

2022/23
Product
Catalogue



Delta Line
Moving together

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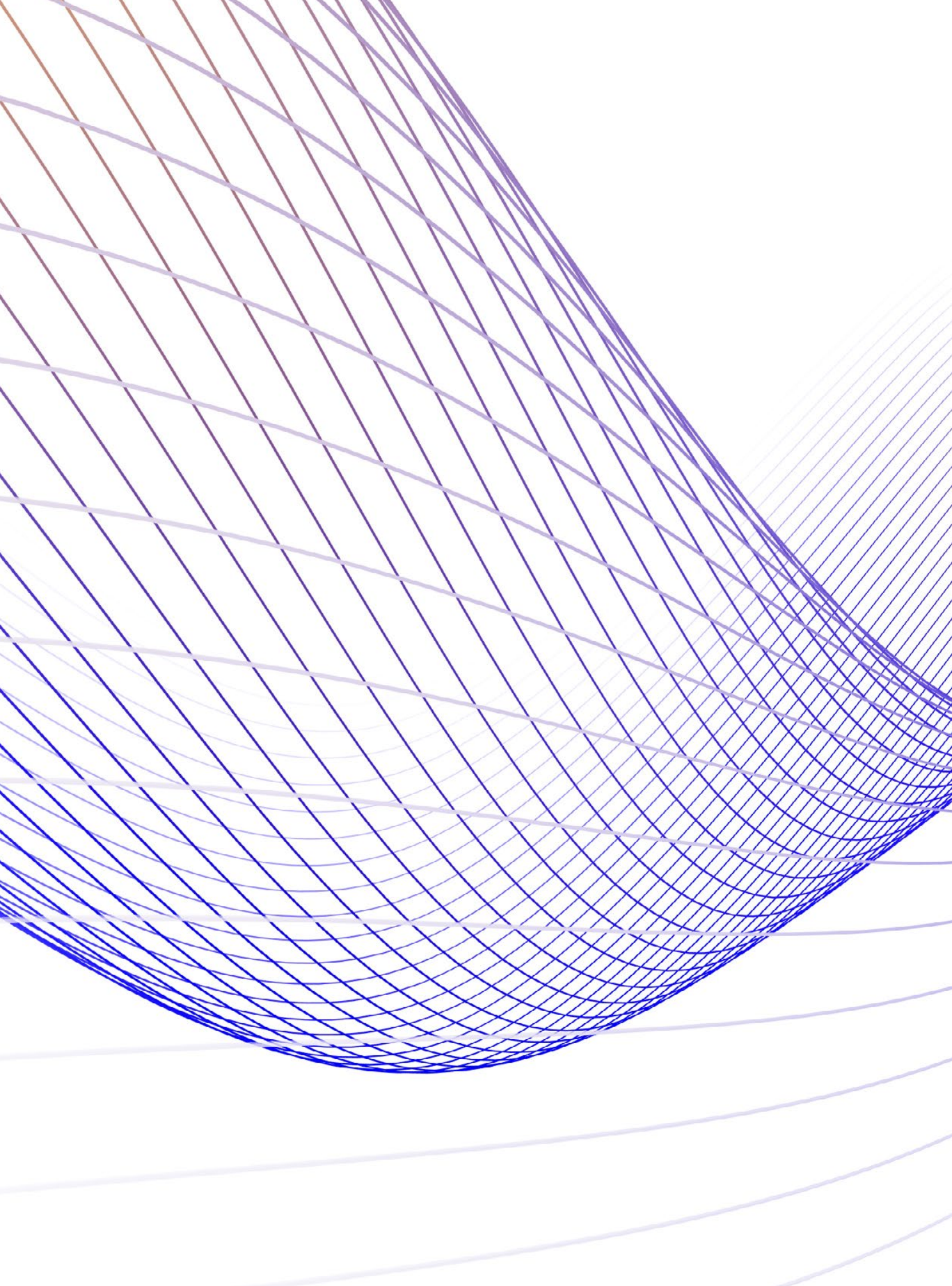
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makes sense only
for large orders?

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

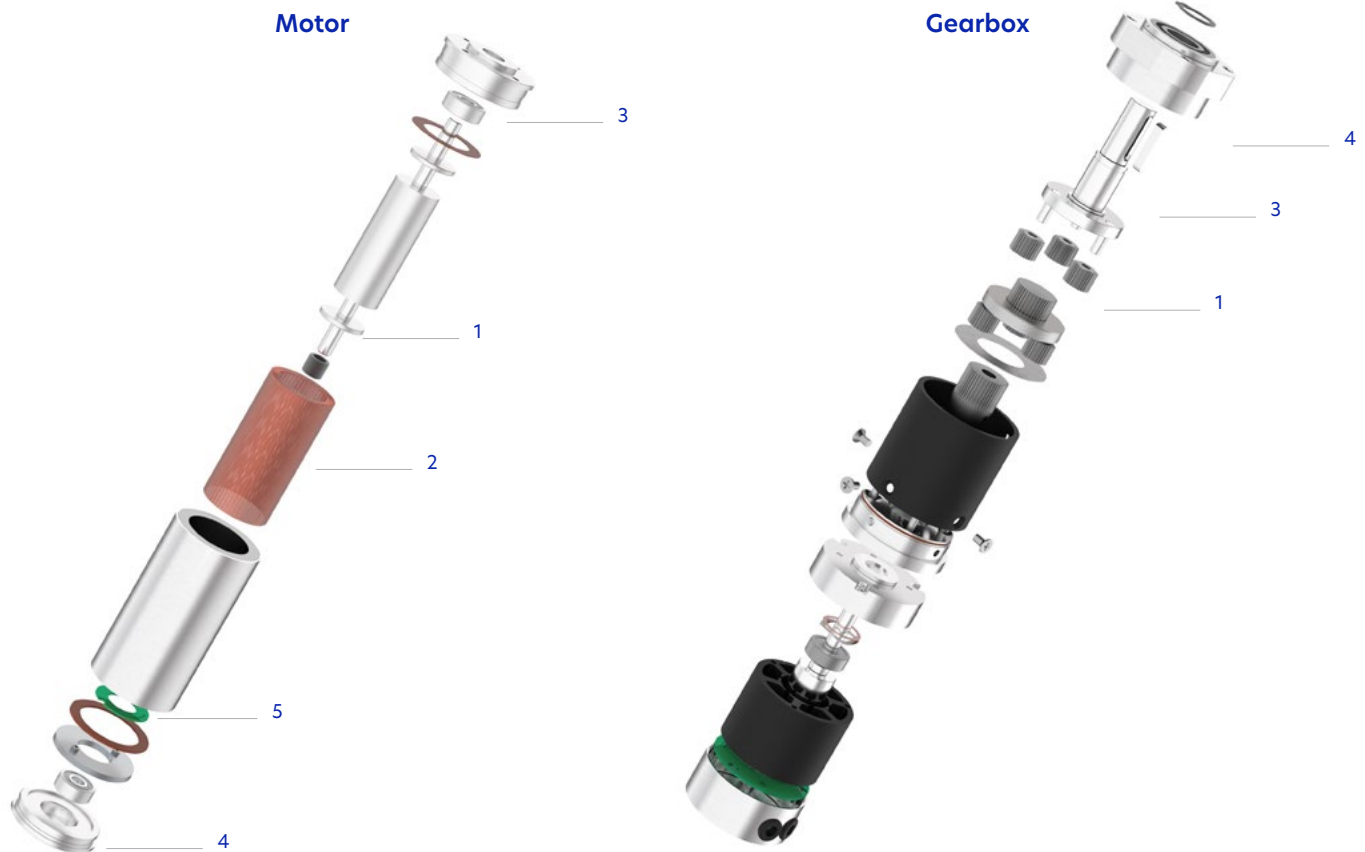
4. Special Front / Rear Flange

5. Cables & Connectors

Length

Hose

Special Connectors

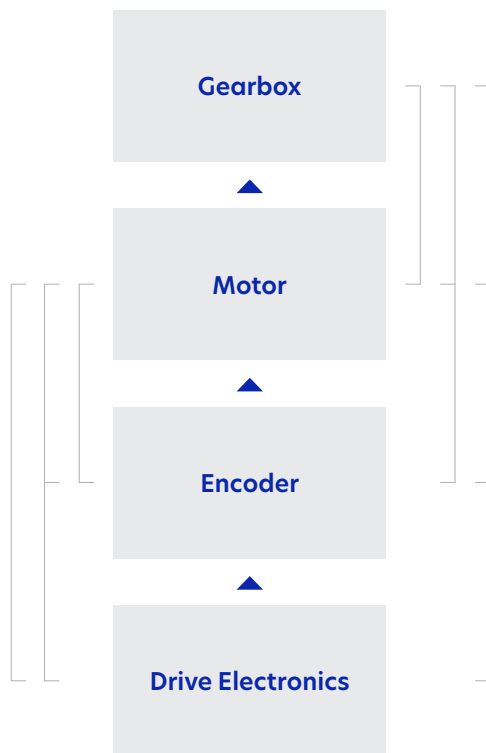


on motors and gearboxes: shaft range,
windings, connector types, bearings.

1. Variation of standard

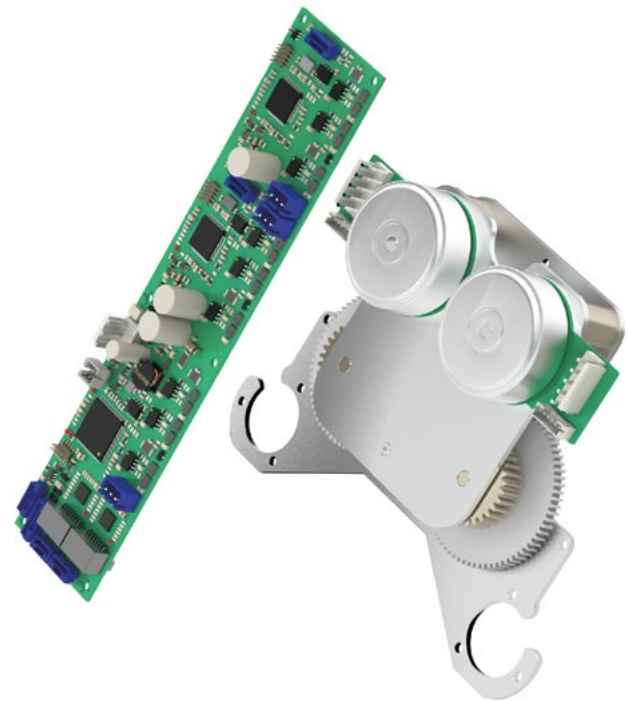
Customization Capabilities

Our design team
can operate at
3 levels



between motors, encoders, gearboxes,
drive electronics.

2. Modular motion system assembly



adapted to specific project needs and
using bespoke components.

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



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

C

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 800 employees
and a turnover of ~€110M, growing
since 2008.

810 employees
110M Euro turnover



Brands

one trusted source of
sub-1kW motion control
components and systems

Delta Line Group



- 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
- 18'000 sqm manufacturing facilities with cutting edge equipment
- 7 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

not top-heavy bureaucratic.
Our organization is setup to be
fast and adaptable to client needs,
allowing us to make decisions quickly.

We Are Lean

offering wide access to technologies
and customizations, thanks to the
combination of own manufacturing,
carefully selected partner brands and
dedicated inhouse design teams.

We Are Flexible

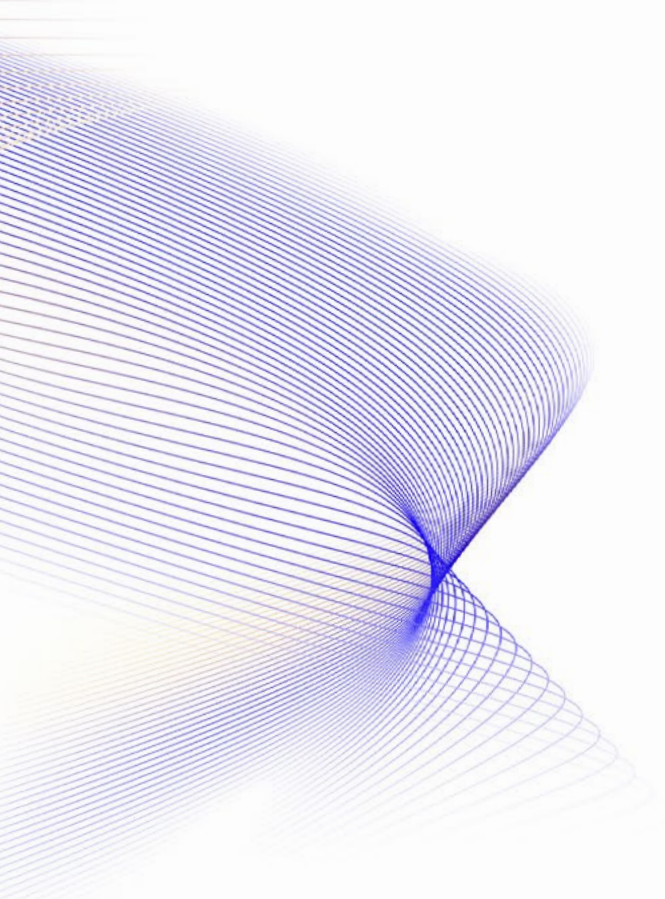
yet also close-at-hand, through our
own manufacturing and logistic
facilities on 3 continents, and
direct contact to our market-based
technical and commercial teams.

We Are Global

**Delta Line combines the
functional capabilities of a
large company with the agility
of a small one.**

**Our unique
corporate structure**

The key to successful partnership is service: we give you a **single point of contact** – a team committed to your project from initial consultation to after-sales service.



We are experts in our technology, but also in applications. Our job is to listen, understand, and suggest cost-effective solutions – not just sell.

1.

We don't have complex internal procedures or policies that slow down delivery. We know how to manage projects and we keep our promises.

2.

We know that every project will require some degree of adaptation: we act fast and can offer all forms of customization.

3.

**Our mission,
personal service**



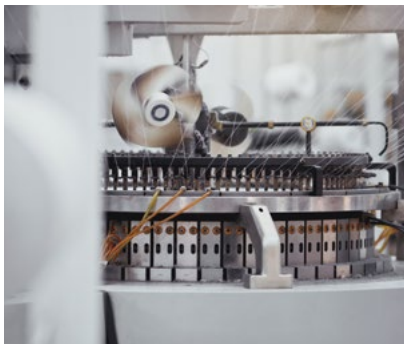
Powered hand tools
X-Ray & Oncology equipment
Liquid analyzers
Pumps (Manufacturers)
Laboratory equipment

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

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Brushed DC



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.

Technical introduction 24

Brushed DC Coreless motors	Torque* (mNm)	21
08DC16N -PM	0,6	26
10DC17...25N -PM	0,9...2	27
12DC19...28N -PM	1,9...3,9	29
16DC25P -PM/G	3,8...4,8	31
16DC26...40N -PM/G	5...11,3	33
22DC32P -PM/G	8,5...12,6	37
22DC34...47N -PM/G	10,7...30,5	39
26DC44P -PM/G	20,8...28,8	43
26DC57N -PM/G	32,9...59,1	45
32DC72N -G	89,4...123	47
35DC70N -G	77,7...138	48

* 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.
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	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).

Glossary

Brushed DC

Brushed DC

Brushed DC

Brushed DC

Brushed DC coreless motors are found in a large variety of products and applications such as healthcare, robotics, instrumentation, and security and access products. 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).

The commutator physically contacts the brushes, which are connected to opposite poles of the power source. The rotation's direction, clockwise and/or counter clockwise, can be reversed easily by reversing the polarity of the brushes, i.e., reversing the leads on the battery. The Coreless – or Ironless – self-supporting coil is the central element of our 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.

In combination with graphite brushes, which are more suitable for applications requiring higher power and higher current, in start/stop operations and in combination with electronic controls.

Mechanical commutation with 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.

Mechanical commutation with Precious metal brushes

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

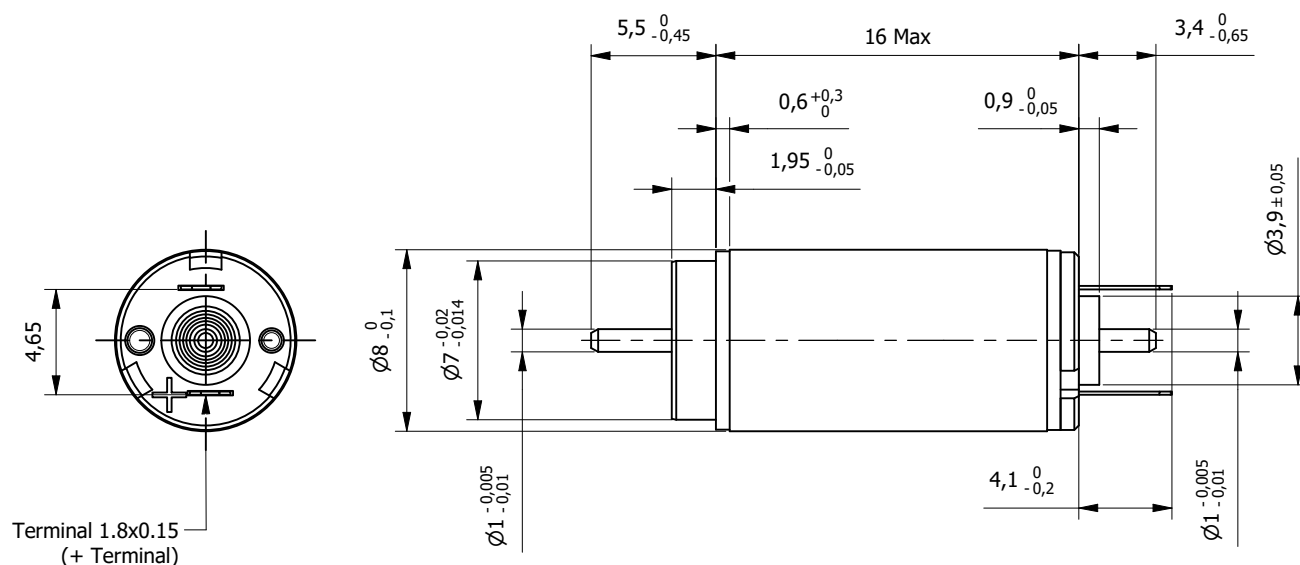


Brushed DC Coreless Motor 08DC16N-PM

Precious Metal brushes

Ø 8mm

0,6mNm

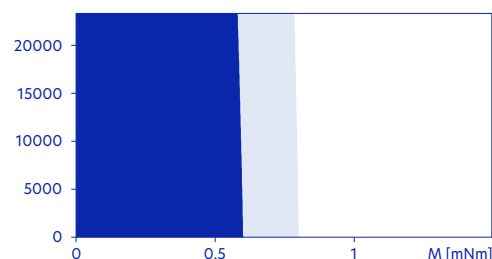


Product also available with ball bearings

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

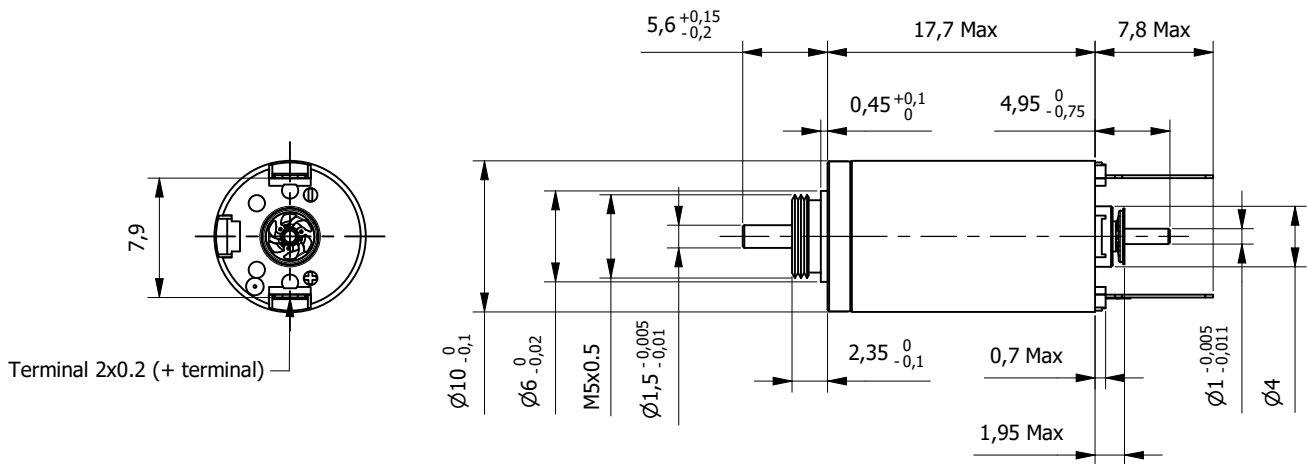
Brushed DC Coreless Motor 10DC17N-PM

Precious Metal brushes

Ø 10mm

0,9 to 1mNm

Brushed DC

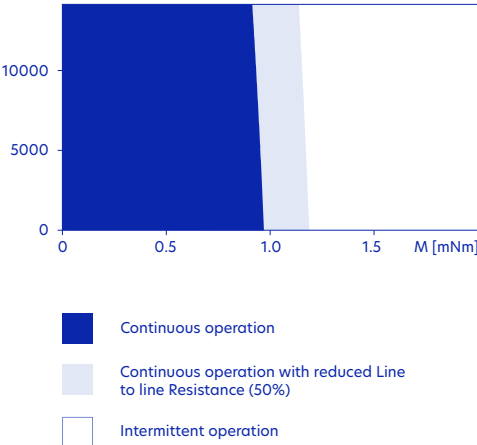


Product also available with ball bearings

Specification					
	Model	...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	gcm2	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

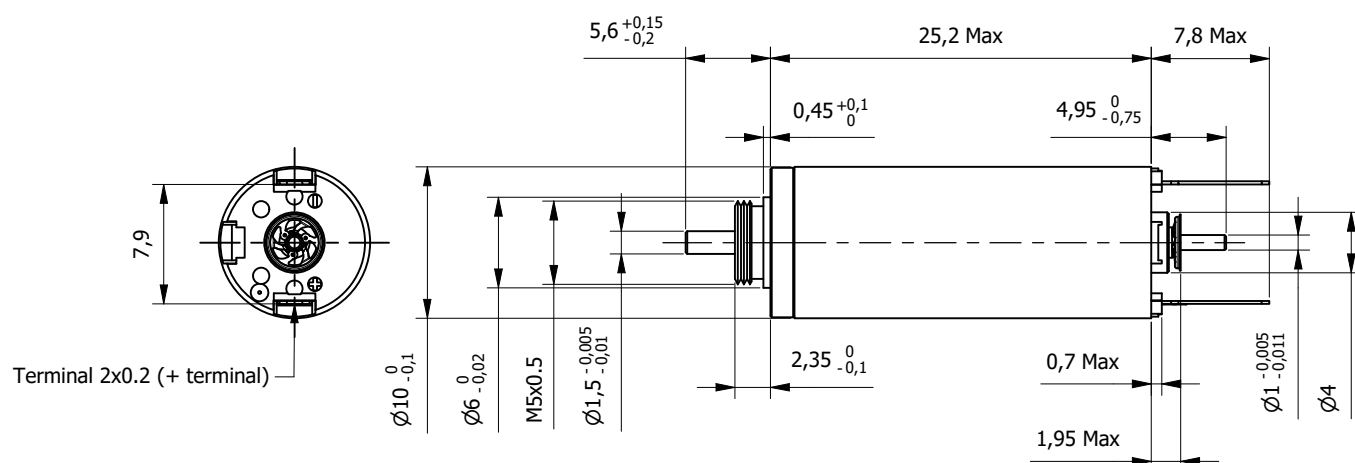


Brushed DC Coreless Motor 10DC25N-PM

Precious Metal brushes

Ø 10mm

1,9 to 2mNm

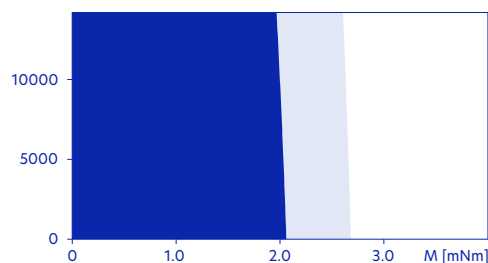


Product also available with ball bearings

Specification		Model	...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

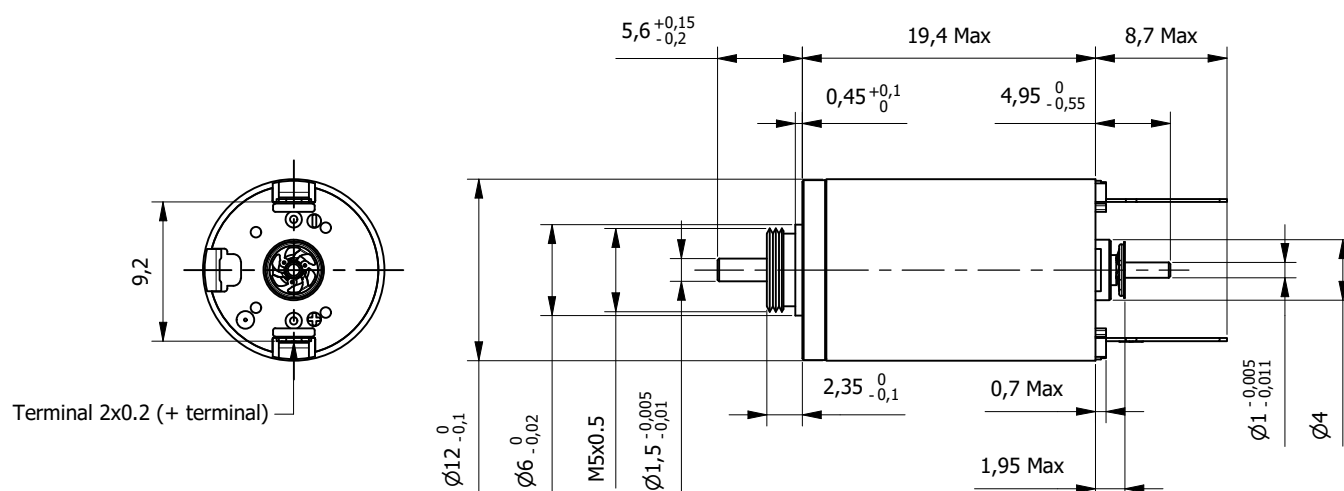


- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Precious Metal brushes

Ø 12mm

1,9mNm



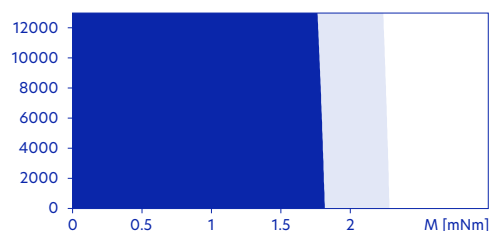
Brushed DC

Product also available with ball bearings

Specification					
	Model		...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	gcm2	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



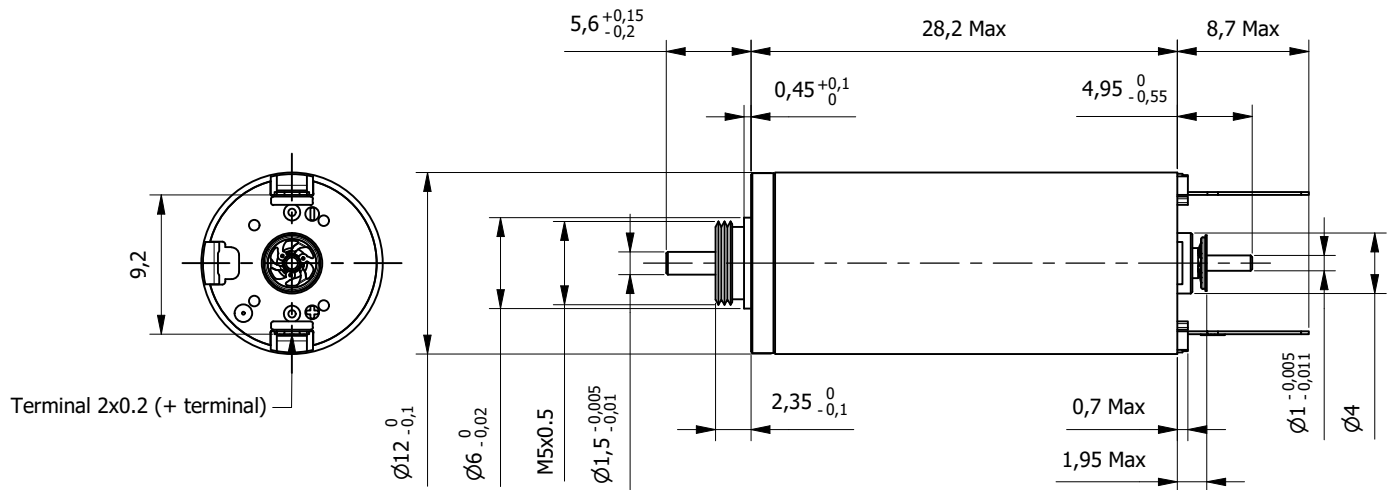
-  Continuous operation
-  Continuous operation with reduced Line to line Resistance (50%)
-  Intermittent operation

Brushed DC Coreless Motor 12DC28N-PM

Precious Metal brushes

Ø 12mm

2,9 to 3,9mNm

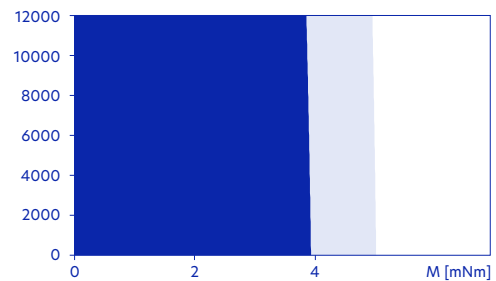


Product also available with ball bearings

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	gcm2	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



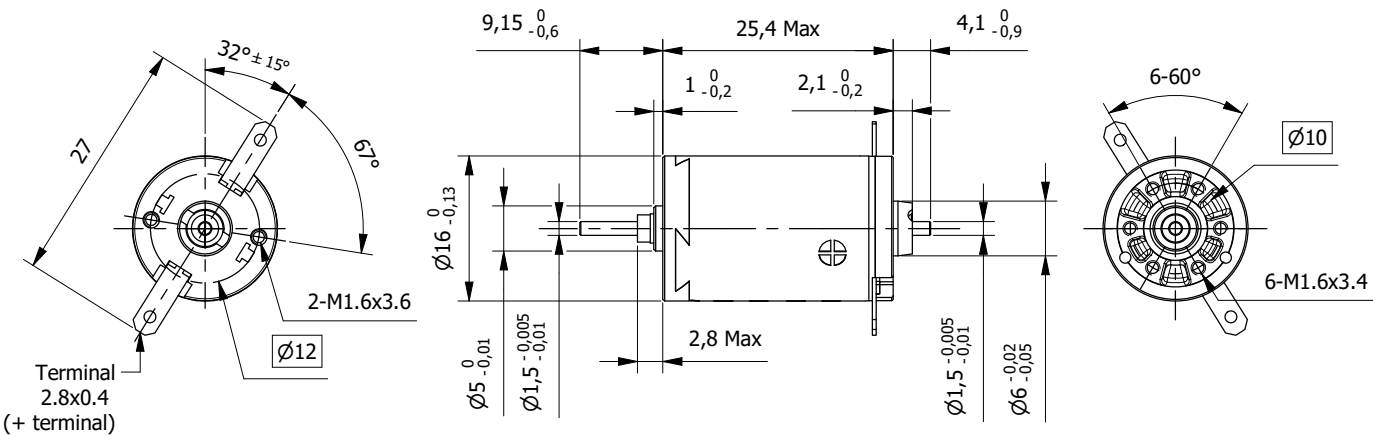
-  Continuous operation
-  Continuous operation with reduced Line to line Resistance (50%)
-  Intermittent operation

Brushed DC Coreless Motor 16DC25P-PM

Precious Metal brushes

Ø 16mm

3,8 to 4,1mNm

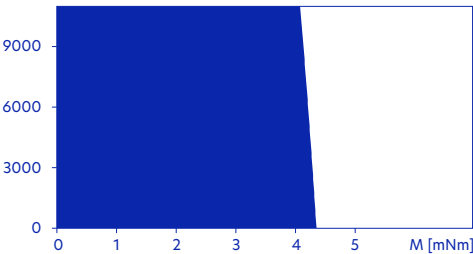


Product also available with ball bearings

Specification					
	Model	...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	gcm2	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



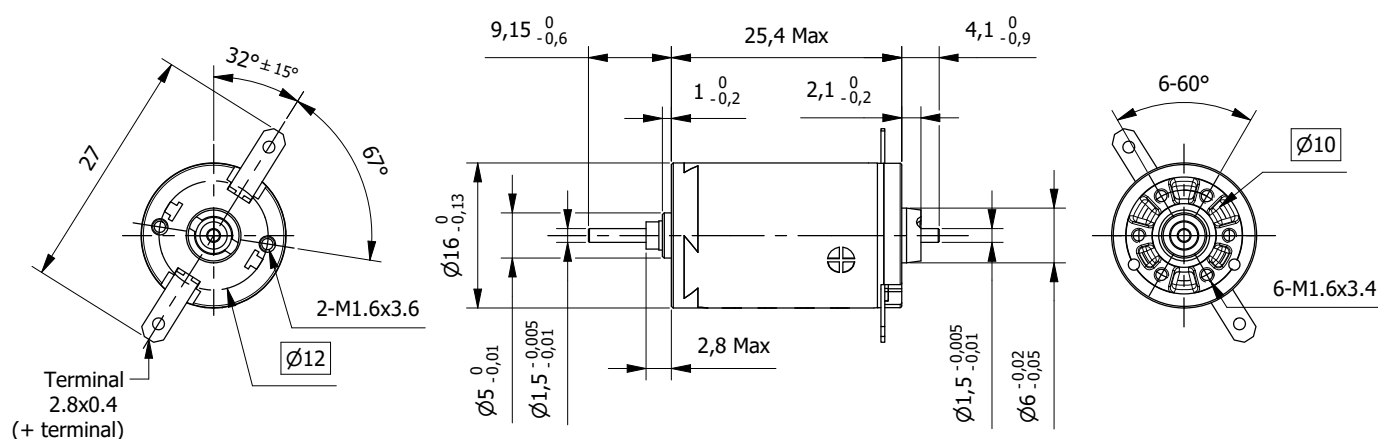
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC25P-G

Graphite brushes

Ø 16mm

3,7 to 4,8mNm

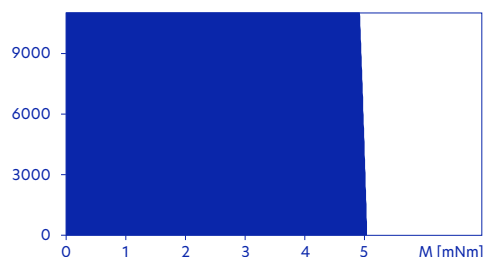


Product also available with ball bearings

Specification			...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



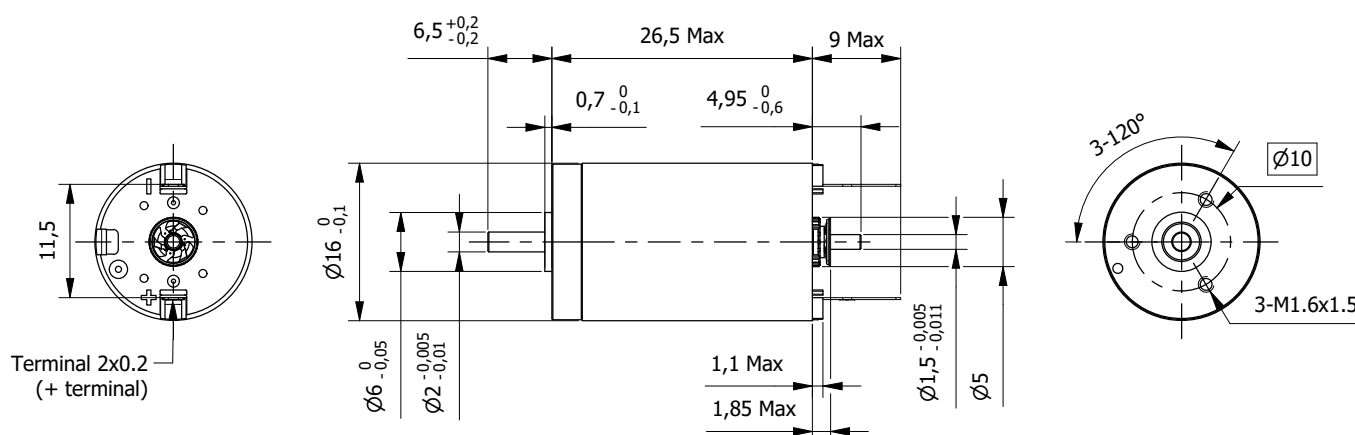
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC26N-PM

Precious Metal brushes

Ø 16mm

5 to 5,4mNm

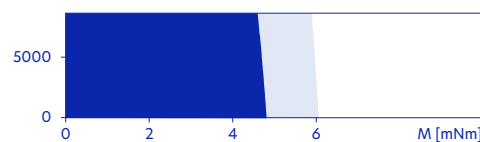


Product also available with ball bearings

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



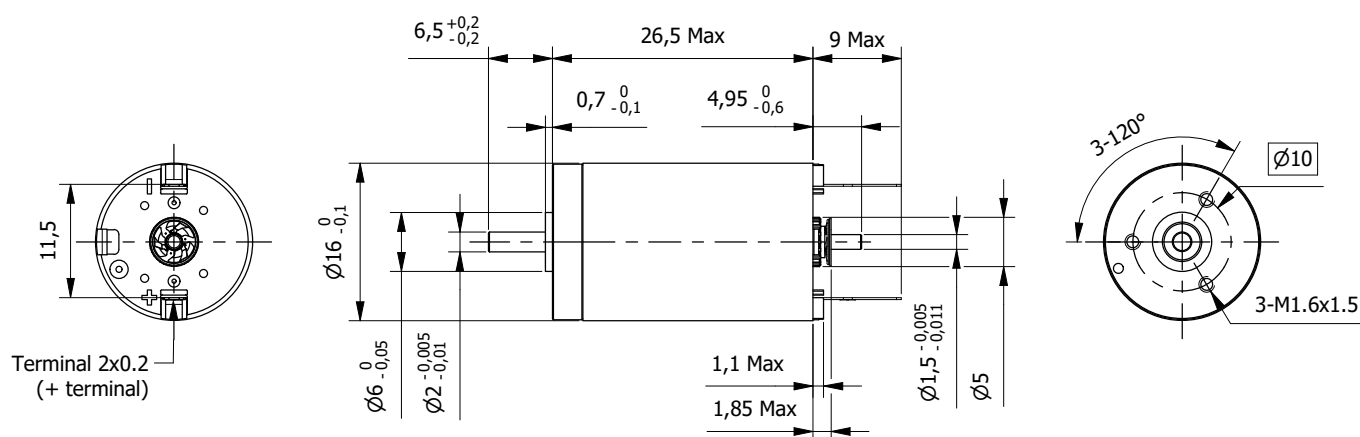
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC26N-G

Graphite brushes

Ø 16mm

5,4mNm

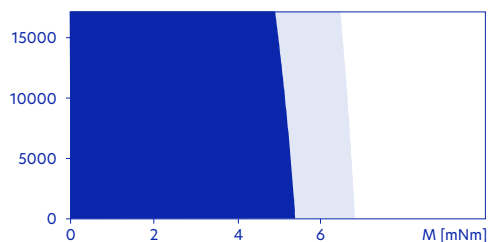


Product also available with ball bearings

Specification							
	Model	...	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	gcm2	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



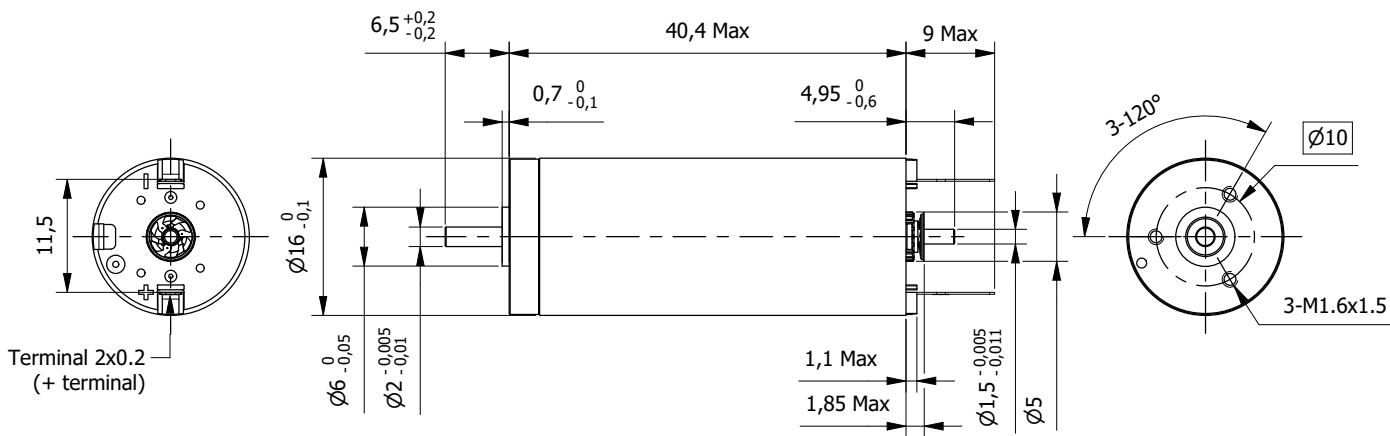
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC40N-PM

Precious Metal brushes

Ø 16mm

5 to 10,8mNm

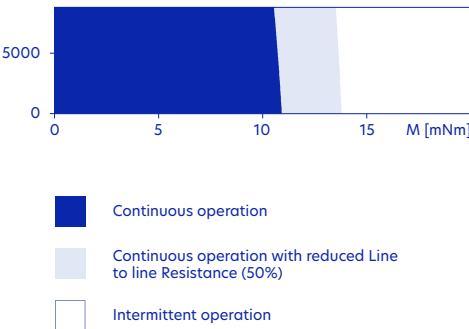


Product also available with ball bearings

Specification						
	Model	...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

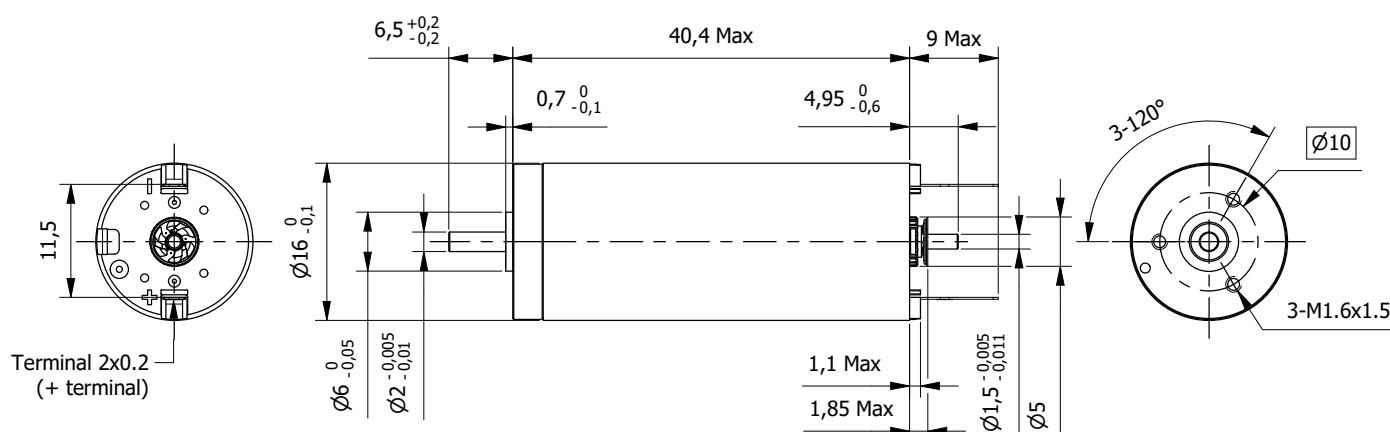


Brushed DC Coreless Motor 16DC40N-G

Graphite brushes

Ø 16mm

8,6 to 11,3mNm

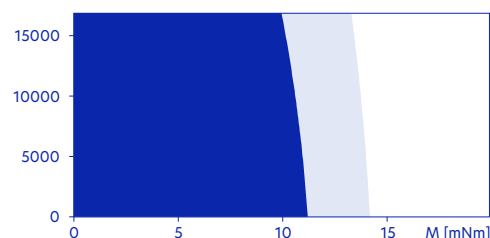


Product also available with ball bearings

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



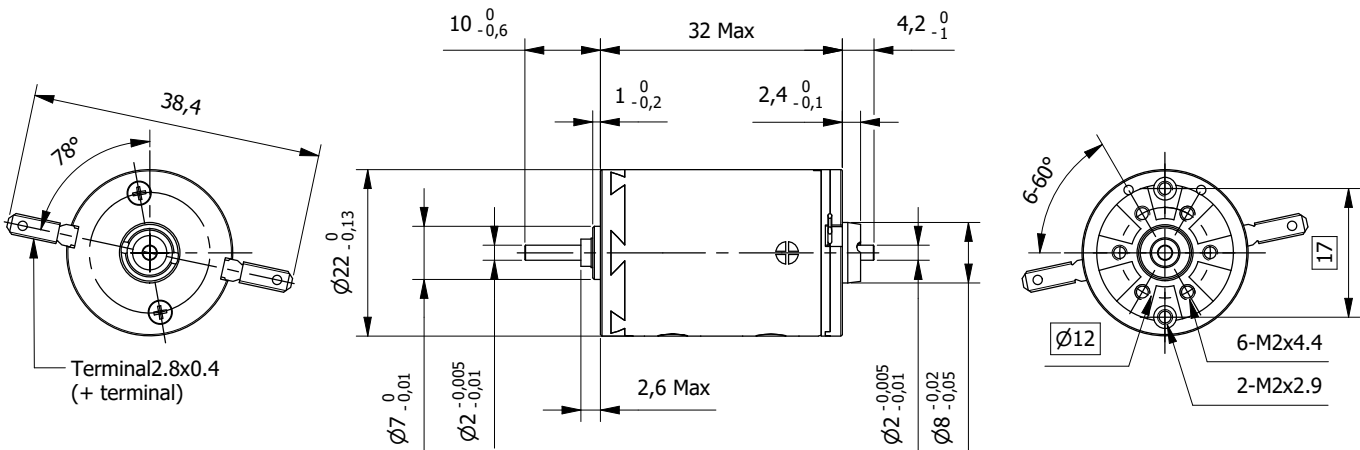
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC32P-PM

Precious Metal brushes

Ø 22mm

8,5 to 10,4mNm

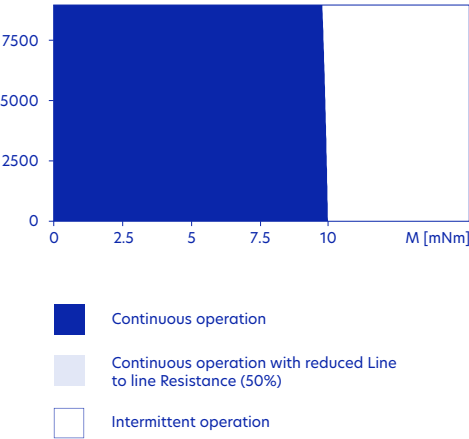


Product also available with ball bearings

Specification					
	Model	...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	gcm2	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

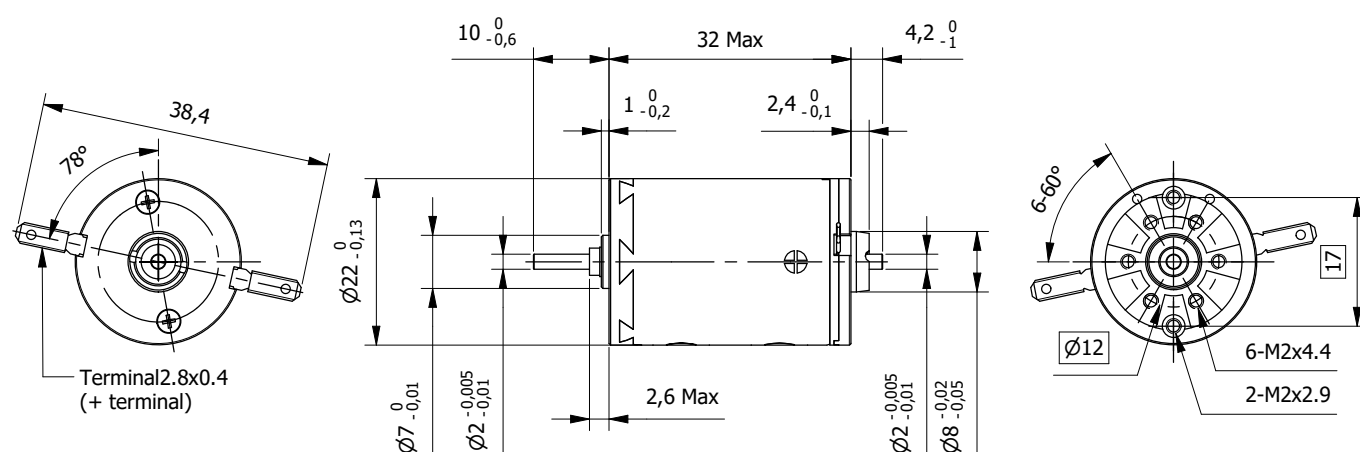


Brushed DC Coreless Motor 22DC32P-G

Graphite brushes

Ø 22mm

11,5 to 12,6mNm

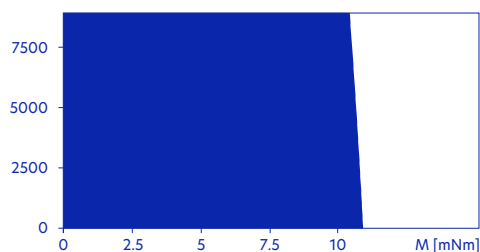


Product also available with ball bearings

Specification					
	Model		...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	gcm2	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

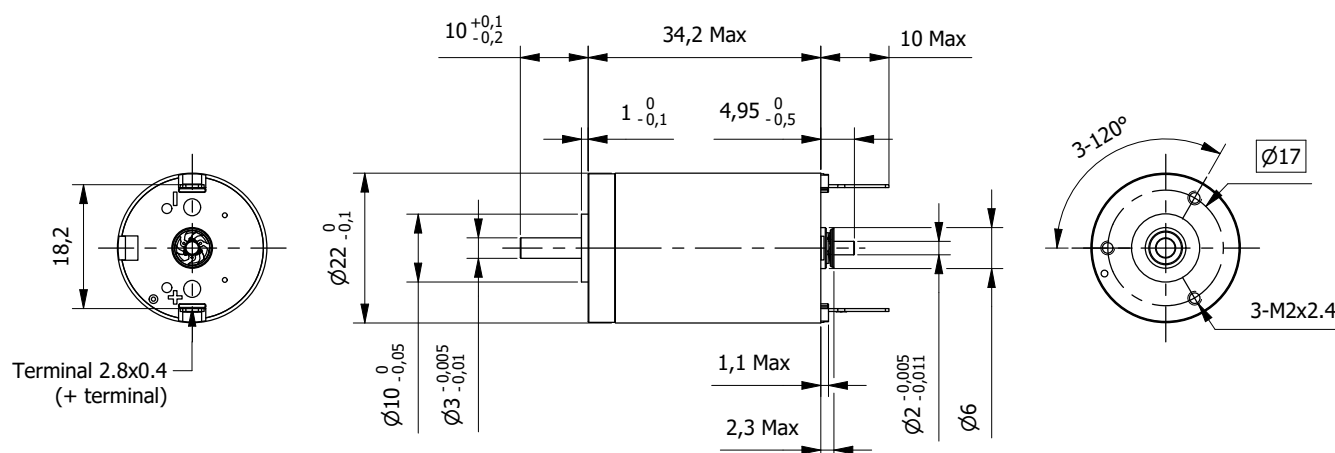


- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Ø 22mm

Precious Metal brushes

10,7 to 14,7mNm



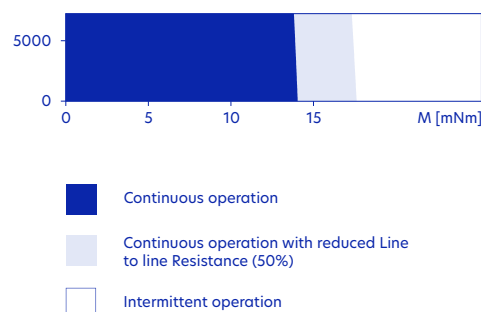
Brushed DC

Product also available with ball bearings

Specification						
	Model		...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	gcm2	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

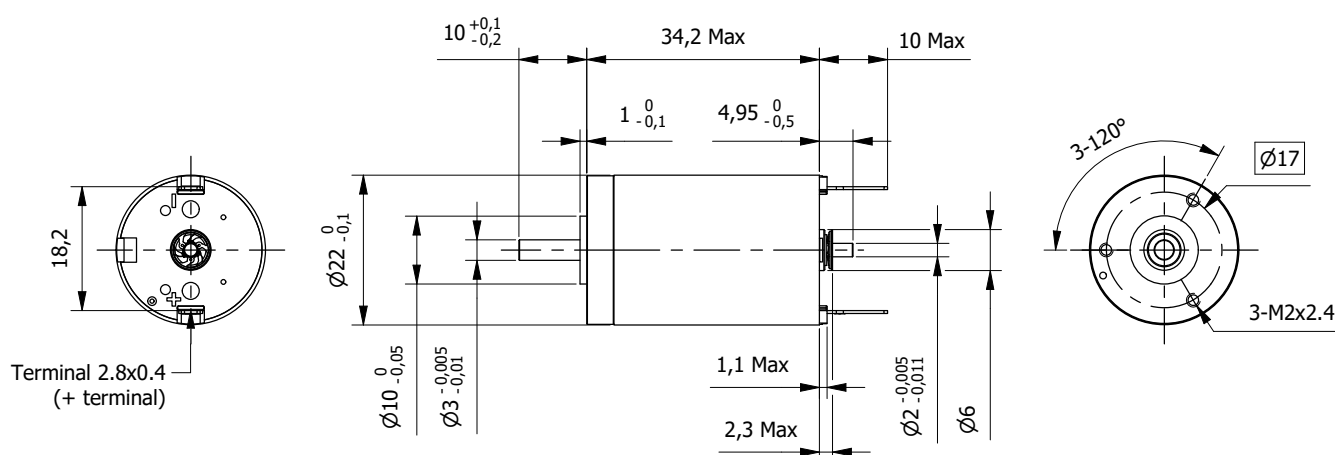


Brushed DC Coreless Motor 22DC34N-G

Graphite brushes

Ø 22mm

14 to 15,3mNm

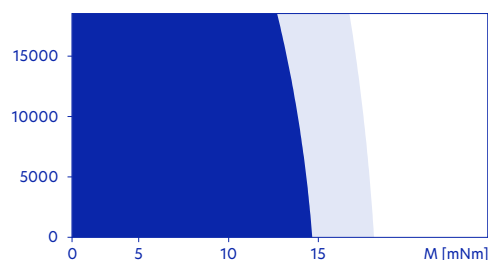


Product also available with ball bearings

Specification						
	Model		...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	gcm2	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



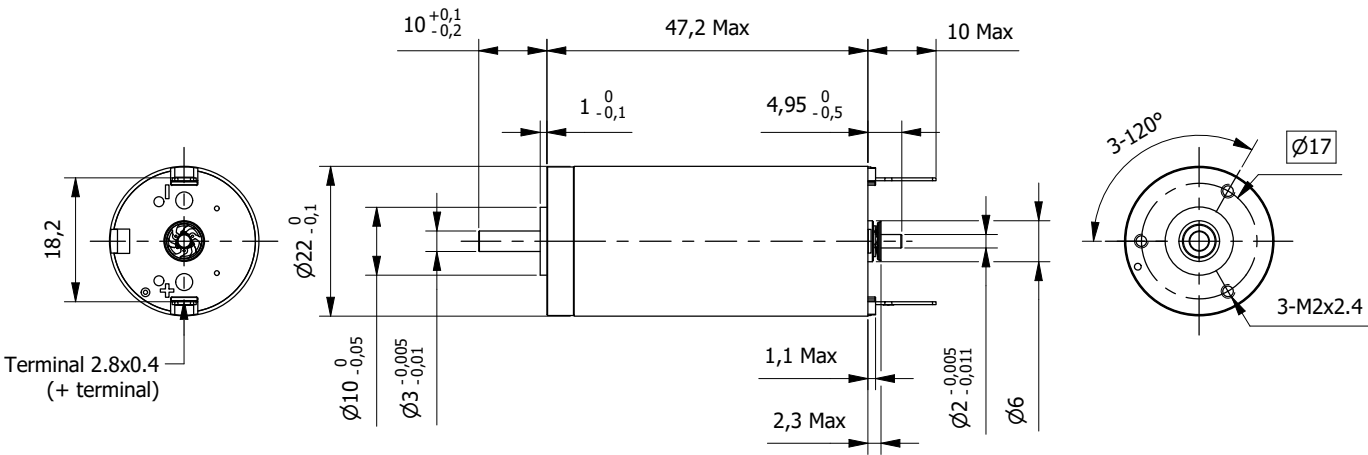
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC47N-PM

Precious Metal brushes

Ø 22mm

14,1 to 29,5mNm

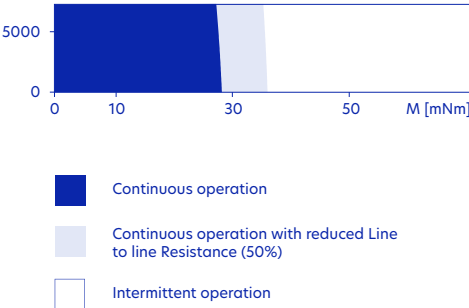


Product also available with ball bearings

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

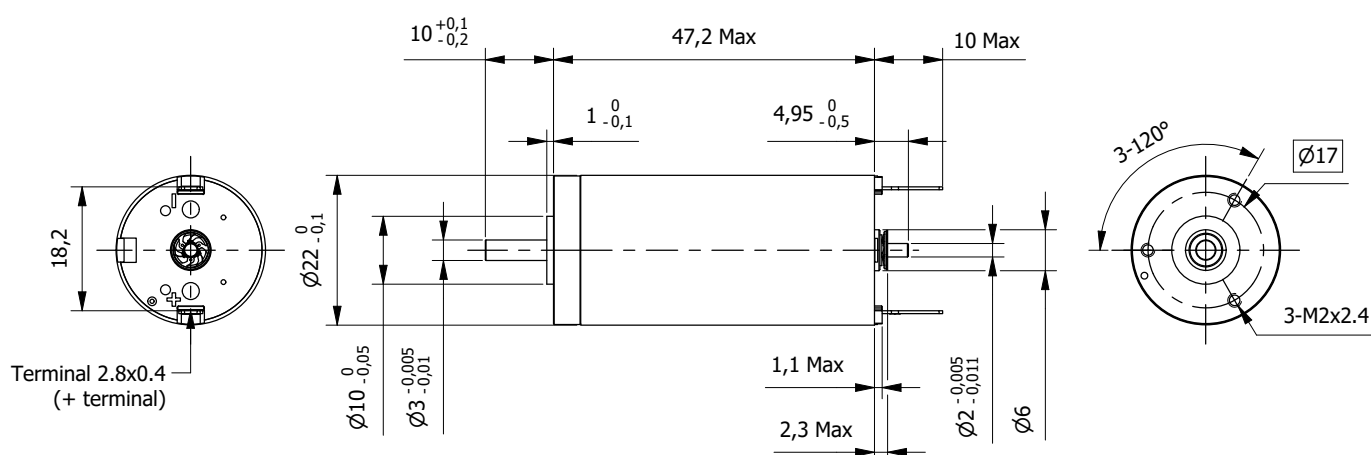


Brushed DC Coreless Motor 22DC47N-G

Graphite brushes

Ø 22mm

27 to 30,5mNm

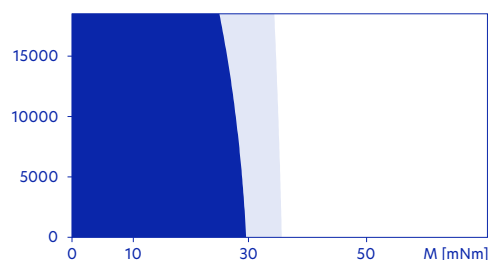


Product also available with ball bearings

Specification					
	Model		...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	gcm2	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

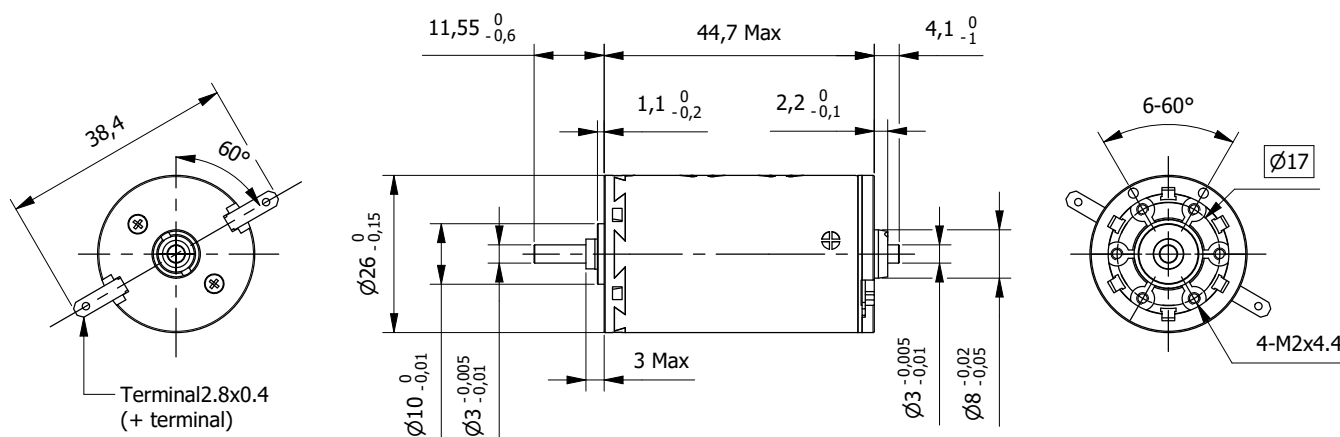


- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Ø 26mm

Precious Metal brushes

20,8 to 28,8mNm



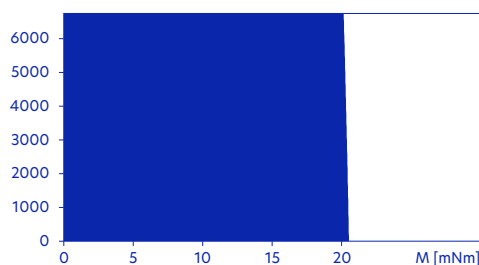
Brushed DC

Product also available with ball bearings

Specification				
	Model		...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	27,1	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



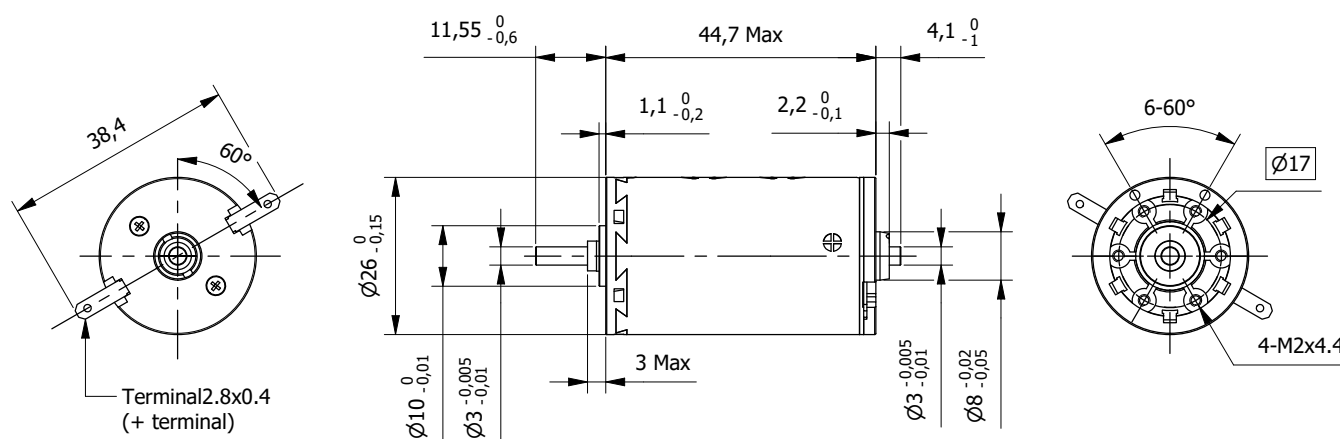
-  Continuous operation
-  Continuous operation with reduced Line to line Resistance (50%)
-  Intermittent operation

Brushed DC Coreless Motor 26DC44P-G

Graphite brushes

Ø 26mm

26,3 to 28,3mNm

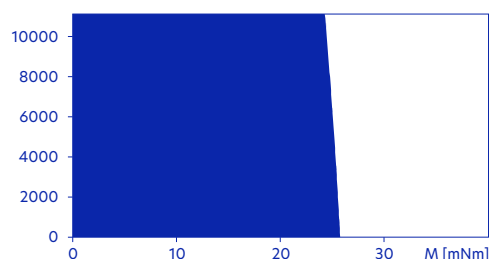


Product also available with ball bearings

Specification				
	Model		...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

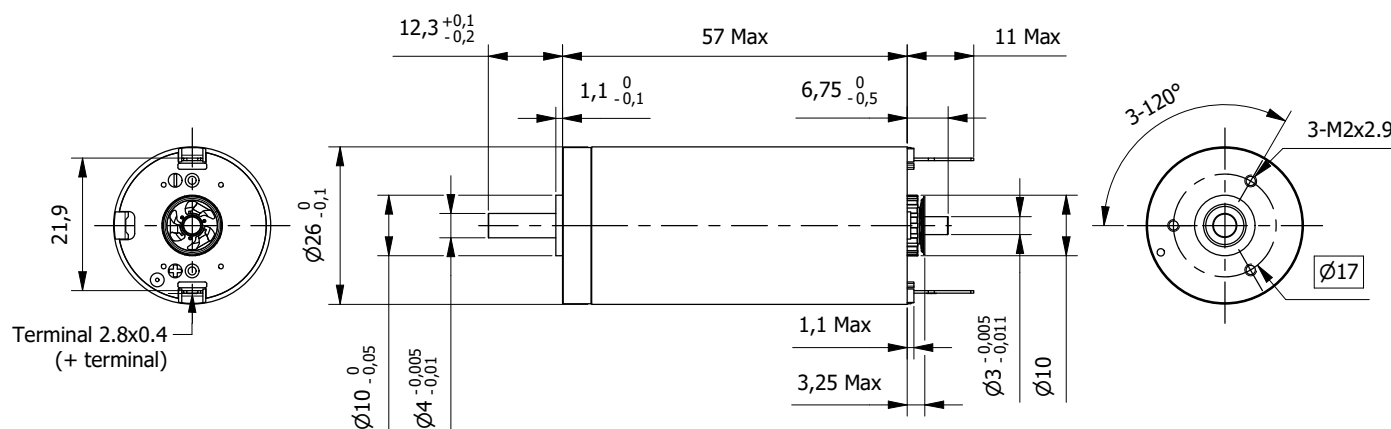


- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Ø 26mm

Precious Metal brushes

32,9 to 52,3mNm



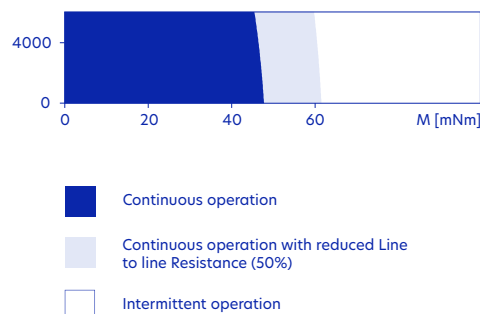
Brushed DC

Product also available with ball bearings

Specification						
	Model		...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	gcm2	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

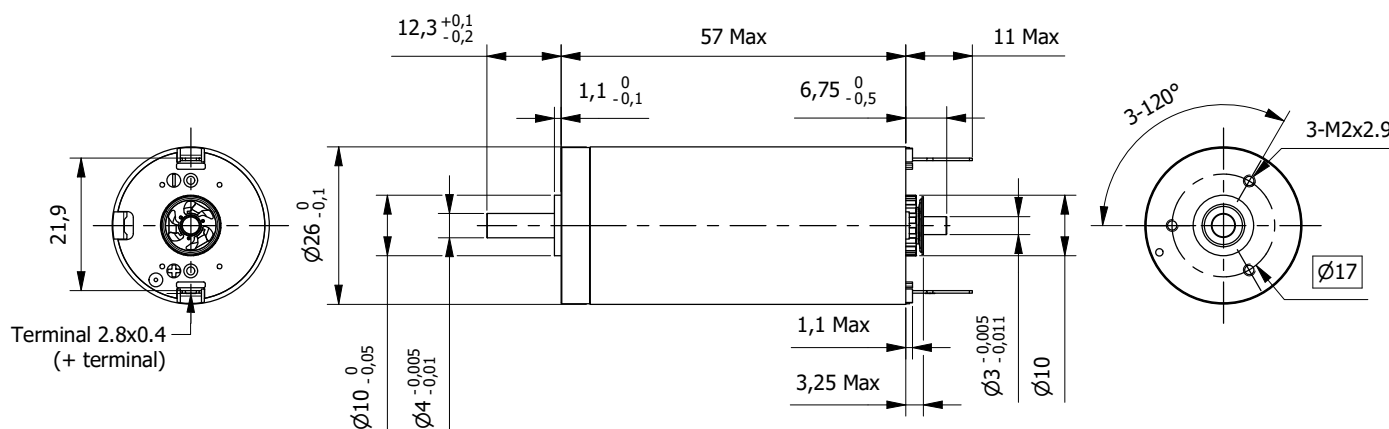


Brushed DC Coreless Motor 26DC57N-G

Graphite brushes

Ø 26mm

46,9 to 59,1mNm

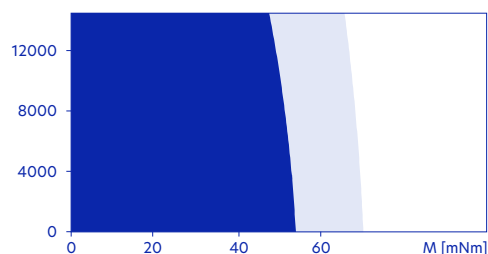


Product also available with ball bearings

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



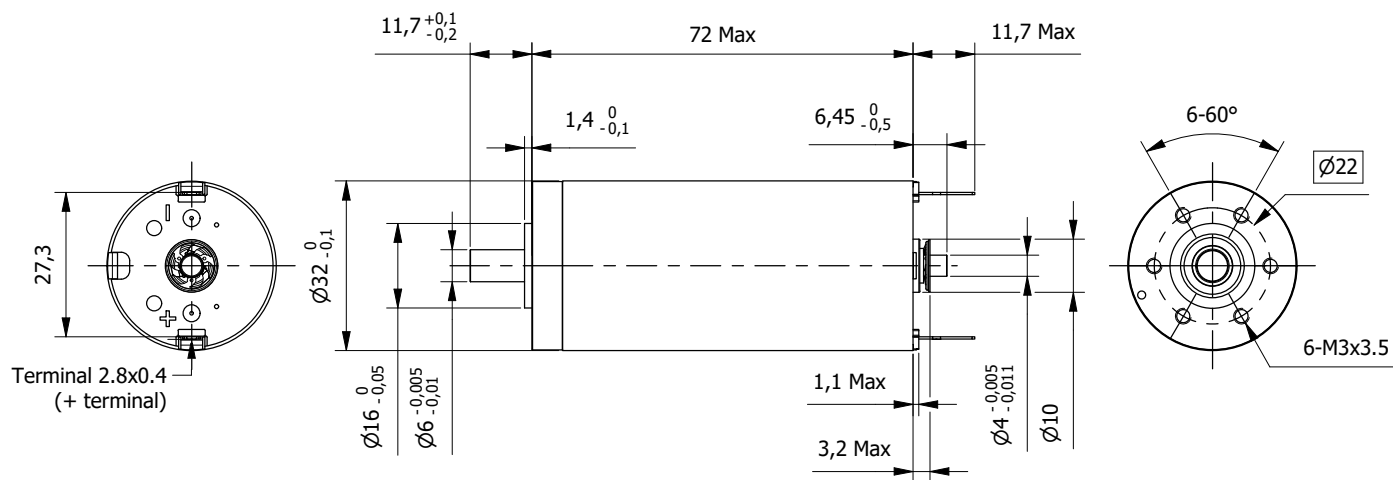
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 32DC72N-G

Graphite brushes

Ø 32mm

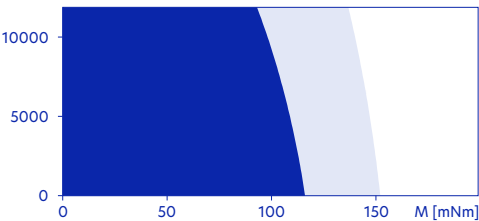
89,4 to 123mNm



Specification					
	Model		...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	gcm2	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



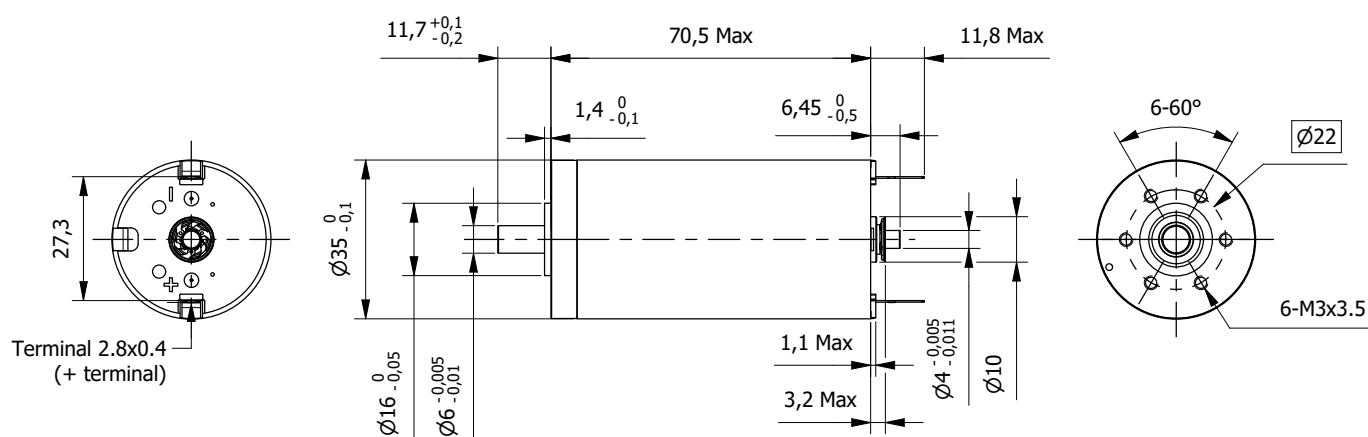
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 35DC70N-G

Graphite brushes

Ø 35mm

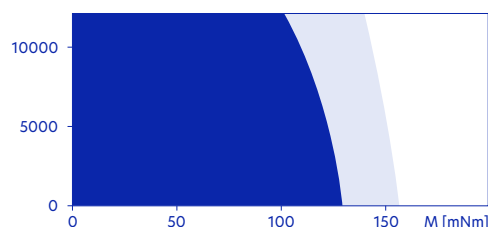
77,7 to 138mNm



Specification			...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

Brushed DC

Brushed DC

Brushed DC

Brushless DC



Slotless motors -
SBL series
Standard

p.95



Slotless motors -
EC series
High Performance

p.103



Slotted motors -
BL series
Standard

p.61



Slotted motors -
EC series
High Performance

p.79



Slotted motors -
CBL series
Economy

p.85



Motors
with Encoder

p.121



Flat motors

p.127



Flat motors
with Encoder

p.139



Frameless
motors

p.145

Brushless DC motors

BLDC Slotted motors - BL Standard series	Torque* (Nm)	61
22BL	0,008...0,02	62
28BL	0,005...0,05	63
33BL	0,022...0,05	64
40BL	0,043...0,083	65
42BL - square - 8pole	0,063...0,25	66
42BLA - square - 10pole	0,07...0,36	67
42BLB - square - 6pole	0,064...0,43	68
42RBL	0,02...0,15	69
57BL - 4pole	0,055...0,44	70
57BLA - 6pole	0,2...0,8	71
57BLB - square	0,3...0,6	72
70BLS	0,5...1,5	73
80BLS	0,9...3	74
86BLC	0,4...2,22	75
86BLS	0,35...2,1	76
BLDC Slotted motors - EC High Performance series	Torque* (Nm)	79
22EC43...82N	0,03...0,08	80
BLDC Slotted motors - CBL Economy series	Torque* (Nm)	85
24CBL30	0,006	86
28CBL	0,028...0,05	87
36CBL	0,015...0,09	88
38CBL58	0,07	89
42CBL	0,068...0,15	90
48CBL68	0,18	91
BLDC Slotless motors - SBL Standard series	Torque* (Nm)	95
10SBL19 - NEW	0,0005	96
14SBL45	0,004	97
16SBL	0,002...0,009	98
22SBL	0,006...0,025	99
28SBL	0,018...0,06	100
40SBL	0,2...0,36	101
BLDC Slotless motors - EC High Performance series	Torque* (Nm)	103
16EC24...36P	0,003...0,008	104
16EC40...56NS - NEW	0,007...0,016	106
22EC32P	0,010...0,011	108
22EC44NS - NEW	0,018...0,02	109
22EC48P	0,023	110
22EC48T	0,043...0,045	111
22EC60NS - NEW	0,027...0,029	112
22EC66T	0,055	113
30EC42P	0,034	114
30EC47T	0,069...0,073	115
30EC64P	0,061...0,064	116
30EC64T	0,093...0,096	117
40EC58...88P	0,09...0,21	118
BLDC motors with Encoder	Torque* (Nm)	121
42SVA	0,062...0,25	122
57SVA	0,3...0,6	123
86SVA	0,4...1,6	124
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32BLW18	0,025	129
45BLW16	0,055	130
45BLW Connector	0,05...0,13	131
45BLW Wires	0,05...0,13	132
60BLWA38	0,5	133
60BLW40	0,3	134
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BLDC Flat motors with Encoder	Torque* (Nm)	139
45BLW29-E - NEW	0,13	140
60BLW42-E	0,29	141
90BLW42-E	0,96	142
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50BLF08...15 - NEW	0,3...0,5	146
70BLF10...19 - NEW	0,66...1	148
85BLF13...23 - NEW	1,44...2	150
115BLF25...50 - NEW	3,9...9,5	152

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.

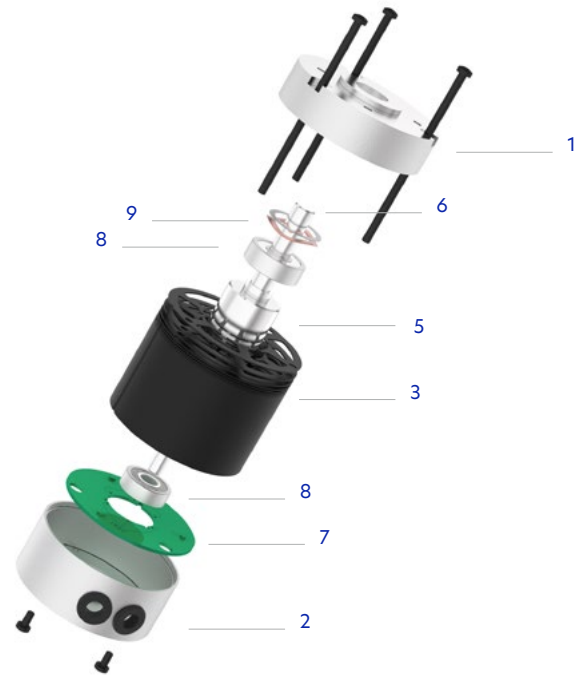
Glossary

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.

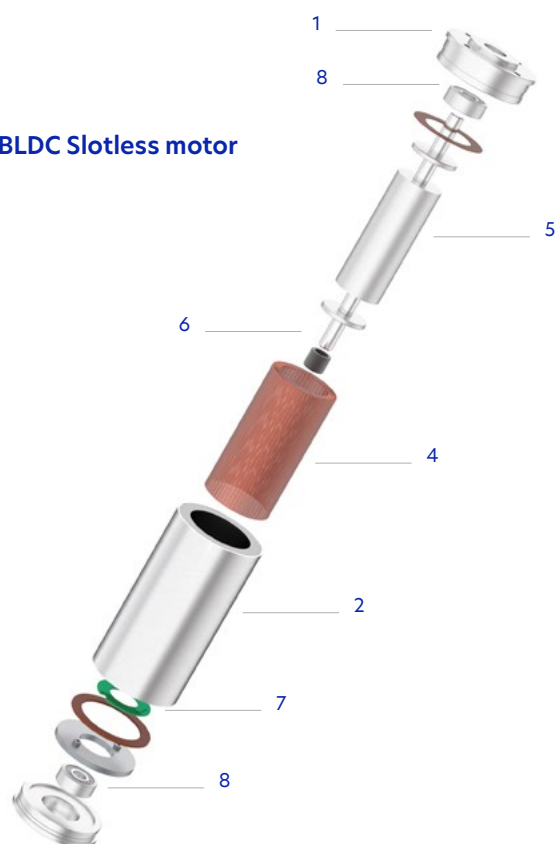
Brushless DC Flat motors

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

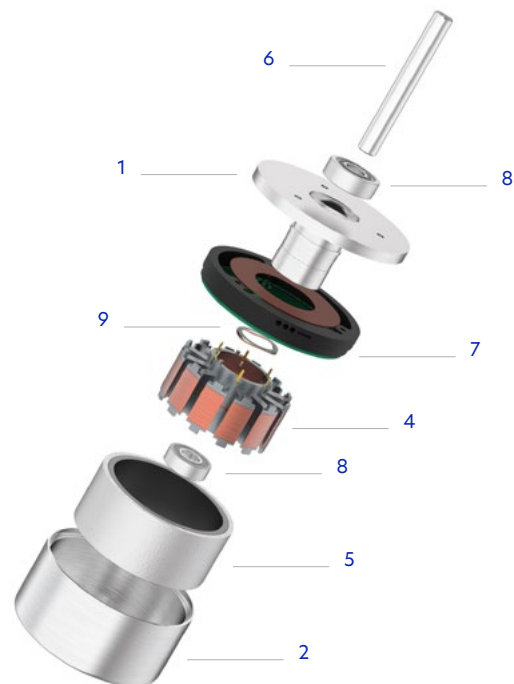
BLDC Slotless motor



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

BLDC Flat motor



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.61



Slotted motors -
EC series
High Performance

p.79



Slotted motors -
CBL series
Economy

p.85

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)	61
22BL	0,008...0,02	62
28BL	0,005...0,05	63
33BL	0,022...0,05	64
40BL	0,043...0,083	65
42BL - square - 8pole	0,063...0,25	66
42BLA - square - 10pole	0,07...0,36	67
42BLB - square - 6pole	0,064...0,43	68
42RBL	0,02...0,15	69
57BL - 4pole	0,055...0,44	70
57BLA - 6pole	0,2...0,8	71
57BLB - square	0,3...0,6	72
70BLS	0,5...1,5	73
80BLS	0,9...3	74
86BLC	0,4...2,22	75
86BLS	0,35...2,1	76
BLDC Slotted motors - EC High Performance series	Torque* (Nm)	79
22EC43N	0,03	80
22EC58N	0,05	81
22EC82N	0,08	82
BLDC Slotted motors - CBL Economy series	Torque* (Nm)	85
24CBL30	0,006	86
28CBL	0,028...0,05	87
36CBL	0,015...0,09	88
38CBL58	0,07	89
42CBL	0,068...0,15	90
48CBL68	0,18	91

* Rated Torque

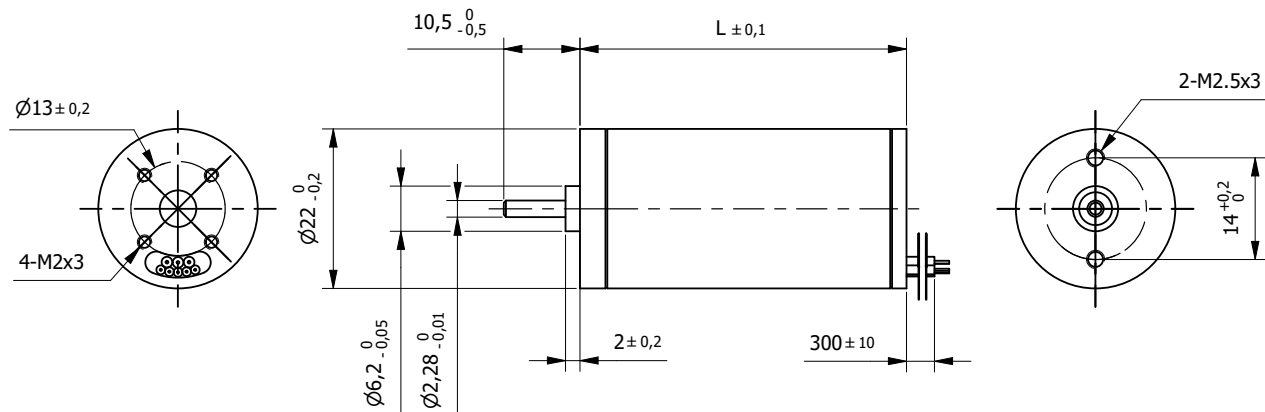


BLDC Slotted motors

BL series - Standard

BLDC Slotted motors - BL Standard series	Torque* (Nm)	
22BL	0,008...0,02	62
28BL	0,005...0,05	63
33BL	0,022...0,05	64
40BL	0,043...0,083	65
42BL - square - 8pole	0,063...0,25	66
42BLA - square - 10pole	0,07...0,36	67
42BLB - square - 6pole	0,064...0,43	68
42RBL	0,02...0,15	69
57BL - 4pole	0,055...0,44	70
57BLA - 6pole	0,2...0,8	71
57BLB - square	0,3...0,6	72
70BLS	0,5...1,5	73
80BLS	0,9...3	74
86BLC	0,4...2,22	75
86BLS	0,35...2,1	76

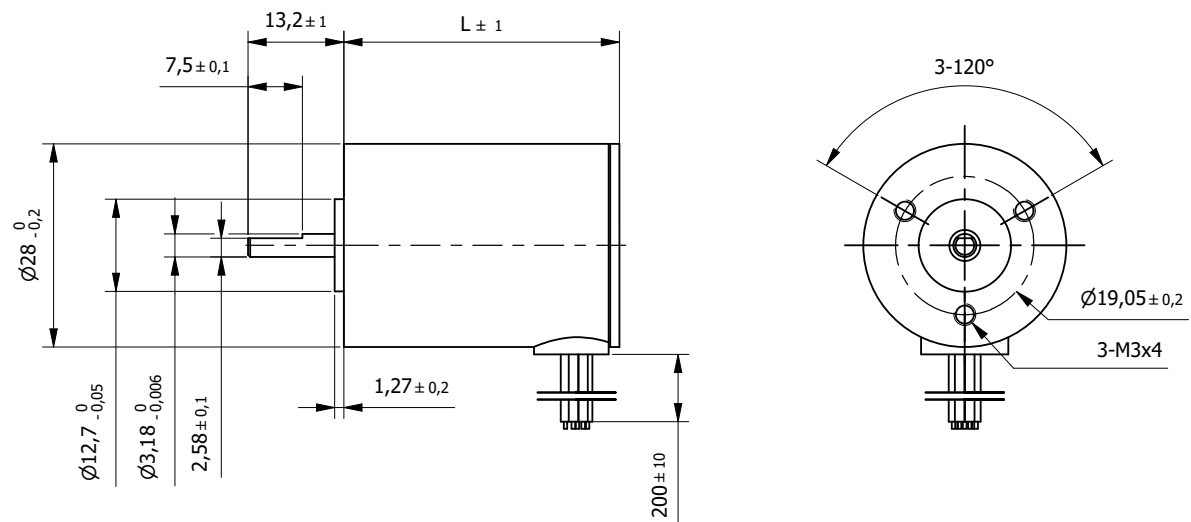
* Rated Torque



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

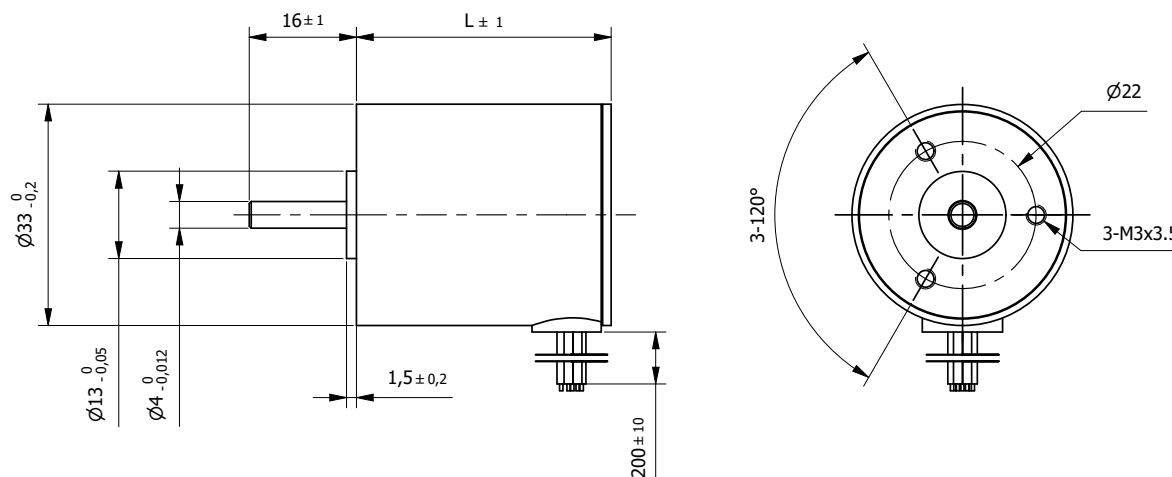


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

Specification				
	Model	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	gcm2	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

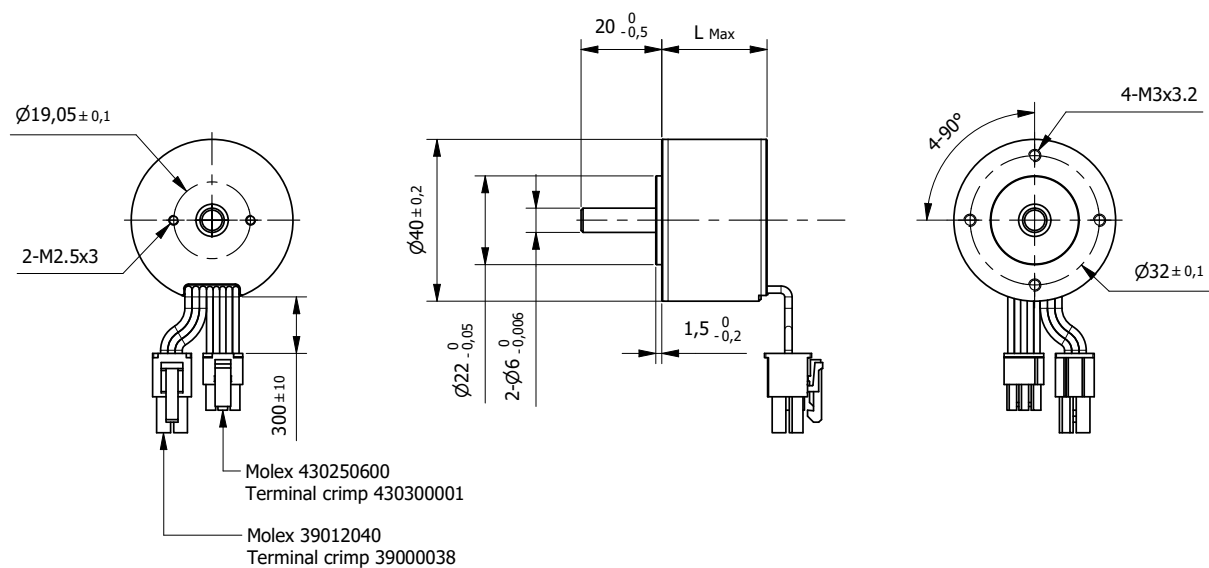


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

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

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						
	Model	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	gcm2	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

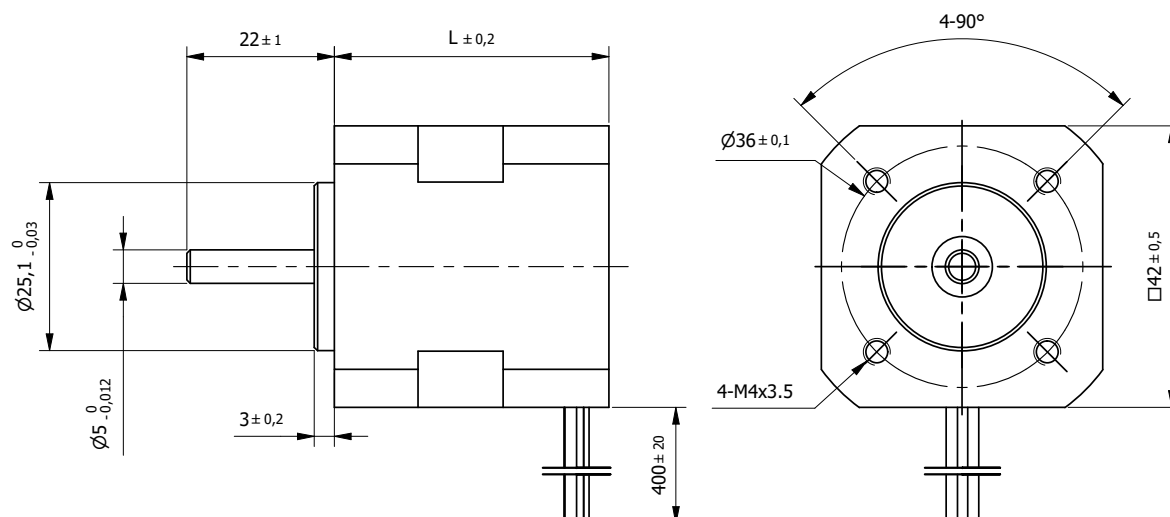
Connection			
Pin n°	Color	Gauge	Function
1	Red	UL1332 AWG20	Phase U
2	Black		Phase V
3	White		Phase W
1	Yellow	UL1332 AWG26	Hall A
2	Brown		Hall B
3	Gray		Hall C
4	Blue		GND Hall Sensor Ground
5	Green		Vcc Hall Sensor +5 to +24 Vdc

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	81
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

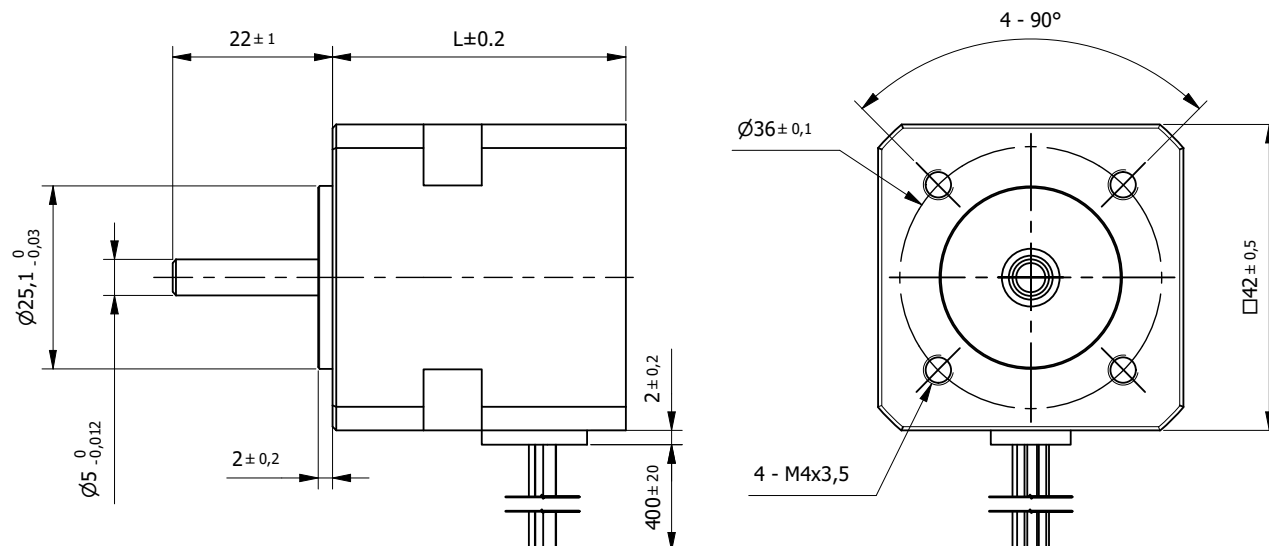
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red		Phase V
8	Black		Phase W

Brushless Slotted Motor 42BLA

10-pole

□ 42mm

0,07 - 0,36Nm



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

Specification		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
6	Max. Peak Torque	Nm	0,21	0,48	0,78
7	Torque Constant	Nm/A	0,055	0,059	0,058
8	Rated Current	A	1,27	2,71	4,48
9	Max. Peak Current	A	4	8,3	13,5
10	No-Load Current	mA	220	450	430
11	Line to Line Resistance	Ω	2,6	1,1	0,7
12	Line to Line Inductance	mH	1,83	0,96	0,58
13	Rotor Inertia	gcm ²	48	101	154
14	Length (L)	mm	40,3	60,3	80,3
15	Weight	Kg	0,26	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

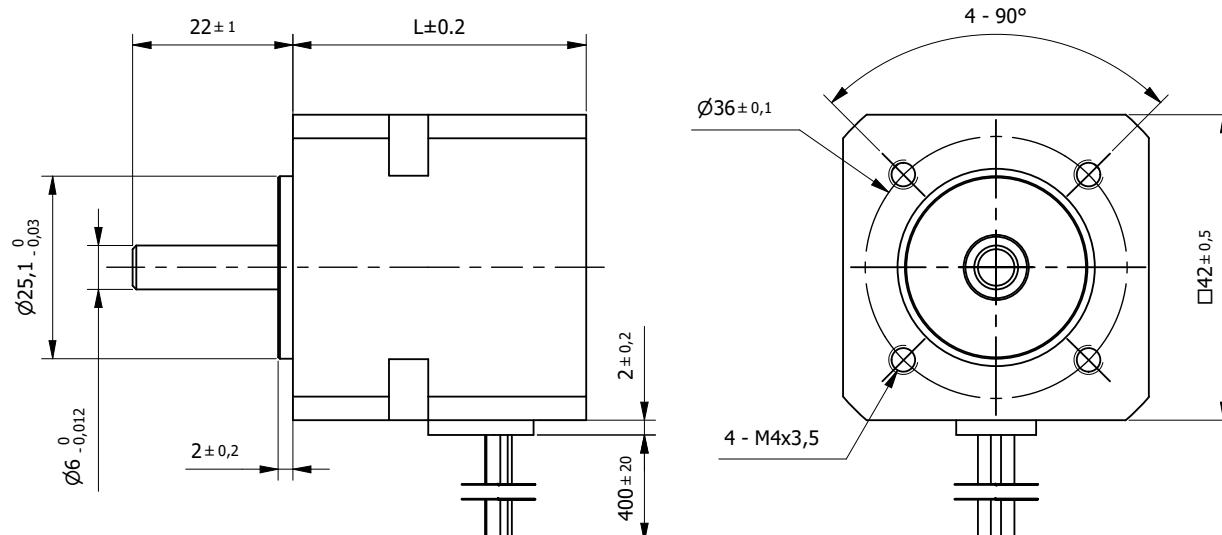
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red		Phase V
8	Black		Phase W

Brushless Slotted Motor 42BLB

6-pole

□ 42mm

0,064 - 0,43Nm

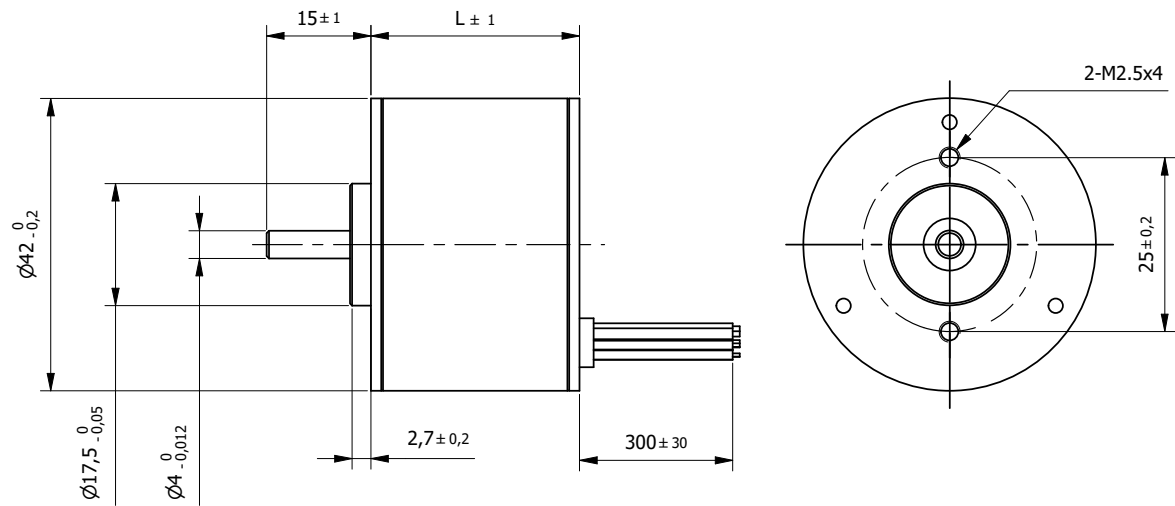


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

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				
	Model	42RBL30	42RBL60	42RBL85
1	n° of Pole	8	8	8
2	n° of Phase	3	3	3
3	Rated Voltage	V	24	24
4	Rated Speed	rpm	4000	4200
5	Rated Torque	Nm	0,02	0,06
6	Max. Peak Torque	Nm	0,06	0,17
7	Torque Constant	Nm/A	0,039	0,041
8	Rated Current	A	0,50	1,4
9	Max. Peak Current	A	1,5	4,2
10	No-Load Current	A	<0,4	<0,4
11	Line to Line Resistance	Ω	5,9	1,6
12	Line to Line Inductance	mH	5,1	1,94
13	Rotor Inertia	gcm2	15,6	33
14	Length (L)	mm	30	60
15	Weight	Kg	0,25	0,4

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

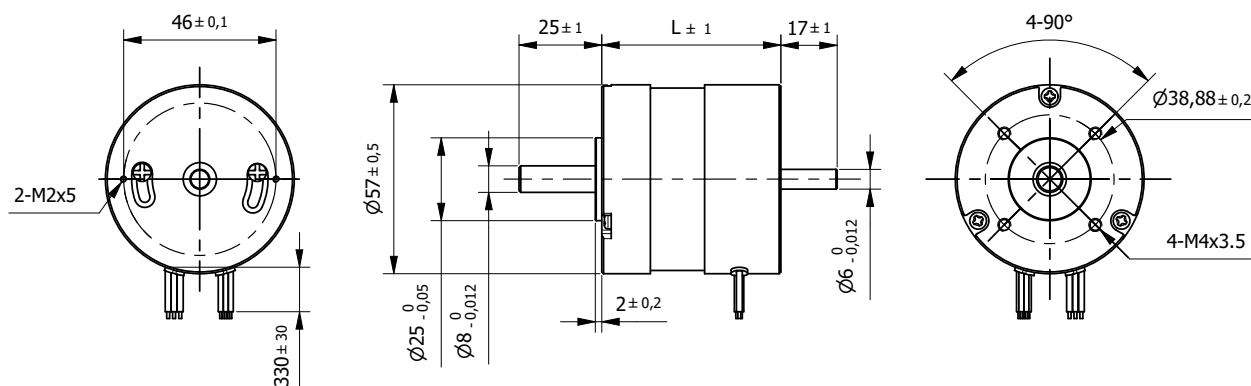
Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1007 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Orange		Hall B
4	Brown		Hall C
5	White		GND Hall
6	Green	UL1007 AWG22	Phase U
7	Red		Phase V
8	Black		Phase W

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	gcm2	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

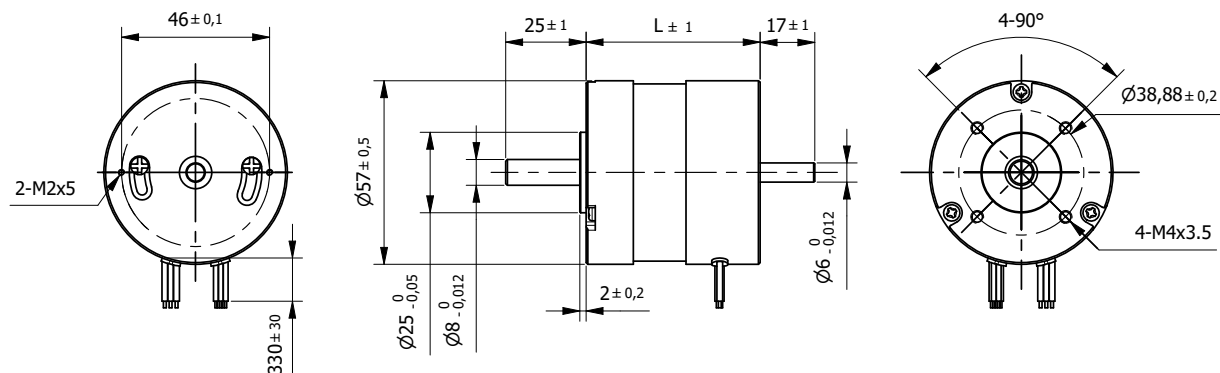
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG20	Phase U
7	Red		Phase V
8	Black		Phase W

Brushless Slotted Motor 57BLA

6-pole

Ø 57mm

0,2 - 0,8Nm

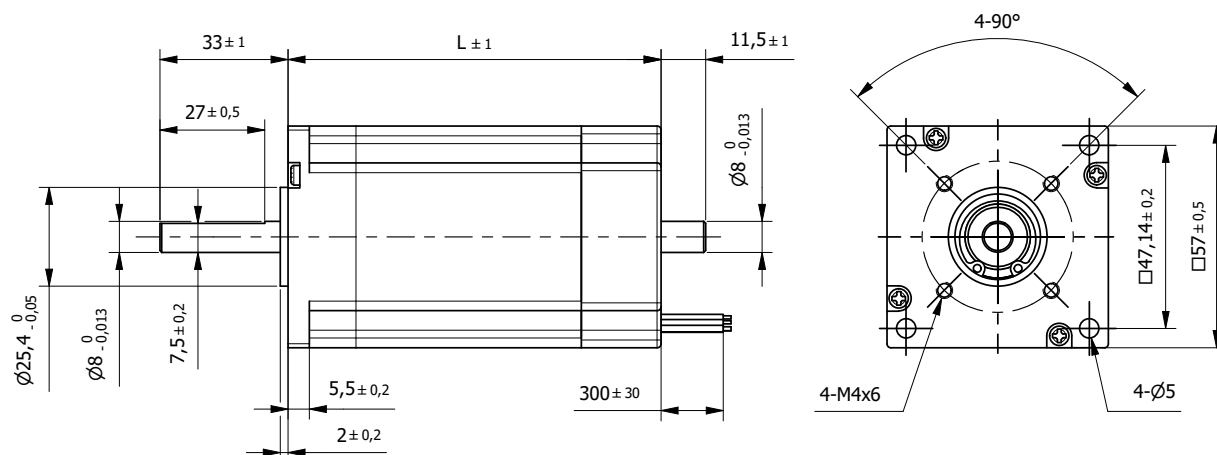


Specification		57BLA01	57BLA02	57BLA03	57BLA04
1	n° of Pole	6	6	6	6
2	n° of Phase	3	3	3	3
3	Rated Voltage	V	36	36	36
4	Rated Speed	rpm	4000	4000	4000
5	Rated Torque	Nm	0,2	0,4	0,6
6	Max. Peak Torque	Nm	0,6	1,2	1,8
7	Torque Constant	Nm/A	0,07	0,07	0,06
8	Rated Current	A	2,86	5,71	10
9	Max. Peak Current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

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

Brushless DC



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	0,6
6	Max. Peak Torque	Nm	0,9	1,8
7	Torque Constant	Nm/A	0,08	0,08
8	Rated Current	A	3,75	7,5
9	Max. Peak Current	A	12,3	23,8
10	No-Load Current	mA	400	620
11	Line to Line Resistance	Ω	1,2	0,5
12	Line to Line Inductance	mH	1,2	0,6
13	Rotor Inertia	gcm2	210	430
14	Length (L)	mm	76	116
15	Weight	Kg	0,8	1,2

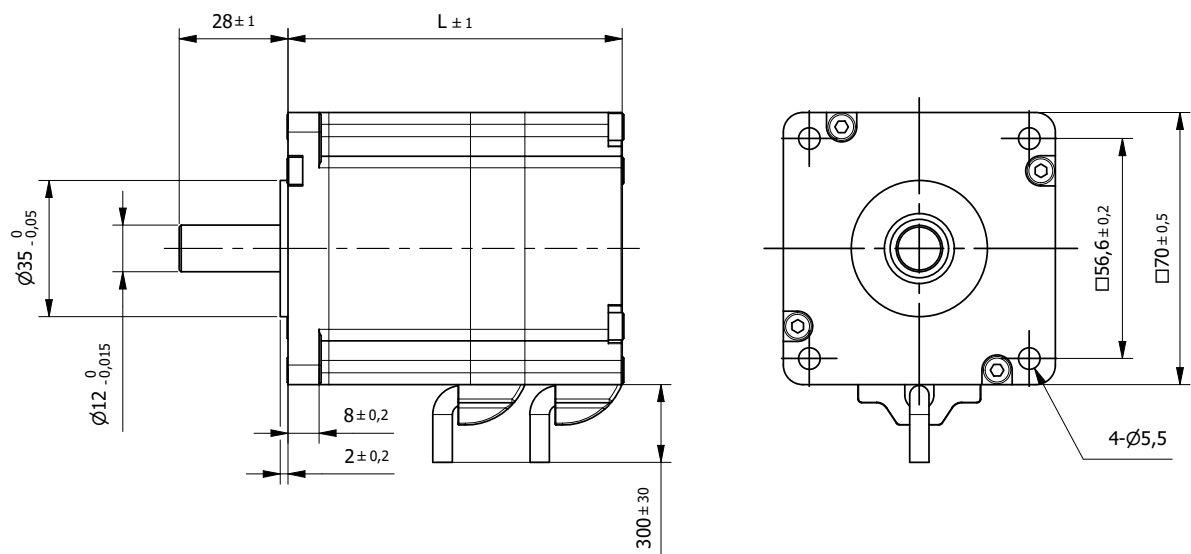
Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP40
Radial play (450g load)	0,025mm
Axial play (4000g load)	0,025mm
Max. Radial force (10mm from flange)	115N
Max. Axial force	45N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min.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

Brushless Slotted Motor 70BLS

□ 70mm

0,5 - 1,5Nm

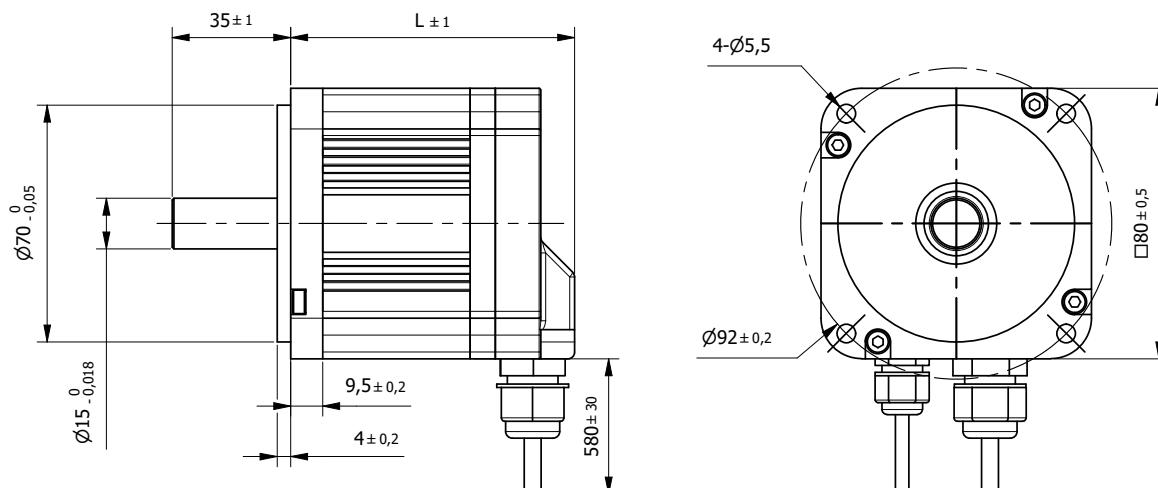


BE Version: Rear shaft 13mm - 2x M2.5 on a diameter 46mm

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

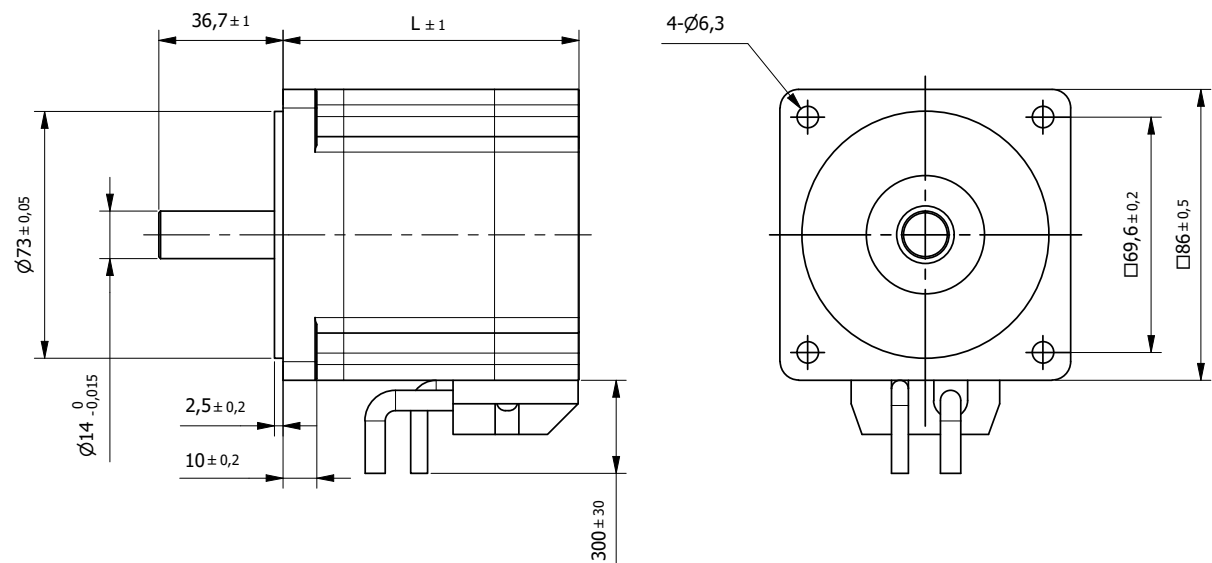


BE Version: Rear shaft 13mm - 2x M2.5 on a diameter 46mm

Specification					
Model		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
4	Rated Speed	rpm	3000	3000	3000
5	Rated Torque	Nm	0,9	1,7	2,2
6	Max. Peak Torque	Nm	2,5	5	6,5
7	Torque Constant	Nm/A	0,118	0,113	0,109
8	Rated Current	A	7,63	15,04	20,18
9	Max. Peak Current	A	22	45	61
10	No-Load Current	mA	500	700	1000
11	Line to Line Resistance	Ω	0,25	0,1	0,07
12	Line to Line Inductance	mH	1,3	0,6	0,4
13	Rotor Inertia	gcm ²	544	1020	1360
14	Length (L)	mm	84	105	120
15	Weight	Kg	1,6	2	2,5

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

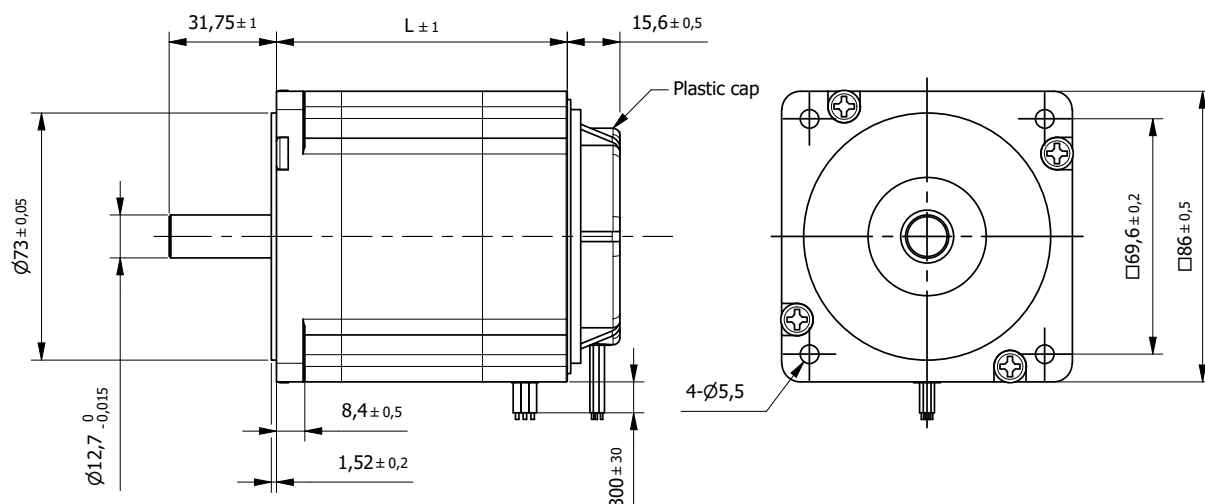


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 46mm

Specification						
	Model	86BLC64	86BLC77	86BLC105	86BLC125	
1	n° of Pole	8	8	8	8	
2	n° of Phase	3	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	2,22
6	Max. Peak Torque	Nm	1,2	2,4	4,8	6,66
7	Torque Constant	Nm/A	0,122	0,149	0,135	0,131
8	Rated Current	A	3,28	5,37	11,85	16,95
9	Max. Peak Current	A	11	17,5	37	52
10	No-Load Current	mA	380	550	860	1200
11	Line to Line Resistance	Ω	1	0,34	0,14	0,1
12	Line to Line Inductance	mH	1,4	0,6	0,36	0,24
13	Rotor Inertia	gcm2	400	800	1600	2400
14	Length (L)	mm	64	77	105	125
15	Weight	Kg	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
4	Rated Speed	rpm	3000	3000	3000
5	Rated Torque	Nm	0,35	0,7	1,4
6	Max. Peak Torque	Nm	1,05	2,1	4,2
7	Torque Constant	Nm/A	0,116	0,124	0,127
8	Rated Current	A	3,02	5,65	11,02
9	Max. Peak Current	A	9,5	20	33
10	No-Load Current	mA	540	800	1450
11	Line to Line Resistance	Ω	0,9	0,34	0,16
12	Line to Line Inductance	mH	2,6	1	0,5
13	Rotor Inertia	gcm ²	400	800	1600
14	Length (L)	mm	58	71	98
15	Weight	Kg	1,6	2,12	3,15

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

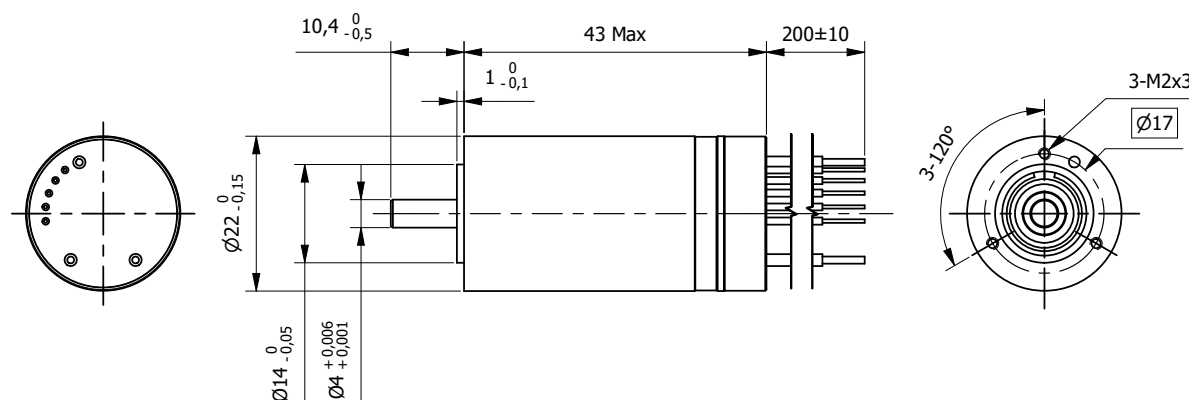


BLDC Slotted motors

EC series - High Performance

BLDC Slotted motors - EC High Performance series		Torque* (Nm)
22EC43N	0,03	80
22EC58N	0,05	81
22EC82N	0,08	82

* Rated Torque

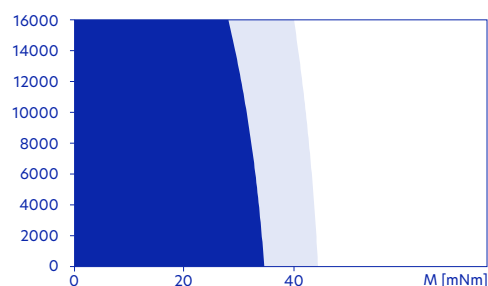


Specification				
	Model		...13107	...10903
1	n° of Pole		8	8
2	n° of Phase		3	3
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	13100	10900
5	Rated Torque	mNm	28,6	32,4
6	Stall Torque	mNm	466	461
7	Torque Constant	mNm/A	14,8	34,9
8	Motor Regulation	10 ³ /Nms	3,5	3
9	Rated Current	A	1,88	0,885
10	Stall Current	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	gcm2	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

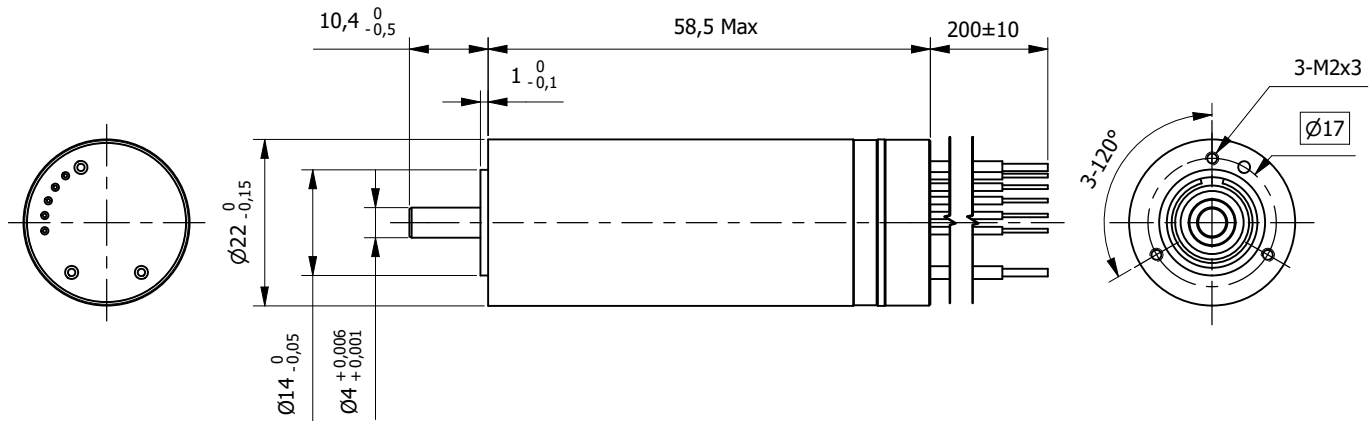


- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushless Slotted Motor 22EC58N

Ø 22mm

45,7 to 48,8mNm



Specification

Specification			...7902	...8807	...9302
1	n° of Pole		8	8	8
2	n° of Phase		3	3	3
3	Rated Voltage	V	12	24	48
4	Rated Speed	rpm	7930	8850	9380
5	Rated Torque	mNm	45,7	48,1	48,8
6	Stall Torque	mNm	528	684	766
7	Torque Constant	mNm/A	12,1	22	41,8
8	Motor Regulation	10 ³ /Nms	1,9	1,6	1,5
9	Rated Current	A	3,7	2,13	1,14
10	Stall Current	A	43,6	31,1	18,3
11	No-load Current	mA	224	129	69,9
12	No-load Speed	rpm	9380	10300	10900
13	Line to Line Resistance	Ω	0,275	0,771	2,62
14	Line to Line Inductance	mH	0,148	0,49	1,77
15	Rotor Inertia	gcm ²	3,06	3,06	3,06
16	Max. Efficiency	%	86,4	87,7	88,2
17	Mechanical Time Constant	ms	0,575	0,488	0,459
18	Length (L)	mm	58,5	58,5	58,5
19	Weight	g	113	113	113

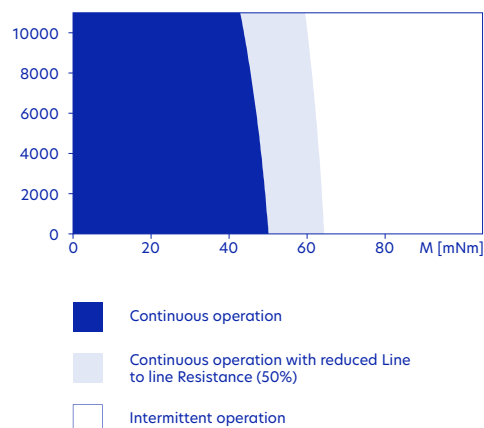
Characteristics

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

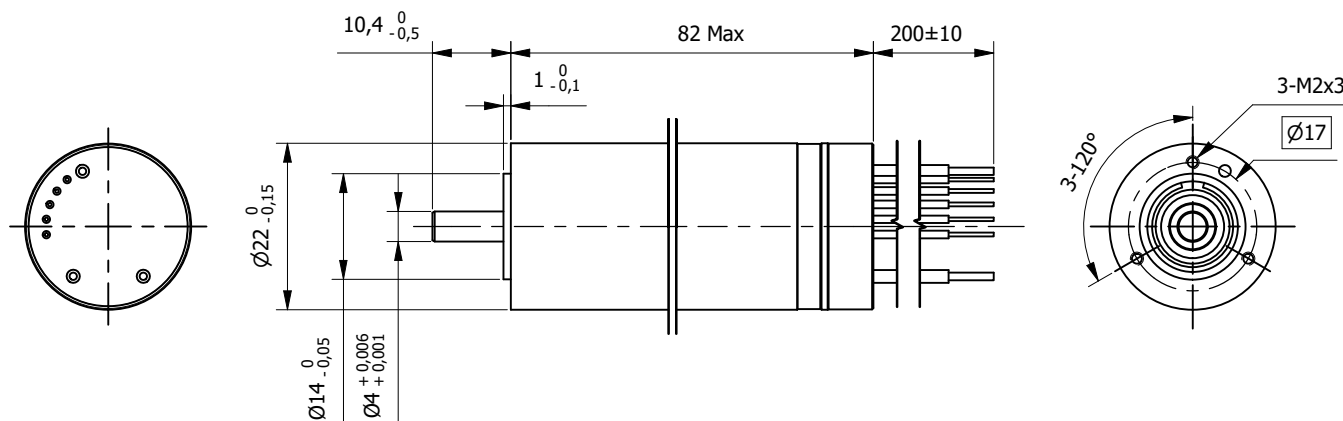
Operating range: Winding 24V



Brushless Slotted Motor 22EC82N

Ø 22mm

77,5 to 79,9mNm



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	gcm2	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



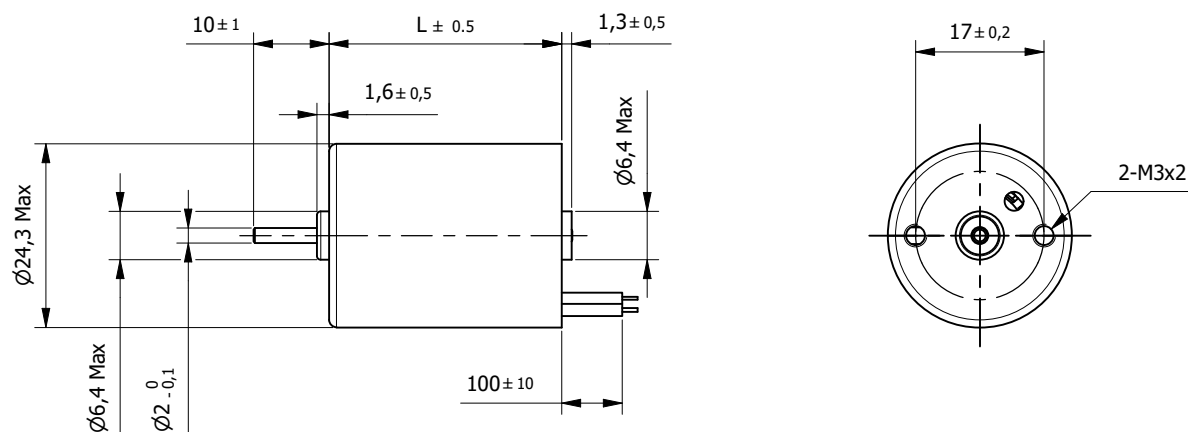


BLDC Slotted motors

CBL series - Economy

BLDC Slotted motors - CBL Economy series		Torque* (Nm)
24CBL30	0,006	86
28CBL	0,028...0,05	87
36CBL	0,015...0,09	88
38CBL58	0,07	89
42CBL	0,068...0,15	90
48CBL68	0,18	91

* Rated Torque

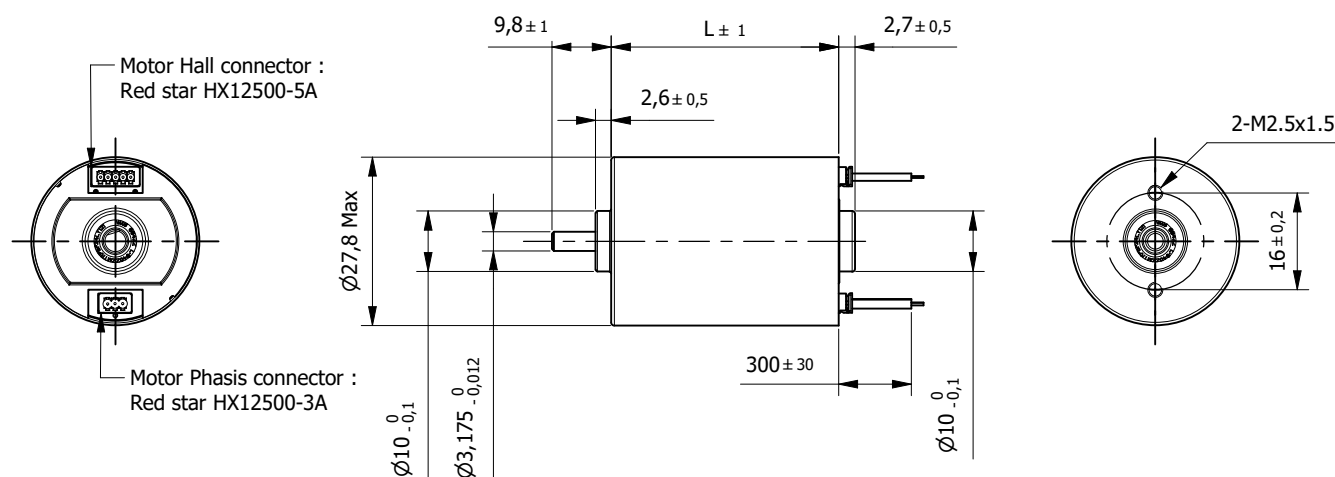


Motor with Sleeve Bearings

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

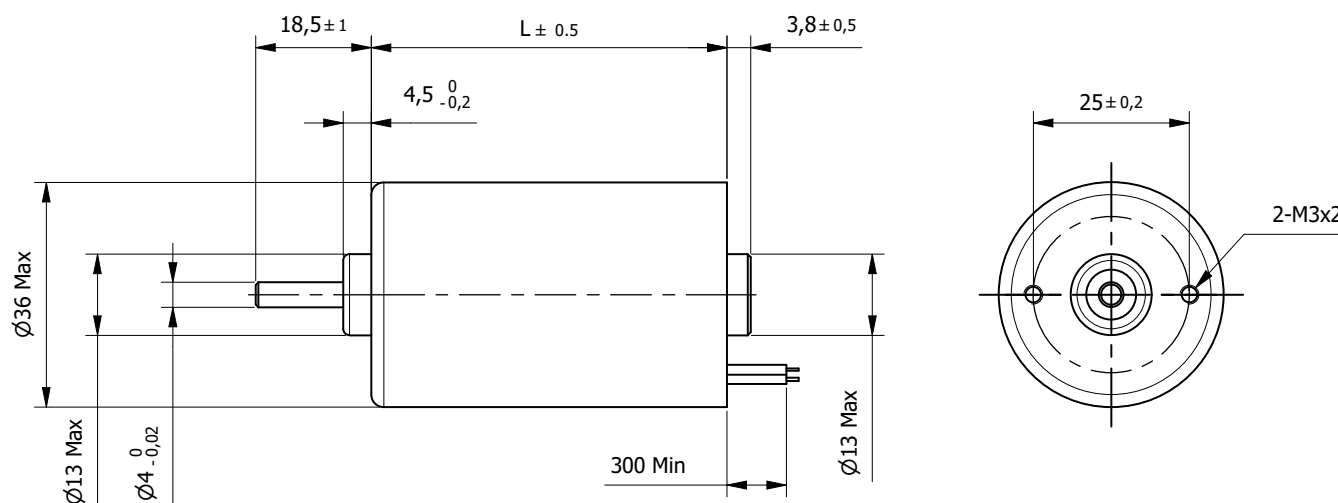
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG28	VCC Hall +5 to +24VDC
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG26	Phase U
7	Red		Phase V
8	Black		Phase W



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

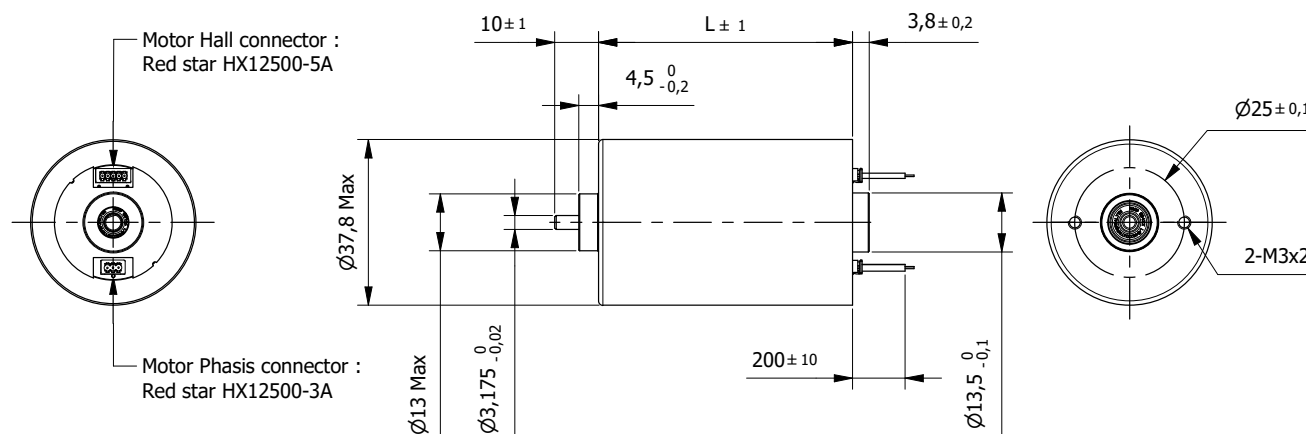
Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1061 AWG28	VCC Hall +5 to +24VDC
2	Blue		Hall A
3	Orange		Hall B
4	Brown		Hall C
5	White		GND Hall
6	Green	UL1061 AWG26	Phase U
7	Red		Phase V
8	Black		Phase W



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	24	24	24	24	24	24
4	Rated Speed	4800	4800	4800	4500	4800	4800
5	Rated Torque	0,015	0,035	0,055	0,07	0,08	0,09
6	Max. Peak Torque	0,045	0,11	0,165	0,21	0,24	0,27
7	Torque Constant	0,03	0,035	0,036	0,04	0,035	0,036
8	Rated Current	0,5	1	1,5	1,8	2,3	2,5
9	Max. Peak Current	1,3	3	4,5	5,3	7	7,5
10	No-Load Current	150	230	250	500	220	400
11	Line to Line Resistance	5,2	2	1,2	1,05	0,95	0,88
12	Line to Line Inductance	3,3	1,9	1,2	1	0,85	0,8
13	Rotor Inertia	6	12	22	27	30	32
14	Length (L)	30	40	50	57	60	65
15	Weight	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

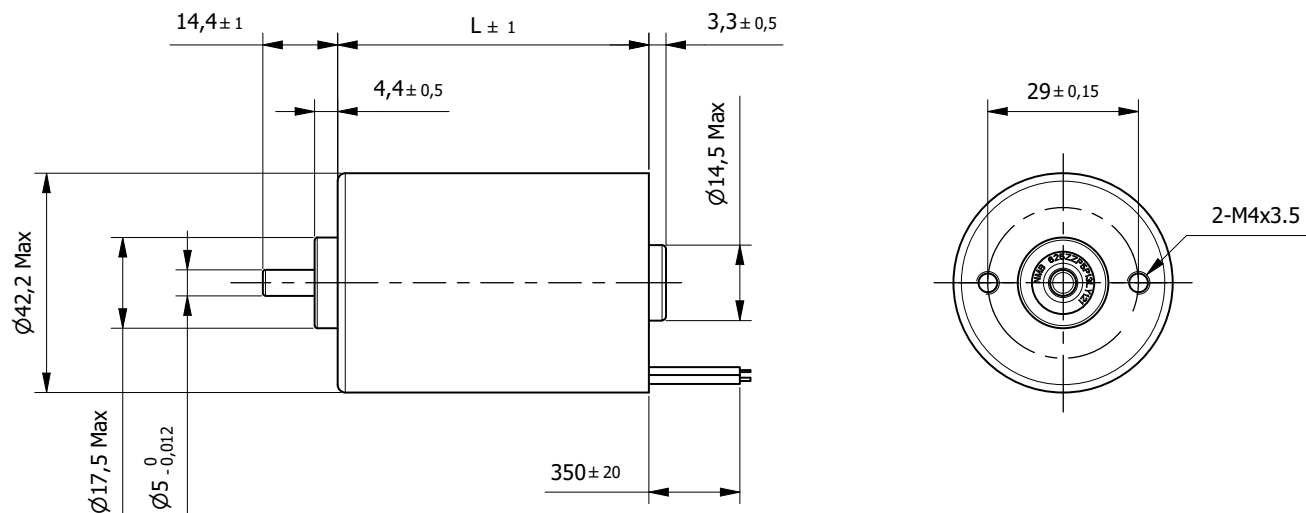
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	VCC Hall +5 to +24VDC
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG24	Phase U
7	Brown		Phase V
8	Orange		Phase W



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

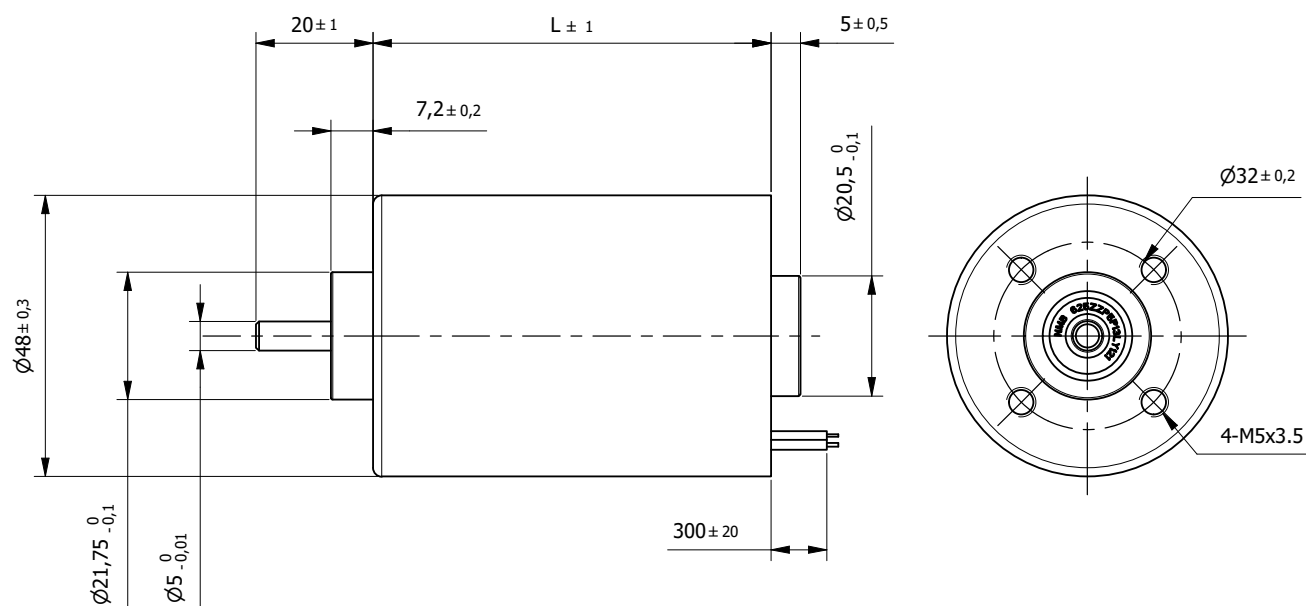
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	VCC Hall +5 to +24VDC
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG22	Phase U
7	Red		Phase V
8	Black		Phase W



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
5	Rated Torque	Nm	0,068	0,12
6	Max. Peak Torque	Nm	0,2	0,36
7	Torque Constant	Nm/A	0,032	0,054
8	Rated Current	A	2,13	2,1
9	Max. Peak Current	A	6,6	6,3
10	No-Load Current	mA	430	300
11	Line to Line Resistance	Ω	0,66	1,2
12	Line to Line Inductance	mH	0,63	1,6
13	Rotor Inertia	gcm ²	44	44
14	Length (L)	mm	60	60
15	Weight	Kg	0,35	0,35

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.95



Slotless motors -
EC series
High Performance

p.103

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 - NEW	0,0005	96
14SBL45	0,004	97
16SBL	0,002...0,009	98
22SBL	0,006...0,025	99
28SBL	0,018...0,06	100
40SBL	0,2...0,36	101

BLDC Slotless motors - EC High Performance series	Torque* (Nm)	103
16EC24P	0,003	104
16EC36P	0,008	105
16EC40NS - NEW	0,007	106
16EC56NS - NEW	0,015...0,016	107
22EC32P	0,010...0,011	108
22EC44NS - NEW	0,018...0,02	109
22EC48P	0,023	110
22EC48T	0,043...0,045	111
22EC60NS - NEW	0,027...0,029	112
22EC66T	0,055	113
30EC42P	0,034	114
30EC47T	0,069...0,073	115
30EC64P	0,061...0,064	116
30EC64T	0,093...0,096	117
40EC58P	0,09...0,094	118
40EC88P	0,21	119

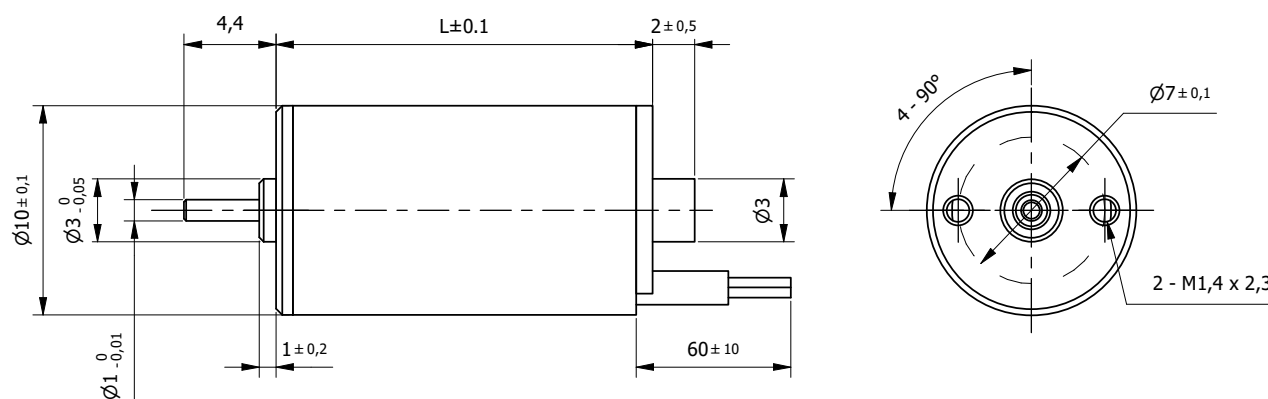


BLDC Slotless motors

SBL series - Standard

BLDC Slotless motors - SBL Standard series		Torque* (Nm)
10SBL19 - NEW	0,0005	96
14SBL45	0,004	97
16SBL	0,002...0,009	98
22SBL	0,006...0,025	99
28SBL	0,018...0,06	100
40SBL	0,2...0,36	101

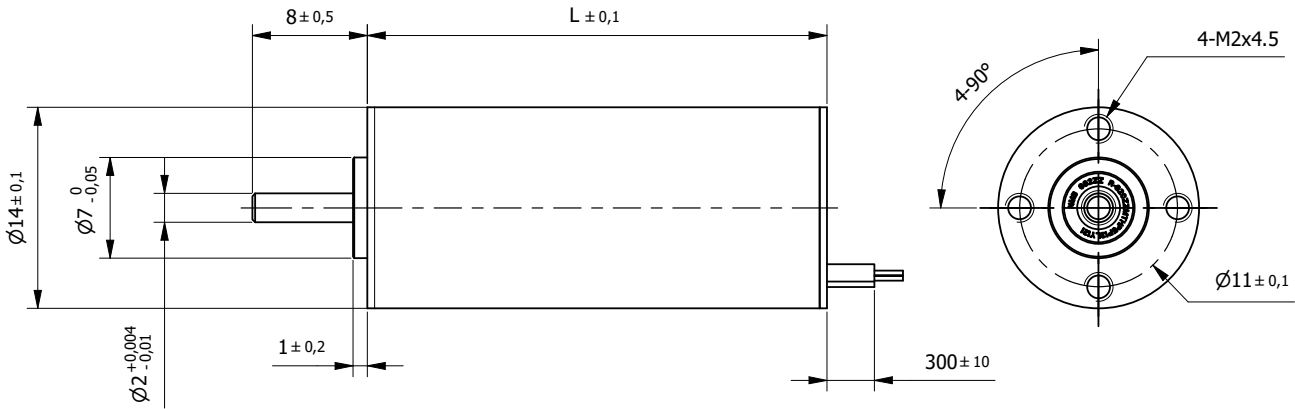
* Rated Torque



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

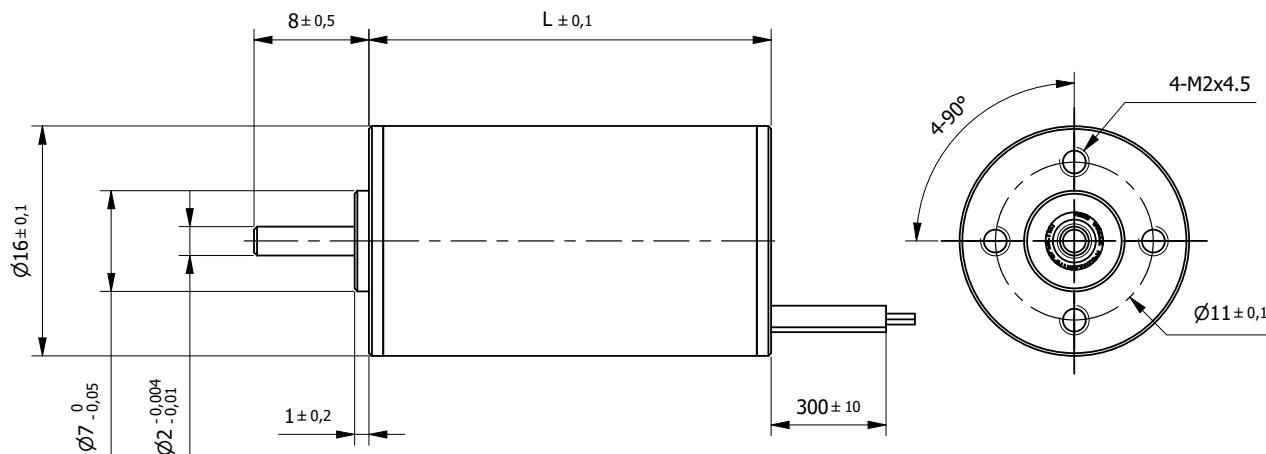
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG28	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG26	Phase U
7	Red		Phase V
8	Black		Phase W



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	0,57
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	gcm2	0,34
14	Length (L)	mm	32
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

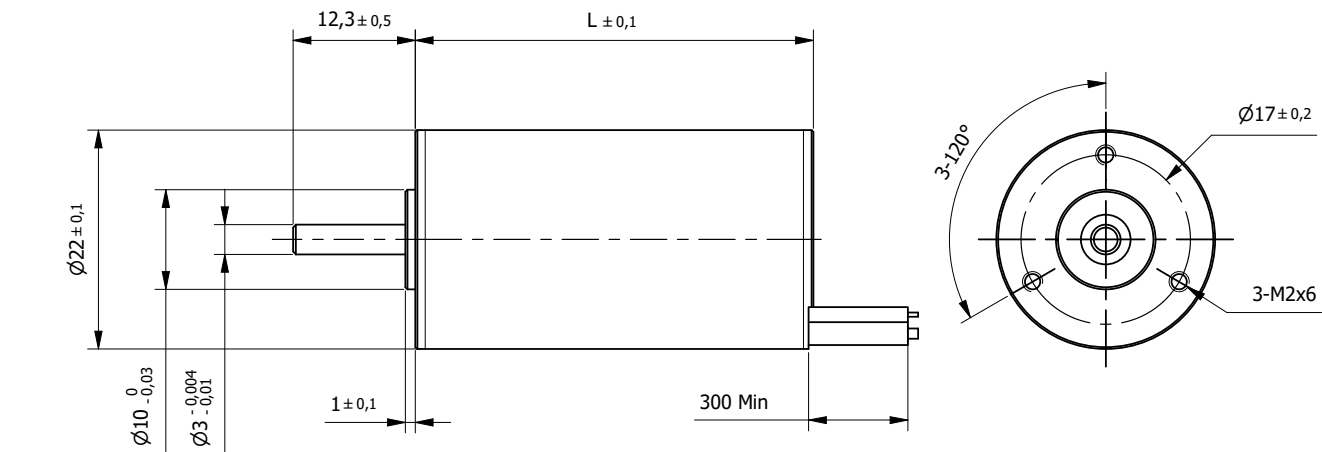
Connection			
Lead n°	Color	Gauge	Function
1	Yellow	UL1332 AWG26	Phase U
2	Red		Phase V
3	Black		Phase W



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

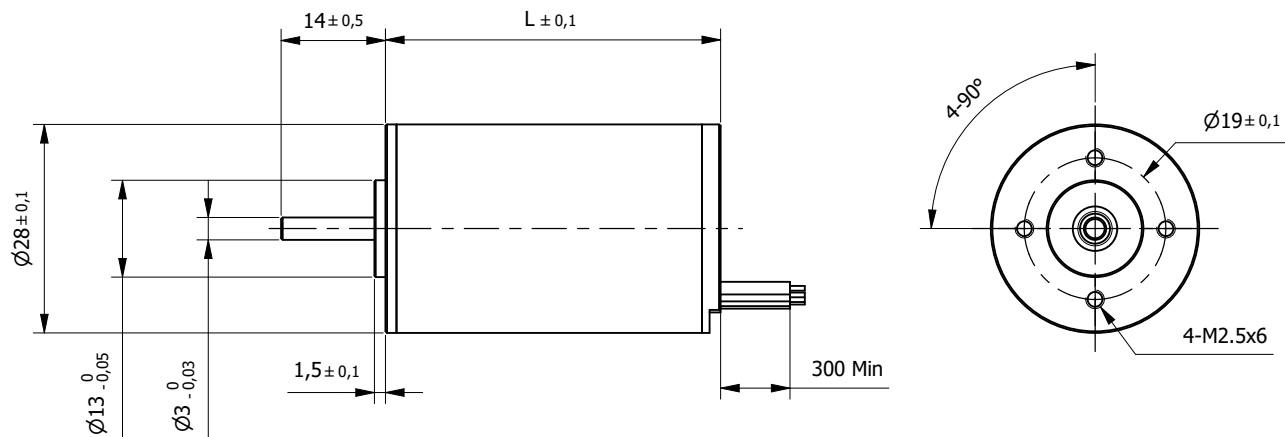


Available with or without Hall Sensors

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	35000	32000	22000
5	Rated Torque	0,006	0,021	0,025
6	Max. Peak Torque	0,018	0,063	0,075
7	Torque Constant	0,006	0,008	0,007
8	Rated Current	1,1	3,8	3,5
9	Max. Peak Current	3,2	7,6	10,5
10	No-Load Current	400	<500	350
11	Line to Line Resistance	2	1	0,75
12	Line to Line Inductance	0,13	0,07	0,07
13	Rotor Inertia	1	3,2	4,5
14	Length (L)	40	60	70
15	Weight	0,04	0,15	0,2
16	Length with Hall Sensors	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

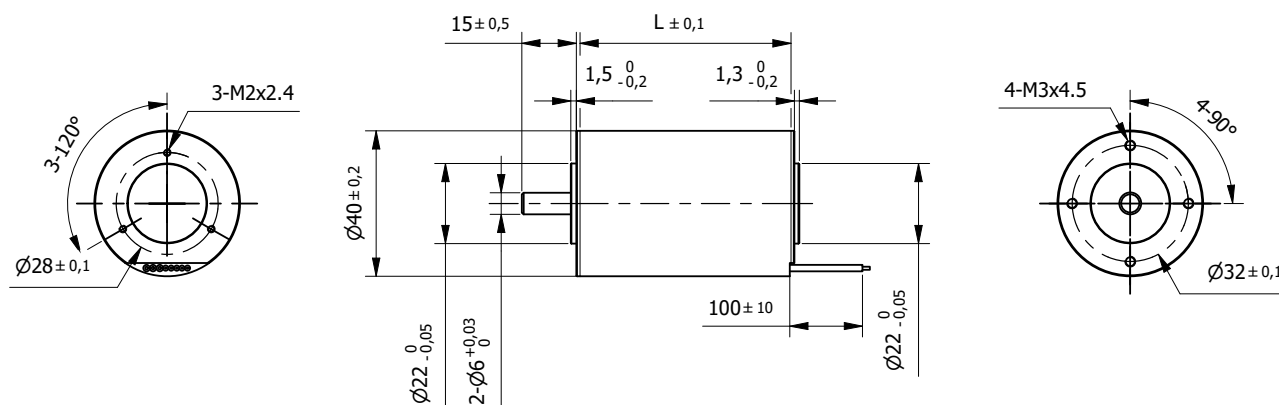


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm
Available with or without Hall Sensors

Specification		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		40SBL60	40SBL80
1	n° of Pole		4	4
2	n° of Phase		3	3
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	4000	5000
5	Rated Torque	Nm	0,2	0,36
6	Max. Peak Torque	Nm	0,6	1,08
7	Torque Constant	Nm/A	0,045	0,076
8	Rated Current	A	4,4	4,7
9	Max. Peak Current	A	14	15
10	No-Load Current	mA	200	200
11	Line to Line Resistance	Ω	0,9	0,82
12	Line to Line Inductance	mH	0,08	0,16
13	Rotor Inertia	gcm2	71,4	117,5
14	Length (L)	mm	60	80
15	Weight	Kg	0,45	0,5
16	Length with Hall Sensors	mm	70	90

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 (20mm from flange)	28N
Max. Axial force	12N
Dielectric strength (for 1 sec.)	800 VAC
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	White		Hall B
4	Grey		Hall C
5	Brown		GND Hall
6	Red	UL1332 AWG18	Phase U
7	Green		Phase V
8	Yellow		Phase W

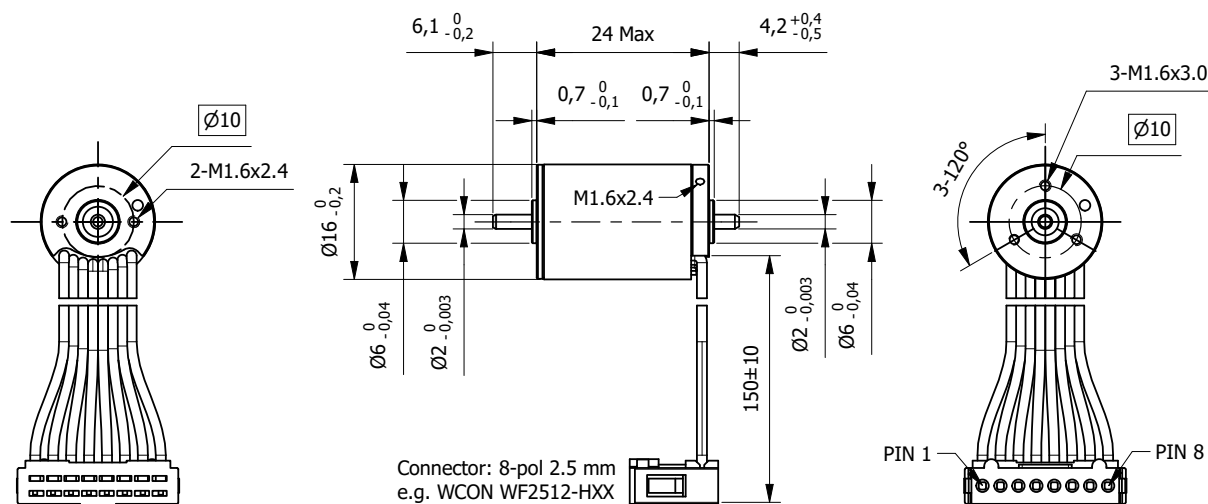


BLDC Slotless motors

EC series - High Performance

BLDC Slotless motors - EC High Performance series	Torque* (Nm)	
16EC24P	0,003	104
16EC36P	0,008	105
16EC40NS - NEW	0,007	106
16EC56NS - NEW	0,015...0,016	107
22EC32P	0,010...0,011	108
22EC44NS - NEW	0,018...0,02	109
22EC48P	0,023	110
22EC48T	0,043...0,045	111
22EC60NS - NEW	0,027...0,029	112
22EC66T	0,055	113
30EC42P	0,034	114
30EC47T	0,069...0,073	115
30EC64P	0,061...0,064	116
30EC64T	0,093...0,096	117
40EC58P	0,09...0,094	118
40EC88P	0,21	119

* Rated Torque

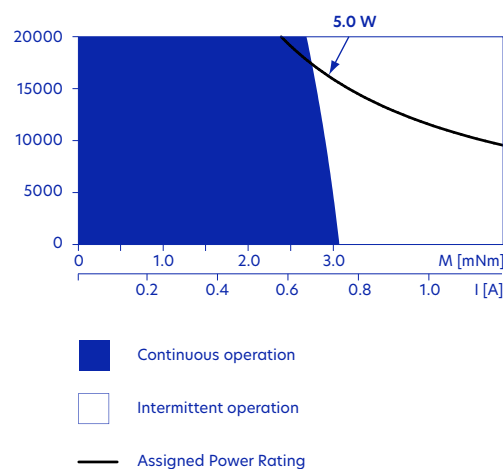


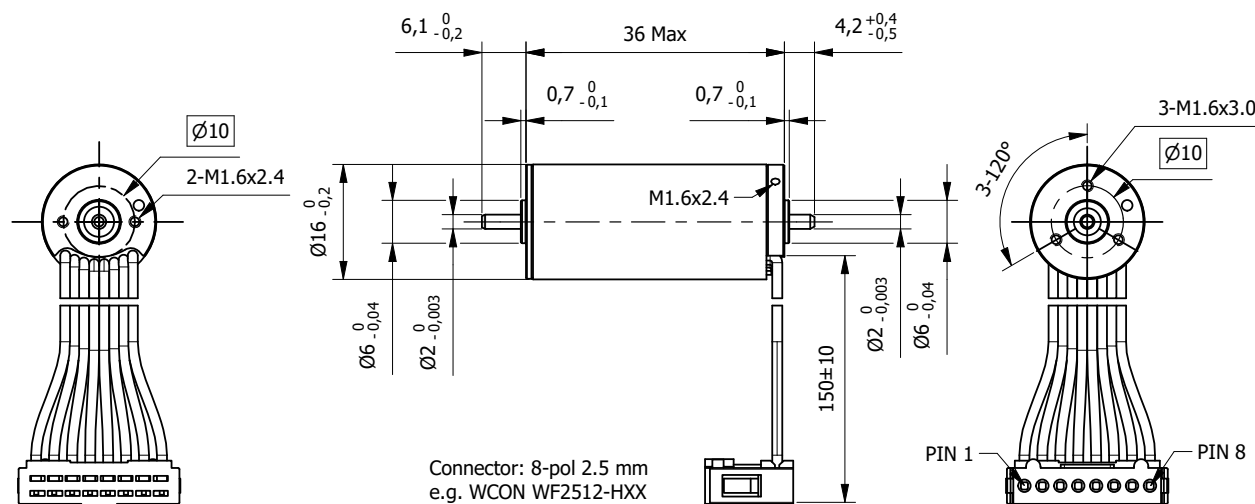
Specification				
	Model		...5604	...5815
1	n° of Pole		2	2
2	n° of Phase		3	3
3	Rated Voltage	V	6	12
4	Rated Speed	rpm	5690	5840
5	Rated Torque	mNm	3,2	3,23
6	Stall Torque	mNm	5,79	5,95
7	Torque Constant	mNm/A	3,9	7,8
8	Motor Regulation	10 ³ /Nms	265,6	258,1
9	Rated Current	A	0,903	0,456
10	Stall Current	A	1,4	0,762
11	No-load Current	mA	120	60,2
12	No-load Speed	rpm	13500	13500
13	Line to Line Resistance	Ω	4,04	15,7
14	Line to Line Inductance	mH	0,063	0,254
15	Rotor Inertia	gcm ²	0,428	0,428
16	Max. Efficiency	%	53	53
17	Mechanical Time Constant	ms	11,4	11,1
18	Length (L)	mm	24	24
19	Weight	g	36	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	Grev		Hall 3

Operating range: Winding 6V



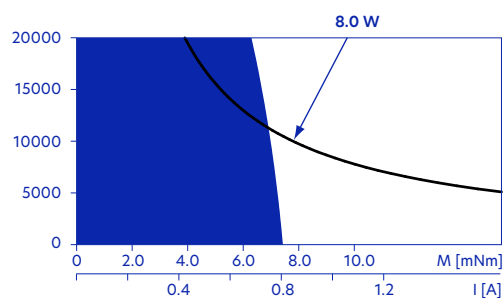


Specification					
	Model	...7101	...7305	...7320	
1	n° of Pole	2	2	2	
2	n° of Phase	3	3	3	
3	Rated Voltage	V	6	12	24
4	Rated Speed	rpm	7120	7300	7350
5	Rated Torque	mNm	7,66	8,02	8,19
6	Stall Torque	mNm	19,2	21,1	22
7	Torque Constant	mNm/A	4,61	9,32	18,7
8	Motor Regulation	10 ³ /Nms	67,8	61	58,6
9	Rated 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	gcm2	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 nº	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



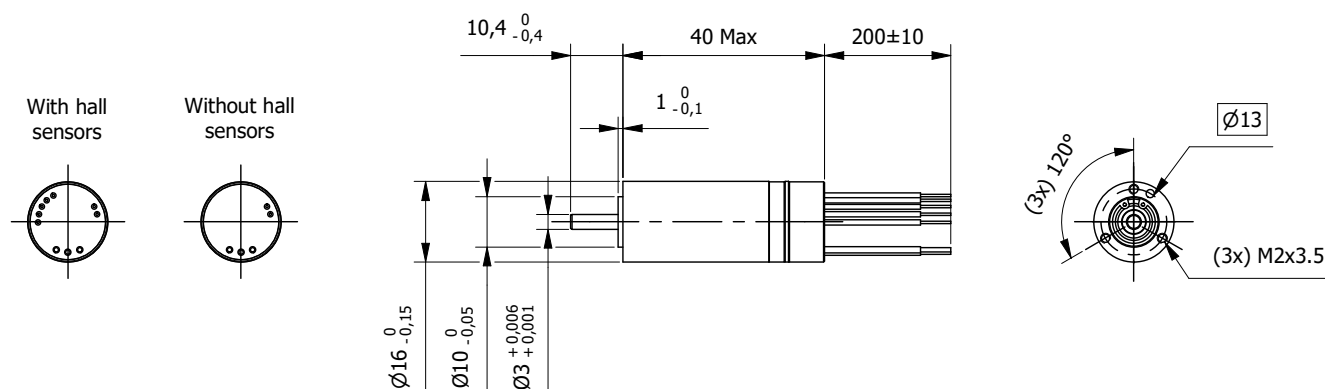
-  Continuous operation
-  Intermittent operation
-  Assigned Power Rating

Brushless Slotless Motor 16EC40NS

High Speed

Ø 16mm

7,2 to 7,5mNm

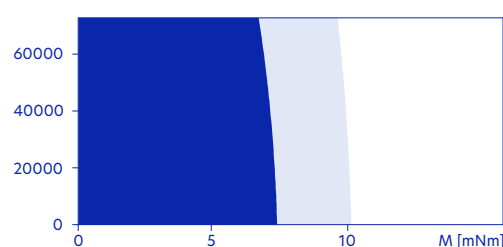


Specification		Model	...50805	...54008	...52201	...52203
1	n° of Pole		2	2	2	2
2	n° of Phase		3	3	3	3
3	Rated Voltage	V	18	24	36	48
4	Rated Speed	rpm	50800	54000	52200	52200
5	Rated Torque	mNm	7,53	7,21	7,4	7,44
6	Stall Torque	mNm	109	111	113	115
7	Torque Constant	mNm/A	3,09	3,9	6,04	8,06
8	Motor Regulation	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



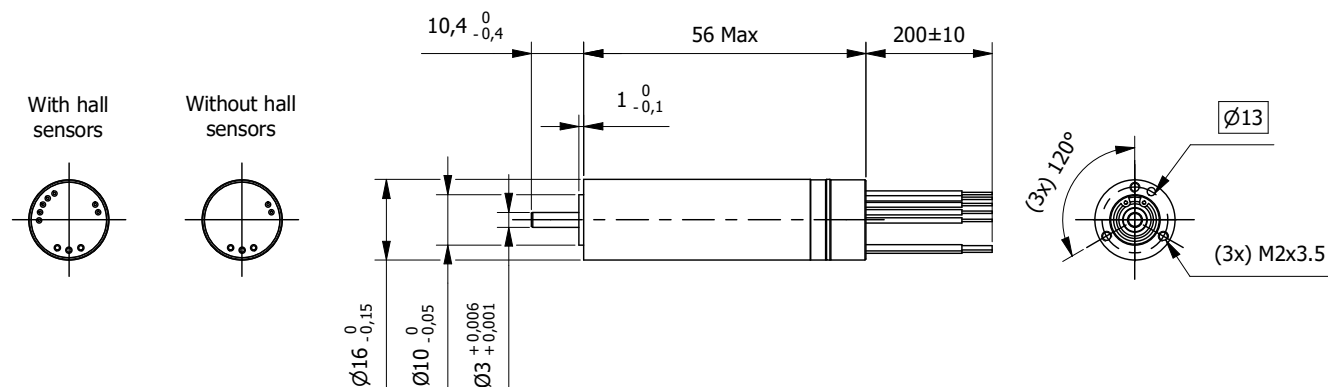
- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

Brushless Slotless Motor 16EC56NS

High Speed

Ø 16mm

14,7 to 16mNm

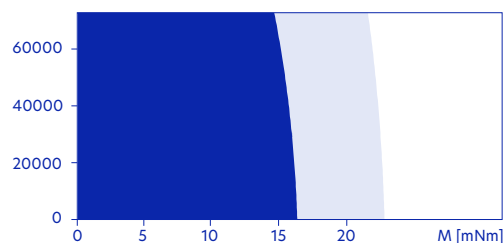


Specification						
	Model	...61201	...61602	...61804	...61808	
1	n° of Pole	2	2	2	2	
2	n° of Phase	3	3	3	3	
3	Rated Voltage	V	18	24	36	48
4	Rated Speed	rpm	61200	61600	61800	61800
5	Rated Torque	mNm	15,4	16	15,4	14,7
6	Stall Torque	mNm	346	407	414	396
7	Torque Constant	mNm/A	2,65	3,53	5,3	7,07
8	Motor Regulation	10³/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	gcm2	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

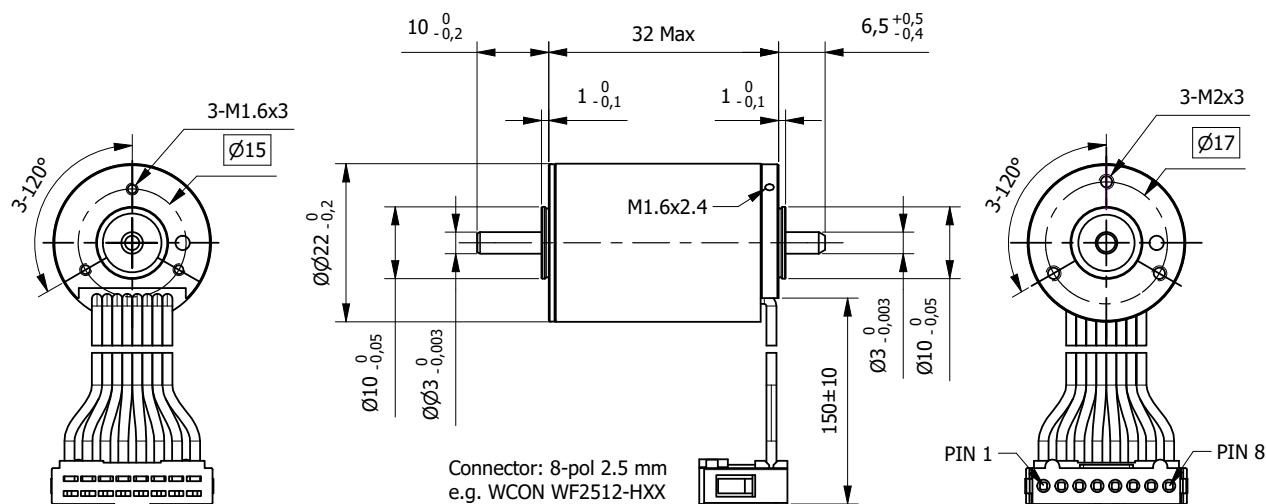
Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	70000rpm
Radial play	preloaded
Axial play	0 to 0,29mm
Max. Radial force (5mm from flange)	10N
Max. Axial force	1,5N
Max. Force for Press fit	60N

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

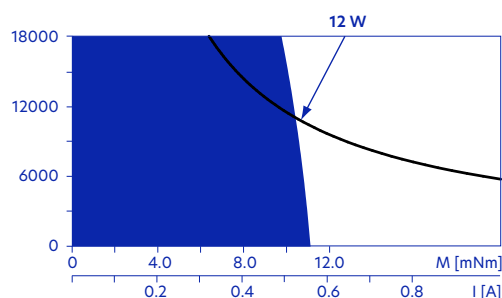


Specification				
Model	...	7908	8003	8212
1 n° of Pole		2	2	2
2 n° of Phase		3	3	3
3 Rated Voltage	V	6	12	24
4 Rated Speed	rpm	7920	8040	8250
5 Rated Torque	mNm	11	10,2	10,8
6 Stall Torque	mNm	33,9	31,3	35,1
7 Torque Constant	mNm/A	4,61	9,02	18,1
8 Motor Regulation	10 ³ /Nms	38,4	42,5	37,8
9 Rated Current	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



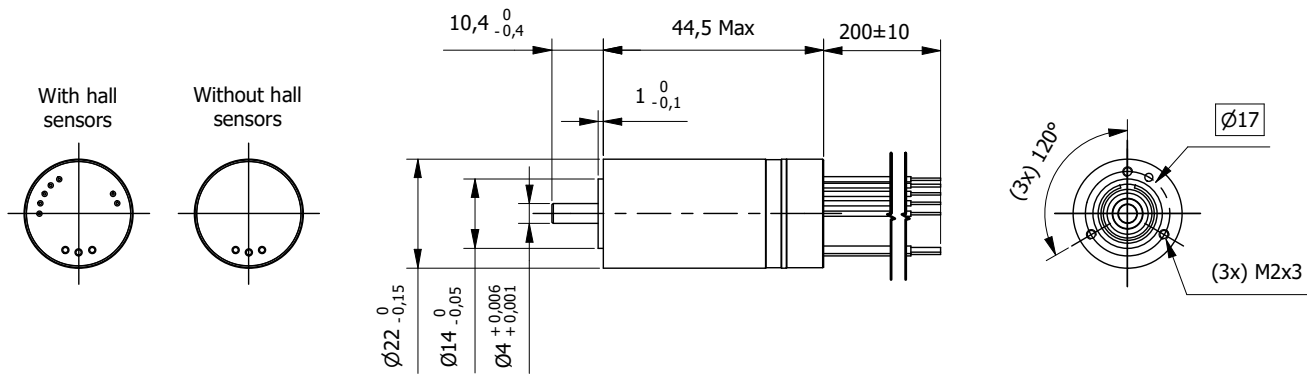
- Continuous operation
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 22EC44NS

High Speed

Ø 22mm

18,3 to 20,3mNm

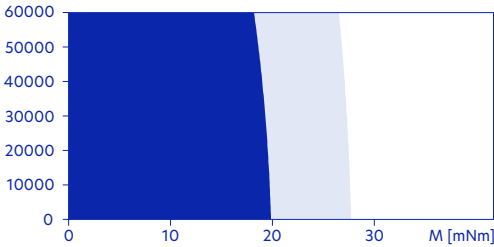


Specification				
Model	...48201	...55601	...53004	...49909
1 n° of Pole	2	2	2	2
2 n° of Phase	3	3	3	3
3 Rated Voltage	V 18	24	36	48
4 Rated Speed	rpm 48200	55600	53000	49900
5 Rated Torque	mNm 20,3	20,1	20	18,3
6 Stall Torque	mNm 454	549	537	425
7 Torque Constant	mNm/A 3,37	3,93	6,18	8,7
8 Motor Regulation	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

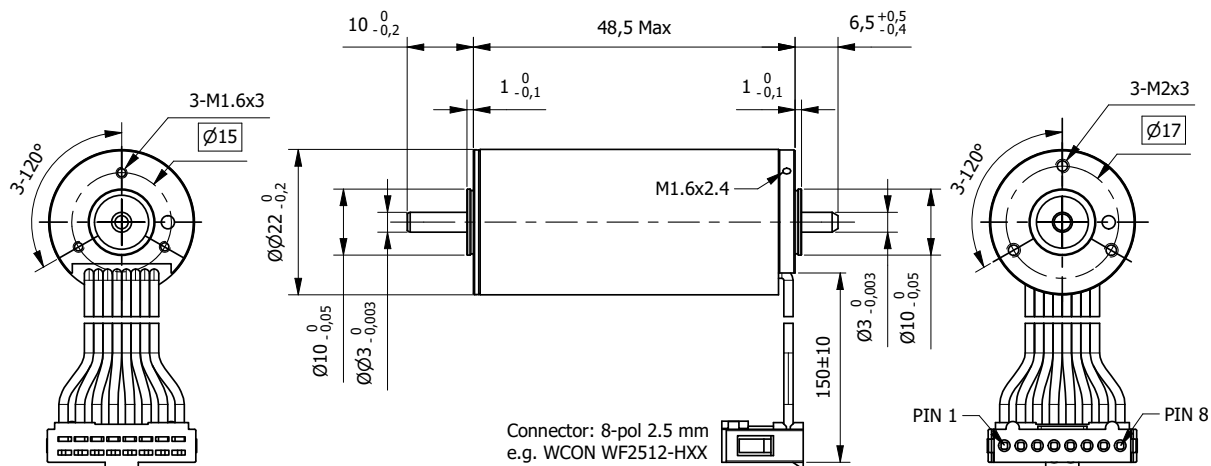


- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

Brushless Slotless Motor 22EC48P

Ø 22mm

22,7 to 23,2mNm

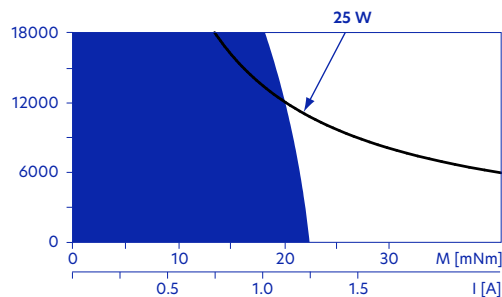


Specification				
	Model	...9809	...10403	...10513
1	n° of Pole	2	2	2
2	n° of Phase	3	3	3
3	Rated Voltage	V	12	24
4	Rated Speed	rpm	9800	10400
5	Rated Torque	mNm	23	22,7
6	Stall Torque	mNm	114	121
7	Torque Constant	mNm/A	9,1	17,4
8	Motor Regulation	10 ³ /Nms	11,5	11,4
9	Rated Current	A	2,71	1,4
10	Stall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

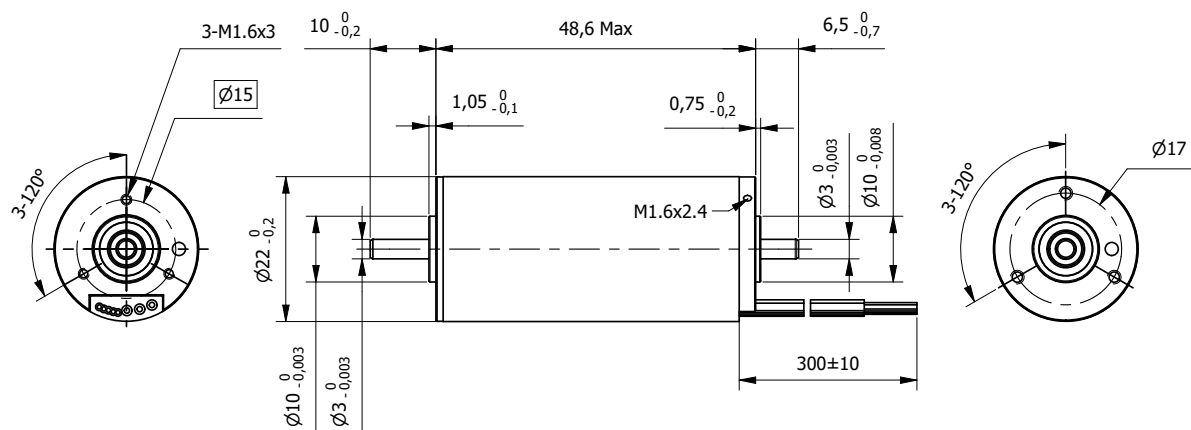


-  Continuous operation
-  Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 22EC48T

High Torque

Ø 22mm
42,6 to 45,1mNm

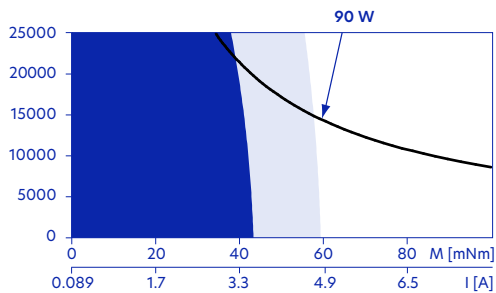


Specification				
	Model		...15005	...14902
1	n° of Pole		4	4
2	n° of Phase		3	3
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	15000	14900
5	Rated Torque	mNm	45,1	42,6
6	Stall Torque	mNm	639	586
7	Torque Constant	mNm/A	14	28,1
8	Motor Regulation	10³/Nms	2,7	2,9
9	Rated Current	A	3,34	1,58
10	Stall Current	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	gcm2	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



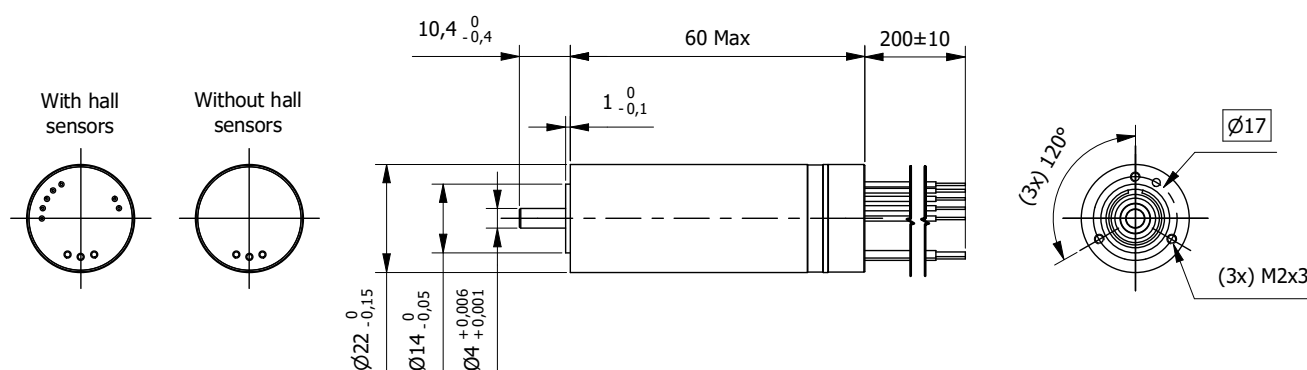
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 22EC60NS

High Speed

Ø 22mm

27,4 to 29,3mNm

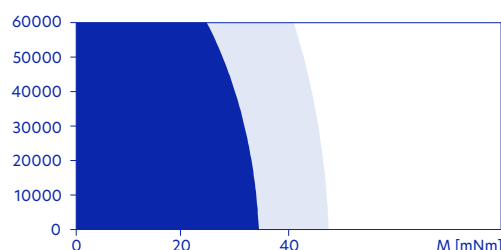


Specification		Model	...47801	...49904	...50903
1	n° of Pole		2	2	2
2	n° of Phase		3	3	3
3	Rated Voltage	V	24	36	48
4	Rated Speed	rpm	47800	49900	50900
5	Rated Torque	mNm	29,1	29,3	27,4
6	Stall Torque	mNm	1080	1290	1230
7	Torque Constant	mNm/A	4,63	6,68	8,74
8	Motor Regulation	10 ³ /Nms	4,8	4,2	4,5
9	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



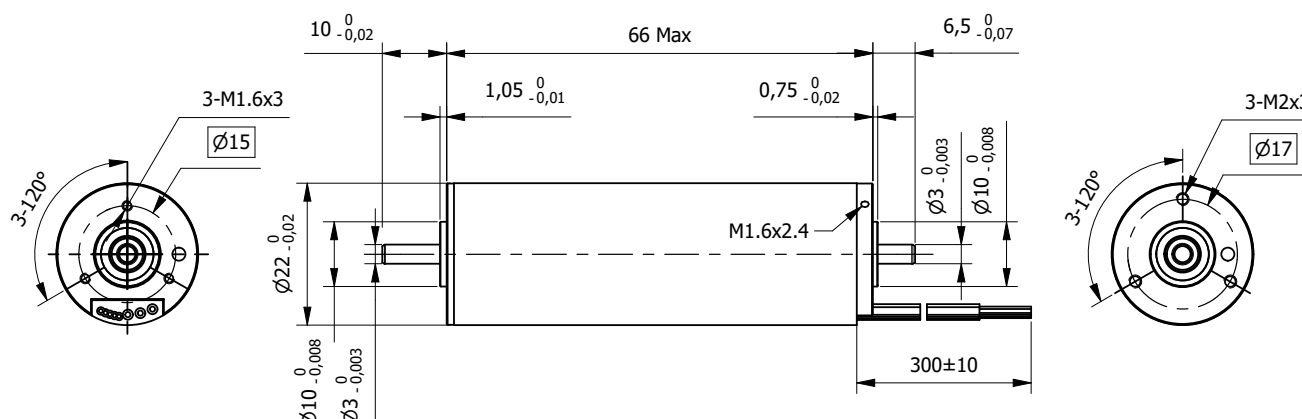
- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

Brushless Slotless Motor 22EC66T

High Torque

Ø 22mm

54,5 to 54,6mNm

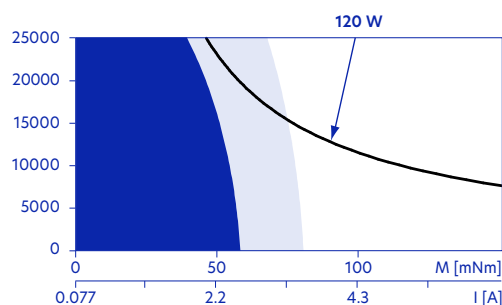


Specification			
Model		...15803	...15801
1	n° of Pole	4	4
2	n° of Phase	3	3
3	Rated Voltage	V	24
4	Rated Speed	rpm	15800
5	Rated Torque	mNm	54,6
6	Stall Torque	mNm	954
7	Torque Constant	mNm/A	13,5
8	Motor Regulation	10 ³ /Nms	1,9
9	Rated Current	A	4,21
10	Stall Current	A	70,4
11	No-load Current	mA	223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

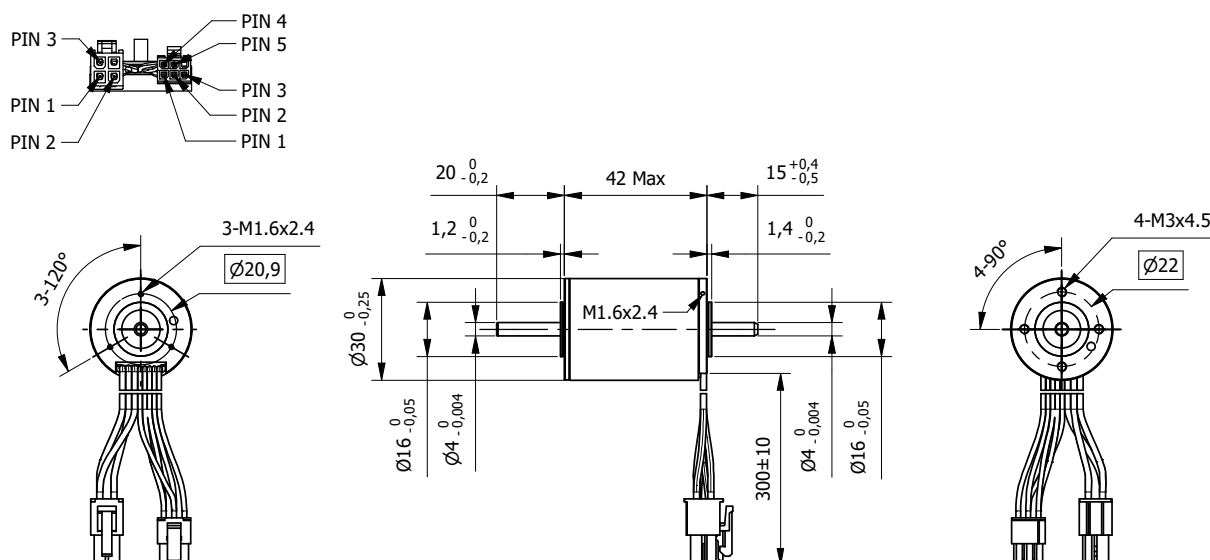
Characteristics	
Item	
Ambient Temperature	-20°C to +100°C
Max. Winding Temperature	+155°C
Max. Speed	25000rpm
Radial play	preloaded
Axial play	0 to 0,14mm
Max. Radial force (5mm from flange)	16N
Max. Axial force	4N
Max. Force for Press fit	53N

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

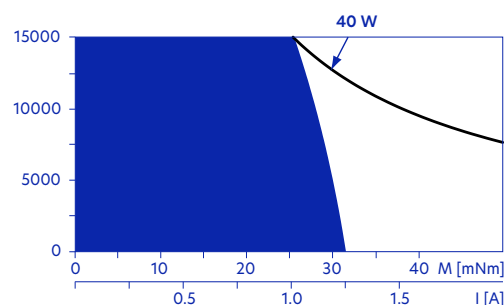


Specification				
	Model		...7203	...7214
1	n° of Pole		2	2
2	n° of Phase		3	3
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	7220	7210
5	Rated Torque	mNm	33,8	33,4
6	Stall Torque	mNm	160	157
7	Torque Constant	mNm/A	24,3	48,6
8	Motor Regulation	10 ³ /Nms	6,2	6,3
9	Rated Current	A	1,49	0,738
10	Stall Current	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	gcm2	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

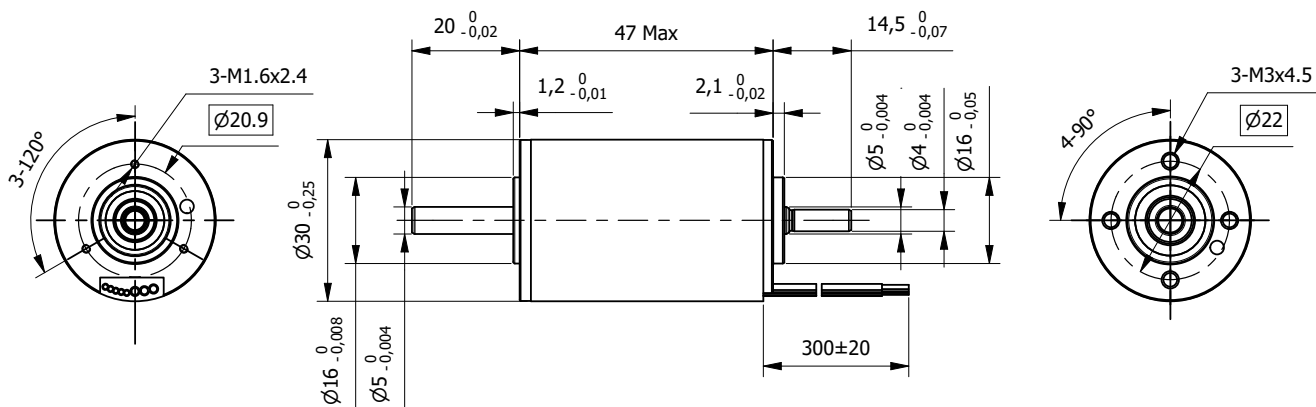


Brushless Slotless Motor 30EC47T

High Torque

Ø 30mm

68,8 to 73,4mNm

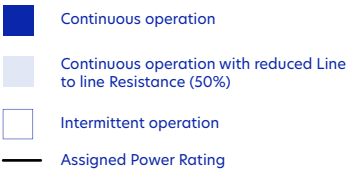
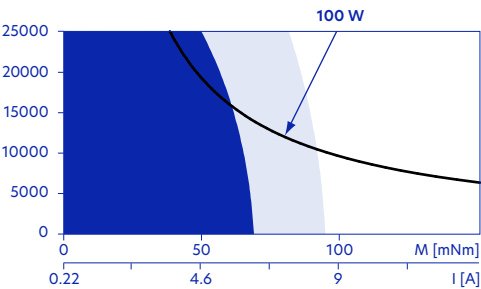


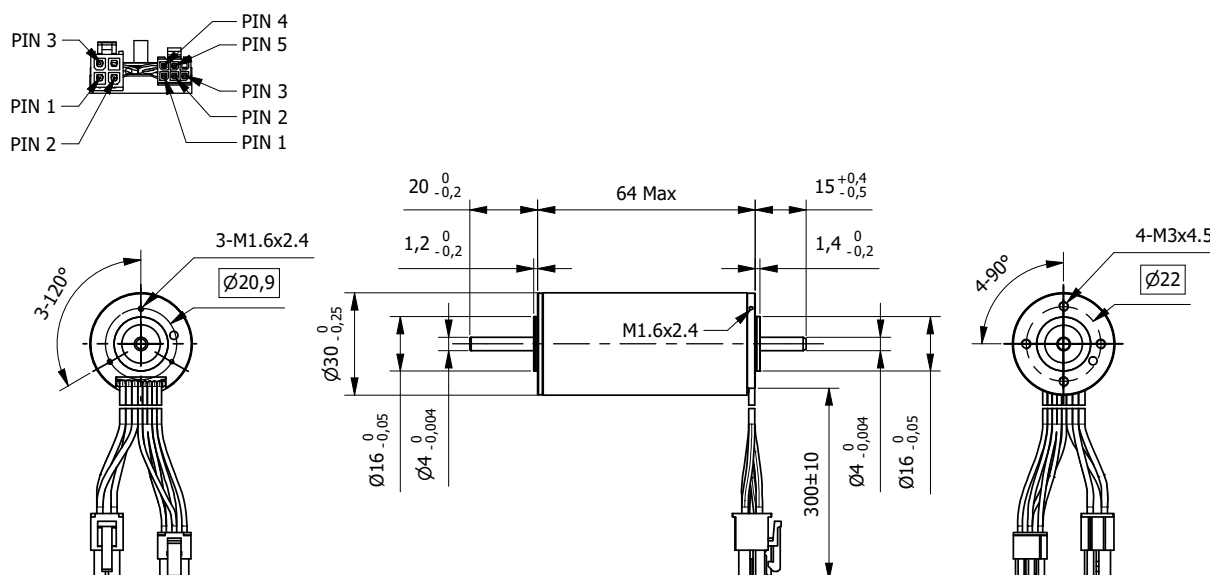
Specification				
	Model		...16302	...16408
1	n° of Pole		4	4
2	n° of Phase		3	3
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	16300	16400
5	Rated Torque	mNm	68,8	73,4
6	Stall Torque	mNm	1270	1500
7	Torque Constant	mNm/A	13,1	26,1
8	Motor Regulation	10³/Nms	1,4	1,2
9	Rated Current	A	5,56	2,95
10	Stall Current	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	gcm2	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



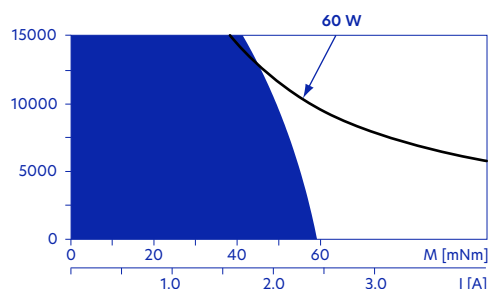


Specification			
Model		...8001	...8104
1	n° of Pole	2	2
2	n° of Phase	3	3
3	Rated Voltage	V	24
4	Rated Speed	rpm	8040
5	Rated Torque	mNm	60,7
6	Stall Torque	mNm	458
7	Torque Constant	mNm/A	24,3
8	Motor Regulation	10 ³ /Nms	2,2
9	Rated Current	A	2,66
10	Stall Current	A	18,8
11	No-load Current	mA	191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



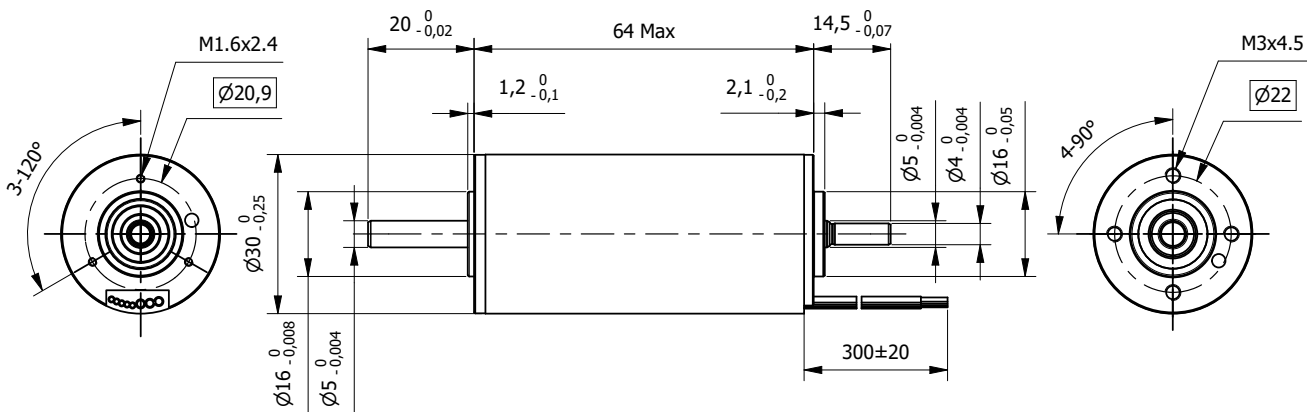
- Continuous operation
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 30EC64T

High Torque

Ø 30mm

92,9 to 95,6mNm

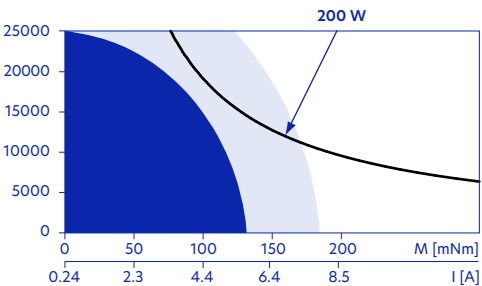


Specification				
	Model		...16101	...16003
1	n° of Pole		4	4
2	n° of Phase		3	3
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	16100	16000
5	Rated Torque	mNm	95,6	92,9
6	Stall Torque	mNm	3240	3430
7	Torque Constant	mNm/A	13,7	27,6
8	Motor Regulation	10³/Nms	0,5	0,5
9	Rated Current	A	7,61	3,68
10	Stall Current	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	gcm2	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

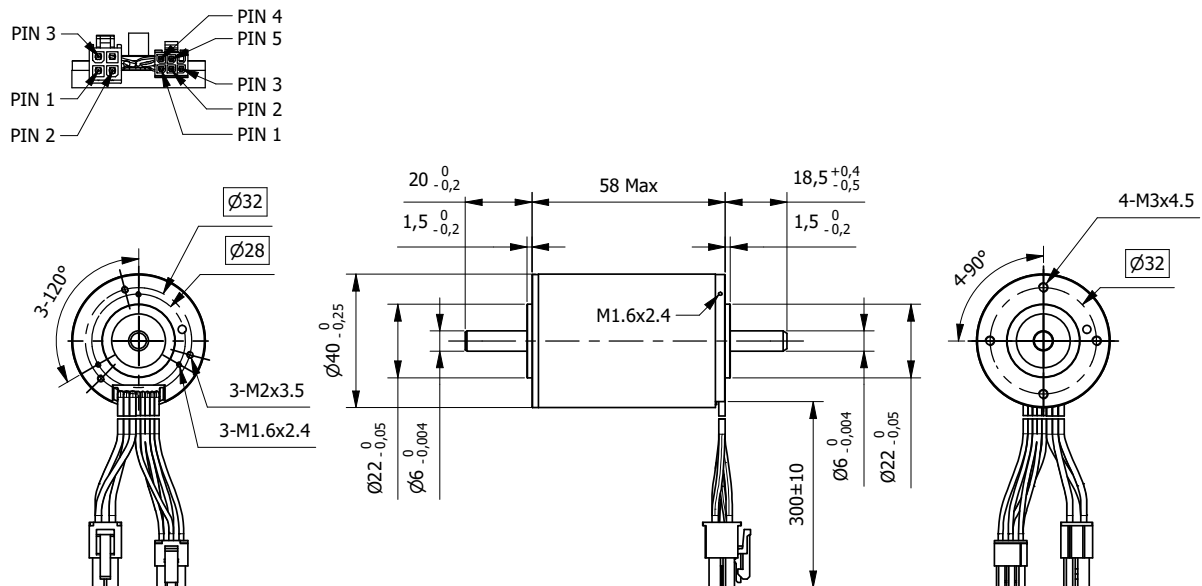


- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 40EC58P

Ø 40mm

89,6 to 94,2mNm

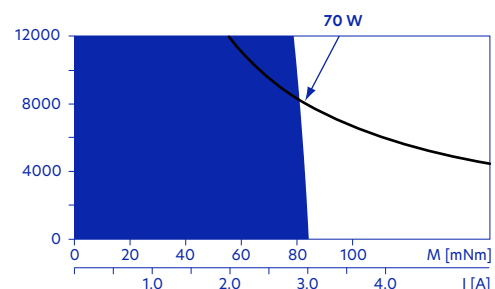


Specification				
	Model		...6501	...7603
1	n° of Pole		2	2
2	n° of Phase		3	3
3	Rated Voltage	V	24	48
4	Rated Speed	rpm	6520	7610
5	Rated Torque	mNm	89,6	94,2
6	Stall Torque	mNm	497	636
7	Torque Constant	mNm/A	28	50
8	Motor Regulation	10 ³ /Nms	1,7	1,5
9	Rated Current	A	3,44	2,02
10	Stall Current	A	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

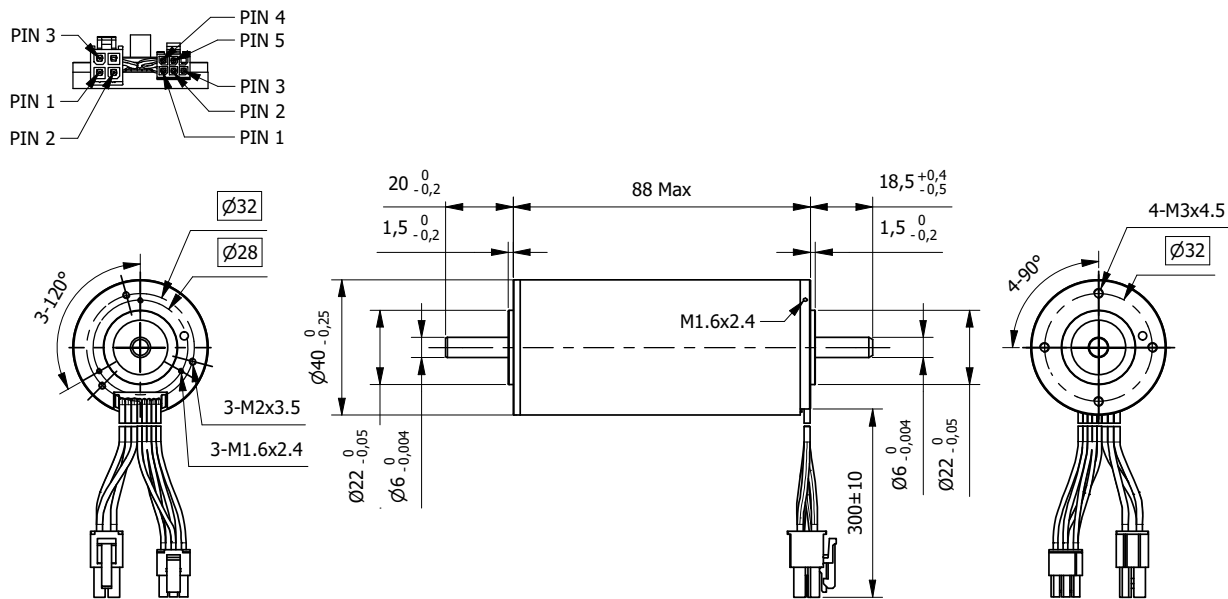
Operating range: Winding 24V



Continuous operation

☐ Intermittent operation

— Assigned Power Rating

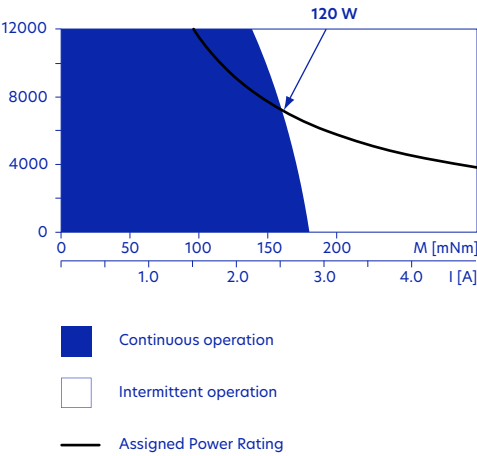


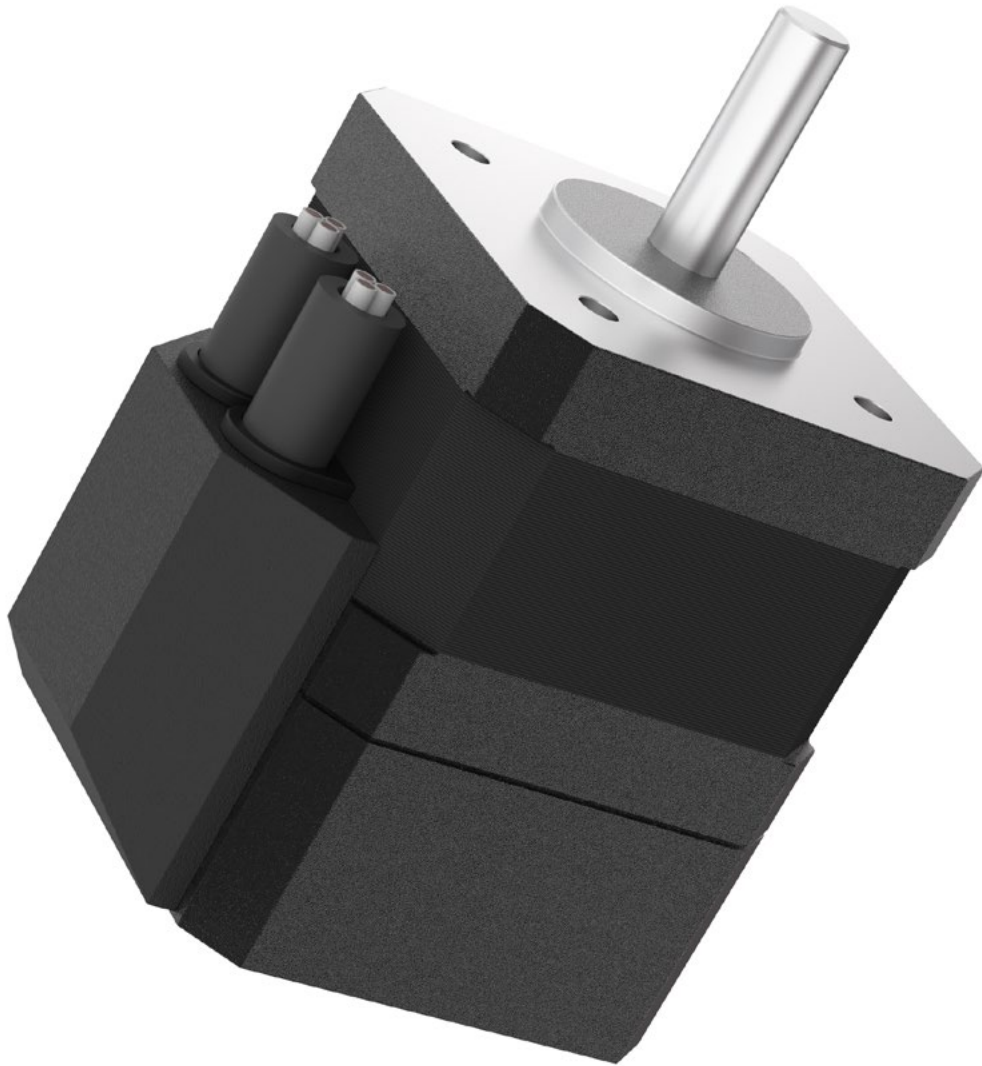
Specification		
Model		...2607
1	n° of Pole	2
2	n° of Phase	3
3	Rated Voltage	V 48
4	Rated Speed	rpm 2670
5	Rated Torque	mNm 211
6	Stall Torque	mNm 838
7	Torque Constant	mNm/A 126
8	Motor Regulation	10 ³ /Nms 0,5
9	Rated Current	A 1,74
10	Stall Current	A 6,68
11	No-load Current	mA 72,8
12	No-load Speed	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





Brushless DC **Motors with Encoder**

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

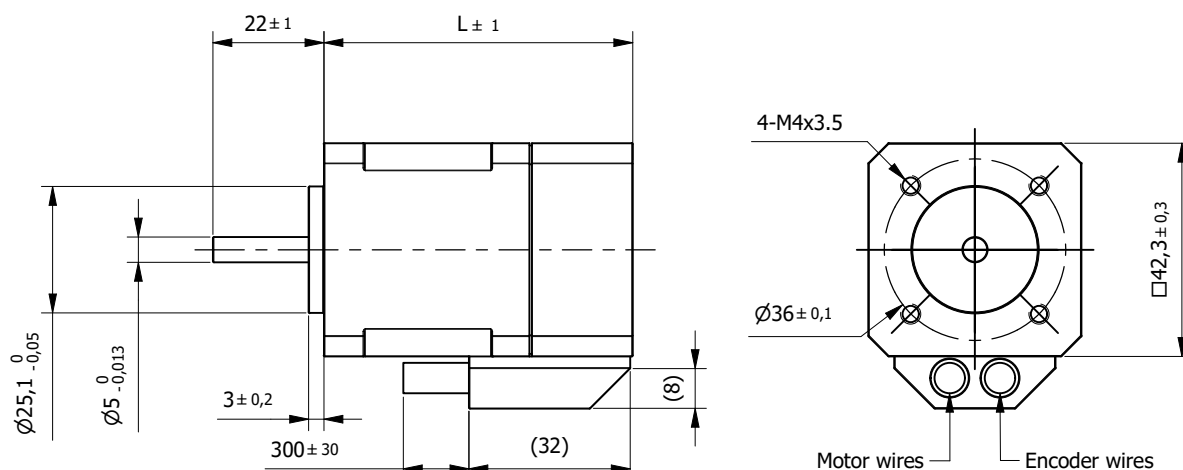
BLDC motors with Encoder	Torque* (Nm)	
42SVA	0,062...0,25	122
57SVA	0,3...0,6	123
86SVA	0,4...1,6	124

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 is critical to know the status of the motor (both position and speed) in every instant.

Brushless Slotted Motor 42SVA

with Encoder

□ 42mm
0,062 - 0,25Nm



Specification		...61-018E	...81-035E	...101-048E	...121-071E
Model					
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	0,062	0,125	0,185
6	Max. Peak Torque	Nm	0,19	0,38	0,56
7	Torque Constant	Nm/A	0,035	0,036	0,038
8	Rated Current	A	1,8	3,5	4,9
9	Max. Peak Current	A	5,4	10,6	14,7
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	61,3	81,3	101,3
15	Weight	Kg	0,3	0,45	0,65

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
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	

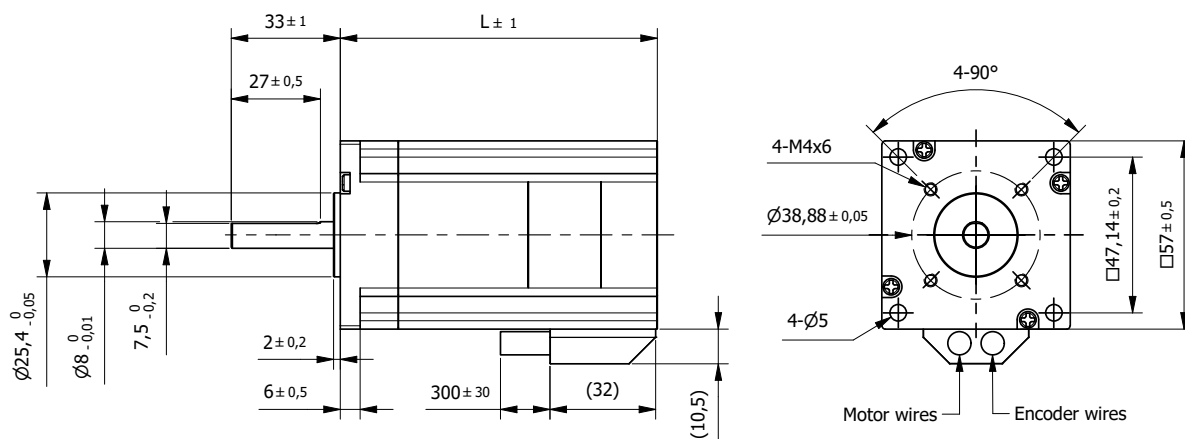
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Red/White	AWG26	GND
2	Red		VCC:+5VDC
3	Blue		EA-
4	Blue/Black		EA+
5	Black		EB-
6	Black/White		EB+
7	Brown		HALL A
8	Orange		HALL B
9	Yellow		HALL C
Motor			
1	Yellow	AWG18	Phase U
2	Red		Phase V
3	Black		Phase W

Brushless Slotted Motor 57SVA

with Encoder

□ 57mm

0,3 - 0,6Nm



Specification				
	Model	...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	0,6
6	Max. Peak Torque	Nm	0,8	1,5
7	Torque Constant	Nm/A	0,075	0,08
8	Rated Current	A	4,0	7,5
9	Max. Peak Current	A	12	18,8
10	No-Load Current	mA	450	650
11	Line to Line Resistance	Ω	1,2	0,5
12	Line to Line Inductance	mH	0,8	0,6
13	Rotor Inertia	gcm2	210	430
14	Length (L)	mm	96	136
15	Weight	Kg	1	1,8

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
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	

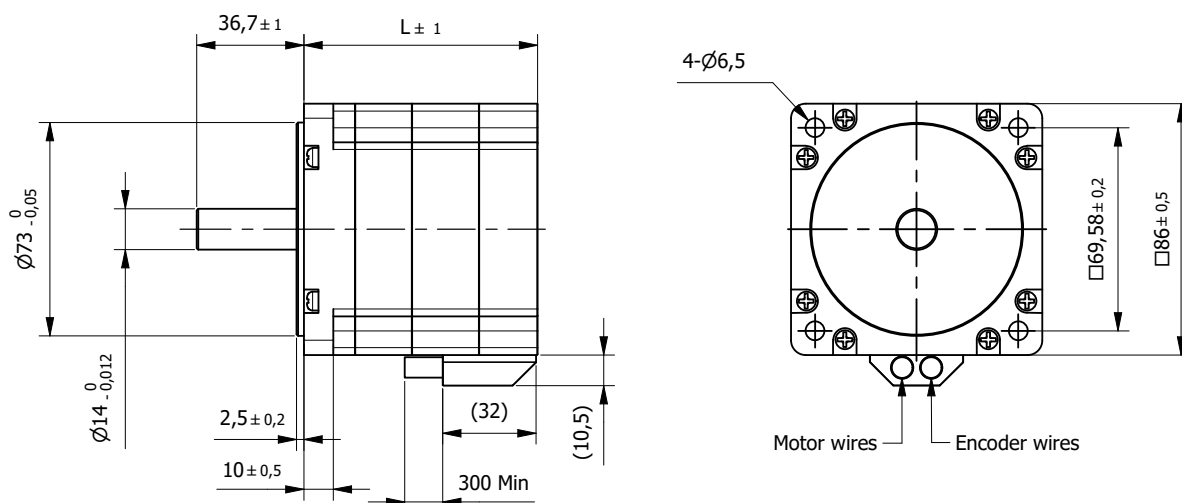
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Red/White	AWG26	GND
2	Red		VCC:+5VDC
3	Blue		EA-
4	Blue/Black		EA+
5	Black		EB-
6	Black/White		EB+
7	Brown		HALL A
8	Orange		HALL B
9	Yellow		HALL C
Motor			
1	Yellow	AWG18	Phase U
2	Red		Phase V
3	Black		Phase W

Brushless Slotted Motor 86SVA

with Encoder

□ 86mm

0,4 - 1,6Nm



Specification				
Model		...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
4	Rated Speed	rpm	3000	3000
5	Rated Torque	Nm	0,4	0,8
6	Max. Peak Torque	Nm	1,2	2,4
7	Torque Constant	Nm/A	0,122	0,13
8	Rated Current	A	3,3	6,154
9	Max. Peak Current	A	9,8	17
10	No-Load Current	mA	380	550
11	Line to Line Resistance	Ω	1	0,45
12	Line to Line Inductance	mH	1,4	0,75
13	Rotor Inertia	gcm ²	400	800
14	Length (L)	mm	80	93
15	Weight	Kg	1,5	1,85

Characteristics	
Item	
Encoder Type*	Optical - Incremental 1000 CPR / 2 channels
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
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**

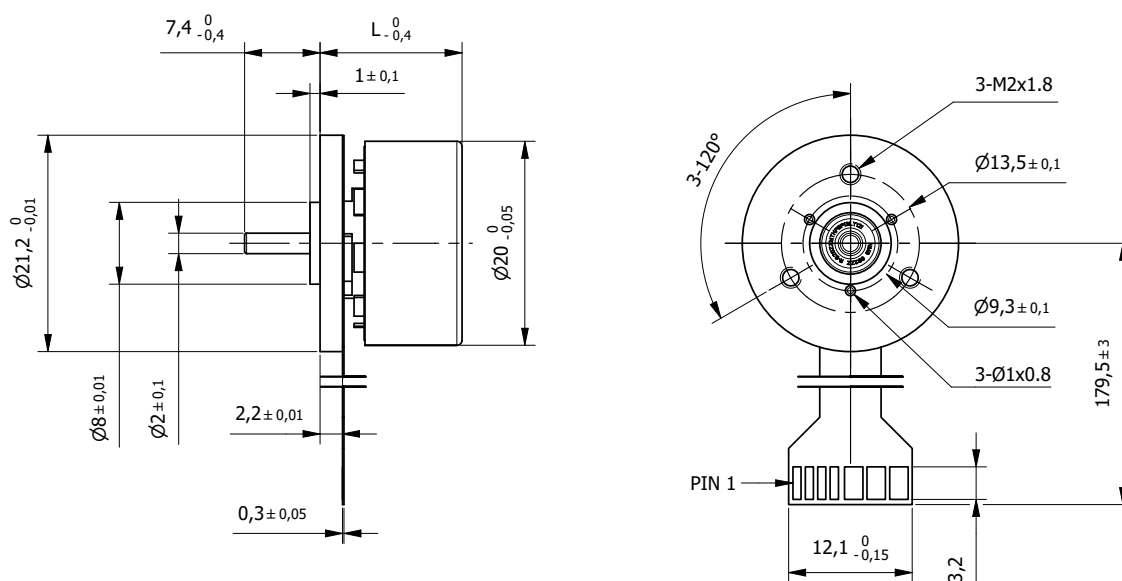
Advantages at a glance

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	128
32BLW18	0,025	129
45BLW16	0,055	130
45BLW Connector	0,05...0,13	131
45BLW Wires	0,05...0,13	132
60BLWA38	0,5	133
60BLW40	0,3	134
60BLW40 - IP54	0,3	135
90BLW	0,46...0,96	136

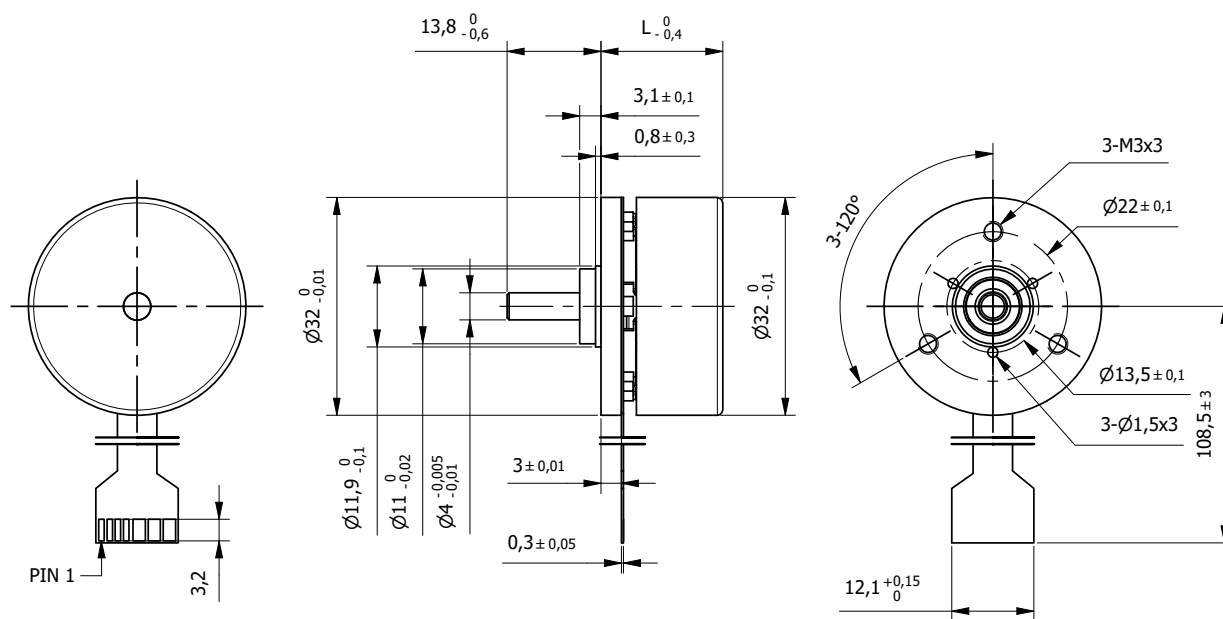
*Rated Torque



Specification				
	Model		20BLW14-12V	20BLW14-24V
1	n° of Pole		8	8
2	n° of Phase		3	3
3	Rated Voltage	V	12	24
4	Rated Speed	rpm	5170	5220
5	Rated Torque	Nm	0,008	0,008
6	Max. Peak Torque	Nm	0,019	0,02
7	Torque Constant	Nm/A	0,012	0,024
8	Rated Current	A	0,63	0,32
9	Max. Peak Current	A	1,62	0,85
10	No-Load Current	mA	230	120
11	Line to Line Resistance	Ω	6,9	25,8
12	Line to Line Inductance	mH	0,7	2,8
13	Rotor Inertia	gcm2	5,1	5,1
14	Length (L)	mm	14	14
15	Weight	Kg	0,023	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
4	Rated Speed	rpm	2100	2800	2760
5	Rated Torque	Nm	0,025	0,025	0,026
6	Max. Peak Torque	Nm	0,075	0,075	0,075
7	Torque Constant	Nm/A	0,023	0,025	0,051
8	Rated Current	A	1,09	1	0,51
9	Max. Peak Current	A	3,4	3,2	1,7
10	No-Load Current	mA	290	190	100
11	Line to Line Resistance	Ω	3	3	13
12	Line to Line Inductance	mH	1,6	1,9	7,7
13	Rotor Inertia	gcm ²	35	35	35
14	Length (L)	mm	17,9	17,9	17,9
15	Weight	Kg	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

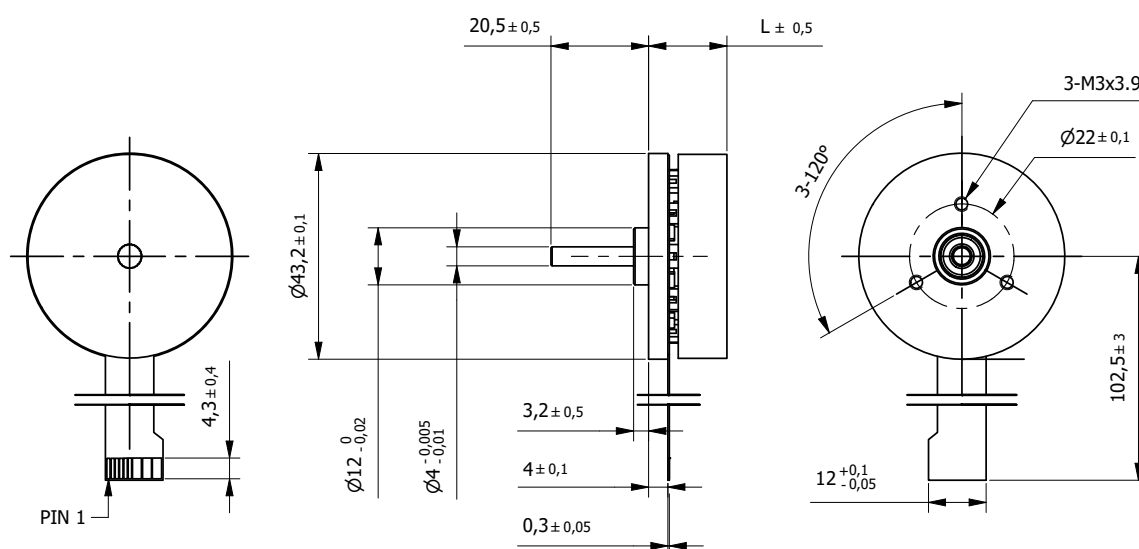
Connection		
Pin n°	Connector	Function
1	FPC cable	Vcc Hall +5 Vdc
2		Hall C
3		Hall A
4		Hall B
5		GND Hall
6		Phase W
7		Phase V
8		Phase U

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

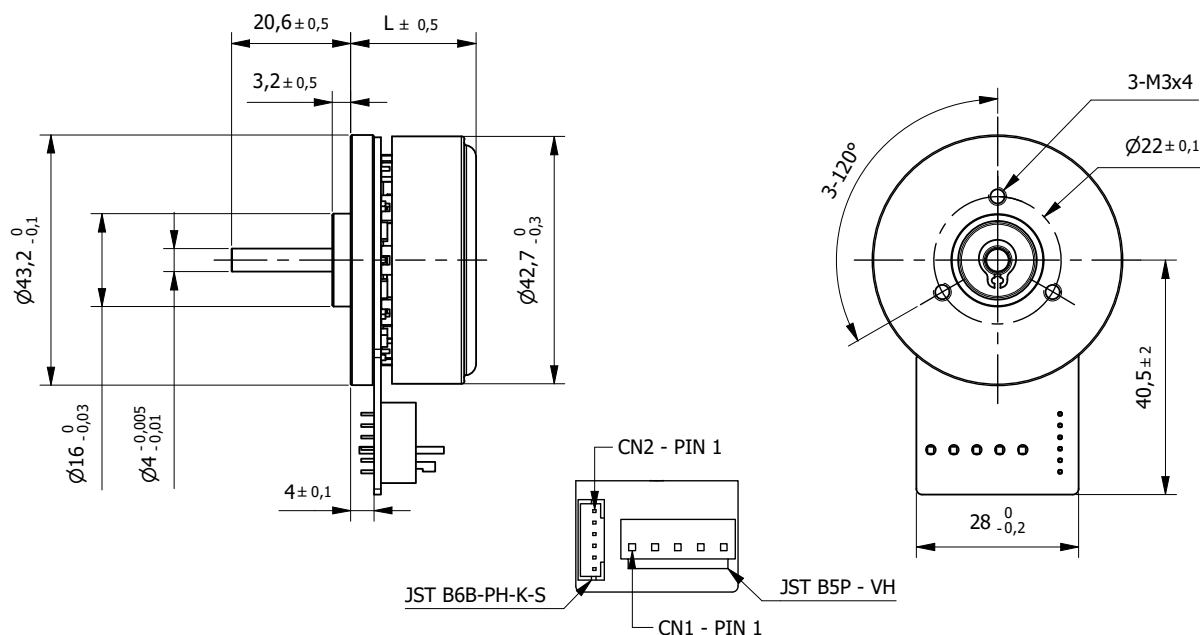
Connection		
Pin n°	Connector	Function
1	FPC cable	Vcc Hall +4,5 to 24 Vdc
2		Hall C
3		Hall A
4		Hall B
5		GND Hall
6		Phase W
7		Phase V
8		Phase U

Brushless Flat Motor 45BLW

Connector

Ø 45mm

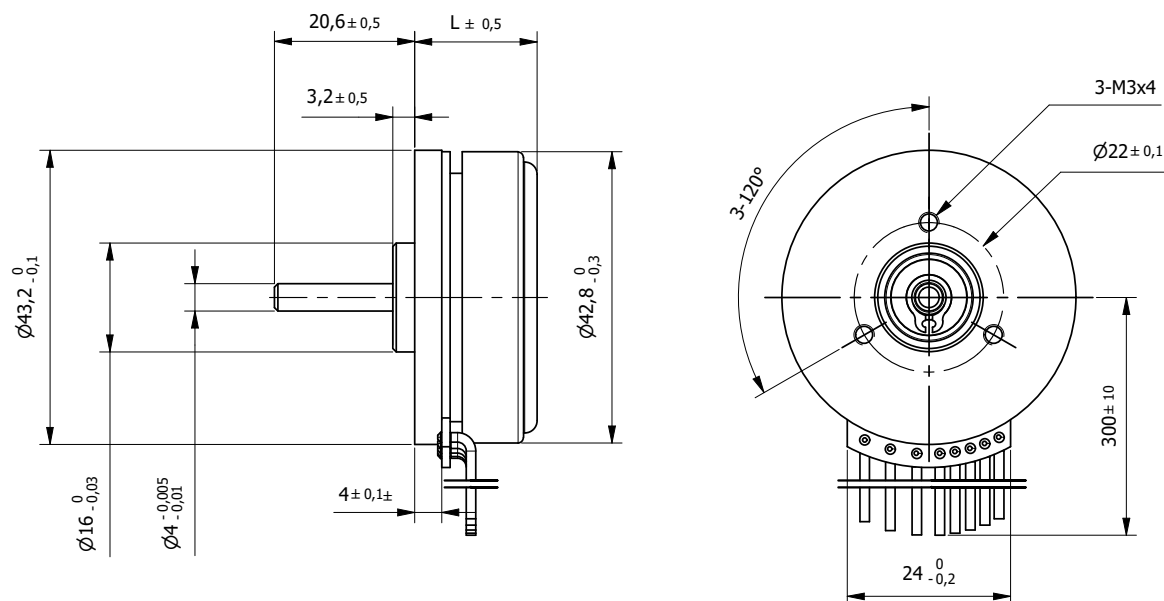
0,05 - 0,13Nm



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	5260	4840
5	Rated Torque	0,05	0,084	0,13
6	Max. Peak Torque	0,15	0,25	0,39
7	Torque Constant	0,031	0,033	0,037
8	Rated Current	1,61	2,55	3,51
9	Max. Peak Current	4,8	7	10
10	No-Load Current	250	390	430
11	Line to Line Resistance	1,83	0,8	0,61
12	Line to Line Inductance	0,59	0,33	0,27
13	Rotor Inertia	100	135	180
14	Length (L)	18	21	27
15	Weight	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

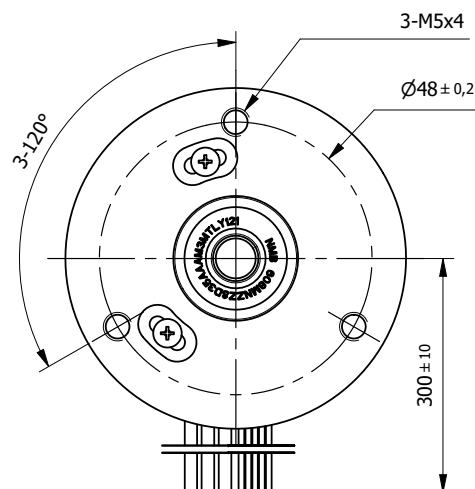
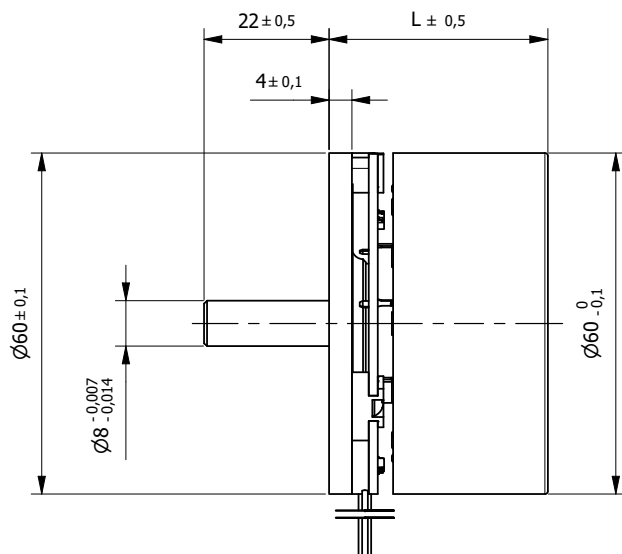
Connection		
Pin n°	Connector	Function
1	JST B5P-VH	GND
2		Phase W
3		Phase V
4		Phase U
5		GND
1	JST B6B-PH-K-S	GND
2		+5V DC
3		Hall A
4		Hall B
5		Hall C
6		GND



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
5	Rated Torque	Nm	0,05	0,084
6	Max. Peak Torque	Nm	0,15	0,25
7	Torque Constant	Nm/A	0,031	0,033
8	Rated Current	A	1,61	2,55
9	Max. Peak Current	A	4,8	7
10	No-Load Current	mA	250	380
11	Line to Line Resistance	Ω	1,83	0,8
12	Line to Line Inductance	mH	0,59	0,33
13	Rotor Inertia	gcm ²	99	135
14	Length (L)	mm	18	21
15	Weight	Kg	0,08	0,12

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

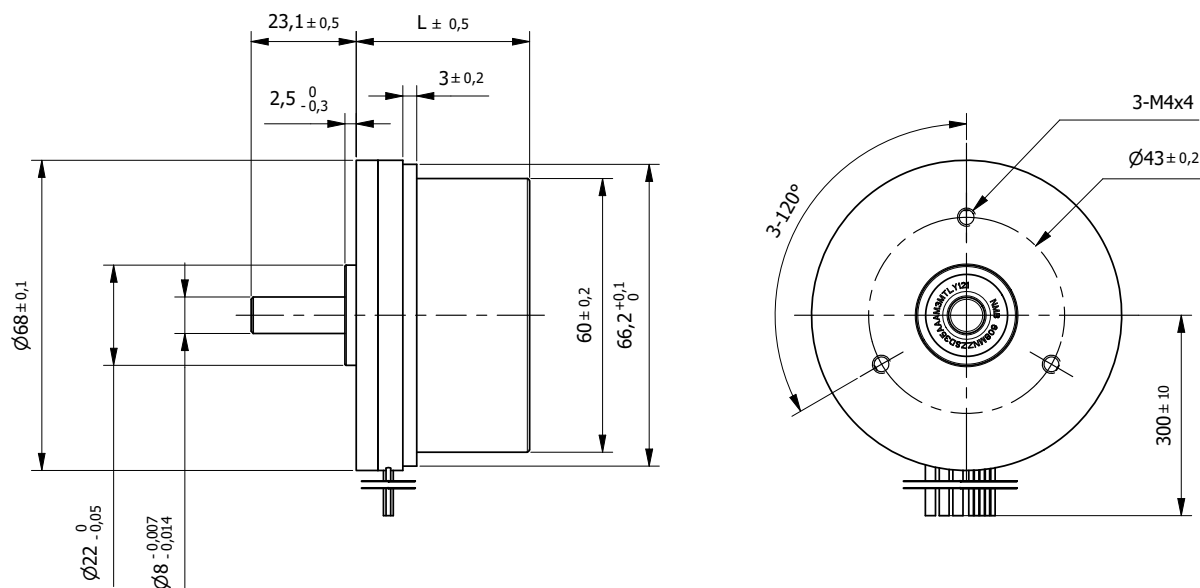
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG24	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Grey		Phase U
7	Brown		Phase V
8	Yellow		Phase W



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	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	gcm2	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	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

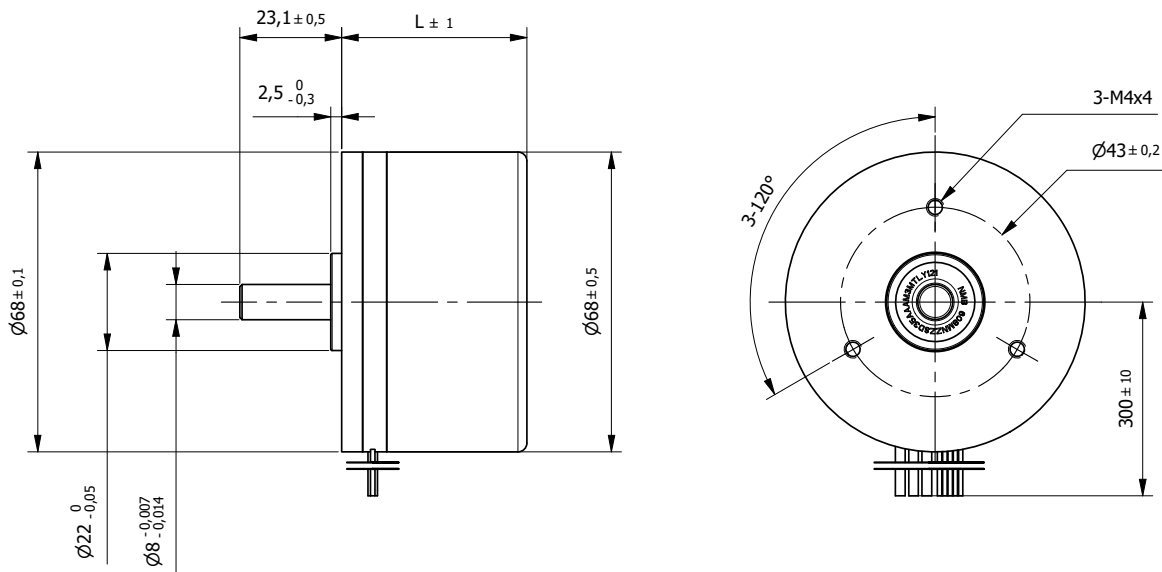
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG26	Vcc Hall +5 to +24 Vdc
2	Blue		Hall A
3	Green		Hall B
4	White		Hall C
5	Black		GND Hall
6	Yellow	UL1430 AWG18	Phase U
7	Red		Phase V
8	Black		Phase W

Brushless Flat Motor 60BLW40

IP54

Ø 68mm

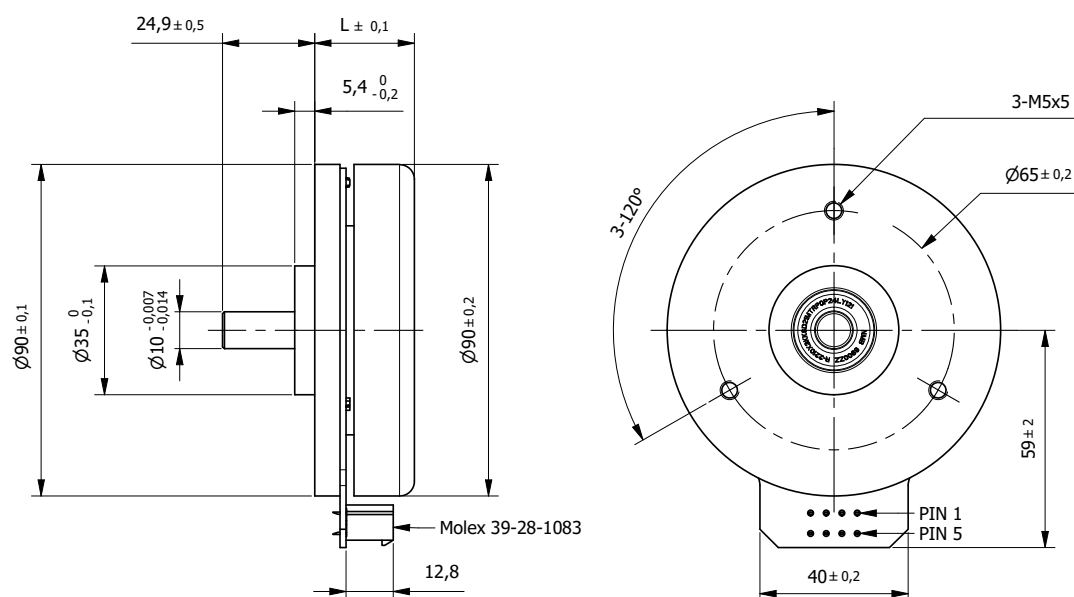
0,3Nm



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	gcm2	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	27
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 - NEW	0,13	140
60BLW42-E	0,29	141
90BLW42-E	0,96	142

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.

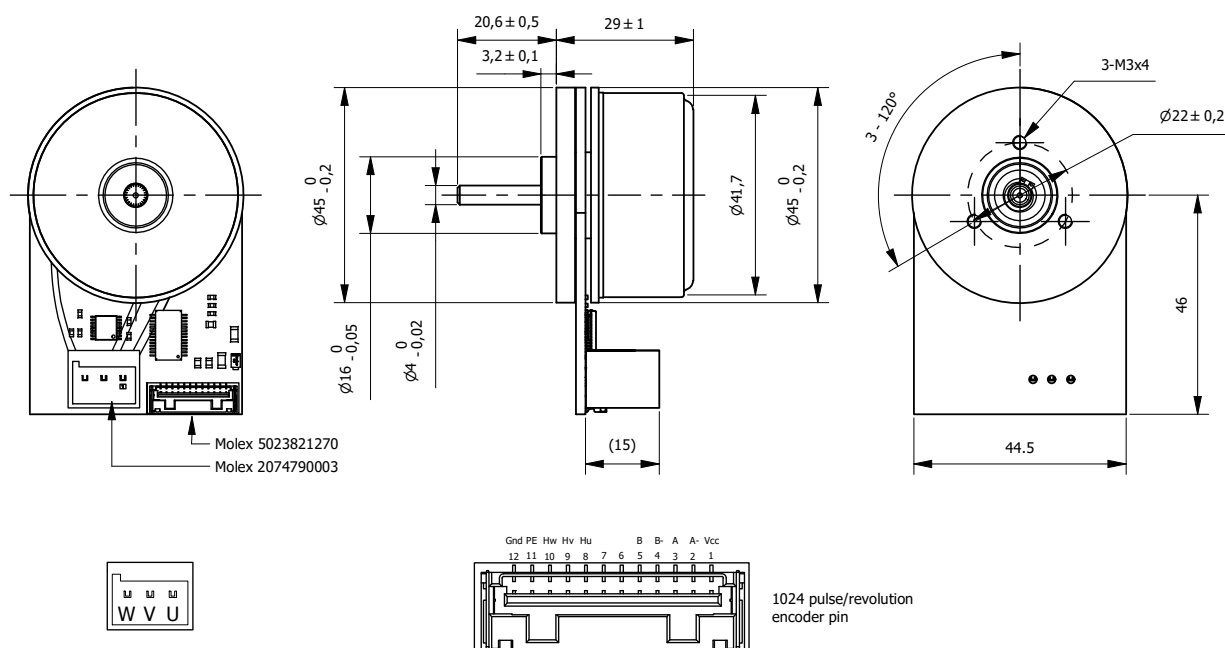
*Rated Torque

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	

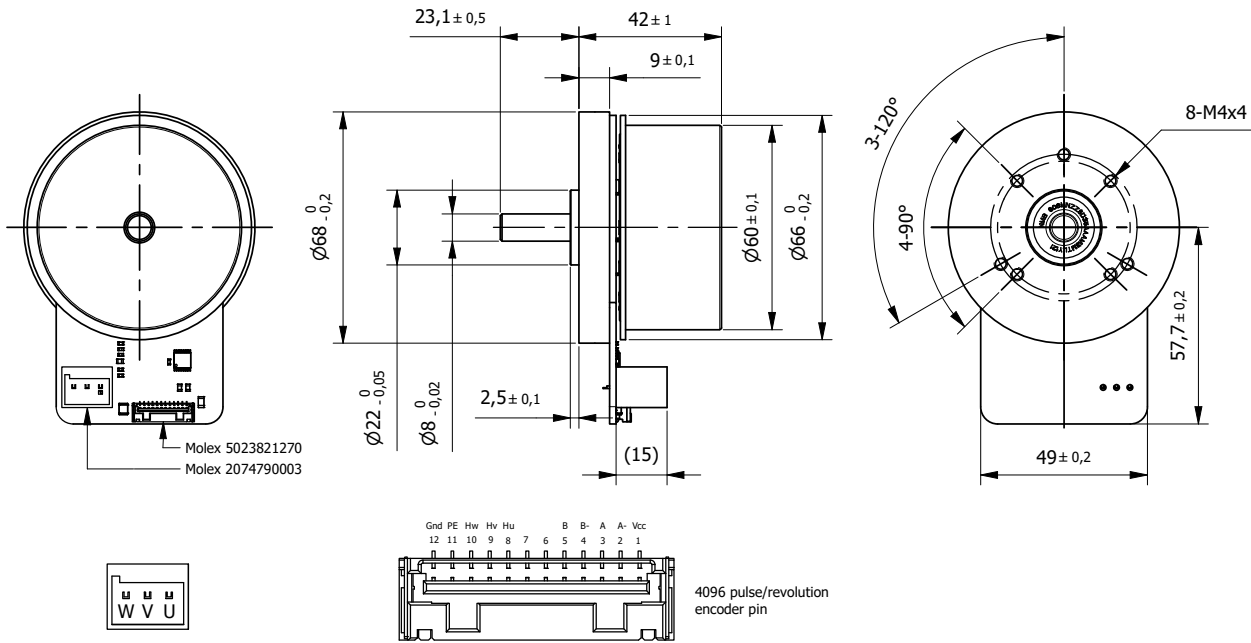
Connection	
Pin n°	Function
Feedback	
1	VCC
2	EA-
3	EA
4	EB-
5	EB
6	EZ-
7	EZ
8	HALL A
9	HALL B
10	HALL C
11	PE
12	GND
Motor	
1	Phase U
2	Phase V
3	Phase W

Brushless Flat Motor 60BLW42-E

with Encoder

Ø 60mm

0,29Nm



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	gcm2 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

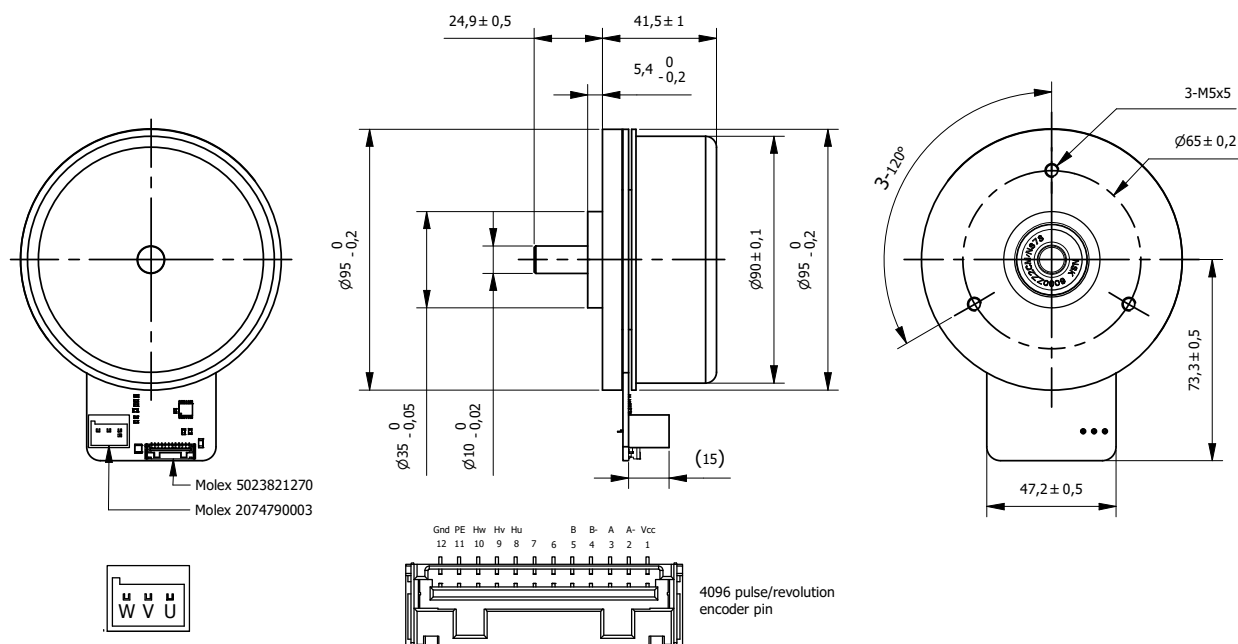
Pin n°	Function
Feedback	
1	VCC
2	EA-
3	EA
4	EB-
5	EB
6	EZ-
7	EZ
8	HALL A
9	HALL B
10	HALL C
11	PE
12	GND
Motor	
1	Phase U
2	Phase V
3	Phase W

Brushless Flat Motor 90BLW42-E

with Encoder

Ø 90mm

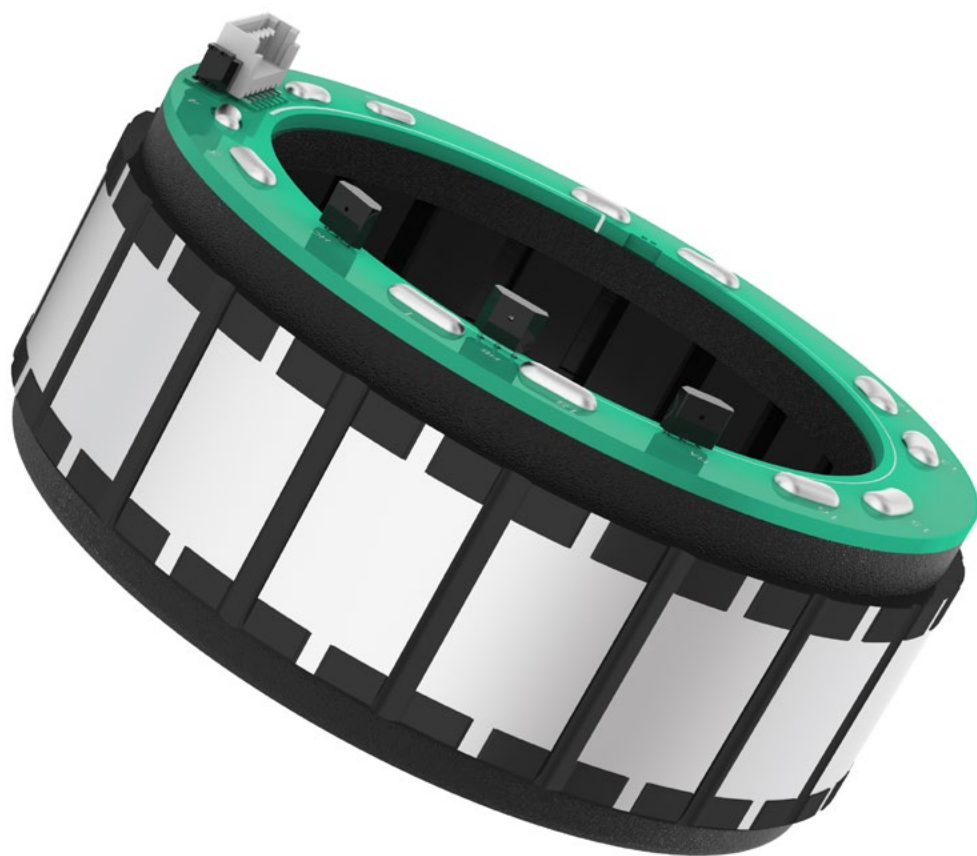
0,96Nm



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



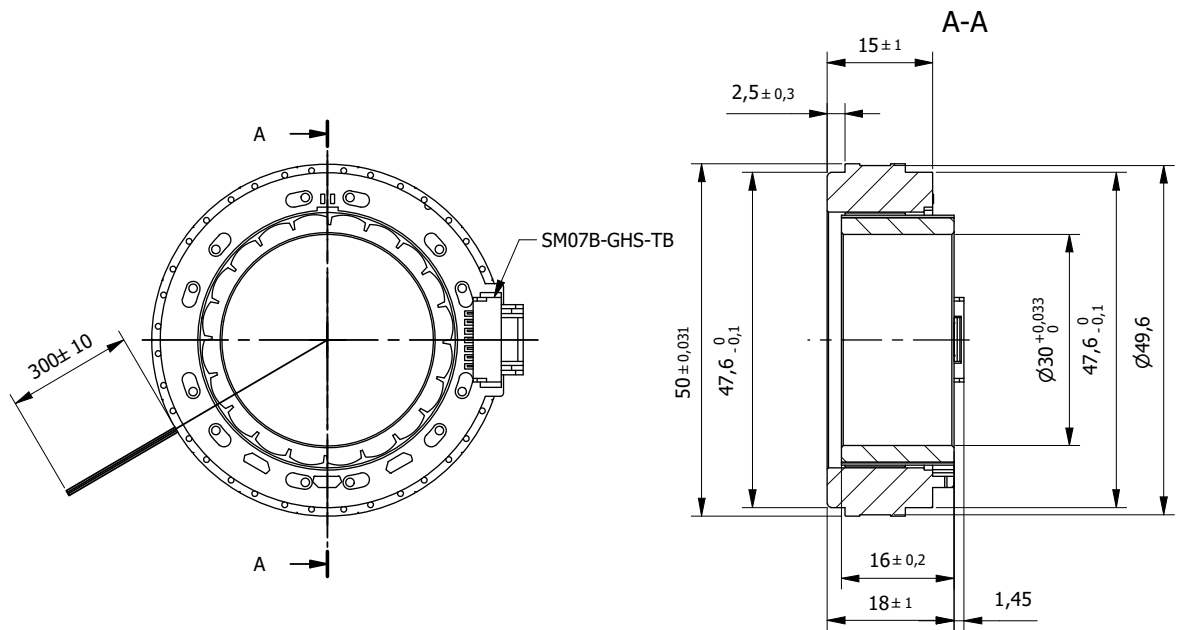
Brushless DC **Frameless motors**

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)	
50BLF08 - NEW	0,3	146
50BLF15	0,5	147
70BLF10 - NEW	0,7	148
70BLF19	1,0	149
85BLF13 - NEW	1,4	150
85BLF23	2,0	151
115BLF25 - NEW	3,9	152
115BLF50 - NEW	9,5	153

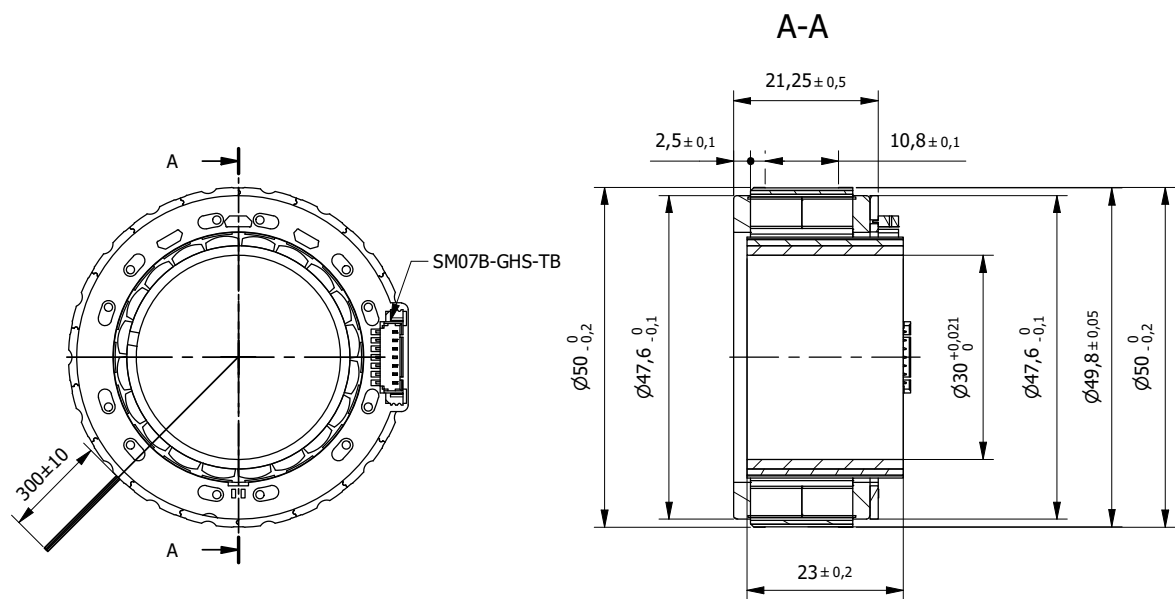
*Rated Torque



Specification			
Model		50BLF08	
1	n° of Pole	20	
2	n° of Phase	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	0,089
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	Length (L)	mm	20
14	Weight	Kg	0,087

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	-25°C to +45°C

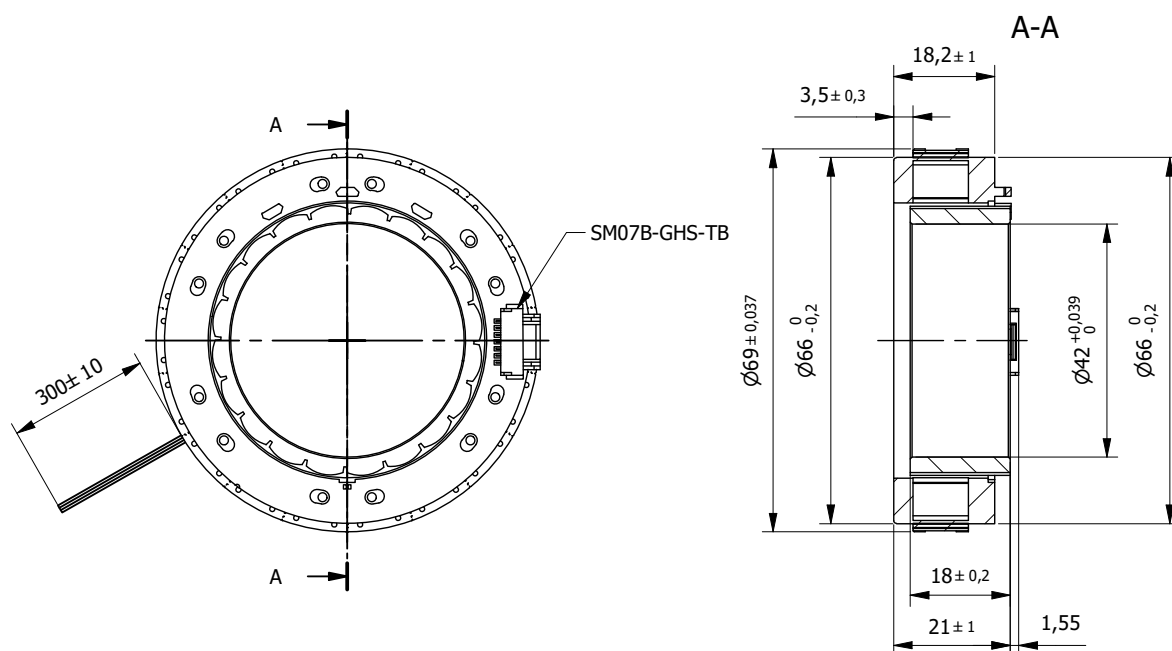
Connection		
Pin n°	Connector	Function
1	SM07B-GHS-TB	Vcc Hall +5V
4		Hall A
3		Hall B
2		Hall C
5		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG22	Phase U
Red		Phase V
Black		Phase W



Specification			
Model		50BLF15	
1	n° of Pole	20	
2	n° of Phase	3	
3	Rated Voltage	V	48
4	Rated Speed	rpm	3500
5	Rated Torque	Nm	0,5
6	Max. Peak Torque	Nm	1,5
7	Torque Constant	Nm/A	0,11
8	Rated Current	A	4,8
9	Max. Peak Current	A	14,5
10	No-Load Current	mA	600
11	Line to Line Resistance	Ω	0,77
12	Line to Line Inductance	mH	0,38
13	Rotor Inertia	gcm2	93
14	Length (L)	mm	26
15	Weight	Kg	0,135

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

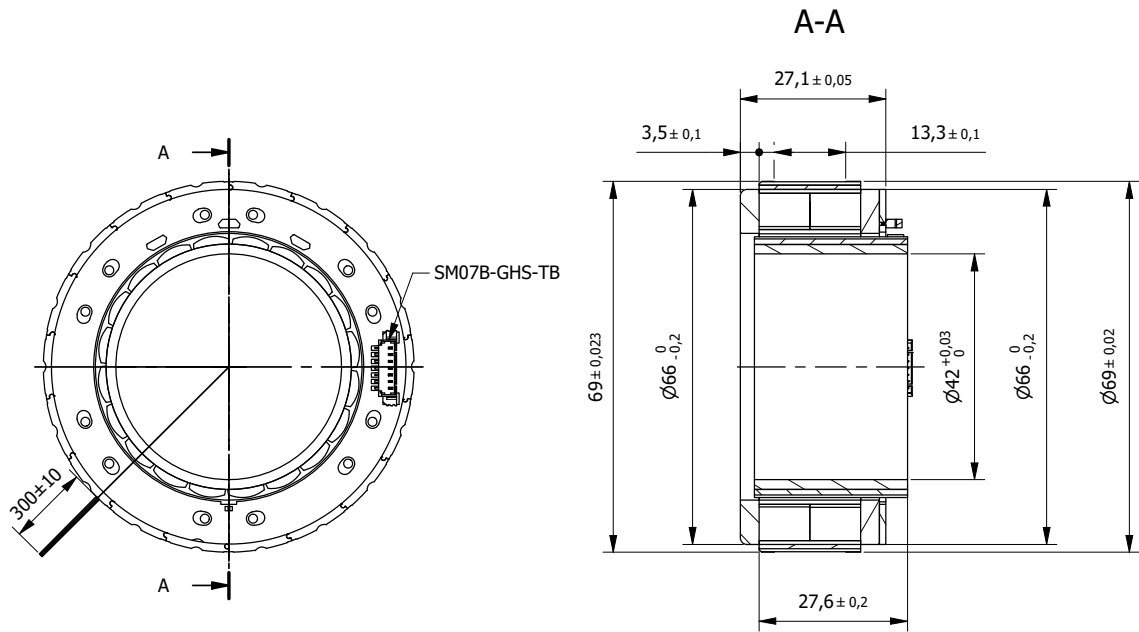
Connection		
Pin n°	Connector	Function
1	SM07B-GHS-TB	Vcc Hall +5V
4		Hall A
3		Hall B
2		Hall C
5		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG22	Phase U
Red		Phase V
Black		Phase W



Specification			
Model		70BLF10	
1	n° of Pole	20	
2	n° of Phase	3	
3	Rated Voltage	V	48
4	Rated Speed	rpm	3650
5	Rated Torque	Nm	0,66
6	Max. Peak Torque	Nm	1,98
7	Torque Constant	Nm/A	0,12
8	Rated Current	A	6,1
9	Max. Peak Current	A	18,5
10	No-Load Current	mA	0,4
11	Line to Line Resistance	Ω	0,41
12	Line to Line Inductance	mH	0,41
13	Length (L)	mm	27,5
14	Weight	Kg	0,22

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	-25°C to +45°C

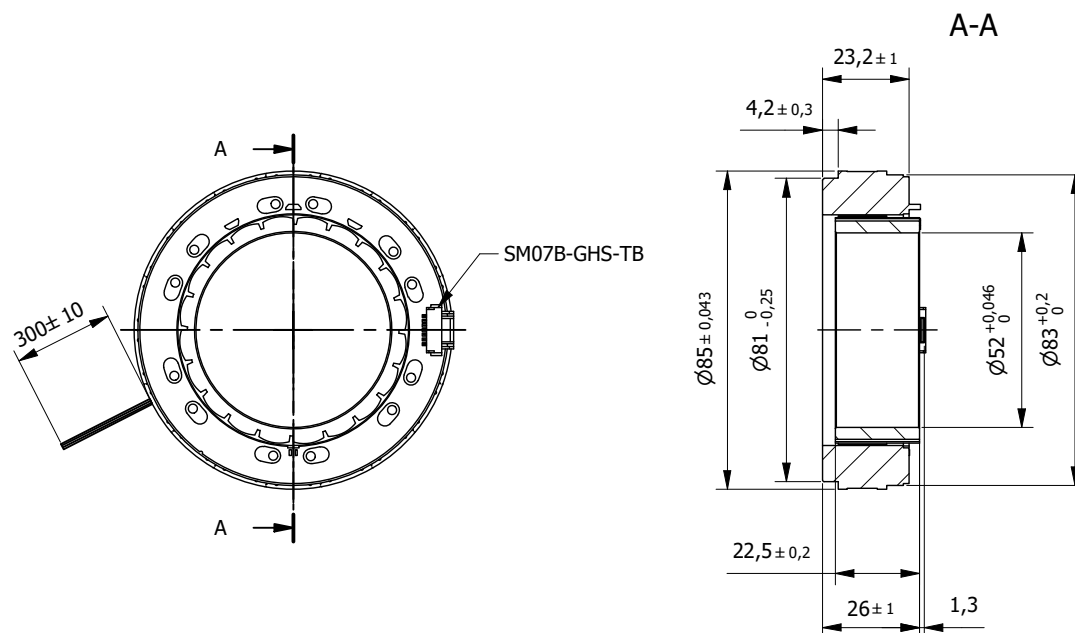
Connection		
Pin n°	Connector	Function
1	SM07B-GHS-TB	Vcc Hall +5V
4		Hall A
3		Hall B
2		Hall C
5		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG22	Phase U
Red		Phase V
Black		Phase W



Specification			
Model		70BLF19	
1	n° of Pole	20	
2	n° of Phase	3	
3	Rated Voltage	V	48
4	Rated Speed	rpm	3500
5	Rated Torque	Nm	1
6	Max. Peak Torque	Nm	3
7	Torque Constant	Nm/A	0,12
8	Rated Current	A	9,2
9	Max. Peak Current	A	28
10	No-Load Current	mA	600
11	Line to Line Resistance	Ω	0,19
12	Line to Line Inductance	mH	0,18
13	Rotor Inertia	gcm2	493
14	Length (L)	mm	32
15	Weight	Kg	0,32

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

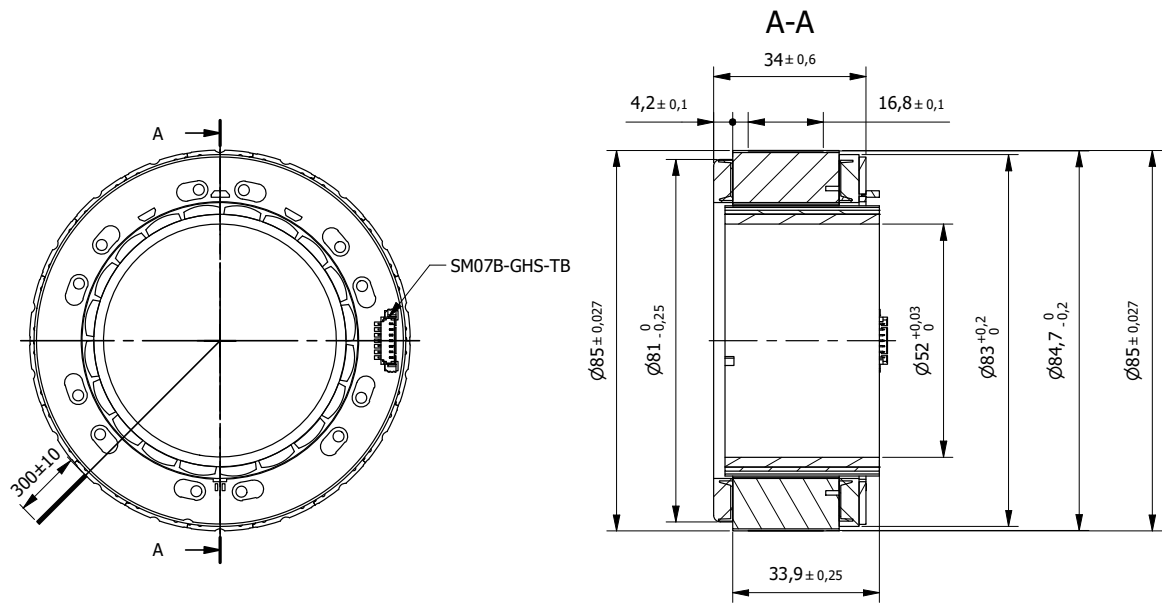
Connection		
Pin n°	Connector	Function
1	SM07B-GHS-TB	Vcc Hall +5V
4		Hall A
3		Hall B
2		Hall C
5		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG20	Phase U
Red		Phase V
Black		Phase W



Specification			
Model		85BLF13	
1	n° of Pole	20	
2	n° of Phase	3	
3	Rated Voltage	V	48
4	Rated Speed	rpm	2950
5	Rated Torque	Nm	1,44
6	Max. Peak Torque	Nm	4,66
7	Torque Constant	Nm/A	0,15
8	Rated Current	A	10,8
9	Max. Peak Current	A	35,5
10	No-Load Current	mA	0,6
11	Line to Line Resistance	Ω	0,25
12	Line to Line Inductance	mH	0,28
13	Length (L)	mm	27,5
14	Weight	Kg	0,42

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	-25°C to +45°C

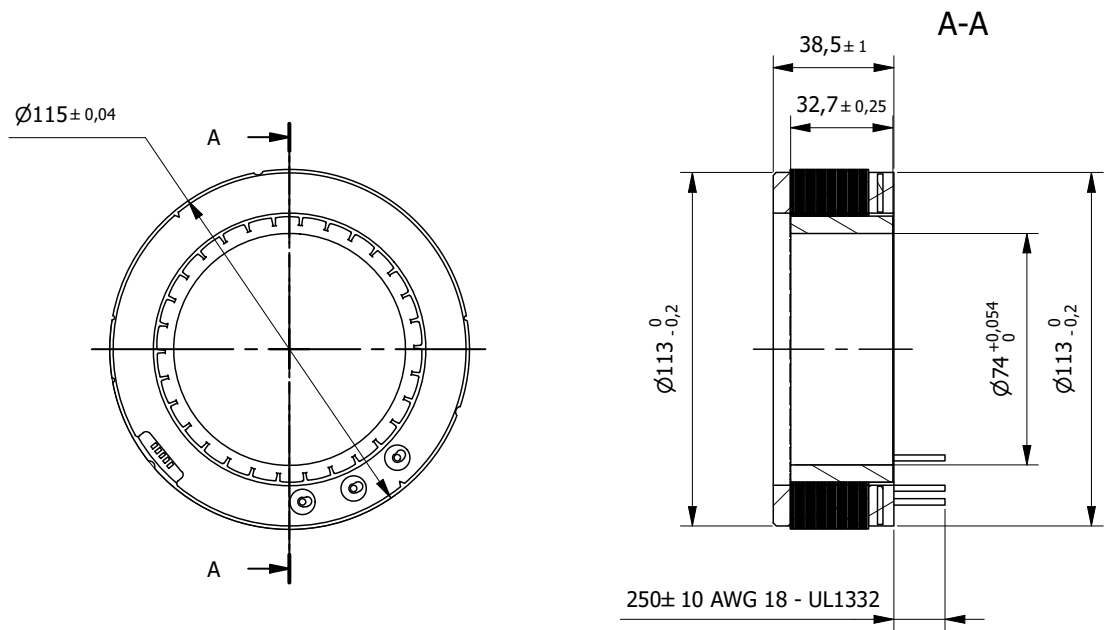
Connection		
Pin n°	Connector	Function
1	SM07B-GHS-TB	Vcc Hall +5V
4		Hall A
3		Hall B
2		Hall C
5		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG16	Phase U
Red		Phase V
Black		Phase W



Specification		
Model		85BLF23
1	n° of Pole	20
2	n° of Phase	3
3	Rated Voltage	V 48
4	Rated Speed	rpm 3500
5	Rated Torque	Nm 2
6	Max. Peak Torque	Nm 6
7	Torque Constant	Nm/A 0,137
8	Rated Current	A 15
9	Max. Peak Current	A 45
10	No-Load Current	mA 1100
11	Line to Line Resistance	Ω 0,1
12	Line to Line Inductance	mH 0,12
13	Rotor Inertia	gcm2 1150
14	Length (L)	mm 35
15	Weight	Kg 0,58

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

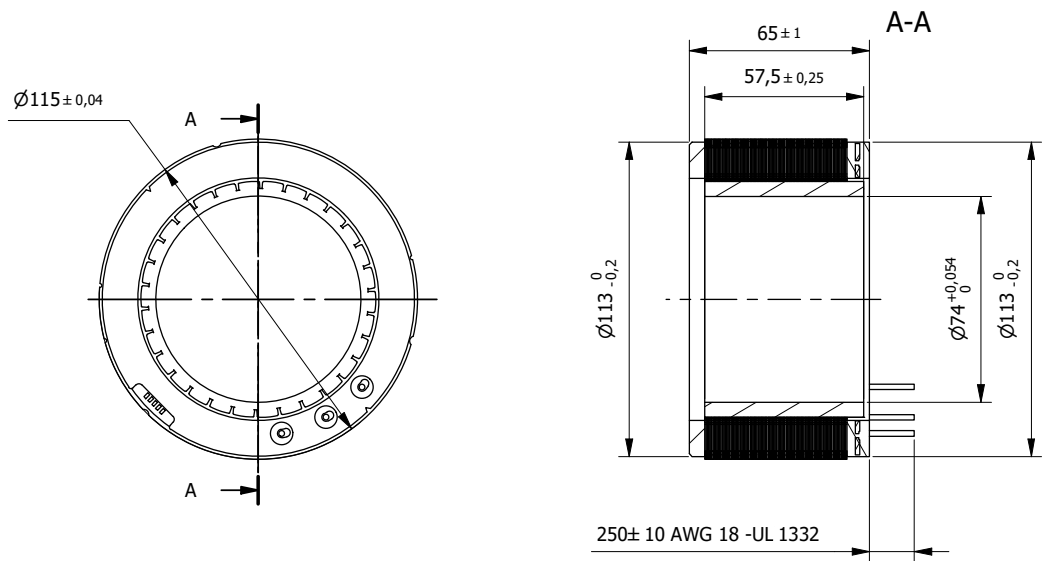
Connection		
Pin n°	Connector	Function
1	SM07B-GHS-TB	Vcc Hall +5V
4		Hall A
3		Hall B
2		Hall C
5		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG16	Phase U
Red		Phase V
Black		Phase W



Specification			
Model		115BLF25	
1	n° of Pole	30	
2	n° of Phase	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	293
8	Rated Current	A	14,1
9	Max. Peak Current	A	58
10	No-Load Current	mA	1,4
11	Line to Line Resistance	Ω	0,15
12	Line to Line Inductance	mH	0,23
13	Length (L)	mm	39
14	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	-25°C to +45°C

Connection		
Color	Gauge	Function
Red	UL2464 AWG24	Vcc Hall +5V
Blue		Hall A
Green		Hall B
White		Hall C
Black		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG18	Phase U
Red		Phase V
Black		Phase W



Specification			
Model		115BLF50	
1	n° of Pole	30	
2	n° of Phase	3	
3	Rated Voltage	V	48
4	Rated Speed	rpm	620
5	Rated Torque	Nm	9,5
6	Max. Peak Torque	Nm	31,4
7	Torque Constant	Nm/A	662
8	Rated Current	A	15,1
9	Max. Peak Current	A	52
10	No-Load Current	mA	1,5
11	Line to Line Resistance	Ω	0,36
12	Line to Line Inductance	mH	0,64
13	Length (L)	mm	68
14	Weight	Kg	2,2

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	-25°C to +45°C

Connection		
Color	Gauge	Function
Red	UL2464 AWG24	Vcc Hall +5V
Blue		Hall A
Green		Hall B
White		Hall C
Black		GND Hall
Color	Gauge	Function
Yellow	UL1332 AWG18	Phase U
Red		Phase V
Black		Phase W

Brushless Servomotors



Low voltage
Servomotors

p.163



Medium voltage
Servomotors

p.171

Brushless **Servomotors**

Low voltage - Brushless DC Servomotors		Torque* (Nm)	163
38SV - 48VDC		0,16...0,32	164
60SV - 48VDC		0,64...1,27	165
80SV - 48VDC		2,39...3,18	166
100SV - 48VDC		3,18...4,77	167
110SV - 48VDC		4,77...6,37	168
130SV - 48VDC		9,55...14,3	169
Medium voltage - Brushless AC Servomotors		Torque* (Nm)	171
38SV - 220VAC		0,16...0,32	172
60SV - 220VAC		0,64...1,27	173
80SV - 220VAC		2,39...3,18	174
100SV - 220VAC		3,18...4,77	175
110SV - 220VAC		4,77...6,37	176
130SV - 220VAC		9,55...14,3	177

* 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

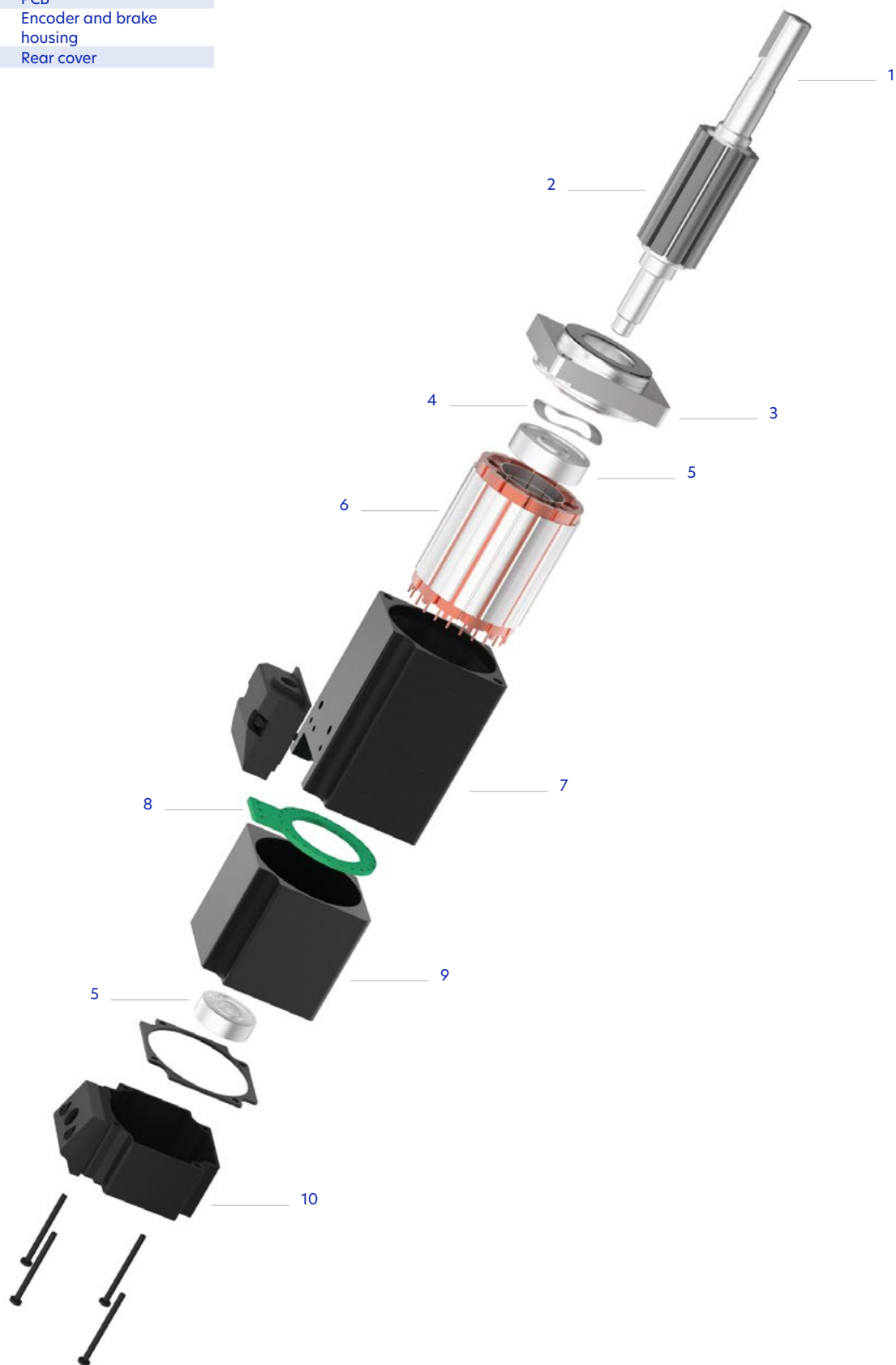
A brake, matched to the power output of the motor, is also an option on all models.

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 - BLDC Servomotors		Torque* (Nm)
38SV - 48VDC	0,16...0,32	164
60SV - 48VDC	0,64...1,27	165
80SV - 48VDC	2,39...3,18	166
100SV - 48VDC	3,18...4,77	167
110SV - 48VDC	4,77...6,37	168
130SV - 48VDC	9,55...14,3	169

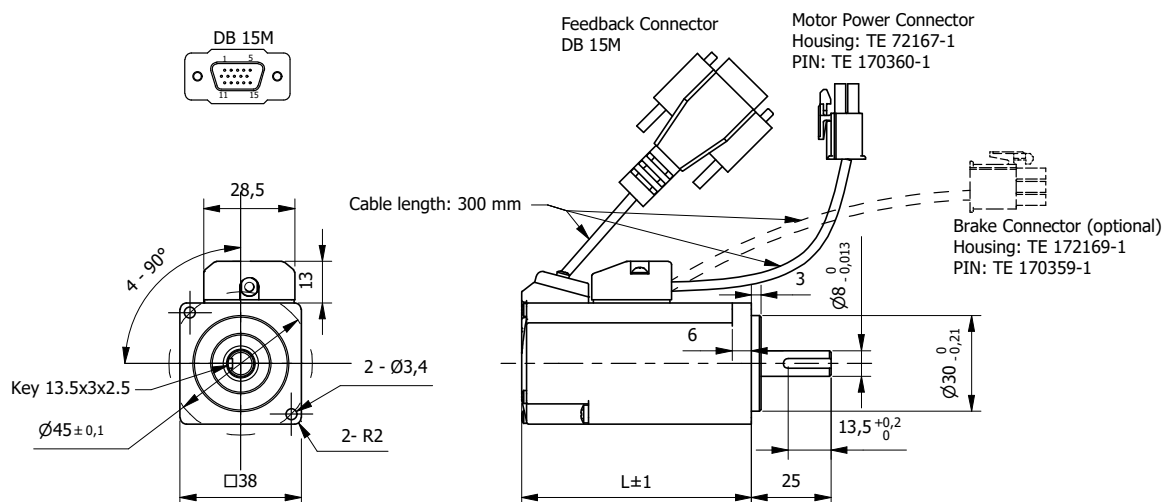
* Rated Torque

Brushless DC Servomotor 38SV-48VDC

Low voltage

□ 38mm

0,16 to 0,32Nm



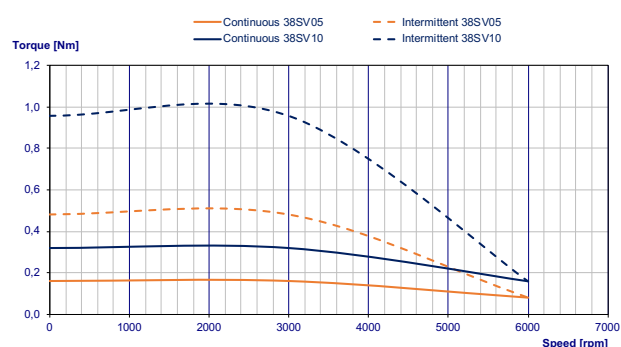
Note: optional brake

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	Kgcm2 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
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 (multi & single-turn): 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

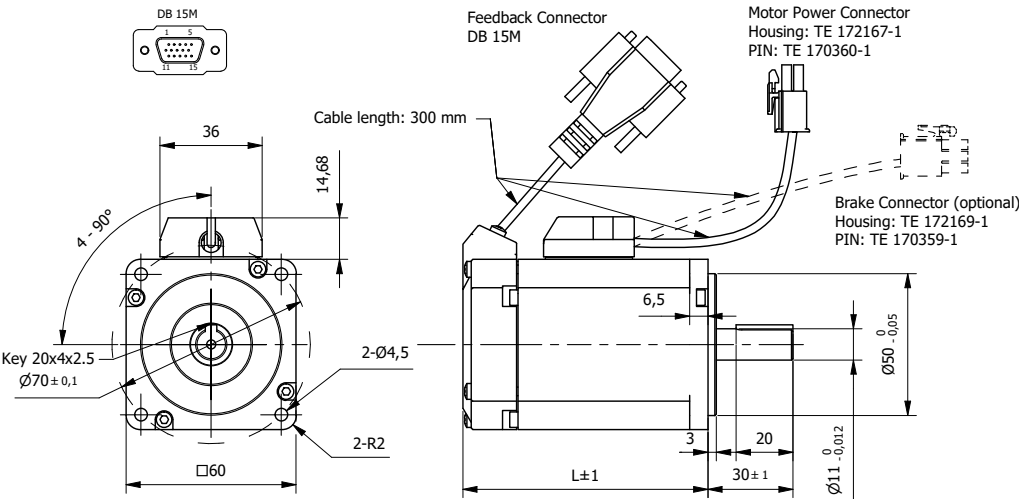


Brushless DC Servomotor 60SV-48VDC

Low voltage

□ 60mm

0,64 to 1,27Nm



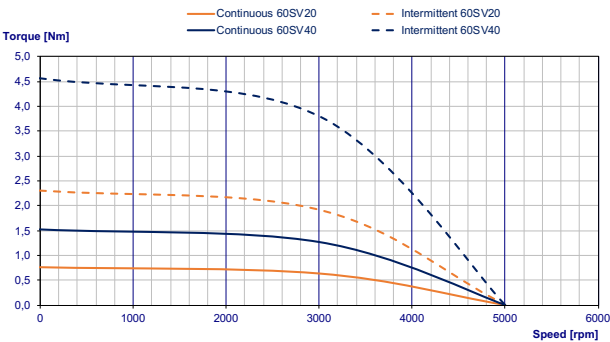
Note: optional brake

Specification					
Model		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
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 (multi & single-turn): 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

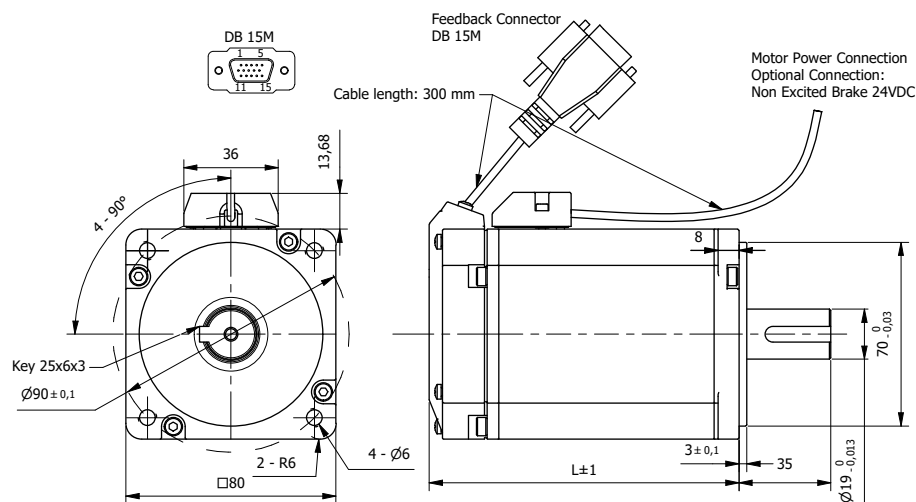


Brushless DC Servomotor 80SV-48VDC

Low voltage

□ 80mm

2,39 to 3,18Nm



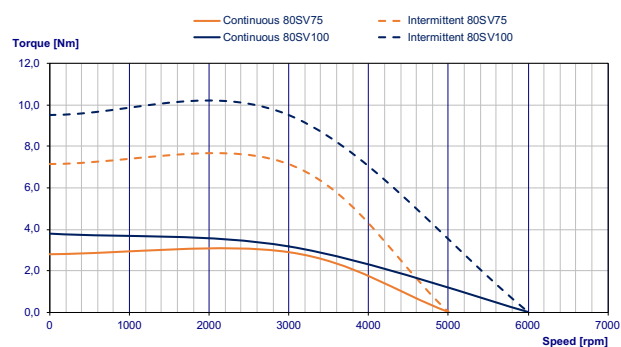
Note: optional brake

Specification		80SV75-48V-30EA1	80SV75-48V-30EA2	80SV100-48V-30EA1	80SV100-48V-30EA2
1	Model				
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
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 (multi & single-turn): 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

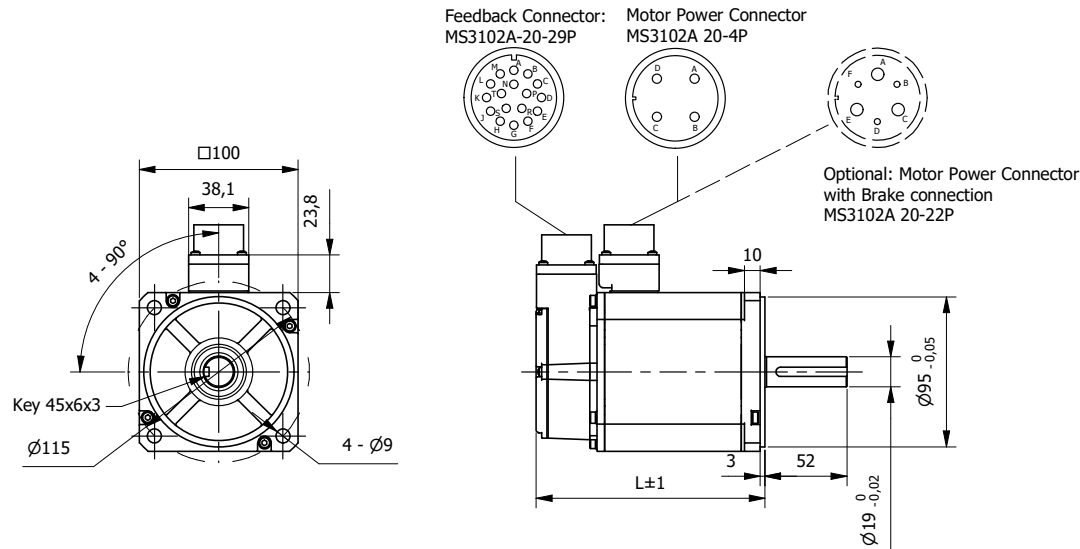


Brushless DC Servomotor 100SV-48VDC

Low voltage

□ 100mm

3,18 to 4,77Nm



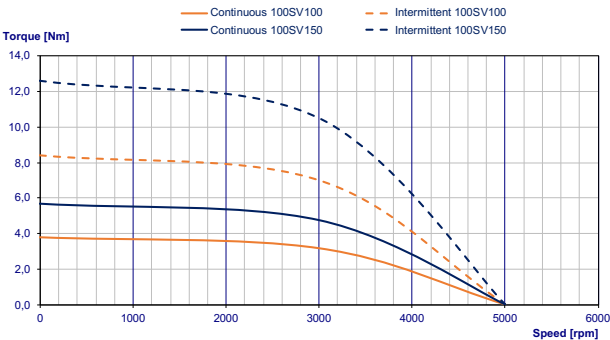
Note: optional brake

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

Characteristics	
Item	
Insulation Class	F 155°C
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 (multi & single-turn): 17bit, 16bit

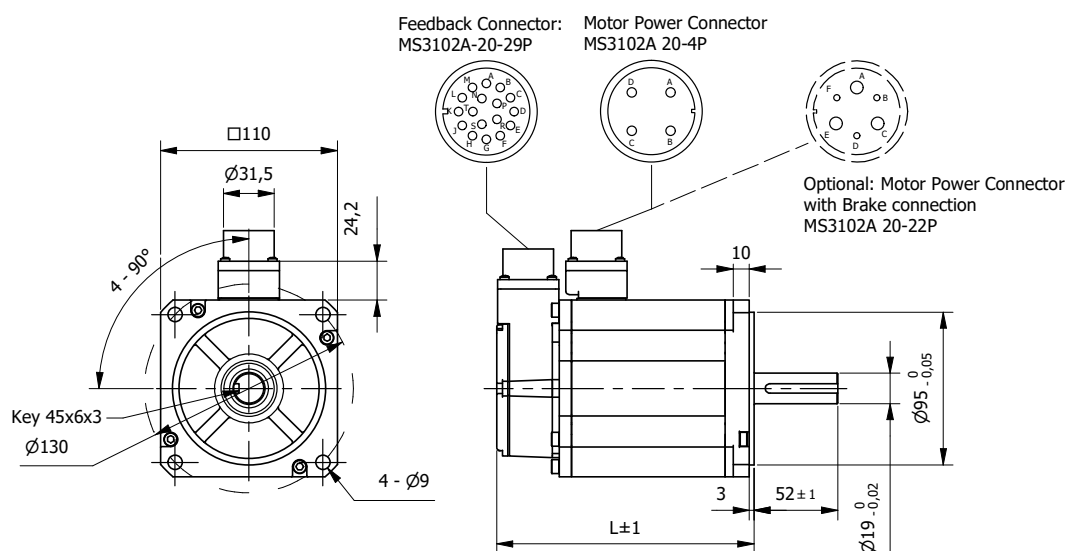


Brushless DC Servomotor 110SV-48VDC

Low voltage

□ 110mm

4,77 to 6,37Nm



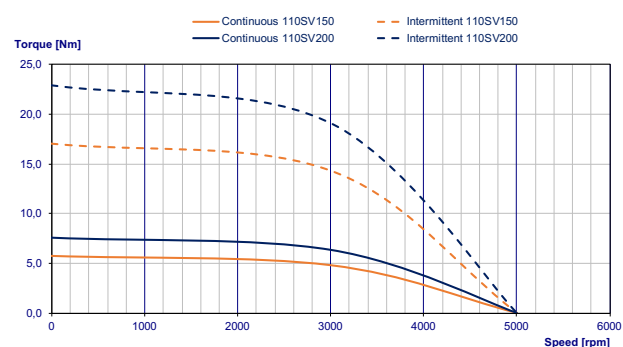
Note: optional brake

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
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 (multi & single-turn): 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		

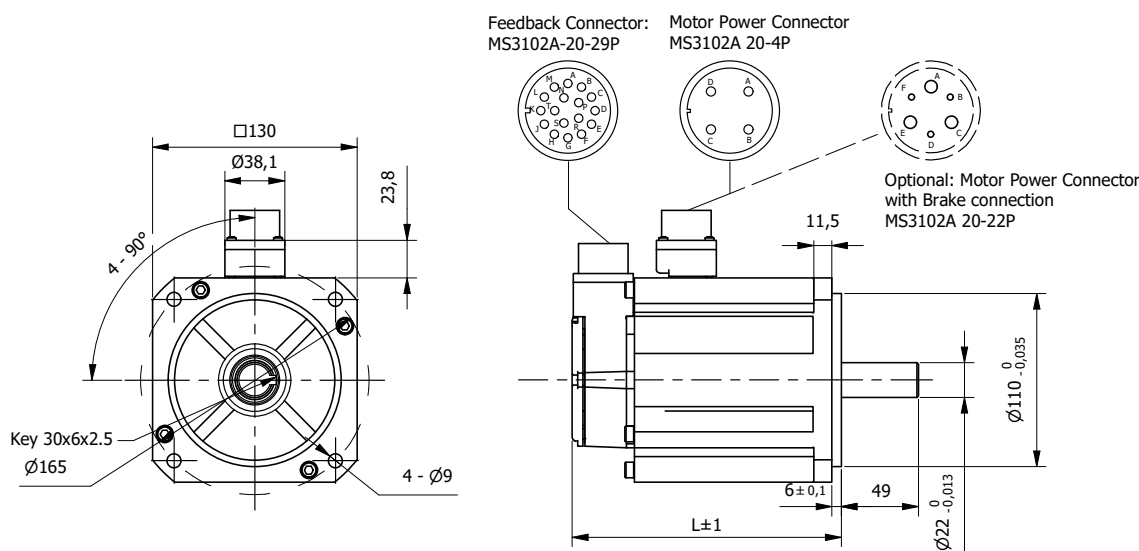


Brushless DC Servomotor 130SV-48VDC

Low voltage

□ 130mm

9,55 to 14,3Nm



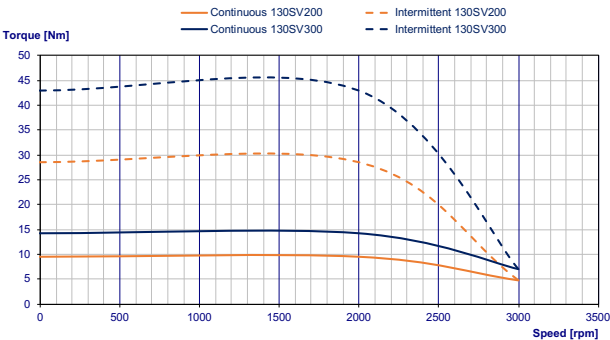
Note: optional brake

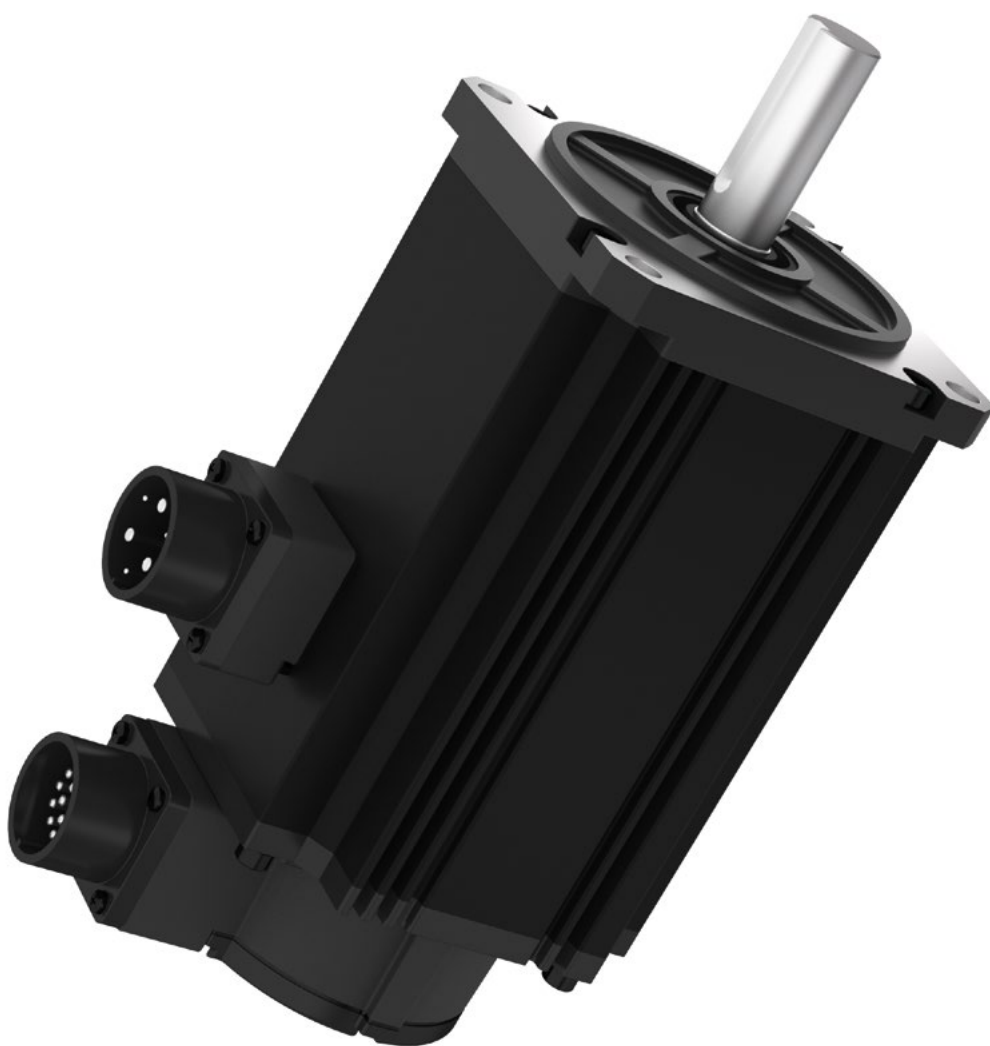
Specification					
Model		130SV200-48V-30EA1	130SV200-48V-30EA2	130SV300-48V-30EA1	130SV300-48V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VDC 48	48	48	48
4	Rated power	W 2000	2000	3000	3000
5	Rated Speed	RPM 2000	2000	2000	2000
6	No-load Speed	RPM 3000 ±10%	3000 ±10%	3000 ±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	Kgcm2 14	15,2	19,9	20,2
17	Brake	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
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

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute (multi & single-turn): 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		





BLAC Servomotors
Medium voltage

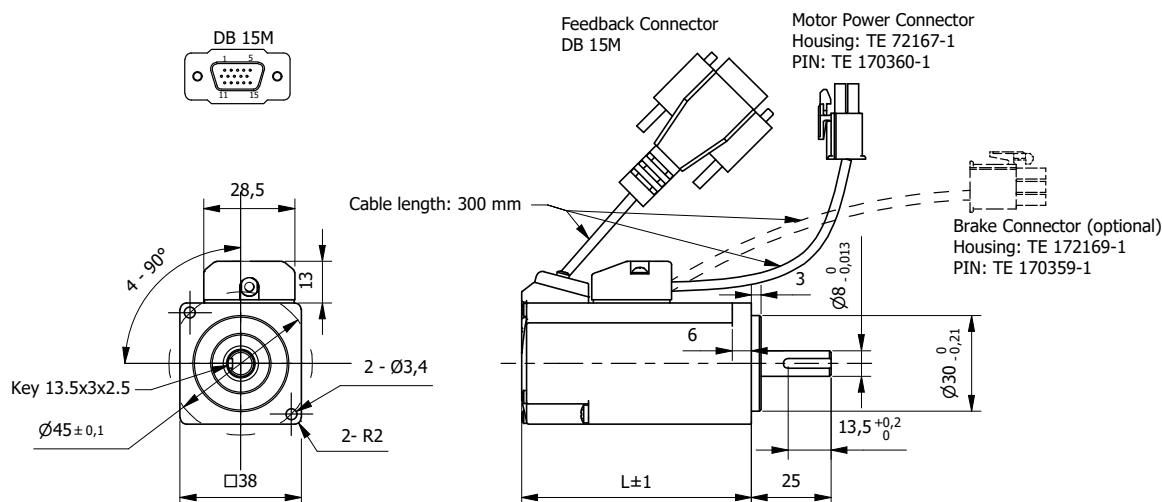
Medium voltage - Brushless AC Servomotors		Torque* (Nm)
38SV - 220VAC	0,16...0,32	172
60SV - 220VAC	0,64...1,27	173
80SV - 220VAC	2,39...3,18	174
100SV - 220VAC	3,18...4,77	175
110SV - 220VAC	4,77...6,37	176
130SV - 220VAC	9,55...14,3	177

Brushless AC Servomotor 38SV-220VAC

Medium voltage

□ 38mm

0,16 to 0,32Nm



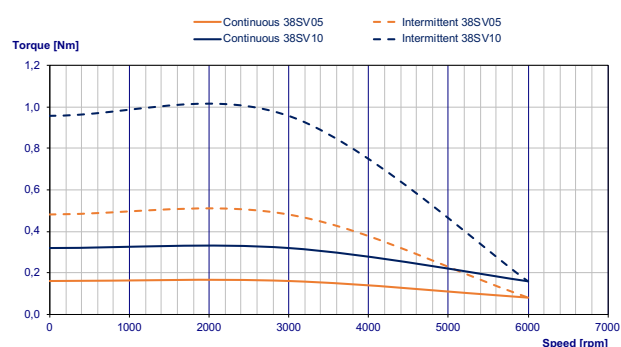
Note: optional brake

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	220	220	220
4	Rated power	W 50	50	100	100
5	Rated Speed	RPM 3000	3000	3000	3000
6	No-load Speed	RPM 10500 ±10%	10500 ±10%	10500 ±10%	10500 ±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 0,032	0,032	0,034	0,034
10	Rated Current	A 0,5	0,5	1,0	1,0
11	Max. Peak Current	A 1,5	1,5	3	3
12	No-Load Current	A 0,1	0,1	0,1	0,1
13	Back EMF constant	V/kRPM 21	21	21	21
14	Line to Line Resistance	Ω 33 ±10%	33 ±10%	17,5 ±10%	17,5 ±10%
15	Line to Line Inductance	mH 24 ±20%	24 ±20%	12,4 ±20%	12,4 ±20%
16	Rotor Inertia	Kgcm ² 0,024	0,034	0,04	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
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 (multi & single-turn): 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

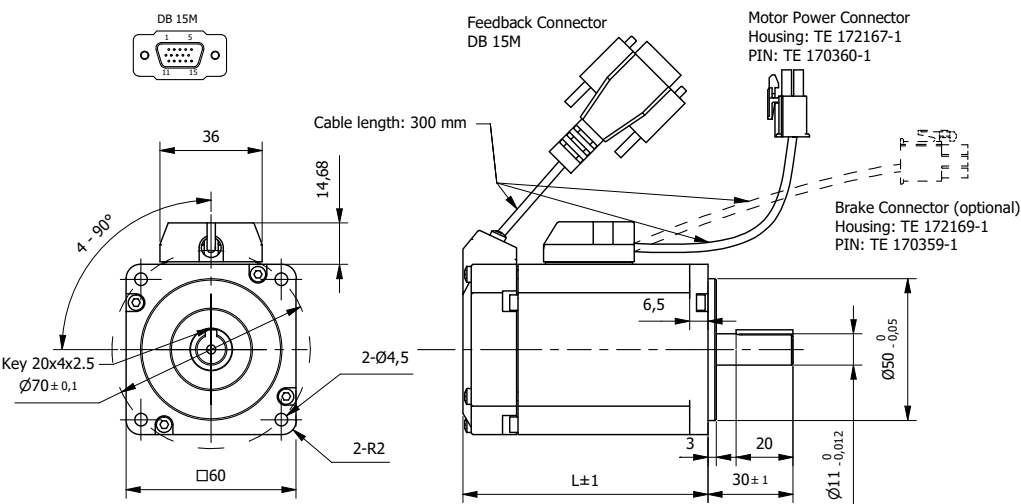


Brushless AC Servomotor 60SV-220VAC

Medium voltage

□ 60mm

0,64 to 1,27Nm



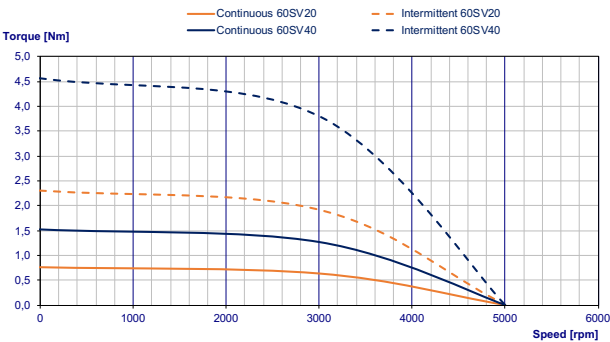
Note: optional brake

Specification				
Model	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
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 (multi & single-turn): 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

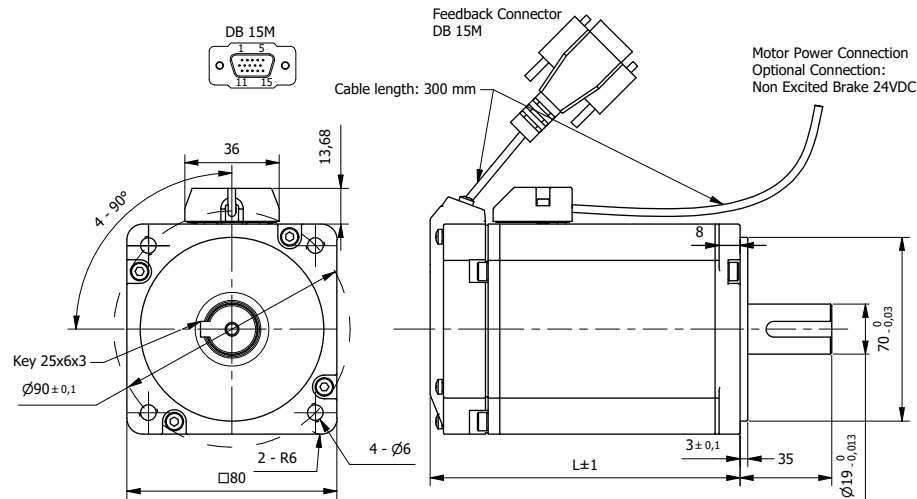


Brushless AC Servomotor 80SV-220VAC

Medium voltage

□ 80mm

2,39 to 3,18Nm



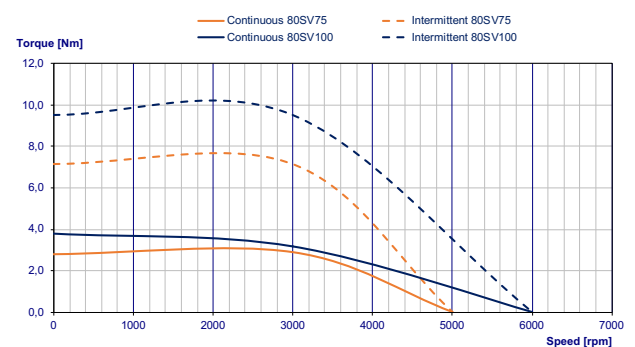
Note: optional brake

Specification		80SV75-220V-30EA1	80SV75-220V-30EA2	80SV100-220V-30EA1	80SV100-220V-30EA2
1	Model				
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
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 (multi & single-turn): 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

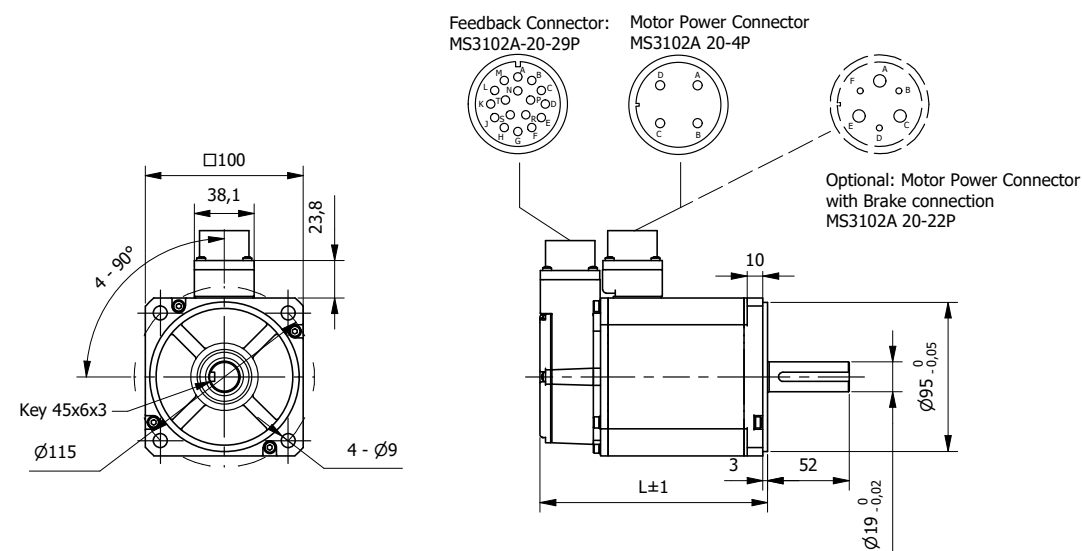


Brushless AC Servomotor 100SV-220VAC

Medium voltage

□ 100mm

3,18 to 4,77Nm



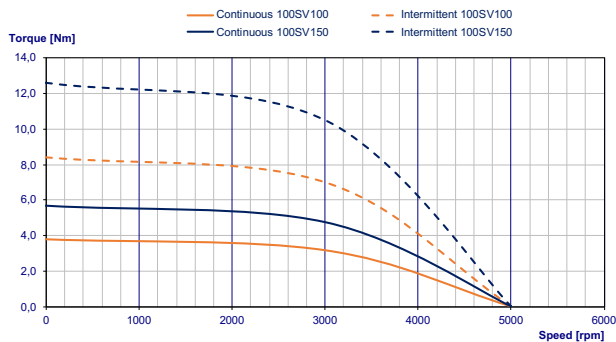
Note: optional brake

Specification					
Model		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	Kgcm2 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
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 (multi & single-turn): 17bit, 16bit

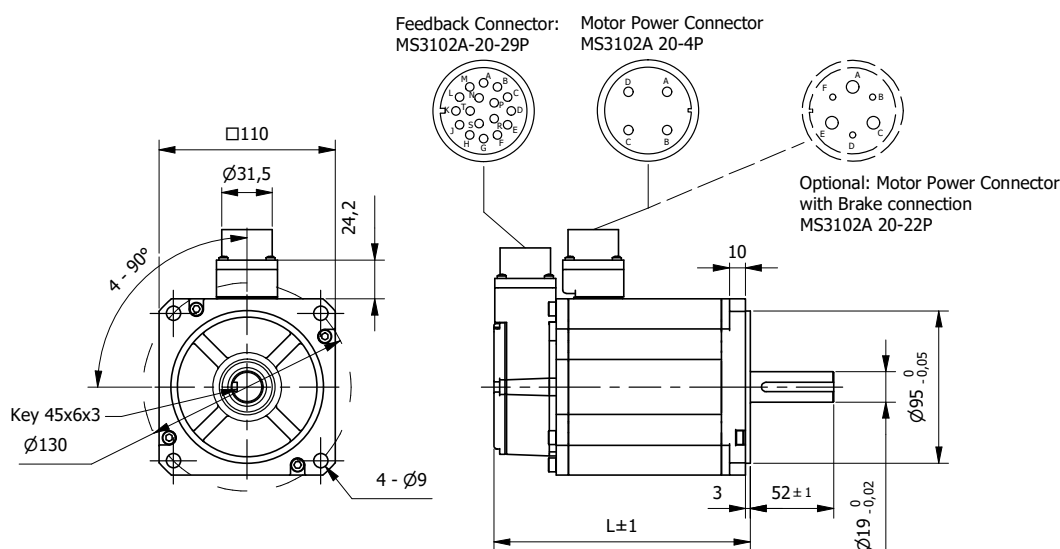


Brushless AC Servomotor 110SV-220VAC

Medium voltage

□ 110mm

4,77 to 6,37Nm



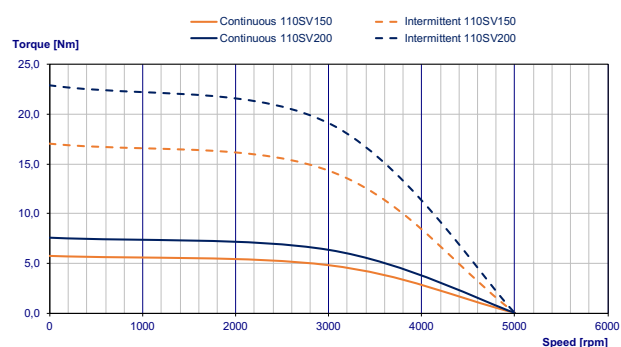
Note: optional brake

Specification		110SV150-220V-30EA1	110SV150-220V-30EA2	110SV200-220V-30EA1	110SV200-220V-30EA2
1	Model				
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
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

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		

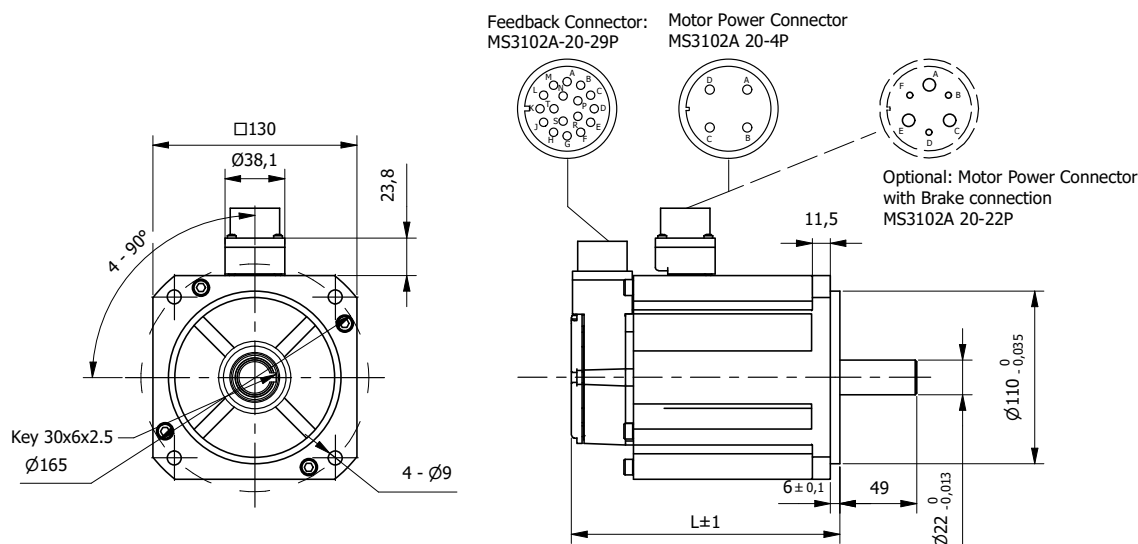
Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR
	Magnetic Incremental: 2500 CPR
	Magnetic Absolute (multi & single-turn): 17bit, 16bit



□ 130mm

Medium voltage

9,55 to 14,3Nm



Note: optional brake

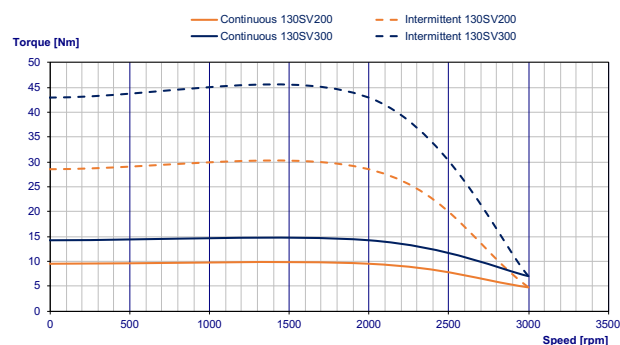
Specification					
	Model	130SV200-220V-30EA1	130SV200-220V-30EA2	130SV300-220V-30EA1	130SV300-220V-30EA2
1	n° of Pole	10	10	10	10
2	n° of Phase	3	3	3	3
3	Nominal Voltage	VAC 220	220	220	220
4	Rated power	W 2000	2000	3000	3000
5	Rated Speed	RPM 2000	2000	2000	2000
6	No-load Speed	RPM 3200 ±10%	3200 ±10%	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	Kgcm2 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
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

Characteristics	
Item	
Insulation Class	F 155°C
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

Encoders	
Item	
Encoder Type - Standard	Optical Incremental 2500 CPR
Encoder Type - Optional	Optical Incremental: 1024-4096 CPR Magnetic Incremental: 2500 CPR Magnetic Absolute (multi & single-turn): 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		



Motors with Controller



BLDC motors
with Speed
controller

p.187



BLDC motors
with Motion
controller

p.195



Stepper motors
with Motion
controller

p.201

Motors with integrated Controller

Brushless DC motors with Speed controller	Torque* (Nm)	187
16EC33P-2W	0,002	188
36CBL-IE	0,016...0,08	189
42BL-IE - square	0,063...0,25	190
42CBL60-IE	0,068	191
42RBL60-IE	0,08	192
57BL-IE	0,11...0,33	193
Brushless DC motors with Motion controller	Torque* (Nm)	195
IBS42	0,062...0,25	196
IBS57	0,055...0,44	197
IBS80 - NEW	0,8...1,13	198
IBI80 - IP65	0,8...1,13	199
Stepper motors with Motion controller	Torque** (Nm)	201
ISS57 - NEW	0,55...1,89	202
ISI57-IP65	0,55...1,89	203
ISS60 - NEW	1...3,1	204
ISI60-IP65	1...3,1	205
ISS86 - NEW	3,4...12	206

* Rated Torque
 ** Holding 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.
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

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 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 RS485 Modbus-RTU or CANopen fieldbuses. 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 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, and Profinet, 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

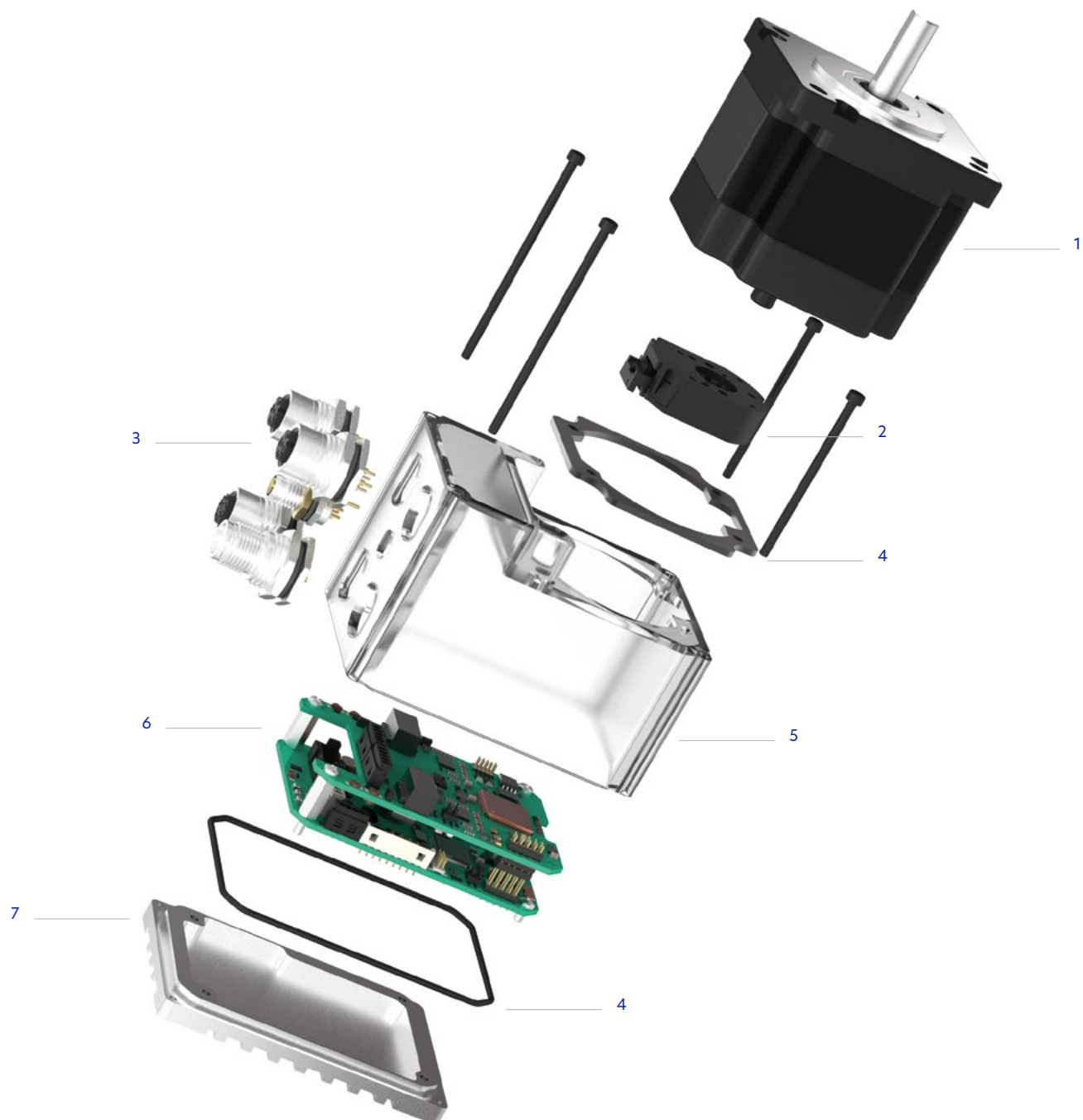
All our motors with Motion Controller are offered with two software: DL Studio and DL Space. DL Studio is a configuration and test tool that lets the user set all the objects inside the drive and move the motor from the PC while seeing the motor response, in terms of current, speed and other information. 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 - Motor with Motion Controller

- 1 Motor
- 2 Encoder
- 3 Connectors
- 4 Gasket
- 5 Case
- 6 PCB
- 7 Heat sink





Brushless DC motors
with Speed controller

Advantages at a glance
Space saving, minimal wiring
Simple Speed and Direction control
High torque

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.

Brushless DC motors with Speed controller	Torque* (Nm)	
16EC33P-2W	0,002	188
36CBL-IE	0,016...0,08	189
42BL-IE - square	0,063...0,25	190
42CBL60-IE	0,068	191
42RBL60-IE	0,08	192
57BL-IE	0,11...0,33	193

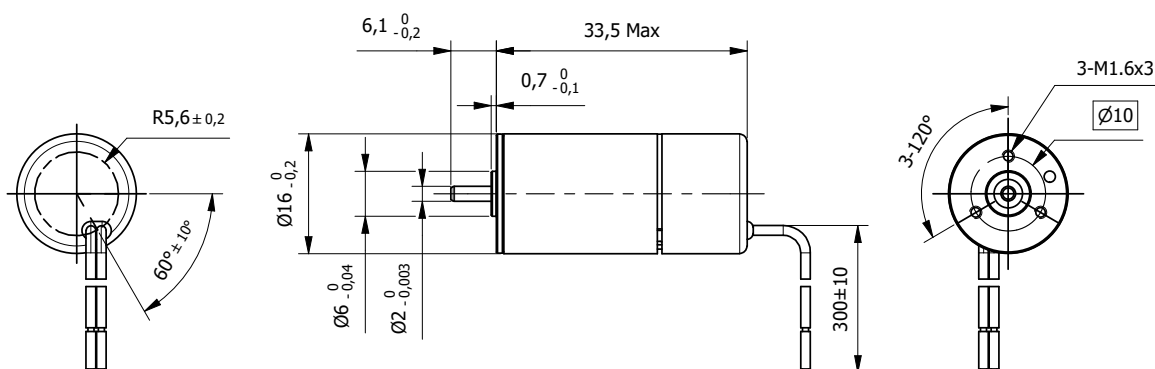
* Rated Torque

Brushless Slotless Motor 16EC33P-2W

with Speed Controller

Ø 16mm

0,002Nm



Specification				
Model		...7500	...8000	
1	Rated Voltage	V	6	12
2	Rated Speed	rpm	7510	8080
3	Rated Torque	mNm	2,19	2,26
4	Stall Torque	mNm	5,25	5,76
5	Torque Constant	mNm/A	3,87	7,73
6	Rated Current	A	0,714	0,37
7	Stall Current	A	1,44	0,801
8	No-load Current	mA	149	72,7
9	No-load Speed	rpm	13400	13800
10	Speed Range	rpm	11300-20000	5360-17400
11	Rotor Inertia	gcm ²	0,428	0,428
12	Max. Efficiency	%	46,4	49
13	Mechanical Time Constant	ms	11,6	11,3
14	Length (L)	mm	33,5	33,5
15	Weight	g	32	32

Characteristics	
Item	
Supply Voltage +Vcc	+5 to +15V
Current Limitation	1,6A ±15%
Type of control	speed
Ambient Temperature	-40°C to +85°C
Max. Electronics Temperature	+100°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			
Lead n°	Color	Gauge	Function
1	Red	UL1569 AWG26/7	+Vcc Supply voltage +5 to +15V
2	Black		GND Ground system

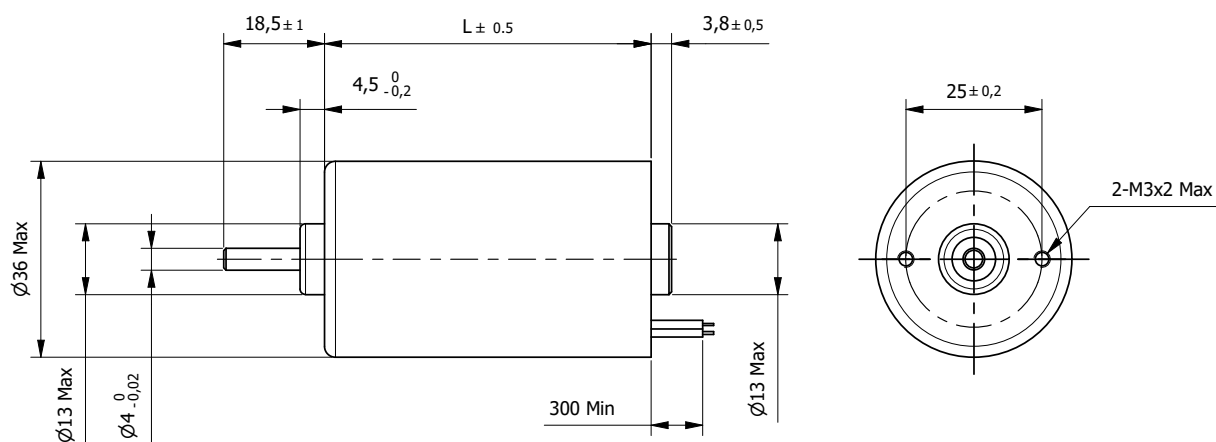
Attention: operating voltage Vcc > 18VDC will destroy the electronics

Brushless Slotted Motor 36CBL-IE

with Speed Controller

Ø 36mm

0,016 - 0,08Nm



Specification				
Model	36CBL30-IE	36CBL40-IE	36CBL57-IE	36CBL60-IE
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	4800	4800	4500	4800
5 Rated Torque Nm	0,016	0,035	0,07	0,08
6 Max. Peak Torque Nm	0,05	0,11	0,21	0,24
7 Torque Constant Nm/A	0,034	0,037	0,041	0,038
8 Rated Current A	0,47	0,95	1,71	2,11
9 Max. Peak Current A	1,4	3	5,3	6,5
10 No-Load Current mA	120	230	260	200
11 Line to Line Resistance Ω	7,8	2,7	1,3	0,9
12 Line to Line Inductance mH	5,5	2,6	1,6	1,3
13 Rotor Inertia gcm ²	6	12	27	30
14 Length (L) mm	30	40	57	60
15 Weight Kg	0,12	0,18	0,25	0,3

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

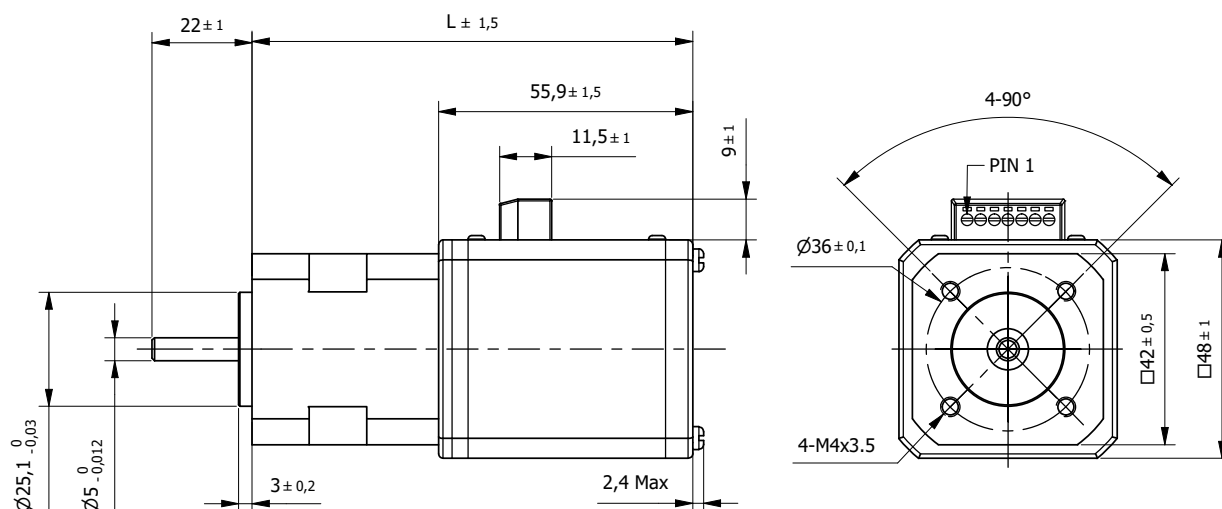
Connection			
Pin n°	Color	Gauge	Function
1	Red	UL1430 AWG22	VCC +24VDC
2	Black		GND
3	Green	UL1430 AWG26	CW/CCW Direction
4	White		PWM speed control
5	Blue		Brake
6	Yellow	UL1332 AWG22	Tacho Out

Motor + Controller

Brushless Slotted Motor 42BL-IE

with Speed Controller

□ 42mm
0,063 - 0,25Nm



Specification					
Model		42BL41-IE	42BL61-IE	42BL81-IE	42BL100-IE
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	0,37	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	220	250	340
11	Line to Line Resistance	Ω	1,5	0,8	0,43
12	Line to Line Inductance	mH	2,1	1,2	0,7
13	Rotor Inertia	gcm ²	24	48	72
14	Length (L)	mm	96	116	137
15	Weight	Kg	0,5	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 sec.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm

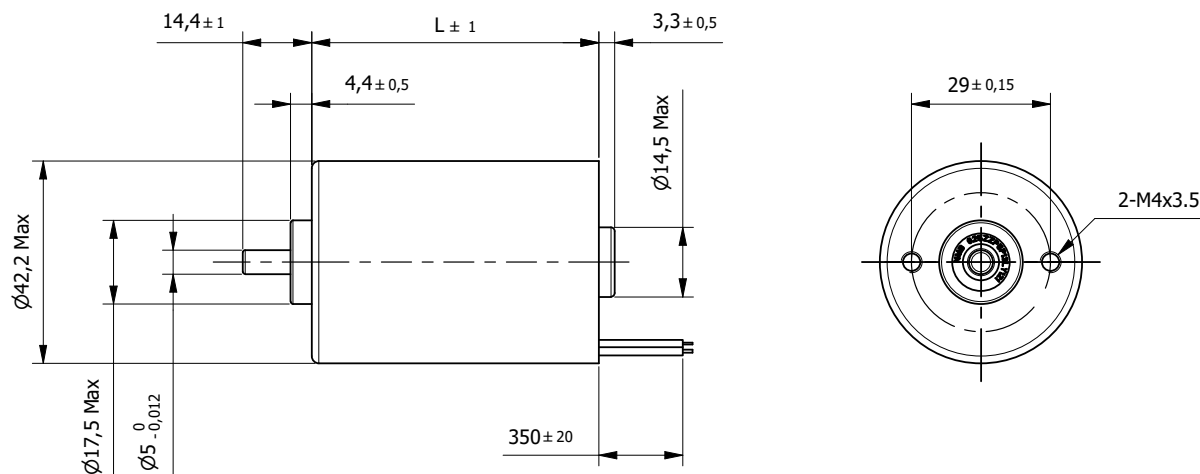
Connection	
Pin n°	Function
1	+5V Voltage output
2	F/R Rotation direction
3	SV Speed voltage 0/+5VDC
4	PG Speed Pulse output TTL.24 pulse/rev.
5	GND Common ground system
6	GND Common ground system
7	+Vp DC power input +24VDC

Brushless Slotted Motor 42CBL60-IE

with Speed Controller

Ø 42mm

0,068Nm



Specification			
Model		42CBL60-IE	
1	n° of Pole		4
2	n° of Phase		3
3	Rated Voltage	V	24
4	Rated Speed	rpm	5900
5	Rated Torque	Nm	0,068
6	Max. Peak Torque	Nm	0,2
7	Torque Constant	Nm/A	0,032
8	Rated Current	A	2,13
9	Max. Peak Current	A	6,6
10	No-Load Current	mA	250
11	Line to Line Resistance	Ω	0,82
12	Line to Line Inductance	mH	0,75
13	Rotor Inertia	gcm ²	44
14	Length (L)	mm	60
15	Weight	Kg	0,35

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	Red	UL1430 AWG22	VCC +24VDC
2	Black		GND
3	Green	UL1430 AWG26	CW/CCW Direction
4	White		PWM speed control
5	Blue		Brake
6	Yellow	UL1332 AWG22	Tacho Out

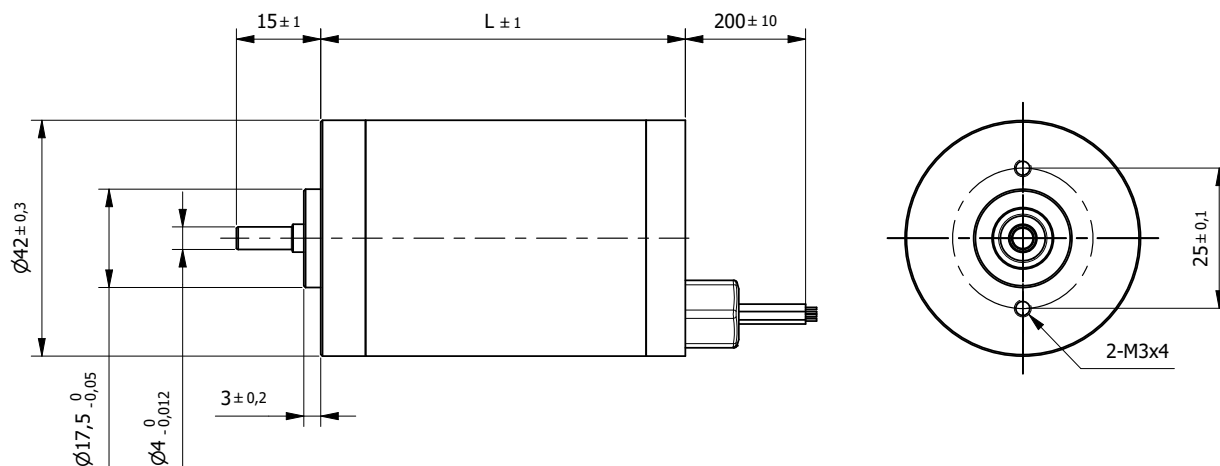
Motor + Controller

Brushless Slotted Motor 42RBL60-IE

with Speed Controller

Ø 42mm

0,056Nm



Specification			
Model		42RBL60-IE	
1	n° of Pole		8
2	n° of Phase		3
3	Rated Voltage	V	24
4	Rated Speed	rpm	4200
5	Rated Torque	Nm	0,056
6	Max. Peak Torque	Nm	0,105
7	Torque Constant	Nm/A	0,041
8	Rated Current	A	1,35
9	Max. Peak Current	A	3
10	No-Load Current	A	<0,4
11	Line to Line Resistance	Ω	1,6
12	Line to Line Inductance	mH	1,94
13	Rotor Inertia	gcm ²	33
14	Length (L)	mm	65
15	Weight	Kg	0,4

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

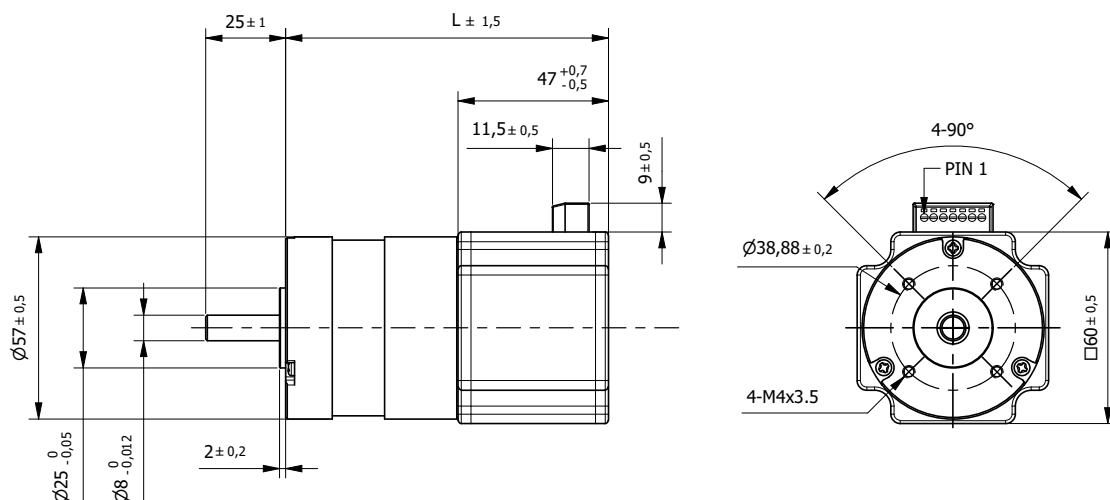
Connection		
Color	Gauge	Function
Red	UL1007 AWG22	VCC +
Black		GND
White		CW/CCW Direction
Blue		SV Speed Control
Yellow		Tacho out

Brushless Slotted Motor 57BL-IE

with Speed Controller

Ø 57mm

0,11 - 0,33Nm



Specification					
	Model	57BL54-IE	57BL74-IE	57BL94-IE	
1	n° of Pole	4	4	4	
2	n° of Phase	3	3	3	
3	Rated Voltage	V	36	36	
4	Rated Speed	rpm	4000	4000	
5	Rated Torque	Nm	0,11	0,22	0,33
6	Max. Peak Torque	Nm	0,39	0,7	1
7	Torque Constant	Nm/A	0,061	0,06	0,065
8	Rated Current	A	1,8	3,67	5,08
9	Max. Peak Current	A	6,8	12	16
10	No-Load Current	mA	300	400	450
11	Line to Line Resistance	Ω	1,5	0,58	0,45
12	Line to Line Inductance	mH	4,4	2	1,5
13	Rotor Inertia	gcm2	75	119	173
14	Length (L)	mm	101	121	141
15	Weight	Kg	0,67	0,9	1,2

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 sec.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection	
Pin n°	Function
1	+Vp DC power input +36VDC
2	GND DC power input GND
3	GND Common ground system
4	PG Speed pulse output TTL.6 pulse/rev.
5	SV Reference speed voltage 0/+5V
6	F/R Rotation direction
7	+5V Voltage output

Motor + Controller



Brushless DC motors
with Motion controller

Advantages at a glance
Compact construction
Integrated Motion, Speed and Current control
Parametrization and programming with software

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 RS485 Modbus-RTU or CANopen fieldbuses. 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.

Brushless DC motors with Motion controller	Torque* (Nm)	
IBS42	0,062...0,25	196
IBS57	0,055...0,44	197
IBS80 - NEW	0,8...1,13	198
IBI80 - IP65	0,8...1,13	199

* Rated Torque

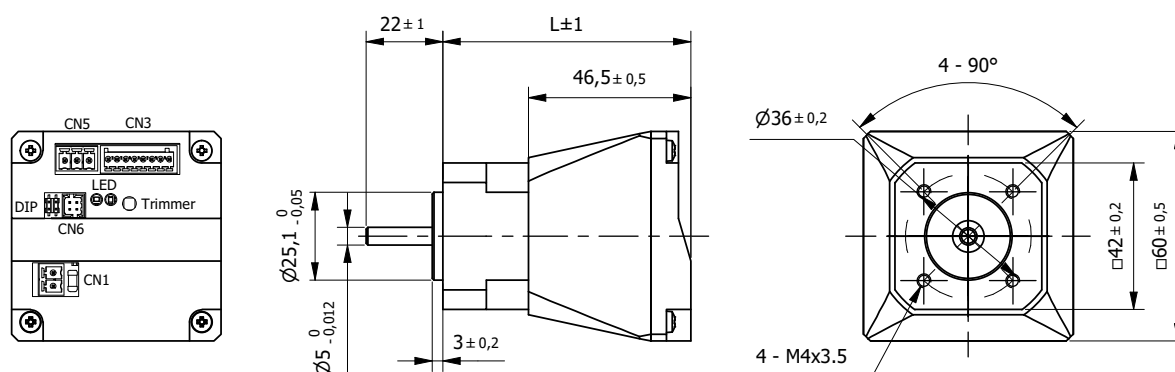
Brushless Slotted Motor IBS42

with Motion Controller

□ 42mm

0,062 - 0,25Nm

CN1 - Phoenix 1707421 : DC Supply
CN3 - Phoenix 1781120 : Inputs and Outputs
CN5 - Phoenix 1800312 : Interface
CN6 : Service SCI Interface



Specification		...026E	...050E	...074E	...100E
Model					
1	n° of Pole	8	8	8	8
2	n° of Phase	3	3	3	3
3	Rated Voltage	V	24	24	24
4	Operating Voltage	Vdc	24-36	24-36	24-36
5	Rated Speed	rpm	4000	4000	4000
6	Rated Torque	Nm	0,062	0,125	0,25
7	Max. Peak Torque	Nm	0,19	0,38	0,75
8	Torque Constant	Nm/A	0,035	0,036	0,036
9	Rated Current	A	1,8	3,5	7
10	Max. Peak Current	A	5,4	10,7	20,8
11	No-Load Current	mA	<500	<500	<600
12	Line to Line Resistance	Ω	1,5	0,8	0,3
13	Line to Line Inductance	mH	2,1	1,2	0,5
14	Rotor Inertia	gcm ²	24	48	96
15	Length (L)	mm	74,5	94,5	134,5
16	Weight	Kg	0,5	0,65	0,85

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP20
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 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating mode	Position, Speed, Torque
Feedback options	Hall effect sensor or Encoder
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	Serial interface
Software	Setup & config. - DL Studio Programming - DL Space
Note: Service SCI Interface cable is required for programming and available on request	

Interface Control Mode	
Fieldbus	Part number
Analog	... A001-S300
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (DS402)	... C001-S402
CANopen (programmable)	... C001-S200

Connection		
Inputs	Digital inputs	3 not isolated 5-24 Vdc NPN or Push Pull
	Analog inputs	1 with potentiometer or 0-10 Vdc
Output	Digital outputs	2 not isolated open drain, 5-24 Vdc 100mA
Mating connectors included. More information can be found in the product manual on our website.		

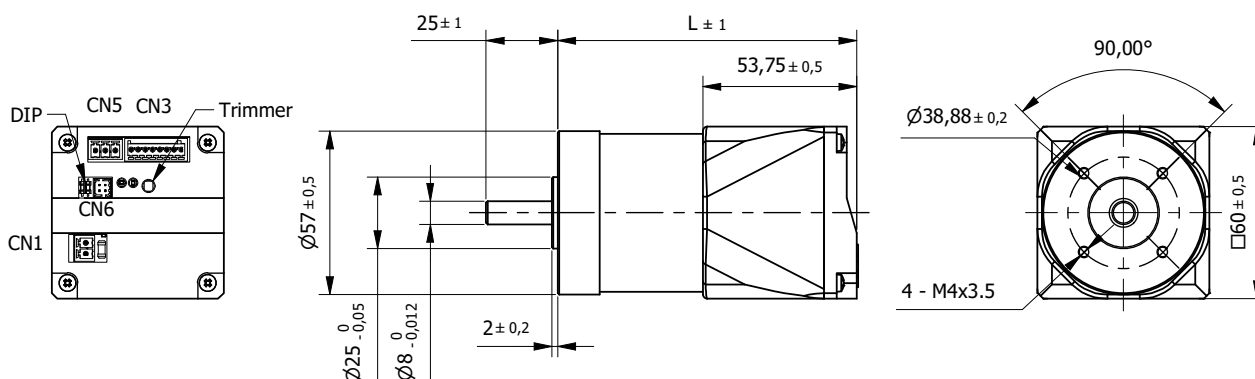
Brushless Slotted Motor IBS57

with Motion Controller

Ø 57mm

0,055 - 0,44Nm

CN1 - Phoenix 1707421 : DC Supply
CN3 - Phoenix 1781120 : Inputs and Outputs
CN5 - Phoenix 1800312 : Interface
CN6 : Service SCI Interface



Specification		Model	...022E	...044E	...088E	...128E	...168E
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	36
4	Operating Voltage	Vdc	24-36	24-36	24-36	24-36	24-36
5	Rated Speed	rpm	4000	4500	4000	4000	4000
6	Rated Torque	Nm	0,055	0,11	0,22	0,33	0,44
7	Max. Peak Torque	Nm	0,16	0,33	0,66	0,99	1,3
8	Torque Constant	Nm/A	0,052	0,06	0,06	0,063	0,063
9	Rated Current	A	1,1	1,8	3,7	5,2	7
10	Max. Peak Current	A	3,1	5,5	11	15,7	20,6
11	No-Load Current	mA	<400	<400	<500	<600	<650
12	Line to Line Resistance	Ω	4,3	1,6	0,6	0,45	0,33
13	Line to Line Inductance	mH	8,6	4,4	2	1,5	0,95
14	Rotor Inertia	gcm2	30	75	119	173	230
15	Length (L)	mm	74,35	84,35	104,35	124,35	144,35
16	Weight	Kg	0,58	0,7	1	1,2	1,45

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,025mm
Insulation Class	B
Protection Class	IP20
Radial play (460g load)	0,025mm
Axial play (4000g load)	0,025mm
Max. Radial force (20mm from flange)	75N
Max. Axial force	15N
Dielectric strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating mode	Position, Speed, Torque
Feedback options	Hall effect sensor or Encoder
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	Serial interface
Software	Setup & config. - DL Studio Programming - DL Space
Note: Service SCI Interface cable is required for programming and available on request	

Connection		
Inputs	Digital inputs	3 not isolated 5-24 Vdc NPN or Push Pull
	Analog inputs	1 with potentiometer or 0-10 Vdc
Output	Digital outputs	2 not isolated open drain, 5-24 Vdc 100mA
Mating connectors included. More information can be found in the product manual on our website.		

Interface Control Mode	
Fieldbus	Part number
Analog	... A001-S300
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (DS402)	... C001-S402
CANopen (programmable)	... C001-S200

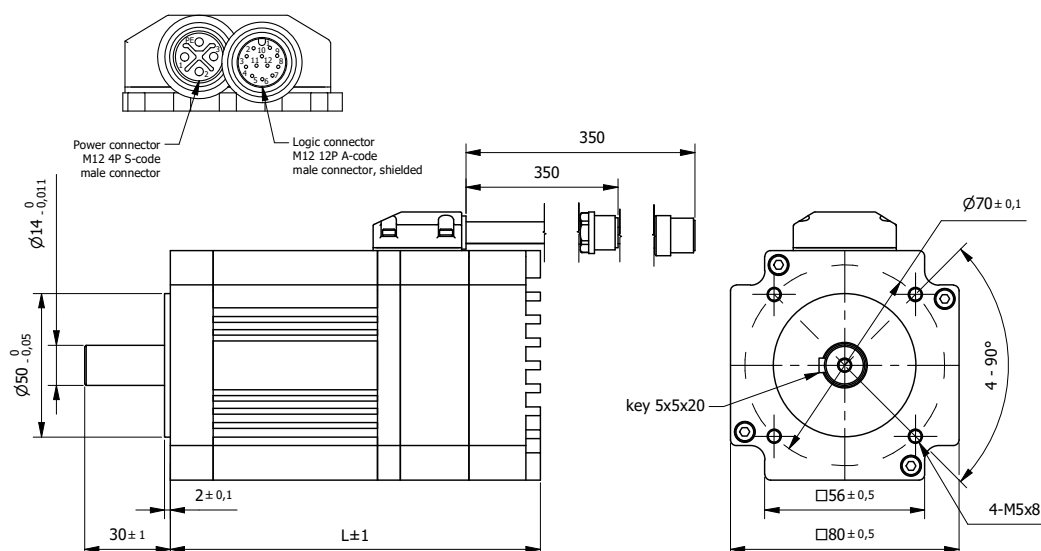
Motor + Controller

Brushless Slotted Motor IBS80

with Motion Controller

□ 80mm

0,8 - 1,13Nm



Specification			
Model		...290E	...362E
1	n° of Pole	8	8
2	n° of Phase	3	3
3	Rated Voltage	V	40
4	Operating Voltage	Vdc	24-48
5	Rated Speed	rpm	3210
6	Rated Torque	Nm	0,8
7	Max. Peak Torque	Nm	2,4
8	Torque Constant	Nm/A	0,094
9	Rated Current	A	10
10	Max. Peak Current	A	30
11	No-Load Current	mA	700
12	Line to Line Resistance	Ω	0,17
13	Line to Line Inductance	mH	0,89
14	Rotor Inertia	gcm ²	680
15	Length (L)	mm	120
16	Weight	Kg	2,1

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	F
Protection Class	IP54
Radial play (450g load)	0,04mm
Axial play (450g load)	0,08mm
Max. Radial force (at mid-shaft)	330N
Max. Axial force	764N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating mode	Position, Speed, Torque
Encoder	Magnetic Incremental and Absolute Single turn
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	CAN/RS485 interface
Software	Setup & config. - DL Studio Programming - DL Space

Interface Control Mode	
Fieldbus	Part number
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (programmable)	... C001-S200

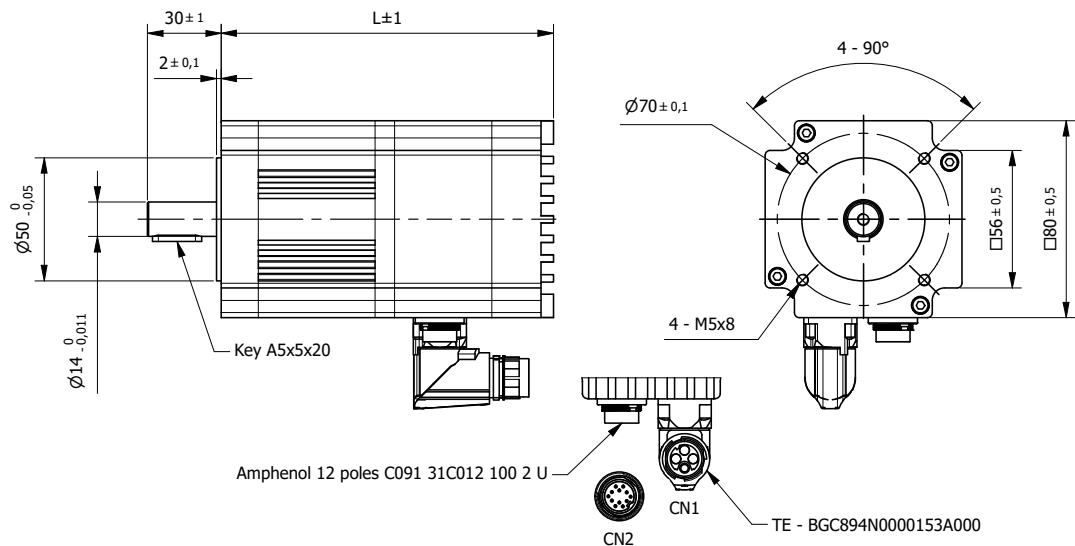
Connection		
Inputs	Digital inputs	4 not isolated 24 Vdc PNP
	Analog inputs	1 0-10 Vdc
Output	Digital outputs	2 not isolated 24 Vdc PNP
CN1		4-Pin Power connector
CN2		12-Pin Logic connector
Cable kit available on request. More information can be found in the product manual on our website.		

Brushless Slotted Motor IBI80

with Motion Controller - IP65

□ 80mm

0,8 - 1,13Nm



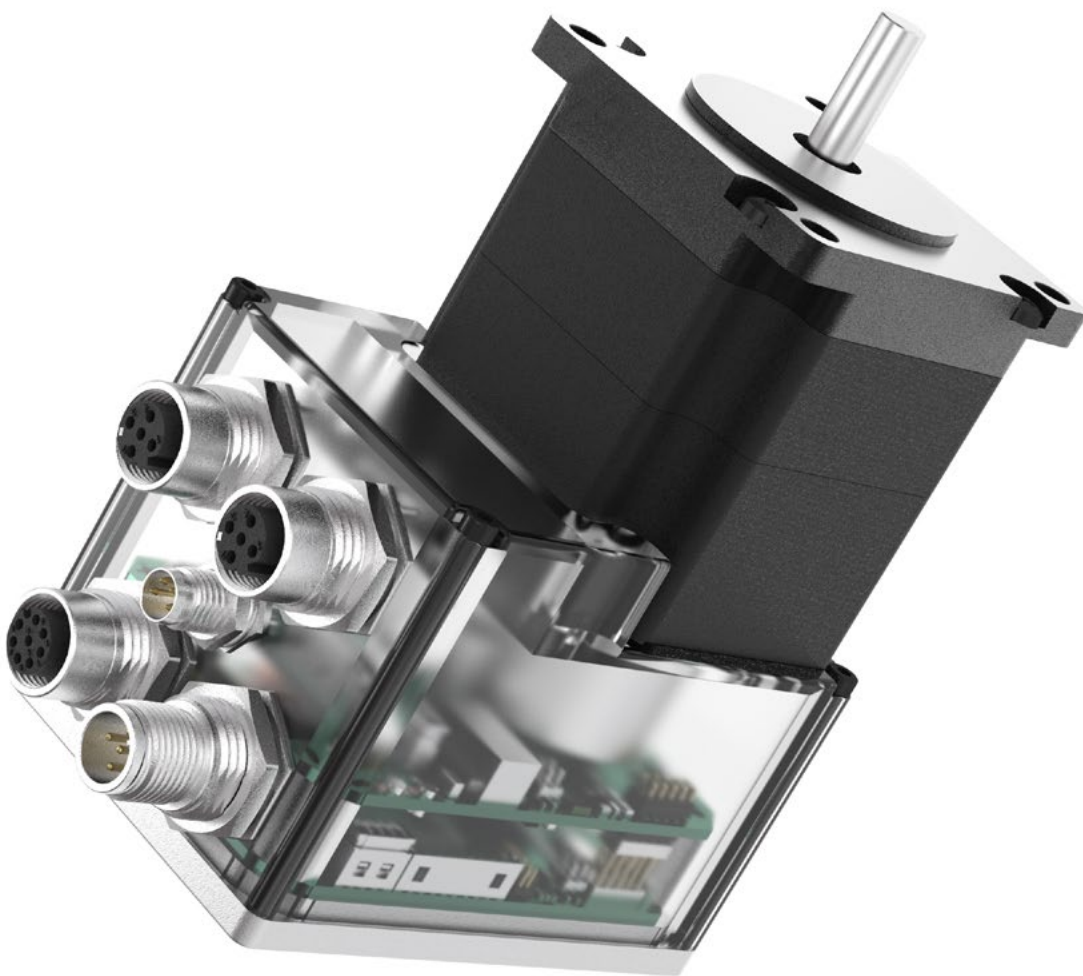
Specification				
Model		...290E-IP	...362E-IP	
1	n° of Pole	8	8	
2	n° of Phase	3	3	
3	Rated Voltage	V	40	40
4	Operating Voltage	Vdc	24-48	24-48
5	Rated Speed	rpm	3210	3210
6	Rated Torque	Nm	0,8	1,13
7	Max. Peak Torque	Nm	2,4	3,4
8	Torque Constant	Nm/A	0,094	0,085
9	Rated Current	A	10	13,3
10	Max. Peak Current	A	30	40
11	No-Load Current	mA	700	600
12	Line to Line Resistance	Ω	0,17	0,11
13	Line to Line Inductance	mH	0,89	0,52
14	Rotor Inertia	gcm2	680	680
15	Length (L)	mm	135	145
16	Weight	Kg	2,1	2,2

Characteristics	
Item	
Hall Effect Angle	120°
Shaft run out	0,05mm
Insulation Class	F
Protection Class	IP65
Radial play (450g load)	0,04mm
Axial play (450g load)	0,08mm
Max. Radial force (at mid-shaft)	330N
Max. Axial force	764N
Dielectric strength (for 1 min.)	500 VDC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating mode	Position, Speed, Torque
Encoder	Magnetic Incremental and Absolute Single turn
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	CAN/RS485 interface
Software	Setup & config. - DL Studio Programming - DL Space

Connection		
Inputs	Digital inputs	4 not isolated 24 Vdc PNP
	Analog inputs	1 0-10 Vdc
Output	Digital outputs	2 not isolated 24 Vdc PNP
CN1		4-Pin Power connector
CN2		12-Pin Logic connector
Cable kit not provided. More information can be found in the product manual on our website.		

Interface Control Mode	
Fieldbus	Part number
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (programmable)	... C001-S200

Motor + Controller



Stepper motors **with Motion controller**

Advantages at a glance
Compact construction
Integrated Motion, Speed and Current control
Parametrization and programming with software

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, and Profinet, 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.

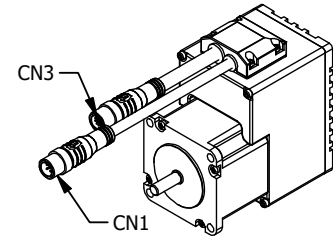
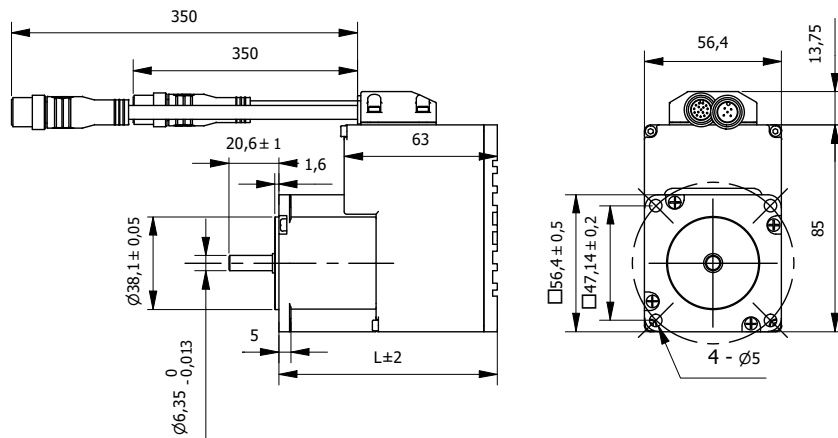
Stepper motors with Motion controller	Torque** (Nm)	
ISS57 - NEW	0,55...1,89	202
ISI57 - IP65	0,55...1,89	203
ISS60 - NEW	1...3,1	204
ISI60 - IP65	1...3,1	205
ISS86 - NEW	3,4...12	206

** Holding Torque

Stepper Motor ISS57

with Motion Controller

□ 57mm



CN1: Power connector M12 A-Code, 5 pins Male
CN3: Logic connector M12 A-Code, 17 pins Male

Specification			...090E	...100E	...104E	...125E
1	Operating Voltage	Vdc	12÷48	12÷48	12÷48	12÷48
2	Current/Phase	A	2,8	2,8	2,8	2,8
3	Resistance/Phase	Ω	0,7	0,83	0,84	1,13
4	Inductance/Phase	mH	1,4	2,5	2,9	4
5	Holding Torque	Nm	0,55	1	1,26	1,89
6	Rotor Inertia	gcm ²	120	275	300	480
7	Detent Torque	Nm	0,021	0,036	0,04	0,067
8	Length (L)	mm	90	100	104	125

Interface Control Mode	
Fieldbus	Part number
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (programmable)	... C001-S200
CANopen (DS402)	... C001-S402
Ethernet Modbus TCP (programmable)	... T001-S200
EtherCAT CoE (DS 402)	... E001-S402
Profinet (programmable)	... P001-S200

Connection		
Inputs	Digital inputs	4 not isolated 5-24 Vdc PNP
	Analog inputs	1 with potentiometer or 0-10 Vdc
Output	Digital outputs	2 not isolated open drain, 5-24 Vdc 100mA

Cable kit available on request. More information can be found in the product manual on our website.

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Protection Class	IP30
Ambient Temperature	+5°C to +40°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)	75 N
Max Axial Force	15 N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating mode	Position, Speed, Torque
Encoder	Incremental
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	Serial interface
Software	Setup & config. - DL Studio Programming - DL Space

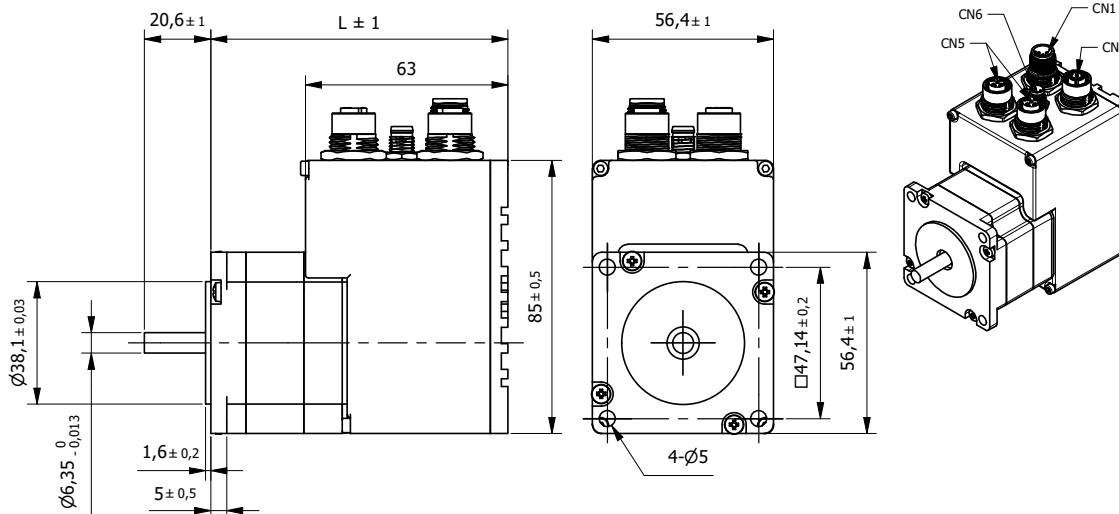
Note: Service SCI Interface cable is required for programming and available on request

Stepper Motor ISI57

with Motion Controller - IP65

□ 57mm

CN1: Power Supply
CN3: Inputs and Outputs
CN5: Communication Interface
CN6: Service Serial Interface



Specification			...093E-IP	...103E-IP	...107E-IP	...128E-IP
1	Operating Voltage	Vdc	12÷48	12÷48	12÷48	12÷48
2	Current/Phase	A	2,8	2,8	2,8	2,8
3	Resistance/Phase	Ω	0,7	0,83	0,9	1,13
4	Inductance/Phase	mH	1,4	2,2	2,5	3,6
5	Holding Torque	Nm	0,55	1	1,26	1,89
6	Rotor Inertia	gcm ²	120	275	300	480
7	Detent Torque	Nm	0,021	0,036	0,04	0,067
8	Length (L)	mm	93,78	103,78	107,78	128,78

Interface Control Mode	
Fieldbus	Part number
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (programmable)	... C001-S200
CANopen (DS402)	... C001-S402
Ethernet Modbus TCP (programmable)	... T001-S200
EtherCAT CoE (DS 402)	... E001-S402
Profinet (programmable)	... P001-S200

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Protection Class	IP65
Ambient Temperature	+5°C to +40°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
Operating mode	Position, Speed, Torque
Encoder	Incremental
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	Serial interface
Software	Setup & config. - DL Studio Programming - DL Space

Note: Service SCI Interface cable is required for programming and available on request

Connection		
Inputs	Digital inputs	4 not isolated 5-24 Vdc PNP
	Analog inputs	1 with potentiometer or 0-10 Vdc
Output	Digital outputs	2 not isolated open drain, 5-24 Vdc 100mA

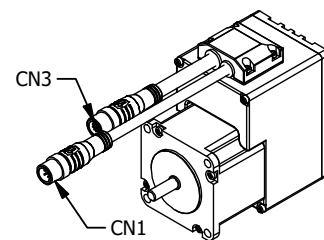
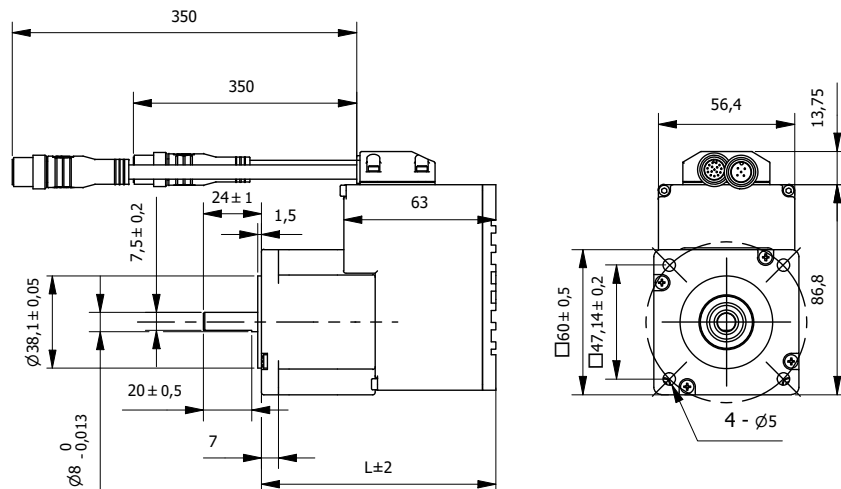
Cable kit available on request. More information can be found in the product manual on our website.

Motor + Controller

Stepper Motor ISS60

with Motion Controller

□ 60mm



CN1: Power connector M12 A-Code, 5 pins Male
CN3: Logic connector M12 A-Code, 17 pins Male

Specification			...099E	...108E	...119E	...140E
1	Operating Voltage	Vdc	12÷48	12÷48	12÷48	12÷48
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	7,2
5	Holding Torque	Nm	1	1,75	2,1	3,1
6	Rotor Inertia	gcm ²	275	440	570	840
7	Detent Torque	Nm	0,05	0,069	0,088	0,098
8	Length (L)	mm	99	108	119	140

Interface Control Mode	
Fieldbus	Part number
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (programmable)	... C001-S200
CANopen (DS402)	... C001-S402
Ethernet Modbus TCP (programmable)	... T001-S200
EtherCAT CoE (DS 402)	... E001-S402
Profinet (programmable)	... P001-S200

Connection		
Inputs	Digital inputs	4 not isolated 5-24 Vdc PNP
	Analog inputs	1 with potentiometer or 0-10 Vdc
Output	Digital outputs	2 not isolated open drain, 5-24 Vdc 100mA

Cable kit available on request. More information can be found in the product manual on our website.

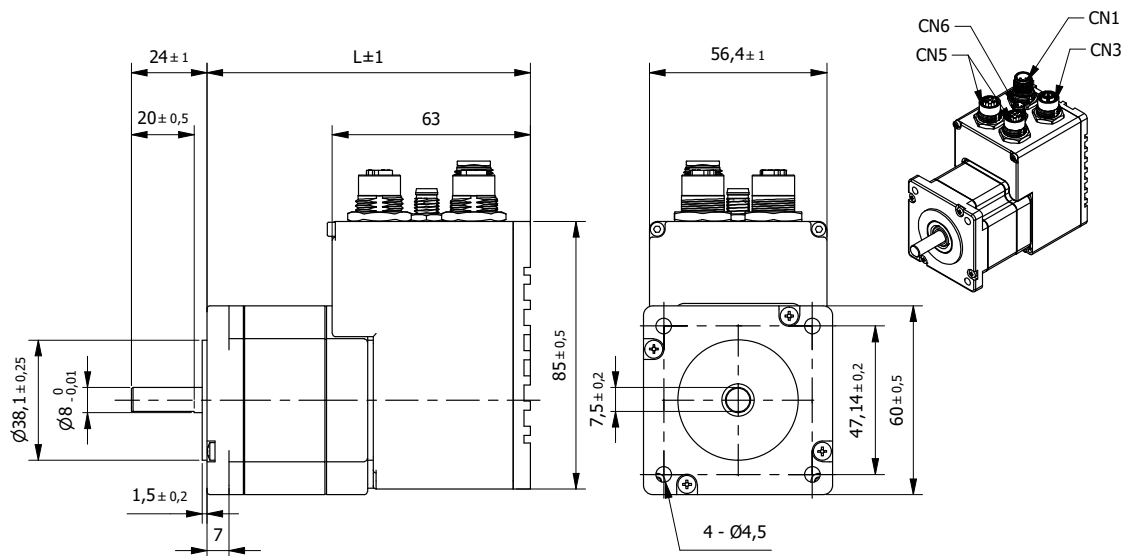
Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Protection Class	IP30
Ambient Temperature	+5°C to +40°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,02mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial Force (20mm from front flange)	75 N
Max Axial Force	15 N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating mode	Position, Speed, Torque
Encoder	Incremental
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	Serial interface
Software	Setup & config. - DL Studio Programming - DL Space

Note: Service SCI Interface cable is required for programming and available on request

Stepper Motor ISI60

with Motion Controller - IP65

□ 60mm



Specification			...102E-IP	...111E-IP	...122E-IP	...143E-IP
1	Operating Voltage	Vdc	12÷48	12÷48	12÷48	12÷48
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	7,2
5	Holding Torque	Nm	1	1,75	2,1	3,1
6	Rotor Inertia	gcm ²	275	440	570	840
7	Detent Torque	Nm	0,05	0,069	0,088	0,098
8	Length (L)	mm	102,78	111,78	122,78	143,78

Interface Control Mode	
Fieldbus	Part number
Serial RS485 Modbus-RTU (programmable)	... M001-S200
CANopen (programmable)	... C001-S200
CANopen (DS402)	... C001-S402
Ethernet Modbus TCP (programmable)	... T001-S200
EtherCAT CoE (DS 402)	... E001-S402
Profinet (programmable)	... P001-S200

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Protection Class	IP65
Ambient Temperature	+5°C to +40°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
Operating mode	Position, Speed, Torque
Encoder	Incremental
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	Serial interface
Software	Setup & config. - DL Studio Programming - DL Space

Note: Service SCI Interface cable is required for programming and available on request

Connection	
Inputs	Digital inputs 4 not isolated 5-24 Vdc PNP Analog inputs 1 with potentiometer or 0-10 Vdc
Output	Digital outputs 2 not isolated open drain, 5-24 Vdc 100mA

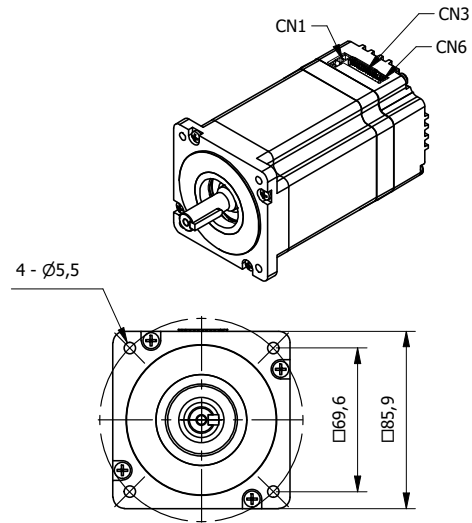
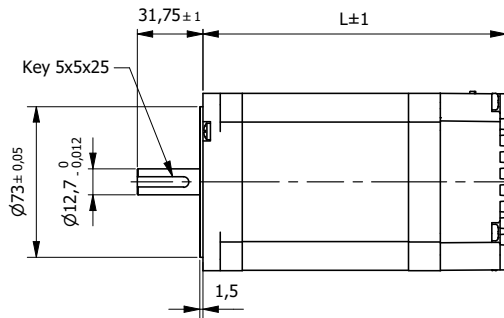
Cable kit available on request. More information can be found in the product manual on our website.

Stepper Motor ISS86

with Motion Controller

□ 86mm

CN1: Power Supply
CN3: Inputs and Outputs
CN6: Service Serial Interface



Specification			...097E	...112E	...128E	...150E	...188E
1	Operating Voltage	Vdc	24÷36	24÷36	24÷36	24÷36	24÷36
2	Current/Phase	A	3	5,5	5,5	6	6,2
3	Resistance/Phase	Ω	1,14	0,42	0,47	0,5	0,68
4	Inductance/Phase	mH	6,8	3,5	4,5	6	9
5	Holding Torque	Nm	3,4	4,5	7	8,5	12
6	Rotor Inertia	gcm ²	1000	1400	2700	2700	4000
7	Detent Torque	Nm	0,08	0,12	0,12	0,24	0,36
8	Length (L)	mm	97	112	128	150	188

Interface Control Mode	
Fieldbus	Part number
Serial RS485 Modbus-RTU (programmable)	... M001-S200

Connection	
Inputs	Digital inputs 3 not isolated 3V3 logic level input
Output	Digital outputs 3 not isolated 3V3 push pull output
Cable and connector kit available on request. More information can be found in the product manual on our website.	

Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Protection Class	IP30
Ambient Temperature	+5°C to +40°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)	220 N
Max Axial Force	60 N
Dielectric Strength (for 1 min.)	600 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm
Operating mode	Position, Speed, Torque
Encoder	Magnetic Incremental and Absolute Single turn
Protective functions	Over/Under voltage, Over current, Overheating, Short circuit
Debug & configuration	Serial interface
Software	Setup & config. - DL Studio Programming - DL Space

Note: Service SCI Interface cable is required for programming and available on request

Stepper



Permanent Magnet Stepper

p.217



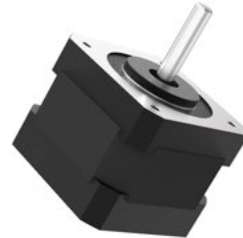
Flat Hybrid Stepper

p.297



Hybrid Stepper
S series
Standard

p.227



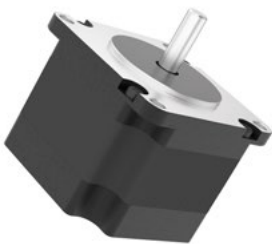
Hybrid Stepper
SH series
High Torque

p.237



Hybrid Stepper
STC series
Connector

p.273



3-Phase Hybrid Stepper

p.283



Hollow Shaft Stepper

p.289



Hybrid Stepper
with Encoder

p.301



IP65 Hybrid Stepper

p.307

Stepper Motors

Technical introduction	214
Permanent Magnet Stepper motors	Torque* (Nm)
15PM12	0,003...0,004
20PM18	0,005
25PM15	0,01...0,016
35PM	0,04...0,055
42PM	0,05...0,06
57PM25	0,12...0,15
Hybrid Stepper motors - S Standard series	Torque* (Nm)
57S41...76	0,288...1,25
86S67...125	2,3...7,6
Hybrid Stepper motors - SH High Torque series	Torque* (Nm)
14SH30 - NEW	0,006
20SH	0,018...0,03
25SH23	0,033
28SH32...51	0,043...0,12
35SH	0,07...0,14
39SH20...38	0,065...0,29
42SH33...60	0,158...0,8
42SH33...47M - step 0,9°	0,158...0,44
57SH41...76	0,39...1,89
57SH41...76M - step 0,9°	0,39...1,8
60SH45...86	0,78...3,1
86SH65...156	2,6...12,1
110SH	11,2...28
Hybrid Stepper motors - STC Connector series	Torque* (Nm)
20STC	0,022...0,036
28STC32...51	0,08...0,18
57STC41...76	0,6...2,3
3-Phase Hybrid Stepper motors	Torque* (Nm)
42 3P	0,08...0,2
57 3P	0,45...1,5
60 3P53	0,9
Hollow Shaft Stepper motors	Torque* (Nm)
20STC40 H	0,036
28STC51 H	0,12
35STC38 H	0,23
42STC47 H	0,44
57STC76 H	2,3
86SH118 H	6
Flat Hybrid Stepper motors	Torque* (Nm)
28S10	0,01
63S10	0,064
Stepper motors with Encoder	Torque* (Nm)
42SC	0,22...0,75
60SC	1...3
86SC	3,5...12
IP65 Hybrid Stepper motors	Torque* (Nm)
SM28 070 - IP65	0,127
SM42-E - IP65	0,16...0,72
SM57-E - IP65	0,7...1,95

* 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

Product families
Permanent Magnet Stepper motors
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.

Often referred to as "tin can" or "can stack" motor the permanent magnet step motor is a low cost and low resolution type motor. PM motors have permanent magnets added to the motor structure. The rotor no longer has teeth, instead the rotor is magnetized with alternating north and south poles situated in a straight line parallel to the rotor shaft. These motors offer good torque at lower speed.

Permanent Magnets stepper motors

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.

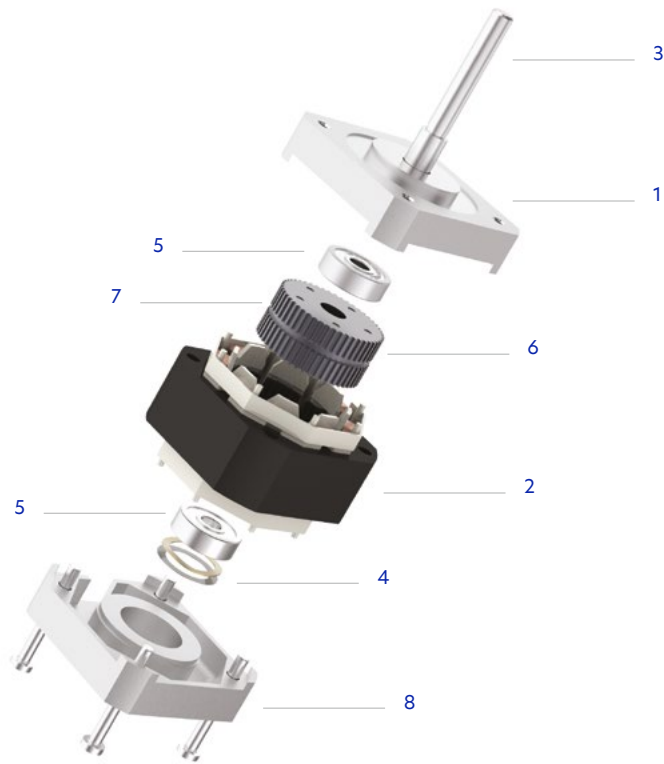
3-Phase Hybrid Stepper motors

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 is critical to know the status of the motor (both position and speed) in every instant.

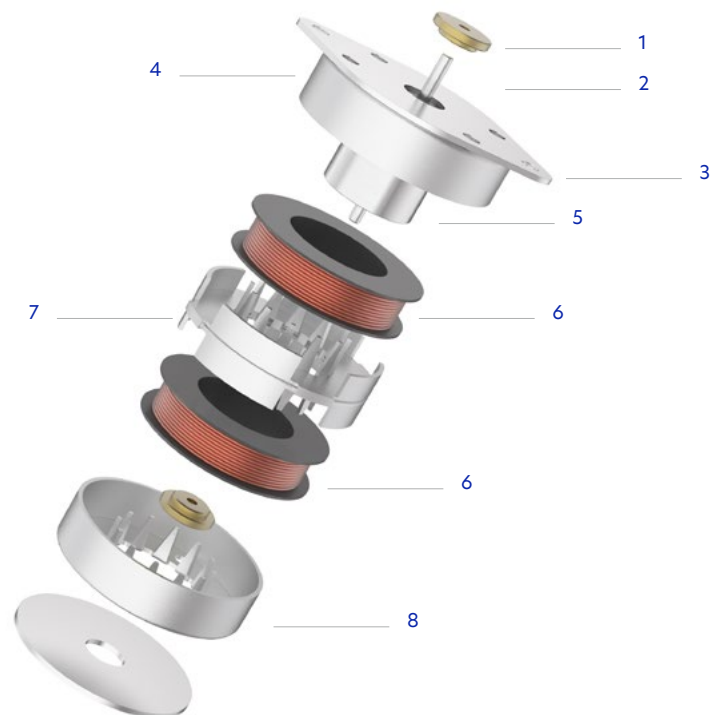
Stepper motors with integrated Encoder

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





Stepper motors

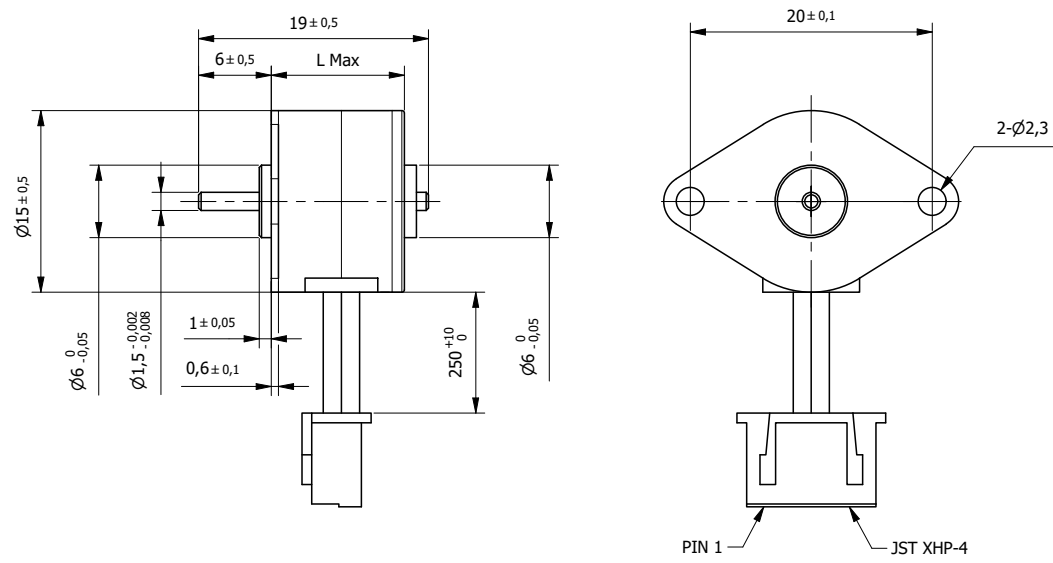
Permanent Magnet

Advantages at a glance
Cost-efficient
Good torque at lower speed
Low noise

Often referred to as “tin can” or “can stack” motor the permanent magnet step motor is a low cost and low resolution type motor. PM motors have permanent magnets added to the motor structure. The rotor no longer has teeth, instead the rotor is magnetized with alternating north and south poles situated in a straight line parallel to the rotor shaft. These motors offer good torque at lower speed.

Permanent Magnet Stepper motors	Torque* (Nm)	
15PM12	0,003...0,004	218
20PM18	0,005	219
25PM15	0,01...0,016	220
35PM	0,04...0,055	221
42PM	0,05...0,06	222
57PM25	0,12...0,15	223

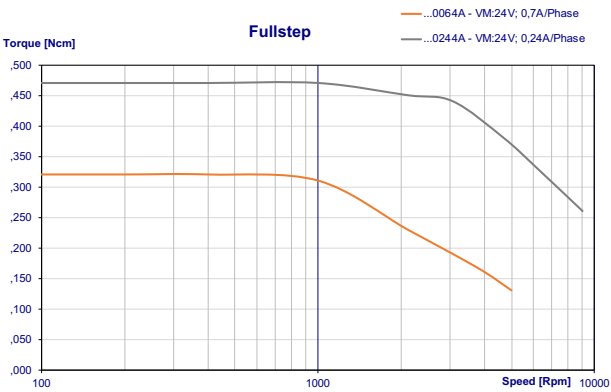
* Holding Torque

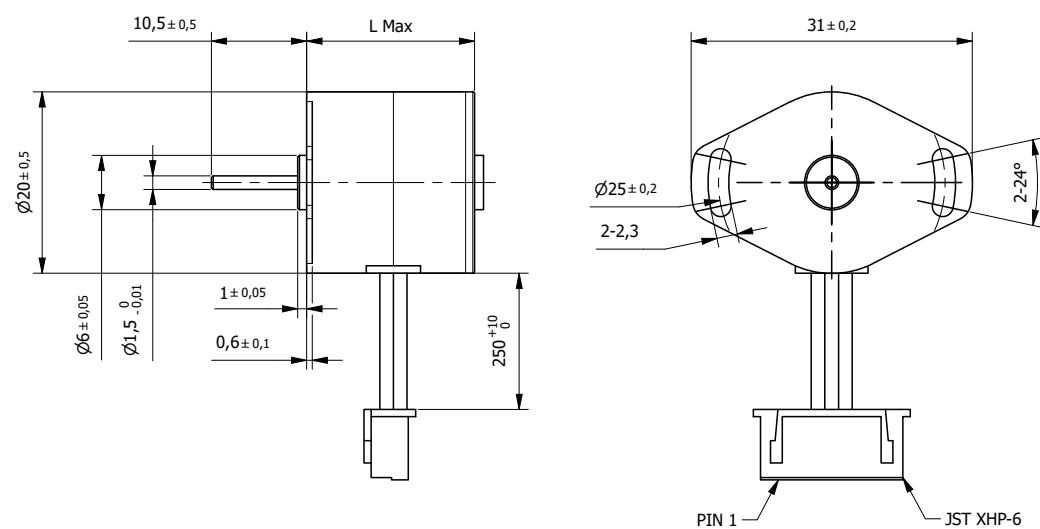


Specification				
Model		...0064A	...0244A	
1	Rated Voltage	V	12	12
2	Current/Phase	A	0,065	0,24
3	Resistance/Phase	Ω	190	50
4	Inductance/Phase	mH	37	9,5
5	Holding Torque	Nm	0,003	0,004
6	Rotor Inertia	gcm2	1	1
7	n°of Leads		4	4
8	Length (L)	mm	12	12
9	Weight	Kg	0,012	0,012

Characteristics	
Item	
Step angle	18°
Step angle Accuracy	±8%
Insulation Class	E
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Radial Force (3mm from front flange)	2N
Max. Axial Force	1N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin n°	Color	Gauge	Function
1	White	UL1430 AWG30	Phase A
2	Red		Phase A-
3	Blue		Phase B
4	Yellow		Phase B-

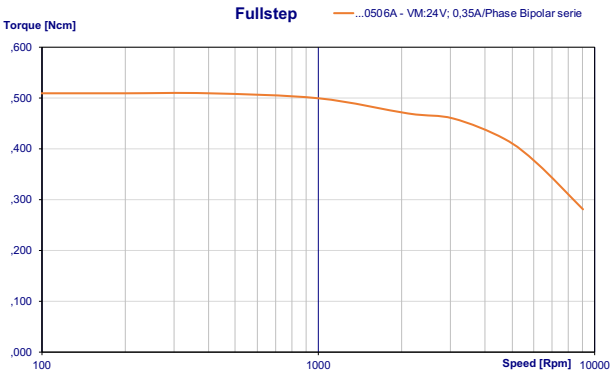


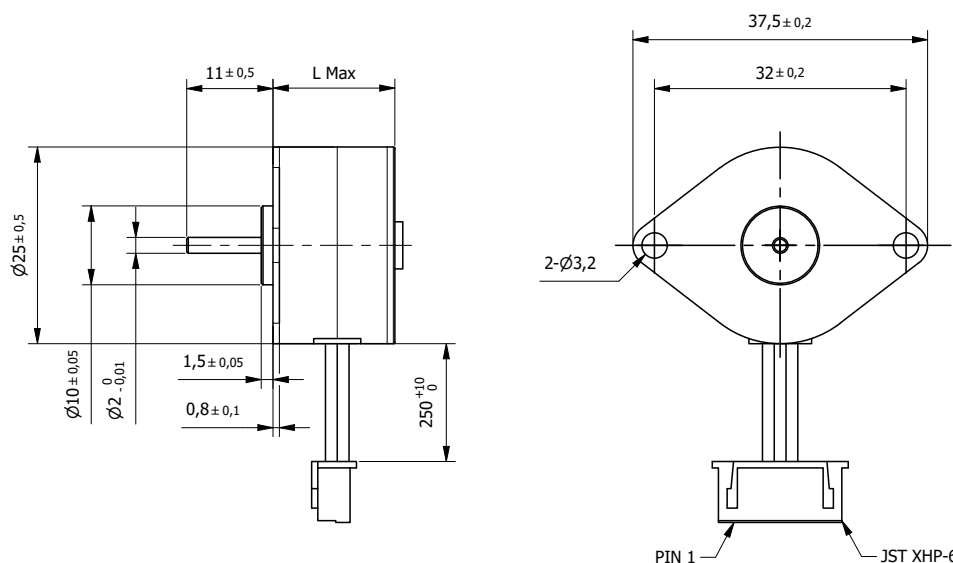


Specification			
Model		...0506A	
1	Rated Voltage	V	5
2	Current/Phase	A	0,5
3	Resistance/Phase	Ω	10
4	Inductance/Phase	mH	1,85
5	Holding Torque	Nm	0,005
6	Rotor Inertia	gcm2	1
7	n°of Leads		6
8	Length (L)	mm	18,5
9	Weight	Kg	0,026

Characteristics	
Item	
Step angle	18°
Step angle Accuracy	±5%
Insulation Class	B
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Radial Force (3mm from front flange)	2N
Max. Axial Force	1N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin n°	Color	Gauge	Function
1	White	UL1430 AWG30	Phase A
2	Red		Phase A-
3	Blue		Phase B
4	Yellow		Phase B-
5	Black		COM Phase A
6	Brown		COM Phase B

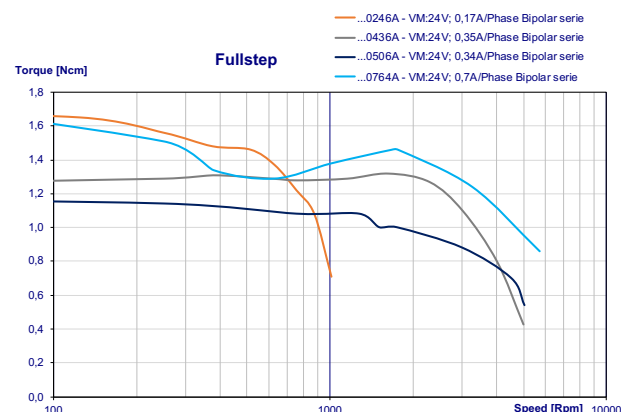


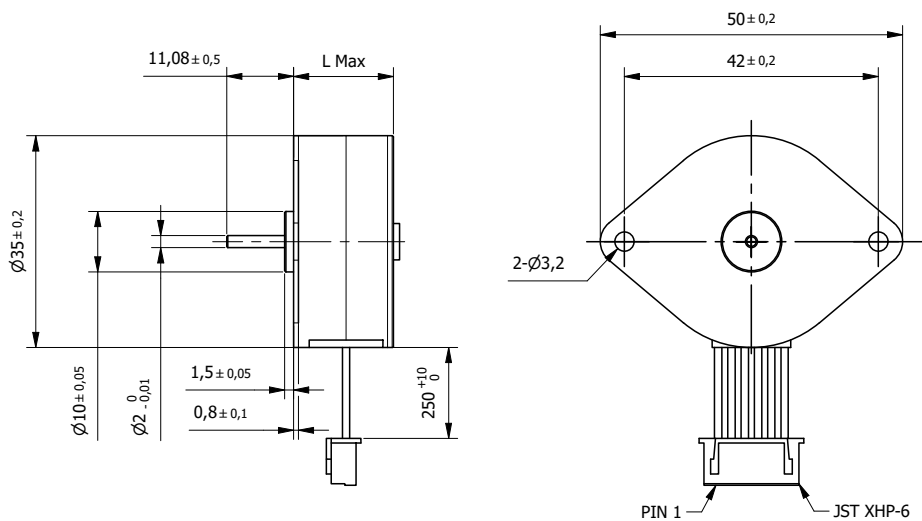


Specification			...0246A	...0436A	...0506A	...0764A
1	Rated Voltage	V	12	5	5	3,8
2	Current/Phase	A	0,24	0,43	0,5	0,76
3	Resistance/Phase	Ω	50	11,5	10	5
4	Inductance/Phase	mH	3	2,3	1,8	3
5	Holding Torque	Nm	0,016	0,01	0,014	0,01
6	Rotor Inertia	gcm ²	1	1	1	1
7	n°of Leads		6	6	6	4
8	Length (L)	mm	15,5	15,5	15,5	15,5
9	Weight	Kg	0,036	0,036	0,036	0,036

Characteristics	
Item	
Step angle	7,5°
Step angle Accuracy	±8%
Insulation Class	B
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Radial Force (3mm from front flange)	3N
Max. Axial Force	1,5N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin n°	Color	Gauge	Function
1	White	UL1430 AWG30	Phase A
2	Red		Phase A-
3	Blue		Phase B
4	Yellow		Phase B-
5	Black		COM Phase A
6	Brown		COM Phase B

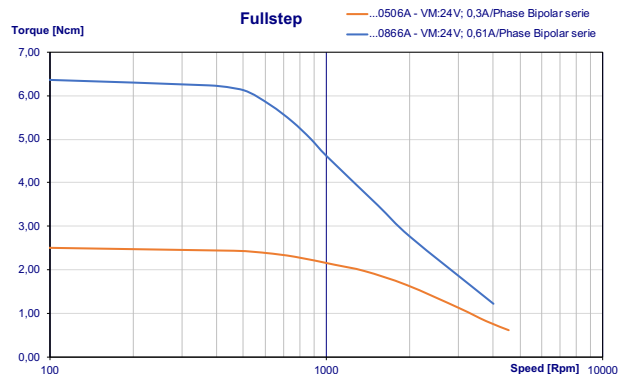


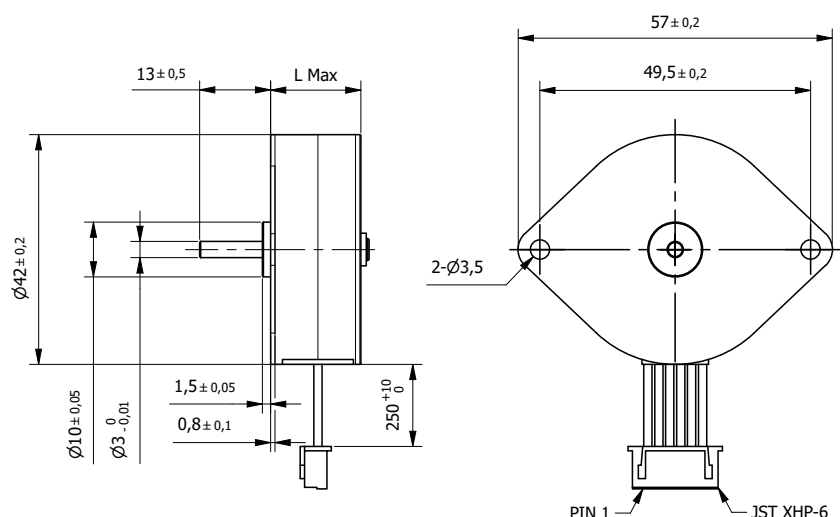


Specification				
Model		...16-0506A	...22-0866A	
1	Rated Voltage	V	5	5
2	Current/Phase	A	0,5	0,86
3	Resistance/Phase	Ω	10	5,8
4	Inductance/Phase	mH	3,8	3,2
5	Holding Torque	Nm	0,04	0,055
6	Rotor Inertia	gcm2	5	7,5
7	n° of Leads		6	6
8	Length (L)	mm	16,5	22
9	Weight	Kg	0,09	0,09

Characteristics	
Item	
Step angle	7,5°
Step angle Accuracy	±7%
Insulation Class	B
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Radial Force (3mm from front flange)	3N
Max. Axial Force	1,5N
Dielectric Strength (for 1 min.)	500 VAC
Insulation Resistance (min. 500 VDC)	100 Mohm

Connection			
Pin n°	Color	Gauge	Function
1	White	UL1430 AWG30	Phase A
2	Red		Phase A-
3	Blue		Phase B
4	Yellow		Phase B-
5	Black		COM Phase A
6	Brown		COM Phase B

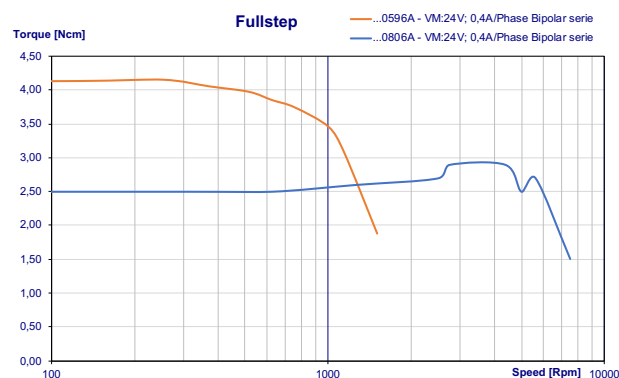


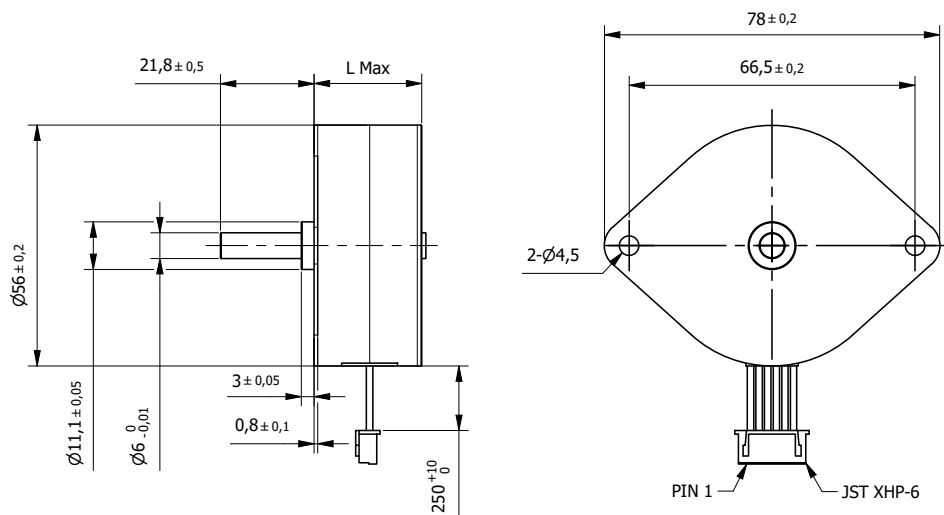


Specification			
Model		...17-0596A	...22-0806A
1	Rated Voltage	V	5
2	Current/Phase	A	0,59
3	Resistance/Phase	Ω	8,6
4	Inductance/Phase	mH	4,5
5	Holding Torque	Nm	0,05
6	Rotor Inertia	gcm ²	9,6
7	n°of Leads		6
8	Length (L)	mm	17
9	Weight	Kg	0,11

Characteristics	
Item	
Step angle	7,5°
Step angle Accuracy	±7%
Insulation Class	B
Ambient Temperature	-10°C to +40°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Radial Force (3mm from front flange)	5N
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	White	UL1430 AWG30	Phase A
2	Red		Phase A-
3	Blue		Phase B
4	Yellow		Phase B-
5	Black		COM Phase A
6	Brown		COM Phase B

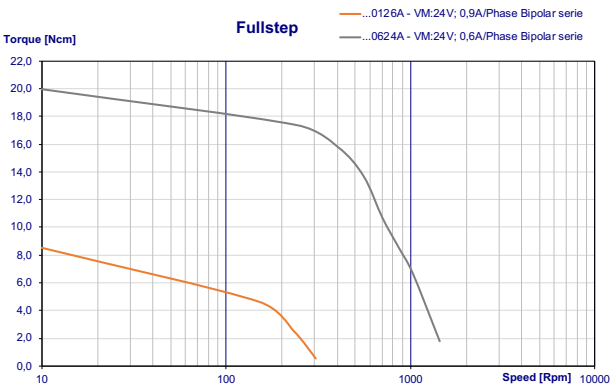




Specification				
Model		...0126A	...0624A	
1	Rated Voltage	V	12	5,6
2	Current/Phase	A	0,12	0,625
3	Resistance/Phase	Ω	100	9
4	Inductance/Phase	mH	107	19,9
5	Holding Torque	Nm	0,15	0,12
6	Rotor Inertia	gcm2	12,5	12,5
7	n° of Leads		6	4
8	Length (L)	mm	25	25
9	Weight	Kg	0,27	0,27

Characteristics	
Item	
Step angle	7,5°
Step angle Accuracy	±8%
Insulation Class	B
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Radial Force (3mm from front flange)	5N
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	White	UL1430 AWG30	Phase A
2	Red		Phase A-
3	Blue		Phase B
4	Yellow		Phase B-
5	Black		COM Phase A
6	Brown		COM Phase B





Hybrid Stepper
S series
Standard

p.227



Hybrid Stepper
SH series
High Torque

p.237



Hybrid Stepper
STC series
Connector

p.273

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.

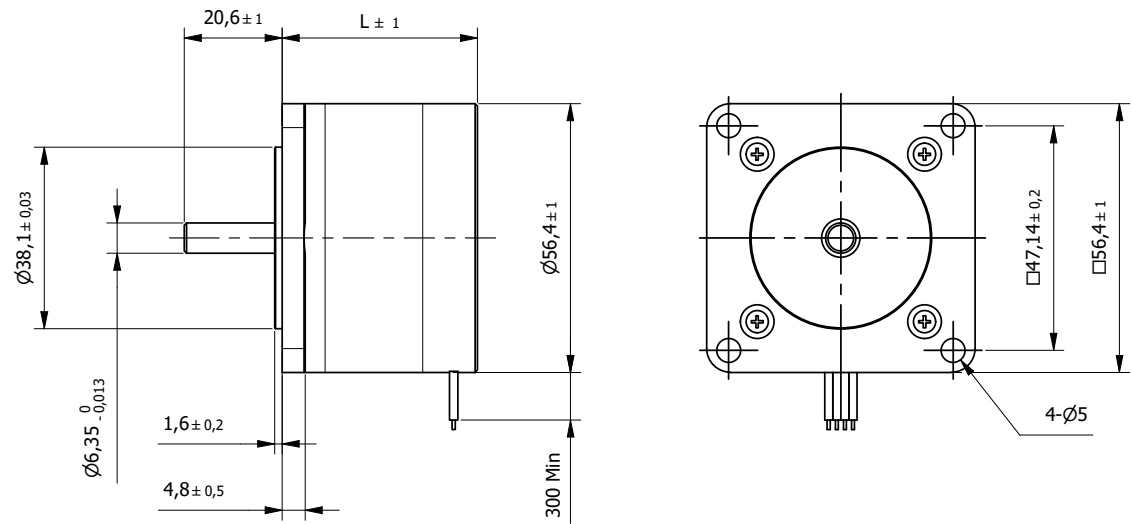
Hybrid Stepper motors - S Standard series	Torque* (Nm)	227
57S41	0,29...0,4	228
57S51	0,49...0,69	229
57S56	0,6...0,84	230
57S76	0,9...1,25	231
86S67	2,3...2,8	232
86S94	3,8...4,8	233
86S125	6,2...7,6	234
Hybrid Stepper motors - SH High Torque series	Torque* (Nm)	237
14SH30 - NEW	0,006	238
20SH	0,018...0,03	239
25SH23	0,033	240
28SH32	0,043...0,06	241
28SH45	0,075...0,095	242
28SH51	0,09...0,12	243
35SH	0,07...0,14	244
39SH20	0,065...0,08	245
39SH34	0,13...0,21	246
39SH38	0,2...0,29	247
42SH33	0,158...0,22	248
42SH38	0,259...0,36	249
42SH47	0,317...0,44	250
42SH60	0,65...0,8	251
42SH33M - step 0,9°	0,158...0,22	252
42SH38M - step 0,9°	0,259...0,36	253
42SH47M - step 0,9°	0,317...0,44	254
57SH41	0,39...0,55	255
57SH51	0,72...1,01	256
57SH56	0,9...1,26	257
57SH76	1,35...1,89	258
57SH41M - step 0,9°	0,39...0,55	259
57SH56M - step 0,9°	0,9...1,26	260
57SH76M - step 0,9°	1,35...1,8	261
60SH45	0,78...1,1	262
60SH56	1,17...1,65	263
60SH65	1,5...2,1	264
60SH86	2,2...3,1	265
86SH65	2,6...3,4	266
86SH80	4,6	267
86SH96	7,0	268
86SH118	8,7	269
86SH156	12,1	270
110SH	11,2...28	271

* Holding Torque



Hybrid Stepper motors
S series - Standard

Hybrid Stepper motors - S Standard series	Torque* (Nm)	
57S41	0,29...0,4	228
57S51	0,49...0,69	229
57S56	0,6...0,84	230
57S76	0,9...1,25	231
86S67	2,3...2,8	232
86S94	3,8...4,8	233
86S125	6,2...7,6	234

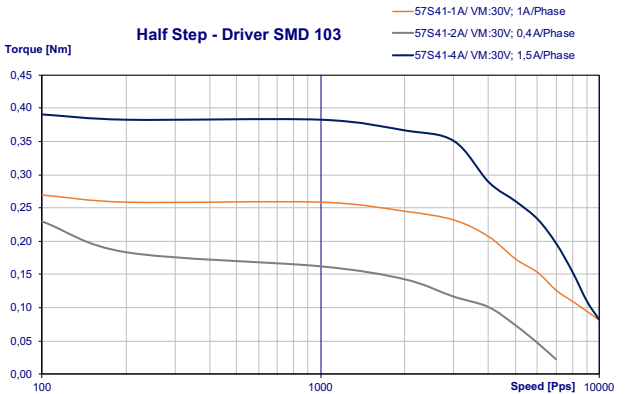


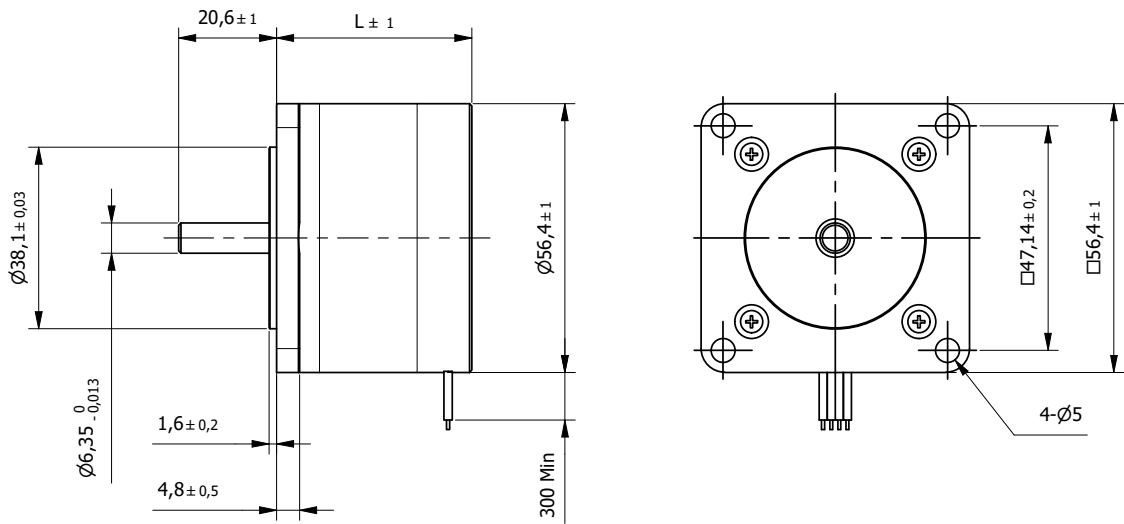
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
	Model		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	gcm2	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



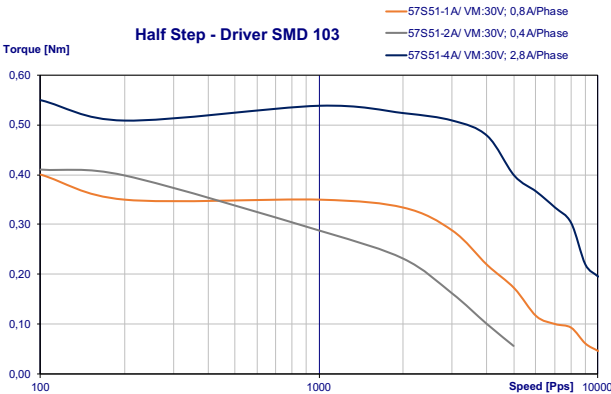


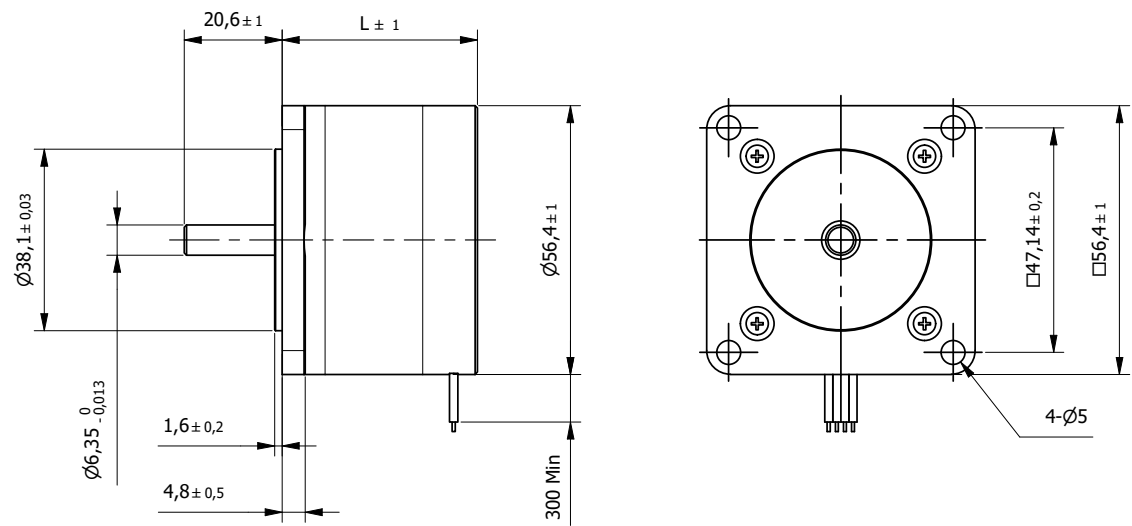
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
	Model		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	gcm2	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



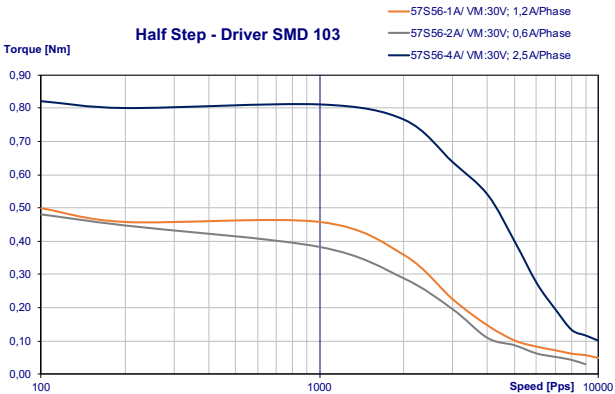


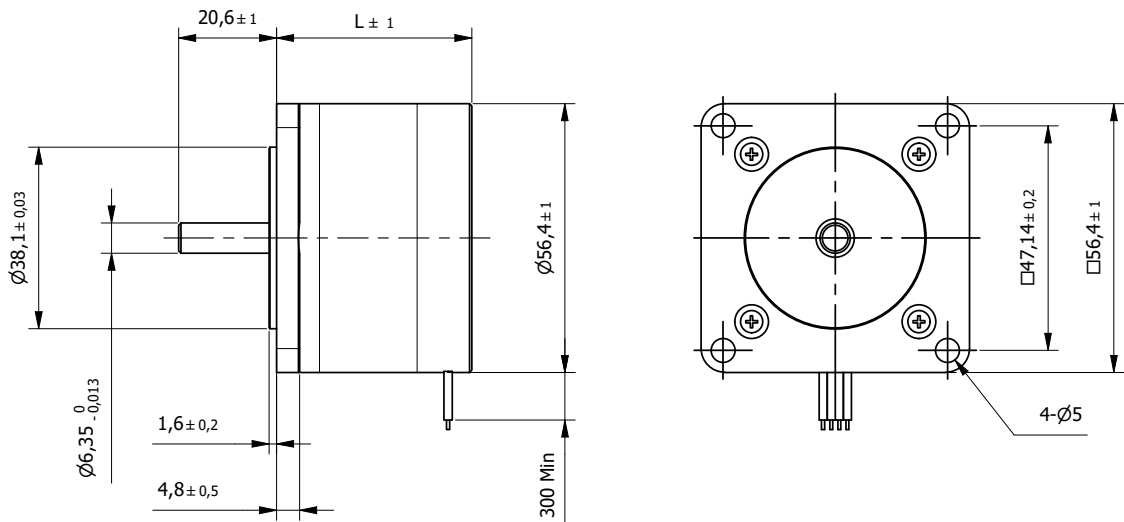
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
	Model		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	gcm2	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



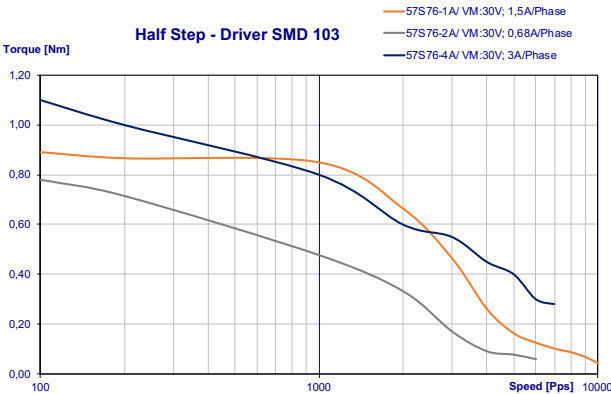


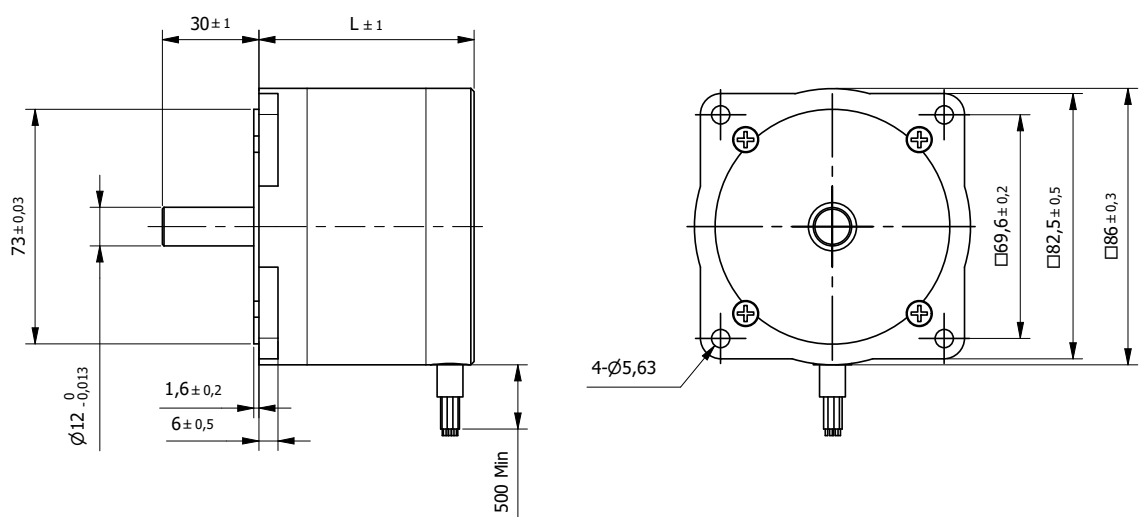
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
	Model		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	gcm2	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



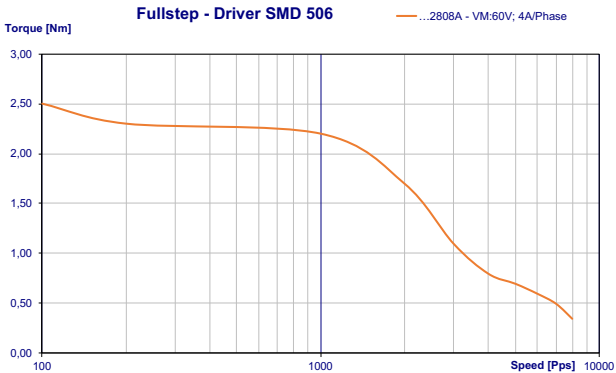


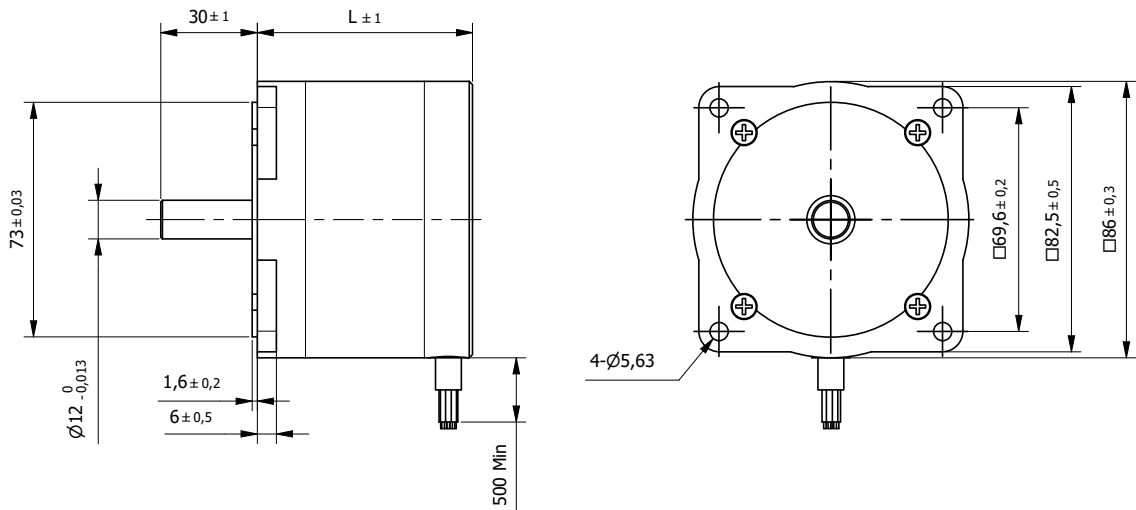
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
Model			86S67-2808A		
			Unipolar	Parallel	Series
1	Rated Voltage	V	3,64	2,54	5
2	Current/Phase	A	2,8	3,92	1,96
3	Resistance/Phase	Ω	1,3	0,65	2,6
4	Inductance/Phase	mH	5,1	5,1	20,4
5	Holding Torque	Nm	2,3	2,8	2,8
6	Rotor Inertia	gcm2	660	660	660
7	Detent Torque	Nm	0,085	0,085	0,085
8	n° of Leads		8	8	8
9	Length (L)	mm	67	67	67
10	Weight	Kg	1,6	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



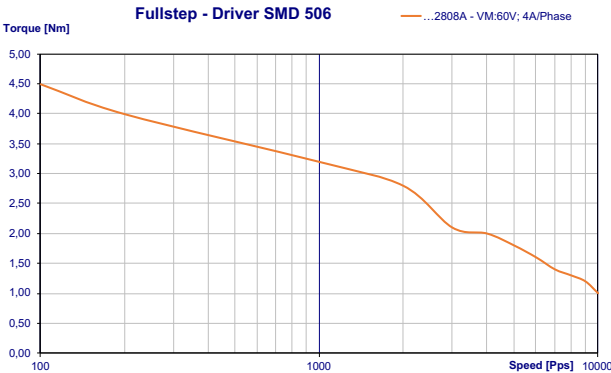


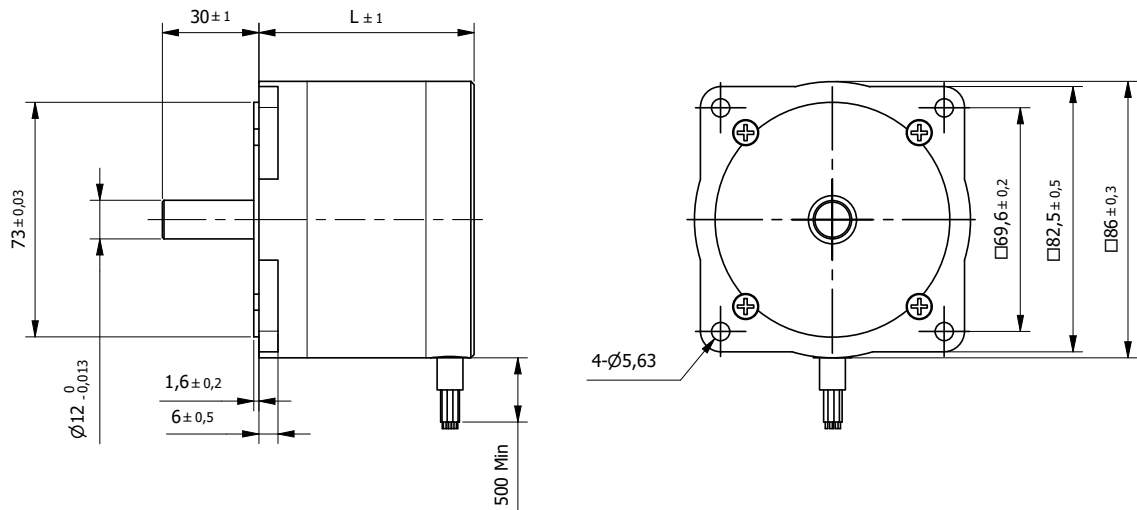
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
Model			86S94-2808A		
			Unipolar	Parallel	Series
1	Rated Voltage	V	4,76	2,54	6,6
2	Current/Phase	A	2,8	3,92	1,96
3	Resistance/Phase	Ω	1,7	0,85	3,4
4	Inductance/Phase	mH	7,7	7,7	30,8
5	Holding Torque	Nm	3,8	4,8	4,8
6	Rotor Inertia	gcm2	1200	1200	1200
7	Detent Torque	Nm	0,13	0,13	0,13
8	n° of Leads		8	8	8
9	Length (L)	mm	94	94	94
10	Weight	Kg	2,4	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



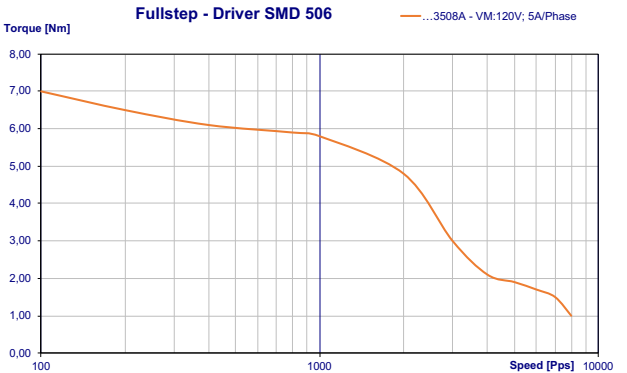


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
Model			86S125-3508A		
			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	gcm2	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



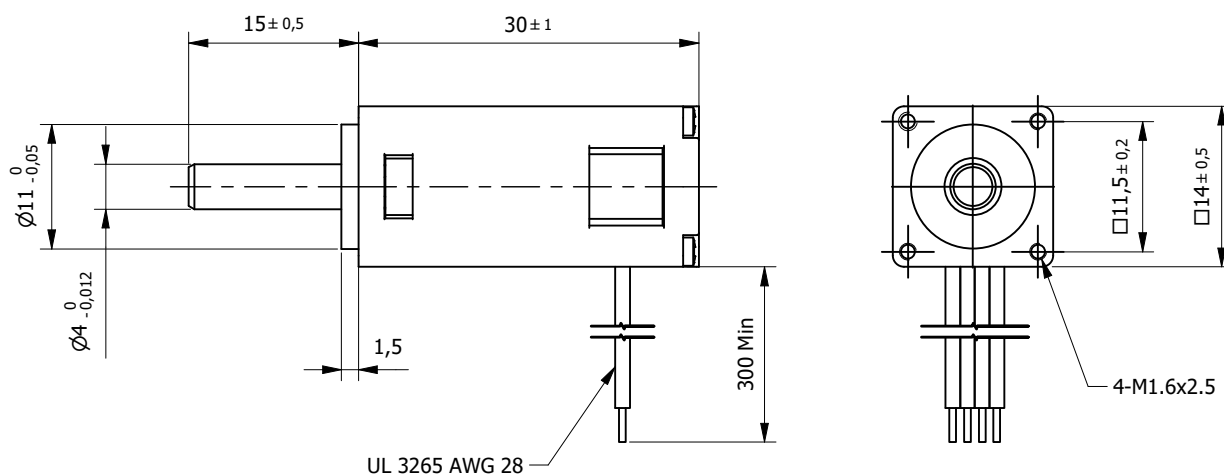


Hybrid Stepper motors

SH series - High Torque

Hybrid Stepper motors - SH High Torque series	Torque* (Nm)	
14SH30 - NEW	0,006	238
20SH	0,018...0,03	239
25SH23	0,033	240
28SH32	0,043...0,06	241
28SH45	0,075...0,095	242
28SH51	0,09...0,12	243
35SH	0,07...0,14	244
39SH20	0,065...0,08	245
39SH34	0,13...0,21	246
39SH38	0,2...0,29	247
42SH33	0,158...0,22	248
42SH38	0,259...0,36	249
42SH47	0,317...0,44	250
42SH60	0,65...0,8	251
42SH33M - step 0,9°	0,158...0,22	252
42SH38M - step 0,9°	0,259...0,36	253
42SH47M - step 0,9°	0,317...0,44	254
57SH41	0,39...0,55	255
57SH51	0,72...1,01	256
57SH56	0,9...1,26	257
57SH76	1,35...1,89	258
57SH41M - step 0,9°	0,39...0,55	259
57SH56M - step 0,9°	0,9...1,26	260
57SH76M - step 0,9°	1,35...1,8	261
60SH45	0,78...1,1	262
60SH56	1,17...1,65	263
60SH65	1,5...2,1	264
60SH86	2,2...3,1	265
86SH65	2,6...3,4	266
86SH80	4,6	267
86SH96	7,0	268
86SH118	8,7	269
86SH156	12,1	270
110SH	11,2...28	271

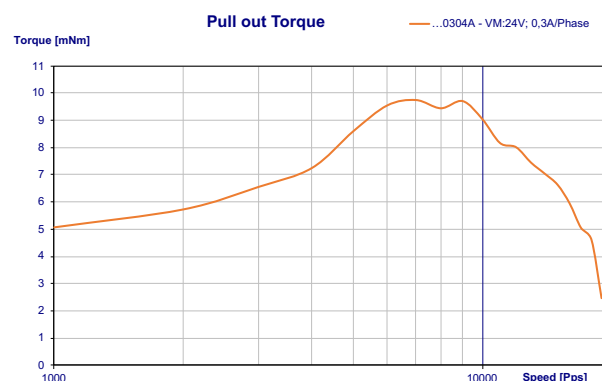
* Holding Torque



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	±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

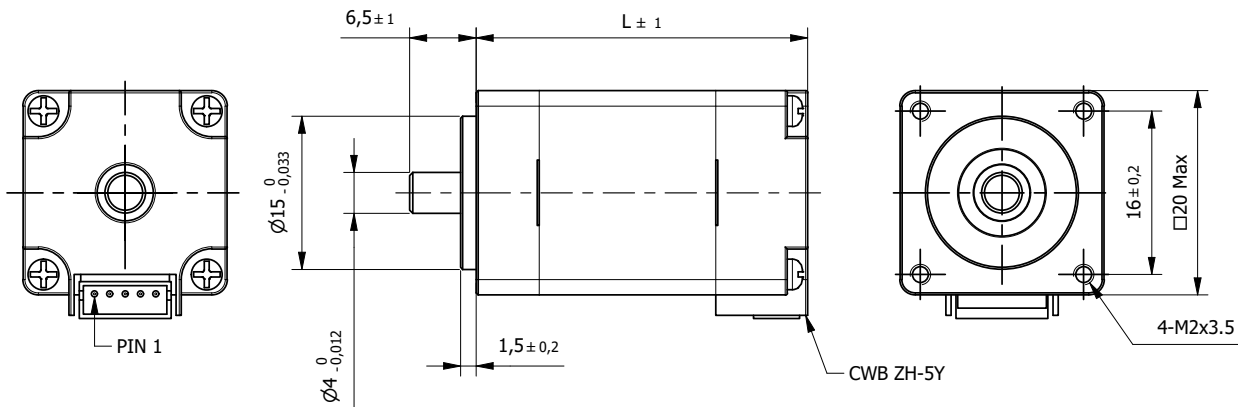
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL3265 AWG28	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 20SH

High Torque

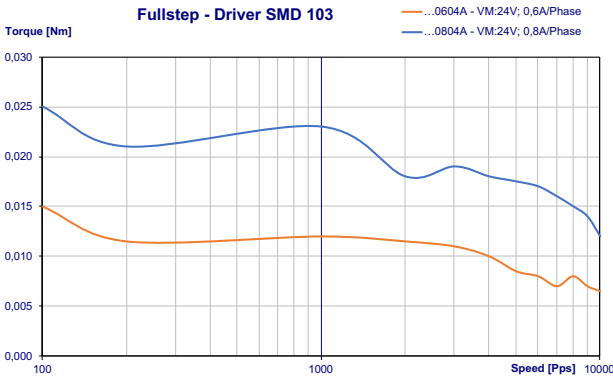
□ 20mm



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

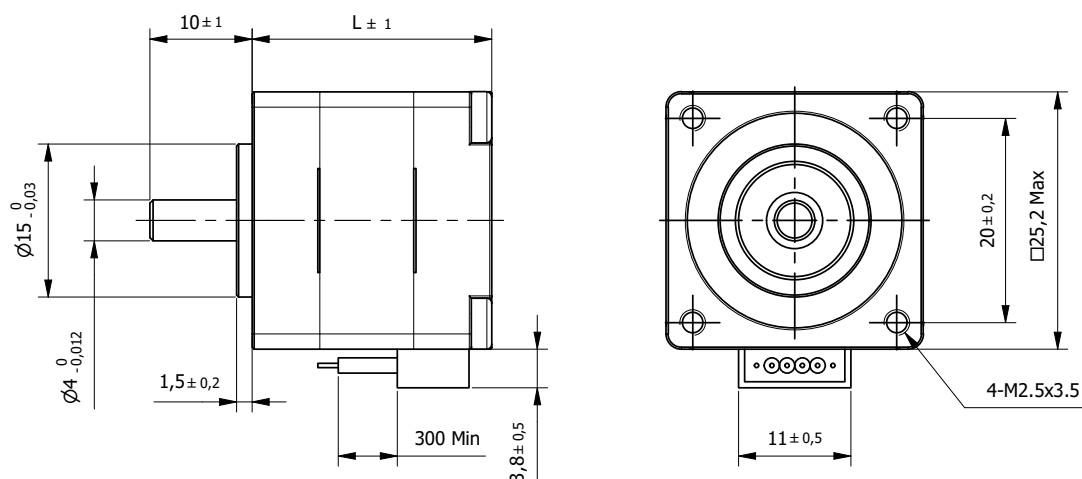
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG28	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 25SH23

High Torque

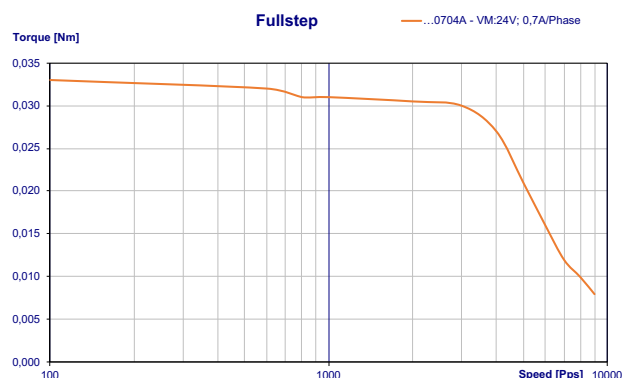
□ 25mm



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

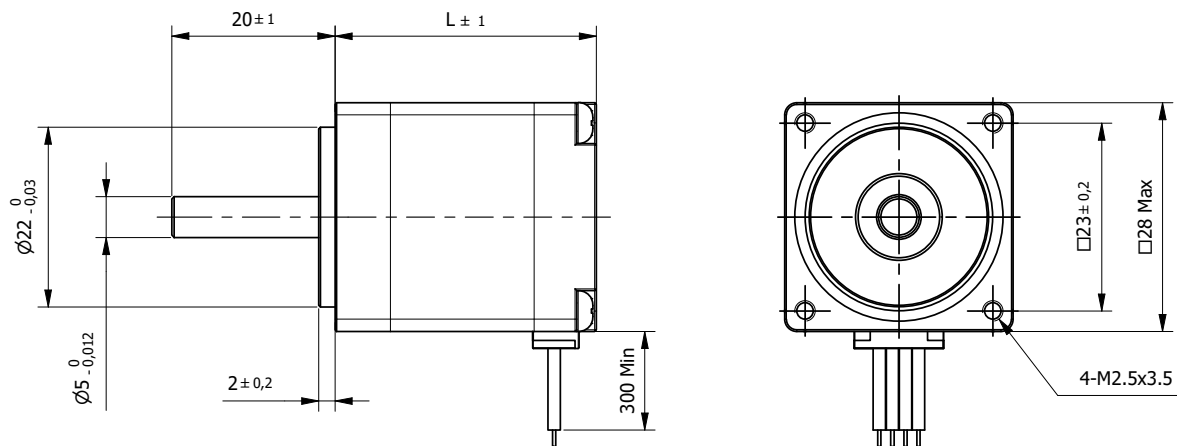
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1061 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 28SH32

High Torque

□ 28mm

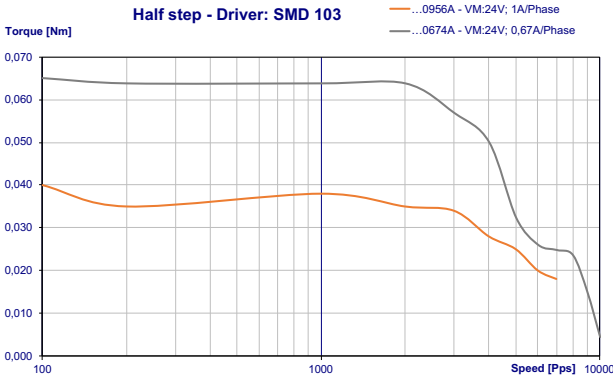


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification				
	Model		...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	gcm2	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

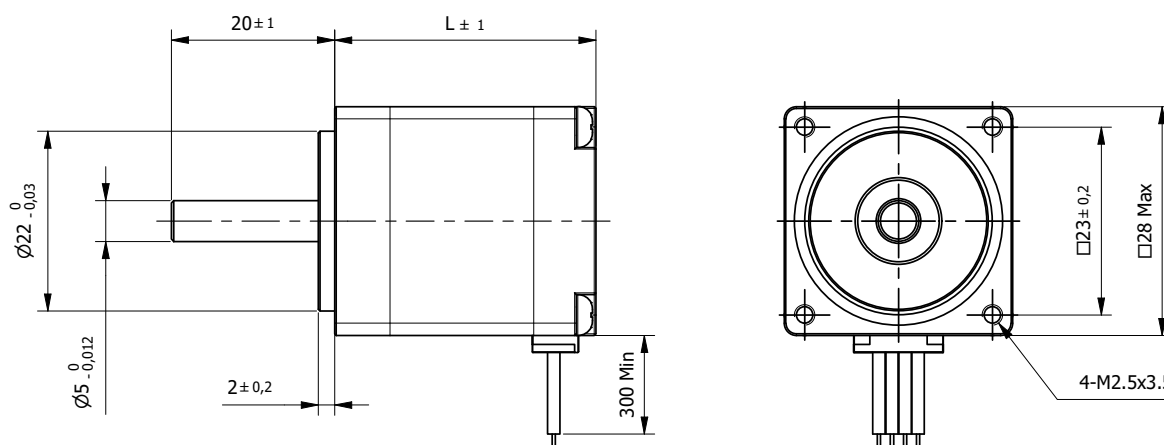
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 28SH45

High Torque

□ 28mm

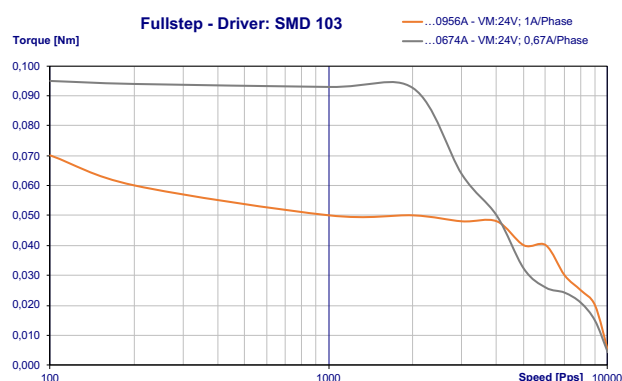


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

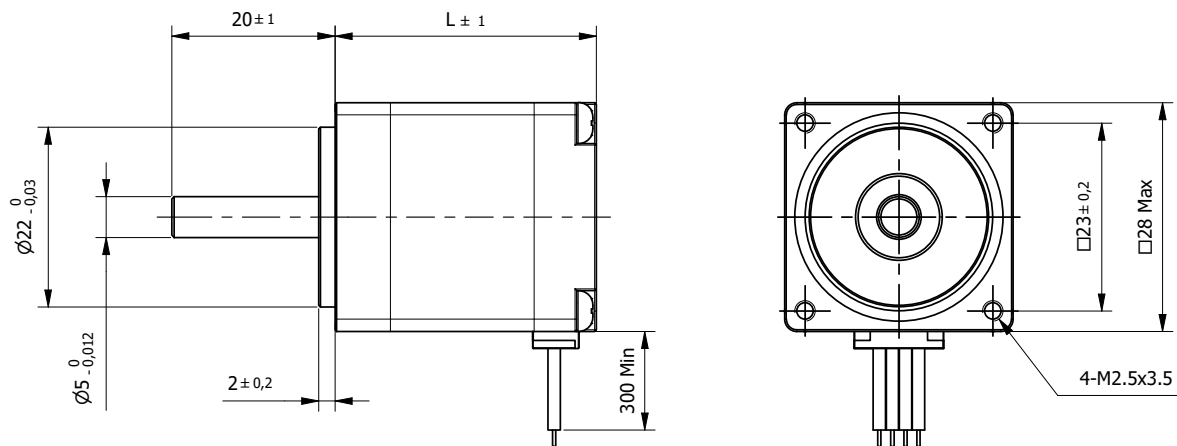
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 28SH51

High Torque

□ 28mm

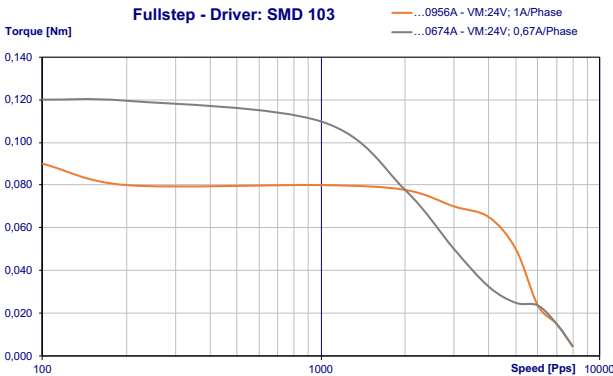


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification				
	Model		...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	gcm2	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

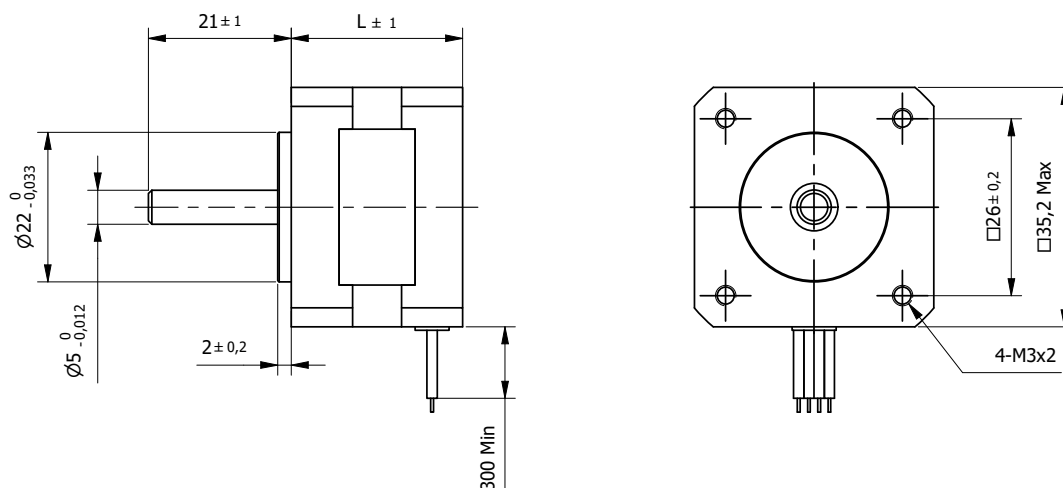
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 35SH

High Torque

□ 35mm

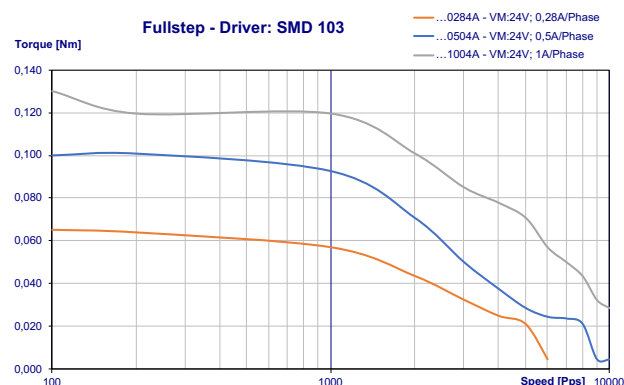


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

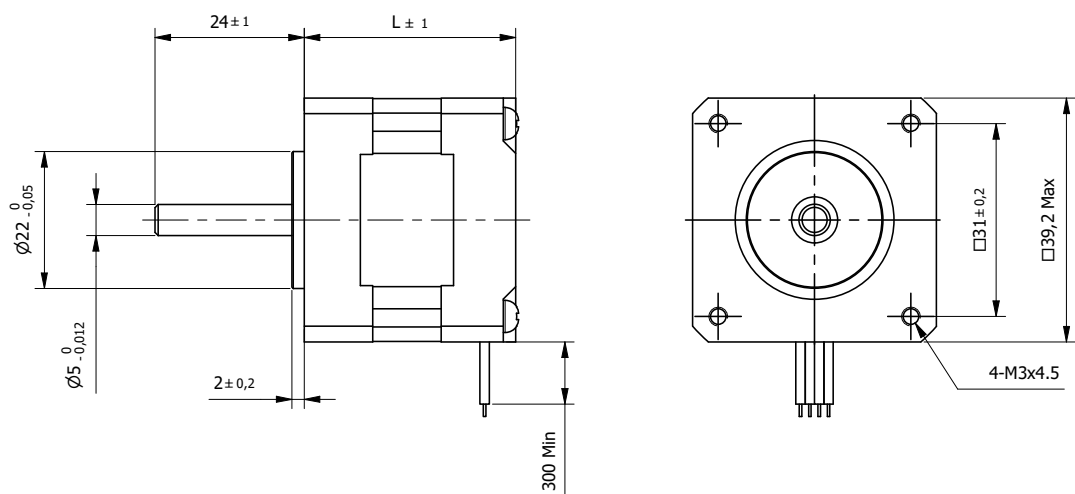
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 39SH20

High Torque

□ 39mm

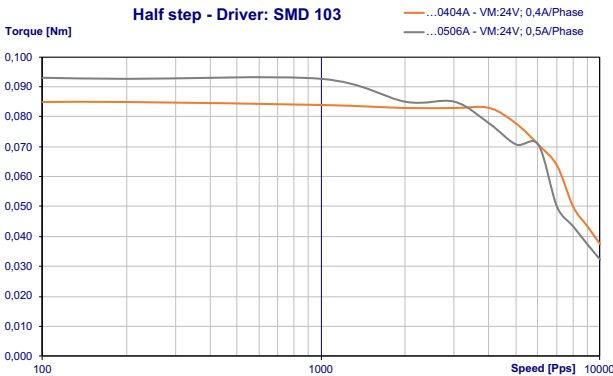


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification				
	Model		...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	gcm2	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

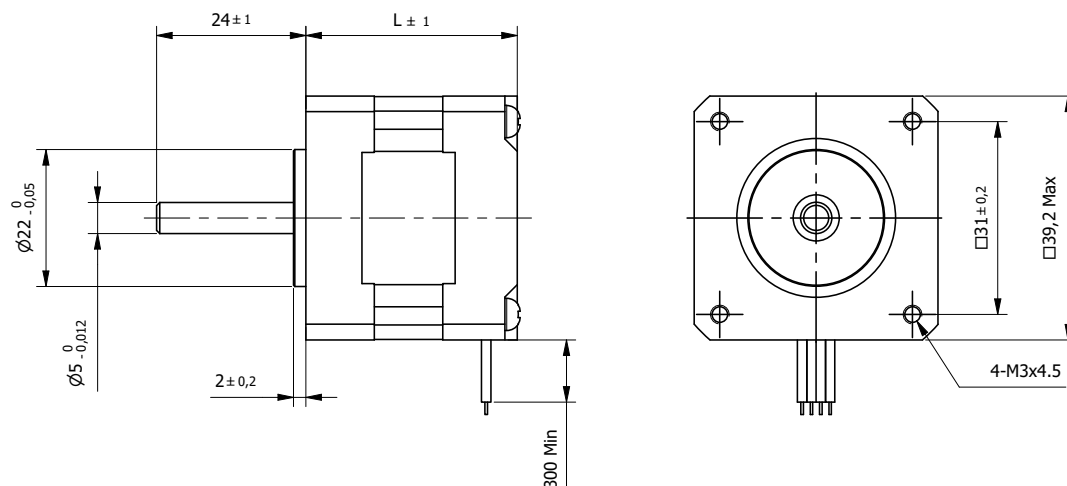
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1007 AWG28	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 39SH34

High Torque

□ 39mm

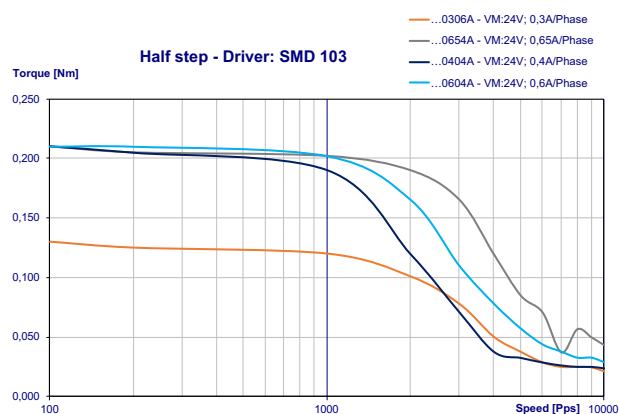


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification						
	Model	...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	gcm2	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

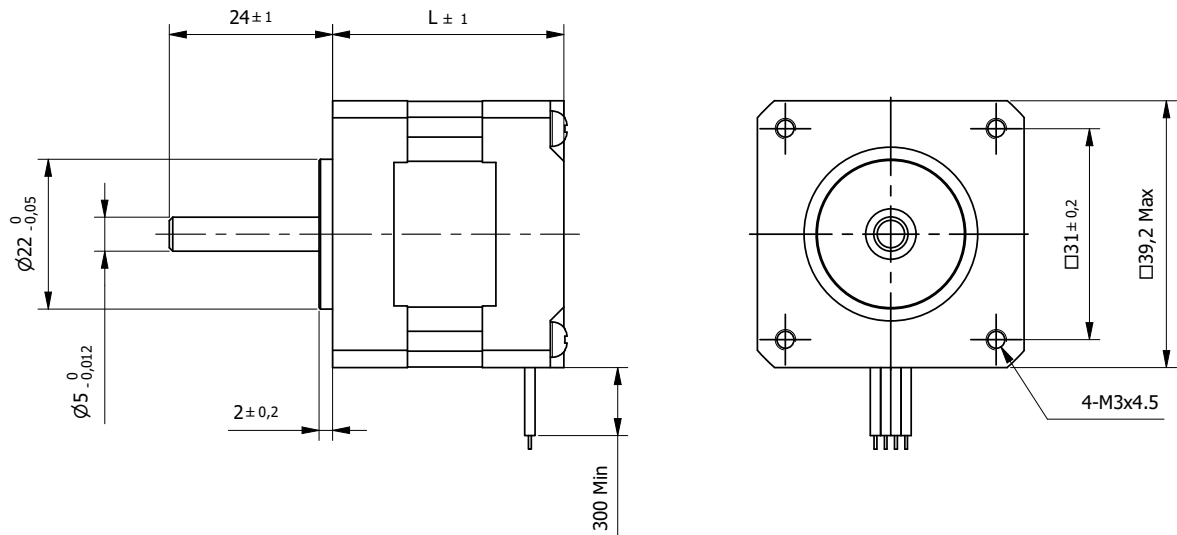
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 39SH38

High Torque

□ 39mm

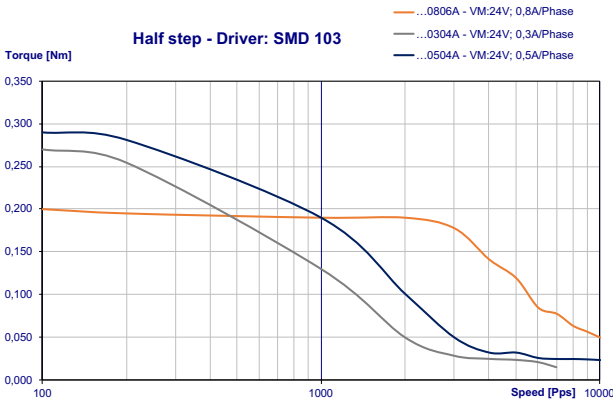


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

Specification					
	Model	...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	gcm2	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

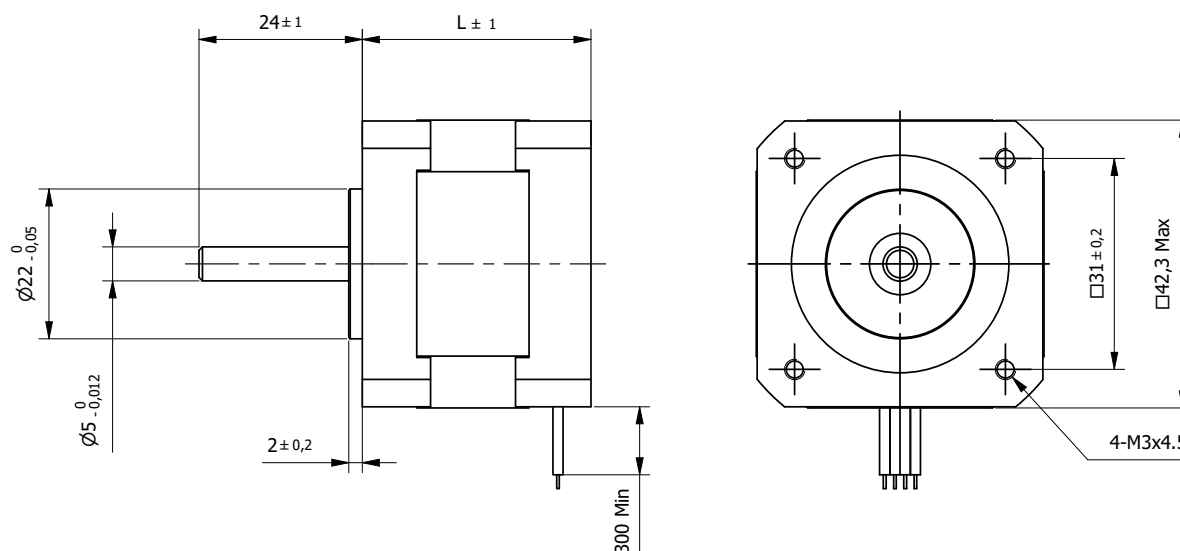
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH33

High Torque

□ 42mm

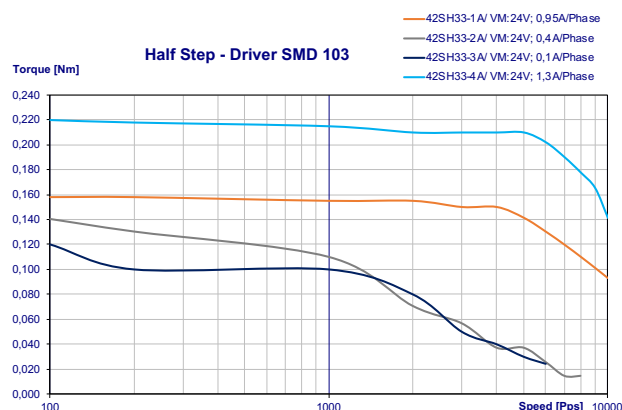


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification						
	Model		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	gcm2	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

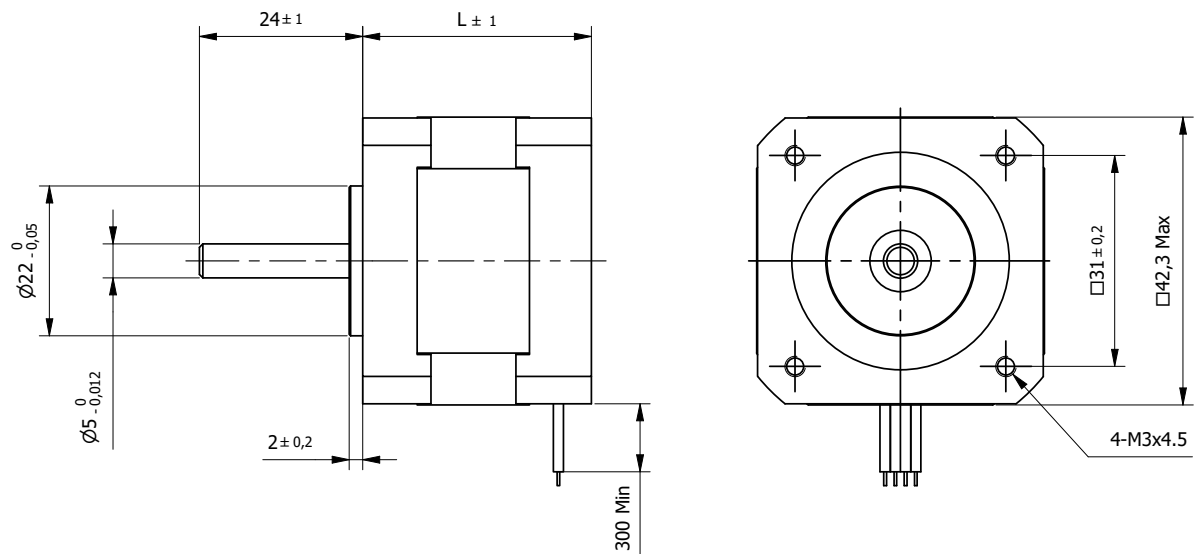
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH38

High Torque

□ 42mm

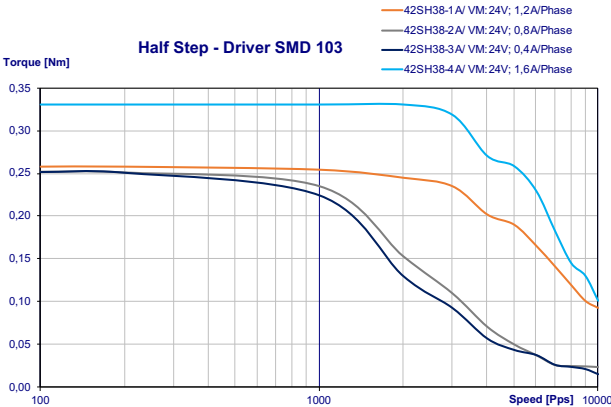


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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	gcm2	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

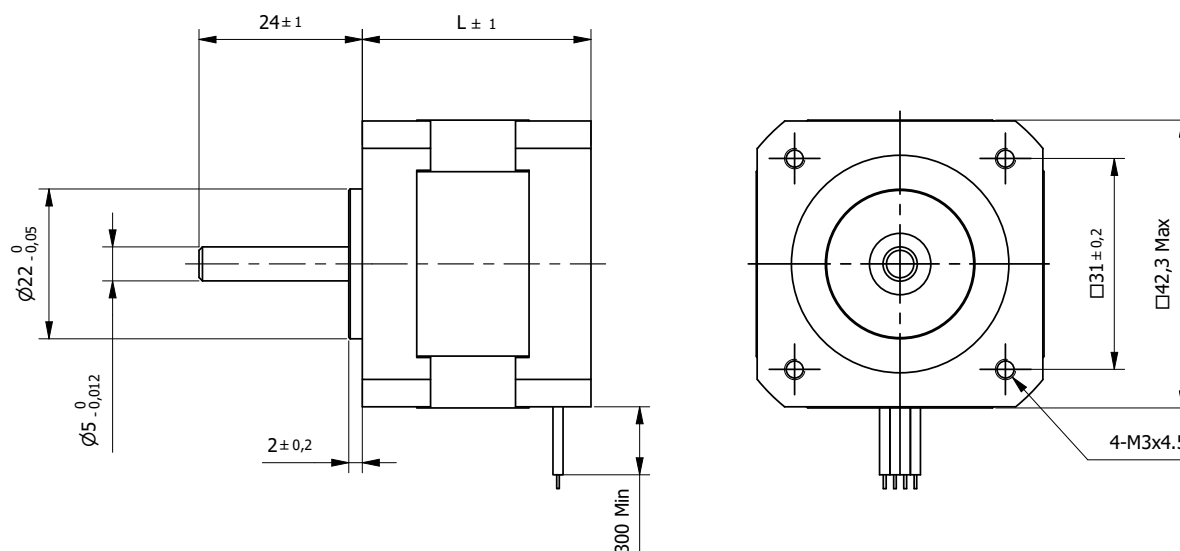
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH47

High Torque

□ 42mm

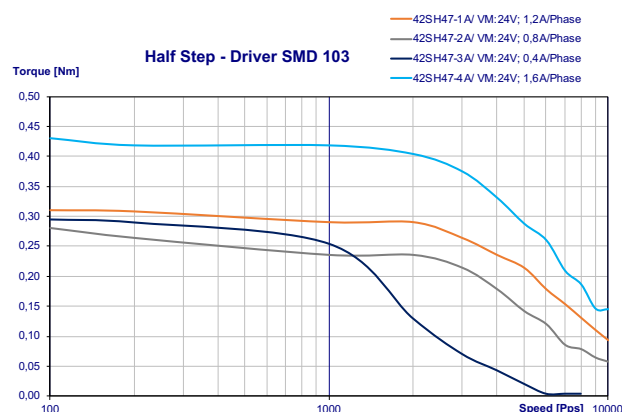


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification						
	Model		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	gcm2	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

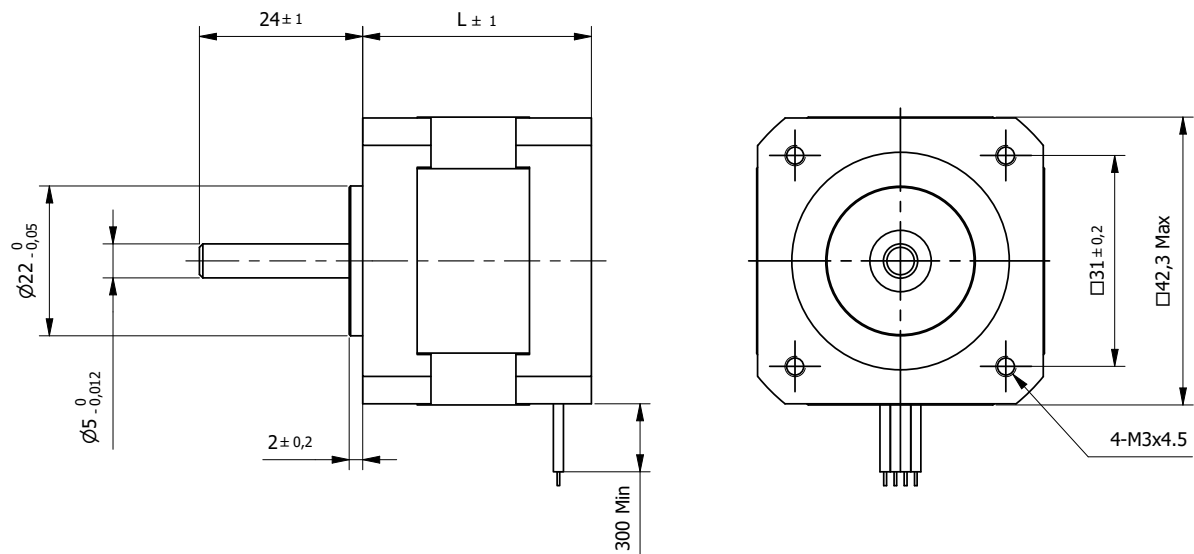
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH60

High Torque

□ 42mm

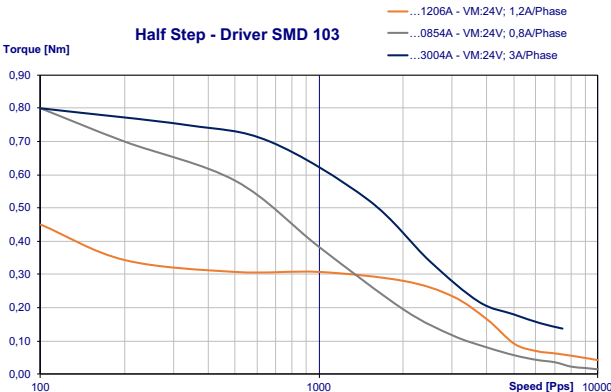


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification					
	Model	...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	gcm2	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

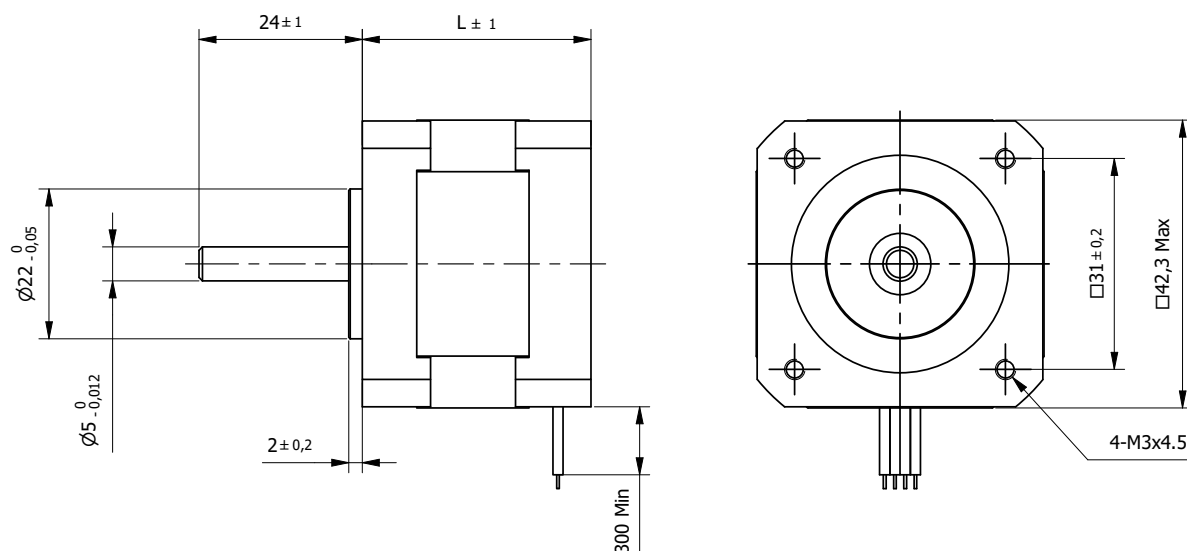
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH33M

□ 42mm

High Torque - step angle 0,9°

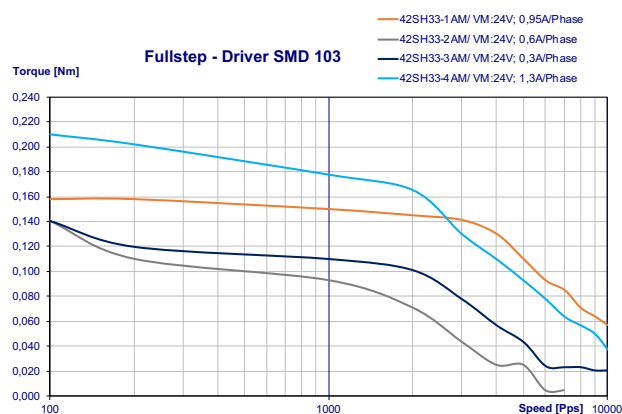


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification						
	Model		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	gcm2	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

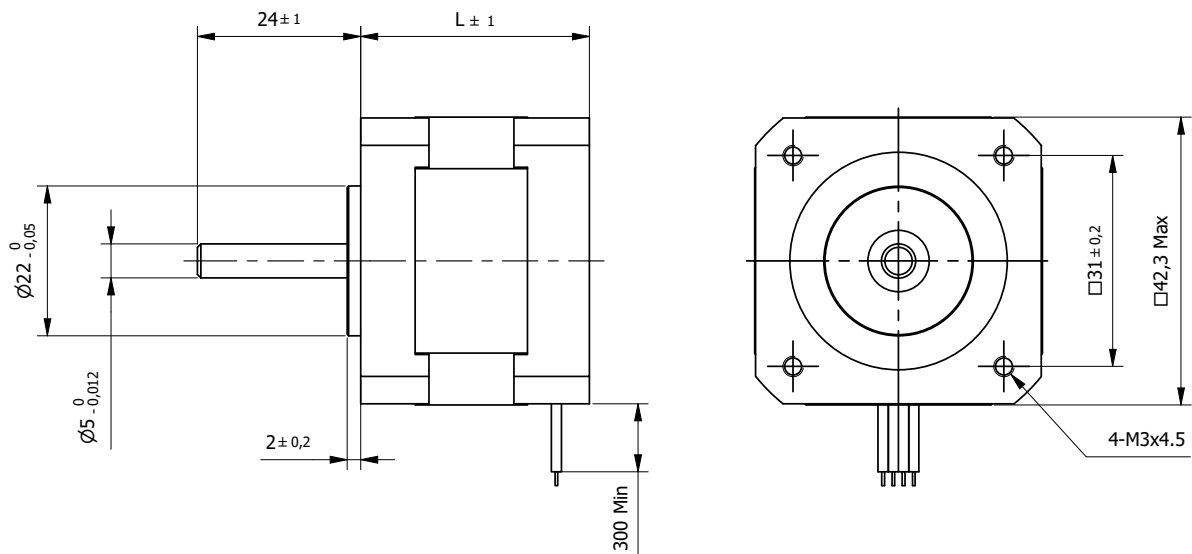
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH38M

High Torque - step angle 0,9°

□ 42mm

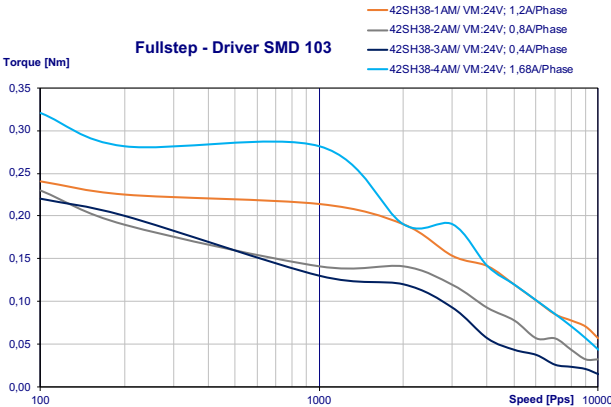


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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	gcm2	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

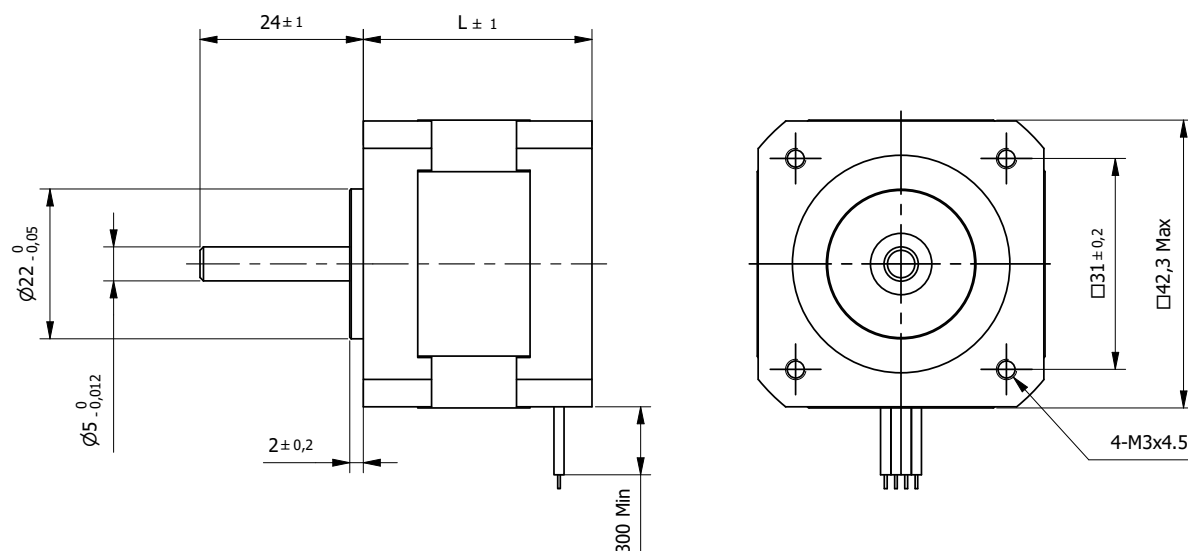
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 42SH47M

□ 42mm

High Torque - step angle 0,9°

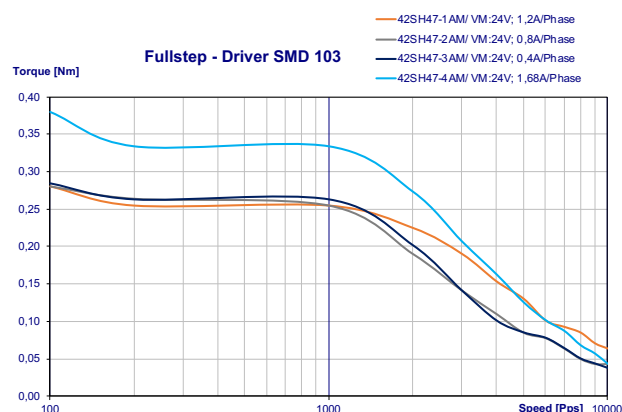


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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

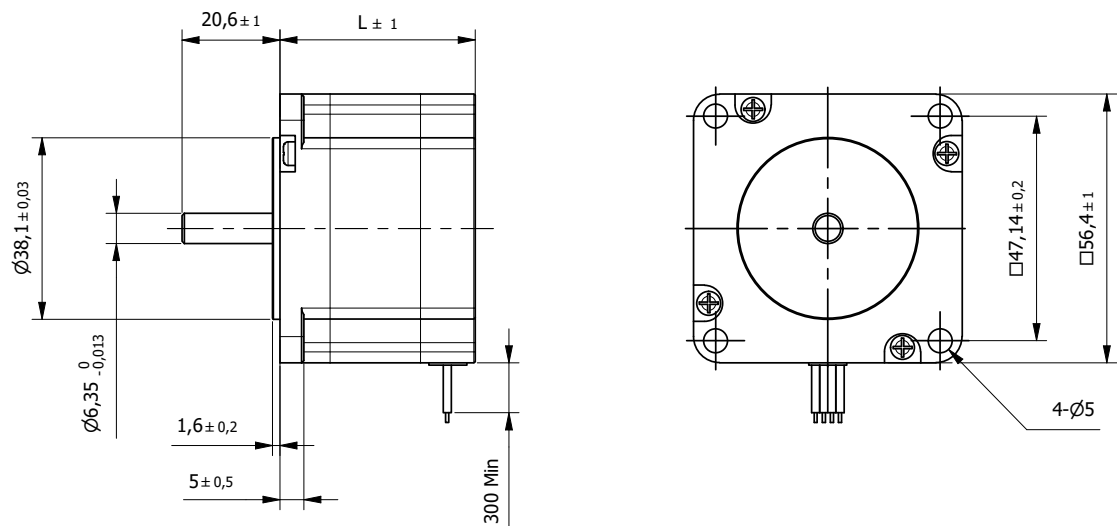
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 57SH41

High Torque

□ 57mm

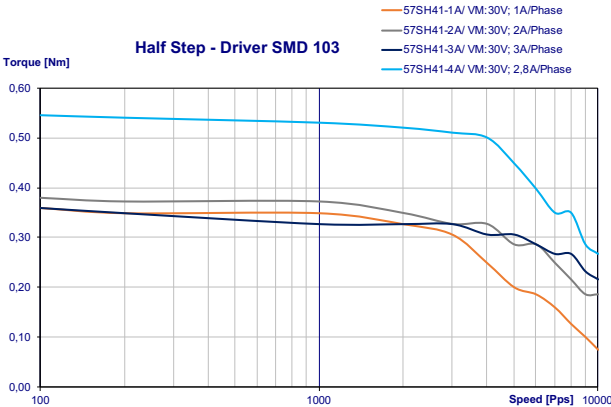


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification						
	Model		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	gcm2	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

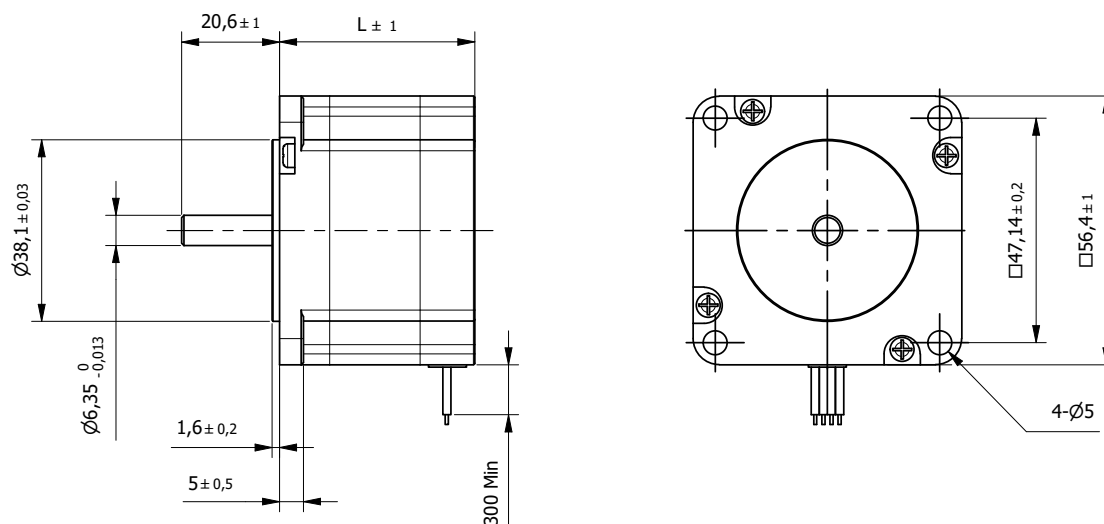
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 57SH51

High Torque

□ 57mm

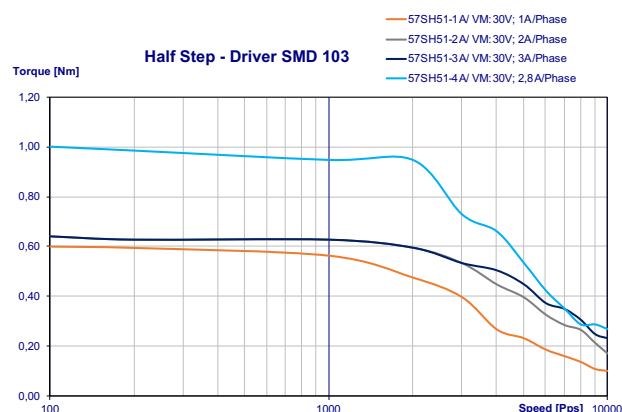


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification						
	Model		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	gcm2	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

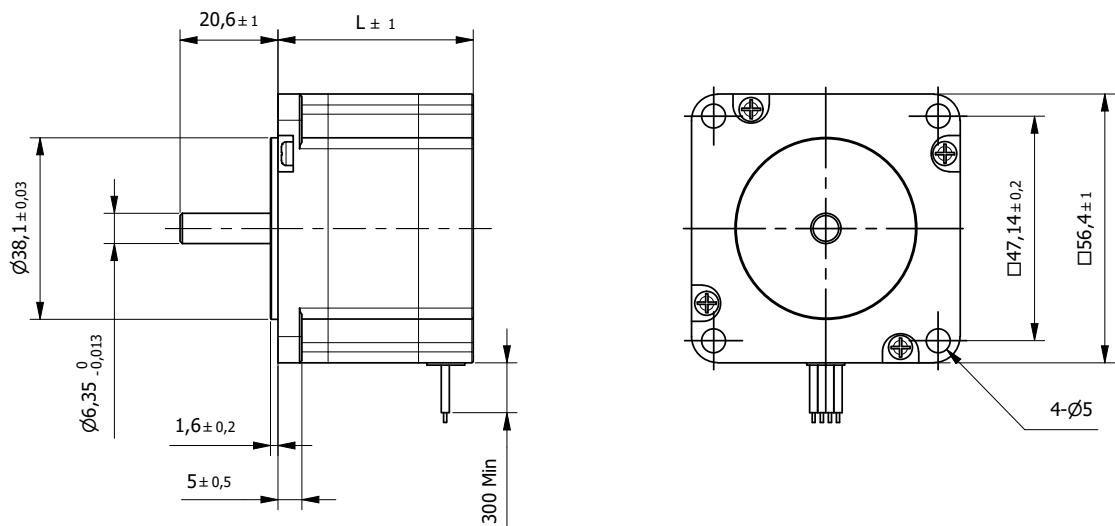
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 57SH56

High Torque

□ 57mm

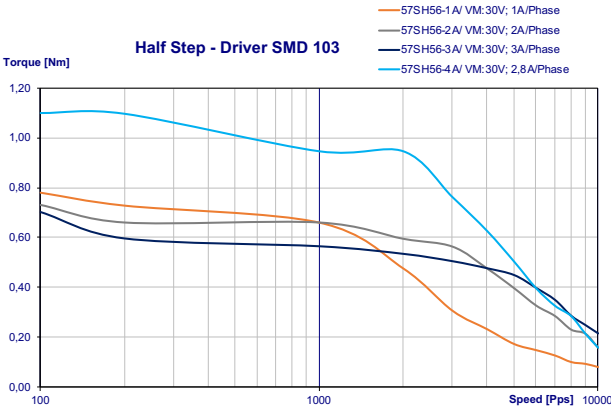


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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	gcm2	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

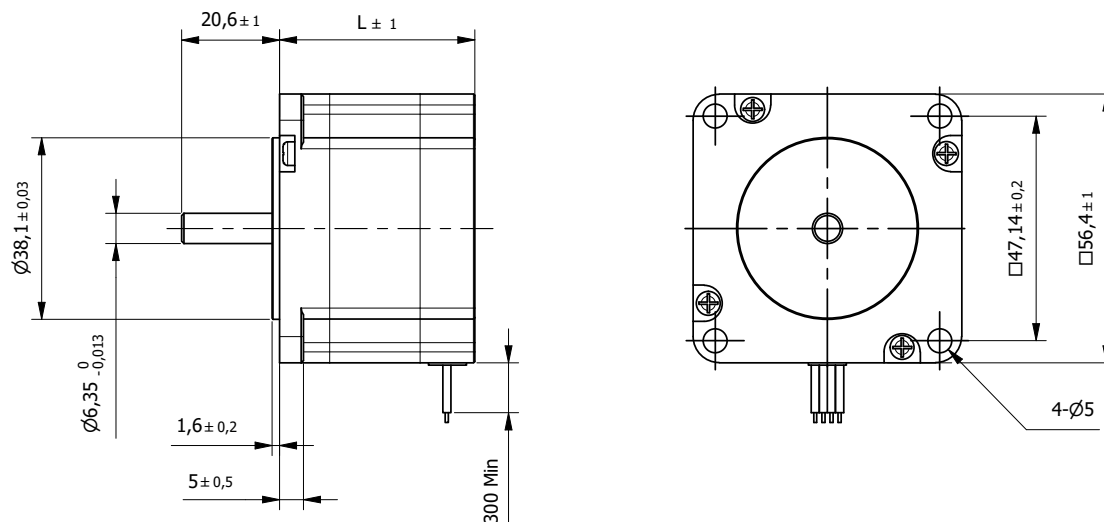
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 57SH76

High Torque

□ 57mm

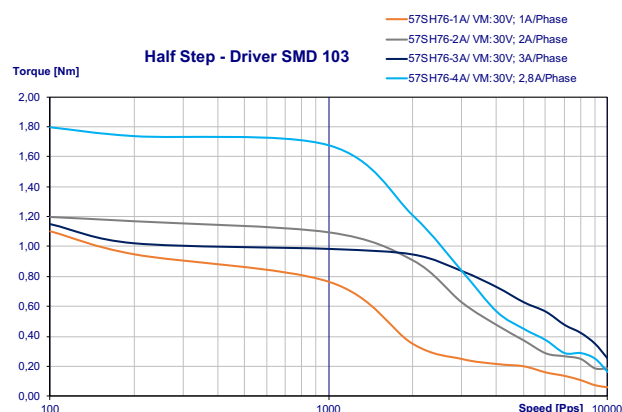


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification						
	Model		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	gcm2	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

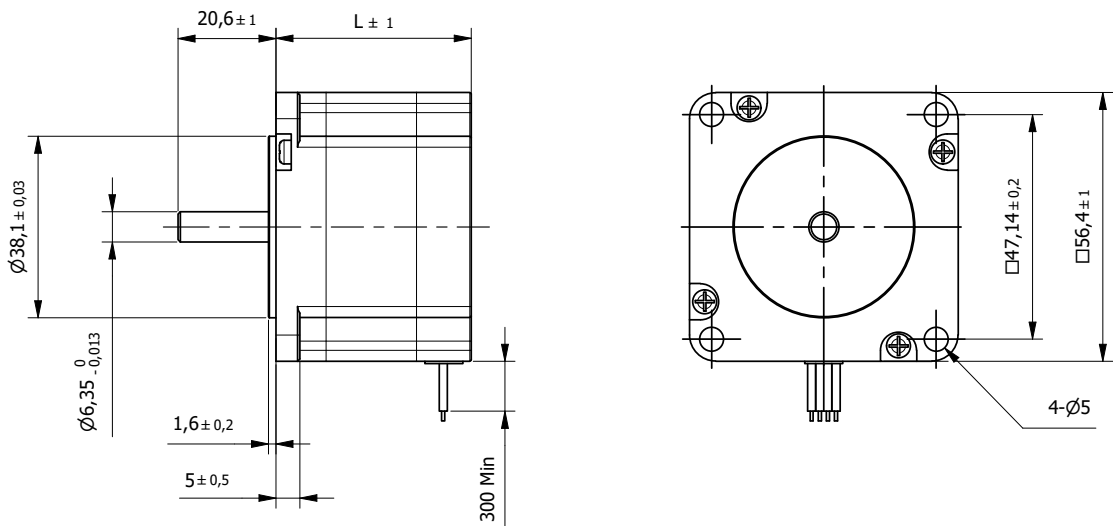
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 57SH41M

High Torque - step angle 0,9°

□ 57mm

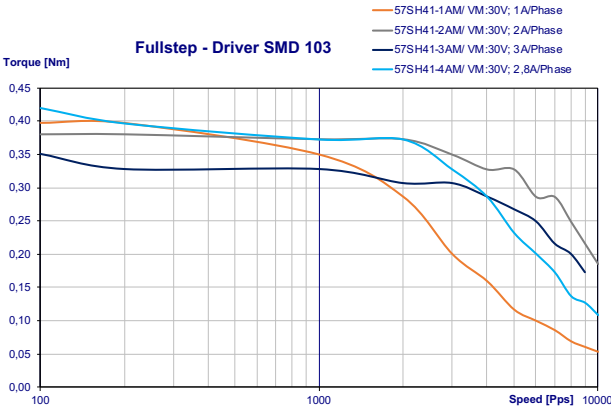


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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	gcm2	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

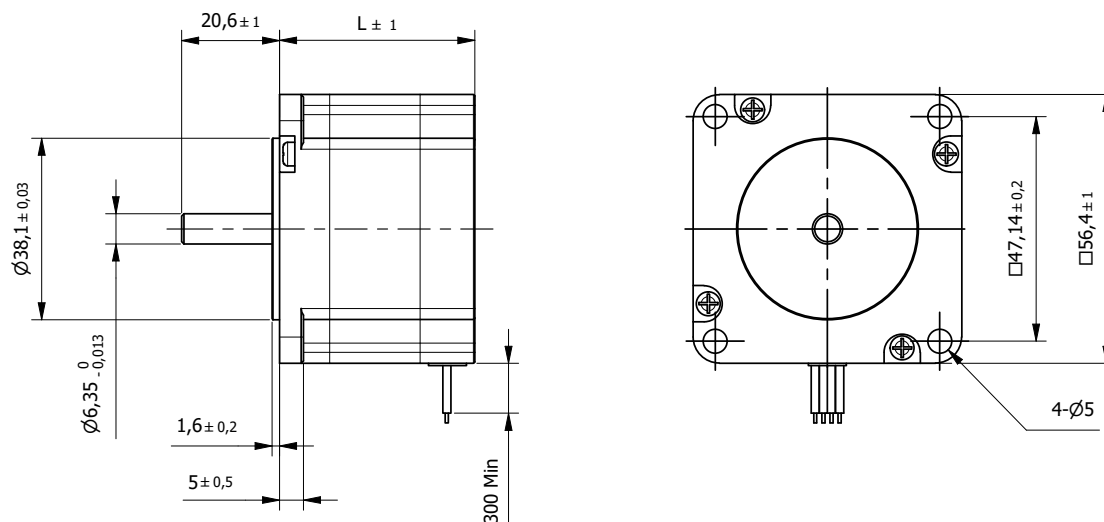
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 57SH56M

High Torque - step angle 0,9°

□ 57mm

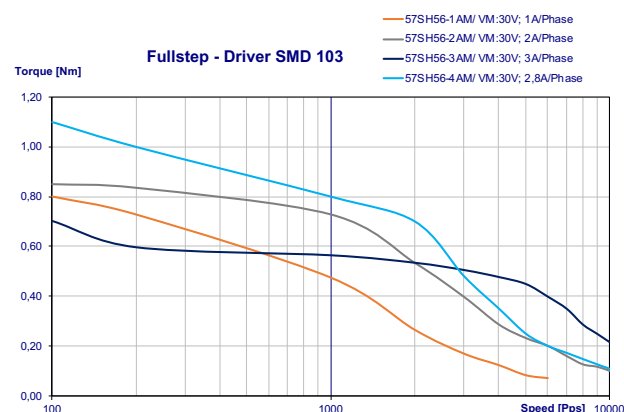


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

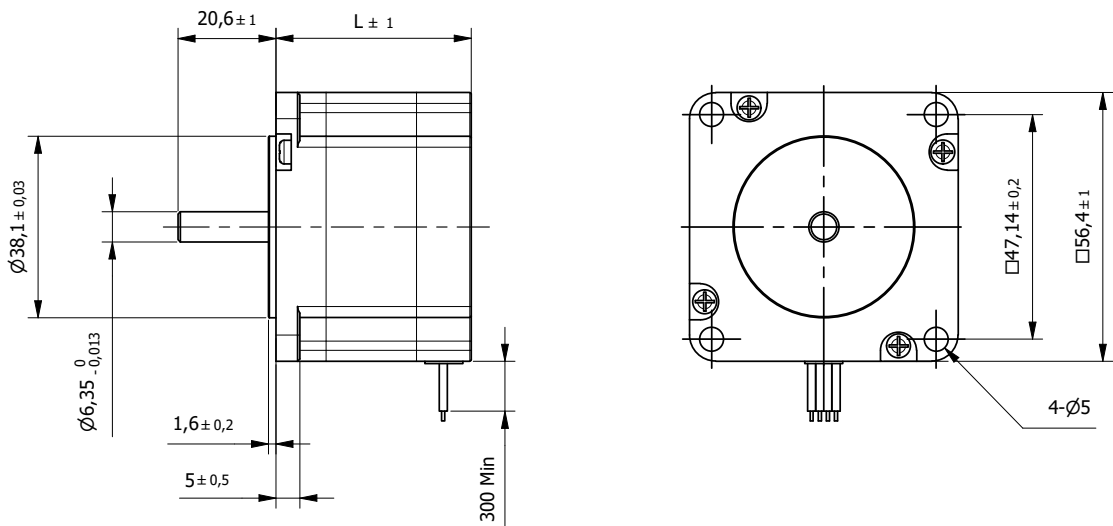
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 57SH76M

High Torque - step angle 0,9°

□ 57mm

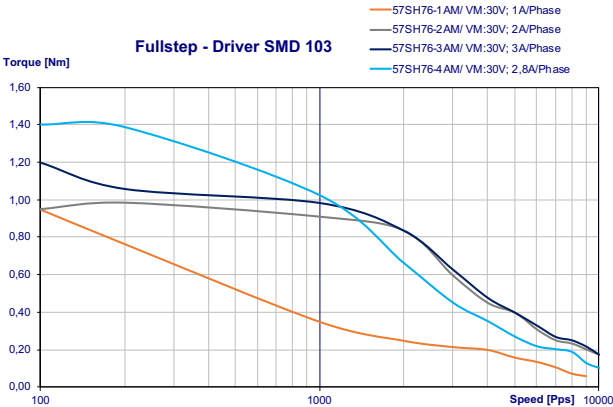


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification						
	Model	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	gcm2	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

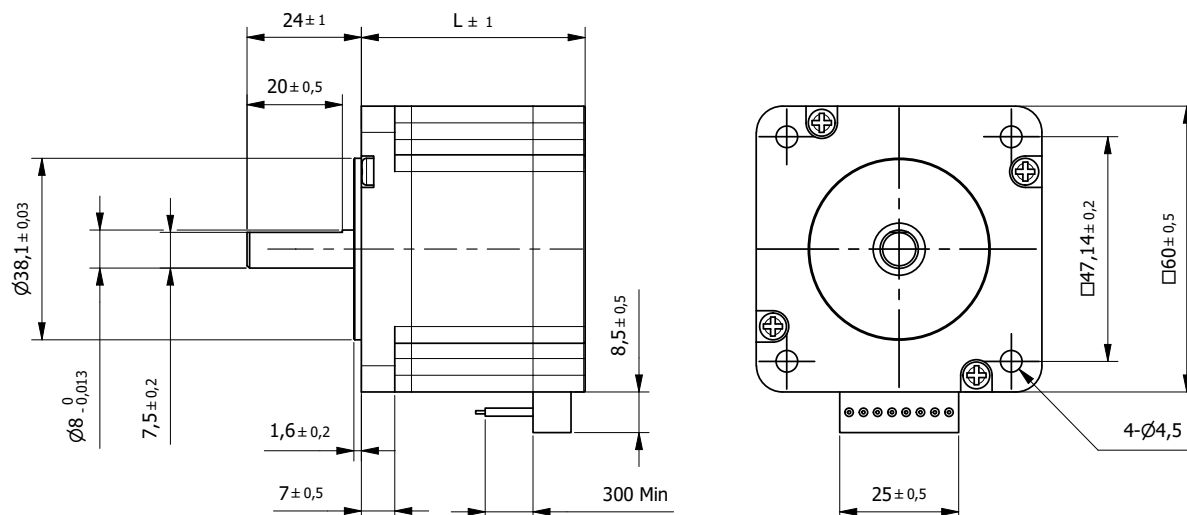
Connection			
Lead n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-
Unipolar motor			
5	Yellow		COM Phase A
6	White		COM Phase B



Hybrid Stepper Motor 60SH45

High Torque

□ 60mm

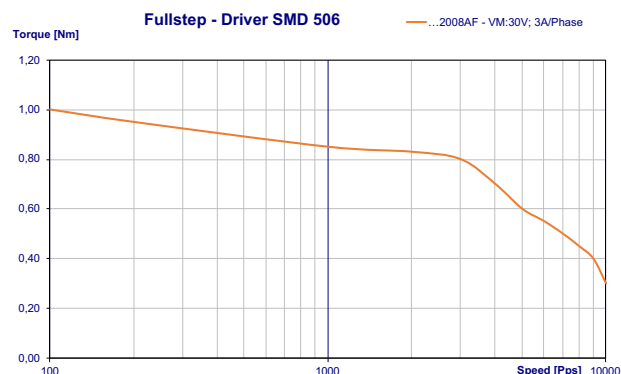


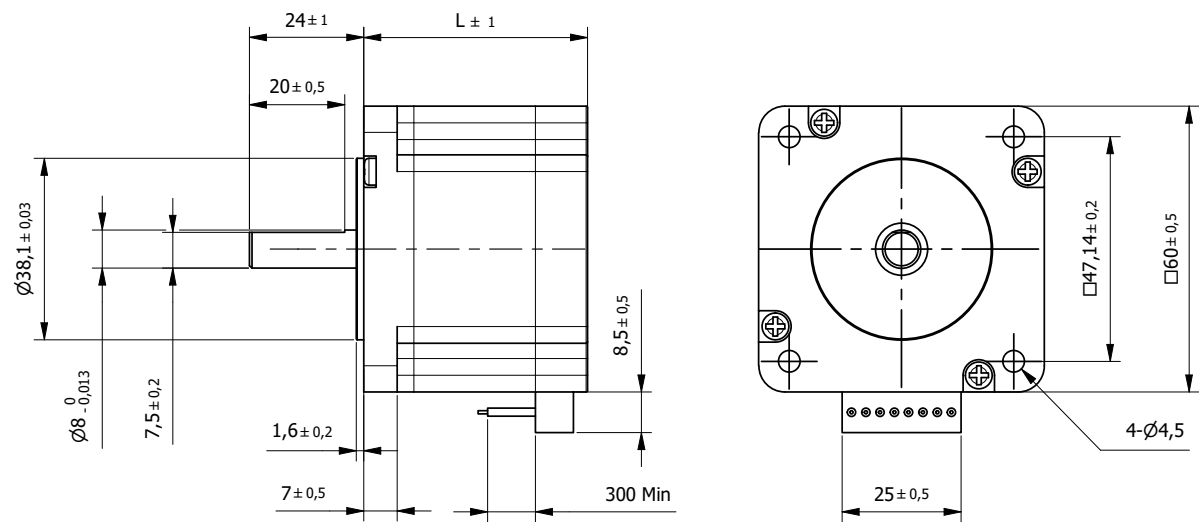
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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	8
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



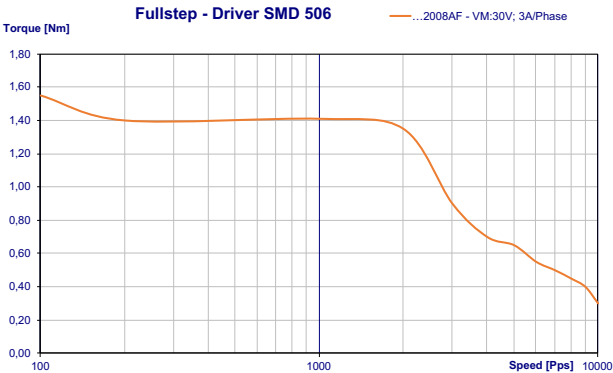


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
Model			60SH56-2008AF		
			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	gcm2	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

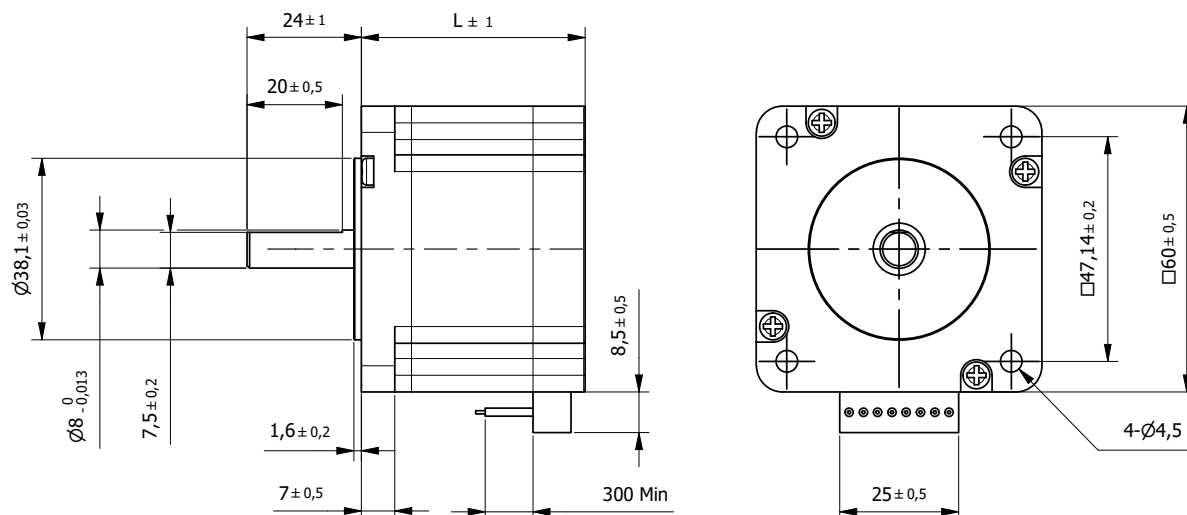
Connection			
Lead n°	Color	Gauge	Function
1	Blue/White	UL1430 AWG22	Phase A
2	Blue		Phase A-
3	Red/White		Phase C-
4	Red		Phase C
5	Green/White		Phase B
6	Green		Phase B-
7	Black/White		Phase D -
8	Black		Phase D



Hybrid Stepper Motor 60SH65

High Torque

□ 60mm

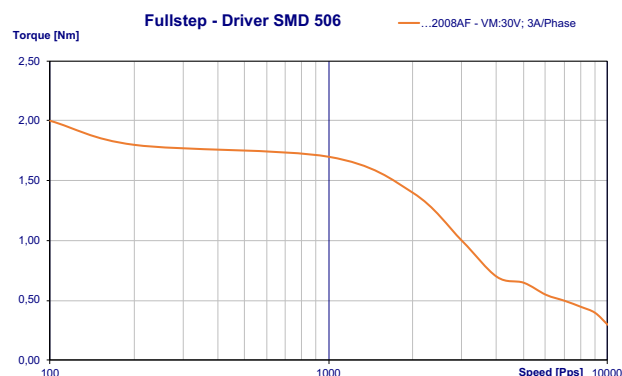


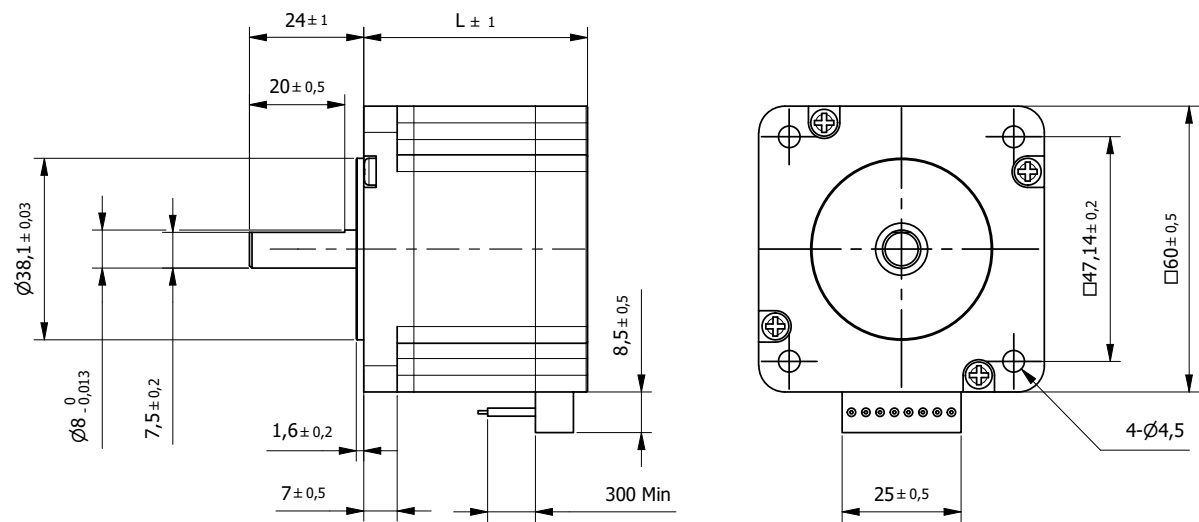
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		60SH65-2008AF			
Model			Unipolar	Parallel	Series
1	Rated Voltage	V	4,8	3,36	6,72
2	Current/Phase	A	2	2,8	1,4
3	Resistance/Phase	Ω	2,4	1,2	4,8
4	Inductance/Phase	mH	4,6	4,6	18,4
5	Holding Torque	Nm	1,5	2,1	2,1
6	Rotor Inertia	gcm ²	570	570	570
7	Detent Torque	Nm	0,09	0,09	0,09
8	n° of Leads		8	8	8
9	Length (L)	mm	65	65	65
10	Weight	Kg	1,2	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



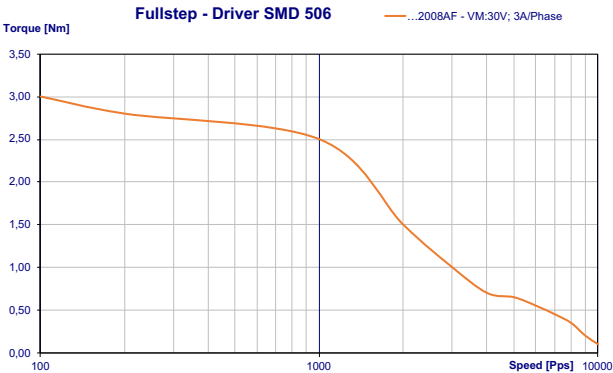


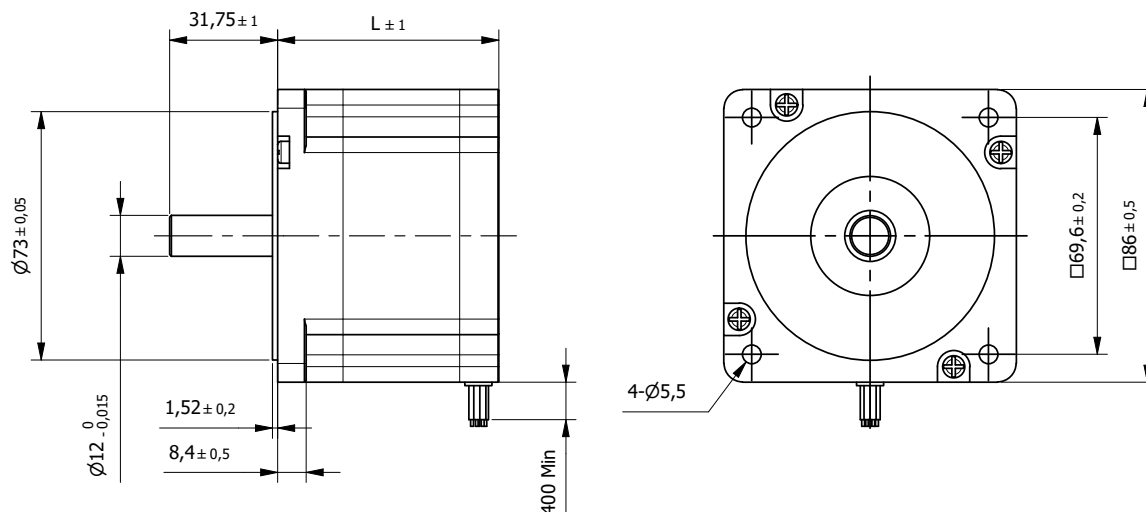
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
Model			60SH86-2008AF		
			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	gcm2	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



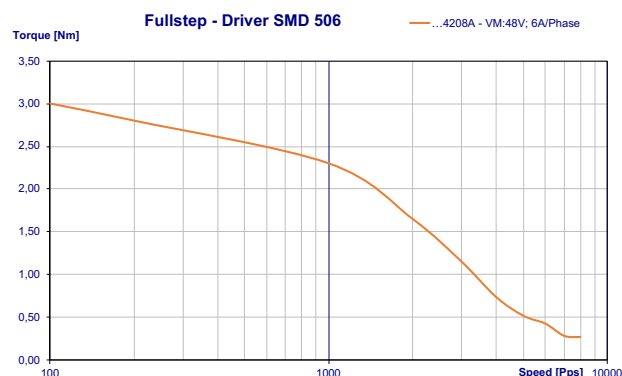


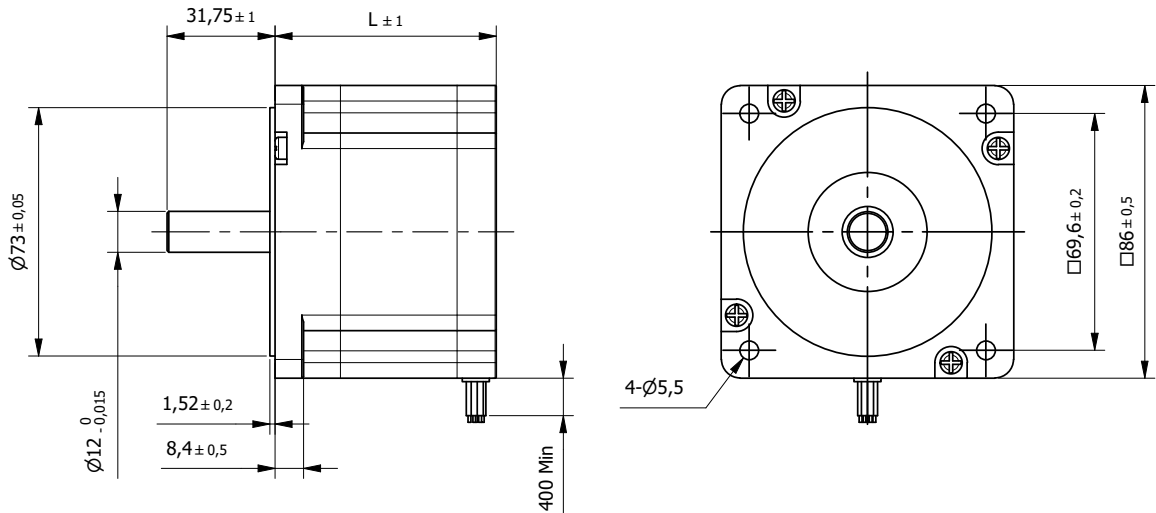
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification		86SH65-4208A		
Model		Unipolar	Parallel	Series
1	Rated Voltage	V	2,39	1,65
2	Current/Phase	A	4,2	5,9
3	Resistance/Phase	Ω	0,57	0,28
4	Inductance/Phase	mH	1,7	1,7
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



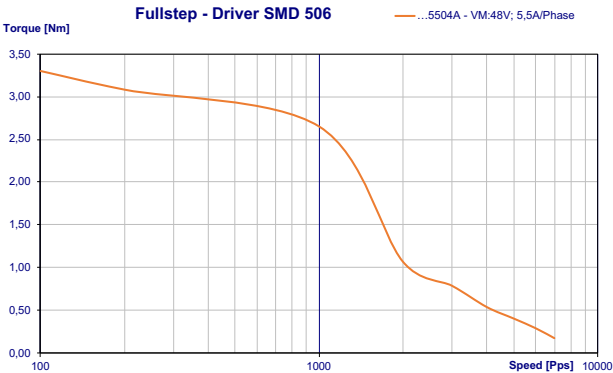


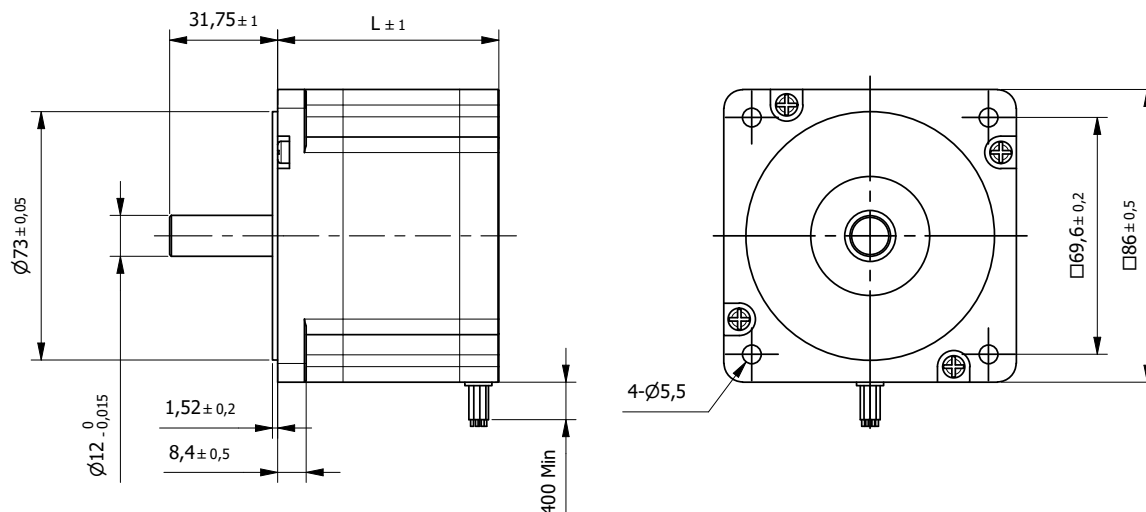
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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	gcm2	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-



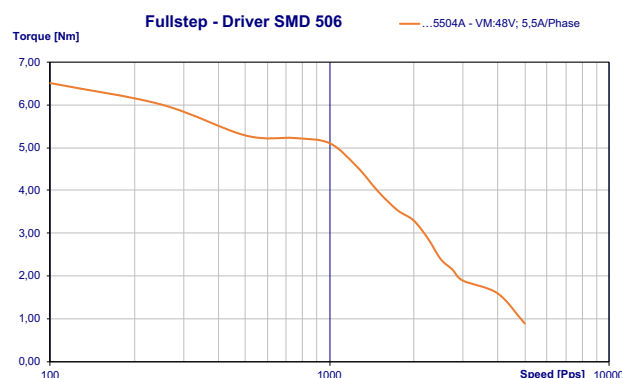


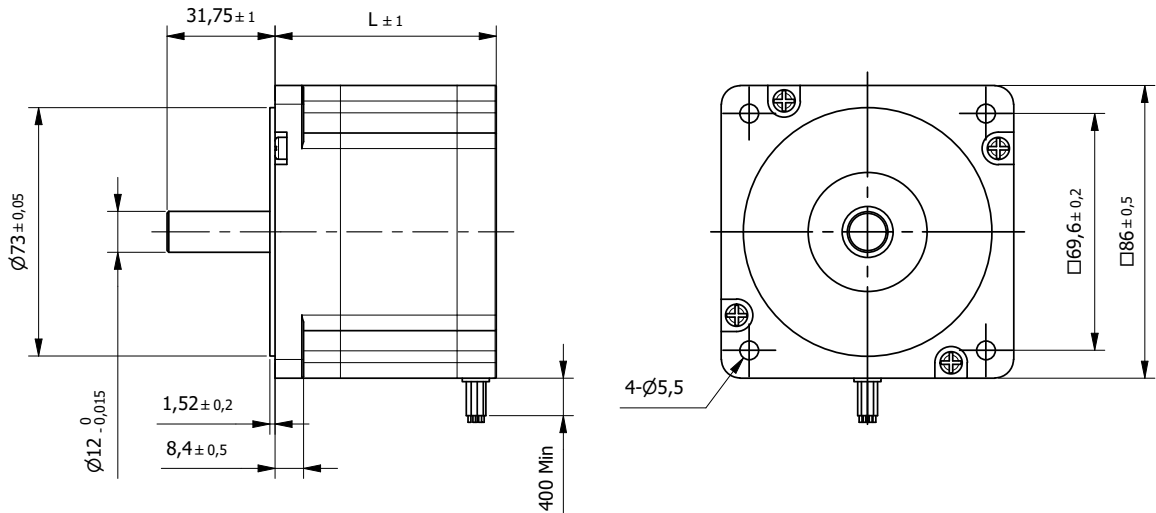
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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-



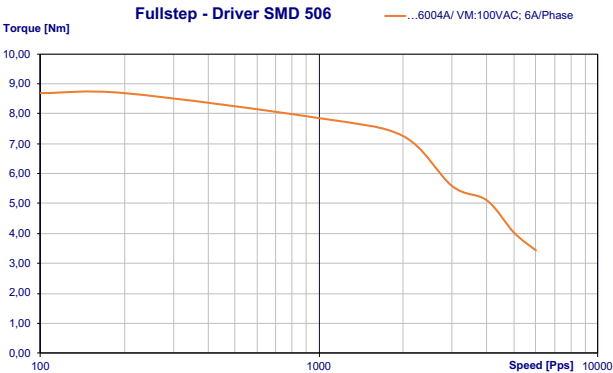


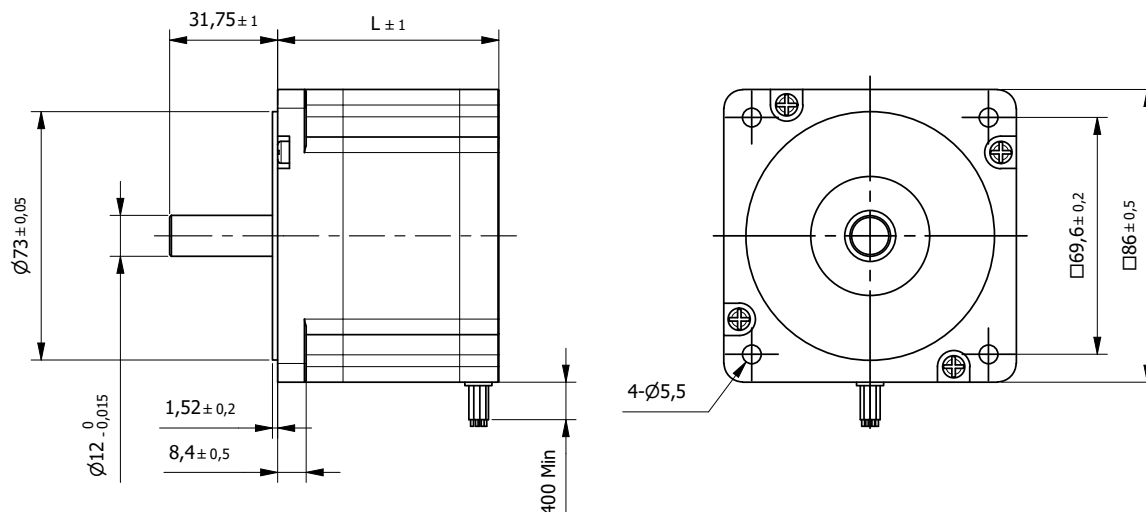
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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	gcm2	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-



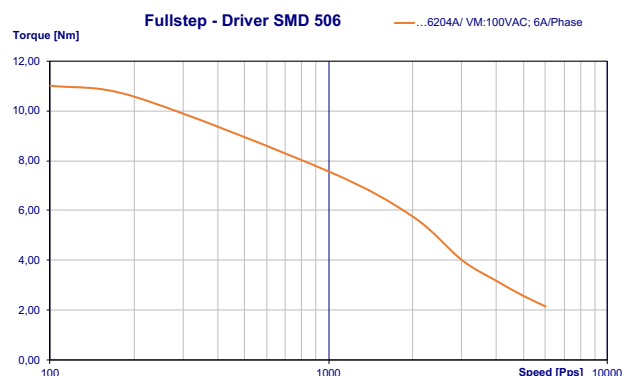


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

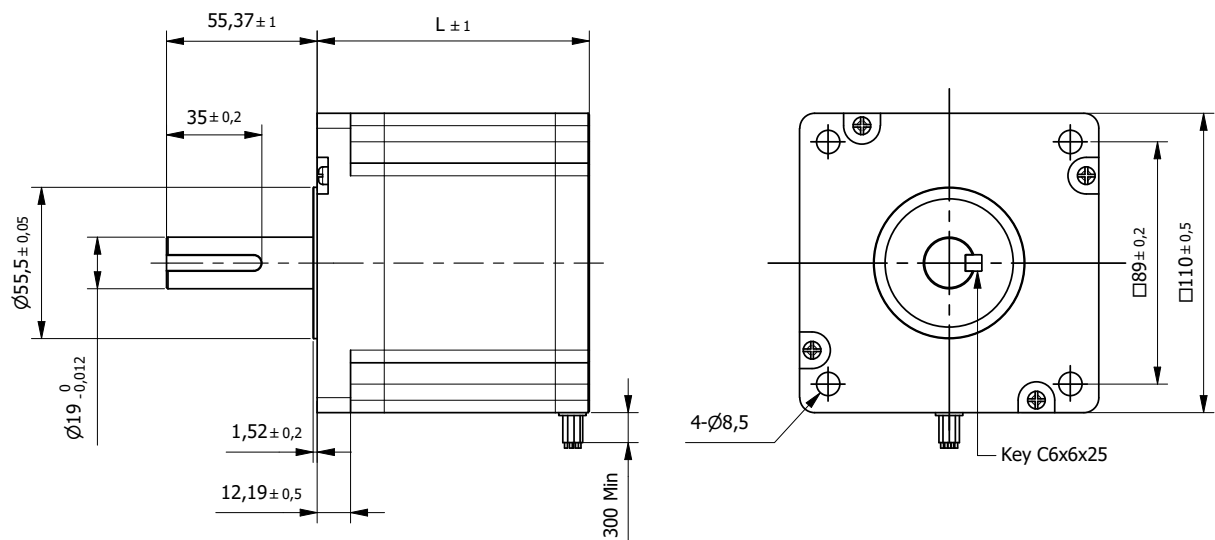
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1430 AWG20	Phase A
2	White		Phase A-
3	Yellow		Phase B
4	Green		Phase B-



Hybrid Stepper Motor 110SH

High Torque

□ 110mm

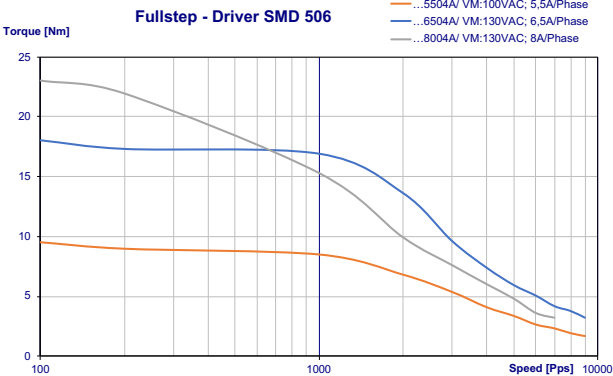


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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	gcm2	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-





Hybrid Stepper motors

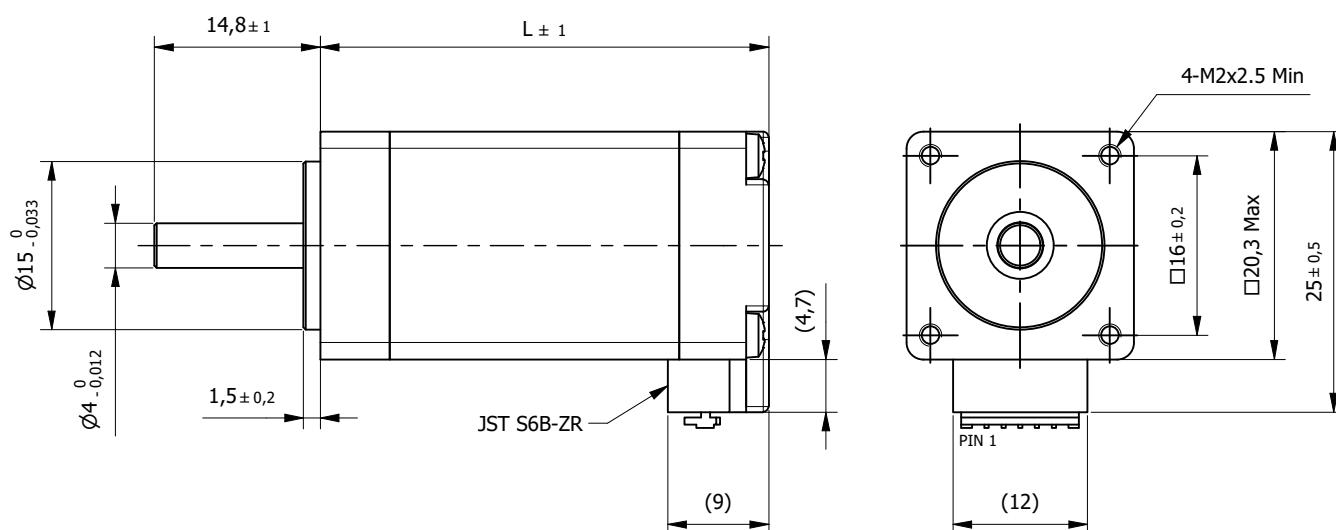
STC series - Integrated Connector

Hybrid Stepper motors - STC Connector series		Torque* (Nm)
20STC	0,022...0,036	274
28STC32	0,08	275
28STC40	0,13	276
28STC51	0,18	277
57STC41	0,6	278
57STC56	1,4	279
57STC76	2,3	280

Hybrid Stepper Motor 20STC

High Torque with Connector

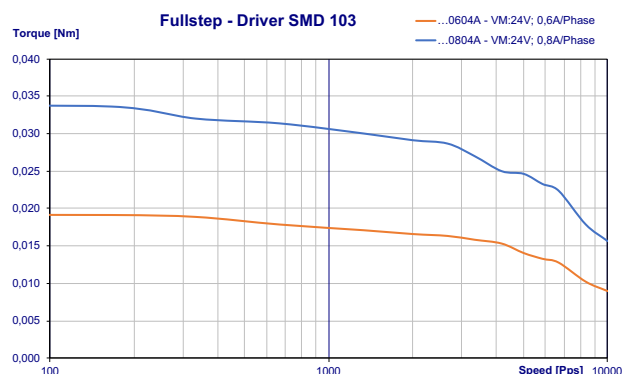
□ 20mm



Specification				
	Model		...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	gcm2	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

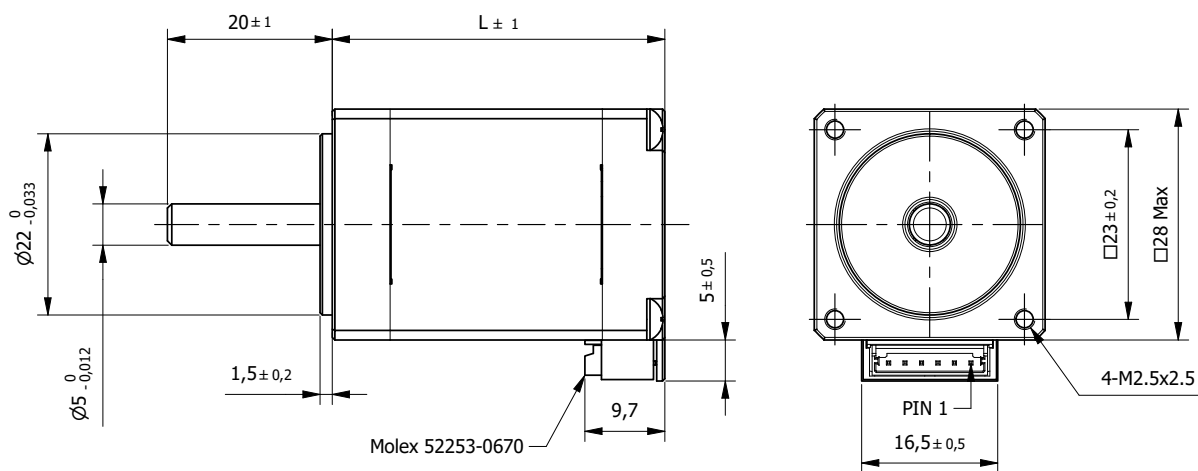
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1061 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 28STC32

High Torque with Connector

□ 28mm

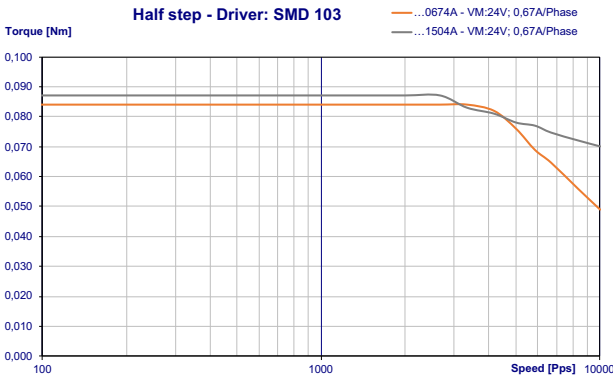


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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	gcm2	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

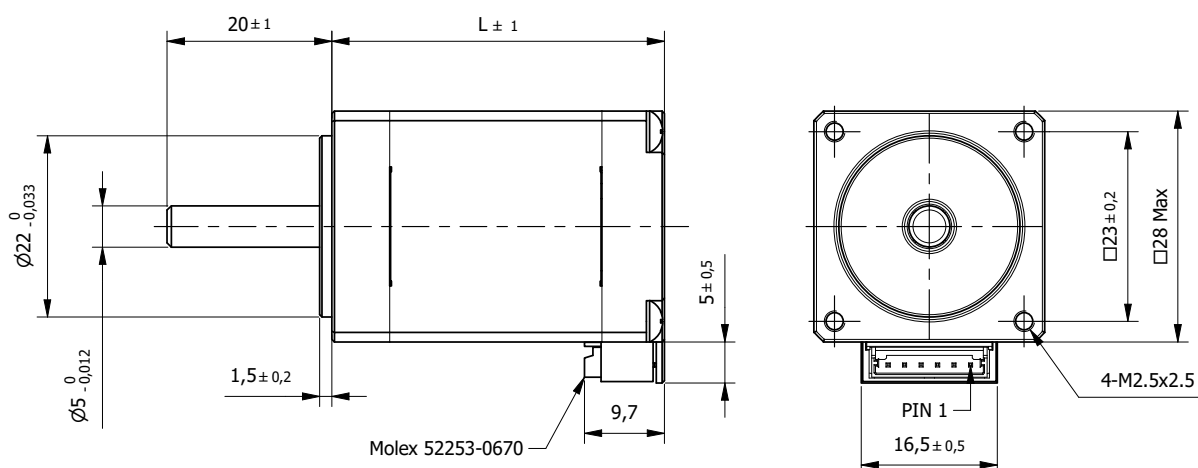
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 28STC40

High Torque with Connector

□ 28mm

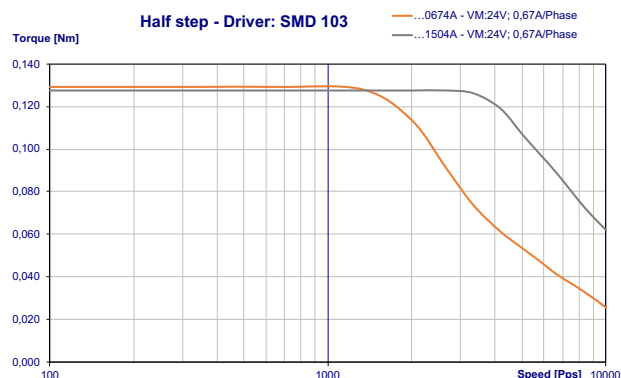


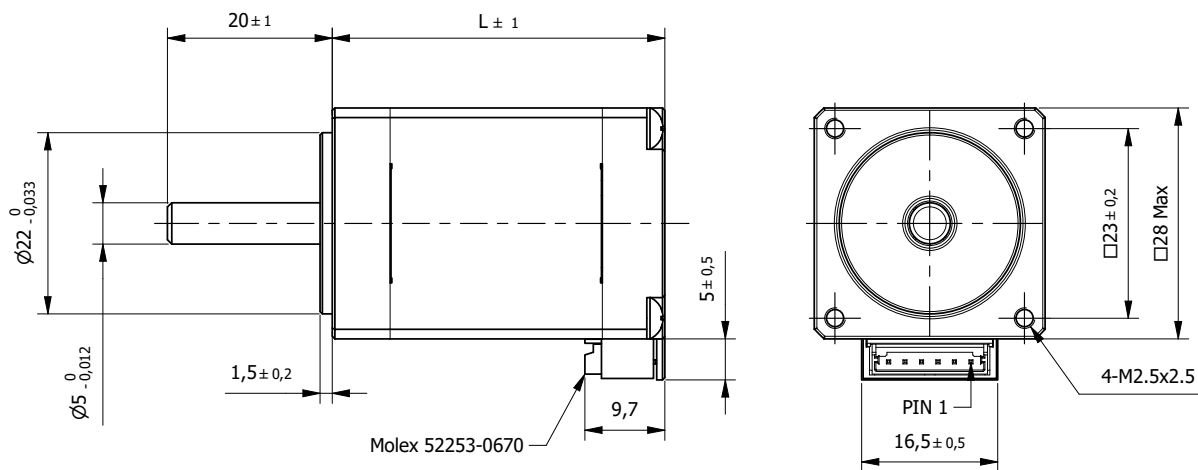
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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	gcm2	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-



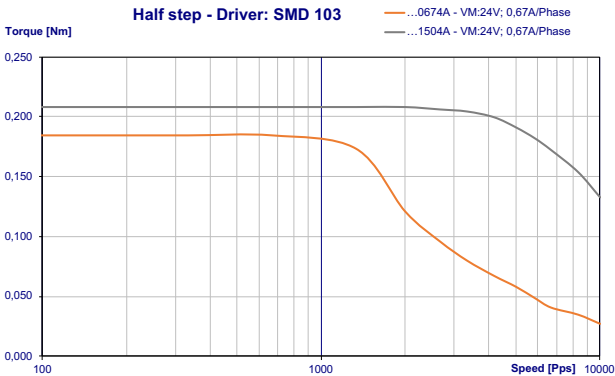


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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	gcm2	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

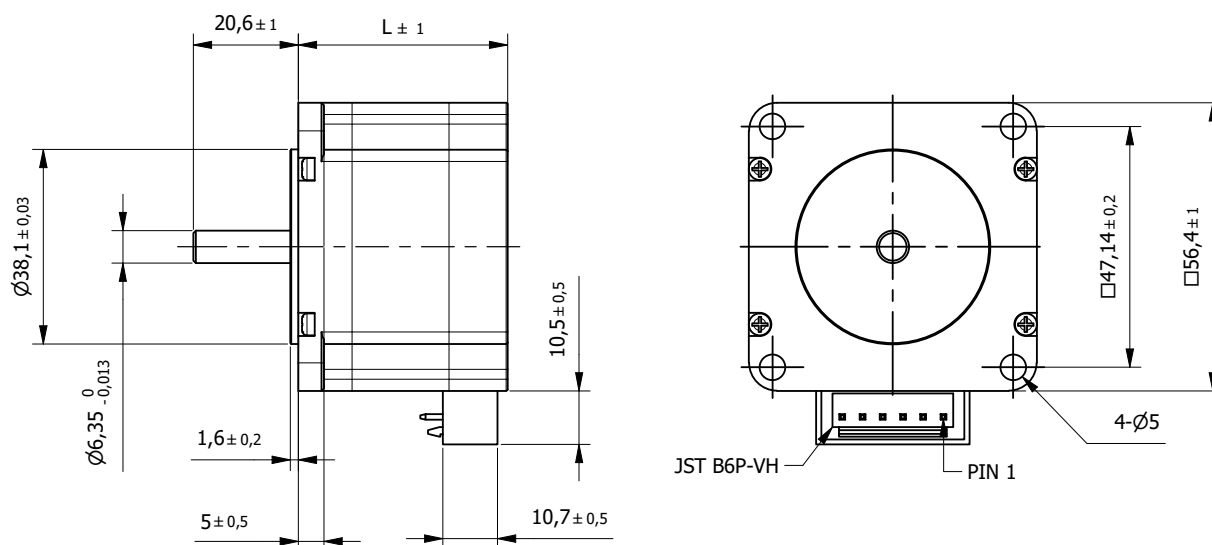
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 57STC41

High Torque with Connector

□ 57mm

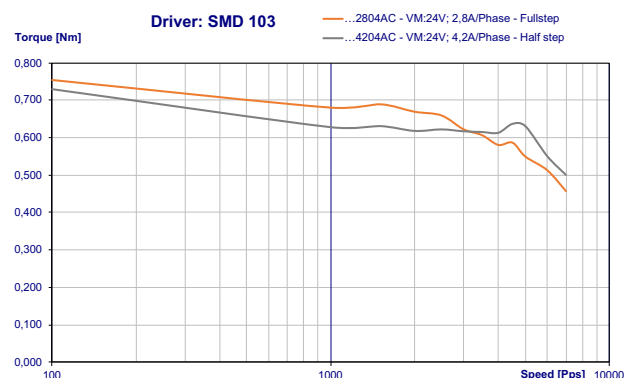


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

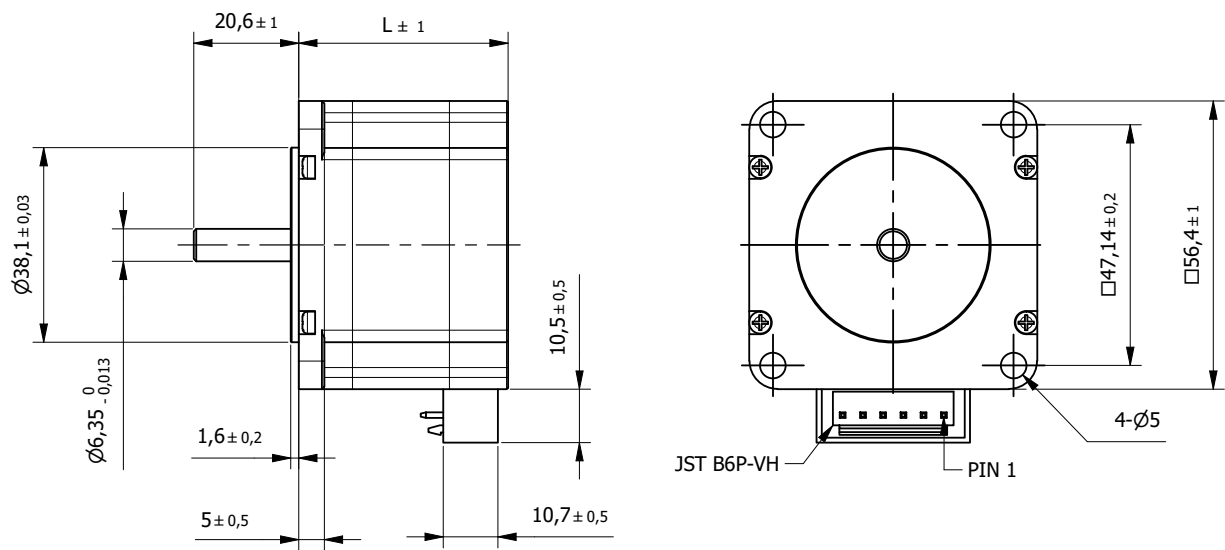
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 57STC56

High Torque with Connector

□ 57mm

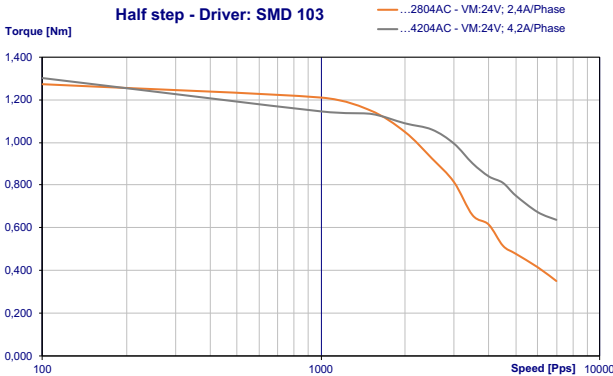


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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	gcm2	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

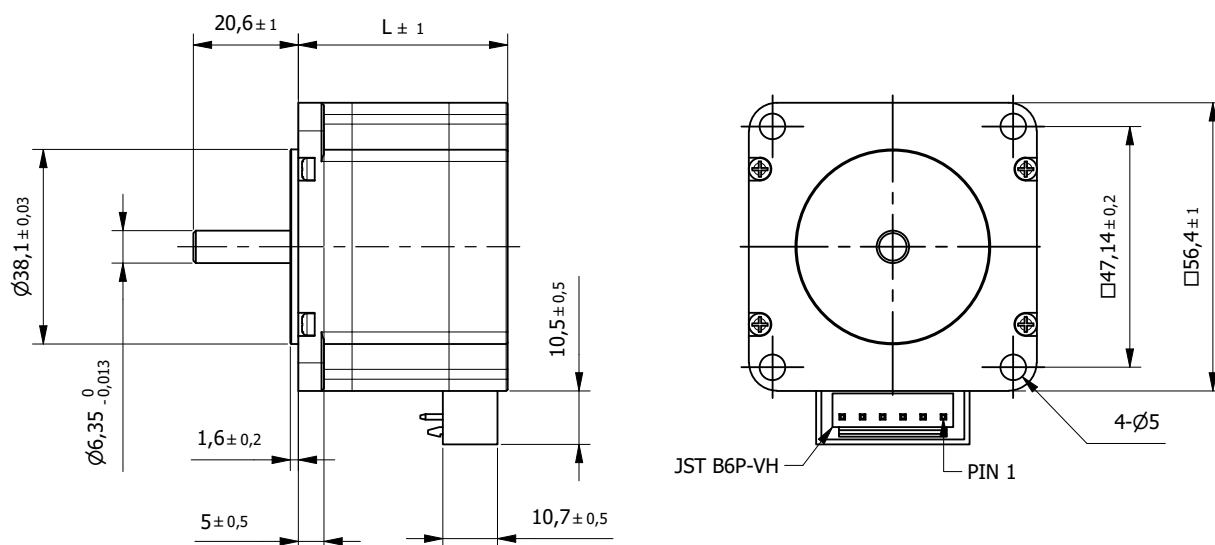
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 57STC76

□ 57mm

High Torque with Connector

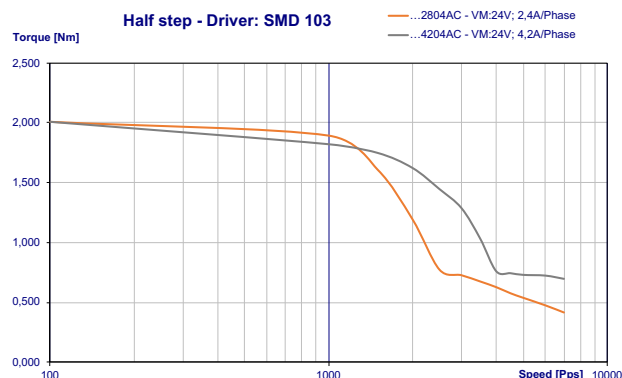


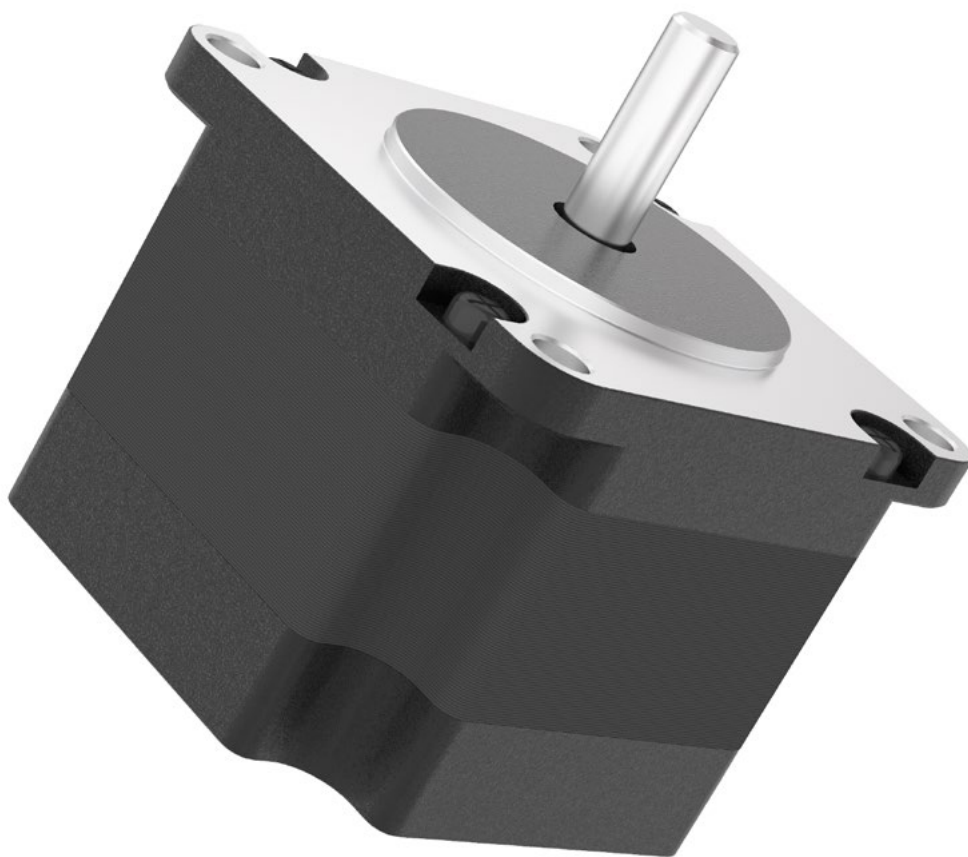
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification				
	Model		...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	gcm2	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

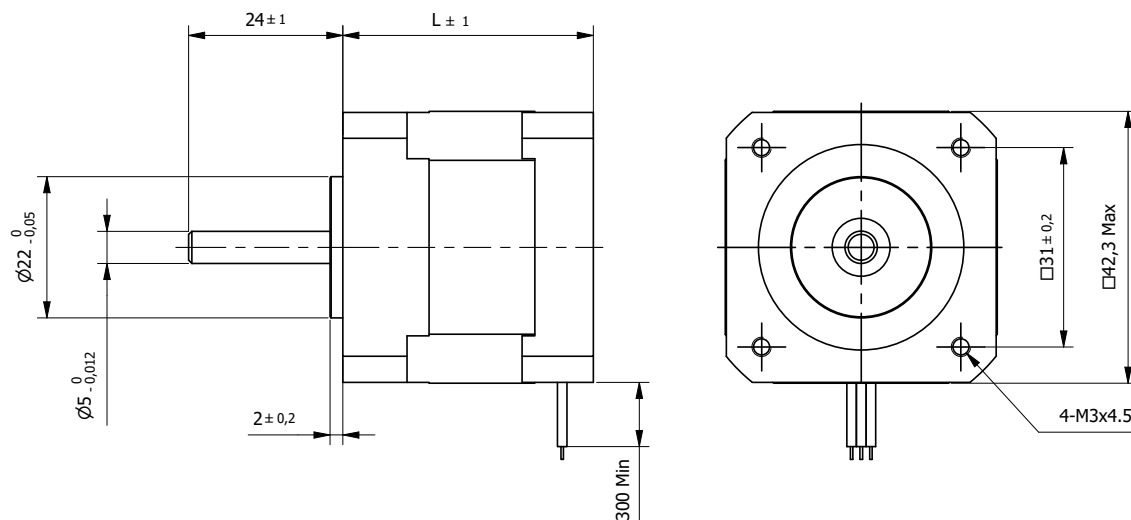
3-Phase Hybrid

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	284
57 3P	0,45...1,5	285
60 3P53	0,9	286

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

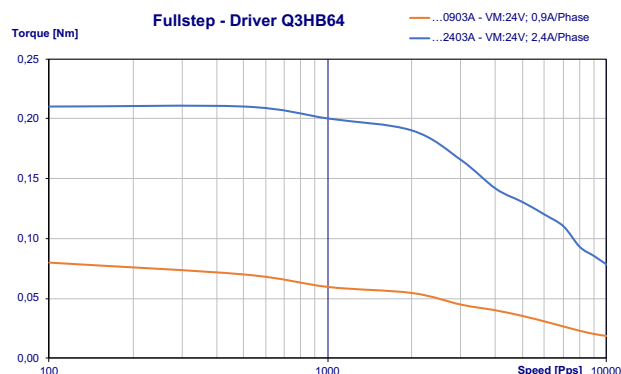


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

Specification				
Model		...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

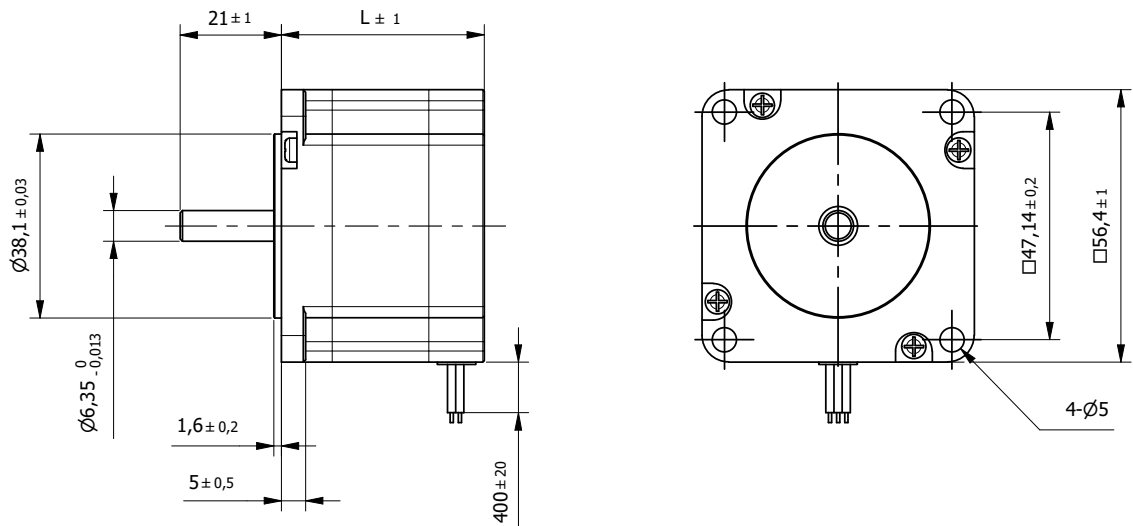
Connection			
Lead n°	Color	Gauge	Function
1	Red	UL1061 AWG26	Phase U
2	Yellow		Phase V
3	Blue		Phase W



Hybrid Stepper Motor 573P

3-Phase

□ 57mm

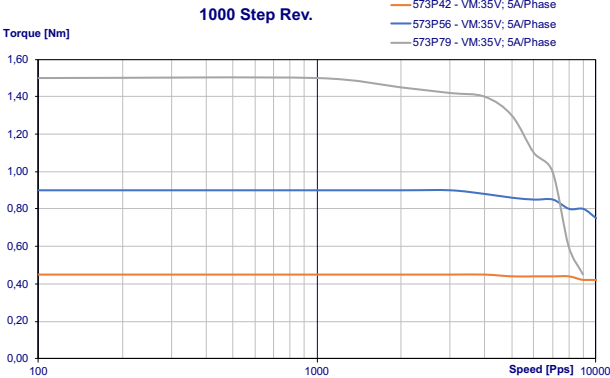


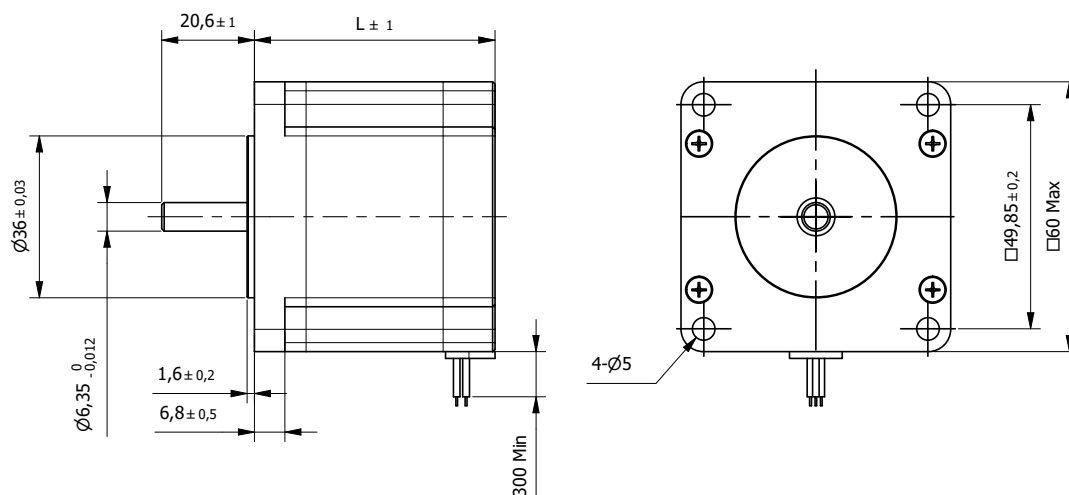
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

Specification					
	Model		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	gcm2	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



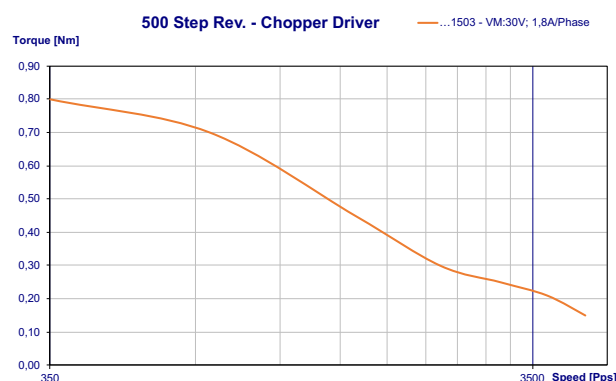


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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.

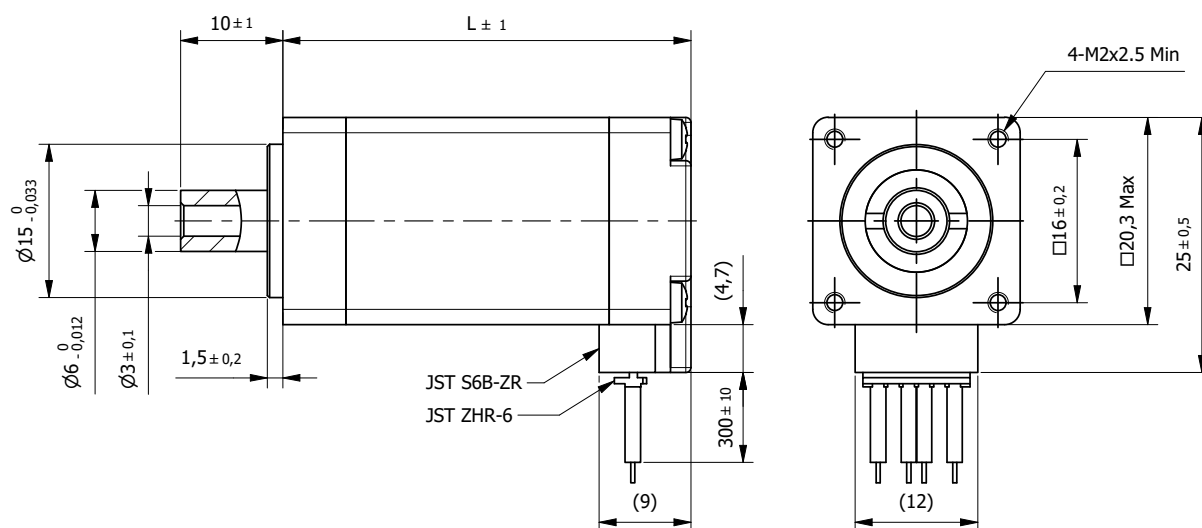
Hollow Shaft Stepper motors	Torque* (Nm)	
20STC40 H	0,036	290
28STC51 H	0,12	291
35STC38 H	0,23	292
42STC47 H	0,44	293
57STC76 H	2,3	294
86SH118 H	6	295

* Holding Torque

Hybrid Stepper Motor 20STC40-H

Hollow Shaft - High Torque

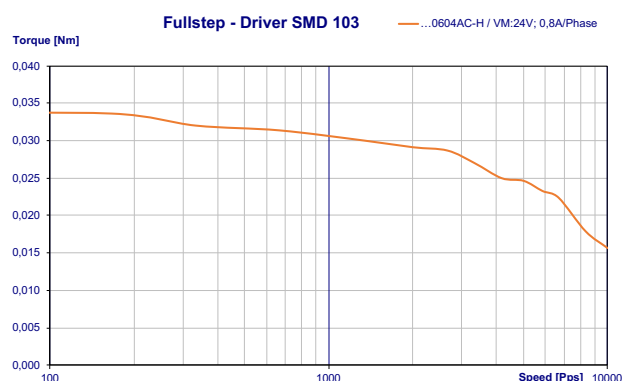
□ 20mm



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

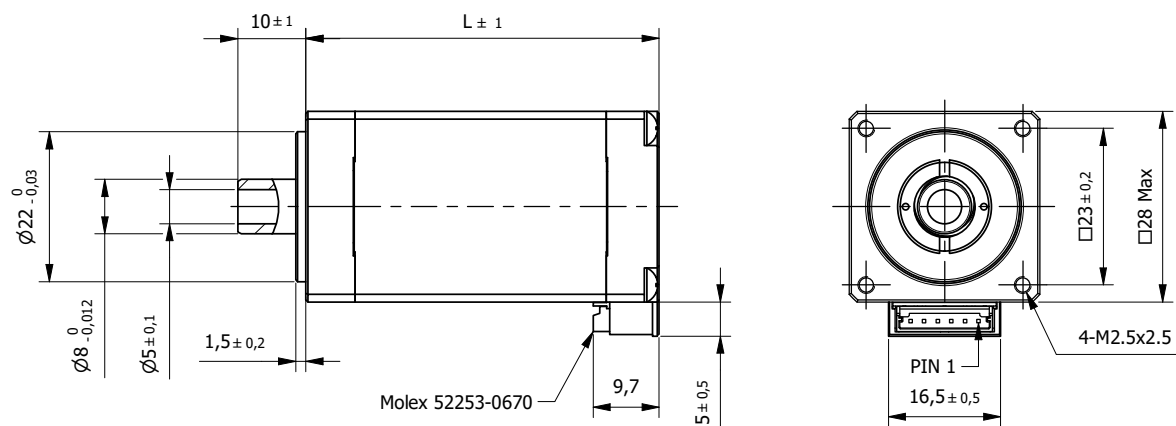
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1061 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 28STC51-H

Hollow Shaft - High Torque

□ 28mm



Specification

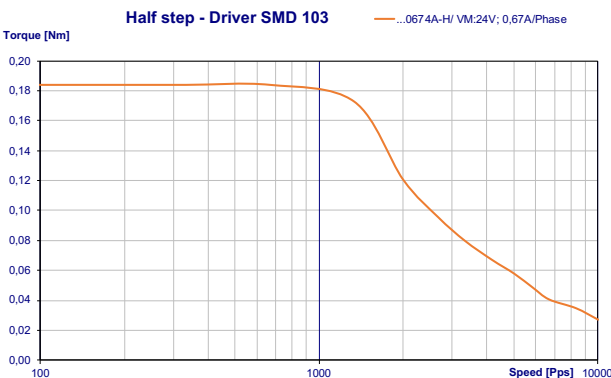
Model	...0674A-H		
1	Rated Voltage	V	6,2
2	Current/Phase	A	0,67
3	Resistance/Phase	Ω	9,2
4	Inductance/Phase	mH	5,6
5	Holding Torque	Nm	0,12
6	Rotor Inertia	gcm2	18
7	Detent Torque	Nm	0,008
8	n° of Leads		4
9	Length (L)	mm	52
10	Weight	Kg	0,2

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

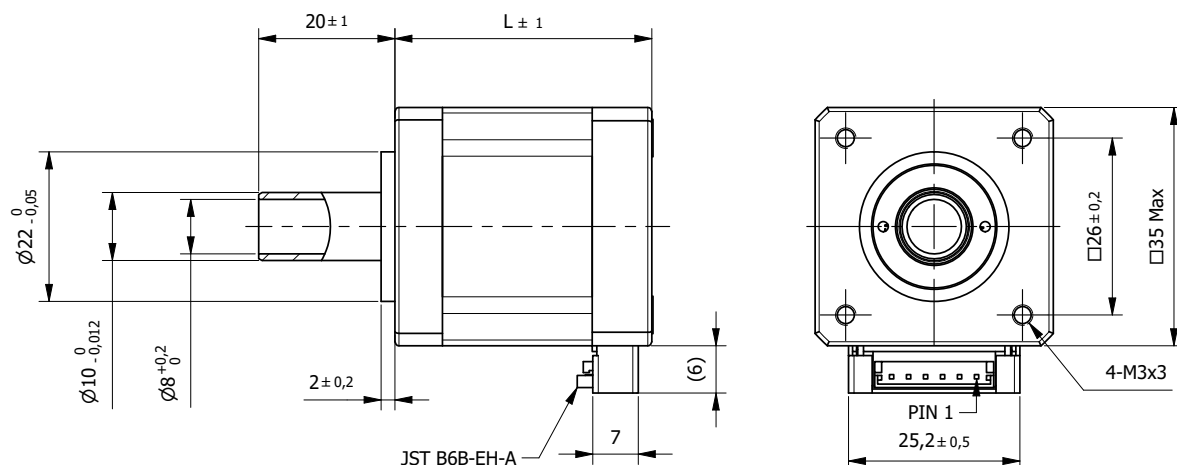
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG26	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 35STC38-H

Hollow Shaft - High Torque

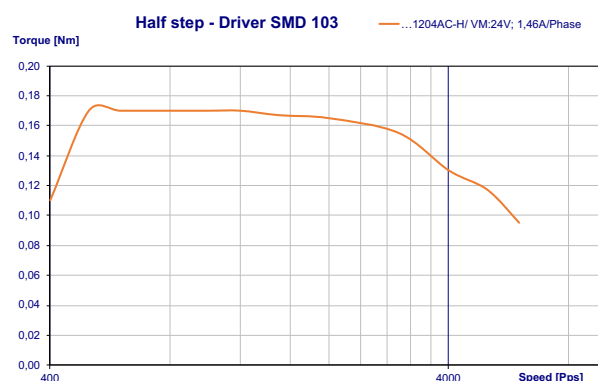
□ 35mm



Specification			
Model		...1204AC-H	
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

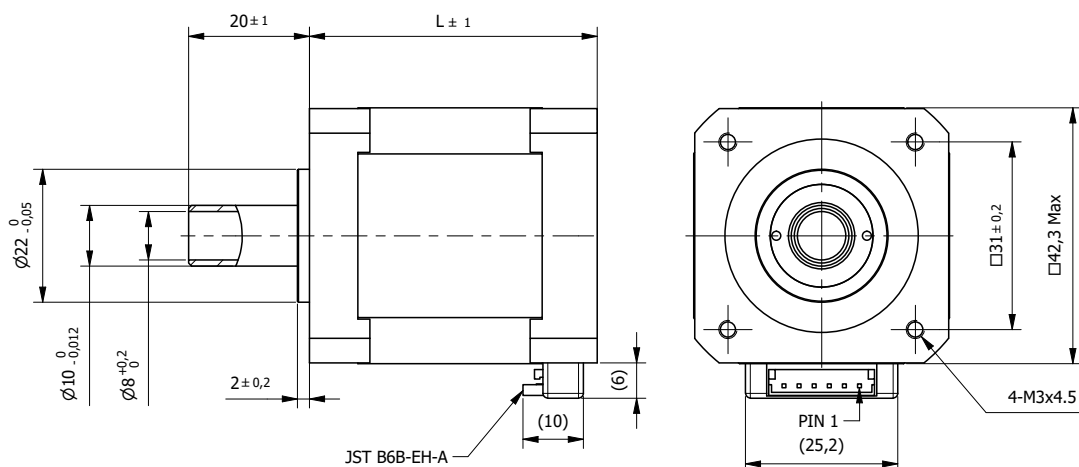
Connection			
Pin n°	Color	Gauge	Function
1	Yellow	UL1430 AWG26	COM Phase A
2	Black		Phase A
3	Green		Phase A-
4	Red		Phase B
5	Blue		Phase B-
6	White		COM Phase B



Hybrid Stepper Motor 42STC47-H

Hollow Shaft - High Torque

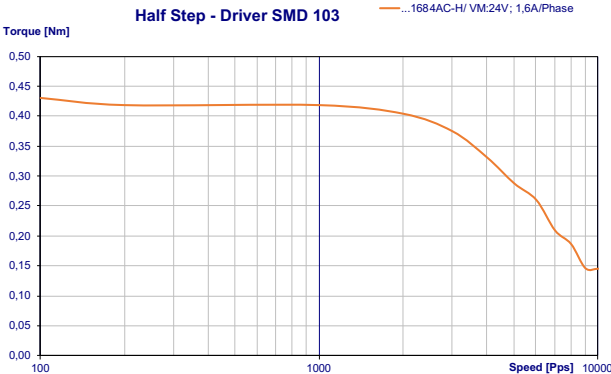
□ 42mm



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

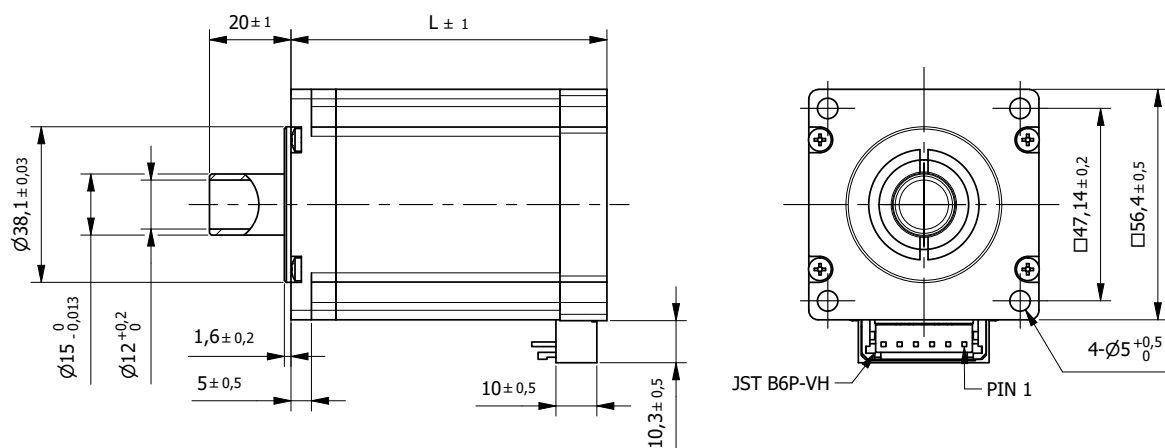
Connection		
Pin n°	Color	Function
1	Yellow	COM Phase A
2	Black	Phase A
3	Green	Phase A-
4	Red	Phase B
5	Blue	Phase B-
6	White	COM Phase B



Hybrid Stepper Motor 57STC76-H

Hollow Shaft - High Torque

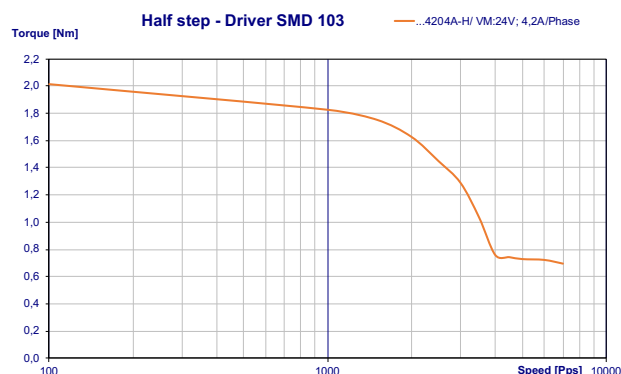
□ 57mm



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

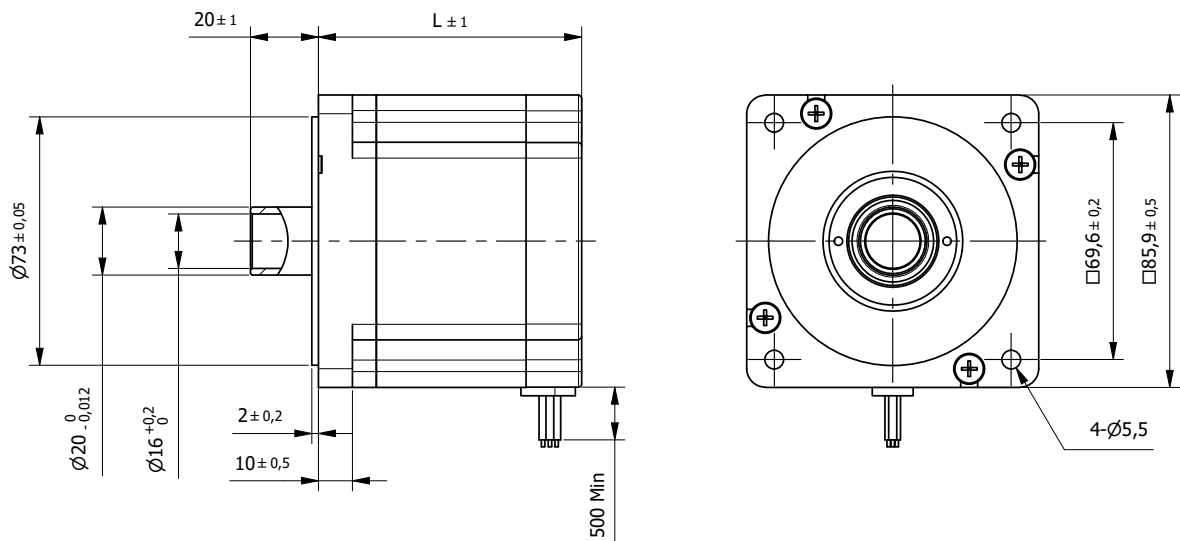
Connection			
Pin n°	Color	Gauge	Function
1	Black	UL1430 AWG22	Phase A
2	Yellow		COM Phase A
3	Green		Phase A-
4	Red		Phase B
5	White		COM Phase B
6	Blue		Phase B-



Hybrid Stepper Motor 86SH118-H

Hollow Shaft - High Torque

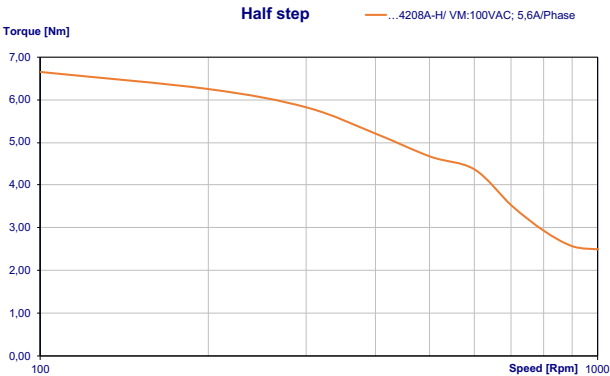
□ 86mm



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	gcm2	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





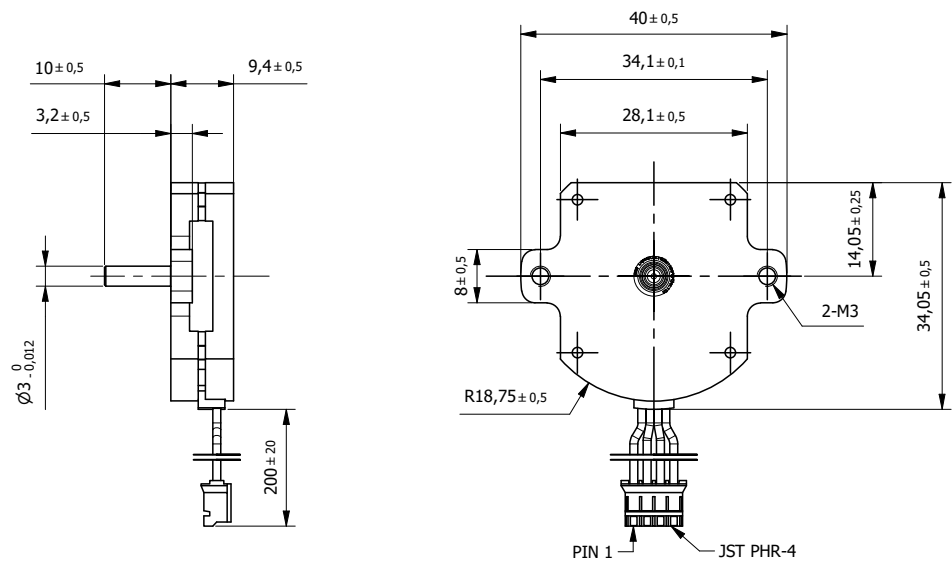
Stepper motors
Flat Hybrid

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

Flat Hybrid Stepper motors	Torque* (Nm)	
28S10	0,01	298
63S10	0,064	299

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.

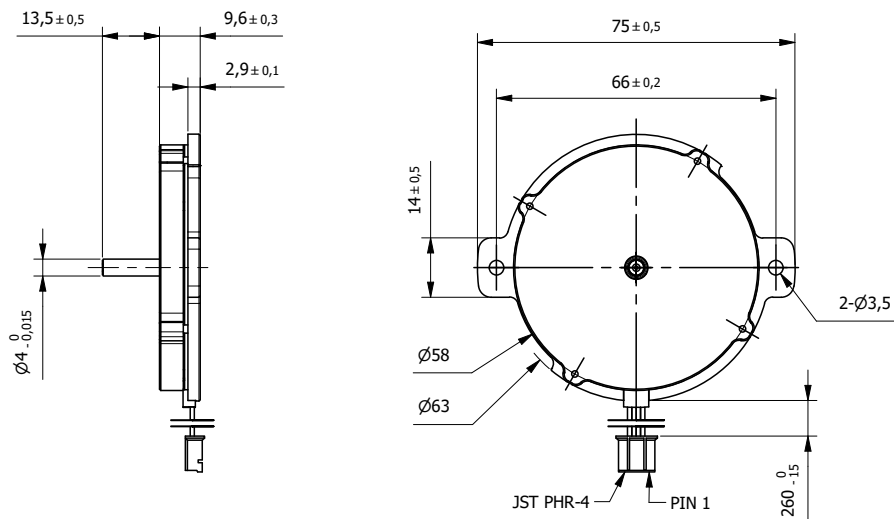
* Holding Torque



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	gcm2	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

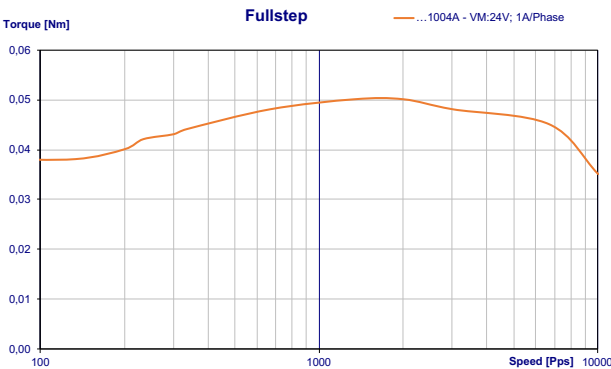
Model	...	1004A
1	Rated Voltage	V 3,8
2	Current/Phase	A 1
3	Resistance/Phase	Ω 3,8
4	Inductance/Phase	mH 2
5	Holding Torque	Nm 0,064
6	Rotor Inertia	gcm2 16
7	n° of Leads	4
8	Length (L)	mm 9,6
9	Weight	Kg 0,095

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	302
60SC	1...3	303
86SC	3,5...12	304

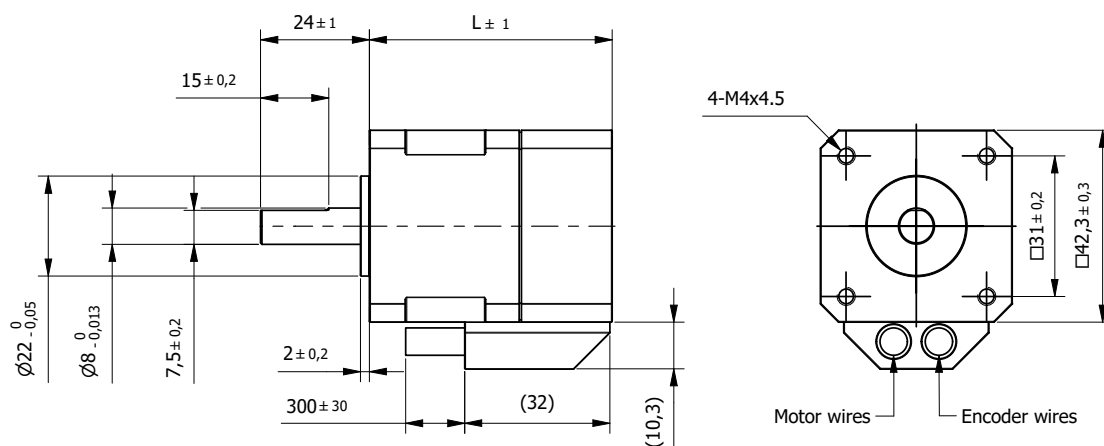
Our Hybrid stepper motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested 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

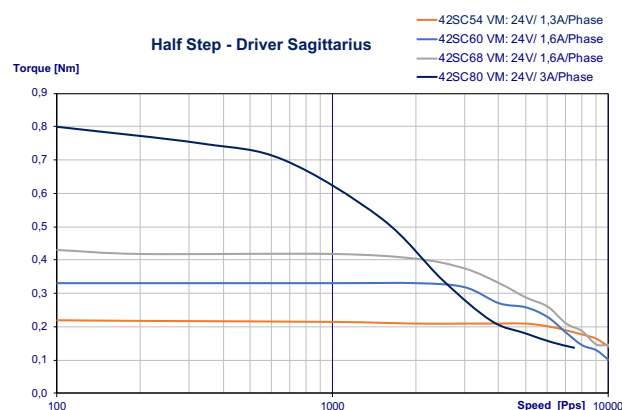


Specification						
	Model		42SC54	42SC60	42SC68	42SC80
1	Rated Voltage	V	2,8	2,8	2,8	3,5
2	Current/Phase	A	1,33	1,68	1,68	3
3	Resistance/Phase	Ω	2,1	1,65	1,65	1,2
4	Inductance/Phase	mH	2,5	3,2	2,8	2,9
5	Holding Torque	Nm	0,22	0,36	0,44	0,75
6	Rotor Inertia	gcm2	35	54	68	102
7	Detent Torque	Nm	0,012	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

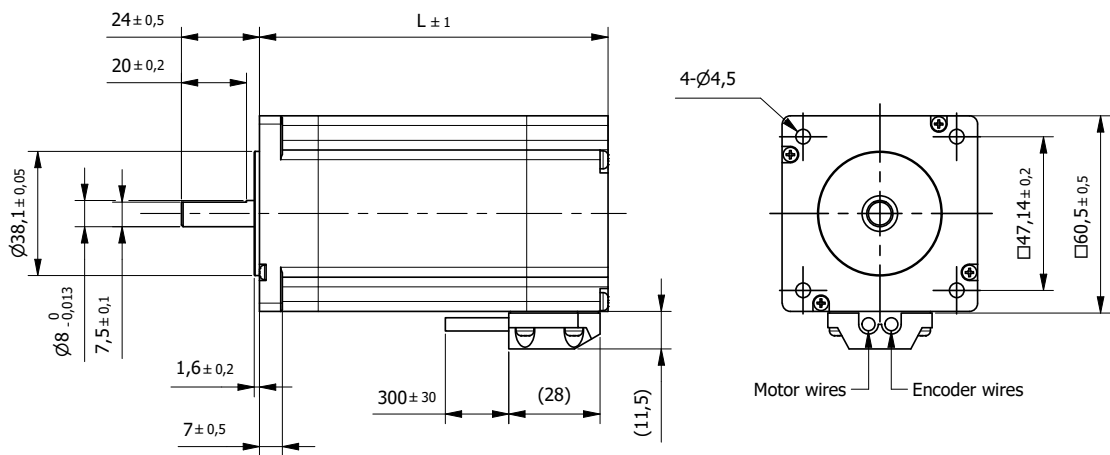
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Black	AWG24	GND
2	Red		VCC:+5VDC
3	Blue		EA-
4	Blue/White		EA+
5	Orange		EB-
6	Orange/White		EB+
Motor			
1	Black	AWG20	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 60SC

with Encoder

□ 60mm

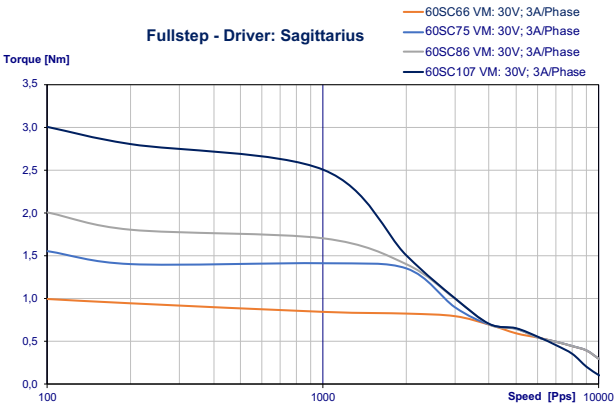


Specification						
	Model		60SC66	60SC75	60SC86	60SC107
1	Rated Voltage	V	2,1	2,8	3,4	4,2
2	Current/Phase	A	2,8	2,8	2,8	2,8
3	Resistance/Phase	Ω	0,75	1	1,2	1,5
4	Inductance/Phase	mH	2	3,6	4,6	6,8
5	Holding Torque	Nm	1	1,65	2	3
6	Rotor Inertia	gcm2	275	450	570	840
7	Detent Torque	Nm	0,05	0,05	0,05	0,1
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

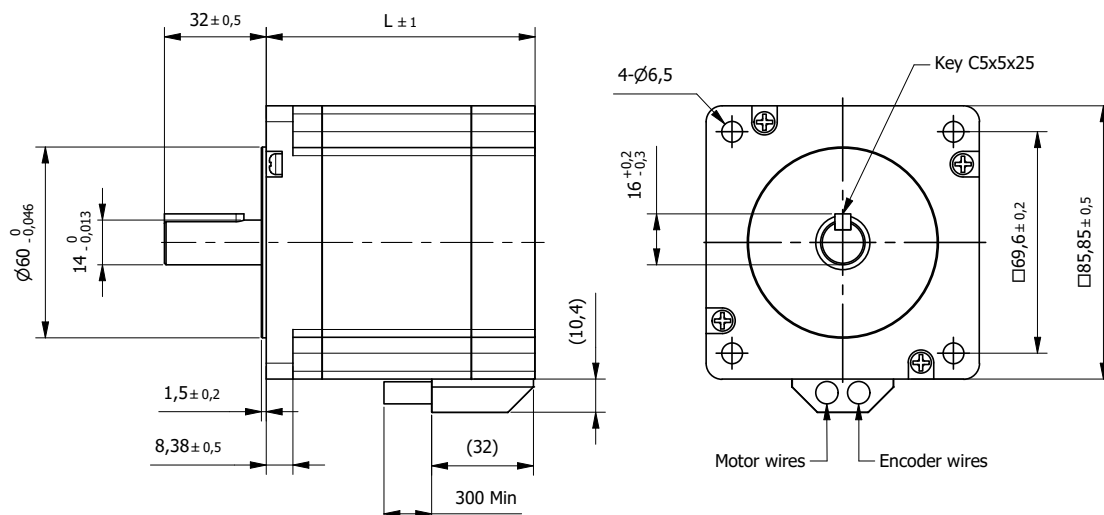
Connection			
Lead n°	Color	Gauge	Function
Feedback			
1	Black	AWG24	GND
2	Red		VCC:+5VDC
3	Blue		EA+
4	Blue/White		EA-
5	Orange		EB+
6	Orange/White		EB-
Motor			
1	Black	AWG20	Phase A
2	Green		Phase A-
3	Red		Phase B
4	Blue		Phase B-



Hybrid Stepper Motor 86SC

with Encoder

□ 86mm

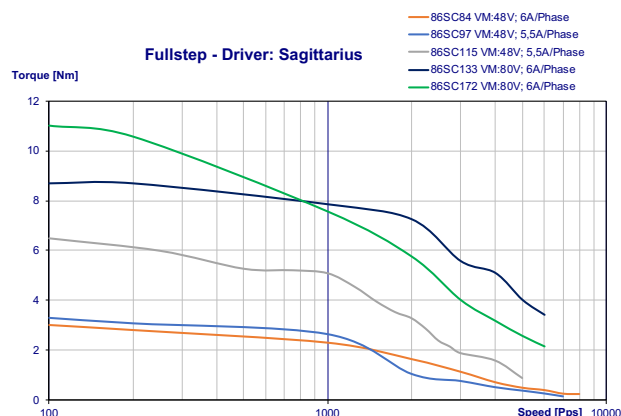


Specification			86SC84	86SC97	86SC115	86SC133	86SC172
1	Rated Voltage	V	1,7	2,3	2,6	3,3	4,3
2	Current/Phase	A	6	5,5	5,5	6	6,2
3	Resistance/Phase	Ω	0,3	0,4	0,5	0,55	0,7
4	Inductance/Phase	mH	1,8	3,5	3,4	6	9
5	Holding Torque	Nm	3,5	4,5	6,5	8,5	12
6	Rotor Inertia	gcm ²	1000	1400	1900	2700	4000
7	Detent 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

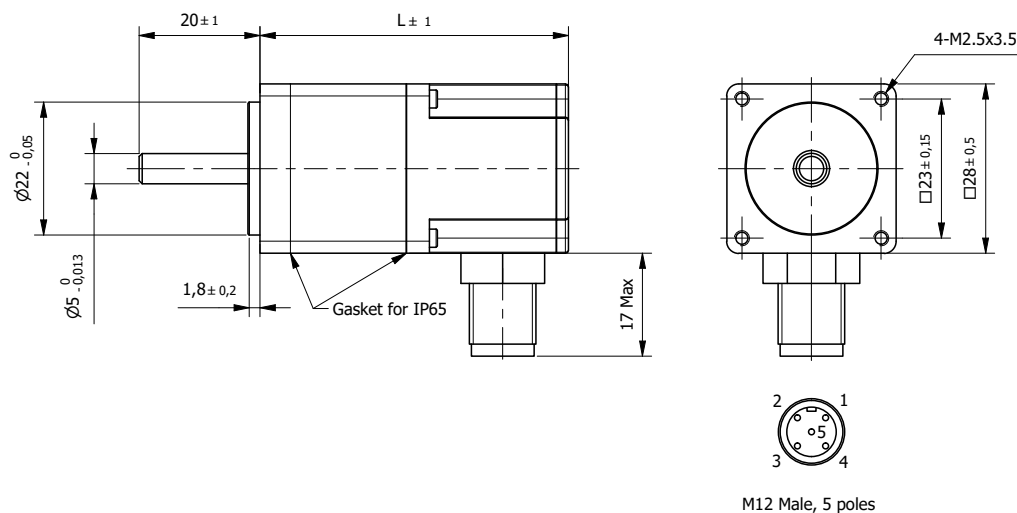
IP65 Hybrid

Advantages at a glance
High protection
High torque
High speed

IP65 Hybrid Stepper motors	Torque* (Nm)	
SM28 070 - IP65	0,127	308
SM42-E - IP65	0,16...0,72	309
SM57-E - IP65	0,7...1,95	310

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

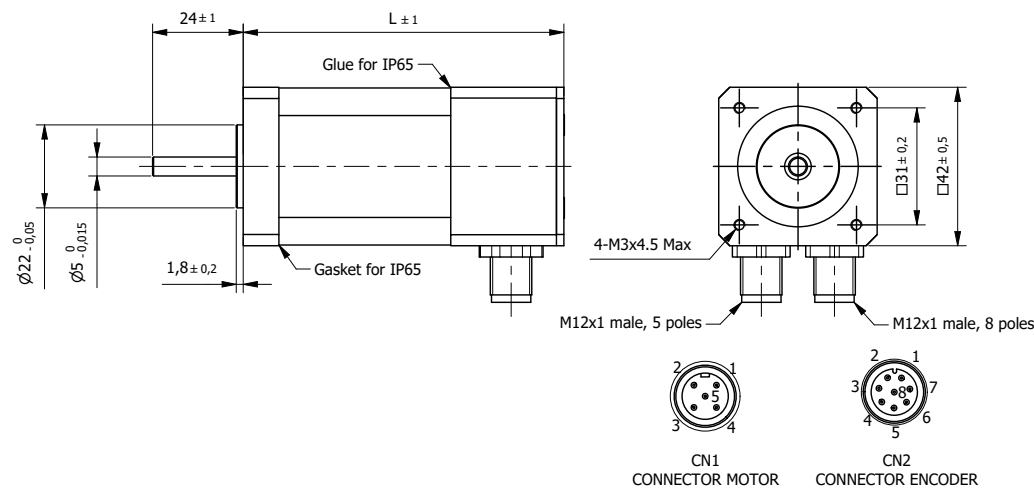
Characteristics	
Item	
Step angle	1,8°
Step angle Accuracy	±5%
Insulation Class	B
Protection Class	IP65
Ambient Temperature	-20°C to +50°C
Max. Temp. Rise (rated current, 2-phase on)	80°C
Max. Shaft Radial play (450g load)	0,03mm
Max. Shaft Axial play (450g load)	0,08mm
Max. Radial force (at shaft end)	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	gcm2	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

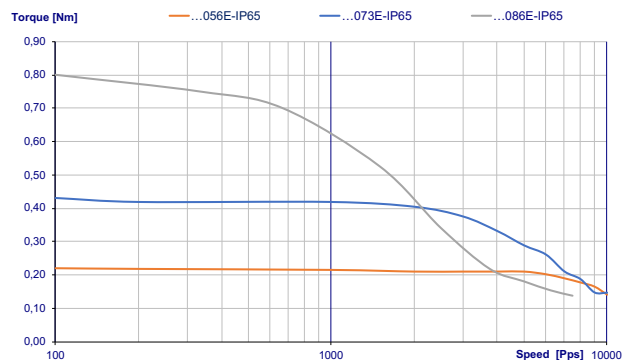
Characteristics

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

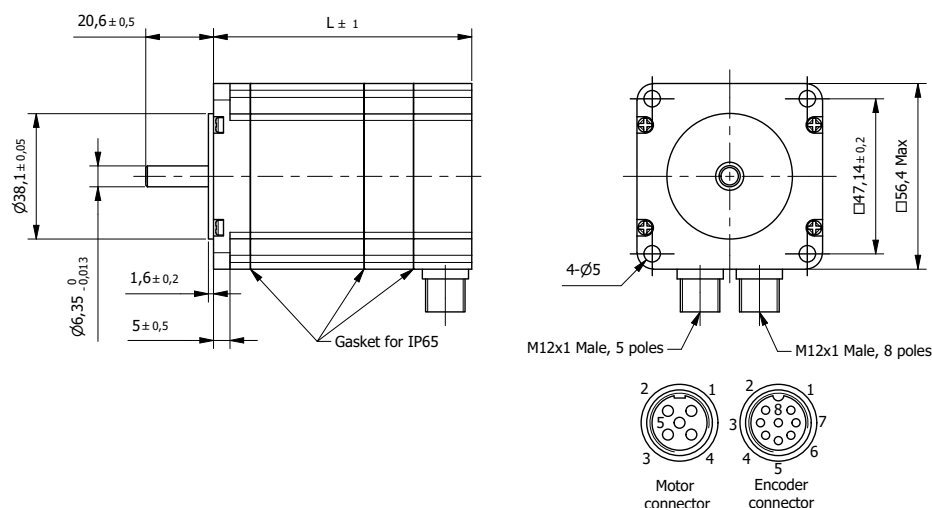
Poles n°	Function
Motor	
1	Phase A
2	Phase A-
3	Phase B
4	Phase B-
Feedback	
1	Vdc
2	GND
3	A
4	A-
5	B
6	B-
7	Z
8	Z-



Hybrid Stepper Motor SM57

with Encoder - IP65

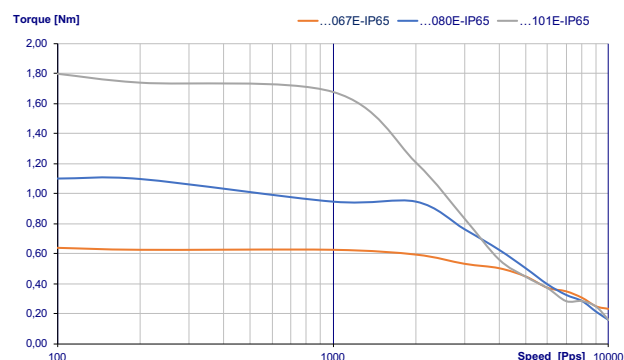
□ 57mm



Specification					
	Model	...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	gcm2	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 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)	0,03mm
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



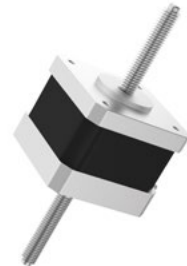
External Stepper
Linear Actuators

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Captive Stepper
Linear Actuators

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Non-Captive Stepper
Linear Actuators

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Lead Screws

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Threaded Nuts

p.355

Linear Actuators

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External Hybrid Stepper Linear Actuators	Load* (N) 321
SMA8-E	45...222 322
SMA11-E	89 323
SMA14-E	222 324
SMA17-E	222 325
SMA23-E	889 326
Captive Hybrid Stepper Linear Actuators	Load* (N) 329
SMA8-C	45 330
SMA11-C	89 331
SMA14-C	222 332
SMA17-C	222 333
SMA23-C	889 334
Non-Captive Hybrid Stepper Linear Actuators	Load* (N) 337
SMA8-N	45 338
SMA11-N	89 339
SMA14-N	222 340
SMA17-N	222 341
SMA23-N	889 342
SMA34-N	2200 343
Lead Screws	345
Threaded Nuts	355

* Max. Axial Load

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.
Power consumption	The power consumption of a motor is the amount of energy consumed by that motor in units of Watts (W). 1W is 1 kg·m ² ·s ⁻³
Max. Axial load	Also referred to as thrust load, this is the maximum axial force that should be applied to not exceed the dynamic load rating of the actuator or its components.
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 x 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 travelling speeds, thanks to over-square pitches ($p \leq 6 \times d$)

High efficiency ($\mu \sim 0.5 \dots 0.8$), thanks to high surface quality of the steel leadscrews and nuts made of high performance plastics

Weight optimization possible based on aluminum screws

Performance optimization sometimes possible based on coating

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.

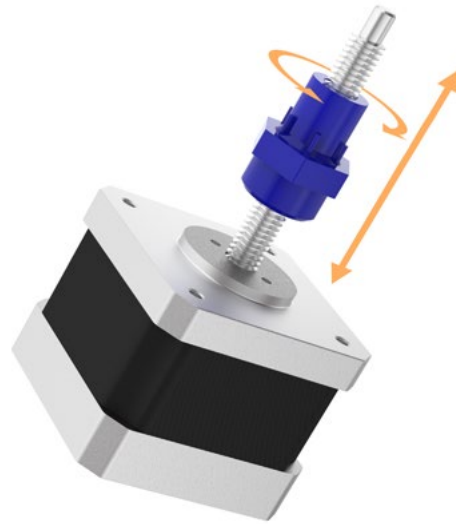
End fixity

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.

LEAD SCREW & NUT Selection

Technical introduction

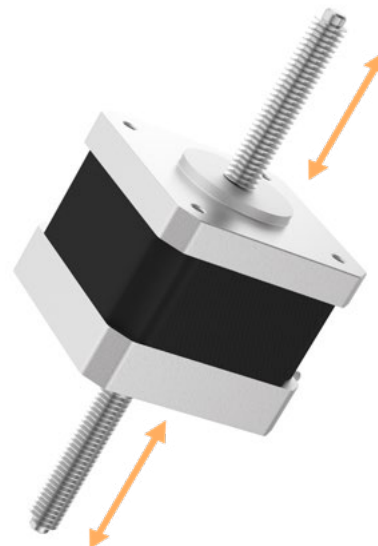
**External Stepper
Linear Actuators**

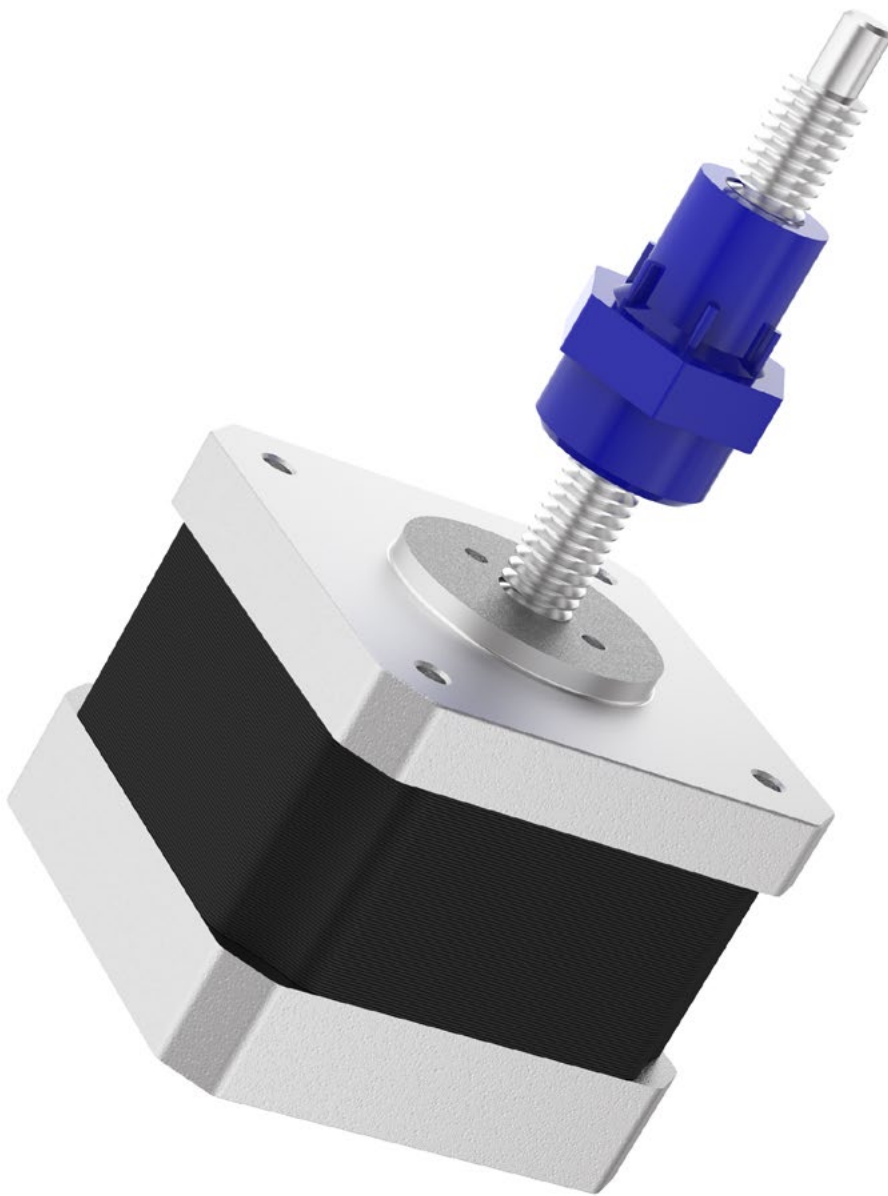


**Captive Stepper
Linear Actuators**



**Non-Captive Stepper
Linear Actuators**





External Linear Actuators

Advantages at a glance
Small to medium load ratings
Very high travelling speeds
High efficiency ($\mu\sim 0.5\ldots 0.8$)

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, 23 and 34. Standard and custom nut designs are available. Optional accessories are connectors, wire harnesses, digital encoders and custom lead screw nuts.

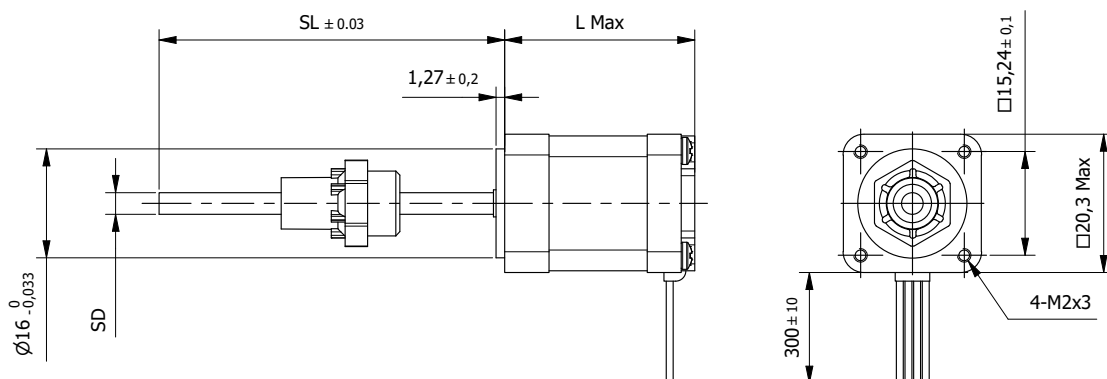
External Hybrid Stepper Linear Actuators	Load* (N)	
SMA8-E	45...222	322
SMA11-E	89	323
SMA14-E	222	324
SMA17-E	222	325
SMA23-E	889	326

* Max. Axial Load

External Linear Actuator SMA-8

□ 20mm

Hybrid Stepper motor



Note: various Nut options available, see below

Motor Specification			...S2,5-E	...S5-E	...S7,5-E	...D2,5-E	...D5-E	...D7,5-E
1	Rated Voltage	V	2,5	5	7,5	2,5	5	7,5
2	Current / Phase	A	0,49	0,24	0,16	1,32	0,65	0,43
3	Resistance / Phase	Ω	5,1	20,4	45,9	1,9	7,7	17,3
4	Inductance / Phase	mH	1,5	5	11,9	0,8	3,2	6,1
5	Power Consumption	W	2,45	2,45	2,45	6,5	6,5	6,5
6	Max. Axial Load	N	45	45	45	222	222	222
7	Length (L)	mm	28	28	28	34	34	34
8	Weight	g	43	43	43	68	68	68

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Connection			
Lead n°	Gauge	Color	Function
1	AWG28	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
012-012	0,125"	0,012"	0,00006"
012-024	0,125"	0,024"	0,00012"
016-039	4mm	1mm	0,005mm
016-078	4mm	2mm	0,010mm

* More options available - see lead screw section

Standard Nut options	
NFA - Standard Flanged Nut	
NTA - Standard Threaded Nut	
AFA - Anti-Backlash Flanged Nut	
ATA - Anti-Backlash Threaded Nut	

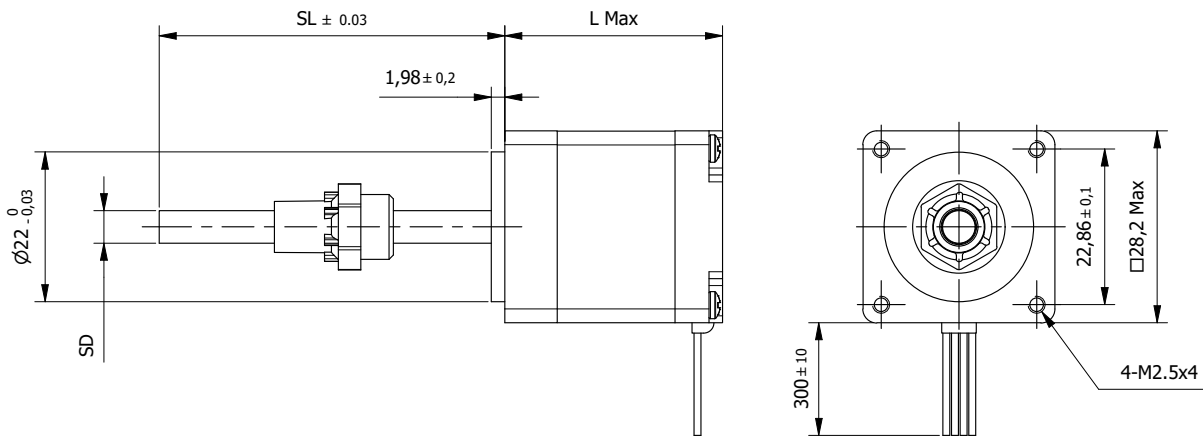
* More options available - see nut section

Standard Combination	
Encoder and Drive combination available on request	

External Linear Actuator SMA-11

□ 28mm

Hybrid Stepper motor



Note: various Nut options available, see below

Motor Specification								
	Model		...S2,1-E	...S5-E	...S12-E	...D2,1-E	...D5-E	...D12-E
1	Rated Voltage	V	2,1	5	12	2,1	5	12
2	Current / Phase	A	1	0,42	0,18	1,9	0,75	0,35
3	Resistance / Phase	Ω	2,1	11,9	68,6	1,1	6,7	34,8
4	Inductance / Phase	mH	1,5	6,7	39	1,1	5,8	35,6
5	Power Consumption	W	4,2	4,2	4,2	7,5	7,5	7,5
6	Max. Axial Load	N	89	89	89	89	89	89
7	Length (L)	mm	32	32	32	46	46	46
8	Weight	g	119	119	119	180	180	180

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
018-050	0,1875"	0,05"	0,00025"
018-100	0,1875"	0,1"	0,00050"
016-157	4mm	4mm	0,020mm
016-196	4mm	5mm	0,025mm

* More options available - see lead screw section

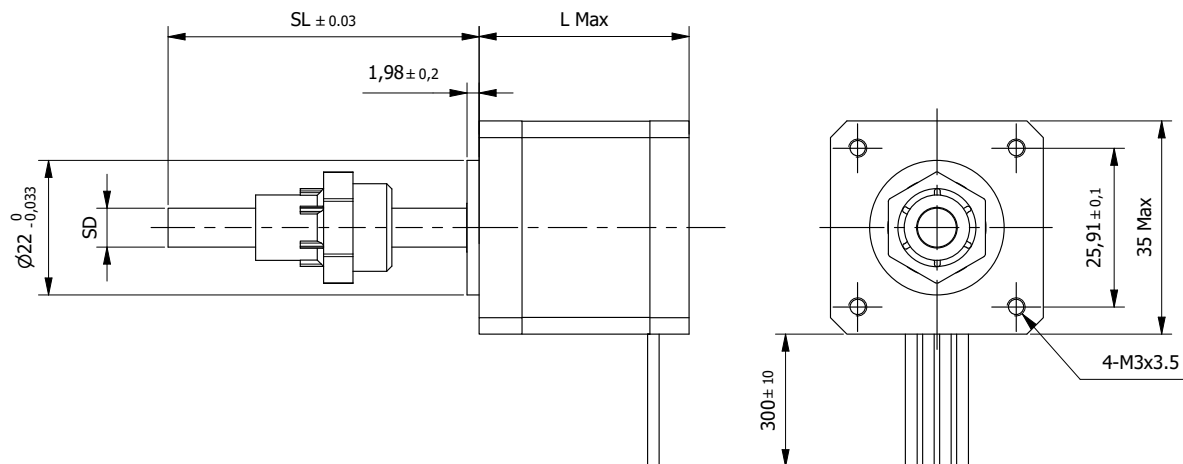
Standard Nut options	
NFA - Standard Flanged Nut	
NTA - Standard Threaded Nut	
AFA - Anti-Backlash Flanged Nut	
ATA - Anti-Backlash Threaded Nut	
* More options available - see nut section	

Standard Combination	
Encoder and Drive combination available on request	

External Linear Actuator SMA-14

Hybrid Stepper motor

□ 35mm



Note: various Nut options available, see below

Motor Specification			...S2,33-E	...S5-E	...S12-E	...D2,33-E	...D5-E	...D12-E
1	Rated Voltage	V	2,33	5	12	2,33	5	12
2	Current / Phase	A	1,25	0,57	0,24	2	0,91	0,38
3	Resistance / Phase	Ω	1,86	8,8	50,5	1,2	5,5	31,6
4	Inductance / Phase	mH	2,8	13	60	1,9	7,63	65,1
5	Power Consumption	W	5,7	5,7	5,7	9,1	9,1	9,1
6	Max. Axial Load	N	222	222	222	222	222	222
7	Length (L)	mm	34	34	34	44	44	44
8	Weight	g	162	162	162	240	240	240

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
025-062	0,25"	0,0625"	0,0003125"
025-250	0,25"	0,25"	0,00125"
024-236	6mm	6mm	0,03mm
024-472	6mm	12mm	0,06mm

* More options available - see lead screw section

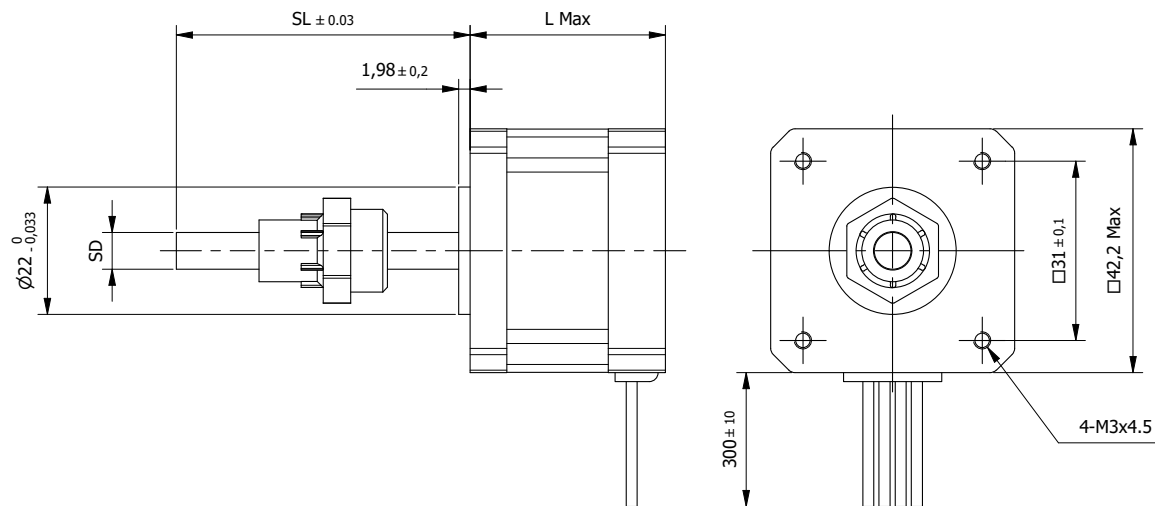
Standard Nut options	
NFA - Standard Flanged Nut	
NTA - Standard Threaded Nut	
AFA - Anti-Backlash Flanged Nut	
ATA - Anti-Backlash Threaded Nut	
RFA - Radial Anti-Backlash Flanged Nut	
RTA - Radial Anti-Backlash Threaded Nut	
* More options available - see nut section	

Standard Combination	
Encoder and Drive combination available on request	

External Linear Actuator SMA-17

Hybrid Stepper motor

□ 42mm



Note: various Nut options available, see below

Motor Specification								
	Model		...S2,33-E	...S5-E	...S12-E	...D2,33-E	...D5-E	...D12-E
1	Rated Voltage	V	2,33	5	12	2,33	5	12
2	Current / Phase	A	1,5	0,7	0,29	2,6	1,3	0,55
3	Resistance / Phase	Ω	1,56	7,2	41,5	0,9	3,8	21,9
4	Inductance / Phase	mH	1,9	10,6	73,3	1,33	6,6	45,1
5	Power Consumption	W	7	7	7	14	14	14
6	Max. Axial Load	N	222	222	222	222	222	222
7	Length (L)	mm	34	34	34	48	48	48
8	Weight	g	241	241	241	352	352	352

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
025-062	0,25"	0,0625"	0,0003125"
025-250	0,25"	0,25"	0,00125"
024-236	6mm	6mm	0,03mm
024-472	6mm	12mm	0,06mm

* More options available - see lead screw section

Standard Nut options	
NFA - Standard Flanged Nut	
NTA - Standard Threaded Nut	
AFA - Anti-Backlash Flanged Nut	
ATA - Anti-Backlash Threaded Nut	
RFA - Radial Anti-Backlash Flanged Nut	
RTA - Radial Anti-Backlash Threaded Nut	
* More options available - see nut section	

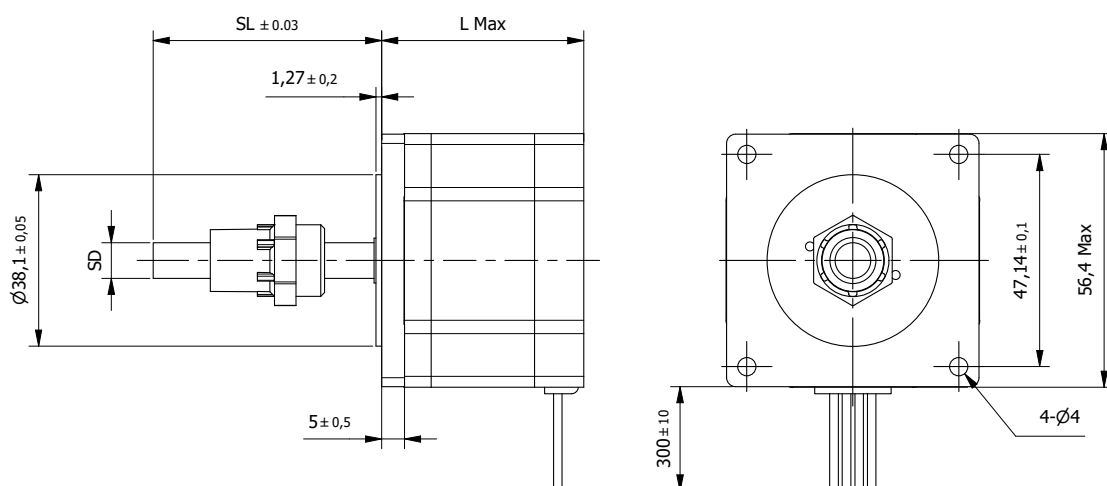
Standard Combination	
Encoder and Drive combination available on request	

Linear actuators

External Linear Actuator SMA-23

Hybrid Stepper motor

□ 56,4mm



Note: various Nut options available, see below

Motor Specification			...S3,25-E	...S5-E	...S12-E	...D3,25-E	...D5-E	...D12-E
1	Rated Voltage	V	3,25	5	12	3,25	5	12
2	Current / Phase	A	2	1,3	0,54	3,32	2,16	0,9
3	Resistance / Phase	Ω	1,63	3,85	22,2	0,98	2,31	13,33
4	Inductance / Phase	mH	3,5	10,5	47	1,33	6,6	45,1
5	Power Consumption	W	13	13	13	14	14	14
6	Max. Axial Load	N	889	889	889	889	889	889
7	Length (L)	mm	45	45	45	64	64	64
8	Weight	g	511	511	511	964	964	964

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Connection			
Lead n°	Gauge	Color	Function
1	AWG22	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
037-100	0,375"	0,1"	0,0005"
037-250	0,375"	0,25"	0,00125"
037-196	10mm	5mm	0,025mm
039-472	10mm	12mm	0,06mm

* More options available - see lead screw section

Standard Nut options	
NFA - Standard Flanged Nut	
NTA - Standard Threaded Nut	
AFA - Anti-Backlash Flanged Nut	
ATA - Anti-Backlash Threaded Nut	
RFA - Radial Anti-Backlash Flanged Nut	
RTA - Radial Anti-Backlash Threaded Nut	
* More options available - see nut section	

Standard Combination	
Encoder and Drive combination available on request	



Captive Linear Actuators

Advantages at a glance
Small to medium load ratings
Very high travelling speeds
High efficiency ($\mu \sim 0.5 \dots 0.8$)

Our Captive Stepper Motor Actuators feature a precision lead screw, nut and a spline shaft to produce accurate and repeatable linear motion. Actuators are manufactured in NEMA sizes 8, 11, 14, 17, 23 and 34. These captive stepper motor actuators operate with a precision lead screw and spline shaft that translates through the motor housing.

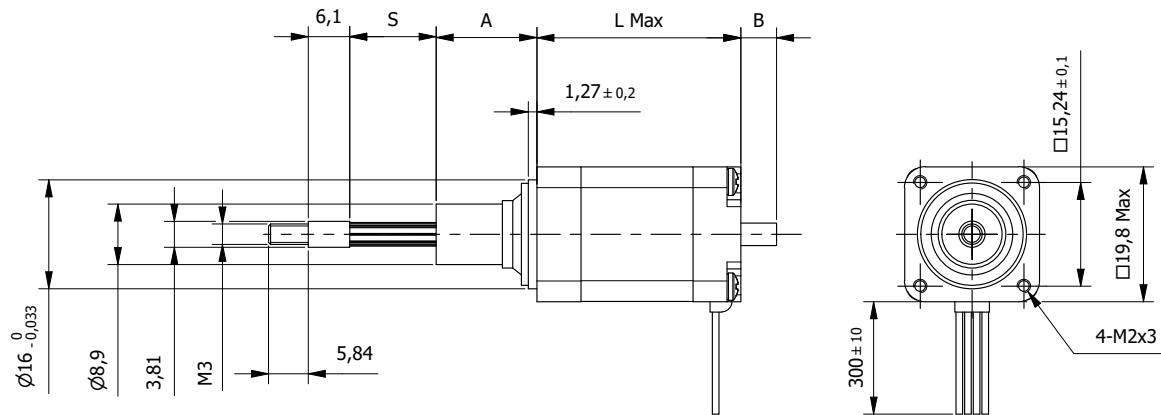
Captive Hybrid Stepper Linear Actuators	Load* (N)	
SMA8-C	45	330
SMA11-C	89	331
SMA14-C	222	332
SMA17-C	222	333
SMA23-C	889	334

* Max. Axial Load

Captive Linear Actuator SMA-8

Hybrid Stepper motor

□ 20mm



Motor Specification					
	Model		...S2,5-C	...S5-C	...S7,5-C
1	Rated Voltage	V	2,5	5	7,5
2	Current / Phase	A	0,49	0,24	0,16
3	Resistance / Phase	Ω	5,1	20,4	45,9
4	Inductance / Phase	mH	1,5	5	11,9
5	Power Consumption	W	2,45	2,45	2,45
6	Max. Axial Load	N	45	45	45
7	Length (L)	mm	28	28	28
8	Weight	g	43	43	43

Standard Stroke options				
Stroke code	Stroke			
	Dim.S in(mm)	Dim.A in(mm)	Dim.B in(mm)	
0,25	0,25 (9)	0,437 (11,1)	0,062 (1,58)	
0,50	0,50 (12,7)	0,583 (14,81)	0,207 (5,28)	
0,75	0,75 (19,1)	0,833 (21,16)	0,457 (11,63)	
1,00	1,00 (25,4)	1,08 (27,51)	0,707 (17,98)	
1,25	1,25 (31,8)	1,33 (33,86)	0,957 (24,33)	
1,50	1,50 (38,1)	1,58 (40,21)	1,20 (30,68)	

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
012-024	0,125"	0,024"	0,00012"
012-048	0,125"	0,048"	0,00024"
012-096	0,125"	0,096"	0,00048"
012-157	0,125"	0,157"	0,00078"

* More options available - see lead screw section

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

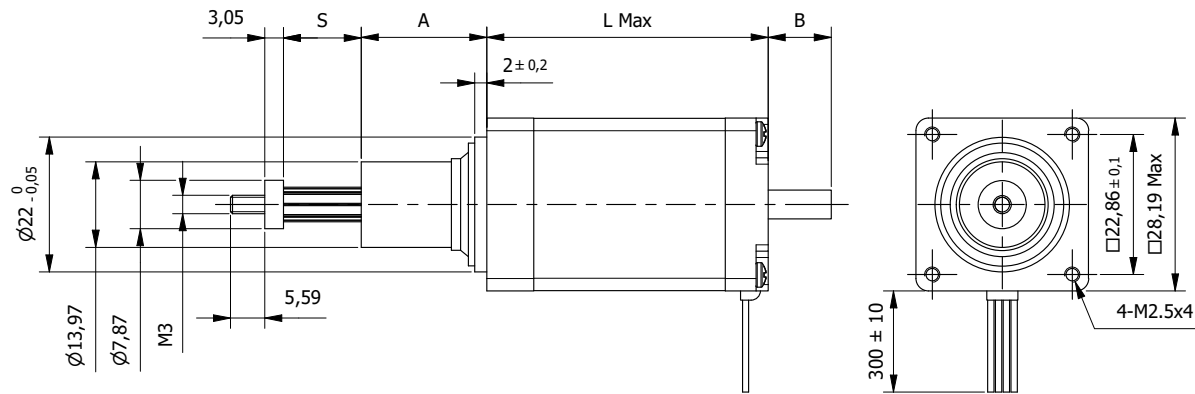
Connection			
Lead n°	Gauge	Color	Function
1	AWG28	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Captive Linear Actuator SMA-11

Hybrid Stepper motor

□ 28mm



Motor Specification								
	Model		...S2,1-C	...S5-C	...S12-C	...D2,1-C	...D5-C	...D12-C
1	Rated Voltage	V	2,1	5	12	2,1	5	12
2	Current / Phase	A	1	0,42	0,18	1,9	0,75	0,35
3	Resistance / Phase	Ω	2,1	11,9	68,6	1,1	6,7	34,8
4	Inductance / Phase	mH	1,5	6,7	39	1,1	5,8	35,6
5	Power Consumption	W	4,2	4,2	4,2	7,5	7,5	7,5
6	Max. Axial Load	N	89	89	89	89	89	89
7	Length (L)	mm	32	32	32	46	46	46
8	Weight	g	119	119	119	180	180	180

Standard Stroke options			
Stroke code	Stroke		
	Dim.S in(mm)	Dim.A in(mm)	Dim.B in(mm)
0,50	0,50 (12,7)	0,818 (20,47)	0,066 (1,68)
0,75	0,75 (19,1)	1,05 (26,82)	0,316 (8,03)
1,00	1,00 (25,4)	1,30 (33,17)	0,566 (14,38)
1,25	1,25 (31,8)	1,55 (39,52)	0,816 (20,73)
1,50	1,50 (38,1)	1,80 (45,85)	1,066 (27,08)
2,00	2,00 (50,8)	2,30 (58,55)	1,566 (39,78)

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
018-025	0,1875"	0,025"	0,00012"
018-050	0,1875"	0,05"	0,00025"
018-100	0,1875"	0,1"	0,00050"
018-200	0,1875"	0,2"	0,001"

* More options available - see lead screw section

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

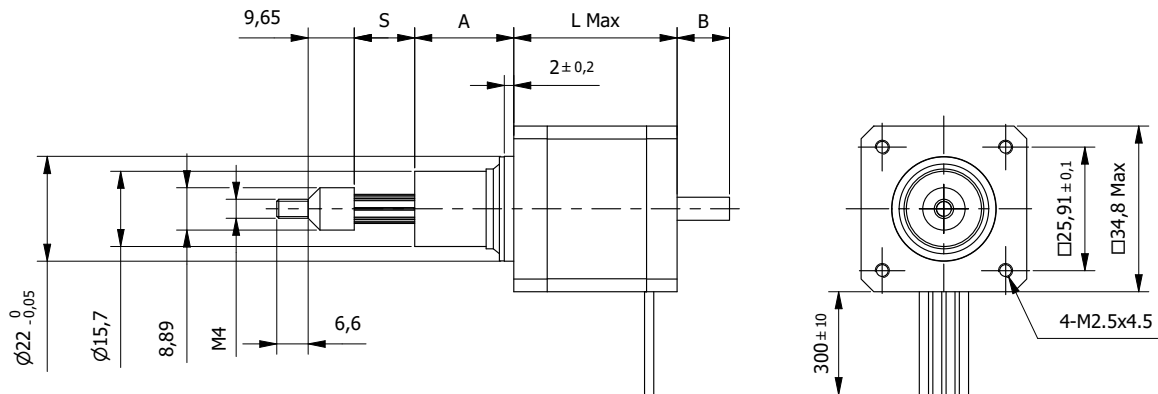
Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Captive Linear Actuator SMA-14

Hybrid Stepper motor

□ 35mm



Motor Specification								
Model		...S2,33-C	...S5-C	...S12-C	...D2,33-C	...D5-C	...D12-C	
1	Rated Voltage	V	2,33	5	12	2,33	5	12
2	Current / Phase	A	1,25	0,57	0,24	2	0,91	0,38
3	Resistance / Phase	Ω	1,86	8,8	50,5	1,2	5,5	31,6
4	Inductance / Phase	mH	2,8	13	60	1,9	7,63	65,1
5	Power Consumption	W	5,7	5,7	5,7	9,1	9,1	9,1
6	Max. Axial Load	N	222	222	222	222	222	222
7	Length (L)	mm	34	34	34	44	44	44
8	Weight	g	162	162	162	240	240	240

Standard Stroke options				
Stroke code	Stroke			
	Dim.S in(mm)	Dim.A in(mm)	Dim.B in(mm)	
0,50	0,50 (12,7)	0,818 (20,8)	0,039 (1)	
0,75	0,75 (19,1)	1,070 (27,2)	0,291 (7,4)	
1,00	1,00 (25,4)	1,318 (33,5)	0,539 (13,7)	
1,25	1,25 (31,8)	1,570 (39,9)	0,791 (20,1)	
1,50	1,50 (38,1)	1,818 (46,2)	1,039 (26,4)	
2,00	2,00 (50,8)	2,318 (58,9)	1,539 (39,1)	

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
025-031	0,25"	0,031"	0,00015625"
025-062	0,25"	0,0625"	0,0003125"
025-096	0,25"	0,096"	0,00048"
025-125	0,25"	0,125"	0,000625"
025-250	0,25"	0,250"	0,00125"
* More options available - see lead screw section			

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

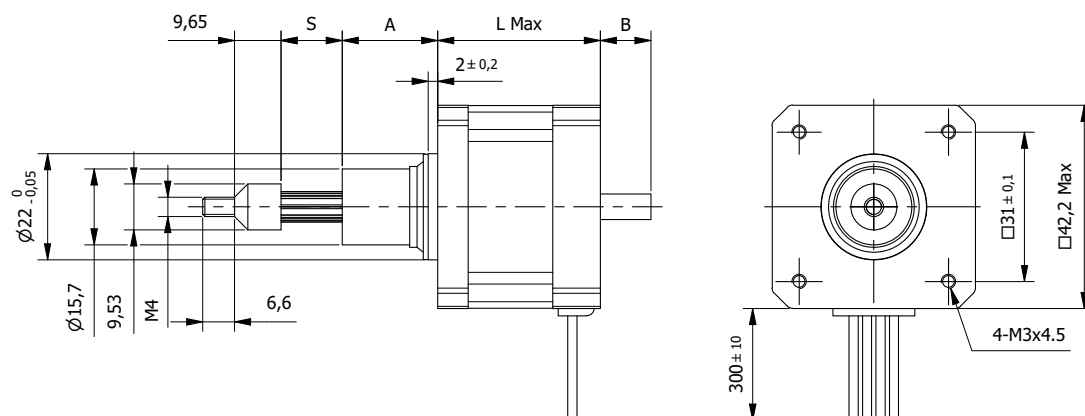
Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Captive Linear Actuator SMA-17

Hybrid Stepper motor

□ 42mm



Motor Specification								
	Model		...S2,33-C	...S5-C	...S12-C	...D2,33-C	...D5-C	...D12-C
1	Rated Voltage	V	2,33	5	12	2,33	5	12
2	Current / Phase	A	1,5	0,7	0,29	2,6	1,3	0,55
3	Resistance / Phase	Ω	1,56	7,2	41,5	0,9	3,8	21,9
4	Inductance / Phase	mH	1,9	10,6	73,3	1,33	6,6	45,1
5	Power Consumption	W	7	7	7	14	14	14
6	Max. Axial Load	N	222	222	222	222	222	222
7	Length (L)	mm	34	34	34	48	48	48
8	Weight	g	241	241	241	352	352	352

Standard Stroke options				
Stroke code	Stroke	Model ...S	Model ...D	
	Dim.S in(mm)	Dim.A in(mm)	Dim.B in(mm)	
0,50	0,50 (12,7)	0,779 (19,8)	0,161 (4,1)	0,020 (0,51)
0,75	0,75 (19,1)	1,031 (26,2)	0,409 (10,4)	0,270 (6,86)
1,00	1,00 (25,4)	1,279 (32,5)	0,661 (16,8)	0,520 (13,21)
1,25	1,25 (31,8)	1,531 (38,9)	0,909 (23,1)	0,770 (19,56)
1,50	1,50 (38,1)	1,779 (45,2)	1,161 (29,5)	1,020 (25,91)
2,00	2,00 (50,8)	2,279 (57,9)	1,661 (42,2)	1,520 (38,61)

Standard Lead Screws			
Product code	Diameter	Lead	Travel per step
025-031	0,25"	0,031"	0,00015625"
025-062	0,25"	0,0625"	0,0003125"
025-096	0,25"	0,096"	0,00048"
025-125	0,25"	0,125"	0,000625"
025-250	0,25"	0,250"	0,00125"
* More options available - see lead screw section			

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

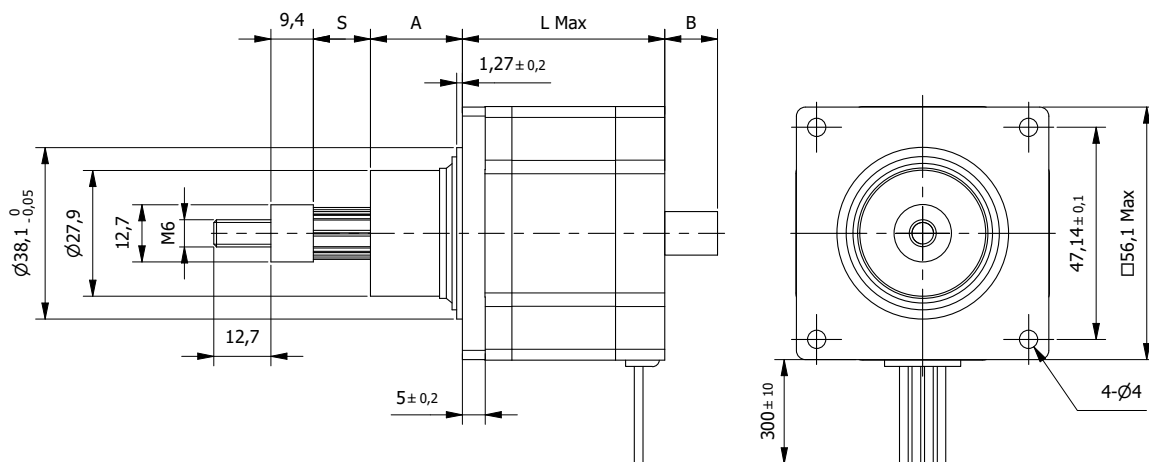
Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Captive Linear Actuator SMA-23

□ 56,4mm

Hybrid Stepper motor



Motor Specification

Motor specification			...S3,25-C	...S5-C	...S12-C	...D3,25-C	...D5-C	...D12-C
1	Rated Voltage	V	3,25	5	12	3,25	5	12
2	Current / Phase	A	2	1,3	0,54	3,32	2,16	0,9
3	Resistance / Phase	Ω	1,63	3,85	22,2	0,98	2,31	13,33
4	Inductance / Phase	mH	3,5	10,5	47	1,33	6,6	45,1
5	Power Consumption	W	13	13	13	14	14	14
6	Max. Axial Load	N	889	889	889	889	889	889
7	Length (L)	mm	45	45	45	64	64	64
8	Weight	g	511	511	511	964	964	964

Standard Stroke options

Stroke code	Stroke	Model ...S		Model ...D	
	Dim.S in(mm)	Dim.A in(mm)	Dim.B in(mm)	Dim.A in(mm)	Dim.B in(mm)
0,50	0,50 (12,7)	1,011 (25,7)	0,059 (1,5)	0,805 (20,47)	0,066 (1,68)
0,75	0,75 (19,1)	1,259 (32)	0,307 (7,9)	1,055 (26,82)	0,316 (8,03)
1,00	1,00 (25,4)	1,511 (38,4)	0,559 (14,2)	1,305 (33,17)	0,566 (14,38)
1,25	1,25 (31,8)	1,759 (44,7)	0,811 (20,6)	1,555 (39,52)	0,816 (20,73)
1,50	1,50 (38,1)	2,011 (51,1)	1,059 (26,9)	1,805 (45,87)	1,066 (27,08)
2,00	2,00 (50,8)	2,511 (63,8)	1,559 (39,6)	2,300 (58,57)	1,566 (39,78)

Standard Lead Screws

Product code	Diameter	Lead	Travel per step
037-062	0,375"	0,062"	0,0003125"
037-083	0,375"	0,083"	0,0004167"
037-100	0,375"	0,1"	0,0005"
037-166	0,375"	0,166"	0,0008333"
037-200	0,375"	0,200"	0,001"
037-400	0,375"	0,400"	0,002"

* More options available - see lead screw section

Motor Characteristics

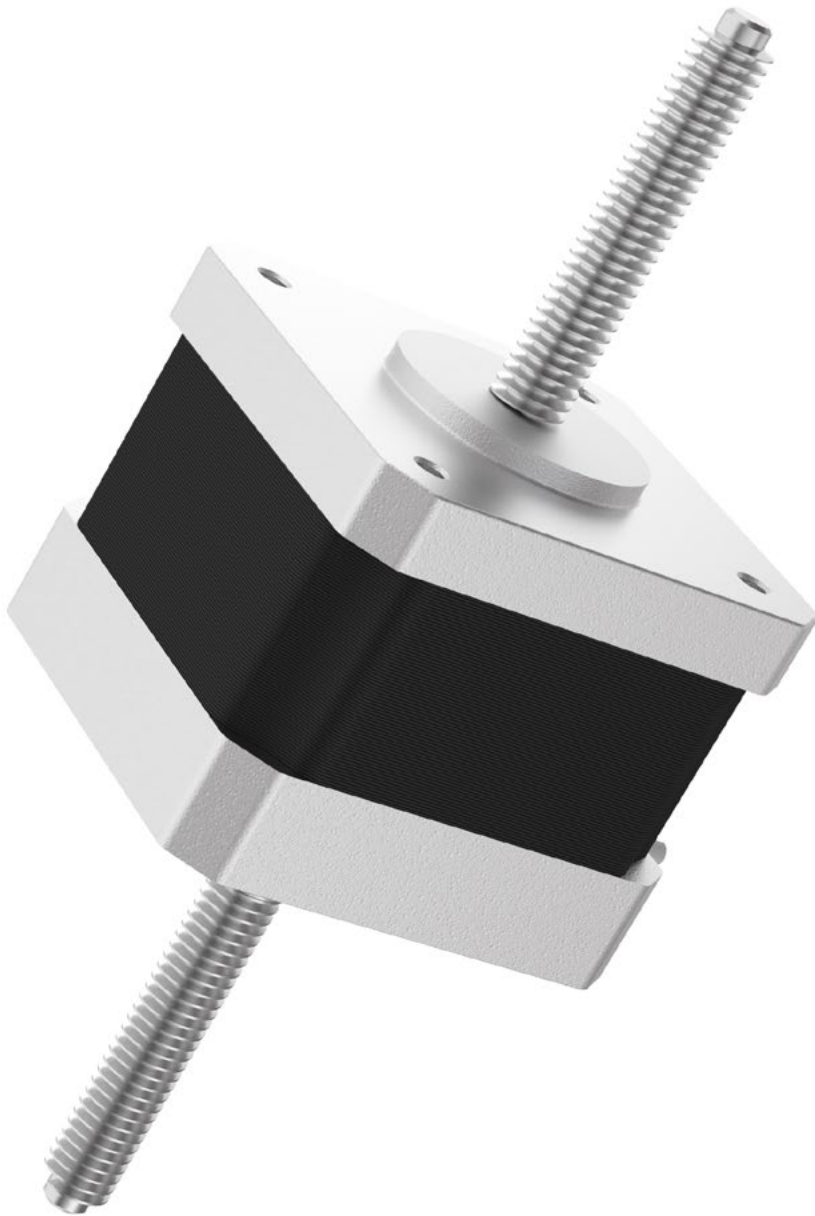
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Connection

Lead n°	Gauge	Color	Function
1	AWG22	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination

Drive combination available on request



Non-Captive Linear Actuators

Advantages at a glance
Small to medium load ratings
Very high travelling speeds
High efficiency ($\mu \sim 0.5 \dots 0.8$)

Our Non-Captive Stepper Motor Actuators are offered in NEMA 8,11,14, 17, 23 and 34 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.

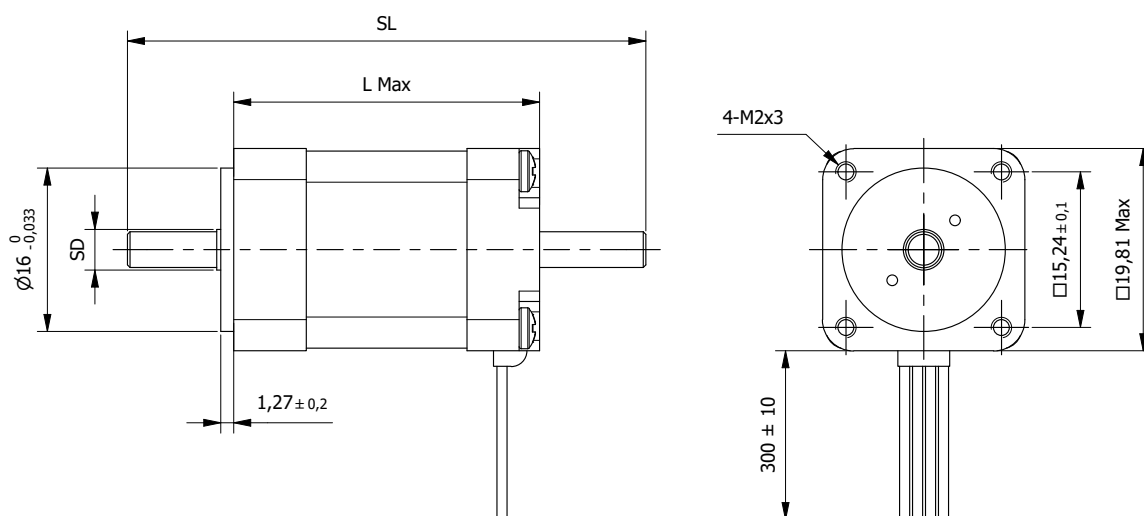
Non-Captive Hybrid Stepper Linear Actuators	Load* (N)	
SMA8-N	45	338
SMA11-N	89	339
SMA14-N	222	340
SMA17-N	222	341
SMA23-N	889	342
SMA34-N	2200	343

* Max. Axial Load

Non-Captive Linear Actuator SMA-8

□ 20mm

Hybrid Stepper motor



Motor Specification					
	Model		...S2,5-N	...S5-N	...S7,5-N
1	Rated Voltage	V	2,5	5	7,5
2	Current / Phase	A	0,49	0,24	0,16
3	Resistance / Phase	Ω	5,1	20,4	45,9
4	Inductance / Phase	mH	1,5	5	11,9
5	Power Consumption	W	2,45	2,45	2,45
6	Max. Axial Load	N	45	45	45
7	Length (L)	mm	28	28	28
8	Weight	g	43	43	43

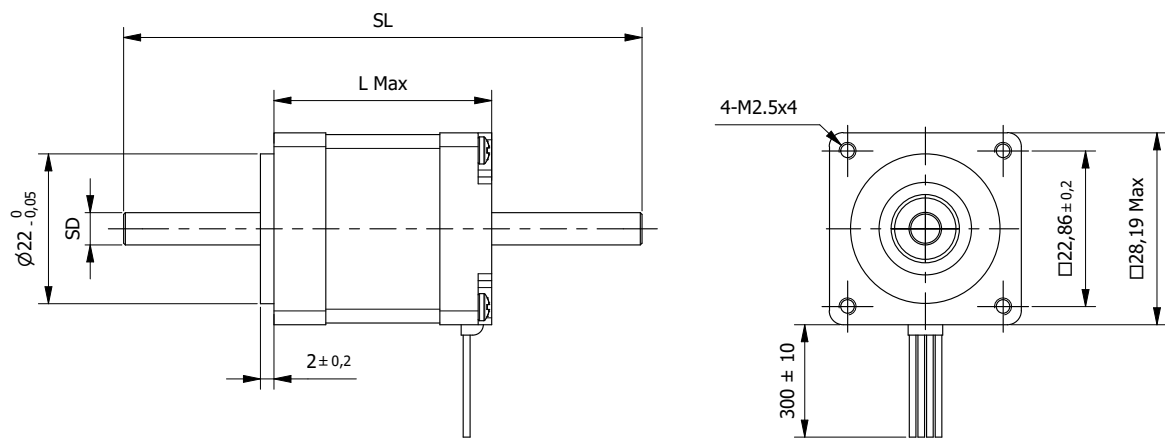
Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws (screw length SL = 2" to 6")			
Product code	Diameter	Lead	Travel per step
012-024	0,125"	0,024"	0,00012"
012-048	0,125"	0,048"	0,00024"
012-096	0,125"	0,096"	0,00048"
012-157	0,125"	0,157"	0,00078"

* More options available - see lead screw section

Connection			
Lead n°	Gauge	Color	Function
1	AWG28	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	



Motor Specification								
	Model		...S2,1-N	...S5-N	...S12-N	...D2,1-N	...D5-N	...D12-N
1	Rated Voltage	V	2,1	5	12	2,1	5	12
2	Current / Phase	A	1	0,42	0,18	1,9	0,75	0,35
3	Resistance / Phase	Ω	2,1	11,9	68,6	1,1	6,7	34,8
4	Inductance / Phase	mH	1,5	6,7	39	1,1	5,8	35,6
5	Power Consumption	W	4,2	4,2	4,2	7,5	7,5	7,5
6	Max. Axial Load	N	89	89	89	89	89	89
7	Length (L)	mm	32	32	32	46	46	46
8	Weight	g	119	119	119	180	180	180

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws (screw length SL = 3" to 12")			
Product code	Diameter	Lead	Travel per step
018-025	0,1875"	0,025"	0,00012"
018-050	0,1875"	0,05"	0,00025"
018-100	0,1875"	0,1"	0,00050"
018-200	0,1875"	0,2"	0,001"
* More options available - see lead screw section			

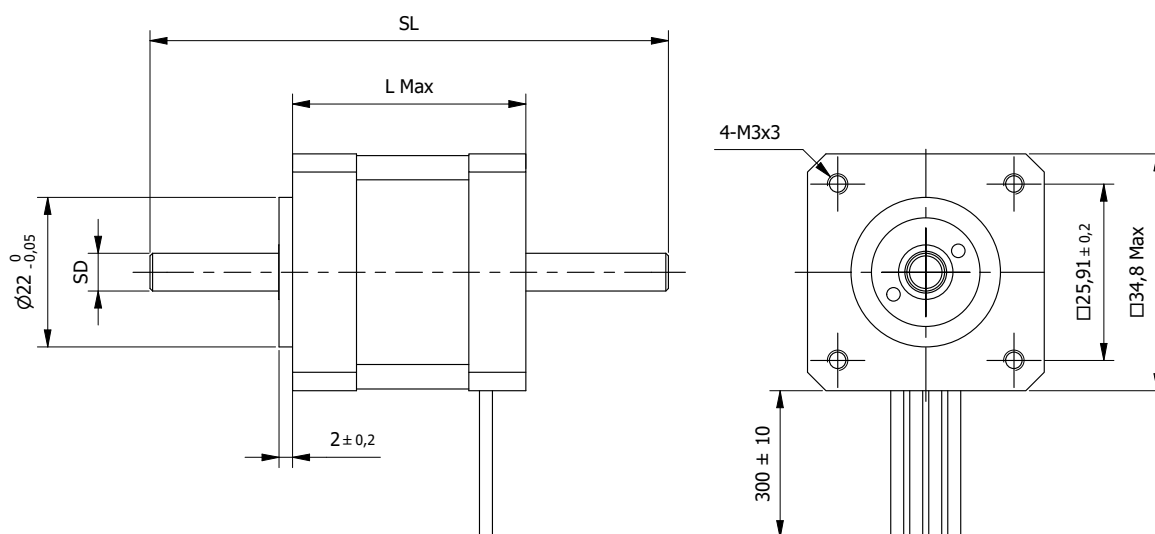
Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Non-Captive Linear Actuator SMA-14

□ 35mm

Hybrid Stepper motor



Motor Specification								
	Model		...S2,33-N	...S5-N	...S12-N	...D2,33-N	...D5-N	...D12-N
1	Rated Voltage	V	2,33	5	12	2,33	5	12
2	Current / Phase	A	1,25	0,57	0,24	2	0,91	0,38
3	Resistance / Phase	Ω	1,86	8,8	50,5	1,2	5,5	31,6
4	Inductance / Phase	mH	2,8	13	60	1,9	7,63	65,1
5	Power Consumption	W	5,7	5,7	5,7	9,1	9,1	9,1
6	Max. Axial Load	N	222	222	222	222	222	222
7	Length (L)	mm	34	34	34	44	44	44
8	Weight	g	162	162	162	240	240	240

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws (screw length SL = 3" to 18")			
Product code	Diameter	Lead	Travel per step
025-031	0,25"	0,031"	0,00015625"
025-062	0,25"	0,0625"	0,0003125"
025-096	0,25"	0,096"	0,00048"
025-125	0,25"	0,125"	0,000625"
025-250	0,25"	0,250"	0,00125"
* More options available - see lead screw section			

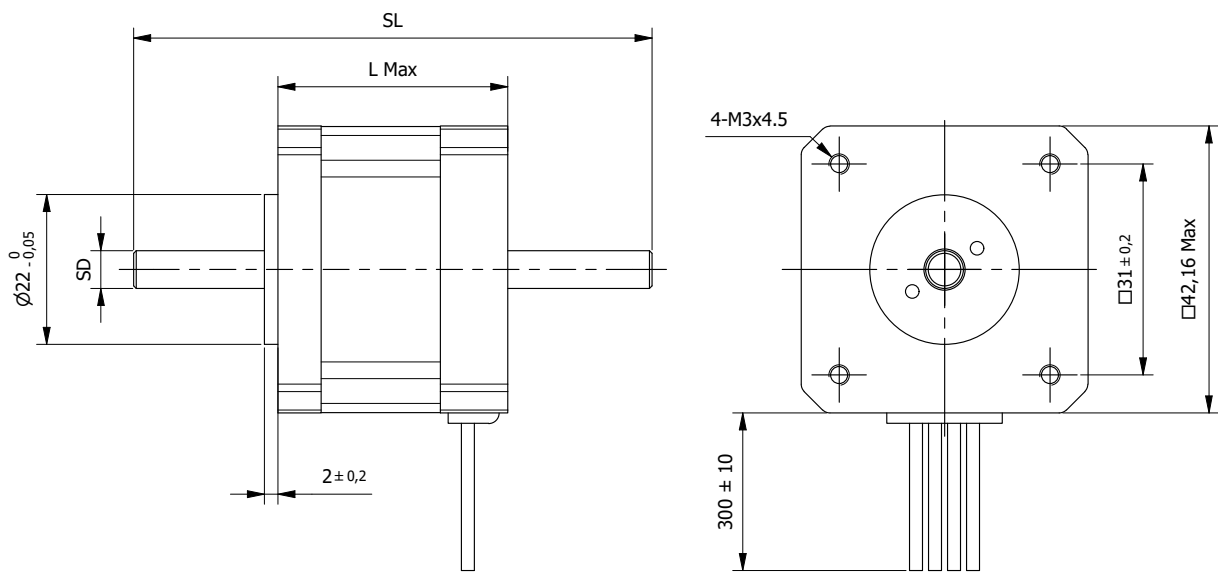
Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Non-Captive Linear Actuator SMA-17

Hybrid Stepper motor

□ 42mm



Motor Specification								
	Model		...S2,33-N	...S5-N	...S12-N	...D2,33-N	...D5-N	...D12-N
1	Rated Voltage	V	2,33	5	12	2,33	5	12
2	Current / Phase	A	1,5	0,7	0,29	2,6	1,3	0,55
3	Resistance / Phase	Ω	1,56	7,2	41,5	0,9	3,8	21,9
4	Inductance / Phase	mH	1,9	10,6	73,3	1,33	6,6	45,1
5	Power Consumption	W	7	7	7	14	14	14
6	Max. Axial Load	N	222	222	222	222	222	222
7	Length (L)	mm	34	34	34	48	48	48
8	Weight	g	241	241	241	352	352	352

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws (screw length SL = 3" to 18")			
Product code	Diameter	Lead	Travel per step
025-031	0,25"	0,031"	0,00015625"
025-062	0,25"	0,0625"	0,0003125"
025-096	0,25"	0,096"	0,00048"
025-125	0,25"	0,125"	0,000625"
025-250	0,25"	0,250"	0,00125"
* More options available - see lead screw section			

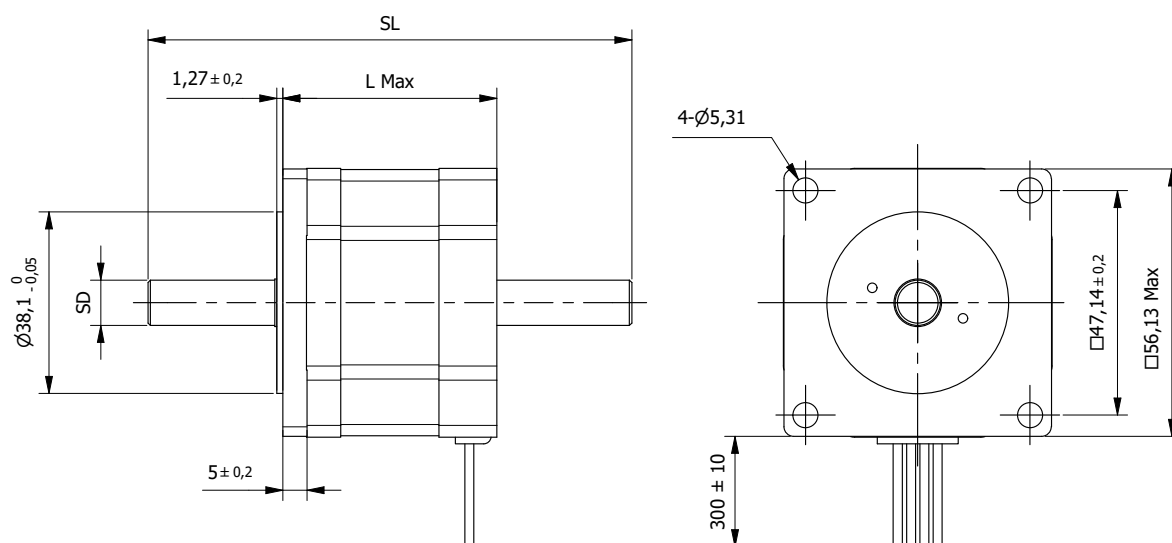
Connection			
Lead n°	Gauge	Color	Function
1	AWG26	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Non-Captive Linear Actuator SMA-23

□ 56,4mm

Hybrid Stepper motor



Motor Specification			...S3,25-N	...S5-N	...S12-N	...D3,25-N	...D5-N	...D12-N
1	Rated Voltage	V	3,25	5	12	3,25	5	12
2	Current / Phase	A	2	1,3	0,54	3,32	2,16	0,9
3	Resistance / Phase	Ω	1,63	3,85	22,2	0,98	2,31	13,33
4	Inductance / Phase	mH	3,5	10,5	47	1,33	6,6	45,1
5	Power Consumption	W	13	13	13	14	14	14
6	Max. Axial Load	N	889	889	889	889	889	889
7	Length (L)	mm	45	45	45	64	64	64
8	Weight	g	511	511	511	964	964	964

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws (screw length SL = 4" to 18")			
Product code	Diameter	Lead	Travel per step
037-062	0,375"	0,062"	0,0003125"
037-083	0,375"	0,083"	0,0004167"
037-100	0,375"	0,1"	0,0005"
037-166	0,375"	0,166"	0,0008333"
037-200	0,375"	0,200"	0,001"
037-400	0,375"	0,400"	0,002"

* More options available - see lead screw section

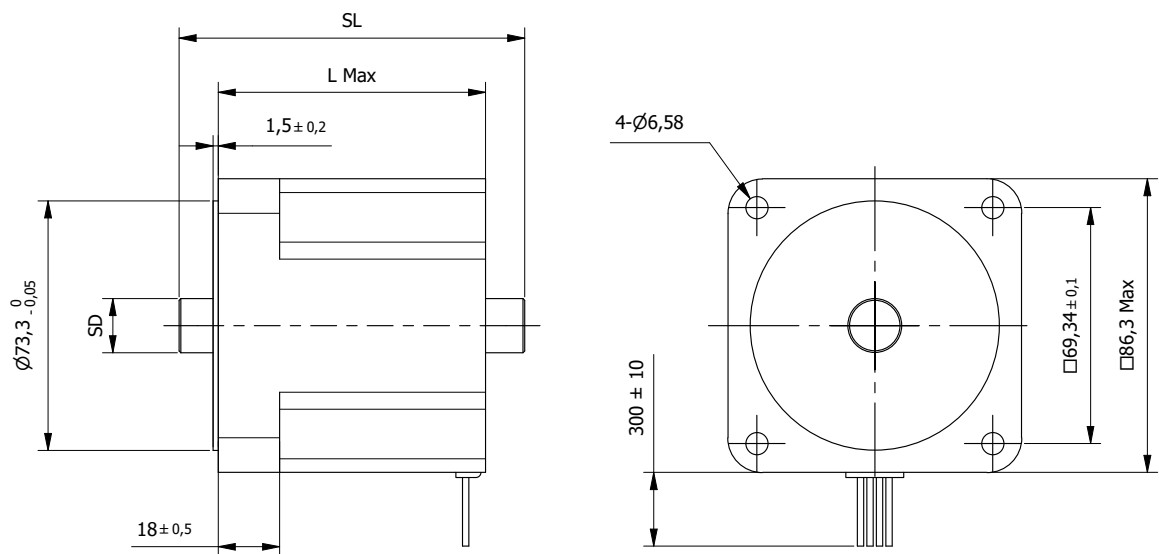
Connection			
Lead n°	Gauge	Color	Function
1	AWG22	Red	Phase A
2		Red/White	Phase A-
3		Green/White	Phase B
4		Green	Phase B-

Standard Combination	
Drive combination available on request	

Non-Captive Linear Actuator SMA-34

□ 85mm

Hybrid Stepper motor



Motor Specification					
	Model		...S2,85-N	...S5-N	...S12-N
1	Rated Voltage	V	2,85	5	12
2	Current / Phase	A	5,47	3,12	1,3
3	Resistance / Phase	Ω	0,52	1,6	9,23
4	Inductance / Phase	mH	2,86	8,8	51
5	Power Consumption	W	31,2	31,2	31,2
6	Max. Axial Load	N	2200	2200	2200
7	Length (L)	mm	78,5	78,5	78,5
8	Weight	kg	2,3	2,3	2,3

Motor Characteristics	
Item	
Wiring	Bipolar
Step angle	1,8°
Magnet Wire Insulation class	B
Operating Temperature	-10 to 50°C
Temperature Rise	75°C
Dielectric Strength (for 1 min.)	500VAC

Standard Lead Screws (screw length SL = 4" to 36")			
Product code	Diameter	Lead	Travel per step
062-100	0,625"	0,100"	0,0005"
062-125	0,625"	0,125"	0,000625"
062-500	0,625"	0,500"	0,0025"
062-999	0,625"	1,000"	0,005"

* More options available - see lead screw section

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

Standard Combination	
Drive combination available on request	

Linear actuators



Lead Screws

Our lead screws are ranging in size from 1.5 - 50 mm diameter with a wide variety of nut designs and materials. Our assemblies guarantee maximum load sharing, minimal torque and long life. Lead screws can be coated with Teflon to provide a dry lubricant and extend nut life by 10X.

Lead Screws	
Technical introduction	346
Lead Screw sizes	350

Lead Screw selection

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: the loads that need to be considered are the static loads, dynamic loads, reaction forces and any external forces affecting the screw, measured in pounds or newtons
- Speed: the travel rate (linear speed) is the rpm at which the screw or nut is rotating multiplied by the lead of the screw, measured in inches or millimeters per minute
- Length: the unsupported length of the screw between bearings, measured in inches or millimeters
- End fixity type: refers to the method by which the ends of the screw are supported.

Materials and Manufacturing

Helix Linear Technologies manufactures precision lead screws by thread rolling, thread whirling, or thread grinding. Helix lead screw products feature centralizing and custom thread forms for smooth, no-wedging performance.

Thread rolling	Helix offers the largest selection of rolled lead screw sizes in the industry. Rolled thread screws are precise, cost effective, and are stocked for quick delivery.
Thread grinding	Ground thread screws offer higher lead accuracy for applications where positioning tolerances are extremely critical.
Thread whirling	Helix thread whirling results in increased productivity and improved thread surface finish.

Machined Ends types

End machining for lead screws is not required, however, the majority of lead screw applications involve some sort of modification on one or both of the ends. Helix Linear Technologies has designed a family of standard machined ends applicable to a variety of bearing arrangements. Specifying standard machined ends results in quicker deliveries, however, where standard ends do not satisfy the application requirements, special ends may be machined to customer specifications. Our End Machining types:

Type 1	Typical Journal for single bearing.
Type 2	Typical Journal for duplexed bearing.
Type 3	Typical Journal for multiple sets of duplexed bearing.
Type 4	Typical Journal for pillow block.
Type 5	Typical Journal for EZRF bearing block (in).
Option K	Designed with a shaft extension and keyway for square keys.
Option L	Designed with a shaft extension without a keyway.
Option N	Designed to be a non-driven support end.

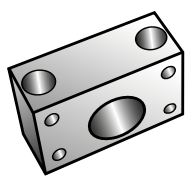
Screw Type	Material	Thread Class	Lead Accuracy	Screw Dia.	Screw Lengths
Rolled	Alloy	Helix Centralizing 2C or Stub	$\pm .0003$ in/in up to 2½" dia.	1/8" to 6"	Limited only by material availability
	Stainless	Helix Centralizing 2C or Stub	$\pm .0003$ in/in up to 1½" dia.	1/8" to 1½"	Limited only by material availability
Ground	Alloy	Helix Centralizing 2C, 3C, 3G, 4C, 4G	$\pm .0005$ "/ft	1/4" to 4"	up to 19"
	Stainless	Helix Centralizing 2C, 2G, 3C, 4G	$\pm .0005$ "/ft	1/4" to 4"	up to 19"

	Alloy	Stainless steel
Screw Material	4140	300 Series
Minimum Hardness	200 Brinell	170 Brinell
Tensile Ultimate Strength	95,000 psi	85,000 psi
Finish	Black Oxide	Polished

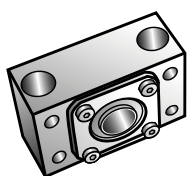
Technical introduction

Bearing mounts - EZZE-MOUNT™

Linear motion applications utilizing a ball screw or an Acme screw require this screw end machining matched with precision bearing mounts. EZZE-MOUNT bearing blocks contain precision anti-friction bearings and are designed to be used with both ball screws and Acme screws.



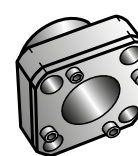
Universal Mount
Single bearing



Universal Mount
Double bearing



Flange Mount
Single bearing



Flange Mount
Double bearing

Term	
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.
Pitch	The axial distance between threads. Pitch is equal to the lead in a single start screw.
Screw Starts	The number of independent threads on the screw shaft; example one, two or four.
Right/Left hand	The handedness of a screw refers to the direction in which the helical thread wraps around the screw shaft.
Efficiency	Efficiency of Helix precision lead screw assemblies range from 15% to 85%. These efficiencies are dependent upon nut material, lubrication, lead and thread form.
Journal	A smooth diameter machined on the end of screw used as mounting surface for bearings, couplings, pulleys, gears, etc.

Glossary

Lead Screw

Screw sizes

Nominal Diameter		Diameter Code	Lead		Lead Code	Pitch		Starts	End Machining Code		Available in Left Hand	Efficiency %*
Inch	mm		Inch	mm		Inch	mm		type 1,2,3	type 4		
5/64	2	008	0.001	0.02	016	0.000	0.02	1			Yes	18
			0.012	0.30	012	0.012	0.30	1	Contact us for Special Applications		Yes	24
			0.019	0.50	020	0.019	0.50	1			Yes	36
			0.039	1.00	039	0.019	0.50	2			**	52
			0.078	2.00	078	0.019	0.50	4			**	66
1/8	3.2	012	0.012	0.30	012	0.012	0.30	1	2*	1*	Yes	23
			0.022	0.58	023	0.022	0.58	1	2*	1*	Yes	
			0.024	0.61	024	0.024	0.61	1	2*	1*	Yes	44
			0.025	0.64	025	0.025	0.64	1	2*	1*	Yes	45
			0.031	0.79	031	0.031	0.79	1	2*	1*	Yes	53
			0.039	1.00	039	0.039	1.00	1	2*	1*	Yes	57
			0.048	1.22	048	0.024	0.61	2	2*	1*	Yes	61
			0.062	1.59	062	0.031	0.79	2	2*	1*	**	67
			0.075	1.91	075	0.025	0.64	3	2*	1*	**	70
			0.078	2.00	078	0.039	1.00	2	2*	1*	**	72
			0.096	2.44	096	0.024	0.61	4	2*	1*	**	75
			0.125	3.18	125	0.031	0.79	4	2*	1*	**	80
			0.1575	4.00	157	0.039	1.00	4	2*	1*	**	81
			0.2000	5.08	200	0.025	0.64	8	2*	1*	**	82
0.140	3.5	RD014	0.2500	6.35	250	0.041	1.06	6	2*	1*	**	83
			0.031	0.79	031	0.031	0.79	1	2*	1*	**	48
			0.062	1.59	062	0.031	0.79	2	2*	1*	**	63
0.160	4	016	0.012	0.30	012	0.012	0.30	1	3	1	Yes	24
			0.024	0.61	024	0.024	0.61	1	2	1	Yes	43
			0.039	1.00	039	0.039	1.00	1	2	1	Yes	45
			0.048	1.22	048	0.024	0.61	2	2*	1*	Yes	59
			0.093	2.38	093	0.031	0.79	3	2	1	**	67
			0.096	2.44	096	0.024	0.61	4	2*	1*	**	69
			0.125	3.18	125	0.031	0.79	4	2	1	**	74
			0.250	6.35	250	0.031	0.79	8	3	1	**	83
			0.375	9.53	375	0.031	0.79	12	3	1	**	85
			0.393	10.00	393	0.049	1.25	8	3*	1*	**	85
			0.500	12.70	500	0.031	0.79	16	3	1	**	86
3/16	4.8	018	0.024	0.61	024	0.024	0.61	1	4	2	Yes	36
			0.025	0.64	025	0.025	0.64	1	4	2	Yes	39
			0.031	0.79	031	0.031	0.79	1	4	2	Yes	42
			0.039	1.00	039	0.039	1.00	1	4*	2	Yes	47
			0.048	1.22	048	0.048	1.22	1	4*	2	Yes	51
			0.050	1.27	050	0.050	1.27	1	4*	2	Yes	58
			0.050	1.27	050	0.050	1.27	1	4*	2	**	58
			0.062	1.59	062	0.031	0.79	2	4	2	Yes	60
			0.078	2.00	078	0.039	1.00	2	4*	2	Yes	64
			0.096	2.44	096	0.048	1.22	2	4*	2	Yes	67
			0.100	2.54	100	0.050	1.27	2	4*	2	**	69
			0.108	2.75	108	0.054	1.38	2	4	2	**	70
			0.125	3.18	125	0.031	0.79	4	4	2	**	72
			0.157	4.00	157	0.039	1.00	4	4*	2	**	75
			0.187	4.76	187	0.023	0.60	8	4*	2	**	78
			0.192	4.88	192	0.048	1.22	4	4*	2	**	80
			0.200	5.08	200	0.050	1.27	4	4*	2	Yes	82
0.200	5	020	0.196	5.00	196	0.049	1.25	4	4*	2	**	82
0.220	5.5	022	0.019	0.50	020	0.019	0.50	1	4*	2	Yes	78
0.240	6	024	0.039	1.00	039	0.039	1.00	1	4*	2	**	40
			0.236	6.00	236	0.059	1.50	4	4	2	**	68
			0.472	12.00	472	0.059	1.50	8	4	2	**	85
			0.787	20.00	787	0.049	1.25	16	5	3	Yes	86

* Listed Efficiencies are theoretical values based on Helix H10X PTFE coated screws. Efficiencies for bronze nuts are approximately 8-10% lower.

** Left Hand screws are available on request. Please contact us.

Nominal Diameter		Diameter Code	Lead		Lead Code	Pitch		Starts	End Machining Code		Available in Left Hand	Efficiency %*
Inch	mm		Inch	mm		Inch	mm		type 1,2,3	type 4		
1/4	6.4	025	0.024	0.61	024	0.024	0.61	1	5	3	Yes	28
			0.025	0.64	025	0.025	0.64	1	5	3	Yes	30
			0.031	0.79	031	0.031	0.79	1	5	3	Yes	34
			0.039	1.00	039	0.039	1.00	1	5*	3	Yes	40
			0.048	1.22	048	0.048	1.22	1	4	3*	Yes	45
			0.050	1.27	050	0.050	1.27	1	4	3*	Yes	46
			0.062	1.59	062	0.062	1.59	1	4	3*	Yes	46
			0.078	2.00	078	0.039	1.00	2	5*	3	Yes	59
			0.096	2.44	096	0.048	1.22	2	4	3*	Yes	61
			0.100	2.54	100	0.050	1.27	2	4	3*	**	62
			0.118	3.00	118	0.059	1.50	2	4	3*	**	68
			0.125	3.18	125	0.063	1.59	2	4	3*	**	67
			0.157	4.00	157	0.039	1.00	4	5*	3	**	69
			0.196	5.00	196	0.039	1.00	5	5*	3	**	72
			0.200	5.08	200	0.050	1.27	4	4	3*	**	65
			0.250	6.35	250	0.063	1.59	4	4	3*	**	79
			0.333	8.46	333	0.083	2.11	4	4	3*	**	82
			0.393	10.00	393	0.032	0.83	12	4	3*	**	78
			0.400	10.16	400	0.080	2.03	5	4	3*	**	84
			0.500	12.70	500	0.071	1.81	7	4	3*	**	85
			0.500	12.70	500	0.083	2.12	6	4	3*	**	85
			1.000	25.40	999	0.100	2.54	10	4	3*	**	84
0.280	7	027	0.019	0.50	020	0.019	0.50	1	6	4*	Yes	73
5/16	7.9	031	0.100	2.54	100	0.100	2.54	1	4	3	Yes	72
			0.200	5.08	200	0.100	2.54	2	4	3	**	72
			0.250	6.35	250	0.125	3.18	2	5	3	**	76
			0.500	12.70	500	0.125	3.18	4	5	3	**	83
0.320	8	032	0.012	0.30	012	0.012	0.30	1	6*	3	Yes	21
			0.024	0.61	024	0.024	0.61	1	6*	3	Yes	26
			0.059	1.50	059	0.059	1.50	1	6*	3	Yes	43
			0.157	4.00	157	0.078	2.00	2	6*	3	**	71
			0.295	7.50	295	0.049	1.25	6	6*	4*	**	74
			0.315	8.00	315	0.078	2.00	4	6*	4*	**	79
			0.393	10.00	393	0.098	2.50	4	6*/5	3	**	80
			0.472	12.00	472	0.094	2.40	5	6*	4*	**	83
			0.590	15.00	590	0.098	2.50	6	6*	4*	**	84
			0.787	20.00	787	0.157	4.00	5	6*	4*	**	86
			0.984	25.00	984	0.049	1.25	20	6	4*	**	88
			1.181	30.00	M30	0.049	1.25	24	7	4	Yes	89
3/8	9.5	037	0.025	0.64	025	0.025	0.64	1	8	4	Yes	21
			0.039	1.00	039	0.039	1.00	1	8	4	Yes	28
			0.050	1.27	050	0.050	1.27	1	7	4	Yes	36
			0.062	1.59	062	0.062	1.59	1	7	4	Yes	41
			0.078	2.00	078	0.079	2.00	1	7*	4	Yes	47
			0.083	2.12	083	0.083	2.12	1	7*	4	Yes	48
			0.100	2.54	100	0.100	2.54	1	6	4*	Yes	53
			0.125	3.18	125	0.063	1.59	2	7	4	Yes	59
			0.157	4.00	157	0.079	2.00	2	7*	4	Yes	65
			0.166	4.23	166	0.083	2.12	2	7*	4	Yes	61
			0.197	5.00	196	0.039	1.00	5	8	4	**	69
			0.200	5.08	200	0.100	2.54	2	6	4*	**	69
			0.250	6.35	250	0.063	1.59	4	7	4	**	70
			0.250	6.35	--	0.125	3.18	2	7	4	**	70
			0.250	6.35	--	0.083	2.12	3	7*	4	**	70
			0.333	8.47	333	0.083	2.12	4	7*	4	**	78
			0.375	9.53	375	0.094	2.38	4	7*	4	**	79
			0.394	10.00	393	0.079	2.00	5	7*	4	**	79
			0.400	10.16	400	0.100	2.54	4	6	4*	**	79
			0.500	12.70	500	0.125	3.18	4	7	4	**	81
			0.667	16.94	667	0.095	2.42	7	7	4	**	83
			0.750	19.05	750	0.125	3.18	6	7*	4	**	84
			1.000	25.40	999	0.200	5.08	5	6	4*	Yes	84
			1.500	38.10	M38	0.167	4.23	9	7*	4	**	83

* Listed Efficiencies are theoretical values based on Helix H10X PTFE coated screws. Efficiencies for bronze nuts are approximately 8-10% lower.
 ** Left Hand screws are available on request. Please contact us.

Nominal Diameter		Diameter Code	Lead		Lead Code	Pitch		Starts	End Machining Code		Available in Left Hand	Efficiency %*
Inch	mm		Inch	mm		Inch	mm		type 1,2,3	type 4		
0.390	10.0	039	0.039	1.00	039	0.039	1.00	1	8	4	Yes	79
			0.059	1.50	059	0.059	1.50	1	8*	4	Yes	38
			0.078	2.00	078	0.078	2.00	1	7	4	Yes	47
			0.118	3.00	118	0.059	1.50	2	8*	4	**	52
			0.1575	4.00	157	0.078	2.00	2	7	4	**	65
			0.3543	9.00	354	0.118	3.00	3	6	4*	**	73
			0.3937	10.00	393	0.049	1.25	8	8	4	**	79
			0.4724	12.00	472	0.118	3.00	4	7	4	Yes	80
			0.500	12.70	500	0.125	3.18	4	7	4	**	80
			0.590	15.00	590	0.118	3.00	5	7	4	**	81
			1.378	35.00	M35	0.049	1.25	28	8	4	Yes	82
			1.968	50.00	M50	0.196	5.00	10	7	4	Yes	85
0.430	11.0	043	0.236	6.00	236	0.118	3.00	2	7	4	**	70
0.450	11.5	RD043	0.500	12.70	500	0.125	3.18	4	8	4	**	80
7/16	11.1	043	0.250	6.35	250	0.125	3.18	2	8	4	Yes	70
			0.500	12.70	500	0.125	3.18	4	8	4	**	80
			1.201	30.50	M31	0.200	5.08	6	8	4	**	84
0.470	12.0	047	0.078	2.00	078	0.079	2.00	1	9	4	Yes	41
			0.118	3.00	118	0.118	3.00	1	7	4	Yes	49
			0.236	6.00	236	0.118	3.00	2	7	4	**	65
			0.393	10.00	393	0.098	2.50	4	8	4	**	76
			0.590	15.00	590	0.118	3.00	5	9	4	Yes	80
			0.984	25.00	984	0.196	5.00	5	9*	4	Yes	84
			1.574	40.00	M40	0.049	1.25	32	10	6	**	85
			1.771	45.00	M45	0.049	1.25	36	10	6	Yes	86
			2.362	60.00	M60	0.197	5.00	12	9	4	Yes	88
0.500	12.7	050	0.050	1.27	050	0.050	1.27	1	9	6	Yes	29
			0.100	2.54	100	0.100	2.54	1	9	6*	Yes	46
			0.125	3.18	125	0.125	3.18	1	9*	6*	Yes	51
			0.196	5.00	197	0.098	2.50	2	9	6	**	62
			0.200	5.08	200	0.100	2.54	2	9	6	**	63
			0.250	6.35	250	0.125	3.18	2	8	4	Yes	67
			0.400	10.16	400	0.100	2.54	4	10	6	**	76
			0.500	6.35	500	0.100	2.54	5	10	6	Yes	79
			0.800	20.32	800	0.100	2.54	8	10	6	**	83
			1.000	25.40	999	0.125	3.18	8	9	6	**	84
0.550	14	055	1.402	35.60	M36	0.200	5.09	7	9	6	**	85
			0.118	3.00	118	0.118	3.00	1	10	6	Yes	48
			0.157	4.00	157	0.157	4.00	1	9	4	Yes	58
			0.3150	8.00	315	0.1575	4.00	2	9	6	**	71
			0.7087	18.00	708	0.1181	3.00	6	10	6	Yes	79
			0.7874	20.00	787	0.1969	5.00	4	9	4	**	82
			1.1811	30.00	M30	0.1969	5.00	6	10	6	Yes	85
9/16	14.3	056	2.756	70.00	M70	0.197	5.00	14	10	6	Yes	88
			1.598	40.60	M41	0.200	5.07	8	10	6	Yes	86
0.625	15.9	062	0.100	2.54	100	0.100	2.54	1	12	8	Yes	40
			0.125	6.35	125	0.125	3.18	1	10	6	Yes	45
			0.200	6.35	200	0.100	2.54	2	12	6	Yes	53
			0.250	6.35	250	0.125	3.18	2	10	6	**	63
			0.375	9.53	375	0.125	3.18	3	10	6	Yes	70
			0.500	12.70	500	0.125	3.18	4	10	6	**	76
			0.625	15.88	625	0.125	3.18	5	10	6	**	78
			2.000	50.80	M51	0.167	4.23	12	10	6	**	86
0.630	16	063	0.079	2.00	078	0.079	2.00	1	10	6	Yes	41
			0.158	4.00	157	0.158	4.00	1	10	6	Yes	58
			0.1969	5.00	196	0.09843	2.50	2	10	6	**	62
			0.236	6.00	236	0.118	3.00	2	10	6	Yes	55
			0.315	8.00	315	0.157	4.00	2	10	6	**	68
			0.7874	20.00	787	0.0984	2.50	8	12	6	Yes	82
			0.8268	21.00	826	0.1181	3.00	7	12	6	Yes	83
			0.9843	25.00	984	0.1969	5.00	5	10	6	**	84
			1.3780	35.00	M35	0.1969	5.00	7	12	6	**	85
			1.8000	45.72	M46	0.2000	5.08	9	12	8	**	86
			3.1496	80.00	M80	0.1969	5.00	16	12	8*	Yes	87
			3.543	90.00	M90	0.197	5.00	18	12	8	**	88

* Listed Efficiencies are theoretical values based on Helix H10X PTFE coated screws. Efficiencies for bronze nuts are approximately 8-10% lower.

** Left Hand screws are available on request. Please contact us.

Nominal Diameter		Diameter Code	Lead		Lead Code	Pitch		Starts	End Machining Code		Available in Left Hand	Efficiency %*
Inch	mm		Inch	mm		Inch	mm		type 1,2,3	type 4		
0.710	18	071	0.0787	2.00	078	0.07874	2.00	1	12	8	Yes	41
			0.158	4.00	157	0.158	4.00	1	12	8	Yes	58
			0.6299	16.00	629	0.1575	4.00	4	12	8	**	76
			0.9449	24.00	944	0.1181	3.00	8	15	8	Yes	84
			1.1811	30.00	M30	0.1969	5.00	6	12	8	**	85
			1.5748	40.00	M40	0.1969	5.00	8	12	8	Yes	86
			2.0000	50.80	M51	0.2000	5.08	10	12	8	**	86
			3.937	100.00	M00	0.197	5.00	20	15	10	Yes	88
0.750	19.1	075	0.100	2.54	100	0.100	2.54	1	15	8	Yes	35
			0.167	4.23	166	0.167	4.23	1	12	8	Yes	47
			0.200	5.08	200	0.200	5.08	1	12	8	Yes	52
			0.250	6.35	250	0.125	3.18	2	12	8	**	57
			0.333	8.47	333	0.167	4.23	2	12	8	Yes	64
			0.500	12.70	500	0.125	3.18	4	12	8	**	73
0.790	20	079	0.158	4.00	157	0.158	4.00	1	12	8	Yes	37
			0.315	8.00	315	0.157	4.00	2	12	8	Yes	61
			0.4724	12.00	472	0.1575	4.00	3	15	8	**	72
			1.0630	27.00	M27	0.1181	3.00	9	17	10	**	82
			1.772	45.00	M45	0.197	5.00	9	15	10	**	84
0.870	22.0	087	0.1969	5.00	196	0.19685	5.00	1	15	10	Yes	50
0.870	22	087	0.7874	20.00	787	0.1575	4.00	5	17	10	**	78
			1.3780	35.00	M35	0.1969	5.00	7	17*	10	**	83
			1.969	50.00	M50	0.197	5.00	10	17	10	**	85
0.87	22.1	RD088	0.2000	5.08	200	0.10000	2.54	2	15	10	**	48
7/8	22.2	088	0.166	4.22	166	0.166	4.22	1	15	10	Yes	45
7/8	22.2	088	0.200	5.08	200	0.200	5.08	1	15	10	Yes	48
0.94	24	094	1.1811	30.00	M30	0.1181	3.00	10	20*	12	Yes	85
			1.5748	40.00	M40	0.1969	5.00	8	20*	12	**	83
			2.165	55.00	M55	0.197	5.00	11	20	12	**	86
1	25.4	100	0.100	2.54	100	0.100	2.54	1	20	12	Yes	24
			0.167	4.23	166	0.167	4.23	1	17	10	Yes	40
			0.200	5.08	200	0.200	5.08	1	17	10	Yes	44
			0.250	6.35	250	0.250	6.35	1	17	10	Yes	46
			0.500	12.70	500	0.250	6.35	2	17	10	Yes	63
			1.000	25.40	999	0.100	2.54	10	20	12	Yes	74
			3.000	76.20	M76	0.200	5.08	15	20	12	Yes	86
1.02	26		0.236	6.00		0.236	6.00	1	17	10	Yes	43
1 1/8	28.6		0.200	5.08		0.200	5.08	1	20	12	Yes	42
1.18	29.9	1.25	1.6000	40.64	1.6	0.40000	10.16	4	20	12	**	84
1 1/4	31.8		0.200	5.08		0.200	5.08	1	25	16	Yes	35
			0.250	6.35		0.250	6.35	1	20	12	Yes	45
			0.500	12.70		0.250	6.35	2	20	12	Yes	55
1 1/2	38.1		0.100	2.54		0.100	2.54	1	30	19	Yes	25
			0.200	5.08		0.200	5.08	1	30	19	Yes	35
			0.250	6.35		0.250	6.35	1	30	19	Yes	40
			0.375	9.53		0.375	9.53	1	25	16	Yes	43
			0.500	12.70		0.250	6.35	2	30	19	Yes	56
			1.000	25.40		0.100	2.54	10	30	19	**	78
1.57	40		0.276	7.00		0.276	7.00	1	30	19	Yes	37
1 3/4	44.5		0.250	6.35		0.250	6.35	1	35	22	Yes	38
2	50.8		0.131	3.33		0.131	3.33	1	50	32	Yes	27
			0.200	5.08		0.200	5.08	1	40	24	Yes	30
			0.250	6.35		0.250	6.35	1	40	24	Yes	32
			0.500	12.70		0.500	12.70	1	35	22	Yes	46
2.17	55		0.472	12.00		0.472	12.00	1	30	19	Yes	37
2 1/4	57.2		0.250	6.35		0.250	6.35	1	45	28	Yes	31
			0.500	12.70		0.500	12.70	1	40	24	Yes	46
2 1/2	63.5		0.250	6.35		0.250	6.35	1	50	32	Yes	30
			0.333	8.47		0.333	8.47	1	50	32	Yes	34
			0.500	12.70		0.500	12.70	1	45	28	Yes	39

* Listed Efficiencies are theoretical values based on Helix H10X PTFE coated screws. Efficiencies for bronze nuts are approximately 8-10% lower.

** Left Hand screws are available on request. Please contact us.



Threaded Nuts

Our nuts are available in threaded and flange mounts. Anti-backlash nuts perform with zero backlash, and are self-compensating for wear. All nuts are molded from a proprietary internally lubricated material.

Threaded Nuts	
Technical introduction	356
Standard Freewheeling Nut	360
Axial Anti-Backlash Nut	362
Radial Anti-Backlash Nut	364
Torsional Anti-Backlash Nut	365

Materials

Plastic Acme & Trapezoidal Nuts

The high strength and inherent lubricity of our proprietary plastic nut material can result in product life that can equal or exceed conventional nut materials.

- Material: Helix™ ACETAL/PTFE blend
- Tensile Strength @70°F: 8,000 psi
- Compressive Strength @70°F: 16,000 psi
- PV Limit: 2,700 lubricated
- Coefficient of Friction: 0.10 lubricated

Bronze Acme & Trapezoidal Nuts

Special high tensile bronze is selected for our smooth running, anti-wedging bronze nuts.

- Material: Bronze
- Tensile Yield: 50,000 psi
- Tensile Ultimate: 65,000 psi
- Hardness: HB75
- Dynamic Coefficient of Friction: 0.125 with Helix™ Lubricant

Flanges for Bronze & Plastic Nuts

Made from carbon steel with black oxide finish.

NUT Selection

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

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

Speed

The travel rate (linear speed) is the rpm at which the screw or nut is rotating multiplied by the lead of the screw, measured in inches or millimeters per minute.

Length

The unsupported length of the screw between bearings, measured in inches or millimeters.

End fixity type

Refers to the method by which the ends of the screw are supported.

Standard Nuts



Standard Freewheeling Nuts

This is a one-piece nut that will have a small amount of axial and radial lash. Applications where repeatability and accuracy are not high. These nuts are often used in vertical applications where the load is always in one direction, like a 3d printer.



Axial Anti-Backlash Nuts

Consist of a main nut body and a secondary ring that share the same thread form. There is a spring between the two components that force each part against opposing flanks of the screw thread. This biasing takes up the clearance between all the components i.e. gets rid of the backlash. The drawback to this design is that if the load is greater than the spring force, you can still get backlash in the system. For a greater load you need a stronger spring to keep backlash to a minimum, however, a stronger spring means more friction between the nut and screw which requires more drive torque to overcome. Applications where repeatability and accuracy are needed. These nuts are the most cost effective anti-backlash nut that we offer.



Radial Anti-Backlash Nuts

Consist of a nut body with flexible "fingers". There is an axial spring that pushes a ring along the nut body. There are ramp features on the ends of the fingers that the ring uses to push the fingers inward towards the screw. The threads on the fingers are pushed into the valleys of the screw thread to take up any clearance. There is a mechanical advantage provided by the ramp features between the fingers and the collar which amplifies the force of the spring. Unlike the axial anti-backlash nut design the radial anti-backlash nut design can handle loads greater than the spring force. There is also less of an increase in required drive torque compared to axial anti-backlash nut. This is a mid-range anti-backlash nut that operates backlash free up to its rated load. Once that load is exceeded, the nut can deflect.



Torsional Anti-Backlash Nuts

The nut with the highest design load rating offering the greatest bi-directional repeatability is the torsion anti-backlash nut. It has the most stiffness of any of the anti-backlash styles while maintaining the lowest drag torque. Essentially, a spacer which separates the two nut halves is adjusted automatically by the torsion spring to lengthen and take up the gap as wear occurs, thus maintaining zero backlash. This is our high-performance nut. It requires the lowest amount of torque and is extremely stiff. This nut will operate without backlash even under loads that are higher than the rated dynamic load.

Technical introduction



Trunnion Nut (Plastic)
TMA Series



Trunnion Nut (Bronze)
TMB Series



Cylinder Nut
CYA Series



Power AC (Plastic)
NPA Series



Power AC (Bronze)
NPB Series



Torsional Anti-Backlash Nut
GNA Compact Series



Heavy Load Nut (2-hole)
HLR Series



Heavy Load Nut (4-hole)
HLC Series



Ball Nut Replacement
BNR Series



Gear Nut



Custom Specialty Nuts

Term	
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.
Pitch	The axial distance between threads. Pitch is equal to the lead in a single start screw.
Screw Starts	The number of independent threads on the screw shaft; example one, two or four.
Right/Left hand	The handedness of a screw refers to the direction in which the helical thread wraps around the screw shaft.
Efficiency	Efficiency of Helix precision lead screw assemblies range from 15% to 85%. These efficiencies are dependent upon nut material, lubrication, lead and thread form.
Journal	A smooth diameter machined on the end of screw used as mounting surface for bearings, couplings, pulleys, gears, etc.
Term - Threaded Nut	
Dynamic Load	Maximum recommended thrust load which should be applied to stepper motor linear actuator assembly while in motion
Drag Torque	The amount of torque required to drive the unloaded lead screw.

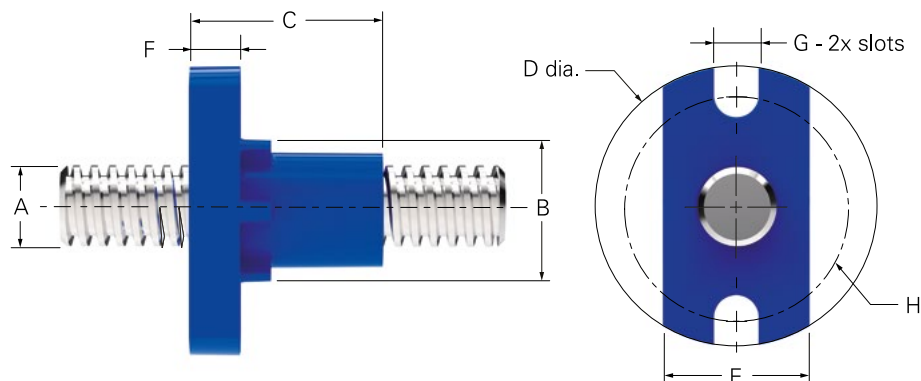
Glossary

Standard Freewheeling Nut

Standard Freewheeling Nut - NFA

Nut material: Helital™

2-Hole flanged

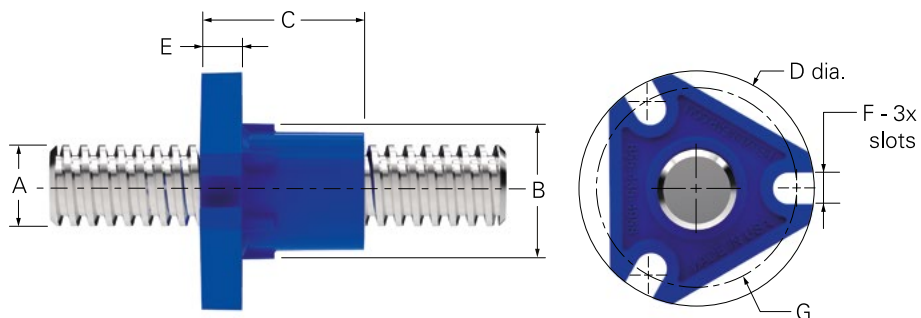


A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Flange Dia. inch (mm)	E Flange Height inch (mm)	F Flange Thickness inch (mm)	G Slot Width inch (mm)	H Bolt Circle Dia. inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
5/64 (2)	0.400 (10.2)	0.500 (12.7)	0.750 (19.0)	0.400 (10.2)	0.130 (3.3)	0.120 (3.1)	0.600 (15.3)	35 (16)	Freewheeling
1/8 (3)									
3/16 (4)									
7/32 (5)									

Standard Freewheeling Nut - NFA

Nut material: Helital™

3-Hole flanged

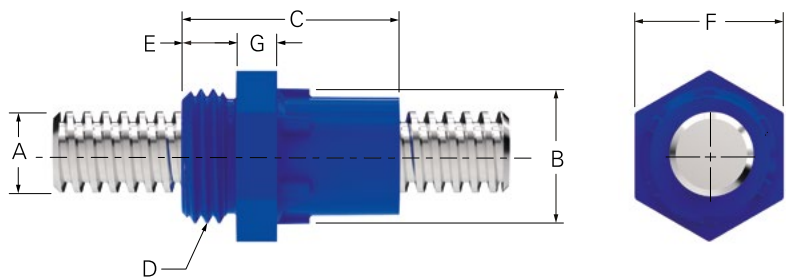


A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Flange Dia. inch (mm)	E Flange Thickness inch (mm)	F Slot Width inch (mm)	G Bolt Circle Dia. inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
1/4 (6)	0.500 (12.7)	0.625 (15.8)	1.00 (25.4)	0.188 (4.8)	0.144 (3.7)	0.750 (19)	75 (35)	Freewheeling
5/16 (8)	0.625 (15.8)	0.750 (19.1)	1.125 (28.5)	0.188 (4.8)	0.144 (3.7)	0.875 (22.2)	75 (35)	
3/8 (10)								
7/16 (11)	0.750 (19.1)	1.125 (28.5)	1.500 (38.1)	0.250 (6.35)	0.203 (5.2)	1.125 (28.5)	150 (68)	
1/2 (13)								
9/16 (14)	1.125 (28.5)	1.250 (31.7)	1.750 (44.4)	0.250 (6.35)	0.221 (5.6)	1.438 (36.5)	150 (68)	
5/8 (16)							225 (100)	
11/16 (18)							350 (160)	
3/4 (19)								

Standard Freewheeling Nut - NTA

Nut material: Helital™

Threaded



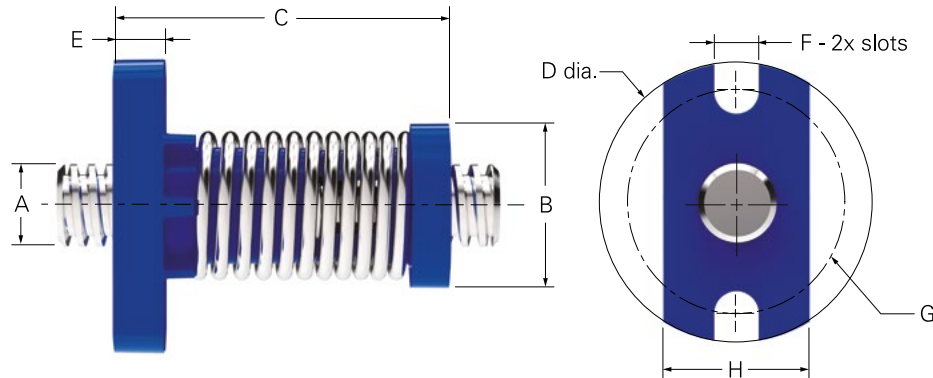
A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Thread Size inch (mm)	E Thread Length inch (mm)	F Hex Across flats inch (mm)	G Hex Thickness inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
5/64 (2) 1/8 (3) 3/16 (4)	0.400 (10.2)	0.500 (12.7)	3/8-24 UNF	0.188 (4.8)	0.437 (11)	0.130 (3.3)	35 (16)	Freewheeling
7/32 (5) 1/4 (6)	0.500 (12.7)	0.625 (15.8)	9/16"-18 UNF	0.250 (6.3)	0.625 (15.8)	0.180 (4.8)	115 (52)	
5/16 (8) 3/8 (10)	0.625 (15.8)	0.750 (19)	5/8"-18 UNF	0.250 (6.3)	0.687 (17.4)	0.180 (4.8)	125 (57)	
7/16 (11) 1/2 (13)	0.750 (19.1)	1.125 (28.6)	15/16"-16 UN	0.375 (9.5)	1.00 (25.4)	0.250 (6.4)	200 (91)	
9/16 (14) 5/8 (16) 11/16 (18)	1.125 (28.6)	1.250 (31.7)	1-1/16-16 UN	0.375 (9.5)	1-1/8 (28.5)	0.250 (6.4)	350 (159)	
3/4 (19) 7/8 (22) 1 (25.4)	1.5 (38)	1.375 (35)	1-3/8"-16 UN	0.375 (9.5)	1-7/16 (36.5)	0.310 (7.9)	530	

Axial Anti-Backlash Nut

Axial Anti-Backlash Nut - AFA

Nut material: Helital™

2-Hole flanged

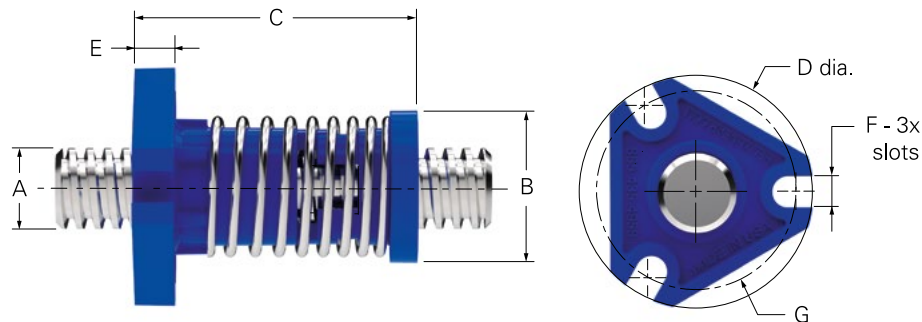


A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Flange Dia. inch (mm)	E Flange Thickness inch (mm)	F Slot Width inch (mm)	G Bolt Circle Dia. inch (mm)	H Flange Height inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
5/64 (2)	0.420 (10.2)	0.945 (24)	0.750 (19.0)	0.130 (3.3)	0.120 (3.1)	0.600 (15.3)	0.400 (10.2)	35 (16)	3 (.113)
1/8 (3)									
3/16 (4)									

Axial Anti-Backlash Nut - AFA

Nut material: Helital™

3-Hole flanged

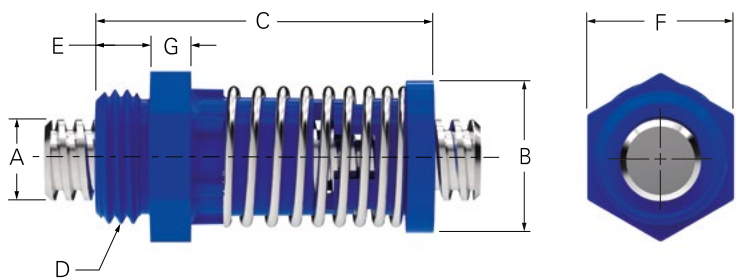


A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Flange Dia. inch (mm)	E Flange Thickness inch (mm)	F Slot Width inch (mm)	G Bolt Circle Dia. inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
7/32 (5)	0.563 (14.3)	1.100 (28)	1.00 (25.4)	0.188 (4.8)	0.144 (3.7)	0.750 (19)	75 (35)	4 (.03)
1/4 (6)								
5/16 (8)	0.688 (17.4)	1.398 (35.5)	1.125 (28.5)	0.188 (4.8)	0.144 (3.7)	0.875 (22.2)	75 (35)	5 (.04)
3/8 (10)								
7/16 (11)	0.875 (22)	2.00 (50.8)	1.500 (38.1)	0.250 (6.35)	0.203 (5.2)	1.125 (28.5)	150 (68)	9 (.06)
1/2 (13)								
9/16 (14)	1.125 (28.5)	2.34 (59.4)	1.750 (44.4)	0.250 (6.35)	0.221 (5.6)	1.438 (36.5)	150 (68) 225 (100) 350 (160)	12 (.113)
5/8 (16)								
11/16 (18)								
3/4 (19)								
7/8 (22)	1.5 (38)	2.675	2.250	0.313	0.257	1.875	530	16 (.113)
15/16 (24)								

Axial Anti-Backlash Nut - ATA

Nut material: Helital™

Threaded



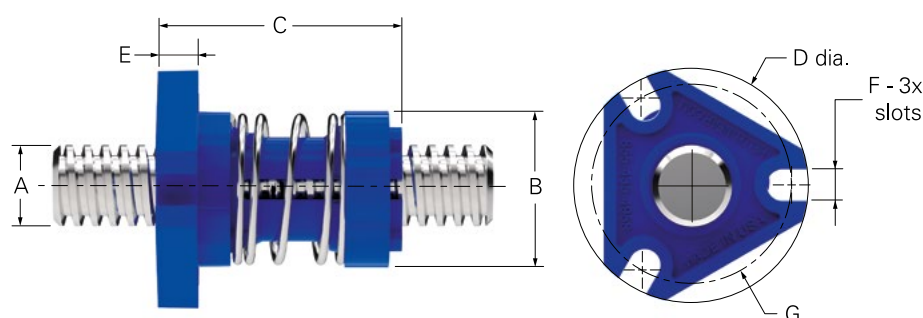
A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Thread Size inch (mm)	E Thread Length inch (mm)	F Hex Across flats inch (mm)	G Hex Thickness inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
5/64 (2) 1/8 (3) 3/16 (4)	0.420 (10.2)	0.945 (24)	3/8-24 UNF	0.188 (4.8)	0.437 (11)	0.130 (3.3)	35 (16)	4 (.03)
7/32 (5) 1/4 (6)	0.500 (12.7)	1.100 (28)	9/16"-18 UNF	0.250 (6.3)	0.625 (15.8)	0.180 (4.8)	75 (35)	4 (.03)
5/16 (8) 3/8 (10)	0.625 (15.8)	1.398 (35.5)	5/8"-18 UNF	0.250 (6.3)	0.687 (17.4)	0.180 (4.8)	75 (35)	5 (.04)
7/16 (11) 1/2 (13)	0.750 (19.1)	2.00 (50.8)	15/16"-16 UN	0.375 (9.5)	1.00 (25.4)	0.250 (6.4)	150 (68)	9 (.06)
9/16 (14) 5/8 (16) 11/16 (18) 3/4 (19)	1.125 (28.6)	2.34 (59.4)	1-1/16-16 UN	0.375 (9.5)	1-1/8 (28.5)	0.250 (6.4)	150 (68) 225 (100) 350 (160)	12 (.084)
7/8 (22) 15/16 (24)	1.5 (38)	2.675 (68)	1-3/8"-16 UN	0.375 (9.5)	1-7/16 (36.5)	0.310 (7.9)	530 (240)	16 (.113)

Radial Anti-Backlash Nut

Radial Anti-Backlash Nut - RFA

Nut material: Helital™

3-Hole flanged

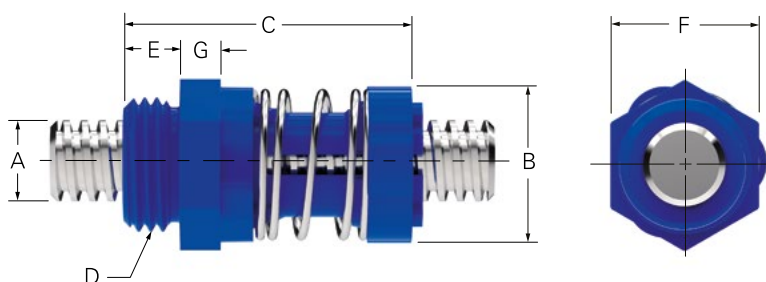


A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Flange Dia. inch (mm)	E Flange Thickness inch (mm)	F Slot Width inch (mm)	G Bolt Circle Dia. inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
1/4 (6)	0.610 (15.4)	0.940 (23.8)	1.00 (25.4)	0.188 (4.8)	0.144 (3.7)	0.750 (19)	75 (35)	0.25-3 (.002-.021)
5/16 (8)	0.780 (19.7)	1.160 (29.5)	1.13 (28.6)	0.188 (4.8)	0.144 (3.7)	0.875 (22.2)	75 (35)	1-5 (.007-.03)
3/8 (10)	0.930 (23.6)	1.440 (36.5)	1.50 (38.1)	0.250 (6.35)	0.203 (5.2)	1.125 (28.5)	150 (68)	3-7 (.02-.05)
7/16 (11)	1.275 (32.4)	1.75 (44.4)	1.75 (44.4)	0.250 (6.3)	0.221 (5.6)	1.438 (36.5)	35 (16)	4-8 (.028-.055)
1/2 (13)								
5/8 (16)								
3/4 (19)								

Radial Anti-Backlash Nut - RTA

Nut material: Helital™

Threaded



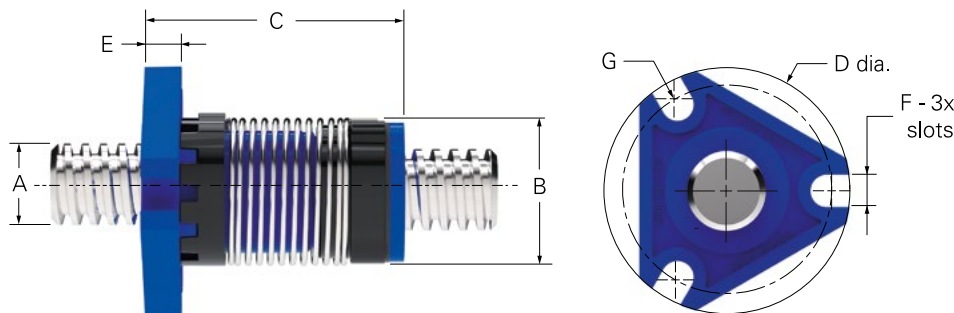
A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Thread Size inch (mm)	E Thread Length inch (mm)	F Hex Across flats inch (mm)	G Hex Thickness inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
1/4 (6)	0.610 (15.4)	0.940 (23.8)	9/16"-18 UNF	0.250 (6.3)	0.625 (15.8)	0.180 (4.8)	75 (35)	0.25-3 (.002-.021)
5/16 (8)	0.780 (19.7)	1.160 (29.5)	15/16"-16 UN	0.375 (9.5)	1.00 (25.4)	0.180 (4.8)	75 (35)	1-5 (.007-.03)
3/8 (10)	0.930 (23.6)	1.440 (36.5)	15/16"-16 UN	0.375 (9.5)	1.00 (25.4)	0.250 (6.4)	150 (68)	3-7 (.02-.05)
7/16 (11)	1.275 (32.4)	2.13 (54.1)	1-1/16"-16 UN	0.370 (9.4)	1.12 (28.4)	0.250 (6.4)	35 (16)	4-8 (.028-.055)
1/2 (13)								
5/8 (16)								
3/4 (19)								

Torsional Anti-Backlash Nut

Torsional Anti-Backlash Nut - KFA

Nut material: Helital™

3-Hole flanged

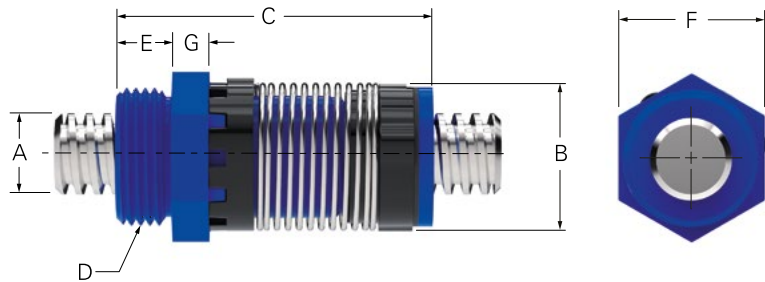


A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Flange Dia. inch (mm)	E Flange Thick- ness inch (mm)	F Slot Width inch (mm)	G Bolt Circle Dia. inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
1/4 (6)	.70 (17.8)	1.6 (40.6)	1.12 (28.6)	.18 (4.8)	.144 (3.7)	.875 (22.2)	20 (9)	3 (.025)
5/16 (8)	.87 (22.1)	1.8 (45.7)	1.50 (38.1)	.25 (6.4)	.203 (5.2)	1.125 (28.6)	30 (13)	3 (.025)
3/8 (10)								
7/16 (11)	1.06 (26.9)	2.1(53.3)	1.75 (44.5)	.25 (6.4)	.220 (5.6)	1.406 (35.7)	50 (23)	6 (.040)
1/2 (13)	1.06 (26.9)	2.1(53.3)	1.75 (44.5)	.25 (6.4)	.220 (5.6)	1.406 (35.7)	75 (34)	6 (.040)
9/16 (14)	1.30 (33.0)	2.5 (63.5)	1.75 (44.5)	.31 (8.0)	.220 (5.6)	1.750 (44.5)	90 (41)	6 (.040)
5/8 (16)	1.30 (33.0)	2.5 (63.5)	1.75 (44.5)	.31 (8.0)	.220 (5.6)	1.750 (44.5)	150 (68)	6 (.040)
3/4 (19)	1.63 (41.4)	2.8 (71.1)	2.38 (60.5)	.31 (8.0)	.220 (5.6)	2.000 (50.8)	250 (113)	7 (.050)

Torsional Anti-Backlash Nut - KTA

Nut material: Helital™

Threaded



A Screw Dia. inch (mm)	B Nut Dia. inch (mm)	C Nut Length inch (mm)	D Thread Size inch (mm)	E Thread Length inch (mm)	F Hex Across flats inch (mm)	G Hex Thickness inch (mm)	Dynamic Load lbs (Kg)	Drag Torque (max.) oz-in (N-m)
1/4 (6)	.70 (17.8)	1.6 (40.6)	9/16-18	0.250 (6.3)	.69 (17.5)	0.180 (4.8)	20 (9)	3 (.025)
5/16 (8)	.87 (22.1)	1.8 (45.7)	3/4-20	0.375 (9.5)	.88 (22.35)	0.250 (6.4)	30 (13)	3 (.025)
3/8 (10)								
7/16 (11)	1.06 (26.9)	2.1(53.3)	15/16-16	0.375 (9.5)	1.00 (25.4)	0.250 (6.4)	50 (23)	6 (.040)
1/2 (13)	1.06 (26.9)	2.1(53.3)	1-1/8-16	0.375 (9.5)	1.00 (25.4)	0.250 (6.4)	75 (34)	6 (.040)
9/16 (14)	1.30 (33.0)	2.5 (63.5)	1-1/8-16	0.375 (9.5)	1.25 (31.7)	0.310 (8.0)	90 (41)	6 (.040)
5/8 (16)	1.30 (33.0)	2.5 (63.5)	1-1/8-16	0.375 (9.5)	1.25 (31.7)	0.310 (8.0)	150 (68)	6 (.040)
3/4 (19)	1.63 (41.4)	2.8 (71.1)	1-3/8-16	0.375 (9.5)	1.56 (39.8)	0.320 (8.0)	250 (113)	7 (.050)

Gearboxes



Spur gearboxes

p.399



Wheel Hub gearboxes

p.407



Planetary gearboxes
GP series
Standard

p.377



Planetary gearboxes
JMS series
Economy

p.391

Gearboxes

Planetary gearboxes - GP Standard series	Torque* (Nm)	377
08GPS	0,008...0,1	378
10GPS	0,01...0,15	379
12GPS	0,08...0,17	380
16GPS	0,2...0,45	381
22GPS	0,5...1,5	382
26GPS	0,75...4,5	383
32GPS	1,25...5	384
GP42-S	6,5...15	385
GP56-S/N/T	1,5...26,38	386
GP80-T	23...67	389
Planetary gearboxes - JMS Economy series	Torque* (Nm)	391
22JMS	0,6...2	392
28JMS	1,2...4	393
36JMS	2...6	394
42JMS	3...10	395
56JMS	9...30	396
Spur gearboxes	Torque* (Nm)	399
12GSS	0,01...0,025	400
16GSS/GSP/GST	0,01...0,1	401
24GSP	0,1	404
Wheel Hub gearboxes - NEW	Torque* (Nm)	407
GPW56	7,73...26,48	408
GPW56 + 57BL03	9,17	409
GPW56 + 60BLWA38	4,5	410
GPW56 + IBI80 362	9,9	411

* 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

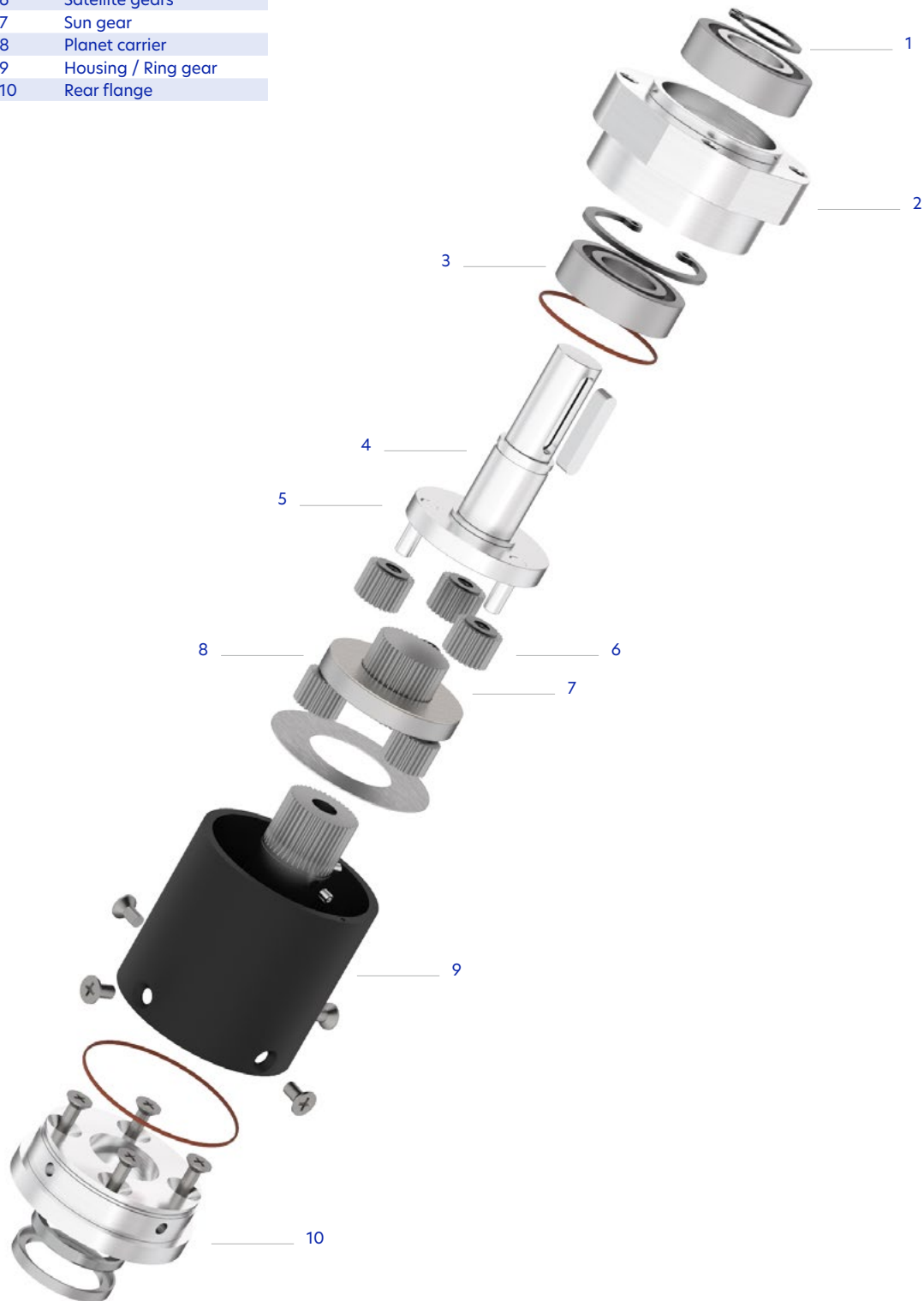
Advantages at a glance

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.377



Planetary gearboxes
JMS series
Economy

p.391

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)	377
08GPS	0,008...0,1	378
10GPS	0,01...0,15	379
12GPS	0,08...0,17	380
16GPS	0,2...0,45	381
22GPS	0,5...1,5	382
26GPS	0,75...4,5	383
32GPS	1,25...5	384
GP42-S	6,5...15	385
GYP56-S	13,55...26,38	386
GYP56-N (Low noise)	1,5...11,8	387
GYP56-T (High radial load)	13,55...26,38	388
GP80-T (High radial load)	23...67	389

Planetary gearboxes - JMS Economy series	Torque* (Nm)	391
22JMS	0,6...2	392
28JMS	1,2...4	393
36JMS	2...6	394
42JMS	3...10	395
56JMS	9...30	396

*Nominal Output Torque

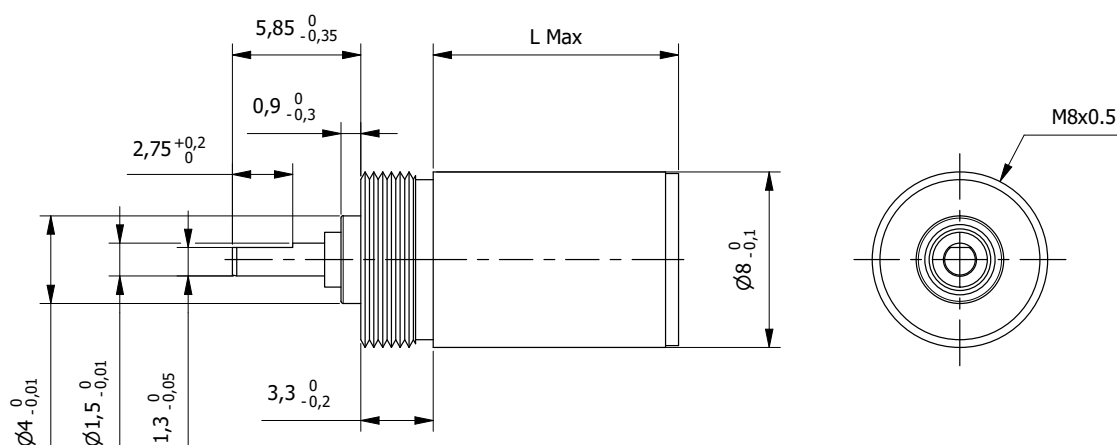


Planetary Gearboxes

GP series - Standard

Planetary gearboxes - GP Standard series		Torque* (Nm)
08GPS	0,008...0,1	378
10GPS	0,01...0,15	379
12GPS	0,08...0,17	380
16GPS	0,2...0,45	381
22GPS	0,5...1,5	382
26GPS	0,75...4,5	383
32GPS	1,25...5	384
GP42-S	6,5...15	385
GYP56-S	13,55...26,38	386
GYP56-N (Low noise)	1,5...11,8	387
GYP56-T (High radial load)	13,55...26,38	388
GP80-T (High radial load)	23...67	389

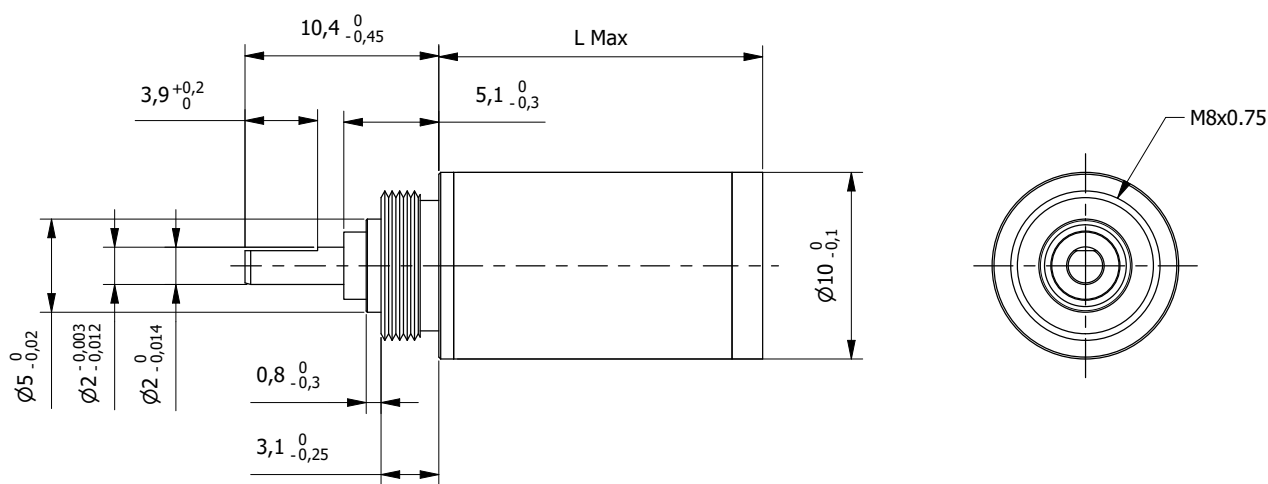
* Nominal Output Torque



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

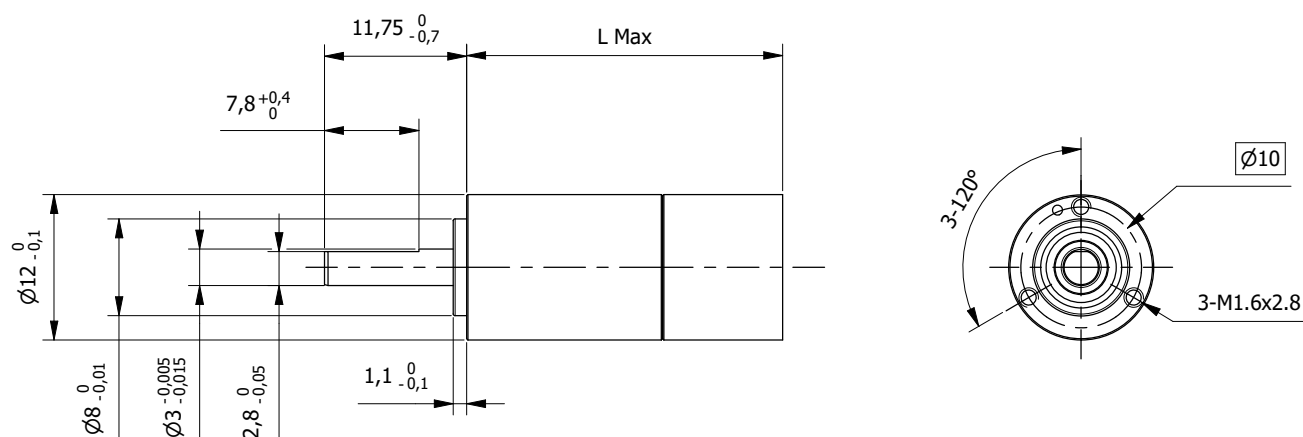
Specification				
	Model	...4N-256	...4N-1296	...5N-1024
1	Stages	4	4	5
2	Reduction Ratio	256	1296	1024
3	Nominal Output Torque	Nm	0,08	0,04
4	Max. Output Torque	Nm	0,12	0,06
5	Recommended Input Speed	rpm	12000	12000
6	Max. Input Speed	rpm	20000	20000
7	Efficiency	%	65	57
8	Average Backlash no-load	°	2,5	2,8
9	Max. Axial load (dynamic)	N	5	5
10	Max. Radial load (5mm from flange)	N	8	8
11	Length (L)	mm	13,3	15,9
12	Weight	g	4,4	5

Characteristics	
Item	
Operating temperature	-15 to +80°C
Bearing output	Ball bearings



Specification						
Model		...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

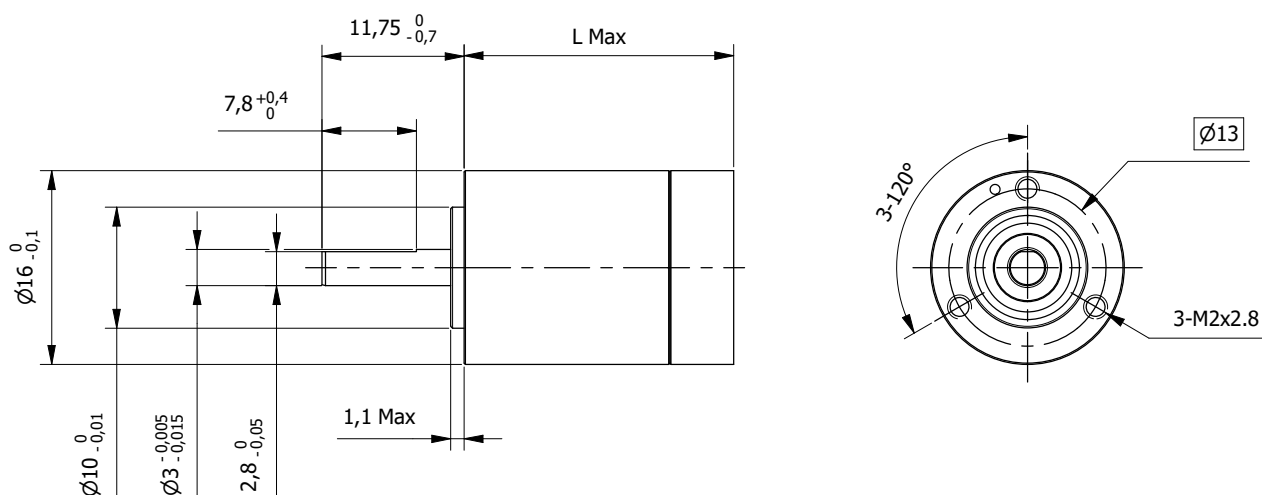
Characteristics	
Item	
Operating temperature	-40 to +80°C
Bearing output	Ball bearings



Specification		...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	0,14	0,14	0,14
4	Max. Output Torque	Nm	0,1	0,14	0,14	0,18	0,18
5	Recommended Input Speed	rpm	16000	16000	16000	16000	16000
6	Max. Input Speed	rpm	20000	20000	20000	20000	20000
7	Efficiency	%	90	80	80	75	75
8	Average Backlash no-load	°	1,2	1,5	1,5	1,8	1,8
9	Max. Axial load (dynamic)	N	20	20	20	20	20
10	Max. Radial load (5mm from flange)	N	30	35	35	50	50
11	Length (L)	mm	15,5	20,4	20,4	25,2	25,2
12	Weight	g	11	14	14	17	17

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	0,17	0,17	0,17
4	Max. Output Torque	Nm	0,21	0,21	0,21
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	°	2,1	2,1	2,1
9	Max. Axial load (dynamic)	N	20	20	20
10	Max. Radial load (5mm from flange)	N	50	50	50
11	Length (L)	mm	30,1	30,1	30,1
12	Weight	g	19	19	19

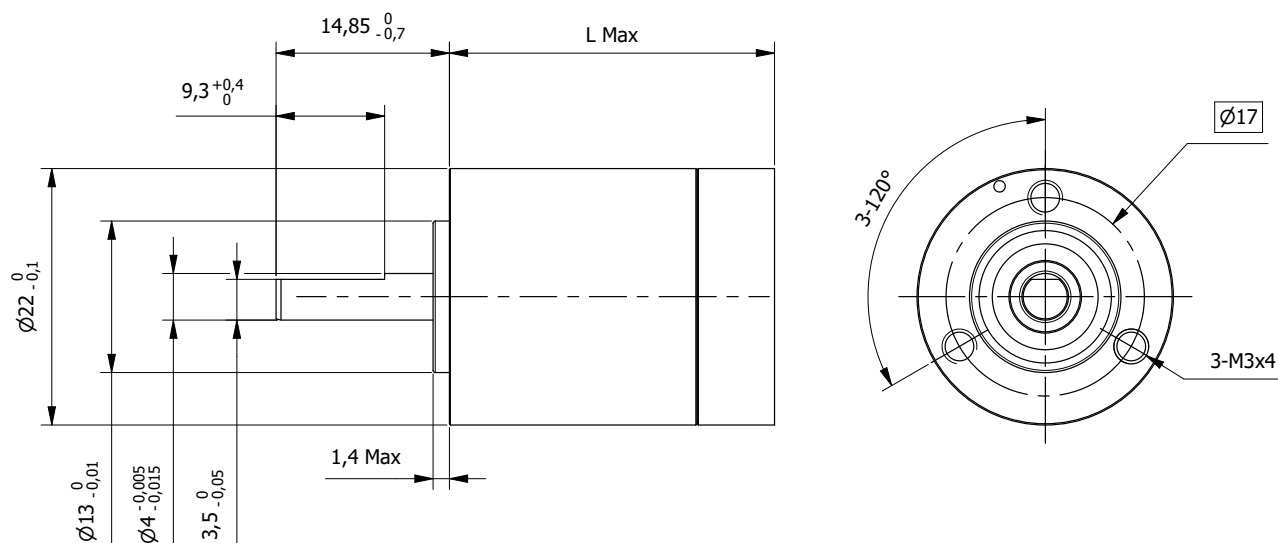
Characteristics	
Item	
Operating temperature	-40 to +100°C
Bearing output	Ball bearings



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	0,2	0,25	0,25	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

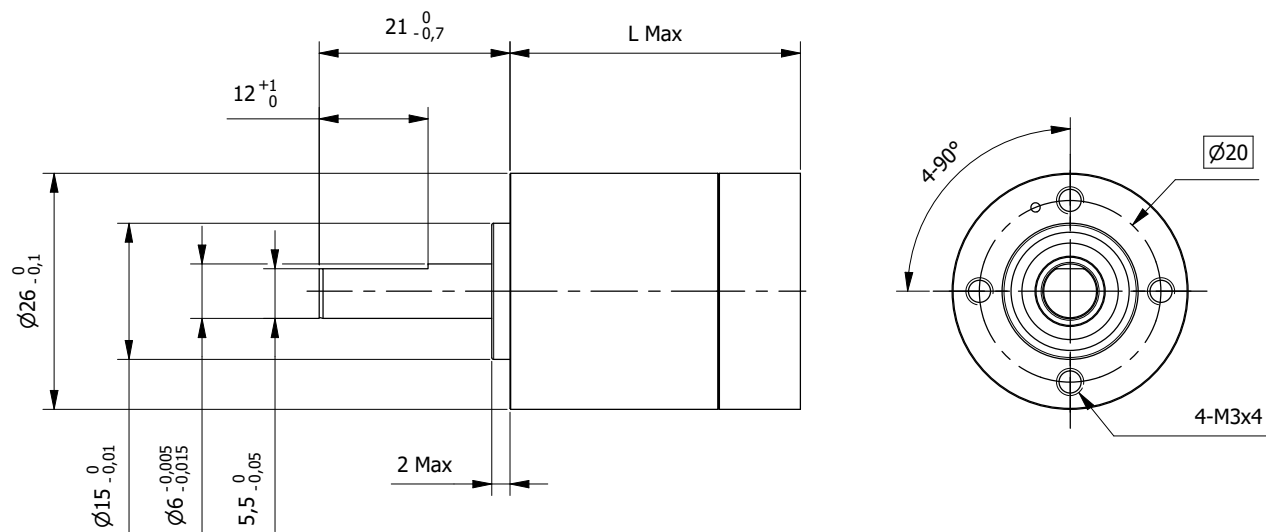
Characteristics	
Item	
Operating temperature	-40 to +100°C
Bearing output	Ball bearings



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

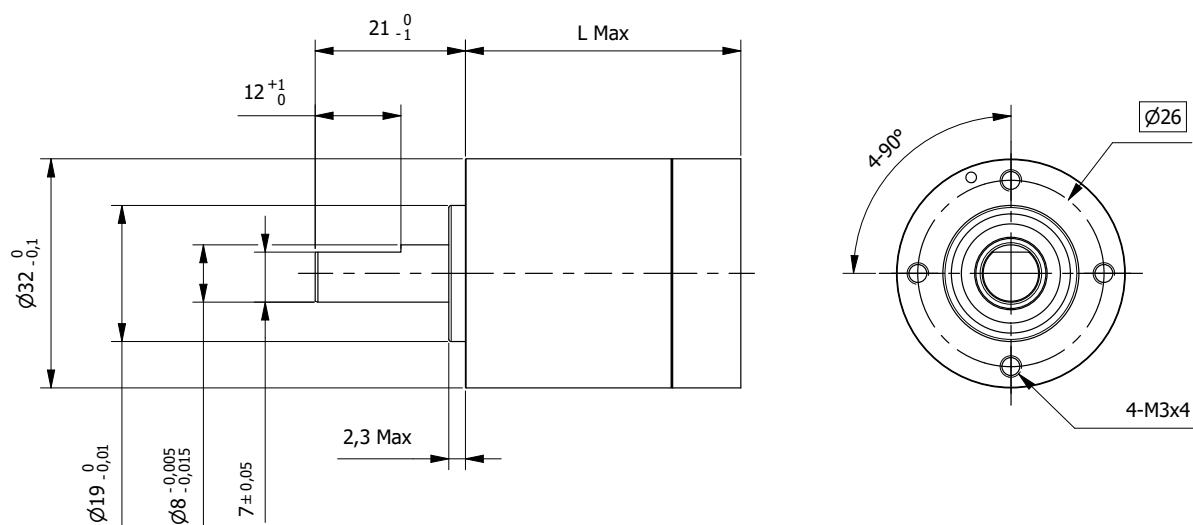
Specification		...4N-326	...4N-439	...4N-679	...4N-913
1	Stages	4	4	4	4
2	Reduction Ratio	326	439	679	913
3	Nominal Output Torque	Nm	1,5	1,5	1,5
4	Max. Output Torque	Nm	1,9	1,9	1,9
5	Recommended Input Speed	rpm	12000	12000	12000
6	Max. Input Speed	rpm	15000	15000	15000
7	Efficiency	%	66	66	66
8	Average 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	Model	...	...	...	...	...	...
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	Max. Output Torque	Nm	1,1	3,2	3,2	6,2	6,2
5	Recommended Input Speed	rpm	7000	8000	8000	10000	10000
6	Max. Input Speed	rpm	8750	10000	10000	12500	12500
7	Efficiency	%	90	78	78	75	75
8	Average Backlash no-load	°	0,75	0,95	0,95	1,1	1,1
9	Max. Axial load (dynamic)	N	80	80	80	80	80
10	Max. Radial load (10mm from flange)	N	95	145	145	150	150
11	Length (L)	mm	21,3	30,2	30,2	35,5	35,5
12	Weight	g	75	95	95	105	105

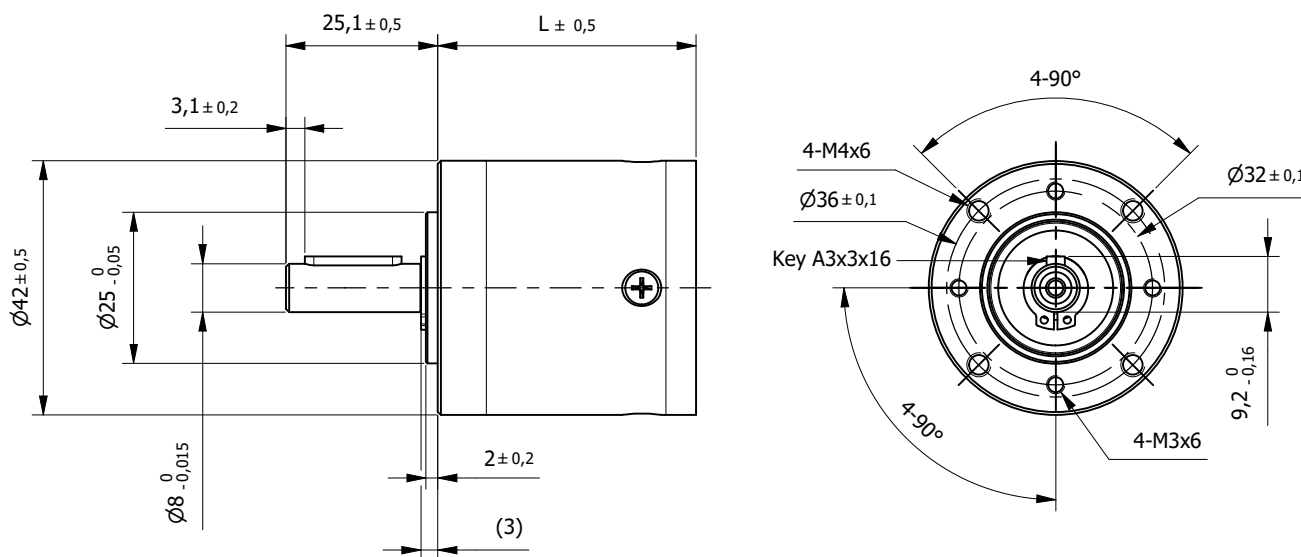
Characteristics	
Item	
Operating temperature	-40 to +100°C
Bearing output	Ball bearings



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	2,9
4 Max. Output Torque	Nm	1,6	3,6	3,6	3,6
5 Recommended Input Speed	rpm	6000	7000	7000	7000
6 Max. Input Speed	rpm	7500	8750	8750	8750
7 Efficiency	%	90	78	78	78
8 Average Backlash no-load	°	0,55	0,7	0,7	0,7
9 Max. Axial load (dynamic)	N	110	110	110	110
10 Max. Radial load (10mm from flange)	N	160	180	180	180
11 Length (L)	mm	26,7	36,3	36,3	36,3
12 Weight	g	140	185	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	5	
4 Max. Output Torque	Nm	6,25	6,25	6,25	
5 Recommended Input Speed	rpm	8000	8000	8000	
6 Max. Input Speed	rpm	10000	10000	10000	
7 Efficiency	%	75	75	75	
8 Average Backlash no-load	°	0,9	0,9	0,9	
9 Max. Axial load (dynamic)	N	110	110	110	
10 Max. Radial load (10mm from flange)	N	180	180	180	
11 Length (L)	mm	43,9	43,9	43,9	
12 Weight	g	230	230	230	

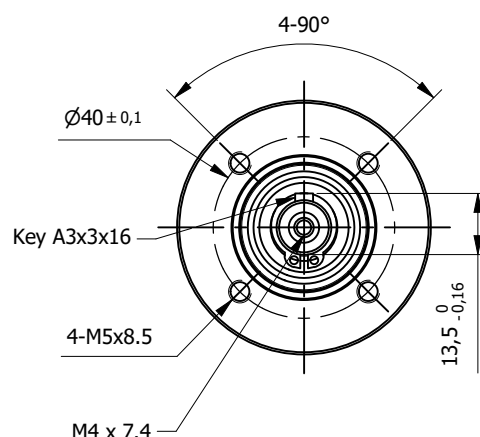
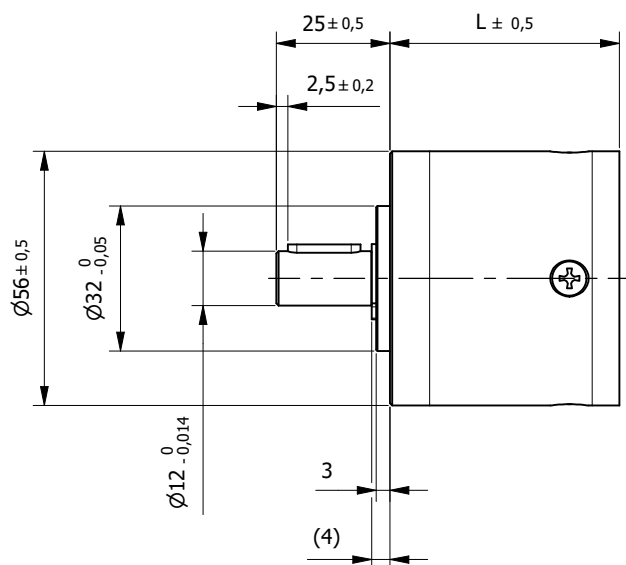
Characteristics		
Item		
Operating temperature	-40 to +100°C	
Bearing output	Ball bearings	



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	6,5	6,9	7	7
4	Max. Output Torque	Nm	13	13	13,8	14	14
5	Recommended Input Speed	rpm	3000	3000	3000	3000	3000
6	Max. Input Speed	rpm	8236	9187	11943	14050	17061
7	Efficiency	%	≈90%	≈90%	≈90%	≈90%	≈90%
8	Moment of Inertia ≤φ6,35	kgmm²	1,23	1,05	0,78	0,67	0,56
9	Length (L)	mm	42,7	42,7	42,7	42,7	42,7
10	Weight	kg	0,3	0,3	0,3	0,3	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	9,4	8,6	12,2	18
4	Max. Output Torque	Nm	18,2	18,8	17,2	24,4	36
5	Recommended Input Speed	rpm	3000	3000	3000	3000	3000
6	Max. Input Speed	rpm	8236	11943	14050	18000	9187
7	Efficiency	%	≈85%	≈85%	≈85%	≈85%	≈78%
8	Moment of Inertia ≤φ6,35	kgmm²	1,26	0,44	0,67	0,46	0,71
9	Length (L)	mm	56,6	56,6	56,6	56,6	70,6
10	Weight	kg	0,4	0,4	0,4	0,4	0,5

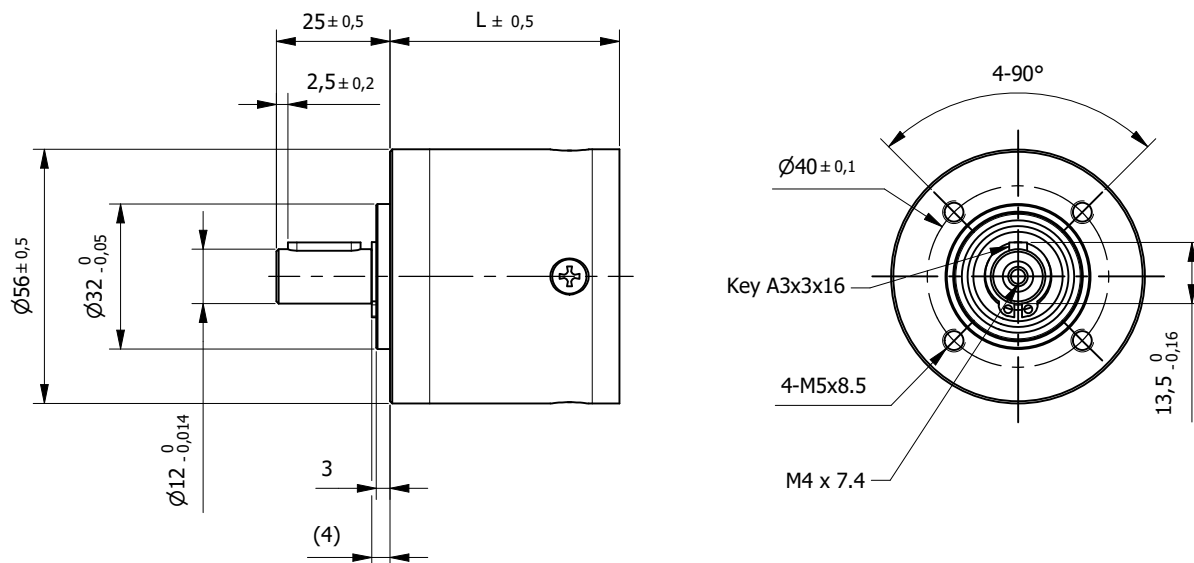
Characteristics	
Item	
Backlash at 2% nominal output torque	≤1°
Max. Radial load (middle of the key)	305N at n out=100rpm 210N at n out=300rpm 140N at n out=1000rpm
Max. Axial load (output shaft center)	890N at n out=100rpm 575N at n out=300rpm 340N at n out=1000rpm
Max. Press fit force	320N
Noise level (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
4	Max. Output Torque	Nm	28,38	29,36	29,52	30,56	32,58	33,16
5	Recommended Input Speed	rpm	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm	4658	5968	6589	8307	8988	10919
7	Efficiency	%	≈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
9	Length (L)	mm	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

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
4	Max. Output Torque	Nm	40,54	44,02	46,06	46,26	44,48	52,76
5	Recommended Input Speed	rpm	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm	4658	5968	8307	8988	10919	8988
7	Efficiency	%	≈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
9	Length (L)	mm	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

Characteristics	
Item	
Backlash at 2% nominal output torque	≤30 arcmin
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



Specification		...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	1,7	1,5
4	Max. Output Torque	Nm	6,09	5,9	4,6
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		...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

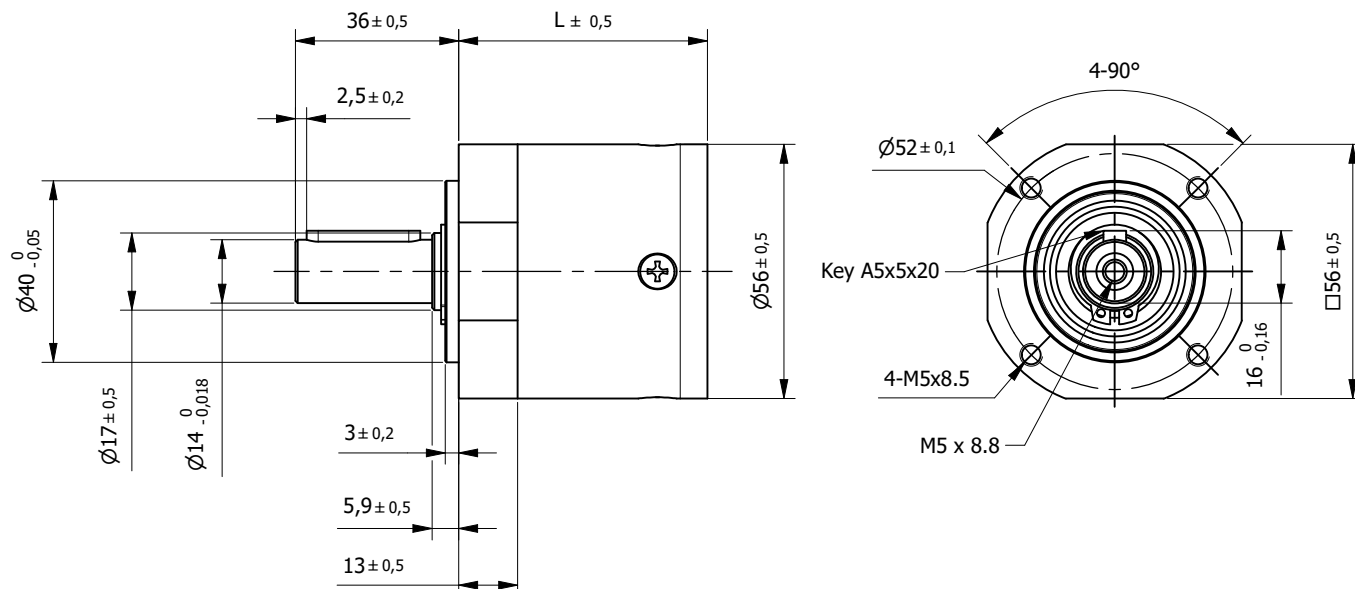
Characteristics	
Item	
Backlash at 2% nominal output torque	≤1° arcmin
Max. Radial load (middle of the key)	515N at n out=100rpm 355N at n out=300rpm 240N at n out=1000rpm
Max. Axial load (output shaft center)	1460N at n out=100rpm 935N at n out=300rpm 555N at n out=1000rpm
Max. Press fit force	500N
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
4	Max. Output Torque	Nm	28,38	29,36	29,52	30,56	32,58	33,16
5	Recommended Input Speed	rpm	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm	4658	5968	6589	8307	8988	10919
7	Efficiency	%	≈92%	≈92%	≈92%	≈92%	≈92%	≈92%
8	Moment of Inertia ≤φ8	kgmm²	15,06	5,48	4,67	3,13	2,6	2,27
9	Length (L)	mm	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

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
4	Max. Output Torque	Nm	40,54	44,02	46,06	46,26	44,48	52,76
5	Recommended Input Speed	rpm	3500	3500	3500	3500	3500	3500
6	Max. Input Speed	rpm	4658	5968	8307	8988	10919	8988
7	Efficiency	%	≈85%	≈85%	≈85%	≈85%	≈85%	≈85%
8	Moment of Inertia ≤φ8	kgmm²	8,7	5,04	3,81	2,51	2,19	2,46
9	Length (L)	mm	72	72	72	72	72	72
10	Weight	kg	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
4	Max. Output Torque	Nm	68
5	Recommended Input Speed	rpm	3500
6	Max. Input Speed	rpm	5968
7	Efficiency	%	≈78%
8	Moment of Inertia ≤φ8	kgmm²	6,446
9	Length (L)	mm	86
10	Weight	kg	1,1

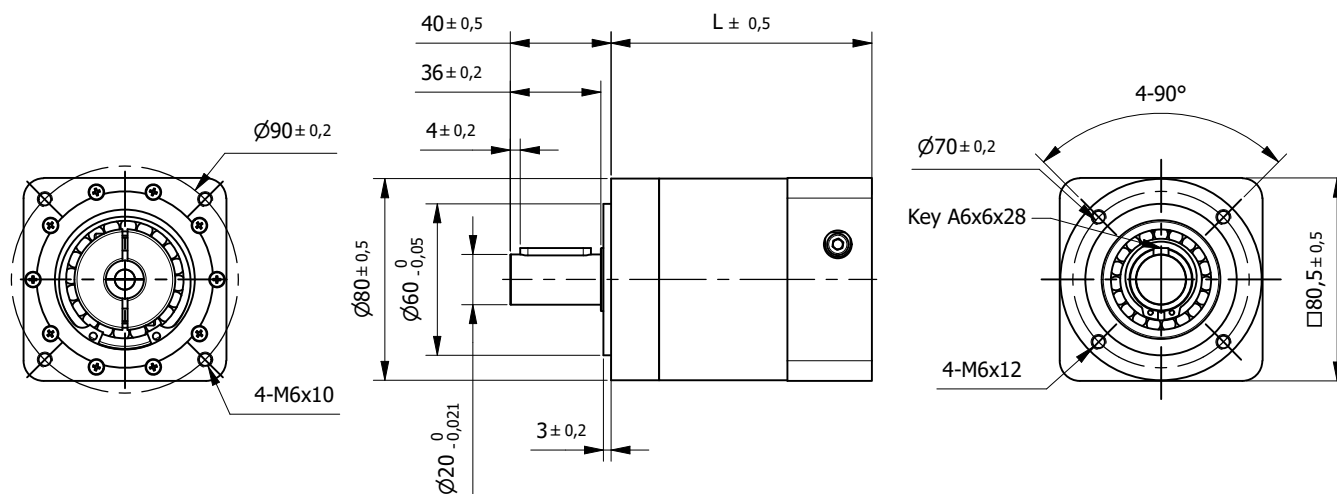
Characteristics	
Item	
Backlash	≤30 arcmin [1-2 stages]
at 2% nominal output torque	≤45 arcmin [3 stages]
Max. Radial load (middle of the key)	540N [711N 3-stage] at n out=100rpm 375N [493N 3-stage] at n out=300rpm 250N [330N 3-stage] at n out=1000rpm
Max. Axial load (output shaft center)	1630N [1931N 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	23
4	Max. Output Torque	Nm	80	82	84	66	46
5	Recommended Input Speed	rpm	3000	3000	3000	3000	3000
6	Max. Input Speed	rpm	3184	4342	5307	7000	7000
7	Efficiency	%	≈92%	≈92%	≈92%	≈92%	≈92%
8	Moment of Inertia ≤φ15	kgmm ²	74,51	64,96	60,74	28,17	53,37
9	Length (L)	mm	103,5	103,5	103,5	103,5	103,5
10	Weight	kg	2,1	2,1	2,1	2,1	2,1

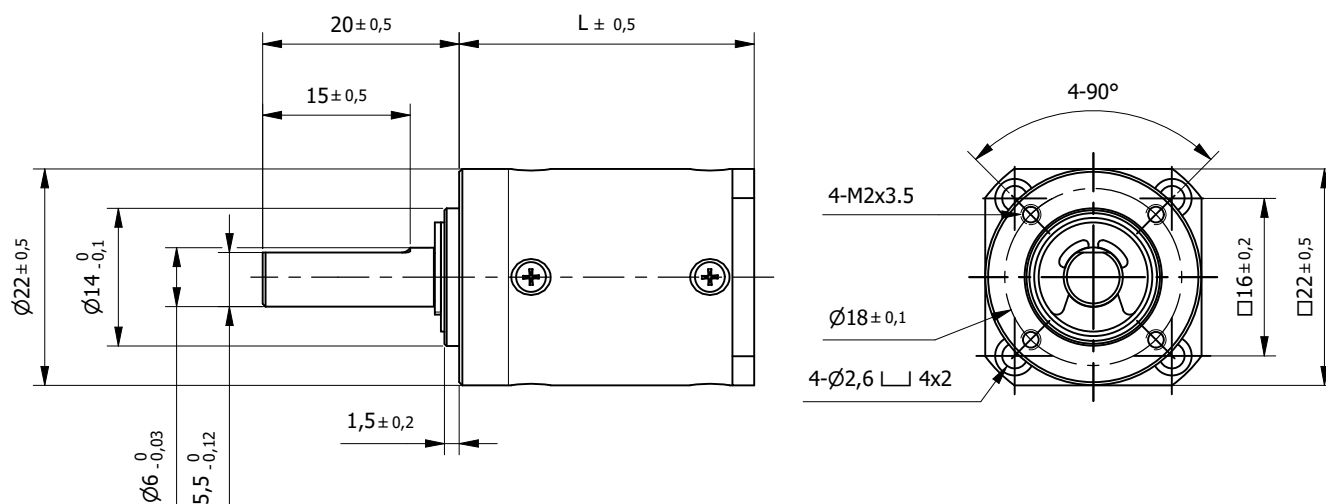
Specification		...2 / 11.1	...2 / 16.3	...2 / 20.4	...2 / 26.3	...2 / 30.7	...2 / 66.6
1	Stages	2	2	2	2	2	2
2	Reduction Ratio	11,111	16,296	20,444	26,278	30,75	66,625
3	Nominal Output Torque	Nm	42	56	57	58	67
4	Max. Output Torque	Nm	84	112	114	116	134
5	Recommended Input Speed	rpm	3000	3000	3000	3000	3000
6	Max. Input Speed	rpm	3184	3184	4342	5307	7000
7	Efficiency	%	≈85%	≈85%	≈85%	≈85%	≈85%
8	Moment of Inertia ≤φ15	kgmm ²	93,33	92,09	83,39	77,8	74,37
9	Length (L)	mm	129,0	129,0	129,0	129,0	129,0
10	Weight	kg	2,6	2,6	2,6	2,6	2,6

Characteristics	
Item	
Backlash at 2% nominal output torque	≤1°
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

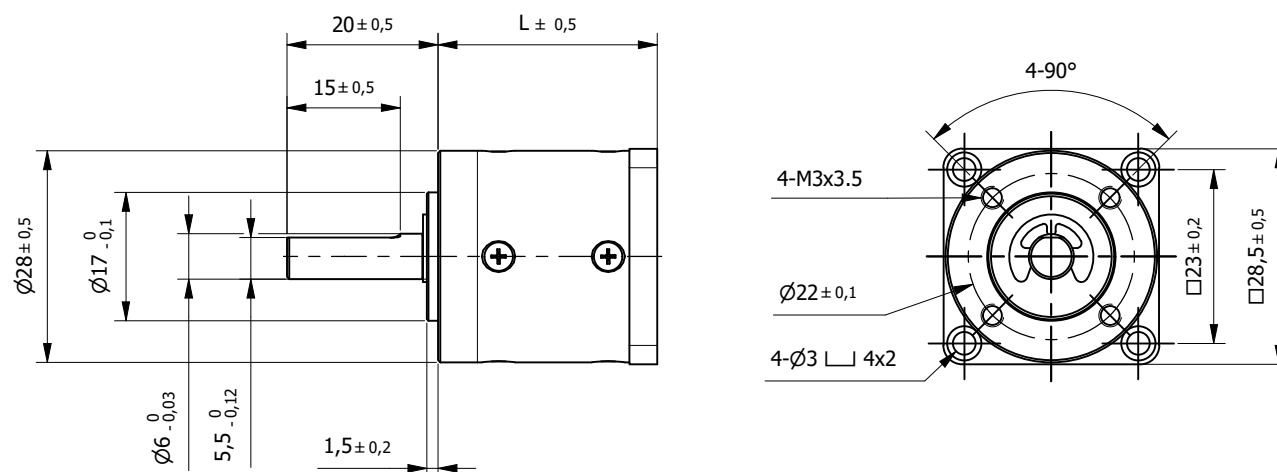
Planetary gearboxes - JMS Economy series		Torque* (Nm)
22JMS	0,6...2	392
28JMS	1,2...4	393
36JMS	2...6	394
42JMS	3...10	395
56JMS	9...30	396



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

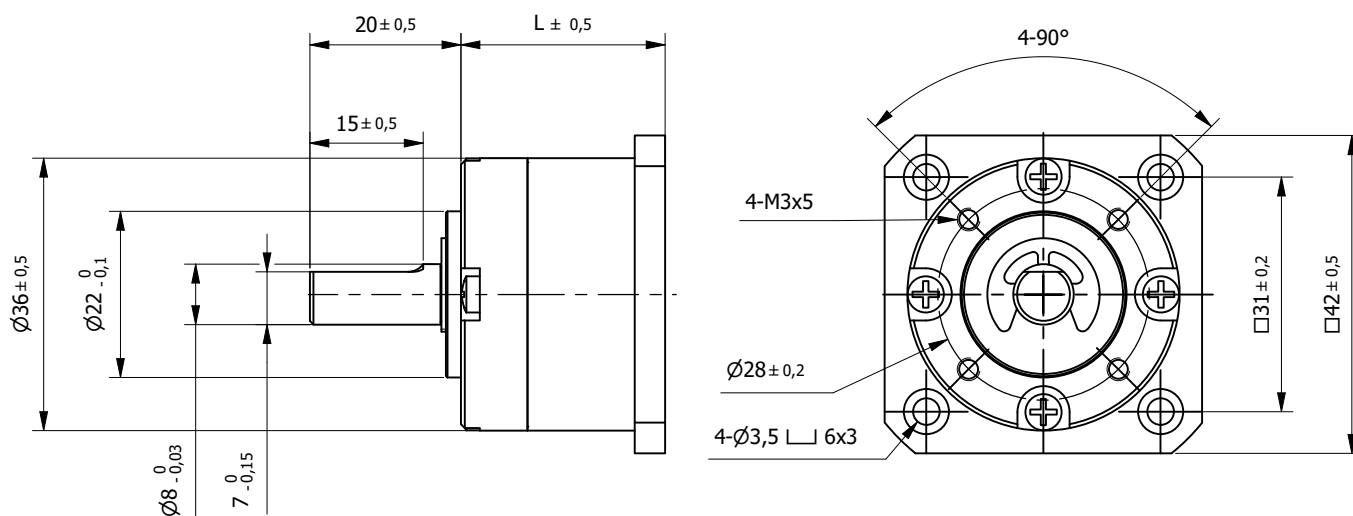
Characteristics	
Item	
Max. Radial load (middle of the key)	50N
Max. Axial load (output shaft center)	30N
Radial Play	<0,08mm
Axial Play	<0,3mm
Max. Press fit force	60N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



Specification		...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
4	Max. Output Torque	Nm	4	4	6	6
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	29,0	29,0	36,1	36,1
9	Weight	kg	0,075	0,075	0,097	0,097

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	4	4	4
4	Max. Output Torque	Nm	12	12	12
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	43	43	43
9	Weight	kg	0,119	0,119	0,119

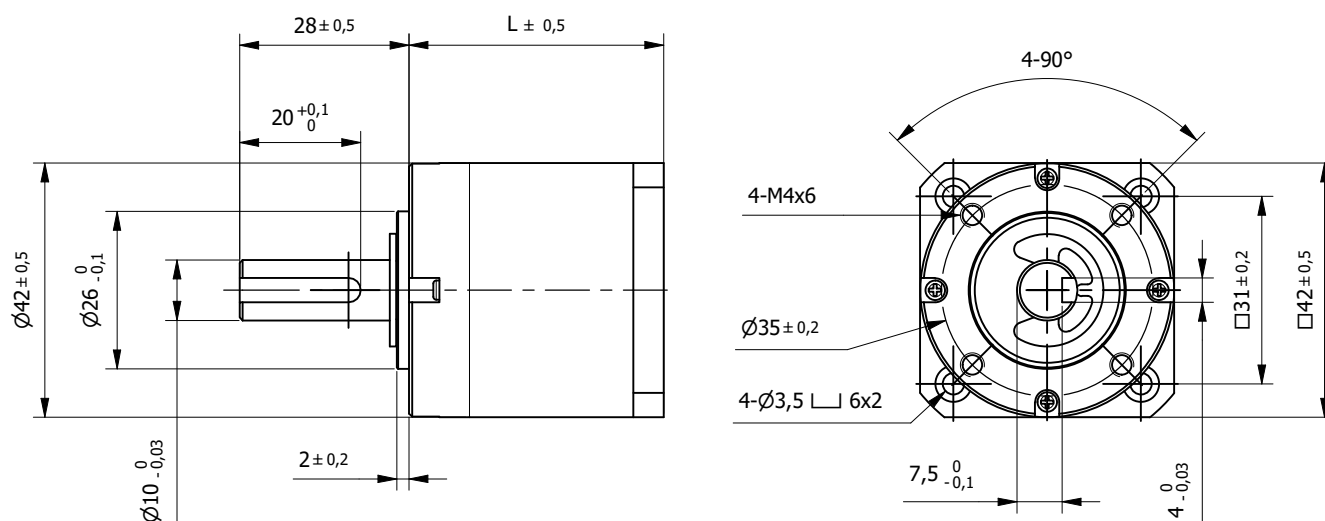
Characteristics	
Item	
Max. Radial load (middle of the key)	100N
Max. Axial load (output shaft center)	50N
Radial Play	<0,07mm
Axial Play	<0,3mm
Max. Press fit force	100N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



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	3
4 Max. Output Torque	Nm	6	6	9	9	9
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	27,0	27,0	34,2	34,2	34,2
9 Weight	kg	0,134	0,134	0,173	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	6
4 Max. Output Torque	Nm	18	18	18	18
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	41,1	41,1	41,1	41,1
9 Weight	kg	0,212	0,212	0,212	0,212

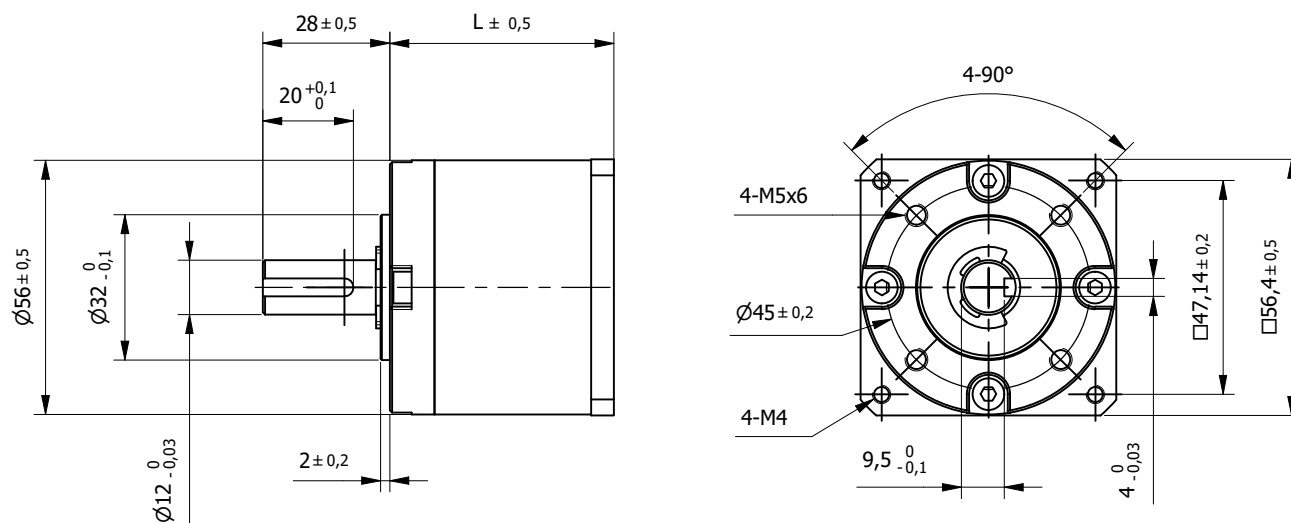
Characteristics	
Item	
Max. Radial load (middle of the key)	100N
Max. Axial load (output shaft center)	50N
Radial Play	<0,07mm
Axial Play	<0,3mm
Max. Press fit force	120N
Operating temperature	-20 to +80°C
Operating Ambient Humidity	20-80% RH
Bearing output	Ball bearings



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	3	5	5
4	Max. Output Torque	Nm	9	9	15	15
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	31,5	31,5	42,1	42,1
9	Weight	kg	0,208	0,208	0,290	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	10	10
4	Max. Output Torque	Nm	30	30	30
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	52,5	52,5	52,5
9	Weight	kg	0,372	0,372	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		...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	15	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°	≤1,2°	≤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		...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

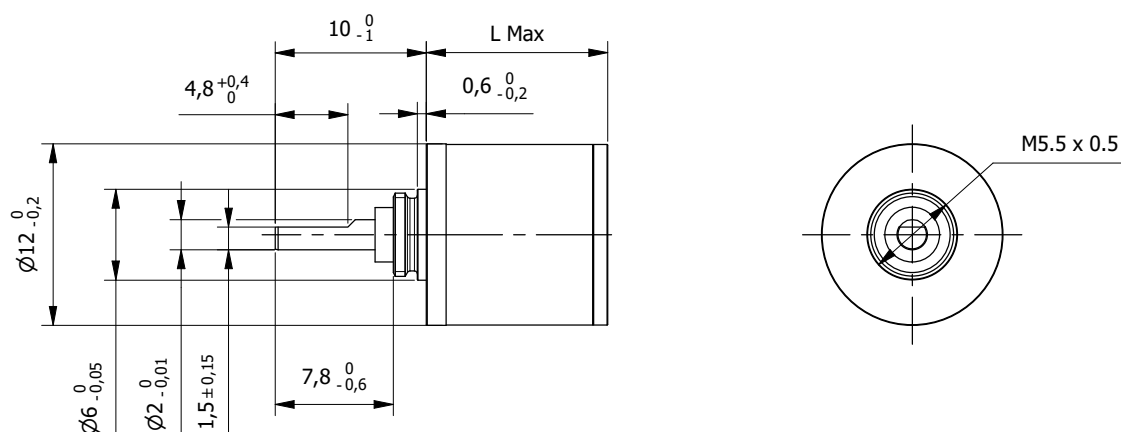
Spur gearboxes

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.

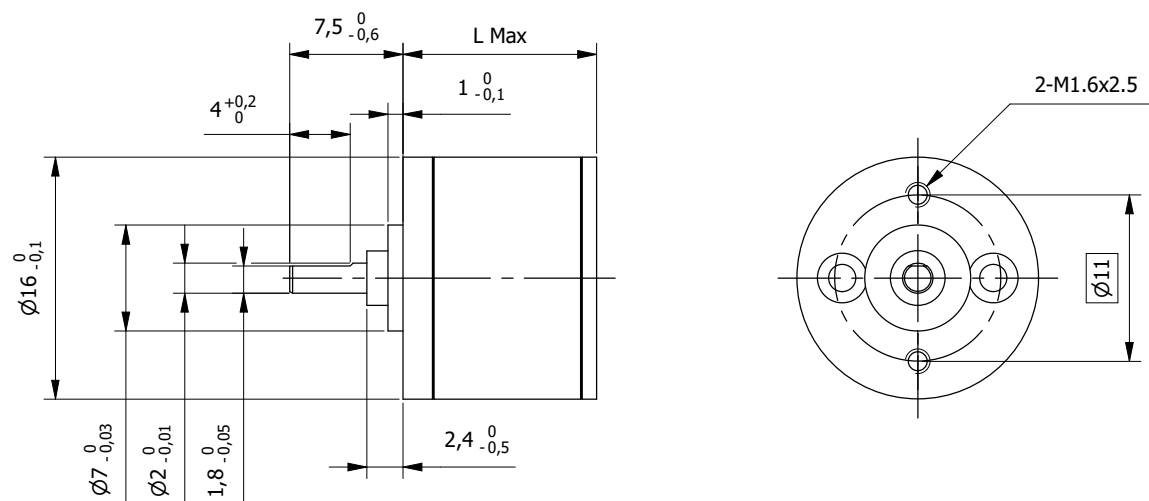
Spur gearboxes	Torque* (Nm)	
12GSS	0,01...0,025	400
16GSS	0,01...0,03	401
16GSP (plastic version)	0,01...0,03	402
16GST (reinforced)	0,06...0,1	403
24GSP	0,1	404

*Nominal Output Torque



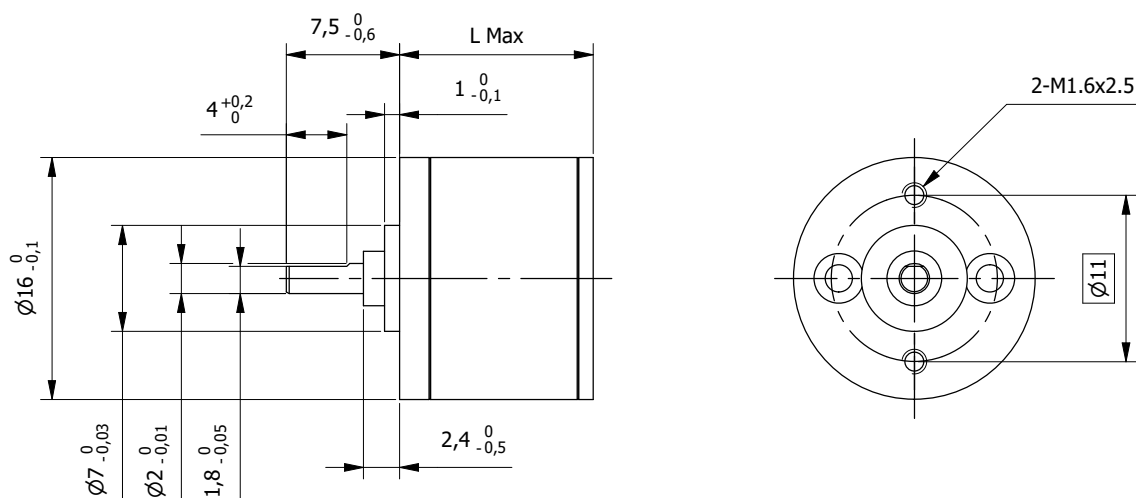
Specification					
Model		...2-6,4	...3-22	...4-76	...5-141
1 Stages		2	3	4	5
2 Reduction Ratio		6,4	22	76	141
3 Nominal Output Torque	Nm	0,01	0,015	0,02	0,025
4 Max. Output Torque	Nm	0,03	0,035	0,04	0,045
5 Recommended Input Speed	rpm	8000	8000	8000	8000
6 Efficiency	%	81	73	66	59
7 Mass Inertia	gcm ²	0,002	0,002	0,002	0,002
8 Average Backlash no-load	°	1	1	1,2	1,2
9 Max. Axial load (dynamic)	N	2	2	2	2
10 Max. Radial load (6,5mm from flange)	N	2	2	2	2
11 Length (L)	mm	10	12	14	16
12 Weight	g	6,5	7,4	8,3	9,2

Characteristics	
Item	
Max. Press fit force	30N
Operating temperature	-15 to +100°C
Bearing output	Sleeve bearings



Specification						
	Model	...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	0,015	0,025	0,035	0,035
4	Max. Output Torque	Nm	0,1	0,1	0,1	0,1
5	Recommended Input Speed	rpm	8000	8000	8000	8000
6	Efficiency	%	81	73	66	66
7	Mass Inertia	gcm²	0,003	0,003	0,003	0,003
8	Average Backlash no-load	°	1	1	1,2	1,2
9	Max. Axial load (dynamic)	N	2	2	2	2
10	Max. Radial load (6,5mm from flange)	N	2	2	2	2
11	Length (L)	mm	11,8	12,8	14,8	14,8
12	Weight	g	9	9,8	10,2	10,2

Characteristics	
Item	
Max. Press fit force	30N
Operating temperature	-15 to +100°C
Bearing output	Sleeve bearings

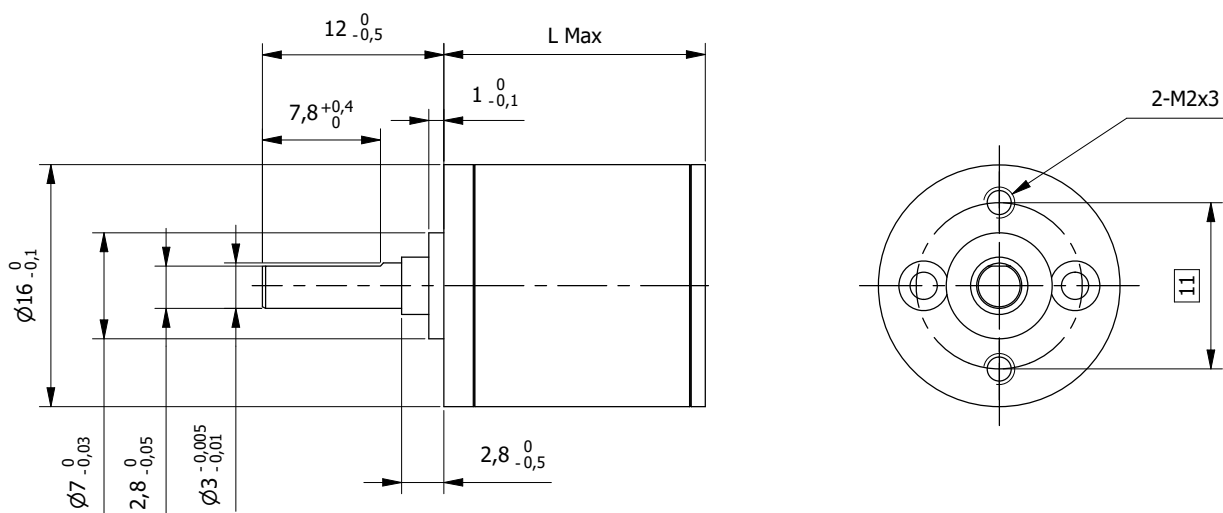


Specification			...2-6,4	...2-9,1	...3-31	...4-76	...4-141
1	Stages		2	2	3	4	4
2	Reduction Ratio		6,4	9,1	31	76	141
3	Nominal Output Torque	Nm	0,01	0,01	0,02	0,03	0,03
4	Max. Output Torque	Nm	0,1	0,1	0,1	0,1	0,1
5	Recommended Input Speed	rpm	8000	8000	8000	8000	8000
6	Efficiency	%	81	81	73	66	66
7	Mass Inertia	gcm ²	0,003	0,003	0,003	0,003	0,003
8	Average Backlash no-load	°	1	1	1	1,2	1,2
9	Max. Axial load (dynamic)	N	2	2	2	2	2
10	Max. Radial load (6,5mm from flange)	N	1	1	1	1	1
11	Length (L)	mm	11,8	11,8	12,8	14,8	14,8
12	Weight	g	9	9	9,8	10,2	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					
Model		...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
4	Max. Output Torque	Nm	0,15	0,15	0,3
5	Recommended Input Speed	rpm	8000	8000	8000
6	Efficiency	%	81	73	66
7	Mass Inertia	gcm ²	0,006	0,005	0,004
8	Average Backlash no-load	°	1	1	1,2
9	Max. Axial load (dynamic)	N	5	5	5
10	Max. Radial load (6,5mm from flange)	N	10	15	20
11	Length (L)	mm	14,3	17,3	19,3
12	Weight	g	13,8	14,5	15,8

Characteristics	
Item	
Max. Press fit force	5N
Operating temperature	-15 to +100°C
Bearing output	Ball bearings



Gearbox
Wheel Hub

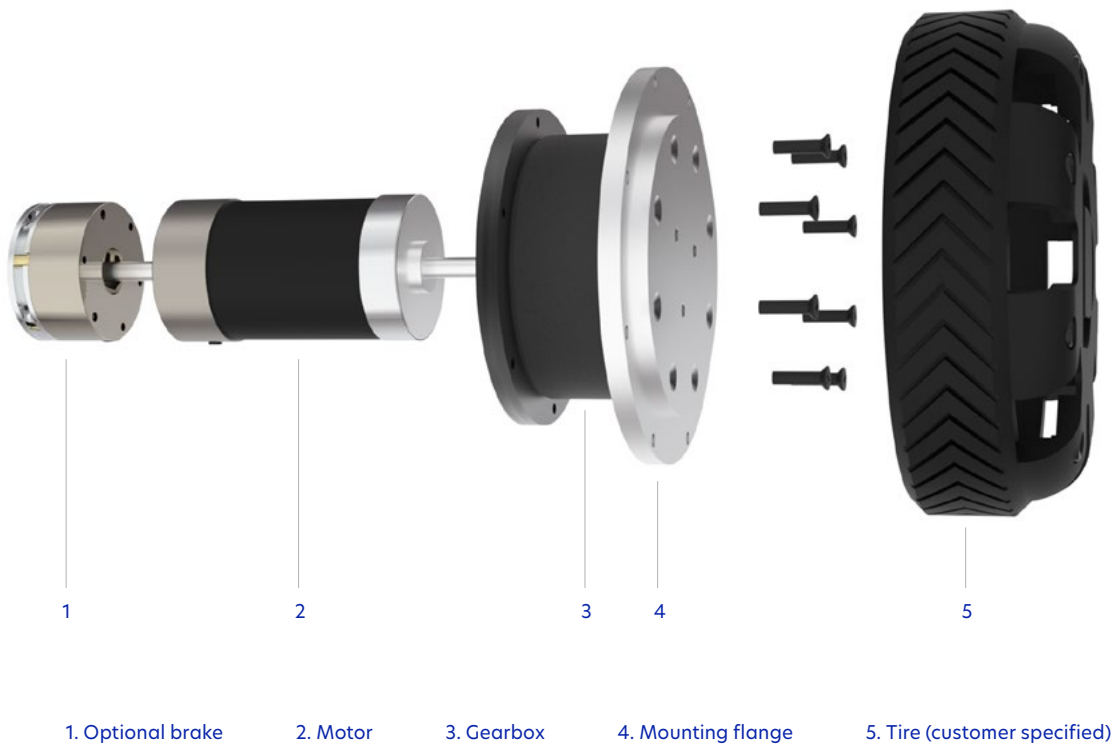
Advantages at a glance
Full modularity of components, including tire
Optimized weight and energy efficiency
Fully customizable mounting flange
Quality cost-effective solution
Payload from 75kg to 300kg per wheel

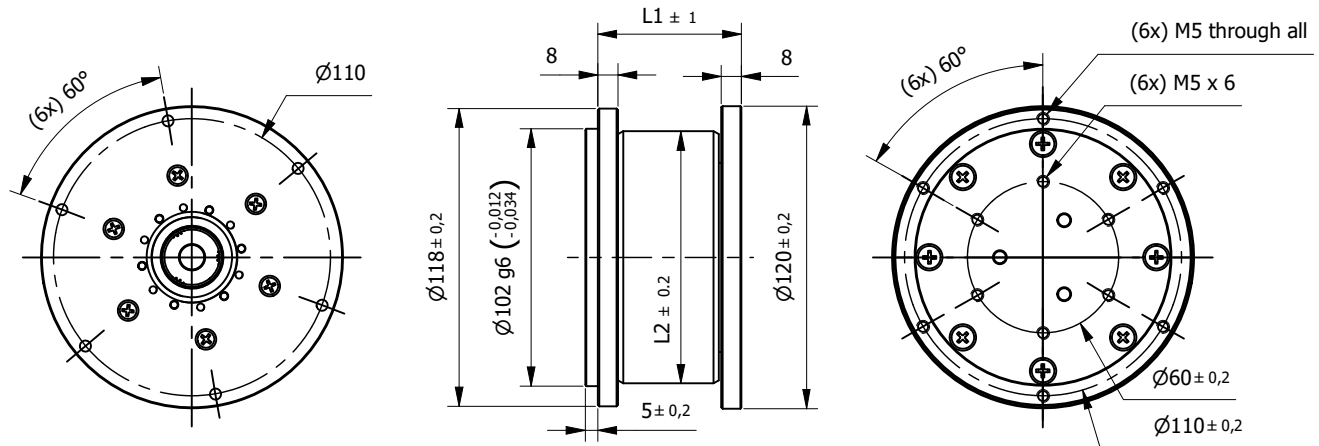
Wheel Hub gearboxes - NEW	Torque* (Nm)	
GPW56	7,73...26,48	408
GPW56 + 57BL03	9,17	409
GPW56 + 60BLWA38	4,5	410
GPW56 + IBI80 362	9,9	411

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





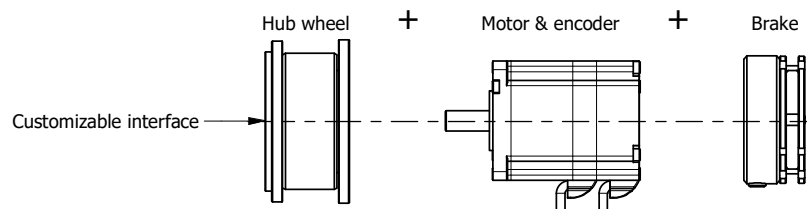
Front and back flange are fully customizable

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

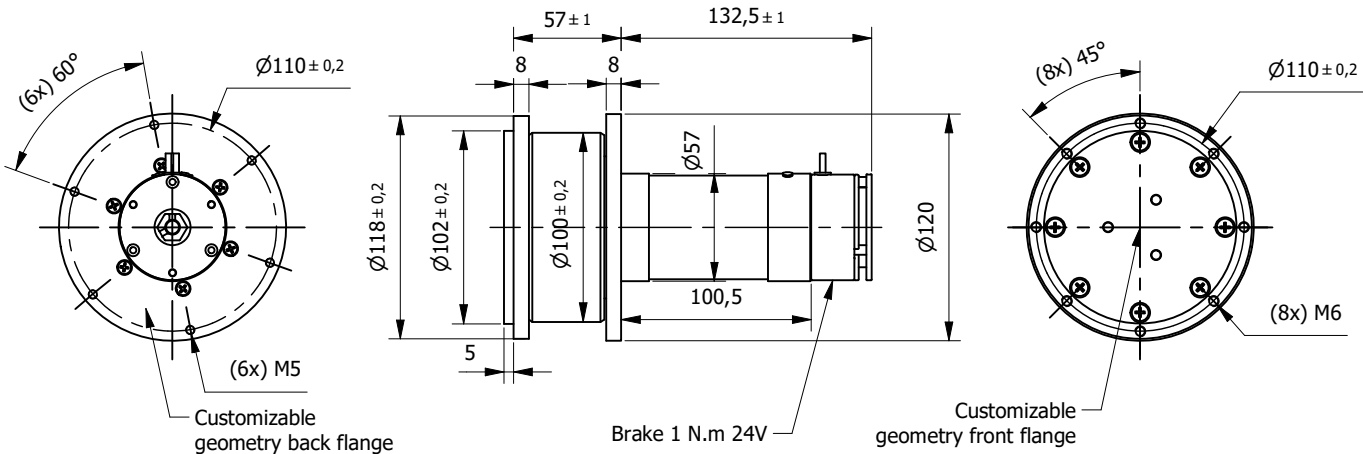


Wheel Hub GPW56 + 57BL03

Gearbox + BLDC motor + brake

Ø 100mm

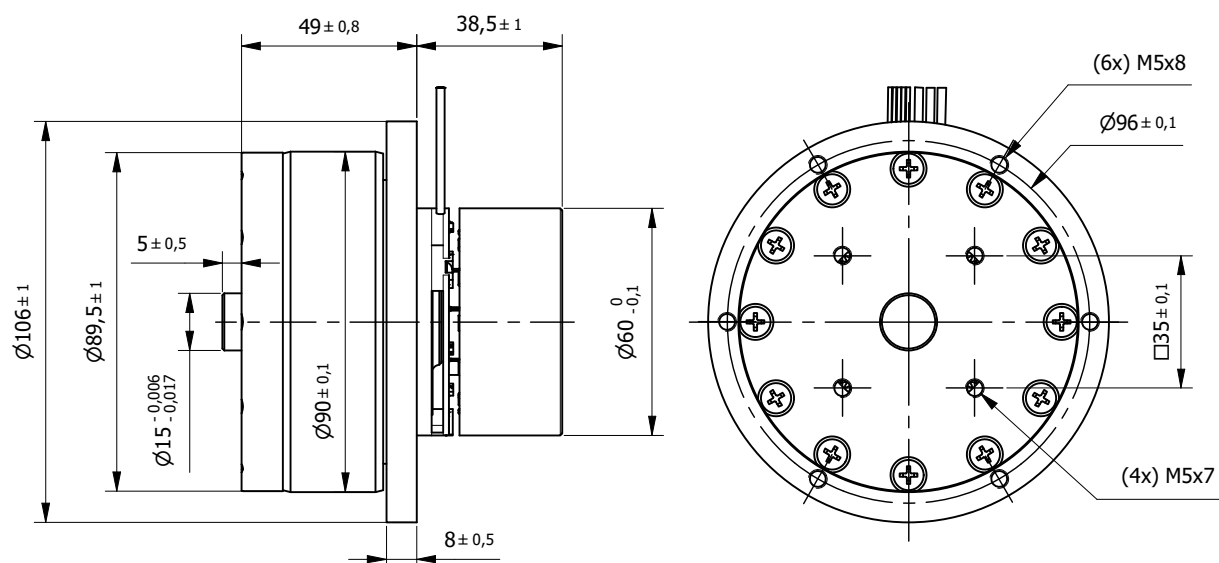
9,17Nm



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/s2	1,4
11	Acc max@ 200kg, 160mm Ø wheel	m/s2	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



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

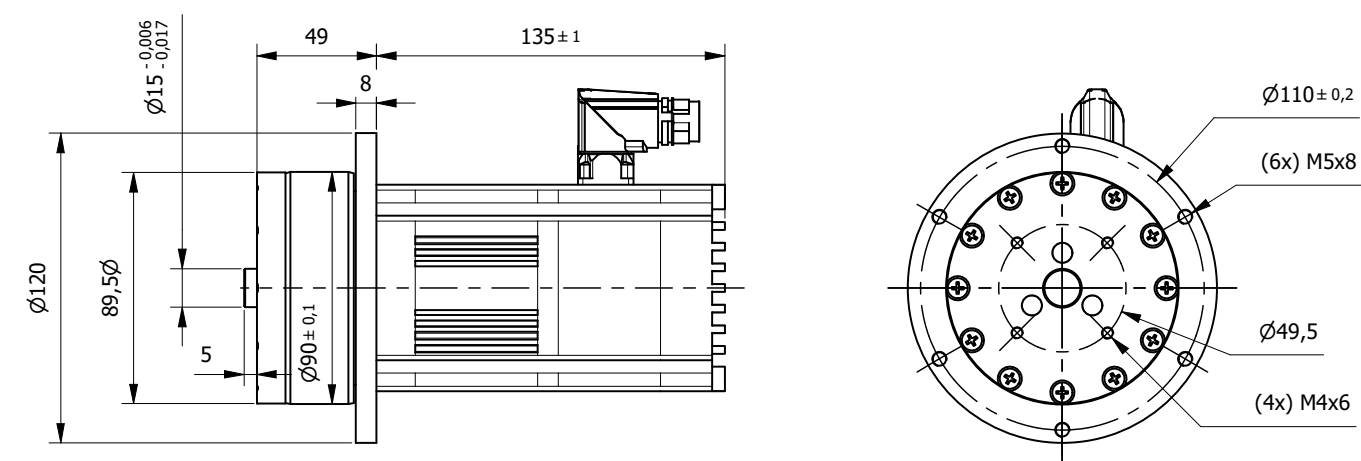
Wheel Hub

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/s2	0,4
11	Acc max@ 200kg, 160mm Ø wheel	m/s2	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

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.

Technical introduction	418
Incremental Encoders	415
E3 - Optical encoder - 3 channels	420
E4 - Optical encoder - 2 channels	421
E5 - Optical encoder - 3 channels	422

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

Technical introduction

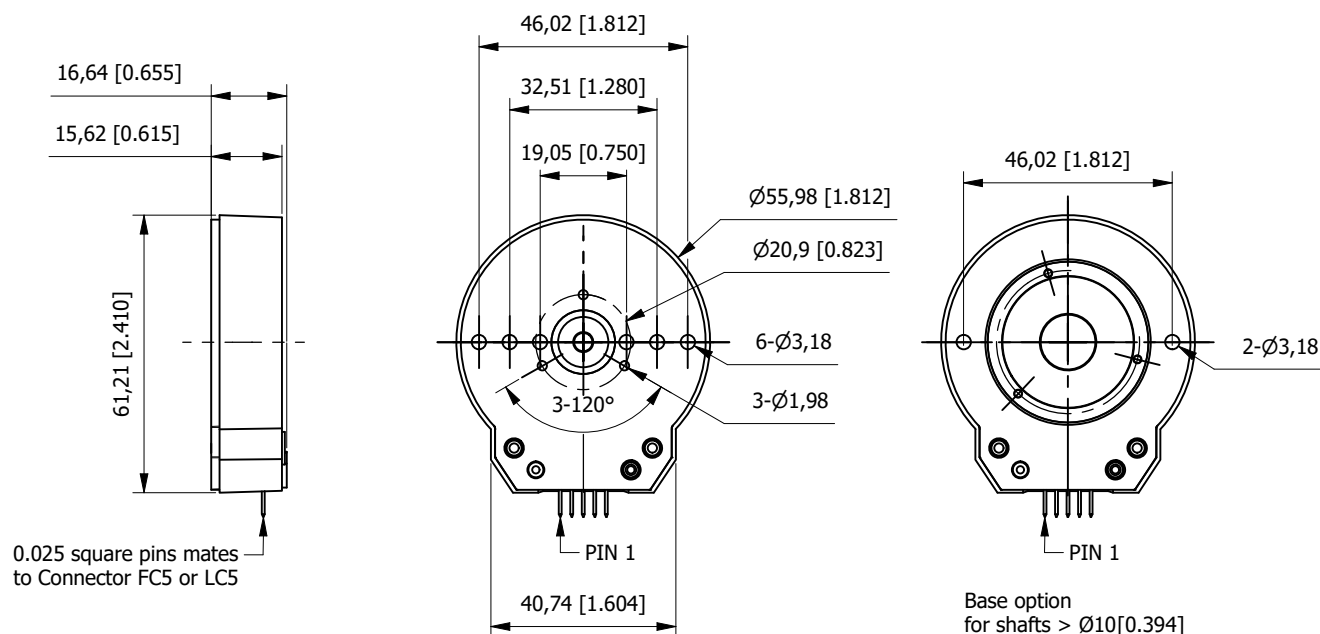
Composition

- | | |
|---|-------------------|
| 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

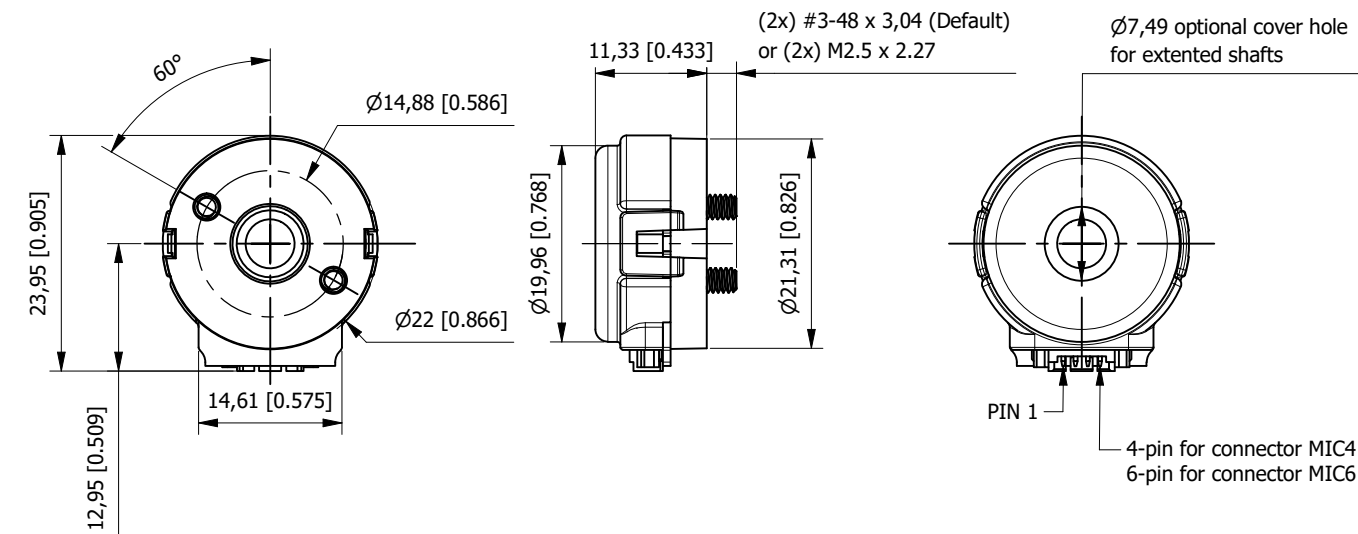
Electrical Specification		
Item		
Supply Voltage	V	5 ±10%
Supply Current (CPR ≤1000, no load)	mA	27-33
Supply Current (CPR ≥1000 and <3600, no load)	mA	54-62
Supply Current (CPR ≥3600, no load)	mA	72-85
Low Level Input	Vmax	0,5
High Level Input	Vmin	2
Output Rise Time (CPR <3600)	ns	110
Output Rise Time (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/s²	250'000
Codewheel Moment of Inertia (bore <12mm)	gcm²	6,285
Codewheel Moment of Inertia (bore ≥12mm)	gcm²	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							
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	Vmax	0,4	0,6
High Level Input	Vmin	2,4	4,75
Differential Output Voltage	Vmin	---	3
Output Rise Time	ns	100	20
Output Fall Time	ns	50	20
Phase shift	°e	90 ±60	90 ±60

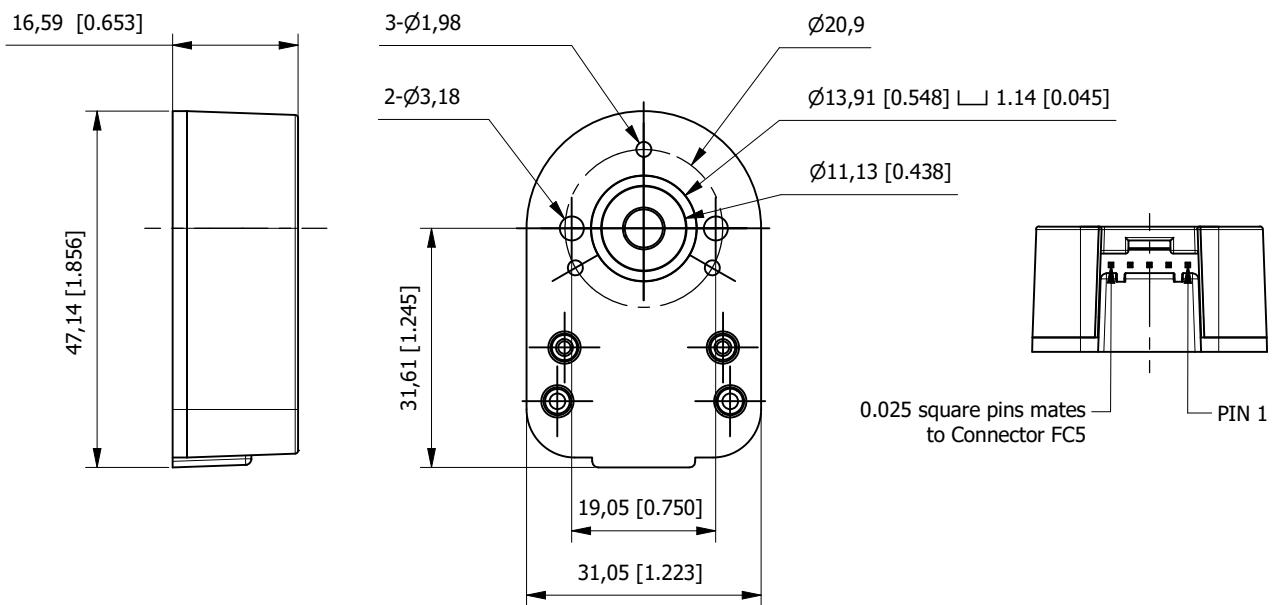
Connection		
Pin	Single-Ended	Differential
1	+5VDC power	Ground
2	A channel	A channel
3	Ground	A- channel
4	B channel	+5VDC power
5		B channel
6		B- channel
Mating Connector	CON-MIC4	CON-MIC6

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 $\pm$ 10%	5 $\pm$ 10%
Supply Current (CPR <500, no load)	mA	27-33	29-36
Supply Current (CPR $\geq$ 500 and <2000, no load)	mA	54-62	56-65
Supply Current (CPR $\geq$ 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	$\leq$ 20
Output Rise Time (CPR $\geq$ 2000, $\pm$ 5mA load)	ns	50	$\leq$ 20
Output Fall Time (CPR <2000, no load)	ns	100	$\leq$ 20
Output Fall Time (CPR $\geq$ 2000, $\pm$ 5mA load)	ns	50	$\leq$ 20
Phase shift	°e	90 $\pm$ 60	90 $\pm$ 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 $\geq$ 2000)	°C -25° to 100°
Max. Shaft Axial Play	mm $\pm$ 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.433



Brushless DC motor
Multi-Axis Controllers

p.437



Brushless AC motor
Controllers

p.441



Stepper motor
Controllers

p.445

Controllers – Drives

Technical introduction		430
BLDC motor Controllers	Current* (A rms)	433
Taurus	up to 3	434
Gemini	up to 10	435
Brushless DC motor Multi-Axis Drives - NEW	Current* (A rms)	437
Phoenix - B100O05	up to 3 (each motor)	438
Phoenix - B500B36	up to 12 (each motor)	439
Brushless AC motor Drives - NEW	Current* (A rms)	441
Scorpius	up to 3	442
Serpens	up to 5,2	443
Stepper motor Drives	Current* (A rms)	445
Orion	up to 3	446
Aries	up to 4,2	447
Aquarius SBD204	up to 4,2	448
Aquarius SBD207	up to 7,1	449
Libra SBA203 - NEW	up to 3	450
Libra SBD203	up to 3,2	451
Libra SBD205 - NEW	up to 5,5	452
Libra SBD/SBA207	up to 7,1	453
Sagittarius	up to 7,1	454
Andromeda	up to 8,5	455
Lyra - NEW	up to 3	456
Dorado - NEW	up to 8	457
Draco - NEW	up to 5,2	458

* 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 BLDC motors.

Our portfolio is divided in Brushless DC Drives for 3-phase BLDC motors with phase current up to 10Arms, Brushless DC Multi-Axis Drives able to simultaneously control up to three BLDC 3-phase motors with phase current up to 12Arms (each motor), Brushless AC Drives for 3-phase BLAC motors with phase current up to 5,2Arms and Stepper Drives for 2-phase Stepper motors suitable for DC and AC power supply and with a phase current up to 8,5Arms. 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 offers five fieldbuses: 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

Brushless DC motor Drives	Current* (Arms)	
Taurus	up to 3	434
Gemini	up to 10	435

Our Brushless DC Drives (Taurus and Gemini) are specifically developed for 3-phases brushless motors with phase current up to 10.0A rms. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

TAURUS	GEMINI
Benefits • Compact dimensions • Digital I/O and analogue input • Programmable	Benefits • Digital I/O and up to 2 analogue inputs • Programmable
Characteristics • Phase Current up to 3.0A rms • Power Supply: 12-36 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT	Characteristics • Phase Current up to 10.0A rms • Power Supply: 12-48 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP

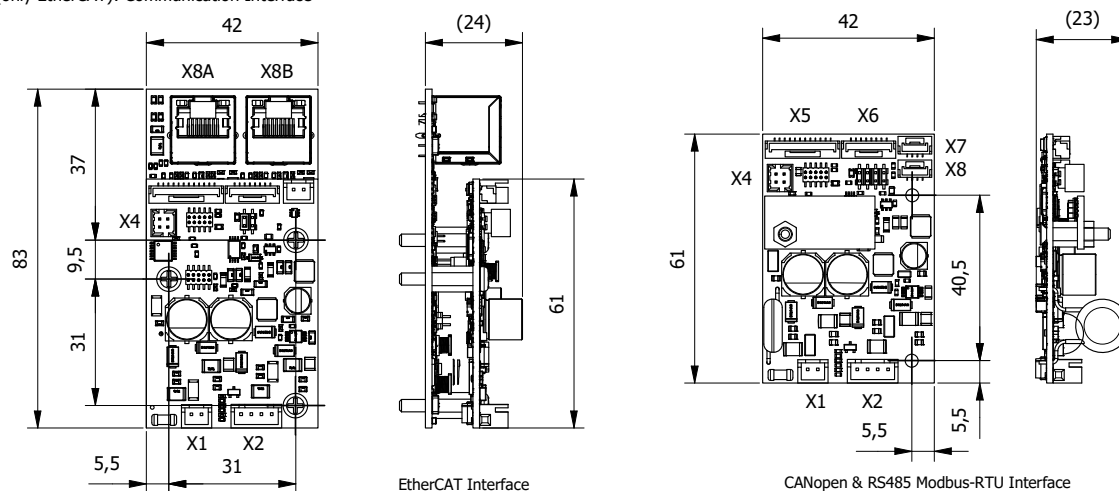
* Phase Current

Drive for BLDC Motor Taurus B025O04

Motion Controller

up to 3A rms

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	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	...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				

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)			

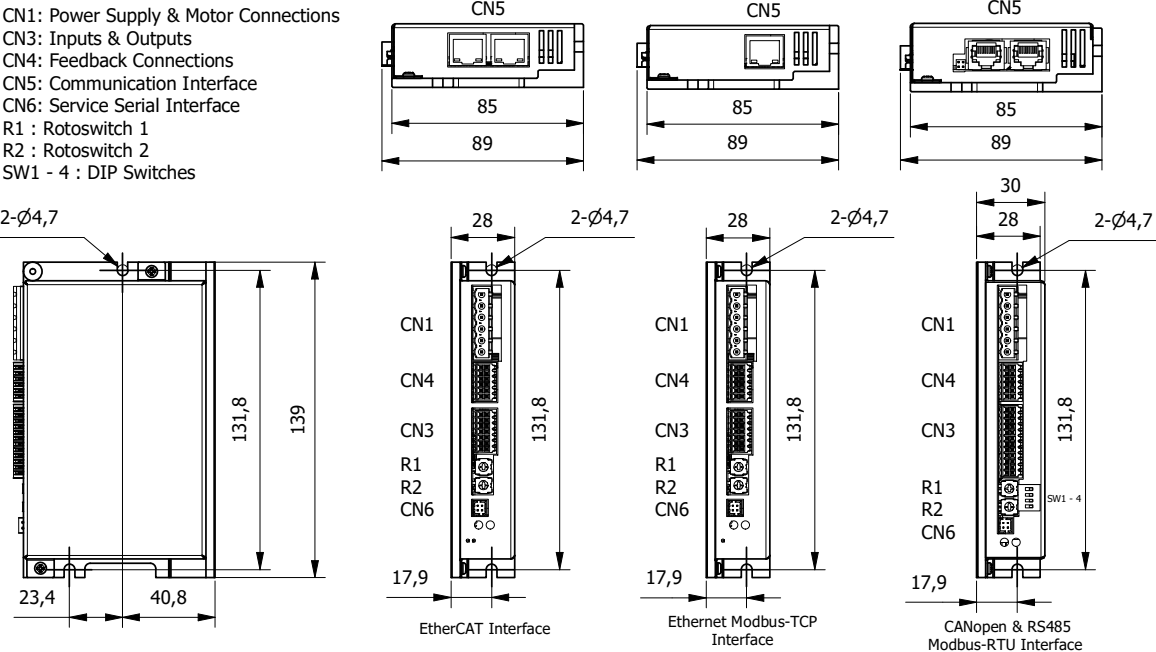
Cable and connector kit available on request. More information can be found in the product manual on our website

Standard Combination

Motor
All motor with Phase Current up to 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



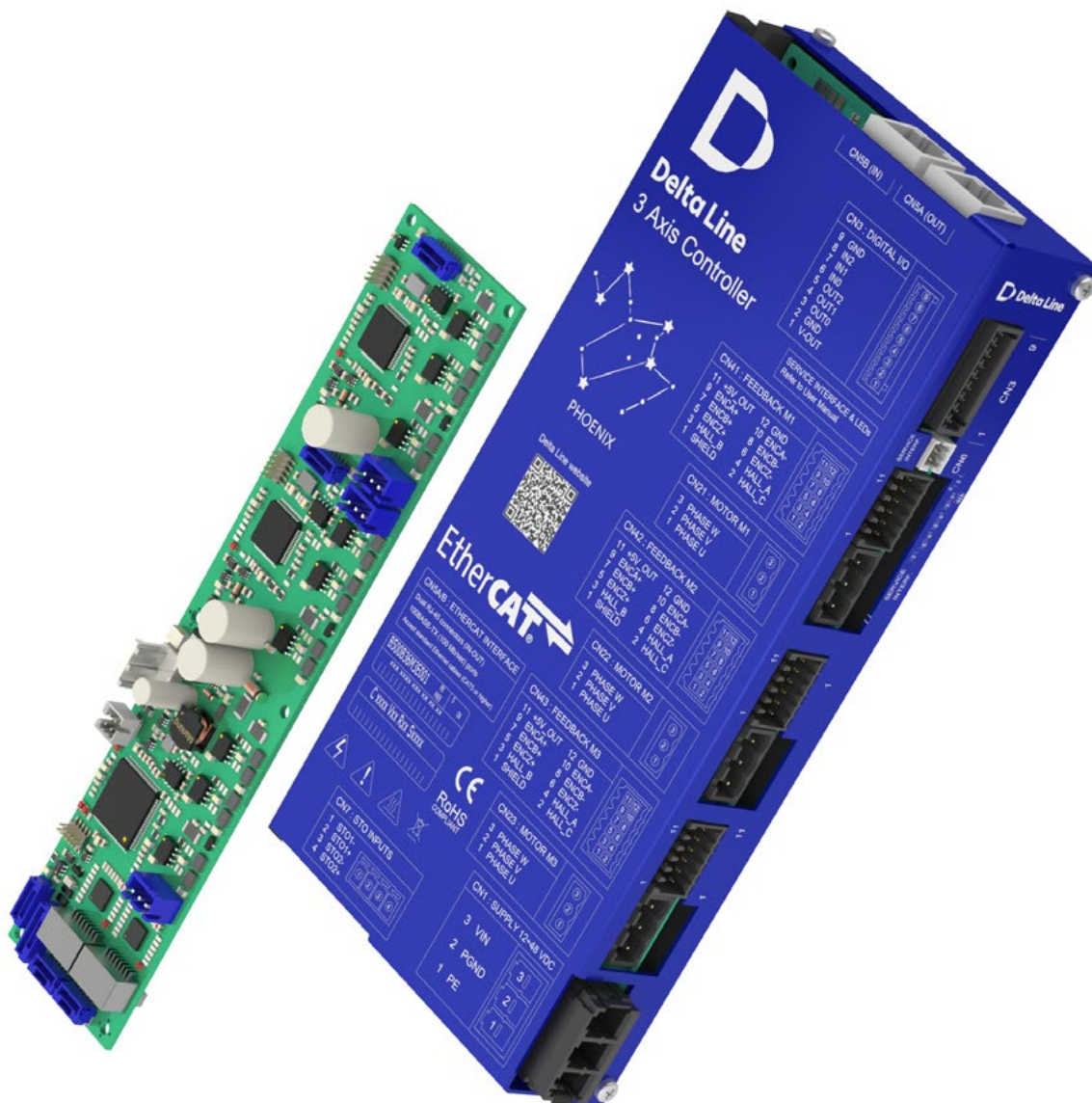
Electrical Data			
Item			
1	Phase Current	A rms	up to 10
2	Peak Current	A peak	28 (for 5s.)
3	Power Supply	VDC	12÷48
4	Logic Power Supply (optional)	VDC	12÷48
5	Motor Power	W	up to 400
6	Chopper Frequency	kHz	40

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					
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 10A rms	



BLDC motor Multi-Axis Controllers — Drives

Advantages at a glance
Position, Speed and Torque control
EtherCAT fieldbus
Flexible configuration

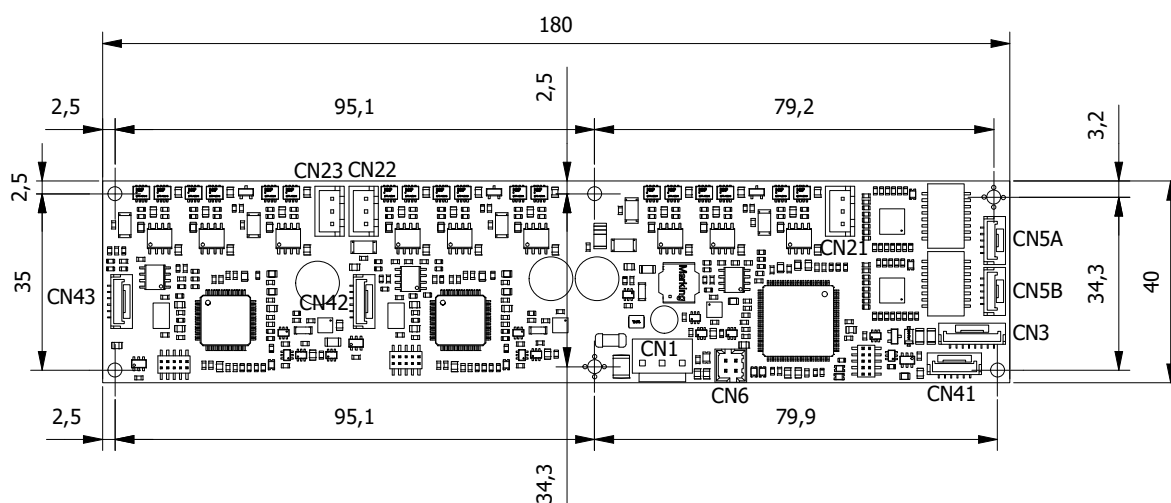
Our Brushless Multi-Axis Drives (Phoenix B100 and Phoenix B500) are specifically developed to simultaneously control up to three BLDC 3-phase motors with phase current up to 12Arms (each motor). All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

BLDC motor Multi-Axis Drives - NEW	Current* (Arms)	
Phoenix - B100O05	up to 3 (each motor)	438
Phoenix - B500B36	up to 12 (each motor)	439

PHOENIX B100	PHOENIX B500
Benefits	Benefits
• Compact dimensions • Digital I/O • Simultaneous control of up to 3 motors/axis	• Compact dimensions • Digital I/O • Simultaneous control of up to 3 motors/axis
Characteristics	Characteristics
• Phase Current up to 3Arms for each motor • Power Supply: 12-48VDC • Fieldbus: EtherCAT	• Phase Current up to 12Arms 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	
	3
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	...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	...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		

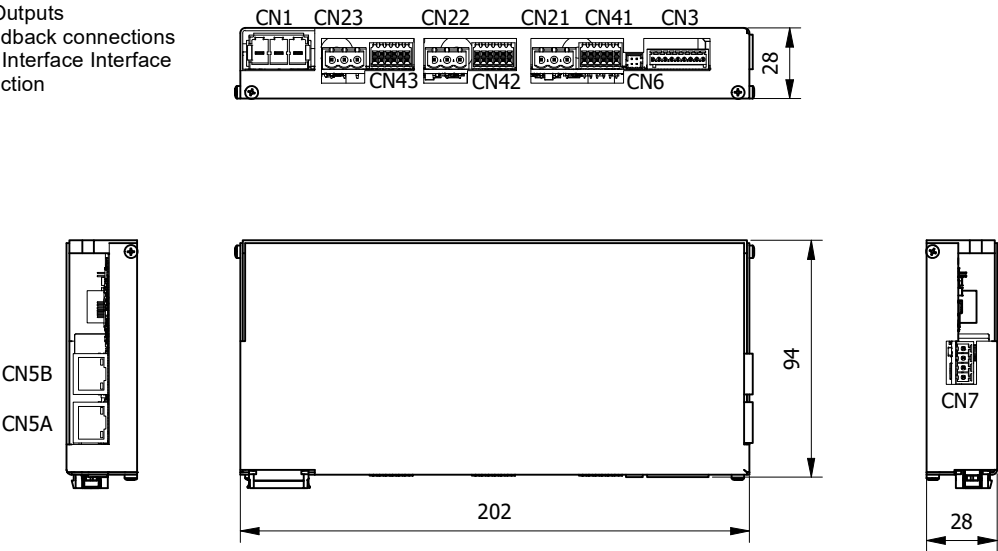
Cable and connector kit available on request. More information can be found in the product manual on our website

Drive for BLDC Motor Phoenix B500B36M3

3-Axis Motion Controller

up to 12 Arms
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



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	...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	...E001-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
Cable and 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 - NEW	Current* (Arms)
Scorpius	up to 3 442
Serpens	up to 5,2 443

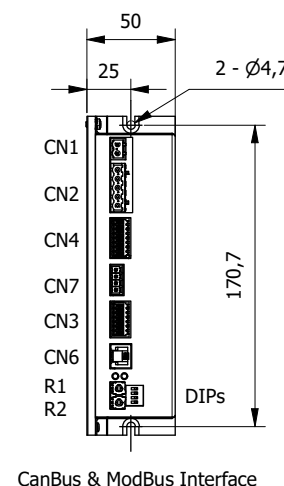
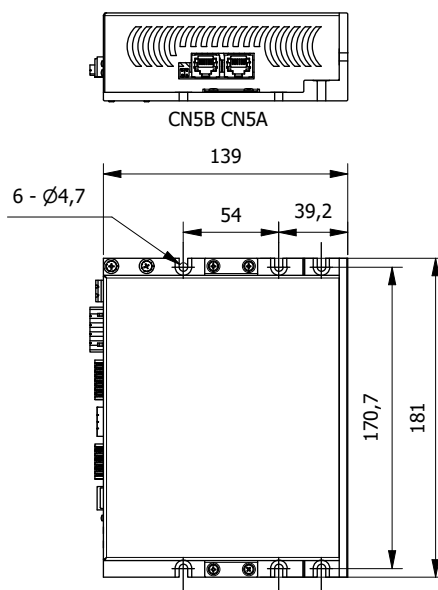
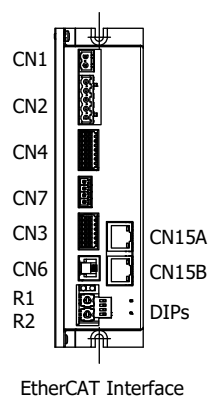
Our Brushless AC Drives (Scorpius and Serpens) are specifically developed to control AC power supplied 3-phase brushless motors with phase current up to 5,2Arms. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

SCORPIUS	SERPENS
Benefits • Compact dimensions • Digital I/O • Programmable	Benefits • Compact dimensions • Digital I/O • Programmable
Characteristics • Phase Current up to 3Arms • Power Supply: 100-240 VAC • Fieldbus: RS485 Modbus RTU, CANopen and EtherCAT	Characteristics • Phase Current up to 5,2Arms • 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)		

Cable and connector kit available on request. More information can be found in the product manual on our website

Standard Combination

Motor

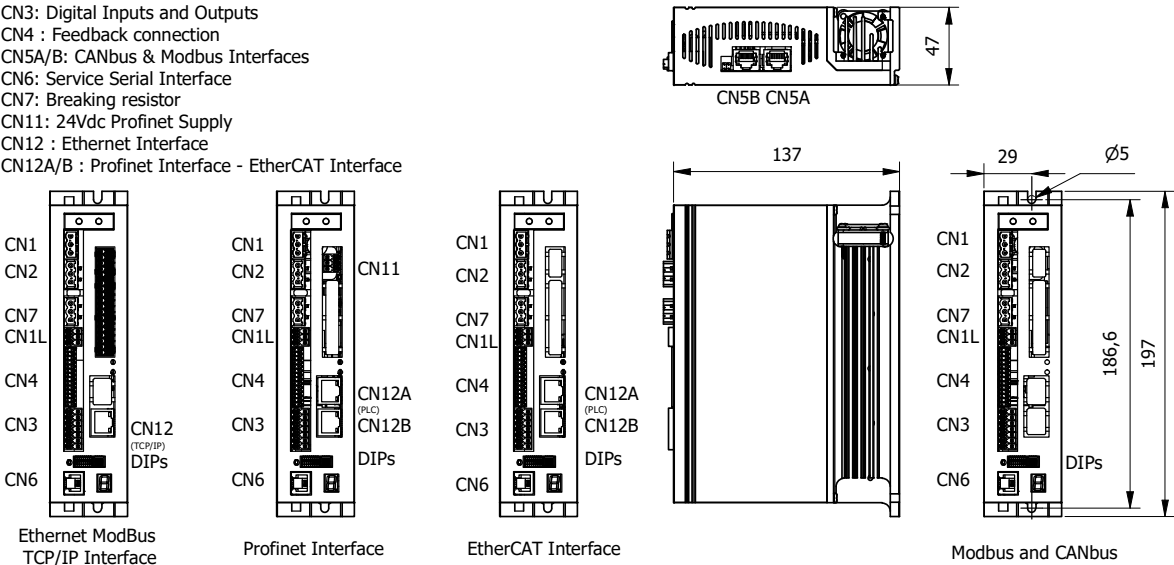
All motor with Phase Current up to 3A rms

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	85÷265 (mono or triphase)	
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)				
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 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* (Arms)
Orion	up to 3 446
Aries	up to 4,2 447
Aquarius SBD204	up to 4,2 448
Aquarius SBD207	up to 7,1 449
Libra SBA203 - NEW	up to 3 450
Libra SBD203	up to 3,2 451
Libra SBD205 - NEW	up to 5,5 452
Libra SBD/SBA207	up to 7,1 453
Sagittarius	up to 7,1 454
Andromeda	up to 8,5 455
Lyra - NEW	up to 3 456
Dorado - NEW	up to 8 457
Draco - NEW	up to 5,2 458

ORION	LYRA	LIBRA
Benefits	Benefits	Benefits
• Compact dimensions • Digital I/O • Programmable	• Digital I/O • Programmable	• Price performance • Simple usage • Programmable
Characteristics	Characteristics	Characteristics
• Phase Current up to 3Arms • Power Supply: 12-36 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT	• Phase Current up to 3Arms • Power Supply: 100-240 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Clock&Direction	• Phase Current up to 7,1Arms • Power Supply: 12-80VDC or 18-240 VAC • Clock & Direction control

ARIES	AQUARIUS	DRACO
Benefits	Benefits	Benefits
• Compact dimensions • Simple usage	• Digital I/O and up to 2 analogue inputs • Programmable	• Digital I/O and up to 1 analogue inputs • Programmable
Characteristics	Characteristics	Characteristics
• Phase Current up to 4,2Arms • Power Supply: 12-48 VDC • Fieldbus: EtherCAT	• Phase Current up to 7,1Arms • Power Supply: 12-48 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet	• Phase Current up to 5,2Arms • Power Supply: 85-265 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet

SAGITTARIUS	DORADO	ANDROMEDA
Benefits	Benefits	Benefits
• Digital I/O and up to 2 analogue inputs • Programmable • AC or DC power supply	• Digital I/O and up to 1 analogue inputs • Programmable	• Digital I/O and up to 2 analogue inputs • Programmable • AC or DC power supply
Characteristics	Characteristics	Characteristics
• Phase Current up to 7,1Arms • Power Supply: 18-56 VAC or 24-80 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP	• Phase Current up to 8Arms • Power Supply: 85-120 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet	• Phase Current up to 8,5Arms • Power Supply: 18-100 VAC or 24-140 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP

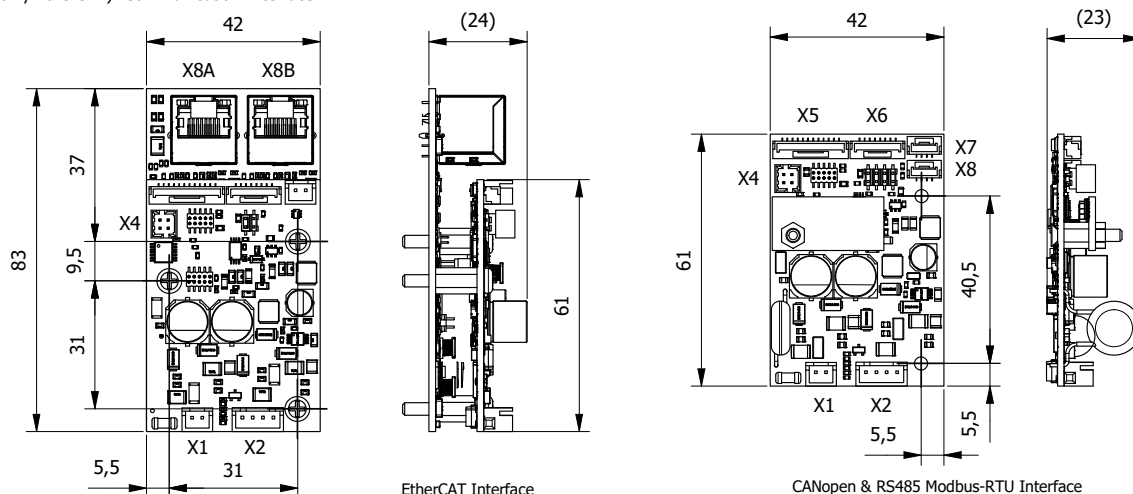
* Phase Current

Drive for Stepper Motor Orion SOD203

Motion Controller

up to 3A rms

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	Chopper Frequency	kHz	40

Characteristics

Item

Weight	120g
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	...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				

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 and connector kit available on request. More information can be found in the product manual on our website

Standard Combination

Motor

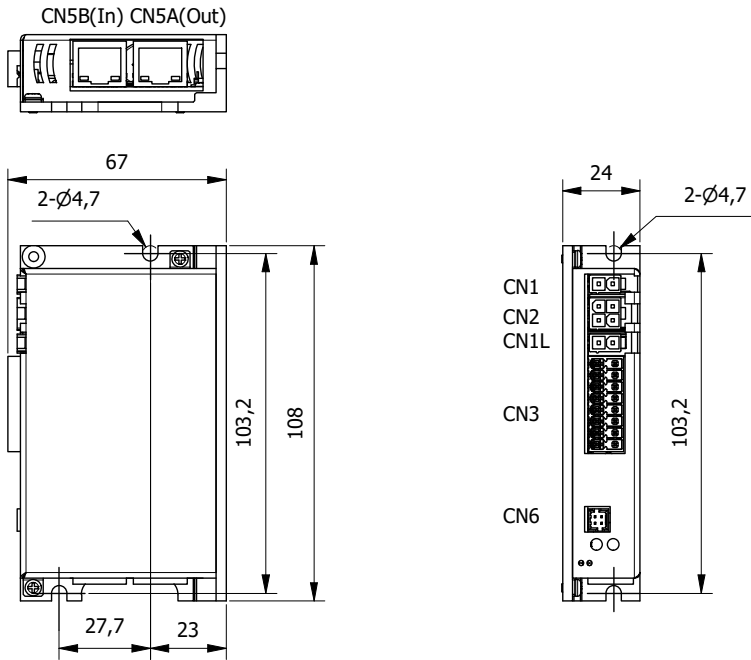
All motor with Phase Current up to 3A rms

Drive for Stepper Motor Aries SBD204

Motion Controller

up to 4,2A rms

- 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	
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	
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	

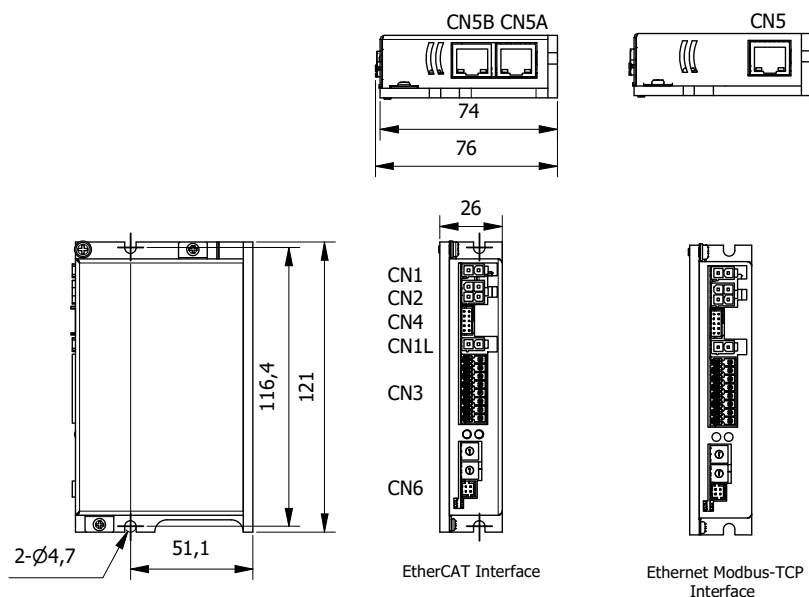
Standard Combination	
Motor	
All motor with Phase Current up to 4,2A rms	

Drive for Stepper Motor Aquarius SBD204

Motion Controller

up to 4,2A rms

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		

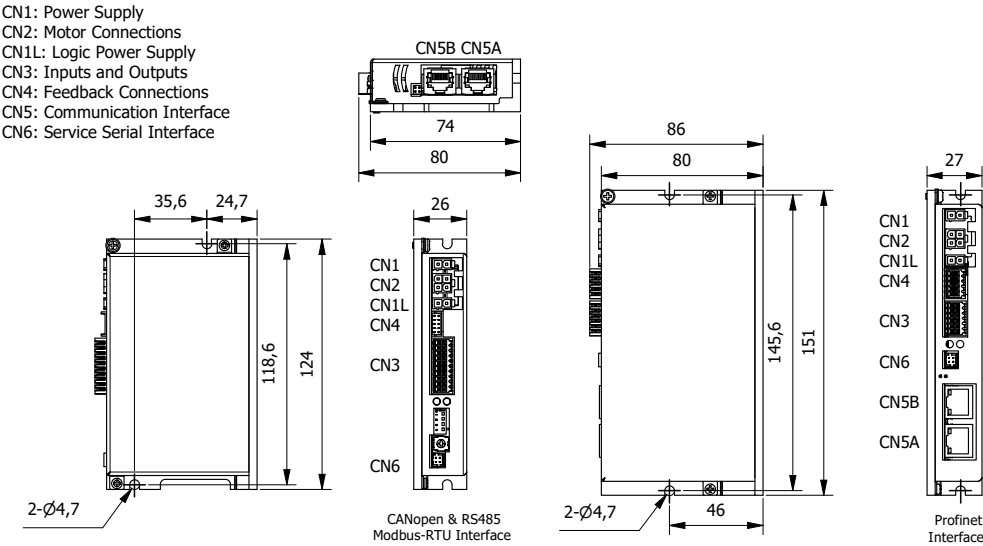
Connection		
Model	...T001-S200	...E002-S402
Digital Inputs (opto-isolated)	4	4
Digital Outputs (opto-isolated)	2	2
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder	
Encoder Output	5V Differential (RS422) (not isolated)	
Cable and connector kit available on request. 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	

Drive for Stepper Motor Aquarius SBD207

Motion Controller

up to 7,1A rms



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

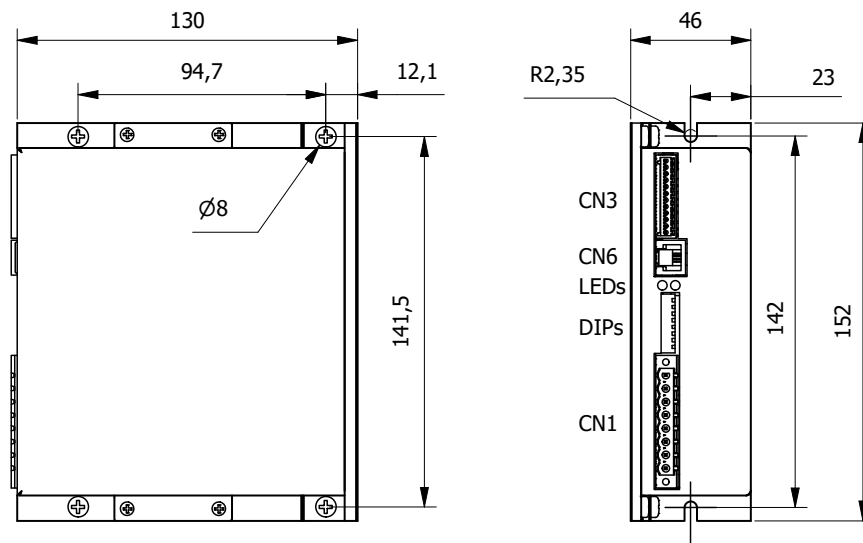
Interface Control Mode				
Model	...M001-S200	...C001-S200	...P001-S200	...C001-S402
Fieldbus	RS485 Modbus RTU	CANopen	Profinet	CANopen
Programmable	Programming and real time debugging			Only configuration
Software	DL Space			DL Studio
Operating mode	Step resolution: Stepless Control Technology (65536 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			
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 - High voltage

CN1: Power Supply
CN3: Inputs and Outputs
CN6: Service SCI Interface



Electrical Data

Item			
1	Phase Current	A rms	up to 3
2	Peak Current	A peak	4,2
3	Power Supply	VAC	100÷240
6	Chopper Frequency	kHz	40

Characteristics

Item	
Weight	800g
Closed-loop	NOT Available
Protections	Over/under-voltage, over current, overheating, short circuit between motor phase to phase and phase to ground
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

Item	
Control Mode	Clock & Direction
Operating mode	Step resolution: from Fullstep to 1/10 step (emulated)

Note: Service SCI Interface cable is available on request

Connection

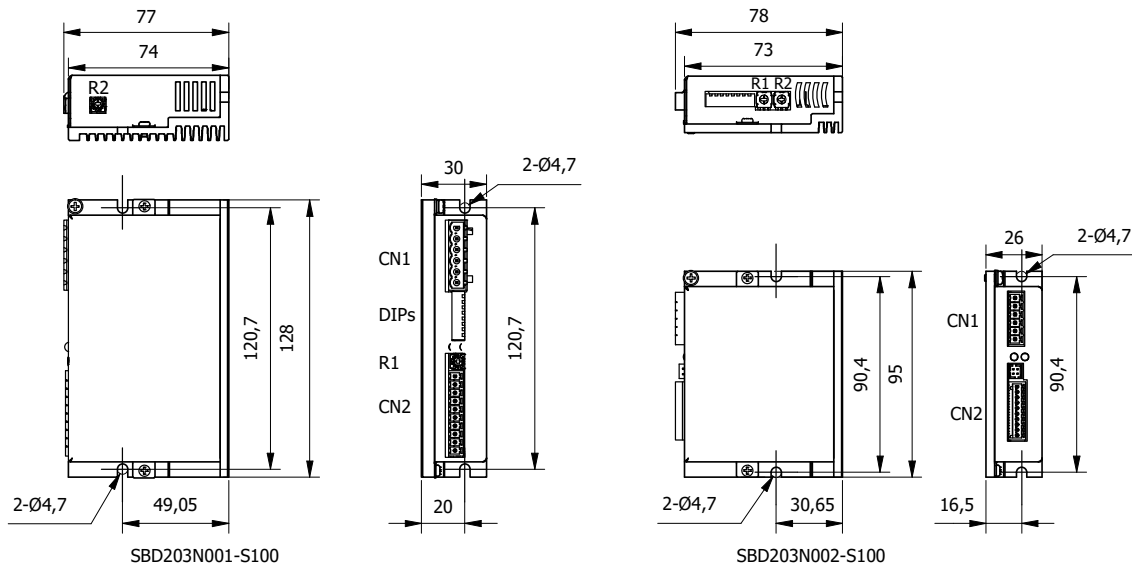
Model	
Model	...N001 - S100
Digital Inputs	4
Digital Outputs	1
Analog Inputs	-

Cable and 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 3A rms	

CN1: Power Supply
CN2: Digital Inputs and Outputs



Electrical Data				
Model		...N001-S100		...N002-S100
1	Phase Current	A rms	up to 3	up to 3,2
2	Peak Current	A peak	4,2	4,5
3	Power Supply	VDC	12÷36	24÷80
4	Chopper Frequency	kHz	40	40

Characteristics	
Item	
Weight	290g (...N001-S100) 200g (...N002-S100)
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	
Item	
Control Mode	Clock & Direction
Operating mode	Step resolution: from Fullstep to 1/256 step (emulated)
Note: Service SCI Interface cable is available on request	

Connection		
Model	...N001 - S100	...N002-S100
Digital Inputs	4	4
Digital Outputs	1	1
Analog Inputs	-	-
Cable and connector kit included. More information can be found in the product manual on our website		

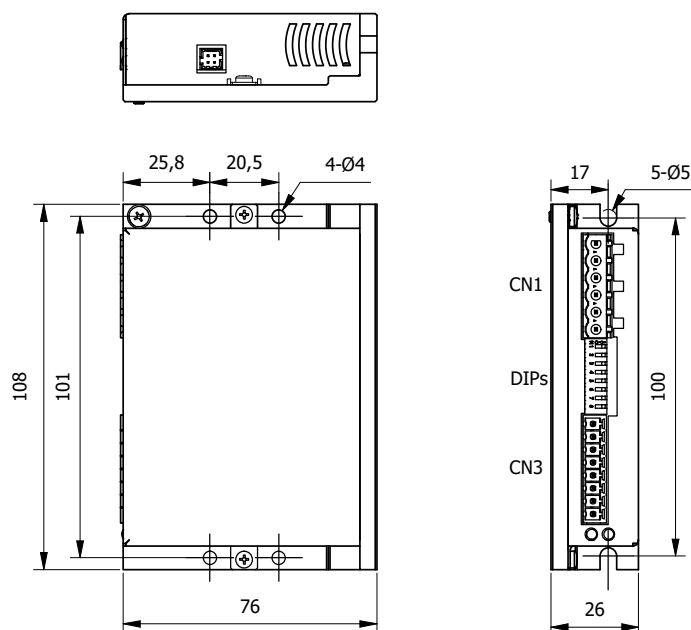
Standard Combination	
Motor	
All motor with Phase Current up to 3,2A rms	

Drive for Stepper Motor Libra SBD205

Motion Controller

up to 5,5A rms

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	...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	...N001-S100
Digital Inputs (opto-coupled)	3 (used for clock & direction)
Digital Outputs (opto-coupled)	1 (used for clock & direction)
Analog Inputs	-

Cable and connector kit included. More information can be found in the product manual on our website

Standard Combination

Motor

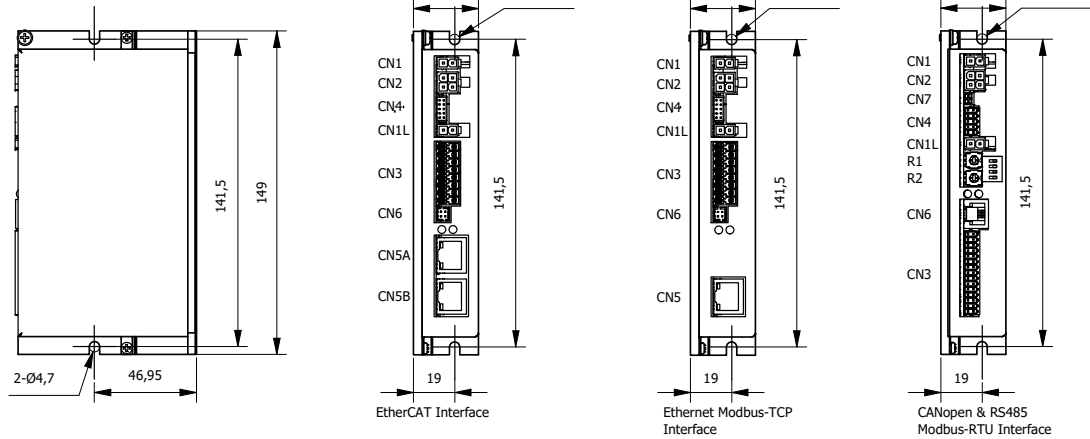
All motor with Phase Current up to 5,5A rms

Drive for Stepper Motor Sagittarius SBA207

Motion Controller

up to 7,1A rms

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	...EA02-S402
Fieldbus	Ethernet ModBus TCP	RS485 Modbus RTU	CANopen	CANopen	EtherCAT	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

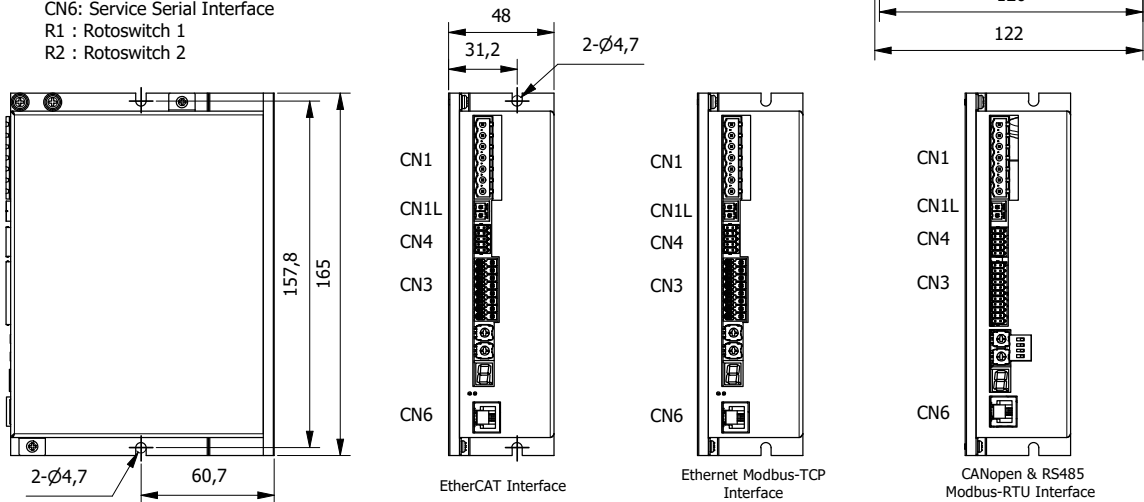
Model	...T001-S200	...M001-S200	...C001-S200	...C001-S402	...E001-S402	...EA02-S402
Digital Inputs (opto-coupled)	4	4	4	4	4	4
Digital Outputs (opto-coupled)	2	2	2	2	2	2
Analog Inputs	---	2	2	2	---	---
Encoder Input	5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) incremental encoder (not isolated)					5V BiSS-C or SSI absolute encoder
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

- 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

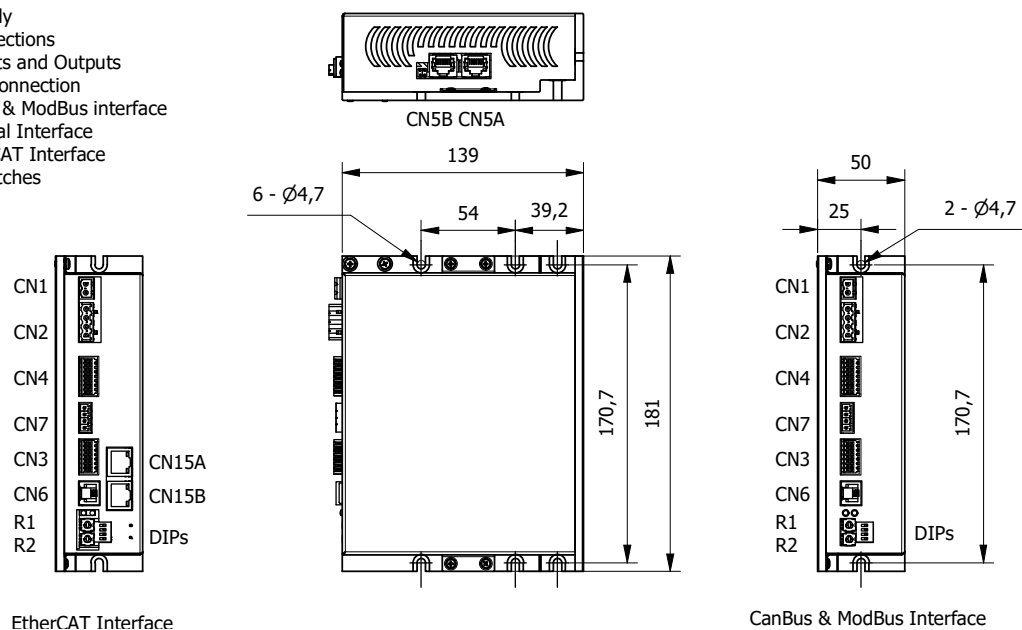
Interface Control Mode					
Model	...T001-S200	...M001-S200	...C001-S200	...C001-S402	...E001-S402
Fieldbus	Ethernet ModBus TCP	RS485 Modbus RTU	CANopen	CANopen	EtherCAT
Programmable	Programming and real time debugging			Only configuration	
Software	DL Space			DL Studio	
Operating mode	Step resolution: 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)				
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 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 3,0
2	Peak Current	A peak	4,2
3	Power Supply	VAC	100÷240

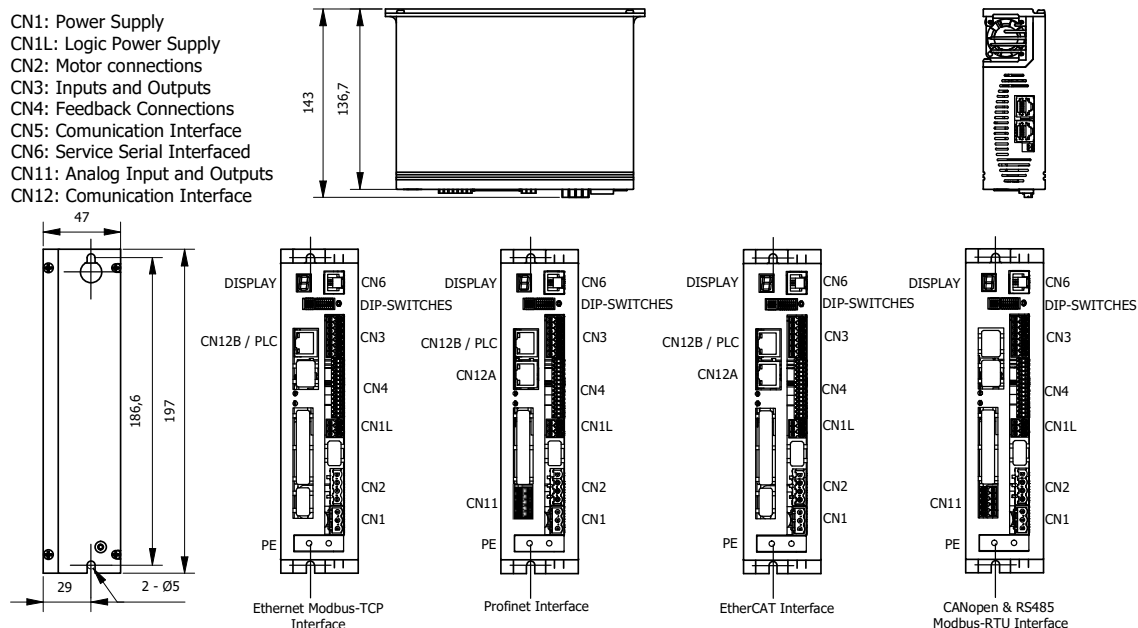
Characteristics	
Item	
Weight	800g
Closed-loop	Available
Protections	Over current, Over/Under Voltage, Overheating, Short circuit
Protection Class	IP20
Pollution Degree	2
Category	C3 following standard EN 61800-3
Temperatures	Working: 5°C ÷ 50°C Storage -25°C ÷ 55°C
Humidity	5% ÷ 85% not condensing
Safety feature	Safe Torque Off (STO) SIL3/PLe

Interface Control Mode				
Model	...L001-S200	...L001-S402	...E001-S402	...N001-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)			Clock & Direction
Note: Service SCI Interface cable is required for programming and available on request				

Connection				
Model	...L001-S200	...L001-S402	...E001-S402	...N001-S402
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)			
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 3A rms	

Motion Controller - High voltage



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

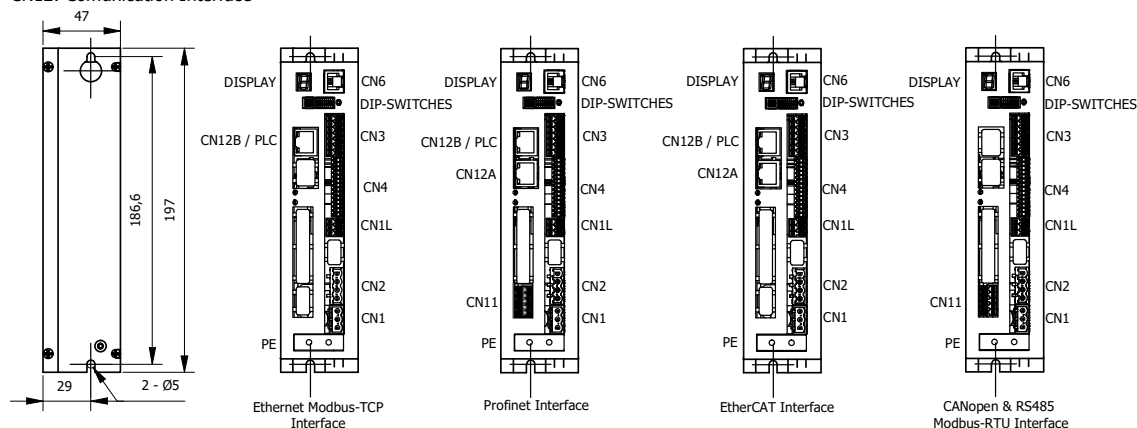
Interface Control Mode					
Model	...L001-S200	...T001-S200	...P001-S200	...L001-S402	...E001-S402
Fieldbus	RS485 Modbus RTU & CANopen	Ethernet ModBus TCP	Profinet	CANopen	EtherCAT
Programmable	Programming and real time debugging			Only configuration	
Software	DL Space			DL Studio	
Operating mode	Step 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)				
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 8A 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

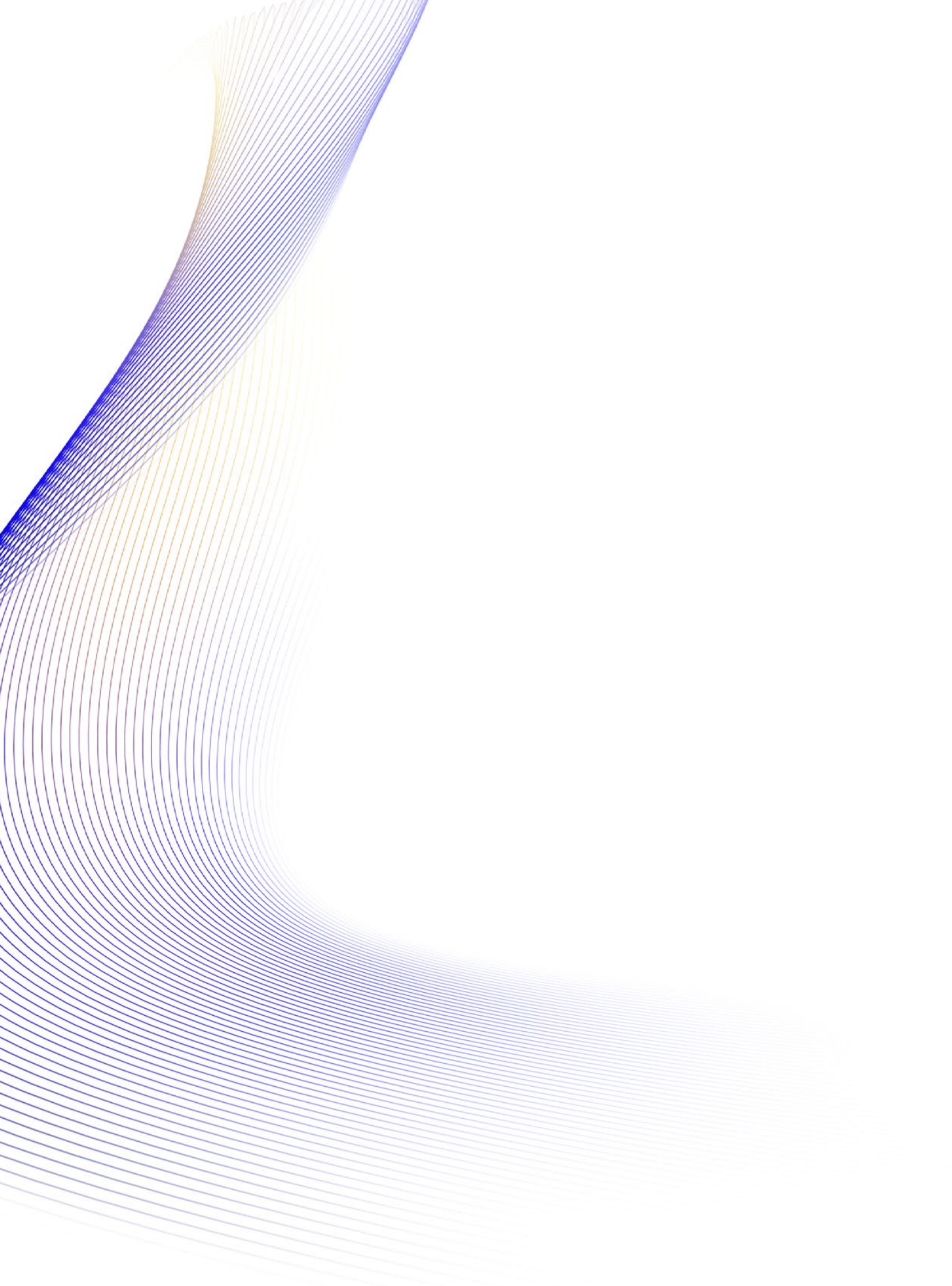
Connection

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)				

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 5,2A rms	



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