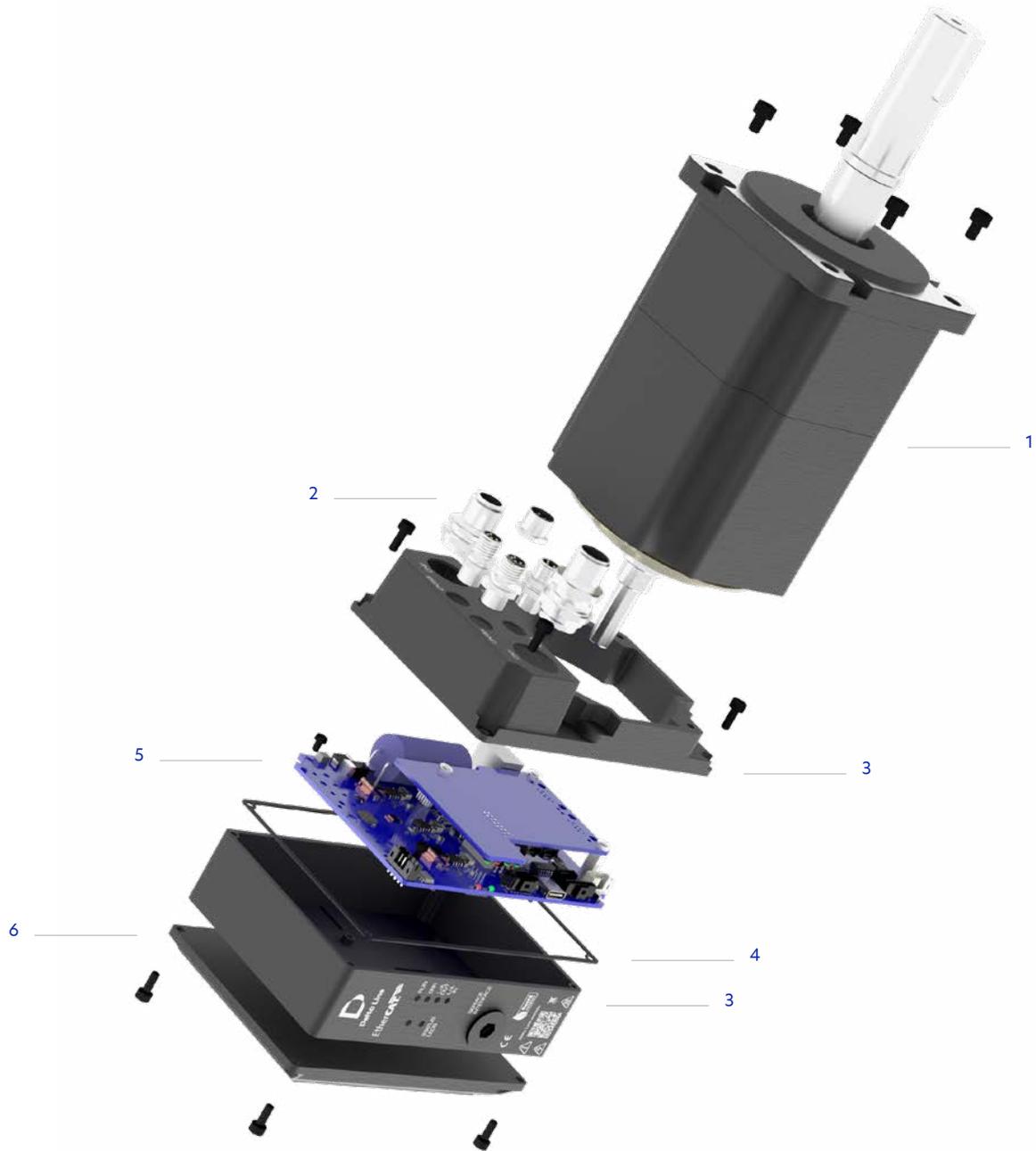
All our motors with Motion Controller are offered with two software: DL Studio and DL Space. DL Studio is a configuration and test tool that lets the user set all the objects inside the drive and move the motor from the PC while seeing the motor response, in terms of current, speed and other information. DL Space contains all the features of DL Studio, but lets the user write custom applications for the drive using a simple and user-friendly programming language. The motor with Motion Controller can be connected to the PC through a specific Interface kit.

Software

Technical introduction

Composition - Servomotor with Motion Controller

- 1 Motor + Encoder
- 2 Connectors
- 3 Case
- 4 Gasket
- 5 Drive
- 6 Heat sink



Stepper



Flat Hybrid Stepper

p.273



Hybrid Stepper S series Standard

p.203



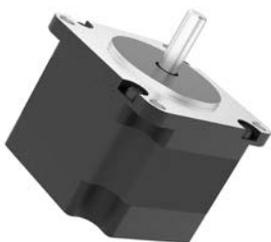
Hybrid Stepper SH series High Torque

p.213



Hybrid Stepper STC series Connector

p.249



3-Phase Hybrid Stepper

p.259



Hollow Shaft Stepper

p.265



Hybrid Stepper with Encoder

p.277



IP65 Hybrid Stepper

p.283

Stepper Motors

Technical introduction		198
Hybrid Stepper motors - S Standard series	Torque* (Nm)	203
57S41...76	0,288...1,25	204
86S67...125	2,3...7,6	208
Hybrid Stepper motors - SH High Torque series	Torque* (Nm)	213
14SH30	0,006	214
20SH	0,018...0,03	215
25SH23	0,033	216
28SH32...51	0,043...0,12	217
35SH	0,07...0,14	220
39SH20...38	0,065...0,29	221
42SH33...60	0,158...0,8	224
42SH33...47M - step 0,9°	0,158...0,44	228
57SH41...76	0,39...1,89	231
57SH41...76M - step 0,9°	0,39...1,8	235
60SH45...86	0,78...3,1	238
86SH65...156	2,6...12,1	242
110SH	11,2...28	247
Hybrid Stepper motors - STC Connector series	Torque* (Nm)	249
20STC	0,022...0,036	250
28STC32...51	0,08...0,18	251
57STC41...76	0,6...2,3	254
3-Phase Hybrid Stepper motors	Torque* (Nm)	259
42 3P	0,08...0,2	260
57 3P	0,45...1,5	261
60 3P53	0,9	262
Hollow Shaft Stepper motors	Torque* (Nm)	265
20STC40 H	0,036	266
28STC51 H	0,12	267
35STC38 H	0,23	268
42STC47 H	0,44	269
57STC76 H	2,3	270
86SH118 H	6	271
Flat Hybrid Stepper motors	Torque* (Nm)	273
28S10	0,01	274
63S10	0,064	275
Stepper motors with Encoder	Torque* (Nm)	277
42SC	0,22...0,75	278
60SC	1...3	279
86SC	3,5...12	280
IP65 Hybrid Stepper motors	Torque* (Nm)	283
SM28 070 - IP65	0,127	284
SM42-E - IP65	0,16...0,72	285
SM57-E - IP65	0,7...1,95	286

* Holding Torque

Term	
Rated voltage	Voltage necessary to reach the nominal current per phase.
Current/Phase	The current supplied to the motor phases that will not exceed, at an ambient temperature of 20°C, the thermal limits of the motor.
Resistance/Phase	Winding resistance per phase. Tolerance +/- 12%, steady state.
Inductance/Phase	Winding inductance per phase measured at 1kHz.
Holding Torque	The torque generated by the motor at nominal current.
Rotor Inertia	Is the mass moment of inertia of the rotor, based on the axis of rotation.
Detent Torque	The torque required to rotate a non-energized step motor.
Number of leads	Number of lead wires available to connect the motor.
Length	Total motor length.
Weight	Total motor mass.
Step angle	Number of angular degrees the motor moves per full-step
Step angle accuracy	The percentage position error per full step, at no load and nominal current. This error is not cumulative between steps.
Insulation class	The electrical insulation system for wires and other wire-wound electrical components is divided into different classes by temperature and temperature rise. The electrical insulation system is sometimes referred to as insulation class or thermal classification.
Ambient temperature	Temperatures at which the motor can operate.
Max. Temp. Rise (rated current 2 phase on)	Maximum temperature rise for the motor at rated voltage and two phases
Max. shaft radial play	The shaft displacement perpendicular to the shaft due to a side force applied perpendicular to the shaft axis.
Max. shaft axial play	Axial shaft displacement occurring during a reversal of an axial force on the shaft.
Max. Radial force	Maximum force that can be applied to the shaft in the radial direction (any direction perpendicular to the motor shaft axis).
Max. Axial force	Maximum force that can be applied to the shaft in the axial direction (in the same axis as or parallel to the motor shaft axis).
Dielectric strength	A dielectric test (also known as hipot or high potential test) is performed on all motors under 500V phases to the housing and during 5 seconds after voltage ramp up. Maximum allowed leakage is 1mA
Insulation resistance	The measurement of insulation resistance is carried out by means of a megohmmeter - high resistance range ohmmeter. DC voltage is applied between the windings and the ground of the motor.

Glossary

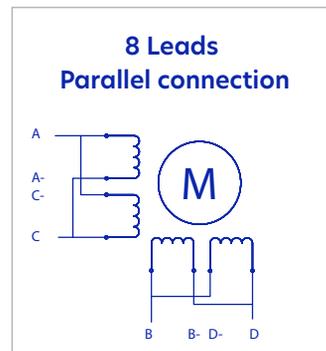
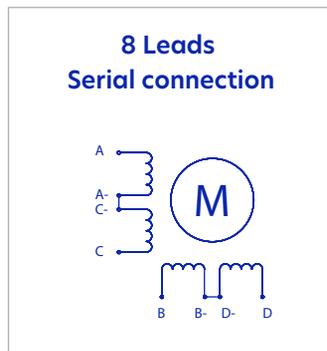
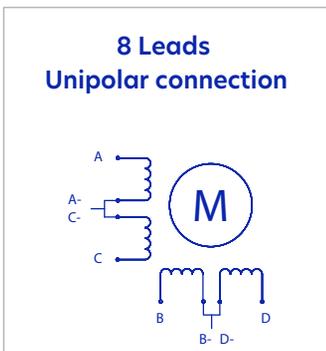
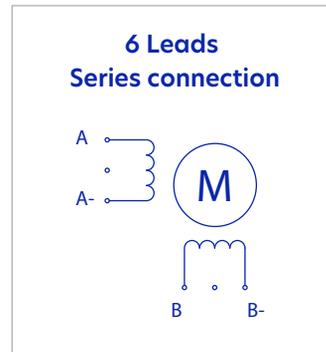
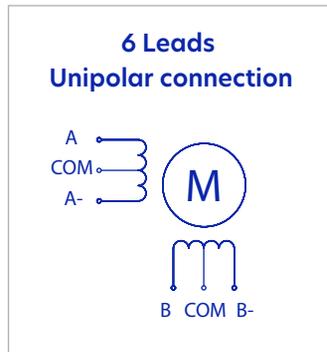
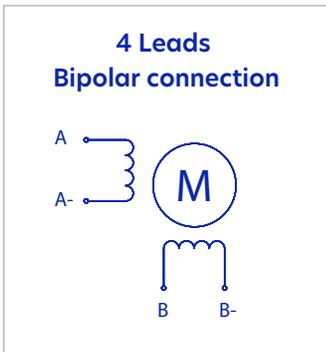
Wires Connection table

4 lead wires	A	A-	B	B-
Color Code 1	White	Red	Blue	Yellow
Color Code 2	Black	Green	Red	Blue
Color Code 3	Red	Blue	Orange	Yellow
Color Code 4	Red	White	Yellow	Green
Color Code 5	Yellow	Green	Red	Black

3 phase wires	U	V	W
Color Code 1	Red	Yellow	Blue
Color Code 2	Red-Orange	White-Blue	Yellow-Green
Color Code 3	Red	Green	White

6 lead wires	A	A-	B	B-	Com A	Com B
Color Code 1	White	Red	Blue	Yellow	Black	Brown
Unipolar Motor	Black	Green	Red	Blue	Yellow	White

8 lead wires	A	A-	C	C-	B	B-	D	D-
Color Code 1	Blue/White	Blue	Red	Red/White	Green/White	Green	Black	Black/White
Color Code 2	Orange	Orange/White	Black	Black/White	Red	Red/White	Yellow	Yellow/White
Color Code 3	Red	Yellow	Black	Blue	White	Orange	Green	Brown



Product families

Hybrid Stepper motors

3-Phase Hybrid Stepper motors

Hollow Shaft Stepper motors

Flat Hybrid Stepper motors

Stepper motors with Encoder

IP65 Hybrid Stepper motors

A stepper motor is an electromechanical device which converts electrical pulses into discrete mechanical movements. The shaft or spindle of a stepper motor rotates in discrete step increments when electrical command pulses are applied to it in the proper sequence. The motors rotation has several direct relationships to these applied input pulses. The sequence of the applied pulses is directly related to the direction of motor shafts rotation. A stepper motor can be a good choice whenever controlled movement is required. They can be used to advantage in applications where you need to control rotation angle, speed, position and synchronism.

Main advantages

- 1 The rotation angle of the motor is proportional to the input pulse.
- 2 Precise positioning and repeatability of movement since good stepper motors have an accuracy of 3 - 5% of a step and this error is non cumulative from one step to the next.
- 3 Excellent response to starting/stopping/reversing.
- 4 Very reliable since there are no contact brushes in the motor. Therefore the life of the motor is simply dependent on the life of the bearing.
- 5 A wide range of rotational speeds can be realized as the speed is proportional to the frequency of the input pulses.

The hybrid stepper motor is more expensive than the PM stepper motor but provides better performance with respect to step resolution, torque and speed. This motor combines the best features of both the PM and Variable Reluctance stepper motors. The rotor is multi-toothed and contains an axially magnetized concentric magnet around its shaft. The teeth on the rotor provide an even better path which helps guide the magnetic flux to preferred locations in the air gap. This further increases the detent, holding and dynamic torque characteristics of the motor when compared with both the VR and PM types.

Hybrid Stepper motors (2-Phase)

3-Phase technology in hybrid stepper motor is used mainly where ultra-low vibration and very low noise levels are required. The drive circuit of these motors is simplified because it is driven with a star wiring connection. The use of three phases inherently helps to reduce torque ripple and smooth motor performance. An example of an ideal application is in performance lighting, where quick movement and quiet operation are required.

3-Phase Hybrid Stepper motors

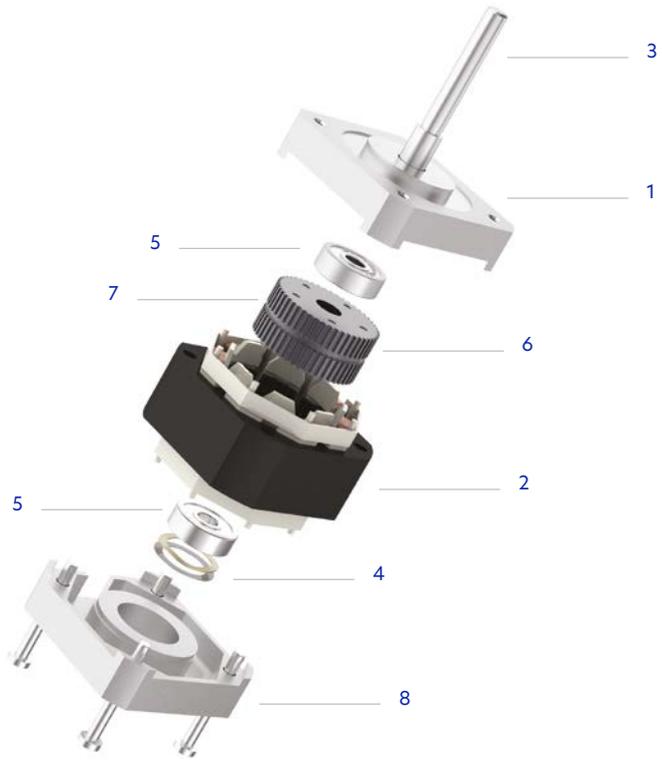
Our Hybrid stepper motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested by the system. The presence of an encoder is highly recommended when it is critical to know the status of the motor (both position and speed) in every instant.

Stepper motors with integrated Encoder

Technical introduction

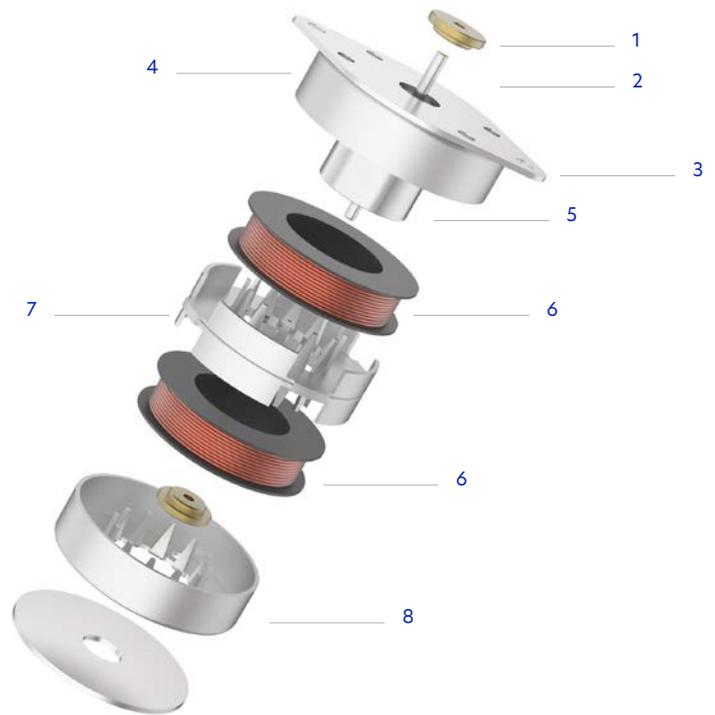
Composition Hybrid Stepper

1	Front Endbell
2	Stator & Coils
3	Shaft
4	Washer
5	Ball bearings
6	Rotor cup
7	Magnet
8	Rear Endbell



Composition PM Stepper

1	Sleeve bearing
2	Shaft
3	Front flange
4	Front cover/stator
5	Rotor
6	Windings
7	Inner stator
8	Rear cover/stator





Hybrid Stepper
S series
Standard

p.203



Hybrid Stepper
SH series
High Torque

p.213



Hybrid Stepper
STC series
Connector

p.249

Stepper motors

2-Phase Hybrid

Advantages at a glance

- High torque
- High speed
- High reliability

The hybrid stepper motor is more expensive than the PM stepper motor but provides better performance with respect to step resolution, torque and speed. This motor combines the best features of both the PM and Variable Reluctance stepper motors. The rotor is multi-toothed and contains an axially magnetized concentric magnet around its shaft. The teeth on the rotor provide an even better path which helps guide the magnetic flux to preferred locations in the air gap. This further increases the detent, holding and dynamic torque characteristics of the motor when compared with both the VR and PM types.

Hybrid Stepper motors - S Standard series	Torque* (Nm)	203
57S41	0,29...0,4	204
57S51	0,49...0,69	205
57S56	0,6...0,84	206
57S76	0,9...1,25	207
86S67	2,3...2,8	208
86S94	3,8...4,8	209
86S125	6,2...7,6	210

Hybrid Stepper motors - SH High Torque series	Torque* (Nm)	213
14SH30	0,006	214
20SH	0,018...0,03	215
25SH23	0,033	216
28SH32	0,043...0,06	217
28SH45	0,075...0,095	218
28SH51	0,09...0,12	219
35SH	0,07...0,14	220
39SH20	0,065...0,08	221
39SH34	0,13...0,21	222
39SH38	0,2...0,29	223
42SH33	0,158...0,22	224
42SH38	0,259...0,36	225
42SH47	0,317...0,44	226
42SH60	0,65...0,8	227
42SH33M - step 0,9°	0,158...0,22	228
42SH38M - step 0,9°	0,259...0,36	229
42SH47M - step 0,9°	0,317...0,44	230
57SH41	0,39...0,55	231
57SH51	0,72...1,01	232
57SH56	0,9...1,26	233
57SH76	1,35...1,89	234
57SH41M - step 0,9°	0,39...0,55	235
57SH56M - step 0,9°	0,9...1,26	236
57SH76M - step 0,9°	1,35...1,8	237
60SH45	0,78...1,1	238
60SH56	1,17...1,65	239
60SH65	1,5...2,1	240
60SH86	2,2...3,1	241
86SH65	2,6...3,4	242
86SH80	4,6	243
86SH96	7,0	244
86SH118	8,7	245
86SH156	12,1	246
110SH	11,2...28	247

Hybrid Stepper motors - STC Connector series	Torque* (Nm)	249
20STC	0,022...0,036	250
28STC32	0,08	251
28STC40	0,13	252
28STC51	0,18	253
57STC41	0,6	254
57STC56	1,4	255
57STC76	2,3	256

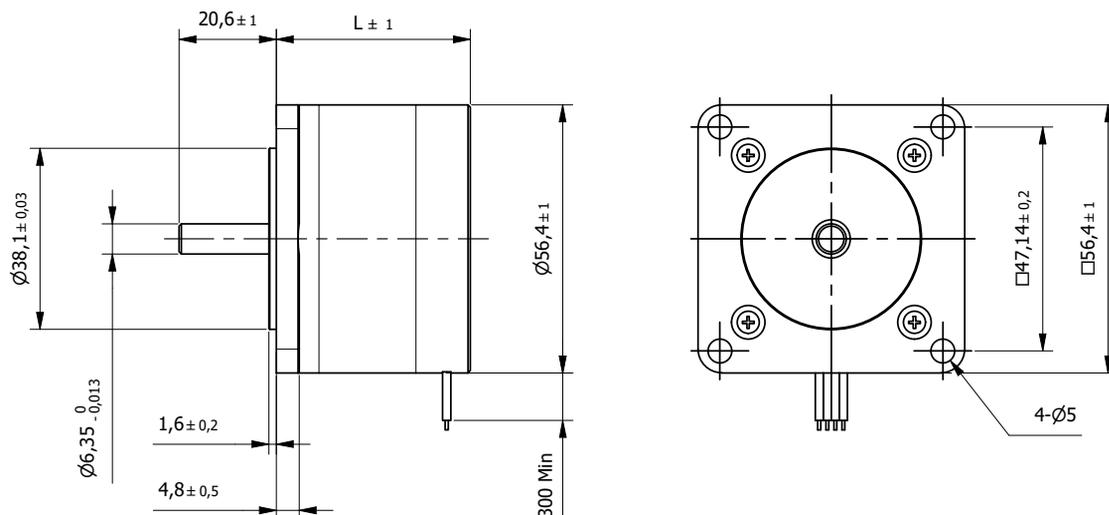
* Holding Torque



Hybrid Stepper motors
S series - Standard

Hybrid Stepper motors - S Standard series	Torque* (Nm)	
57S41	0,29...0,4	204
57S51	0,49...0,69	205
57S56	0,6...0,84	206
57S76	0,9...1,25	207
86S67	2,3...2,8	208
86S94	3,8...4,8	209
86S125	6,2...7,6	210

* Holding Torque

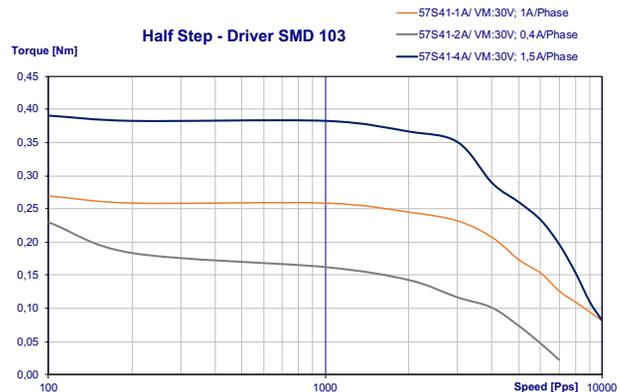


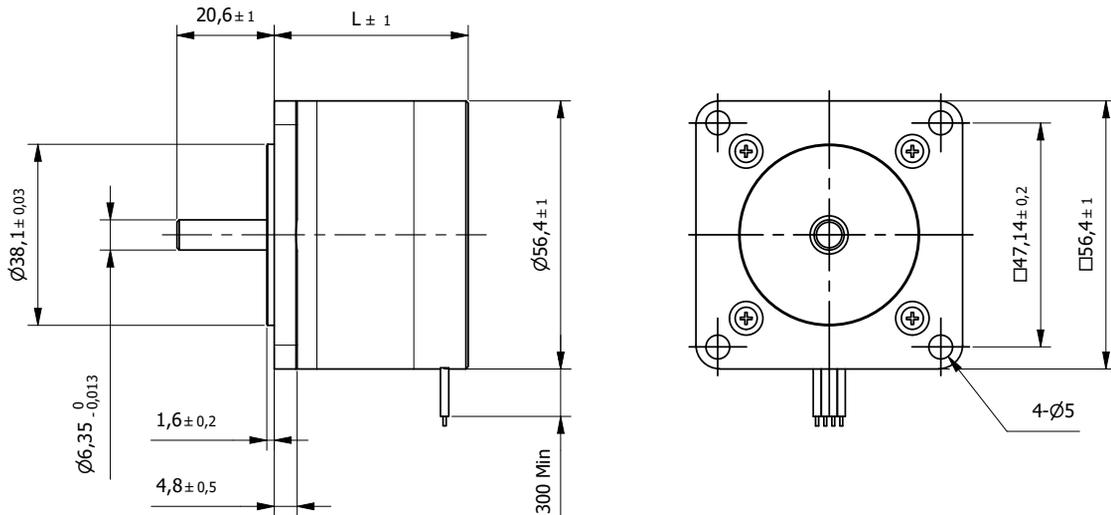
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57S41-1A	57S41-2A	57S41-4A	
1	Rated Voltage	V	4	12	2,8
2	Current/Phase	A	1,1	0,4	1,56
3	Resistance/Phase	Ω	3,6	30	1,8
4	Inductance/Phase	mH	4	30	3,6
5	Holding Torque	Nm	0,288	0,288	0,4
6	Rotor Inertia	gcm ²	57	57	57
7	Detent Torque	Nm	0,018	0,018	0,018
8	n° of Leads		6	6	4
9	Length (L)	mm	41	41	41
10	Weight	Kg	0,54	0,54	0,54

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG22	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



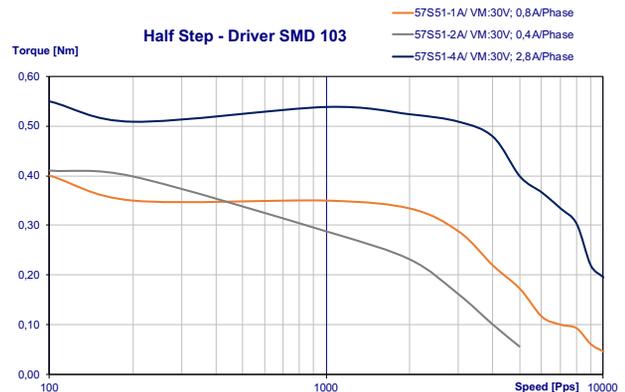


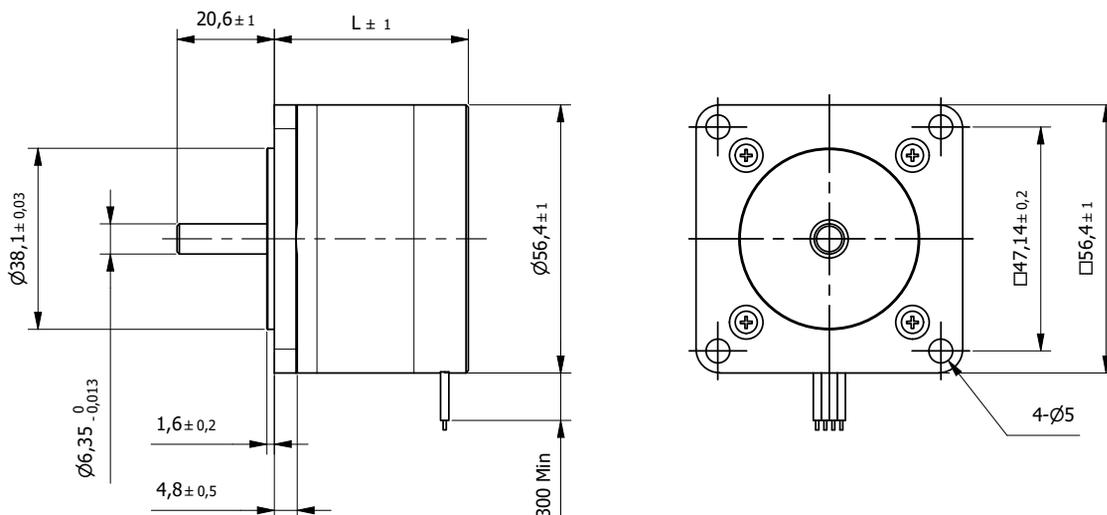
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57S51-1A	57S51-2A	57S51-4A	
1	Rated Voltage	V	6	12	2,38
2	Current/Phase	A	0,85	0,42	2,8
3	Resistance/Phase	Ω	7,1	29	0,85
4	Inductance/Phase	mH	9	36	2,1
5	Holding Torque	Nm	0,49	0,49	0,69
6	Rotor Inertia	gcm ²	110	110	110
7	Detent Torque	Nm	0,035	0,035	0,035
8	n° of Leads		6	6	4
9	Length (L)	mm	51	51	51
10	Weight	Kg	0,6	0,6	0,6

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



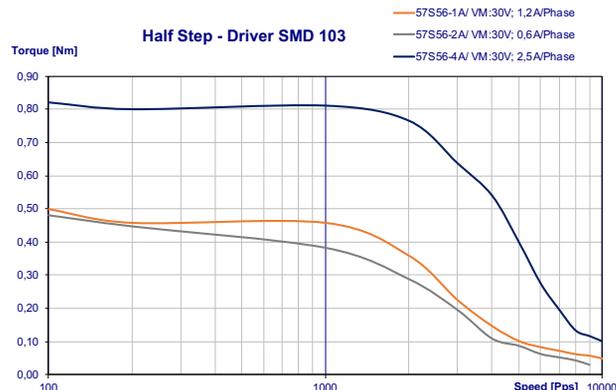


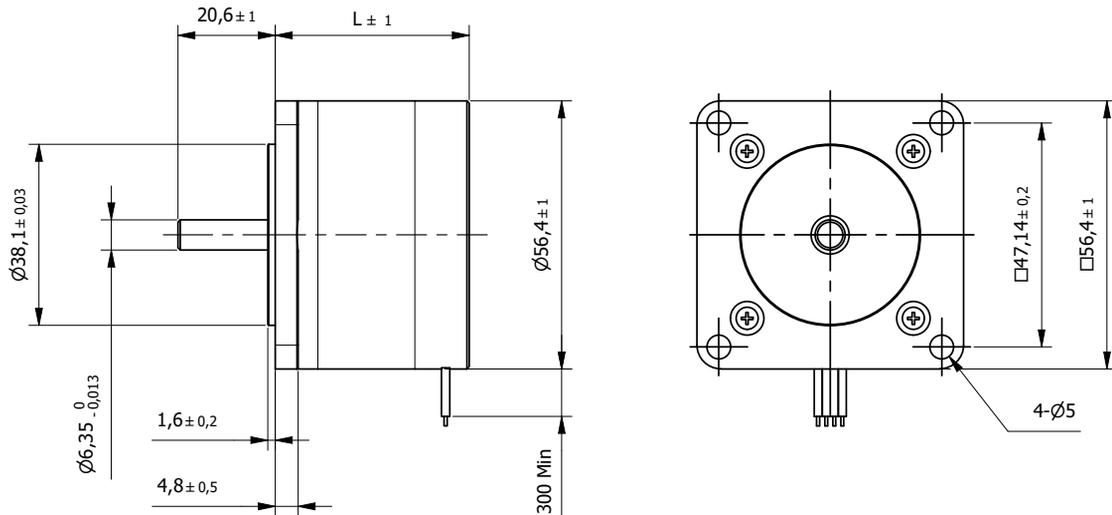
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57S56-1A	57S56-2A	57S56-4A	
1	Rated Voltage	V	6	12	2,8
2	Current/Phase	A	1,2	0,6	2,5
3	Resistance/Phase	Ω	5	20	1,1
4	Inductance/Phase	mH	8	32	3,6
5	Holding Torque	Nm	0,605	0,605	0,84
6	Rotor Inertia	gcm ²	135	135	135
7	Detent Torque	Nm	0,042	0,042	0,042
8	n° of Leads		6	6	4
9	Length (L)	mm	56	56	56
10	Weight	Kg	0,65	0,65	0,65

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG22	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



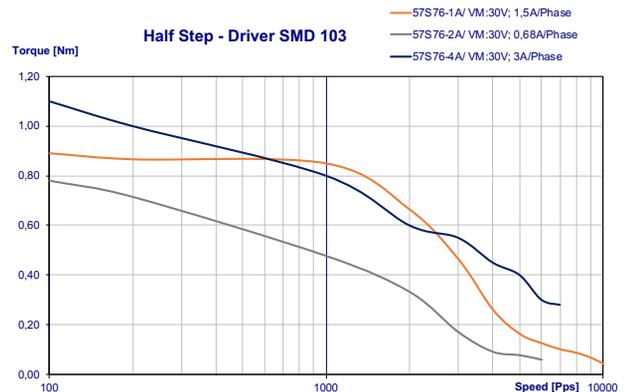


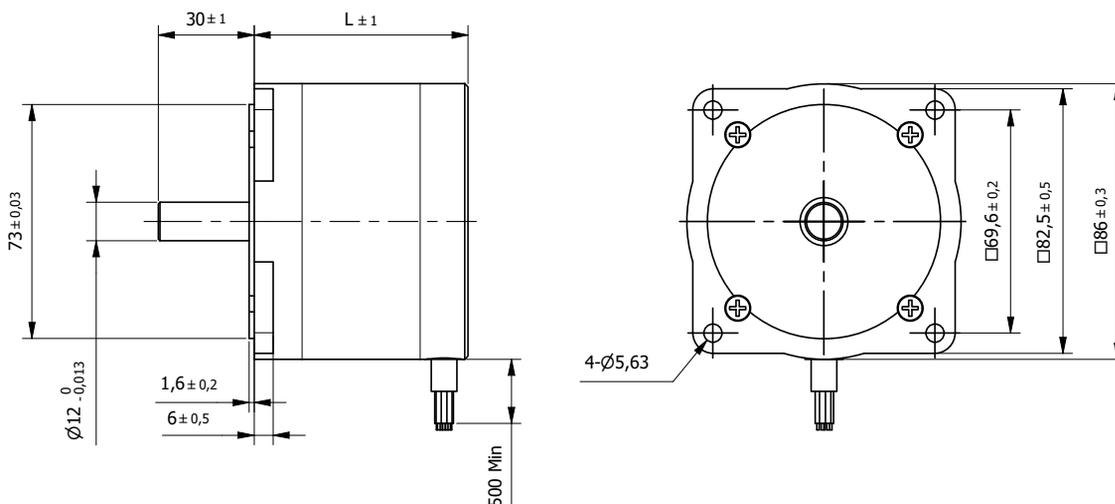
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57S76-1A	57S76-2A	57S76-4A	
1	Rated Voltage	V	5,4	12	2,7
2	Current/Phase	A	1,5	0,68	3,3
3	Resistance/Phase	Ω	3,6	17,7	0,85
4	Inductance/Phase	mH	6	30	3
5	Holding Torque	Nm	0,9	0,9	1,25
6	Rotor Inertia	gcm ²	200	200	200
7	Detent Torque	Nm	0,072	0,072	0,072
8	n° of Leads		6	6	4
9	Length (L)	mm	76	76	76
10	Weight	Kg	0,95	0,95	0,95

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



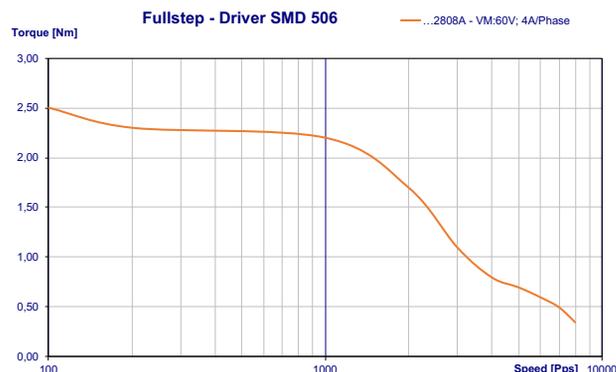


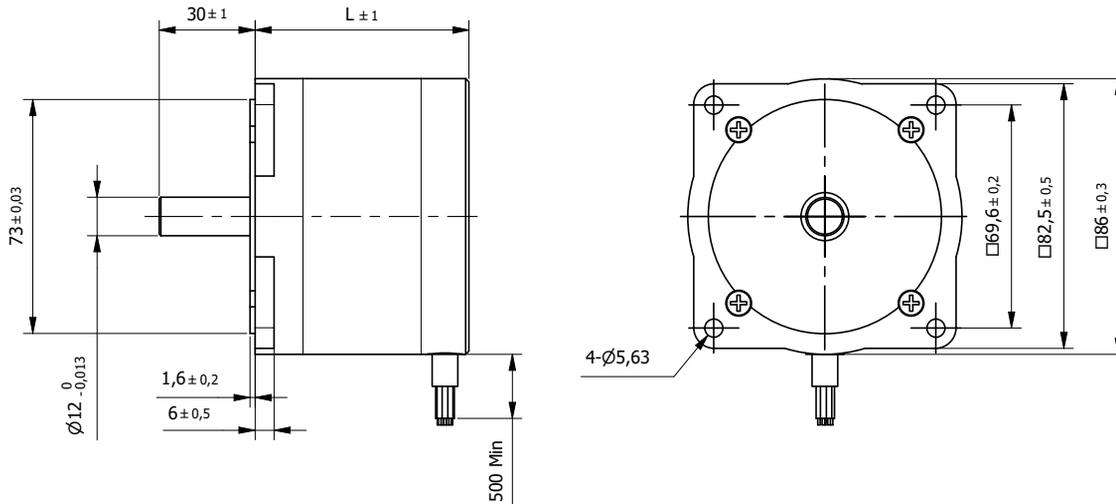
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		86S67-2808A		
Model		Unipolar	Parallel	Series
1	Rated Voltage	V	3,64	2,54
2	Current/Phase	A	2,8	3,92
3	Resistance/Phase	Ω	1,3	0,65
4	Inductance/Phase	mH	5,1	5,1
5	Holding Torque	Nm	2,3	2,8
6	Rotor Inertia	gcm ²	660	660
7	Detent Torque	Nm	0,085	0,085
8	n° of Leads		8	8
9	Length (L)	mm	67	67
10	Weight	Kg	1,6	1,6

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 min.)	750 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Orange	UL3266 AWG20	Phase A
2	Orange/White		Phase A-
3	Black/White		Phase C-
4	Black		Phase C
5	Red		Phase B
6	Red/White		Phase B-
7	Yellow/White		Phase D -
8	Yellow		Phase D



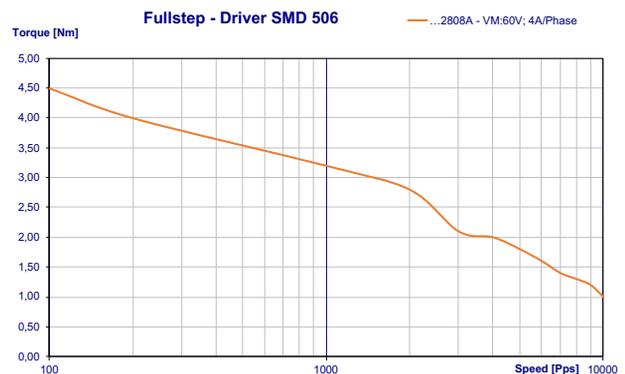


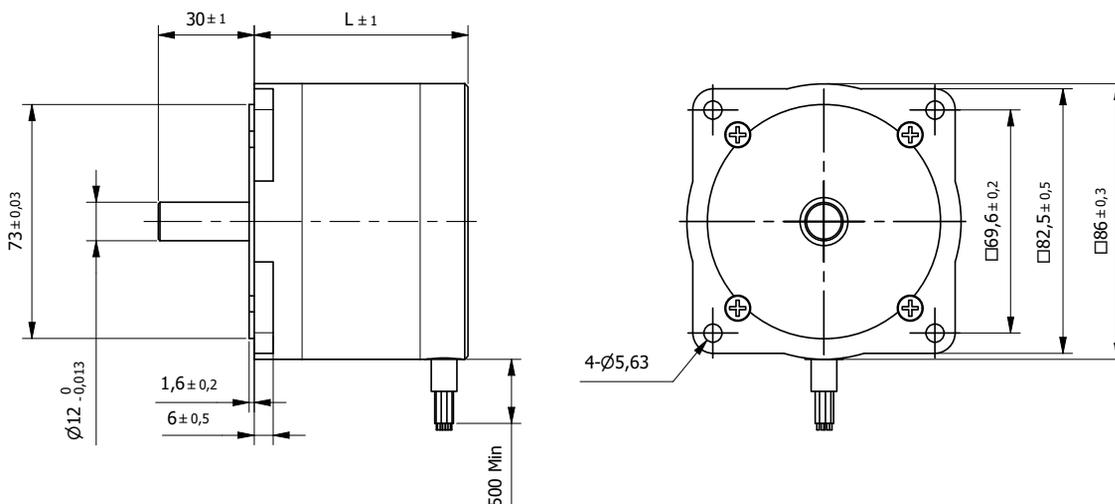
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		86S94-2808A		
Model		Unipolar	Parallel	Series
1	Rated Voltage	V	4,76	6,6
2	Current/Phase	A	2,8	1,96
3	Resistance/Phase	Ω	1,7	3,4
4	Inductance/Phase	mH	7,7	30,8
5	Holding Torque	Nm	3,8	4,8
6	Rotor Inertia	gcm ²	1200	1200
7	Detent Torque	Nm	0,13	0,13
8	n° of Leads		8	8
9	Length (L)	mm	94	94
10	Weight	Kg	2,4	2,4

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 min.)	750 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Orange	UL3266 AWG20	Phase A
2	Orange/White		Phase A-
3	Black/White		Phase C-
4	Black		Phase C
5	Red		Phase B
6	Red/White		Phase B-
7	Yellow/White		Phase D -
8	Yellow		Phase D



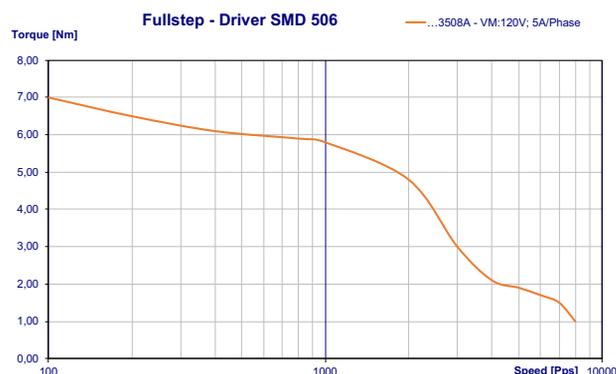


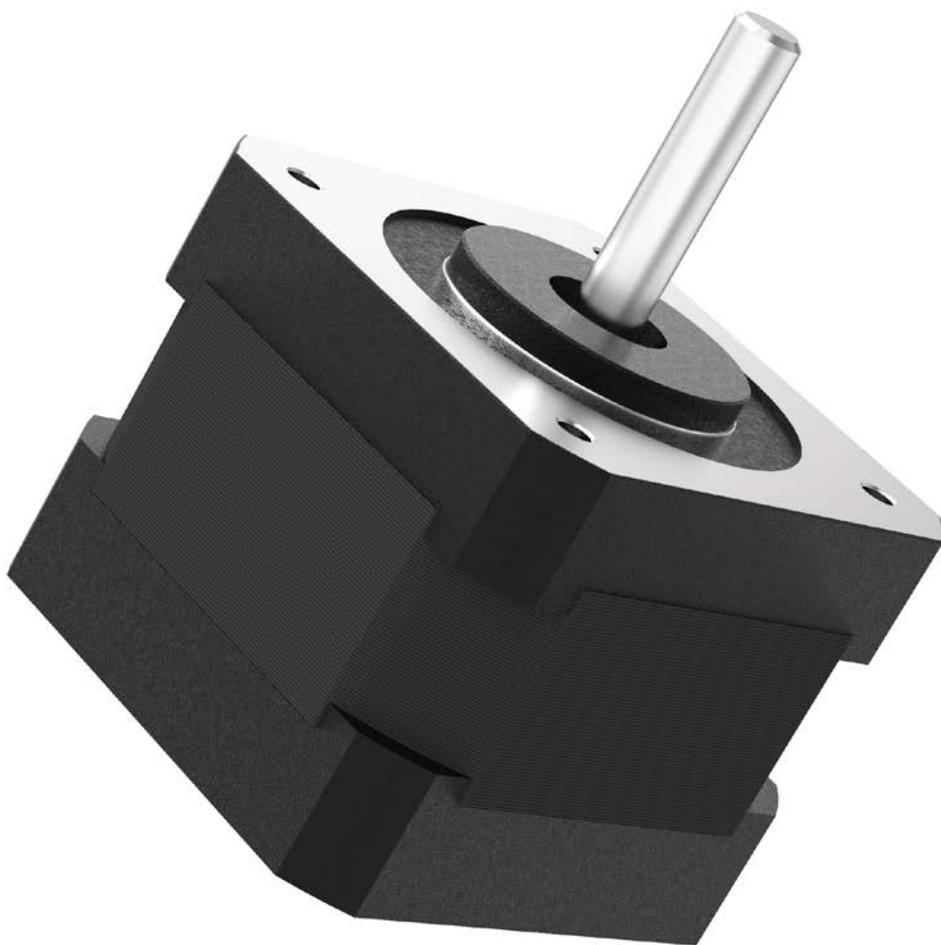
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		86S125-3508A			
Model		Unipolar	Parallel	Series	
1	Rated Voltage	V	4,97	3,47	6,95
2	Current/Phase	A	3,5	4,9	2,45
3	Resistance/Phase	Ω	1,42	0,71	2,84
4	Inductance/Phase	mH	7,9	7,9	31,6
5	Holding Torque	Nm	6,2	7,6	7,6
6	Rotor Inertia	gcm ²	1800	1800	1800
7	Detent Torque	Nm	0,23	0,23	0,23
8	n° of Leads		8	8	8
9	Length (L)	mm	125	125	125
10	Weight	Kg	3,6	3,6	3,6

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 min.)	750 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Orange	UL3266 AWG20	Phase A
2	Orange/White		Phase A-
3	Black/White		Phase C-
4	Black		Phase C
5	Red		Phase B
6	Red/White		Phase B-
7	Yellow/White		Phase D -
8	Yellow		Phase D





Hybrid Stepper motors

SH series - High Torque

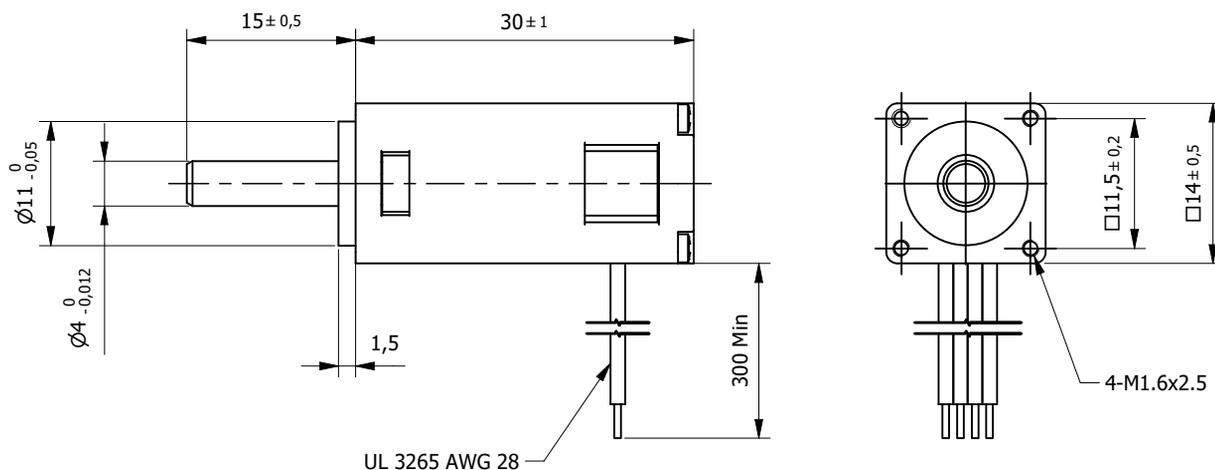
Hybrid Stepper motors - SH High Torque series	Torque* (Nm)	
14SH30	0,006	214
20SH	0,018...0,03	215
25SH23	0,033	216
28SH32	0,043...0,06	217
28SH45	0,075...0,095	218
28SH51	0,09...0,12	219
35SH	0,07...0,14	220
39SH20	0,065...0,08	221
39SH34	0,13...0,21	222
39SH38	0,2...0,29	223
42SH33	0,158...0,22	224
42SH38	0,259...0,36	225
42SH47	0,317...0,44	226
42SH60	0,65...0,8	227
42SH33M - step 0,9°	0,158...0,22	228
42SH38M - step 0,9°	0,259...0,36	229
42SH47M - step 0,9°	0,317...0,44	230
57SH41	0,39...0,55	231
57SH51	0,72...1,01	232
57SH56	0,9...1,26	233
57SH76	1,35...1,89	234
57SH41M - step 0,9°	0,39...0,55	235
57SH56M - step 0,9°	0,9...1,26	236
57SH76M - step 0,9°	1,35...1,8	237
60SH45	0,78...1,1	238
60SH56	1,17...1,65	239
60SH65	1,5...2,1	240
60SH86	2,2...3,1	241
86SH65	2,6...3,4	242
86SH80	4,6	243
86SH96	7,0	244
86SH118	8,7	245
86SH156	12,1	246
110SH	11,2...28	247

* Holding Torque

Hybrid Stepper Motor 14SH30

□ 14mm

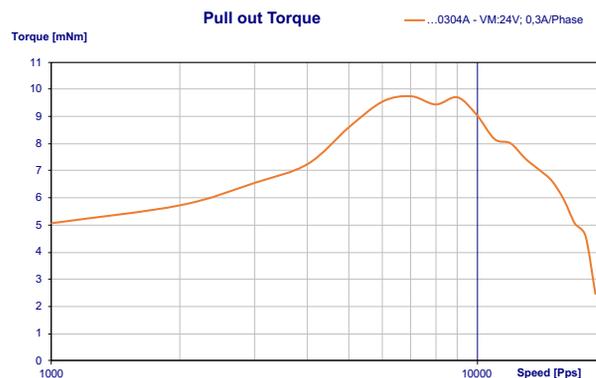
High Torque



Specification			
Model	...0304A		
1	Rated Voltage	V	6,3
2	Current/Phase	A	0,3
3	Resistance/Phase	Ω	21
4	Inductance/Phase	mH	4,2
5	Holding Torque	Nm	0,006
6	Rotor Inertia	gcm ²	5,8
7	n° of Leads		4
8	Length (L)	mm	30
9	Weight	Kg	0,03

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	$\pm 5\%$
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (4N load)	0,02mm
Max. Shaft Axial play (4N load)	0,08mm
Max. Radial Force (20mm from front flange)	3,9N
Max Axial Force	1N
Dielectric Strength (for 1 sec.)	300 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

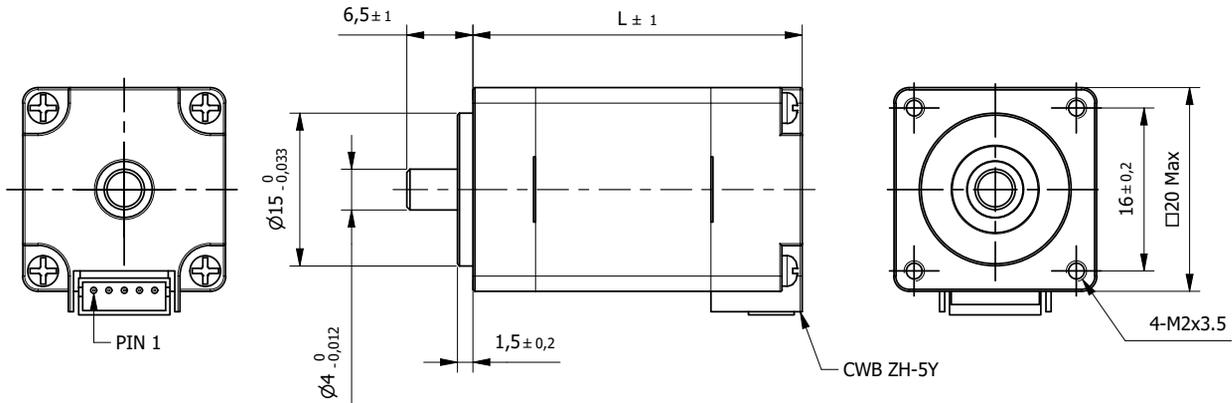
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL3265 AWG28	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 20SH

High Torque

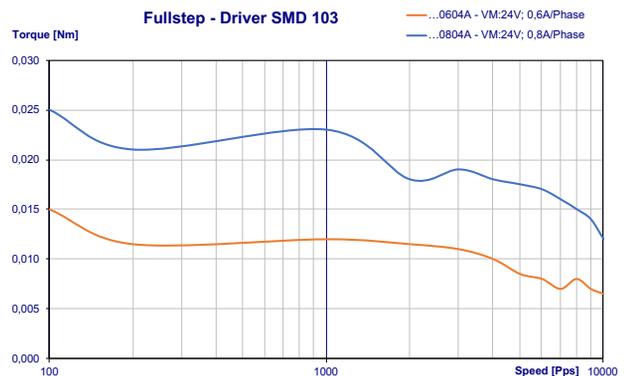
□ 20mm



Specification				
Model		...33-0604A	...42-0804A	
1	Rated Voltage	V	3,96	4,32
2	Current/Phase	A	0,6	0,8
3	Resistance/Phase	Ω	6,5	5,4
4	Inductance/Phase	mH	1,7	1,5
5	Holding Torque	Nm	0,018	0,03
6	Rotor Inertia	gcm ²	2	3,6
7	Detent Torque	Nm	0,002	0,002
8	n° of Leads		4	4
9	Length (L)	mm	33	42
10	Weight	Kg	0,06	0,08

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	10N
Max Axial Force	4N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

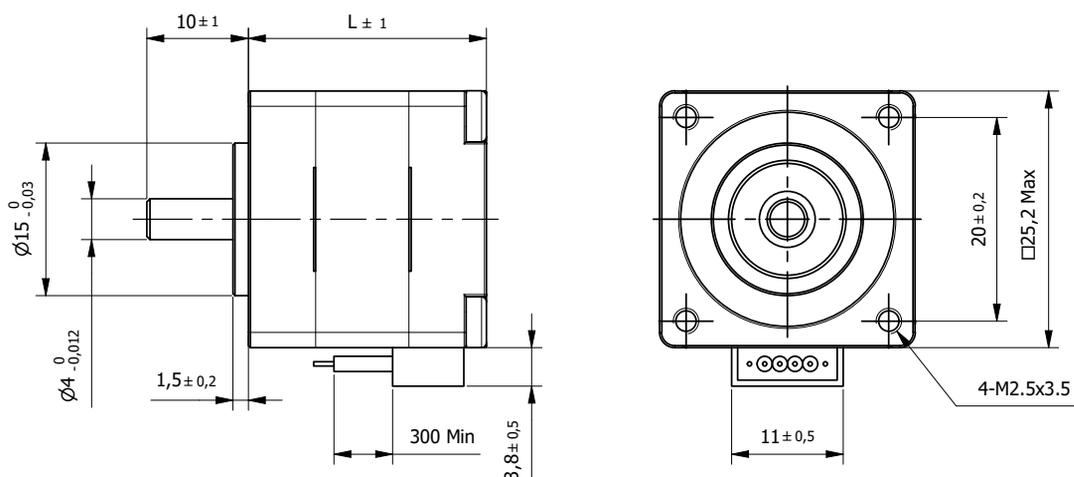
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG28	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 25SH23

High Torque

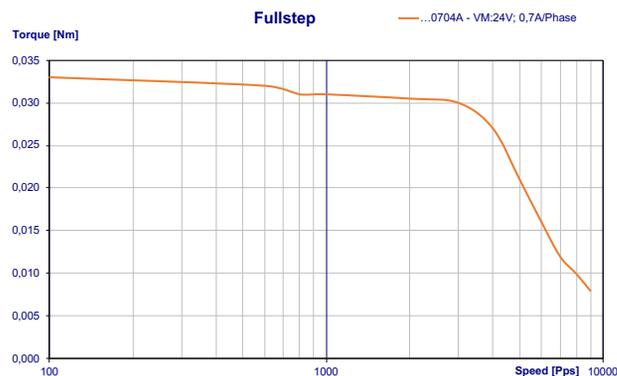
□ 25mm



Specification			
Model	...0704A		
1	Rated Voltage	V	3
2	Current/Phase	A	0,7
3	Resistance/Phase	Ω	4,3
4	Inductance/Phase	mH	2,4
5	Holding Torque	Nm	0,033
6	Rotor Inertia	gcm ²	2
7	Detent Torque	Nm	0,003
8	n° of Leads		4
9	Length (L)	mm	23
10	Weight	Kg	0,055

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

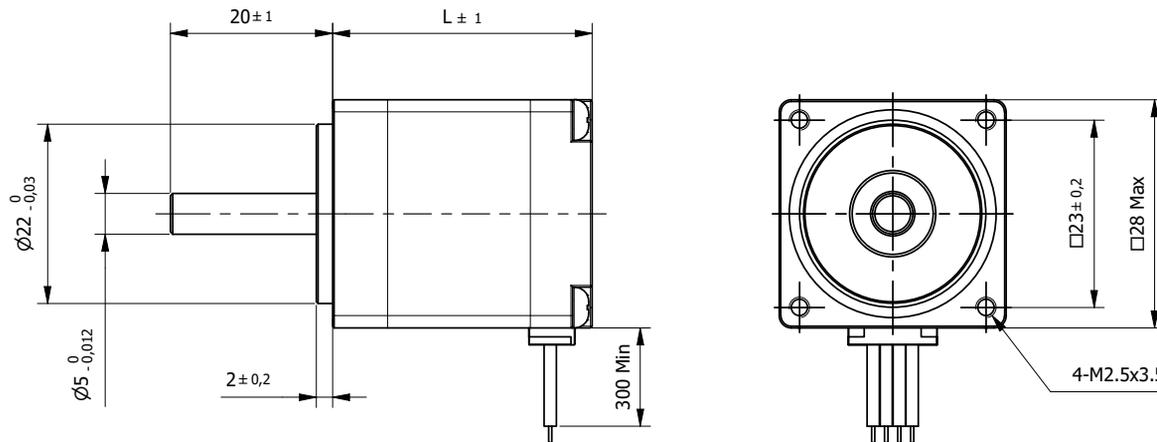
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG26	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-



Hybrid Stepper Motor 28SH32

High Torque

□ 28mm

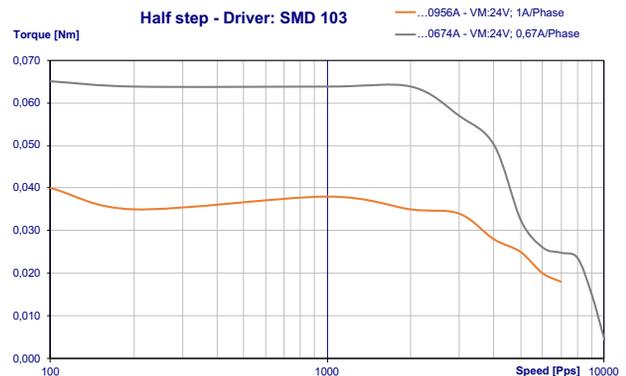


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification			...0956A	...0674A
1	Rated Voltage	V	2,66	3,8
2	Current/Phase	A	0,95	0,67
3	Resistance/Phase	Ω	2,8	5,6
4	Inductance/Phase	mH	0,8	3,4
5	Holding Torque	Nm	0,043	0,06
6	Rotor Inertia	gcm ²	9	9
7	Detent Torque	Nm	0,005	0,005
8	n° of Leads		6	4
9	Length (L)	mm	32	32
10	Weight	Kg	0,11	0,11

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (5mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

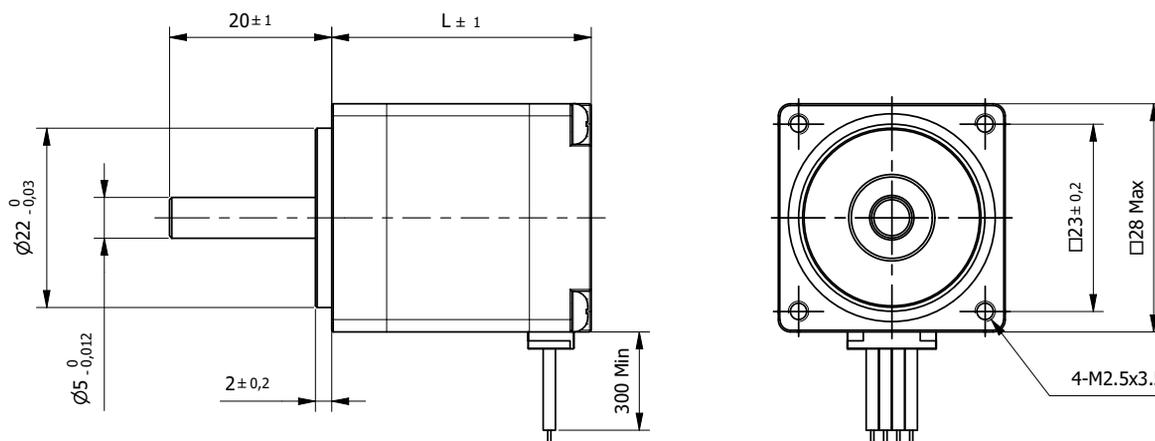
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 28SH45

□ 28mm

High Torque

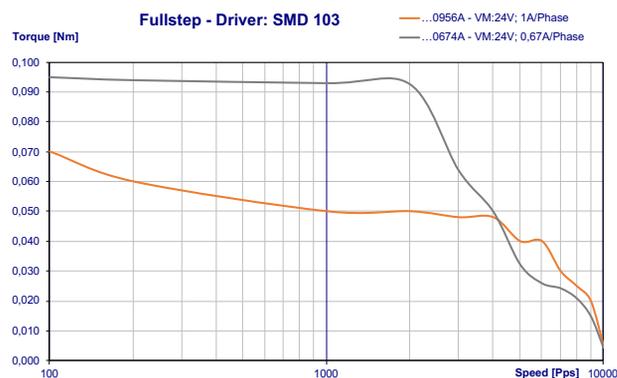


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification				
Model		...0956A	...0674A	
1	Rated Voltage	V	3,4	4,56
2	Current/Phase	A	0,95	0,67
3	Resistance/Phase	Ω	3,4	6,8
4	Inductance/Phase	mH	1,2	4,9
5	Holding Torque	Nm	0,075	0,095
6	Rotor Inertia	gcm ²	12	12
7	Detent Torque	Nm	0,006	0,006
8	n° of Leads		6	4
9	Length (L)	mm	45	45
10	Weight	Kg	0,14	0,14

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (5mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

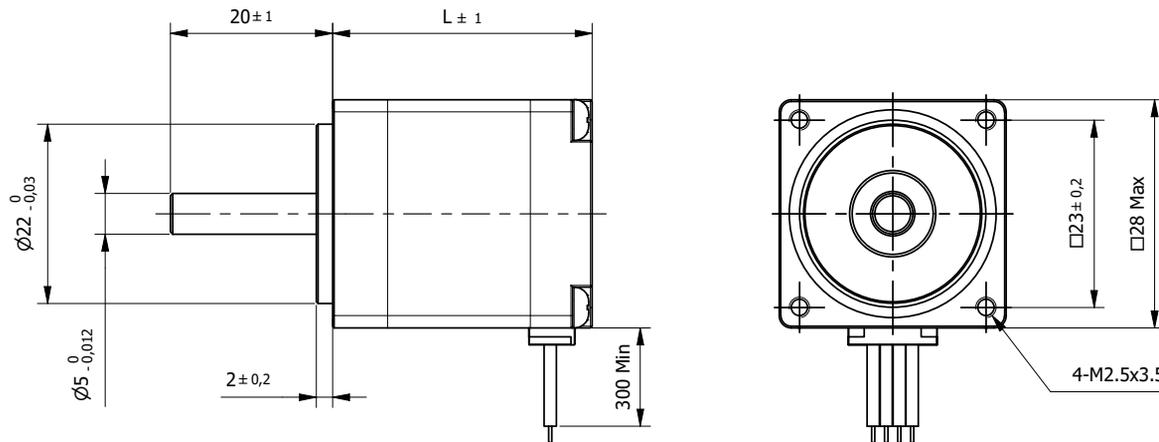
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



Hybrid Stepper Motor 28SH51

High Torque

□ 28mm

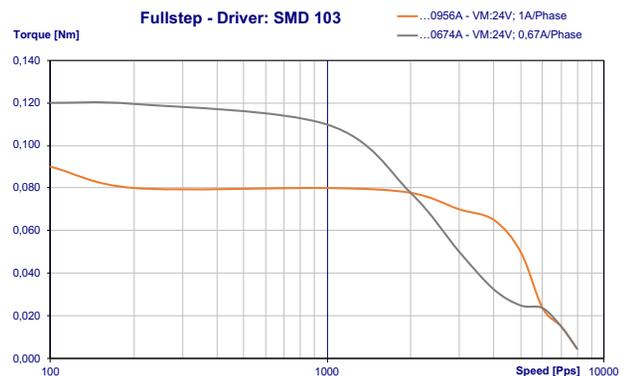


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification			...0956A	...0674A
1	Rated Voltage	V	4,4	6,2
2	Current/Phase	A	0,95	0,67
3	Resistance/Phase	Ω	4,6	9,2
4	Inductance/Phase	mH	1,8	7,2
5	Holding Torque	Nm	0,09	0,12
6	Rotor Inertia	gcm ²	18	18
7	Detent Torque	Nm	0,008	0,008
8	n° of Leads		6	4
9	Length (L)	mm	51	51
10	Weight	Kg	0,2	0,2

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (5mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

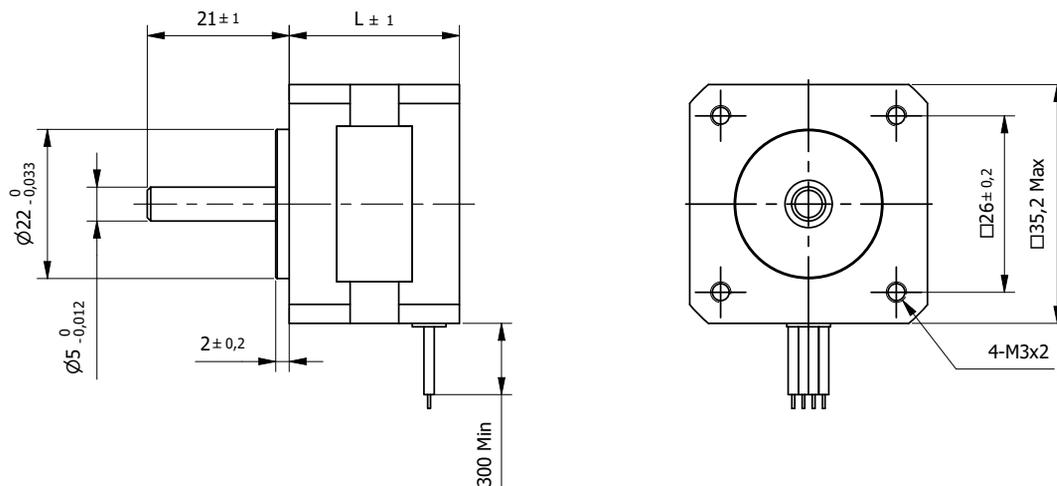
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 35SH

High Torque

□ 35mm

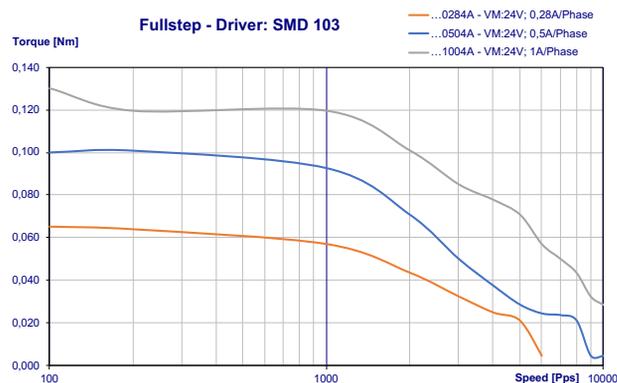


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification			...26-0284A	...28-0504A	...36-1004A
1	Rated Voltage	V	7,4	10	2,7
2	Current/Phase	A	0,28	0,5	1
3	Resistance/Phase	Ω	26	20	2,7
4	Inductance/Phase	mH	27	14	4,3
5	Holding Torque	Nm	0,07	0,1	0,14
6	Rotor Inertia	gcm ²	10	11	14
7	Detent Torque	Nm	0,006	0,008	0,01
8	n° of Leads		4	4	4
9	Length (L)	mm	26	28	36
10	Weight	Kg	0,13	0,14	0,18

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

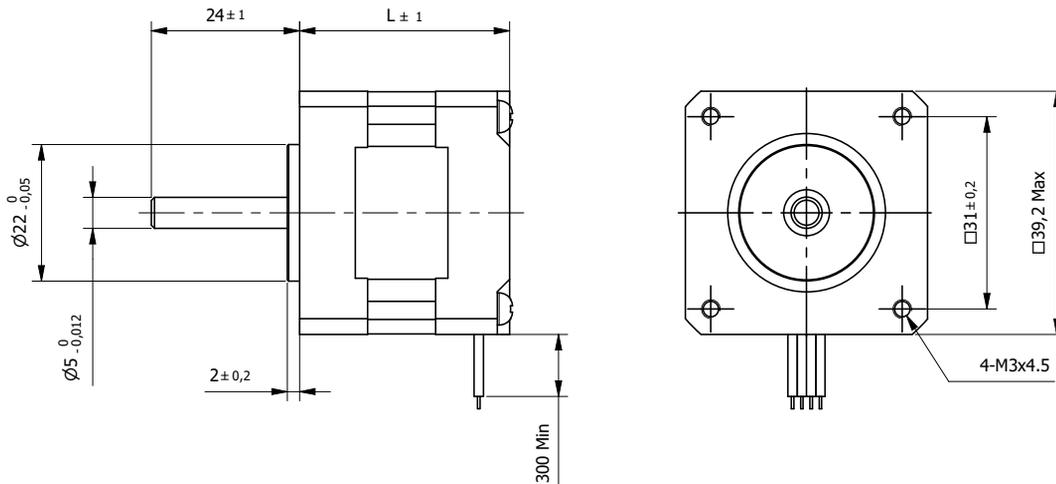
Connection				
Lead n°	Color	Gauge	Function	
1	Black	UL1430 AWG26	Phase A	
2	Green		Phase A-	
3	Red		Phase B	
4	Blue		Phase B-	



Hybrid Stepper Motor 39SH20

High Torque

□ 39mm

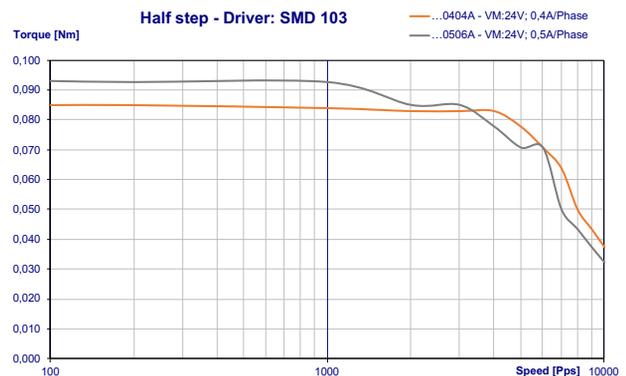


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification			...0404A	...0506A
1	Rated Voltage	V	2,64	6,5
2	Current/Phase	A	0,4	0,5
3	Resistance/Phase	Ω	6,6	13
4	Inductance/Phase	mH	6	6
5	Holding Torque	Nm	0,065	0,08
6	Rotor Inertia	gcm ²	11	11
7	Detent Torque	Nm	0,005	0,005
8	n° of Leads		4	4
9	Length (L)	mm	20	20
10	Weight	Kg	0,12	0,12

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

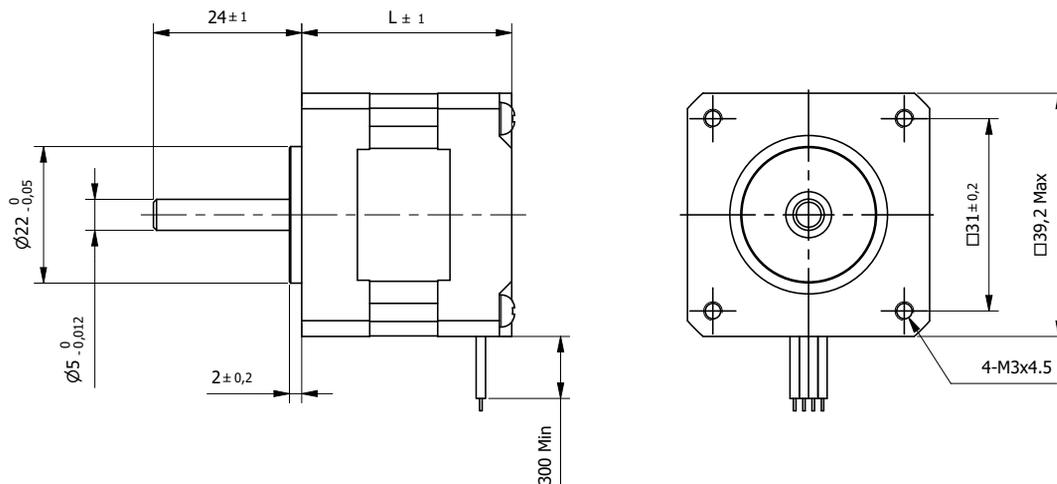
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1007 AWG28	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 39SH34

High Torque

□ 39mm

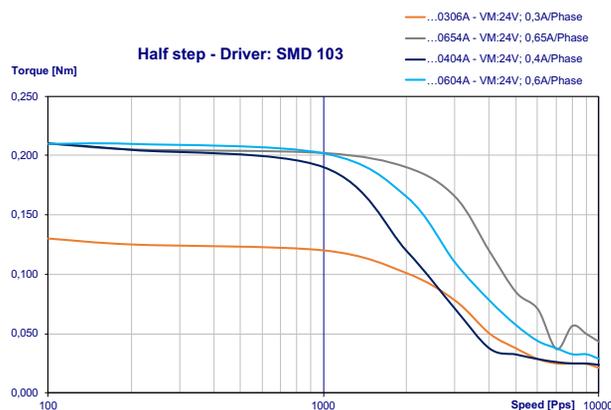


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification			...0306A	...0654A	...0404A	...0604A
1	Rated Voltage	V	12	4,55	12	9
2	Current/Phase	A	0,3	0,65	0,4	0,6
3	Resistance/Phase	Ω	40	7	30	15
4	Inductance/Phase	mH	20	9,3	43	16
5	Holding Torque	Nm	0,13	0,18	0,21	0,21
6	Rotor Inertia	gcm ²	20	20	20	20
7	Detent Torque	Nm	0,012	0,012	0,012	0,012
8	n° of Leads		6	4	4	4
9	Length (L)	mm	34	34	34	34
10	Weight	Kg	0,18	0,18	0,18	0,18

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

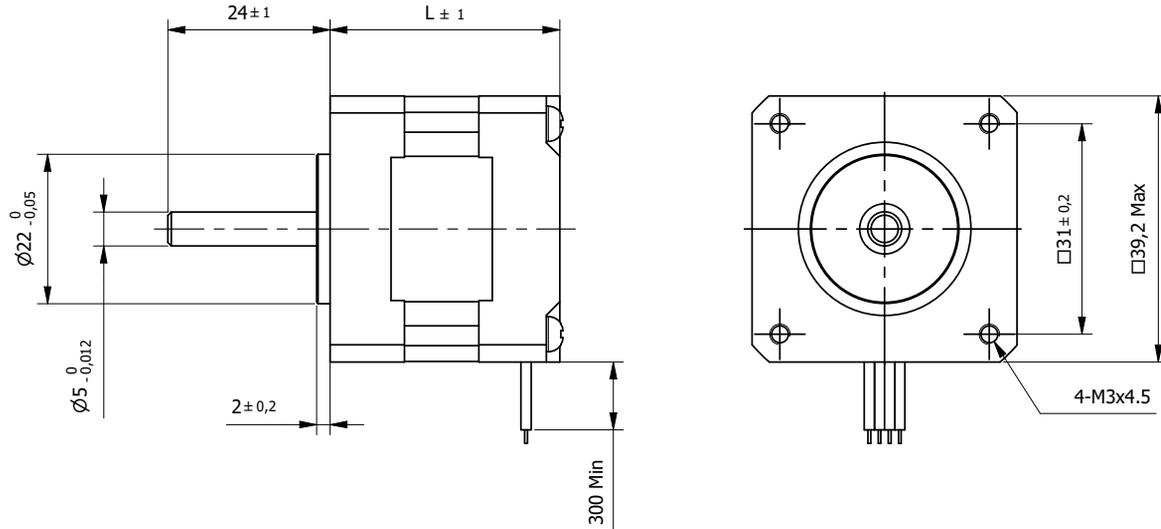
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 39SH38

High Torque

□ 39mm

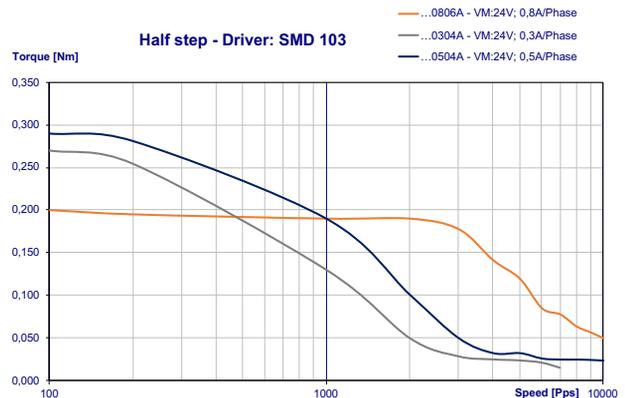


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification			...0806A	...0304A	...0504A
1	Rated Voltage	V	6	12	11
2	Current/Phase	A	0,8	0,3	0,5
3	Resistance/Phase	Ω	7,5	40	22
4	Inductance/Phase	mH	8	100	40
5	Holding Torque	Nm	0,2	0,28	0,29
6	Rotor Inertia	gcm ²	24	24	24
7	Detent Torque	Nm	0,018	0,018	0,018
8	n° of Leads		6	4	4
9	Length (L)	mm	38	38	38
10	Weight	Kg	0,2	0,2	0,2

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

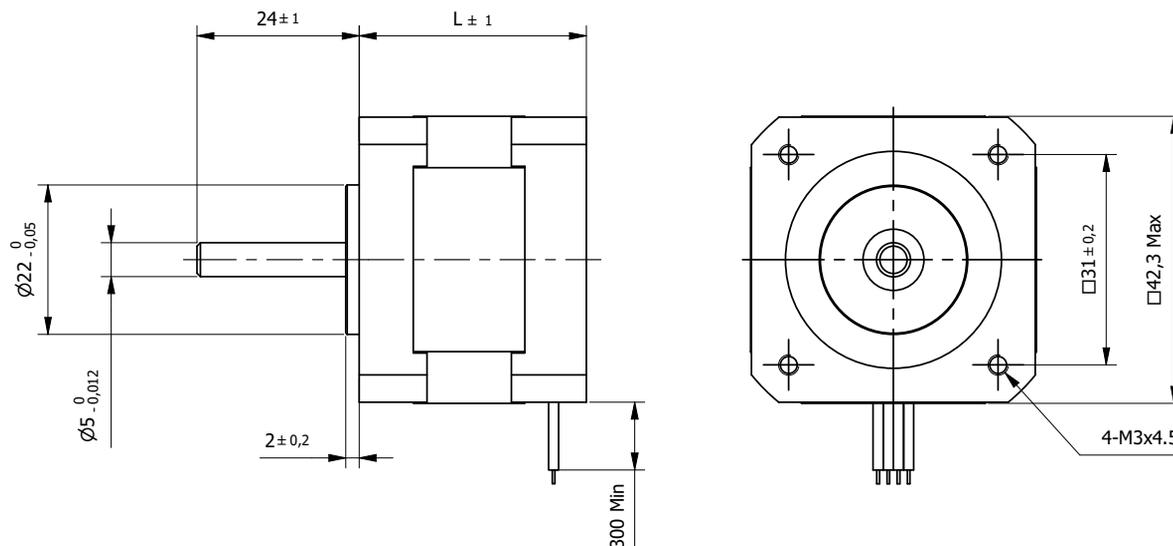
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH33

□ 42mm

High Torque

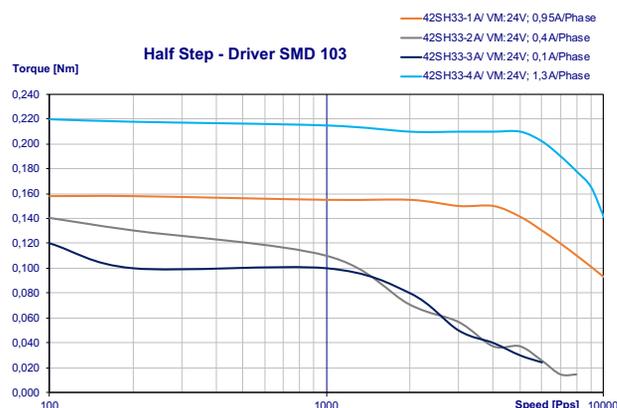


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification		42SH33-1A	42SH33-2A	42SH33-3A	42SH33-4A	
1	Rated Voltage	V	4	9,6	12	2,8
2	Current/Phase	A	0,95	0,4	0,31	1,33
3	Resistance/Phase	Ω	4,2	24	38,5	2,1
4	Inductance/Phase	mH	2,5	15	21	2,5
5	Holding Torque	Nm	0,158	0,158	0,158	0,22
6	Rotor Inertia	gcm ²	35	35	35	35
7	Detent Torque	Nm	0,012	0,012	0,012	0,012
8	n° of Leads		6	6	6	4
9	Length (L)	mm	33,5	33,5	33,5	33,5
10	Weight	Kg	0,22	0,22	0,22	0,22

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

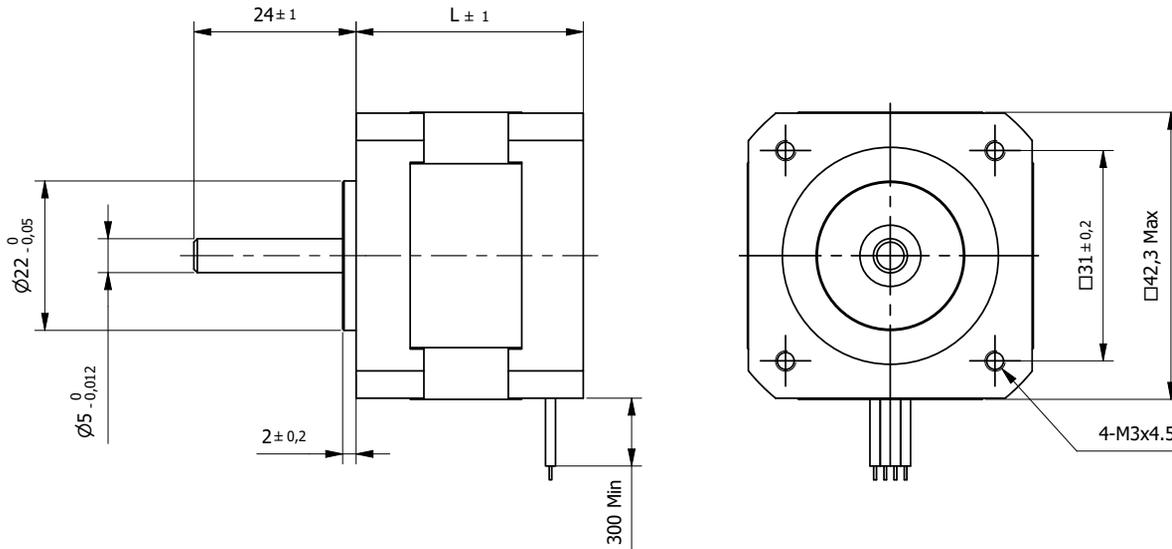
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH38

High Torque

□ 42mm

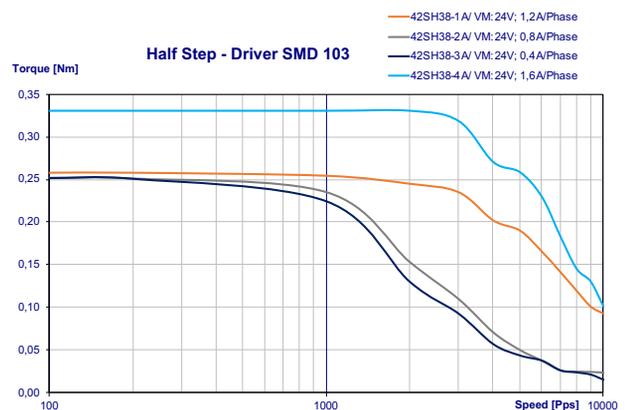


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification		42SH38-1A	42SH38-2A	42SH38-3A	42SH38-4A	
1	Rated Voltage	V	4	6	12	2,8
2	Current/Phase	A	1,2	0,8	0,4	1,68
3	Resistance/Phase	Ω	3,3	7,5	30	1,65
4	Inductance/Phase	mH	3,2	6,7	25	3,2
5	Holding Torque	Nm	0,259	0,259	0,259	0,36
6	Rotor Inertia	gcm ²	54	54	54	54
7	Detent Torque	Nm	0,015	0,015	0,015	0,015
8	n° of Leads		6	6	6	4
9	Length (L)	mm	39,5	39,5	39,5	39,5
10	Weight	Kg	0,28	0,28	0,28	0,28

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

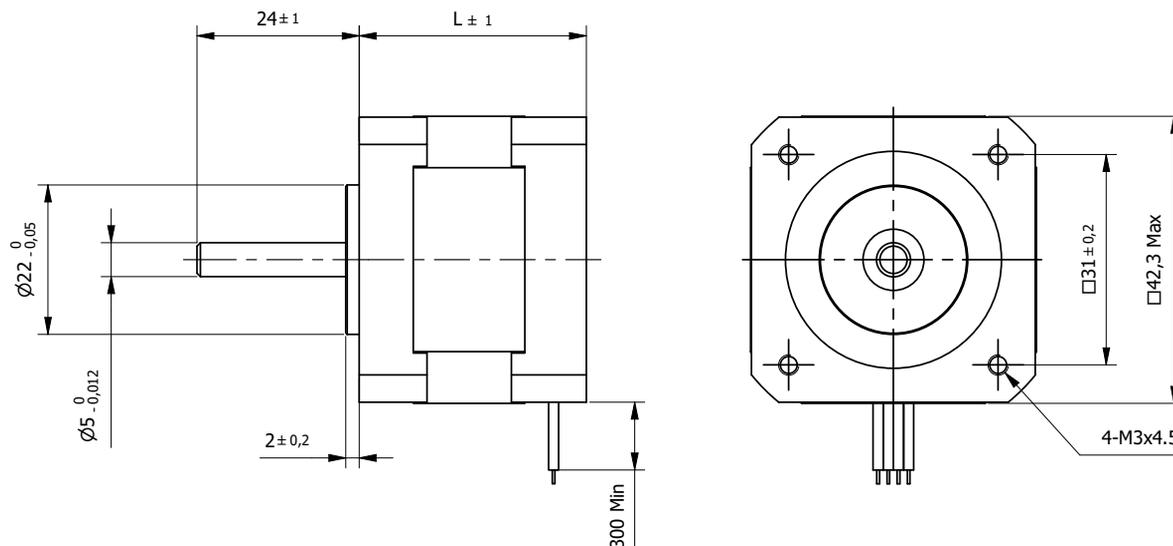
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH47

□ 42mm

High Torque

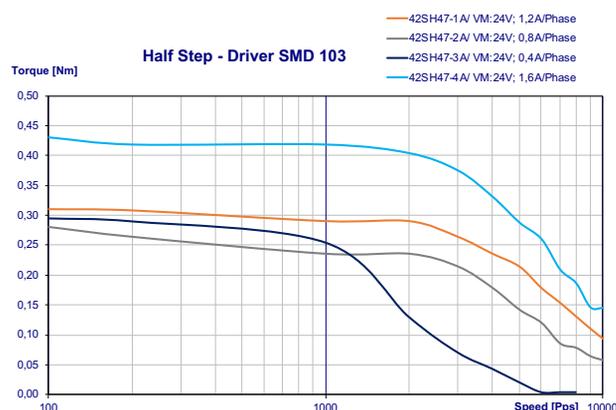


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification		42SH47-1A	42SH47-2A	42SH47-3A	42SH47-4A	
1	Rated Voltage	V	4	6	12	2,8
2	Current/Phase	A	1,2	0,8	0,4	1,68
3	Resistance/Phase	Ω	3,3	7,5	30	1,65
4	Inductance/Phase	mH	2,8	6,3	25	2,8
5	Holding Torque	Nm	0,317	0,317	0,317	0,44
6	Rotor Inertia	gcm ²	68	68	68	68
7	Detent Torque	Nm	0,02	0,02	0,02	0,02
8	n° of Leads		6	6	6	4
9	Length (L)	mm	47,5	47,5	47,5	47,5
10	Weight	Kg	0,35	0,35	0,35	0,35

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

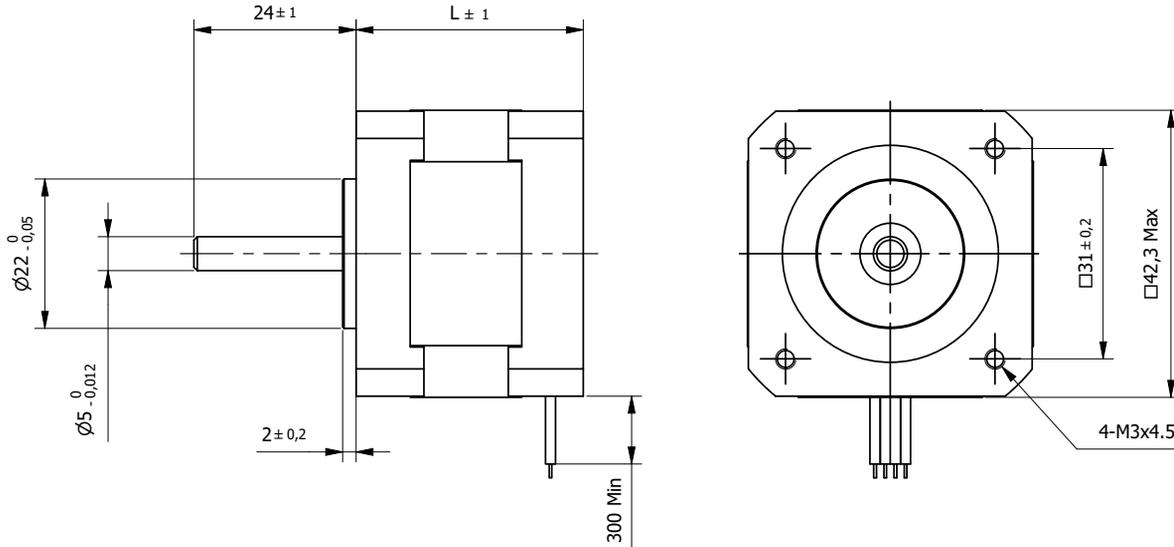
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



Hybrid Stepper Motor 42SH60

High Torque

□ 42mm

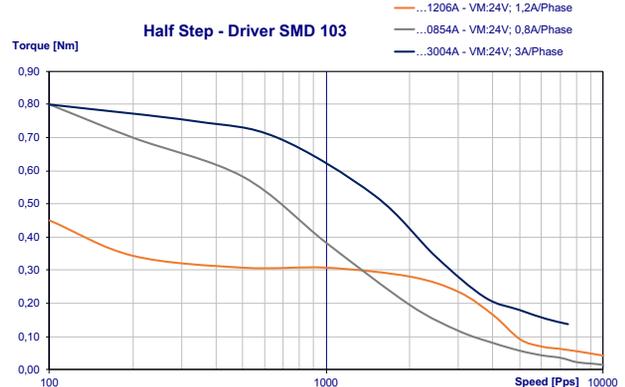


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification			...1206A	...0854A	...3004A
1	Rated Voltage	V	7,2	10,2	3,3
2	Current/Phase	A	1,2	0,85	3
3	Resistance/Phase	Ω	6	12	1,1
4	Inductance/Phase	mH	7	29	2,7
5	Holding Torque	Nm	0,65	0,8	0,8
6	Rotor Inertia	gcm ²	102	102	102
7	Detent Torque	Nm	0,028	0,028	0,028
8	n° of Leads		6	4	4
9	Length (L)	mm	60	60	60
10	Weight	Kg	0,5	0,5	0,5

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

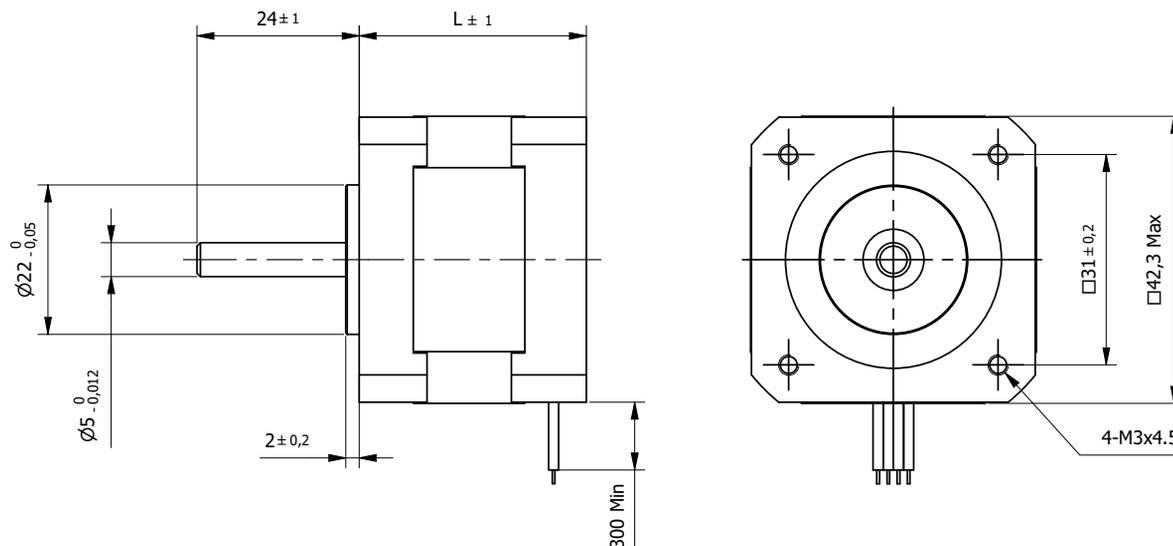
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH33M

□ 42mm

High Torque - step angle 0,9°

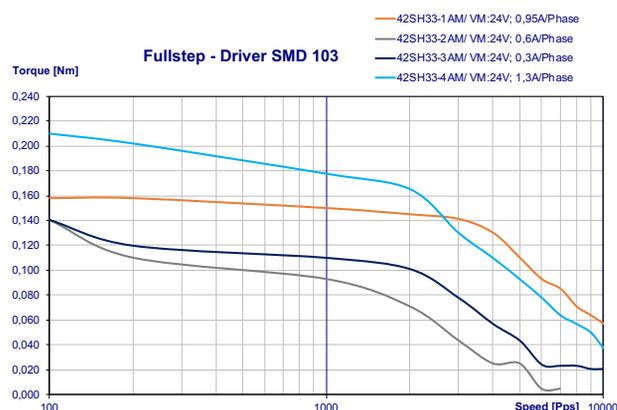


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification			42SH33-1AM	42SH33-2AM	42SH33-3AM	42SH33-4AM
1	Rated Voltage	V	4	6	12	2,8
2	Current/Phase	A	0,95	0,6	0,31	1,33
3	Resistance/Phase	Ω	4,2	10	38,5	2,1
4	Inductance/Phase	mH	4	11	33	4,2
5	Holding Torque	Nm	0,158	0,158	0,158	0,22
6	Rotor Inertia	gcm ²	35	35	35	35
7	Detent Torque	Nm	0,02	0,02	0,02	0,02
8	n° of Leads		6	6	6	4
9	Length (L)	mm	33,5	33,5	33,5	33,5
10	Weight	Kg	0,22	0,22	0,22	0,22

Characteristics	
Item	
Step angle	0,9°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

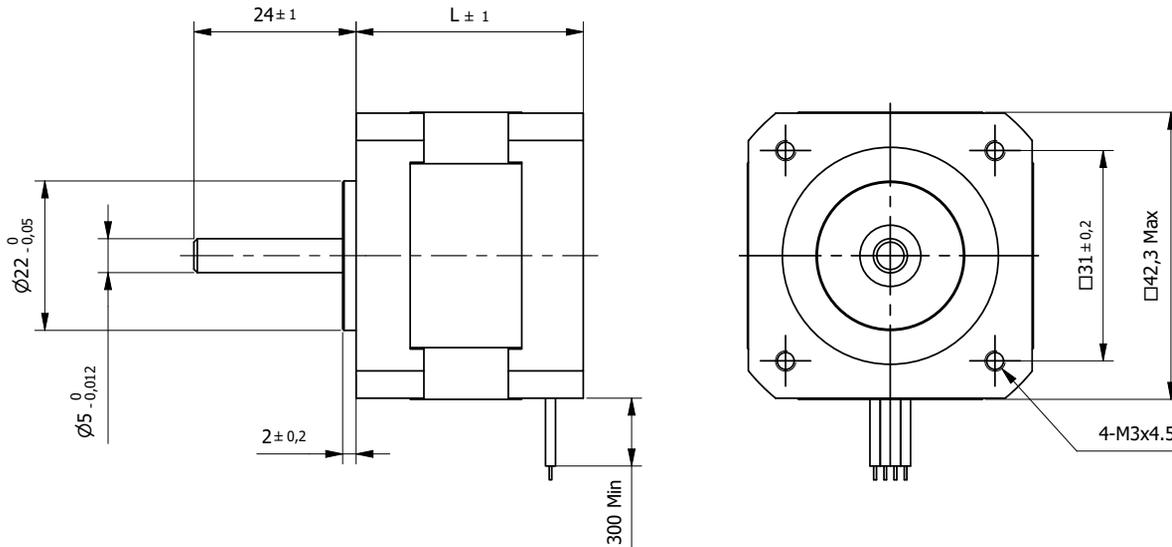
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



Hybrid Stepper Motor 42SH38M

□ 42mm

High Torque - step angle 0,9°

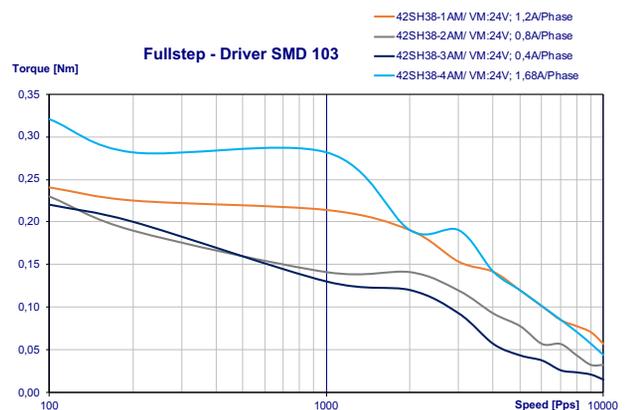


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification		42SH38-1AM	42SH38-2AM	42SH38-3AM	42SH38-4AM	
1	Rated Voltage	V	4	6	12	2,8
2	Current/Phase	A	1,2	0,8	0,4	1,68
3	Resistance/Phase	Ω	3,3	7,5	30	1,65
4	Inductance/Phase	mH	4,1	8,3	30	4,1
5	Holding Torque	Nm	0,259	0,259	0,259	0,36
6	Rotor Inertia	gcm ²	54	54	54	54
7	Detent Torque	Nm	0,022	0,022	0,022	0,022
8	n° of Leads		6	6	6	4
9	Length (L)	mm	39,5	39,5	39,5	39,5
10	Weight	Kg	0,28	0,28	0,28	0,28

Characteristics	
Item	
Step angle	0,9°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

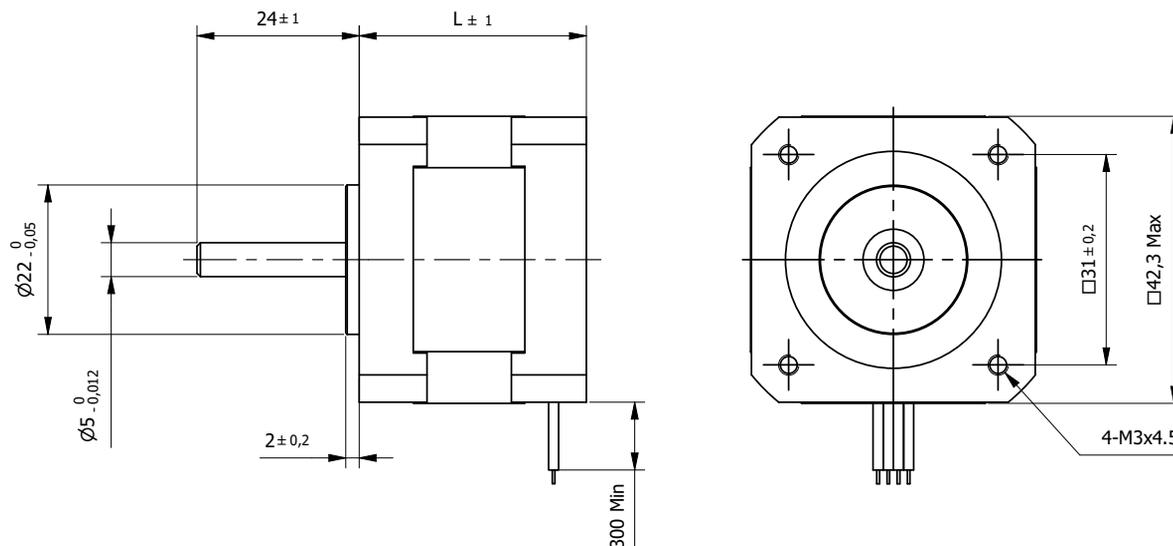
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH47M

□ 42mm

High Torque - step angle 0,9°

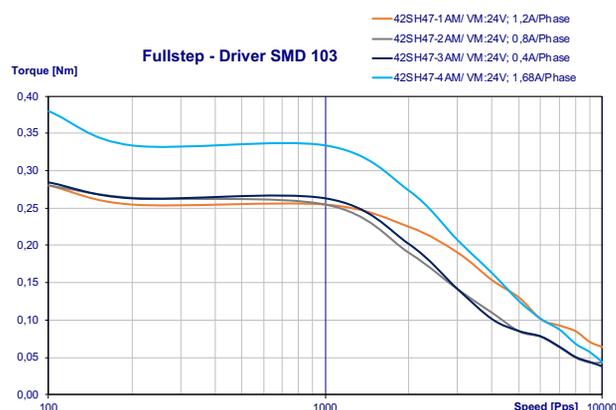


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification			42SH47-1AM	42SH47-2AM	42SH47-3AM	42SH47-4AM
1	Rated Voltage	V	4	6	12	2,8
2	Current/Phase	A	1,2	0,8	0,4	1,68
3	Resistance/Phase	Ω	3,3	7,5	30	1,65
4	Inductance/Phase	mH	4,9	110	43	50
5	Holding Torque	Nm	0,317	0,317	0,317	0,44
6	Rotor Inertia	gcm ²	68	68	68	68
7	Detent Torque	Nm	0,02	0,02	0,02	0,02
8	n° of Leads		6	6	6	4
9	Length (L)	mm	47,5	47,5	47,5	47,5
10	Weight	Kg	0,35	0,35	0,35	0,35

Characteristics	
Item	
Step angle	0,9°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

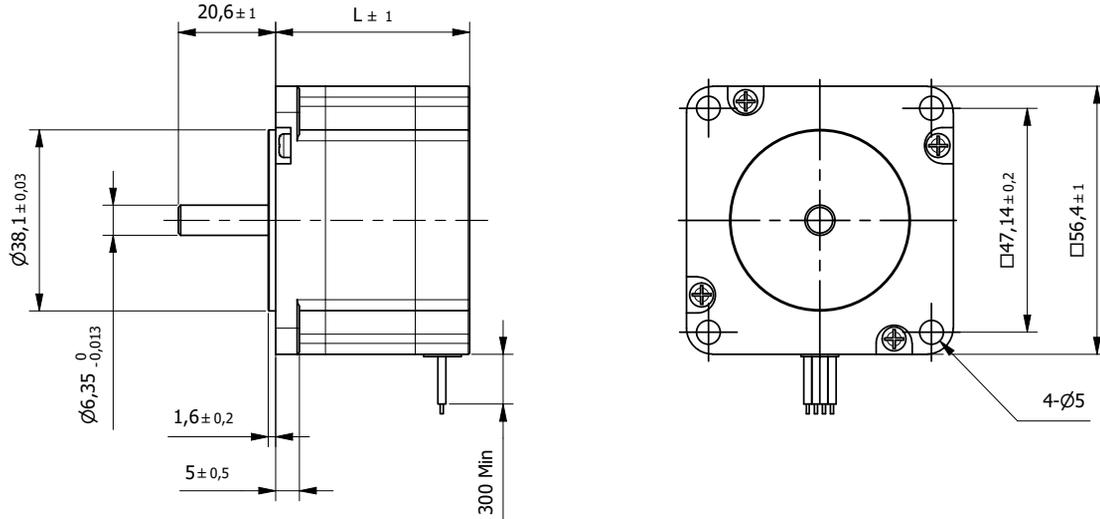
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



Hybrid Stepper Motor 57SH41

High Torque

□ 57mm

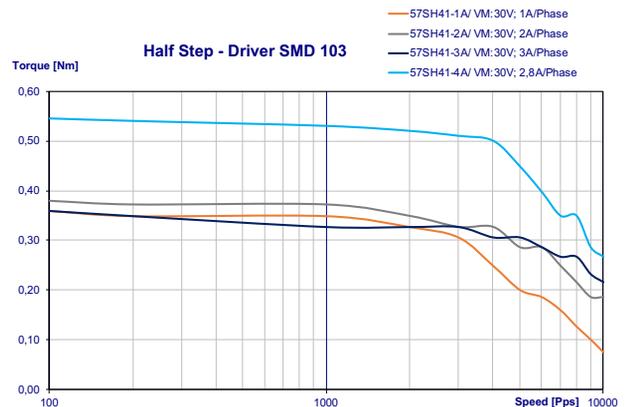


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57SH41-1A	57SH41-2A	57SH41-3A	57SH41-4A	
1	Rated Voltage	V	5,7	2,8	1,9	2
2	Current/Phase	A	1	2	3	2,8
3	Resistance/Phase	Ω	5,7	1,4	0,63	0,7
4	Inductance/Phase	mH	5,4	1,4	0,6	1,4
5	Holding Torque	Nm	0,39	0,39	0,39	0,55
6	Rotor Inertia	gcm ²	120	120	120	120
7	Detent Torque	Nm	0,021	0,021	0,021	0,021
8	n° of Leads		6	6	6	4
9	Length (L)	mm	41	41	41	41
10	Weight	Kg	0,45	0,45	0,45	0,45

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B

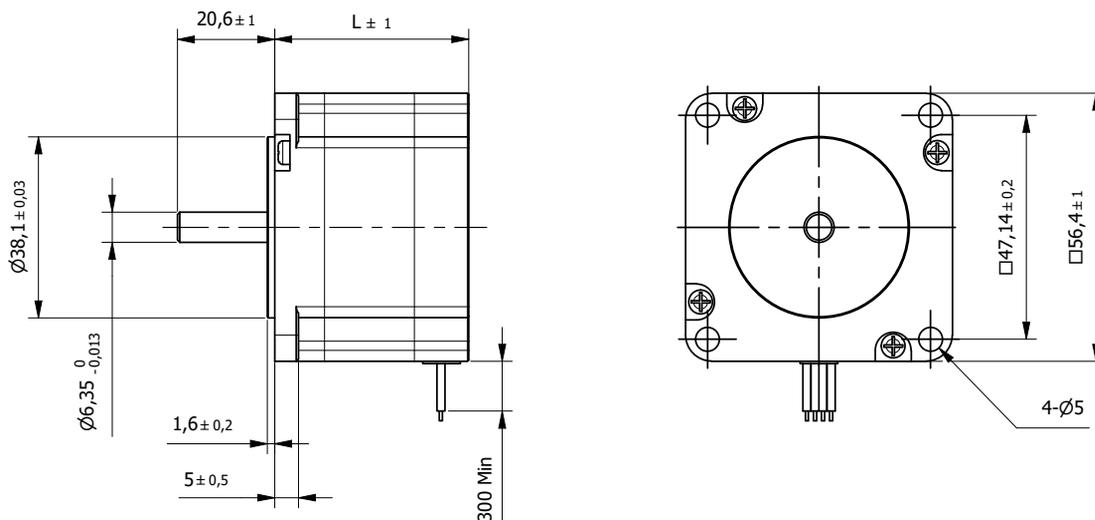


Stepper

Hybrid Stepper Motor 57SH51

High Torque

□ 57mm

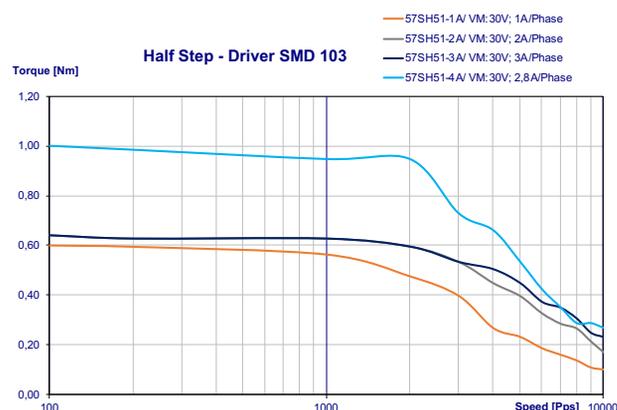


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57SH51-1A	57SH51-2A	57SH51-3A	57SH51-4A	
1	Rated Voltage	V	6,6	3,3	2,2	2,3
2	Current/Phase	A	1	2	3	2,8
3	Resistance/Phase	Ω	6,6	1,65	0,74	0,83
4	Inductance/Phase	mH	8,2	2,2	0,9	2,2
5	Holding Torque	Nm	0,72	0,72	0,72	1,01
6	Rotor Inertia	gcm ²	275	275	275	275
7	Detent Torque	Nm	0,036	0,036	0,036	0,036
8	n° of Leads		6	6	6	4
9	Length (L)	mm	51	51	51	51
10	Weight	Kg	0,65	0,65	0,65	0,65

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

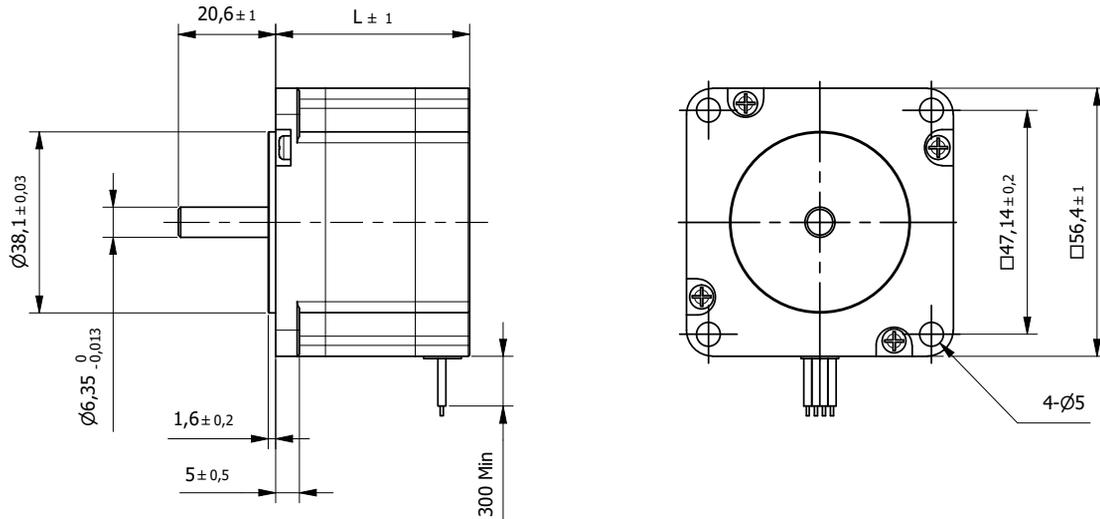
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



Hybrid Stepper Motor 57SH56

High Torque

□ 57mm

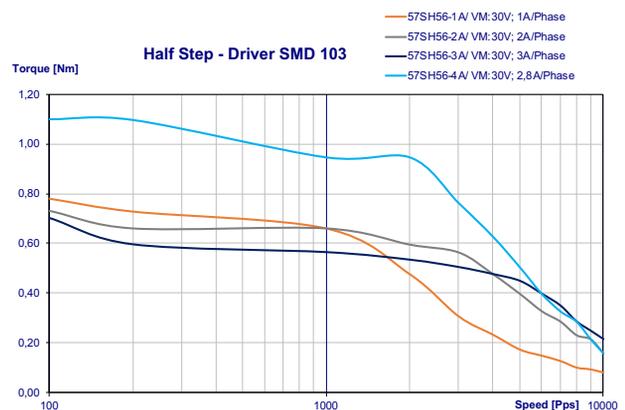


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57SH56-1A	57SH56-2A	57SH56-3A	57SH56-4A	
1	Rated Voltage	V	7,4	3,6	2,3	2,5
2	Current/Phase	A	1	2	3	2,8
3	Resistance/Phase	Ω	7,4	1,8	0,75	0,9
4	Inductance/Phase	mH	10	2,5	1,1	2,5
5	Holding Torque	Nm	0,9	0,9	0,9	1,26
6	Rotor Inertia	gcm ²	300	300	300	300
7	Detent Torque	Nm	0,04	0,04	0,04	0,04
8	n° of Leads		6	6	6	4
9	Length (L)	mm	56	56	56	56
10	Weight	Kg	0,7	0,7	0,7	0,7

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B

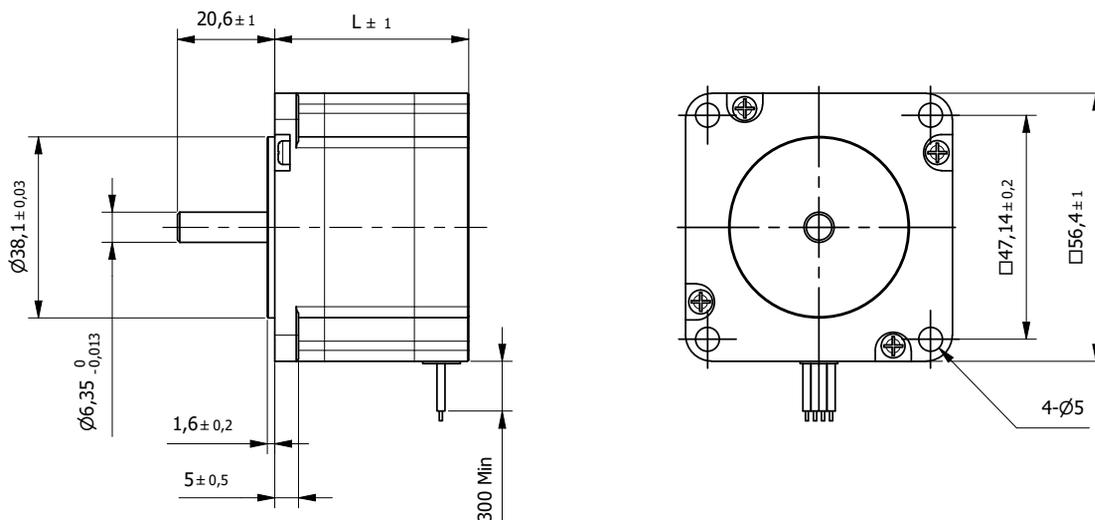


Stepper

Hybrid Stepper Motor 57SH76

High Torque

□ 57mm

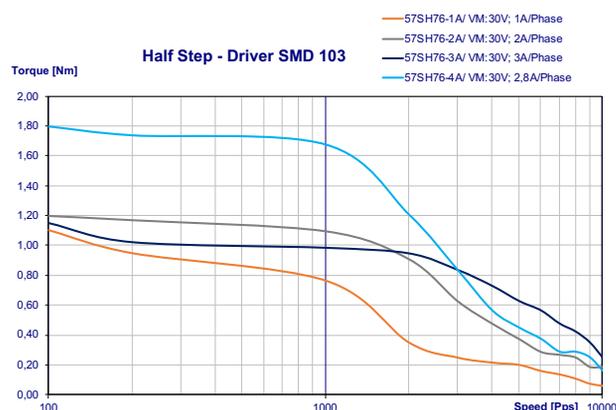


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57SH76-1A	57SH76-2A	57SH76-3A	57SH76-4A	
1	Rated Voltage	V	8,6	4,5	3	3,2
2	Current/Phase	A	1	2	3	2,8
3	Resistance/Phase	Ω	8,6	2,25	1	1,13
4	Inductance/Phase	mH	14	3,6	1,6	3,6
5	Holding Torque	Nm	1,35	1,35	1,35	1,89
6	Rotor Inertia	gcm ²	480	480	480	480
7	Detent Torque	Nm	0,068	0,068	0,068	0,068
8	n° of Leads		6	6	6	4
9	Length (L)	mm	76	76	76	76
10	Weight	Kg	1	1	1	1

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

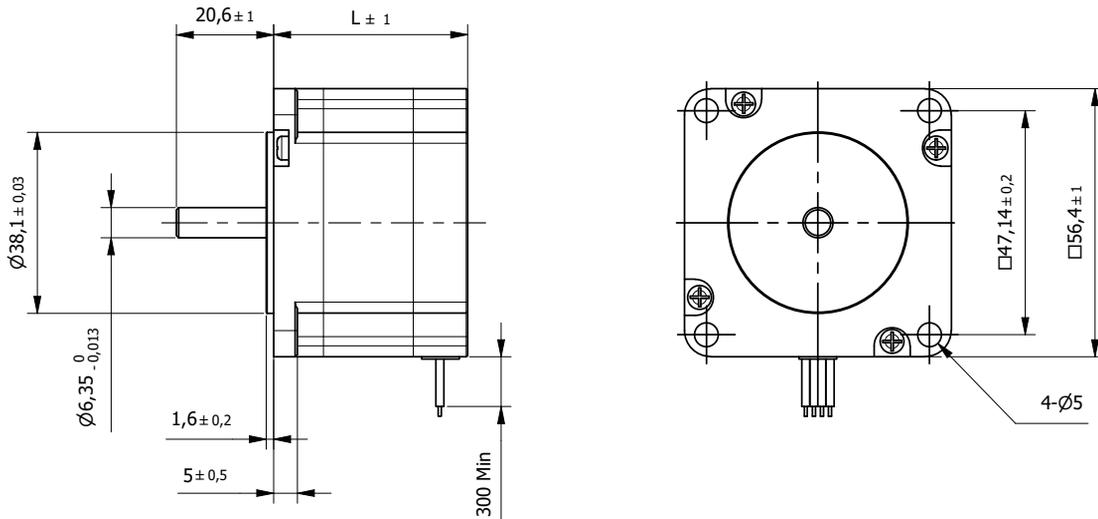
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



Hybrid Stepper Motor 57SH41M

□ 57mm

High Torque - step angle 0,9°



BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57SH41-1AM	57SH41-2AM	57SH41-3AM	57SH41-4AM	
1	Rated Voltage	V	5,7	2,8	1,9	2
2	Current/Phase	A	1	2	3	2,8
3	Resistance/Phase	Ω	5,7	1,4	0,63	0,7
4	Inductance/Phase	mH	8	2,2	1	2,2
5	Holding Torque	Nm	0,39	0,39	0,39	0,55
6	Rotor Inertia	gcm ²	120	120	120	120
7	Detent Torque	Nm	0,021	0,021	0,021	0,021
8	n° of Leads		6	6	6	4
9	Length (L)	mm	41	41	41	41
10	Weight	Kg	0,45	0,45	0,45	0,45

Characteristics	
Item	
Step angle	0,9°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B

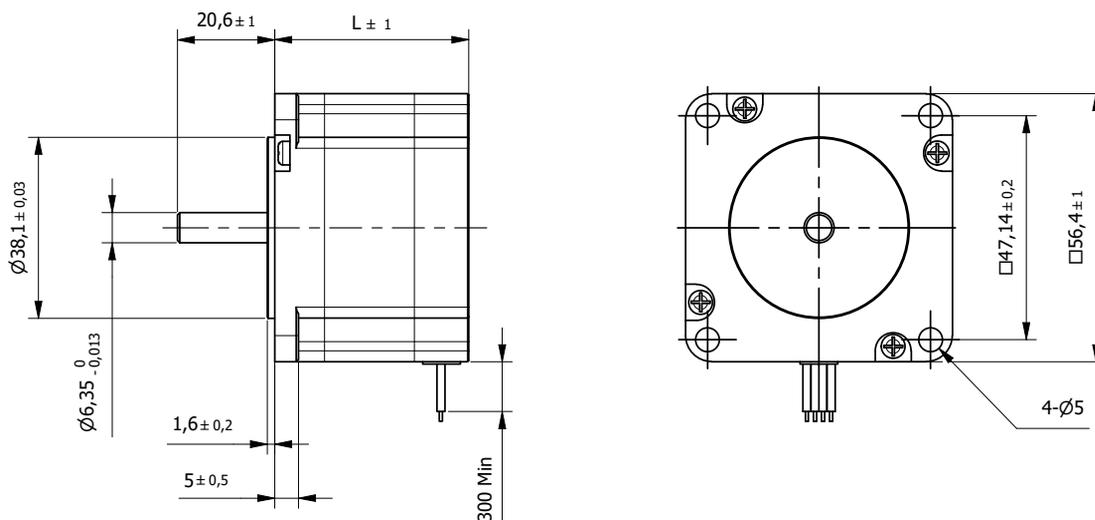


Stepper

Hybrid Stepper Motor 57SH56M

□ 57mm

High Torque - step angle 0,9°

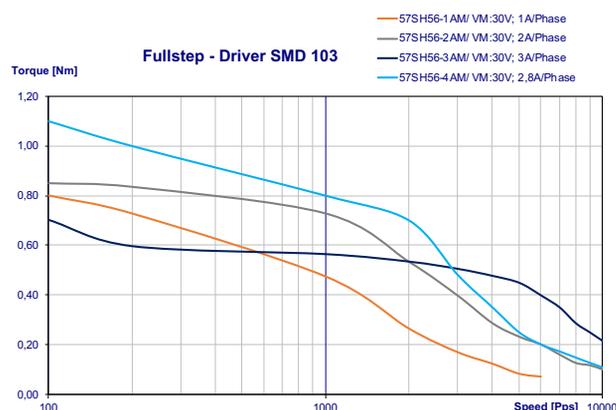


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			57SH56-1AM	57SH56-2AM	57SH56-3AM	57SH56-4AM
1	Rated Voltage	V	7,4	3,6	2,3	2,5
2	Current/Phase	A	1	2	3	2,8
3	Resistance/Phase	Ω	7,4	1,8	0,75	0,9
4	Inductance/Phase	mH	17,5	4,5	1,9	4,5
5	Holding Torque	Nm	0,9	0,9	0,9	1,26
6	Rotor Inertia	gcm ²	300	300	300	300
7	Detent Torque	Nm	0,04	0,04	0,04	0,04
8	n° of Leads		6	6	6	4
9	Length (L)	mm	56	56	56	56
10	Weight	Kg	0,7	0,7	0,7	0,7

Characteristics	
Item	
Step angle	0,9°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

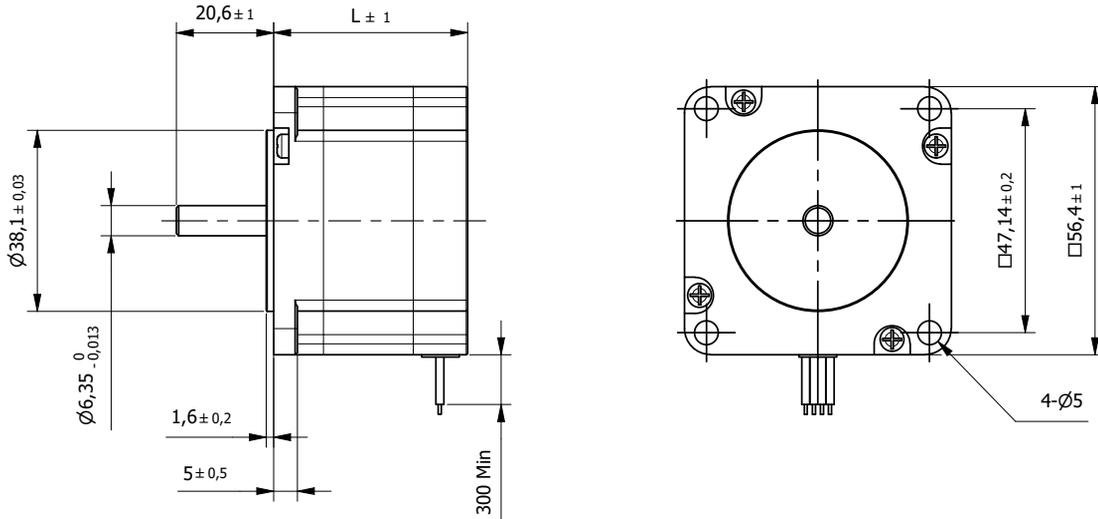
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green	|	Phase A-
3	Red	|	Phase B
4	Blue	|	Phase B-
Unipolar motor			
5	Yellow	|	COM Phase A
6	White	|	COM Phase B



Hybrid Stepper Motor 57SH76M

High Torque - step angle 0,9°

□ 57mm

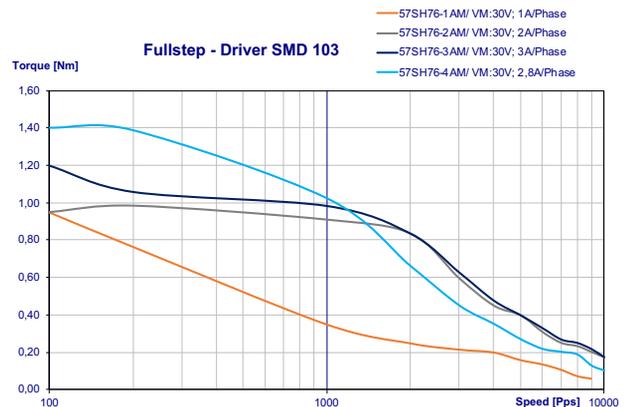


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		57SH76-1AM	57SH76-2AM	57SH76-3AM	57SH76-4AM	
1	Rated Voltage	V	8,6	4,5	3	3,2
2	Current/Phase	A	1	2	3	2,8
3	Resistance/Phase	Ω	8,6	2,25	1	1,13
4	Inductance/Phase	mH	23	5,6	2,6	5,6
5	Holding Torque	Nm	1,35	1,35	1,35	1,8
6	Rotor Inertia	gcm ²	480	480	480	480
7	Detent Torque	Nm	0,068	0,068	0,068	0,068
8	n° of Leads		6	6	6	4
9	Length (L)	mm	76	76	76	76
10	Weight	Kg	1	1	1	1

Characteristics	
Item	
Step angle	0,9°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

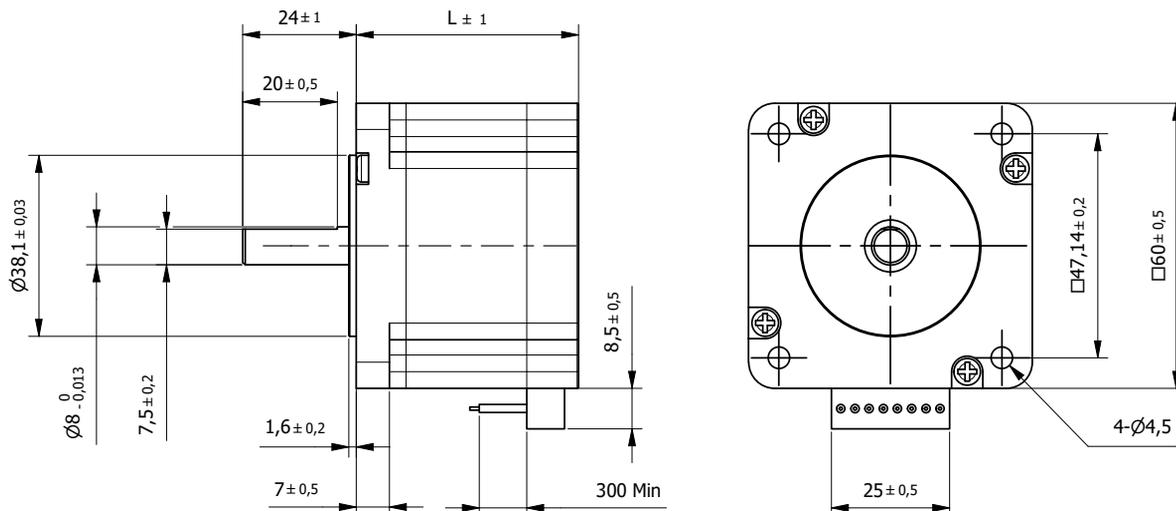
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 60SH45

□ 60mm

High Torque

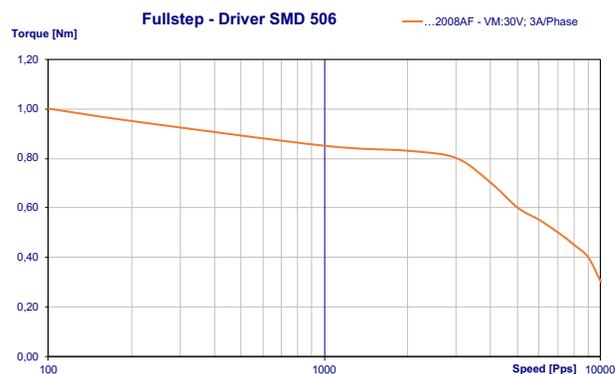


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		60SH45-2008AF		
Model		Unipolar	Parallel	Series
1	Rated Voltage	V	3	2,1
2	Current/Phase	A	2	2,8
3	Resistance/Phase	Ω	1,5	0,75
4	Inductance/Phase	mH	2	2
5	Holding Torque	Nm	0,78	1,1
6	Rotor Inertia	gcm ²	275	275
7	Detent Torque	Nm	0,05	0,05
8	n° of Leads		8	8
9	Length (L)	mm	45	45
10	Weight	Kg	0,6	0,6

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

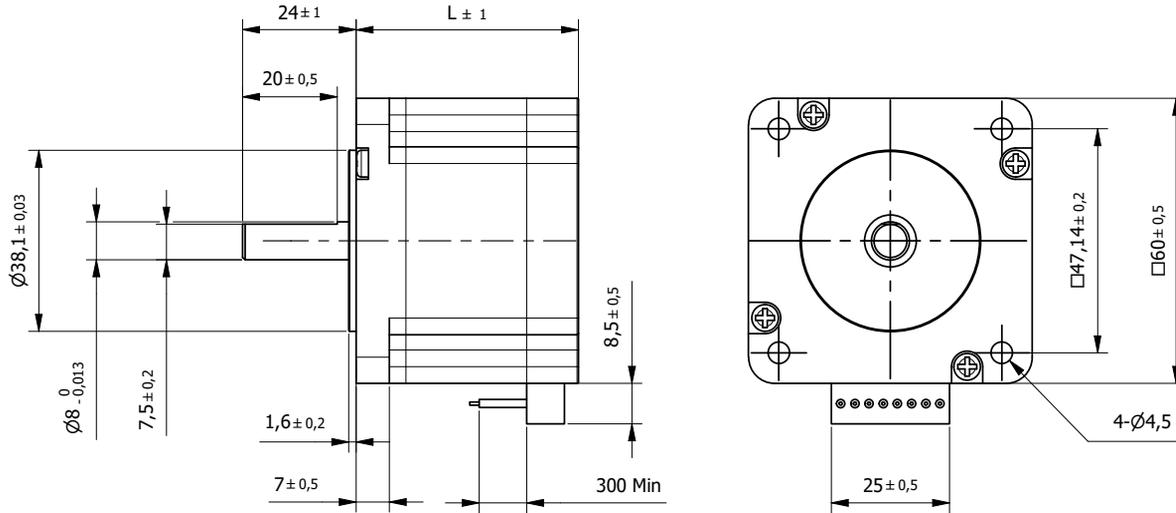
Connection			
Lead n°	Color	Gauge	Function
1	Blue/White	UL1430 AWG22	Phase A
2	Blue		Phase A-
3	Red/White		Phase C-
4	Red		Phase C
5	Green/White		Phase B
6	Green		Phase B-
7	Black/White		Phase D -
8	Black		Phase D



Hybrid Stepper Motor 60SH56

□ 60mm

High Torque

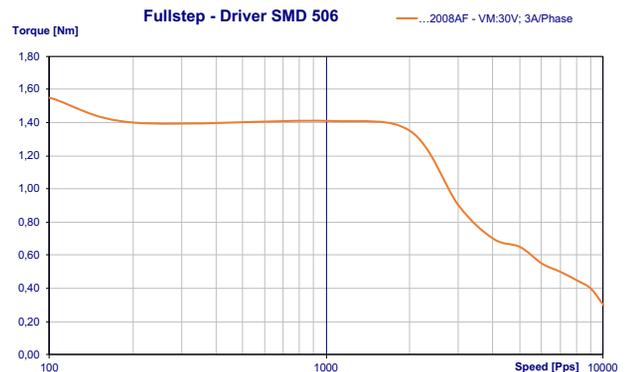


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		60SH56-2008AF			
Model		Unipolar	Parallel	Series	
1	Rated Voltage	V	3,6	2,52	5,04
2	Current/Phase	A	2	2,8	1,4
3	Resistance/Phase	Ω	1,8	0,9	3,6
4	Inductance/Phase	mH	3,6	3,6	14,4
5	Holding Torque	Nm	1,17	1,65	1,65
6	Rotor Inertia	gcm ²	400	400	400
7	Detent Torque	Nm	0,07	0,07	0,07
8	n° of Leads		8	8	8
9	Length (L)	mm	56	56	56
10	Weight	Kg	0,77	0,77	0,77

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Blue/White	UL1430 AWG22	Phase A
2	Blue		Phase A-
3	Red/White		Phase C-
4	Red		Phase C
5	Green/White		Phase B
6	Green		Phase B-
7	Black/White		Phase D -
8	Black		Phase D

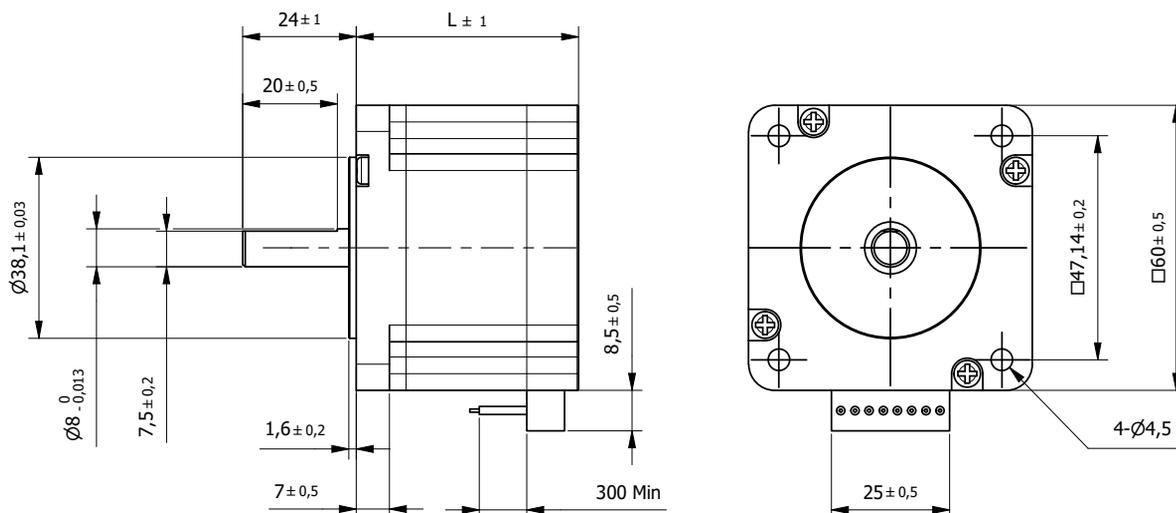


Stepper

Hybrid Stepper Motor 60SH65

□ 60mm

High Torque

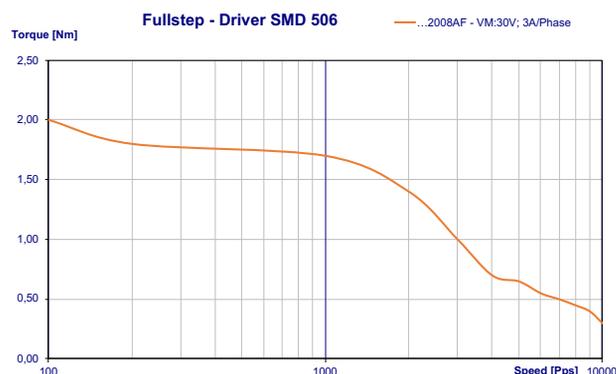


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		60SH65-2008AF		
Model		Unipolar	Parallel	Series
1	Rated Voltage	V	4,8	3,36
2	Current/Phase	A	2	2,8
3	Resistance/Phase	Ω	2,4	1,2
4	Inductance/Phase	mH	4,6	4,6
5	Holding Torque	Nm	1,5	2,1
6	Rotor Inertia	gcm ²	570	570
7	Detent Torque	Nm	0,09	0,09
8	n° of Leads		8	8
9	Length (L)	mm	65	65
10	Weight	Kg	1,2	1,2

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

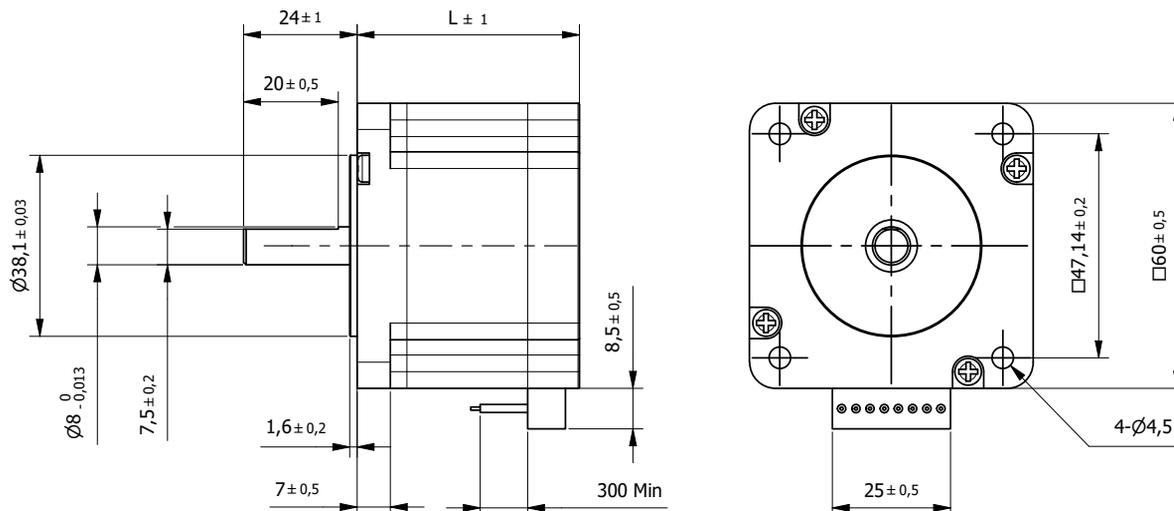
Connection			
Lead n°	Color	Gauge	Function
1	Blue/White	UL1430 AWG22	Phase A
2	Blue		Phase A-
3	Red/White		Phase C-
4	Red		Phase C
5	Green/White		Phase B
6	Green		Phase B-
7	Black/White		Phase D -
8	Black		Phase D



Hybrid Stepper Motor 60SH86

□ 60mm

High Torque

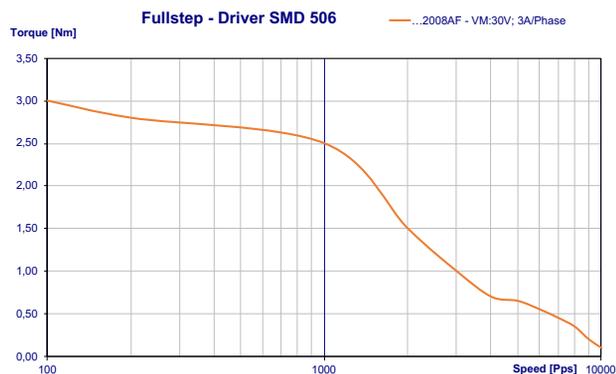


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		60SH86-2008AF			
Model		Unipolar	Parallel	Series	
1	Rated Voltage	V	6	4,17	8,4
2	Current/Phase	A	2	2,8	1,4
3	Resistance/Phase	Ω	3	1,5	6
4	Inductance/Phase	mH	6,8	6,8	27,2
5	Holding Torque	Nm	2,2	3,1	3,1
6	Rotor Inertia	gcm ²	840	840	840
7	Detent Torque	Nm	0,1	0,1	0,1
8	n° of Leads		8	8	8
9	Length (L)	mm	86	86	86
10	Weight	Kg	1,4	1,4	1,4

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Blue/White	UL1430 AWG22	Phase A
2	Blue		Phase A-
3	Red/White		Phase C-
4	Red		Phase C
5	Green/White		Phase B
6	Green		Phase B-
7	Black/White		Phase D -
8	Black		Phase D

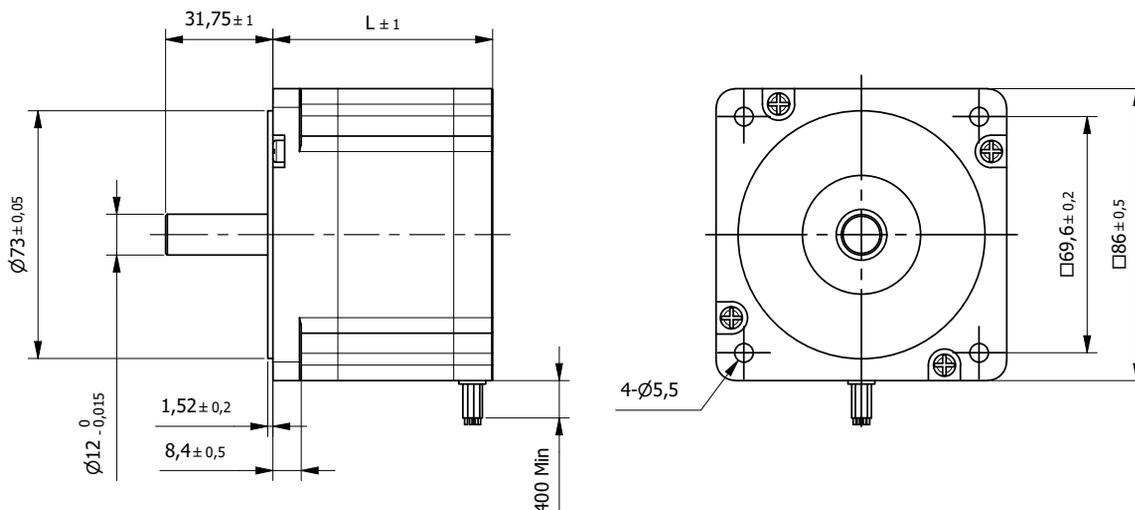


Stepper

Hybrid Stepper Motor 86SH65

□ 86mm

High Torque

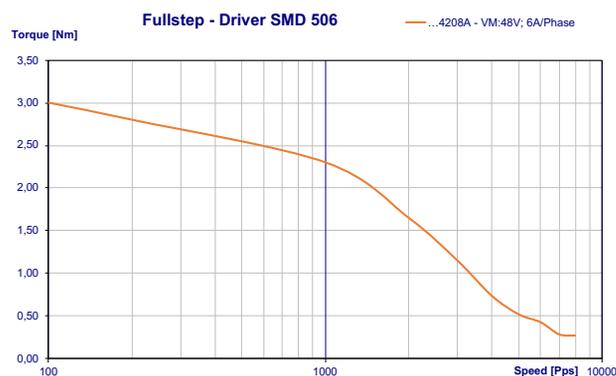


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		86SH65-4208A		
Model		Unipolar	Parallel	Series
1	Rated Voltage	V	2,39	3,42
2	Current/Phase	A	4,2	3
3	Resistance/Phase	Ω	0,57	1,14
4	Inductance/Phase	mH	1,7	6,8
5	Holding Torque	Nm	2,6	3,4
6	Rotor Inertia	gcm ²	1000	1000
7	Detent Torque	Nm	0,08	0,08
8	n° of Leads		8	8
9	Length (L)	mm	65	65
10	Weight	Kg	1,7	1,7

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 sec.)	1200 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

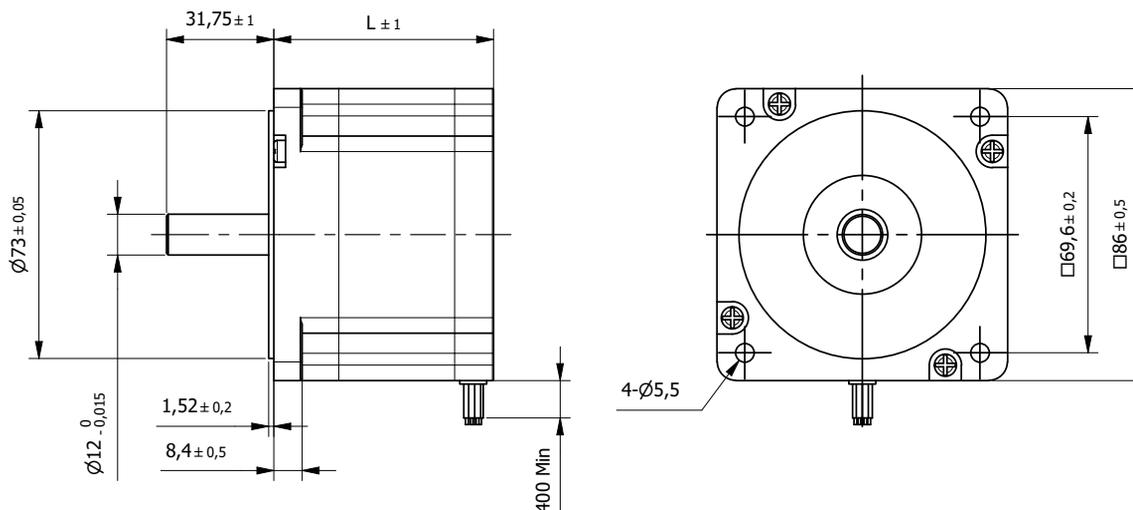
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG20	Phase A
2	Yellow		Phase A-
3	Blue		Phase C-
4	Black		Phase C
5	White		Phase B
6	Orange		Phase B-
7	Brown		Phase D -
8	Green		Phase D



Hybrid Stepper Motor 86SH80

□ 86mm

High Torque

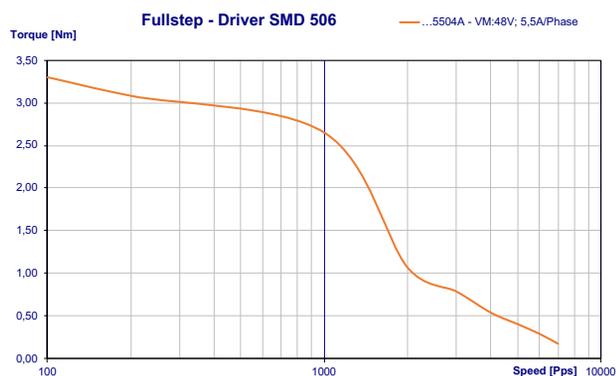


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			
Model	...5504A		
1	Rated Voltage	V	2,3
2	Current/Phase	A	5,5
3	Resistance/Phase	Ω	0,42
4	Inductance/Phase	mH	3,5
5	Holding Torque	Nm	4,6
6	Rotor Inertia	gcm ²	1400
7	Detent Torque	Nm	0,12
8	n° of Leads		4
9	Length (L)	mm	80
10	Weight	Kg	2,3

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 sec.)	1200 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

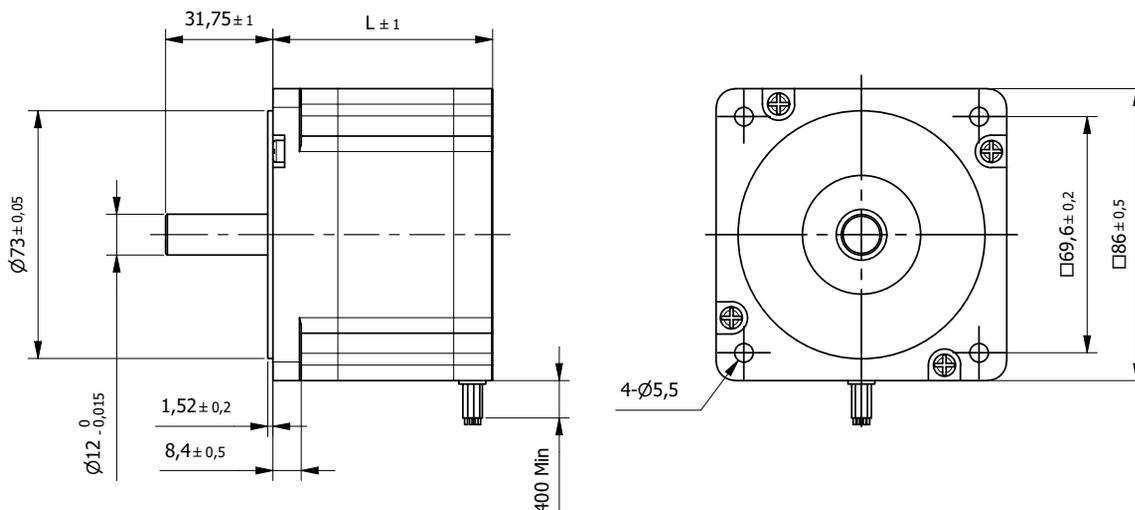
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG20	Phase A
2	White		Phase A-
3	Yellow		Phase B
4	Green		Phase B-



Hybrid Stepper Motor 86SH96

□ 86mm

High Torque

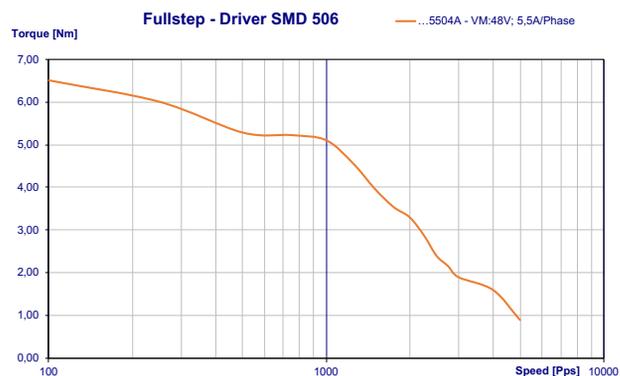


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			
Model	...5504A		
1	Rated Voltage	V	2,56
2	Current/Phase	A	5,5
3	Resistance/Phase	Ω	0,465
4	Inductance/Phase	mH	4,5
5	Holding Torque	Nm	7
6	Rotor Inertia	gcm ²	2700
7	Detent Torque	Nm	0,12
8	n° of Leads		4
9	Length (L)	mm	96
10	Weight	Kg	2,8

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 sec.)	1200 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

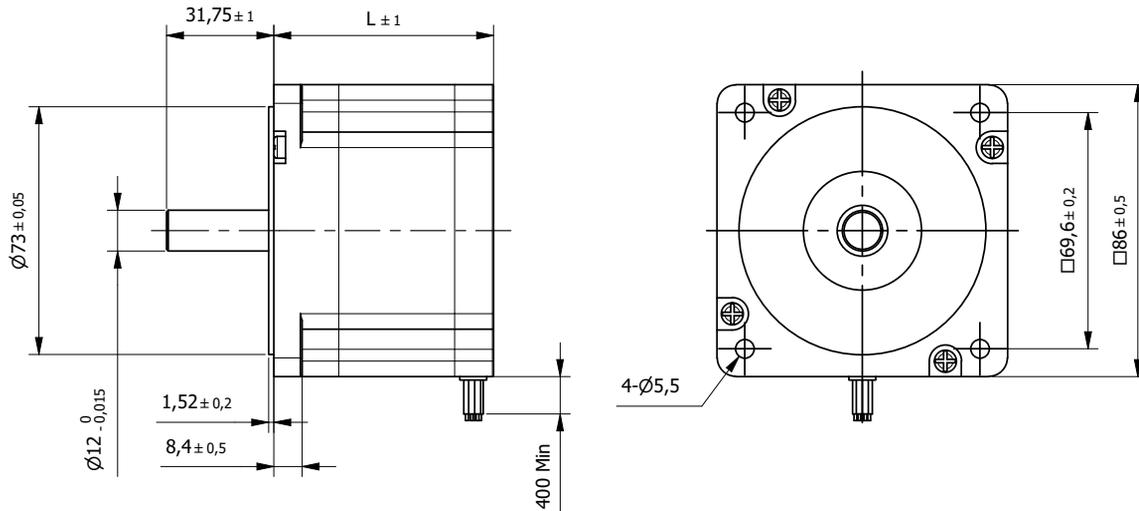
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG20	Phase A
2	White	|	Phase A-
3	Yellow	|	Phase B
4	Green	|	Phase B-



Hybrid Stepper Motor 86SH118

□ 86mm

High Torque

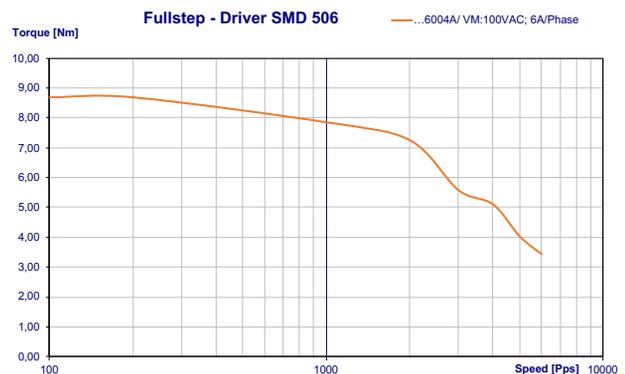


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			
Model	...6004A		
1	Rated Voltage	V	2,7
2	Current/Phase	A	6
3	Resistance/Phase	Ω	0,45
4	Inductance/Phase	mH	5,1
5	Holding Torque	Nm	8,7
6	Rotor Inertia	gcm ²	2700
7	Detent Torque	Nm	0,24
8	n° of Leads		4
9	Length (L)	mm	118
10	Weight	Kg	3,8

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 sec.)	1200 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG20	Phase A
2	White		Phase A-
3	Yellow		Phase B
4	Green		Phase B-

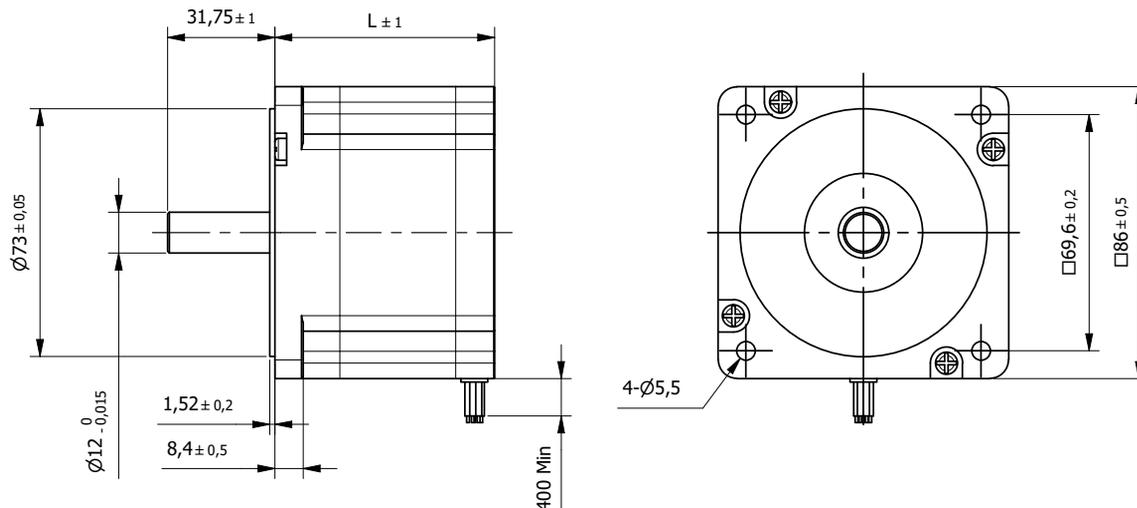


Stepper

Hybrid Stepper Motor 86SH156

□ 86mm

High Torque

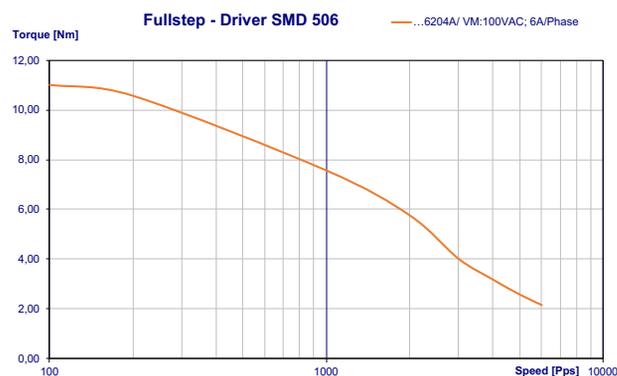


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			
Model	...6204A		
1	Rated Voltage	V	4,5
2	Current/Phase	A	6,2
3	Resistance/Phase	Ω	0,72
4	Inductance/Phase	mH	9
5	Holding Torque	Nm	12,1
6	Rotor Inertia	gcm ²	4000
7	Detent Torque	Nm	0,36
8	n° of Leads		4
9	Length (L)	mm	156
10	Weight	Kg	5,4

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	220N
Max Axial Force	60N
Dielectric Strength (for 1 sec.)	1200 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

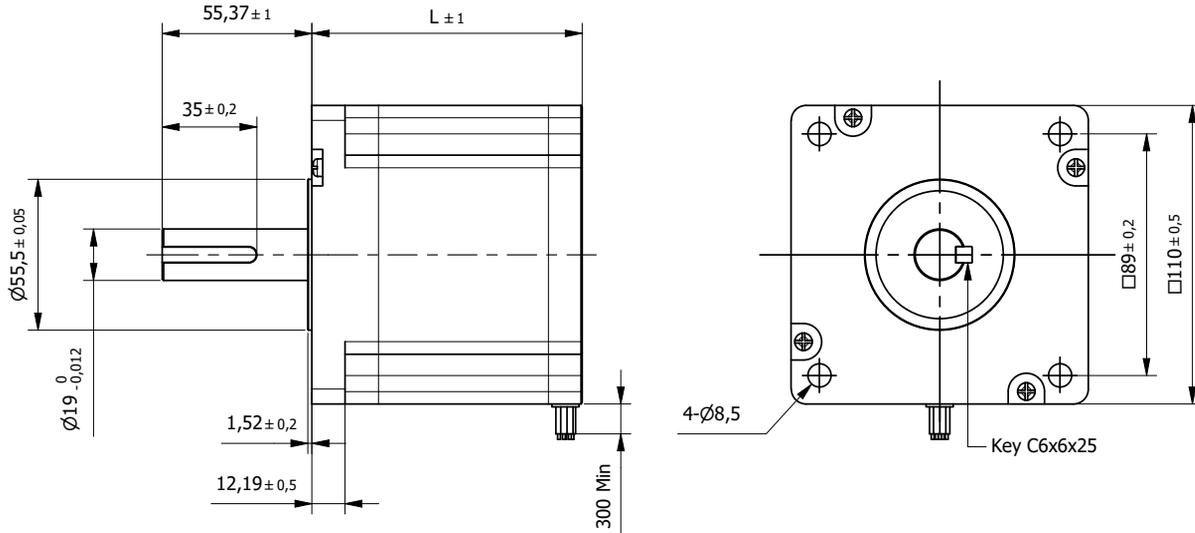
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG20	Phase A
2	White	|	Phase A-
3	Yellow	|	Phase B
4	Green	|	Phase B-



Hybrid Stepper Motor 110SH

High Torque

□ 110mm

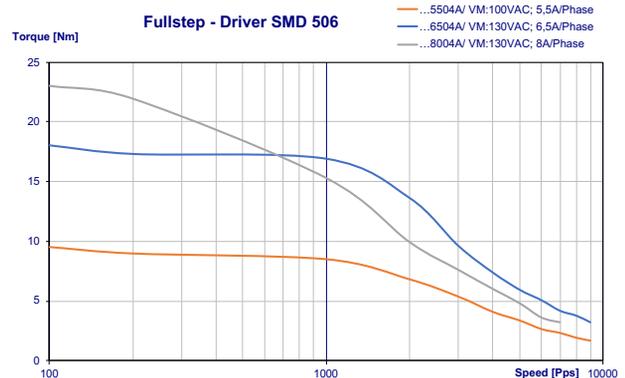


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

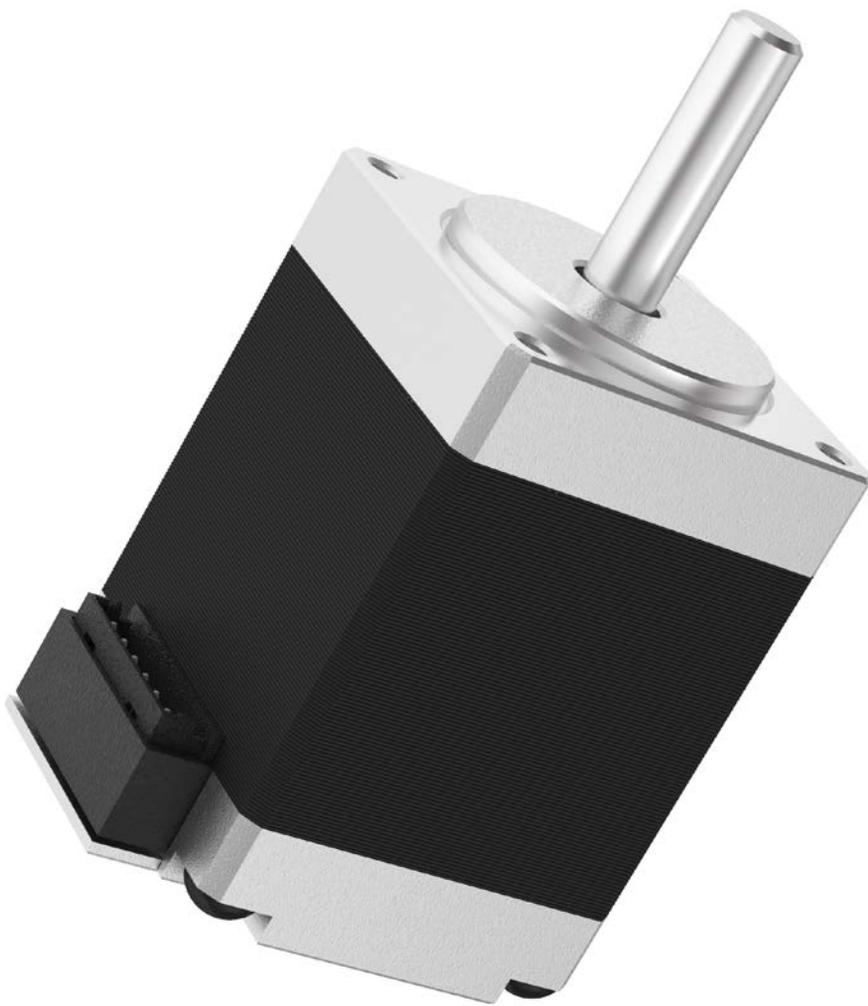
Specification			...99-5504A	...150-6504A	...201-8004A
1	Rated Voltage	V	4,95	5,2	5,36
2	Current/Phase	A	5,5	6,5	8
3	Resistance/Phase	Ω	0,7	0,72	0,67
4	Inductance/Phase	mH	9,8	11,5	12
5	Holding Torque	Nm	11,2	21	28
6	Rotor Inertia	gcm ²	5500	10'900	16'200
7	Detent Torque	Nm	0,3	0,59	0,75
8	n° of Leads		4	4	4
9	Length (L)	mm	99	150	201
10	Weight	Kg	5	8,4	11,7

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	330N
Max Axial Force	100N
Dielectric Strength (for 1 sec.)	1200 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG18	Phase A
2	White		Phase A-
3	Yellow		Phase B
4	Green		Phase B-



Stepper



Hybrid Stepper motors

STC series - Integrated Connector

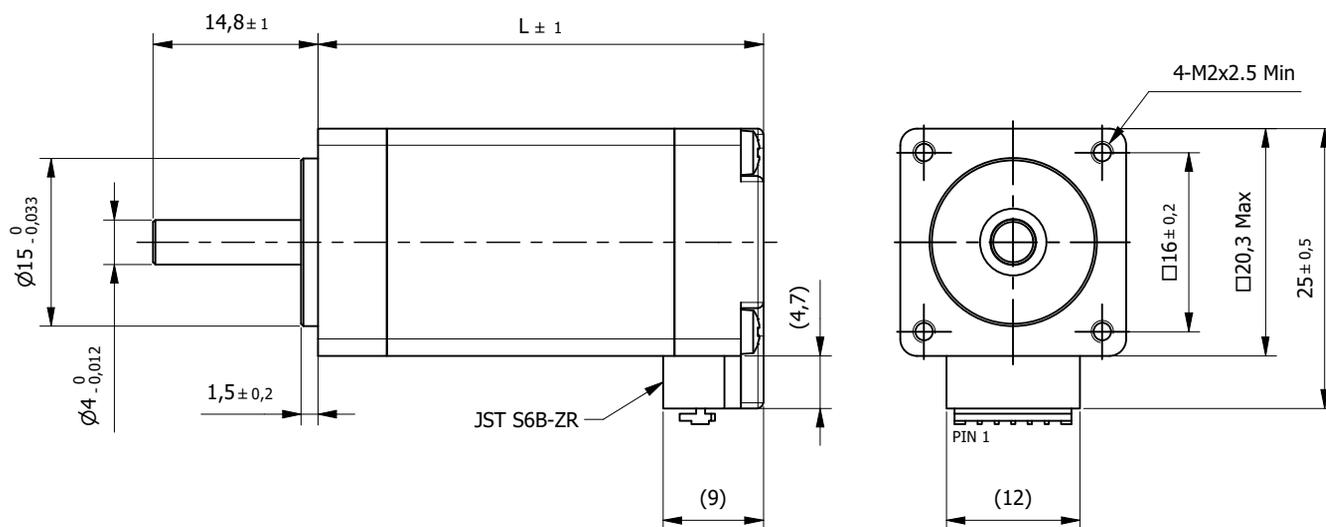
Hybrid Stepper motors - STC Connector series	Torque* (Nm)	
20STC	0,022...0,036	250
28STC32	0,08	251
28STC40	0,13	252
28STC51	0,18	253
57STC41	0,6	254
57STC56	1,4	255
57STC76	2,3	256

* Holding Torque

Hybrid Stepper Motor 20STC

High Torque with Connector

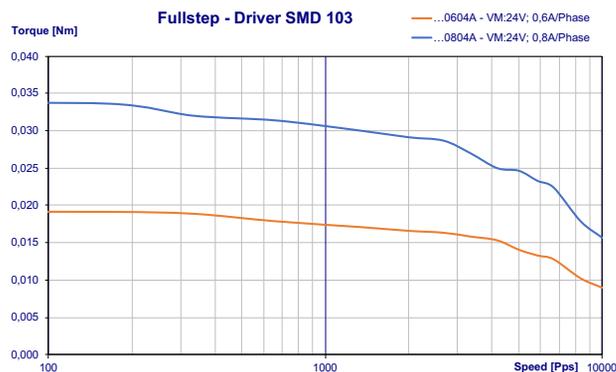
□ 20mm



Specification			...33-0604A	...40-0804A
1	Rated Voltage	V	3,84	4,32
2	Current/Phase	A	0,6	0,8
3	Resistance/Phase	Ω	6,4	5,6
4	Inductance/Phase	mH	2,6	2,3
5	Holding Torque	Nm	0,022	0,036
6	Rotor Inertia	gcm ²	2	3,6
7	Detent Torque	Nm	0,002	0,002
8	n° of Leads		4	4
9	Length (L)	mm	33	40
10	Weight	Kg	0,06	0,08

Characteristics		
Item		
Step angle		1,8°
Step angle Accuracy		±5%
Insulation Class		B
Protection Class		IP30
Ambient Temperature		-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)		80°C
Max. Shaft Radial play (450g load)		0,02mm
Max. Shaft Axial play (450g load)		0,08mm
Max. Radial Force (20mm from front flange)		10N
Max Axial Force		4N
Dielectric Strength (for 1 sec.)		600 VAC
Insulation Resistance (min. 500 VDC)		100 Mohm

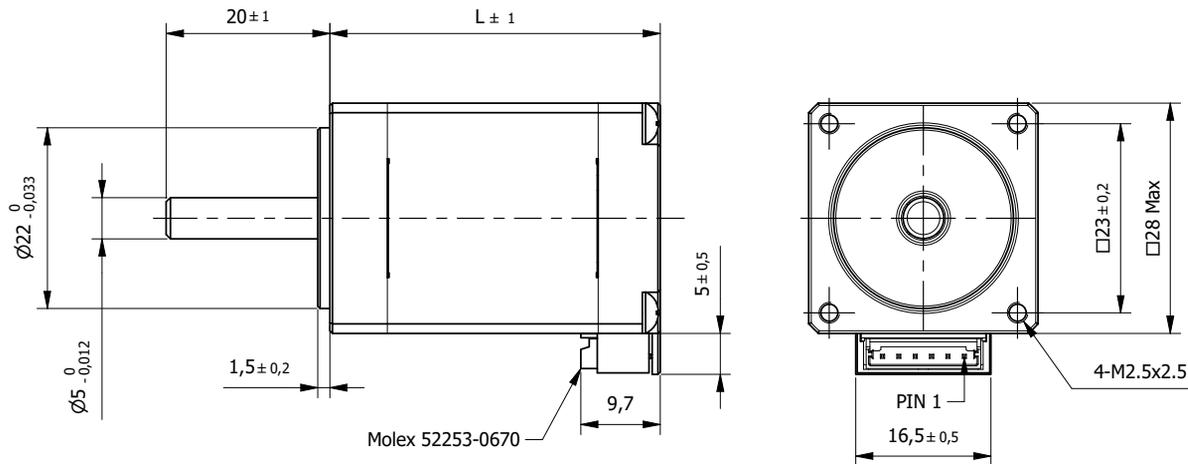
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1061 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 28STC32

□ 28mm

High Torque with Connector

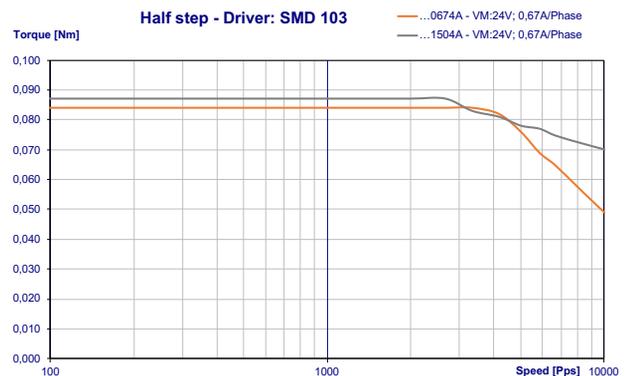


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification				
Model		...0674A	...1504A	
1	Rated Voltage	V	4,2	1,95
2	Current/Phase	A	0,67	1,5
3	Resistance/Phase	Ω	6,2	1,3
4	Inductance/Phase	mH	5,76	1
5	Holding Torque	Nm	0,08	0,08
6	Rotor Inertia	gcm ²	9	9
7	Detent Torque	Nm	0,005	0,005
8	n° of Leads		4	4
9	Length (L)	mm	32	32
10	Weight	Kg	0,11	0,11

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (5mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

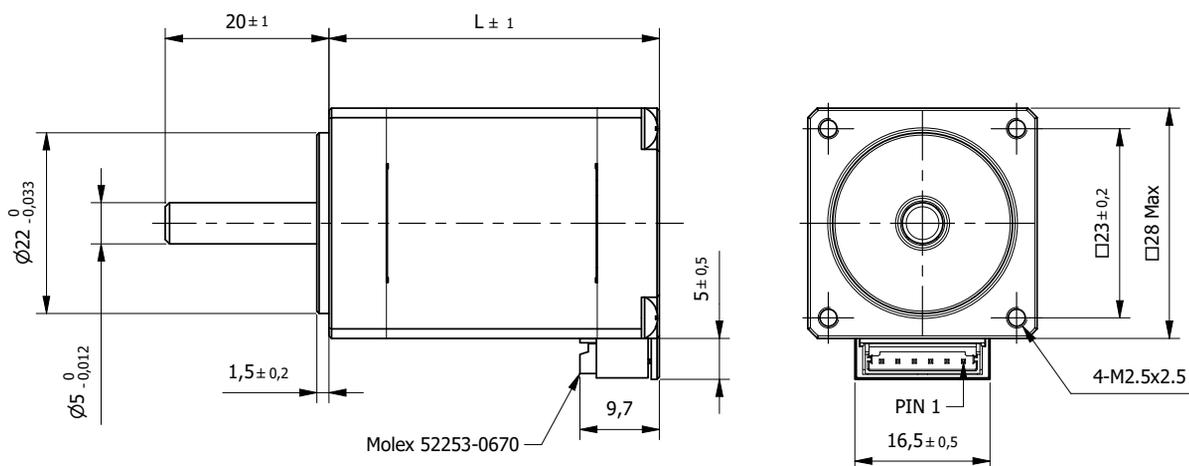
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 28STC40

□ 28mm

High Torque with Connector

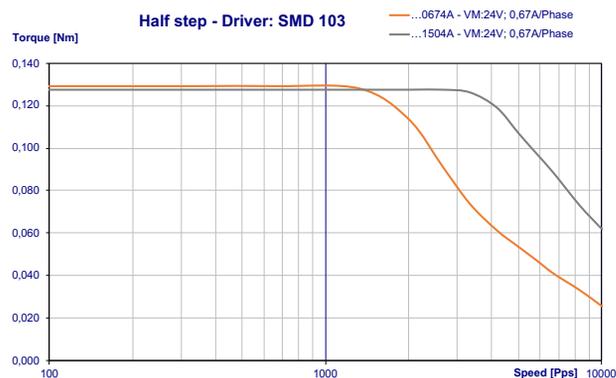


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification				
Model		...0674A	...1504A	
1	Rated Voltage	V	4,9	2,2
2	Current/Phase	A	0,67	1,5
3	Resistance/Phase	Ω	7,3	1,45
4	Inductance/Phase	mH	6,52	1,25
5	Holding Torque	Nm	0,13	0,13
6	Rotor Inertia	gcm ²	12	12
7	Detent Torque	Nm	0,006	0,006
8	n° of Leads		4	4
9	Length (L)	mm	40	40
10	Weight	Kg	0,14	0,14

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (5mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

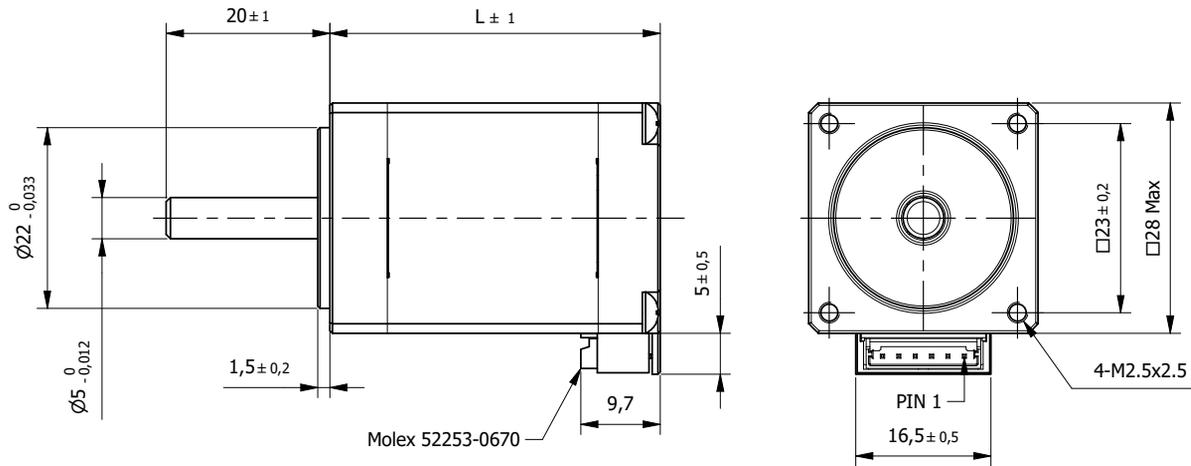
Connection				
Pin n°	Color	Gauge	Function	
1	Black	UL1430 AWG26	Phase A	
2	Yellow		COM Phase A	
3	Green		Phase A-	
4	Red		Phase B	
5	White		COM Phase B	
6	Blue		Phase B-	



Hybrid Stepper Motor 28STC51

□ 28mm

High Torque with Connector

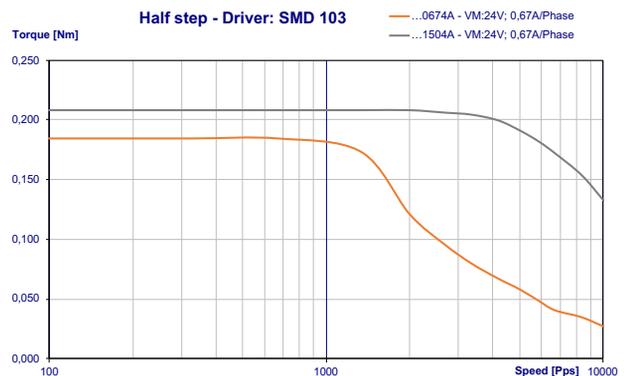


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification		Model	...0674A	...1504A
1	Rated Voltage	V	6,2	2,7
2	Current/Phase	A	0,67	1,5
3	Resistance/Phase	Ω	9,2	1,9
4	Inductance/Phase	mH	8,4	1,9
5	Holding Torque	Nm	0,18	0,18
6	Rotor Inertia	gcm ²	18	18
7	Detent Torque	Nm	0,008	0,008
8	n° of Leads		4	4
9	Length (L)	mm	51,5	51,5
10	Weight	Kg	0,2	0,2

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (5mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

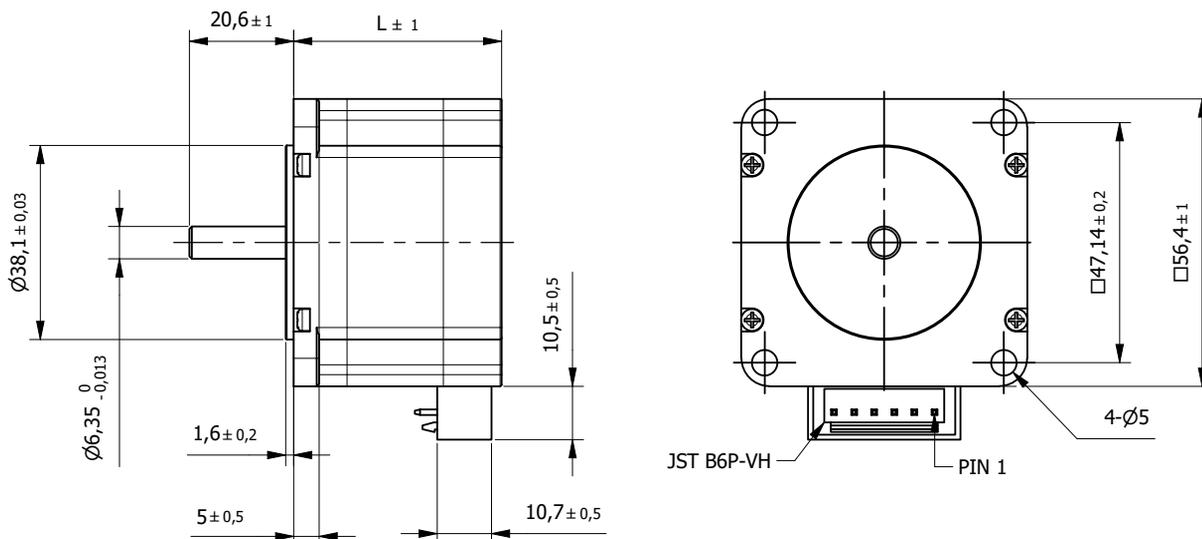
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 57STC41

□ 57mm

High Torque with Connector

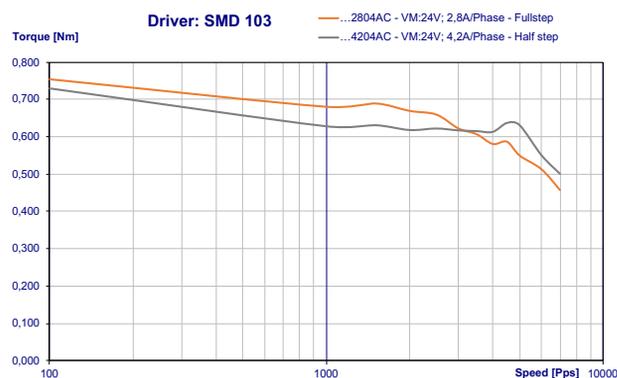


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			...2804AC	...4204AC
1	Rated Voltage	V	2,1	1,5
2	Current/Phase	A	2,8	4,2
3	Resistance/Phase	Ω	0,78	0,35
4	Inductance/Phase	mH	1,8	0,8
5	Holding Torque	Nm	0,6	0,6
6	Rotor Inertia	gcm ²	120	120
7	Detent Torque	Nm	0,021	0,021
8	n° of Leads		4	4
9	Length (L)	mm	41	41
10	Weight	Kg	0,45	0,45

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

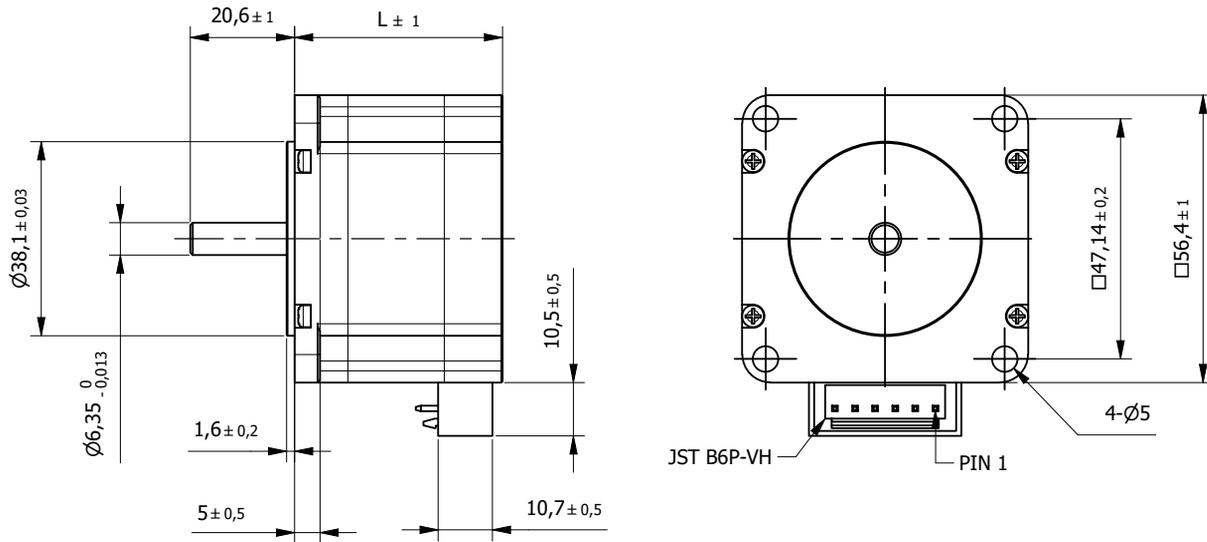
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 57STC56

□ 57mm

High Torque with Connector

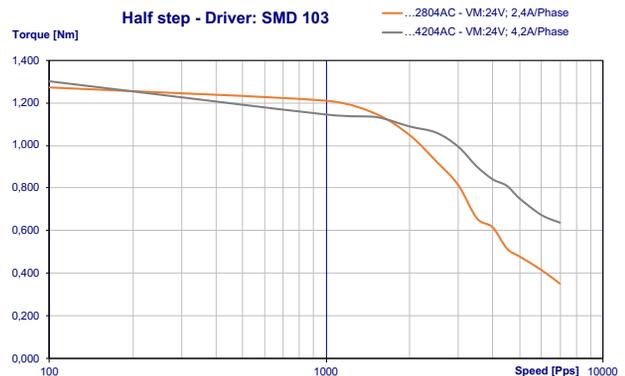


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification				
Model		...2804AC	...4204AC	
1	Rated Voltage	V	2,8	2,1
2	Current/Phase	A	2,8	4,2
3	Resistance/Phase	Ω	1	0,5
4	Inductance/Phase	mH	3,2	1,6
5	Holding Torque	Nm	1,4	1,4
6	Rotor Inertia	gcm ²	300	300
7	Detent Torque	Nm	0,04	0,04
8	n° of Leads		4	4
9	Length (L)	mm	56	56
10	Weight	Kg	0,7	0,7

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

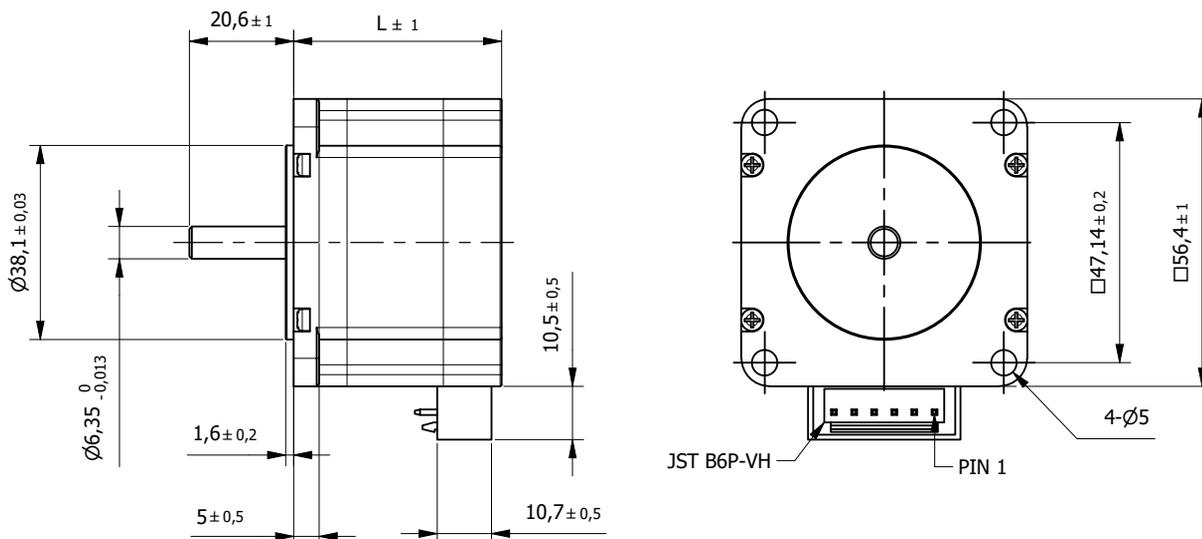
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 57STC76

□ 57mm

High Torque with Connector

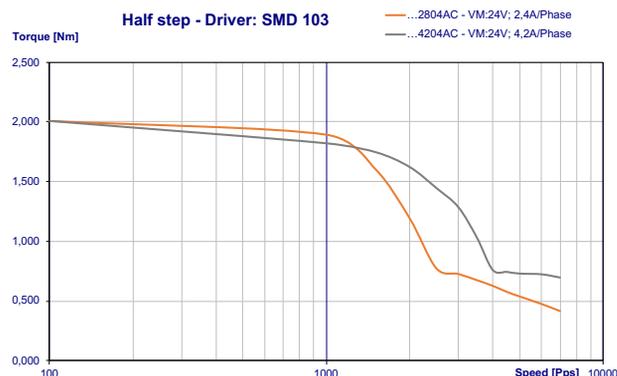


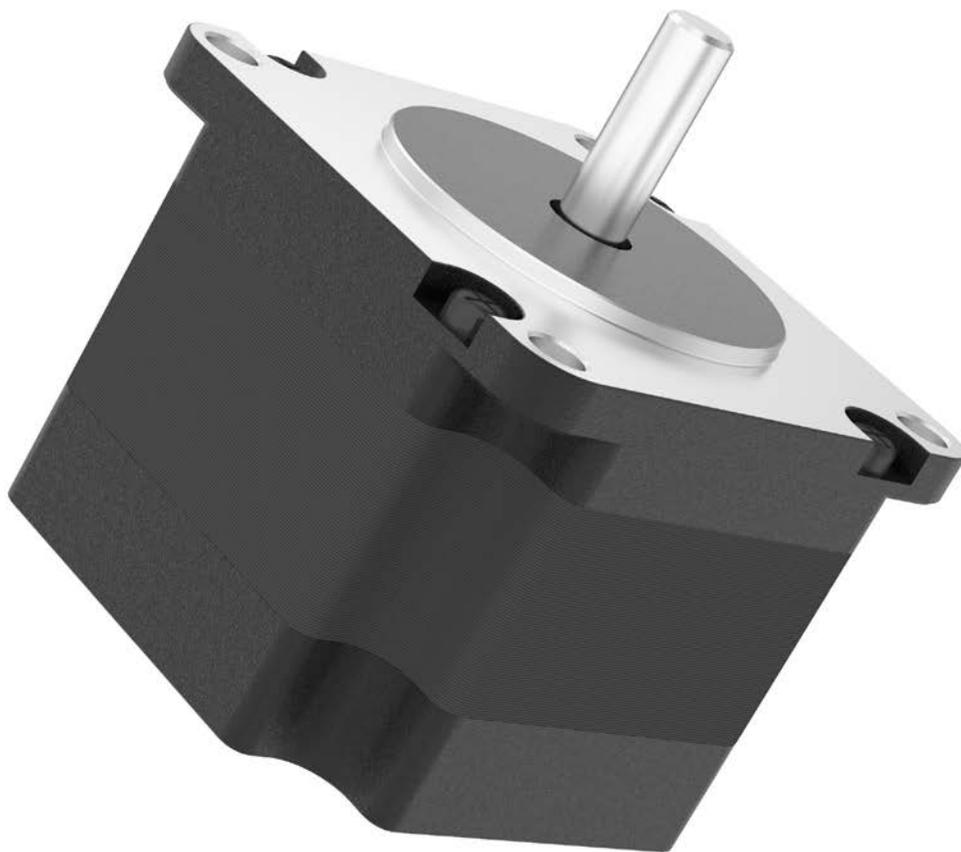
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			...2804AC	...4204AC
1	Rated Voltage	V	3,6	2,3
2	Current/Phase	A	2,8	4,2
3	Resistance/Phase	Ω	1,3	0,55
4	Inductance/Phase	mH	5,3	2,1
5	Holding Torque	Nm	2,3	2,3
6	Rotor Inertia	gcm ²	480	480
7	Detent Torque	Nm	0,068	0,068
8	n° of Leads		4	4
9	Length (L)	mm	76	76
10	Weight	Kg	1,2	1,2

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-





Stepper motors
3-Phase Hybrid

Advantages at a glance
Low noise and losses
High torque
Smooth precise movement

3-Phase Hybrid Stepper motors	Torque* (Nm)	
42 3P	0,08...0,2	260
57 3P	0,45...1,5	261
60 3P53	0,9	262

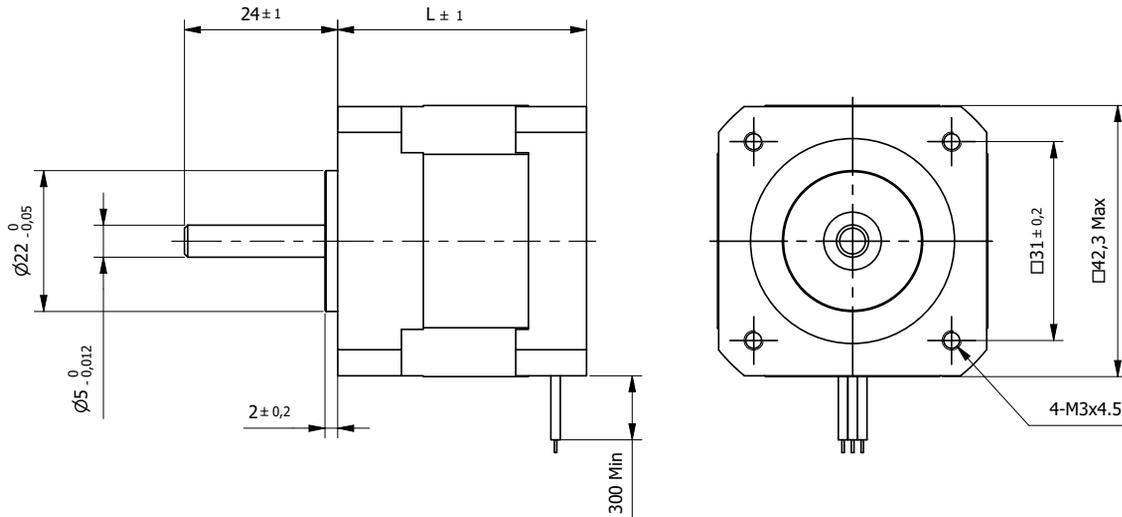
3-Phase technology in hybrid stepper motor is used mainly where ultra-low vibration and very low noise levels are required. The drive circuit of these motors is simplified because it is driven with a star wiring connection. The use of three phases inherently helps to reduce torque ripple and smooth motor performance. An example of an ideal application is in performance lighting, where quick movement and quiet operation are required.

* Holding Torque

Hybrid Stepper Motor 423P

□ 42mm

3-Phase

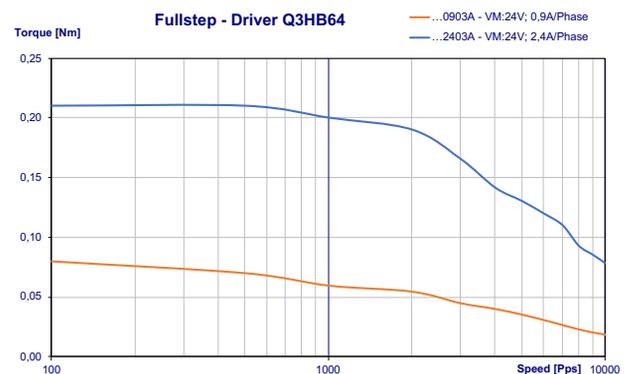


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification			...24-0903A	...39-2403A
1	Rated Voltage	V	5,58	2,88
2	Current/Phase	A	0,9	2,4
3	Resistance/Phase	Ω	6,2	1,2
4	Inductance/Phase	mH	3,2	0,8
5	Holding Torque	Nm	0,08	0,2
6	Rotor Inertia	gcm ²	20	54
7	n° of Leads		3	3
8	Length (L)	mm	24	39
9	Weight	Kg	0,14	0,28

Characteristics	
Item	
Step angle	1,2°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

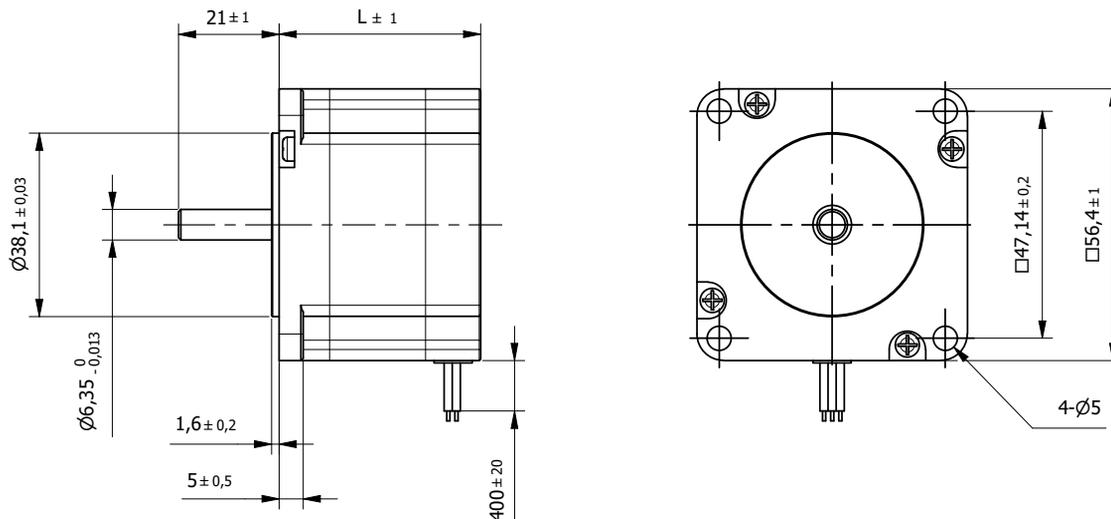
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1061 AWG26	Phase U
2	Yellow	|	Phase V
3	Blue	|	Phase W



Hybrid Stepper Motor 573P

3-Phase

□ 57mm

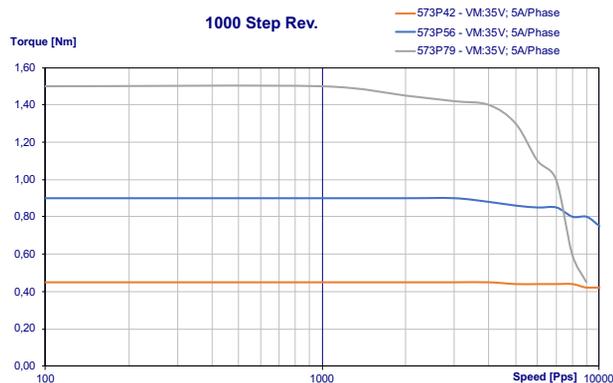


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			573P42	573P56	573P79
1	Rated Voltage	V	6,76	4	6
2	Current/Phase	A	5,2	5,6	5,8
3	Resistance/Phase	Ω	1,3	0,7	1,05
4	Inductance/Phase	mH	1,4	1,7	2,4
5	Holding Torque	Nm	0,45	0,9	1,5
6	Rotor Inertia	gcm ²	110	300	480
7	n° of Leads		6	6	6
8	Length (L)	mm	42	56	79
9	Weight	Kg	0,45	0,75	1,1

Characteristics	
Item	
Step angle	1,2°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1332 AWG18	Phase U
2	Orange		Phase U
3	White		Phase V
4	Blue		Phase V
5	Yellow		Phase W
6	Green		Phase W

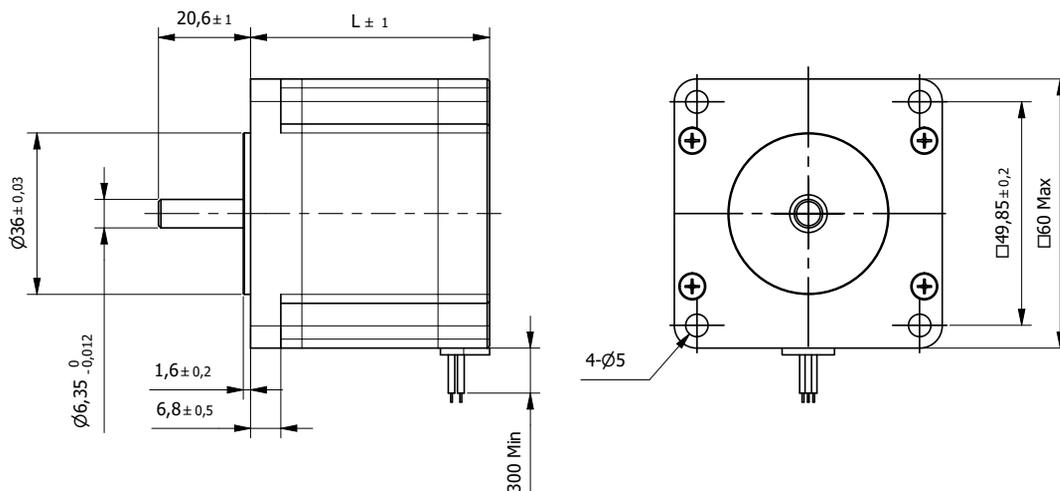


Stepper

Hybrid Stepper Motor 603P53

□ 60mm

3-Phase

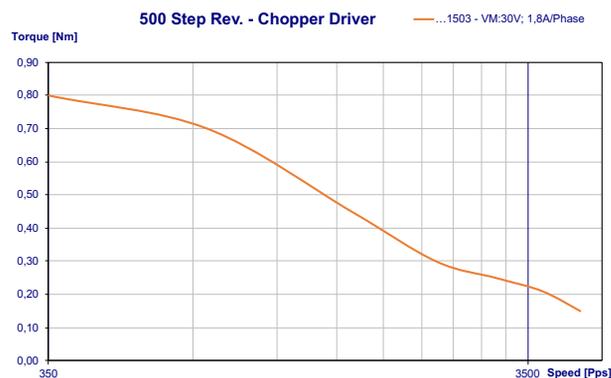


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification			
Model	...1503		
1	Rated Voltage	V	6,75
2	Current/Phase	A	1,5
3	Resistance/Phase	Ω	4,5
4	Inductance/Phase	mH	12
5	Holding Torque	Nm	0,9
6	Rotor Inertia	gcm ²	260
7	n° of Leads		3
8	Length (L)	mm	53,5
9	Weight	Kg	0,8

Characteristics	
Item	
Step angle	1,2°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG22	Phase U
2	Green	|	Phase V
3	White	|	Phase W





Stepper motors
Hollow Shaft

Advantages at a glance

- High torque
- High speed
- High reliability

Based on our standard range of Hybrid stepper motor which provide superior performance with respect to step resolution, torque and speed, our hollow shaft series comes in sizes from 20 till 86mm. The hollow shaft can be used to pass cables or conduct laser beams through it in order to save space.

Hollow Shaft Stepper motors

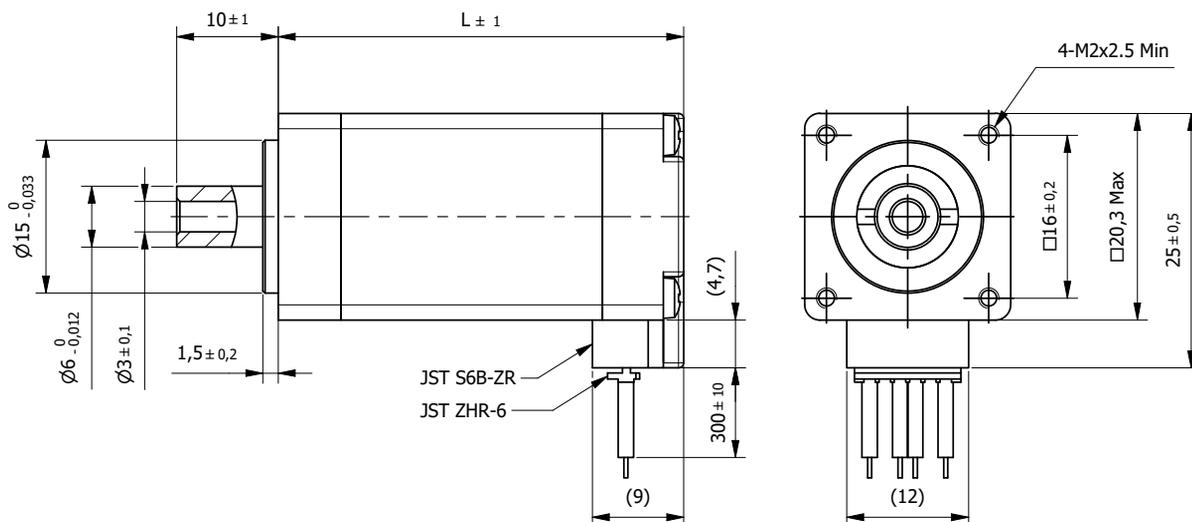
	Torque* (Nm)	
20STC40 H	0,036	266
28STC51 H	0,12	267
35STC38 H	0,23	268
42STC47 H	0,44	269
57STC76 H	2,3	270
86SH118 H	6	271

* Holding Torque

Hybrid Stepper Motor 20STC40-H

□ 20mm

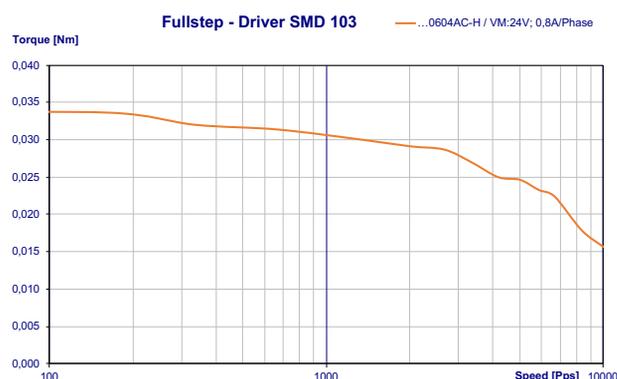
Hollow Shaft - High Torque



Specification			
Model	...0604AC-H		
1	Rated Voltage	V	4,3
2	Current/Phase	A	0,6
3	Resistance/Phase	Ω	7,2
4	Inductance/Phase	mH	3,15
5	Holding Torque	Nm	0,036
6	Rotor Inertia	gcm ²	2,9
7	Detent Torque	Nm	0,002
8	n° of Leads		4
9	Length (L)	mm	40
10	Weight	Kg	0,08

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (5mm from front flange)	10N
Max Axial Force	4N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

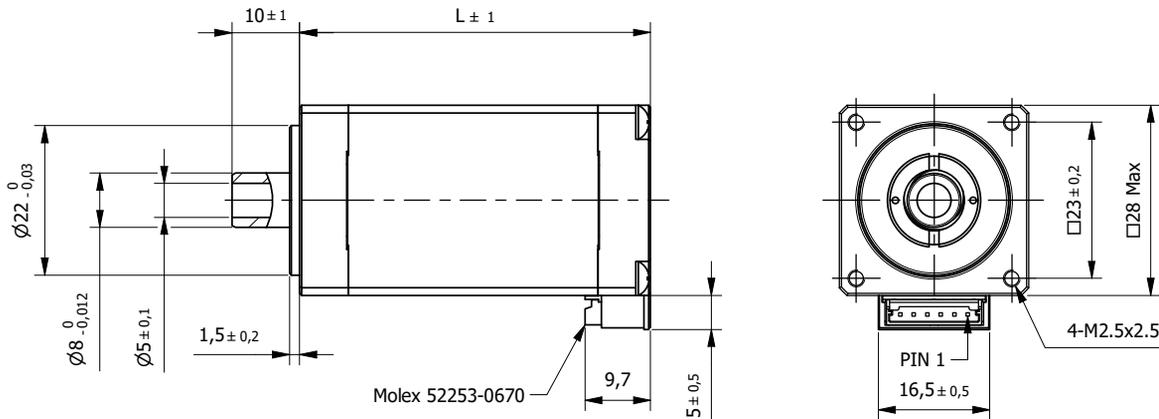
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1061 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 28STC51-H

Hollow Shaft - High Torque

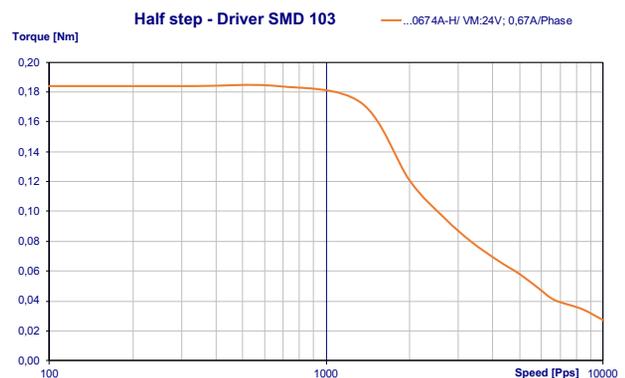
□ 28mm



Specification			
Model		...0674A-H	
1	Rated Voltage	V	6,2
2	Current/Phase	A	0,67
3	Resistance/Phase	Ω	9,2
4	Inductance/Phase	mH	5,6
5	Holding Torque	Nm	0,12
6	Rotor Inertia	gcm ²	18
7	Detent Torque	Nm	0,008
8	n° of Leads		4
9	Length (L)	mm	52
10	Weight	Kg	0,2

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (at 4,5N)	0,02mm
Max. Shaft Axial play (at 4,5N)	0,08mm
Max. Radial Force (5mm from front flange)	28N
Max Axial Force	7N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

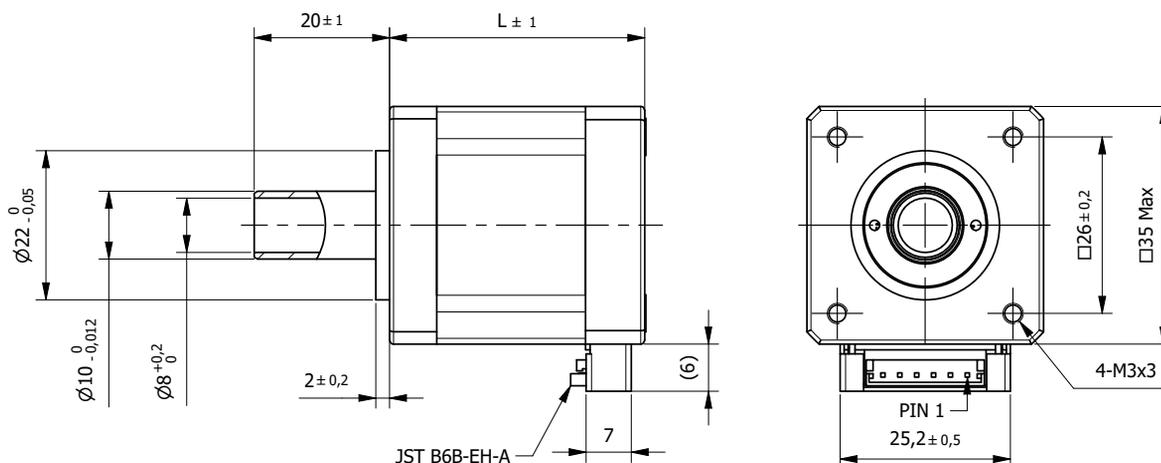
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 35STC38-H

□ 35mm

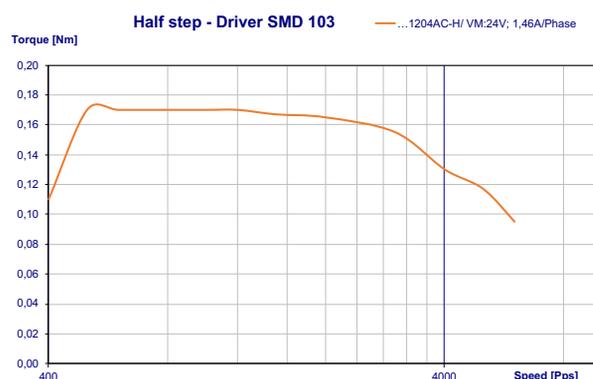
Hollow Shaft - High Torque



Specification		...1204AC-H	
Model			
1	Rated Voltage	V	3,4
2	Current/Phase	A	1,2
3	Resistance/Phase	Ω	2,8
4	Inductance/Phase	mH	4
5	Holding Torque	Nm	0,23
6	Rotor Inertia	gcm ²	20
7	Detent Torque	Nm	0,018
8	n° of Leads		4
9	Length (L)	mm	38
10	Weight	Kg	0,21

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (at 4N)	0,02mm
Max. Shaft Axial play (at 4N)	0,08mm
Max. Radial Force (10mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

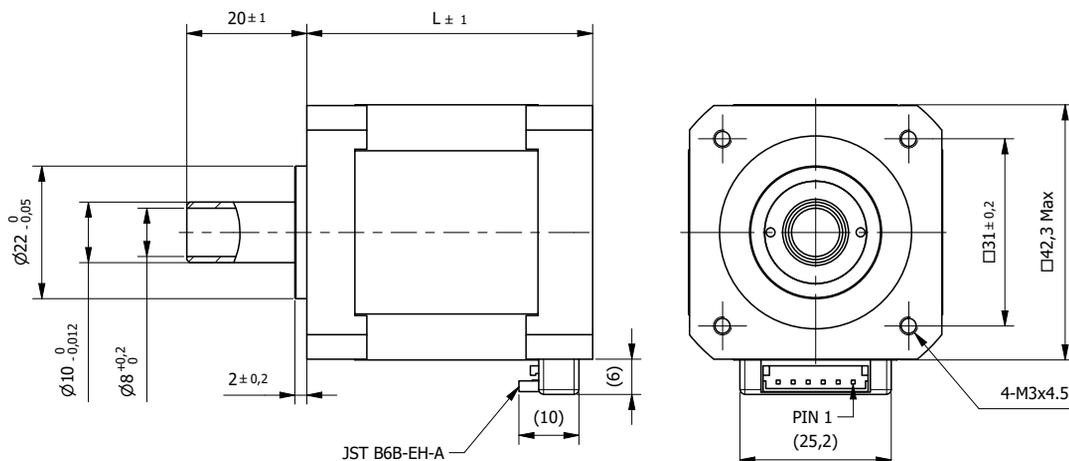
Connection			
Pin n°	Color	Gauge	Function
1	Yellow	UL1430 AWG26	COM Phase A
2	Black		Phase A
3	Green		Phase A-
4	Red		Phase B
5	Blue		Phase B-
6	White		COM Phase B



Hybrid Stepper Motor 42STC47-H

Hollow Shaft - High Torque

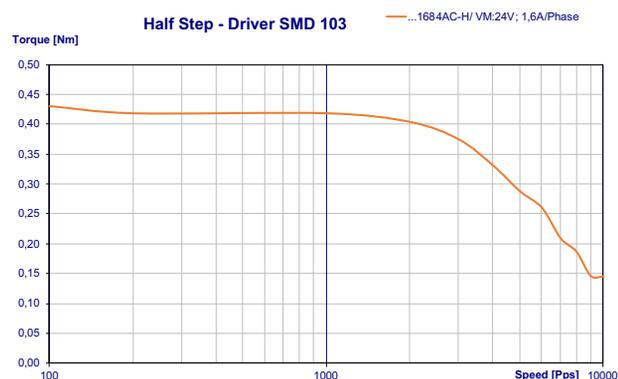
□ 42mm



Specification			
Model		...1684AC-H	
1	Rated Voltage	V	2,8
2	Current/Phase	A	1,7
3	Resistance/Phase	Ω	1,65
4	Inductance/Phase	mH	2,8
5	Holding Torque	Nm	0,44
6	Rotor Inertia	gcm ²	68
7	Detent Torque	Nm	0,02
8	n° of Leads		4
9	Length (L)	mm	47,5
10	Weight	Kg	0,35

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (at 4N)	0,02mm
Max. Shaft Axial play (at 4N)	0,08mm
Max. Radial Force (20mm from front flange)	28N
Max Axial Force	10N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection		
Pin n°	Color	Function
1	Yellow	COM Phase A
2	Black	Phase A
3	Green	Phase A-
4	Red	Phase B
5	Blue	Phase B-
6	White	COM Phase B

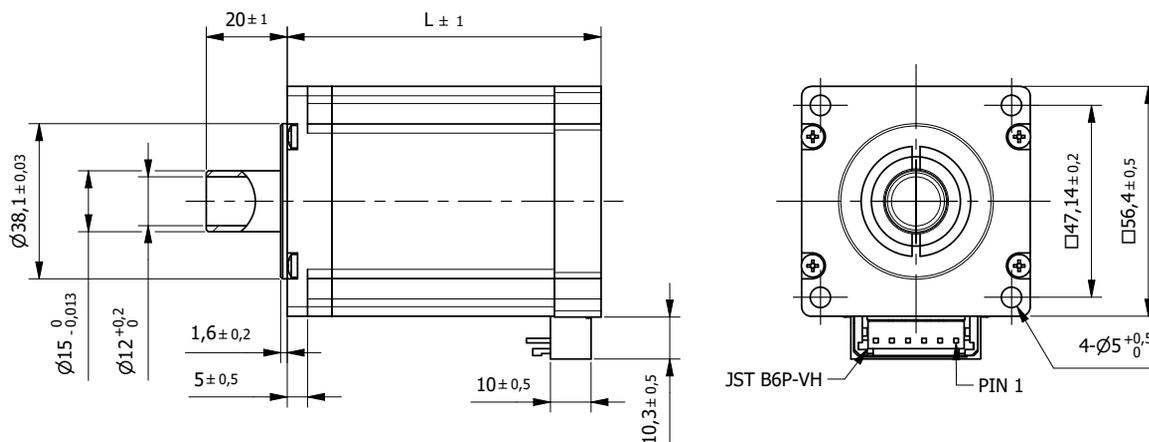


Stepper

Hybrid Stepper Motor 57STC76-H

□ 57mm

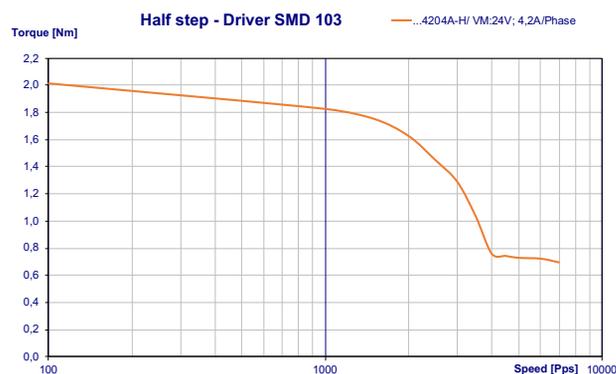
Hollow Shaft - High Torque



Specification			
Model	...4204A-H		
1	Rated Voltage	V	3,6
2	Current/Phase	A	4,2
3	Resistance/Phase	Ω	0,55
4	Inductance/Phase	mH	2,1
5	Holding Torque	Nm	2,3
6	Rotor Inertia	gcm ²	480
7	Detent Torque	Nm	0,068
8	n° of Leads		4
9	Length (L)	mm	77,5
10	Weight	Kg	1,1

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75N
Max Axial Force	15N
Dielectric Strength (for 1 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

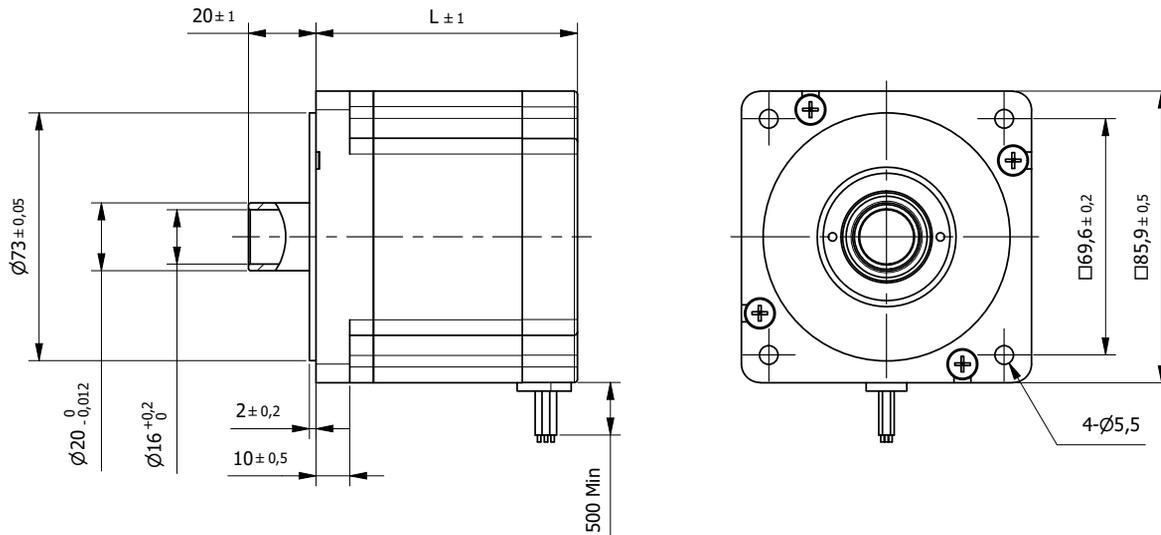
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 86SH118-H

□ 86mm

Hollow Shaft - High Torque



Specification			
Model	...4208A-H		
1	Rated Voltage	V	5
2	Current/Phase	A	4,2
3	Resistance/Phase	Ω	1,2
4	Inductance/Phase	mH	6,5
5	Holding Torque	Nm	6
6	Rotor Inertia	gcm ²	2700
7	Detent Torque	Nm	0,24
8	n° of Leads		8
9	Length (L)	mm	114
10	Weight	Kg	3,8

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (at 4N)	0,02mm
Max. Shaft Axial play (at 4N)	0,08mm
Max. Radial Force (20mm from front flange)	130N
Max Axial Force	36N
Dielectric Strength (for 1 sec.)	1200 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG18	Phase A
2	Yellow		Phase A-
3	Blue		Phase C-
4	Black		Phase C
5	White		Phase B
6	Orange		Phase B-
7	Brown		Phase D-
8	Green		Phase D





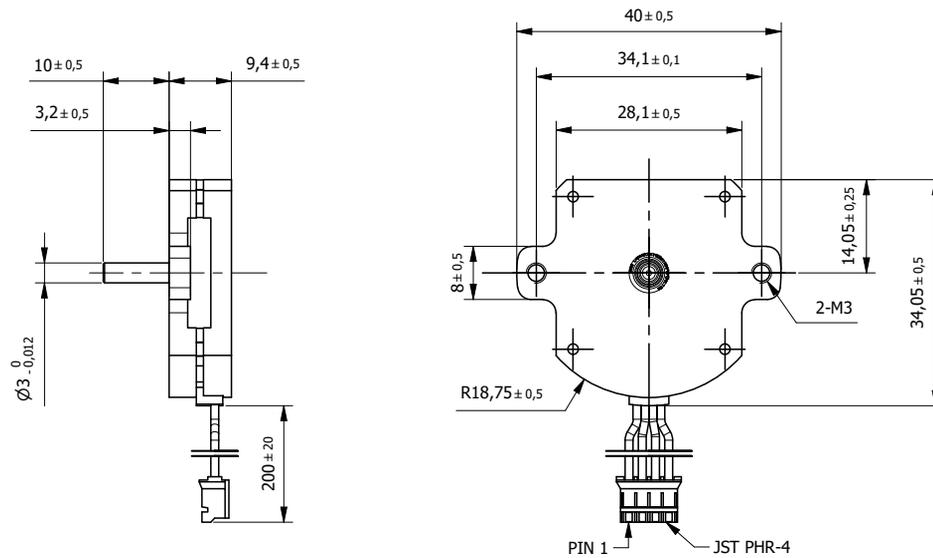
Stepper motors
Flat Hybrid

Advantages at a glance
Very compact size
High torque
Great power to volume ratio

Flat Hybrid Stepper motors	Torque* (Nm)	
28S10	0,01	274
63S10	0,064	275

Our flat high-torque stepper motors offer maximum functionality in a very compact package. With speed up to 4300 rpm, our 2-phase flat stepper motors are ideal for applications where power and size are decisive. Specifically designed for semi-conductor applications, these unique Stepper motors are suitable for many other size-sensitive devices.

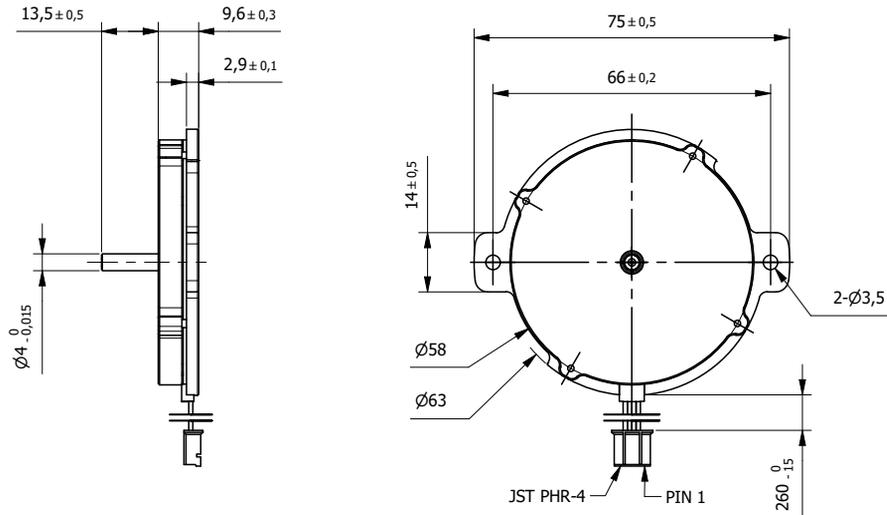
* Holding Torque



Specification			
Model	...0504		
1	Rated Voltage	V	1,85
2	Current/Phase	A	0,5
3	Resistance/Phase	Ω	3,7
4	Inductance/Phase	mH	0,88
5	Holding Torque	Nm	0,01
6	Rotor Inertia	gcm ²	1,7
7	n° of Leads		4
8	Length (L)	mm	9,4
9	Weight	Kg	0,028

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (at 4N)	0,02mm
Max. Shaft Axial play (at 4N)	0,08mm
Max. Radial Force (5mm from front flange)	10N
Max Axial Force	2N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

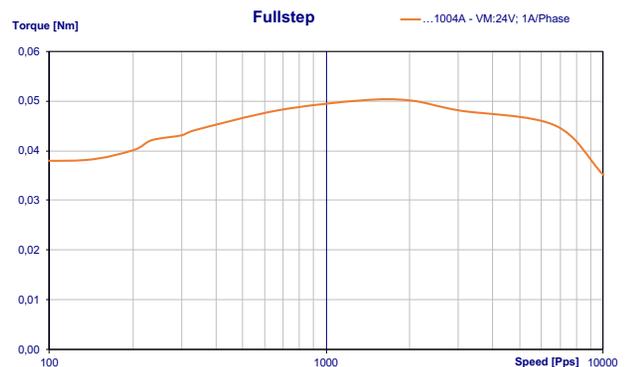
Connection			
Pin n°	Color	Gauge	Function
1	Red	UL1061 AWG26	Phase A
2	Blue		Phase A-
3	Orange		Phase B
4	Yellow		Phase B-



Specification			
Model	...1004A		
1	Rated Voltage	V	3,8
2	Current/Phase	A	1
3	Resistance/Phase	Ω	3,8
4	Inductance/Phase	mH	2
5	Holding Torque	Nm	0,064
6	Rotor Inertia	gcm ²	16
7	n° of Leads		4
8	Length (L)	mm	9,6
9	Weight	Kg	0,095

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	E
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (at 4N)	0,02mm
Max. Shaft Axial play (at 4N)	0,08mm
Max. Radial Force (5mm from front flange)	10N
Max Axial Force	2N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin n°	Color	Gauge	Function
1	Red	UL1061 AWG26	Phase A
2	Blue		Phase A-
3	Orange		Phase B
4	Yellow		Phase B-





Stepper motors
Hybrid with Encoder

Advantages at a glance
Compact design
Complete closed loop system
Smooth and precise

Stepper motors with Encoder	Torque* (Nm)	
42SC	0,22...0,75	278
60SC	1...3	279
86SC	3,5...12	280

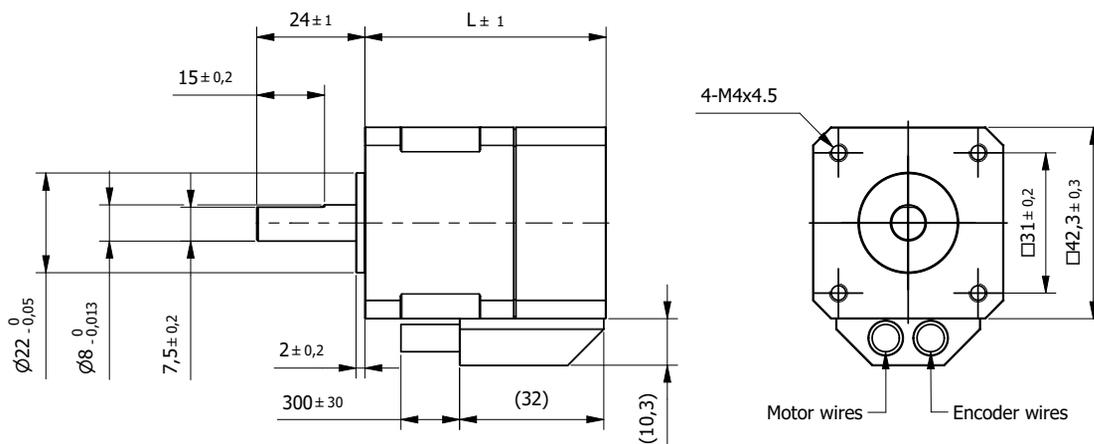
Our Hybrid stepper motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested by the system. The presence of an encoder is highly recommended when is critical to know the status of the motor (both position and speed) in every instant.

* Holding Torque

Hybrid Stepper Motor 42SC

with Encoder

□ 42mm



Specification		42SC54	42SC60	42SC68	42SC80	
1	Model	42SC54	42SC60	42SC68	42SC80	
1	Rated Voltage	V	2,8	2,8	2,8	3,5
2	Current/Phase	A	1,33	1,68	1,68	3
3	Resistance/Phase	Ω	2,1	1,65	1,65	1,2
4	Inductance/Phase	mH	2,5	3,2	2,8	2,9
5	Holding Torque	Nm	0,22	0,36	0,44	0,75
6	Rotor Inertia	gcm ²	35	54	68	102
7	Detent Torque	Nm	0,012	0,015	0,02	0,028
8	n°of Leads		4	4	4	4
9	Length (L)	mm	53,5	59,5	67,5	80
10	Weight	Kg	0,22	0,28	0,35	0,5

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP20
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial force (20mm from front flange)	28N
Max. Axial force	10N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

* 3-channel encoder or other types on request

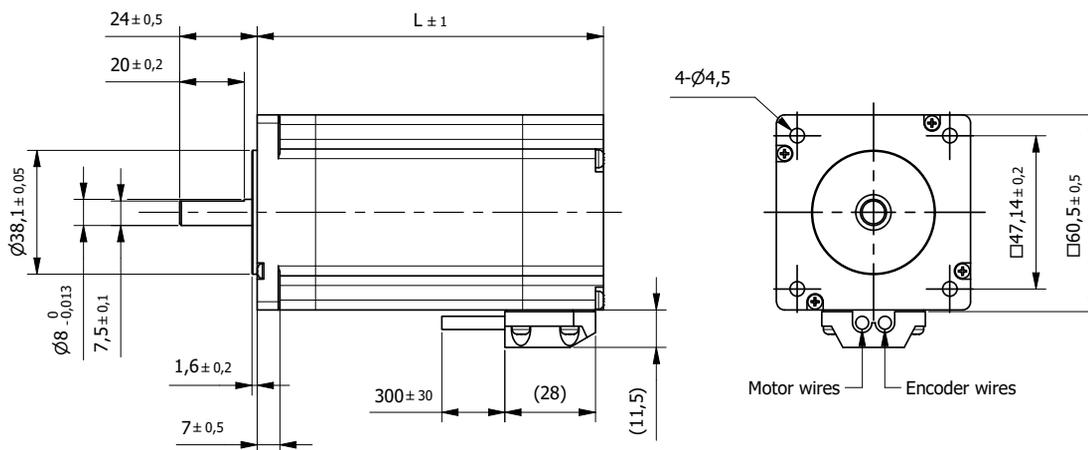
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Black	AWG24	GND
2	Red		VCC:+5VDC
3	Blue		EA-
4	Blue/White		EA+
5	Orange		EB-
6	Orange/White		EB+
Motor			
1	Black	AWG20	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 60SC

with Encoder

□ 60mm

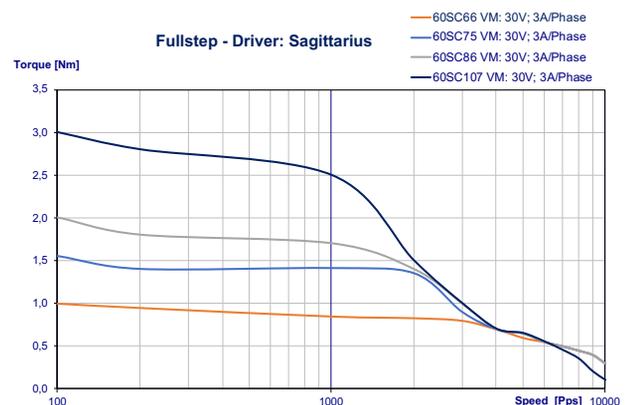


Specification		60SC66	60SC75	60SC86	60SC107	
1	Rated Voltage	V	2,1	2,8	3,4	4,2
2	Current/Phase	A	2,8	2,8	2,8	2,8
3	Resistance/Phase	Ω	0,75	1	1,2	1,5
4	Inductance/Phase	mH	2	3,6	4,6	6,8
5	Holding Torque	Nm	1	1,65	2	3
6	Rotor Inertia	gcm ²	275	450	570	840
7	Detent Torque	Nm	0,05	0,05	0,05	0,1
8	n° of Leads		4	4	4	4
9	Length (L)	mm	66	75	86	107
10	Weight	Kg	0,6	0,82	1,3	1,4

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial force (20mm from front flange)	75N
Max. Axial force	15N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

* 3-channel encoder or other types on request

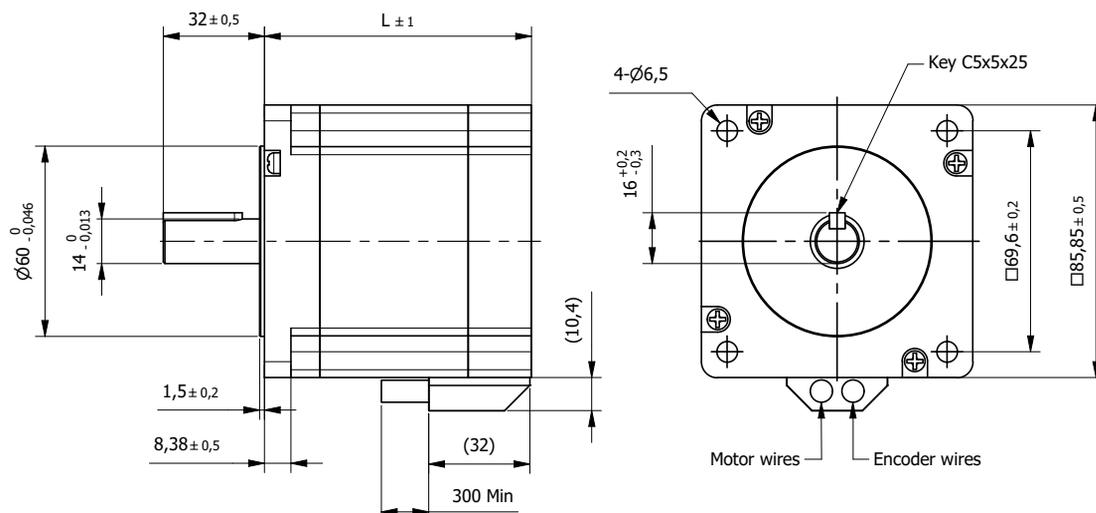
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Black	AWG24	GND
2	Red		VCC:+5VDC
3	Blue		EA+
4	Blue/White		EA-
5	Orange		EB+
6	Orange/White		EB-
Motor			
1	Black	AWG20	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 86SC

with Encoder

□ 86mm

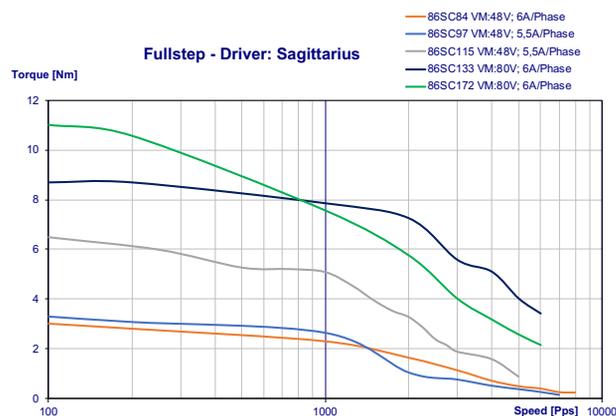


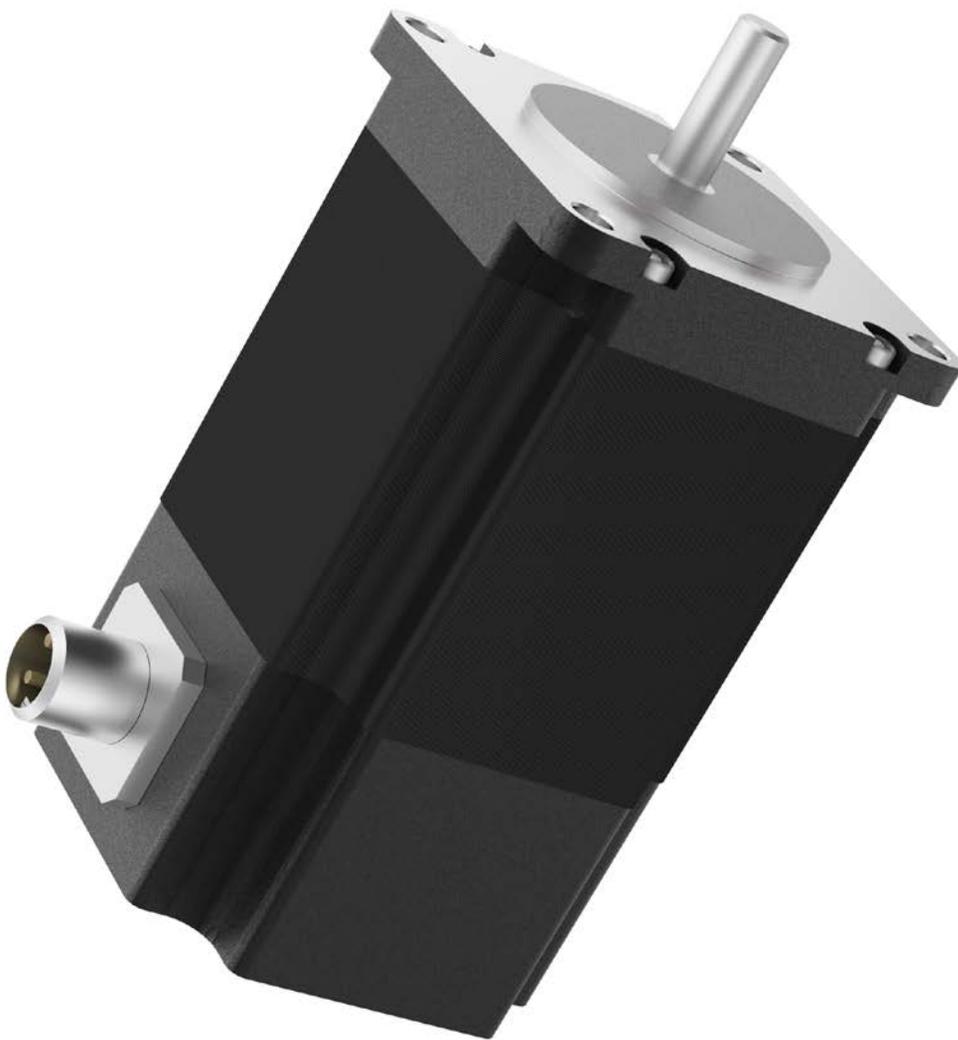
Specification		86SC84	86SC97	86SC115	86SC133	86SC172	
1	Rated Voltage	V	1,7	2,3	2,6	3,3	4,3
2	Current/Phase	A	6	5,5	5,5	6	6,2
3	Resistance/Phase	Ω	0,3	0,4	0,5	0,55	0,7
4	Inductance/Phase	mH	1,8	3,5	3,4	6	9
5	Holding Torque	Nm	3,5	4,5	6,5	8,5	12
6	Rotor Inertia	gcm ²	1000	1400	1900	2700	4000
7	Detent Torque	Nm		0,12	0,12	0,24	0,36
8	n°of Leads		4	4	4	4	4
9	Length (L)	mm	84,5	97	115,5	133	172
10	Weight	Kg	1,7	2,3	2,8	3,8	5,3

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP30
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial force (20mm from front flange)	220N
Max. Axial force	60N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

* 3-channel encoder or other types on request

Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Black	AWG24	GND
2	Red		VCC:+5VDC
3	Blue		EA+
4	Blue/White		EA-
5	Orange		EB+
6	Orange/White		EB-
Motor			
1	Black	AWG18	Phase A
2	Red		Phase A-
3	Yellow		Phase B
4	Green		Phase B-





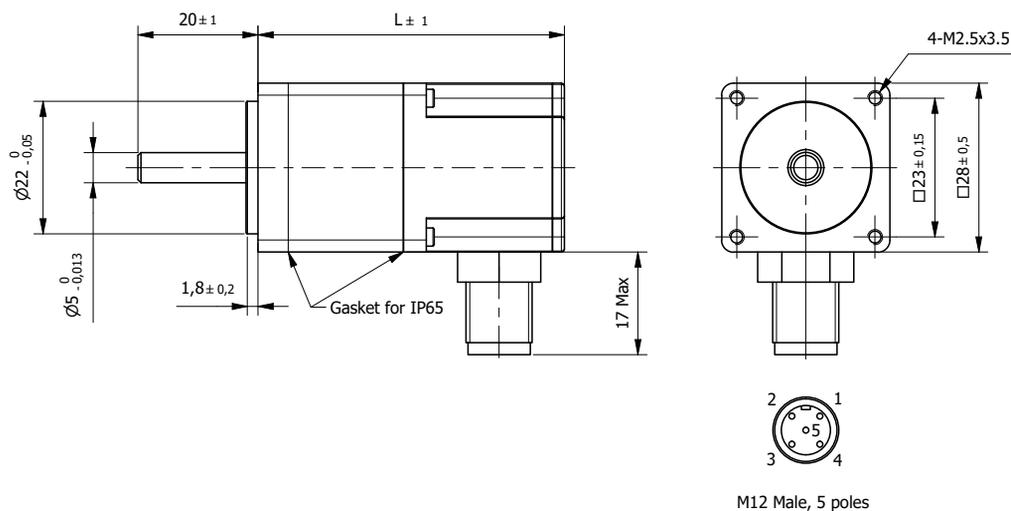
Stepper motors
IP65 Hybrid

Advantages at a glance
High protection
High torque
High speed

IP65 Hybrid Stepper motors	Torque* (Nm)	
SM28 070 - IP65	0,127	284
SM42-E - IP65	0,16...0,72	285
SM57-E - IP65	0,7...1,95	286

Our Hybrid stepper motors with protection class IP65 are designed for harsh operating environments. These IP65-rated stepper motors are completely dustproof. Dust cannot enter the device and therefore cannot damage it internally under any circumstances. IP65 rating also guarantees the protection of the device against water projections, and can withstand low-pressure jets of water.

* Holding Torque



Specification			
Model	SM28 070		
1	Rated Voltage	V	9,2
2	Current/Phase	A	0,67
3	Resistance/Phase	Ω	9,2
4	Inductance/Phase	mH	7,2
5	Holding Torque	Nm	0,127
6	Rotor Inertia	gcm ²	18
7	Detent Torque	Nm	0,036
8	n°of Leads		4
9	Length (L)	mm	70,3
10	Weight	Kg	0,22

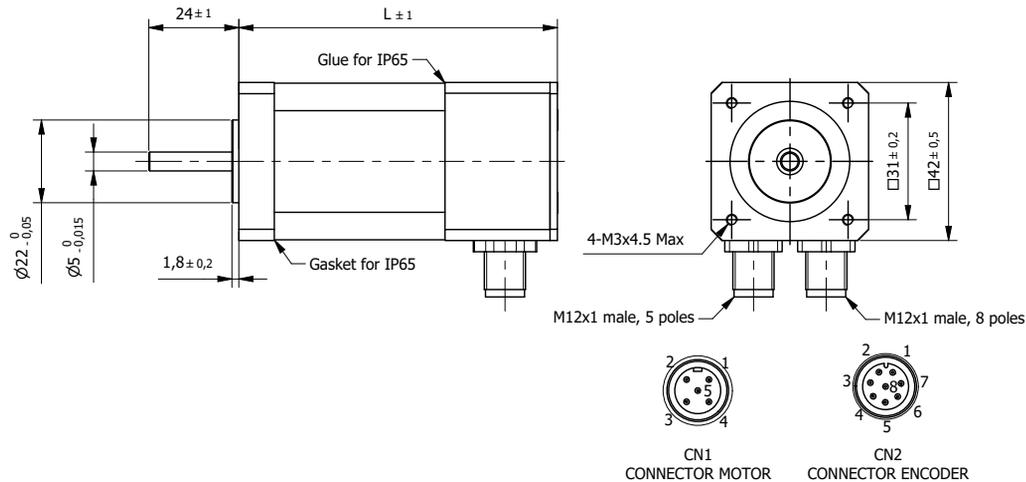
Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP65
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,03mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial force (at shaft end)	21N
Max. Axial force	10N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection	
Poles n°	Function
Motor	
1	Phase A
2	Phase A-
3	Phase B
4	Phase B-

Hybrid Stepper Motor SM42

with Encoder - IP65

□ 42mm

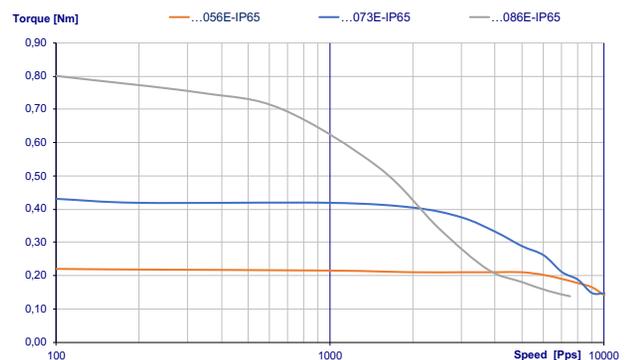


Specification		Model	...056E-IP65	...073E-IP65	...086E-IP65
1	Rated Voltage	V	1,5	2,7	3,6
2	Current/Phase	A	1,8	1,8	1,8
3	Resistance/Phase	Ω	0,86	1,52	2
4	Inductance/Phase	mH	1,1	3,7	5
5	Holding Torque	Nm	0,16	0,48	0,72
6	Rotor Inertia	gcm ²	25	80	115
7	Detent Torque	Nm	0,012	0,012	0,012
8	n°of Leads		4	4	4
9	Length (L)	mm	56	73	86
10	Weight	Kg	0,2	0,56	0,7

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP65
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial force (at shaft end)	21N
Max. Axial force	10N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

* 3-channel encoder or other types on request

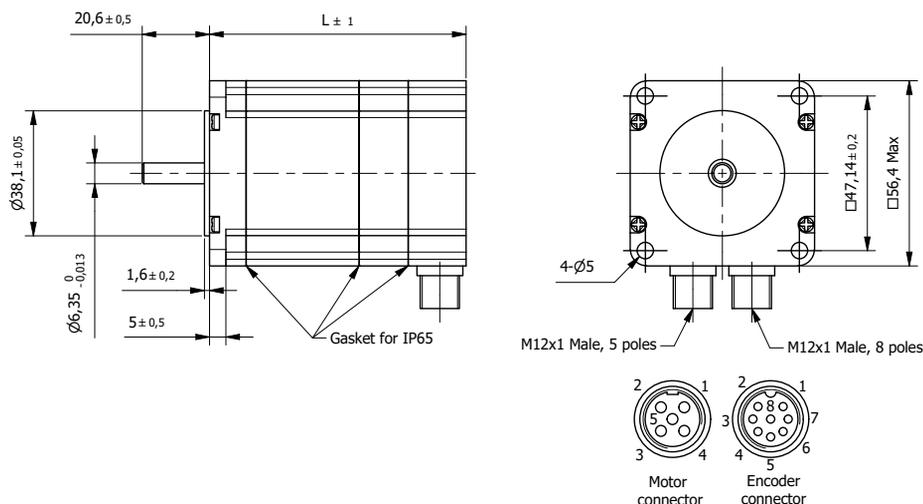
Connection	
Poles n°	Function
Motor	
1	Phase A
2	Phase A-
3	Phase B
4	Phase B-
Feedback	
1	Vdc
2	GND
3	A
4	A-
5	B
6	B-
7	Z
8	Z-



Hybrid Stepper Motor SM57

with Encoder - IP65

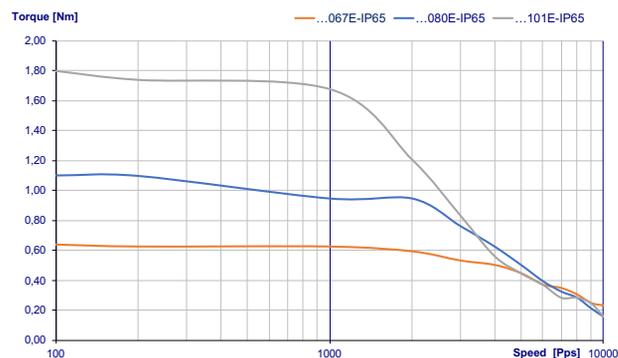
□ 57mm



Specification		...067E-IP65	...080E-IP65	...101E-IP65	
1	Rated Voltage	V	1,6	2,4	3,1
2	Current/Phase	A	2,82	2,82	2,82
3	Resistance/Phase	Ω	0,57	0,85	1,1
4	Inductance/Phase	mH	1,6	2,5	4,4
5	Holding Torque	Nm	0,7	1,1	1,95
6	Rotor Inertia	gcm ²	170	280	520
7	Detent Torque	Nm	0,036	0,036	0,036
8	n°of Leads		4	4	4
9	Length (L)	mm	67	80	101
10	Weight	Kg	0,5	0,85	1

Characteristics	
Item	
Encoder Type*	Optical - Incremental 500 CPR / 2 channels
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP65
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,03mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial force (at shaft end)	75N
Max. Axial force	15N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection	
Poles n°	Function
Motor	
1	Phase A
2	Phase A-
3	GND
4	Phase B
5	Phase B-
Feedback	
1	Vdc
2	GND
3	A
4	A-
5	B
6	B-
7	Z
8	Z-



Linear Actuators



External Stepper
Linear Actuators

[p.297](#)



Non-Captive Stepper
Linear Actuators

[p.305](#)

Linear Actuators

Technical introduction		294
External Hybrid Stepper Linear Actuators		
	Thrust ref (N)	297
20E	20...60	298
28E	30...170	299
35E	115...440	300
42E	185...750	301
57E	96...2000	302
Non-Captive Hybrid Stepper Linear Actuators		
	Thrust ref (N)	305
20N	20...60	306
28N	30...170	307
35N	115...440	308
42N	185...750	309
57N	96...2000	310

Term	
Rated voltage	Voltage necessary to reach the nominal current per phase.
Current/Phase	The current supplied to the motor phases that will not exceed, at an ambient temperature of 20°C, the thermal limits of the motor.
Resistance/Phase	Winding resistance per phase. Tolerance +/- 12%, steady state.
Inductance/Phase	Winding inductance per phase measured at 1kHz.
Number of leads	Number of lead wires available to connect the motor.
Thrust ref	Maximum load the actuator is able to drive at minimum speed, close to the stall point.
Length	Total motor length.
Weight	Total motor mass.
Wiring - Bipolar	A motor having two groups of coils in the stator. Generally represented by A and B on the wiring diagram and 4 lead wires extending from the motor.
Step angle	Number of angular degrees the motor moves per full-step
Magnet Wire insulation class	The electrical insulation system for wires and other wire-wound electrical components is divided into different classes by temperature and temperature rise. The electrical insulation system is sometimes referred to as insulation class or thermal classification.
Operating temperature	Temperatures at which the motor can operate.
Temperature rise	Maximum temperature rise for the motor at rated voltage.
Dielectric strength	A dielectric test (also known as hipot or high potential test) is performed on all motors under 500V phases to the housing and during 5 seconds after voltage ramp up. Maximum allowed leakage is 1mA
Screw Diameter	The outside diameter of the screw.
Lead	The axial distance the nut advances in one revolution of the screw. The lead is equal to the pitch times the number of starts. $PITCH \times STARTS = LEAD$
Travel per step	The linear translation of a lead nut or screw for one full step of the motor.

Glossary

Product families

External Hybrid Stepper
Linear Actuators
Captive Hybrid Stepper
Linear Actuators
Non-Captive Hybrid Stepper
Linear Actuators

Linear actuators are a type of actuator that convert rotational motion in motors into linear or straight push/pull movements. Linear actuators are ideal for all types of applications where tilting, lifting, pulling or pushing with high force are required. Electric linear actuators are often the preferred solution when you need simple, safe and clean movement with accurate precision and smooth motion control.

Lead Screws Actuators Characteristics

Small to medium load ratings, therefore suitable for low to medium loads

Very high accuracy using closed loop function through Delta Line drivers

Customizable screws end machining

Customizable nuts

High reliability and long service life with marginal need for maintenance

The lead screw turns with the rotor, moving a nut back and forth linearly. An external guide is necessary to prevent rotation of the nut. In the case of external linear actuators, the lead screw is permanently attached to the motor shaft and turns with the shaft when the motor is energized. If an external threaded nut - in standardized or anti-backlash version - is mounted on the lead screw and secured against rotating by an external guide, the threaded nut moves along the lead screw.

EXTERNAL Stepper Motor Actuators

The lead screw moves back and forth linearly with the linear guide serving as an anti-rotation device. In the case of linear actuators with linear guide (captive), the plastic threaded nut is injection-molded into the hollow shaft rotor of the stepper motor and positively connected to it. If the motor is energized, the connection of lead screw and threaded nut transforms the rotary movement of the rotor into the linear movement of the lead screw. For this purpose, a linear guide is attached to the front of the lead screw and prevents the lead screw from rotating.

CAPTIVE Stepper Motor Actuators

The rotor drives the lead screw back and forth linearly. An external guide is necessary to prevent rotation. In the case of linear actuators without linear guide (non-captive), the plastic threaded nut is injection-molded into the hollow shaft rotor of the stepper motor and positively connected to it. If the motor is energized and the lead screw secured against rotating by means of an external guide, the connection of lead screw and threaded nut transforms the rotary movement of the rotor into the linear movement of the lead screw.

NON-CAPTIVE Stepper Motor Actuators

The selection of the correct lead screw and nut for a particular application involves four interrelated factors. Before attempting to determine the lead screw and nut combination, the following values must be known:

- Axial load measured in pounds or newtons
- Speed measured in inches or millimeters per minute
- Length between bearings measured in inches or millimeters
- End fixity type

Load

The loads that need to be considered are the static loads, dynamic loads, reaction forces and any external forces affecting the screw.

Speed

The travel rate (linear speed) is the rpm at which the screw or nut is rotating multiplied by the lead of the screw.

Length

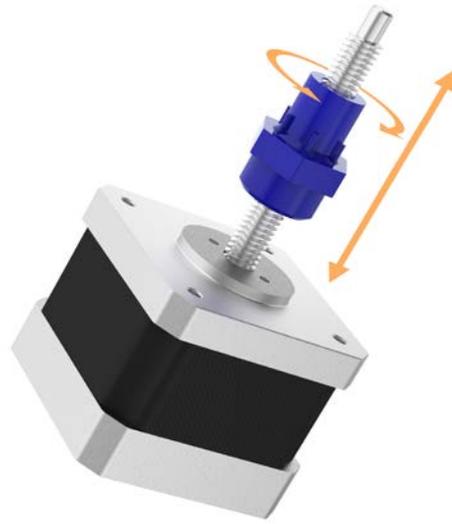
The unsupported length of the screw.

End fixity

Refers to the method by which the ends of the screw are supported. The degree of end fixity is related to the amount of restraint of the ends of the screw.

Technical introduction

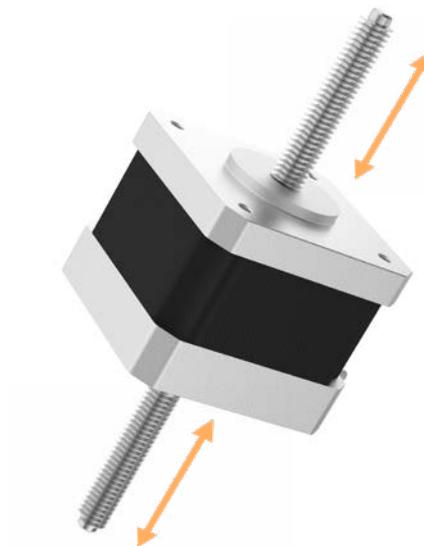
External Stepper
Linear Actuators

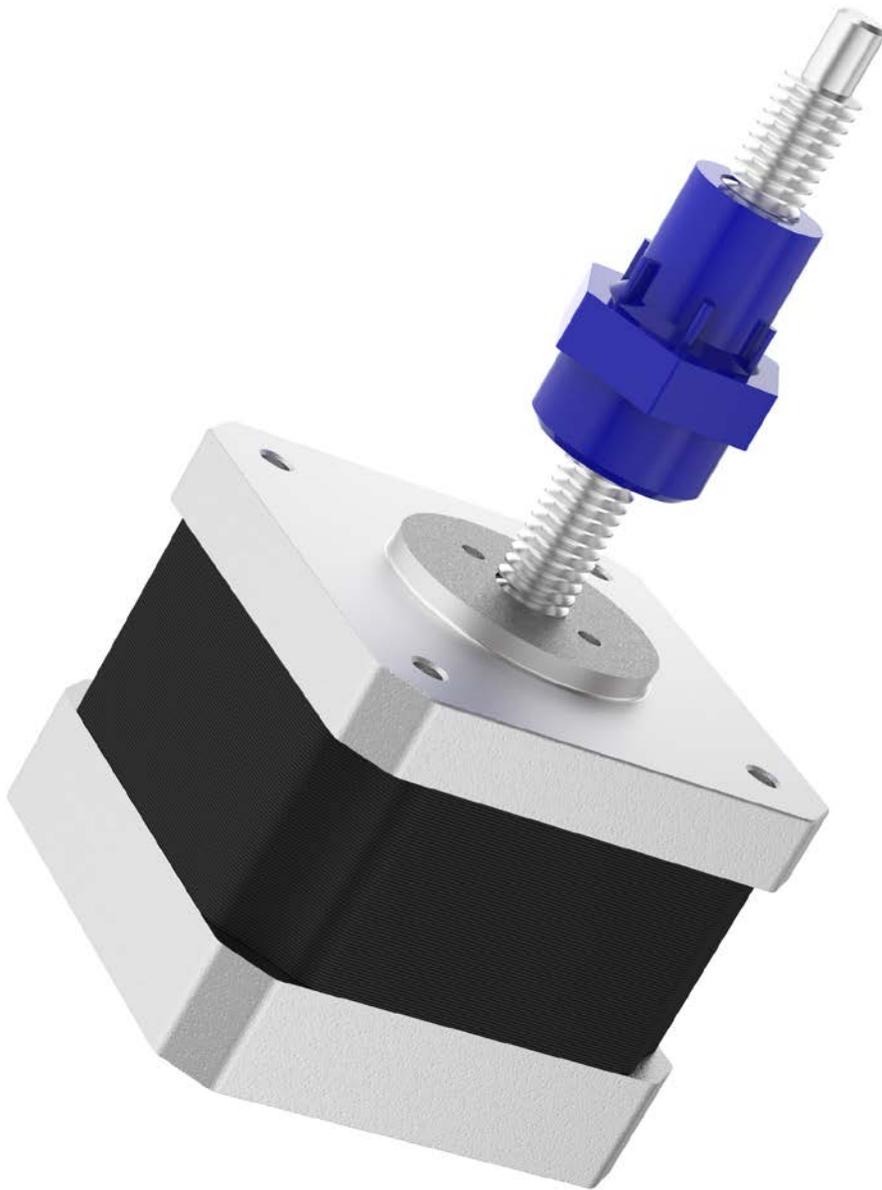


Captive Stepper
Linear Actuators



Non-Captive Stepper
Linear Actuators





External Linear Actuators

Advantages at a glance

Small to medium load ratings

High accuracy

Customizable

Our External Stepper Motor Actuators feature precision lead screws and nuts to produce accurate and repeatable linear motion. Actuators are manufactured in NEMA sizes 8, 11, 14, 17 and 23. Standard and custom nut designs are available. Optional accessories are connectors, wire harnesses, digital encoders and custom lead screw nuts.

External Hybrid Stepper Linear Actuators

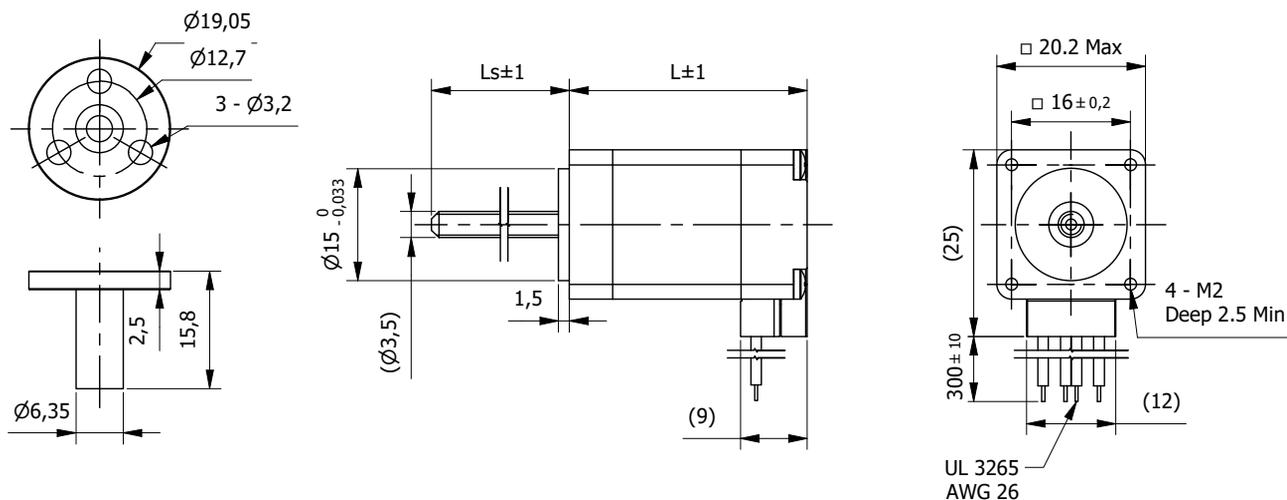
Thrust ref (N)

20E	20...60	298
28E	30...170	299
35E	115...440	300
42E	185...750	301
57E	96...2000	302

External Linear Actuator 20E

□ 20mm

Hybrid Stepper motor



Actuator Specification			...33-06B	...33-06R	...42-08B	...42-08R
1	Rated Voltage	V	4	4	4,32	4,32
2	Current / Phase	A	0,6	0,6	0,8	0,8
3	Resistance / Phase	Ω	6,6	6,6	5,4	5,4
4	Inductance / Phase	mH	2,3	2,3	1,5	1,5
5	n° of Leads		4	4	4	4
6	Thrust ref	N	20	40	30	60
7	Motor Length (L)	mm	32	32	42	42
8	Weight	g	60	60	80	80

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
A	3,5mm	1,2192mm	0,006096mm	102mm
AM	3,5mm	1,2192mm	0,006096mm	102mm
B	3,5mm	2mm	0,01mm	102mm
R	3,5mm	1mm	0,005mm	102mm
U	3,5mm	4mm	0,02mm	102mm

* Other screw length available on request

Standard Nut options	
Delrin flanged nut	
* Custom nut available on request	

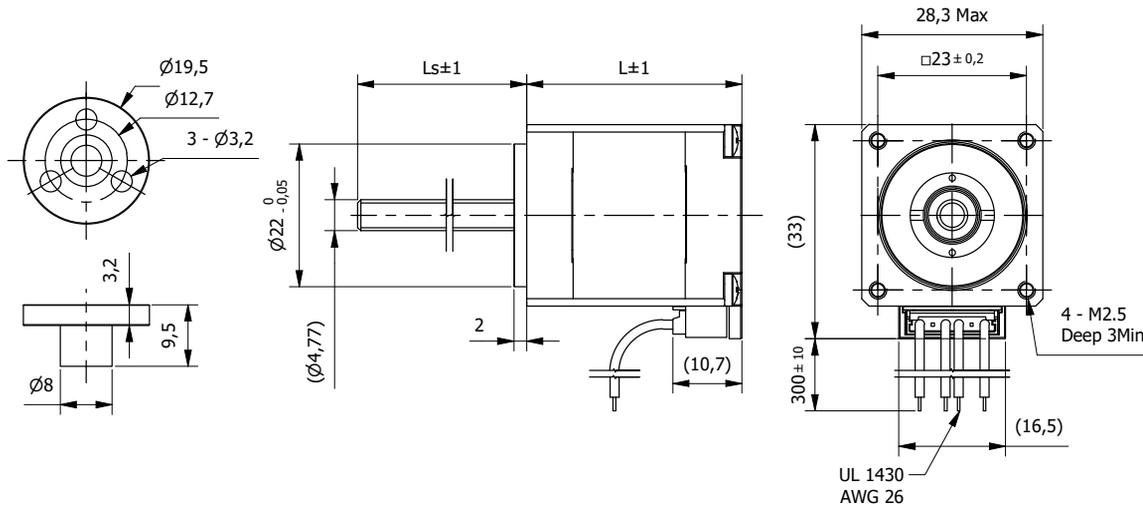
Connection			
Lead n°	Gauge	Color	Function
1	UL3265 AWG26	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

Product code reference	
20 E 33 - 06 B 102 S	
20	Frame size
E	External
33	Motor length
06	Rated current
B	Lead screw code
102	Screw length
S	Standard flanged nut

External Linear Actuator 28E

Hybrid Stepper motor

□ 28mm



Actuator Specification			...32-07V	...32-07Y	...45-07V	...45-07Y
1	Rated Voltage	V	3,75	3,75	4,56	4,56
2	Current / Phase	A	0,67	0,67	0,67	0,67
3	Resistance / Phase	Ω	5,6	5,6	6,8	6,8
4	Inductance / Phase	mH	3,4	3,4	4,9	4,9
5	n° of Leads		4	4	4	4
6	Thrust ref	N	110	30	170	45
7	Motor Length (L)	mm	31,5	31,5	44,5	44,5
8	Weight	g	110	110	140	140

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
M	4,77mm	10,16mm	0,0508mm	102mm
Q	4,77mm	0,635mm	0,003175mm	102mm
V	4,77mm	1,27mm	0,00635mm	102mm
Y	4,77mm	5,08mm	0,0254mm	102mm
Z	4,77mm	2,54mm	0,0127mm	102mm

* Other screw length available on request

Standard Nut options	
Delrin flanged nut	
* Custom nut available on request	

Connection				
Lead n°	Gauge	Color	Function	
1	UL1430 AWG26	Black	Phase A	
2	|	Red	Phase B	
3	|	Green	Phase C	
4	|	Blue	Phase D	

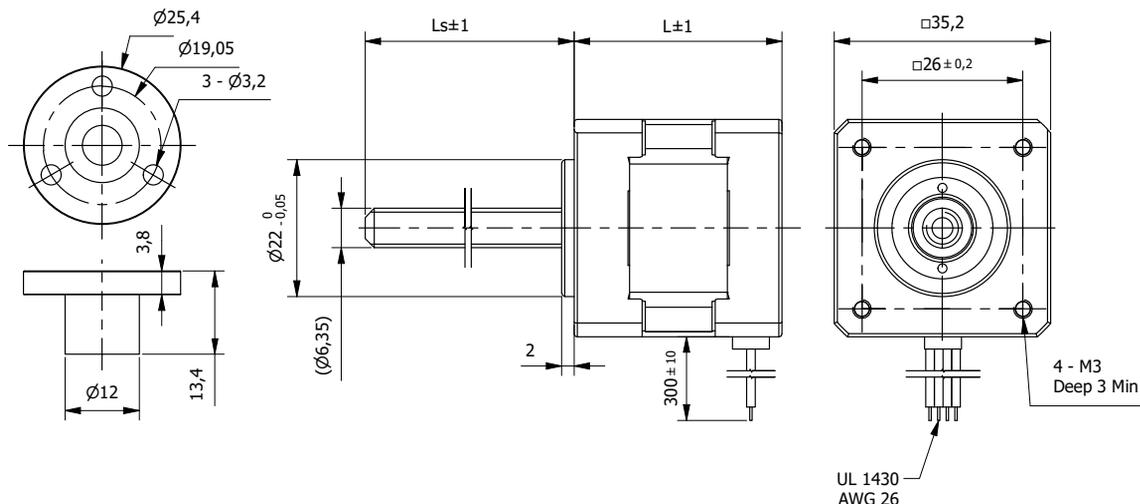
Product code reference	
28 E 32 - 07 V 102 S	
28	Frame size
E	External
32	Motor length
07	Rated current
V	Lead screw code
102	Screw length
S	Standard flanged nut

Linear actuators

External Linear Actuator 35E

□ 35mm

Hybrid Stepper motor



Actuator Specification			...33-12D	...33-12I	...42-15D	...42-15I
1	Rated Voltage	V	2,16	2,16	3,45	3,45
2	Current / Phase	A	1,2	1,2	1,5	1,5
3	Resistance / Phase	Ω	1,8	1,8	2,3	2,3
4	Inductance / Phase	mH	2,7	2,7	3	3
5	n° of Leads		4	4	4	4
6	Thrust ref	N	115	220	230	440
7	Motor Length (L)	mm	33,5	33,5	42	42
8	Weight	g	200	200	230	230

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Connection			
Lead n°	Gauge	Color	Function
1	UL1430 AWG26	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
AA	6,35mm	25,4mm	0,127mm	152mm
AB	6,35mm	12,7mm	0,0635mm	152mm
AG	6,35mm	2mm	0,01mm	152mm
AI	6,35mm	0,6096mm	0,003048mm	152mm
AN	6,35mm	2,54mm	0,0127mm	152mm
AP	6,35mm	0,79mm	0,00395mm	152mm
D	6,35mm	2,4384mm	0,012192mm	152mm
E	6,35mm	3,175mm	0,015875mm	152mm
F	6,35mm	5,08mm	0,0254mm	152mm
I	6,35mm	1,27mm	0,00635mm	152mm
K	6,35mm	6,35mm	0,03175mm	152mm
N	6,35mm	1,5875mm	0,0079375mm	152mm
T	6,35mm	9,7536mm	0,048768mm	152mm
X	6,35mm	4,8768mm	0,024384mm	152mm

* Other screw length available on request

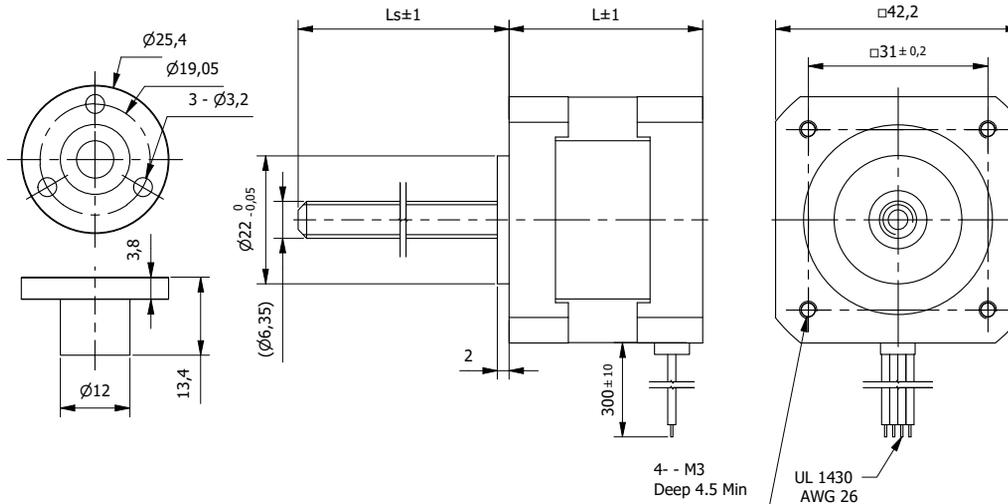
Product code reference	
35 E 33 - 12 D 152 S	
35	Frame size
E	External
33	Motor length
12	Rated current
D	Lead screw code
152	Screw length
S	Standard flanged nut

Standard Nut options
Delrin flanged nut
* Custom nut available on request

External Linear Actuator 42E

Hybrid Stepper motor

□ 42mm



Actuator Specification			...33-10D	...33-10I	...47-18D	...47-18F	...47-18I
1	Rated Voltage	V	3,8	3,8	3,24	3,24	3,24
2	Current / Phase	A	1	1	1,8	1,8	1,8
3	Resistance / Phase	Ω	3,8	3,8	1,8	1,8	1,8
4	Inductance / Phase	mH	5	5	3,3	3,3	3,3
5	n° of Leads		4	4	4	4	4
6	Thrust ref	N	185	350	390	185	750
7	Motor Length (L)	mm	33,5	33,5	47,5	47,5	47,5
8	Weight	g	220	220	350	350	350

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
AA	6,35mm	25,4mm	0,127mm	152mm
AB	6,35mm	12,7mm	0,0635mm	152mm
AG	6,35mm	2mm	0,01mm	152mm
AI	6,35mm	0,6096mm	0,003048mm	152mm
AN	6,35mm	2,54mm	0,0127mm	152mm
AP	6,35mm	0,79mm	0,00395mm	152mm
D	6,35mm	2,4384mm	0,012192mm	152mm
E	6,35mm	3,175mm	0,015875mm	152mm
F	6,35mm	5,08mm	0,0254mm	152mm
I	6,35mm	1,27mm	0,00635mm	152mm
K	6,35mm	6,35mm	0,03175mm	152mm
N	6,35mm	1,5875mm	0,0079375mm	152mm
T	6,35mm	9,7536mm	0,048768mm	152mm
X	6,35mm	4,8768mm	0,024384mm	152mm

* Other screw length available on request

Standard Nut options	
Delrin flanged nut	
* Custom nut available on request	

Connection			
Lead n°	Gauge	Color	Function
1	UL1430 AWG26	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

Product code reference	
42 E 33 - 10 D 152 S	

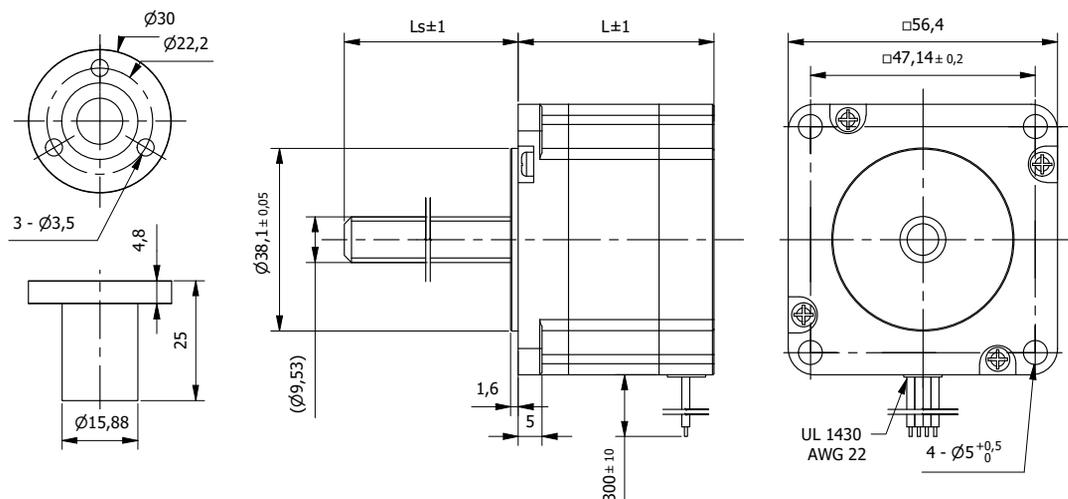
42	Frame size
E	External
33	Motor length
10	Rated current
D	Lead screw code
152	Screw length
S	Standard flanged nut

Linear actuators

External Linear Actuator 57E

□ 57mm

Hybrid Stepper motor



Actuator Specification			...44-20AC	...44-20AF	...44-20AL	...67-25AC	...67-25AF
1	Rated Voltage	V	3,6	3,6	3,6	5	5
2	Current / Phase	A	2	2	2	2,5	2,5
3	Resistance / Phase	Ω	1,8	1,8	1,8	2	2
4	Inductance / Phase	mH	4,5	4,5	4,5	-	-
5	n° of Leads		4	4	4	4	4
6	Thrust ref	N	890	480	96	2000	1050
7	Motor Length (L)	mm	44	44	44	67	67
8	Weight	g	450	450	450	900	900

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
AC	9,525mm	1,27mm	0,00635mm	152mm
AF	9,525mm	2,54mm	0,0127mm	152mm
AJ	9,525mm	5,08mm	0,0254mm	152mm
AL	9,525mm	12,7mm	0,0635mm	152mm
AO	9,525mm	10,16mm	0,0508mm	152mm
AQ	9,525mm	1,5875mm	0,0079375mm	152mm
W	9,525mm	4,233mm	0,021165mm	152mm

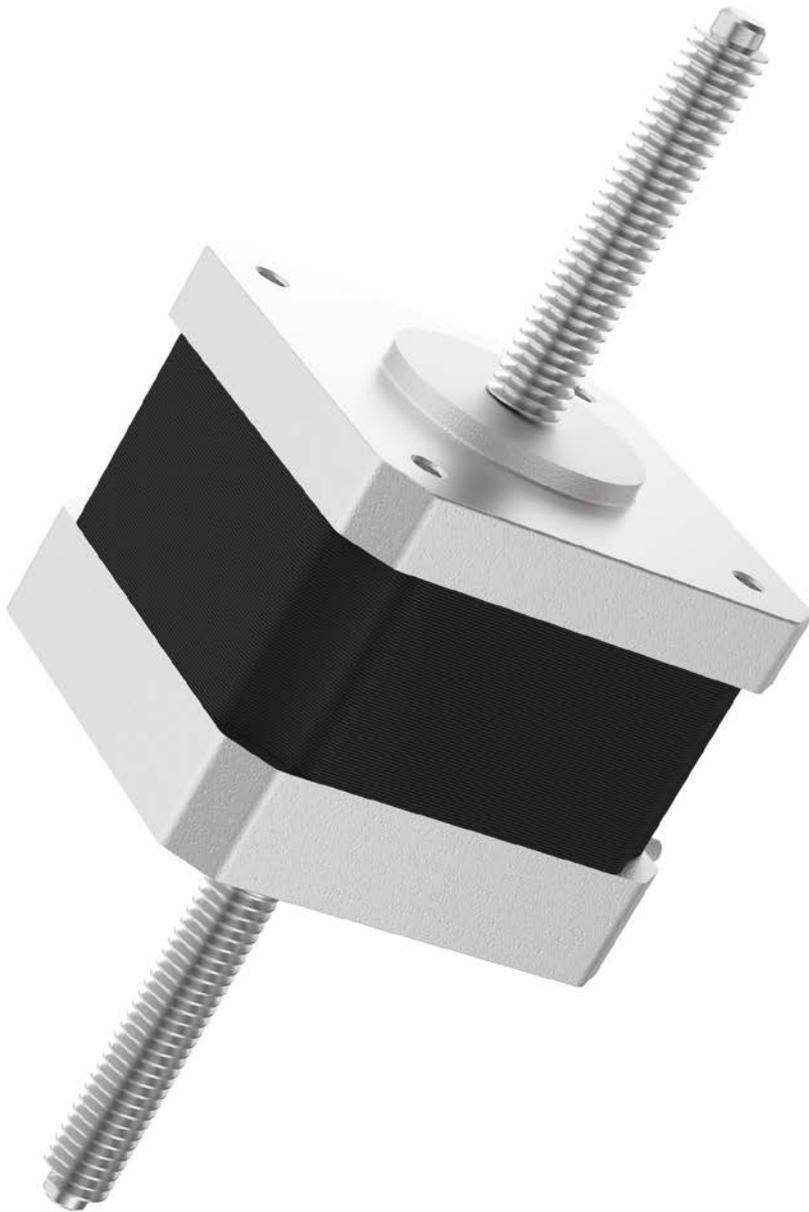
* Other screw length available on request

Standard Nut options	
Delrin flanged nut	
* Custom nut available on request	

Connection			
Lead n°	Gauge	Color	Function
1	UL1430 AWG22	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

Product code reference	
57 E 44 - 20 AC 152 S	

57	Frame size
E	External
44	Motor length
20	Rated current
AC	Lead screw code
152	Screw length
S	Standard flanged nut



Non-Captive Linear Actuators

Advantages at a glance

Small to medium load ratings

High accuracy

Customizable

Our Non-Captive Stepper Motor Actuators are offered in NEMA 8,11,14, 17 and 23 frame motors. These stepper motor linear actuators operate with a precision lead screw that translates through the motor housing. The lead screw nut is manufactured from high performance plastic to offer long life and maximum load carrying.

Non-Captive Hybrid Stepper Linear Actuators

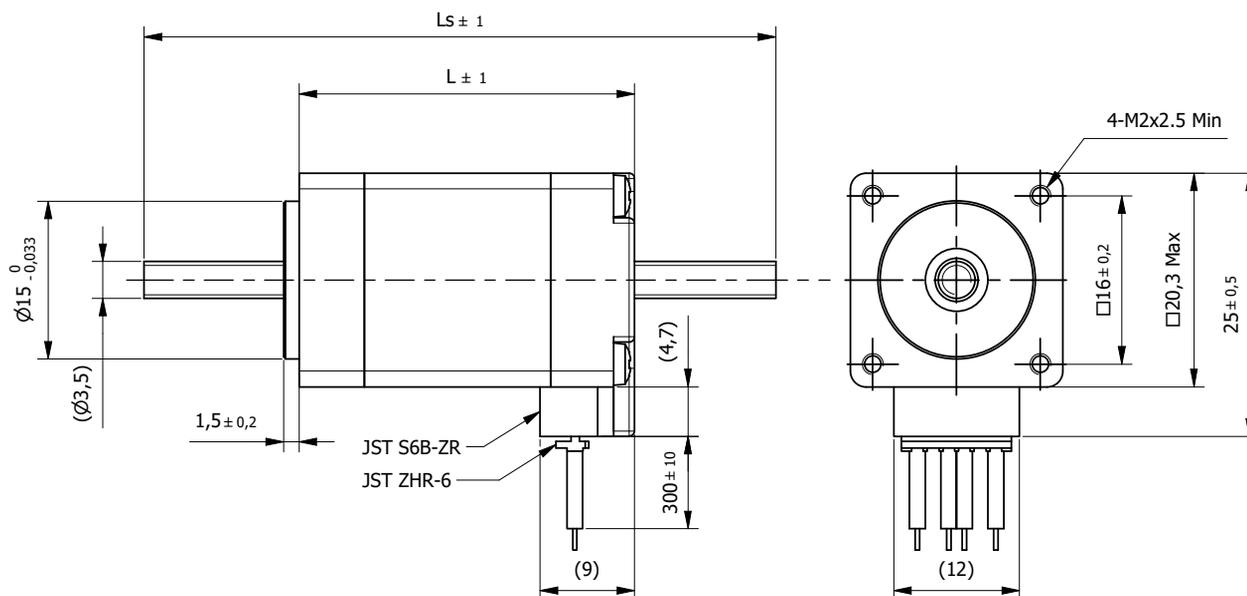
Thrust ref (N)

20N	20...60	306
28N	30...170	307
35N	115...440	308
42N	185...750	309
57N	96...2000	310

Non-Captive Linear Actuator 20N

□ 20mm

Hybrid Stepper motor



Actuator Specification			...33-06B	...33-06R	...42-08B	...42-08R
1	Rated Voltage	V	4	4	4,32	4,32
2	Current / Phase	A	0,6	0,6	0,8	0,8
3	Resistance / Phase	Ω	6,6	6,6	5,4	5,4
4	Inductance / Phase	mH	2,3	2,3	1,5	1,5
5	n° of Leads		4	4	4	4
6	Thrust ref	N	20	40	30	60
7	Motor Length (L)	mm	32	32	42	42
8	Weight	g	60	60	80	80

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
A	3,5mm	1,2192mm	0,006096mm	102mm
AM	3,5mm	1,2192mm	0,006096mm	102mm
B	3,5mm	2mm	0,01mm	102mm
R	3,5mm	1mm	0,005mm	102mm
U	3,5mm	4mm	0,02mm	102mm

* Other screw length available on request

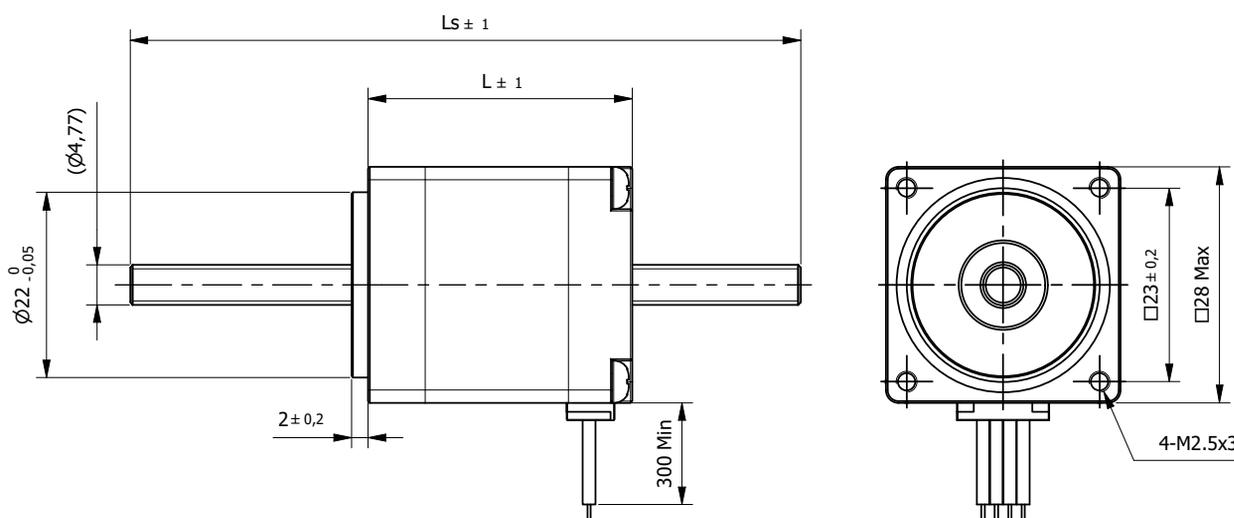
Connection			
Lead n°	Gauge	Color	Function
1	UL3265 AWG26	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

Product code reference	
20 N 33 - 06 B 102	
20	Frame size
N	Non-Captive
33	Motor length
06	Rated current
B	Lead screw code
102	Screw length

Non-Captive Linear Actuator 28N

□ 28mm

Hybrid Stepper motor



Actuator Specification						
Model		...32-07V	...32-07Y	...45-07V	...45-07Y	
1	Rated Voltage	V	3,75	3,75	4,56	4,56
2	Current / Phase	A	0,67	0,67	0,67	0,67
3	Resistance / Phase	Ω	5,6	5,6	6,8	6,8
4	Inductance / Phase	mH	3,6	3,6	4,9	4,9
5	n° of Leads		4	4	4	4
6	Thrust ref	N	110	30	170	45
7	Motor Length (L)	mm	31,5	31,5	44,5	44,5
8	Weight	g	110	110	140	140

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
M	4,77mm	10,16mm	0,0508mm	102mm
Q	4,77mm	0,635mm	0,003175mm	102mm
V	4,77mm	1,27mm	0,00635mm	102mm
Y	4,77mm	5,08mm	0,0254mm	102mm
Z	4,77mm	2,54mm	0,0127mm	102mm

* Other screw length available on request

Connection			
Lead n°	Gauge	Color	Function
1	UL1430 AWG26	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

Product code reference	
28 N 32 - 07 V 102	

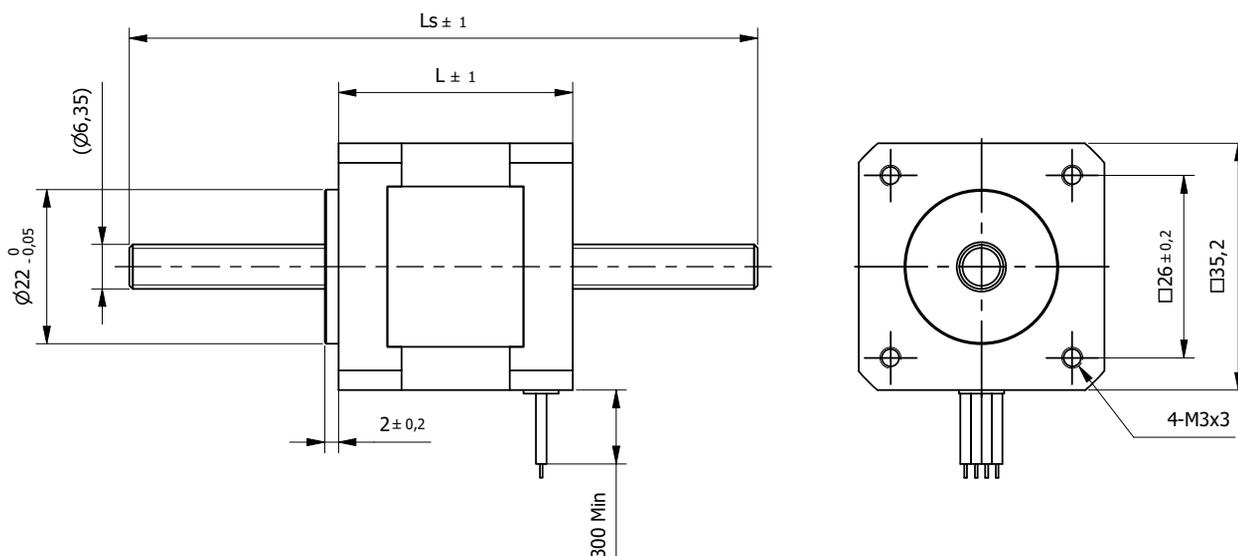
28	Frame size
N	Non-Captive
32	Motor length
07	Rated current
V	Lead screw code
102	Screw length

Linear actuators

Non-Captive Linear Actuator 35N

□ 35mm

Hybrid Stepper motor



Actuator Specification			...33-12D	...33-12I	...42-15D	...42-15I
1	Rated Voltage	V	2,16	2,16	3,45	3,45
2	Current / Phase	A	1,2	1,2	1,5	1,5
3	Resistance / Phase	Ω	1,8	1,8	2,3	2,3
4	Inductance / Phase	mH	2,7	2,7	3,7	3,7
5	n° of Leads		4	4	4	4
6	Thrust ref	N	115	220	230	440
7	Motor Length (L)	mm	33,5	33,5	42	42
8	Weight	g	200	200	230	230

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
AA	6,35mm	25,4mm	0,127mm	152mm
AB	6,35mm	12,7mm	0,0635mm	152mm
AG	6,35mm	2mm	0,01mm	152mm
AI	6,35mm	0,6096mm	0,003048mm	152mm
AN	6,35mm	2,54mm	0,0127mm	152mm
AP	6,35mm	0,79mm	0,00395mm	152mm
D	6,35mm	2,4384mm	0,012192mm	152mm
E	6,35mm	3,175mm	0,015875mm	152mm
F	6,35mm	5,08mm	0,0254mm	152mm
I	6,35mm	1,27mm	0,00635mm	152mm
K	6,35mm	6,35mm	0,03175mm	152mm
N	6,35mm	1,5875mm	0,0079375mm	152mm
T	6,35mm	9,7536mm	0,048768mm	152mm
X	6,35mm	4,8768mm	0,024384mm	152mm

* Other screw length available on request

Connection			
Lead n°	Gauge	Color	Function
1	UL1430 AWG26	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

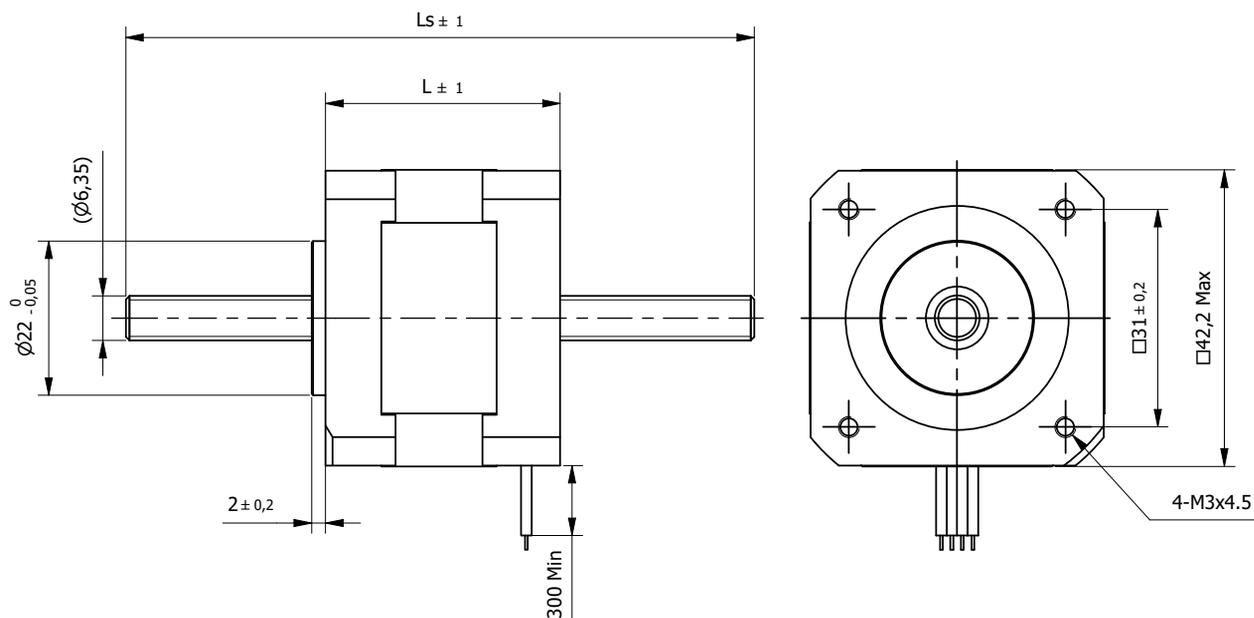
Product code reference	
35 N 33 - 12 D 152	

35	Frame size
N	Non-Captive
33	Motor length
12	Rated current
D	Lead screw code
152	Screw length

Non-Captive Linear Actuator 42N

□ 42mm

Hybrid Stepper motor



Actuator Specification			...33-10D	...33-10I	...47-18D	...47-18F	...47-18I
1	Rated Voltage	V	3,8	3,8	3,24	3,24	3,24
2	Current / Phase	A	1	1	1,8	1,8	1,8
3	Resistance / Phase	Ω	3,8	3,8	1,8	1,8	1,8
4	Inductance / Phase	mH	5	5	3,3	3,3	3,3
5	n° of Leads		4	4	4	4	4
6	Thrust ref	N	185	350	390	185	750
7	Motor Length (L)	mm	33,5	33,5	47,5	47,5	47,5
8	Weight	g	220	220	350	350	350

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
AA	6,35mm	25,4mm	0,127mm	152mm
AB	6,35mm	12,7mm	0,0635mm	152mm
AG	6,35mm	2mm	0,01mm	152mm
AI	6,35mm	0,6096mm	0,003048mm	152mm
AN	6,35mm	2,54mm	0,0127mm	152mm
AP	6,35mm	0,79mm	0,00395mm	152mm
D	6,35mm	2,4384mm	0,012192mm	152mm
E	6,35mm	3,175mm	0,015875mm	152mm
F	6,35mm	5,08mm	0,0254mm	152mm
I	6,35mm	1,27mm	0,00635mm	152mm
K	6,35mm	6,35mm	0,03175mm	152mm
N	6,35mm	1,5875mm	0,0079375mm	152mm
T	6,35mm	9,7536mm	0,048768mm	152mm
X	6,35mm	4,8768mm	0,024384mm	152mm

* Other screw length available on request

Connection			
Lead n°	Gauge	Color	Function
1	UL1430 AWG26	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

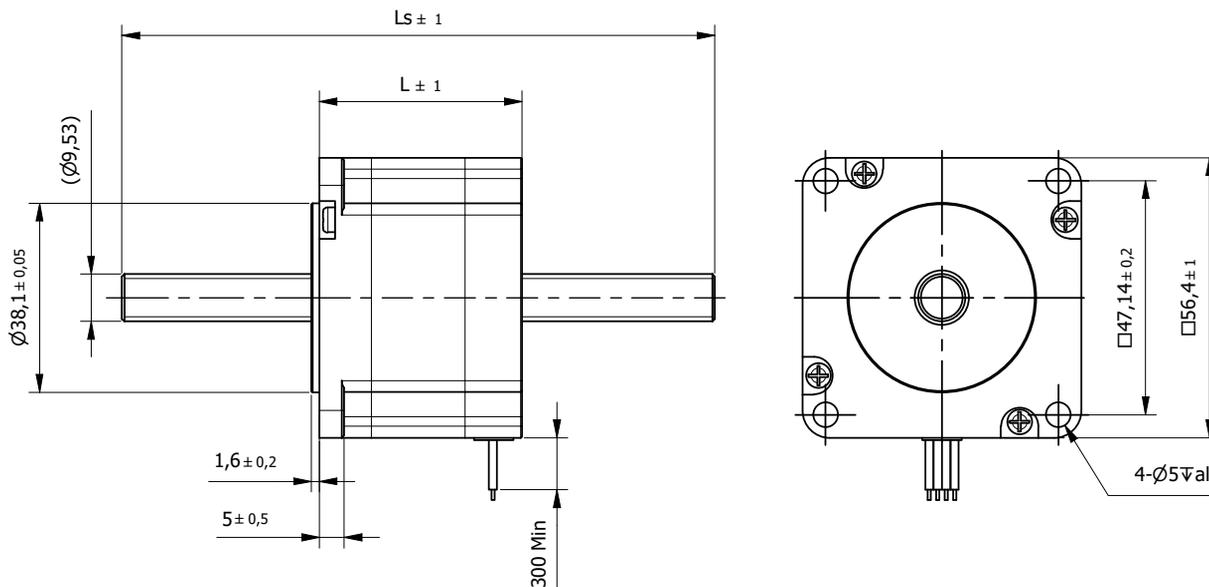
Product code reference	
42 N 33 - 10 D 152	

42	Frame size
N	Non-Captive
33	Motor length
10	Rated current
D	Lead screw code
152	Screw length

Non-Captive Linear Actuator 57N

□ 57mm

Hybrid Stepper motor



Actuator Specification		Model	...44-20AC	...44-20AF	...44-20AL	...67-25AC	...67-25AF
1	Rated Voltage	V	3,6	3,6	3,6	5	5
2	Current / Phase	A	2	2	2	2,5	2,5
3	Resistance / Phase	Ω	1,8	1,8	1,8	2	2
4	Inductance / Phase	mH	4,5	4,5	4,5	6,5	6,5
5	n° of Leads		4	4	4	4	4
6	Thrust ref	N	890	480	96	2000	1050
7	Motor Length (L)	mm	44	44	44	67	67
8	Weight	g	450	450	450	900	900

Actuator Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-20 to 50°C
Temperature Rise	80°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws				
Code	Ø	Lead	Travel/step	Length (Ls)
AC	9,525mm	1,27mm	0,00635mm	152mm
AF	9,525mm	2,54mm	0,0127mm	152mm
AJ	9,525mm	5,08mm	0,0254mm	152mm
AL	9,525mm	12,7mm	0,0635mm	152mm
AO	9,525mm	10,16mm	0,0508mm	152mm
AQ	9,525mm	1,5875mm	0,0079375mm	152mm
W	9,525mm	4,233mm	0,021165mm	152mm

* Other screw length available on request

Connection			
Lead n°	Gauge	Color	Function
1	UL1430 AWG22	Black	Phase A
2	|	Red	Phase B
3	|	Green	Phase C
4	|	Blue	Phase D

Product code reference	
57 N 44 - 20 AC 152	
57	Frame size
N	Non-Captive
44	Motor length
20	Rated current
AC	Lead screw code
152	Screw length

Gearboxes



Spur gearboxes

p.345



Wheel Hub gearboxes

p.353



Planetary gearboxes
GP series
Standard

p.323



Planetary gearboxes
JMS series
Economy

p.337

Gearboxes

Technical introduction		318
Planetary gearboxes - GP Standard series	Torque* (Nm)	323
08GPS	0,008...0,1	324
10GPS	0,01...0,15	325
12GPS	0,08...0,17	326
16GPS	0,2...0,45	327
22GPS	0,5...1,5	328
26GPS	0,75...4,5	329
32GPS	1,25...5	330
GP42-S	6,5...19	331
GP56-S/N/T	1,5...35	332
GP80-T	23...67	335
Planetary gearboxes - JMS Economy series	Torque* (Nm)	337
22JMS	0,6...2	338
28JMS	1,2...4	339
36JMS	2...6	340
42JMS	3...10	341
56JMS	9...30	342
Spur gearboxes	Torque* (Nm)	345
12GSS	0,01...0,025	346
16GSS/GSP/GST	0,01...0,1	347
24GSP	0,1	350
Wheel Hub gearboxes	Torque* (Nm)	353
GPW56	7,73...26,48	354
GPW56 + 57BL03	9,17	355
GPW56 + 60BLWA38	4,5	356
GPW56 + IBI80 362	9,9	357

* Nominal Output Torque

Term	
Number of stages	States the number of gear stages engaged in series.
Reduction ratio	The ratio by which the speed of the gear output shaft is smaller than the motor speed.
Rated output torque	Recommended load applied to the output shaft for continuous operation.
Max. output torque	Maximum load possible applied to the output shaft; exceeding this value will reduce service life.
Rated input speed	Recommended input speed for continuous operation.
Max. input speed	Maximum input speed possible; exceeding this value will reduce service life.
Efficiency	The specified efficiency is a maximum value that is valid for maximum continuous torque.
Moment of inertia	Is the mass moment of inertia of the gearbox, based on the axis of rotation.
Length	Total gearbox length.
Weight	Total gearbox mass.
Backlash	The backlash is defined as the recoil angle of the output shaft, when the gearbox input pinion is locked in a fixed position. The recoil angle is the angle through which the output shaft can be rotated back and forth with this condition. The amount of torque used for this validation test is 1-2% of the rated continuous torque.
Max radial load	The maximum radial load is the maximum load that can be applied radially (perpendicular) to the output shaft at a given position of the shaft. This load value is based upon a given output shaft reference speed in RPM. The service life may be compromised if this load value is exceeded.
Max axial load	The maximum axial load is the maximum load that can be applied axially to the output shaft. This load value is based upon a given output shaft reference speed in RPM. The service life may be compromised if this load value is exceeded.
Max press-fit force	Corresponds to the force with which, for example, a coupling element may be mounted to the gear drive shaft.
Noise level	Noise at given speed and distance
Operating temperature	Temperatures at which the gearbox can operate.
Service Life	Operational lifetime estimation based on rated parameters.
Protection class	IP (or "Ingress Protection") ratings are defined in international standard EN 60529 (British BS EN 60529:1992, European IEC 60509:1989). They are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt etc) and moisture.

Glossary

Product families

Planetary gearboxes
Spur gearboxes

A planetary gearbox is a gearbox with the input shaft and the output shaft aligned. This type of gearbox is used to transfer the largest torque in the most compact form (known as torque density).

The planetary gearbox got its name because of how the different gears move together. In a planetary gearbox we see a sun (solar) gear, satellite (ring) gear and two or more planet gears. Normally, the sun-gear is driven and thus move the planet gears locked in the planet carrier and form the output shaft. The satellite gears have a fixed position in relation to the outside world. This looks like our planetary solar system and that is where the name comes from.

Planetary gearboxes

Advantages at a glance

Compact size
High efficiency
Low backlash
High torque to weight ratio

A spur gear head's construction consists of larger gears that mesh with smaller gears. The gears are mounted on parallel shafts, but offset from one another. The meshing of the smaller gears with the larger gears reduces rpm transforming it into torque. The tooth pitch of the gears is critical in determining the final output speed and torque of the gear motor. Adding multiple gear stages within the gear head produces larger reduction ratios resulting in even lower output speed and higher output torque. Spur gearheads have a single contact point at any time. This means that any load is held entirely by a single point of contact between two gears.

Spur gearboxes

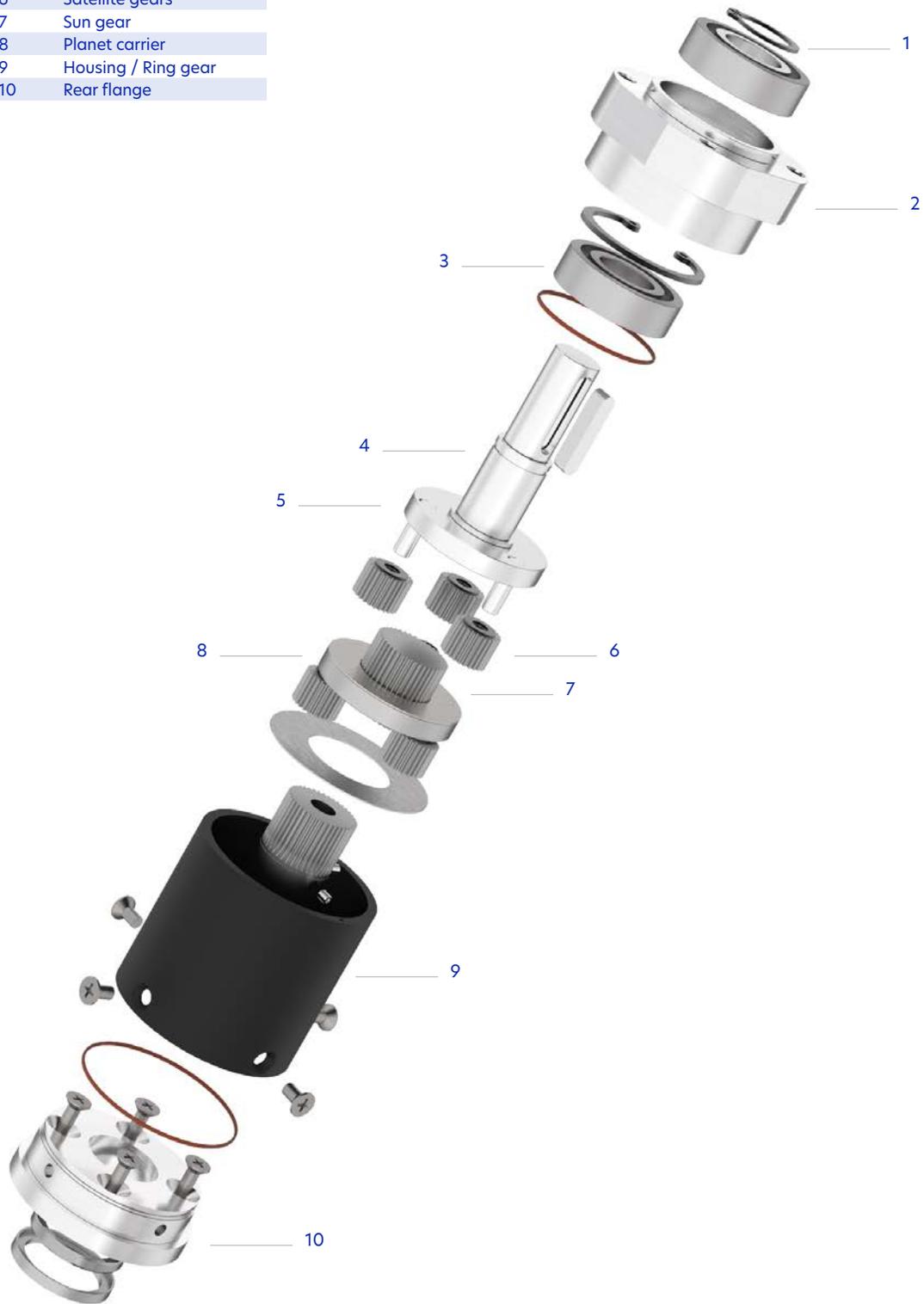
Advantages at a glance

Simple design and less expensive
Best for low-torque and low-speed applications

Technical introduction

Planetary gearbox Composition

1	Retaining ring
2	Front flange
3	Ball bearing
4	Output shaft
5	Satellite gear shafts
6	Satellite gears
7	Sun gear
8	Planet carrier
9	Housing / Ring gear
10	Rear flange





Planetary gearboxes
GP series
Standard

p.323



Planetary gearboxes
JMS series
Economy

p.337

Planetary gearboxes

Advantages at a glance

- High efficiency
- Low backlash
- High torque to weight ratio

Our high performance planetary gearboxes are designed for robustness to sustain intermittent or sudden load changes. Depending on the diameter size, these gearboxes can sustain a high input speed or a high output torque, and are also ideally suited for precise positioning applications.

Planetary gearboxes - GP Standard series	Torque* (Nm)	323
08GPS	0,008...0,1	324
10GPS	0,01...0,15	325
12GPS	0,08...0,17	326
16GPS	0,2...0,45	327
22GPS	0,5...1,5	328
26GPS	0,75...4,5	329
32GPS	1,25...5	330
GP42-S	6,5...19	331
GYP56-S	13,55...26,38	332
GYP56-N (Low noise)	1,5...11,8	333
GYP56-T (High radial load)	13,55...35	334
GP80-T (High radial load)	23...67	335

Planetary gearboxes - JMS Economy series	Torque* (Nm)	337
22JMS	0,6...2	338
28JMS	1,2...4	339
36JMS	2...6	340
42JMS	3...10	341
56JMS	9...30	342

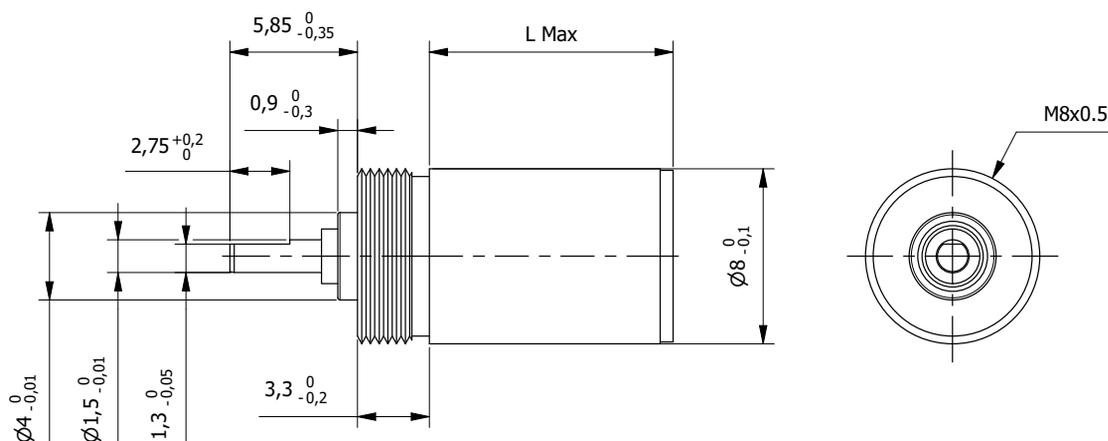
*Nominal Output Torque



Planetary Gearboxes
GP series - Standard

Planetary gearboxes - GP Standard series	Torque* (Nm)	
08GPS	0,008...0,1	324
10GPS	0,01...0,15	325
12GPS	0,08...0,17	326
16GPS	0,2...0,45	327
22GPS	0,5...1,5	328
26GPS	0,75...4,5	329
32GPS	1,25...5	330
GP42-S	6,5...19	331
GYP56-S	13,55...26,38	332
GYP56-N (Low noise)	1,5...11,8	333
GYP56-T (High radial load)	13,55...35	334
GP80-T (High radial load)	23...67	335

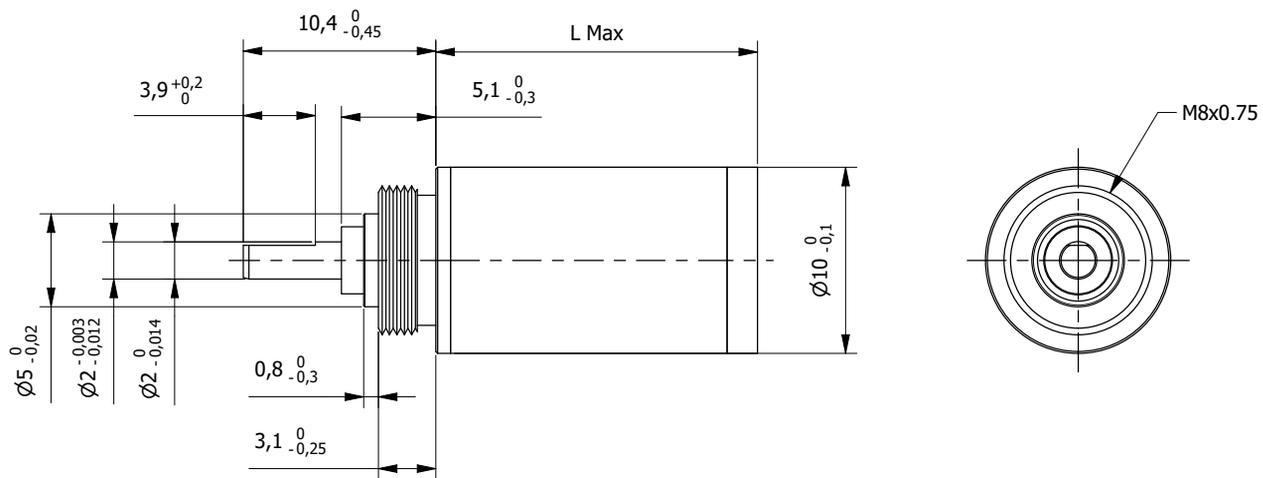
* Nominal Output Torque



Specification		Model	...1N-4	...2N-16	...2N-36	...3N-64	...3N-216
1	Stages		1	2	2	3	3
2	Reduction Ratio		4	16	36	64	216
3	Nominal Output Torque	Nm	0,01	0,02	0,008	0,06	0,02
4	Max. Output Torque	Nm	0,015	0,03	0,012	0,09	0,03
5	Recommended Input Speed	rpm	12000	12000	12000	12000	12000
6	Max. Input Speed	rpm	20000	20000	20000	20000	20000
7	Efficiency	%	90	81	76	73	66
8	Average Backlash no-load	°	1,8	2	2,4	2,2	2,6
9	Max. Axial load (dynamic)	N	5	5	5	5	5
10	Max. Radial load (5mm from flange)	N	5	6	6	7	7
11	Length (L)	mm	5,5	8,1	8,3	10,7	11,1
12	Weight	g	2,6	3,2	3,2	3,8	3,8

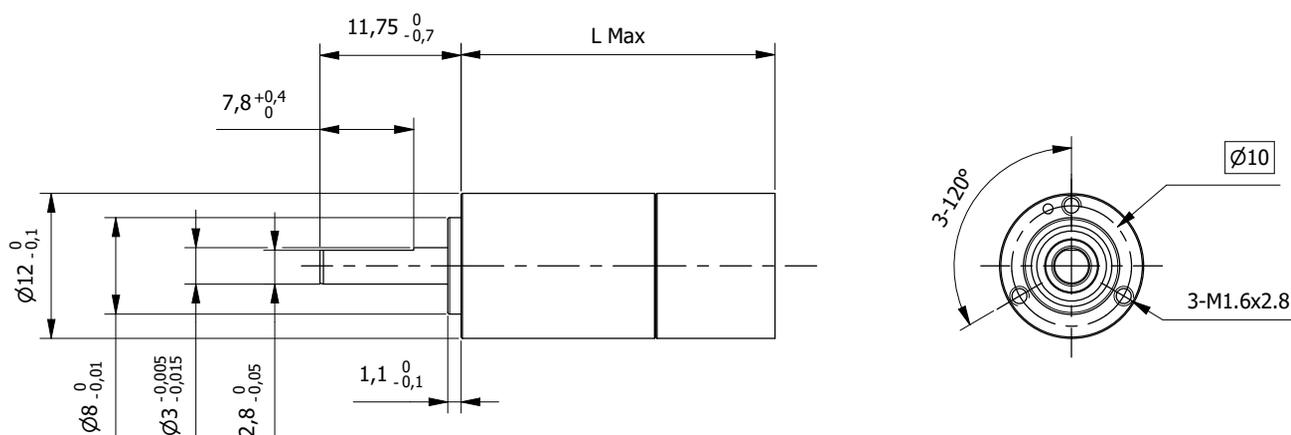
Specification		Model	...4N-256	...4N-1296	...5N-1024
1	Stages		4	4	5
2	Reduction Ratio		256	1296	1024
3	Nominal Output Torque	Nm	0,08	0,04	0,1
4	Max. Output Torque	Nm	0,12	0,06	0,15
5	Recommended Input Speed	rpm	12000	12000	12000
6	Max. Input Speed	rpm	20000	20000	20000
7	Efficiency	%	65	57	59
8	Average Backlash no-load	°	2,5	2,8	2,8
9	Max. Axial load (dynamic)	N	5	5	5
10	Max. Radial load (5mm from flange)	N	8	8	8
11	Length (L)	mm	13,3	13,9	15,9
12	Weight	g	4,4	4,4	5

Characteristics	
Item	
Operating temperature	-15 to +80°C
Bearing output	Ball bearings



Specification		...1N-4	...2N-16	...3N-64	...4N-256	...5N-1024
1	Stages	1	2	3	4	5
2	Reduction Ratio	4	16	64	256	1024
3	Nominal Output Torque	Nm 0,01	0,03	0,1	0,15	0,15
4	Max. Output Torque	Nm 0,02	0,05	0,15	0,2	0,2
5	Recommended Input Speed	rpm 12000	12000	12000	12000	12000
6	Max. Input Speed	rpm 15000	15000	15000	15000	15000
7	Efficiency	% 90	81	73	65	59
8	Average Backlash no-load	° 1,5	1,8	2	2,2	2,5
9	Max. Axial load (dynamic)	N 5	5	5	5	5
10	Max. Radial load (5mm from flange)	N 5	10	15	20	25
11	Length (L)	mm 9,9	13,4	16,6	19,8	23
12	Weight	g 6,7	7,2	7,7	8,2	8,7

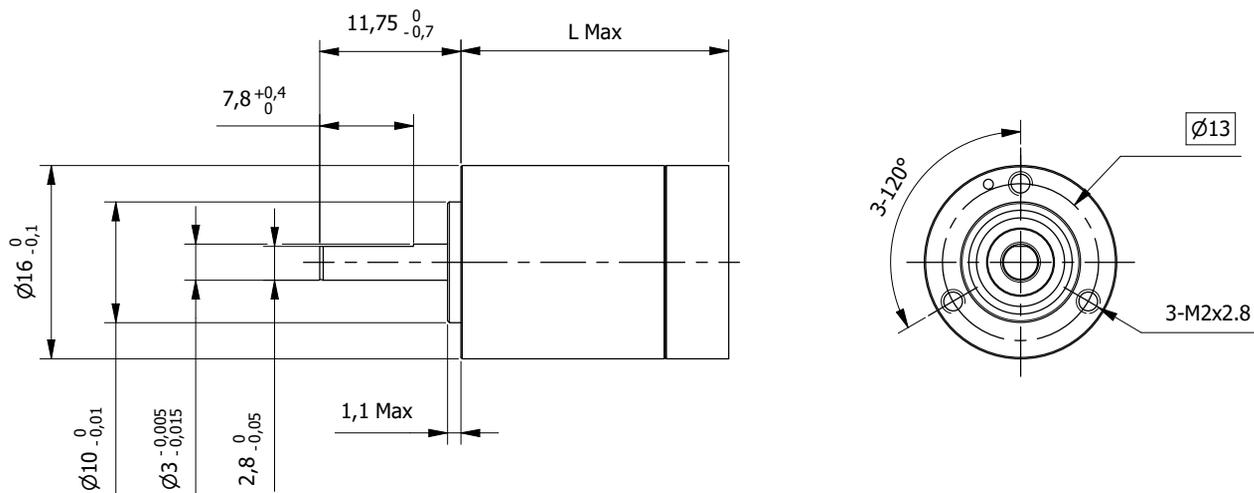
Characteristics	
Item	
Operating temperature	-40 to +80°C
Bearing output	Ball bearings



Specification		Model	...1N-5,3	...2N-21	...2N-28	...3N-83	...3N-138	...3N-172
1	Stages		1	2	2	3	3	3
2	Reduction Ratio		5,3	21	28	83	138	172
3	Nominal Output Torque	Nm	0,08	0,11	0,11	0,14	0,14	0,14
4	Max. Output Torque	Nm	0,1	0,14	0,14	0,18	0,18	0,18
5	Recommended Input Speed	rpm	16000	16000	16000	16000	16000	16000
6	Max. Input Speed	rpm	20000	20000	20000	20000	20000	20000
7	Efficiency	%	90	80	80	75	75	75
8	Average Backlash no-load	°	1,2	1,5	1,5	1,8	1,8	1,8
9	Max. Axial load (dynamic)	N	20	20	20	20	20	20
10	Max. Radial load (5mm from flange)	N	30	35	35	50	50	50
11	Length (L)	mm	15,5	20,4	20,4	25,2	25,2	25,2
12	Weight	g	11	14	14	17	17	17

Specification		Model	...4N-326	...4N-439	...4N-679	...4N-913
1	Stages		4	4	4	4
2	Reduction Ratio		326	439	679	913
3	Nominal Output Torque	Nm	0,17	0,17	0,17	0,17
4	Max. Output Torque	Nm	0,21	0,21	0,21	0,21
5	Recommended Input Speed	rpm	16000	16000	16000	16000
6	Max. Input Speed	rpm	20000	20000	20000	20000
7	Efficiency	%	65	65	65	65
8	Average Backlash no-load	°	2,1	2,1	2,1	2,1
9	Max. Axial load (dynamic)	N	20	20	20	20
10	Max. Radial load (5mm from flange)	N	50	50	50	50
11	Length (L)	mm	30,1	30,1	30,1	30,1
12	Weight	g	19	19	19	19

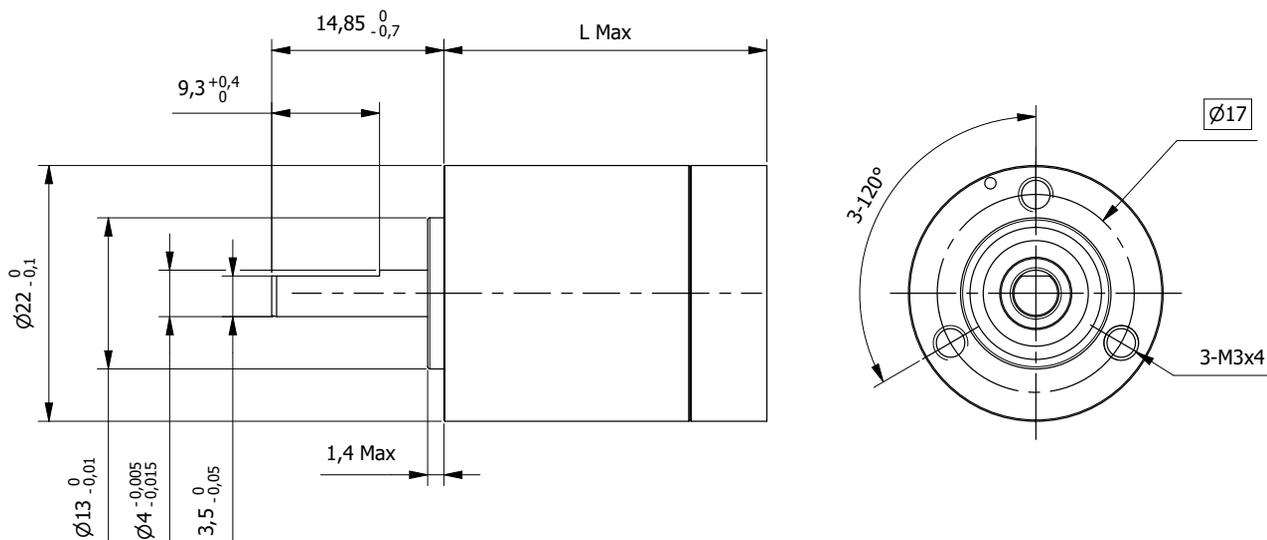
Characteristics	
Item	
Operating temperature	-40 to +100°C
Bearing output	Ball bearings



Specification		...1N-5,3	...2N-21	...2N-28	...3N-83	...3N-138	...3N-172
1	Stages	1	2	2	3	3	3
2	Reduction Ratio	5,3	21	28	83	138	172
3	Nominal Output Torque	Nm	0,25	0,25	0,35	0,35	0,35
4	Max. Output Torque	Nm	0,25	0,35	0,35	0,45	0,45
5	Recommended Input Speed	rpm	12000	14000	14000	16000	16000
6	Max. Input Speed	rpm	15000	17500	17500	20000	20000
7	Efficiency	%	90	80	80	75	75
8	Average Backlash no-load	°	1	1,2	1,2	1,3	1,3
9	Max. Axial load (dynamic)	N	20	20	20	20	20
10	Max. Radial load (5mm from flange)	N	30	45	45	70	70
11	Length (L)	mm	15,8	20,7	20,7	25,7	25,7
12	Weight	g	20	25	25	27	27

Specification		...4N-326	...4N-439	...4N-679	...4N-913
1	Stages	4	4	4	4
2	Reduction Ratio	326	439	679	913
3	Nominal Output Torque	Nm	0,45	0,45	0,45
4	Max. Output Torque	Nm	0,55	0,55	0,55
5	Recommended Input Speed	rpm	16000	16000	16000
6	Max. Input Speed	rpm	20000	20000	20000
7	Efficiency	%	65	65	65
8	Average Backlash no-load	°	1,4	1,4	1,4
9	Max. Axial load (dynamic)	N	20	20	20
10	Max. Radial load (5mm from flange)	N	70	70	70
11	Length (L)	mm	30,6	30,6	30,6
12	Weight	g	31	31	31

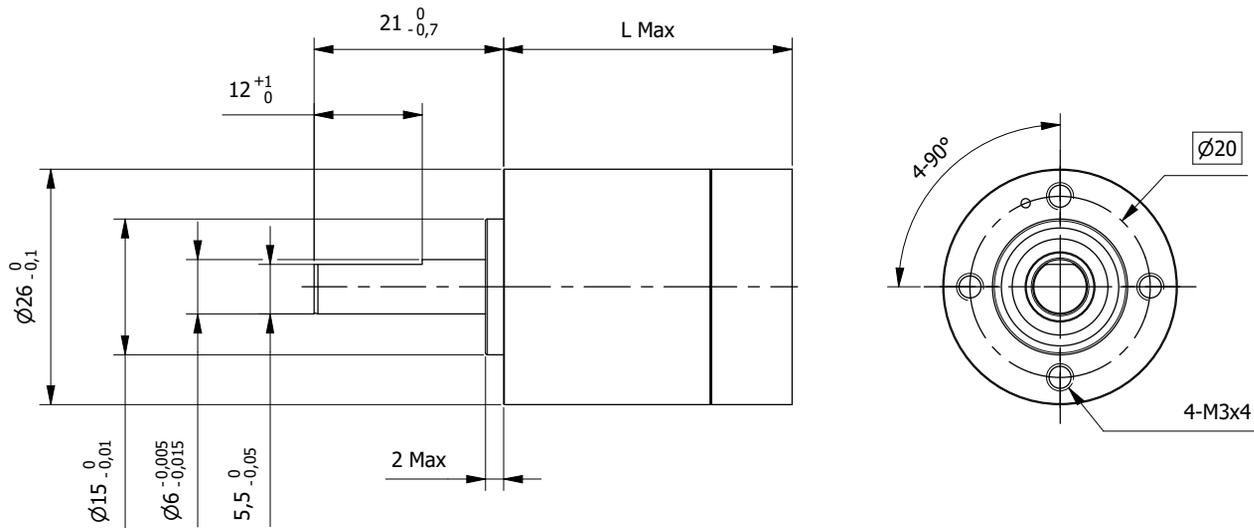
Characteristics	
Item	
Operating temperature	-40 to +100°C
Bearing output	Ball bearings



Specification		...1N-5,3	...2N-21	...2N-28	...3N-83	...3N-138	...3N-172
1	Stages	1	2	2	3	3	3
2	Reduction Ratio	5,3	21	28	83	138	172
3	Nominal Output Torque	Nm	0,5	0,7	1,2	1,2	1,2
4	Max. Output Torque	Nm	0,6	0,9	1,5	1,5	1,5
5	Recommended Input Speed	rpm	8000	10000	10000	12000	12000
6	Max. Input Speed	rpm	10000	12500	12500	15000	15000
7	Efficiency	%	90	81	81	74	74
8	Average Backlash no-load	°	0,85	1,05	1,05	1,2	1,2
9	Max. Axial load (dynamic)	N	40	40	40	40	40
10	Max. Radial load (10mm from flange)	N	65	100	100	120	120
11	Length (L)	mm	19,9	26,4	26,4	32,2	32,2
12	Weight	g	45	58	58	67	67

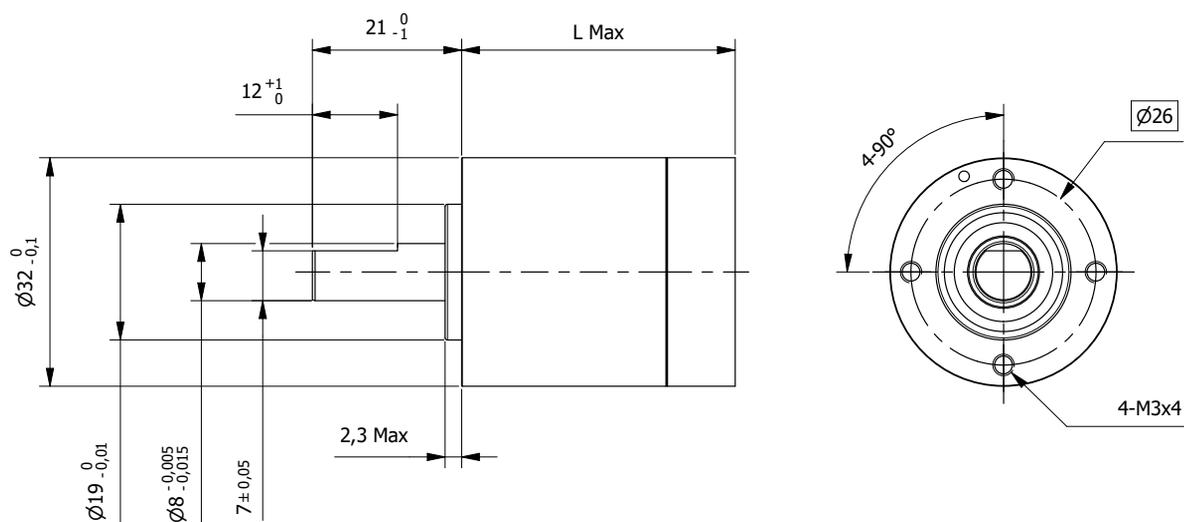
Specification		...4N-326	...4N-439	...4N-679	...4N-913
1	Stages	4	4	4	4
2	Reduction Ratio	326	439	679	913
3	Nominal Output Torque	Nm	1,5	1,5	1,5
4	Max. Output Torque	Nm	1,9	1,9	1,9
5	Recommended Input Speed	rpm	12000	12000	12000
6	Max. Input Speed	rpm	15000	15000	15000
7	Efficiency	%	66	66	66
8	Average Backlash no-load	°	1,35	1,35	1,35
9	Max. Axial load (dynamic)	N	40	40	40
10	Max. Radial load (10mm from flange)	N	120	120	120
11	Length (L)	mm	43	43	43
12	Weight	g	89	89	89

Characteristics	
Item	
Operating temperature	-40 to +100°C
Bearing output	Ball bearings



Specification		...1N-5,3	...2N-21	...2N-28	...3N-83	...3N-138	...3N-172
1	Stages	1	2	2	3	3	3
2	Reduction Ratio	5,3	21	28	83	138	172
3	Nominal Output Torque	Nm 0,75	2,25	2,25	4,5	4,5	4,5
4	Max. Output Torque	Nm 1,1	3,2	3,2	6,2	6,2	6,2
5	Recommended Input Speed	rpm 7000	8000	8000	10000	10000	10000
6	Max. Input Speed	rpm 8750	10000	10000	12500	12500	12500
7	Efficiency	% 90	78	78	75	75	75
8	Average Backlash no-load	° 0,75	0,95	0,95	1,1	1,1	1,1
9	Max. Axial load (dynamic)	N 80	80	80	80	80	80
10	Max. Radial load (10mm from flange)	N 95	145	145	150	150	150
11	Length (L)	mm 21,3	30,2	30,2	35,5	35,5	35,5
12	Weight	g 75	95	95	105	105	105

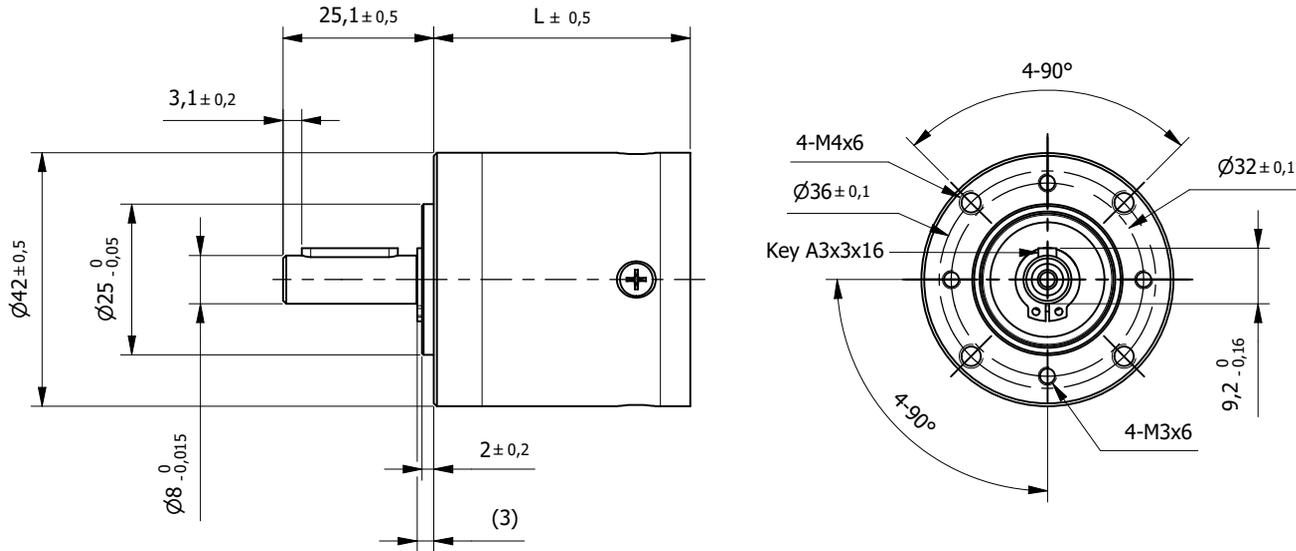
Characteristics	
Item	
Operating temperature	-40 to +100°C
Bearing output	Ball bearings



Specification					
Model		...1N-5,3	...2N-16	...2N-26	...2N-35
1	Stages	1	2	2	2
2	Reduction Ratio	5,3	16	26	35
3	Nominal Output Torque	Nm	1,25	2,9	2,9
4	Max. Output Torque	Nm	1,6	3,6	3,6
5	Recommended Input Speed	rpm	6000	7000	7000
6	Max. Input Speed	rpm	7500	8750	8750
7	Efficiency	%	90	78	78
8	Average Backlash no-load	°	0,55	0,7	0,7
9	Max. Axial load (dynamic)	N	110	110	110
10	Max. Radial load (10mm from flange)	N	160	180	180
11	Length (L)	mm	26,7	36,3	36,3
12	Weight	g	140	185	185

Specification				
Model		...3N-62	...3N-138	...3N-186
1	Stages	3	3	3
2	Reduction Ratio	62	138	186
3	Nominal Output Torque	Nm	5	5
4	Max. Output Torque	Nm	6,25	6,25
5	Recommended Input Speed	rpm	8000	8000
6	Max. Input Speed	rpm	10000	10000
7	Efficiency	%	75	75
8	Average Backlash no-load	°	0,9	0,9
9	Max. Axial load (dynamic)	N	110	110
10	Max. Radial load (10mm from flange)	N	180	180
11	Length (L)	mm	43,9	43,9
12	Weight	g	230	230

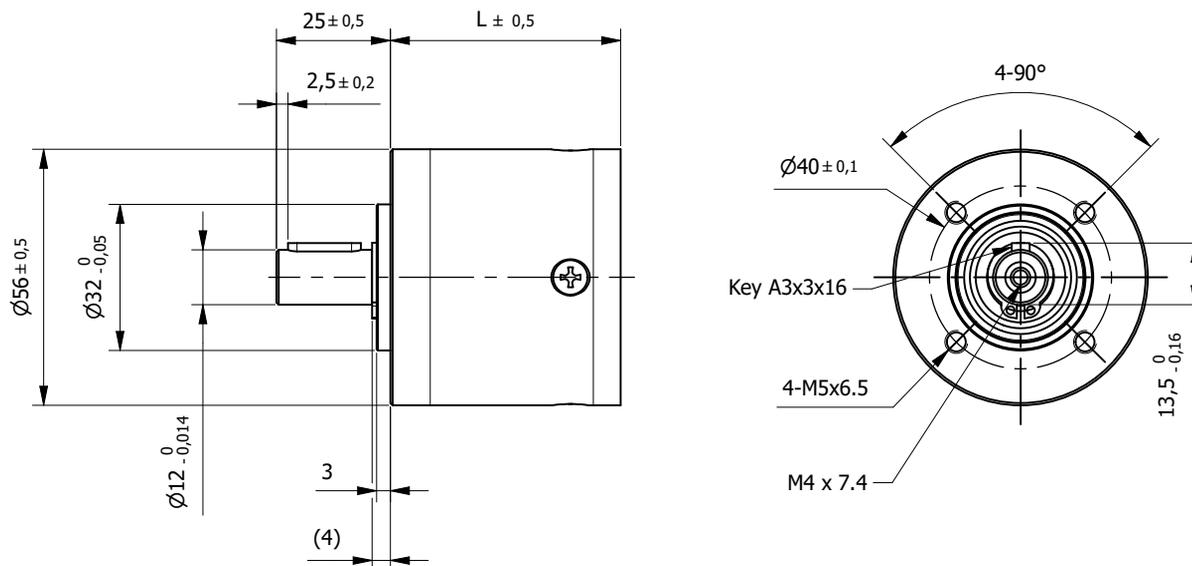
Characteristics		
Item		
Operating temperature	-40 to +100°C	
Bearing output	Ball bearings	



Specification		...1 / 3.9	...1 / 4.3	...1 / 5.3	...1 / 6	...1 / 7.1	...1 / 8.7
1	Stages	1	1	1	1	1	1
2	Reduction Ratio	3,93	4,27	5,25	6	7,07	8,73
3	Nominal Output Torque	Nm 6,5	Nm 6,5	Nm 6,9	Nm 7	Nm 7,3	Nm 7
4	Max. Output Torque	Nm 13	Nm 13	Nm 13,8	Nm 14	Nm 14,6	Nm 14
5	Recommended Input Speed	rpm 3000	rpm 3000	rpm 3000	rpm 3000	rpm 3000	rpm 3000
6	Max. Input Speed	rpm 8236	rpm 9187	rpm 11943	rpm 14050	rpm 17061	rpm 18000
7	Efficiency	% ≈90%	% ≈90%	% ≈90%	% ≈90%	% ≈90%	% ≈90%
8	Moment of Inertia ≤φ6,35	kgmm ² 1,23	kgmm ² 1,05	kgmm ² 0,78	kgmm ² 0,67	kgmm ² 0,56	kgmm ² 0,46
9	Length (L)	mm 42,7	mm 42,7	mm 42,7	mm 42,7	mm 42,7	mm 42,7
10	Weight	kg 0,3	kg 0,3	kg 0,3	kg 0,3	kg 0,3	kg 0,3

Specification		...2 / 15.5	...2 / 20.6	...2 / 25.6	...2 / 45.8	...3 / 100	...3 / 250
1	Stages	2	2	2	2	3	3
2	Reduction Ratio	15,45	20,64	25,62	45,82	95,688	240,545
3	Nominal Output Torque	Nm 9,1	Nm 9,4	Nm 8,6	Nm 12,2	Nm 18	Nm 19
4	Max. Output Torque	Nm 18,2	Nm 18,8	Nm 17,2	Nm 24,4	Nm 36	Nm 38
5	Recommended Input Speed	rpm 3000	rpm 3000	rpm 3000	rpm 3000	rpm 3000	rpm 3000
6	Max. Input Speed	rpm 8236	rpm 11943	rpm 14050	rpm 18000	rpm 9187	rpm 18000
7	Efficiency	% ≈85%	% ≈85%	% ≈85%	% ≈85%	% ≈78%	% ≈78%
8	Moment of Inertia ≤φ6,35	kgmm ² 1,26	kgmm ² 0,44	kgmm ² 0,67	kgmm ² 0,46	kgmm ² 0,71	kgmm ² 0,43
9	Length (L)	mm 56,6	mm 56,6	mm 56,6	mm 56,6	mm 70,6	mm 70,6
10	Weight	kg 0,4	kg 0,4	kg 0,4	kg 0,4	kg 0,5	kg 0,5

Characteristics	
Item	
Backlash at 2% nominal output torque	≤1°
Max. Radial load (middle of the key)	305N at n out=100rpm 210N at n out=300rpm 140N at n out=1000rpm
Max. Axial load (output shaft center)	890N at n out=100rpm 575N at n out=300rpm 340N at n out=1000rpm
Max. Press fit force	320N
Noise level (at recommended speed and 1m)	≤55 dB
Operating temperature	-15 to +90°C
Service Life (at recommended input speed)	10000h
Protection class	IP54
Bearing output	Ball bearings



Specification		...1 / 3.3	...1 / 3.9	...1 / 4.2	...1 / 5.1	...1 / 6.5	...1 / 7.7	...1 / 9.5
1	Stages	1	1	1	1	1	1	1
2	Reduction Ratio	3,29	3,94	4,24	5,09	6,53	7,71	9,55
3	Nominal Output Torque	Nm 14,19	14,68	14,76	15,28	16,29	16,58	13,55
4	Max. Output Torque	Nm 28,38	29,36	29,52	30,56	32,58	33,16	27,1
5	Recommended Input Speed	rpm 3500	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm 4658	5968	6589	8307	8988	10919	13000
7	Efficiency	% ≈92%	≈92%	≈92%	≈92%	≈92%	≈92%	≈92%
8	Moment of Inertia ≤φ8	kgmm ² 15,05	5,48	4,67	3,13	2,62	2,27	4,3
9	Length (L)	mm 50,6	50,6	50,6	50,6	50,6	50,6	50,6
10	Weight	kg 0,5	0,5	0,5	0,5	0,5	0,5	0,5

Specification		...2 / 10.8	...2 / 15.5	...2 / 20	...2 / 25.7	...2 / 32.7	...2 / 42.6	...2 / 62.3
1	Stages	2	2	2	2	2	2	2
2	Reduction Ratio	10,84	15,51	20,03	25,71	32,72	42,63	62,33
3	Nominal Output Torque	Nm 20,27	22,01	23,03	23,13	22,24	26,38	26,38
4	Max. Output Torque	Nm 40,54	44,02	46,06	46,26	44,48	52,76	52,76
5	Recommended Input Speed	rpm 3500	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm 4658	5968	8307	8988	10919	8988	13000
7	Efficiency	% ≈85%	≈85%	≈85%	≈85%	≈85%	≈85%	≈85%
8	Moment of Inertia ≤φ8	kgmm ² 8,7	5,04	3,81	2,51	2,19	2,46	1,87
9	Length (L)	mm 67,8	67,8	67,8	67,8	67,8	67,8	67,8
10	Weight	kg 0,8	0,8	0,8	0,8	0,8	0,8	0,8

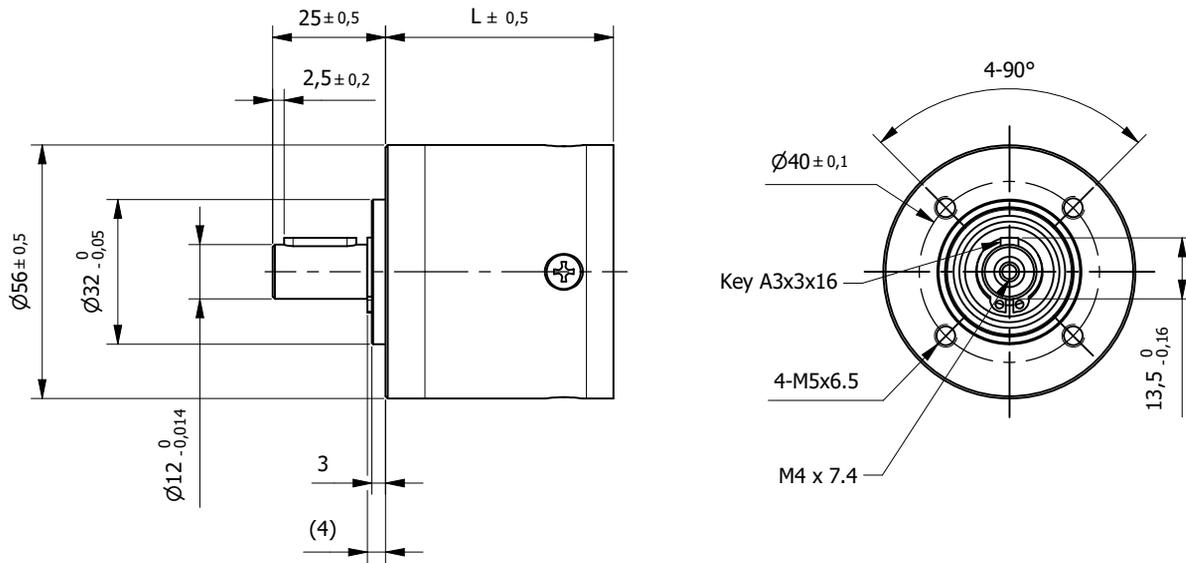
Characteristics	
Item	
Backlash at 2% nominal output torque	≤0,5°
Max. Radial load (middle of the key)	515N at n out=100rpm 355N at n out=300rpm 240N at n out=1000rpm
Max. Axial load (output shaft center)	1460N at n out=100rpm 935N at n out=300rpm 555N at n out=1000rpm
Max. Press fit force	500N
Noise level (at recommended speed and 1m)	≤55 dB
Operating temperature	-15 to +90°C
Service Life (at recommended input speed)	10000h
Protection class	IP 54
Bearing output	Ball bearings

Planetary Gearbox GP56-N

Low Noise

Ø 56mm

1,5 to 11,8Nm



Specification					
Model		...1 / 3.2	...1 / 4	...1 / 5.4	...1 / 6.2
1	Stages	1	1	1	1
2	Reduction Ratio	3,24	3,96	5,37	6,19
3	Nominal Output Torque	Nm	2	2	1,7
4	Max. Output Torque	Nm	6,09	5,9	5
5	Recommended Input Speed	rpm	3500	3500	3500
6	Max. Input Speed	rpm	4700	6050	8800
7	Efficiency	%	≈92%	≈92%	≈92%
8	Moment of Inertia ≤φ8	kgmm ²	4,09	2,08	0,88
9	Length (L)	mm	56	56	56
10	Weight	kg	0,3	0,3	0,3

Specification						
Model		...2 / 10.7	...2 / 15.6	...2 / 20.2	...2 / 25.9	...2 / 35
1	Stages	2	2	2	2	2
2	Reduction Ratio	10,68	15,61	20,17	25,88	35,05
3	Nominal Output Torque	Nm	6,4	7,4	9,2	11,8
4	Max. Output Torque	Nm	12,6	15,1	14,8	19
5	Recommended Input Speed	rpm	3500	3500	3500	3500
6	Max. Input Speed	rpm	4700	6050	6050	8800
7	Efficiency	%	≈85%	≈85%	≈85%	≈85%
8	Moment of Inertia ≤φ8	kgmm ²	4,2	2,04	1,97	1,92
9	Length (L)	mm	73	73	73	73
10	Weight	kg	0,4	0,4	0,4	0,4

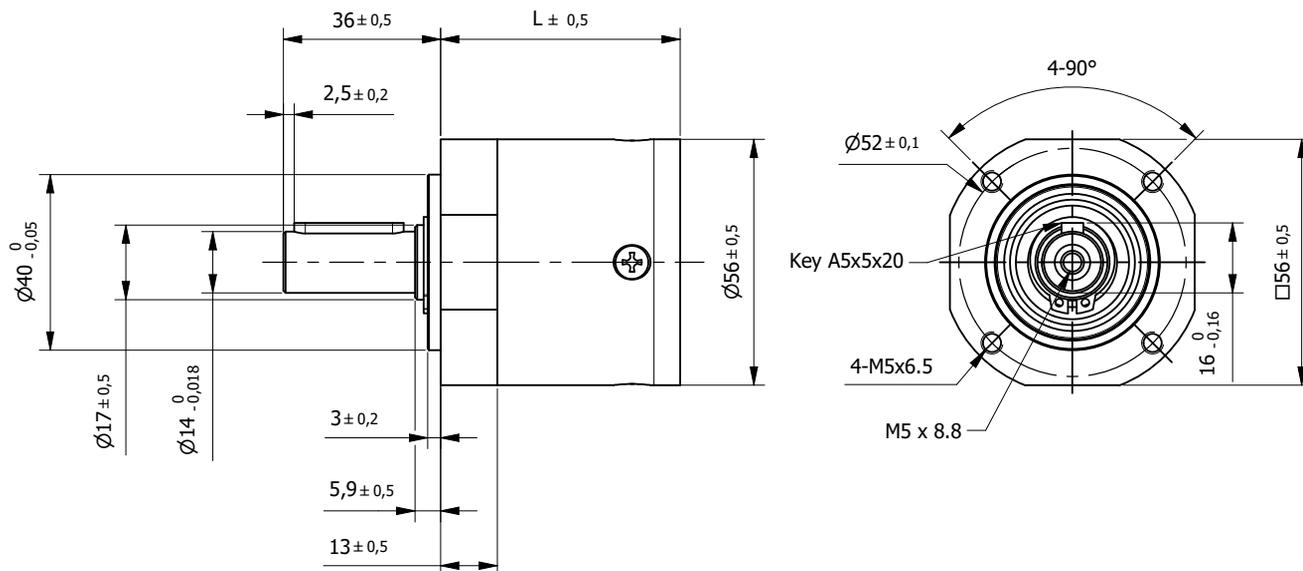
Characteristics	
Item	
Backlash at 2% nominal output torque	≤1°
Max. Radial load (middle of the key)	515N at n out=100rpm 355N at n out=300rpm 240N at n out=1000rpm
Max. Axial load (output shaft center)	1460N at n out=100rpm 935N at n out=300rpm 555N at n out=1000rpm
Max. Press fit force	500N
Noise level (at recommended speed and 1m)	≤50 dB
Operating temperature	-15 to +90°C
Service Life (at recommended input speed)	5000h
Protection class	IP 54
Bearing output	Ball bearings

Planetary Gearbox GP56-T

High Radial Load

Ø 56mm

13,55 to 35Nm



Specification		...1 / 3.3	...1 / 3.9	...1 / 4.2	...1 / 5.1	...1 / 6.5	...1 / 7.7	...1 / 9.5
1	Stages	1	1	1	1	1	1	1
2	Reduction Ratio	3,29	3,94	4,24	5,09	6,53	7,71	9,55
3	Nominal Output Torque	Nm 14,19	14,68	14,76	15,28	16,29	16,58	13,55
4	Max. Output Torque	Nm 28,38	29,36	29,52	30,56	32,58	33,16	27,1
5	Recommended Input Speed	rpm 3500	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm 4658	5968	6589	8307	8988	10919	13000
7	Efficiency	% ≈92%	≈92%	≈92%	≈92%	≈92%	≈92%	≈92%
8	Moment of Inertia ≤φ8	kgmm ² 15,06	5,48	4,67	3,13	2,6	2,27	4,3
9	Length (L)	mm 54,8	54,8	54,8	54,8	54,8	54,8	54,8
10	Weight	kg 0,5	0,5	0,5	0,5	0,5	0,5	0,5

Specification		...2 / 10.8	...2 / 15.5	...2 / 20	...2 / 25.7	...2 / 32.7	...2 / 42.6	...2 / 62.3
1	Stages	2	2	2	2	2	2	2
2	Reduction Ratio	10,84	15,51	20,03	25,71	32,72	42,63	62,33
3	Nominal Output Torque	Nm 20,27	22,01	23,03	23,13	22,24	26,38	28,38
4	Max. Output Torque	Nm 40,54	44,02	46,06	46,26	44,48	52,76	52,76
5	Recommended Input Speed	rpm 3500	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm 4658	5968	8307	8988	10919	8988	13000
7	Efficiency	% ≈85%	≈85%	≈85%	≈85%	≈85%	≈85%	≈85%
8	Moment of Inertia ≤φ8	kgmm ² 8,7	5,04	3,81	2,51	2,19	2,46	1,87
9	Length (L)	mm 72	72	72	72	72	72	72
10	Weight	kg 0,8	0,8	0,8	0,8	0,8	0,8	0,8

Specification		...3 / 100	...3 / 250
1	Stages	3	3
2	Reduction Ratio	101,23	256,23
3	Nominal Output Torque	Nm 34	35
4	Max. Output Torque	Nm 68	70
5	Recommended Input Speed	rpm 3500	3500
6	Max. Input Speed	rpm 5968	10919
7	Efficiency	% ≈78%	≈78%
8	Moment of Inertia ≤φ8	kgmm ² 6,446	4,129
9	Length (L)	mm 86	86
10	Weight	kg 1,1	1,1

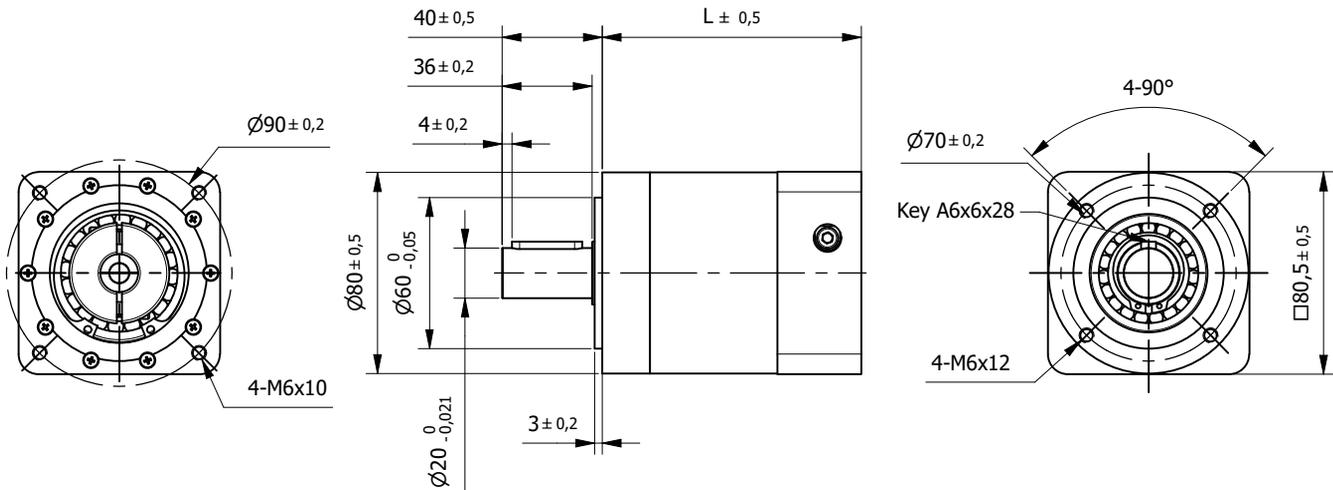
Characteristics	
Item	
Backlash	≤0,5° [1-2 stages]
at 2% nominal output torque	≤0,75° [3 stages]
Max. Radial load (middle of the key)	540N [711N 3-stage] at n out=100rpm 375N [493N 3-stage] at n out=300rpm 250N [330N 3-stage] at n out=1000rpm
Max. Axial load (output shaft center)	1630N [1931N 3-stage] at n out=100rpm 1015N [1329N 3-stage] at n out=300rpm 595N [764N 3-stage] at n out=1000rpm
Max. Press fit force	500N
Noise level (at 1m and 3'000rpm input)	≤55 dB
Operating temperature	-15 to +90°C
Service Life	10000h
Protection class	IP 54
Bearing output	Ball bearings

Planetary Gearbox GP80-T

High Radial Load

Ø 80mm

23 to 67Nm



Specification		...1 / 3.3	...1 / 4.2	...1 / 4.9	...1 / 6.8	...1 / 8	...1 / 9.7
1	Stages	1	1	1	1	1	1
2	Reduction Ratio	3,333	4,182	4,889	6,833	8	9,75
3	Nominal Output Torque	Nm 40	41	42	33	32	23
4	Max. Output Torque	Nm 80	82	84	66	64	46
5	Recommended Input Speed	rpm 3000	3000	3000	3000	3000	3000
6	Max. Input Speed	rpm 3184	4342	5307	7000	7000	7000
7	Efficiency	% $\approx 92\%$	$\approx 92\%$	$\approx 92\%$	$\approx 92\%$	$\approx 92\%$	$\approx 92\%$
8	Moment of Inertia $\leq \varphi 15$	kgmm ² 74,51	64,96	60,74	28,17	53,37	51,86
9	Length (L)	mm 103,5	103,5	103,5	103,5	103,5	103,5
10	Weight	kg 2,1	2,1	2,1	2,1	2,1	2,1

Specification		...2 / 11.1	...2 / 16.3	...2 / 20.4	...2 / 26.3	...2 / 30.7	...2 / 66.6
1	Stages	2	2	2	2	2	2
2	Reduction Ratio	11,111	16,296	20,444	26,278	30,75	66,625
3	Nominal Output Torque	Nm 42	56	57	58	67	42
4	Max. Output Torque	Nm 84	112	114	116	134	84
5	Recommended Input Speed	rpm 3000	3000	3000	3000	3000	3000
6	Max. Input Speed	rpm 3184	3184	4342	5307	7000	7000
7	Efficiency	% $\approx 85\%$	$\approx 85\%$	$\approx 85\%$	$\approx 85\%$	$\approx 85\%$	$\approx 85\%$
8	Moment of Inertia $\leq \varphi 15$	kgmm ² 93,33	92,09	83,39	77,8	74,37	71,35
9	Length (L)	mm 129,0	129,0	129,0	129,0	129,0	129,0
10	Weight	kg 2,6	2,6	2,6	2,6	2,6	2,6

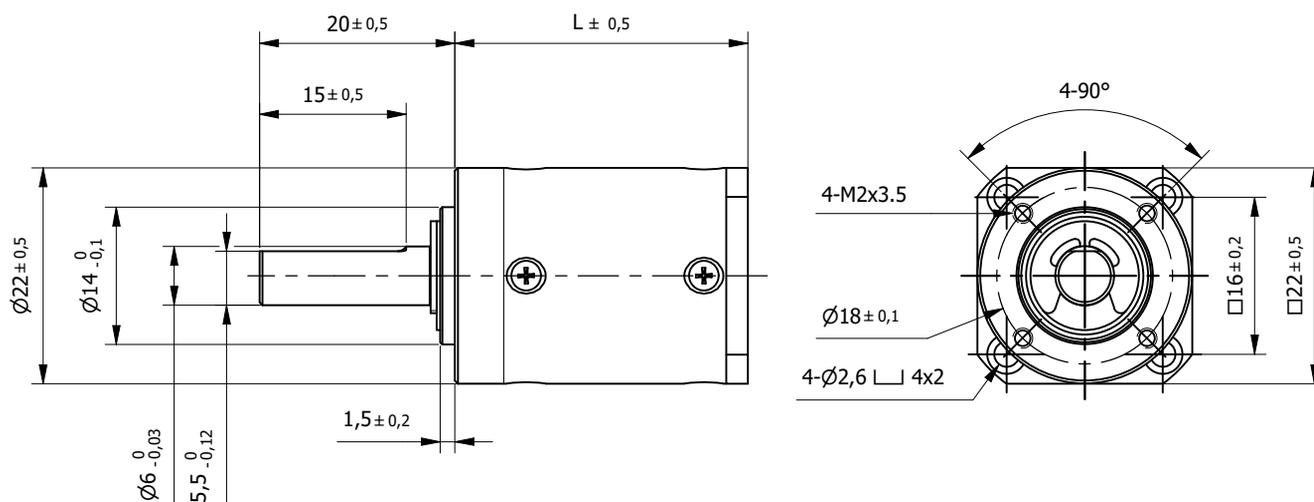
Characteristics	
Item	
Backlash at 2% nominal output torque	$\leq 1^\circ$
Max. Radial load (middle of the key)	970N at n out=100rpm 680N at n out=300rpm 455N at n out=1000rpm
Max. Axial load (output shaft center)	2950N at n out=100rpm 1800N at n out=300rpm 1055N at n out=1000rpm
Max. Press fit force	1500N
Noise level (at recommended speed and 1m)	≤ 60 dB
Operating temperature	-15 to +90°C
Service Life (at recommended input speed)	10000h
Protection class	IP 54
Bearing output	Ball bearings



Planetary Gearboxes
JMS series - Economy

Planetary gearboxes - JMS Economy series	Torque* (Nm)	
22JMS	0,6...2	338
28JMS	1,2...4	339
36JMS	2...6	340
42JMS	3...10	341
56JMS	9...30	342

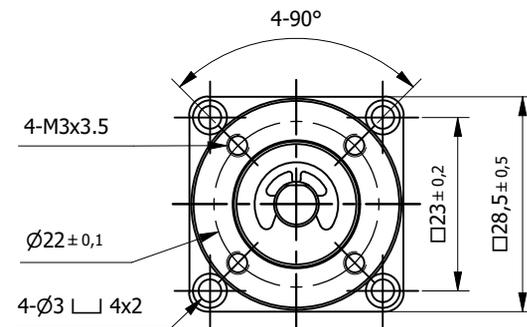
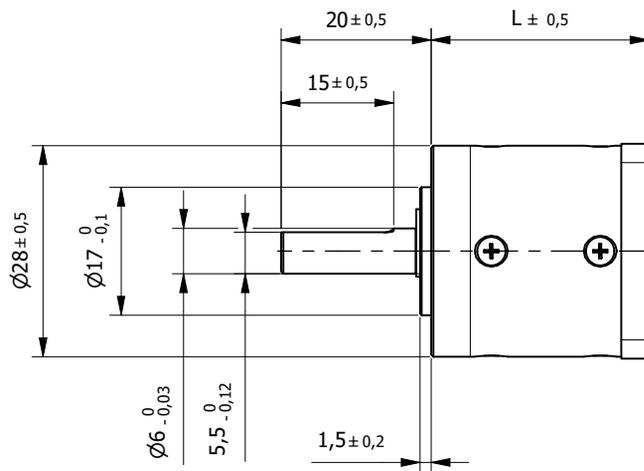
* Nominal Output Torque



Specification						
Model		...1 / 3.7	...1 / 5.2	...2 / 14	...2 / 19	...2 / 27
1	Stages	1	1	2	2	2
2	Exact Ratio	3,71	5,18	13,76	19,22	26,83
3	Nominal Output Torque	Nm 0,6	0,6	1	1	1
4	Max. Output Torque	Nm 2	2	3	3	3
5	Recommended Input Speed	rpm 4000	4000	4000	4000	4000
6	Efficiency	% ≈90%	≈90%	≈81%	≈81%	≈81%
7	Backlash at No-load	≤1°	≤1°	≤1,2°	≤1,2°	≤1,2°
8	Length (L)	mm 23,4	23,4	30,0	30,0	30,0
9	Weight	kg 0,031	0,031	0,037	0,037	0,037

Specification					
Model		...3 / 51	...3 / 71	...3 / 100	...3 / 139
1	Stages	3	3	3	3
2	Exact Ratio	51,06	71,3	99,55	138,99
3	Nominal Output Torque	Nm 2	2	2	2
4	Max. Output Torque	Nm 6	6	6	6
5	Recommended Input Speed	rpm 4000	4000	4000	4000
6	Efficiency	% ≈73%	≈73%	≈73%	≈73%
7	Backlash at No-load	≤1,5°	≤1,5°	≤1,5°	≤1,5°
8	Length (L)	mm 36,4	36,4	36,4	36,4
9	Weight	kg 0,043	0,043	0,043	0,043

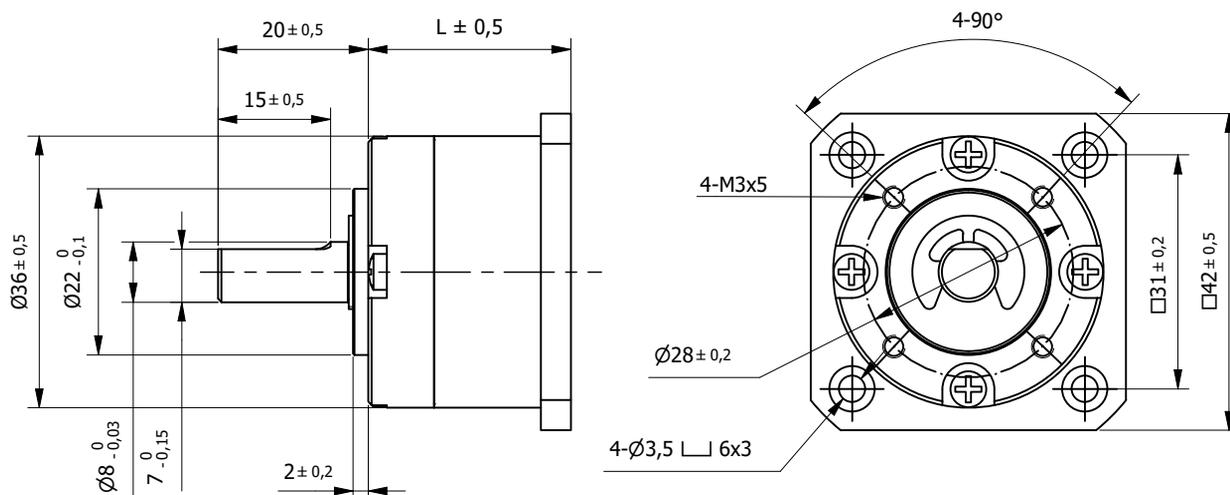
Characteristics	
Item	
Max. Radial load (middle of the key)	50N
Max. Axial load (output shaft center)	30N
Radial Play	<0,08mm
Axial Play	<0,3mm
Max. Press fit force	60N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



Specification		Model	...1 / 3.7	...1 / 5.2	...2 / 14	...2 / 19	...2 / 27
1	Stages		1	1	2	2	2
2	Exact Ratio		3,71	5,18	13,76	19,22	26,83
3	Nominal Output Torque	Nm	1,2	1,2	2	2	2
4	Max. Output Torque	Nm	4	4	6	6	6
5	Recommended Input Speed	rpm	4000	4000	4000	4000	4000
6	Efficiency	%	≈90%	≈90%	≈81%	≈81%	≈81%
7	Backlash at No-load		≤1°	≤1°	≤1,2°	≤1,2°	≤1,2°
8	Length (L)	mm	29,0	29,0	36,1	36,1	36,1
9	Weight	kg	0,075	0,075	0,097	0,097	0,097

Specification		Model	...3 / 51	...3 / 71	...3 / 100	...3 / 139
1	Stages		3	3	3	3
2	Exact Ratio		51,06	71,3	99,55	138,99
3	Nominal Output Torque	Nm	4	4	4	4
4	Max. Output Torque	Nm	12	12	12	12
5	Recommended Input Speed	rpm	4000	4000	4000	4000
6	Efficiency	%	≈73%	≈73%	≈73%	≈73%
7	Backlash at No-load		≤1,5°	≤1,5°	≤1,5°	≤1,5°
8	Length (L)	mm	43	43	43	43
9	Weight	kg	0,119	0,119	0,119	0,119

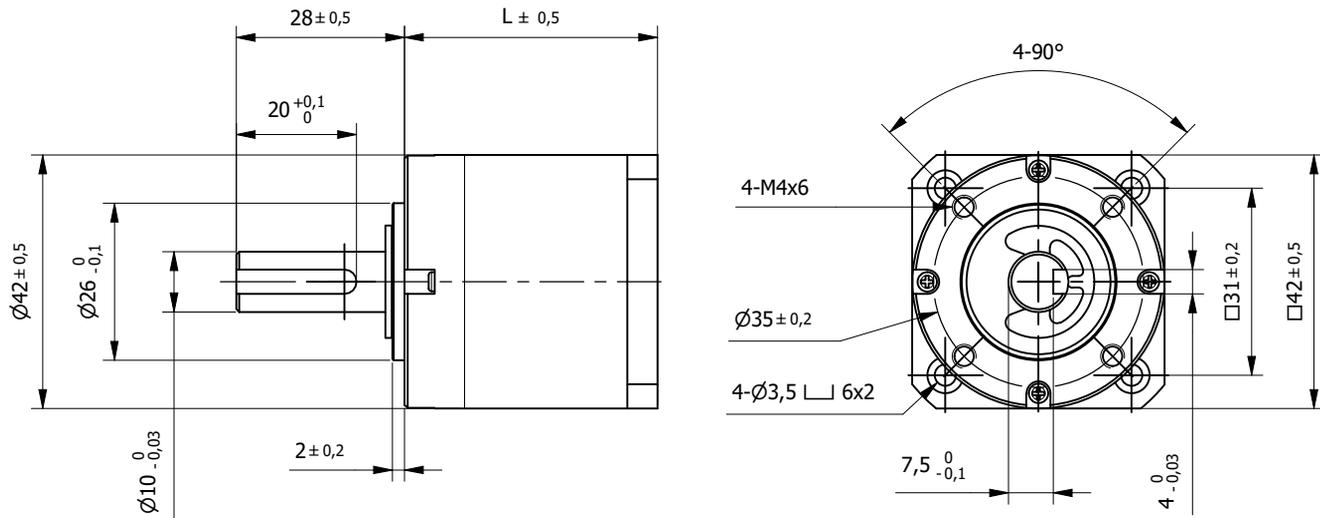
Characteristics	
Item	
Max. Radial load (middle of the key)	100N
Max. Axial load (output shaft center)	50N
Radial Play	<0,07mm
Axial Play	<0,3mm
Max. Press fit force	100N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



Specification						
Model		...1 / 3,7	...1 / 5,2	...2 / 14	...2 / 19	...2 / 27
1	Stages	1	1	2	2	2
2	Exact Ratio	3,71	5,18	13,76	19,22	26,83
3	Nominal Output Torque	Nm	2	2	3	3
4	Max. Output Torque	Nm	6	6	9	9
5	Recommended Input Speed	rpm	4000	4000	4000	4000
6	Efficiency	%	≈90%	≈90%	≈81%	≈81%
7	Backlash at No-load		≤1°	≤1°	≤1,2°	≤1,2°
8	Length (L)	mm	27,0	27,0	34,2	34,2
9	Weight	kg	0,134	0,134	0,173	0,173

Specification					
Model		...3 / 51	...3 / 71	...3 / 100	...3 / 139
1	Stages	3	3	3	3
2	Exact Ratio	51,06	71,3	99,55	138,99
3	Nominal Output Torque	Nm	6	6	6
4	Max. Output Torque	Nm	18	18	18
5	Recommended Input Speed	rpm	4000	4000	4000
6	Efficiency	%	≈73%	≈73%	≈73%
7	Backlash at No-load		≤1,5°	≤1,5°	≤1,5°
8	Length (L)	mm	41,1	41,1	41,1
9	Weight	kg	0,212	0,212	0,212

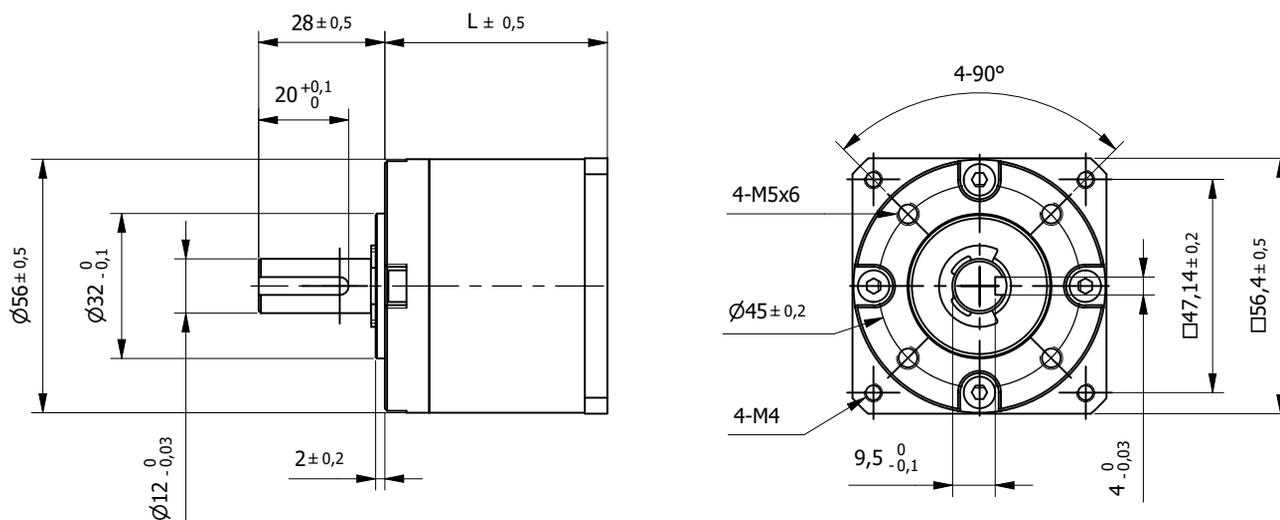
Characteristics	
Item	
Max. Radial load (middle of the key)	100N
Max. Axial load (output shaft center)	50N
Radial Play	<0,07mm
Axial Play	<0,3mm
Max. Press fit force	120N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



Specification		...1 / 3.7	...1 / 5.2	...2 / 14	...2 / 19	...2 / 27
1	Stages	1	1	2	2	2
2	Exact Ratio	3,71	5,18	13,76	19,22	26,83
3	Nominal Output Torque	Nm 3	Nm 3	Nm 5	Nm 5	Nm 5
4	Max. Output Torque	Nm 9	Nm 9	Nm 15	Nm 15	Nm 15
5	Recommended Input Speed	rpm 4000	rpm 4000	rpm 4000	rpm 4000	rpm 4000
6	Efficiency	% ≈90%	% ≈90%	% ≈81%	% ≈81%	% ≈81%
7	Backlash at No-load	≤1°	≤1°	≤1,2°	≤1,2°	≤1,2°
8	Length (L)	mm 31,5	mm 31,5	mm 42,1	mm 42,1	mm 42,1
9	Weight	kg 0,208	kg 0,208	kg 0,290	kg 0,290	kg 0,290

Specification		...3 / 51	...3 / 71	...3 / 100	...3 / 139
1	Stages	3	3	3	3
2	Exact Ratio	51,06	71,3	99,55	138,99
3	Nominal Output Torque	Nm 10	Nm 10	Nm 10	Nm 10
4	Max. Output Torque	Nm 30	Nm 30	Nm 30	Nm 30
5	Recommended Input Speed	rpm 4000	rpm 4000	rpm 4000	rpm 4000
6	Efficiency	% ≈73%	% ≈73%	% ≈73%	% ≈73%
7	Backlash at No-load	≤1,5°	≤1,5°	≤1,5°	≤1,5°
8	Length (L)	mm 52,5	mm 52,5	mm 52,5	mm 52,5
9	Weight	kg 0,372	kg 0,372	kg 0,372	kg 0,372

Characteristics	
Item	
Max. Radial load (middle of the key)	200N
Max. Axial load (output shaft center)	100N
Radial Play	<0,06mm
Axial Play	<0,3mm
Max. Press fit force	150N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



Specification							
Model		...1 / 3.6	...1 / 4.3	...2 / 13	...2 / 15	...2 / 18	...2 / 23
1	Stages	1	1	2	2	2	2
2	Exact Ratio	3,6	4,25	12,96	15,3	18,06	22,67
3	Nominal Output Torque	Nm	9	9	15	15	15
4	Max. Output Torque	Nm	27	27	60	60	60
5	Recommended Input Speed	rpm	4000	4000	4000	4000	4000
6	Efficiency	%	≈90%	≈90%	≈81%	≈81%	≈81%
7	Backlash at No-load		≤1°	≤1°	≤1,2°	≤1,2°	≤1,2°
8	Length (L)	mm	37,8	37,8	49,4	49,4	49,4
9	Weight	kg	0,455	0,455	0,610	0,610	0,610

Specification					
Model		...3 / 47	...3 / 55	...3 / 65	...3 / 77
1	Stages	3	3	3	3
2	Exact Ratio	46,66	55,08	65,03	76,77
3	Nominal Output Torque	Nm	30	30	30
4	Max. Output Torque	Nm	90	90	90
5	Recommended Input Speed	rpm	4000	4000	4000
6	Efficiency	%	≈73%	≈73%	≈73%
7	Backlash at No-load		≤1,5°	≤1,5°	≤1,5°
8	Length (L)	mm	60,8	60,8	60,8
9	Weight	kg	0,765	0,765	0,765

Characteristics	
Item	
Max. Radial load (middle of the key)	300N
Max. Axial load (output shaft center)	200N
Radial Play	<0,08mm
Axial Play	<0,4mm
Max. Press fit force	300N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



Gearboxes
Spur gearboxes

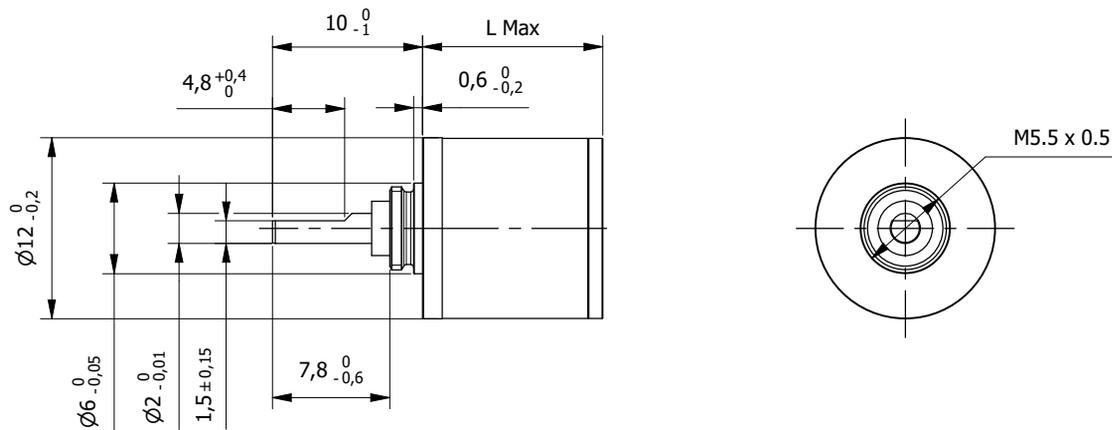
Advantages at a glance

- Compact & simple design
- Cost-efficient
- Best for low-torque/speed applications

Our extensive spur gearbox range offers good torque to size ratios coupled with high efficiencies. If the standard configuration does not meet the application requirement then a customized design could be proposed, even for low volumes.

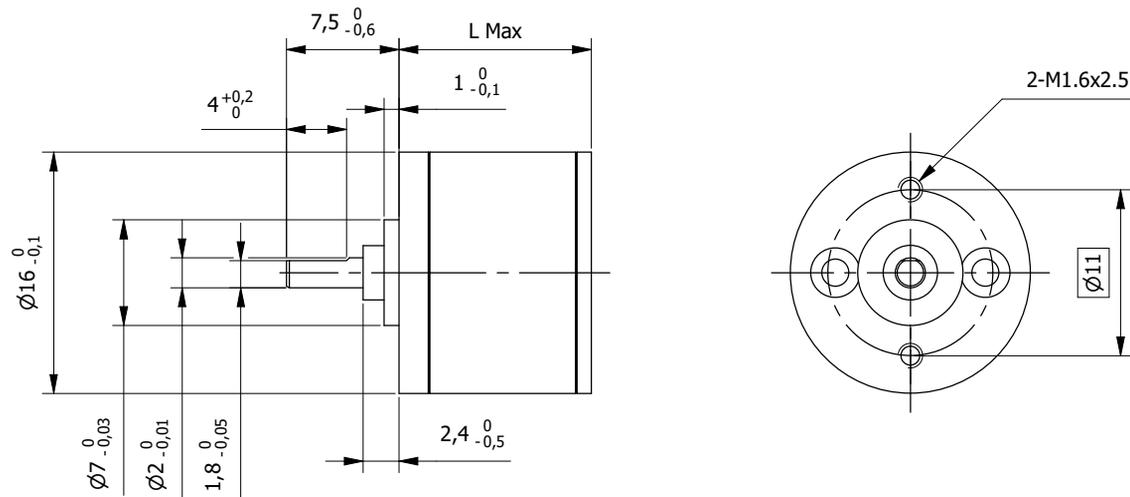
Spur gearboxes	Torque* (Nm)	
12GSS	0,01...0,025	346
16GSS	0,01...0,03	347
16GSP (plastic version)	0,01...0,03	348
16GST (reinforced)	0,06...0,1	349
24GSP	0,1	350

*Nominal Output Torque



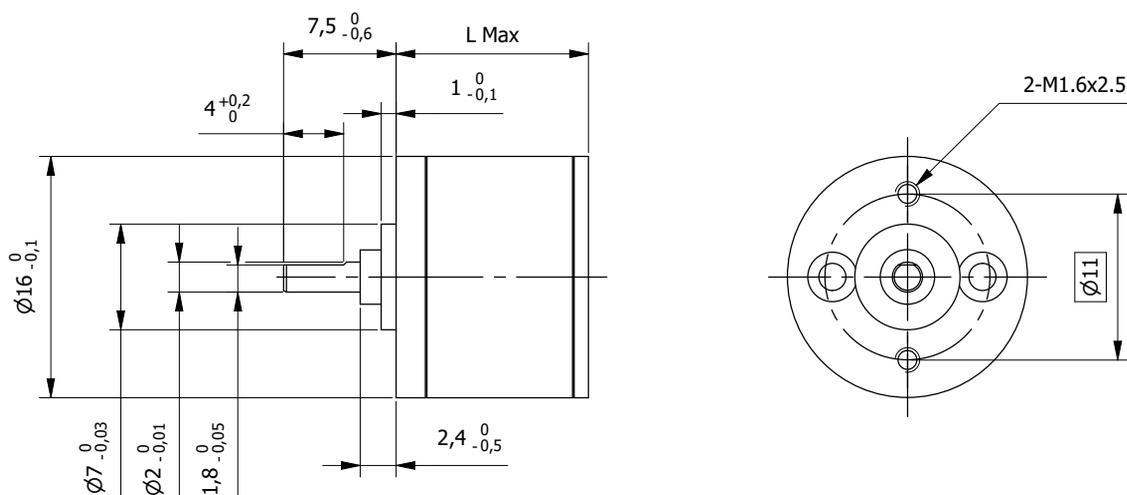
Specification		...2-6,4	...3-22	...4-76	...5-141
1	Model	2	3	4	5
2	Stages	2	3	4	5
3	Reduction Ratio	6,4	22	76	141
4	Nominal Output Torque	Nm	0,01	0,015	0,02
5	Max. Output Torque	Nm	0,03	0,035	0,04
6	Recommended Input Speed	rpm	8000	8000	8000
7	Efficiency	%	81	73	66
8	Mass Inertia	gcm ²	0,002	0,002	0,002
9	Average Backlash no-load	°	1	1	1,2
10	Max. Axial load (dynamic)	N	2	2	2
11	Max. Radial load (6,5mm from flange)	N	2	2	2
12	Length (L)	mm	10	12	14
	Weight	g	6,5	7,4	8,3

Characteristics	
Item	
Max. Press fit force	30N
Operating temperature	-15 to +100°C
Bearing output	Sleeve bearings



Specification		...2-9,1	...3-31	...4-76	...4-141
1	Model	...	...	...	...
1	Stages	2	3	4	4
2	Reduction Ratio	9,1	31	76	141
3	Nominal Output Torque	Nm	0,015	0,025	0,035
4	Max. Output Torque	Nm	0,1	0,1	0,1
5	Recommended Input Speed	rpm	8000	8000	8000
6	Efficiency	%	81	73	66
7	Mass Inertia	gcm ²	0,003	0,003	0,003
8	Average Backlash no-load	°	1	1	1,2
9	Max. Axial load (dynamic)	N	2	2	2
10	Max. Radial load (6,5mm from flange)	N	2	2	2
11	Length (L)	mm	11,8	12,8	14,8
12	Weight	g	9	9,8	10,2

Characteristics	
Item	
Max. Press fit force	30N
Operating temperature	-15 to +100°C
Bearing output	Sleeve bearings



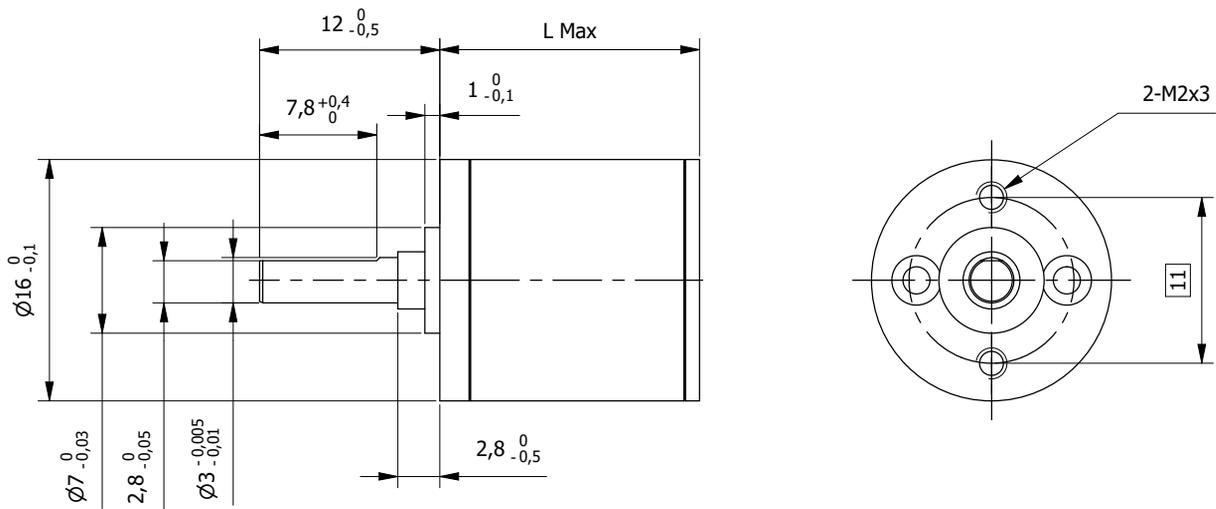
Specification		...2-6,4	...2-9,1	...3-31	...4-76	...4-141
1	Stages	2	2	3	4	4
2	Reduction Ratio	6,4	9,1	31	76	141
3	Nominal Output Torque	Nm 0,01	Nm 0,01	Nm 0,02	Nm 0,03	Nm 0,03
4	Max. Output Torque	Nm 0,1	Nm 0,1	Nm 0,1	Nm 0,1	Nm 0,1
5	Recommended Input Speed	rpm 8000	rpm 8000	rpm 8000	rpm 8000	rpm 8000
6	Efficiency	% 81	% 81	% 73	% 66	% 66
7	Mass Inertia	gcm^{2} 0,003	gcm^{2} 0,003	gcm^{2} 0,003	gcm^{2} 0,003	gcm ² 0,003
8	Average Backlash no-load	° 1	° 1	° 1	° 1,2	° 1,2
9	Max. Axial load (dynamic)	N 2	N 2	N 2	N 2	N 2
10	Max. Radial load (6,5mm from flange)	N 1	N 1	N 1	N 1	N 1
11	Length (L)	mm 11,8	mm 11,8	mm 12,8	mm 14,8	mm 14,8
12	Weight	g 9	g 9	g 9,8	g 10,2	g 10,2

Characteristics	
Item	
Max. Press fit force	15N
Operating temperature	-15 to +80°C
Bearing output	Sleeve bearings

Spur Gearbox 16GST

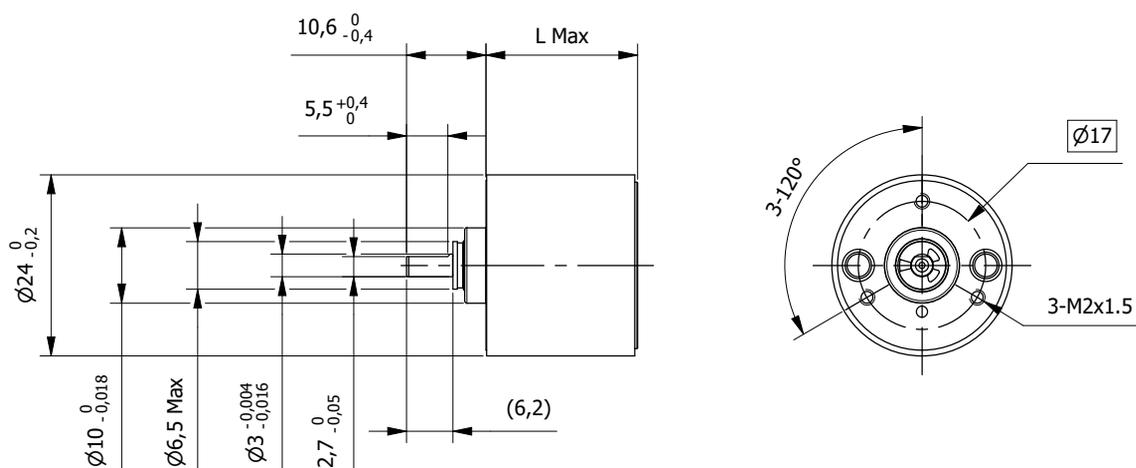
Reinforced

Ø 16mm
0,06 to 0,1Nm



Specification		...2-9,1	...3-31	...4-76	...4-141
1	Stages	2	3	4	4
2	Reduction Ratio	9,1	31	76	141
3	Nominal Output Torque	Nm 0,06	0,06	0,1	0,1
4	Max. Output Torque	Nm 0,15	0,15	0,3	0,3
5	Recommended Input Speed	rpm 8000	8000	8000	8000
6	Efficiency	% 81	73	66	66
7	Mass Inertia	gcm ² 0,006	0,005	0,004	0,004
8	Average Backlash no-load	° 1	1	1,2	1,2
9	Max. Axial load (dynamic)	N 5	5	5	5
10	Max. Radial load (6,5mm from flange)	N 10	15	20	20
11	Length (L)	mm 14,3	17,3	19,3	19,3
12	Weight	g 13,8	14,5	15,8	15,8

Characteristics	
Item	
Max. Press fit force	5N
Operating temperature	-15 to +100°C
Bearing output	Ball bearings



Specification		...2-7,2	...2-20	...4-32	...4-64	...4-131	...6-325
1	Model	...2-7,2	...2-20	...4-32	...4-64	...4-131	...6-325
1	Stages	2	2	4	4	4	6
2	Reduction Ratio	7,2	20	32	64	131	325
3	Nominal Output Torque	Nm	0,1	0,1	0,1	0,1	0,1
4	Max. Output Torque	Nm	0,15	0,15	0,15	0,15	0,15
5	Recommended Input Speed	rpm	4000	4000	4000	4000	4000
6	Efficiency	%	81	66	66	66	53
7	Mass Inertia	gcm ²	0,008	0,01	0,008	0,007	0,006
8	Average Backlash no-load	°	1	2	2	2	3
9	Max. Axial load (dynamic)	N	8	8	8	8	8
10	Max. Radial load (8mm from flange)	N	5	5	5	5	5
11	Length (L)	mm	16,5	16,5	20,2	20,2	24
12	Weight	g	25	28	28	28	30

Characteristics	
Item	
Max. Press fit force	500N
Operating temperature	-15 to +80°C
Bearing output	Sleeve bearings



Gearbox
Wheel Hub

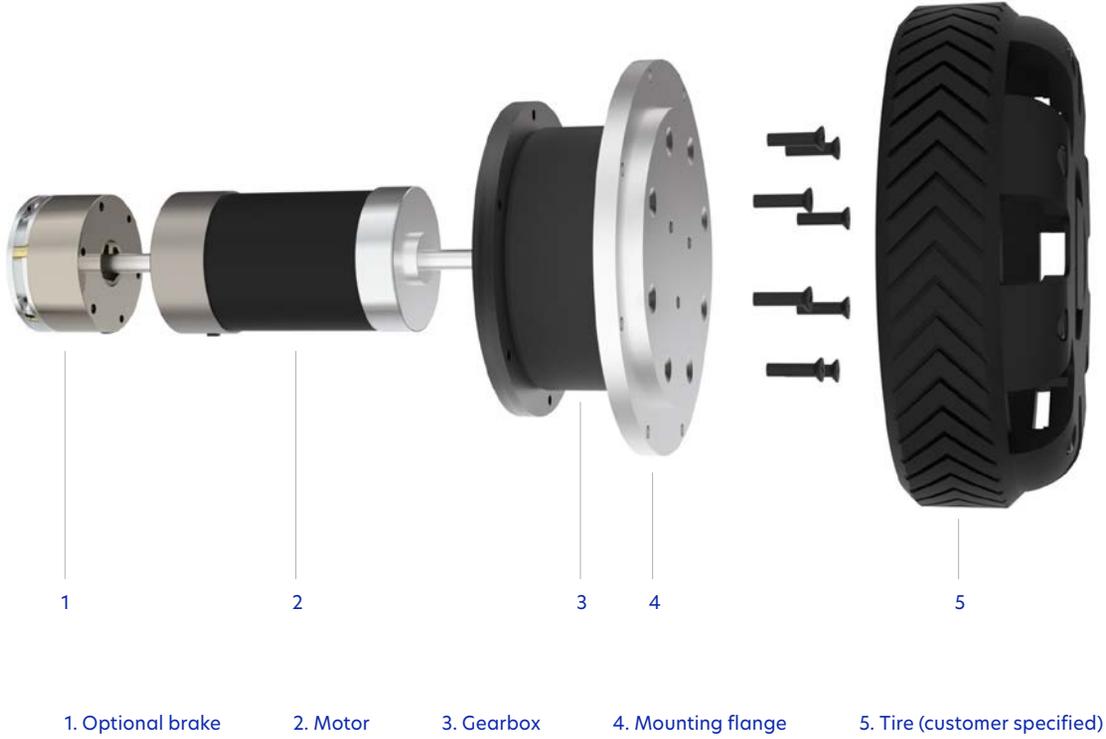
Advantages at a glance
Full modularity of components, including tire
Optimized weight and energy efficiency
Fully customizable mounting flange
Quality cost-effective solution
Payload from 75kg to 300kg per wheel

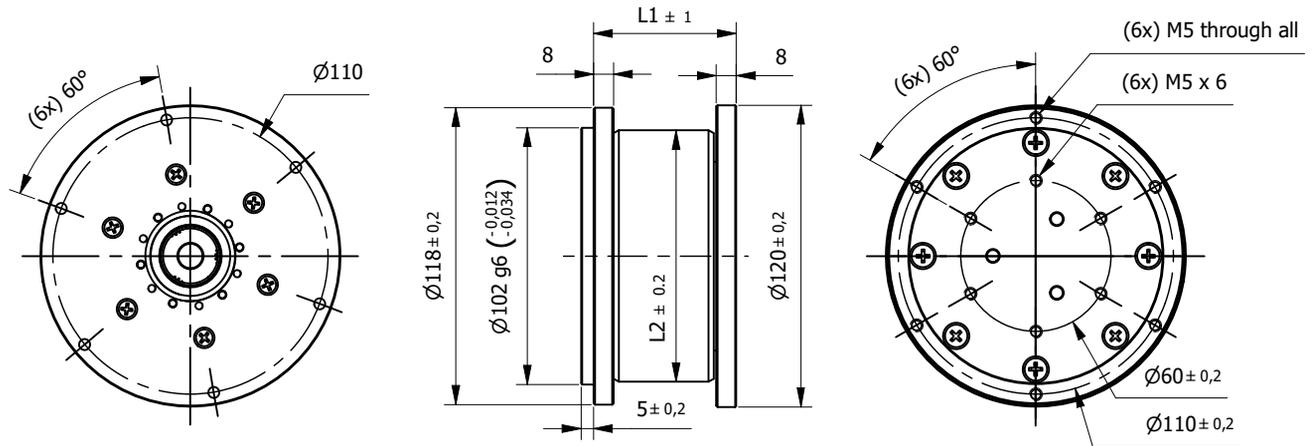
Wheel Hub gearboxes	Torque* (Nm)	
GPW56	7,73...26,48	354
GPW56 + 57BL03	9,17	355
GPW56 + 60BLWA38	4,5	356
GPW56 + IB180 362	9,9	357

Our GPW56 Wheel Hub is the latest development of our R&D department. This compact wheel unit has been created to offer an unprecedented flexibility in composition, performance, cost and applications, being suitable not only for Automated Guided Vehicles (AGVs), Autonomous Mobile Robots (AMRs) and Service robots but for example also for conveyors or door applications.

* Nominal Output Torque

Our Wheel Hub can be modularly assembled with most of our wide range of BLDC and Stepper motors





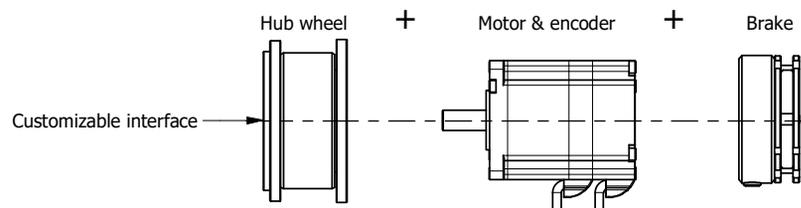
Front and back flange are fully customizable

Specification		Model	...1 / 3.3	...1 / 3.9	...1 / 4.2	...1 / 5.1	...1 / 6.5	...1 / 7.7	...1 / 9.5
1	Stages		1	1	1	1	1	1	1
2	Reduction Ratio		3,3	3,9	4,2	5,1	6,5	7,7	9,5
3	Nominal Output Torque	Nm	7,73	18,03	18,15	18,82	20,04	16,89	10,16
4	Max. Output Torque	Nm	15,46	36,06	36,3	37,64	40,08	33,78	20,32
5	Recommended Input Speed	rpm	3500	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm	4658	5968	6589	8307	8988	10919	13000
7	Efficiency	%	≈92%	≈92%	≈92%	≈92%	≈92%	≈92%	≈92%
8	Length (L1)	mm	49	49	49	49	49	49	49
9	Length (L2)	mm	90	90	90	90	90	90	90
10	Weight	kg	2,5	2,5	2,5	2,5	2,5	2,5	2,5

Specification		Model	...2 / 10.8	...2 / 15.5	...2 / 20	...2 / 25.7	...2 / 32.7	...2 / 42.6	...2 / 62.3
1	Stages		2	2	2	2	2	2	2
2	Reduction Ratio		10,8	15,5	20	25,7	32,7	42,6	62,3
3	Nominal Output Torque	Nm	11,22	25,27	25,17	25,83	25,61	26,15	26,48
4	Max. Output Torque	Nm	22,44	50,54	50,34	51,66	51,22	52,3	52,96
5	Recommended Input Speed	rpm	3500	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm	4658	5968	8307	8988	10919	8988	13000
7	Efficiency	%	≈85%	≈85%	≈85%	≈85%	≈85%	≈85%	≈85%
8	Length (L1)	mm	57	57	57	57	57	57	57
9	Length (L2)	mm	100	100	100	100	100	100	100
10	Weight	kg	3	3	3	3	3	3	3

Characteristics	
Item	
Backlash at 2% nominal output torque	≤30 arcmin
Max. load to apply on the wheel (axial load) - 1 stages	50kg (more load capacity on request)
Max. load to apply on the wheel (axial load) - 2 stages	300kg
Operating temperature	-15 to +90°C
Service Life (at recommended input speed)	5000h
Protection class	IP44 (IP54 on request)
Flange material	Aluminium

Combinations
Can be assembled with motor, integrated or stand alone drive, brake, encoder, support, connectors

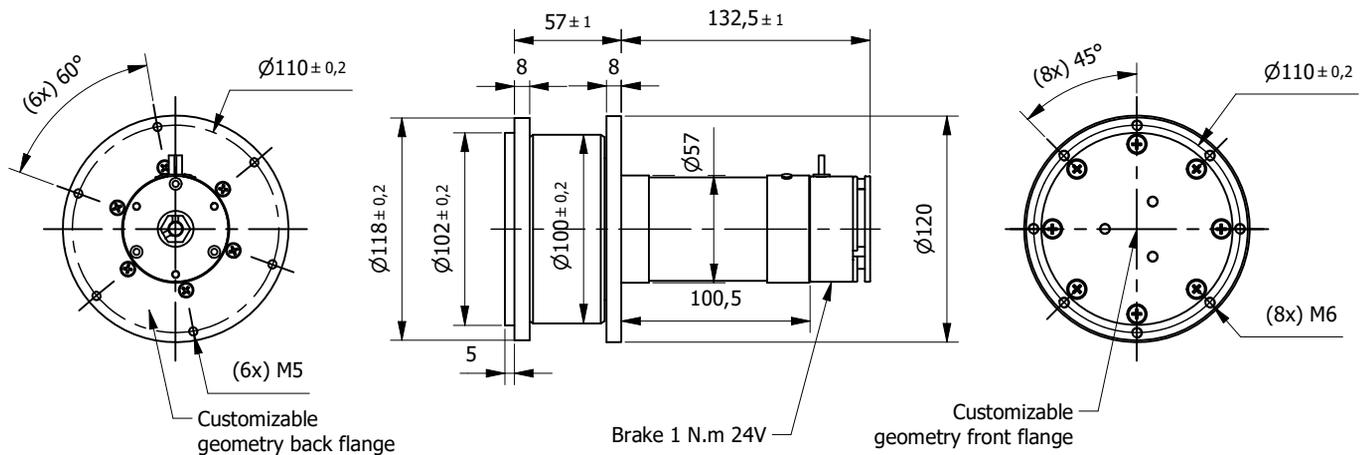


Wheel Hub GPW56 + 57BL03

Gearbox + BLDC motor + brake

Ø 100mm

9,17Nm



Note: all values are calculated with synthetic tire on flat concrete floor

Specification			
Model	...2 / 32.7		
1	Rated Voltage	V	24
2	Rated Current	A	9,1
3	Stages		2
4	Reduction Ratio		32,7
5	Nominal Output Torque	Nm	9,17
6	Max. Output Torque	Nm	27,5
7	Recommended Input Speed	rpm	3500
8	Max. Input Speed	rpm	10919
9	Gearbox Efficiency	%	≈85%
10	Acc@ 200kg, 160mm Ø wheel	m/s ²	1,4
11	Acc max@ 200kg, 160mm Ø wheel	m/s ²	2,81
12	Rated speed, 160 mm wheel	m/s	0,9
13	Weight	kg	4,5

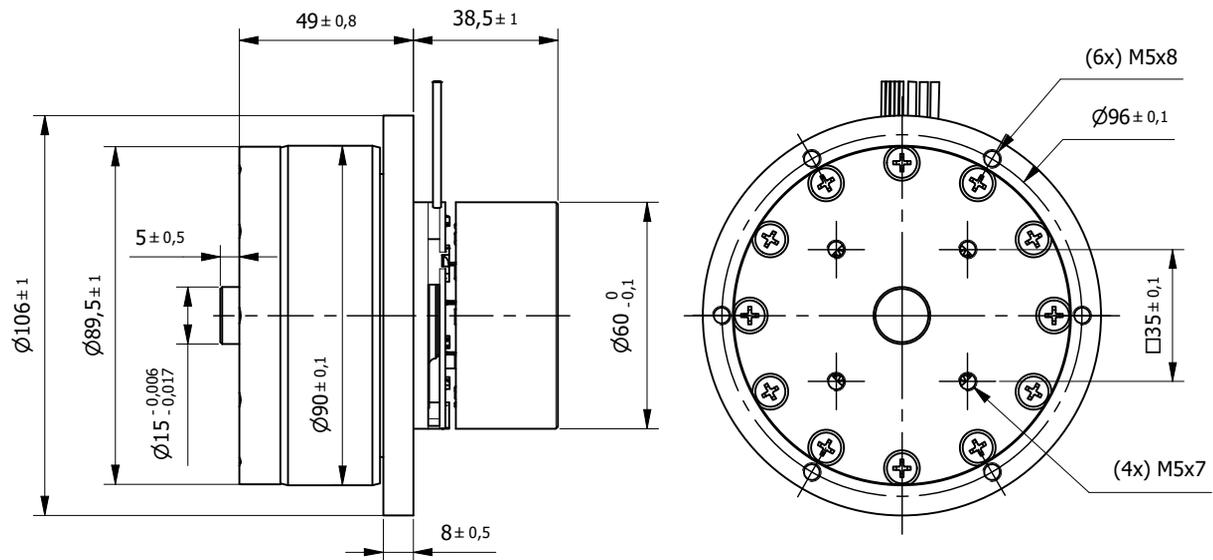
Characteristics		
Item		
Backlash at 2% nominal output torque	≤30 arcmin	
Max. load to apply on the wheel (axial load)	300kg	
Operating temperature	-15 to +90°C	
Service Life (at recommended input speed)	5000h	
Protection class	IP44 (IP54 on request)	
Flange material	Aluminium	

Wheel Hub GPW56 + 60BLWA38

Gearbox + Flat BLDC motor

Ø 90mm

4,5Nm



Note: all values are calculated with synthetic tire on flat concrete floor

Specification*			
Model	...1 / 9,5		
1	Rated Voltage	V	48
2	Rated Current	A	1,2
3	Stages		1
4	Reduction Ratio		9,55
5	Nominal Output Torque	Nm	4,55
6	Max. Output Torque	Nm	14,89
7	Recommended Input Speed	rpm	1060
8	Max. Input Speed	rpm	13000
9	Gearbox Efficiency	%	≈ 92%
10	Acc@ 50kg, 160mm Ø wheel	m/s ²	1
11	Acc max@ 50kg, 160mm Ø wheel	m/s ²	3,09
12	Rated speed, 160 mm wheel	m/s	0,9
13	Weight	kg	4,7

*more data about the motor are available on 60BLWA38 datasheet

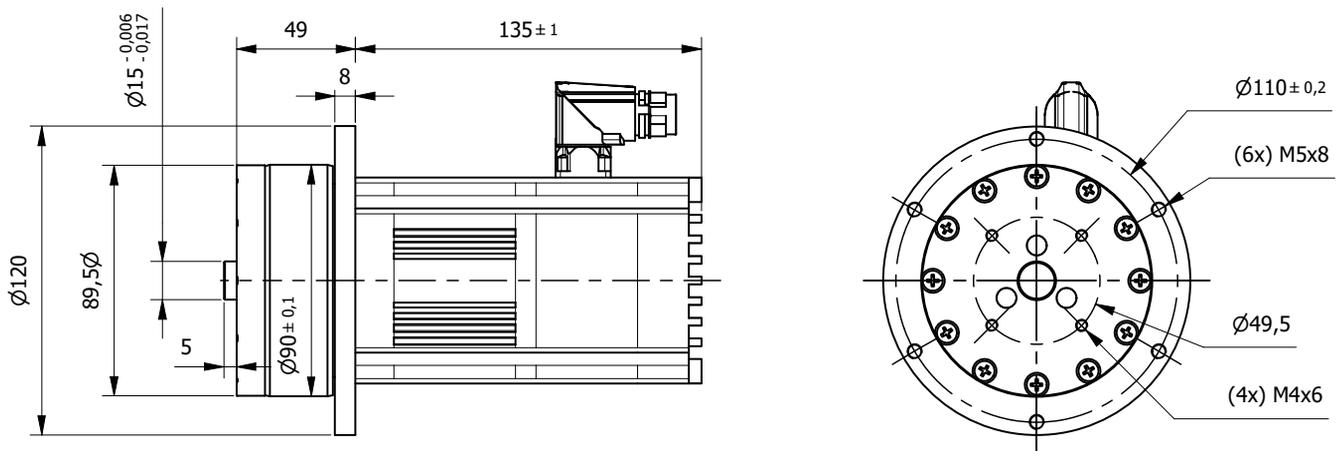
Characteristics	
Item	
Backlash at 2% nominal output torque	≤30 arcmin
Max. load to apply on the wheel (axial load)	75kg
Operating temperature	-15 to +90°C
Service Life (at recommended input speed)	5000h
Protection class	IP44 (IP54 on request)
Flange material	Aluminium

Wheel Hub GPW56 + IB180 362

Gearbox + BLDC motor with integrated controller

Ø 90mm

9,9Nm



Note: all values are calculated with synthetic tire on flat concrete floor

Specification*			
Model	...1 / 9,5		
1	Rated Voltage	V	40
2	Rated Current	A	13
3	Stages		1
4	Reduction Ratio		9,55
5	Nominal Output Torque	Nm	9,87
6	Max. Output Torque	Nm	29,07
7	Recommended Input Speed	rpm	3500
8	Max. Input Speed	rpm	13000
9	Gearbox Efficiency	%	≈ 92%
10	Acc@ 200kg, 160mm Ø wheel	m/s ²	0,4
11	Acc max@ 200kg, 160mm Ø wheel	m/s ²	1,22
12	Rated speed, 160 mm wheel	m/s	3,1
13	Weight	kg	4,7

*more data about the motor are available on IB180 362 datasheet

Characteristics	
Item	
Backlash at 2% nominal output torque	≤30 arcmin
Max. load to apply on the wheel (axial load)	75kg
Operating temperature	-15 to +90°C
Service Life (at recommended input speed)	5000h
Protection class	IP44 (IP54 on request)
Flange material	Aluminium

Encoders



Incremental
Encoders

Advantages at a glance

- Modular design
- Easy assembly
- High compatibility

Technical introduction

364

Incremental Encoders

361

E3 - Optical encoder - 3 channels

366

E4 - Optical encoder - 2 channels

367

E5 - Optical encoder - 3 channels

368

Encoders translate rotary or linear motion into a digital signal for monitoring or controlling speed, direction, distance or position. Incremental encoders provide a relative position with respect to a home or zero position. Depending on the required precision and environmental harshness, optical or magnetic sensors can be utilized. An incremental encoder has two output signals, A and B, which issue pulses when the device is moved. Together, the A and B signals indicate both the occurrence of and direction of movement. Many incremental encoders have an additional output signal, typically designated index or Z, which indicates the encoder is located at a particular reference position.

Term	
Cycles per revolution	The number of full quadrature cycles per full shaft revolution (360 mechanical degrees).
Number of channels	A channel is an electrical output signal from an incremental encoder. Channels are designated A and B for the two quadrature outputs and I or Z for the index output.
Max. Frequency	Maximum frequency at which the encoder electronics can switch back and forth between low and high signal level.
Max. Speed	Maximum speed at which the encoder electronics can switch back and forth between low and high signal level.
Supply Voltage	Defines the range of supply voltage necessary for the encoder to function properly. To avoid damaging the encoder, this range must be adhered to.
Supply Current	Indicates the current consumption of the encoder at the given operating voltage.
Low level input	Voltage value of the low level signal.
High level input	Voltage value of the high level signal.
Output rise time	Time for changing from the lower to the higher signal.
Output fall time	Time for changing from the higher to the lower signal.
Phase shift	The delay in time or degrees between the rising edge of channel A and the rising edge of channel B. Also defined as the delay between the center of the high state on channel A to the center of the high state on channel B.
Operating temperature	Temperatures at which the encoder can operate.
Max. shaft radial play	Maximum allowed perpendicular shaft displacement.
Max. Acceleration	Maximum acceleration that the encoder can properly measure.
Codewheel	The encoder code wheel (or disc) defines the transmission code of pulses.

Glossary

Encoders translate rotary or linear motion into a digital signal for monitoring or controlling speed, direction, distance or position. Incremental encoders provide a relative position with respect to a home or zero position. Depending on the required precision and environmental harshness, optical or magnetic sensors can be utilized. An incremental encoder has two output signals, A and B, which issue pulses when the device is moved. Together, the A and B signals indicate both the occurrence of and direction of movement. Many incremental encoders have an additional output signal, typically designated index or Z, which indicates the encoder is located at a particular reference position.

The E3 is a high resolution rotary encoder with a rugged glass-filled polymer enclosure, which utilizes either a 5-pin locking or standard connector. This optical incremental encoder is designed to easily mount to and dismount from an existing shaft to provide digital feedback information.

E3

The E4 miniature transmissive optical encoder is designed to provide digital quadrature encoder feedback for high volume, limited space applications. The E4T utilizes an innovative, push-on encoder disk which accepts shaft diameters of 2mm to 6.3mm. The E4T is designed to be a one-time installation miniature encoder.

E4

The E5 rotary encoder has a rugged glass-filled polymer enclosure with either a 5-pin or 10-pin latching connector. The module contains a highly collimated solid state light source and monolithic phased array sensor, which together provide a system extremely tolerant to mechanical misalignments.

E5

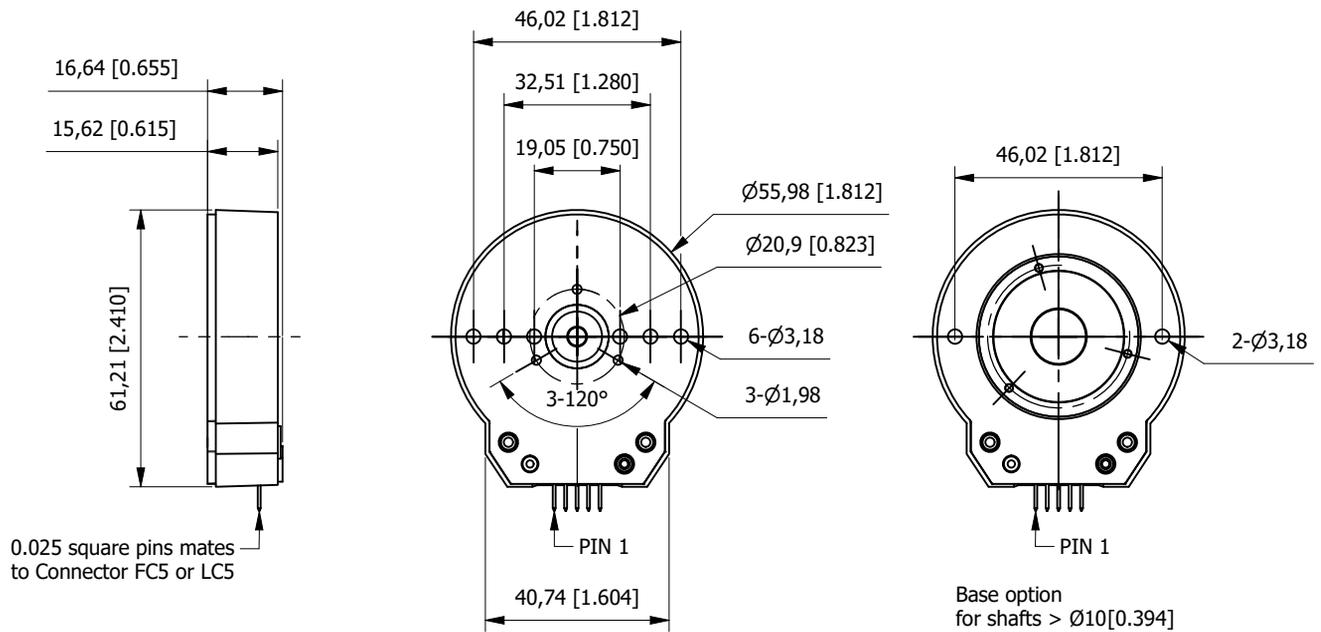
Composition

1	Base
2	PCB & Connector
3	Hub
4	Code wheel / disc
5	Cover



Incremental Encoder E3

Optical - 3 channel



Specification		E3-100	E3-500	E3-1024	E3-2500	E3-4096	E3-8000
Model		E3-100	E3-500	E3-1024	E3-2500	E3-4096	E3-8000
Cycles per revolution	CPR	100	500	1024	2500	4096	8000
Number of channels		2 + index*	2 + index*	2 + index*	2 + index*	2 + index*	2 + index*
Max. Frequency	kHz	300	300	300	300	300	300
Max. Speed	rpm	60'000	36'000	17'575	7'200	5'273	5'400

Available CPR: 64, 100, 200, 400, 500, 512, 1000, 1024, 1800, 2000, 2048, 2500, 3600, 4000, 4096, 5000, 7200, 8000, 8192, 10000

Available with different bore options to suit all our motors

* optional

Electrical Specification		
Item		
Supply Voltage	V	5 ±10%
Supply Current (CPR ≤1000, no load)	mA	27-33
Supply Current (CPR ≥1000 and <3600, no load)	mA	54-62
Supply Current (CPR ≥3600, no load)	mA	72-85
Low Level Input	Vmax	0,5
High Level Input	Vmin	2
Output Rise Time (CPR <3600)	ns	110
Output Rise Time (CPR ≥3600)	ns	50
Output Fall Time (CPR <3600)	ns	35
Output Fall Time (CPR ≥3600)	ns	50
Phase shift	°e	90 ±60

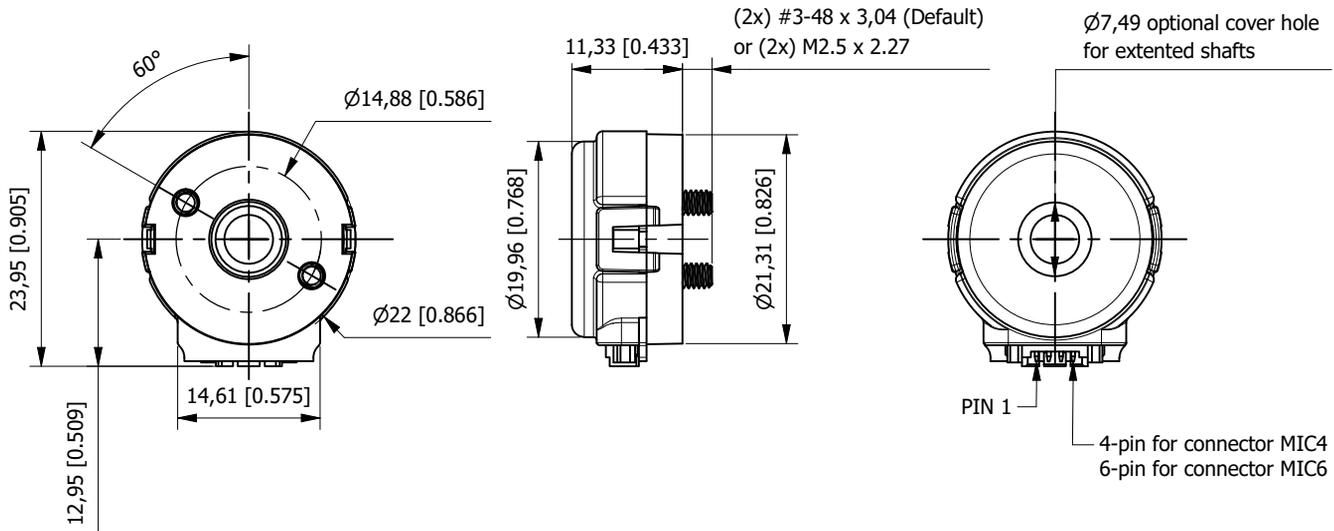
Connection	
Pin	
1	Ground
2	Index
3	A channel
4	+5VDC power
5	B channel
Mating Connector	CON-C5 or CON-LC5

Available with different cable options

Characteristics		
Item		
Operating Temperature (CPR <3600)	°C	-40° to 100°
Operating Temperature (CPR ≥3600)	°C	-25° to 100°
Max. Shaft Axial Play	mm	±0,254
Max. Shaft Run out	mm	0,1 T.I.R.
Max. Acceleration	rad/s ²	250'000
Codewheel Moment of Inertia (bore <12mm)	gcm ²	6,285
Codewheel Moment of Inertia (bore ≥12mm)	gcm ²	28,246
Minimum Shaft Length	mm	11,3
Maximum Shaft Length	mm	17,02

Incremental Encoder E4

Optical - 2 channel



Specification		E4T-100	E4T-200	E4T-256	E4T-400	E4T-500	E4T-1000
Model		E4T-100	E4T-200	E4T-256	E4T-400	E4T-500	E4T-1000
Cycles per revolution	CPR	100	200	256	400	500	1000
Number of channels		2	2	2	2	2	2
Max. Frequency	kHz	100	100	100	100	100	100
Max. Speed	rpm	60'000	30'000	23'437	15'000	12'000	6'000

Available CPR: 100, 108, 120, 125, 128, 200, 250, 256, 300, 360, 400, 500, 512, 720, 800, 1000
 Available with different bore options to suit all our motors

Electrical Specification		Single-Ended	Differential
Supply Voltage	V	5 ±10%	5 ±10%
Supply Current (CPR ≤ 500, no load)	mA	25-30	27-32
Supply Current (CPR > 500, no load)	mA	34-42	36-44
Low Level Input	V _{max}	0,4	0,6
High Level Input	V _{min}	2,4	4,75
Differential Output Voltage	V _{min}	---	3
Output Rise Time	ns	100	20
Output Fall Time	ns	50	20
Phase shift	°e	90 ±60	90 ±60

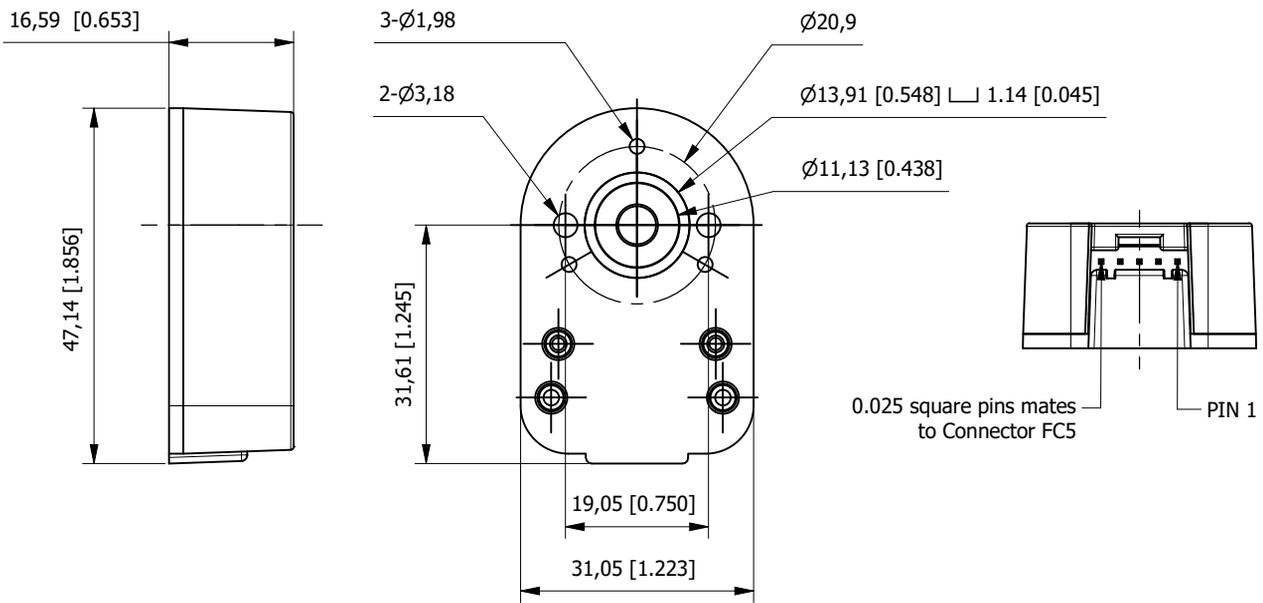
Connection		
Pin	Single-Ended	Differential
1	+5VDC power	Ground
2	A channel	A channel
3	Ground	A- channel
4	B channel	+5VDC power
5		B channel
6		B- channel
Mating Connector	CON-MIC4	CON-MIC6

Available with different cable options

Characteristics	
Item	
Operating Temperature	°C -20° to 100°
Max. Shaft Axial Play	mm ±0,254
Max. Shaft Run out	mm 0,05 T.I.R.
Max. Acceleration	rad/s ² 250'000
Codewheel Moment of Inertia	gcm ² 0,036
Minimum Shaft Length	mm 6,985
Maximum Shaft Length	mm 10

Incremental Encoder E5

Optical - 3 channel



Specification		E5-100	E5-200	E5-400	E5-500	E5-1024	E5-4096
Model		E5-100	E5-200	E5-400	E5-500	E5-1024	E5-4096
Cycles per revolution	CPR	100	200	400	500	1024	4096
Number of channels		2 + index*	2 + index*	2 + index*	2 + index*	2 + index*	2 + index*
Max. Frequency	kHz	300	300	300	300	300	720
Max. Speed	rpm	60'000	60'000	45'000	36'000	17'575	10'546

Available CPR: 32,50, 96, 100, 192, 200, 250, 256, 360, 400, 500, 512, 540, 720, 800, 900, 1000, 1024, 1250, 2000, 2048, 2500, 4000, 4096, 5000

Available with different bore options to suit all our motors

* optional

Electrical Specification		Single-Ended	Differential
Supply Voltage	V	5 ±10%	5 ±10%
Supply Current (CPR <500, no load)	mA	27-33	29-36
Supply Current (CPR ≥500 and <2000, no load)	mA	54-62	56-65
Supply Current (CPR ≥2000, no load)	mA	72-85	74-88
Low Level Input	V _{max}	0,5	0,4
High Level Input	V _{min}	2	2,4
Output Rise Time (CPR <2000, no load)	ns	110	≤20
Output Rise Time (CPR ≥2000, ±5mA load)	ns	50	≤20
Output Fall Time (CPR <2000, no load)	ns	100	≤20
Output Fall Time (CPR ≥2000, ±5mA load)	ns	50	≤20
Phase shift	°e	90 ±60	90 ±60

Connection		
Pin	Single-Ended	Differential
1	Ground	Ground
2	Index	Ground
3	A channel	Index-
4	+5VDC power	Index+
5	B channel	A- channel
6		A+ channel
7		+5VDC power
8		+5VDC power
9		B- channel
10		B+ channel
Mating Connector	CON-FC5	CON-FC10

Available with different cable options

Characteristics	
Item	
Operating Temperature (CPR <2000)	°C -40° to 100°
Operating Temperature (CPR ≥2000)	°C -25° to 100°
Max. Shaft Axial Play	mm ±0,254
Max. Shaft Run out	mm 0,1 T.I.R.
Max. Acceleration	rad/s ² 250'000
Codewheel Moment of Inertia	gcm ² 0,565
Minimum Shaft Length	mm 11,3
Maximum Shaft Length	mm 19,05

Controllers — Drives



Brushless DC motor
Controllers

p.379



Brushless DC motor
Multi-Axis Controllers

p.387



Brushless AC motor
Controllers

p.391



Stepper motor
Controllers

p.395

Controllers – Drives

Technical introduction		376
Brushless DC motor Drives	Current* (A rms)	379
Pegasus - NEW	up to 2	380
Taurus	up to 3	381
Gemini	up to 10	382
Leo B1400 - NEW	up to 30	383
Leo B2000 - NEW	up to 40	384
Brushless DC motor Multi-Axis Drives	Current* (A rms)	387
Phoenix - B100O05	up to 3 (each motor)	388
Phoenix - B500B36	up to 12 (each motor)	389
Brushless AC motor Drives	Current* (A rms)	391
Scorpius	up to 3	392
Serpens	up to 5,2	393
Stepper motor Drives	Current* (A rms)	395
Hercules - NEW	up to 2	396
Orion	up to 3	397
Aries	up to 4,2	398
Libra	up to 5,5	399
Aquarius SBD204	up to 4,2	400
Aquarius SBD207	up to 7,1	401
Sagittarius	up to 7,1	402
Andromeda	up to 8,5	403
Lyra	up to 3	404
Draco	up to 5,2	405
Dorado	up to 8	406

* Phase Current

Term	
Phase Current	Nominal Current that the drive can provide to one phase of the motor.
Peak Current	Maximum Current that the drive can provide to one phase of the motor, for a limited time (max 1s).
Power Supply	AC or DC Voltage range allowed to supply the drive.
Logic Power Supply	AC or DC Voltage range allowed to supply the logic part of the drive.
Motor Power	Maximum motor power managed by the drive.
Chopper frequency	Switching frequency of the drive.
Protection degree	IP (International Protection) degree: it defines the protection against dust and water
Pollution degree	Degree of protection against pollution.
Category	Drive category following standard EN 61800-3 (electromagnetic compatibility): it defines the capability of a device to work satisfactorily in an electromagnetic environment without itself causing electromagnetic interference which is unacceptable for other devices present in this environment.
Temperatures	Temperature ranges allowed for correct operation (Working Temperature) or for proper storage (Storage Temperature).
Humidity	Humidity range allowed for correct operation.

Product families

BLDC motor Controllers

BLDC motor Multi-Axis Controllers

BLAC motor Controllers

Stepper motor Controllers

Delta Line Electronics can provide solutions to accomplish every customers' need: our drives portfolio can cover a wide range of different motors, from Stepper to Brushless motors.

Our portfolio is divided in Brushless DC Drives for 3-phase BLDC motors with phase current up to 40A rms, Brushless DC Multi-Axis Drives able to simultaneously control up to three BLDC 3-phase motors with phase current up to 12A rms (each motor), Brushless AC Drives for 3-phase BLAC motors with phase current up to 5,2A rms and Stepper Drives for 2-phase Stepper motors suitable for DC and AC power supply and with a phase current up to 8,5A rms. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

Portfolio

All our programmable drives are offered with two software: DL Studio and DL Space. DL Studio is a configuration and test tool that lets the user set all the objects inside the drive and move the motor from the PC while seeing the motor response, in terms of current, speed and other information. DL Space contains all the features of DL Studio, but lets the user write custom applications for the drive using a simple and user-friendly programming language. The drive can be connected to the PC through a specific interface kit.

Software

One of the many peculiarities of our drives is the possibility to choose different control methods:

the drive receives one signal to control the direction and one signal to control the speed from a master (a PLC or any other master capable of this control methodologies). These methods are extremely simple but limited by the performance of the master.

Clock and Direction / Analogue Reference

the drive is controlled through a fieldbus network: the master exchanges data with the drives connected to the bus. This control method has a great robustness, and the initial high cost is often justified by a reduction of the cablings and of the cost of assembly/maintenance procedures.

Fieldbus

the drive contains a custom application that can control the drive itself and the motor, even without the presence of a master. Programmable drives can be coupled with a PLC master to lighten the complexity of the PLC program, or they can be use standalone, even for complex usages.

Programmable

Technical introduction



Fieldbuses are more and more used and preferred over standard control methods, because of the high flexibility and the possibility to cover long distances. All Delta Line Drives equipped with any fieldbus act like slave for the bus, so it is necessary to have at least one master that handles the data exchange. Delta Line most widely used fieldbuses are: CANopen, RS485 Modbus-RTU, Ethernet Modbus TCP, EtherCAT and Profinet.

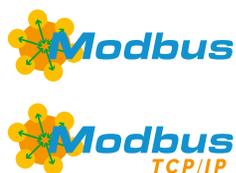
FIELDBUSES

It is a communication protocol widely used in automation, healthcare, agricultural and automotive systems. The CANopen protocol is based on the CANbus (Controller Area Network) physical layer, it can reach a transmission rate up to 1Mbps and allows the connection of up to 32 drives without losing performance.



CANopen

It is a very common serial communication protocol published by Gould-Modicon (now Schneider Electric) in 1979. Modbus RTU is based on the RS485 physical layer, it can reach a transmission rate up to 115200 bps and allows the connection of up to 32 drives without losing performance. Modbus TCP instead leans on the Ethernet bus; it can reach a transmission rate up to 100Mbps and allows the connection of an infinite number of drives. Also, the Modbus TCP/IP potentially allows remote connections.



Modbus

Ethernet for Control Automation Technology (EtherCAT) was developed by Beckhoff: it is based on the CANopen protocol and on the Ethernet bus, and it is optimized for industrial automation control. It has a transmission rate of 100Mbps and has no limits on the number of drives connected. It is the only fieldbus we offer that permits axes interpolation.



EtherCAT

Profinet is an industrial technical standard for data communication over industrial ethernet, designed for collecting data and controlling equipment in industrial systems, with a particular strength in delivering data under tight time constraints. It defines the communication with field connected peripheral devices. Profinet defines the entire data exchange between controllers and the devices.



Profinet



Brushless DC motor Controllers – Drives

Advantages at a glance
Position, Speed and Torque control
Analogue, fieldbus or programmable
Flexible configuration

Our Brushless DC Drives are specifically developed for 3-phases brushless motors with phase current up to 40A rms. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

Brushless DC motor Drives	Current* (A rms)	
Pegasus - NEW	up to 2	380
Taurus	up to 3	381
Gemini	up to 10	382
Leo B1400 - NEW	up to 30	383
Leo B2000 - NEW	up to 40	384

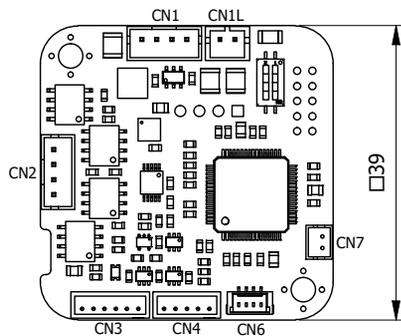
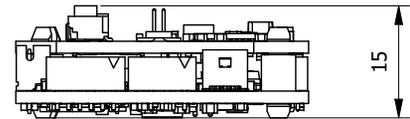
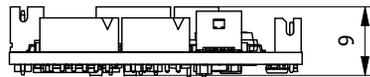
PEGASUS	TAURUS
Benefits	Benefits
<ul style="list-style-type: none"> • Compact design • Price/performance • Programmable 	<ul style="list-style-type: none"> • Digital I/O and analogue input • Programmable
Characteristics	Characteristics
<ul style="list-style-type: none"> • Phase Current up to 2A rms • Power Supply: 12-36 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet, PowerLink, IOLink, Ethernet IP 	<ul style="list-style-type: none"> • Phase Current up to 3A rms • Power Supply: 12-36 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT

LEO	GEMINI
Benefits	Benefits
<ul style="list-style-type: none"> • Compact design • High performance • High motor power 	<ul style="list-style-type: none"> • Digital I/O and up to 2 analogue inputs • Programmable
Characteristics	Characteristics
<ul style="list-style-type: none"> • Phase Current up to 40A rms • Power Supply: 12-48 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP 	<ul style="list-style-type: none"> • Phase Current up to 10A rms • Power Supply: 12-48 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP

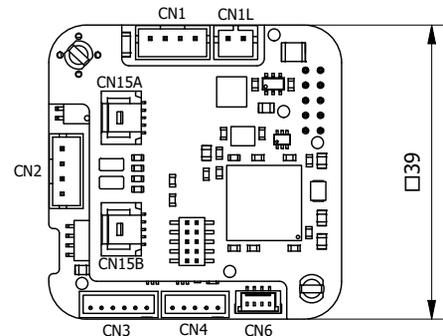
* Phase Current

Motion Controller

- CN1: Power supply connector
- CN1L: Logic supply connector
- CN2: Motor connector
- CN3/CN7: Input and Output connector
- CN4: Feedback interfaces connector
- CN6: Service interface
- CN15A/B: Fieldbus connector



CANopen & RS485
Modbus-RTU Interface



EtherCAT & Ethernet
Modbus-TCP Interface

Electrical Data

Item

1	Phase Current	A rms	up to 2
2	Peak Current	A peak	3,5
3	Power Supply	VDC	12÷36
4	Logic Power Supply	VDC	12÷36
5	Chopper Frequency	kHz	40

Characteristics

Item

Weight	24g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Supply inversion
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode

Also available on request with the following Fieldbus: Profinet, PowerLink, IOLink, Ethernet IP

Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402	...T001-S402
Fieldbus	RS485 Modbus RTU	CANopen	CANopen	EtherCAT	Modbus TCP
Programmable	Programming and real time debugging		Only configuration		
Software	DL Space		DL Studio		
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)				

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402	...T001-S402
Digital Inputs (not isolated)	3	3	3	3	3
Digital Outputs (not isolated)	2	2	2	2	2
Analog Inputs	1	1	1	0	0
Encoder Input/HALL Sensor	5V Single-Ended (TTL/CMOS) or Single-Ended (TTL/CMOS) hall effect sensors				

Cable kit available on request. More information can be found in the product manual on our website

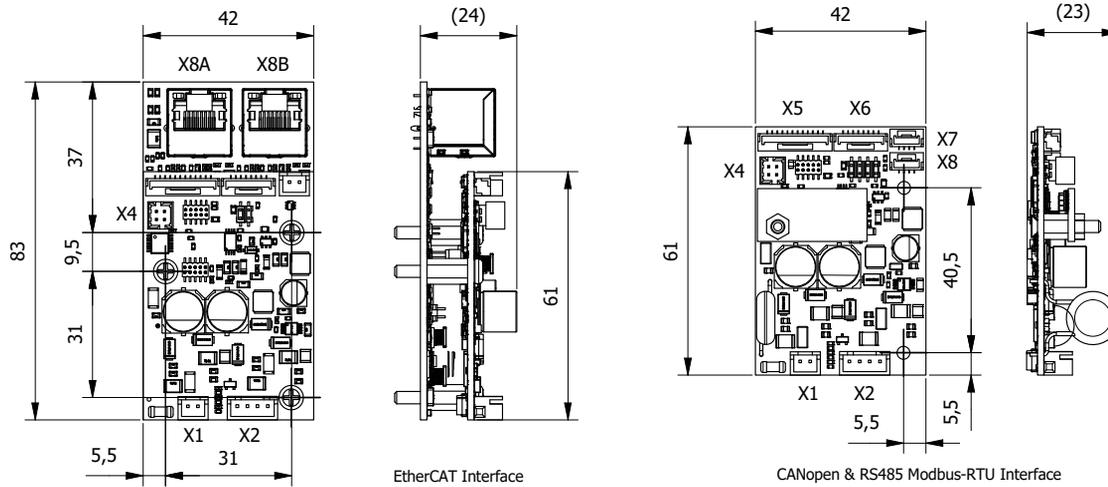
Standard Combination

Motor

All motor with Phase Current up to 2A rms

Motion Controller

- X1: Power Connections
- X2: Motor Connections
- X4: Service Serial Interface
- X5: Inputs and Outputs
- X6: Feedback Connections
- X7/X8 (all versions except for EtherCAT) : CommunicationInterface and Logic Power Supply
- X7 (only EtherCAT): Logic Power Supply
- X8 (only EtherCAT): Communication Interface



Electrical Data			
Item			
1	Phase Current	A rms	up to 3
2	Peak Current	A peak	4,2
3	Power Supply	VDC	12÷36
4	Logic Power Supply (mandatory)	VDC	24
5	Motor Power	W	25
6	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	120g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode				
Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Fieldbus	RS485 Modbus RTU	CANopen	CANopen	EtherCAT
Programmable	Programming and real time debugging		Only configuration	
Software	DL Space		DL Studio	
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)			

Note: Service SCI Interface cable is required for programming and available on request

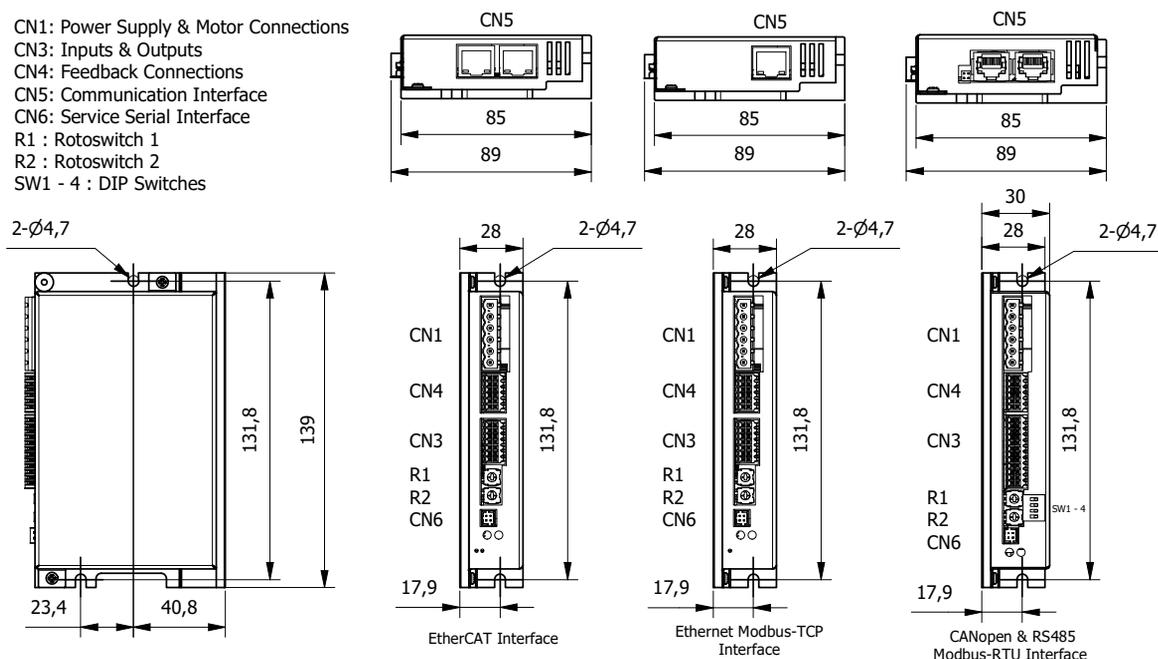
Connection				
Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Digital Inputs (not isolated)	4	4	4	4
Digital Outputs (not isolated)	3	3	3	3
Analog Inputs	1	1	1	1
Encoder Input	5V Single-Ended (TTL/CMOS) or 24V Push-Pull incremental encoder (not isolated)			

Cable kit is available on request. More information can be found in the product manual on our website

Standard Combination	
Motor	
All motor with Phase Current up to 3A rms	

Motion Controller

CN1: Power Supply & Motor Connections
 CN3: Inputs & Outputs
 CN4: Feedback Connections
 CN5: Communication Interface
 CN6: Service Serial Interface
 R1 : Rotoswitch 1
 R2 : Rotoswitch 2
 SW1 - 4 : DIP Switches



Electrical Data

Item			
1	Phase Current	A rms	up to 10
2	Peak Current	A peak	28 (for 5s.)
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Motor Power	W	up to 400
6	Chopper Frequency	kHz	40

Characteristics

Item	
Weight	150g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode

Model	...M001-S200	...T001-S200	...C001-S200	...E001-S200	...C001-S402	...E001-S402
Fieldbus	RS485 Modbus RTU	Ethernet Modbus TCP	CANopen	EtherCAT	CANopen	EtherCAT
Programmable	Programming and real time debugging				Only configuration	
Software	DL Space				DL Studio	
Operating mode	Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode, Clock direction mode					

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...M001-S200	...T001-S200	...C001-S200	...E001-S200	...C001-S402	...E001-S402
Digital Inputs (opto-coupled)	6	4	6	4	6	4
Digital Outputs (opto-coupled)	3	3	3	3	3	3
Analog Inputs	2	---	2	---	2	---
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder (not isolated)					
Hall Input	5V Single-Ended (TTL/CMOS) hall effect sensors					

Connector kit is available on request. More information can be found in the product manual on our website

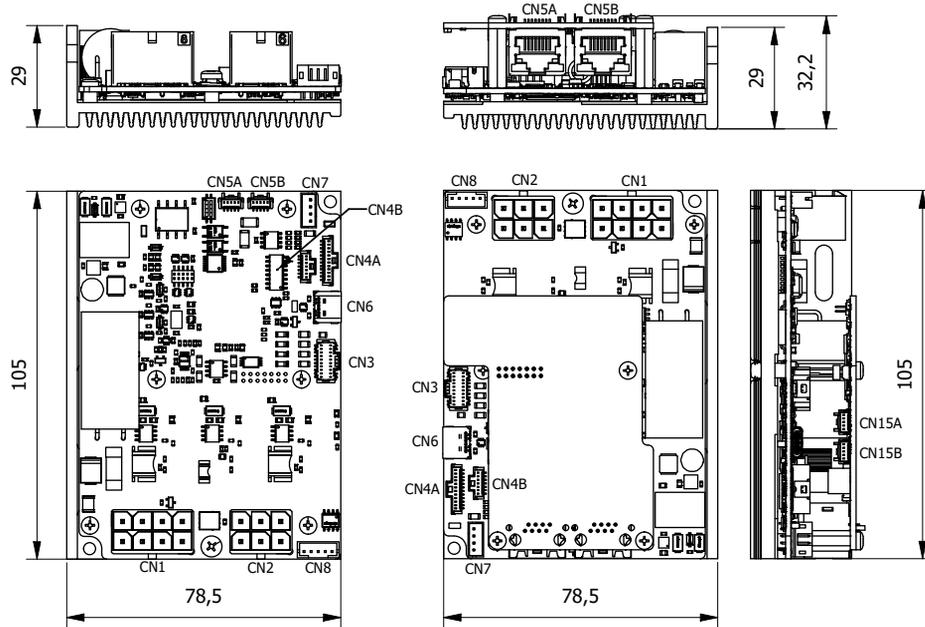
Standard Combination

Motor

All motor with Phase Current up to 10A rms

Motion Controller

- CN1: Power Supply + Logic Supply + Brake Resistor Outputs
- CN2: Motor connector
- CN3: Inputs and Outputs
- CN4A: Incremental Encoder + Hall Sensor
- CN4B: Absolute Encoder
- CN5A/B: Communication Interface (CANBUS & MODBUS)
- CN6: Service Serial Interface
- CN7: STO Interface
- CN8: Brake Output + External Temperature Sensor
- CN15A/B: Communication Interface (EtherCAT/Modbus TCP)



Electrical Data			
Item			
1	Phase Current	A rms	up to 30
2	Peak Current	A peak	90 (for 2s.)
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Motor Power	W	up to 1400
6	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	200g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode			
Model	...L001-S200	...T001-S200	...E001-S402
Fieldbus	RS485 Modbus RTU & CANopen	Ethernet Modbus TCP	EtherCAT
Programmable	Programming and real time debugging		Only configuration
Software	DL Space		DL Studio
Operating mode	Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode, Clock direction mode		

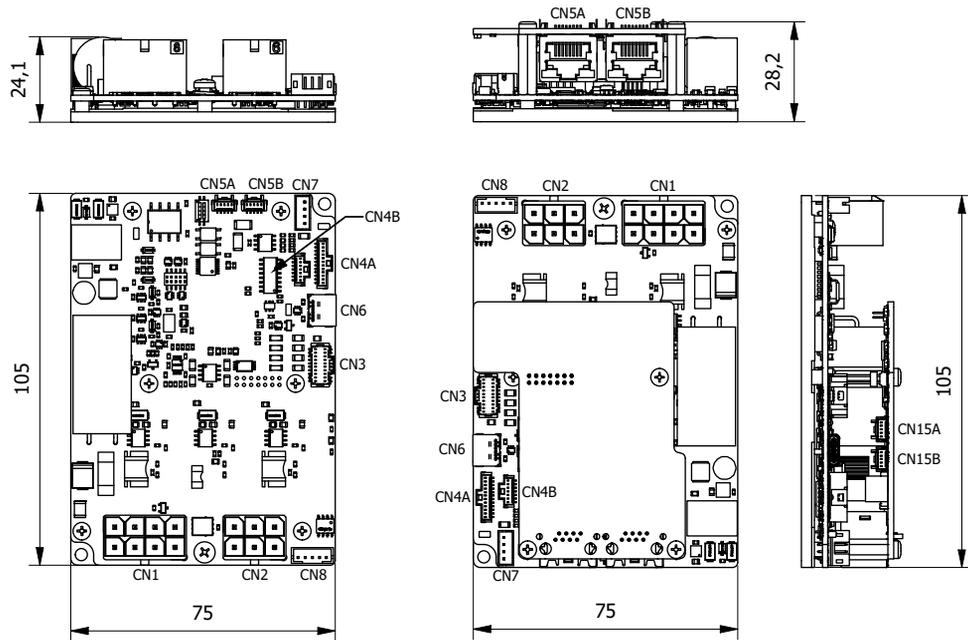
Note: Service SCI Interface cable is required for programming and available on request

Connection			
Model	...L001-S200	...T001-S200	...E001-S402
Digital Inputs	4	4	4
Digital Outputs	3	3	3
Analog Inputs	2	2	2
Encoder Input	5V Differential (RS422) or Single-Ended (TTL/CMOS) incremental encoder (not isolated) and Biss Absolute encoder		
Hall Input	5V Single-Ended (TTL/CMOS) hall effect sensors		
Cable kit available on request. More information can be found in the product manual on our website			

Standard Combination	
Motor	
All motor with Phase Current up to 30A rms	

Motion Controller

- CN1: Power Supply + Logic Supply + Brake Resistor Outputs
- CN2: Motor connector
- CN3: Inputs and Outputs
- CN4A: Incremental Encoder + Hall Sensor
- CN4B: Absolute Encoder
- CN5A/B: Communication Interface (CANBUS & MODBUS)
- CN6: Service Serial Interface
- CN7: STO Interface
- CN8: Brake Output + External Temperature Sensor
- CN15A/B: Communication Interface (EtherCAT/Modbus TCP)



Electrical Data			
Item			
1	Phase Current	A rms	up to 40
2	Peak Current	A peak	90 (for 2s.)
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Motor Power	W	up to 2000
6	Chopper Frequency	kHz	20

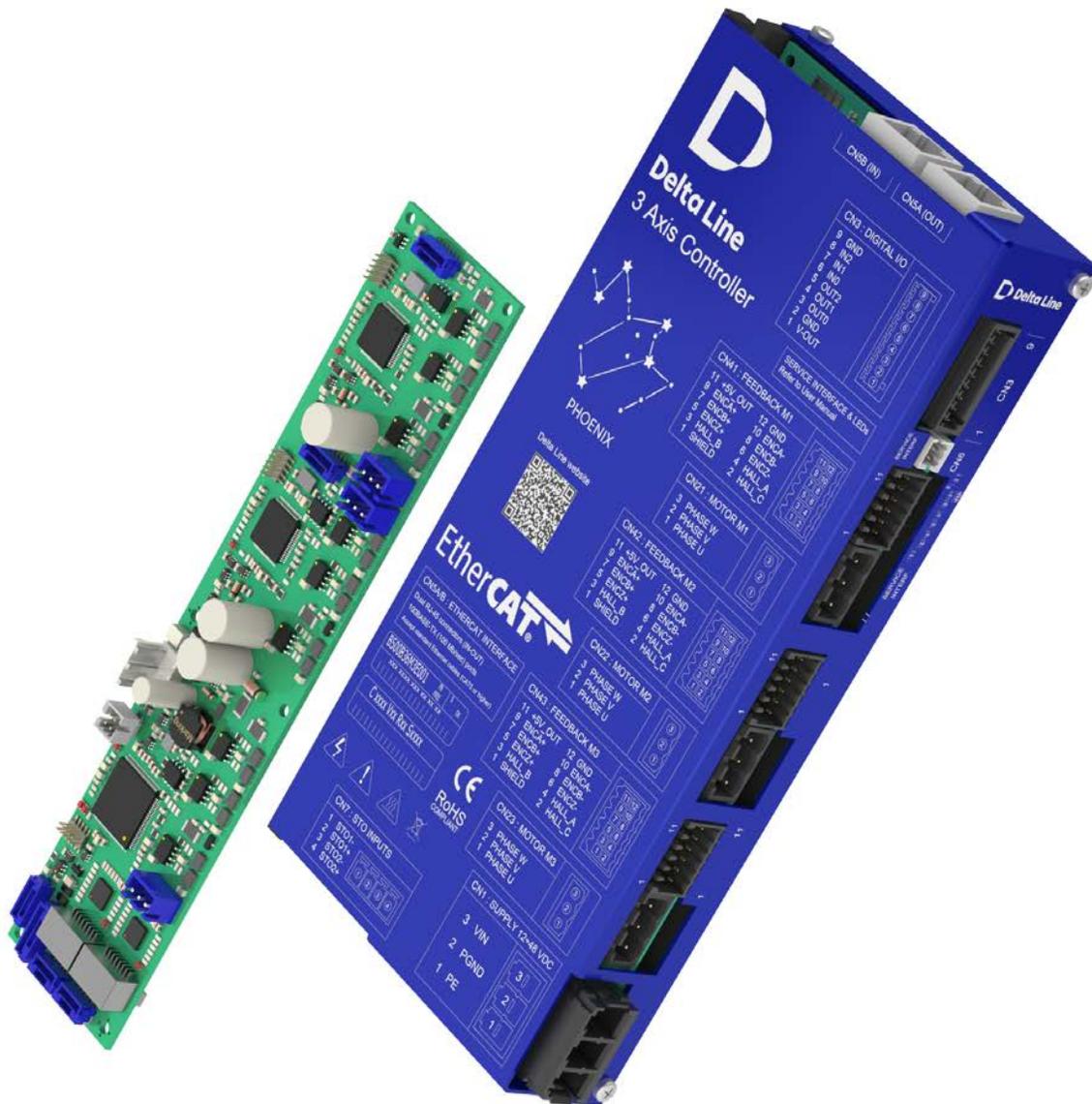
Characteristics	
Item	
Weight	180g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode			
Model	...L001-S200	...T001-S200	...E001-S402
Fieldbus	RS485 Modbus RTU & CANopen	Ethernet Modbus TCP	EtherCAT
Programmable	Programming and real time debugging		Only configuration
Software	DL Space		DL Studio
Operating mode	Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode, Clock direction mode		

Note: Service SCI Interface cable is required for programming and available on request

Connection			
Model	...L001-S200	...T001-S200	...E001-S402
Digital Inputs	4	4	4
Digital Outputs	3	3	3
Analog Inputs	2	2	2
Encoder Input	5V Differential (RS422) or Single-Ended (TTL/CMOS) incremental encoder (not isolated) and Biss Absolute encoder		
Hall Input	5V Single-Ended (TTL/CMOS) hall effect sensors		
Cable kit available on request. More information can be found in the product manual on our website			

Standard Combination	
Motor	
All motor with Phase Current up to 40A rms	



BLDC motor Multi-Axis Controllers – Drives

Advantages at a glance
Position, Speed and Torque control
EtherCAT fieldbus
Flexible configuration

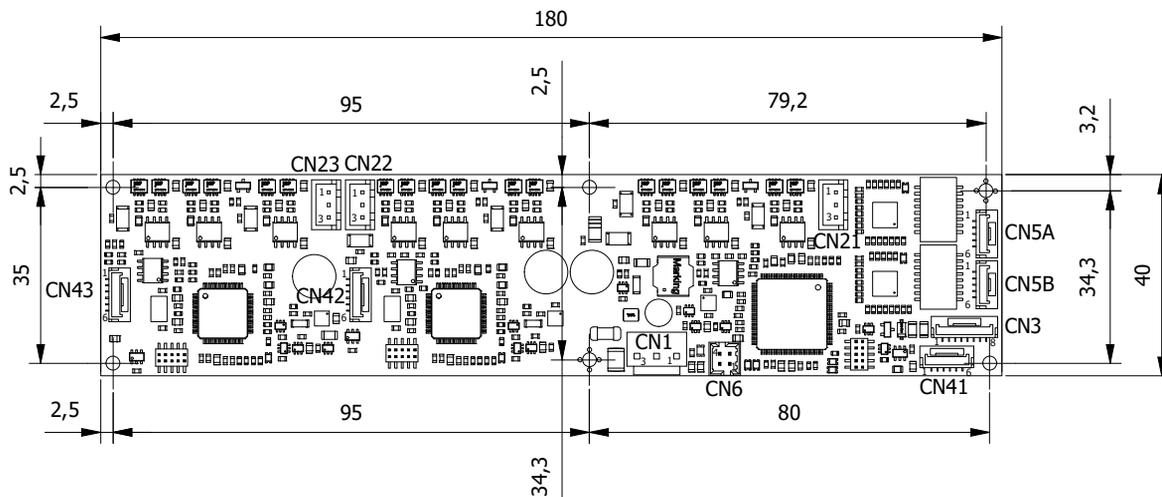
Brushless DC motor Multi-Axis Drives	Current* (A rms)	
Phoenix - B100O05	up to 3 (each motor)	388
Phoenix - B500B36	up to 12 (each motor)	389

Our Brushless Multi-Axis Drives (Phoenix B100 and Phoenix B500) are specifically developed to simultaneously control up to three BLDC 3-phase motors with phase current up to 12A rms (each motor). All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

PHOENIX B100	PHOENIX B500
Benefits <ul style="list-style-type: none"> • Compact dimensions • Digital I/O • Simultaneous control of up to 3 motors/axis 	Benefits <ul style="list-style-type: none"> • Compact dimensions • Digital I/O • Simultaneous control of up to 3 motors/axis
Characteristics <ul style="list-style-type: none"> • Phase Current up to 3A rms for each motor • Power Supply: 12-48VDC • Fieldbus: EtherCAT 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 12A rms for each motor • Power Supply: 12-48VDC • Fieldbus: EtherCAT

* Phase Current

- CN1: Power Supply
- CN21, CN22, CN23: Motor connections
- CN3: Digital Inputs and Outputs
- CN41, CN42, CN43: Feedback connections
- CN5A, CN5B: EtherCAT Interface Interface
- CN6: Service SCI Connection



Electrical Data			
Item			
1	Phase Current (each axis)	A rms	up to 3,0
2	Peak Current (each axis)	A peak	5 (for 2s.)
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Motor Power	W	100
6	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	200g
Closed-loop	Available
Protections	Over/under-voltage, over current, overheating, short circuit between motor phase to phase and phase to ground
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 50°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode	
Model	
Model	...E001-S402
Fieldbus	EtherCAT
Programmable	Only configuration
Software	DL Studio
Operating mode	Profile position/velocity/homing mode,Cycling sync position/velocity/torque mode.

Note: Service SCI Interface cable is required for programming and available on request

Connection	
Model	
Model	...E001-S402
Digital Inputs	3
Digital Outputs	3
Analog Inputs	-
Analog Output	-
Encoder Input	5V Single-Ended (TTL/CMOS) or 24V Push-Pull incremental encoder (not isolated)
Hall input	5V Single-Ended (TTL/CMOS) hall effect sensor

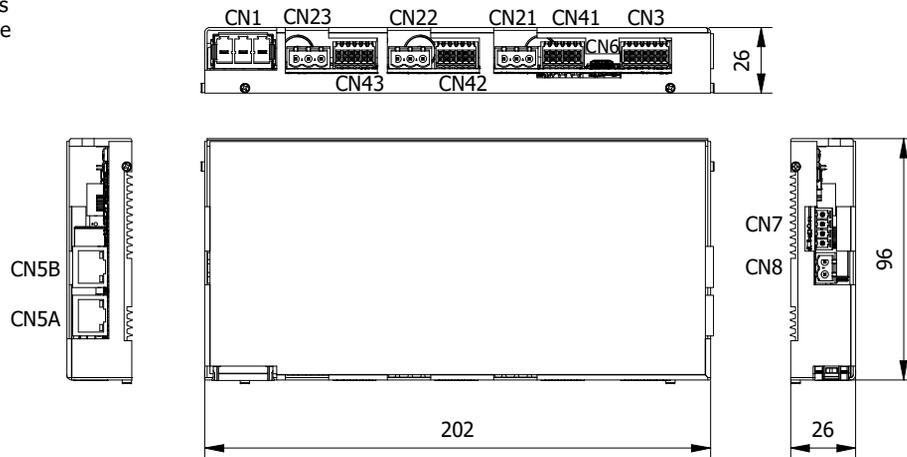
Cable kit available on request. More information can be found in the product manual on our website

Drive for BLDC Motor Phoenix B500B36M3

3-Axis Motion Controller

up to 12A rms
each motor

- CN1: Power Supply
- CN21, CN22, CN23: Motor connections
- CN3: Digital Inputs and Outputs
- CN41, CN42, CN43: Feedback connections
- CN5A, CN5B: EtherCAT Interface Interface
- CN6: Service SCI Connection
- CN7: STO Connection
- CN8: Brake Resistor connector



Electrical Data			
Item			
1	Phase Current (each axis)	A rms	up to 12
2	Peak Current (each axis)	A peak	36 (for 2s.)
3	Power Supply	VDC	12÷48
4	Motor Power	W	500
5	Chopper Frequency	kHz	40

Characteristics	
Item	
Number of axis	3
Weight	300g
Closed-loop	Available
Protections	Over/under-voltage, over current, overheating, short circuit between motor phase to phase and phase to ground
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 50°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode	
Model	
Model	...E002-S402
Fieldbus	EtherCAT
Programmable	Only configuration
Software	DL Studio
Operating mode	Profile position/velocity/homing mode, Cycling sync position/velocity/torque mode
Note: Service SCI Interface cable is required for programming and available on request	

Connection	
Model	
Model	...E002-S402
Digital Inputs	3
Digital Outputs	3
Analog Inputs	-
Analog Output	-
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder (not isolated)
Hall input	5V Single-Ended (TTL/CMOS) hall effect sensor
Connector kit available on request. More information can be found in the product manual on our website	

Advantages at a glance
Position, Speed and Torque control
Analogue, fieldbus or programmable
Flexible configuration

Brushless AC motor Drives	Current* (A rms)	
Scorpius	up to 3	392
Serpens	up to 5,2	393

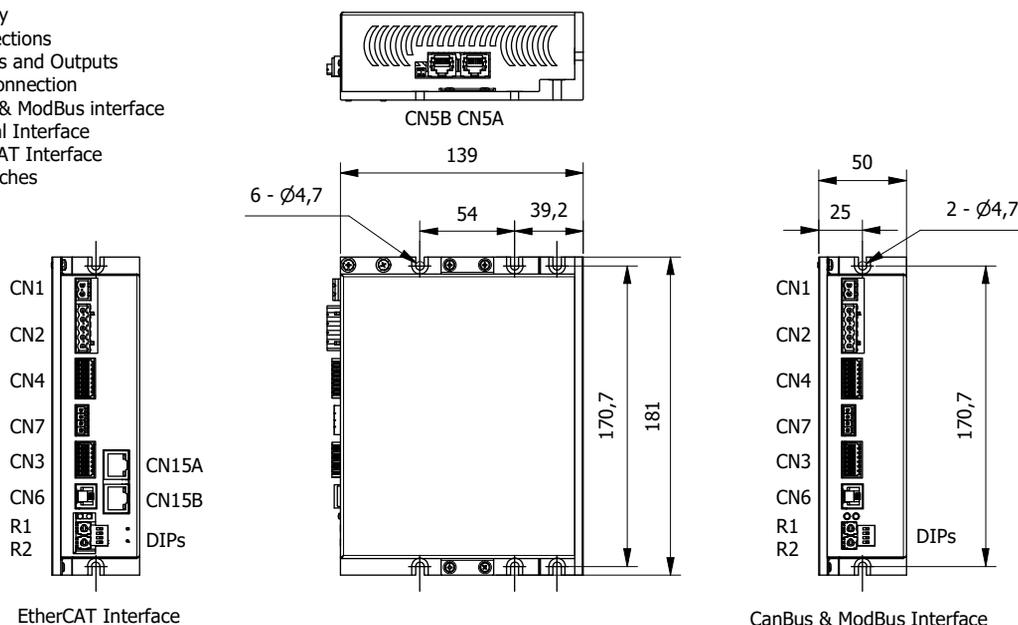
Our Brushless AC Drives are specifically developed to control AC power supplied 3-phase brushless motors with phase current up to 5,2A rms. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

SCORPIUS	SERPENS
Benefits	Benefits
<ul style="list-style-type: none"> • Compact dimensions • Digital I/O • Programmable 	<ul style="list-style-type: none"> • Compact dimensions • Digital I/O • Programmable
Characteristics	Characteristics
<ul style="list-style-type: none"> • Phase Current up to 3A rms • Power Supply: 100-240 VAC • Fieldbus: RS485 Modbus RTU, CANopen and EtherCAT 	<ul style="list-style-type: none"> • Phase Current up to 5,2A rms • Power Supply: 85-265 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP and Profinet

* Phase Current

Motion Controller

- CN1: Power Supply
- CN2: Motor Connections
- CN3: Digital Inputs and Outputs
- CN4 : Feedback connection
- CN5A/B : CanBus & ModBus interface
- CN6: Service Serial Interface
- CN15A/B : EtherCAT Interface
- R1/R2 : Roto-Switches



with Safe Torque Off function

Electrical Data			
Item			
1	Phase Current	A rms	up to 3,0
2	Peak Current	A peak	12
3	Power Supply	VAC	100÷240
4	Logic Power Supply (optional)	VDC	24
5	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	800g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 50°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing
Safety feature	Safe Torque Off (STO) SIL3/PLe

Interface Control Mode			
Model	...L001-S200	...L001-S402	...E001-S402
Fieldbus	RS485 Modbus RTU & CANopen	CANopen	EtherCAT
Programmable	Programming and real time debugging	Only configuration	
Software	DL Space	DL Studio	
Operating mode	Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode		

Note: Service SCI Interface cable is required for programming and available on request

Connection			
Model	...L001-S200	...L001-S402	...E001-S402
Digital Inputs (opto-coupled)	4	4	4
Digital Outputs (opto-coupled)	3	3	3
Analog Inputs	-	-	-
Analog Outputs	-	-	-
Encoder Input	Incremental 5 V differential RS422 or single-ended TTL/CMOS (isolated) or absolute SSI or BiSS-C (isolated)		
Hall Input	5 V Single-Ended (TTL/CMOS) (isolated)		

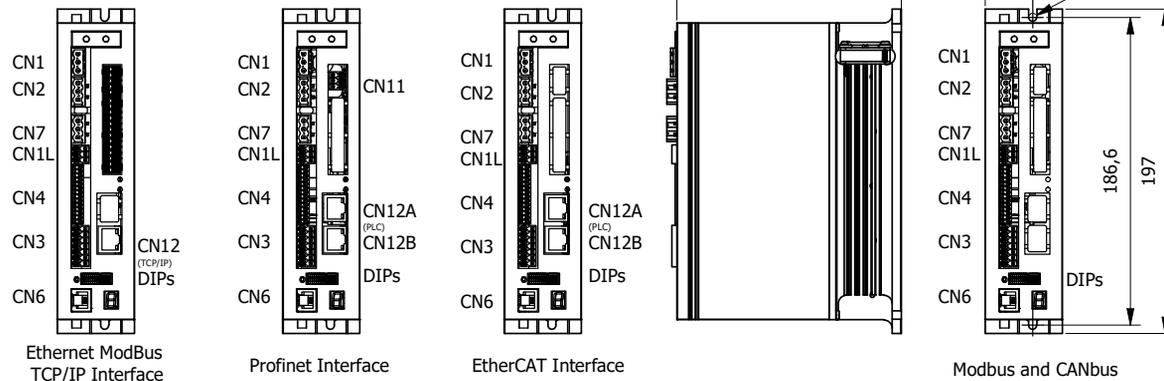
Connector kit available on request. More information can be found in the product manual on our website

Standard Combination	
Motor	
All motor with Phase Current up to 3A rms	

Drive for AC Brushless Motor Serpens A1300B12 up to 5,2A rms

Motion Controller

- CN1: AC Power Supply
- CN1L: 24Vdc Logic Supply and STO inputs
- CN2: Motor Connections
- CN3: Digital Inputs and Outputs
- CN4 : Feedback connection
- CN5A/B: CANbus & Modbus Interfaces
- CN6: Service Serial Interface
- CN7: Breaking resistor
- CN11: 24Vdc Profinet Supply
- CN12 : Ethernet Interface
- CN12A/B : Profinet Interface - EtherCAT Interface



with Safe Torque Off function

Electrical Data			
Item			
1	Phase Current	A rms	up to 5,2
2	Peak Current	A peak	12
3	Power Supply	VAC (mono or triphase)	85÷265
4	Logic Power Supply (mandatory)	VDC	24

Characteristics	
Item	
Weight	550g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing
Safety feature	Safe Torque Off (STO) SIL3/PLe

Interface Control Mode					
Model	...L001-S200	...T001-S200	...P001-S200	...L001-S402	...E001-S402
Fieldbus	RS485 ModBus RTU & CANopen	Ethernet ModBus TCP	Profinet	CANopen	EtherCAT
Programmable	Programming and real time debugging			Only configuration	
Software	DL Space			DL Studio	
Operating mode	Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode				

Note: Service SCI Interface cable is required for programming and available on request

Connection					
Model	...L001-S200	...T001-S200	...P001-S200	...L001-S402	...E001-S402
Digital Inputs (opto-coupled)	4	4	4	4	4
Digital Outputs (opto-coupled)	3	3	3	3	3
Analog Inputs	1	-	-	-	-
Analog Outputs	-	-	-	-	-
Encoder Input	Incremental 5 V differential RS422 or single-ended TTL/CMOS (isolated) or absolute SSI or BiSS-C (isolated)				
Hall Input	5 V Single-Ended (TTL/CMOS) (isolated)				

Connector kit available on request. More information can be found in the product manual on our website

Standard Combination	
Motor	
All motor with Phase Current up to 5,2A rms	



Stepper motor Controllers – Drives

Advantages at a glance
Position, Speed and Torque control
Analogue, fieldbus or programmable
Flexible configuration

Our Stepper Drives are specifically developed for 2-phases stepper motors with phase current up to 8,5A rms and offer solutions for both DC and AC power supply. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

Stepper motor Drives	Current* (A rms)
Hercules - NEW	up to 2 396
Orion	up to 3 397
Aries	up to 4,2 398
Libra	up to 5,5 399
Aquarius SBD204	up to 4,2 400
Aquarius SBD207	up to 7,1 401
Sagittarius	up to 7,1 402
Andromeda	up to 8,5 403
Lyra	up to 3 404
Draco	up to 5,2 405
Dorado	up to 8 406

HERCULES	ORION	ARIES	AQUARIUS
Benefits <ul style="list-style-type: none"> • Compact design • Price/performance • Programmable • DC power supply 	Benefits <ul style="list-style-type: none"> • Digital I/O • Programmable • DC power supply 	Benefits <ul style="list-style-type: none"> • Compact dimensions • Simple usage • DC power supply 	Benefits <ul style="list-style-type: none"> • Digital I/O and up to 2 analogue inputs • Programmable • DC power supply
Characteristics <ul style="list-style-type: none"> • Phase Current up to 2A rms • Power Supply: 12-36 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet, PowerLink, IOLink, Ethernet IP 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 3A rms • Power Supply: 12-36 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 4,2A rms • Power Supply: 12-48 VDC • Fieldbus: EtherCAT 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 7,1A rms • Power Supply: 12-48 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet

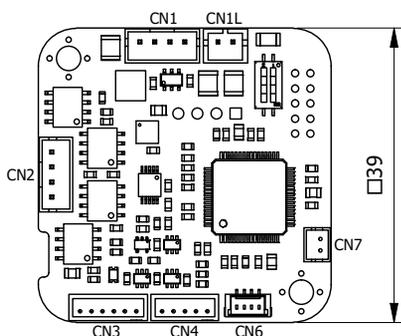
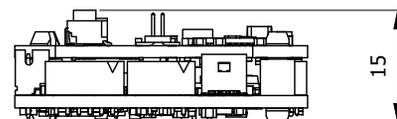
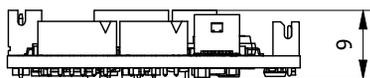
LIBRA	SAGITTARIUS	ANDROMEDA
Benefits <ul style="list-style-type: none"> • Price/performance • Simple usage • DC power supply 	Benefits <ul style="list-style-type: none"> • Digital I/O and up to 2 analogue inputs • Programmable • AC or DC power supply 	Benefits <ul style="list-style-type: none"> • Digital I/O and up to 2 analogue inputs • Programmable • AC or DC power supply
Characteristics <ul style="list-style-type: none"> • Phase Current up to 5,5A rms • Power Supply: 24-80 VDC • Clock & Direction control 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 7,1A rms • Power Supply: 18-56 VAC or 24-80 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 8,5A rms • Power Supply: 18-100 VAC or 24-140 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP

LYRA	DRACO	DORADO
Benefits <ul style="list-style-type: none"> • Digital I/O • Programmable • AC power supply 	Benefits <ul style="list-style-type: none"> • Digital I/O and up to 1 analogue inputs • Programmable • AC power supply 	Benefits <ul style="list-style-type: none"> • Digital I/O and up to 1 analogue inputs • Programmable • AC power supply
Characteristics <ul style="list-style-type: none"> • Phase Current up to 3A rms • Power Supply: 100-240 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Clock&Direction 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 5,2A rms • Power Supply: 85-265 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet 	Characteristics <ul style="list-style-type: none"> • Phase Current up to 8A rms • Power Supply: 85-120 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet

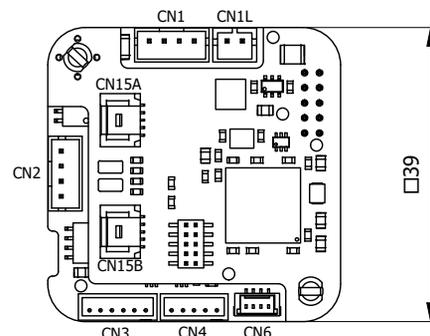
* Phase Current

Motion Controller

- CN1: Power supply connector
- CN1L: Logic supply connector
- CN2: Motor connector
- CN3/CN7: Input and Output connector
- CN4: Feedback interfaces connector
- CN6: Service interface
- CN15A/B: Fieldbus connector



CANopen & RS485
Modbus-RTU Interface



EtherCAT & Ethernet
Modbus-TCP Interface

Electrical Data

Item

1	Phase Current	A rms	up to 2
2	Peak Current	A peak	3,5
3	Power Supply	VDC	12÷36
4	Logic Power Supply	VDC	12÷36
5	Chopper Frequency	kHz	40

Characteristics

Item

Weight	24g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Supply inversion
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode

Also available on request with the following Fieldbus: Profinet, PowerLink, IOLink, Ethernet IP

Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402	...T001-S402
Fieldbus	RS485 Modbus RTU	CANopen	CANopen	EtherCAT	Modbus TCP
Programmable	Programming and real time debugging		Only configuration		
Software	DL Space		DL Studio		
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)				

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402	...T001-S402
Digital Inputs (not isolated)	3	3	3	3	3
Digital Outputs (not isolated)	2	2	2	2	2
Analog Inputs	1	1	1	0	0
Encoder Input	5V Single-Ended (TTL/CMOS)				

Cable kit available on request. More information can be found in the product manual on our website

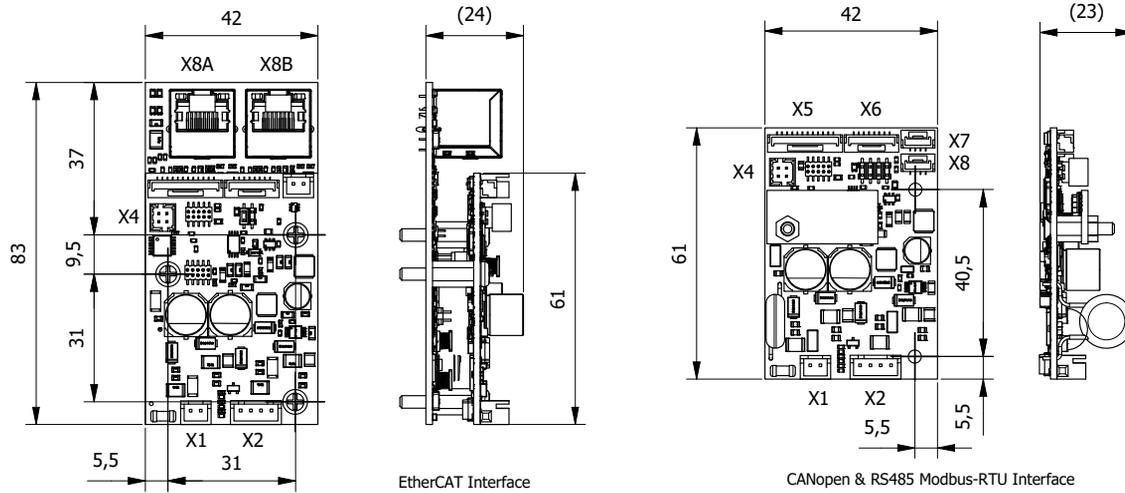
Standard Combination

Motor

All motor with Phase Current up to 2A rms

Motion Controller

- X1: Power Connections
- X2: Motor Connections
- X4: Service Serial Interface
- X5: Inputs and Outputs
- X6: Feedback Connections
- X7/X8 (all versions except for EtherCAT) : Communication Interface and Logic Power Supply
- X7 (only EtherCAT): Logic Power Supply
- X8 (only EtherCAT): Communication Interface



Electrical Data

Item			
1	Phase Current	A rms	up to 3
2	Peak Current	A peak	4,2
3	Power Supply	VDC	12÷36
4	Logic Power Supply (mandatory)	VDC	24
5	Chopper Frequency	kHz	40

Characteristics

Item	
Weight	120g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP00
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode

Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Fieldbus	RS485 Modbus RTU	CANopen	CANopen	EtherCAT
Programmable	Programming and real time debugging		Only configuration	
Software	DL Space		DL Studio	
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)			

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Digital Inputs (not isolated)	4	4	4	4
Digital Outputs (not isolated)	3	3	3	3
Analog Inputs	1	1	1	1
Encoder Input	5V Single-Ended (TTL/CMOS) or 24V Push-Pull incremental encoder (not isolated)			

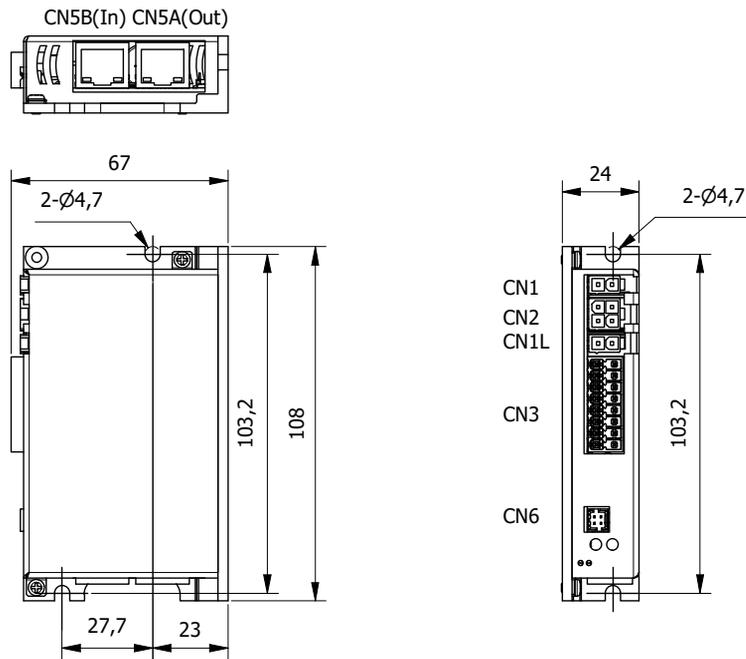
Cable kit available on request. More information can be found in the product manual on our website

Standard Combination

Motor	
All motor with Phase Current up to 3A rms	

Motion Controller

- CN1: Power Supply
- CN1L: Logic Power Supply
- CN2: Motor Connections
- CN3: Inputs and Outputs
- CN5: Communication Interface
- CN6: Service Serial Interface



Electrical Data

Item			
1	Phase Current	A rms	up to 4,2
2	Peak Current	A peak	6
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Chopper Frequency	kHz	40

Characteristics

Item		
Weight		150g
Closed-loop		NOT available
Protections		Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class		IP20
Pollution Degree		2
Category		C3 following standard EN 61800-3
Temperatures		Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity		5% ÷ 85% not condensing

Interface Control Mode

Model	...E001-S402
Fieldbus	EtherCAT
Programmable	Only configuration
Software	DL Studio
Operating mode	Stepless Control Technology (65536 emulated positions per turn)

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...E001-S402
Digital Inputs (opto-coupled)	4
Digital Outputs (opto-coupled)	2
Analog Inputs	---

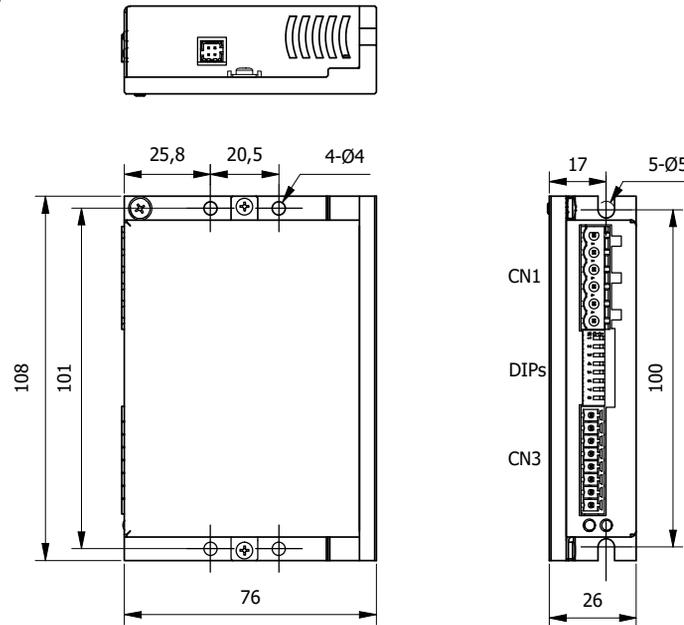
Cable and connector kit available on request. More information can be found in the product manual on our website

Standard Combination

Motor
All motor with Phase Current up to 4,2A rms

Motion Controller

CN1: Power Supply
CN3: Digital I/O



Electrical Data			
Item			
1	Phase Current	A rms	up to 5,5
2	Peak Current	A peak	7,8
3	Power Supply	VDC	24 ÷ 80
4	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	200g
Closed-loop	NOT available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

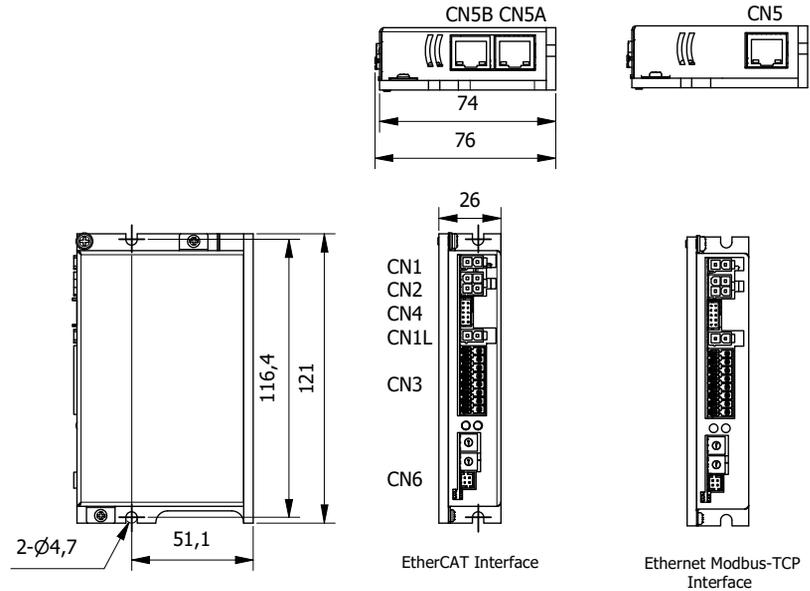
Interface Control Mode	
Model	
Model	...N001-S100
Control mode	Clock & Direction
Operating mode	Step resolution: from Fullstep to 1/100 step (config. with dip switches). Other step angle can be defined by software.
Note: Service SCI Interface cable is available on request	

Connection	
Model	
Model	...N001-S100
Digital Inputs (opto-coupled)	3 (used for clock & direction)
Digital Outputs (opto-coupled)	1 (used for clock & direction)
Analog Inputs	-
Connector kit included. More information can be found in the product manual on our website	

Standard Combination	
Motor	
All motor with Phase Current up to 5,5A rms	

Motion Controller

- CN1: Power Supply
- CN2: Motor Connections
- CN1L: Logic Power Supply
- CN3: Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interface



Electrical Data			
Item			
1	Phase Current	A rms	up to 4,2
2	Peak Current	A peak	6
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	350g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

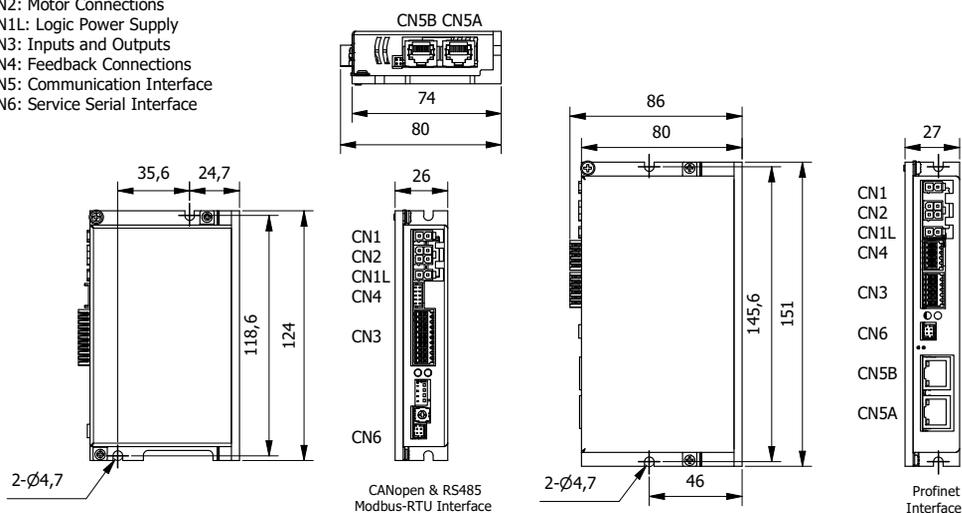
Interface Control Mode		
Model	...T001-S200	...E002-S402
Fieldbus	Ethernet ModBus TCP	EtherCAT
Programmable	Programming and real time debugging	Only configuration
Software	DL Space	DL Studio
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)	
Note: Service SCI Interface cable is required for programming and available on request		

Connection		
Model	...T001-S200	...E002-S402
Digital Inputs (opto-isolated)	4	4
Digital Outputs (opto-isolated)	2	2
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder Also available with Absolute Encoder on request	
Encoder Output	5V Differential (RS422) (not isolated)	
Cable and connector kit available on request. More information can be found in the product manual on our website		

Standard Combination	
Motor	
All motor with Phase Current up to 4,2A rms	

Motion Controller

- CN1: Power Supply
- CN2: Motor Connections
- CN1L: Logic Power Supply
- CN3: Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interface



Electrical Data

Item			
1	Phase Current	A rms	up to 7,1
2	Peak Current	A peak	10
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Chopper Frequency	kHz	40

Characteristics

Item	
Weight	280g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode

Model	...M001-S200	...C001-S200	...P001-S200	...C001-S402
Fieldbus	RS485 Modbus RTU	CANopen	Profinet	CANopen
Programmable	Programming and real time debugging			Only configuration
Software	DL Space			DL Studio
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)			

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...M001-S200	...C001-S200	...P001-S200	...C001-S402
Digital Inputs (opto-coupled)	4	4	4	4
Digital Outputs (opto-coupled)	3	3	2	3
Analog Inputs	2	2	---	2
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder Also available with Absolute Encoder on request			
Encoder Output	5V Differential (RS422) (not isolated)			

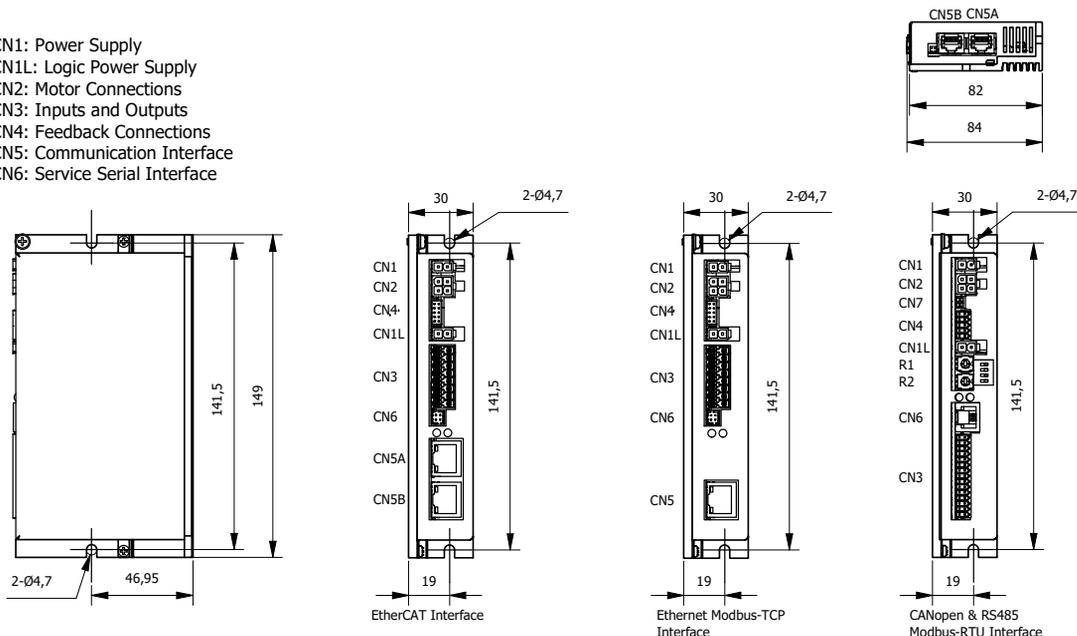
Cable and connector kit available on request. More information can be found in the product manual on our website

Standard Combination

Motor
All motor with Phase Current up to 7,1A rms

Motion Controller

- CN1: Power Supply
- CN1L: Logic Power Supply
- CN2: Motor Connections
- CN3: Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interface



Electrical Data

Item

1	Phase Current	A rms	up to 7,1
2	Peak Current	A peak	10
3	Power Supply		18÷56VAC or 24÷80VDC
4	Logic Power Supply (optional)	VDC	24
5	Chopper Frequency	kHz	40

Characteristics

Item

Weight	450g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode

Model	...T001-S200	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Fieldbus	Ethernet ModBus TCP	RS485 Modbus RTU	CANopen	CANopen	EtherCAT
Programmable	Programming and real time debugging			Only configuration	
Software	DL Space			DL Studio	
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)				

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...T001-S200	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Digital Inputs (opto-coupled)	4	4	4	4	4
Digital Outputs (opto-coupled)	2	2	2	2	2
Analog Inputs	---	2	2	2	---
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder (not isolated) Also available with Absolute Encoder on request				
Encoder Output	5V Differential (RS422) (not isolated)				

Cable and connector kit available on request. More information can be found in the product manual on our website

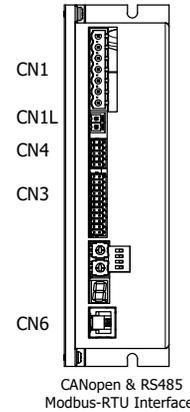
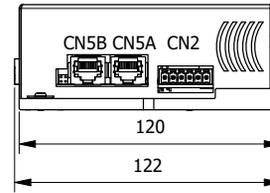
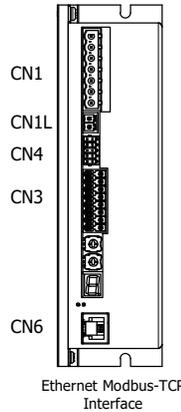
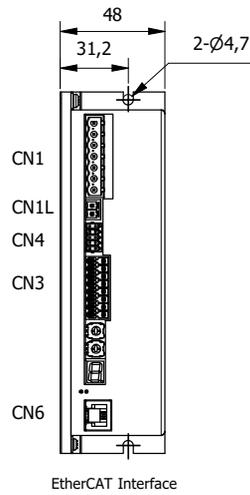
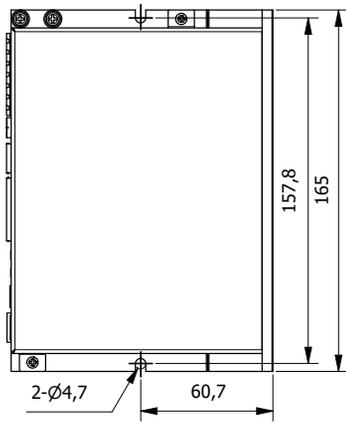
Standard Combination

Motor

All motor with Phase Current up to 7,1A rms

Motion Controller

- CN1: Power Supply
- CN1L: Logic Power Supply
- CN2: Analog Inputs
- CN3: Digital Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interface
- R1 : Rotoswitch 1
- R2 : Rotoswitch 2



Electrical Data			
Item			
1	Phase Current	A rms	up to 8,5
2	Peak Current	A peak	12
3	Power Supply		18÷100VAC or 24÷140VDC
4	Logic Power Supply (optional)		18÷100VAC or 24÷140VDC
5	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	550g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing

Interface Control Mode					
Model	...T001-S200	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Fieldbus	Ethernet ModBus TCP	RS485 Modbus RTU	CANopen	CANopen	EtherCAT
Programmable	Programming and real time debugging			Only configuration	
Software	DL Space			DL Studio	
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)				

Note: Service SCI Interface cable is required for programming and available on request

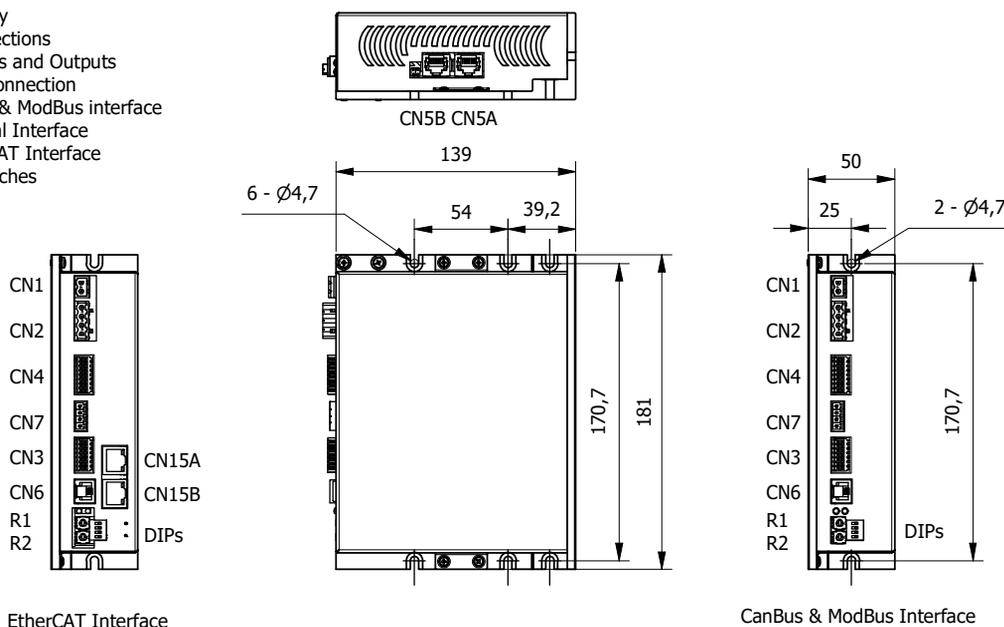
Connection					
Model	...T001-S200	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Digital Inputs (opto-coupled)	4	6	6	6	4
Digital Outputs (opto-coupled)	2	4	4	4	2
Analog Inputs	---	2	2	2	---
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder (not isolated)				
Encoder Output	5V Differential (RS422) (not isolated)				

Connector kit available on request. More information can be found in the product manual on our website

Standard Combination	
Motor	
All motor with Phase Current up to 8,5A rms	

Motion Controller - High voltage

- CN1: Power Supply
- CN2: Motor Connections
- CN3: Digital Inputs and Outputs
- CN4 : Feedback connection
- CN5A/B : CanBus & ModBus interface
- CN6: Service Serial Interface
- CN15A/B : EtherCAT Interface
- R1/R2 : Roto-Switches



with Safe Torque Off function

Electrical Data			
Item			
1	Phase Current	A rms	up to 3
2	Peak Current	A peak	4,2
3	Power Supply	VAC	100÷240

Characteristics	
Item	
Weight	800g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 50°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing
Safety feature	Safe Torque Off (STO) SIL3/PLe

Interface Control Mode				
Model	...N001-S100	...L001-S402	...E001-S402	...L001-S200
Fieldbus	---	CANopen	EtherCAT	RS485 Modbus RTU & CANopen
Programmable	Only configuration			Programming and real time debugging
Software	-	DL Studio		DL Space
Operating mode	Clock & Direction	Step resolution: Stepless Control Technology (65536 emulated positions per turn)		

Note: Service SCI Interface cable is required for programming and available on request

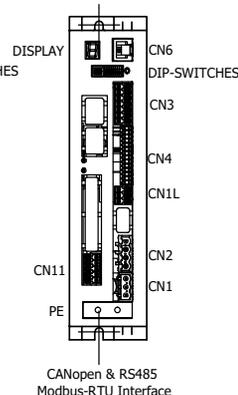
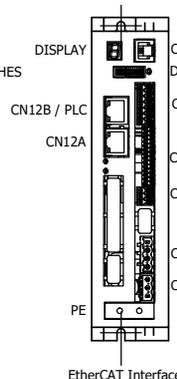
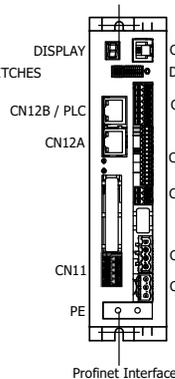
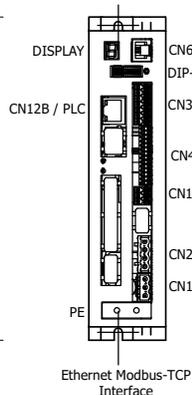
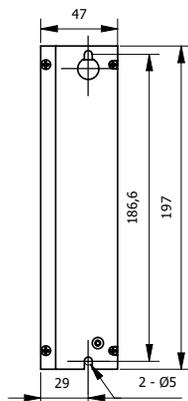
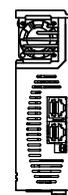
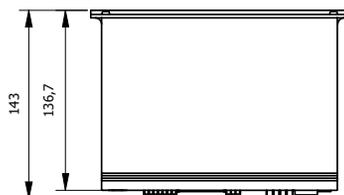
Connection				
Model	...N001-S100	...L001-S402	...E001-S402	...L001-S200
Digital Inputs (opto-coupled)	4	4	4	4
Digital Outputs (opto-coupled)	3	3	3	3
Analog Inputs	-	-	-	-
Analog Outputs	-	-	-	-
Encoder Input	Incremental 5V differential RS422 or single-ended TTL/CMOS (isolated) or absolute 5V SSI or BiSS-C (isolated)			

Connector kit available on request. More information can be found in the product manual on our website

Standard Combination	
Motor	
All motor with Phase Current up to 3A rms	

Motion Controller - High voltage

- CN1: Power Supply
- CN1L: Logic Power Supply
- CN2: Motor connections
- CN3: Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interfaced
- CN11: Analog Input and Outputs
- CN12: Communication Interface



with Safe Torque Off function

Electrical Data

Item			
1	Phase Current	A rms	up to 5,2
2	Peak Current	A peak	7,3
3	Power Supply (monophase-triphas)	VAC	85÷265
4	Logic Power Supply (mandatory)	VDC	24
5	Chopper Frequency	kHz	40

Characteristics

Item	
Weight	550g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing
Safety feature	Safe Torque Off (STO) SIL3/PLe

Interface Control Mode

Model	...L001-S200	...T001-S200	...P001-S200	...L001-S402	...E001-S402
Fieldbus	RS485 Modbus RTU & CANopen	Ethernet ModBus TCP	Profinet	CANopen	EtherCAT
Programmable	Programming and real time debugging			Only configuration	
Software	DL Space			DL Studio	
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)				

Note: Service SCI Interface cable is required for programming and available on request

Connection

Model	...L001-S200	...T001-S200	...P001-S200	...L001-S402	...E001-S402
Digital Inputs (opto-coupled)	4	4	4	4	4
Digital Outputs (opto-coupled)	3	3	3	3	3
Analog Inputs	1	-	-	1	-
Analog Outputs	-	-	-	-	-
Encoder Input	Incremental encoder input 5V differential RS422 or single-ended TTL/CMOS (isolated) or absolute encoder input 5V SSI or BISS-C (isolated)				
Encoder Output	Output encoder 5V differential RS422 (isolated)				

Connector kit available on request. More information can be found in the product manual on our website

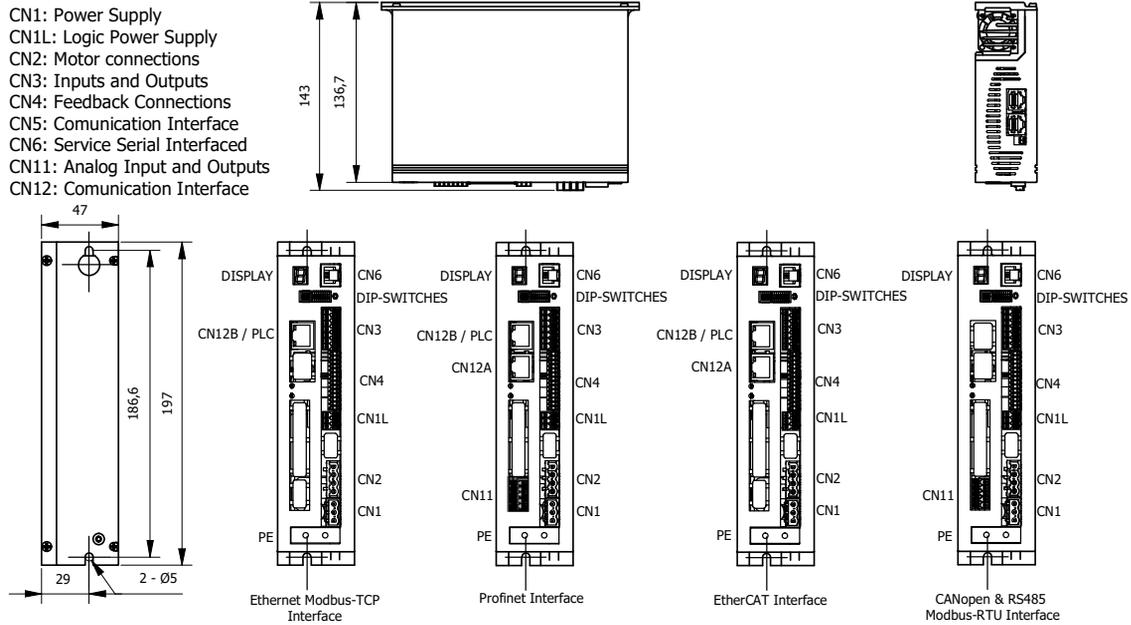
Standard Combination

Motor
All motor with Phase Current up to 5,2A rms

Drive for Stepper Motor Dorado SBAC208

Motion Controller - High voltage

up to 8A rms



with Safe Torque Off function

Electrical Data			
Item			
1	Phase Current	A rms	up to 8
2	Peak Current	A peak	11,3
3	Power Supply (monophase-triphas)	VAC	85÷120
4	Logic Power Supply (mandatory)	VDC	24
5	Chopper Frequency	kHz	40

Characteristics	
Item	
Weight	550g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 40°C | Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing
Safety feature	Safe Torque Off (STO) SIL3/PLe

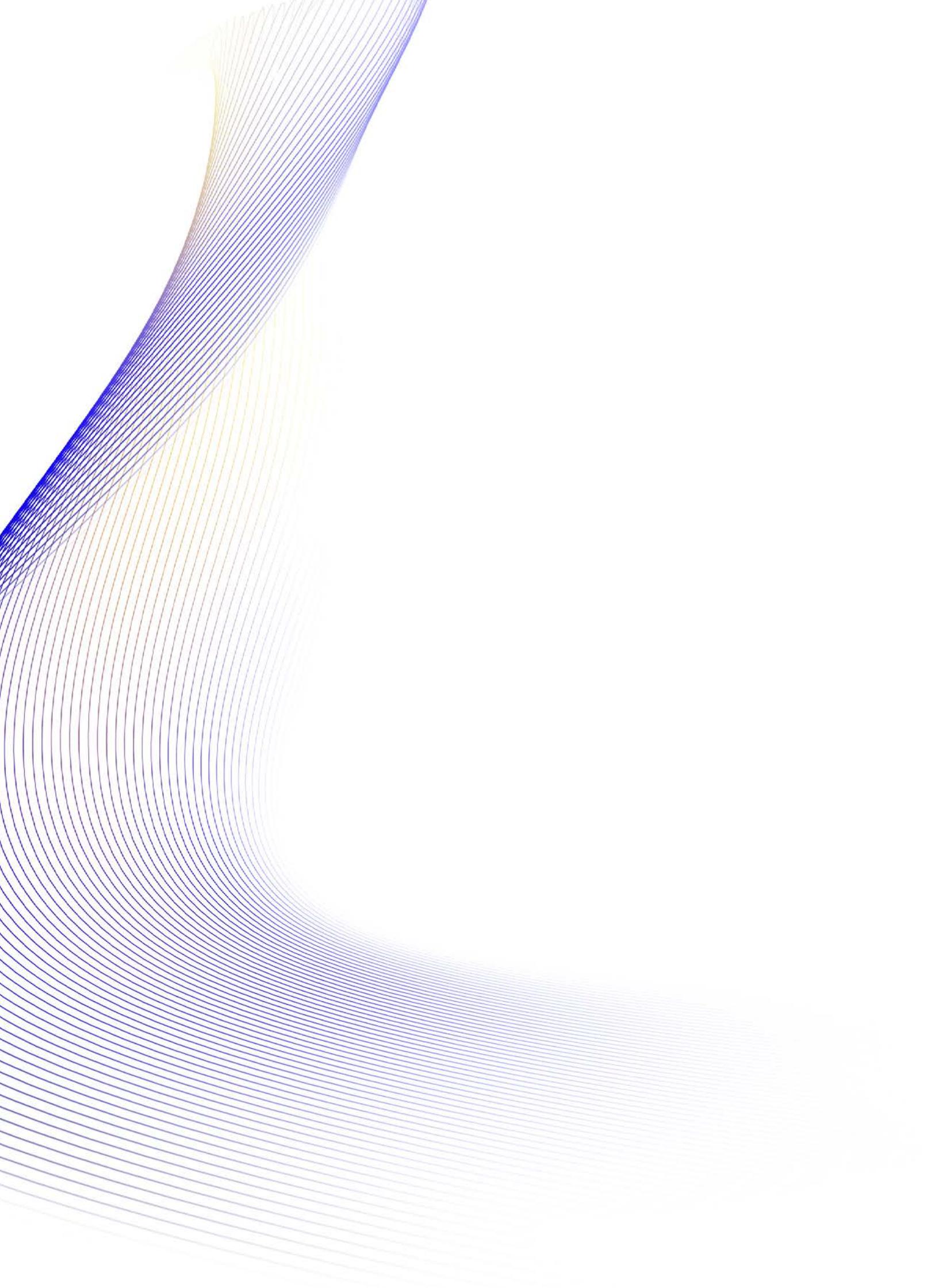
Interface Control Mode					
Model	...L001-S200	...T001-S200	...P001-S200	...L001-S402	...E001-S402
Fieldbus	RS485 Modbus RTU & CANopen	Ethernet ModBus TCP	Profinet	CANopen	EtherCAT
Programmable	Programming and real time debugging			Only configuration	
Software	DL Space			DL Studio	
Operating mode	Step resolution: Stepless Control Technology (65536 emulated positions per turn)				

Note: Service SCI Interface cable is required for programming and available on request

Connection					
Model	...L001-S200	...T001-S200	...P001-S200	...L001-S402	...E001-S402
Digital Inputs (opto-coupled)	4	4	4	4	4
Digital Outputs (opto-coupled)	3	3	3	3	3
Analog Inputs	1	-	-	1	-
Analog Outputs	-	-	-	-	-
Encoder Input	Incremental encoder input 5V differential RS422 or single-ended TTL/CMOS (isolated) or absolute encoder input 5V SSI or BISS-C (isolated)				
Encoder Output	Output encoder 5V differential RS422 (isolated)				

Connector kit available on request. More information can be found in the product manual on our website

Standard Combination	
Motor	
All motor with Phase Current up to 8A rms	



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