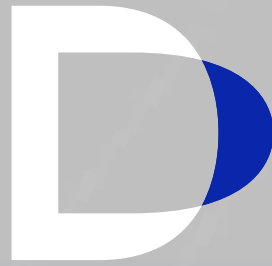


2025/26
Product
Catalogue



Delta Line
Moving together

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Brushed DC

Brushless DC

Servomotors

Motor + Controller

Stepper

Linear actuators

Gearboxes

Encoders

Controllers/Drives

Delta Line SA

Via Prè d'là 1
CH - 6814 Lamone
Switzerland

ph. +41 (0)91 612 85 00
fax. +41 (0)91 612 85 19

www.delta-line.com
info@delta-line.com

Delta Line North America, Inc

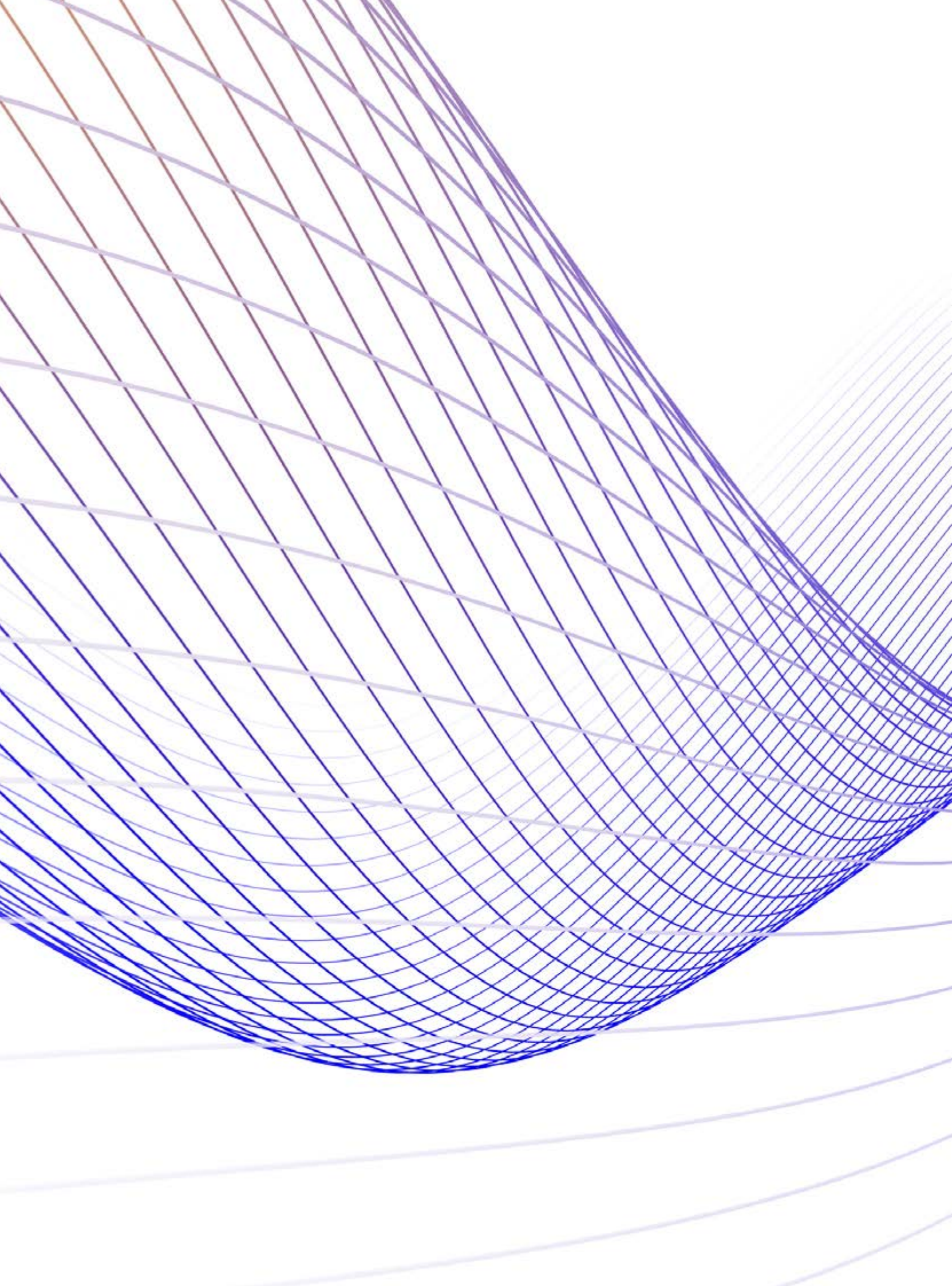
4600 South Syracuse, 9th Floor
Denver, CO 80237, USA

ph. +1 303 256 6212

www.delta-line.com
infous@delta-line.com



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makes sense only
for large orders?

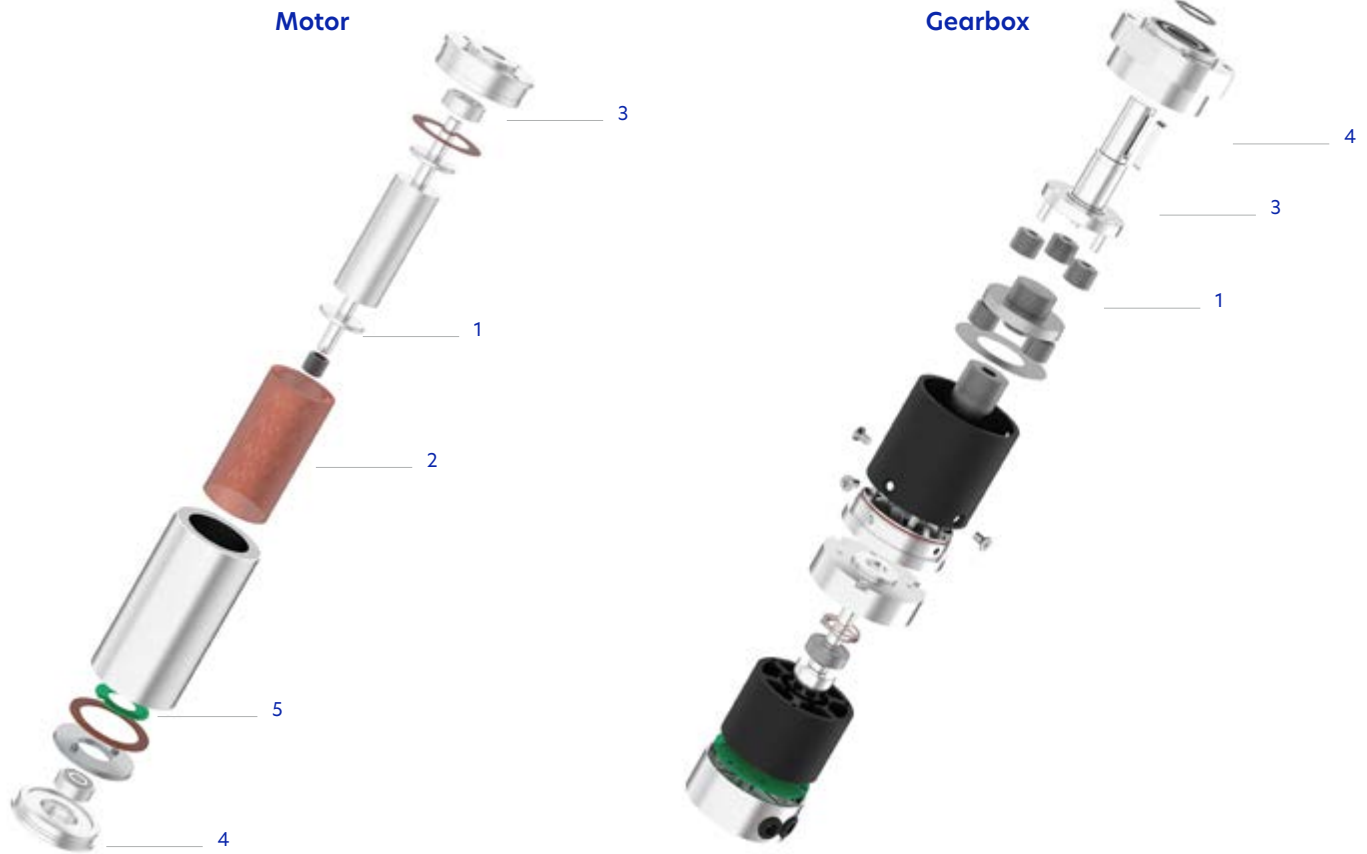
Who said that customization

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 |

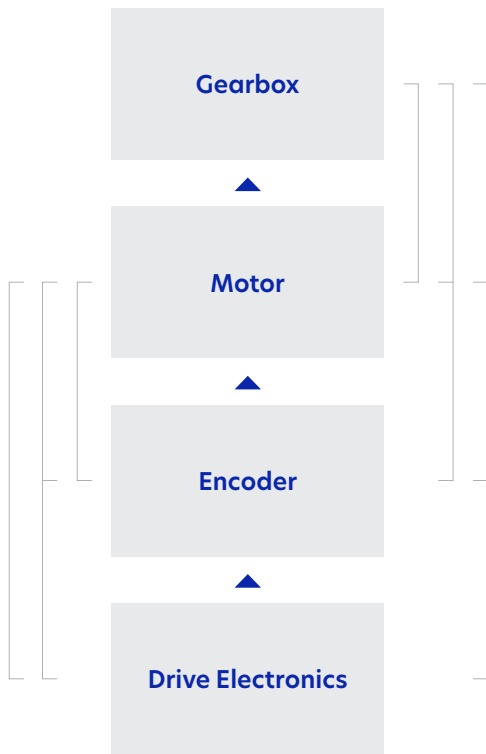


on motors and gearboxes: shaft range, windings, connector types, bearings.

1. Variation of standard

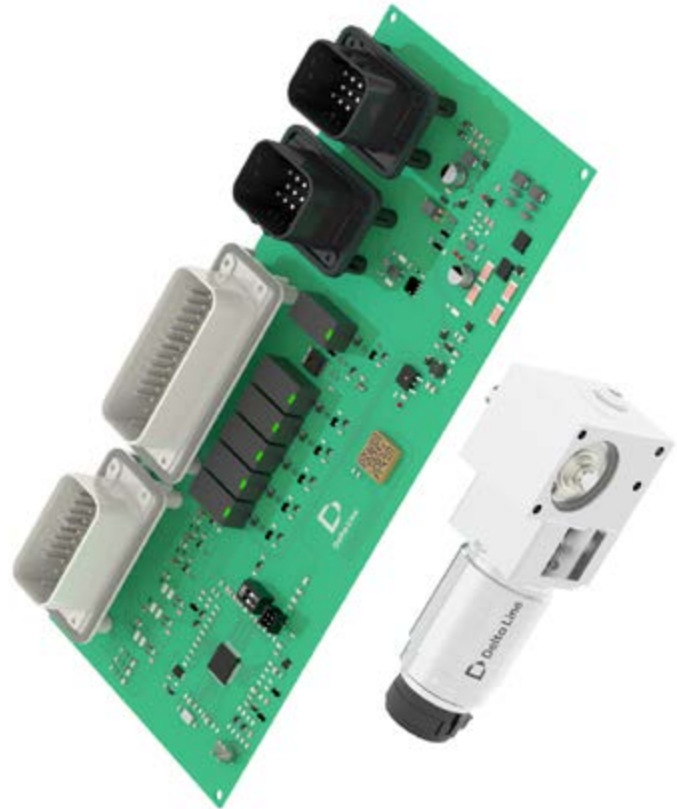
Customization Capabilities

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

Drive motor for professional grass cutting machinery.

Challenges

Supply an IP65 solution to fit into existing limited length space envelope as part of customer's product upgrade.

Solution

Supplied a modified IP65 BLDC motor with special output configuration and cabling/ connectors with increased performance and quality levels in shortest possible length.

A



Sector

Vacuum pump for water and bioburden analysis in pharmaceutical environment.

Challenges

Supply a very compact cost effective dual mechatronic system.

Solution

Development of a compact, lightweight, quiet and reliable system for easy disinfection. The system is equipped with two flat BLDC 45BLW motors.

B

Some of our customizations

tell us your challenge
and we will solve it



Sector

Agriculture, high-speed precision seed drill.

Challenges

Supply a compact, IP-protected system with integrated controller.

Solution

Gearmotor with integrated CAN controller, and cost-effective IP protection on the body and the back of the solution.

C



Sector

Intralogistics, parcel handling and sorting system.

Challenges

Supply a very compact, direct drive, low noise brushless motor.

Solution

Multipolar flat brushless motor with specific electromagnetic design for low noise operation at various speed ranges, adapted to customer's electronics.

D

Over 4.500 delighted customers served across **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

As a group, across our manufacturing locations and regional and local headquarters, we have more than 800 employees and a turnover of ~€135M.

800 employees
135M Euro turnover



Brands

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

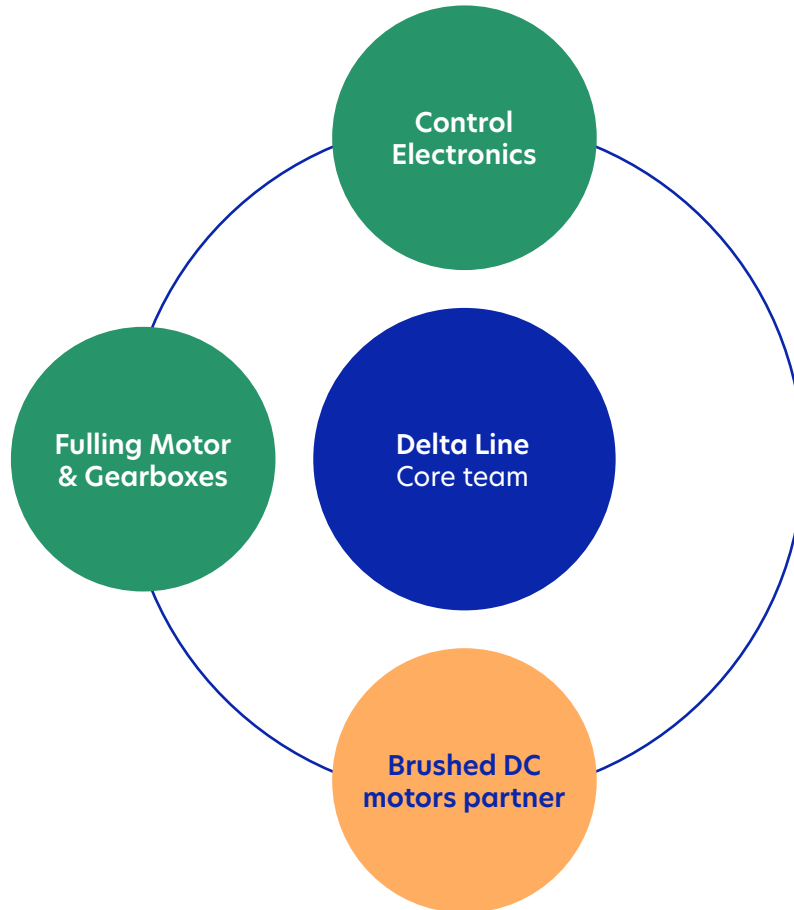
Delta Line Group

two carefully selected contract manufacturing partners

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

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

- **Core team**



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

with many advantages

A unique structure



- **Part of the Delta Line Group since 2010**
- **Established in 2001**, Jiangsu Fulling Motor Technology Co. is a Chinese-Swiss joint venture
- Specialized in **stepper motors, DC brushless motors and gearboxes** design and manufacturing
- Based in Changzhou, China, employing more than **700 workers**
- **60'000 sqm manufacturing** facilities with cutting edge equipment
- More than **5 Million motors and gearboxes** produced yearly
- **ISO9001** and **ISO14001** certified by TUV Germany
- All products **RoHS compliant** and **CE certified**



Delta Line

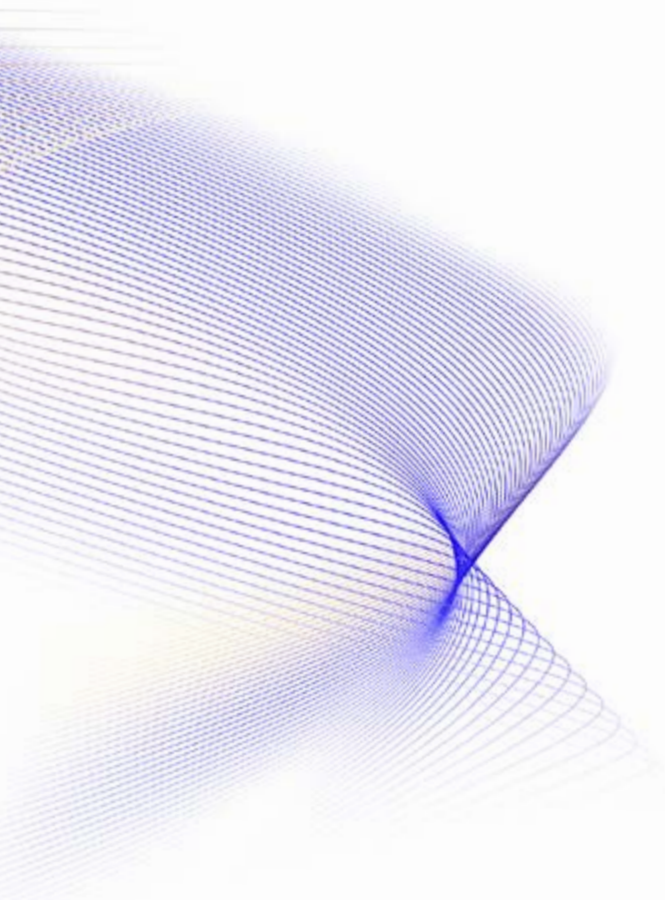
- **Established in 1983**, Delta Line is a Swiss based motion systems provider
- Headquartered in Lamone, Switzerland the company has an **extensive footprint in Europe and North America**
- **Specialized in custom solution and Integrated Motors design and manufacturing** through its own production and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

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

Our brands

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

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

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

Your benefits



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

Healthcare



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

Agriculture



Knitting & embroidery machines
 Spinning machines
 Yarn preparation machines

Textile



Pedestrian & Passenger security
 Physical access management
 Vehicular access
 Observation security

Security & Access



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

Robotics

Market expertise



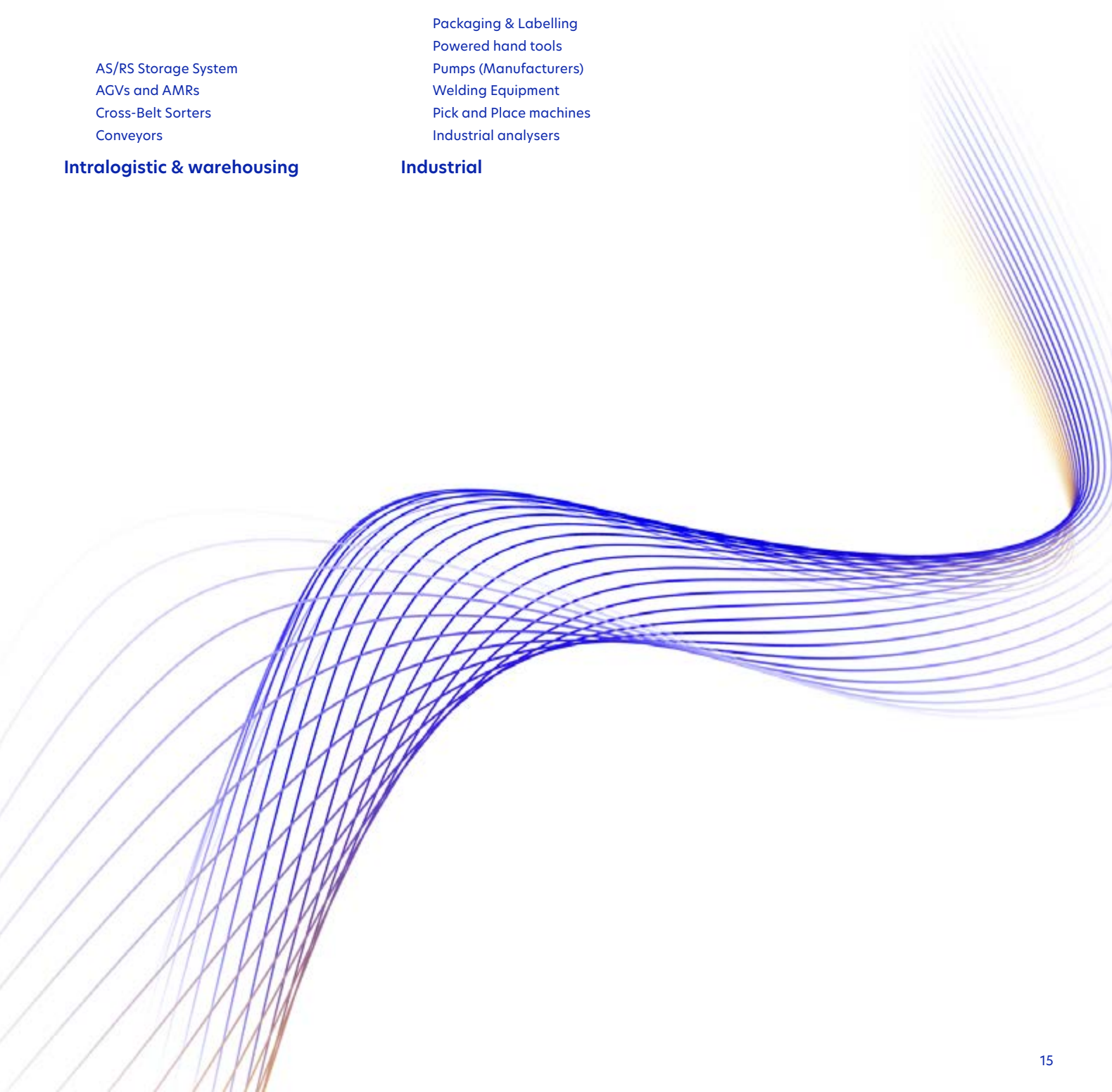
AS/RS Storage System
AGVs and AMRs
Cross-Belt Sorters
Conveyors

Intralogistic & warehousing



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

Industrial



Brushed DC motors

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motors

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Permanent Magnet
motors

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Brushed DC Motors

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* Rated Torque

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

Glossary

Product families

Brushed DC Coreless motors

Brushed PMDC motors

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

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

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

Graphite brushes

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

Precious metal brushes

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

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

Coreless technology

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

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

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

Permanent Magnet technology

Technical introduction

Composition

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





Brushed DC

Coreless motors

Advantages at a glance

- No cogging
- High efficiency
- Low starting voltage

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

| Brushed DC Coreless motors | Torque* (mNm) | |
|----------------------------|---------------|----|
| 08DC16N-PM | 0,61...0,64 | 30 |
| 10DC17N-PM | 0,91...0,99 | 31 |
| 10DC25N-PM | 1,94...2,05 | 32 |
| 12DC19N-PM | 1,88...1,95 | 33 |
| 12DC28N-PM | 2,88...3,89 | 34 |
| 16DC25P-PM | 3,8...4,06 | 35 |
| 16DC25P-G | 3,71...4,76 | 36 |
| 16DC26N-PM | 4,99...5,36 | 37 |
| 16DC26N-G | 5,36...5,45 | 38 |
| 16DC40N-PM | 5,06...10,8 | 39 |
| 16DC40N-G | 8,58...11,3 | 40 |
| 22DC32P-PM | 8,54...10,4 | 41 |
| 22DC32P-G | 11,5...12,6 | 42 |
| 22DC34N-PM | 10,7...14,7 | 43 |
| 22DC34N-G | 14...15,3 | 44 |
| 22DC47N-PM | 14,1...29,5 | 45 |
| 22DC47N-G | 27...30,5 | 46 |
| 26DC44P-PM | 20,8...28,8 | 47 |
| 26DC44P-G | 26,3...28,3 | 48 |
| 26DC57N-PM | 32,9...52,3 | 49 |
| 26DC57N-G | 46,9...59,1 | 50 |
| 32DC72N -G | 89,4...123 | 51 |
| 35DC70N -G | 77,7...138 | 52 |

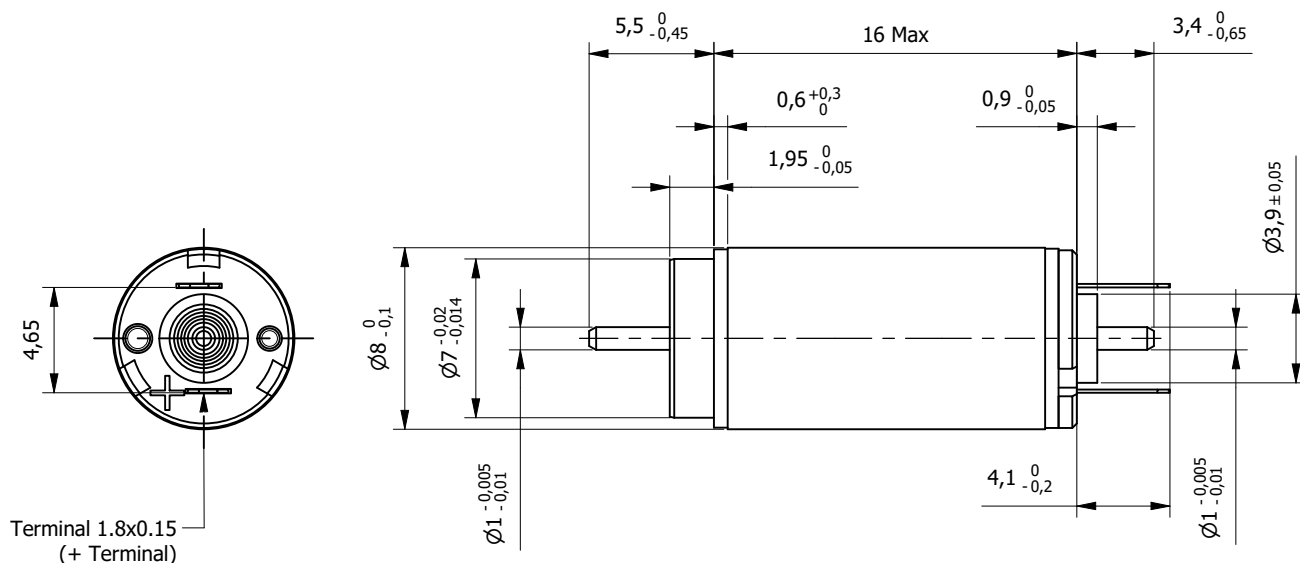
* Rated Torque

Brushed DC Coreless Motor 08DC16N-PM

Ø 8mm

Precious Metal brushes

0,6mNm

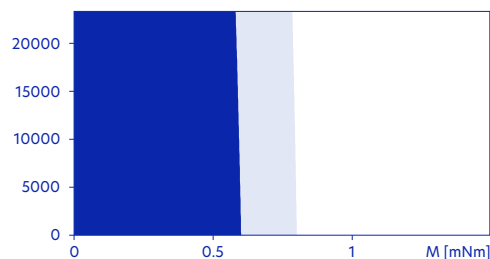


Product also available with ball bearings

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

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

Operating range: Winding 6V



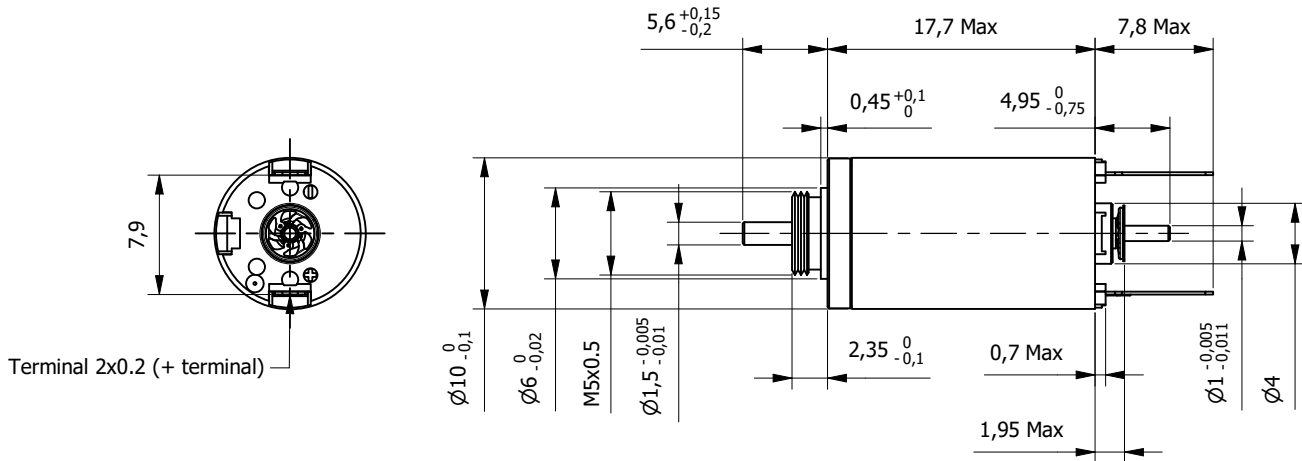
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 10DC17N-PM

Precious Metal brushes

Ø 10mm

0,9 to 1mNm

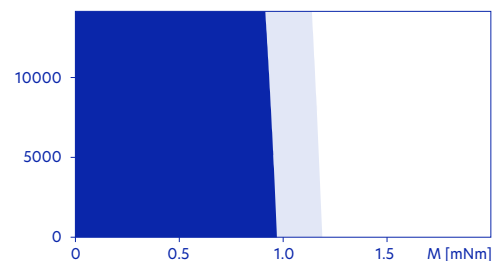


Product also available with ball bearings

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

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

Operating range: Winding 4.5V



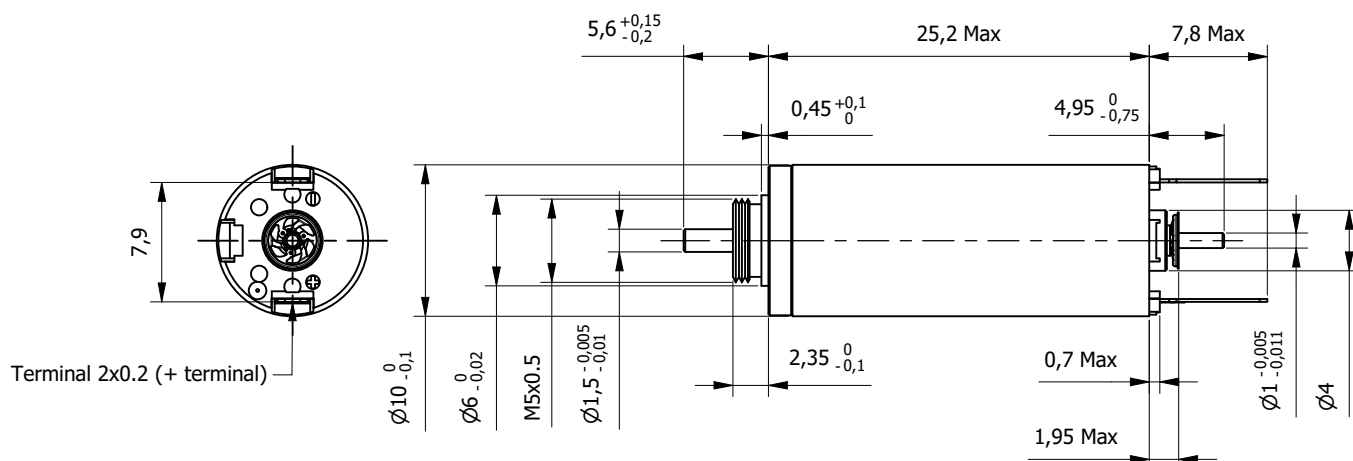
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 10DC25N-PM

Precious Metal brushes

Ø 10mm

1,9 to 2mNm

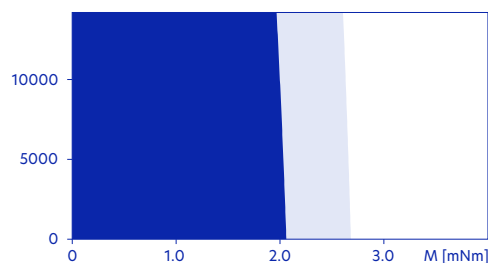


Product also available with ball bearings

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

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

Operating range: Winding 4.5V



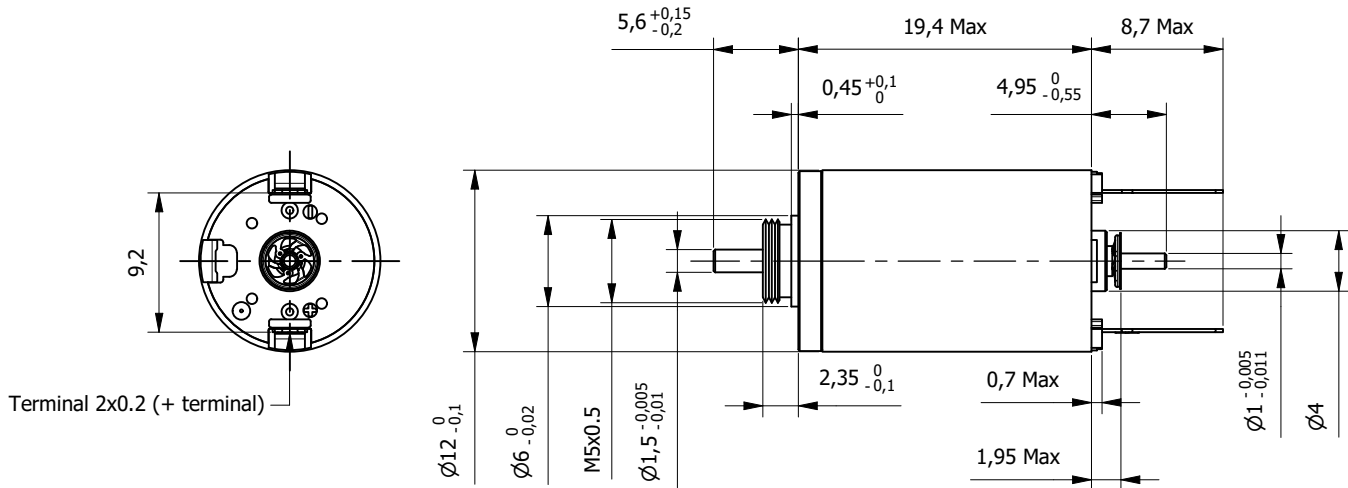
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 12DC19N-PM

Precious Metal brushes

Ø 12mm

1,9mNm

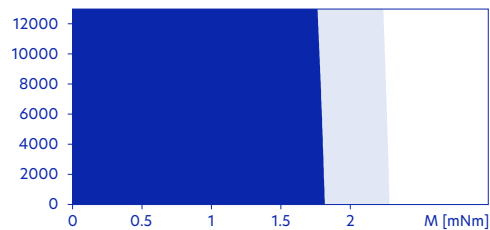


Product also available with ball bearings

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

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

Operating range: Winding 4.5V



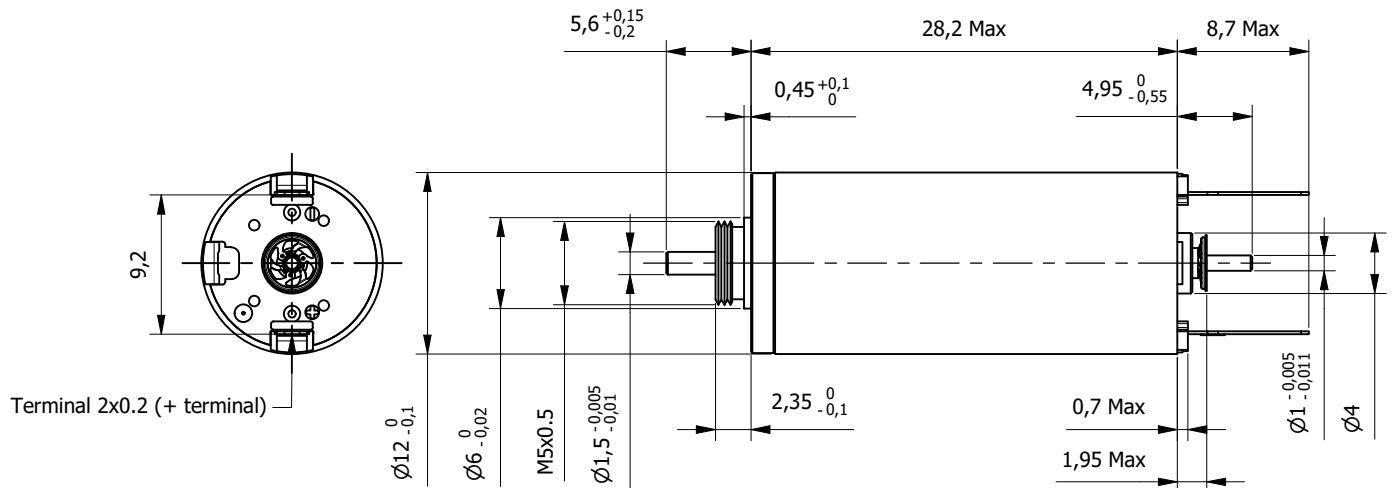
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 12DC28N-PM

Precious Metal brushes

Ø 12mm

2,9 to 3,9mNm

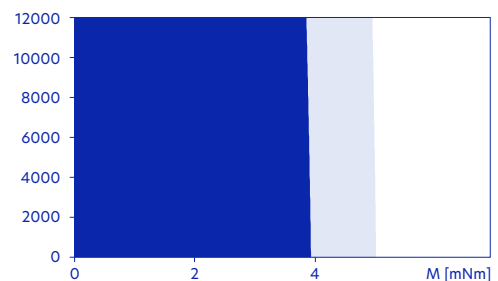


Product also available with ball bearings

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

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

Operating range: Winding 4.5V



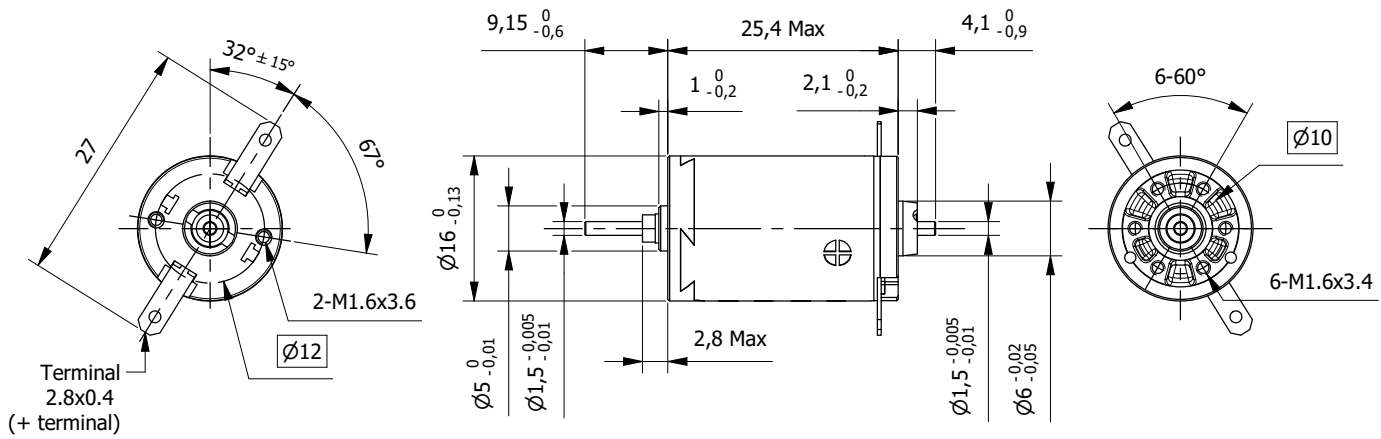
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC25P-PM

Precious Metal brushes

Ø 16mm

3,8 to 4,1mNm

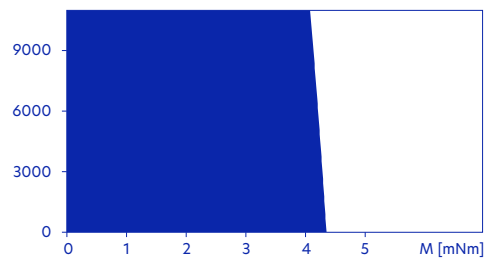


Product also available with ball bearings

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

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

Operating range: Winding 12V



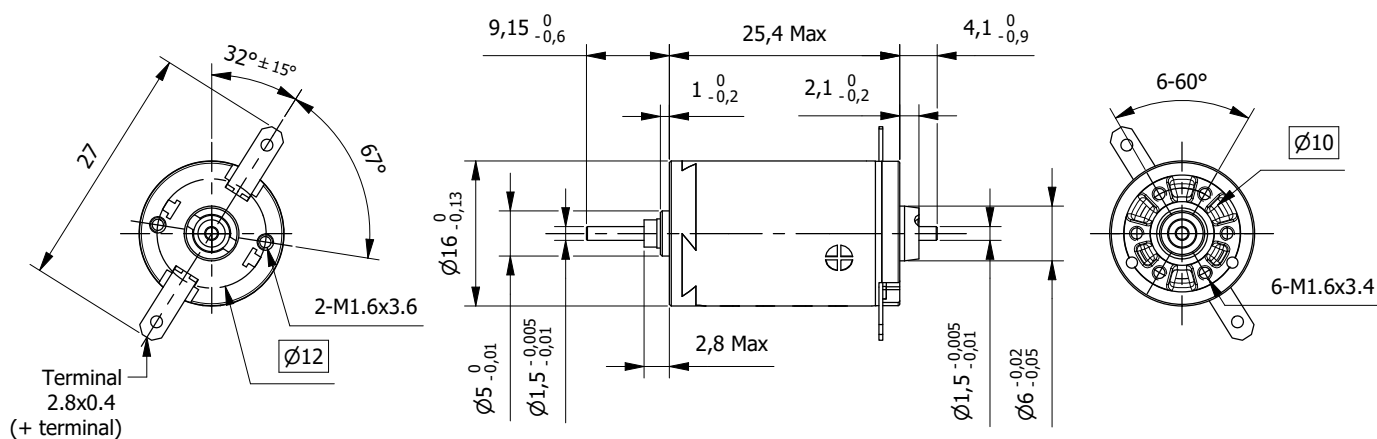
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC25P-G

Graphite brushes

Ø 16mm

3,7 to 4,8mNm

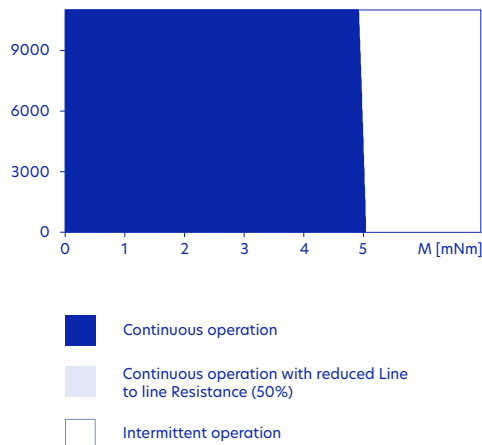


Product also available with ball bearings

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

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

Operating range: Winding 24V

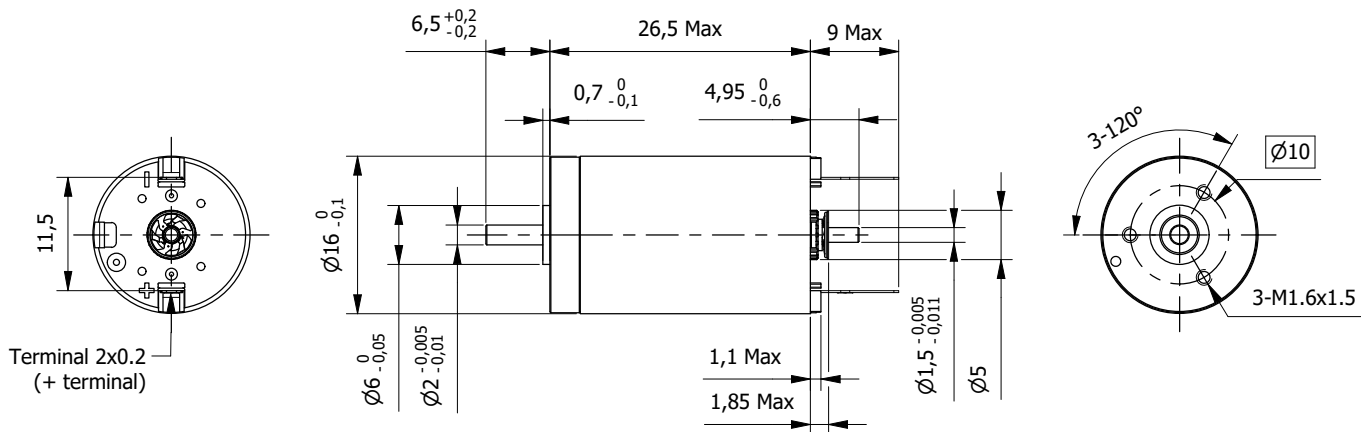


Brushed DC Coreless Motor 16DC26N-PM

Precious Metal brushes

Ø 16mm

5 to 5,4mNm

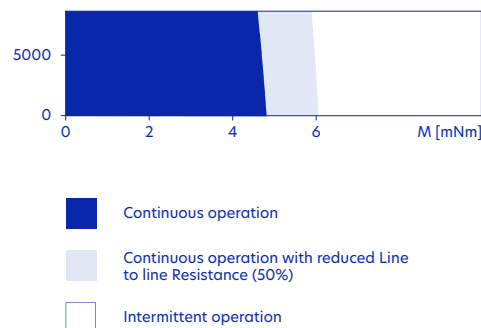


Product also available with ball bearings

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

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

Operating range: Winding 12V

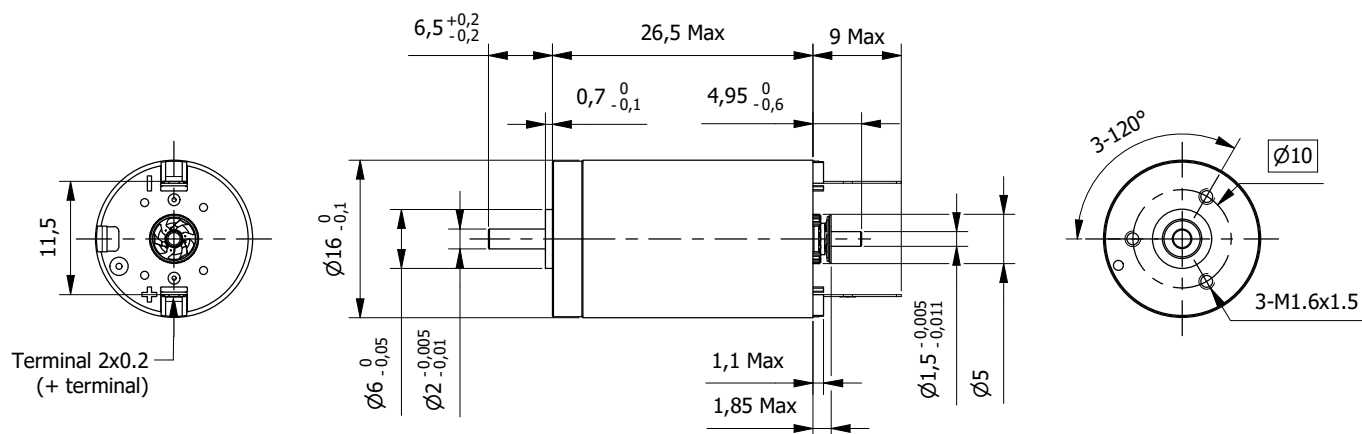


Brushed DC Coreless Motor 16DC26N-G

Ø 16mm

Graphite brushes

5,4mNm

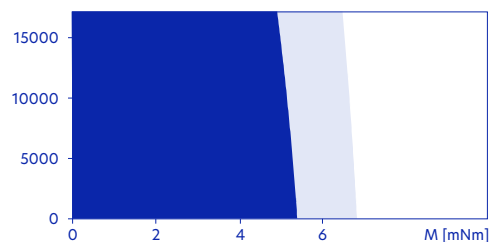


Product also available with ball bearings

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

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

Operating range: Winding 12V



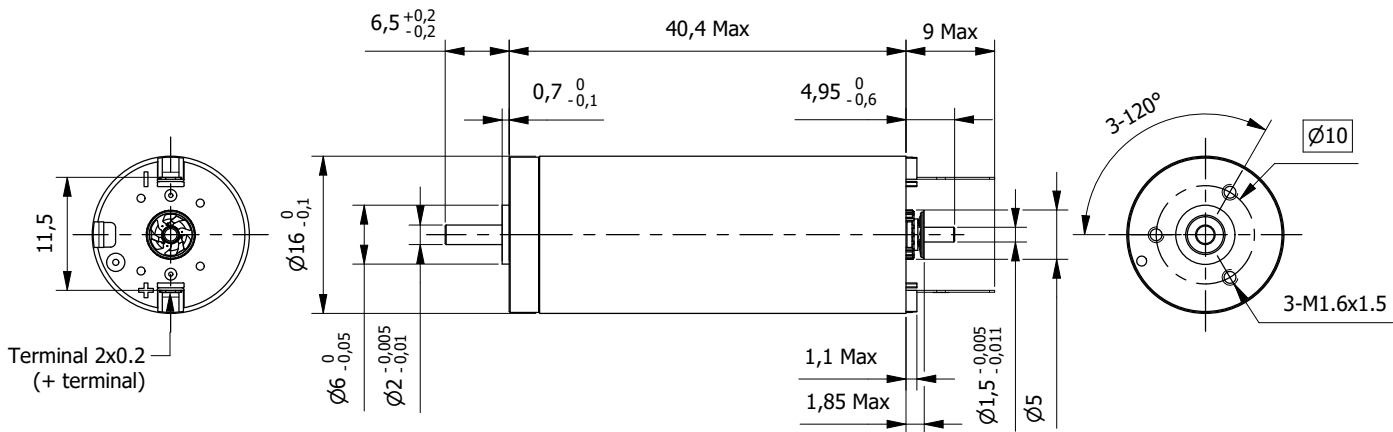
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 16DC40N-PM

Precious Metal brushes

Ø 16mm

5 to 10,8mNm

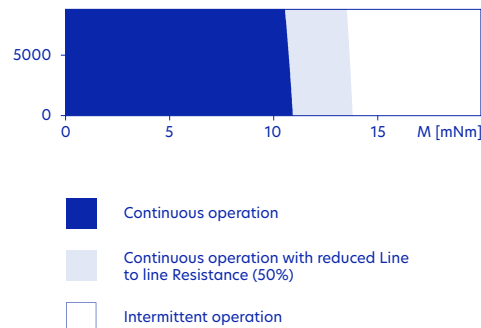


Product also available with ball bearings

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

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

Operating range: Winding 9V

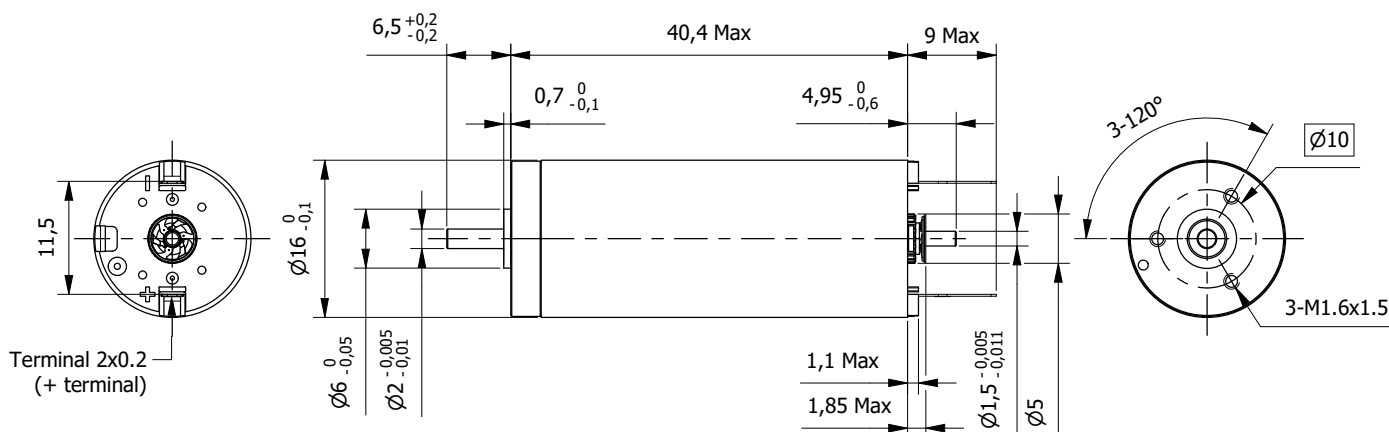


Brushed DC Coreless Motor 16DC40N-G

Graphite brushes

Ø 16mm

8,6 to 11,3mNm

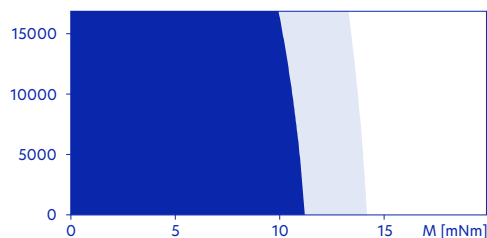


Product also available with ball bearings

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

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

Operating range: Winding 12V



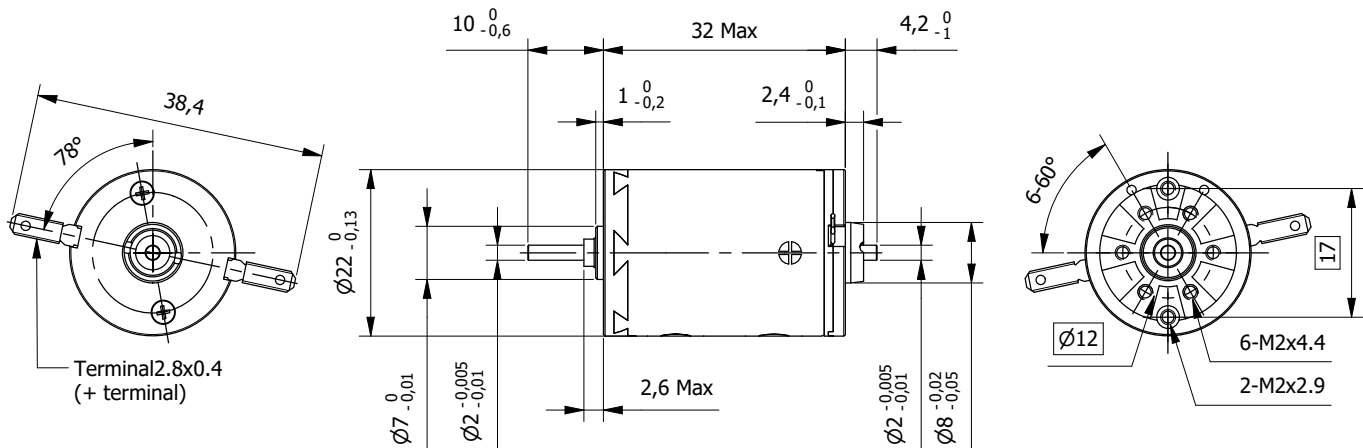
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC32P-PM

Precious Metal brushes

Ø 22mm

8,5 to 10,4mNm

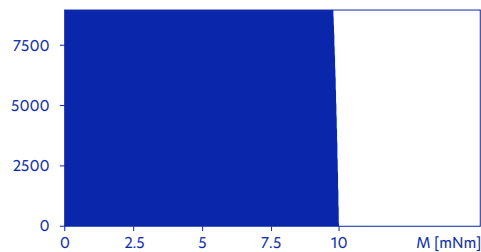


Product also available with ball bearings

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

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

Operating range: Winding 12V



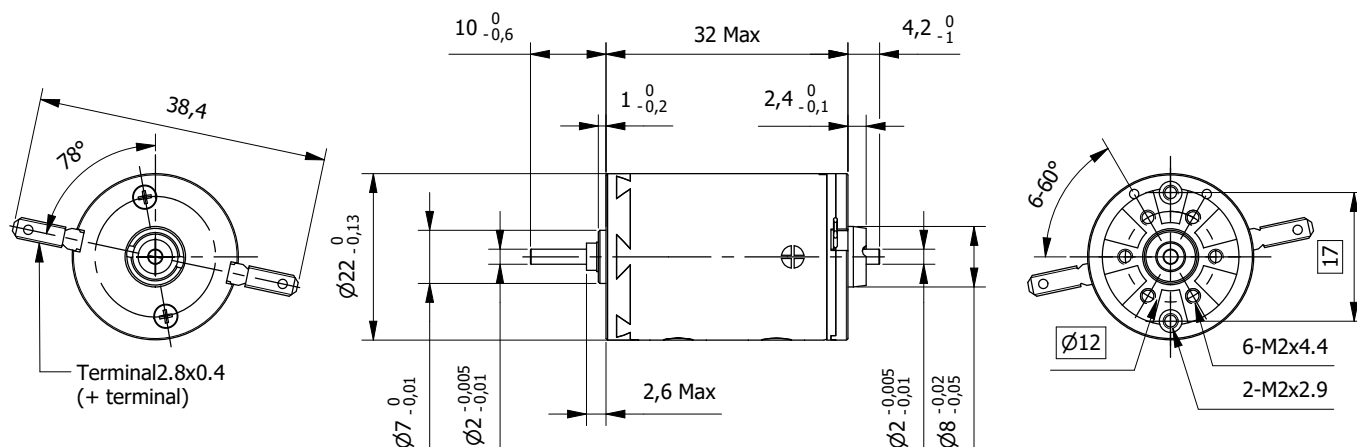
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC32P-G

Graphite brushes

Ø 22mm

11,5 to 12,6mNm

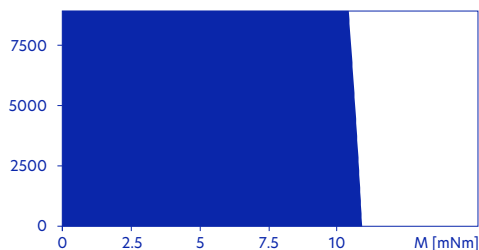


Product also available with ball bearings

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

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

Operating range: Winding 12V



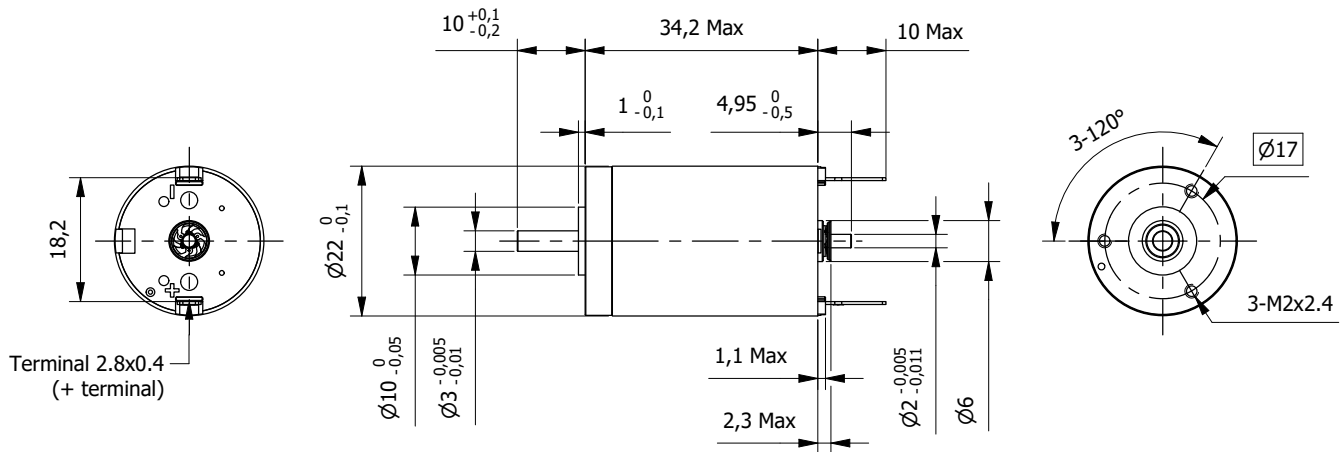
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC34N-PM

Precious Metal brushes

Ø 22mm

10,7 to 14,7mNm

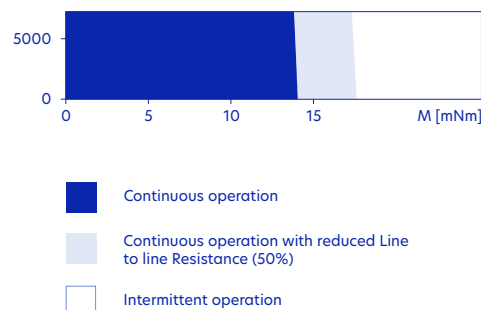


Product also available with ball bearings

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

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

Operating range: Winding 18V

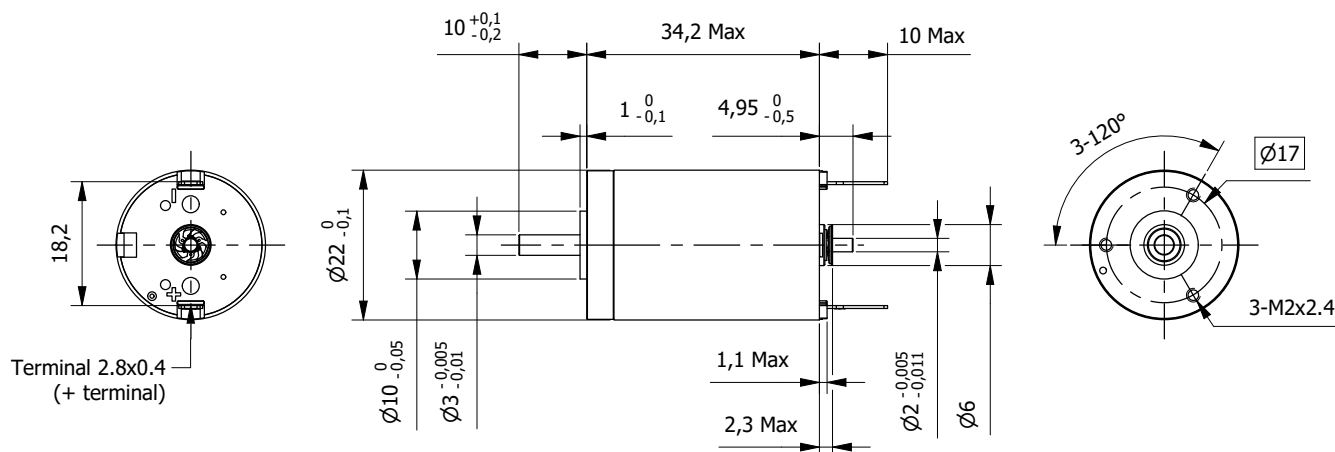


Brushed DC Coreless Motor 22DC34N-G

Graphite brushes

Ø 22mm

14 to 15,3mNm

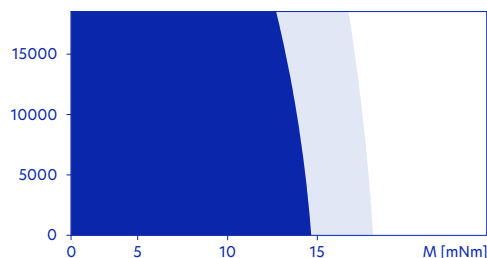


Product also available with ball bearings

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

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

Operating range: Winding 18V



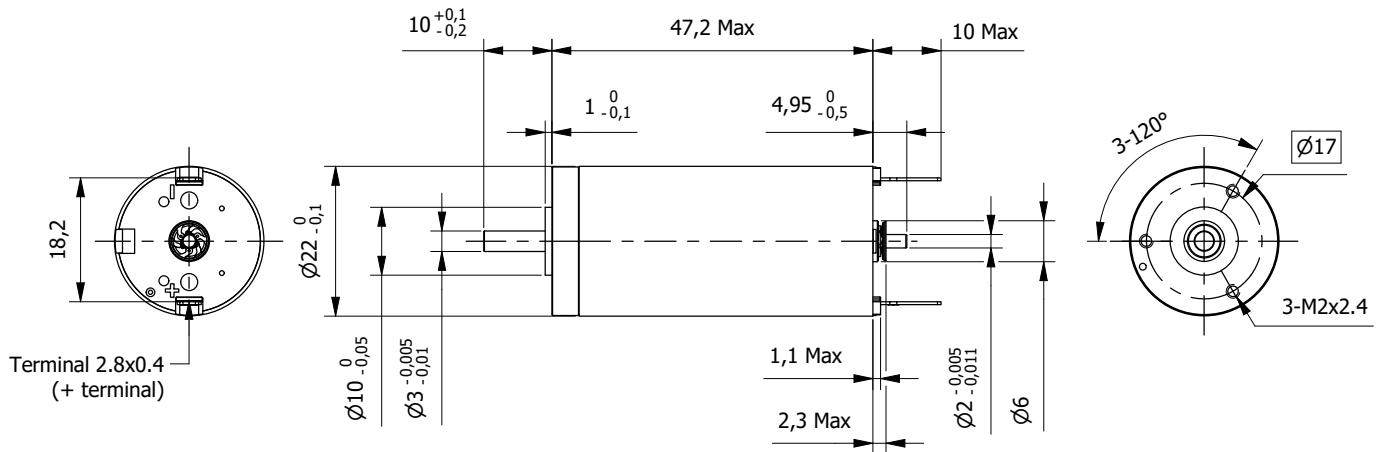
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 22DC47N-PM

Precious Metal brushes

Ø 22mm

14,1 to 29,5mNm

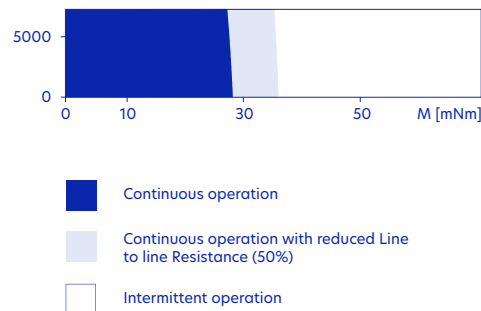


Product also available with ball bearings

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

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

Operating range: Winding 18V

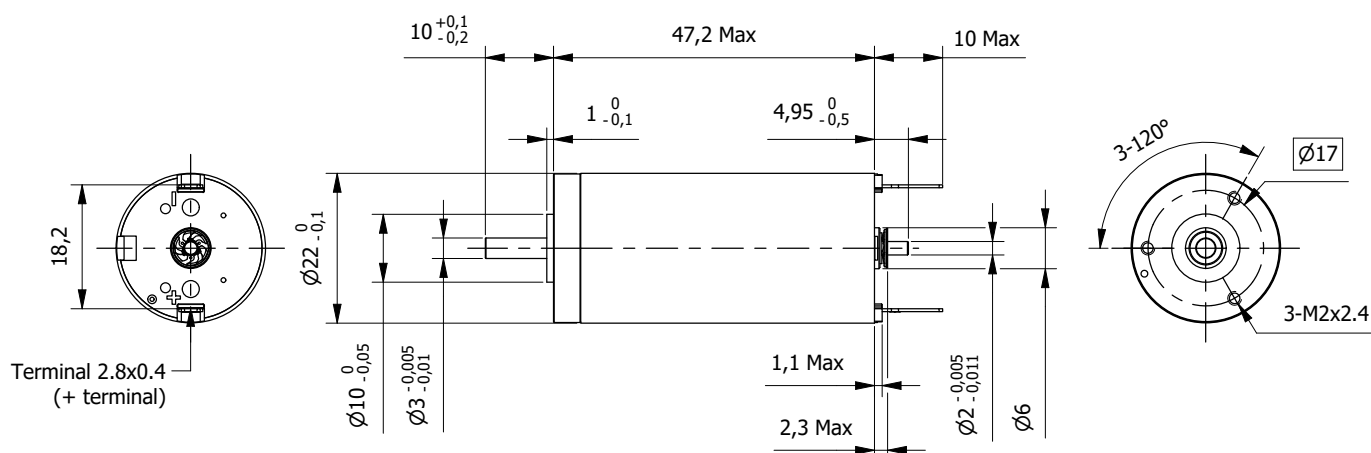


Brushed DC Coreless Motor 22DC47N-G

Ø 22mm

Graphite brushes

27 to 30,5mNm

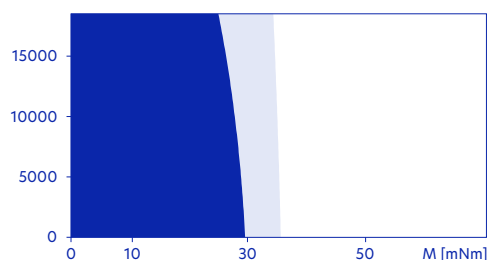


Product also available with ball bearings

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

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

Operating range: Winding 18V



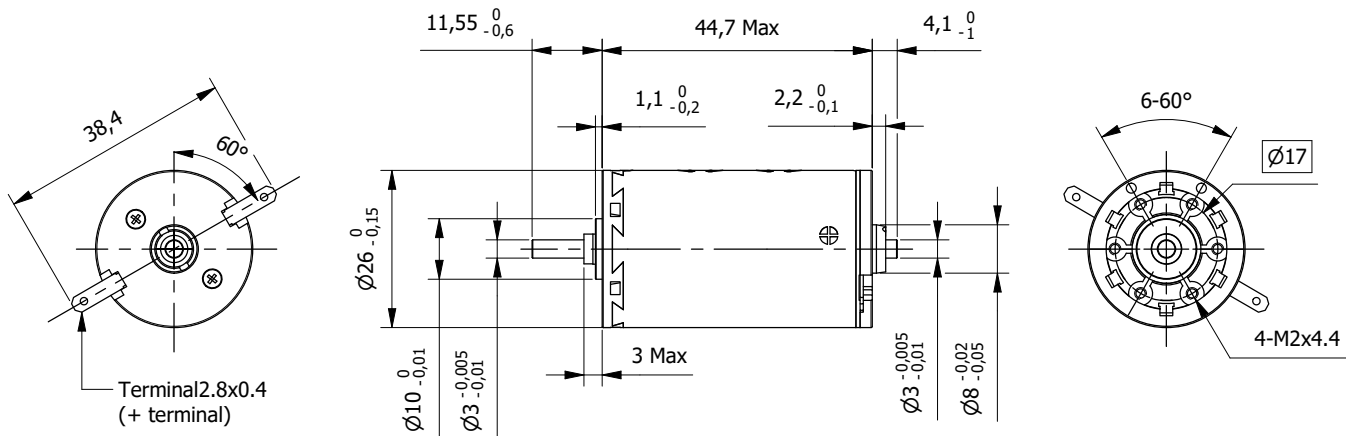
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 26DC44P-PM

Precious Metal brushes

Ø 26mm

20,8 to 28,8mNm

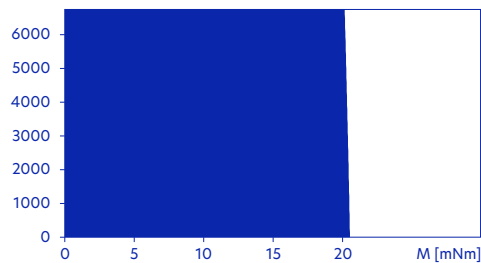


Product also available with ball bearings

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

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

Operating range: Winding 12V



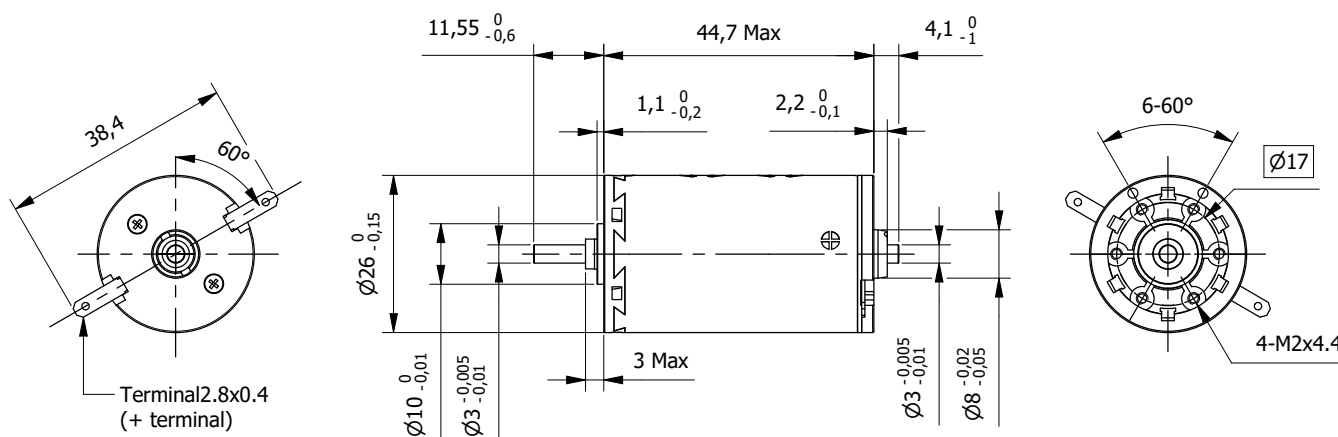
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 26DC44P-G

Ø 26mm

Graphite brushes

26,3 to 28,3mNm

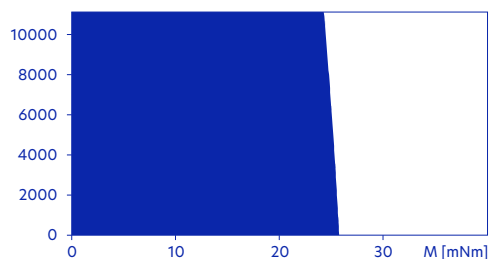


Product also available with ball bearings

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

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

Operating range: Winding 24V



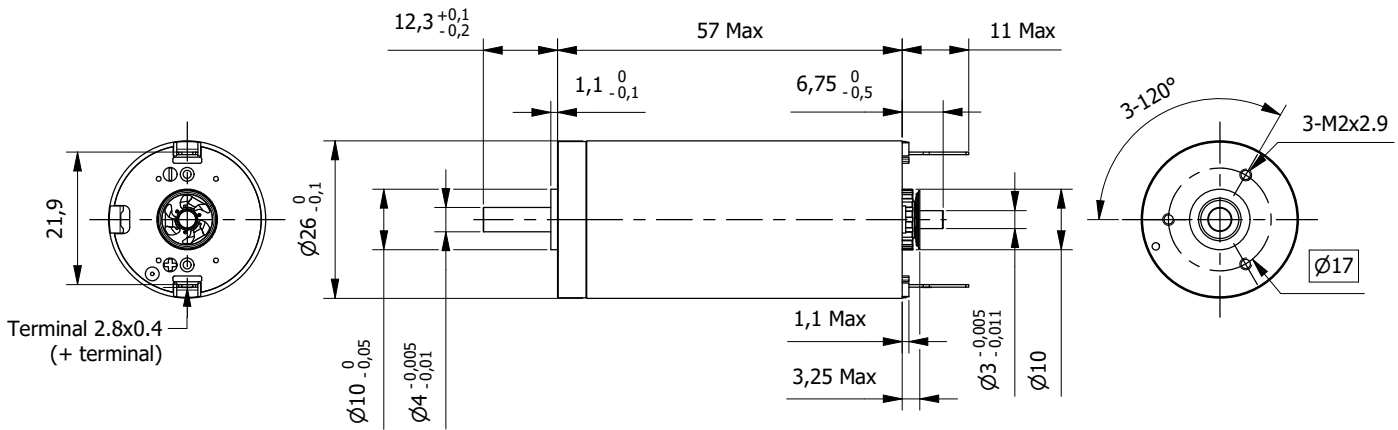
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 26DC57N-PM

Precious Metal brushes

Ø 26mm

32,9 to 52,3mNm

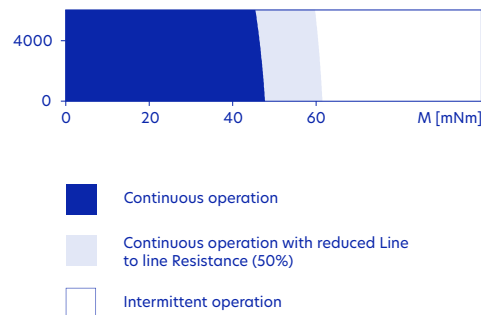


Product also available with ball bearings

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

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

Operating range: Winding 18V

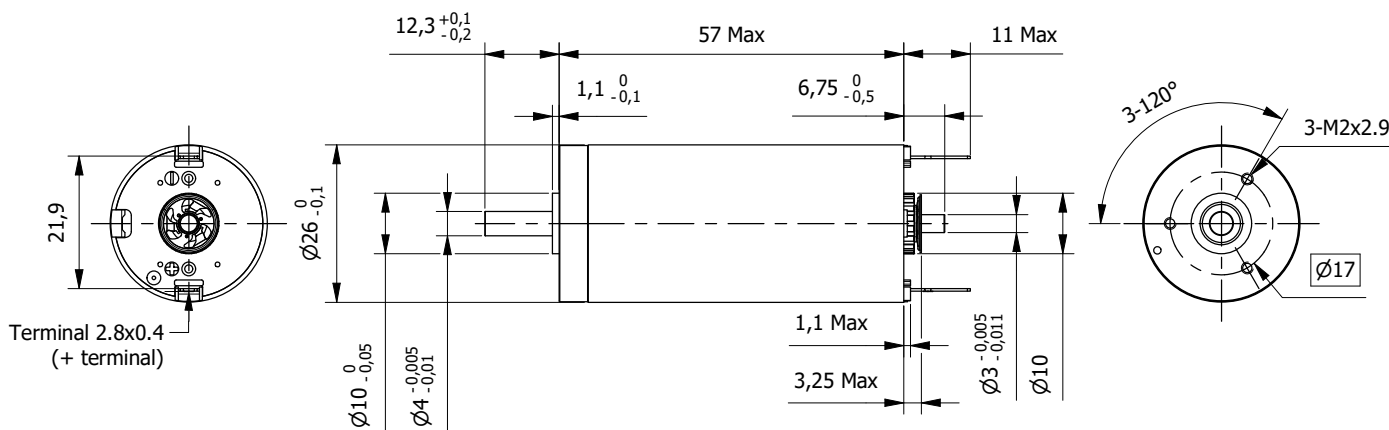


Brushed DC Coreless Motor 26DC57N-G

Graphite brushes

Ø 26mm

46,9 to 59,1mNm

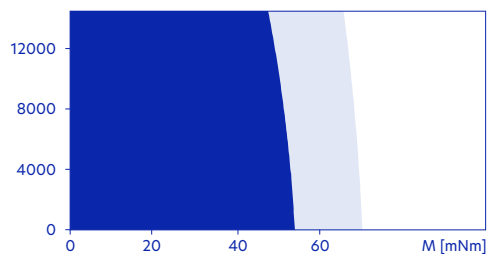


Product also available with ball bearings

| 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



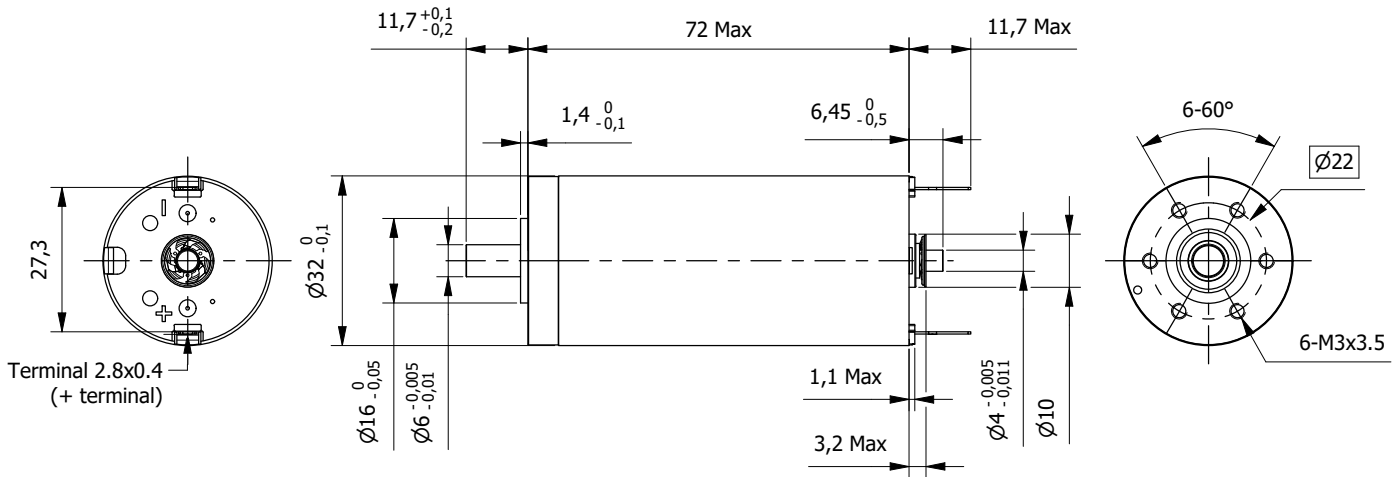
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 32DC72N-G

Graphite brushes

Ø 32mm

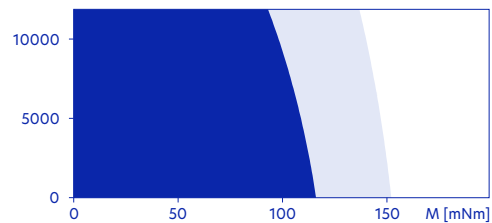
89,4 to 123mNm



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

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

Operating range: Winding 36V



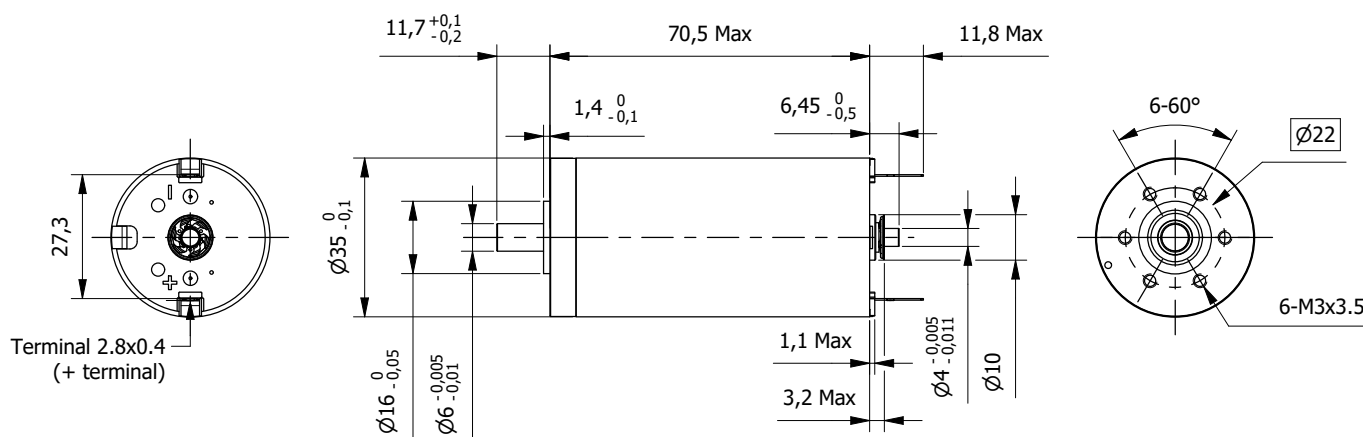
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation

Brushed DC Coreless Motor 35DC70N-G

Ø 35mm

Graphite brushes

77,7 to 138mNm



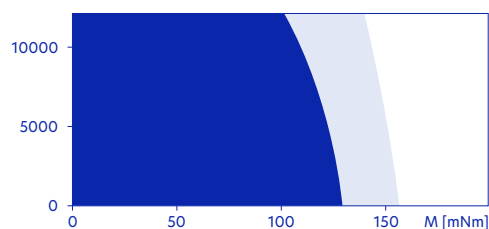
Specification

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

Characteristics

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

Operating range: Winding 36V



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



Brushed DC

Permanent Magnet motors

Advantages at a glance

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

Permanent Magnet DC motors

| | Torque* (Nm) | |
|------|---------------|----|
| 42DI | 0,038...0,057 | 56 |
| 52DI | 0,09...0,22 | 57 |
| 63DI | 0,18...0,27 | 58 |

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

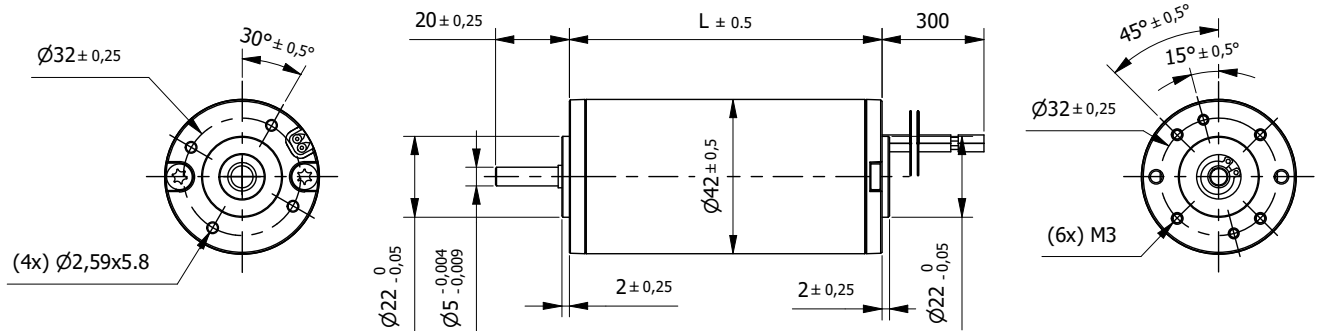
* Rated Torque

Brushed PMDC Motor 42DI

Permanent Magnet

Ø 42mm

0,038 - 0,057Nm



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

Characteristics

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

Connection

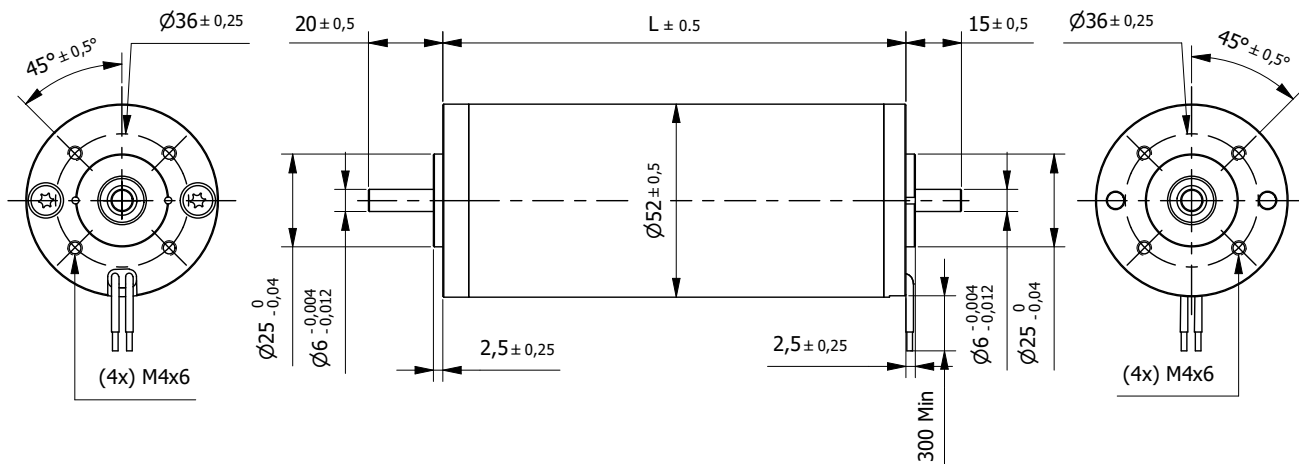
| n° | Color | Gauge | Function |
|----|-------|--------------|----------|
| 1 | Black | UL1569 AWG22 | (V-) |
| 2 | Red | UL1569 AWG22 | (V+) |

Brushed PMDC Motor 52DI

Permanent Magnet

Ø 52mm

0,09 - 0,22Nm



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

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

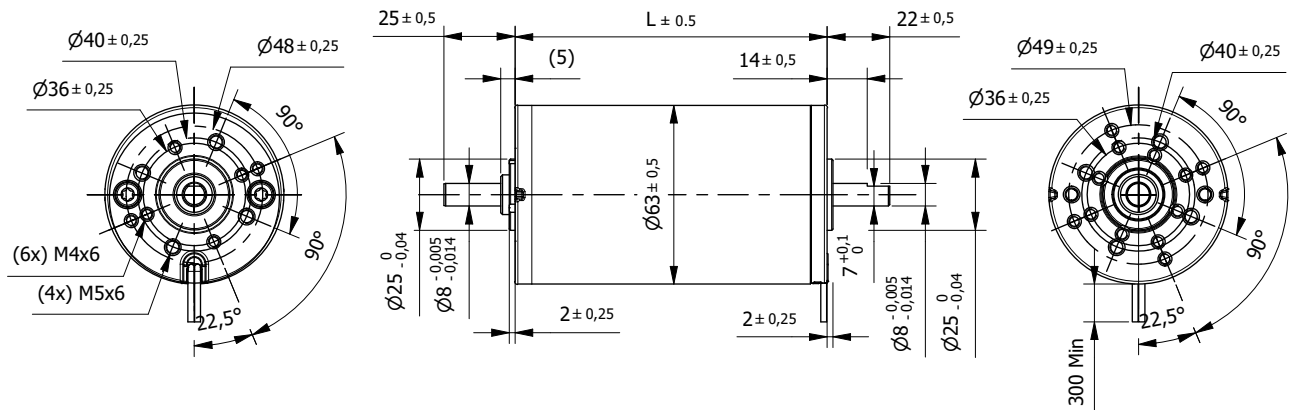
| Connection | | | |
|------------|-------|--------------|----------|
| n° | Color | Gauge | Function |
| 1 | Black | UL3266 AWG18 | (V-) |
| 2 | Red | UL3266 AWG18 | (V+) |

Brushed PMDC Motor 63DI

Permanent Magnet

Ø 63mm

0,18 - 0,27Nm



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

Characteristics

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

Connection

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

Brushless DC



Controllers/Drives

Encoders

Gearboxes

Linear actuators

Stepper

Motor + Controller

Servomotors

Brushless DC

Brushed DC

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SBL series
Standard

p.105



Slotless motors -
EC series
High Performance

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Slotted motors -
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Flat motors

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Flat motors
with Encoder

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Frameless
motors

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Brushless DC motors

| | | |
|--|---------------------|------------|
| BLDC Slotted motors - BL Standard series | Torque* (Nm) | 71 |
| 22BL | 0,008...0,02 | 72 |
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| 22EC43...82N | 0,03...0,08 | 90 |
| BLDC Slotted motors - CBL Economy series | Torque* (Nm) | 95 |
| 24CBL30 | 0,006 | 96 |
| 28CBL | 0,028...0,05 | 97 |
| 36CBL | 0,015...0,09 | 98 |
| 38CBL58 | 0,07 | 99 |
| 42CBL | 0,068...0,15 | 100 |
| 48CBL68 | 0,18 | 101 |
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| 30EC47T | 0,069...0,073 | 125 |
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| 42SVA | 0,062...0,25 | 132 |
| 57SVA | 0,3...0,6 | 133 |
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| 45BLW Connector | 0,05...0,13 | 141 |
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| 50BLF | 0,3...0,5 | 159 |
| 60BLF | 0,45 | 160 |
| 70BLF | 0,55...1 | 161 |
| 85BLF | 1,2...2 | 162 |
| 102BLF | 2,5 | 163 |
| 115BLF | 3,9...7,8 | 164 |

| 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. |
| Back EMF | The back (or counter) electromotive force (emf) E is the voltage generated by a running motor that acts to counter the supplied voltage. |
| 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. |
| Operating Ambient Temperature | Temperature range allowed for correct operation. |
| Humidity | Humidity range allowed for correct operation. |
| 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

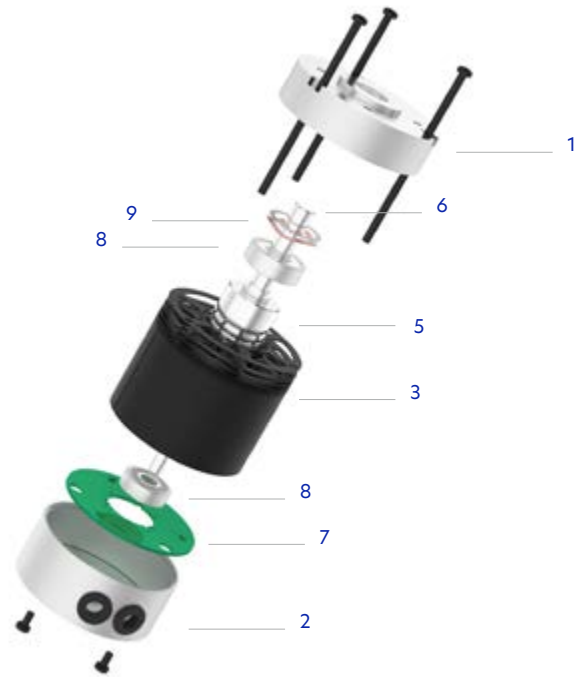
- Brushless DC Slotted motors
- Brushless DC Slotless motors
- Brushless DC motors with Encoder
- Brushless DC Flat motors
- Brushless DC Frameless motors

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

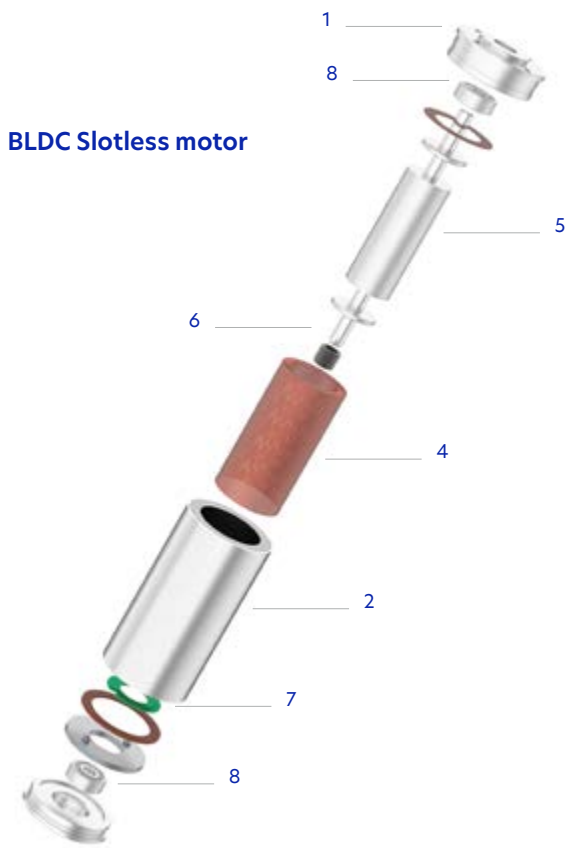
Our flat brushless DC motors have an extremely flat design, ranging from 14 to 40mm. The specific design gives these products an exceptional power to volume ratio, while keeping them very light and compact. Thanks to a high number of poles (starting at 8 till 22 poles), these motors offer very good control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

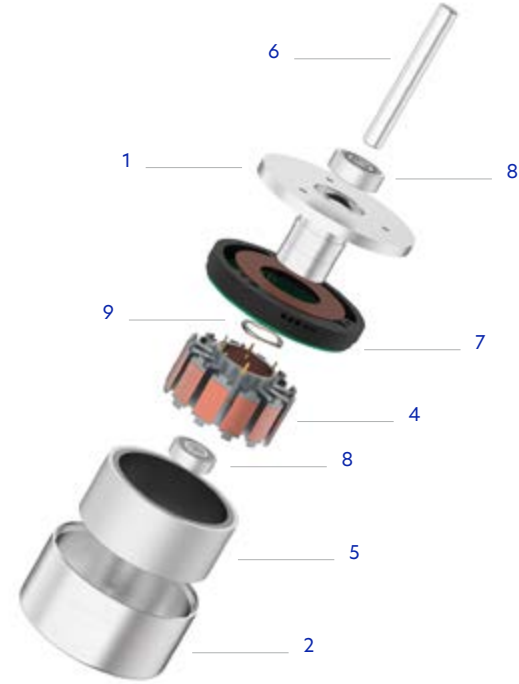
Brushless DC Frameless motors

Technical introduction



BLDC Slotless motor

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

Brushless DC motors with Encoder

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

Hall sensors

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

Magnets



Slotted motors -
BL series
Standard

p.71



Slotted motors -
EC series
High Performance

p.89



Slotted motors -
CBL series
Economy

p.95

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) | 71 |
|--|--|--|---------------|-----|
| 22BL | | | 0,008...0,02 | 72 |
| 28BL | | | 0,005...0,05 | 73 |
| 33BL | | | 0,022...0,05 | 74 |
| 40BL | | | 0,043...0,083 | 75 |
| 42BL - square - 8pole | | | 0,063...0,25 | 76 |
| 42BLA - square - 10pole | | | 0,07...0,36 | 77 |
| 42BLB - square - 6pole | | | 0,064...0,43 | 78 |
| 42RBL | | | 0,02...0,15 | 79 |
| 57BL - 4pole | | | 0,055...0,44 | 80 |
| 57BLA - 6pole | | | 0,2...0,8 | 81 |
| 57BLB - square | | | 0,3...0,6 | 82 |
| 70BLS | | | 0,5...1,5 | 83 |
| 80BLS | | | 0,9...3 | 84 |
| 86BLC | | | 0,4...2,22 | 85 |
| 86BLS | | | 0,35...2,1 | 86 |
| BLDC Slotted motors - EC High Performance series | | | Torque* (Nm) | 89 |
| 22EC43N | | | 0,03 | 90 |
| 22EC58N | | | 0,05 | 91 |
| 22EC82N | | | 0,08 | 92 |
| BLDC Slotted motors - CBL Economy series | | | Torque* (Nm) | 95 |
| 24CBL30 | | | 0,006 | 96 |
| 28CBL | | | 0,028...0,05 | 97 |
| 36CBL | | | 0,015...0,09 | 98 |
| 38CBL58 | | | 0,07 | 99 |
| 42CBL | | | 0,068...0,15 | 100 |
| 48CBL68 | | | 0,18 | 101 |

* Rated Torque

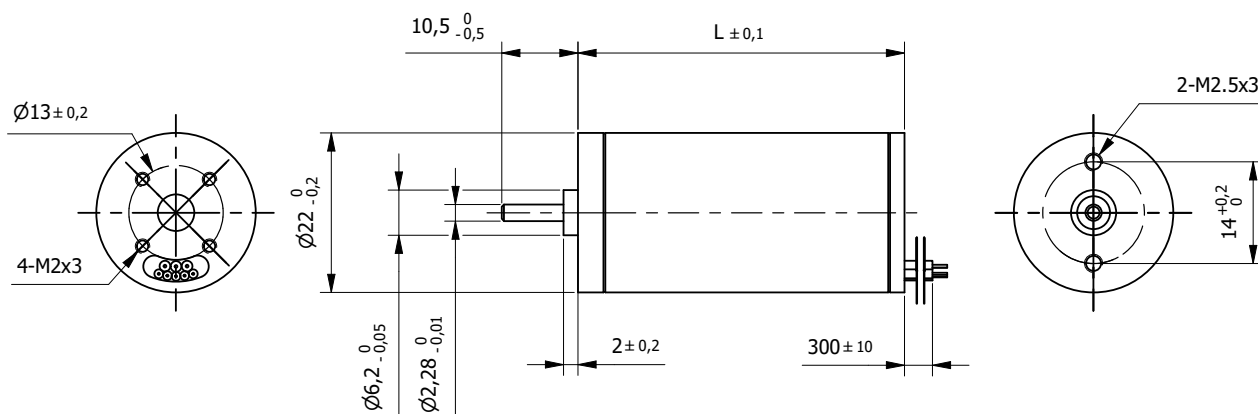


BLDC Slotted motors

BL series - Standard

| BLDC Slotted motors - BL Standard series | Torque* (Nm) | |
|--|---------------|----|
| 22BL | 0,008...0,02 | 72 |
| 28BL | 0,005...0,05 | 73 |
| 33BL | 0,022...0,05 | 74 |
| 40BL | 0,043...0,083 | 75 |
| 42BL - square - 8pole | 0,063...0,25 | 76 |
| 42BLA - square - 10pole | 0,07...0,36 | 77 |
| 42BLB - square - 6pole | 0,064...0,43 | 78 |
| 42RBL | 0,02...0,15 | 79 |
| 57BL - 4pole | 0,055...0,44 | 80 |
| 57BLA - 6pole | 0,2...0,8 | 81 |
| 57BLB - square | 0,3...0,6 | 82 |
| 70BLS | 0,5...1,5 | 83 |
| 80BLS | 0,9...3 | 84 |
| 86BLC | 0,4...2,22 | 85 |
| 86BLS | 0,35...2,1 | 86 |

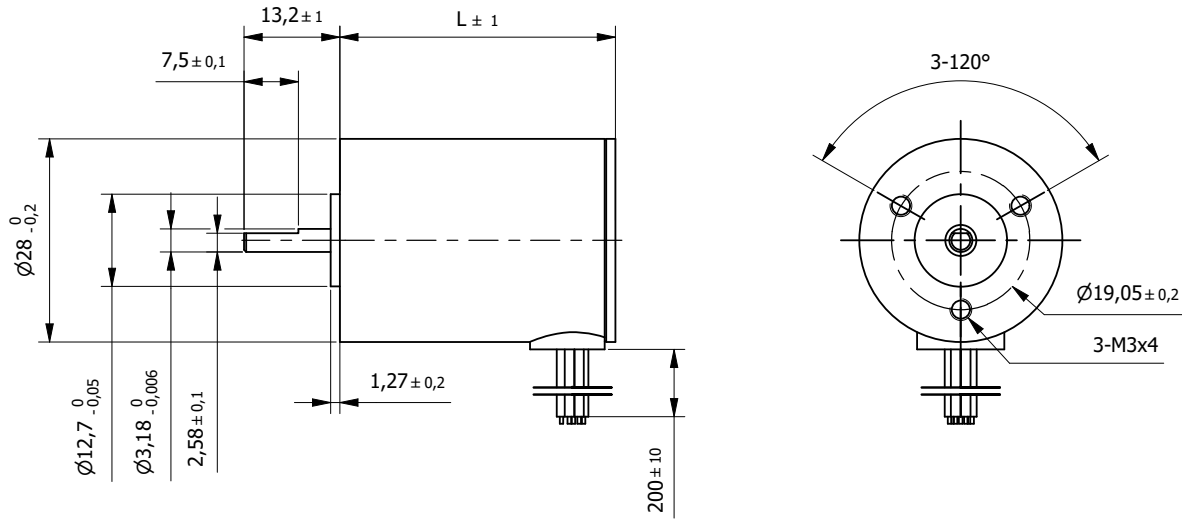
* Rated Torque



| 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 |

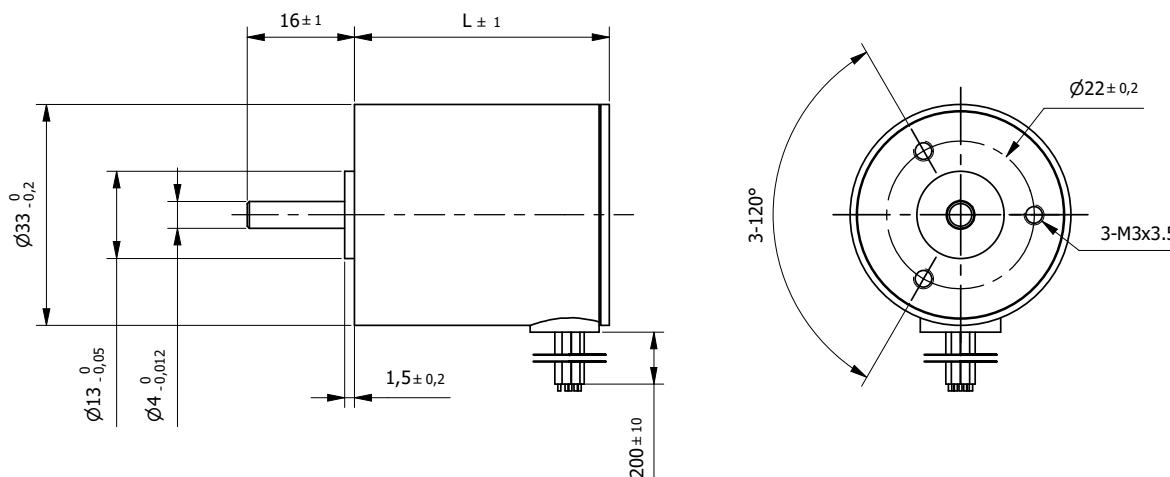


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

| 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 | gcm ² | 2,35 | 3,69 |
| 14 | Length (L) | mm | 26 | 38 |
| 15 | Weight | Kg | 0,06 | 0,082 |

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (10mm from flange) | 10N |
| Max. Axial force | 2N |
| Dielectric strength (for 1 sec.) | 600 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 |

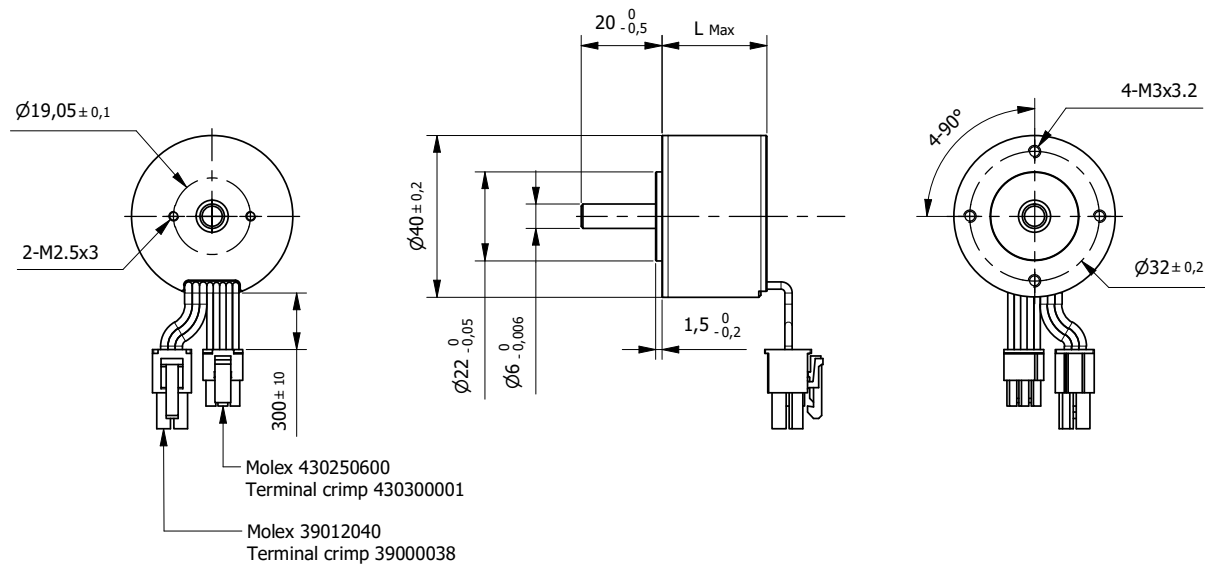


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm

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

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



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

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

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

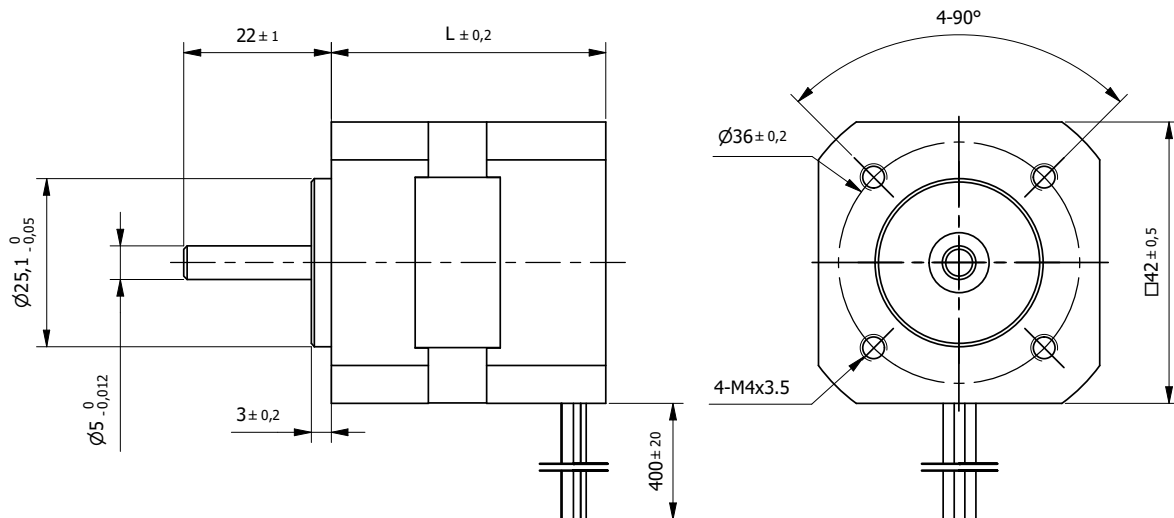
| Connection | | | |
|------------|--------|--------------|-------------------------------|
| Pin n° | Color | Gauge | Function |
| 1 | Red | UL1332 AWG20 | Phase U |
| 2 | Black | | Phase V |
| 3 | White | | Phase W |
| 1 | Yellow | UL1332 AWG26 | Hall A |
| 2 | Brown | | Hall B |
| 3 | Gray | | Hall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

Brushless Slotted Motor 42BL

8-pole

□ 42mm

0,063 - 0,25Nm



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

| Specification | | 42BL41 | 42BL61 | 42BL81 | 42BL100 |
|---------------|-------------------------|------------------|--------|--------|---------|
| 1 | n° of Pole | 8 | 8 | 8 | 8 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Rated Voltage | V | 24 | 24 | 24 |
| 4 | Rated Speed | rpm | 4000 | 4000 | 4000 |
| 5 | Rated Torque | Nm | 0,063 | 0,125 | 0,185 |
| 6 | Max. Peak Torque | Nm | 0,19 | 0,38 | 0,56 |
| 7 | Torque Constant | Nm/A | 0,035 | 0,036 | 0,036 |
| 8 | Rated Current | A | 1,79 | 3,47 | 5,14 |
| 9 | Max. Peak Current | A | 6 | 10,8 | 15,5 |
| 10 | No-Load Current | mA | 200 | 240 | 400 |
| 11 | Line to Line Resistance | Ω | 1,5 | 0,8 | 0,43 |
| 12 | Line to Line Inductance | mH | 2,1 | 1,2 | 0,71 |
| 13 | Rotor Inertia | gcm ² | 24 | 48 | 72 |
| 14 | Length (L) | mm | 41 | 61 | 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 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

Connection

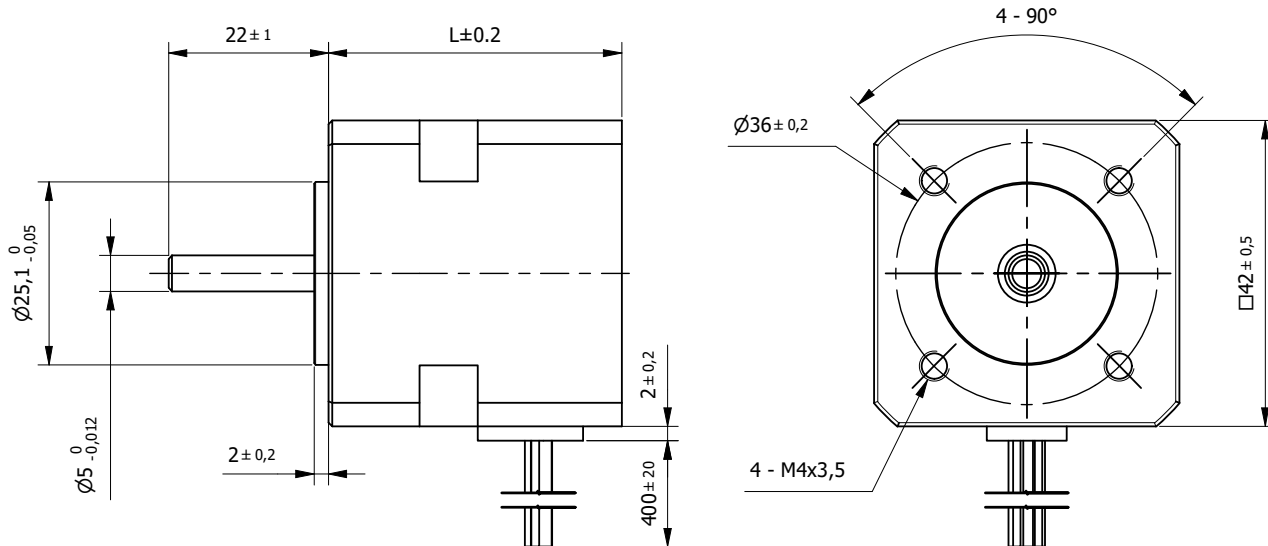
| Lead n° | Color | Gauge | Function |
|---------|--------|--------------|------------------------|
| 1 | Red | UL1430 AWG26 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG20 | Phase U |
| 7 | Red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

Brushless Slotted Motor 42BLA

10-pole

□ 42mm

0,07 - 0,36Nm



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

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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (10mm from flange) | 28N |
| Max. Axial force | 10N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

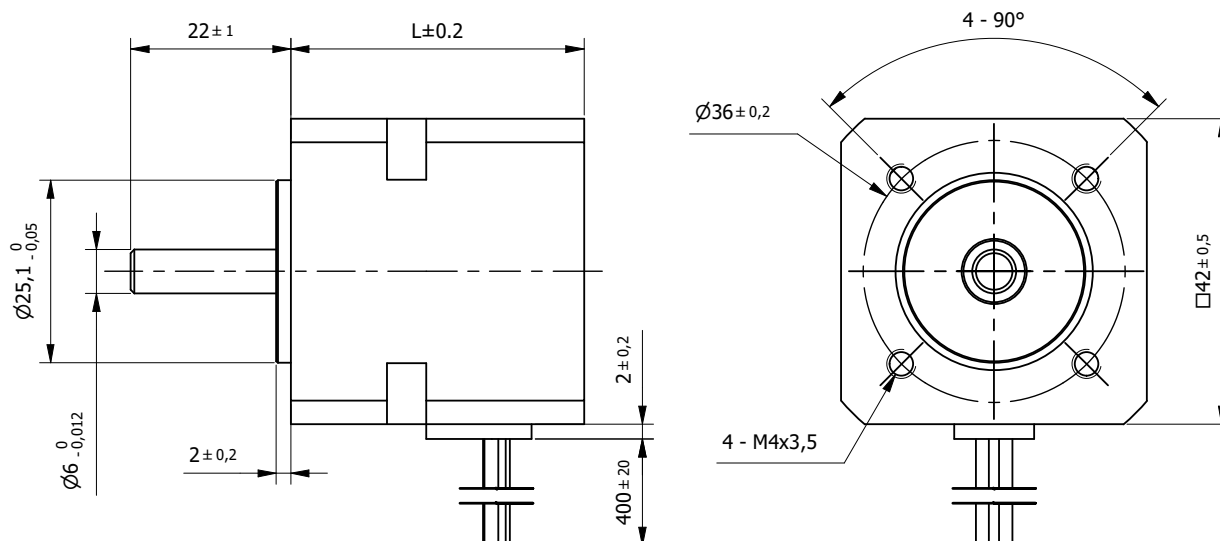
| Connection | | | |
|------------|--------|--------------|------------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG26 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG20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

Brushless Slotted Motor 42BLB

6-pole

□ 42mm

0,064 - 0,43Nm



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

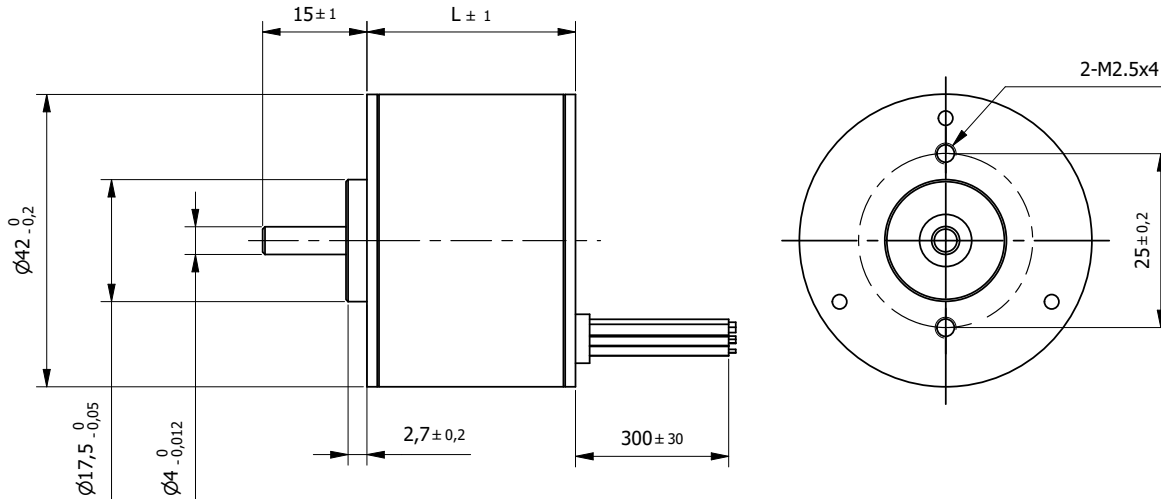
| Specification | | 42BLB01 | 42BLB02 | 42BLB03 | 42BLB04 |
|---------------|-------------------------|------------------|---------|---------|---------|
| 1 | n° of Pole | 6 | 6 | 6 | 6 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Rated Voltage | V | 24 | 24 | 24 |
| 4 | Rated Speed | rpm | 3000 | 3000 | 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 sec.) | 600 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 |



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 | gcm ² | 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 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

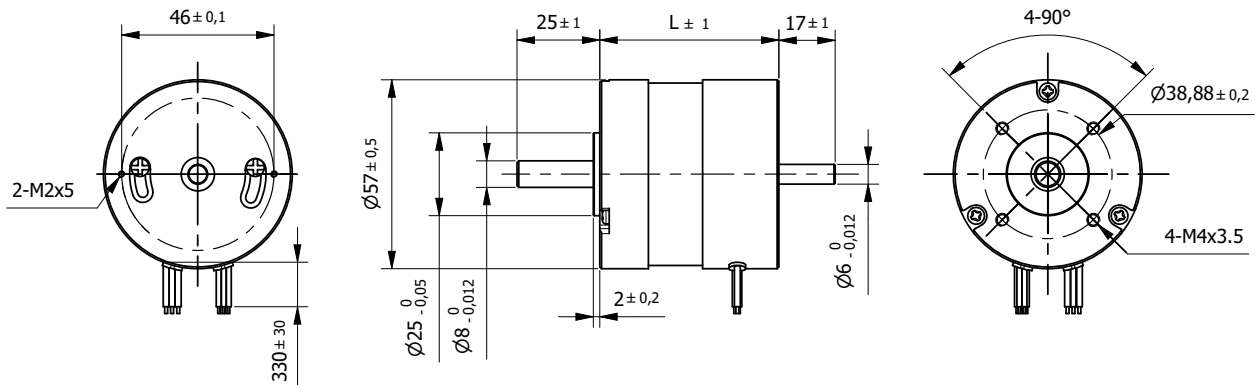
| Connection | | | |
|------------|--------|--------------|------------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Yellow | UL1007 AWG26 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Orange | | Hall B |
| 4 | Brown | | Hall C |
| 5 | White | | GND Hall |
| 6 | Green | UL1007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

Brushless Slotted Motor 57BL

4-pole

Ø 57mm

0,055 - 0,44Nm



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (460g load) | 0,025mm |
| Axial play (4000g load) | 0,025mm |
| Max. Radial force (10mm from flange) | 75N |
| Max. Axial force | 15N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

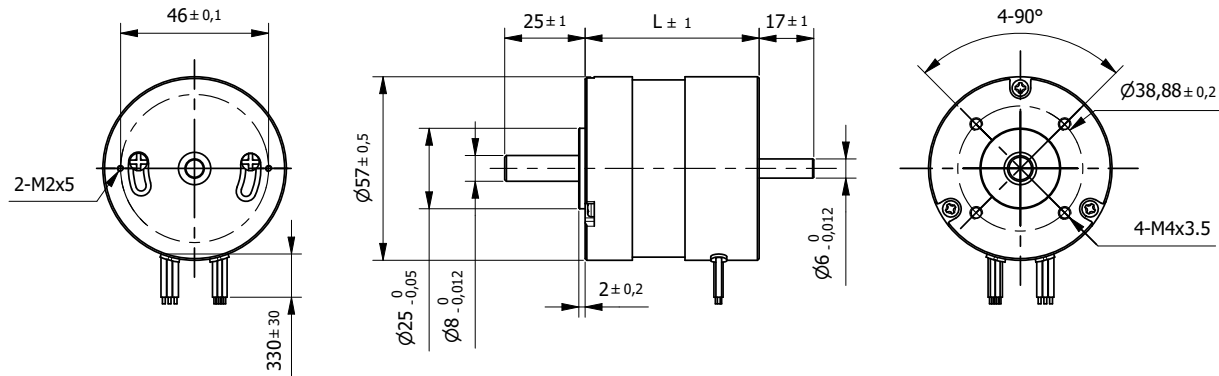
| Connection | | | |
|------------|--------|--------------|------------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG26 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG20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

Brushless Slotted Motor 57BLA

6-pole

Ø 57mm

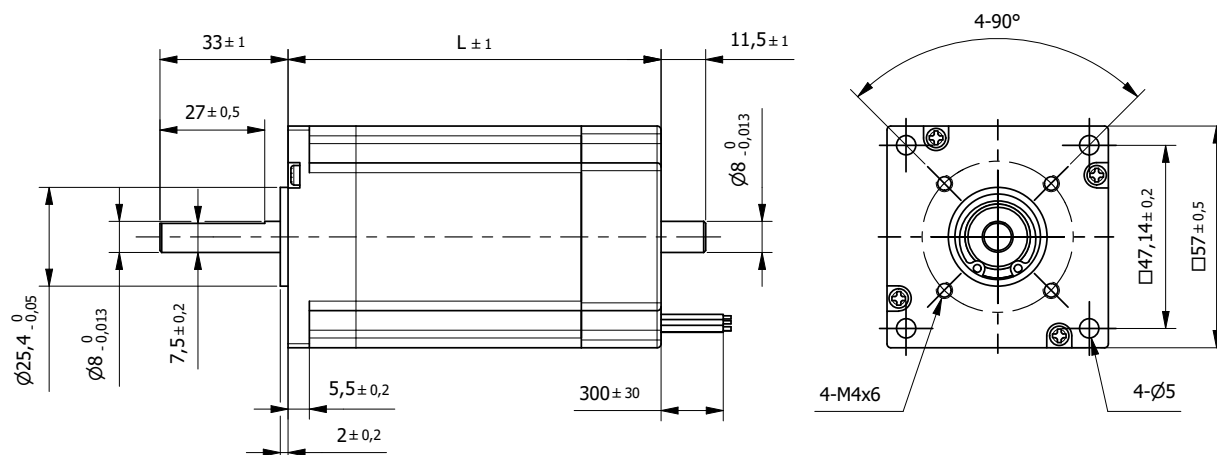
0,2 - 0,8Nm



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (460g load) | 0,025mm |
| Axial play (4000g load) | 0,025mm |
| Max. Radial force (20mm from flange) | 115N |
| Max. Axial force | 45N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

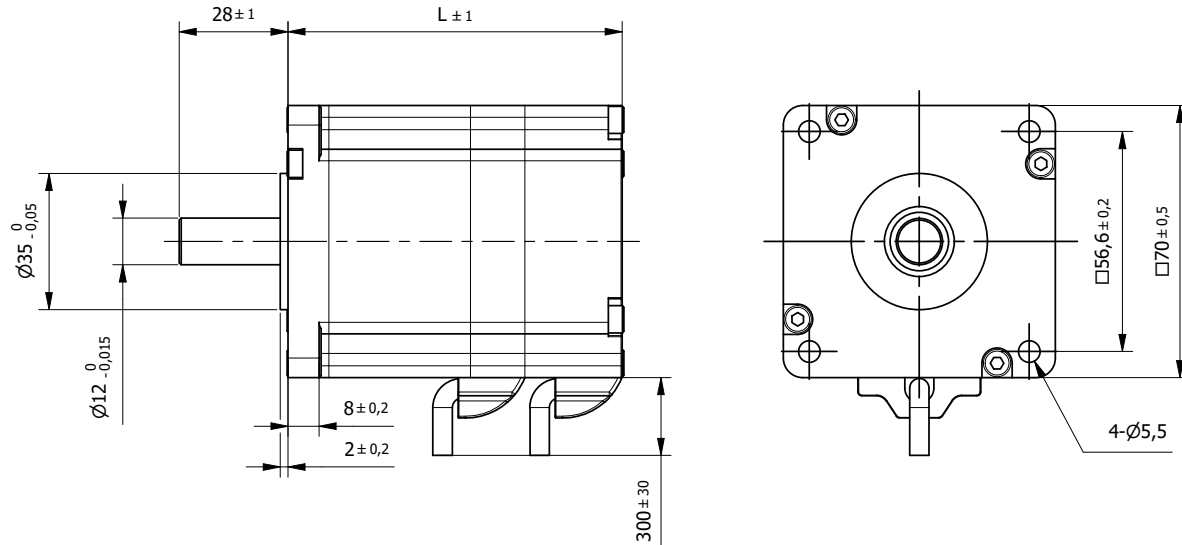
| Connection | | | |
|------------|--------|--------------|------------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG26 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1332 AWG18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



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,025mm |
| Axial play (4000g load) | 0,025mm |
| Max. Radial force (10mm from flange) | 115N |
| Max. Axial force | 45N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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

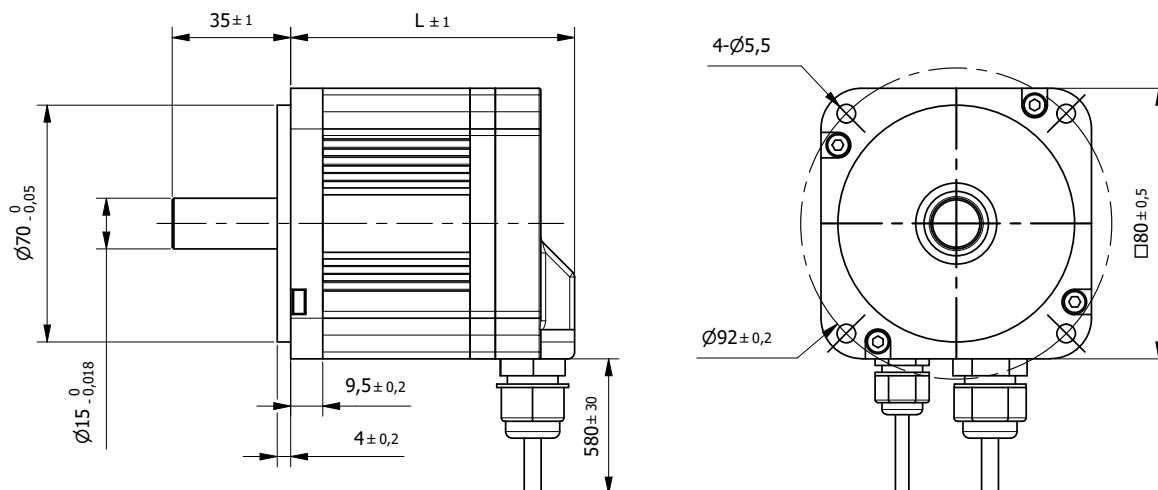


BE Version: Rear shaft 13mm - 2x M2.5 on a diameter 46mm

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

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

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

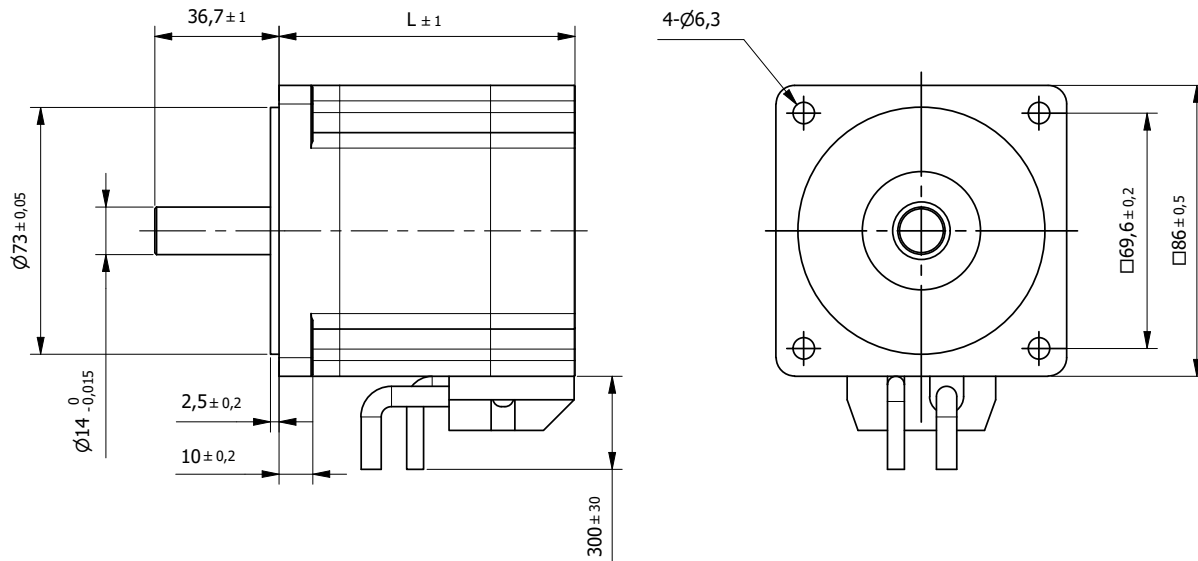


BE Version: Rear shaft 13mm - 2x M2.5 on a diameter 46mm

| Specification | | 80BLS84 | 80BLS105 | 80BLS120 | 80BLS140 |
|---------------|-------------------------|----------------------|----------|----------|----------|
| 1 | n° of Pole | 8 | 8 | 8 | 8 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Rated Voltage | V 48 | 48 | 48 | 48 |
| 4 | Rated Speed | rpm 3000 | 3000 | 3000 | 3000 |
| 5 | Rated Torque | Nm 0,9 | 1,7 | 2,2 | 3 |
| 6 | Max. Peak Torque | Nm 2,5 | 5 | 6,5 | 8,5 |
| 7 | Torque Constant | Nm/A 0,118 | 0,113 | 0,109 | 0,111 |
| 8 | Rated Current | A 7,63 | 15,04 | 20,18 | 27,03 |
| 9 | Max. Peak Current | A 22 | 45 | 61 | 78 |
| 10 | No-Load Current | mA 500 | 700 | 1000 | 1500 |
| 11 | Line to Line Resistance | Ω 0,25 | 0,1 | 0,07 | 0,057 |
| 12 | Line to Line Inductance | mH 1,3 | 0,6 | 0,4 | 0,3 |
| 13 | Rotor Inertia | gcm ² 544 | 1020 | 1360 | 1900 |
| 14 | Length (L) | mm 84 | 105 | 120 | 140 |
| 15 | Weight | Kg 1,6 | 2 | 2,5 | 2,9 |

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

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

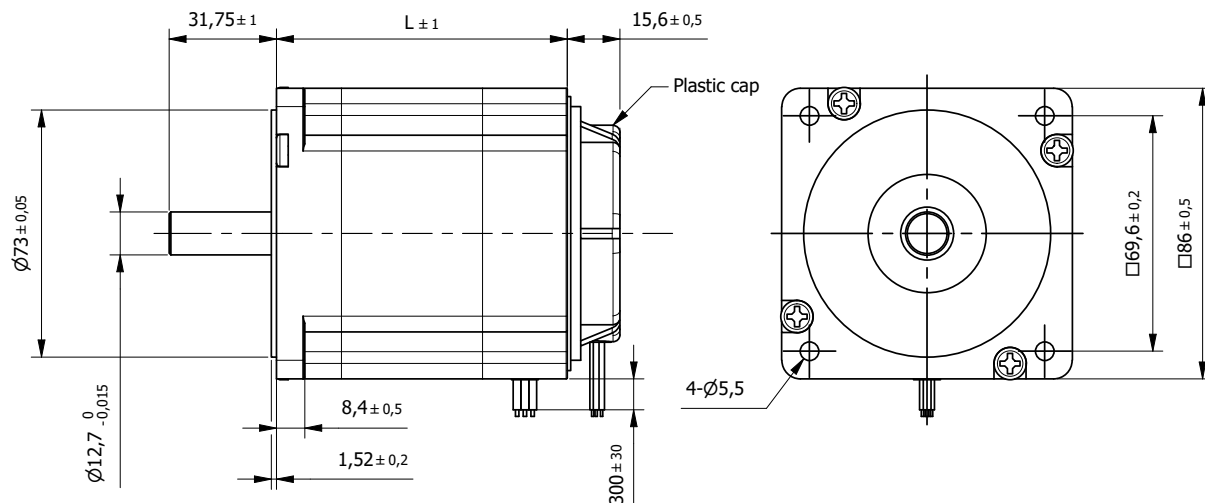


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 46mm

| Specification | | 86BLC64 | 86BLC77 | 86BLC105 | 86BLC125 |
|---------------|-------------------------|------------------|---------|----------|----------|
| 1 | n° of Pole | 8 | 8 | 8 | 8 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Rated Voltage | V | 48 | 48 | 48 |
| 4 | Rated Speed | rpm | 3000 | 3000 | 3000 |
| 5 | Rated Torque | Nm | 0,4 | 0,8 | 1,6 |
| 6 | Max. Peak Torque | Nm | 1,2 | 2,4 | 4,8 |
| 7 | Torque Constant | Nm/A | 0,122 | 0,149 | 0,135 |
| 8 | Rated Current | A | 3,28 | 5,37 | 11,85 |
| 9 | Max. Peak Current | A | 11 | 17,5 | 37 |
| 10 | No-Load Current | mA | 380 | 550 | 860 |
| 11 | Line to Line Resistance | Ω | 1 | 0,34 | 0,14 |
| 12 | Line to Line Inductance | mH | 1,4 | 0,6 | 0,36 |
| 13 | Rotor Inertia | gcm ² | 400 | 800 | 1600 |
| 14 | Length (L) | mm | 64 | 77 | 105 |
| 15 | Weight | Kg | 1,5 | 1,85 | 2,7 |

| 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 sec.) | 600 VAC |
| 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 sec.) | 600 VAC |
| 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 |

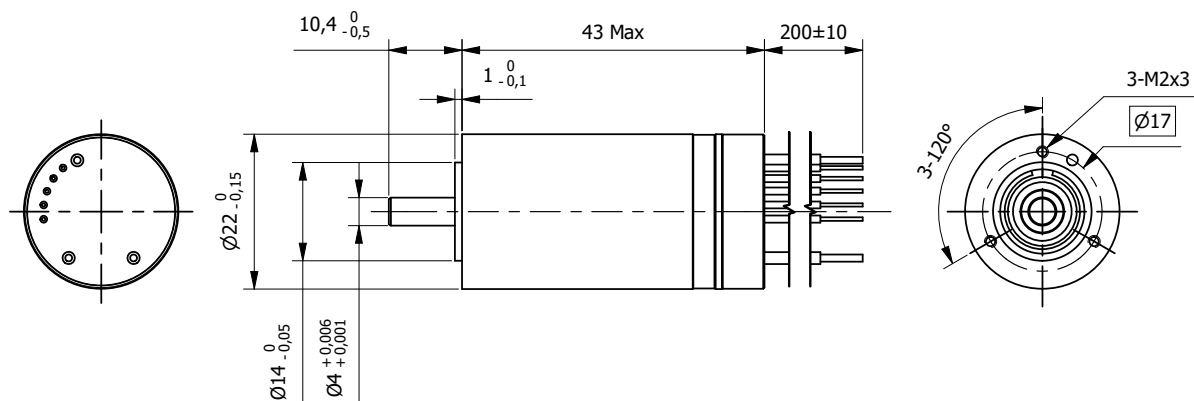


BLDC Slotted motors

EC series - High Performance

| BLDC Slotted motors - EC High Performance series | Torque* (Nm) | |
|--|--------------|----|
| 22EC43N | 0,03 | 90 |
| 22EC58N | 0,05 | 91 |
| 22EC82N | 0,08 | 92 |

* Rated Torque

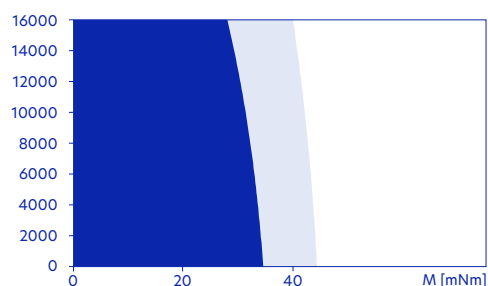


| Specification | | | |
|---------------|--------------------------|--------------------------|----------|
| Model | | ...13107 | ...10903 |
| 1 | n° of Pole | 8 | 8 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V 24 | 48 |
| 4 | Rated Speed | rpm 13100 | 10900 |
| 5 | Rated Torque | mNm 28,6 |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

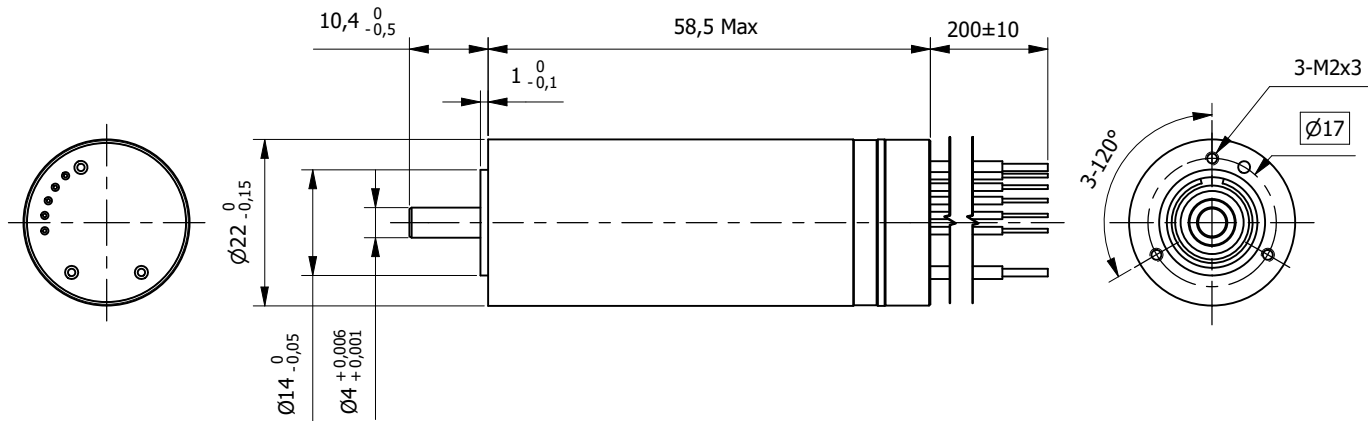
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature Ball bearings | -40°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 16000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,24mm |
| Max. Radial force (5mm from flange)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

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

Operating range: Winding 24V



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



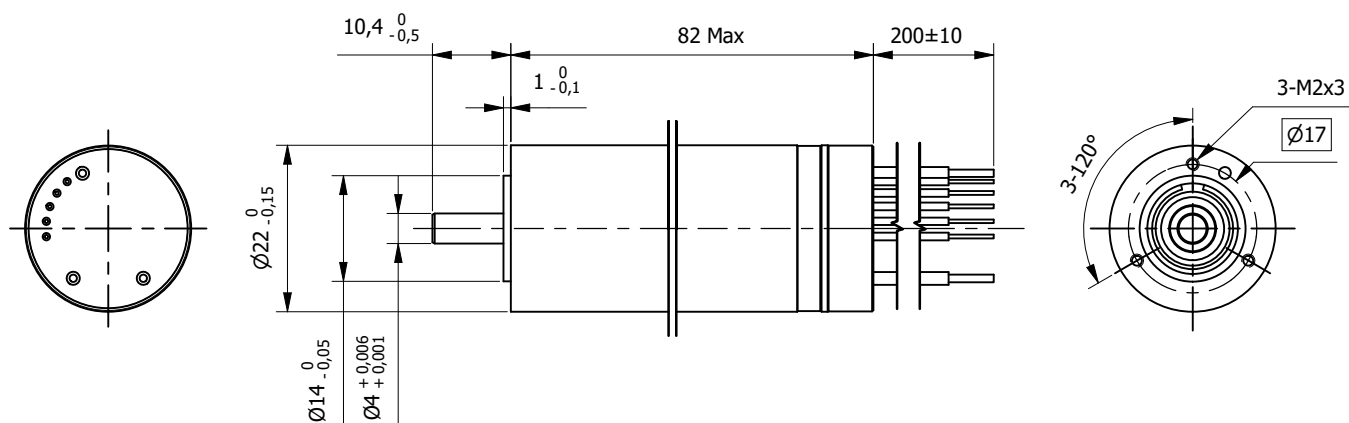
| Specification | | | | | |
|---------------|--------------------------|----------------------|---------|---------|-------|
| Model | ... | ...7902 | ...8807 | ...9302 | |
| 1 | n° of Pole | 8 | 8 | 8 | |
| 2 | n° of Phase | 3 | 3 | 3 | |
| 3 | Rated Voltage | V | 12 | 24 | 48 |
| 4 | Rated Speed | rpm | 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



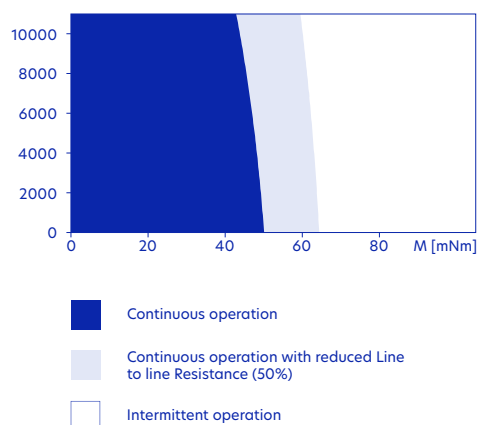


| Specification | | | | |
|---------------|--------------------------|----------------------|---------|-------|
| Model | | ...5001 | ...5304 | |
| 1 | n° of Pole | 8 | 8 | |
| 2 | n° of Phase | 3 | 3 | |
| 3 | Rated Voltage | V | 24 | 48 |
| 4 | Rated Speed | rpm | 5000 | 5320 |
| 5 | Rated Torque |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

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

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

Operating range: Winding 24V



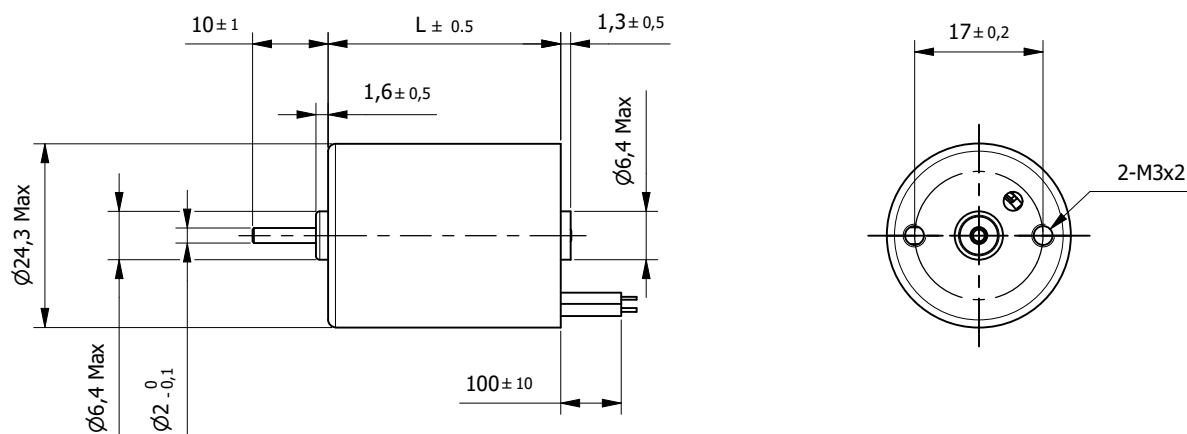


BLDC Slotted motors

CBL series - Economy

| BLDC Slotted motors - CBL Economy series | Torque* (Nm) | |
|--|--------------|-----|
| 24CBL30 | 0,006 | 96 |
| 28CBL | 0,028...0,05 | 97 |
| 36CBL | 0,015...0,09 | 98 |
| 38CBL58 | 0,07 | 99 |
| 42CBL | 0,068...0,15 | 100 |
| 48CBL68 | 0,18 | 101 |

* Rated Torque

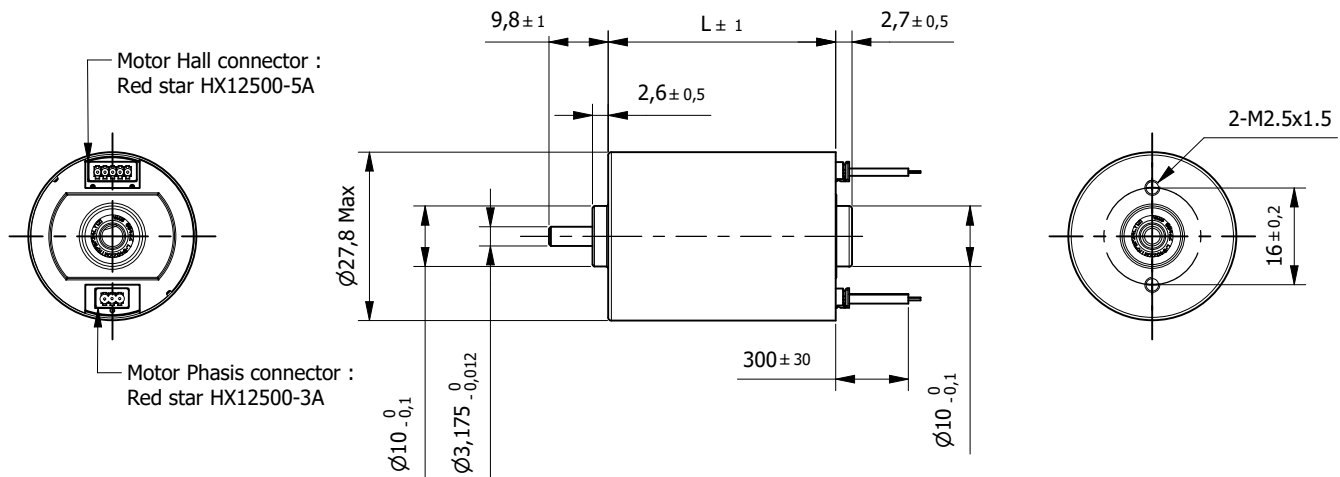


Motor with Sleeve Bearings

| 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 (450g load) | 0,025mm |
| Axial play (450g load) | 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 |

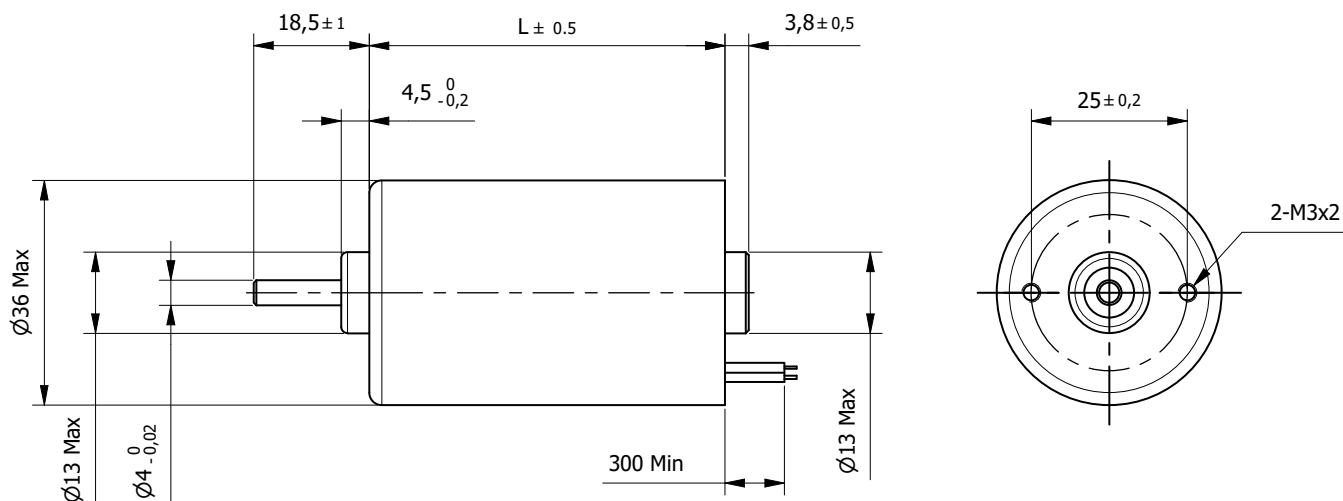
| Connection | | | |
|------------|--------|--------------|-----------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG28 | VCC Hall +5 to +24VDC |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG26 | 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 | 24 | 24 |
| 4 | Rated Speed | 4000 rpm | 4500 rpm |
| 5 | Rated Torque | 0,028 Nm | 0,05 Nm |
| 6 | Max. Peak Torque | 0,084 Nm | 0,15 Nm |
| 7 | Torque Constant | 0,043 Nm/A | 0,036 Nm/A |
| 8 | Rated Current | 0,75 A | 1,5 A |
| 9 | Max. Peak Current | 2,3 A | 4,5 A |
| 10 | No-Load Current | 300 mA | <400 mA |
| 11 | Line to Line Resistance | 5,7 Ω | 3,2 Ω |
| 12 | Line to Line Inductance | 2,48 mH | 1,2 mH |
| 13 | Rotor Inertia | 5,8 gcm ² | 6 gcm ² |
| 14 | Length (L) | 38 mm | 48 mm |
| 15 | Weight | 0,095 Kg | 0,12 Kg |

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

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



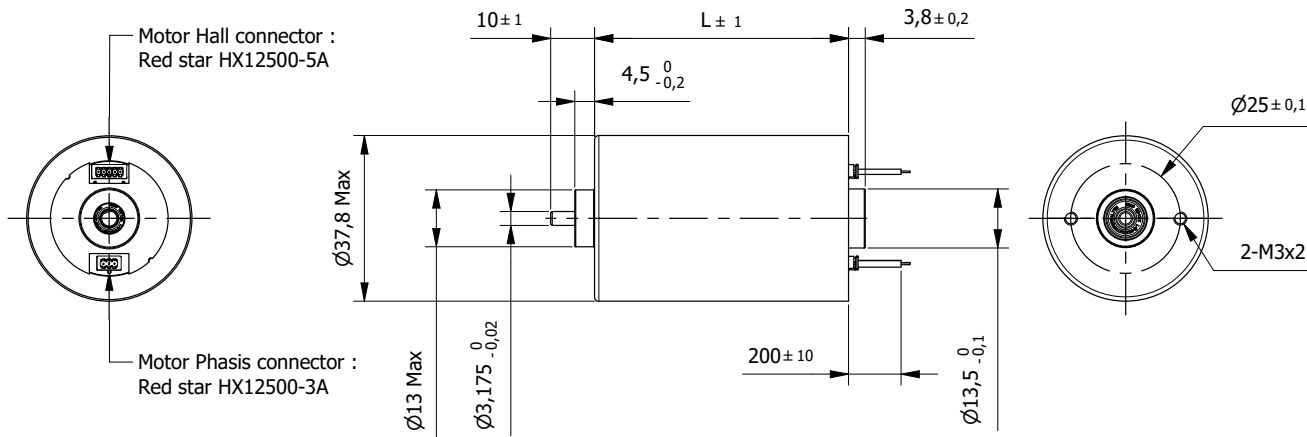
| Specification | | 36CBL30 | 36CBL40 | 36CBL50 | 36CBL57 | 36CBL60 | 36CBL65 | |
|---------------|-------------------------|------------------|---------|---------|---------|---------|---------|-------|
| 1 | n° of Pole | 8 | 8 | 8 | 8 | 8 | 8 | |
| 2 | n° of Phase | 3 | 3 | 3 | 3 | 3 | 3 | |
| 3 | Rated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

Characteristics

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

Connection

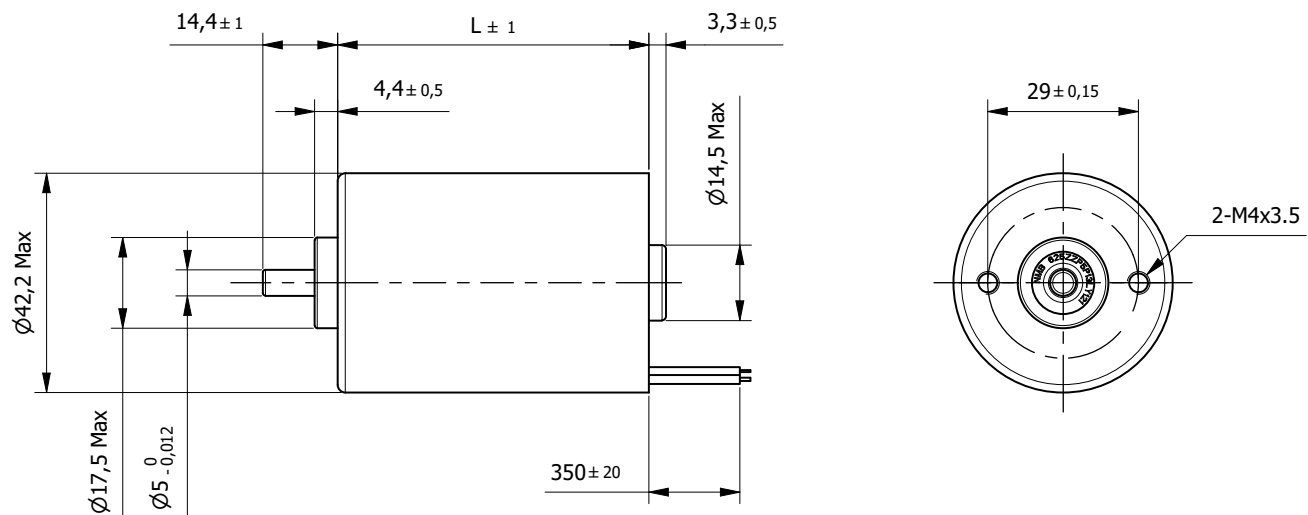
| Lead n° | Color | Gauge | Function |
|---------|--------|--------------|-----------------------|
| 1 | Red | UL1430 AWG26 | VCC Hall +5 to +24VDC |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG24 | Phase U |
| 7 | Brown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



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

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

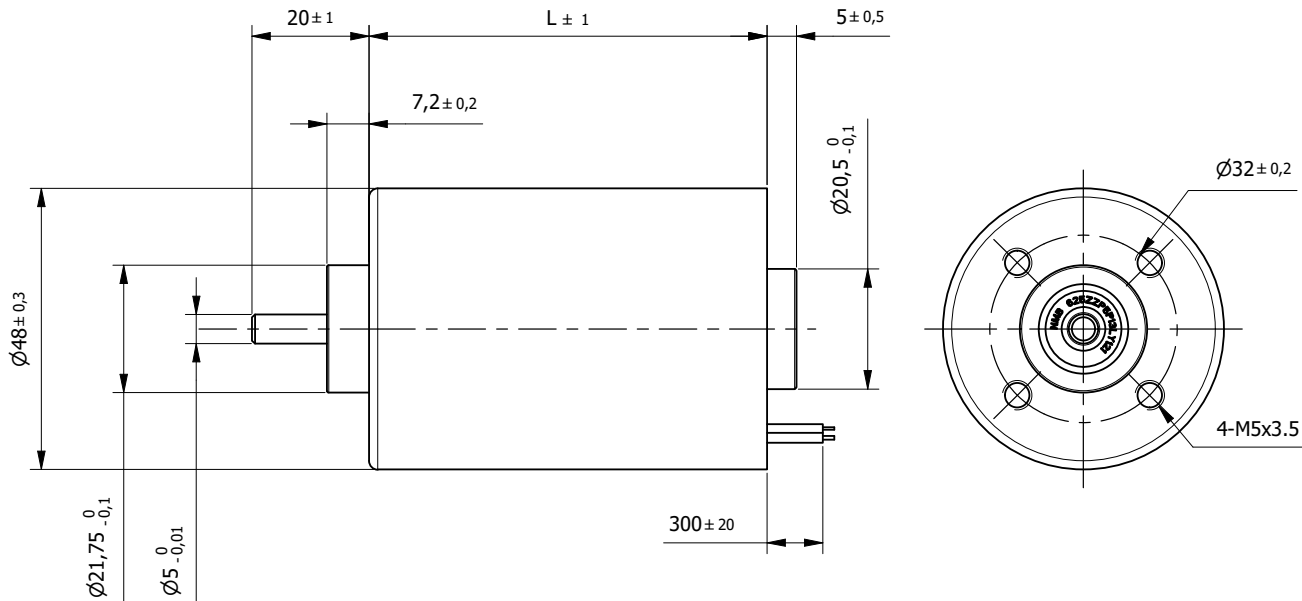
| Connection | | | |
|------------|--------|--------------|-----------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG26 | VCC Hall +5 to +24VDC |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG22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



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (10mm from flange) | 25N |
| Max. Axial force | 15N |
| Dielectric strength (for 1 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 | 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.105



Slotless motors -
EC series
High Performance

p.113

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) | 105 |
|--|---------------|-----|
| 10SBL19 | 0,0005 | 106 |
| 14SBL45 | 0,004 | 107 |
| 16SBL | 0,002...0,009 | 108 |
| 22SBL | 0,006...0,025 | 109 |
| 28SBL | 0,018...0,06 | 110 |
| 40SBL | 0,2...0,25 | 111 |

| BLDC Slotless motors - EC High Performance series | Torque* (Nm) | 113 |
|---|---------------|-----|
| 16EC24P | 0,003 | 114 |
| 16EC36P | 0,008 | 115 |
| 16EC40NS | 0,007 | 116 |
| 16EC56NS | 0,015...0,016 | 117 |
| 22EC32P | 0,010...0,011 | 118 |
| 22EC44NS | 0,018...0,02 | 119 |
| 22EC48P | 0,023 | 120 |
| 22EC48T | 0,043...0,045 | 121 |
| 22EC60NS | 0,027...0,029 | 122 |
| 22EC66T | 0,055 | 123 |
| 30EC42P | 0,034 | 124 |
| 30EC47T | 0,069...0,073 | 125 |
| 30EC64P | 0,061...0,064 | 126 |
| 30EC64T | 0,093...0,096 | 127 |
| 40EC58P | 0,09...0,094 | 128 |
| 40EC88P | 0,21 | 129 |

*Rated Torque

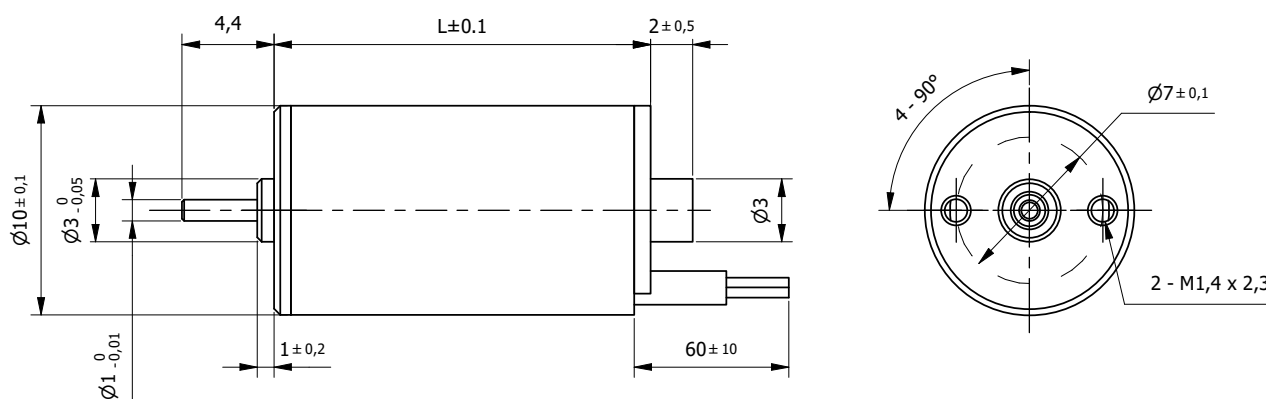


BLDC Slotless motors

SBL series - Standard

| BLDC Slotless motors - SBL Standard series | Torque* (Nm) | |
|--|---------------|-----|
| 10SBL19 | 0,0005 | 106 |
| 14SBL45 | 0,004 | 107 |
| 16SBL | 0,002...0,009 | 108 |
| 22SBL | 0,006...0,025 | 109 |
| 28SBL | 0,018...0,06 | 110 |
| 40SBL | 0,2...0,25 | 111 |

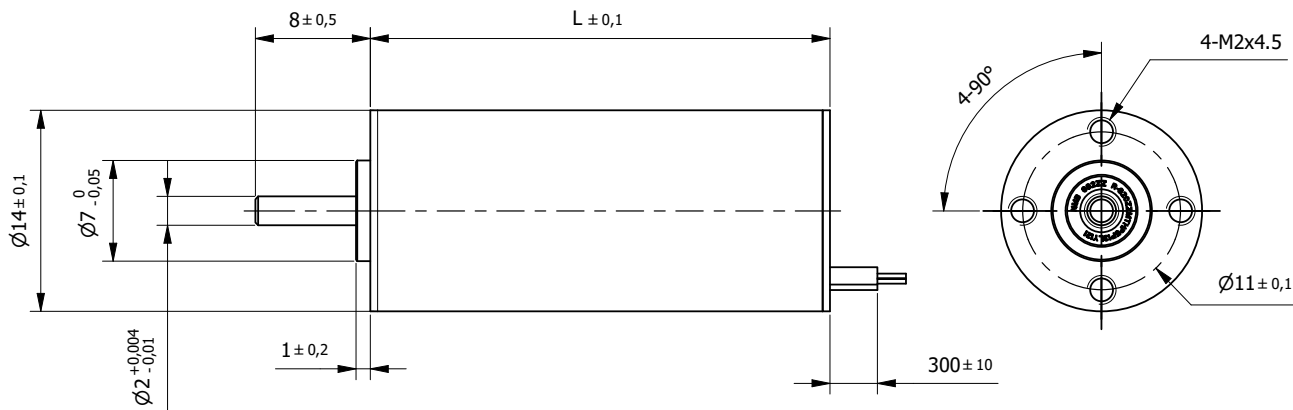
* Rated Torque



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

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

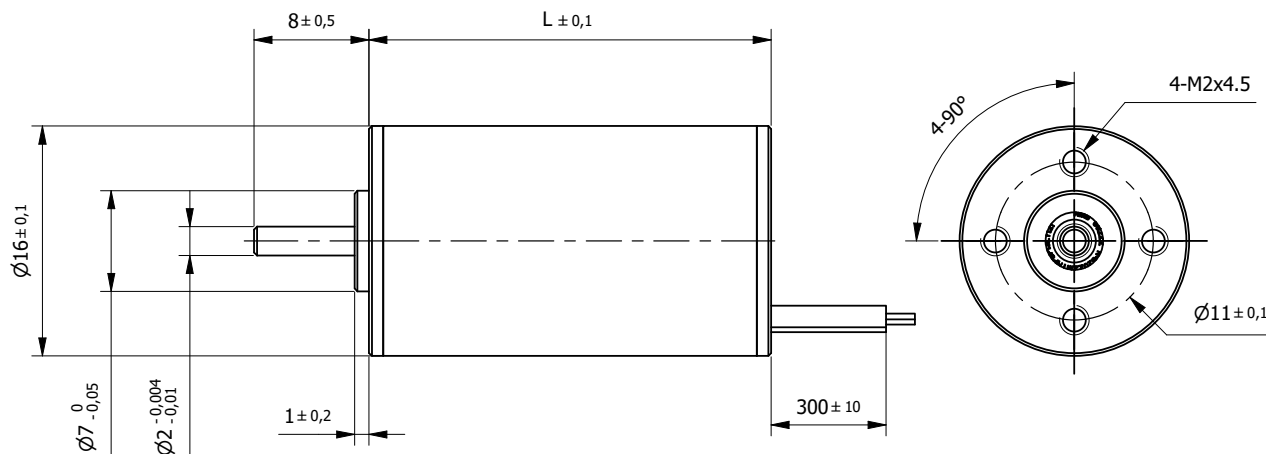
| Connection | | | |
|------------|--------|--------------|------------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG28 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG26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



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

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

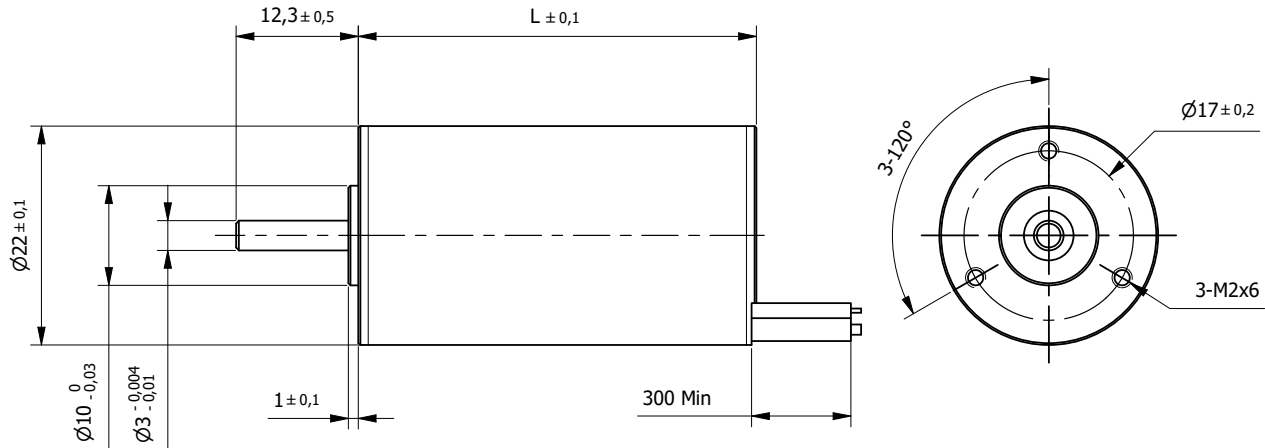
| Connection | | | |
|------------|--------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Yellow | UL1332 AWG26 | Phase U |
| 2 | Red | | Phase V |
| 3 | Black | | Phase W |



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

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

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

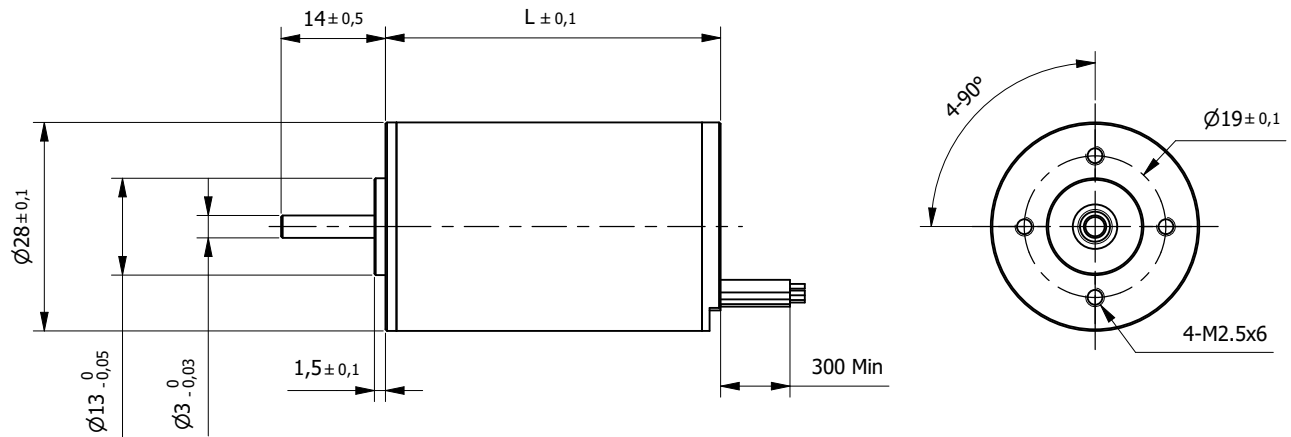


Available with or without Hall Sensors

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

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

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

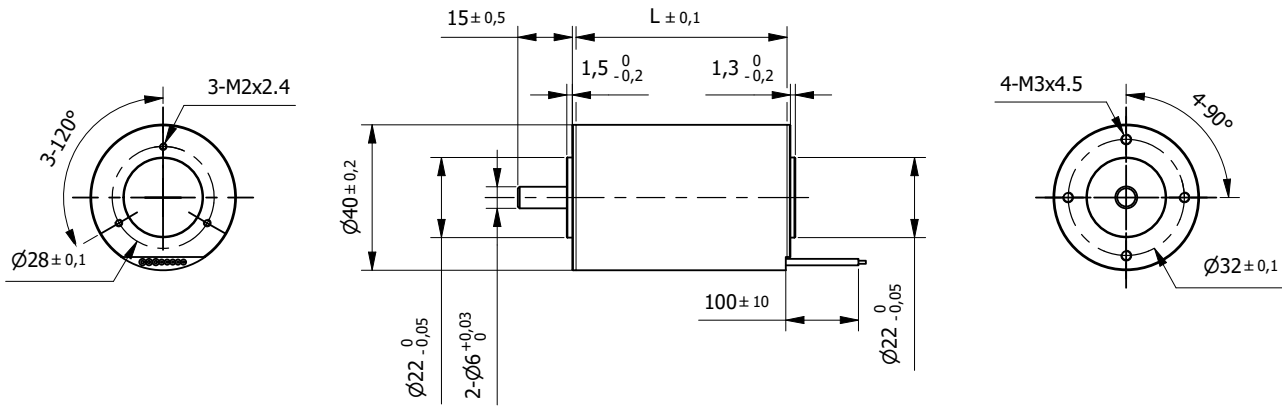


BE Version: Rear shaft 13mm - 2x M2.5 on diameter 19,05mm
Available with or without Hall Sensors

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

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

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



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

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

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

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

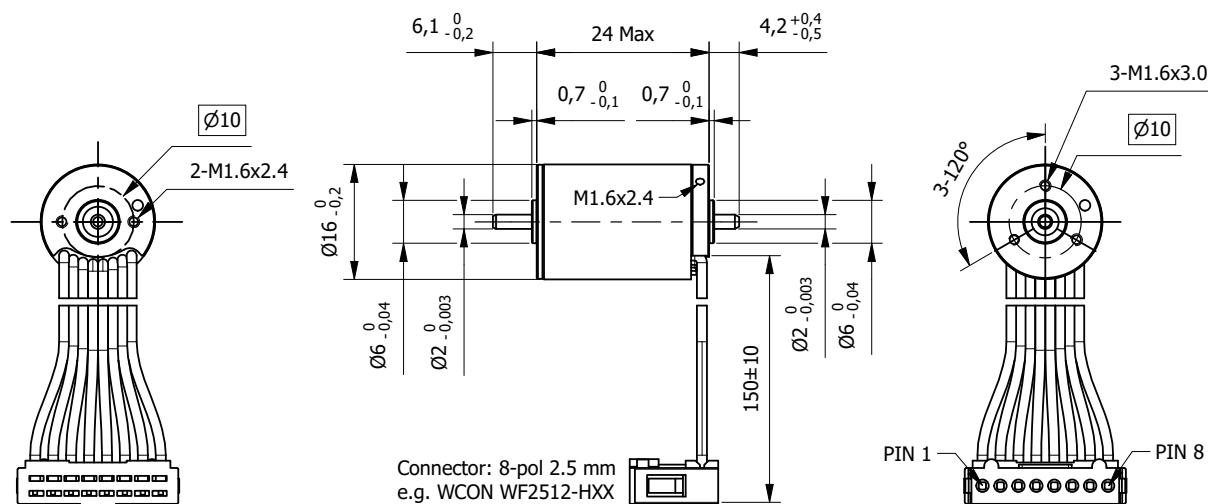


BLDC Slotless motors

EC series - High Performance

| BLDC Slotless motors - EC High Performance series | Torque* (Nm) | |
|---|---------------|-----|
| 16EC24P | 0,003 | 114 |
| 16EC36P | 0,008 | 115 |
| 16EC40NS | 0,007 | 116 |
| 16EC56NS | 0,015...0,016 | 117 |
| 22EC32P | 0,010...0,011 | 118 |
| 22EC44NS | 0,018...0,02 | 119 |
| 22EC48P | 0,023 | 120 |
| 22EC48T | 0,043...0,045 | 121 |
| 22EC60NS | 0,027...0,029 | 122 |
| 22EC66T | 0,055 | 123 |
| 30EC42P | 0,034 | 124 |
| 30EC47T | 0,069...0,073 | 125 |
| 30EC64P | 0,061...0,064 | 126 |
| 30EC64T | 0,093...0,096 | 127 |
| 40EC58P | 0,09...0,094 | 128 |
| 40EC88P | 0,21 | 129 |

* Rated Torque

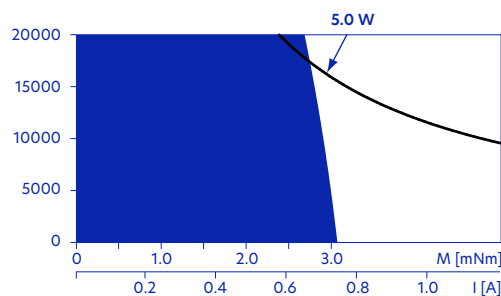


| Specification | | | |
|---------------|--------------------------|------------------|---------|
| Model | | ...5604 | ...5815 |
| 1 | n° of Pole | 2 | 2 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V | 6 |
| 4 | Rated Speed | rpm | 5690 |
| 5 | Rated Torque | mNm | 3,2 |
| 6 | Stall Torque |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

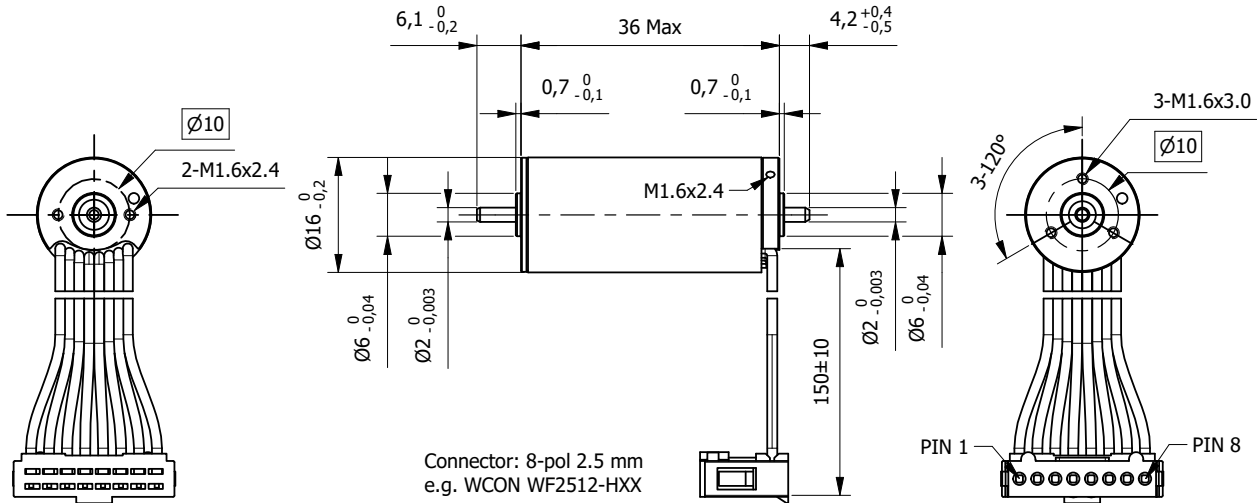
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -40°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 20000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,14mm |
| Max. Radial force (5mm from flange) | 6N |
|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

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

Operating range: Winding 6V



Continuous operation
 Intermittent operation
 Assigned Power Rating

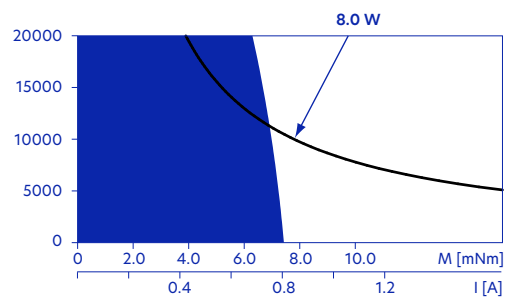


| Specification | | ...7101 | ...7305 | ...7320 | |
|---------------|--------------------------|----------------------|---------|---------|-------|
| 1 | n° of Pole | 2 | 2 | 2 | |
| 2 | n° of Phase | 3 | 3 | 3 | |
| 3 | Rated Voltage | V | 6 | 12 | 24 |
| 4 | Rated Speed | rpm | 7120 | 7300 | 7350 |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

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

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

Operating range: Winding 12V



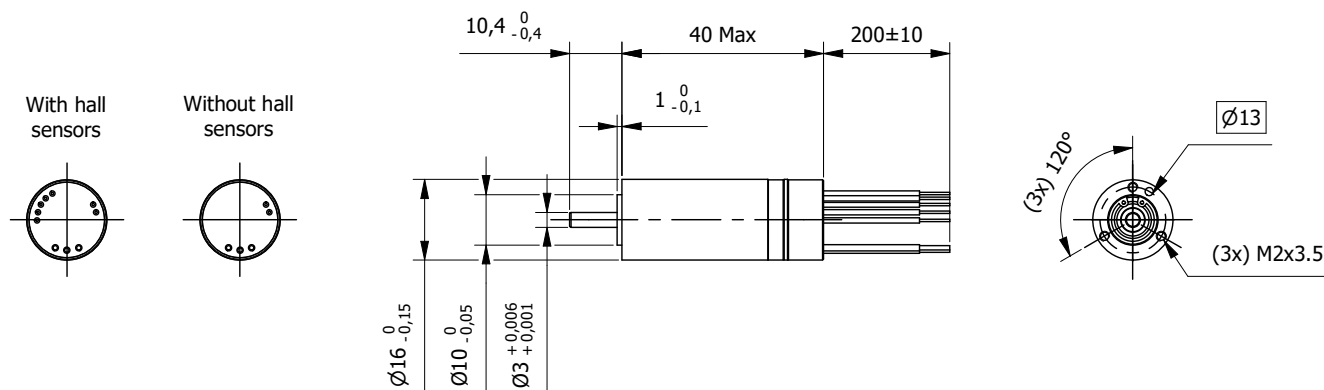
- Continuous operation
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 16EC40NS

High Speed

Ø 16mm

7,2 to 7,5mNm

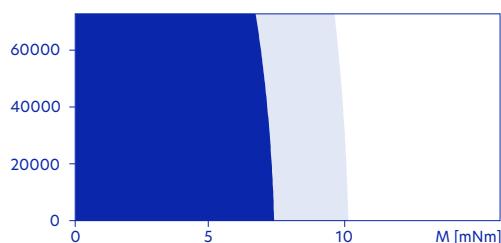


| Specification | | Model | ...50805 | ...54008 | ...52201 | ...52203 |
|---------------|--------------------------|----------------------|----------|----------|----------|----------|
| 1 | n° of Pole | | 2 | 2 | 2 | 2 |
| 2 | n° of Phase | | 3 | 3 | 3 | 3 |
| 3 | Rated Voltage | V | 18 | 24 | 36 | 48 |
| 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



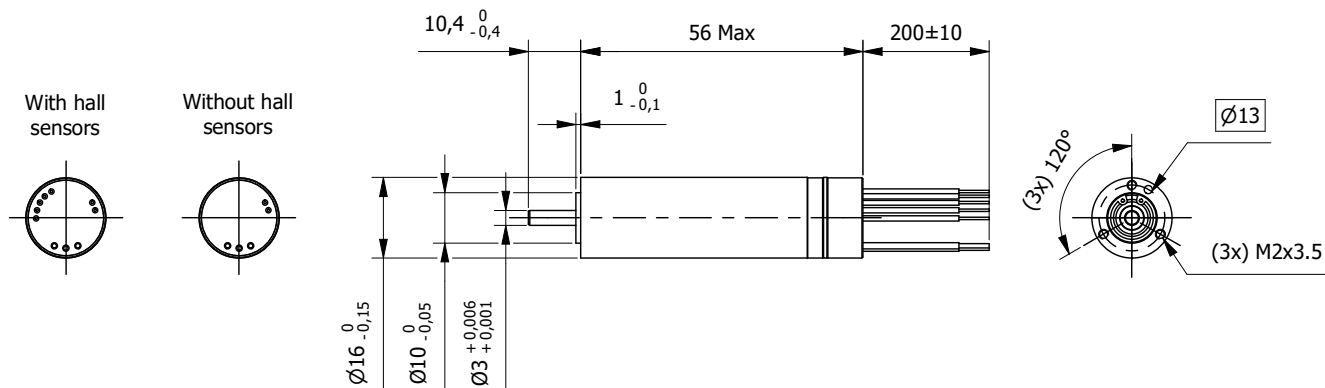
- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

Brushless Slotless Motor 16EC56NS

High Speed

Ø 16mm

14,7 to 16mNm

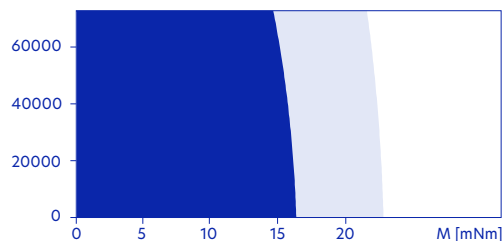


| Specification | | ...61201 | ...61602 | ...61804 | ...61808 | |
|---------------|--------------------------|----------------------|----------|----------|----------|-------|
| 1 | n° of Pole | 2 | 2 | 2 | 2 | |
| 2 | n° of Phase | 3 | 3 | 3 | 3 | |
| 3 | Rated Voltage | V | 18 | 24 | 36 | 48 |
| 4 |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

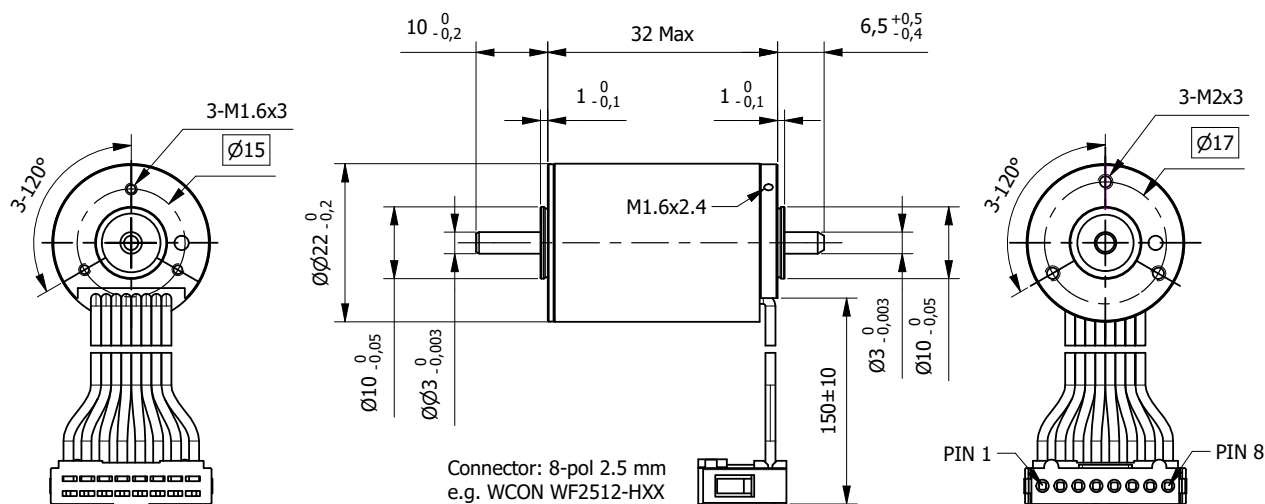
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -20°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 70000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,29mm |
| Max. Radial force (5mm from flange) | 10N |
|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

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

Operating range: Winding 36V



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

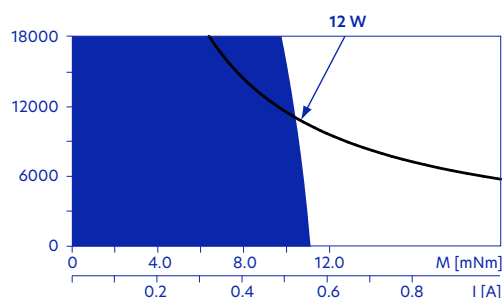


| Specification | | ...7908 | ...8003 | ...8212 | |
|---------------|--------------------------|----------------------|---------|---------|-------|
| 1 | n° of Pole | 2 | 2 | 2 | |
| 2 | n° of Phase | 3 | 3 | 3 | |
| 3 | Rated Voltage | V | 6 | 12 | 24 |
| 4 | Rated Speed | rpm | 7920 | 8040 | 8250 |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

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

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

Operating range: Winding 24V

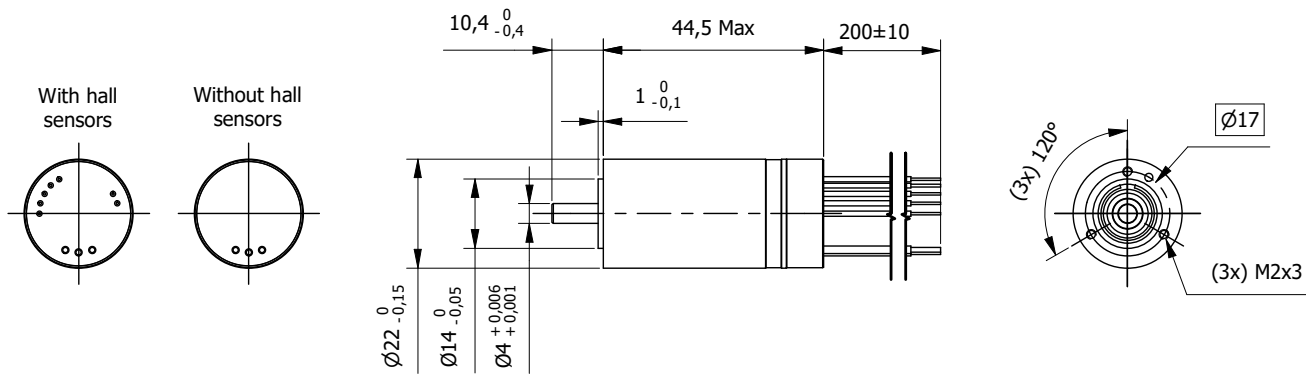


Brushless Slotless Motor 22EC44NS

High Speed

Ø 22mm

18,3 to 20,3mNm

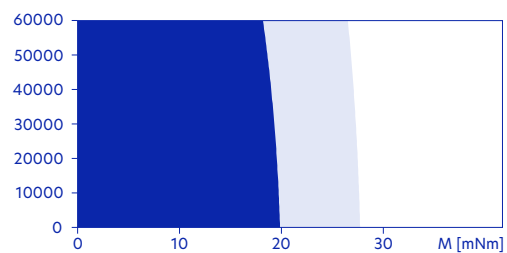


| Specification | | ...48201 | ...55601 | ...53004 | ...49909 |
|---------------|--------------------------|---------------------------|----------|----------|----------|
| 1 | n° of Pole | 2 | 2 | 2 | 2 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Rated Voltage | V 18 | 24 | 36 | 48 |
| 4 | Rated Speed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

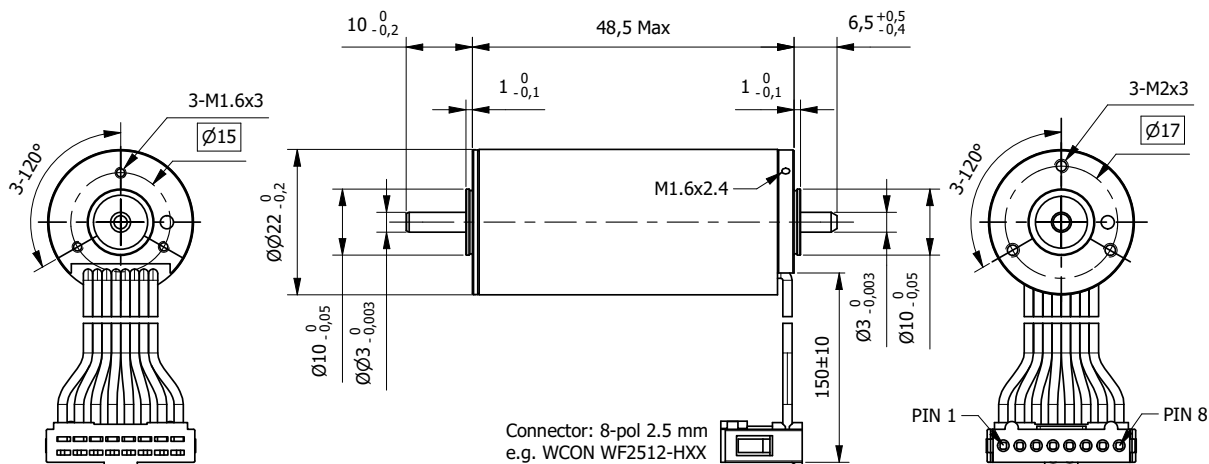
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -20°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 60000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,24mm |
| Max. Radial force (5mm from flange) | 16N |
|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

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

Operating range: Winding 36V



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

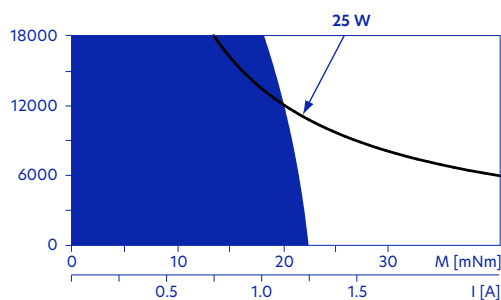


| Specification | | ...9809 | ...10403 | ...10513 |
|---------------|--------------------------|---------------------------|----------|----------|
| 1 | n° of Pole | 2 | 2 | 2 |
| 2 | n° of Phase | 3 | 3 | 3 |
| 3 | Rated Voltage | V 12 | 24 | 48 |
| 4 | Rated Speed | rpm 9800 | 10400 | 10500 |
| 5 |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

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

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

Operating range: Winding 24V



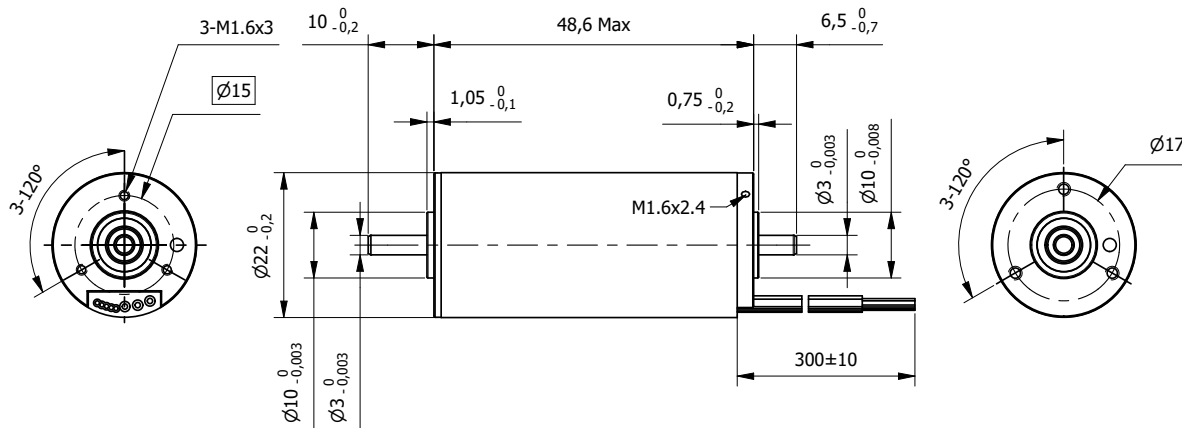
- Continuous operation
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 22EC48T

High Torque

Ø 22mm

42,6 to 45,1mNm

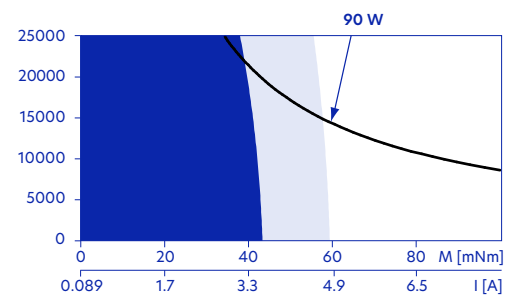


| Specification | | | |
|---------------|--------------------------|--------------------------|----------|
| Model | | ...15005 | ...14902 |
| 1 | n° of Pole | 4 | 4 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V 24 | 48 |
| 4 | Rated Speed | rpm 15000 | 14900 |
| 5 | Rated Torque | mNm 45,1 |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

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

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

Operating range: Winding 24V



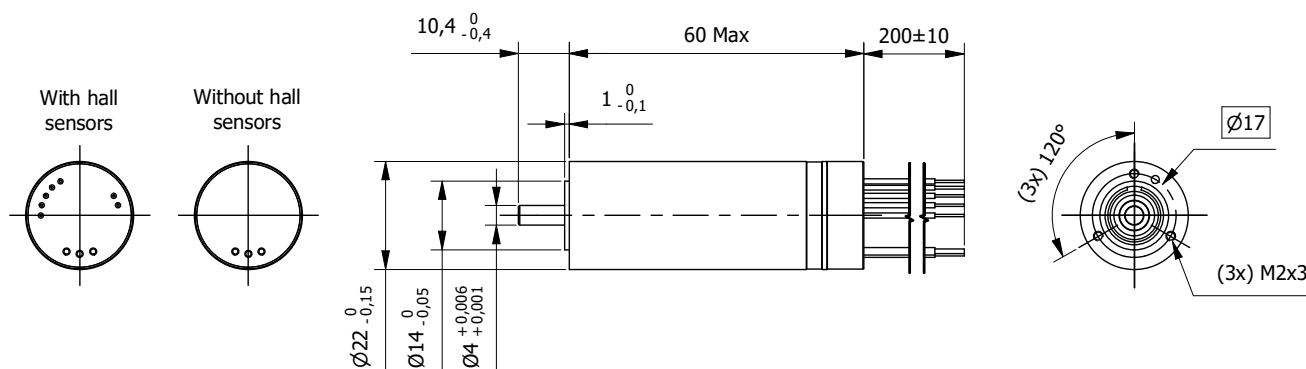
- Continuous operation
- Continuous operation with reduced Line to line Resistance (50%)
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 22EC60NS

High Speed

Ø 22mm

27,4 to 29,3mNm

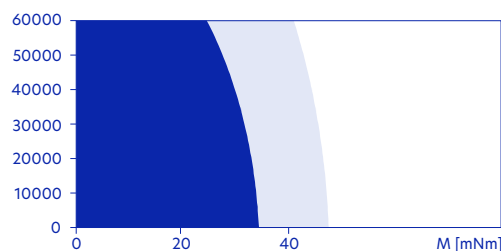


| Specification | | ...47801 | ...49904 | ...50903 |
|---------------|--------------------------|--------------------------|----------|----------|
| 1 | n° of Pole | 2 | 2 | 2 |
| 2 | n° of Phase | 3 | 3 | 3 |
| 3 | Rated Voltage | V 24 | 36 | 48 |
| 4 | Rated Speed | rpm 47800 | 49900 | 50900 |
| 5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

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

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

Operating range: Winding 36V



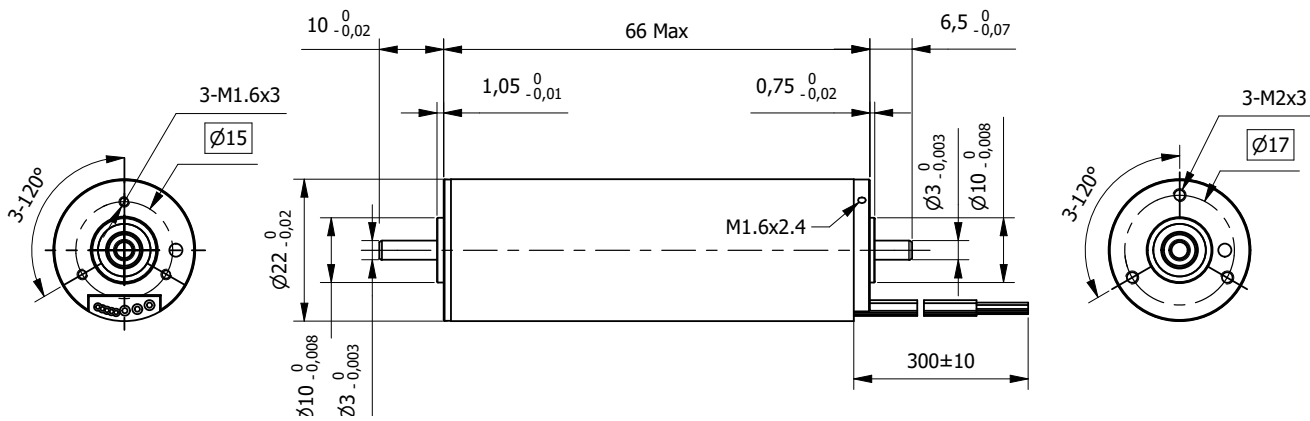
- Continuous operation
- Continuous operation with reduced thermal resistance (50%)
- Intermittent operation

Brushless Slotless Motor 22EC66T

High Torque

Ø 22mm

54,5 to 54,6mNm

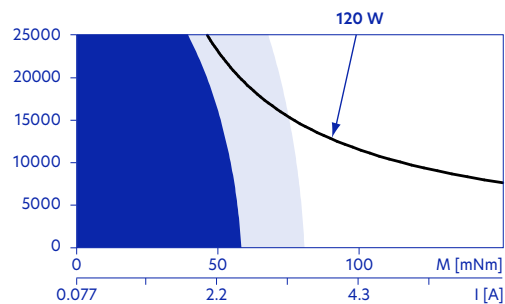


| Specification | | | |
|---------------|--------------------------|----------------------|----------|
| Model | | ...15803 | ...15801 |
| 1 | n° of Pole | 4 | 4 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V | 24 |
| 4 | Rated Speed | rpm | 15800 |
| 5 | Rated Torque | mNm | 54,6 |
| 6 | Stall 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 |

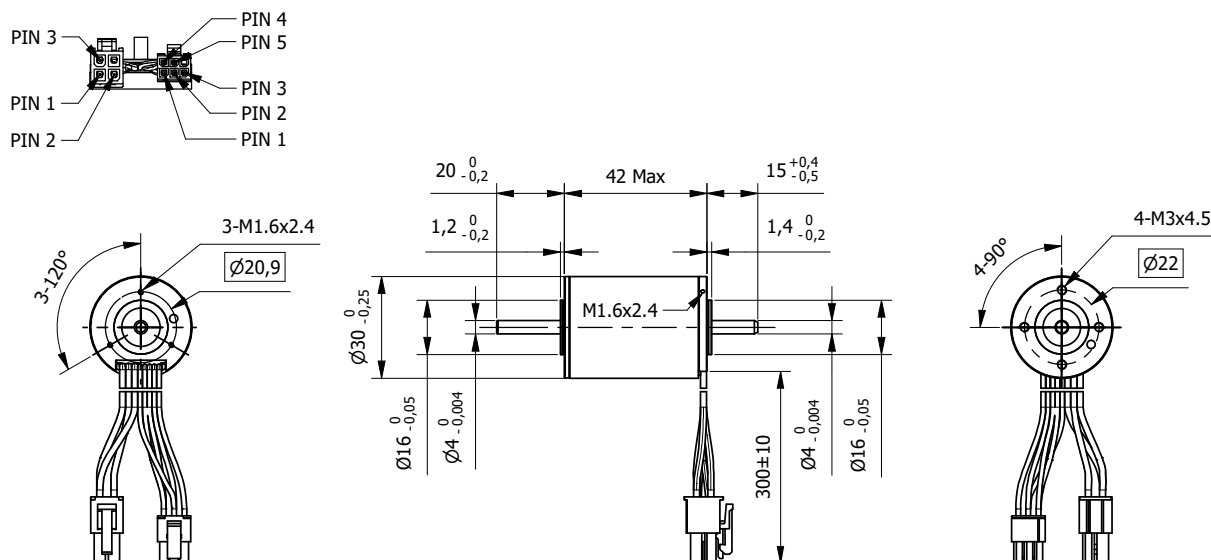
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -20°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 25000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,14mm |
| Max. Radial force (5mm from flange) | 16N |
|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

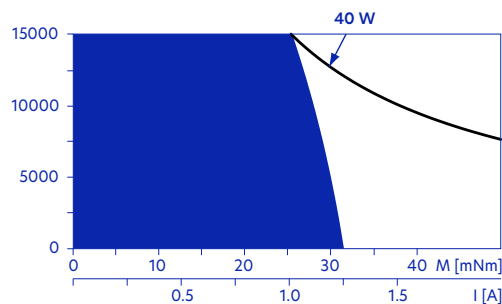


| Specification | | | |
|---------------|--------------------------|--------------------------|---------|
| Model | | ...7203 | ...7214 |
| 1 | n° of Pole | 2 | 2 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V 24 | 48 |
| 4 | Rated Speed | rpm 7220 | 7210 |
| 5 | Rated Torque | mNm 33,8 | 33,4 |
| 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 | gcm ² 11 | 11 |
| 16 | Max. Efficiency | % 75 | 75 |
| 17 | Mechanical Time Constant | ms 6,81 | 6,9 |
| 18 | Length (L) | mm 42 | 42 |
| 19 | Weight | g 195 | 195 |

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

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

Operating range: Winding 24V

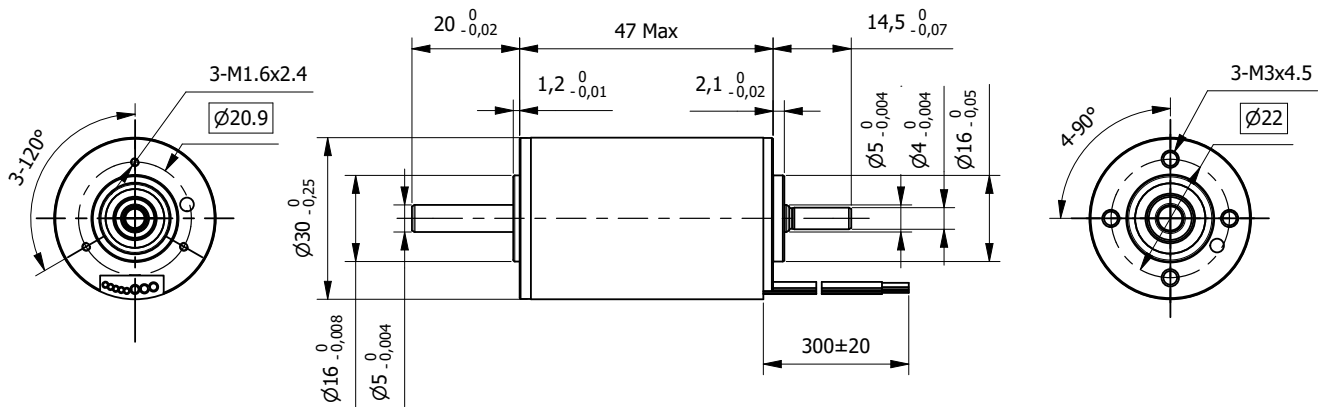


Brushless Slotless Motor 30EC47T

High Torque

Ø 30mm

68,8 to 73,4mNm

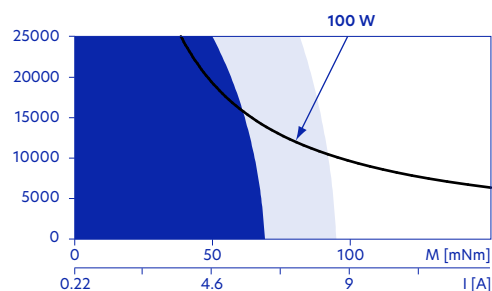


| Specification | | | |
|---------------|--------------------------|--------------------------|----------|
| Model | | ...16302 | ...16408 |
| 1 | n° of Pole | 4 | 4 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V 24 | 48 |
| 4 | Rated Speed | rpm 16300 | 16400 |
| 5 | Rated Torque | mNm 68,8 |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

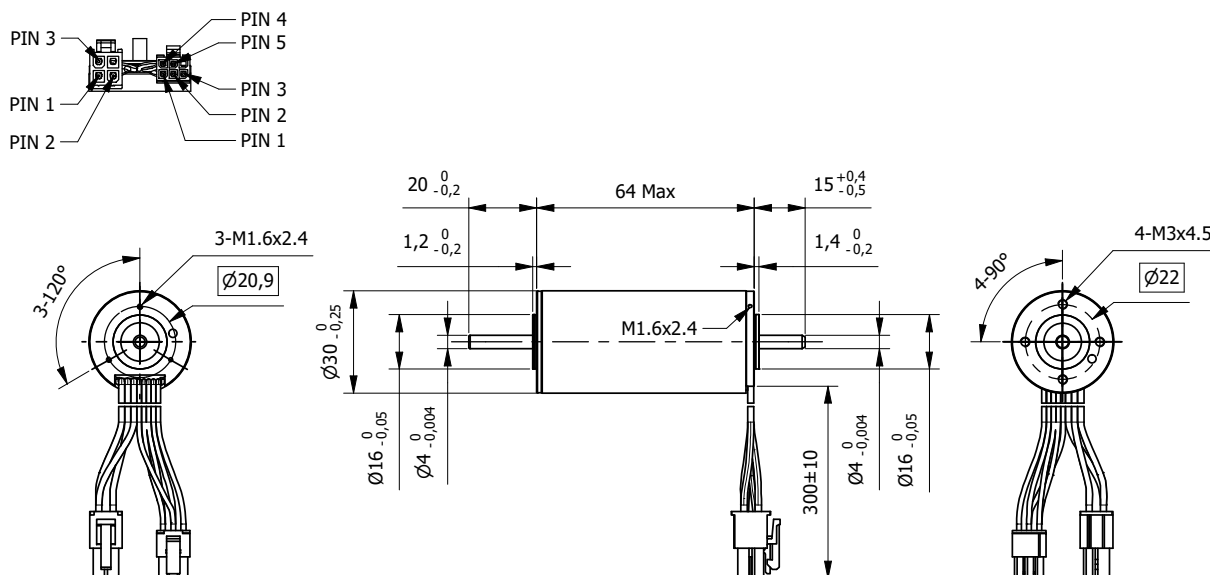
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -20°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 25000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,14mm |
| Max. Radial force (5mm from flange) | 25N |
|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

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

Operating range: Winding 24V



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

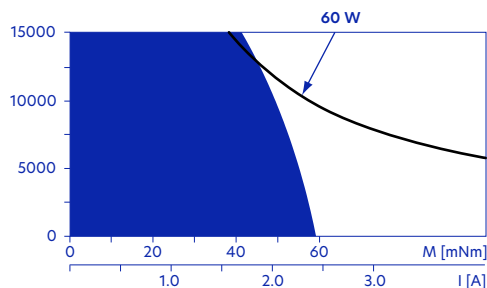


| Specification | | | |
|---------------|--------------------------|----------------------|---------|
| Model | | ...8001 | ...8104 |
| 1 | n° of Pole | 2 | 2 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V | 24 |
| 4 | Rated Speed | rpm | 8040 |
| 5 | Rated Torque | mNm | 60,7 |
| 6 | Stall Torque | 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



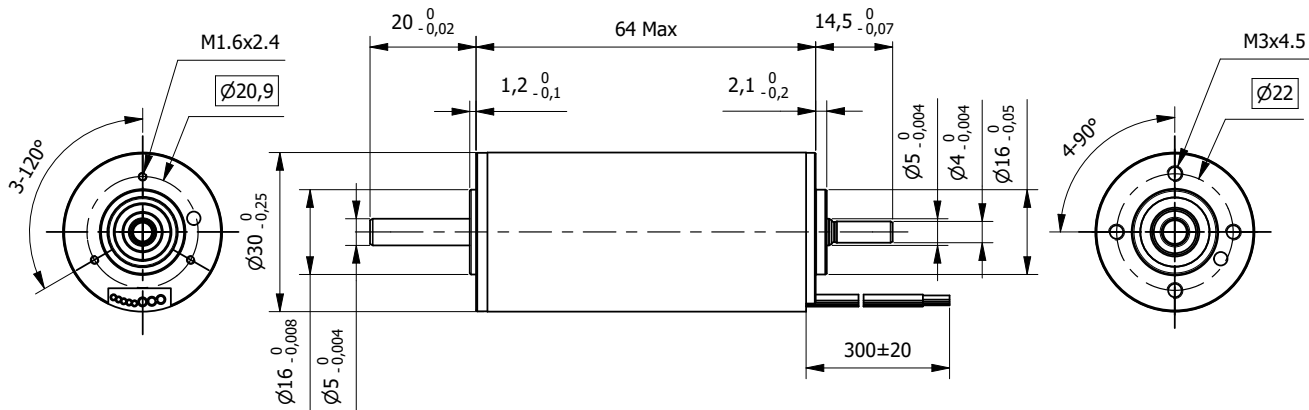
- Continuous operation
- Intermittent operation
- Assigned Power Rating

Brushless Slotless Motor 30EC64T

High Torque

Ø 30mm

92,9 to 95,6mNm

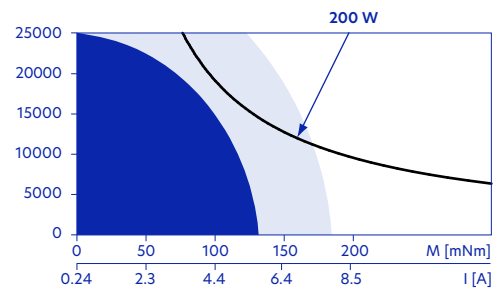


| Specification | | | |
|---------------|--------------------------|----------------------|----------|
| Model | | ...16101 | ...16003 |
| 1 | n° of Pole | 4 | 4 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V | 24 |
| 4 | Rated Speed | rpm | 16100 |
| 5 | Rated Torque | mNm | 95,6 |
| 6 | Stall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

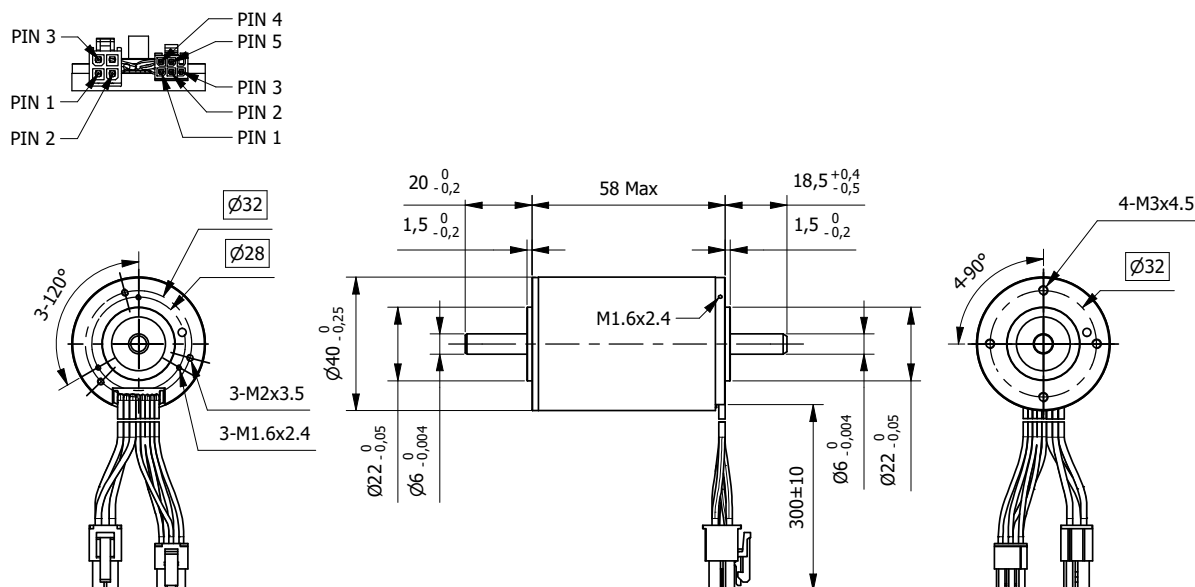
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -20°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 25000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,14mm |
| Max. Radial force (5mm from flange) | 25N |
|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

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

Operating range: Winding 48V



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

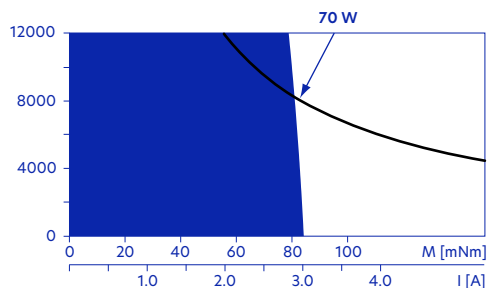


| Specification | | ...6501 | ...7603 |
|---------------|--------------------------|--------------------------|---------|
| 1 | n° of Pole | 2 | 2 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V 24 | 48 |
| 4 | Rated Speed | rpm 6520 | 7610 |
| 5 | Rated Torque | mNm 89,6 | 94,2 |
| 6 | Stall Torque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

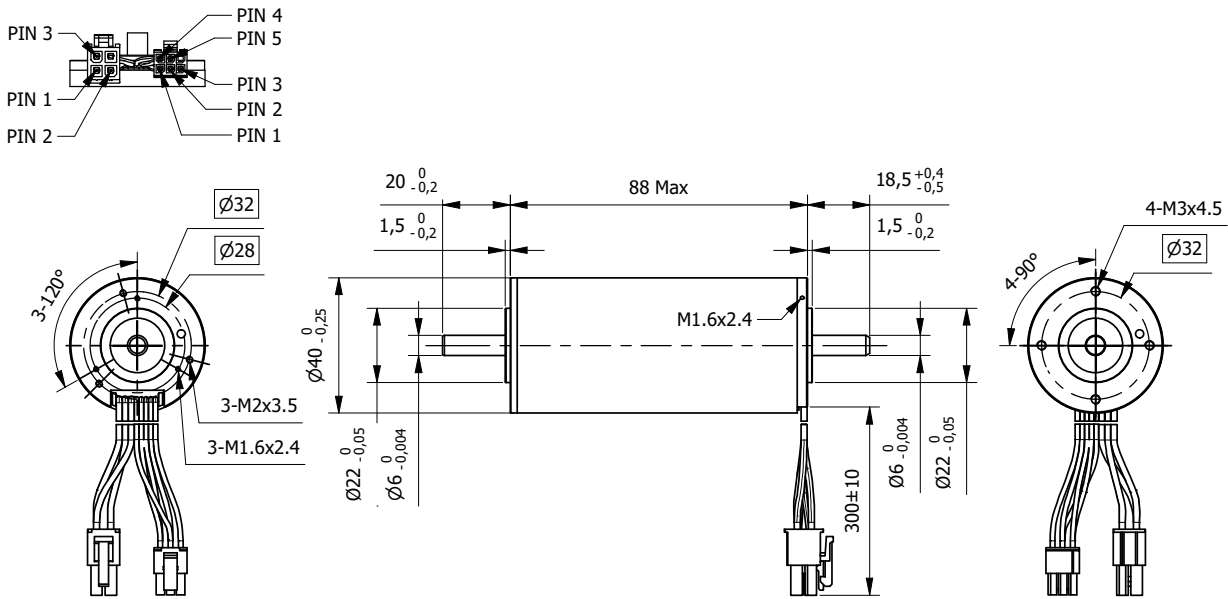
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -40°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 12000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,14mm |
| Max. Radial force (5mm from flange) | 80N |
|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

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

Operating range: Winding 24V



- Continuous operation
- Intermittent operation
- Assigned Power Rating

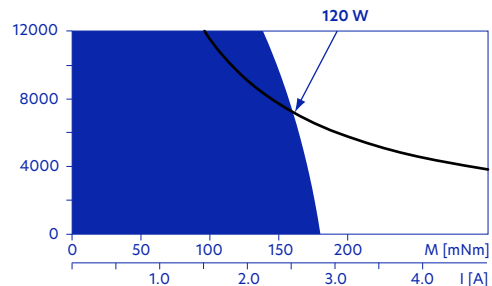


| Specification | | | |
|---------------|--------------------------|----------------------|------|
| Model | ...2607 | | |
| 1 | n° of Pole | | 2 |
| 2 | n° of Phase | | 3 |
| 3 | Rated Voltage | V | 48 |
| 4 | Rated Speed | rpm | 2670 |
| 5 | Rated Torque | mNm | 211 |
| 6 | Stall Torque | mNm | 838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

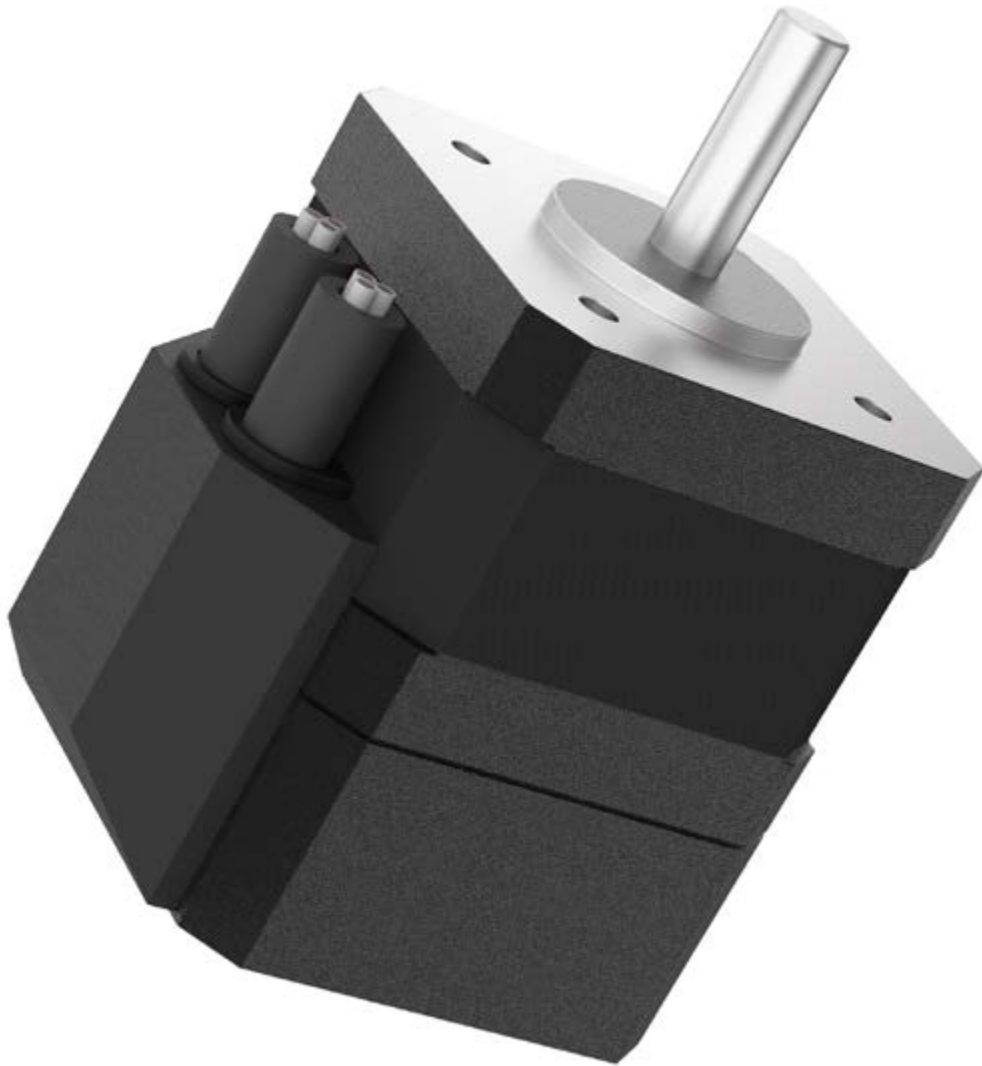
| Characteristics | |
|-------------------------------------|-----------------|
| Item | |
| Ambient Temperature | -40°C to +100°C |
| Max. Winding Temperature | +155°C |
| Max. Speed | 12000rpm |
| Radial play | preloaded |
| Axial play | 0 to 0,14mm |
| Max. Radial force (5mm from flange) | 80N |
|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

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

Operating range: Winding 48V



Continuous operation
 Intermittent operation
 Assigned Power Rating



Brushless DC
Motors with Encoder

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

| BLDC motors with Encoder | Torque* (Nm) | |
|--------------------------|--------------|-----|
| 42SVA | 0,062...0,25 | 132 |
| 57SVA | 0,3...0,6 | 133 |
| 80SVA | 0,9...1,7 | 134 |

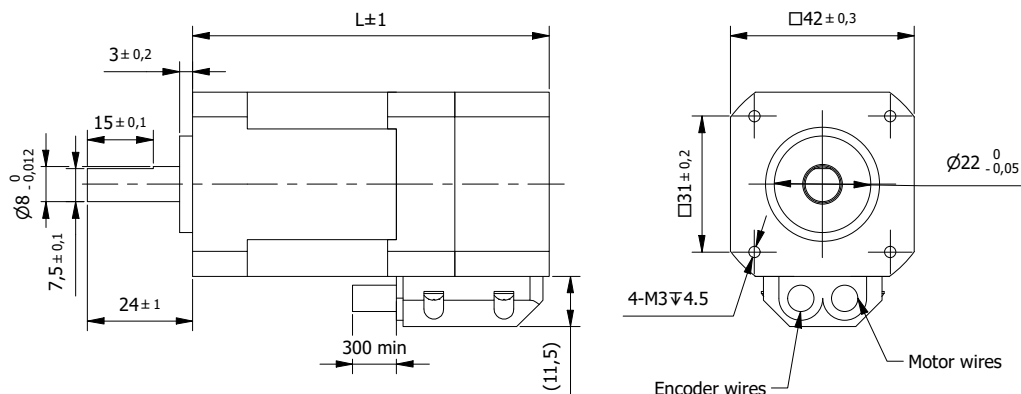
Our BLDC slotted motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested by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

*Rated Torque

Brushless Slotted Motor 42SVA

with Encoder

□ 42mm
0,062 - 0,25Nm



| Specification | | 42SVA01 | 42SVA02 | 42SVA03 | 42SVA04 |
|---------------|-------------------------|---------------------|---------|---------|---------|
| 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 5000 | 5000 | 5000 | 5000 |
| 5 | Rated Torque | Nm 0,062 | 0,125 | 0,185 | 0,25 |
| 6 | Max. Peak Torque | Nm 0,19 | 0,38 | 0,56 | 0,75 |
| 7 | Torque Constant | Nm/A 0,03 | 0,031 | 0,031 | 0,031 |
| 8 | Rated Current | A 2,1 | 4 | 6 | 8 |
| 9 | Max. Peak Current | A 6,25 | 12 | 18 | 24 |
| 10 | No Load Current | A 0,5 | 0,5 | 0,5 | 0,65 |
| 11 | Back EMF | V/Krpm 2,23 | 2,3 | 2,32 | 2,28 |
| 12 | Line to Line Resistance | Ω 1,15 | 0,5 | 0,28 | 0,25 |
| 13 | Line to Line Inductance | mH 1,75 | 0,9 | 0,51 | 0,38 |
| 14 | Rotor Inertia | gcm ² 24 | 48 | 72 | 96 |
| 15 | Length (L) | mm 61,3 | 81,3 | 101,3 | 121,3 |
| 16 | Weight | Kg 0,3 | 0,45 | 0,65 | 0,8 |

| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Hall Effect Angle | 120° |
| Insulation Class | B |
| Protection Class | IP40 |
| Max. Radial force (20mm from flange) | 28 N |
| Max. Axial force | 10 N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Working Temperature | -20°C to +40°C |
| * 3-channel encoder or other types on request | |

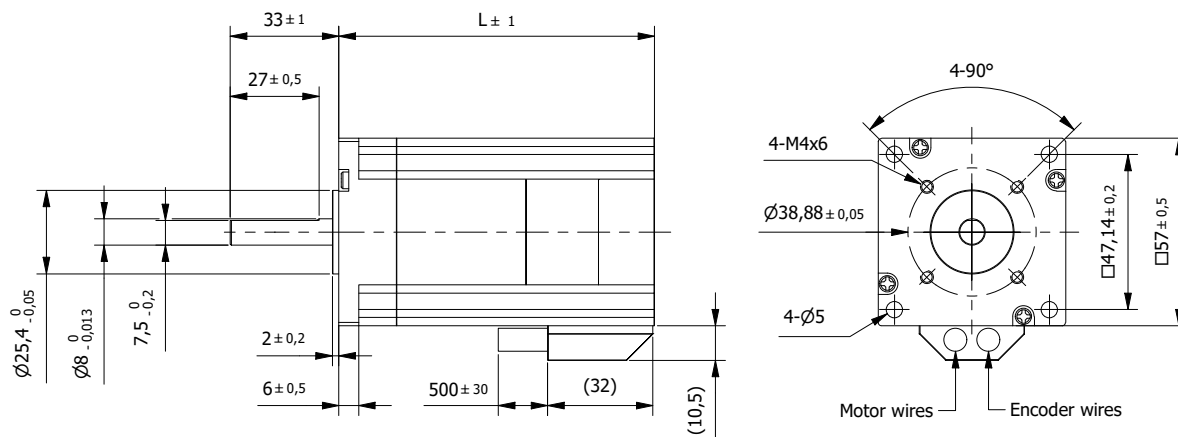
| Connection | | | |
|-----------------|-------------|-------|-----------|
| Lead n° | Color | Gauge | Function |
| Feedback | | | |
| 1 | Red/White | AWG26 | GND |
| 2 | Red | | VCC:+5VDC |
| 3 | Blue | | EA- |
| 4 | Blue/Black | | EA+ |
| 5 | Black | | EB- |
| 6 | Black/White | | EB+ |
| 7 | Brown | | 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 | | 57SVA02 | 57SVA03 | 57SVA04 |
| 1 | n° of Pole | 8 | 8 | 8 |
| 2 | n° of Phase | 3 | 3 | 3 |
| 3 | Rated Voltage | V | 36 | 36 |
| 4 | Rated Speed | rpm | 3000 | 3000 |
| 5 | Rated Torque | Nm | 0,3 | 0,45 |
| 6 | Max. Peak Torque | Nm | 0,9 | 1,35 |
| 7 | Torque Constant | Nm/A | 0,075 | 0,075 |
| 8 | Rated Current | A | 4 | 6 |
| 9 | Max. Peak Current | A | 12,6 | 16,2 |
| 10 | No Load Current | A | 0,35 | 0,55 |
| 11 | Back EMF | V/Krpm | 5,6 | 5,6 |
| 12 | Line to Line Resistance | Ω | 1,2 | 0,8 |
| 13 | Line to Line Inductance | mH | 1,2 | 0,8 |
| 14 | Rotor Inertia | gcm ² | 210 | 320 |
| 15 | Length (L) | mm | 96 | 116 |
| 16 | Weight | Kg | 0,8 | 1 |

| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Hall Effect Angle | 120° |
| Insulation Class | B |
| Protection Class | IP30 |
| Max. Radial force (20mm from flange) | 115N |
| Max. Axial force | 45 N |
| Dielectric strength (for 1 sec.) | 650 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Working Temperature | -20°C to +40°C |
| * 3-channel encoder or other types on request | |

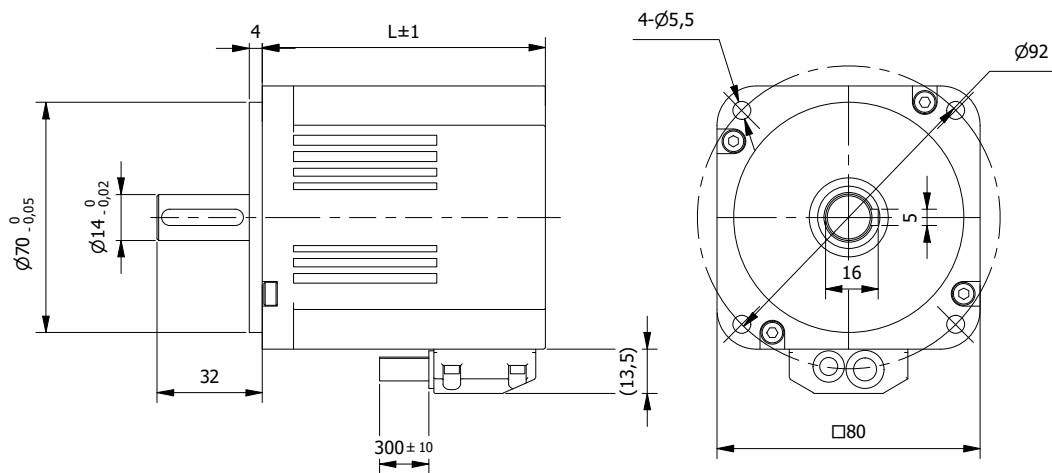
| Connection | | | |
|-----------------|-------------|-------|-----------|
| Lead n° | Color | Gauge | Function |
| Feedback | | | |
| 1 | Red/White | AWG26 | GND |
| 2 | Red | | VCC:+5VDC |
| 3 | Blue | | EA- |
| 4 | Blue/Black | | EA+ |
| 5 | Black | | EB- |
| 6 | Black/White | | EB+ |
| 7 | Brown | | 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 80SVA

with Encoder

□ 80mm

0,9 - 1,7Nm



| Specification | | | |
|---------------|-------------------------|------------------|---------|
| Model | | 80SVA01 | 80SVA02 |
| 1 | n° of Pole | 8 | 8 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V | 48 |
| 4 | Rated Speed | rpm | 3000 |
| 5 | Rated Torque | Nm | 0,9 |
| 6 | Max. Peak Torque | Nm | 2,7 |
| 7 | Torque Constant | Nm/A | 0,118 |
| 8 | Rated Current | A | 7,6 |
| 9 | Max. Peak Current | A | 23 |
| 10 | No Load Current | A | 0,7 |
| 11 | Back EMF | V/Krpm | 8,7 |
| 12 | Line to Line Resistance | Ω | 0,29 |
| 13 | Line to Line Inductance | mH | 1,3 |
| 14 | Rotor Inertia | gcm ² | 544 |
| 15 | Length (L) | mm | 86 |
| 16 | Weight | Kg | 1,7 |

| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Hall Effect Angle | 120° |
| Insulation Class | B |
| Protection Class | IP65 |
| Max. Radial force (10mm from flange) | 115N |
| Max. Axial force | 45N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Working Temperature | -20°C to +55°C |
| * 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

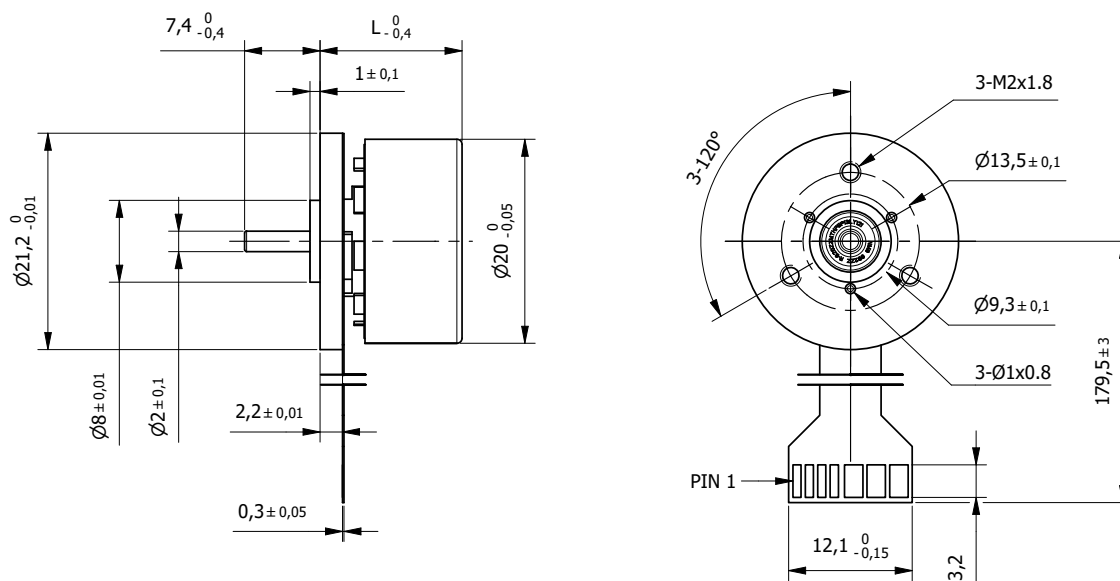
Advantages at a glance

- 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 | 138 |
| 32BLW18 | 0,025 | 139 |
| 45BLW16 | 0,055 | 140 |
| 45BLW Connector | 0,05...0,13 | 141 |
| 45BLW Wires | 0,05...0,13 | 142 |
| 60BLWA38 | 0,5 | 143 |
| 60BLW40 | 0,3 | 144 |
| 60BLW40 - IP54 | 0,3 | 145 |
| 90BLW | 0,46...0,96 | 146 |

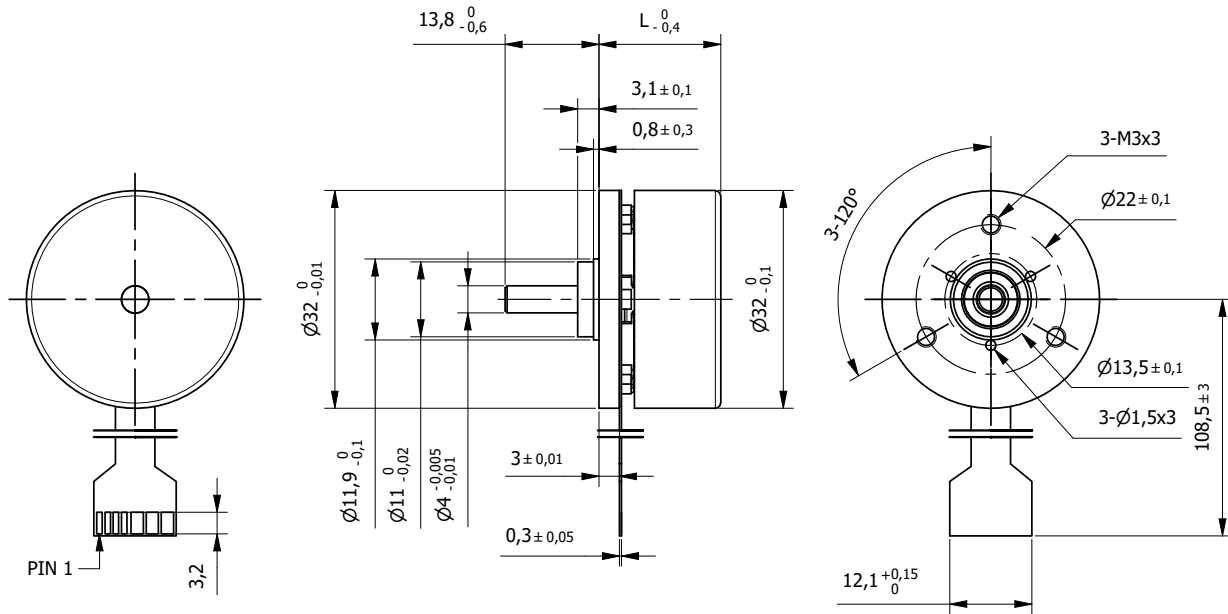
*Rated Torque



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (10mm from flange) | 5N |
| Max. Axial force | 2N |
| Dielectric strength (for 1 sec.) | 600 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 |



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,03mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,06mm |
| Max. Radial force (10mm from flange) | 14N |
| Max. Axial force | 4N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

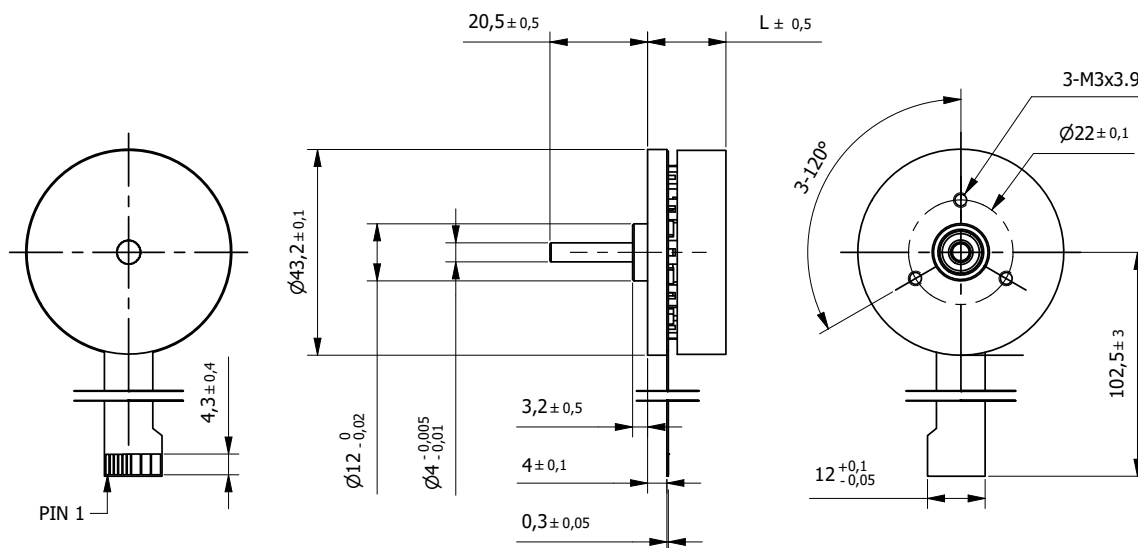
| Connection | | |
|------------|-----------|-----------------|
| Pin n° | Connector | Function |
| 1 | FPC cable | Vcc Hall +5 Vdc |
| 2 | | Hall C |
| 3 | | Hall A |
| 4 | | Hall B |
| 5 | | GND Hall |
| 6 | | Phase W |
| 7 | | Phase V |
| 8 | | Phase U |

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

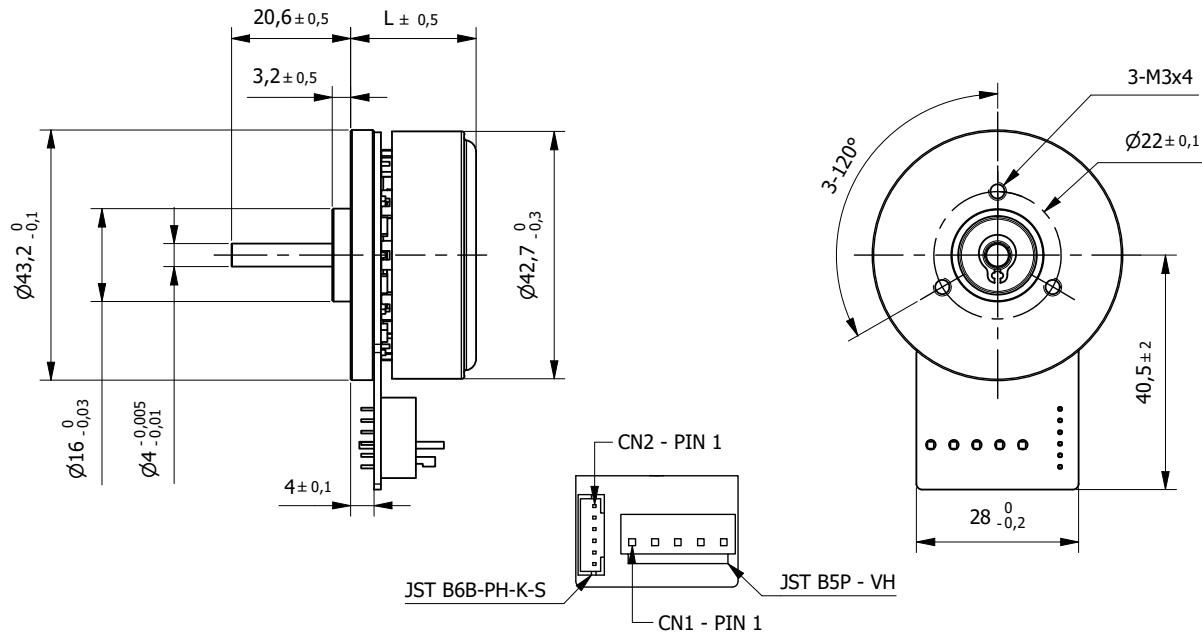
| Connection | | |
|------------|-----------|-------------------------|
| Pin n° | Connector | Function |
| 1 | FPC cable | Vcc Hall +4,5 to 24 Vdc |
| 2 | | Hall C |
| 3 | | Hall A |
| 4 | | Hall B |
| 5 | | GND Hall |
| 6 | | Phase W |
| 7 | | Phase V |
| 8 | | Phase U |

Brushless Flat Motor 45BLW

Connector

Ø 45mm

0,05 - 0,13Nm



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,03mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,14mm |
| Max. Radial force (10mm from flange) | 28N |
| Max. Axial force | 10N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

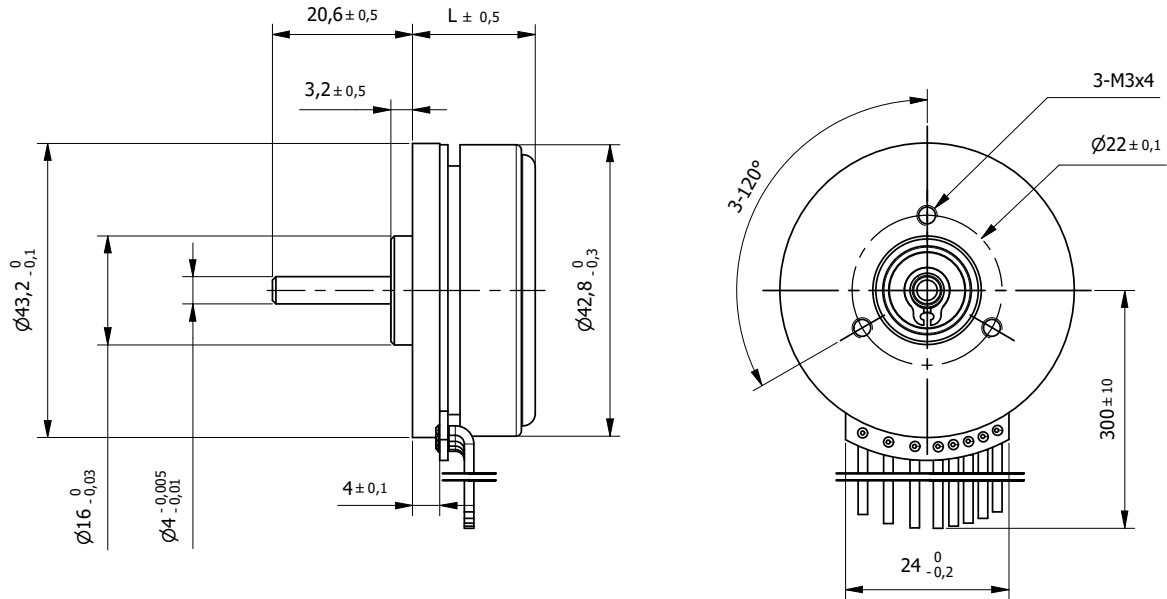
| Connection | | |
|------------|----------------|----------|
| Pin n° | Connector | Function |
| 1 | JST B5P-VH | GND |
| 2 | | Phase W |
| 3 | | Phase V |
| 4 | | Phase U |
| 5 | | GND |
| | | |
| 1 | JST B6B-PH-K-S | GND |
| 2 | | +5V DC |
| 3 | | Hall A |
| 4 | | Hall B |
| 5 | | Hall C |
| 6 | |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

Brushless Flat Motor 45BLW

Wires

Ø 45mm

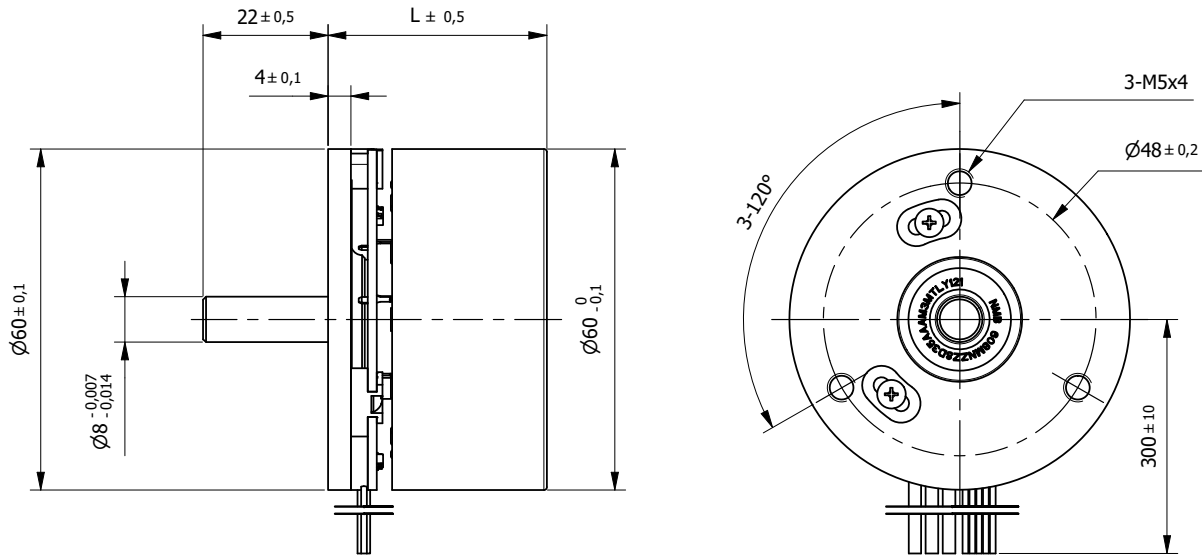
0,05 - 0,13Nm



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,03mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,14mm |
| Max. Radial force (10mm from flange) | 28N |
| Max. Axial force | 10N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

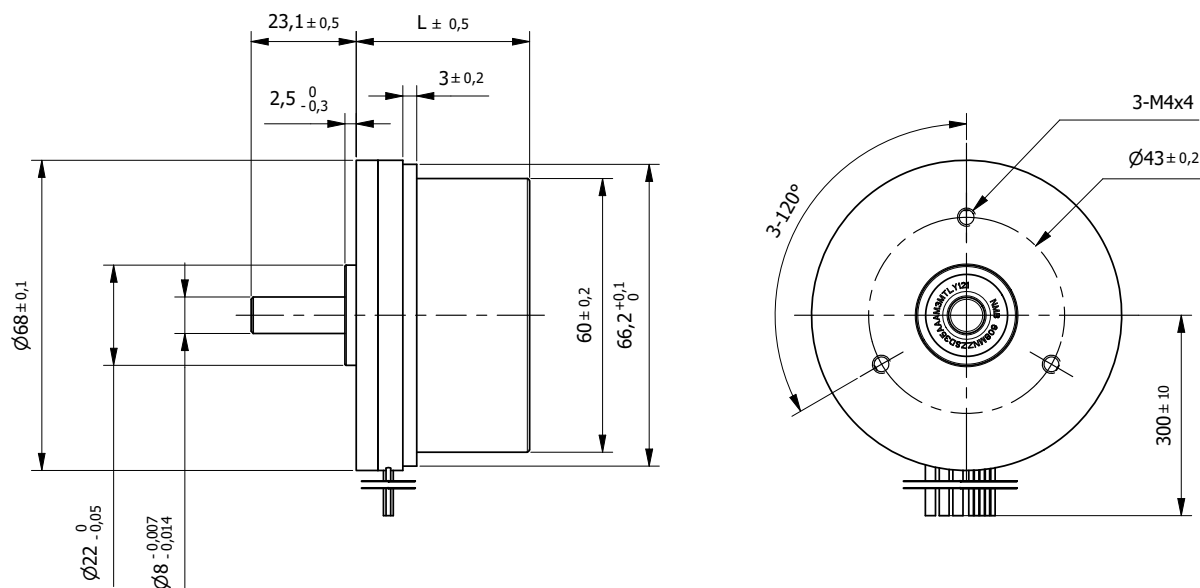
| Connection | | | |
|------------|--------|--------------|------------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG24 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Grey | | Phase U |
| 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 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 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1007 AWG20 | Phase U |
| 7 | Brown | | Phase V |
| 8 | Orange | | Phase W |



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,14mm |
| Max. Radial force (10mm from flange) | 55N |
| Max. Axial force | 12N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

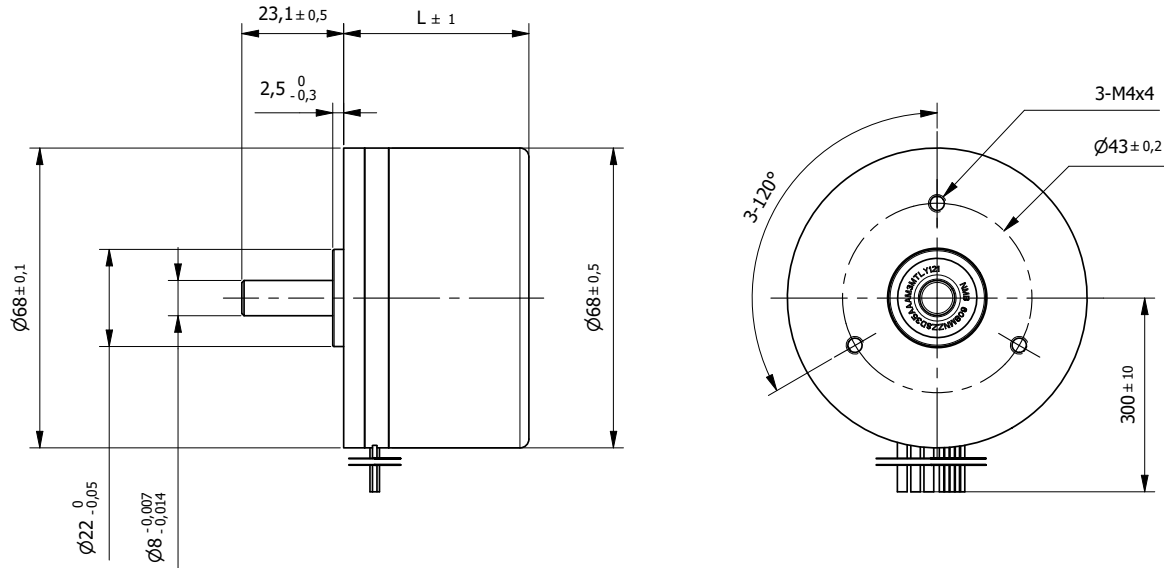
| Connection | | | |
|------------|--------|--------------|------------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG26 | Vcc Hall +5 to +24 Vdc |
| 2 | Blue | | Hall A |
| 3 | Green | | Hall B |
| 4 | White | | Hall C |
| 5 | Black | | GND Hall |
| 6 | Yellow | UL1430 AWG18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

Brushless Flat Motor 60BLW40

IP54

Ø 68mm

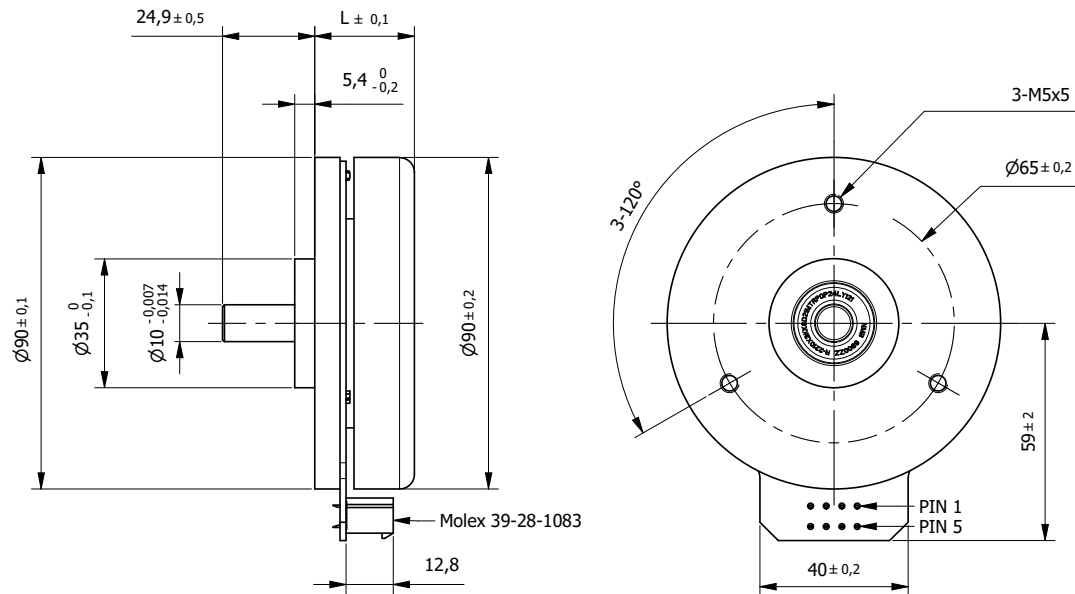
0,3Nm



| 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 |
| 4 | Rated Speed | rpm | 3700 |
| 5 | Rated Torque | Nm | 0,3 |
| 6 | Max. Peak Torque | Nm | 0,9 |
| 7 | Torque Constant | Nm/A | 0,05 |
| 8 | Rated Current | A | 6 |
| 9 | Max. Peak Current | A | 18 |
| 10 | No-Load Current | mA | 800 |
| 11 | Line to Line Resistance | Ω | 0,3 |
| 12 | Line to Line Inductance | mH | 0,3 |
| 13 | Rotor Inertia | gcm ² | 1500 |
| 14 | Length (L) | mm | 42 |
| 15 | Weight | Kg | 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 sec.) | 600 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 AWG18 | Phase U |
| 7 | Red | | Phase V |
| 8 | Black | | Phase W |



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

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Hall Effect Angle | 120° |
| Shaft run out | 0,05mm |
| Insulation Class | B |
| Protection Class | IP40 |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (10mm from flange) | 110N |
| Max. Axial force | 45N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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



Brushless DC

Flat motors with Encoder

Advantages at a glance

- Very compact size
- Exceptional power to volume ratio
- Complete closed loop system

BLDC Flat motors with Encoder

| | Torque* (Nm) | |
|-----------|--------------|-----|
| 45BLW29-E | 0,13 | 150 |
| 60BLW42-E | 0,29 | 151 |
| 90BLW42-E | 0,96 | 152 |

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.

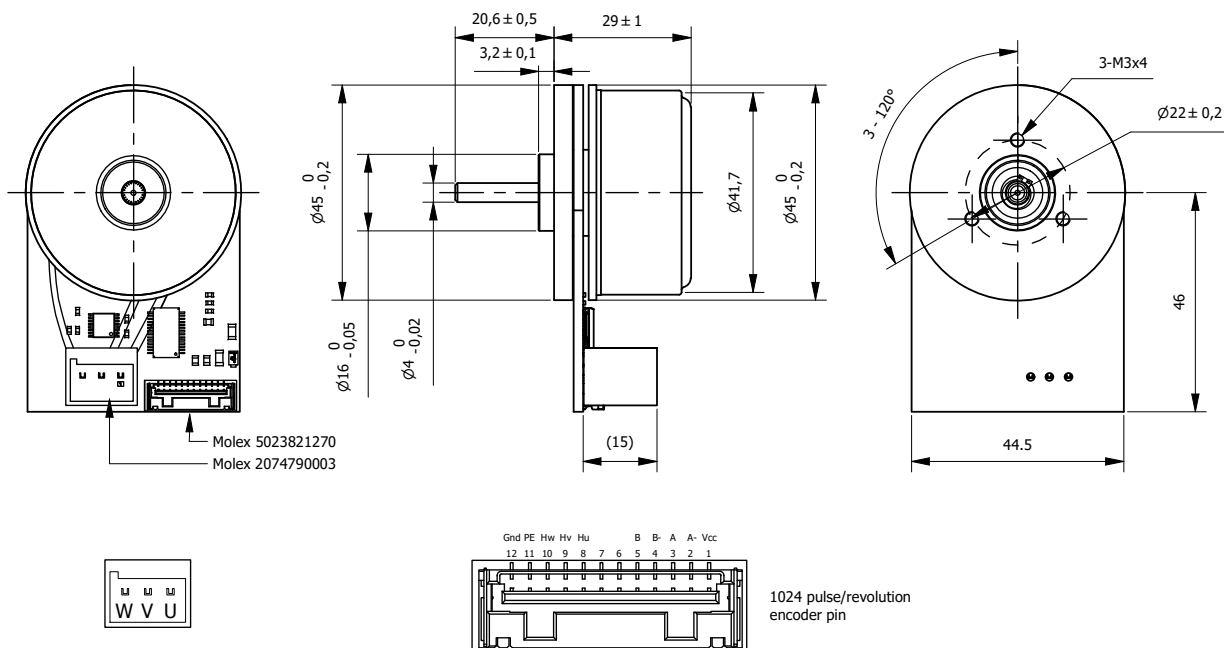
*Rated Torque

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 / 2 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 |
| 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

Index

Brushed DC

Brushless DC

Servomotors

Motor + Controller

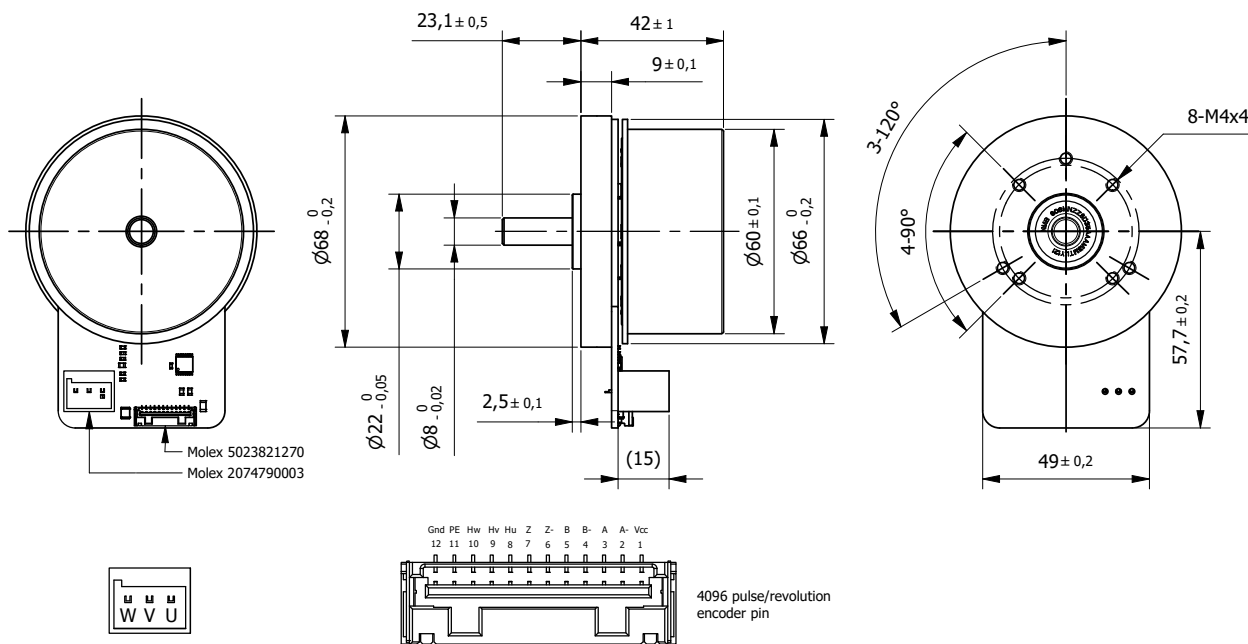
Stepper

Linear actuators

Gearboxes

Encoders

Controllers/Drives



Specification

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

Characteristics

| Item | Value |
|--------------------------------------|------------------------|
| 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

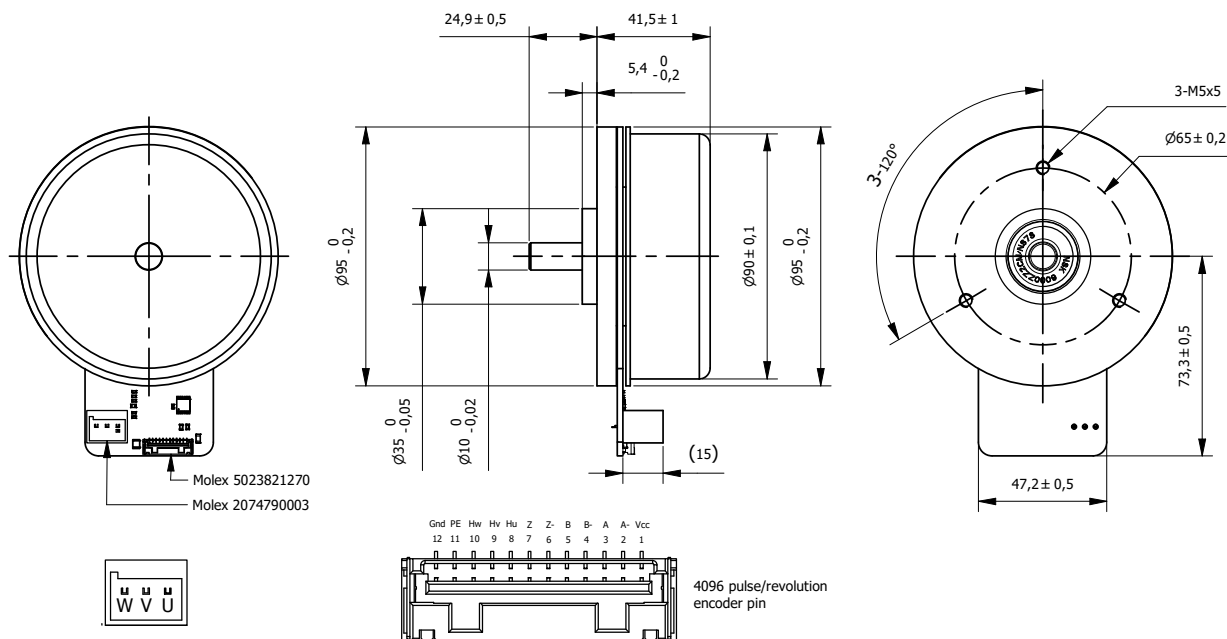
| Pin n° | Function |
|-----------------|----------|
| Feedback | |
| 1 | VCC |
| 2 | EA- |
| 3 | EA |
| 4 | EB- |
| 5 | EB |
| 6 | EZ- |
| 7 | EZ |
| 8 | HALL A |
| 9 | HALL B |
| 10 | HALL C |
| 11 | PE |
| 12 | GND |
| Motor | |
| 1 | Phase U |
| 2 | Phase V |
| 3 | Phase W |

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

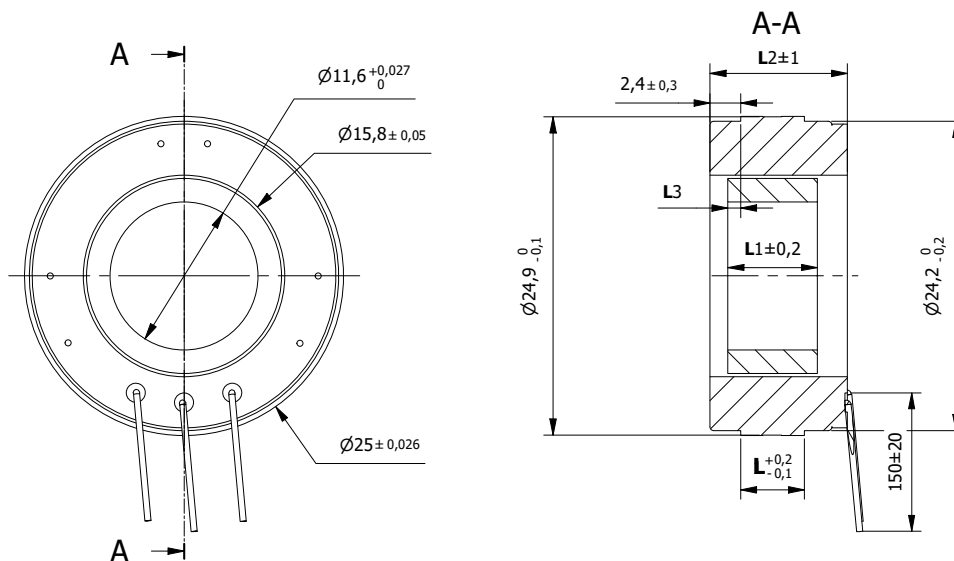
High torque

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) | |
|-----------------------|--------------|-----|
| 25BLF | 0,03...0,06 | 156 |
| 38BLF | 0,1...0,2 | 157 |
| 43BLF | 0,15 | 158 |
| 50BLF | 0,3...0,5 | 159 |
| 60BLF | 0,45 | 160 |
| 70BLF | 0,55...1 | 161 |
| 85BLF | 1,2...2 | 162 |
| 102BLF | 2,5 | 163 |
| 115BLF | 3,9...7,8 | 164 |

*Rated Torque

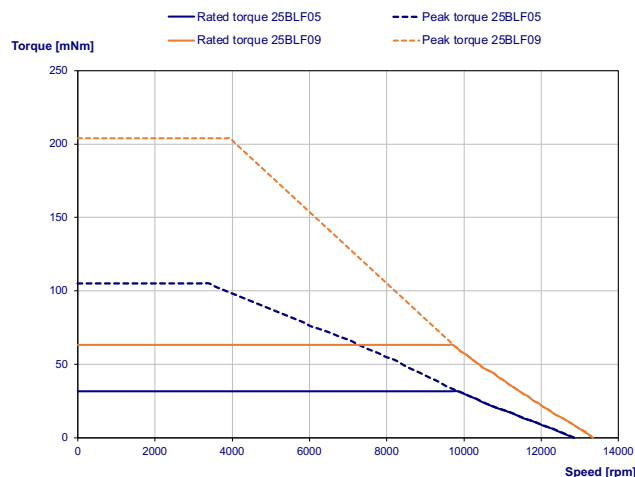


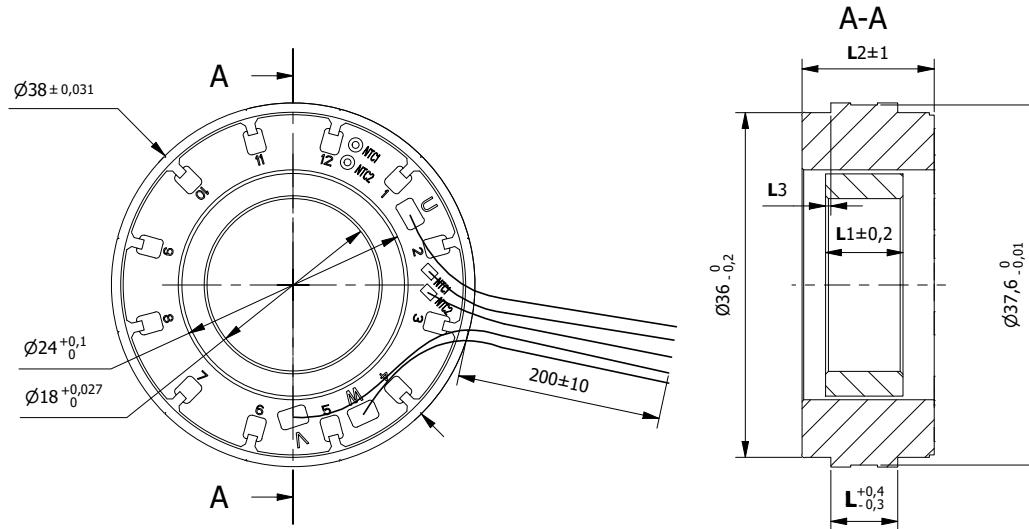
Optional: Thermistor

| Specification | | | 25BLF05 | 25BLF09 |
|---------------|-------------------------|------------------|---------|---------|
| 1 | n° of Pole | | 14 | 14 |
| 2 | n° of Phase | | 3 | 3 |
| 3 | Rated Voltage | V | 24 | 24 |
| 4 | Rated Speed | rpm | 10000 | 10000 |
| 5 | Max. Speed | rpm | 12300 | 13000 |
| 6 | Rated Torque | Nm | 0,032 | 0,063 |
| 7 | Max. Peak Torque | Nm | 0,105 | 0,204 |
| 8 | Torque Constant | Nm/A | 0,023 | 0,021 |
| 9 | Rated Current | A | 1,5 | 3 |
| 10 | Max. Peak Current | A | 5 | 9,8 |
| 11 | No-Load Current | A | 0,5 | 0,5 |
| 12 | Line to Line Resistance | Ω | 1,7 | 0,77 |
| 13 | Line to Line Inductance | mH | 0,6 | 0,28 |
| 14 | Rotor Inertia | gcm ² | 1,17 | 2,34 |
| 15 | Back EMF | Vrms/Krpm | 1,37 | 1,3 |
| 16 | Stator height (L) | mm | 5 | 9,2 |
| 17 | Rotor height (L1) | mm | 7 | 11 |
| 18 | Length (L2) | mm | 10,75 | 14,95 |
| 19 | Measure (L3) | mm | 1 | 0,9 |
| 20 | Weight | g | 18 | 28,5 |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|-------|----------|
| Color | Gauge | Function |
| Red | AWG22 | Phase U |
| White | | Phase V |
| Black | | Phase W |



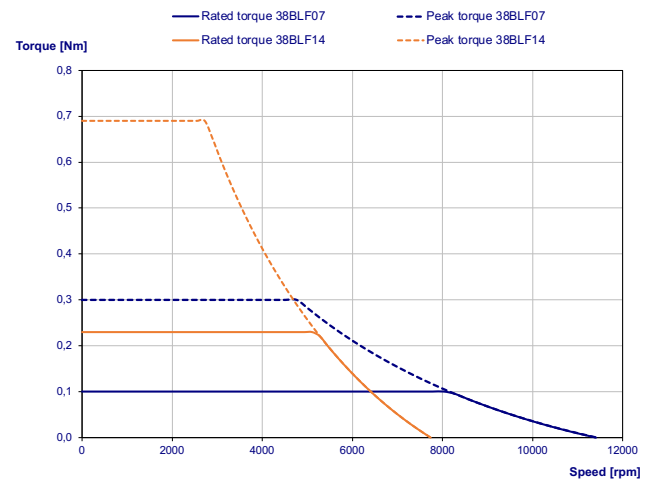


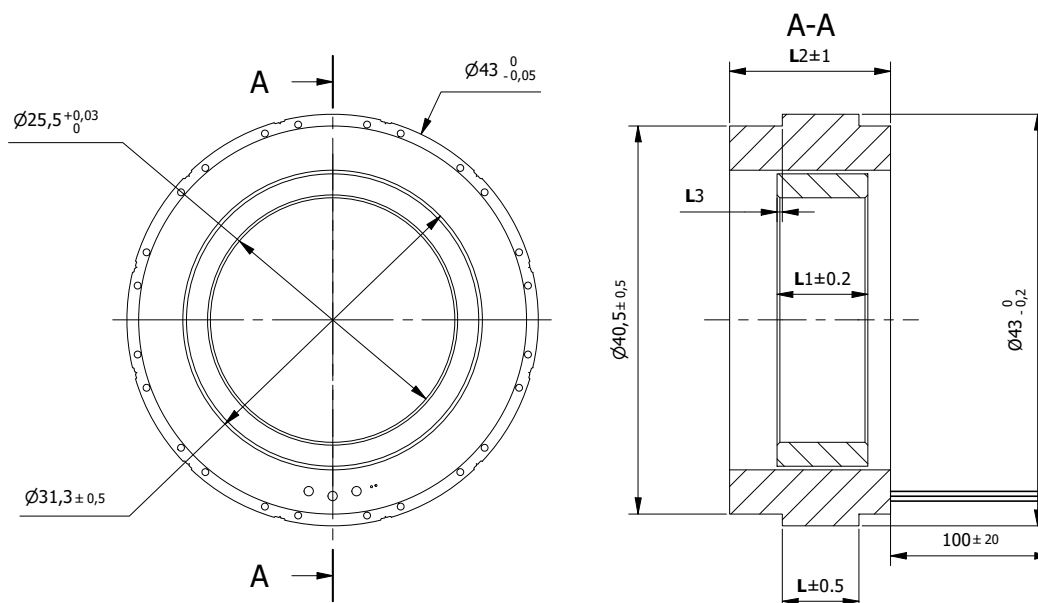
Optional: Thermistor

| Specification | | | |
|---------------|-------------------------|-----------------------|-----------------------|
| Model | | 38BLF07 | 38BLF14 |
| 1 | n° of Pole | 14 | 14 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | 24 | 48 |
| 4 | Rated Speed | 8000 rpm | 5000 rpm |
| 5 | Max. Speed | 11000 rpm | 7500 rpm |
| 6 | Rated Torque | 0,1 Nm | 0,23 Nm |
| 7 | Max. Peak Torque | 0,3 Nm | 0,69 Nm |
| 8 | Torque Constant | 0,025 Nm/A | 0,074 Nm/A |
| 9 | Rated Current | 4,5 A | 3,5 A |
| 10 | Max. Peak Current | 13,5 A | 10,5 A |
| 11 | No-Load Current | 0,5 A | 0,4 A |
| 12 | Line to Line Resistance | 0,37 Ω | 1,24 Ω |
| 13 | Line to Line Inductance | 0,32 mH | 1,3 mH |
| 14 | Rotor Inertia | 9,68 gcm ² | 19,2 gcm ² |
| 15 | Back EMF | 1,54 Vrms/Krpm | 4,5 Vrms/Krpm |
| 16 | Stator height (L) | 7 mm | 14 mm |
| 17 | Rotor height (L1) | 8,1 mm | 16,1 mm |
| 18 | Length (L2) | 13,8 mm | 20,8 mm |
| 19 | Measure (L3) | 0,55 mm | 1 mm |
| 20 | Weight | 57 g | 112 g |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|-------|----------|
| Color | Gauge | Function |
| Yellow | AWG20 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



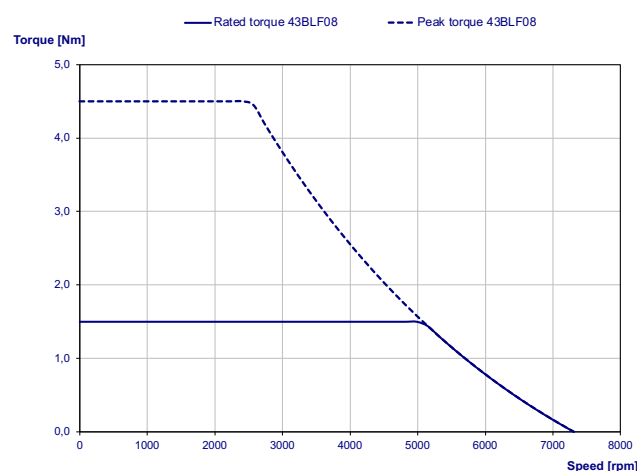


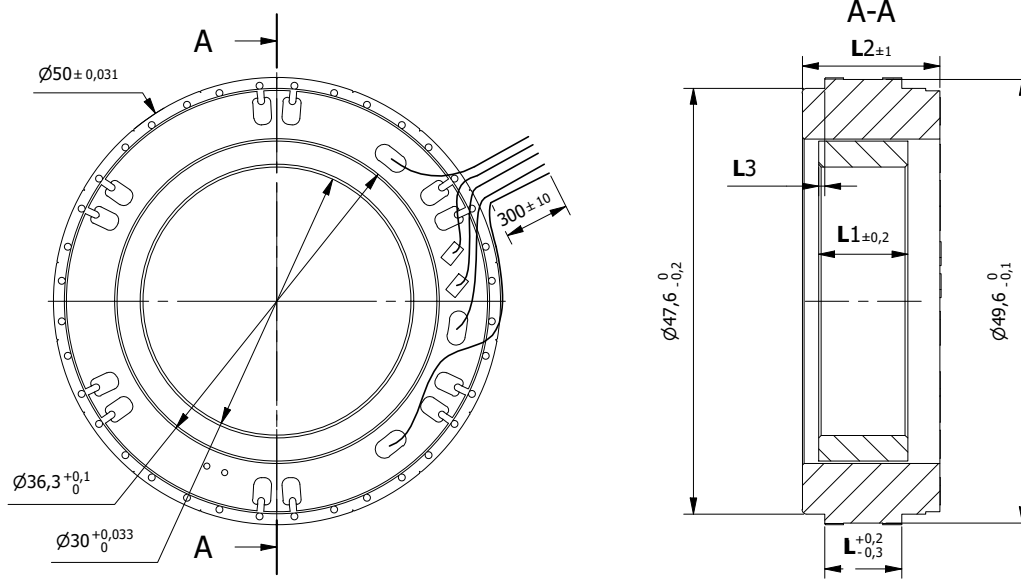
Optional: Thermistor

| Specification | | |
|---------------|-------------------------|---------------------|
| Model | 43BLF08 | |
| 1 | n° of Pole | 14 |
| 2 | n° of Phase | 3 |
| 3 | Rated Voltage | V 48 |
| 4 | Rated Speed | rpm 5000 |
| 5 | Max. Speed | rpm 7300 |
| 6 | Rated Torque | Nm 0,15 |
| 7 | Max. Peak Torque | Nm 0,45 |
| 8 | Torque Constant | Nm/A 0,077 |
| 9 | Rated Current | A 2 |
| 10 | Max. Peak Current | A 6 |
| 11 | No-Load Current | A 0,4 |
| 12 | Line to Line Resistance | Ω 2,8 |
| 13 | Line to Line Inductance | mH 1,8 |
| 14 | Rotor Inertia | gcm ² 27 |
| 15 | Back EMF | Vrms/Krpm 4,65 |
| 16 | Stator height (L) | mm 8 |
| 17 | Rotor height (L1) | mm 9,5 |
| 18 | Length (L2) | mm 16,8 |
| 19 | Measure (L3) | mm 0,5 |
| 20 | Weight | g 70 |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 650 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|-------|----------|
| Color | Gauge | Function |
| Yellow | AWG24 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



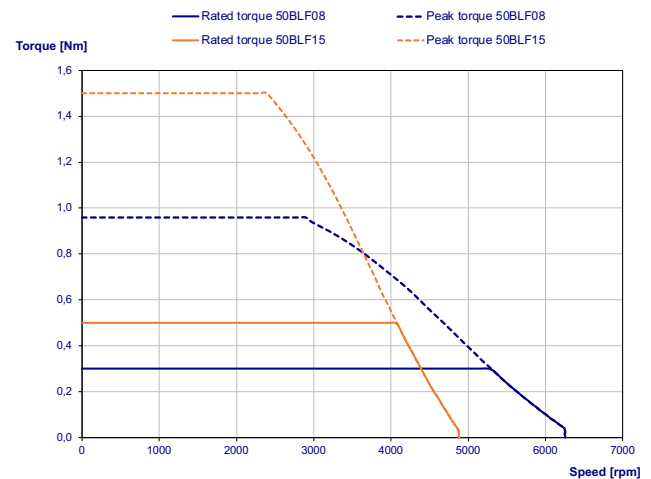


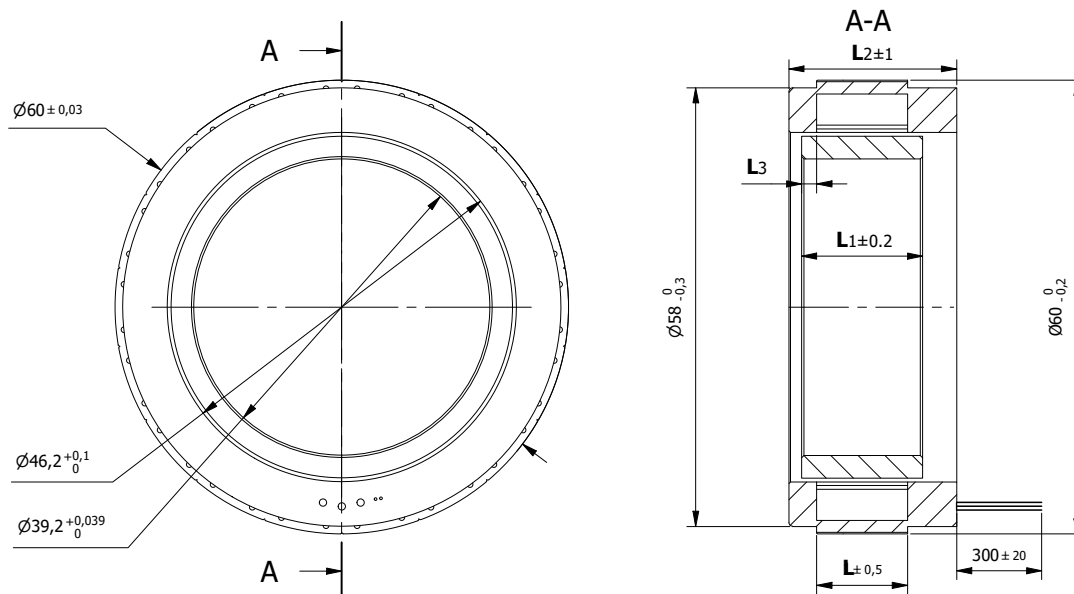
Optional: Hall sensors, Thermistor and PCB mounted Connector

| Specification | | | |
|---------------|-------------------------|------------------------|------------------------|
| Model | | 50BLF08 | 50BLF15 |
| 1 | n° of Pole | 20 | 20 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | 48 | 48 |
| 4 | Rated Speed | 5000 rpm | 3500 rpm |
| 5 | Max. Speed | 6200 rpm | 4800 rpm |
| 6 | Rated Torque | 0,3 Nm | 0,5 Nm |
| 7 | Max. Peak Torque | 0,96 Nm | 1,5 Nm |
| 8 | Torque Constant | 0,089 Nm/A | 0,117 Nm/A |
| 9 | Rated Current | 3,6 A | 4,8 A |
| 10 | Max. Peak Current | 11,6 A | 14,5 A |
| 11 | No-Load Current | 0,4 A | 0,6 A |
| 12 | Line to Line Resistance | 0,93 Ω | 0,7 Ω |
| 13 | Line to Line Inductance | 0,46 mH | 0,38 mH |
| 14 | Rotor Inertia | 56,36 gcm ² | 95,93 gcm ² |
| 15 | Back EMF | 5,4 Vrms/Krpm | 7,1 Vrms/Krpm |
| 16 | Stator height (L) | 8,6 mm | 15 mm |
| 17 | Rotor height (L1) | 10 mm | 17 mm |
| 18 | Length (L2) | 15,4 mm | 21,6 mm |
| 19 | Measure (L3) | 0,7 mm | 1 mm |
| 20 | Weight | 105 g | 128 g |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 1000 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|----------|----------|
| Color | Gauge | Function |
| Yellow | AWG22/20 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



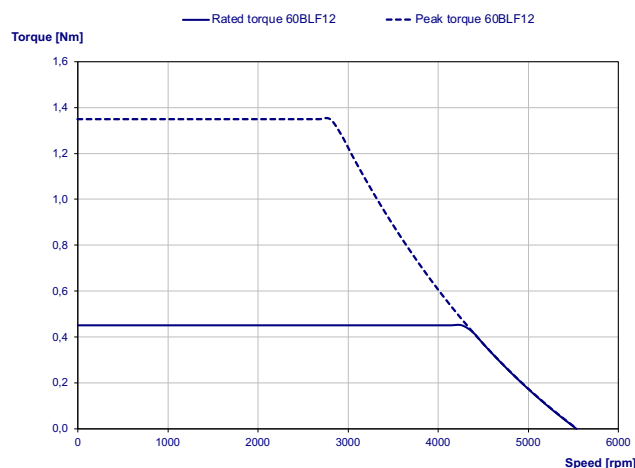


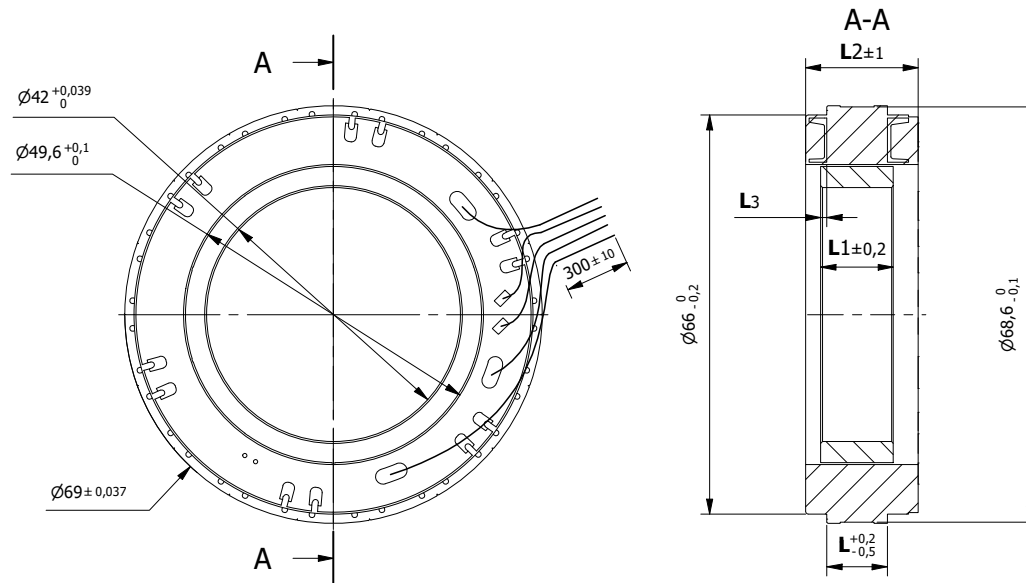
Optional: Hall sensors, Thermistor and PCB mounted Connector

| Specification | | |
|---------------|-------------------------|----------------------|
| Model | 60BLF12 | |
| 1 | n° of Pole | 20 |
| 2 | n° of Phase | 3 |
| 3 | Rated Voltage | V 48 |
| 4 | Rated Speed | rpm 4000 |
| 5 | Max. Speed | rpm 5200 |
| 6 | Rated Torque | Nm 0,45 |
| 7 | Max. Peak Torque | Nm 1,35 |
| 8 | Torque Constant | Nm/A 0,102 |
| 9 | Rated Current | A 5 |
| 10 | Max. Peak Current | A 15 |
| 11 | No-Load Current | A 2 |
| 12 | Line to Line Resistance | Ω 0,62 |
| 13 | Line to Line Inductance | mH 0,46 |
| 14 | Rotor Inertia | gcm ² 172 |
| 15 | Back EMF | Vrms/Krpm 6,2 |
| 16 | Stator height (L) | mm 12 |
| 17 | Rotor height (L1) | mm 16 |
| 18 | Length (L2) | mm 22,2 |
| 19 | Measure (L3) | mm 2 |
| 20 | Weight | g 165 |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 650 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|-------|----------|
| Color | Gauge | Function |
| Yellow | AWG20 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



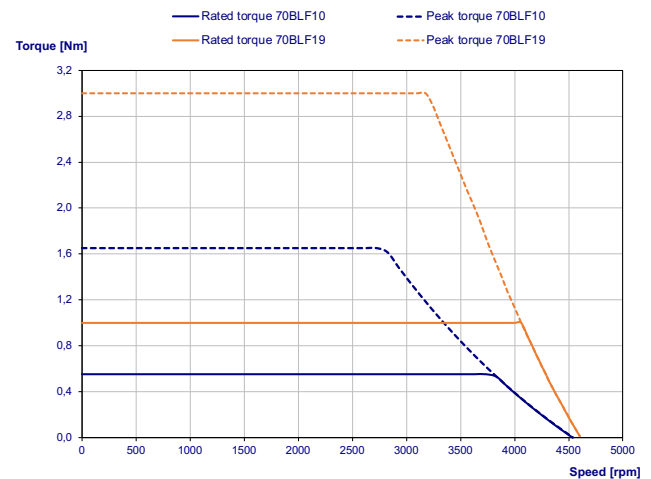


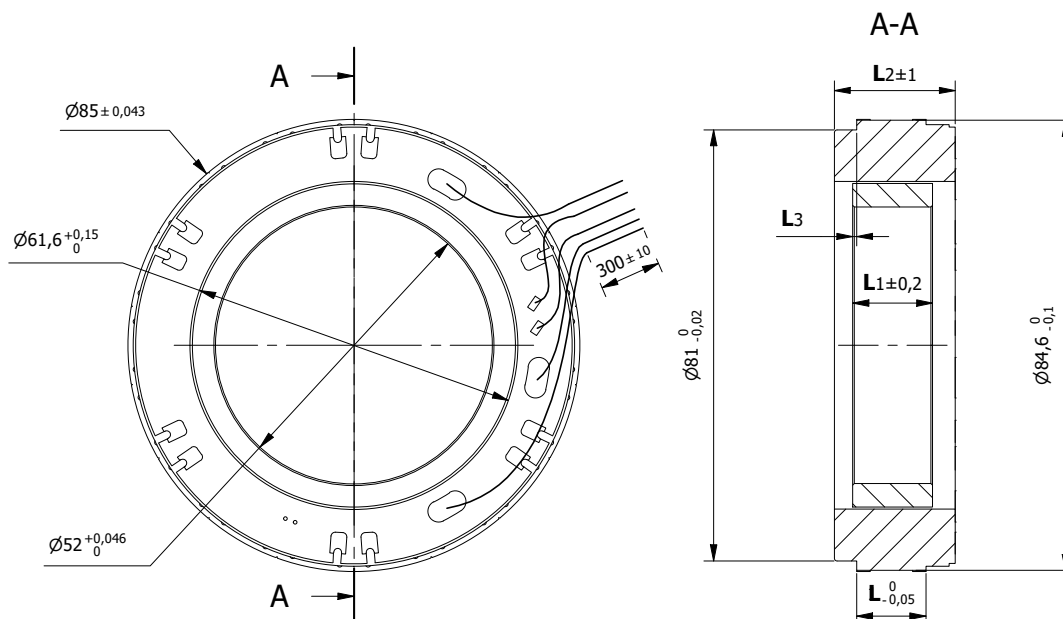
Optional: Hall sensors, Thermistor and PCB mounted Connector

| Specification | | | 70BLF10 | 70BLF19 |
|---------------|-------------------------|------------------|---------|---------|
| 1 | n° of Pole | | 20 | 20 |
| 2 | n° of Phase | | 3 | 3 |
| 3 | Rated Voltage | V | 48 | 48 |
| 4 | Rated Speed | rpm | 3650 | 3500 |
| 5 | Max. Speed | rpm | 4750 | 4500 |
| 6 | Rated Torque | Nm | 0,55 | 1 |
| 7 | Max. Peak Torque | Nm | 1,65 | 3 |
| 8 | Torque Constant | Nm/A | 0,118 | 0,12 |
| 9 | Rated Current | A | 5,1 | 9 |
| 10 | Max. Peak Current | A | 15,5 | 27 |
| 11 | No-Load Current | A | 0,4 | 0,6 |
| 12 | Line to Line Resistance | Ω | 0,36 | 0,19 |
| 13 | Line to Line Inductance | mH | 0,33 | 0,18 |
| 14 | Rotor Inertia | gcm ² | 215 | 376 |
| 15 | Back EMF | Vrms/Krpm | 7,14 | 7,2 |
| 16 | Stator height (L) | mm | 10 | 18,9 |
| 17 | Rotor height (L1) | mm | 12 | 21 |
| 18 | Length (L2) | mm | 18,6 | 27 |
| 19 | Measure (L3) | mm | 1 | 1 |
| 20 | Weight | g | 189 | 296 |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 1000 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|----------|----------|
| Color | Gauge | Function |
| Yellow | AWG20/18 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



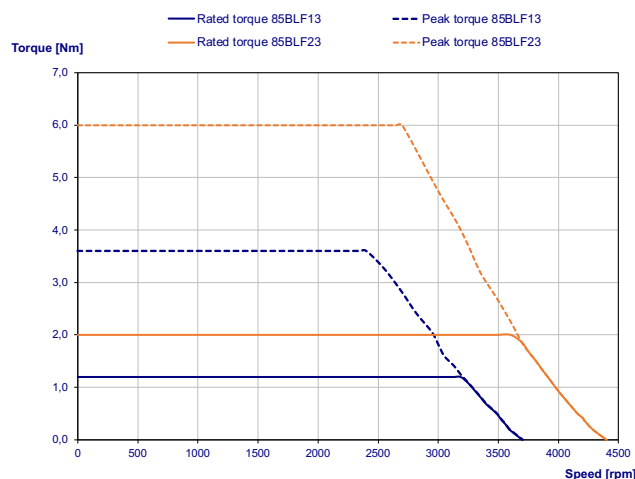


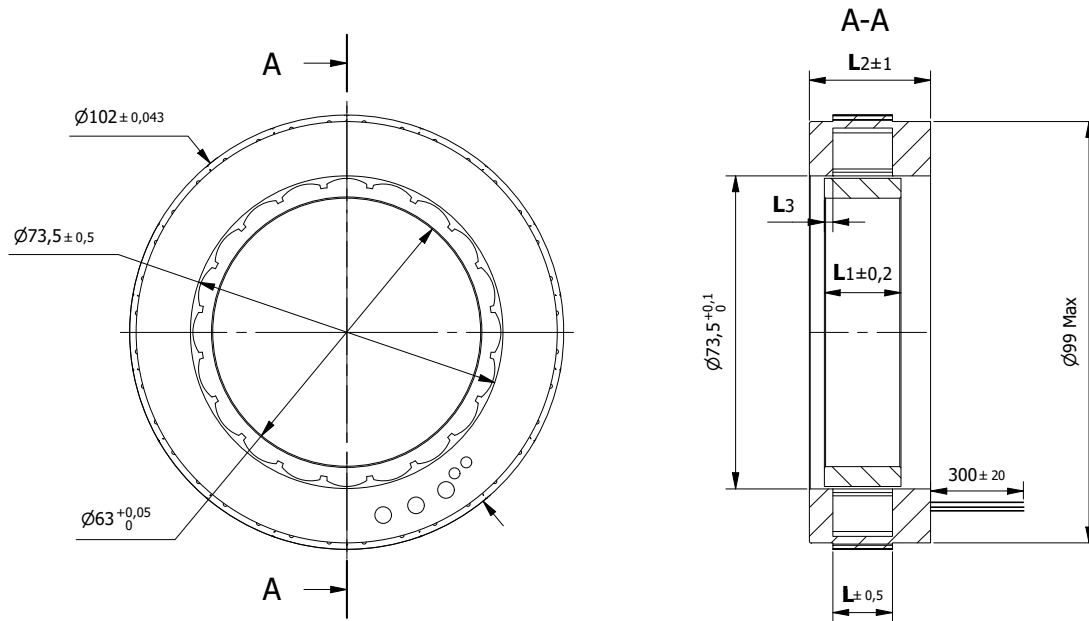
Optional: Hall sensors, Thermistor and PCB mounted Connector

| Specification | | | |
|---------------|-------------------------|------------------|---------|
| Model | | 85BLF13 | 85BLF23 |
| 1 | n° of Pole | 20 | 20 |
| 2 | n° of Phase | 3 | 3 |
| 3 | Rated Voltage | V | 48 |
| 4 | Rated Speed | rpm | 2950 |
| 5 | Max. Speed | rpm | 3700 |
| 6 | Rated Torque | Nm | 1,2 |
| 7 | Max. Peak Torque | Nm | 3,6 |
| 8 | Torque Constant | Nm/A | 0,143 |
| 9 | Rated Current | A | 9 |
| 10 | Max. Peak Current | A | 27 |
| 11 | No-Load Current | A | 0,6 |
| 12 | Line to Line Resistance | Ω | 0,21 |
| 13 | Line to Line Inductance | mH | 0,3 |
| 14 | Rotor Inertia | gcm ² | 646 |
| 15 | Back EMF | Vrms/Krpm | 8,7 |
| 16 | Stator height (L) | mm | 13 |
| 17 | Rotor height (L1) | mm | 15 |
| 18 | Length (L2) | mm | 22,7 |
| 19 | Measure (L3) | mm | 0,7 |
| 20 | Weight | g | 346 |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 1000 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|----------|----------|
| Color | Gauge | Function |
| Yellow | AWG18/16 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



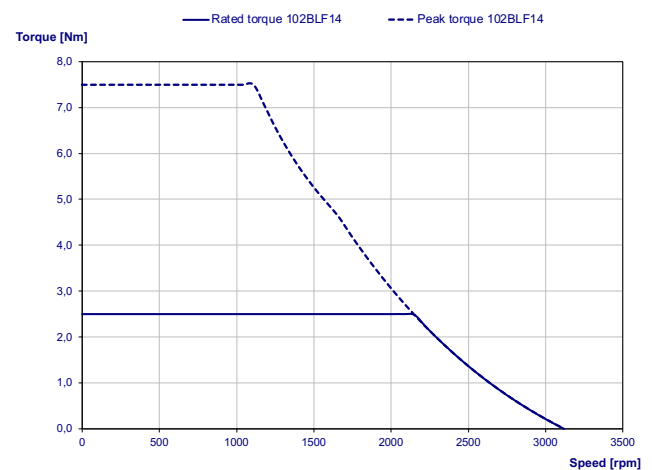


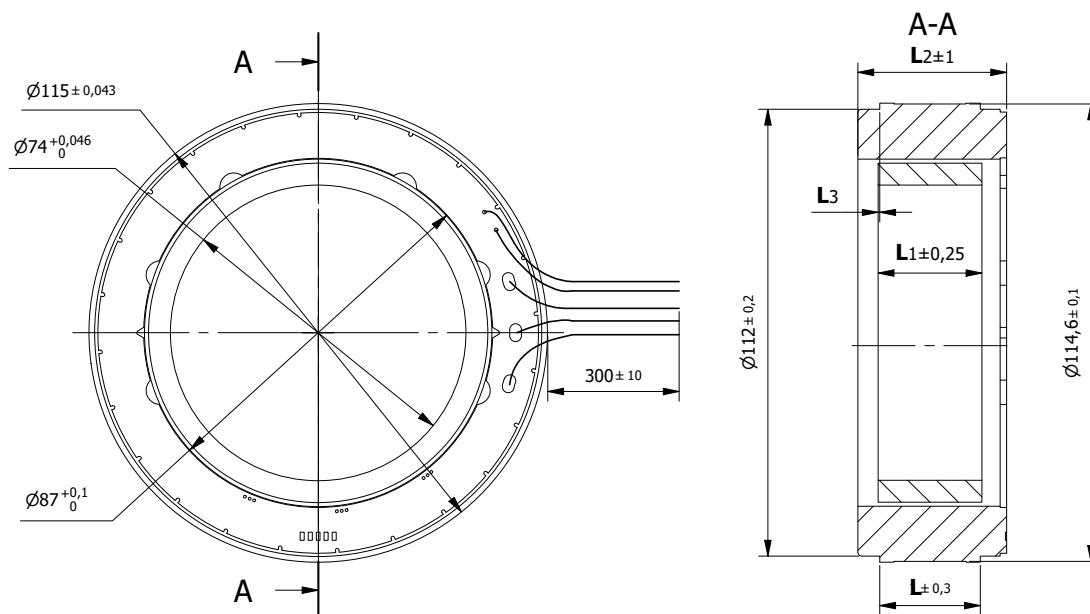
Optional: Hall sensors, Thermistor and PCB mounted Connector

| Specification | | |
|---------------|-------------------------|-----------------------|
| Model | 102BLF14 | |
| 1 | n° of Pole | 20 |
| 2 | n° of Phase | 3 |
| 3 | Rated Voltage | V 48 |
| 4 | Rated Speed | rpm 2000 |
| 5 | Max. Speed | rpm 3100 |
| 6 | Rated Torque | Nm 2,5 |
| 7 | Max. Peak Torque | Nm 7,5 |
| 8 | Torque Constant | Nm/A 0,182 |
| 9 | Rated Current | A 15,8 |
| 10 | Max. Peak Current | A 44,4 |
| 11 | No-Load Current | A 1,5 |
| 12 | Line to Line Resistance | Ω 0,157 |
| 13 | Line to Line Inductance | mH 0,555 |
| 14 | Rotor Inertia | gcm ² 1375 |
| 15 | Back EMF | Vrms/Krpm 11,05 |
| 16 | Stator height (L) | mm 14 |
| 17 | Rotor height (L1) | mm 18 |
| 18 | Length (L2) | mm 28,5 |
| 19 | Measure (L3) | mm 2 |
| 20 | Weight | g 608 |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 650 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|-------|----------|
| Color | Gauge | Function |
| Yellow | AWG16 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



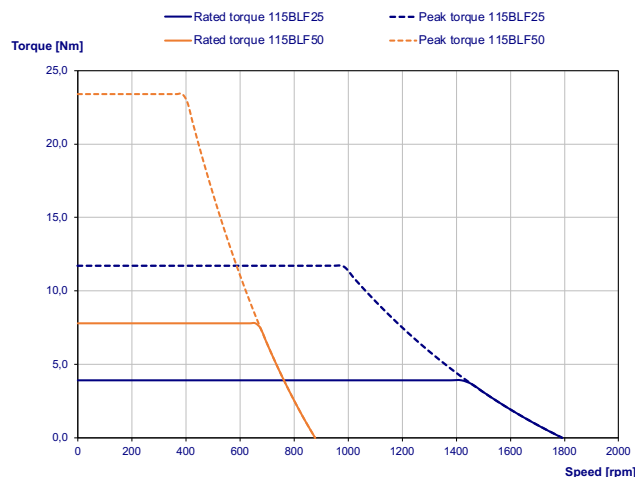


Optional: Hall sensors, Thermistor and PCB mounted Connector

| Specification | | | 115BLF25 | 115BLF50 |
|---------------|-------------------------|------------------|----------|----------|
| 1 | n° of Pole | | 20 | 20 |
| 2 | n° of Phase | | 3 | 3 |
| 3 | Rated Voltage | V | 48 | 48 |
| 4 | Rated Speed | rpm | 1400 | 620 |
| 5 | Max. Speed | rpm | 1900 | 900 |
| 6 | Rated Torque | Nm | 3,9 | 7,8 |
| 7 | Max. Peak Torque | Nm | 11,7 | 23,4 |
| 8 | Torque Constant | Nm/A | 0,293 | 0,662 |
| 9 | Rated Current | A | 14,1 | 13 |
| 10 | Max. Peak Current | A | 42,3 | 39 |
| 11 | No-Load Current | A | 1,4 | 1,3 |
| 12 | Line to Line Resistance | Ω | 0,2 | 0,35 |
| 13 | Line to Line Inductance | mH | 0,5 | 1,6 |
| 14 | Rotor Inertia | gcm ² | 4120 | 9100 |
| 15 | Back EMF | Vrms/Krpm | 17,7 | 40 |
| 16 | Stator height (L) | mm | 25 | 50 |
| 17 | Rotor height (L1) | mm | 26 | 51 |
| 18 | Length (L2) | mm | 37,3 | 62,1 |
| 19 | Measure (L3) | mm | 0,4 | 0,5 |
| 20 | Weight | g | 1100 | 2000 |

| Characteristics | |
|--------------------------------------|-------------------------|
| Item | |
| Hall Effect Angle | 120° |
| Insulation Class | B 130°C |
| Dielectric strength (for 1 sec.) | 1000 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating ambient temperature | -20°C to +50°C |
| Humidity | max. 85% not condensing |

| Connection | | |
|------------|-------|----------|
| Color | Gauge | Function |
| Yellow | AWG12 | Phase U |
| Red | | Phase V |
| Black | | Phase W |



Brushless Servomotors



Controllers/Drives

Encoders

Gearboxes

Linear actuators

Stepper

Motor + Controller

Servomotors

Brushless DC

Brushed DC

Index



Low voltage
Servomotors

p.175



Medium voltage
Servomotors

p.185

Brushless **Servomotors**

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| Technical introduction | | 172 |
| Low voltage - Brushless DC Servomotors | | |
| | Torque* (Nm) | 175 |
| 25SV - 24VDC - NEW | 0,095 | 176 |
| 38SV - 48VDC | 0,16...0,32 | 177 |
| 60SV - 48VDC | 0,64...1,27 | 178 |
| 80SV - 48VDC | 2,39...3,18 | 179 |
| 100SV - 48VDC | 3,18...4,77 | 180 |
| 110SV - 48VDC | 4,77...6,37 | 181 |
| 130SV - 48VDC | 9,55...14,3 | 182 |
| Medium voltage - Brushless AC Servomotors | | |
| | Torque* (Nm) | 185 |
| 38SV - 220VAC | 0,16...0,32 | 186 |
| 60SV - 220VAC | 0,64...1,27 | 187 |
| 80SV - 220VAC | 2,39...3,18 | 188 |
| 100SV - 220VAC | 3,18...4,77 | 189 |
| 110SV - 220VAC | 4,77...6,37 | 190 |
| 130SV - 220VAC | 9,55...14,3 | 191 |

* 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 (except our 25SV-24VDC which is IP54) so that they can be used in a wide variety of environments without concern.

IP65

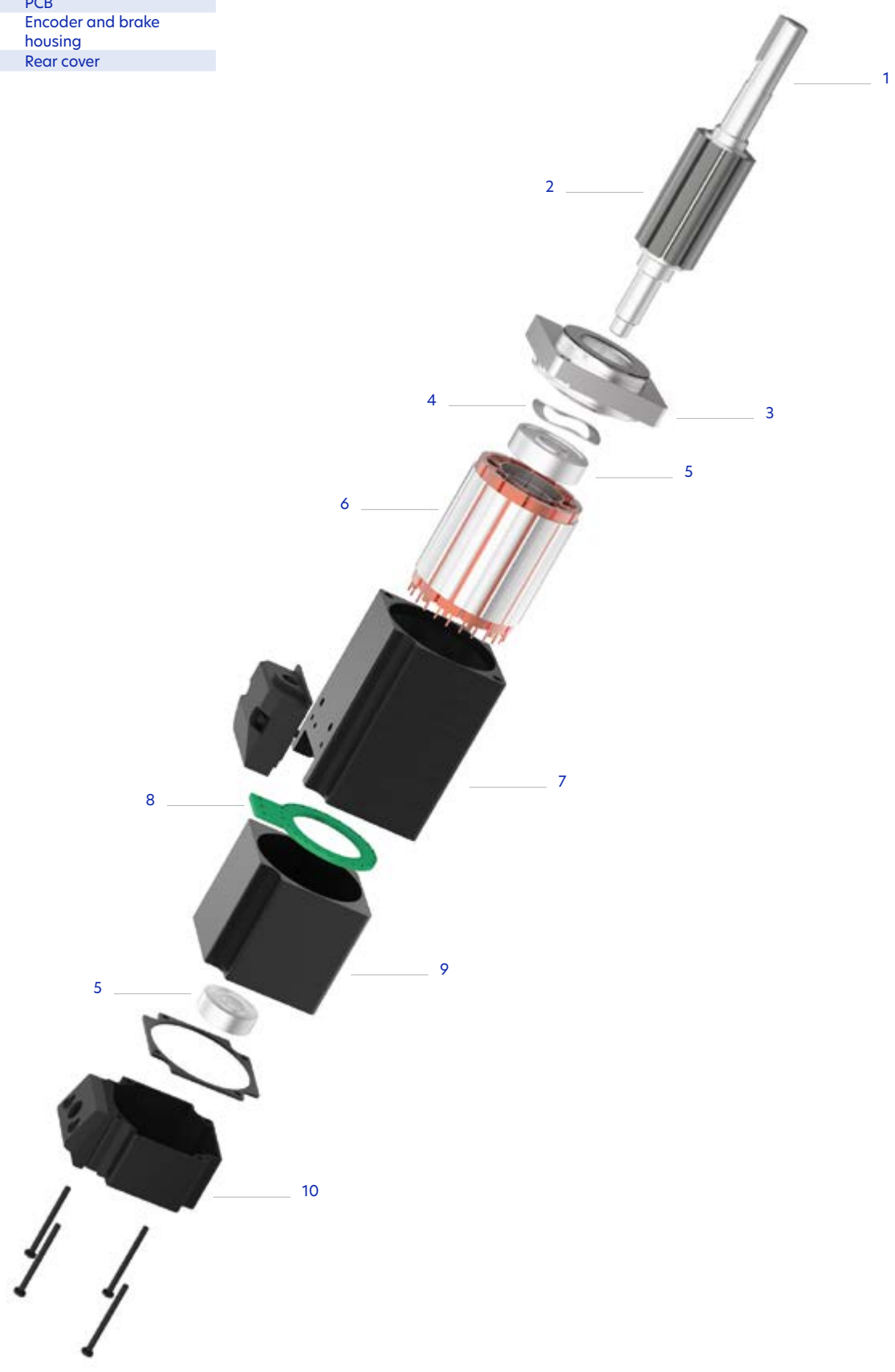
A brake, matched to the power output of the motor, is also an option on almost all models.

Optional brake

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

Technical introduction

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





BLDC Servomotors
Low voltage

| Low voltage - Brushless DC Servomotors | Torque* (Nm) | |
|--|--------------|-----|
| 25SV - 24VDC - NEW | 0,095 | 176 |
| 38SV - 48VDC | 0,16...0,32 | 177 |
| 60SV - 48VDC | 0,64...1,27 | 178 |
| 80SV - 48VDC | 2,39...3,18 | 179 |
| 100SV - 48VDC | 3,18...4,77 | 180 |
| 110SV - 48VDC | 4,77...6,37 | 181 |
| 130SV - 48VDC | 9,55...14,3 | 182 |

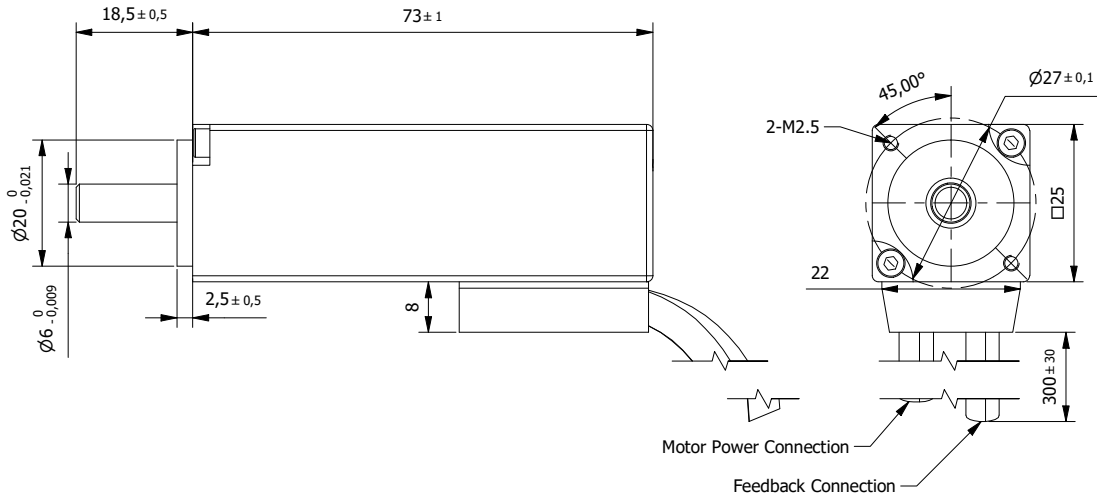
* Rated Torque

Brushless DC Servomotor 25SV-24VDC

Low voltage - IP54

□ 25mm

0,095Nm

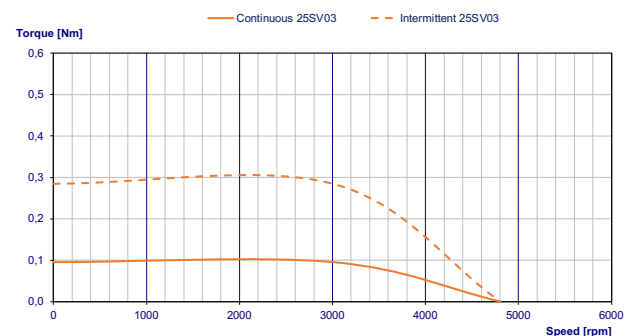


| Specification | | | |
|---------------|-------------------------|------------------|----------|
| Model | | 25SV03-24V-30EA1 | |
| 1 | n° of Pole | | 8 |
| 2 | n° of Phase | | 3 |
| 3 | Nominal Voltage | VDC | 24 |
| 4 | Rated power | W | 30 |
| 5 | Rated Speed | RPM | 3000 |
| 6 | Max. Speed | RPM | 4800 |
| 7 | Rated Torque | Nm | 0,095 |
| 8 | Max. Peak Torque | Nm | 0,285 |
| 9 | Torque Constant | Nm/A | 0,057 |
| 10 | Rated Current | A | 2 |
| 11 | Max. Peak Current | A | 6 |
| 12 | Back EMF constant | V/kRPM | 3,42 |
| 13 | Line to Line Resistance | Ω | 2,3 ±10% |
| 14 | Line to Line Inductance | mH | 0,7 ±20% |
| 15 | Rotor Inertia | gcm ² | 1,27 |
| 16 | Length (L) | mm | 73 |
| 17 | Weight | Kg | 0,2 |

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Insulation Class | F 155°C |
| Protection Class | IP54 |
| Radial play (max. 4N) | 0,02 mm |
| Axial play (max. 4N) | 0,14 mm |
| Max. Radial force (14mm from flange) | 6N |
| Max. Axial force | 5N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

| Connection | | |
|-----------------|--------------|----------|
| Color | Gauge | Function |
| Feedback | | |
| Red | UL2517 AWG28 | +5V |
| Black | | GND |
| White | | 485+ |
| Blue | | 485- |
| Shielded | | PE |
| Power | | |
| Yellow | AWG20 | U |
| Red | | V |
| Black | | W |
| Green | | GND |

| Encoders | |
|-------------------------|--|
| Item | |
| Encoder Type - Standard | Magnetic Absolute multi-turn encoder (Communication Interface RS485): 17 bit, 16 bit |

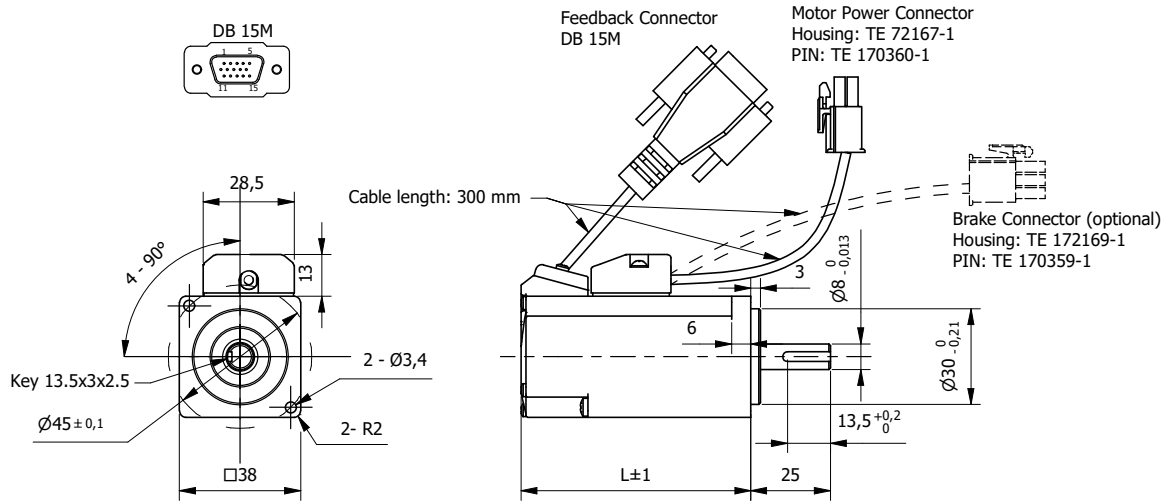


Brushless DC Servomotor 38SV-48VDC

Low voltage - IP65

□ 38mm

0,16 to 0,32Nm



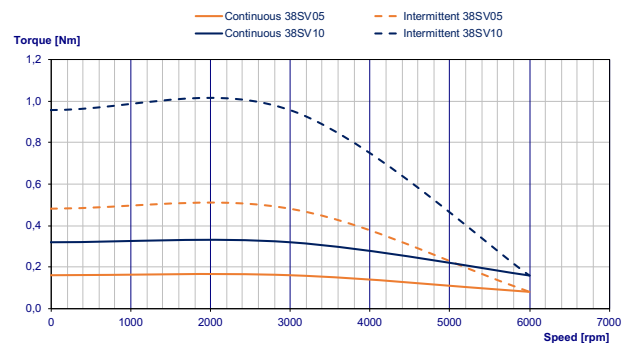
Note: optional brake

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

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

| 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 |

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

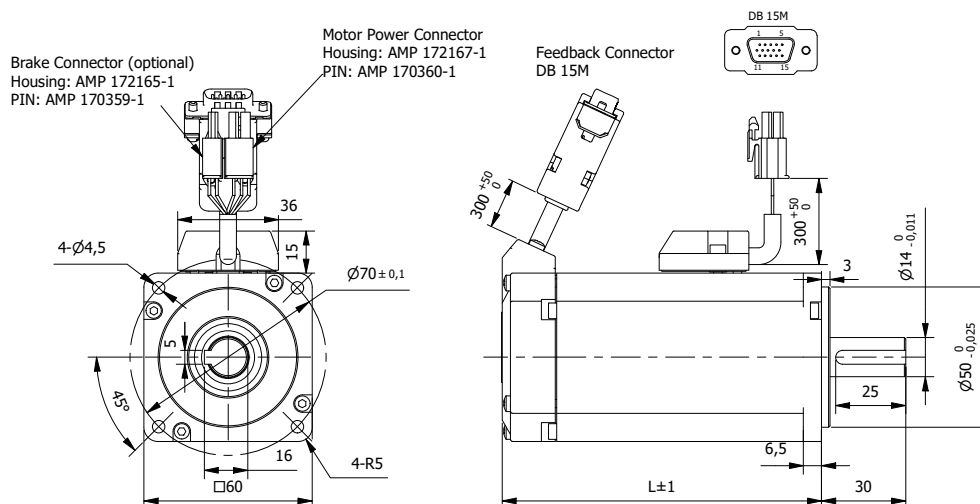


Brushless DC Servomotor 60SV-48VDC

Low voltage - IP65

□ 60mm

0,64 to 1,27Nm



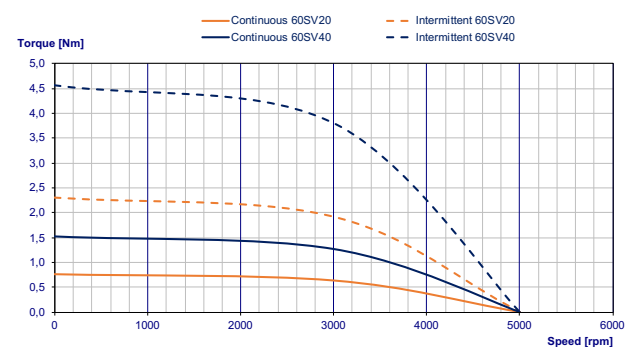
Note: optional brake

| Specification | | 60SV20-48V-30EA1 | 60SV20-48V-30EA2 | 60SV40-48V-30EA1 | 60SV40-48V-30EA2 |
|---------------|-------------------------|------------------|------------------|------------------|------------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Nominal Voltage | VDC 48 | 48 | 48 | 48 |
| 4 | Rated power | W 200 | 200 | 400 | 400 |
| 5 | Rated Speed | RPM 3000 | 3000 | 3000 | 3000 |
| 6 | No-load Speed | RPM 5200 ±10% | 5200 ±10% | 5200 ±10% | 5200 ±10% |
| 7 | Rated Torque | Nm 0,64 | 0,64 | 1,27 | 1,27 |
| 8 | Max. Peak Torque | Nm 1,92 | 1,92 | 3,81 | 3,81 |
| 9 | Torque Constant | Nm/A 0,107 | 0,107 | 0,107 | 0,107 |
| 10 | Rated Current | A 6 | 6 | 12 | 12 |
| 11 | Max. Peak Current | A 18 | 18 | 36 | 36 |
| 12 | No-Load Current | A 0,6 | 0,6 | 1,2 | 1,2 |
| 13 | Back EMF constant | V/kRPM 6,5 | 6,5 | 6,5 | 6,5 |
| 14 | Line to Line Resistance | Ω 0,44 ±10% | 0,44 ±10% | 0,19 ±10% | 0,19 ±10% |
| 15 | Line to Line Inductance | mH 0,65 ±20% | 0,65 ±20% | 0,38 ±20% | 0,38 ±20% |
| 16 | Rotor Inertia | Kgcm2 0,21 | 0,21 | 0,25 | 0,25 |
| 17 | Brake | | 24VDC - 1,3Nm | | 24VDC - 1,3Nm |
| 18 | Length (L) | mm 79 | 114 | 99 | 135 |
| 19 | Weight | Kg 0,95 | 1,35 | 1,35 | 1,85 |

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Insulation Class | F 155°C |
| Protection Class | IP65 |
| Radial play (max. 4N) | 0,02 mm |
| Axial play (max. 4N) | 0,08 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 | Magnetic Incremental: 2500 CPR |
| Encoder Type - Optional | Optical Incremental: 1024-4096 CPR |
| | Magnetic Absolute (single-turn, BiSS): 17bit, 16bit |

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

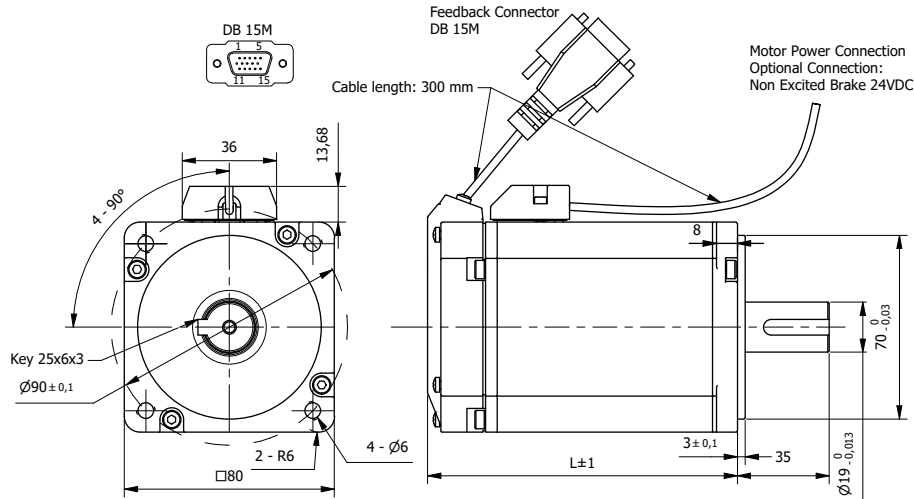


Brushless DC Servomotor 80SV-48VDC

Low voltage - IP65

□ 80mm

2,39 to 3,18Nm



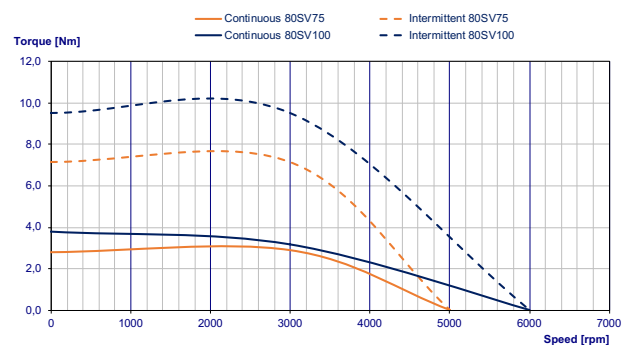
Note: optional brake

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

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

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

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

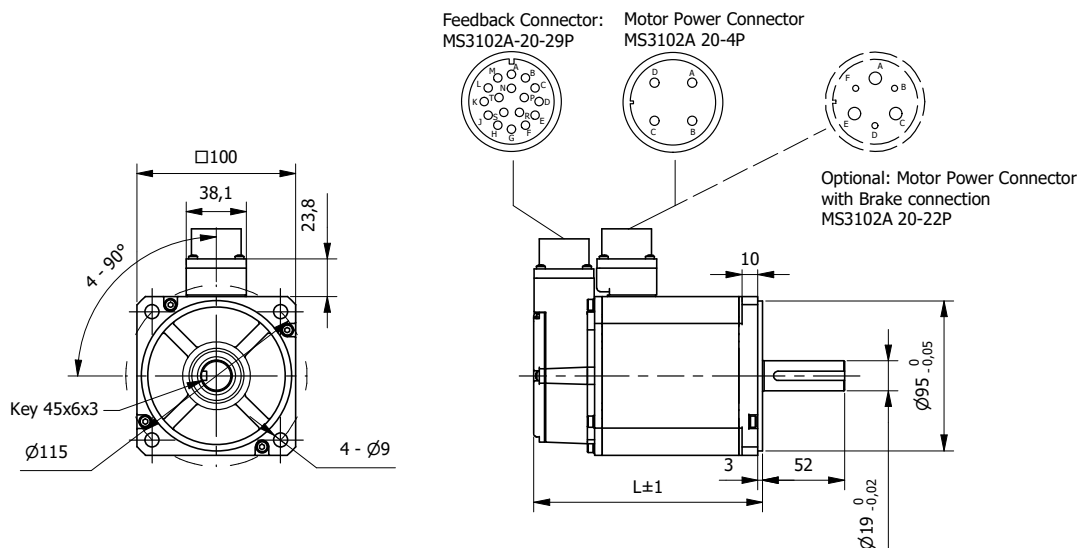


Brushless DC Servomotor 100SV-48VDC

Low voltage - IP65

□ 100mm

3,18 to 4,77Nm

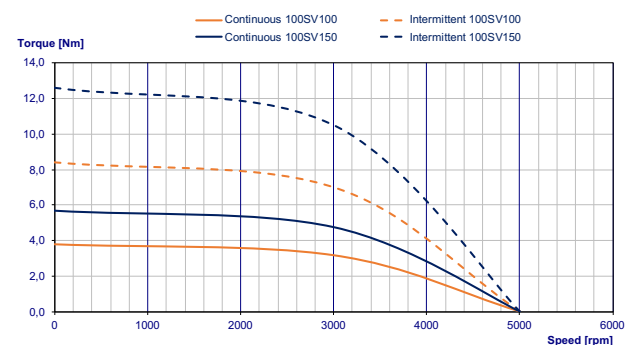


| Specification | | 100SV100-48V-30EA1 | 100SV100-48V-30EA2 | 100SV150-48V-30EA1 | 100SV150-48V-30EA2 |
|---------------|-------------------------|-----------------------|--------------------|--------------------|--------------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | n° of Phase | 3 | 3 |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

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

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

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

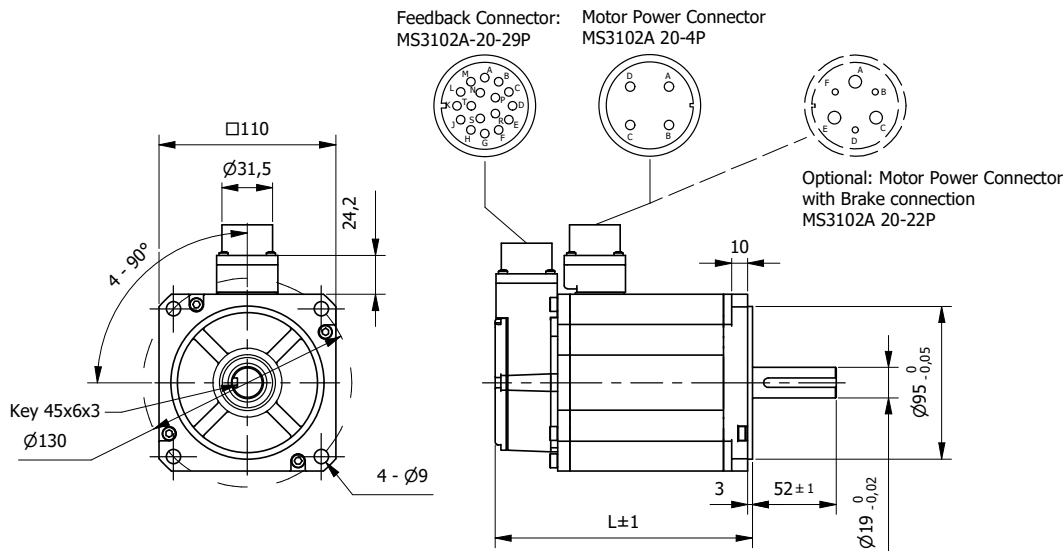


Brushless DC Servomotor 110SV-48VDC

Low voltage - IP65

□ 110mm

4,77 to 6,37Nm



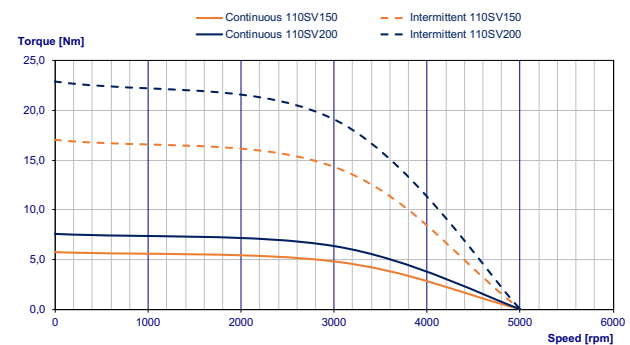
Note: optional brake

| Specification | | 110SV150-48V-30EA1 | 110SV150-48V-30EA2 | 110SV200-48V-30EA1 | 110SV200-48V-30EA2 |
|---------------|-------------------------|--------------------|--------------------|--------------------|--------------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Nominal Voltage | VDC 48 | 48 | 48 | 48 |
| 4 | Rated power | W 1500 | 1500 | 2000 | 2000 |
| 5 | Rated Speed | RPM 3000 | 3000 | 3000 | 3000 |
| 6 | No-load Speed | RPM 5000 ±10% | 5000 ±10% | 5000 ±10% | 5000 ±10% |
| 7 | Rated Torque | Nm 4,77 | 4,77 | 6,37 | 6,37 |
| 8 | Max. Peak Torque | Nm 14,3 | 14,3 | 19,1 | 19,1 |
| 9 | Torque Constant | Nm/A 0,11 | 0,11 | 0,11 | 0,11 |
| 10 | Rated Current | A 43,0 | 43,0 | 58,0 | 58,0 |
| 11 | Max. Peak Current | A 130 | 130 | 174 | 174 |
| 12 | No-Load Current | A 0,8 | 0,8 | 0,8 | 0,8 |
| 13 | Back EMF constant | V/kRPM 6,35 | 6,35 | 6,63 | 6,63 |
| 14 | Line to Line Resistance | Ω 0,01 ±10% | 0,01 ±10% | 0,009 ±10% | 0,009 ±10% |
| 15 | Line to Line Inductance | mH 0,16 ±20% | 0,16 ±20% | 0,145 ±20% | 0,145 ±20% |
| 16 | Rotor Inertia | Kgcm2 3,1 | 3,47 | 4,1 | 4,47 |
| 17 | Brake | | 24VDC - 10Nm | | 24VDC - 10Nm |
| 18 | Length (L) | mm 156,5 | 192 | 173,5 | 209 |
| 19 | Weight | Kg 5,2 | 6,2 | 6,9 | 7,9 |

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

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

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

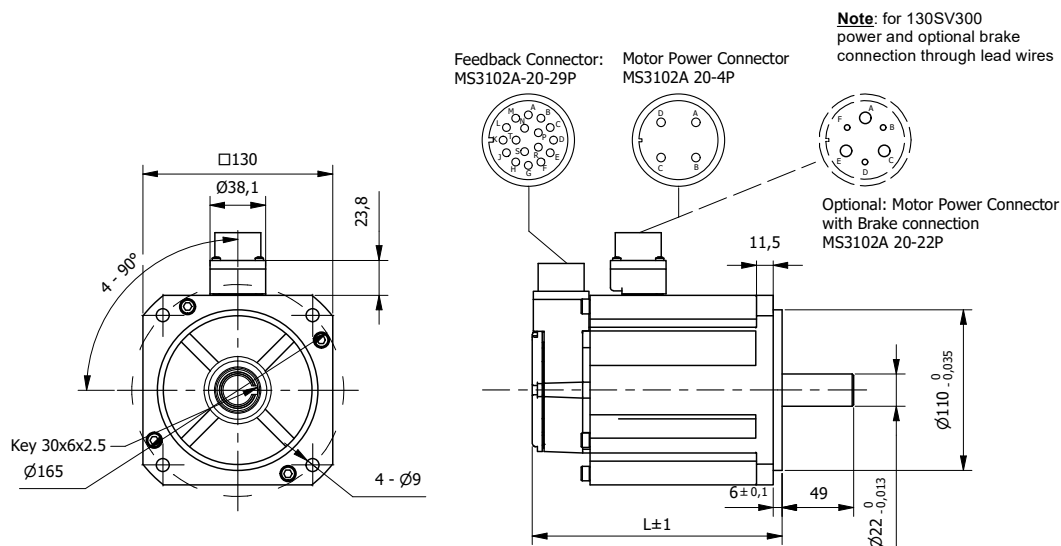


Brushless DC Servomotor 130SV-48VDC

Low voltage - IP65

□ 130mm

9,55 to 14,3Nm



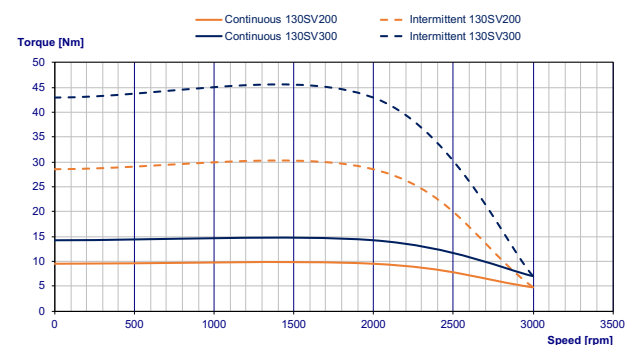
Note: optional brake

| 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 | | 24VDC - 16Nm |
| 18 | Length (L) | mm 165 | 193 | 193 | 221 |
| 19 | Weight | Kg 7,5 | 10 | 12,7 | 15,2 |

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

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

| Connection | | | |
|---|------------|-----|-----------------|
| Pin | Function | Pin | Function |
| Feedback | | | |
| A | +5V | J | U+ |
| B | GND | K | U- |
| C | A+ | L | V+ |
| D | A- | M | V- |
| E | B+ | N | W+ |
| F | B- | P | W- |
| G | Z+ | R | PE |
| H | Z- | | |
| Power (for SV300 3x AWG8 300mm wires) | | | |
| A | U (yellow) | B | V (red) |
| C | W (black) | D | GND |
| Optional: Power & Brake (for SV300 2x AWG26 300mm wires) | | | |
| A | U | B | Brake 1 (black) |
| C | V | D | Brake 2 (black) |
| E | W | | |





BLAC Servomotors
Medium voltage

| Medium voltage - Brushless AC Servomotors | Torque* (Nm) | |
|---|--------------|-----|
| 38SV - 220VAC | 0,16...0,32 | 186 |
| 60SV - 220VAC | 0,64...1,27 | 187 |
| 80SV - 220VAC | 2,39...3,18 | 188 |
| 100SV - 220VAC | 3,18...4,77 | 189 |
| 110SV - 220VAC | 4,77...6,37 | 190 |
| 130SV - 220VAC | 9,55...14,3 | 191 |

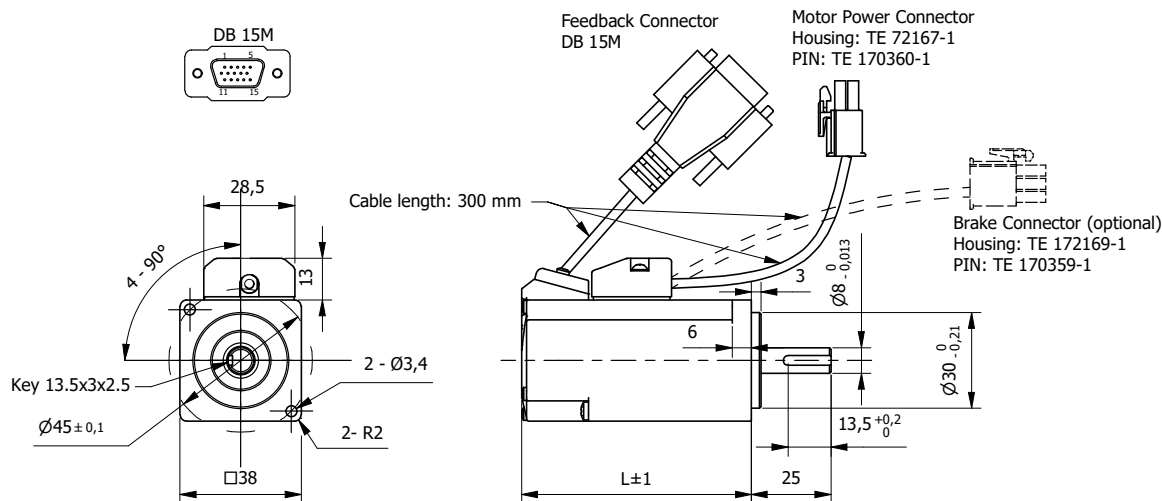
* Rated Torque

Brushless AC Servomotor 38SV-220VAC

Medium voltage - IP65

□ 38mm

0,16 to 0,32Nm



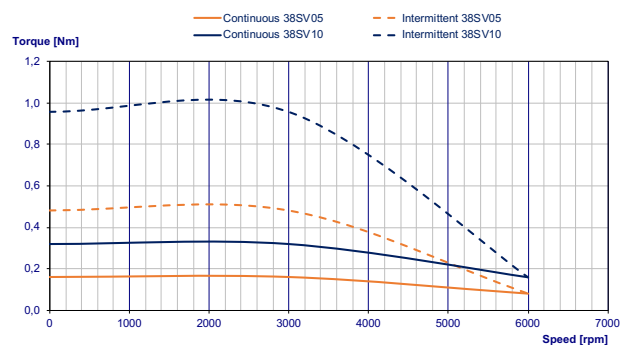
Note: optional brake

| Specification | | 38SV05-220V-30EA1 | 38SV05-220V-30EA2 | 38SV10-220V-30EA1 | 38SV10-220V-30EA2 |
|---------------|-------------------------|-------------------------|-------------------|-------------------|-------------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Nominal Voltage | VAC 220 | 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 |
| Protection Class | IP65 |
| Radial play (max. 4N) | 0,02 mm |
| Axial play (max. 4N) | 0,14 mm |
| Max. Radial force (14mm from flange) | 69N |
| Max. Axial force | 59N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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

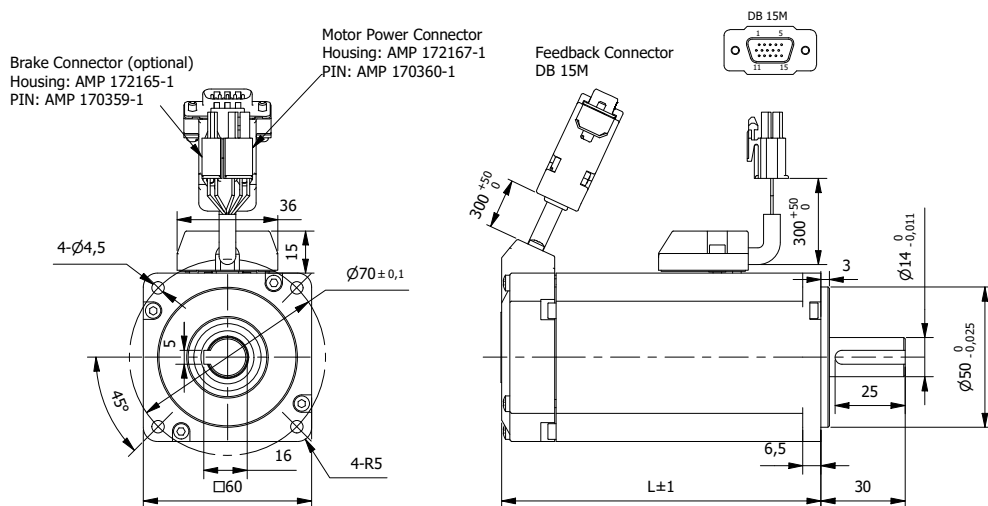
| Connection | | | | | |
|-----------------|-------|----------|-----|-------|----------|
| Pin | Color | Function | Pin | Color | Function |
| Feedback | | | | | |
| 1 | RD | +5V | 9 | WH | W+ |
| 2 | BK | GND | 10 | GY | V+ |
| 4 | BR | U+ | 11 | YL/BK | Z- |
| 5 | BR/BK | U- | 12 | OR/BK | B- |
| 6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



Brushless AC Servomotor 60SV-220VAC

Medium voltage - IP65

□ 60mm
0,64 to 1,27Nm



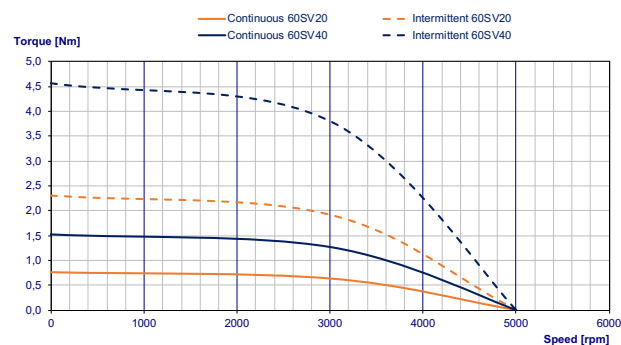
Note: optional brake

| Specification | | 60SV20-220V-30EA1 | 60SV20-220V-30EA2 | 60SV40-220V-30EA1 | 60SV40-220V-30EA2 |
|---------------|-------------------------|-------------------|-------------------|-------------------|-------------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Nominal Voltage | VAC 220 | 220 | 220 | 220 |
| 4 | Rated power | W 200 | 200 | 400 | 400 |
| 5 | Rated Speed | RPM 3000 | 3000 | 3000 | 3000 |
| 6 | No-load Speed | RPM 8800 ±10% | 8800 ±10% | 8800 ±10% | 8800 ±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 0,41 | 0,41 | 0,41 | 0,41 |
| 10 | Rated Current | A 1,7 | 1,7 | 3,4 | 3,4 |
| 11 | Max. Peak Current | A 5,1 | 5,1 | 10,2 | 10,2 |
| 12 | No-Load Current | A 0,17 | 0,17 | 0,8 | 0,8 |
| 13 | Back EMF constant | V/kRPM 25 | 25 | 25 | 25 |
| 14 | Line to Line Resistance | Ω 5,7 ±10% | 5,7 ±10% | 2,8 ±10% | 2,8 ±10% |
| 15 | Line to Line Inductance | mH 10,6 ±20% | 10,6 ±20% | 5,1 ±20% | 5,1 ±20% |
| 16 | Rotor Inertia | Kgcm2 0,2 | 0,2 | 0,38 | 0,38 |
| 17 | Brake | | 24VDC - 1,3Nm | | 24VDC - 1,3Nm |
| 18 | Length (L) | mm 79 | 114 | 99 | 135 |
| 19 | Weight | Kg 0,95 | 1,3 | 1,3 | 1,8 |

| Characteristics | |
|--------------------------------------|----------|
| Item | |
| Insulation Class | F 155°C |
| Protection Class | IP65 |
| Radial play (max. 4N) | 0,02 mm |
| Axial play (max. 4N) | 0,08 mm |
| Max. Radial force (20mm from flange) | 245N |
| Max. Axial force | 98N |
| Dielectric strength (for 1 sec.) | 1200 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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

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

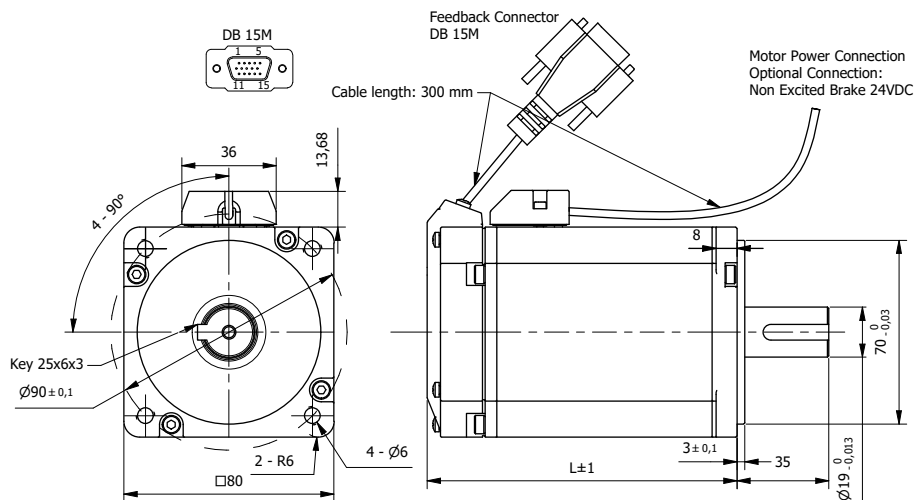


Brushless AC Servomotor 80SV-220VAC

Medium voltage - IP65

□ 80mm

2,39 to 3,18Nm



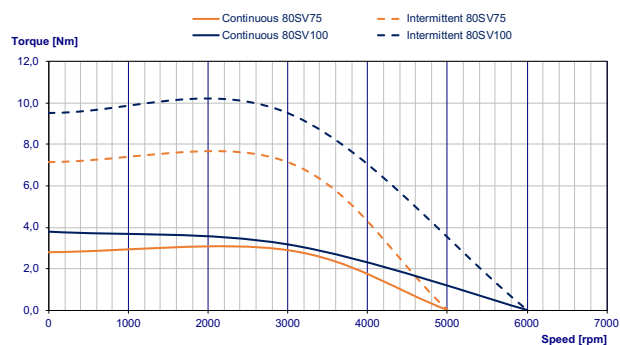
Note: optional brake

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

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

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

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

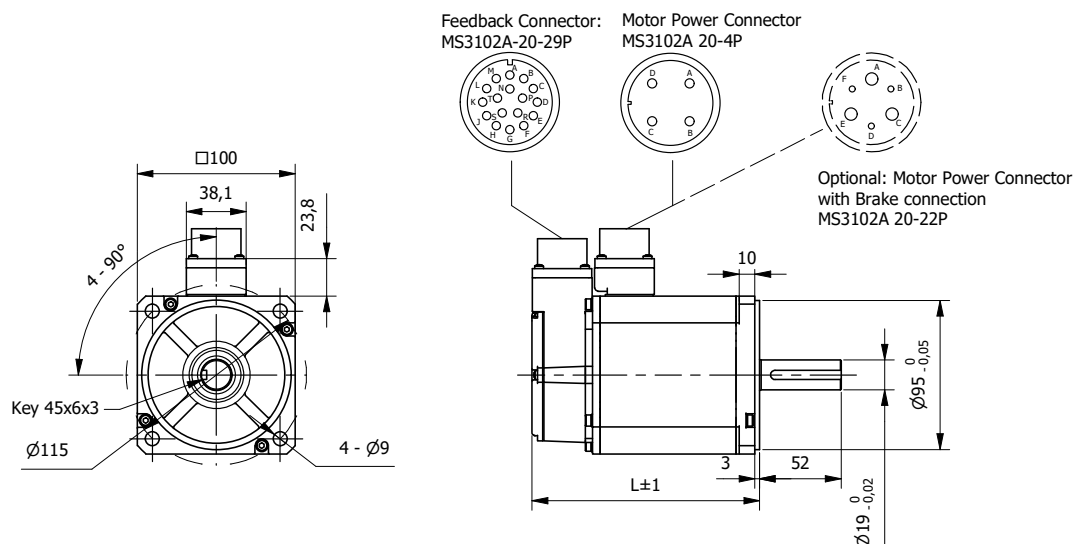


Brushless AC Servomotor 100SV-220VAC

Medium voltage - IP65

□ 100mm

3,18 to 4,77Nm



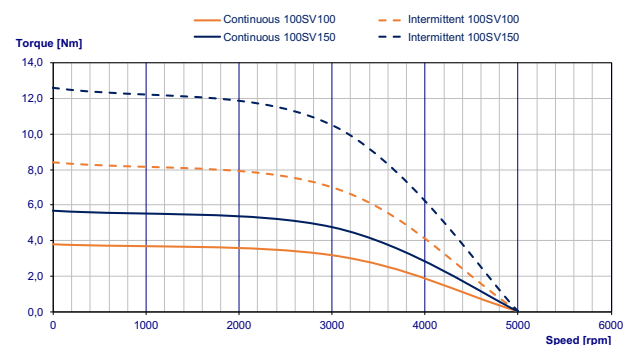
Note: optional brake

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

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

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

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

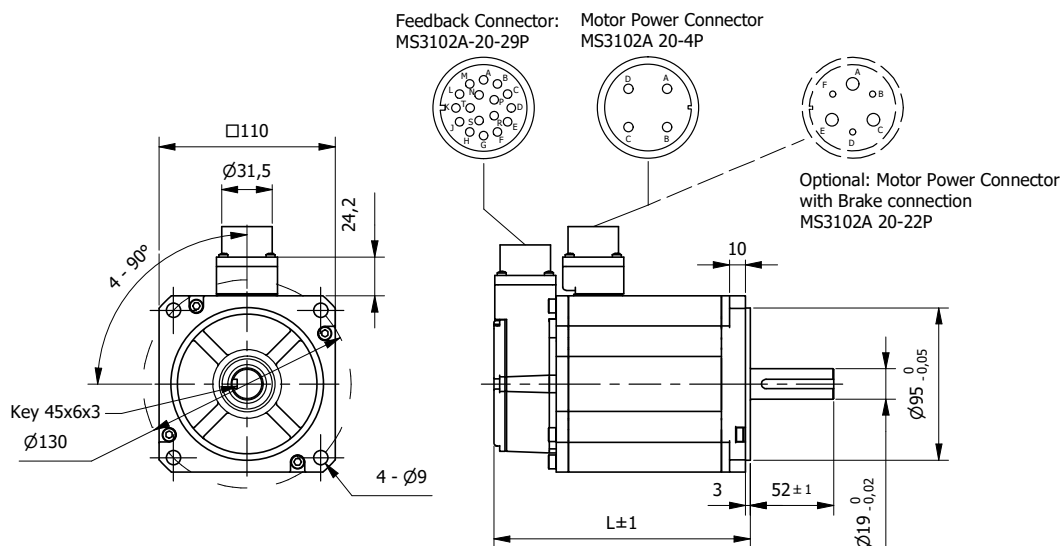


Brushless AC Servomotor 110SV-220VAC

Medium voltage - IP65

□ 110mm

4,77 to 6,37Nm



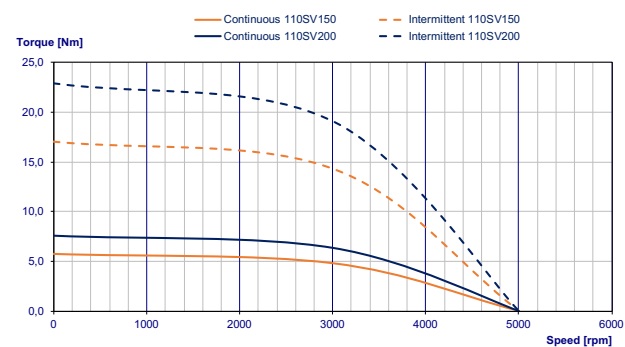
Note: optional brake

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

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

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

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

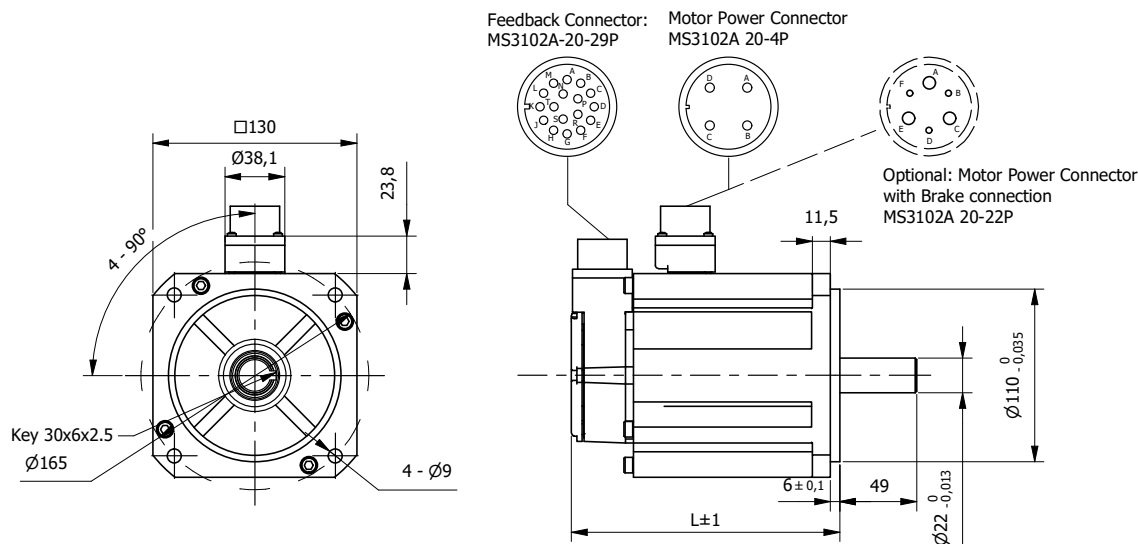


Brushless AC Servomotor 130SV-220VAC

Medium voltage - IP65

□ 130mm

9,55 to 14,3Nm



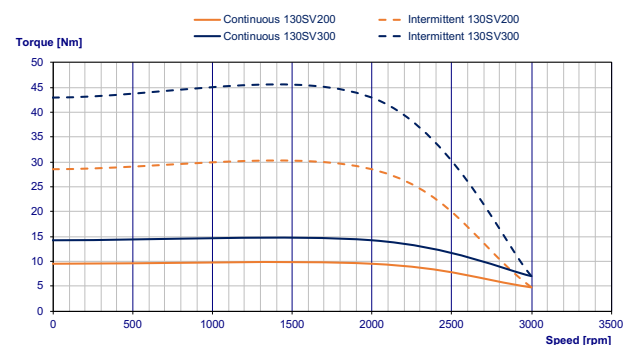
Note: optional brake

| Specification | | 130SV200-220V-30EA1 | 130SV200-220V-30EA2 | 130SV300-220V-30EA1 | 130SV300-220V-30EA2 |
|---------------|-------------------------|---------------------|---------------------|---------------------|---------------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | n° of Phase | 3 | 3 | 3 | 3 |
| 3 | Nominal Voltage | VAC 220 | 220 | 220 | 220 |
| 4 | Rated power | W 2000 | 2000 | 3000 | 3000 |
| 5 | Rated Speed | RPM 2000 | 2000 | 2000 | 2000 |
| 6 | No-load Speed | RPM 3200 ±10% | 3200 ±10% | 3200 ±10% | 3200 ±10% |
| 7 | Rated Torque | Nm 9,55 | 9,55 | 14,3 | 14,3 |
| 8 | Max. Peak Torque | Nm 28,65 | 28,65 | 42,9 | 42,9 |
| 9 | Torque Constant | Nm/A 1,12 | 1,12 | 1,12 | 1,12 |
| 10 | Rated Current | A 9,3 | 9,3 | 14,0 | 14,0 |
| 11 | Max. Peak Current | A 27,9 | 27,9 | 42 | 42 |
| 12 | No-Load Current | A <1 | <1 | <1,4 | <1,4 |
| 13 | Back EMF constant | V/kRPM 68 | 68 | 68 | 68 |
| 14 | Line to Line Resistance | Ω 0,8 ±10% | 0,8 ±10% | 0,5 ±10% | 0,5 ±10% |
| 15 | Line to Line Inductance | mH 4,2 ±20% | 4,2 ±20% | 3 ±20% | 3 ±20% |
| 16 | Rotor Inertia | 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 |
| Protection Class | IP65 |
| Radial play (max. 4N) | 0,02 mm |
| Axial play (max. 4N) | 0,12 mm |
| Max. Radial force (30mm from flange) | 490N |
| Max. Axial force | 196N |
| Dielectric strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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

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



Motors with Controller



Controllers/Drives

Encoders

Gearboxes

Linear actuators

Stepper

Motor + Controller

Servomotors

Brushless DC

Brushed DC

Index



Stepper motors
with Motion
controller

p.223



Servomotors
with Motion
controller

p.217



BLDC motors
with Speed
controller

p.201



BLDC motors
with Motion
controller

p.209

Motors with integrated Controller

| Brushless DC motors with Speed Controller | | | Torque* (Nm) | 201 |
|--|--|--|----------------------|------------|
| 16EC33P-2W | | | 0,002 | 202 |
| 36CBL-IE | | | 0,015...0,08 | 203 |
| 42BL-IE - square | | | 0,063...0,25 | 204 |
| 42CBL60-IE | | | 0,068 | 205 |
| 42RBL60-IE | | | 0,08 | 206 |
| 57BL-IE | | | 0,11...0,33 | 207 |
| Brushless DC motors with Motion Controller | | | Torque* (Nm) | 209 |
| IBS042 | | | 0,062...0,25 | 210 |
| IBS057 | | | 0,055...0,44 | 211 |
| IBI057- IP65 | | | 0,055...0,44 | 212 |
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| Brushless Servo motors with Motion Controller | | | Torque* (Nm) | 217 |
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| ISIO42 - IP65 | | | 0,22...0,8 | 225 |
| ISS057 | | | 0,55...1,89 | 226 |
| ISIO57-IP65 | | | 0,55...1,89 | 227 |
| ISS060 | | | 1...3,1 | 228 |
| ISIO60-IP65 | | | 1...3,1 | 229 |
| ISS086 | | | 2,2...12 | 230 |
| ISIO86 - IP65 | | | 2,2...12 | 231 |

* 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 Power | Maximum amount of power that the motor is designed to handle under specific operating conditions without overheating or suffering damage. |
| 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 |
| Holding Torque | The torque generated by the motor at nominal current. |
| 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 |
| 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. |
| 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. |
| Back EMF constant | The back (or counter) electromotive force (emf) E is the voltage generated by a running motor that acts to counter the supplied voltage. |
| Length | Total motor length. |
| Weight | Total motor mass. |
| Hall Effect angle | Phase angle at which hall sensors are positioned from each other. |
| 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. |
| 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. |
| 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. |
| Working Temperature | Temperature range allowed for correct operation. |
| Humidity | Humidity range allowed for correct operation. |
| Radial Play | The shaft displacement perpendicular to the shaft due to a side force applied perpendicular to the shaft axis. |
| Axial Play | Axial shaft displacement occurring during a reversal of an axial force on the shaft. |
| Max. Radial force | Maximum force that can be applied to the shaft in the radial direction (any direction perpendicular to the motor shaft axis). |
| Max. Axial force | Maximum force that can be applied to the shaft in the axial direction (in the same axis as or parallel to the motor shaft axis). |
| Dielectric strength | A dielectric test (also known as hipot or high potential test) is performed on all motors under 500V phases to the housing and during 5 seconds after voltage ramp up. Maximum allowed leakage is 1mA |
| Insulation resistance | The measurement of insulation resistance is carried out by means of a megohmmeter - high resistance range ohmmeter. DC voltage is applied between the windings and the ground of the motor. |

Glossary

Product families

BLDC motors with Speed Controller

BLDC motors with Motion Controller

Servomotors with Motion Controller

Stepper motors with Motion Controller

Delta Line's motors with integrated drive and control electronics offer machine builders unprecedented design flexibility due to their compact size, high efficiency, and exceptional reliability. Available as Brushless DC, Servo, and Stepper motors, these advanced motors eliminate the need for separate drives and external controllers, thereby removing the requirement for motor power and feedback cables. This significant reduction in cabling simplifies integration, enhances efficiency, and improves both reliability and electrical noise reduction. As a result, encoder signals remain "clean" and free from electromagnetic interference, providing 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 controllers combine the compactness of a standard motor with the advanced features of our drives. These motors come equipped with digital inputs and outputs, an analog input, and support for multiple Fieldbus protocols, including CANopen, Modbus RTU, EtherCAT, Modbus TCP/IP, Profinet, Powerlink, and EtherNet/IP. For optimal performance, a fully integrated single-turn magnetic encoder is also available. Additionally, several of our models are IP65 rated as standard, ensuring they can operate reliably in a wide variety of environments.

BLDC motor with integrated Motion Controller

Our servo motors with integrated controllers are among the most compact on the market. The powerful drive, integrated directly into the motor, reduces cabling and simplifies installation and configuration, thereby improving overall efficiency. These high-performance motors are IP65 rated, STO (Safe Torque Off) certified, and available with an optional integrated brake. All models support a wide range of Fieldbus protocols, including CANopen, Modbus-RTU, Modbus-TCP, EtherCAT, Profinet, EtherNet/IP, and Powerlink.

Servomotors with integrated Motion Controller

Our stepper motors with integrated electronics use continuous control technology for 65,536 microsteps per revolution and offer encoder options such as magnetic incremental, single-turn absolute, or multi-turn absolute, to meet a wide range of applications. Communication options include CANopen, Modbus RTU, EtherCAT, Modbus TCP/IP, Profinet, Powerlink and EtherNet/IP, allowing the motors to easily connect to any industrial network. Many of our models are IP65 rated, making them suitable for a wide range of environments where moisture or water spray is present.

Stepper motor with integrated Motion Controller

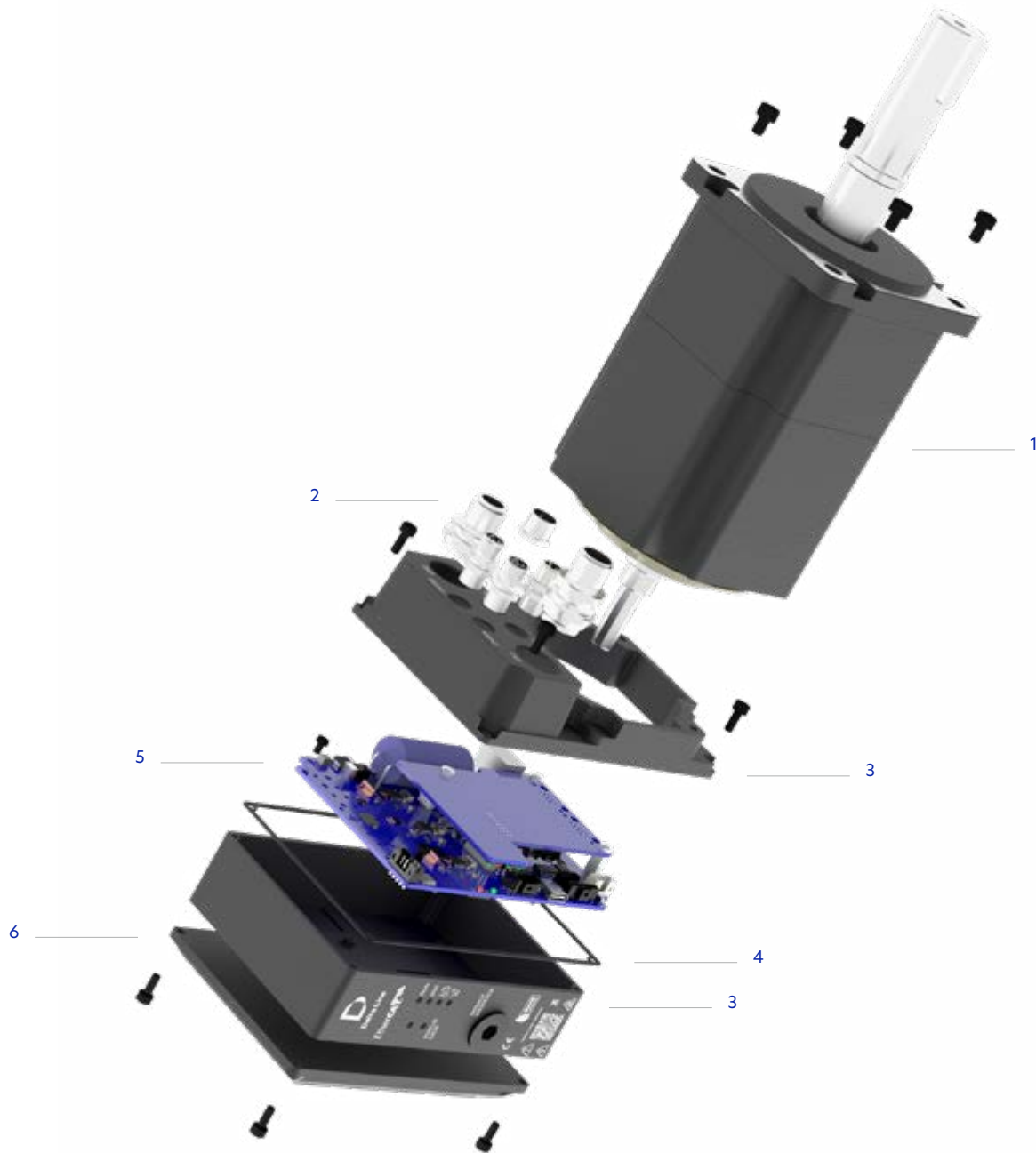
All our motors with Motion Controllers come with two software options: DL Studio and DL Space. DL Studio is a configuration and testing tool that allows users to set all parameters within the drive and control the motor from a PC while monitoring its response, including current, speed, and other data. DL Space includes all the features of DL Studio but also enables users to write custom applications for the drive using a simple, user-friendly programming language. The motor with a Motion Controller can be connected to the PC through a specific interface kit.

Software

Technical introduction

Composition - Servomotor with Motion Controller

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





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 | 202 |
| 36CBL-IE | 0,015...0,08 | 203 |
| 42BL-IE - square | 0,063...0,25 | 204 |
| 42CBL60-IE | 0,068 | 205 |
| 42RBL60-IE | 0,08 | 206 |
| 57BL-IE | 0,11...0,33 | 207 |

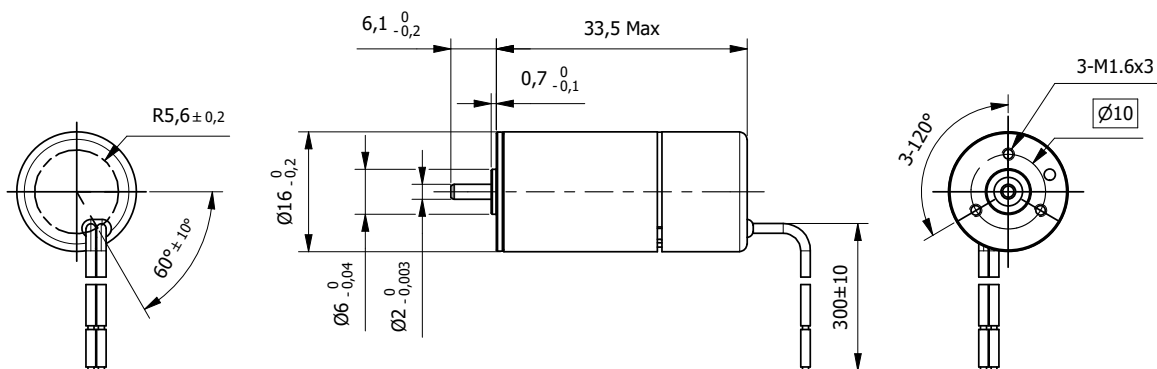
* Rated Torque

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 |

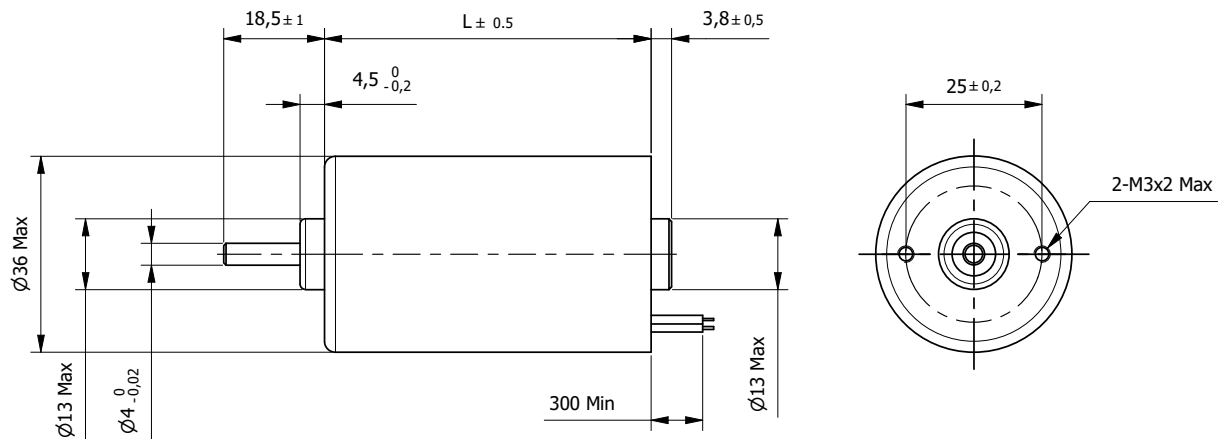
Attention: operating voltage Vcc > 18VDC will destroy the electronics

Brushless Slotted Motor 36CBL-IE

with Speed Controller

Ø 36mm

0,015 - 0,08Nm



| Specification | | 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 |
| 4 | Rated Speed | rpm | 4800 | 4800 | 4500 |
| 5 | Rated Torque | Nm | 0,015 | 0,035 | 0,07 |
| 6 | Max. Peak Torque | Nm | 0,045 | 0,105 | 0,11 |
| 7 | Torque Constant | Nm/A | 0,036 | 0,04 | 0,038 |
| 8 | Rated Current | A | 0,5 | 1 | 1,8 |
| 9 | Max. Peak Current | A | 1,4 | 3 | 3 |
| 10 | No-Load Current | mA | 150 | 250 | 300 |
| 11 | Line to Line Resistance | Ω | 5,2 | 2 | 1,05 |
| 12 | Line to Line Inductance | mH | 3,3 | 1,75 | 1 |
| 13 | Rotor Inertia | gcm ² | 6 | 12 | 27 |
| 14 | Length (L) | mm | 30 | 40 | 57 |
| 15 | Weight | Kg | 0,12 | 0,16 | 0,25 |

| 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 |

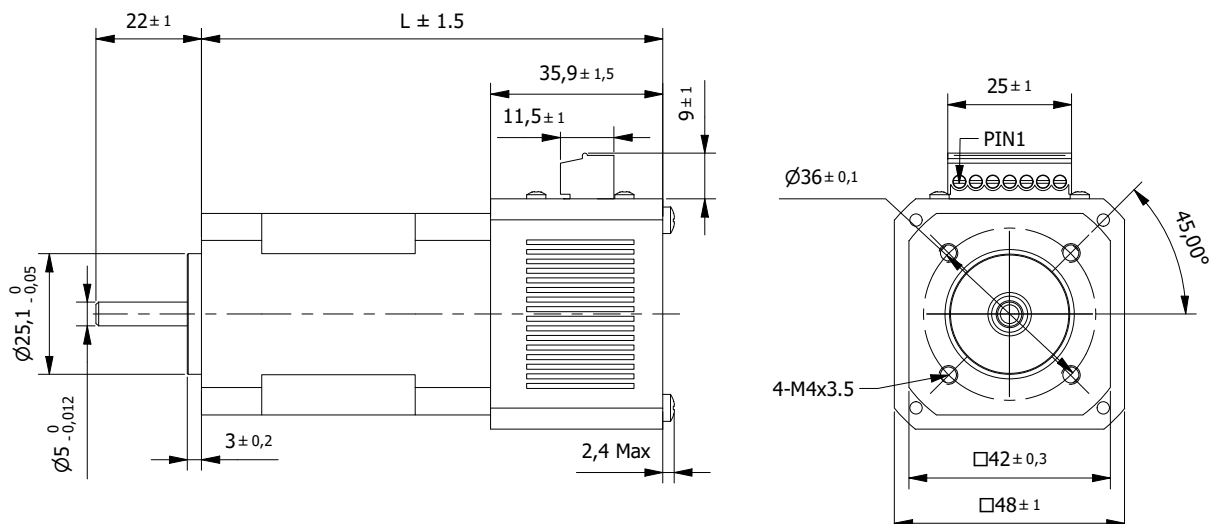
| Connection | | | |
|------------|--------|--------------|-------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG22 | VCC +24VDC |
| 2 | Black | | GND |
| 3 | Blue | UL1430 AWG26 | CW/CCW Direction |
| 4 | Green | | PWM speed control |
| 5 | Yellow | | Tacho Out |
| 6 | White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

Brushless Slotted Motor 42BL-IE

with Speed Controller

□ 42mm

0,063 - 0,25Nm



| Specification | | 42BL01-IE | 42BL02-IE | 42BL03-IE | 42BL04-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 | 0,38 | 0,56 |
| 7 | Torque Constant | Nm/A | 0,035 | 0,036 | 0,038 |
| 8 | Rated Current | A | 1,8 | 3,6 | 5 |
| 9 | Max. Peak Current | A | 5,4 | 10,8 | 15 |
| 10 | No-Load Current | mA | 500 | 500 | <500 |
| 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 | 76 | 96 | 116 |
| 15 | Weight | Kg | 0,35 | 0,5 | 0,7 |

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

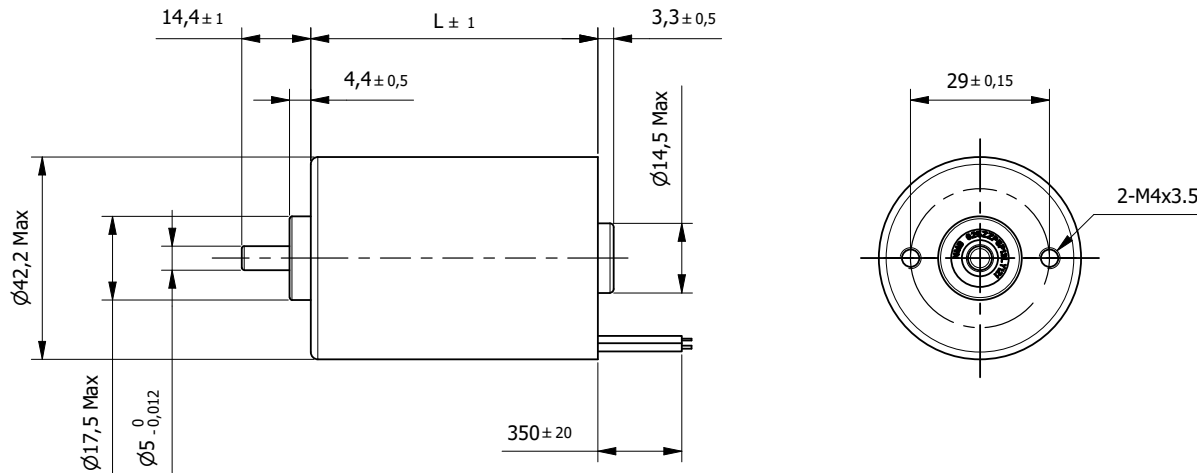
| Connection | |
|------------|---|
| Pin n° | Function |
| 1 | +5V Voltage output |
| 2 | F/R Rotation direction |
| 3 | SV Speed voltage 0/+5VDC |
| 4 | PG Speed Pulse output TTL.24 pulse/rev. |
| 5 | GND Common ground system |
| 6 | GND Common ground system |
| 7 | +Vp DC power input +24VDC |

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 0,102 |
| 7 | Torque Constant | Nm/A 0,034 |
| 8 | Rated Current | A 2 |
| 9 | Max. Peak Current | A 3 |
| 10 | No-Load Current | mA 250 |
| 11 | Line to Line Resistance | Ω 0,87 |
| 12 | Line to Line Inductance | mH 1 |
| 13 | Rotor Inertia | gcm ² 44 |
| 14 | Length (L) | mm 60 |
| 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) | 0,14mm |
| Max. Radial force (10mm from flange) | 15N |
| Max. Axial force | 10N |
| Dielectric strength (for 1 sec.) | 750 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

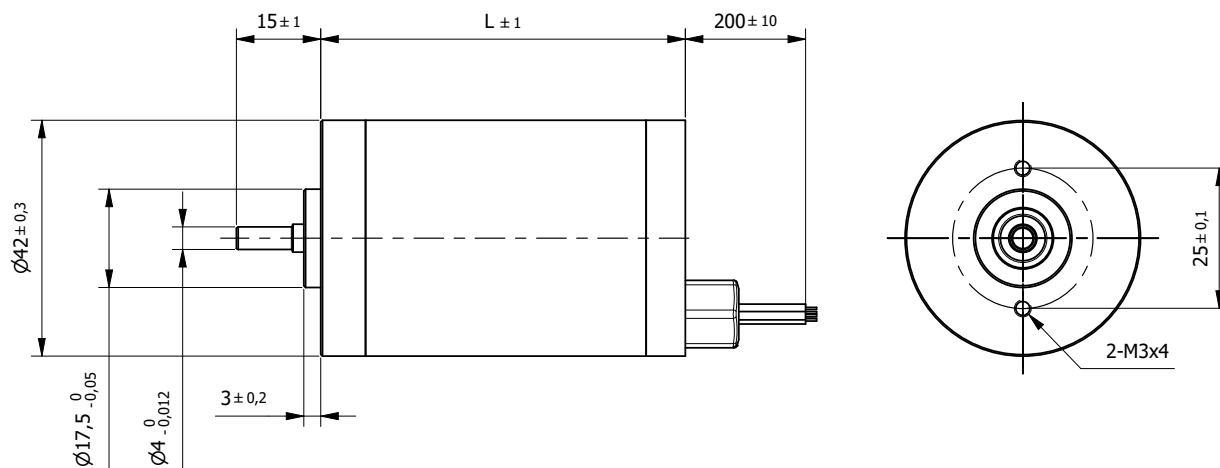
| Connection | | | |
|------------|--------|--------------|-------------------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1332 AWG22 | VCC +24VDC |
| 2 | Black | | GND |
| 3 | Green | UL1430 AWG26 | CW/CCW Direction |
| 4 | White | | PWM speed control |
| 5 | Yellow | | Tacho Out |
| 6 | Blue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

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 | 0,125 |
| 7 | Torque Constant | Nm/A | 0,039 |
| 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) | 0,14mm |
| Max. Radial force (10mm from flange) | 15N |
| Max. Axial force | 10N |
| Dielectric strength (for 1 sec.) | 650 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

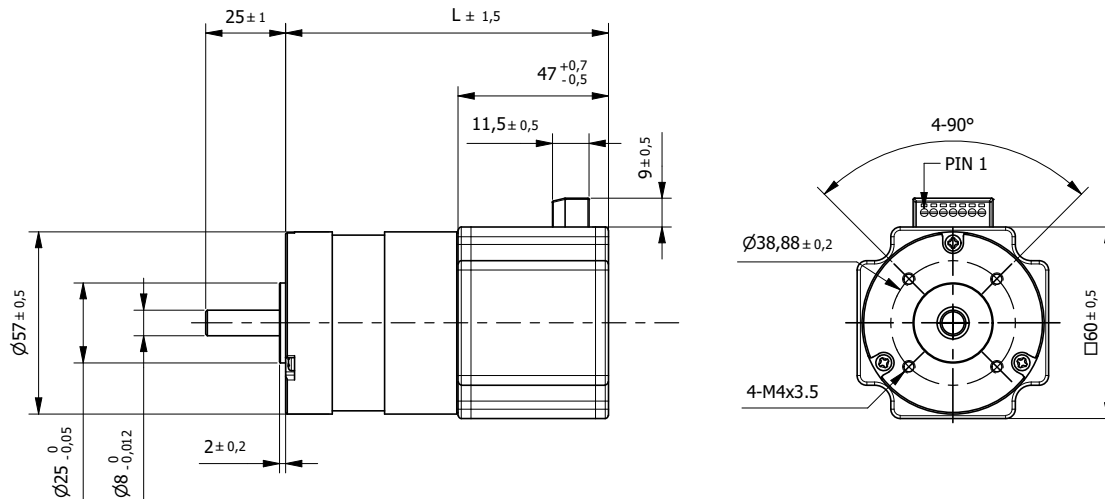
| Connection | | |
|------------|--------------|------------------|
| Color | Gauge | Function |
| Red | UL1007 AWG22 | VCC + |
| Black | | GND |
| White | | CW/CCW Direction |
| Blue | | SV Speed Control |
| Yellow | | Tacho out |

Brushless Slotted Motor 57BL-IE

with Speed Controller

Ø 57mm

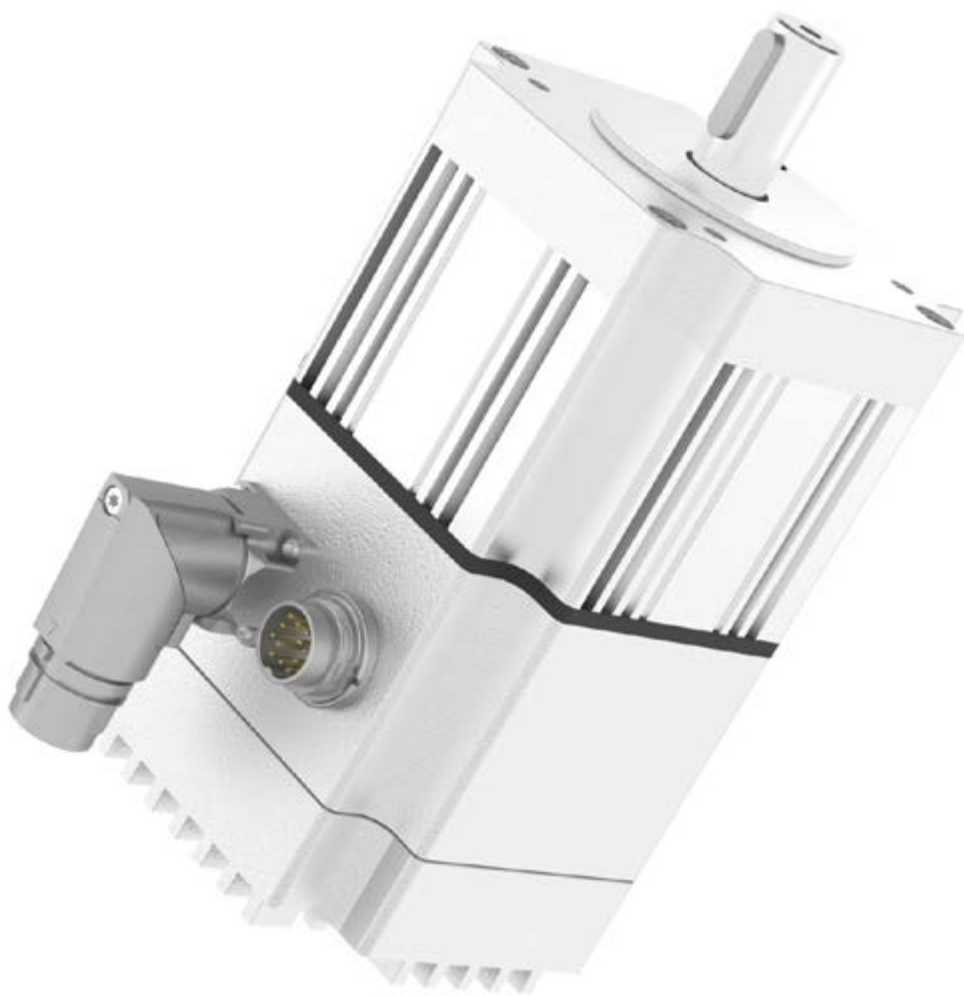
0,11 - 0,33Nm



| Specification | | 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 | 36 |
| 4 | Rated Speed | rpm 4000 | 4000 | 4000 |
| 5 | Rated Torque | Nm 0,11 | 0,22 | 0,33 |
| 6 | Max. Peak Torque | Nm 0,33 | 0,66 | 1 |
| 7 | Torque Constant | Nm/A 0,061 | 0,06 | 0,065 |
| 8 | Rated Current | A 1,8 | 3,7 | 5,1 |
| 9 | Max. Peak Current | A 5,5 | 11,1 | 16 |
| 10 | No-Load Current | mA <400 | <500 | <500 |
| 11 | Line to Line Resistance | Ω 1,6 | 0,64 | 0,45 |
| 12 | Line to Line Inductance | mH 4,4 | 2 | 1,5 |
| 13 | Rotor Inertia | gcm ² 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 (20mm 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 | Vp- DC power input +36VDC |
| 3 | GND Common ground system |
| 4 | PG Speed pulse output (TTL) 12 pulse/rev. |
| 5 | SV Reference speed voltage 0/+5VDC |
| 6 | F/R Rotation direction |
| 7 | +5V Voltage output |



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 controllers combine the compactness of a standard motor with the advanced features of our drives. These motors come equipped with digital inputs and outputs, an analog input, and support for multiple Fieldbus protocols, including CANopen, Modbus RTU, EtherCAT, Modbus TCP/IP, Profinet, Powerlink, and EtherNet/IP. For optimal performance, a fully integrated single-turn magnetic encoder is also available. Additionally, several of our models are IP65 rated as standard, ensuring they can operate reliably in a wide variety of environments.

| Brushless DC motors with Motion Controller | Torque* (Nm) | |
|--|--------------|-----|
| IBS042 | 0,062...0,25 | 210 |
| IBS057 | 0,055...0,44 | 211 |
| IBI057- IP65 | 0,055...0,44 | 212 |
| IBS080 | 0,8...1,13 | 213 |
| IBI080 - IP65 | 0,8...1,13 | 214 |

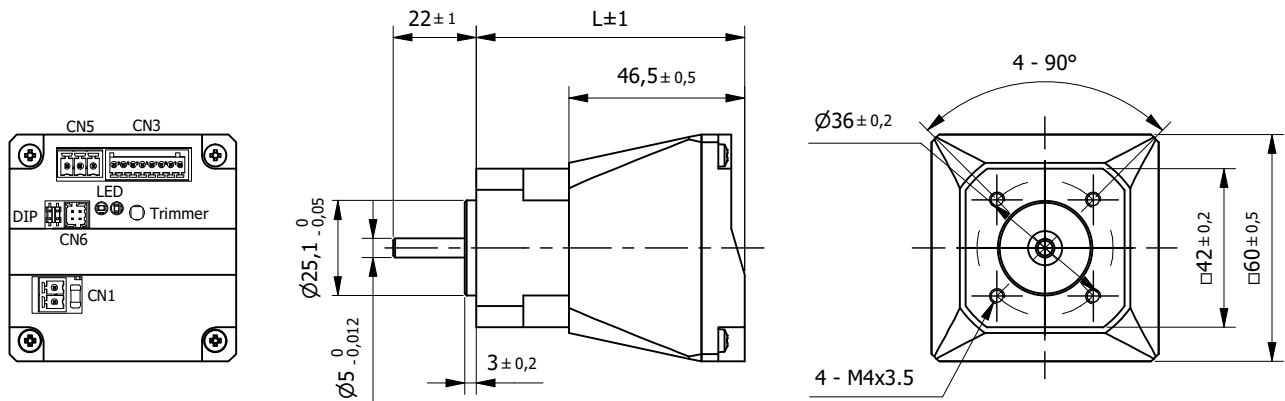
* Rated Torque

Brushless DC Motor IBS042

with Motion Controller

□ 42mm

0,062 - 0,25Nm



| Specification | | | | | |
|---------------|----------------------|-------------------------|------------|------------|-----------|
| | Model | ...0026N | ...0050N | ...0074N | ...0100N |
| 1 | n° of Pole | 8 | 8 | 8 | 8 |
| 2 | Rated Voltage | VDC 24 | 24 | 24 | 24 |
| 3 | Operating Voltage | VDC 24-36 | 24-36 | 24-36 | 24-36 |
| 4 | Rated Power | W 26 | 50 | 74 | 100 |
| 5 | Rated Speed | rpm 4000 | 4000 | 4000 | 4000 |
| 6 | Torque - Rated/Peak | Nm 0,062/0,19 | 0,125/0,38 | 0,185/0,56 | 0,25/0,75 |
| 7 | Torque Constant | Nm/A 0,035 | 0,036 | 0,038 | 0,036 |
| 8 | Current - Rated/Peak | A 1,8/5,4 | 3,5/10,7 | 4,9/14,7 | 7/20,8 |
| 9 | No-Load Current | A <0,5 | <0,5 | <0,5 | <0,6 |
| 10 | Rotor Inertia | Kgcm ² 0,024 | 0,048 | 0,072 | 0,096 |
| 11 | Length (L) | mm 75 | 95 | 115 | 135 |
| 12 | Weight | Kg 0,5 | 0,65 | 0,85 | 1 |

| Characteristics | |
|--------------------------------------|--|
| Item | |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP20 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 | Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | Serial interface |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Product code reference | |
|-------------------------------|------------------------------|
| IBS 042 0026 N E 1 000 M S200 | |
| 042 | Frame size |
| 0026 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code (1= standard) |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|------------------------------|------|
| Type | Code |
| Magnetic Incremental encoder | E |

| Connection | | |
|------------|-----------------|-----------------------|
| Connector | Type | Function |
| CN1 | Phoenix 1707421 | DC Supply |
| CN3 | Phoenix 1781120 | Inputs and Outputs |
| CN5 | Phoenix 1800312 | Interface |
| CN6 | | Service SCI Interface |

Mating connectors included. More information can be found in the product manual on our website.

| Input and Output | | |
|------------------|---------|---|
| Input | Digital | 3 not isolated 5-24 Vdc NPN or Push Pull |
| | Analog | 1 with potentiometer or 0-10 Vdc |
| Output | Digital | 2 not isolated open drain, 5-24 Vdc 100mA |

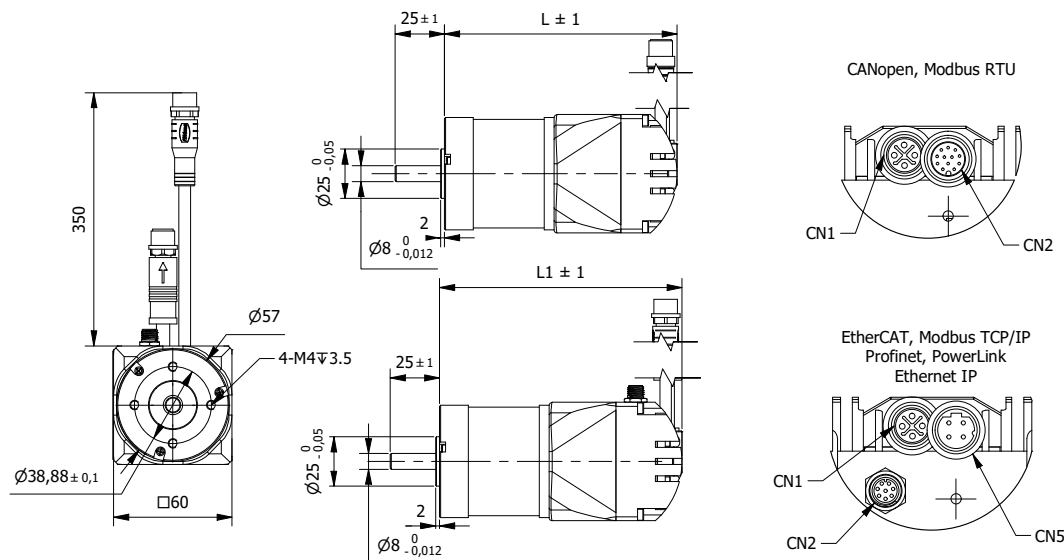
| Interface Control Mode | |
|---------------------------------|--------|
| Fieldbus | Code |
| Analog | A-S300 |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |

Brushless DC Motor IBS057

with Motion Controller

Ø 57mm

0,055 - 0,44Nm



| Specification | | ...0022N | ...0044N | ...0088N | ...0128N | ...0168N |
|---------------|----------------------|-------------------|------------|-----------|-----------|-----------|
| 1 | n° of Pole | 4 | 4 | 4 | 4 | 4 |
| 2 | Rated Voltage | VDC | 36 | 36 | 36 | 36 |
| 3 | Operating Voltage | VDC | 24-36 | 24-36 | 24-36 | 24-36 |
| 4 | Rated Power | W | 22 | 44 | 88 | 128 |
| 5 | Rated Speed | rpm | 4000 | 4000 | 4000 | 4000 |
| 6 | Torque - Rated/Peak | Nm | 0,055/0,16 | 0,11/0,33 | 0,22/0,66 | 0,33/0,99 |
| 7 | Torque Constant | Nm/A | 0,052 | 0,06 | 0,06 | 0,063 |
| 8 | Current - Rated/Peak | A | 1,1/3,1 | 1,8/5,5 | 3,7/11 | 5,2/15,7 |
| 9 | No-Load Current | A | <0,4 | <0,4 | <0,5 | <0,6 |
| 10 | Rotor Inertia | Kgcm ² | 0,03 | 0,075 | 0,119 | 0,173 |
| 11 | Length (L) | mm | 88 | 98 | 118 | 138 |
| 12 | Length (L1) | mm | 93 | 103 | 123 | 143 |
| 13 | Weight | Kg | 0,58 | 0,7 | 1 | 1,2 |

| Characteristics | |
|--------------------------------------|---|
| Item | |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP20 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 | Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration Software* | Serial interface (not for A-M-C) Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Product code reference | |
|-------------------------------|------------------------------|
| IBS 057 0022 N E 1 000 M S200 | |
| 057 | Frame size |
| 0022 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code (1= standard) |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|------------------------------|------|
| Type | Code |
| Magnetic Incremental encoder | E |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | |
|------------|----------------------|-----------------------------|
| Connector | Type | Function |
| CN1 | M12 4P S-Code Male | DC Supply |
| CN2 | M12 12P A-Code Male | In/Out (A-M-C fieldbus) |
| CN2 | M8 8P A-Code Male | In/Out (T-E-P-R-H fieldbus) |
| CN5 | M12 4P D-Code Female | Communication interface |

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

| Input and Output | | |
|------------------|-----------------------|-----------------------------|
| Input | Digital inputs | 4 not isolated 5-24 Vdc PNP |
| | Analog inputs (A-M-C) | 1 not isolated 0-10 Vdc |
| Output | Digital outputs | 2 not isolated 24 Vdc PNP |

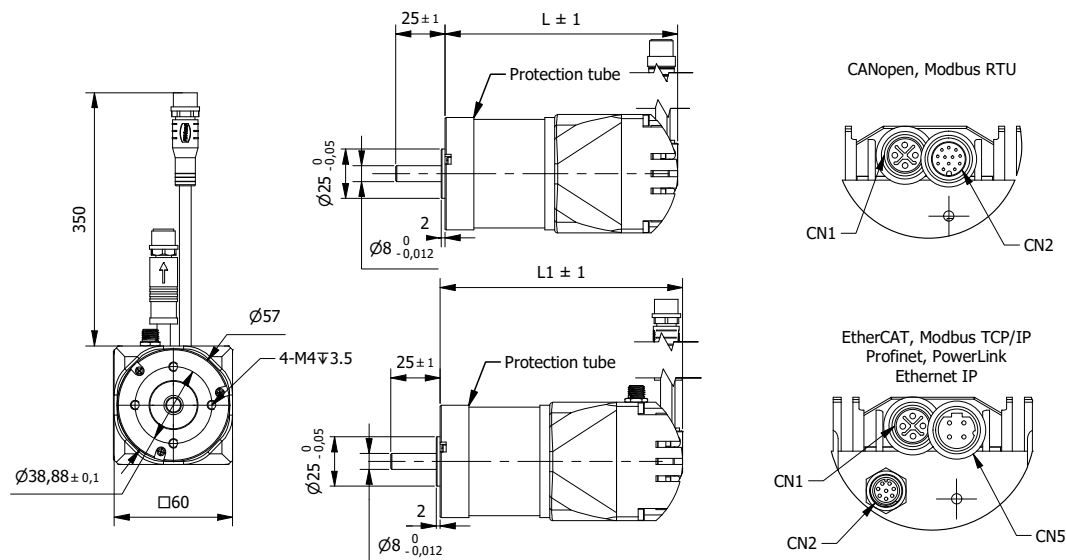
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| Analog | A-S300 |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Brushless DC Motor IBI057

with Motion Controller - IP65

Ø 57mm

0,055 - 0,44Nm



| Specification | | ...0022N | ...0044N | ...0088N | ...0128N | ...0168N |
|---------------|----------------------|------------------------|-------------------------|-------------------------|-------------------------|------------------------|
| 1 | n° of Pole | 4 | 4 | 4 | 4 | 4 |
| 2 | Rated Voltage | VDC 36 | VDC 36 | VDC 36 | VDC 36 | VDC 36 |
| 3 | Operating Voltage | VDC 24-36 | VDC 24-36 | VDC 24-36 | VDC 24-36 | VDC 24-36 |
| 4 | Rated Power | W 22 | W 44 | W 88 | W 128 | W 168 |
| 5 | Rated Speed | rpm 4000 | rpm 4000 | rpm 4000 | rpm 4000 | rpm 4000 |
| 6 | Torque - Rated/Peak | Nm 0,055/0,16 | Nm 0,11/0,33 | Nm 0,22/0,66 | Nm 0,33/0,99 | Nm 0,44/1,3 |
| 7 | Torque Constant | Nm/A 0,052 | Nm/A 0,06 | Nm/A 0,06 | Nm/A 0,063 | Nm/A 0,063 |
| 8 | Current - Rated/Peak | A 1,1/3,1 | A 1,8/5,5 | A 3,7/11 | A 5,2/15,7 | A 7/20,6 |
| 9 | No-Load Current | A <0,4 | A <0,4 | A <0,5 | A <0,6 | A <0,65 |
| 10 | Rotor Inertia | Kgcm ² 0,03 | Kgcm ² 0,075 | Kgcm ² 0,119 | Kgcm ² 0,173 | Kgcm ² 0,23 |
| 11 | Length (L) | mm 89 | mm 99 | mm 119 | mm 139 | mm 159 |
| 12 | Length (L1) | mm 94 | mm 104 | mm 124 | mm 144 | mm 164 |
| 13 | Weight | Kg 0,58 | Kg 0,7 | Kg 1 | Kg 1,2 | Kg 1,45 |

| Characteristics | |
|--|---|
| Item | |
| Shaft run out | 0,025mm |
| Insulation Class | B |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 | Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration Software* | Serial interface (not for A-M-C) Setup & config. - DL Studio Programming - DL Space |
| *Service SCI cable required and available on request | |

| Product code reference | |
|-------------------------------|------------------------------|
| IBI 057 0022 N E 1 000 M S200 | |
| 057 | Frame size |
| 0022 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code (1= standard) |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|------------------------------|------|
| Type | Code |
| Magnetic Incremental encoder | E |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | |
|---|----------------------|-----------------------------|
| Connector | Type | Function |
| CN1 | M12 4P S-Code Male | DC Supply |
| CN2 | M12 12P A-Code Male | In/Out (A-M-C fieldbus) |
| CN2 | M8 8P A-Code Male | In/Out (T-E-P-R-H fieldbus) |
| CN5 | M12 4P D-Code Female | Communication interface |
| Cable kit available on request. More information can be found in the product manual on our website. | | |

| Input and Output | | |
|------------------|-----------------------|-----------------------------|
| Input | Digital inputs | 4 not isolated 5-24 Vdc PNP |
| | Analog inputs (A-M-C) | 1 not isolated 0-10 Vdc |
| Output | Digital outputs | 2 not isolated 24 Vdc PNP |

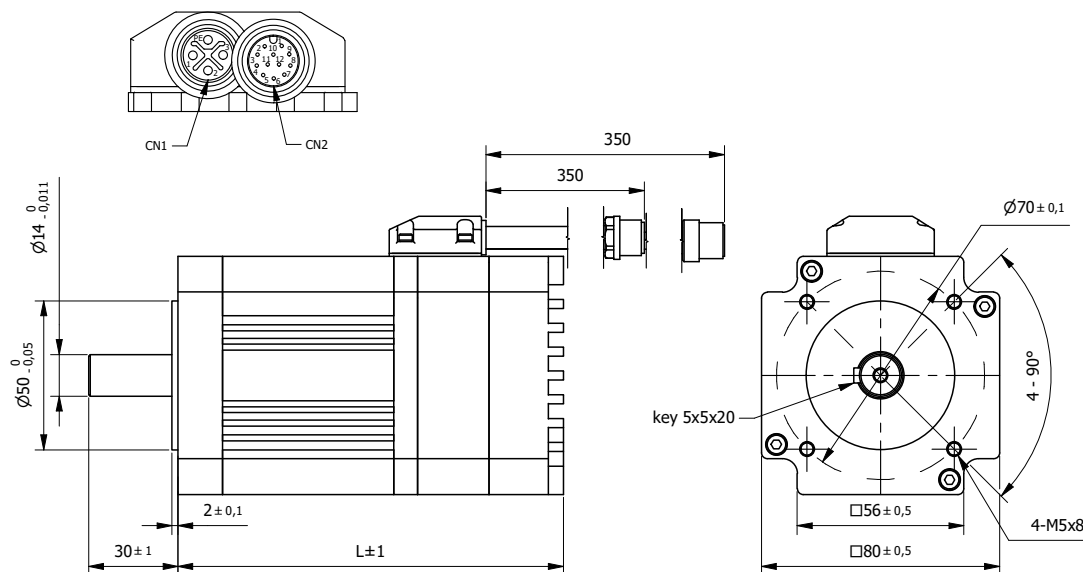
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| Analog | A-S300 |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Brushless DC Motor IBS080

with Motion Controller

□ 80mm

0,8 - 1,13Nm



UL certified: UL E531626 | UL E531627

| Specification | | ...0290N | ...0362N |
|---------------|----------------------|------------------------|----------|
| 1 | n° of Pole | 8 | 8 |
| 2 | Rated Voltage | VDC 40 | 40 |
| 3 | Operating Voltage | VDC 24-48 | 24-48 |
| 4 | Rated Power | W 290 | 362 |
| 5 | Rated Speed | rpm 3210 | 3210 |
| 6 | Torque - Rated/Peak | Nm 0,8/2,4 | 1,13/3,4 |
| 7 | Torque Constant | Nm/A 0,094 | 0,085 |
| 8 | Current - Rated/Peak | A 10/30 | 13,3/40 |
| 9 | No-Load Current | A 0,7 | 0,6 |
| 10 | Rotor Inertia | Kgcm ² 0,68 | 0,68 |
| 11 | Length (L) | mm 120 | 130 |
| 12 | Weight | Kg 2,1 | 2,3 |

| Characteristics | |
|--------------------------------------|--|
| Item | |
| Shaft run out | 0,05mm |
| Insulation Class | F |
| Protection Class | IP54 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 | Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | CAN/RS485 interface |
| Software | Setup & config. - DL Studio Programming - DL Space |

| Product code reference | |
|-------------------------------|------------------------------|
| IBS 080 0290 N E 1 000 M S200 | |
| 080 | Frame size |
| 0290 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code (1= standard) |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|------------------------------|------|
| Type | Code |
| Magnetic Incremental encoder | E |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | |
|------------|---------------------|----------------|
| Connector | Type | Function |
| CN1 | M12 4P S-Code Male | DC Supply |
| CN2 | M12 12P A-Code Male | Inputs/Outputs |

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

| Input and Output | | |
|------------------|-----------------|---------------------------|
| Input | Digital inputs | 4 not isolated 24 Vdc PNP |
| | Analog inputs | 1 not isolated 0-10 Vdc |
| Output | Digital outputs | 2 not isolated 24 Vdc PNP |

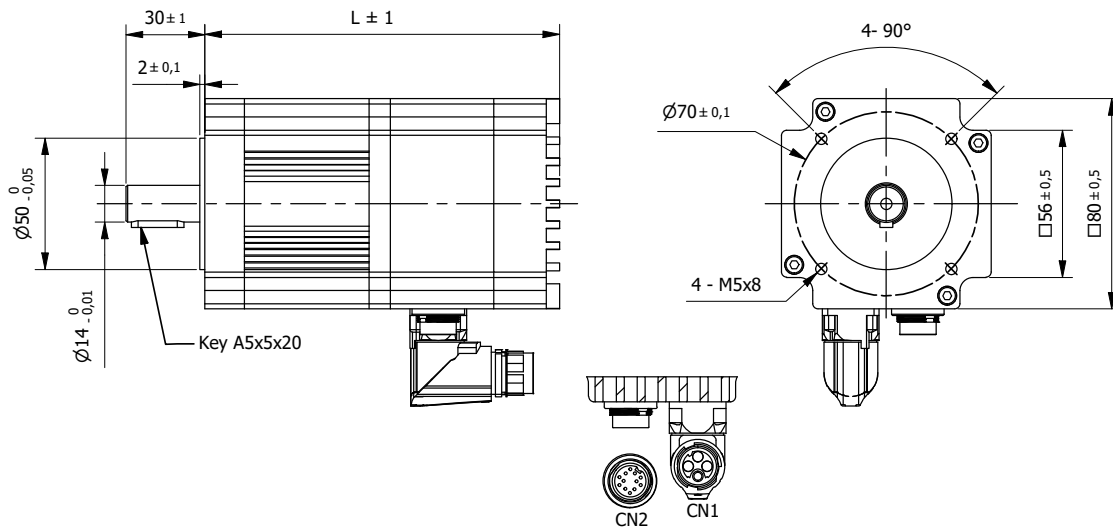
| Interface Control Mode | |
|---------------------------------|--------|
| Fieldbus | Code |
| Analog | A-S300 |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |

Brushless DC Motor IBI080

with Motion Controller - IP65

□ 80mm

0,8 - 1,13Nm



UL certified: UL E531626 | UL E531627

| Specification | | | |
|---------------|----------------------|------------|----------|
| | Model | ...0290N | ...0362N |
| 1 | n° of Pole | 8 | 8 |
| 2 | Rated Voltage | VDC 40 | 40 |
| 3 | Operating Voltage | VDC 24-48 | 24-48 |
| 4 | Rated Power | W 290 | 362 |
| 5 | Rated Speed | rpm 3210 | 3210 |
| 6 | Torque - Rated/Peak | Nm 0,8/2,4 | 1,13/3,4 |
| 7 | Torque Constant | Nm/A 0,094 | 0,085 |
| 8 | Current - Rated/Peak | A 10/30 | 13,3/40 |
| 9 | No-Load Current | A 0,7 | 0,6 |
| 10 | Rotor Inertia | Kgcm2 0,68 | 0,68 |
| 11 | Length (L) | mm 135 | 145 |
| 12 | Weight | Kg 2,15 | 2,35 |

| Characteristics | |
|--------------------------------------|--|
| Item | |
| Shaft run out | 0,05mm |
| Insulation Class | F |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 | Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | CAN/RS485 interface |
| Software | Setup & config. - DL Studio Programming - DL Space |

| Product code reference | |
|-------------------------------|------------------------------|
| IBI 080 0290 N E 1 000 M S200 | |
| 080 | Frame size |
| 0290 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code (1= standard) |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|------------------------------|------|
| Type | Code |
| Magnetic Incremental encoder | E |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | |
|------------|----------------------------------|----------------|
| Connector | Type | Function |
| CN1 | M17 4P TE-BGC-894N0000153A00 | DC Supply |
| CN2 | M16 12P Amphenol C09131C0121002U | Inputs/Outputs |

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

| Input and Output | | |
|------------------|-----------------|---------------------------|
| | | |
| Input | Digital inputs | 4 not isolated 24 Vdc PNP |
| | Analog inputs | 1 not isolated 0-10 Vdc |
| Output | Digital outputs | 2 not isolated 24 Vdc PNP |

| Interface Control Mode | |
|---------------------------------|--------|
| Fieldbus | Code |
| Analog | A-S300 |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |



Brushless Servo motors
with Motion controller

Advantages at a glance

- High Rated Torque and Power
- STO (Safe Torque Off) function
- IP65 rated and optional integrated brake

| Brushless Servo motors with Motion Controller | Torque* (Nm) | |
|---|--------------|-----|
| IVI060 | 0,64...1,27 | 218 |
| IVI080 | 2,39...3,18 | 219 |
| IVI100 - NEW | 3,18...4,77 | 220 |
| IVI110 - NEW | 4,77...6,37 | 221 |

Our servo motors with integrated controllers are among the most compact on the market. The powerful drive, integrated directly into the motor, reduces cabling and simplifies installation and configuration, thereby improving overall efficiency. These high-performance motors are IP65 rated, STO (Safe Torque Off) certified, and available with an optional integrated brake. All models support a wide range of Fieldbus protocols, including CANopen, Modbus-RTU, Modbus-TCP, EtherCAT, Profinet, EtherNet/IP, and Powerlink.

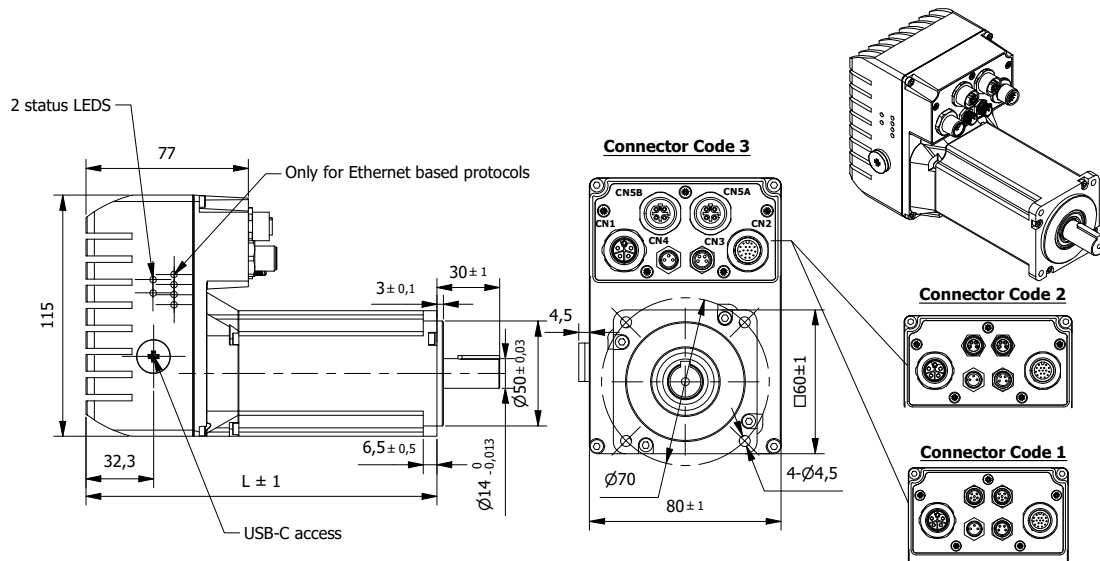
* Rated Torque

Brushless DC Servo motor IVI060

with Motion Controller - IP65

□ 60mm

0,64 - 1,27Nm



UL certified: UL E531627
with Safe Torque Off function

| Specification | | ...0200N | ...0200B | ...0400N | ...0400B |
|---------------|----------------------|------------------------|---------------|-----------|---------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | Rated Voltage | VDC 48 | 48 | 48 | 48 |
| 3 | Operating Voltage | VDC 24-48 | 24-48 | 24-48 | 24-48 |
| 4 | Rated Power | W 200 | 200 | 400 | 400 |
| 5 | Rated Speed | rpm 3000 | 3000 | 3000 | 3000 |
| 6 | Torque - Rated/Peak | Nm 0,64/1,92 | 0,64/1,92 | 1,27/3,81 | 1,27/3,81 |
| 7 | Torque Constant | Nm/A 0,107 | 0,107 | 0,107 | 0,107 |
| 8 | Current - Rated/Peak | A 6/18 | 6/18 | 12/36 | 12/36 |
| 9 | No-Load Current | A 0,6 | 0,6 | <1 | <1 |
| 10 | Back EMF constant | V/kRPM 6,5 | 6,5 | 6,5 | 6,5 |
| 11 | Rotor Inertia | Kgcm ² 0,15 | 0,15 | 0,25 | 0,25 |
| 12 | Brake | | 24VDC - 1,5Nm | | 24VDC - 1,5Nm |
| 13 | Length (L) | mm 131 | 167 | 152 | 188 |
| 14 | Weight | Kg 1,43 | 1,86 | 1,82 | 2,25 |

| Characteristics | |
|--------------------------------------|--|
| Item | |
| Shaft run out | 0,02mm |
| Insulation Class | F 155°C |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,14mm |
| Max. Radial force (at mid-shaft) | 245N |
| Max. Axial force | 98N |
| Dielectric strength (for 1 min.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating mode | Position, Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLe |
| Debug & configuration | Serial interface |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Product code reference | |
|-------------------------------|-----------------------------|
| IVI 060 0200 N E 1 000 M S200 | |
| 060 | Frame size |
| 0200 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|--|------|
| Type | Code |
| Magnetic Incremental/Absolute single turn 2500 CPR | E |
| Magnetic Absolute multi-turn 16bit (single-turn 17bit) | A |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | | |
|------------|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M12 5P L-Code Male | DC Supply | |
| CN2 | M12 17P A-Code Male | Inputs/Outputs | |
| CN3 | M8 4P A-Code Male | STO Input | |
| CN4 | M8 3P A-Code Male | Brake Resistor | |
| CN5A/B | M8 6P A-Code Male | Fieldbus (M-C) | 1 |
| CN5A/B | M8 4P A-Code Female | Fieldbus (T-E) | 2 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 3 |

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

| Input and Output | | |
|------------------|---------|-----------------------------|
| Input | Digital | 4 not isolated 5-24 Vdc PNP |
| | Analog | 2 not isolated 0-10 Vdc |
| Output | Digital | 2 not isolated 24 Vdc PNP |

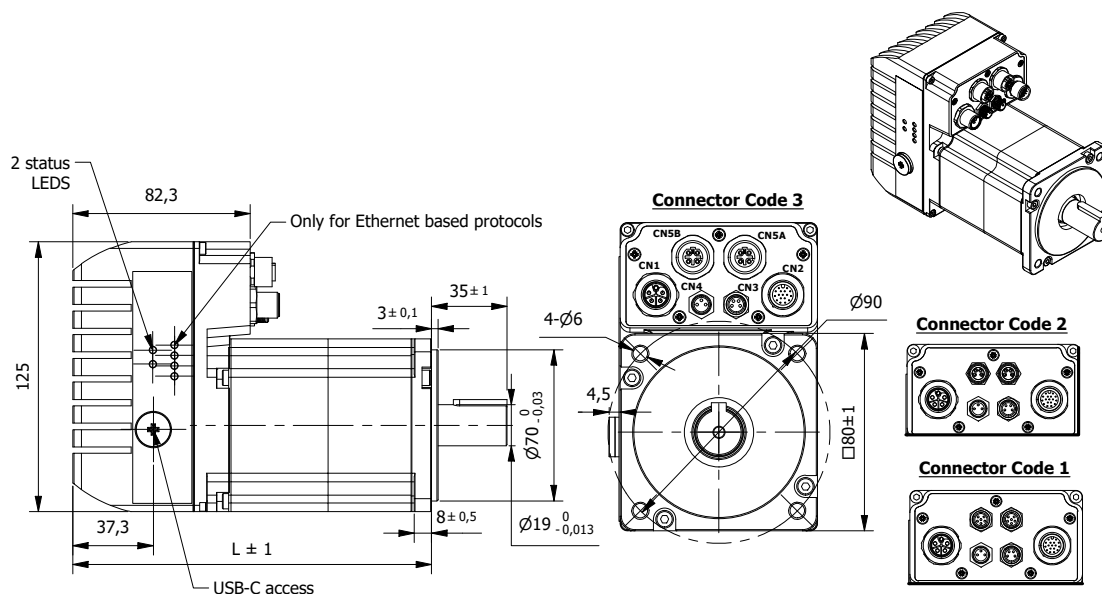
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Brushless DC Servo motor IVI080

with Motion Controller - IP65

□ 80mm

2,39 - 3,18Nm



with Safe Torque Off function

| Specification | | ...0750N | ...0750B | ...1000N | ...1000B |
|---------------|----------------------|--------------|---------------|-----------|---------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | Rated Voltage | VDC 48 | 48 | 48 | 48 |
| 3 | Operating Voltage | VDC 24-48 | 24-48 | 24-48 | 24-48 |
| 4 | Rated Power | W 750 | 750 | 1000 | 1000 |
| 5 | Rated Speed | rpm 3000 | 3000 | 3000 | 3000 |
| 6 | Torque - Rated/Peak | Nm 2,39/7,17 | 2,39/7,17 | 3,18/9,54 | 3,18/9,54 |
| 7 | Torque Constant | Nm/A 0,113 | 0,113 | 0,113 | 0,113 |
| 8 | Current - Rated/Peak | A 21/63 | 21/63 | 28/84 | 28/84 |
| 9 | No-Load Current | A 2 | 2 | 2 | 2 |
| 10 | Back EMF constant | V/kRPM 6,8 | 6,8 | 6,8 | 6,8 |
| 11 | Rotor Inertia | Kgcm2 1,56 | 1,56 | 2,22 | 2,22 |
| 12 | Brake | | 24VDC - 2,5Nm | | 24VDC - 2,5Nm |
| 13 | Length (L) | mm 165 | 195 | 185 | 215 |
| 14 | Weight | Kg 3,15 | 3,74 | 3,8 | 4,39 |

| Characteristics | |
|--------------------------------------|--|
| Item | |
| Shaft run out | 0,02mm |
| Insulation Class | F 155°C |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (at mid-shaft) | 392N |
| Max. Axial force | 147N |
| Dielectric strength (for 1 min.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating mode | Position, Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLe |
| Debug & configuration | Serial interface |
| Software* | Setup & config. - DL Studio Programming - DL Space |

| Product code reference | |
|-------------------------------|-----------------------------|
| IVI 080 0750 N E 1 000 M S200 | |
| 080 | Frame size |
| 0750 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|--|------|
| Type | Code |
| Magnetic Incremental/Absolute single turn 2500 CPR | E |
| Magnetic Absolute multi-turn 16bit (single-turn 17bit) | A |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | | |
|------------|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M12 5P L-Code Male | DC Supply | |
| CN2 | M12 17P A-Code Male | Inputs/Outputs | |
| CN3 | M8 4P A-Code Male | STO Input | |
| CN4 | M8 3P A-Code Male | Brake Resistor | |
| CN5A/B | M8 6P A-Code Male | Fieldbus (M-C) | 1 |
| CN5A/B | M8 4P A-Code Female | Fieldbus (T-E) | 2 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 3 |

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

| Input and Output | | |
|------------------|---------|-----------------------------|
| Input | Digital | 4 not isolated 5-24 Vdc PNP |
| | Analog | 2 not isolated 0-10 Vdc |
| Output | Digital | 2 not isolated 24 Vdc PNP |

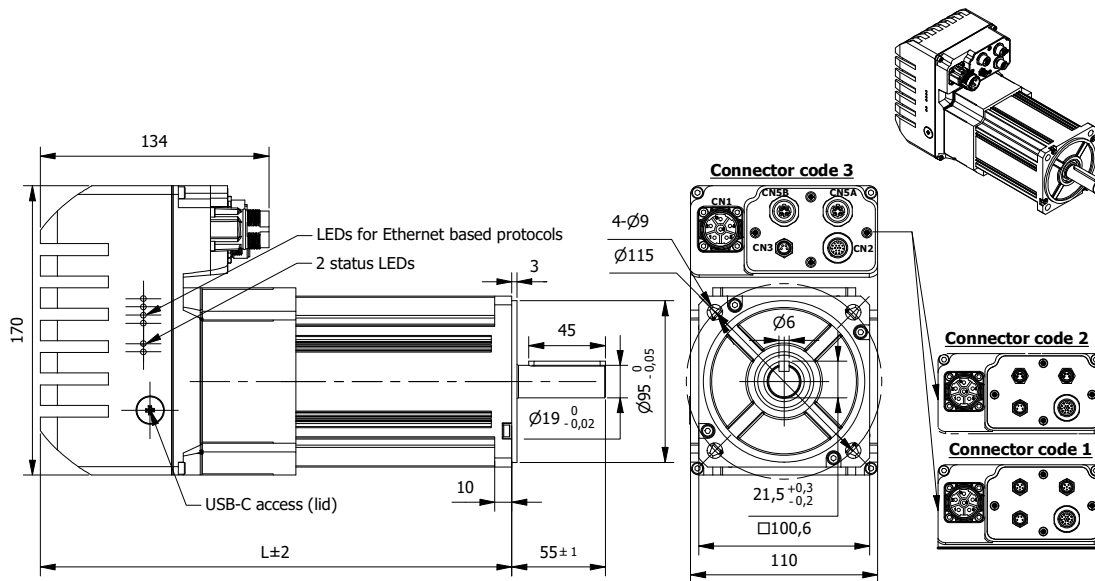
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Brushless DC Servo motor IVI100

with Motion Controller - IP65

□ 100mm

3,18 - 4,77Nm



with Safe Torque Off function

| Specification | | ...1000N | ...1000B | ...1500N | ...1500B |
|---------------|----------------------|-----------------------|--------------|-----------|--------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | Rated Voltage | VDC 48 | 48 | 48 | 48 |
| 3 | Operating Voltage | VDC 24-48 | 24-48 | 24-48 | 24-48 |
| 4 | Rated Power | W 1000 | 1000 | 1500 | 1500 |
| 5 | Rated Speed | rpm 3000 | 3000 | 3000 | 3000 |
| 6 | Torque - Rated/Peak | Nm 3,18/7 | 3,18/7 | 4,77/10,5 | 4,77/10,5 |
| 7 | Torque Constant | Nm/A 0,1 | 0,1 | 0,11 | 0,11 |
| 8 | Current - Rated/Peak | A 31,8/70 | 31,8/70 | 43,4/95,5 | 43,4/95,5 |
| 9 | No-Load Current | A 0,8 | 0,8 | 0,8 | 0,8 |
| 10 | Back EMF constant | V/kRPM 6,18 | 6,18 | 6,48 | 6,48 |
| 11 | Rotor Inertia | Kgcm ² 1,3 | 1,67 | 1,84 | 2,21 |
| 12 | Brake | | 24VDC - 10Nm | | 24VDC - 10Nm |
| 13 | Length (L) | mm 207 | 249 | 235 | 277 |
| 14 | Weight | Kg 5,4 | 6,4 | 6,4 | 7,4 |

| Characteristics | |
|--------------------------------------|--|
| Item | |
| Shaft run out | 0,05mm |
| Insulation Class | B 130°C |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (at mid-shaft) | 490N |
| Max. Axial force | 196N |
| Dielectric strength (for 1 min.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating mode | Position, Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLe |
| Debug & configuration | Serial interface |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Product code reference | |
|-------------------------------|-----------------------------|
| Code | Description |
| IVI 100 1000 N E 1 000 M S200 | |
| 100 | Frame size |
| 1000 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder type |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 2500 CPR | E |
| Magnetic Absolute (single-turn, BiSS): 17bit, 16bit | A |

| Connection | | | |
|------------|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M23 6P (5+PE) Male | DC Supply | |
| CN2 | M12 17P A-Code Male | Inputs/Outputs | |
| CN3 | M8 4P A-Code Male | STO Input | |
| CN5A/B | M8 6P A-Code Male | Fieldbus (M-C) | 1 |
| CN5A/B | M8 4P A-Code Female | Fieldbus (T-E) | 2 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 3 |

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

| Input and Output | | |
|------------------|---------|-----------------------------|
| Input | Output | |
| Digital | Digital | 4 not isolated 5-24 Vdc PNP |
| Analog | | 2 not isolated 0-10 Vdc |
| | Digital | 2 not isolated 24 Vdc PNP |

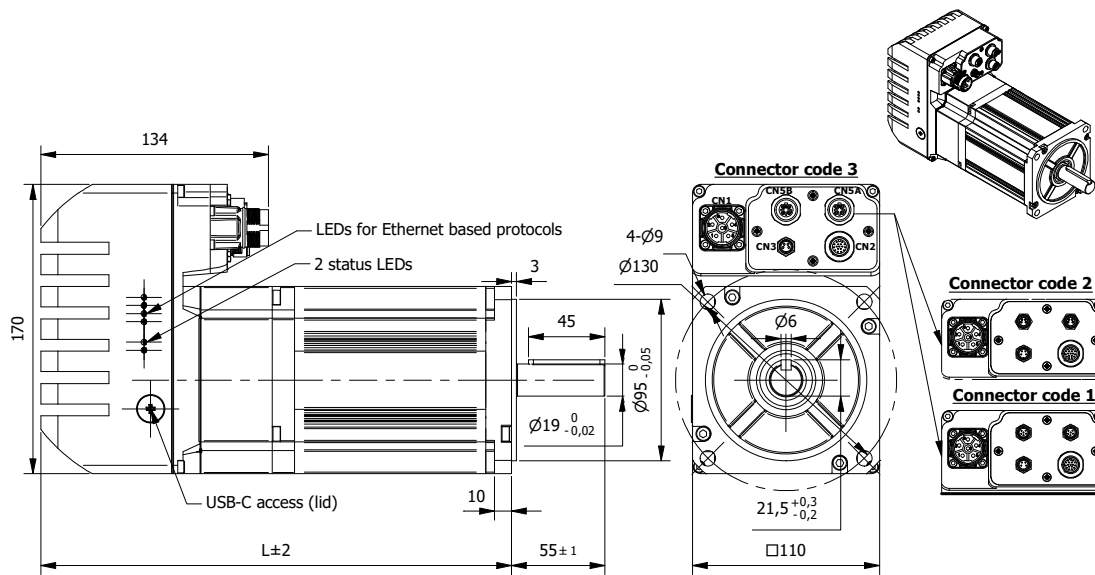
| Interface Control Mode | |
|------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS402) | C-S402 |
| Ethernet Modbus TCP (programmable) | T-S200 |
| Ethercat (DS402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS402) | R-S402 |
| Ethernet IP (programmable) | H-S200 |

Brushless DC Servo motor IV1110

with Motion Controller - IP65

□ 110mm

4,77 - 6,37Nm



with Safe Torque Off function

| Specification | | ...1500N | ...1500B | ...2000N | ...2000B |
|---------------|----------------------|--------------|--------------|-----------|--------------|
| 1 | n° of Pole | 10 | 10 | 10 | 10 |
| 2 | Rated Voltage | VDC 48 | 48 | 48 | 48 |
| 3 | Operating Voltage | VDC 24-48 | 24-48 | 24-48 | 24-48 |
| 4 | Rated Power | W 1500 | 1500 | 2000 | 2000 |
| 5 | Rated Speed | rpm 3000 | 3000 | 3000 | 3000 |
| 6 | Torque - Rated/Peak | Nm 4,77/14,3 | 4,77/14,3 | 6,37/19,1 | 6,37/19,1 |
| 7 | Torque Constant | Nm/A 0,11 | 0,11 | 0,11 | 0,11 |
| 8 | Current - Rated/Peak | A 43/130 | 43/130 | 58/174 | 58/174 |
| 9 | No-Load Current | A 0,8 | 0,8 | 0,8 | 0,8 |
| 10 | Back EMF constant | V/kRPM 6,35 | 6,35 | 6,63 | 6,63 |
| 11 | Rotor Inertia | Kgcm2 3,1 | 3,1 | 4,1 | 4,1 |
| 12 | Brake | | 24VDC - 10Nm | | 24VDC - 10Nm |
| 13 | Length (L) | mm 218 | 261 | 236 | 277 |
| 14 | Weight | Kg 6,9 | 7,9 | 8,6 | 9,6 |

| Characteristics | |
|--------------------------------------|--|
| Item | |
| Shaft run out | 0,05mm |
| Insulation Class | B 130°C |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| Radial play (450g load) | 0,02mm |
| Axial play (450g load) | 0,08mm |
| Max. Radial force (at mid-shaft) | 630N |
| Max. Axial force | 315N |
| Dielectric strength (for 1 min.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |
| Operating mode | Position, Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLe |
| Debug & configuration | Serial interface |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Product code reference | |
|------------------------|-----------------------------|
| IV11101500NE1000MS200 | |
| 110 | Frame size |
| 1500 | Rated Power |
| N | Brake options (N= no brake) |
| E | Encoder type |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

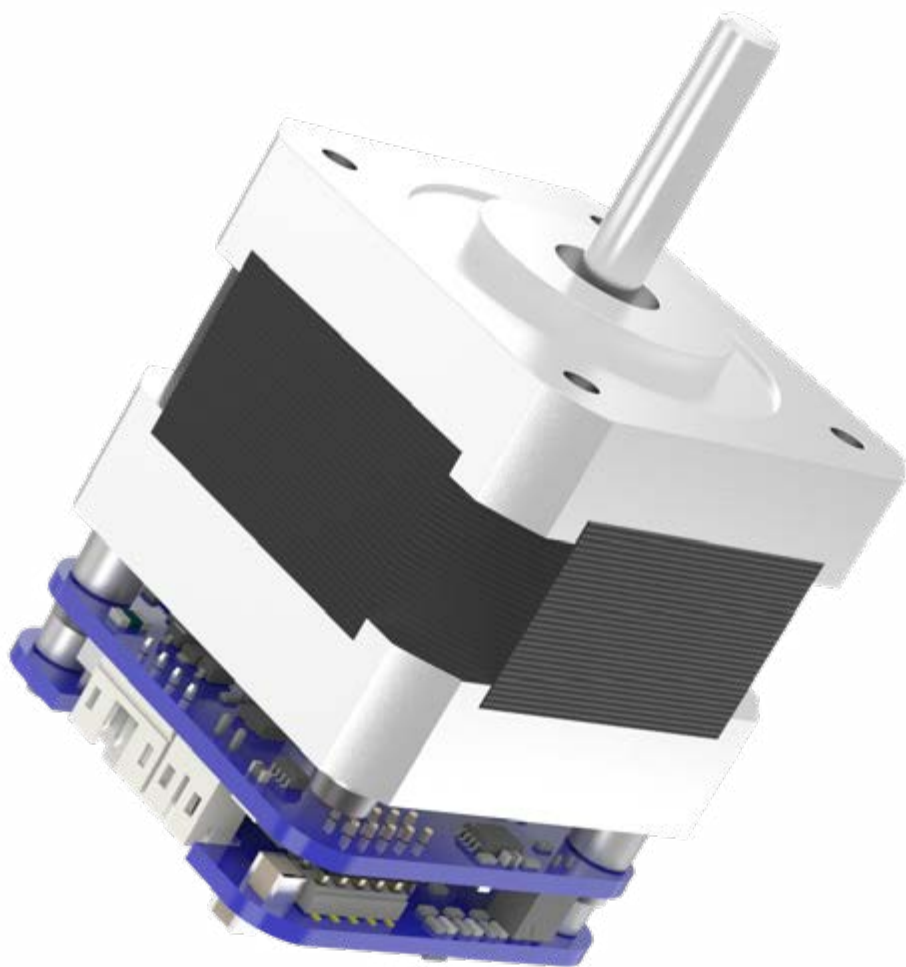
| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 2500 CPR | E |
| Magnetic Absolute (single-turn, BiSS): 17bit, 16bit | A |

| Connection | | | |
|------------|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M23 6P (5+PE) Male | DC Supply | |
| CN2 | M12 17P A-Code Male | Inputs/Outputs | |
| CN3 | M8 4P A-Code Male | STO Input | |
| CN5A/B | M8 6P A-Code Male | Fieldbus (M-C) | 1 |
| CN5A/B | M8 4P A-Code Female | Fieldbus (T-E) | 2 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 3 |

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

| Input and Output | | |
|------------------|---------|-----------------------------|
| Input | Output | |
| Digital | Digital | 4 not isolated 5-24 Vdc PNP |
| Analog | | 2 not isolated 0-10 Vdc |
| | Digital | 2 not isolated 24 Vdc PNP |

| Interface Control Mode | |
|------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS402) | C-S402 |
| Ethernet Modbus TCP (programmable) | T-S200 |
| Ethercat (DS402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS402) | R-S402 |
| Ethernet IP (programmable) | H-S200 |



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 continuous control technology for 65,536 microsteps per revolution and offer encoder options such as magnetic incremental, single-turn absolute, or multi-turn absolute, to meet a wide range of applications. Communication options include CANopen, Modbus RTU, EtherCAT, Modbus TCP/IP, Profinet, Powerlink and EtherNet/IP, allowing the motors to easily connect to any industrial network. Many of our models are IP65 rated, making them suitable for a wide range of environments where moisture or water spray is present.

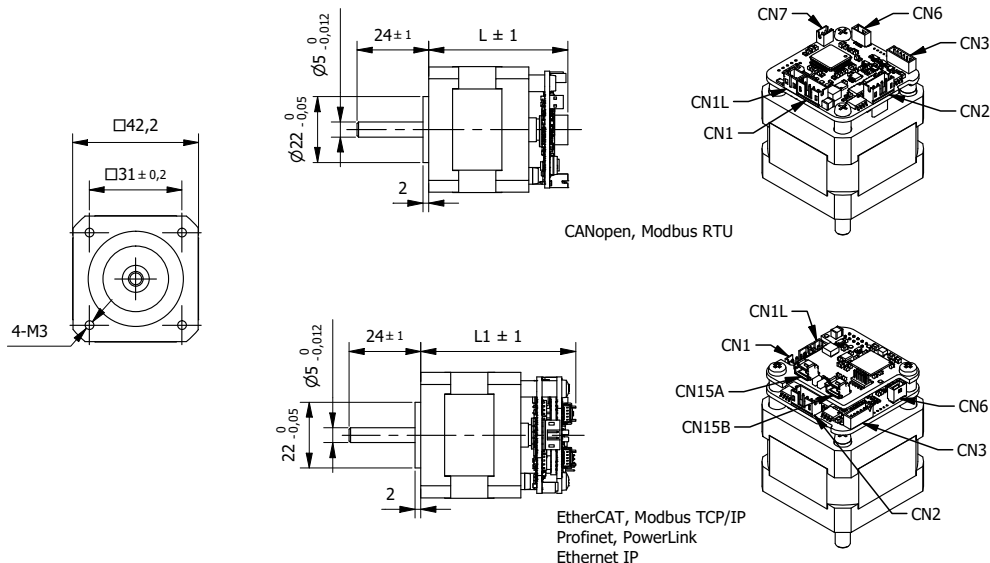
| Stepper motors with Motion Controller | Torque** (Nm) | |
|---------------------------------------|---------------|-----|
| ISS042 | 0,22...0,8 | 224 |
| ISI042 - IP65 | 0,22...0,8 | 225 |
| ISS057 | 0,55...1,89 | 226 |
| ISI057-IP65 | 0,55...1,89 | 227 |
| ISS060 | 1...3,1 | 228 |
| ISI060-IP65 | 1...3,1 | 229 |
| ISS086 | 2,2...12 | 230 |
| ISI086 - IP65 | 2,2...12 | 231 |

** Holding Torque

Stepper Motor ISS042

with Motion Controller

□ 42mm
0,22 - 0,8Nm



| Specification | | | ...0047N | ...0053N | ...0061N | ...0073N |
|---------------|-------------------|------------------|----------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12±36 | 12±36 | 12±36 | 12±36 |
| 2 | Current/Phase | A | 2 | 2 | 2 | 2 |
| 3 | Resistance/Phase | Ω | 0,95 | 1 | 1,4 | 2,1 |
| 4 | Inductance/Phase | mH | 1,4 | 2,2 | 2,5 | 4,7 |
| 5 | Holding Torque | Nm | 0,22 | 0,36 | 0,44 | 0,8 |
| 6 | Rotor Inertia | gcm ² | 38 | 54 | 75 | 102 |
| 7 | Length (L) | mm | 47 | 53 | 61 | 73 |
| 8 | Length (L1) | mm | 52 | 58 | 66 | 79 |
| 9 | Weight | Kg | 0,27 | 0,32 | 0,39 | 0,52 |

| Characteristics | |
|--|--|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Protection Class | IP00 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 |
| Operating mode | Position, Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating |
| Debug & configuration | Serial interface |
| Software* | Setup & config. - DL Studio Programming - DL Space |
| *Service SCI cable required and available on request | |

| Product code reference | |
|-------------------------------|------------------------------|
| ISS 042 0047 N E 1 000 M S200 | |
| 042 | Frame size |
| 0047 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code (1= standard) |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | E |

| Connection | | |
|---|-------------------|-----------------------------|
| Connector | Type | Function |
| CN1 | JST B4B-PH | Power and Fieldbus (M-C) |
| CN1L | JST B2B-PH | Logic |
| CN2 | JST B4B-PH-B | Motor connection |
| CN3 | JST B6B-ZR | Inputs/Outputs |
| CN6 | Molex 203562-0505 | Service SCI Interface |
| CN7 | JST B2B-ZR | Analog Input (M-C fieldbus) |
| CN15A/B | Molex 203562-0505 | Fieldbus (T-E-P-R-H) |
| Cable kit available on request. More information can be found in the product manual on our website. | | |

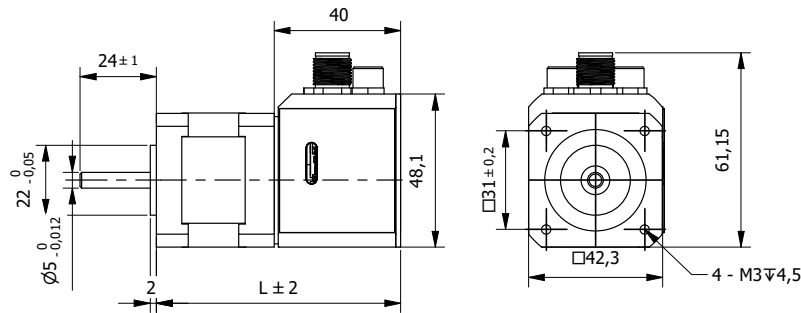
| Input and Output | | |
|------------------|-----------------------|---|
| Input | Digital | 3 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 1 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | 2 not isolated open drain, 5-24 Vdc 100mA |

| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Stepper Motor ISI042

with Motion Controller - IP65

□ 42mm
0,22 - 0,8Nm



| Specification | | | ...0077N | ...0083N | ...0091N | ...0104N |
|---------------|-------------------|------------------|----------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12+30 | 12+30 | 12+30 | 12+30 |
| 2 | Current/Phase | A | 1,5 | 1,5 | 1,5 | 1,5 |
| 3 | Resistance/Phase | Ω | 1,6 | 1,95 | 2,3 | 3,2 |
| 4 | Inductance/Phase | mH | 2,2 | 4,5 | 4,6 | 8 |
| 5 | Holding Torque | Nm | 0,22 | 0,36 | 0,44 | 0,8 |
| 6 | Rotor Inertia | gcm ² | 35 | 54 | 68 | 102 |
| 7 | Length (L) | mm | 77 | 83 | 91 | 104 |
| 8 | Weight | Kg | 0,35 | 0,41 | 0,48 | 0,61 |

| Characteristics | |
|---|---|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 |
| Operating mode | Position, Speed, Torque |
| Protective functions | Over/Under voltage, Over current, Overheating |
| Debug & configuration | Serial interface (not for M-C) |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Product code reference | |
|-------------------------------|------------------------------|
| ISS 042 0077 N E 1 000 M S200 | |
| 042 | Frame size |
| 0077 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code (1= standard) |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | E |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120 Ω (for M-C fieldbus) | 001 |

| Connection | | |
|------------|---------------------|------------------------------|
| Connector | Type | Function |
| CN1 | M12 17P A-Code Male | Power, Logic, Inputs/Outputs |
| CN5A/B | M8 4P A-Code Female | Fieldbus |

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

| Input and Output | | |
|------------------|-----------------------|---|
| Input | Type | Function |
| Input | Digital | 3 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 1 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | 2 not isolated open drain, 5-24 Vdc 100mA |

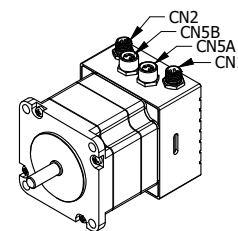
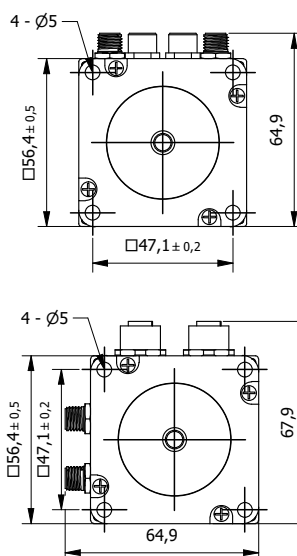
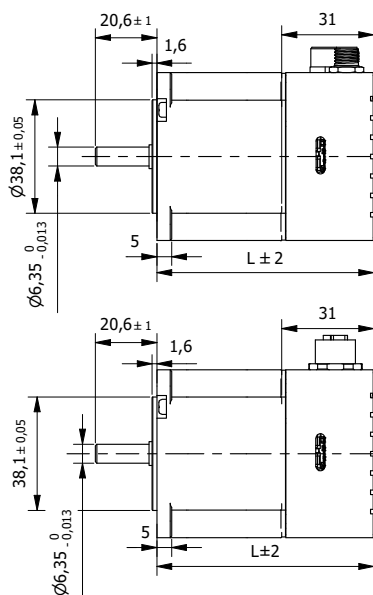
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Stepper Motor ISS057

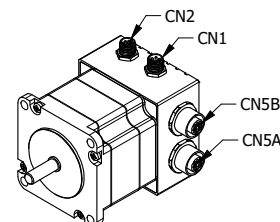
with Motion Controller

57mm

0,55 - 1,89Nm



CONNECTOR CODE 1: CANopen, Modbus RTU, Modbus TCP/IP, EtherCAT



CONNECTOR CODE 2: EtherCAT, Modbus TCP/IP, Profinet, PowerLink, Ethernet IP

Integrated Brake available on request

| Specification | | | ...0071N | ...0081N | ...0085N | ...0106N |
|---------------|-------------------|------------------|----------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12÷48 | 12÷48 | 12÷48 | 12÷48 |
| 2 | Current/Phase | A | 3 | 3 | 3 | 3 |
| 3 | Resistance/Phase | Ω | 0,7 | 0,83 | 0,83 | 1,13 |
| 4 | Inductance/Phase | mH | 1,4 | 2,5 | 2,8 | 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 | 71 | 81 | 85 | 106 |
| 9 | Weight | Kg | 0,54 | 0,71 | 0,78 | 1,12 |

| Characteristics | |
|--|--|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Protection Class | IP30 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | Serial interface (not for M-C) |
| Software* | Setup & config. - DL Studio Programming - DL Space |
| *Service SCL cable required and available on request | |

| Product code reference | |
|-------------------------------|-----------------------------|
| ISS 057 0071 N E 1 000 M S200 | |
| 057 | Frame size |
| 0071 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | E |
| Other options on request | |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | | |
|---|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M8 4P A-Code Male | Power/Logic | |
| CN2 | M8 8P A-Code Male | Inputs/Outputs | |
| CN5A/B | M8 4P A-Code Female | Fieldbus (M-C-T-E) | 1 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 2 |
| Cable kit available on request. More information can be found in the product manual on our website. | | | |

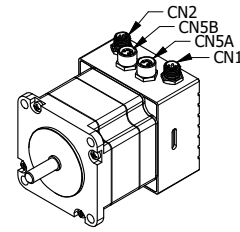
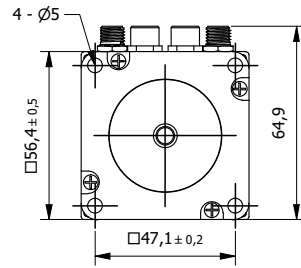
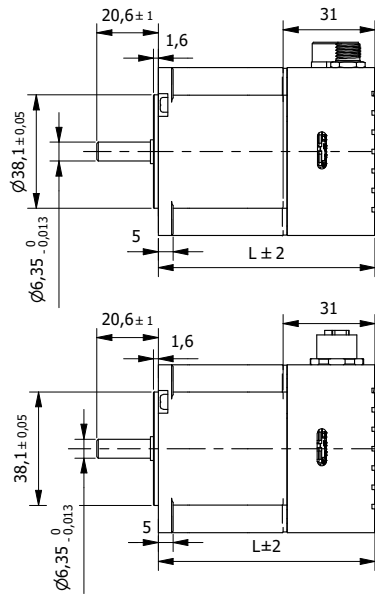
| Input and Output | | |
|------------------|-----------------------|---|
| Input | Digital | Up to 4 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 1 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | Up to 2 not isolated open drain, 5-24 Vdc 100mA |

| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

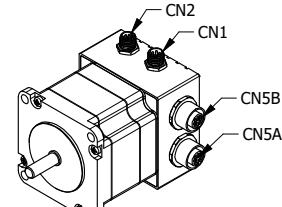
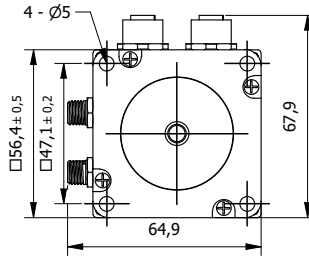
Stepper Motor ISI057

with Motion Controller - IP65

□ 57mm
0,55 - 1,89Nm



CONNECTOR CODE 1: CANopen, Modbus RTU, Modbus TCP/IP, EtherCAT



CONNECTOR CODE 2: EtherCAT, Modbus TCP/IP, Profinet, PowerLink, Ethernet IP

Integrated Brake available on request

| Specification | | | ...0073N | ...0083N | ...0087N | ...0108N |
|---------------|-------------------|------------------|----------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12÷48 | 12÷48 | 12÷48 | 12÷48 |
| 2 | Current/Phase | A | 3 | 3 | 3 | 3 |
| 3 | Resistance/Phase | Ω | 0,7 | 0,83 | 0,83 | 1,13 |
| 4 | Inductance/Phase | mH | 1,4 | 2,5 | 2,8 | 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 | 73 | 83 | 87 | 108 |
| 9 | Weight | Kg | 0,56 | 0,73 | 0,79 | 1,13 |

| Characteristics | | |
|--|--|--|
| Item | | |
| Step angle | | 1,8° |
| Step angle Accuracy | | ±5% |
| Protection Class | | IP65 |
| Working Temperature | | +5°C to +40°C |
| Humidity | | 5% to 85% not condensing |
| 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 |
| Protective functions | | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | | Serial interface (not for M-C) |
| Software* | | Setup & config. - DL Studio Programming - DL Space |
| *Service SCI cable required and available on request | | |

| Product code reference | |
|-------------------------------|-----------------------------|
| ISI 057 0073 N E 1 000 M S200 | |
| 057 | Frame size |
| 0073 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | | |
|---|--|------|
| Type | | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | | E |
| Other options on request | | |

| Other options | | |
|---|--|------|
| Item | | Code |
| Standard | | 000 |
| With End resistor 120Ω (for M-C fieldbus) | | 001 |

| Connection | | | |
|---|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M8 4P A-Code Male | Power/Logic | |
| CN2 | M8 8P A-Code Male | Inputs/Outputs | |
| CN5A/B | M8 4P A-Code Female | Fieldbus (M-C-T-E) | 1 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 2 |
| Cable kit available on request. More information can be found in the product manual on our website. | | | |

| Input and Output | | |
|------------------|-----------------------|---|
| Input | Digital | Up to 4 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 1 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | Up to 2 not isolated open drain, 5-24 Vdc 100mA |

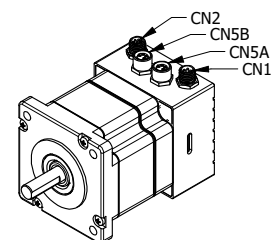
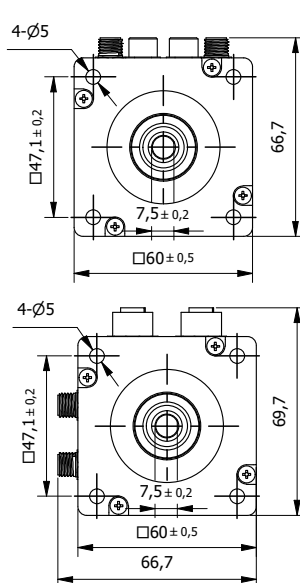
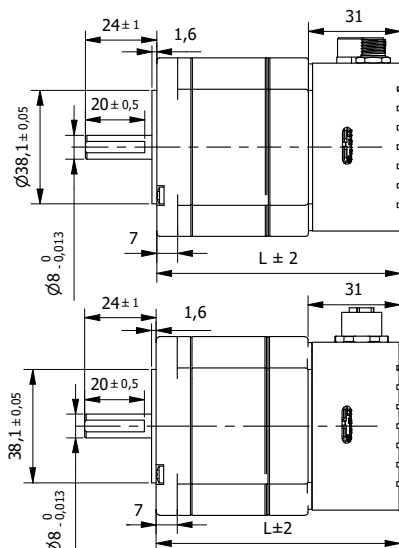
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Stepper Motor ISS060

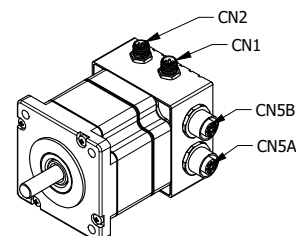
with Motion Controller

□ 60mm

1 - 3,1Nm



CONNECTOR CODE 1: CANopen, Modbus RTU, Modbus TCP/IP, EtherCAT



CONNECTOR CODE 2: EtherCAT, Modbus TCP/IP, Profinet, PowerLink, Ethernet IP

Integrated Brake available on request

| Specification | | | ...0080N | ...0089N | ...0100N | ...0121N |
|---------------|-------------------|------------------|----------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12÷48 | 12÷48 | 12÷48 | 12÷48 |
| 2 | Current/Phase | A | 3 | 3 | 3 | 3 |
| 3 | Resistance/Phase | Ω | 0,68 | 0,8 | 0,98 | 1,2 |
| 4 | Inductance/Phase | mH | 1,7 | 3 | 3 | 5,4 |
| 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 | 80 | 89 | 100 | 121 |
| 9 | Weight | Kg | 0,76 | 0,94 | 1,14 | 1,55 |

| Characteristics | | |
|--|--|--|
| Item | | |
| Step angle | | 1,8° |
| Step angle Accuracy | | ±5% |
| Protection Class | | IP30 |
| Working Temperature | | +5°C to +40°C |
| Humidity | | 5% to 85% not condensing |
| 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 |
| Protective functions | | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | | Serial interface (not for M-C) |
| Software* | | Setup & config. - DL Studio Programming - DL Space |
| *Service SCL cable required and available on request | | |

| Product code reference | |
|-------------------------------|-----------------------------|
| ISS 060 0080 N E 1 000 M S200 | |
| 060 | Frame size |
| 0080 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | E |
| Other options on request | |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | | |
|---|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M8 4P A-Code Male | Power/Logic | |
| CN2 | M8 8P A-Code Male | Inputs/Outputs | |
| CN5A/B | M8 4P A-Code Female | Fieldbus (M-C-T-E) | 1 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 2 |
| Cable kit available on request. More information can be found in the product manual on our website. | | | |

| Input and Output | | |
|------------------|-----------------------|---|
| Input | Digital | Up to 4 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 1 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | Up to 2 not isolated open drain, 5-24 Vdc 100mA |

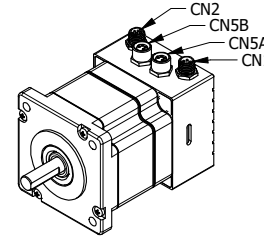
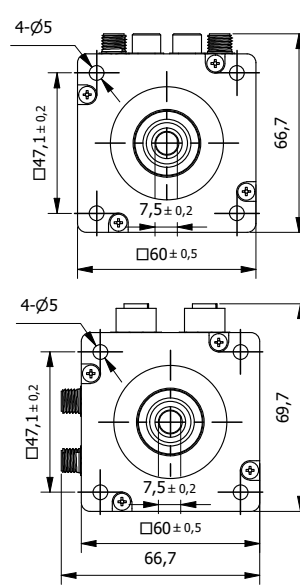
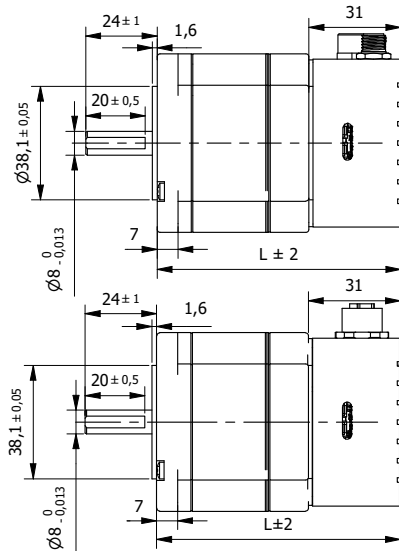
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Stepper Motor ISI060

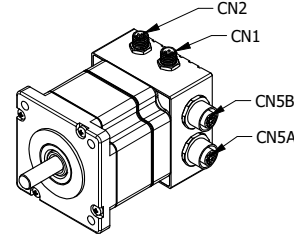
with Motion Controller - IP65

□ 60mm

1 - 3,1Nm



CONNECTOR CODE 1: CANopen, Modbus RTU, Modbus TCP/IP, EtherCAT



CONNECTOR CODE 2: EtherCAT, Modbus TCP/IP, Profinet, PowerLink, Ethernet IP

Integrated Brake available on request

| Specification | | ...0082N | ...0091N | ...0102N | ...0123N |
|---------------|-------------------|------------------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12÷48 | 12÷48 | 12÷48 |
| 2 | Current/Phase | A | 3 | 3 | 3 |
| 3 | Resistance/Phase | Ω | 0,68 | 0,8 | 0,98 |
| 4 | Inductance/Phase | mH | 1,7 | 3 | 5,4 |
| 5 | Holding Torque | Nm | 1 | 1,75 | 2,1 |
| 6 | Rotor Inertia | gcm ² | 275 | 440 | 570 |
| 7 | Detent Torque | Nm | 0,05 | 0,069 | 0,088 |
| 8 | Length (L) | mm | 82 | 91 | 102 |
| 9 | Weight | Kg | 0,78 | 0,95 | 1,16 |

| Characteristics | |
|--|--|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | Serial interface (not for M-C) |
| Software* | Setup & config. - DL Studio Programming - DL Space |
| *Service SCI cable required and available on request | |

| Product code reference | |
|-------------------------------|-----------------------------|
| ISI 060 0082 N E 1 000 M S200 | |
| 060 | Frame size |
| 0082 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | E |
| Other options on request | |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | | |
|---|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M8 4P A-Code Male | Power/Logic | |
| CN2 | M8 8P A-Code Male | Inputs/Outputs | |
| CN5A/B | M8 4P A-Code Female | Fieldbus (M-C-T-E) | 1 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 2 |
| Cable kit available on request. More information can be found in the product manual on our website. | | | |

| Input and Output | | |
|------------------|-----------------------|---|
| Input | Digital | Up to 4 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 1 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | Up to 2 not isolated open drain, 5-24 Vdc 100mA |

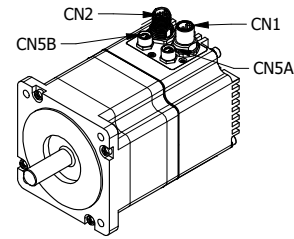
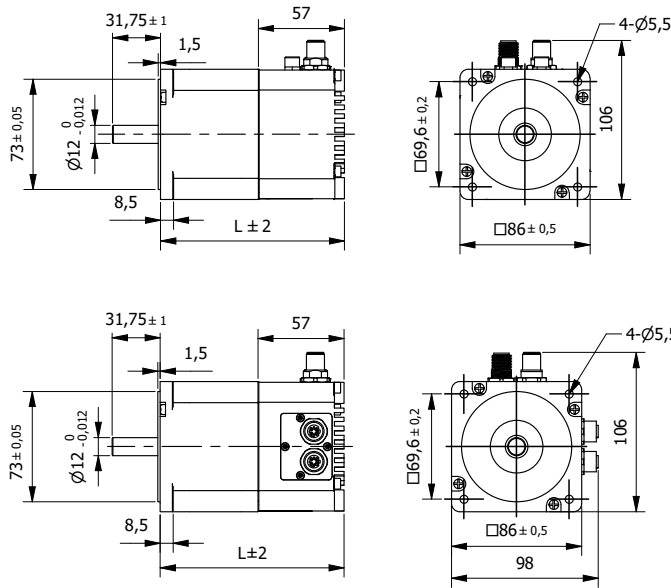
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Stepper Motor ISS086

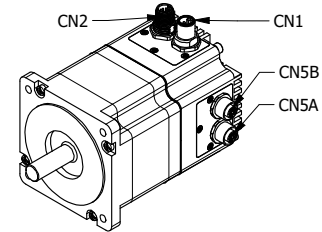
with Motion Controller

□ 86mm

2,2 - 12Nm



CONNECTOR CODE 1: CANopen, Modbus RTU, Modbus TCP/IP, EtherCAT



CONNECTOR CODE 2: EtherCAT, Modbus TCP/IP, Profinet, PowerLink, Ethernet IP

Integrated Brake available on request

| Specification | | | ...0122N | ...0135N | ...0156N | ...0173N | ...0212N |
|---------------|-------------------|------------------|----------|----------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12÷48 | 12÷48 | 12÷48 | 12÷48 | 12÷48 |
| 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 | 2,2 | 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 | 122 | 135 | 156 | 173 | 212 |
| 9 | Weight | Kg | 2,19 | 2,79 | 3,29 | 4,29 | 5,89 |

| Characteristics | |
|--|--|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Protection Class | IP30 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | Serial interface (not for M-C) |
| Software* | Setup & config. - DL Studio Programming - DL Space |
| *Service SCL cable required and available on request | |

| Product code reference | |
|-------------------------------|-----------------------------|
| ISS 086 0122 N E 1 000 M S200 | |
| 086 | Frame size |
| 0122 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | E |
| Other options on request | |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | | |
|---|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M12 5P L-Code Male | Power/Logic | |
| CN2 | M12 12P A-Code Male | Inputs/Outputs | |
| CN5A/B | M8 4P A-Code Female | Fieldbus (M-C-T-E) | 1 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 2 |
| Cable kit available on request. More information can be found in the product manual on our website. | | | |

| Input and Output | | |
|------------------|-----------------------|---|
| Input | Digital | 4 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 2 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | 2 not isolated open drain, 5-24 Vdc 100mA |

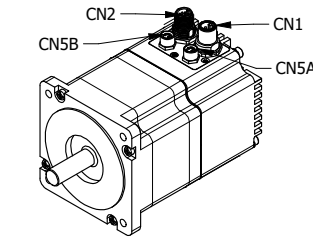
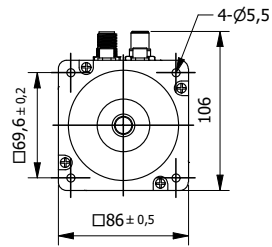
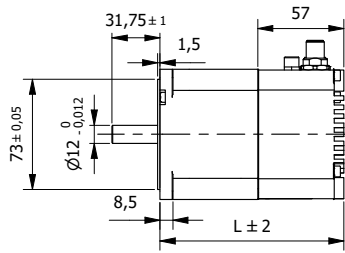
| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Stepper Motor ISI086

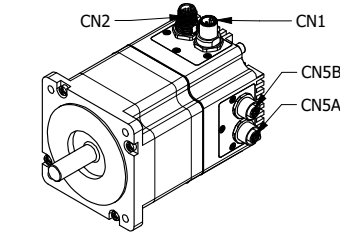
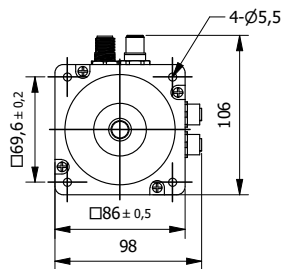
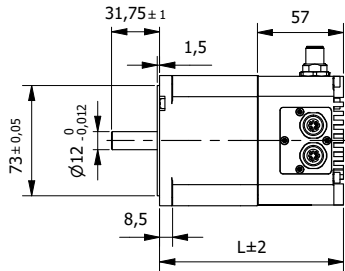
with Motion Controller - IP65

□ 86mm

2,2 - 12Nm



CONNECTOR CODE 1: CANopen, Modbus RTU, Modbus TCP/IP, EtherCAT



CONNECTOR CODE 2: EtherCAT, Modbus TCP/IP, Profinet, PowerLink, Ethernet IP

Integrated Brake available on request

| Specification | | | ...0122N | ...0135N | ...0156N | ...0173N | ...0212N |
|---------------|-------------------|------------------|----------|----------|----------|----------|----------|
| 1 | Operating Voltage | VDC | 12÷48 | 12÷48 | 12÷48 | 12÷48 | 12÷48 |
| 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 | 2,2 | 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 | 122 | 135 | 156 | 173 | 212 |
| 9 | Weight | Kg | 2,19 | 2,79 | 3,29 | 4,29 | 5,89 |

| Characteristics | |
|--|--|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Protection Class | IP65 |
| Working Temperature | +5°C to +40°C |
| Humidity | 5% to 85% not condensing |
| 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 |
| Protective functions | Over/Under voltage, Over current, Overheating, Short circuit |
| Debug & configuration | Serial interface (not for M-C) |
| Software* | Setup & config. - DL Studio Programming - DL Space |
| *Service SCI cable required and available on request | |

| Product code reference | |
|-------------------------------|-----------------------------|
| ISS 086 0122 N E 1 000 M S200 | |
| 086 | Frame size |
| 0122 | Motor length |
| N | Brake options (N= no brake) |
| E | Encoder options |
| 1 | Connector code |
| 000 | Other options |
| M | Fieldbus |
| S200 | Protocol reference |

| Encoders | |
|---|------|
| Type | Code |
| Magnetic Incremental 4096 CPR or Absolute Single turn encoder | E |
| Other options on request | |

| Other options | |
|---|------|
| Item | Code |
| Standard | 000 |
| With End resistor 120Ω (for M-C fieldbus) | 001 |

| Connection | | | |
|---|----------------------|----------------------|------|
| Connector | Type | Function | Code |
| CN1 | M12 5P L-Code Male | Power/Logic | |
| CN2 | M12 12P A-Code Male | Inputs/Outputs | |
| CN5A/B | M8 4P A-Code Female | Fieldbus (M-C-T-E) | 1 |
| CN5A/B | M12 4P D-Code Female | Fieldbus (T-E-P-R-H) | 2 |
| Cable kit available on request. More information can be found in the product manual on our website. | | | |

| Input and Output | | |
|------------------|-----------------------|---|
| Input | Digital | 4 not isolated 5-24 Vdc PNP |
| | Analog (M-C fieldbus) | 2 with potentiometer or 0-10 Vdc not isolated |
| Output | Digital | 2 not isolated open drain, 5-24 Vdc 100mA |

| Interface Control Mode | |
|---------------------------------------|--------|
| Fieldbus | Code |
| RS485 Modbus-RTU (programmable) | M-S200 |
| CANopen (programmable) | C-S200 |
| CANopen (DS 402) | C-S402 |
| Ethernet Modbus TCP/IP (programmable) | T-S200 |
| EtherCAT (DS 402) | E-S402 |
| Profinet (programmable) | P-S200 |
| PowerLink (DS 402) | R-S402 |
| EtherNet IP (programmable) | H-S200 |

Stepper



Controllers/Drives

Encoders

Gearboxes

Linear actuators

Stepper

Motor + Controller

Servomotors

Brushless DC

Brushed DC

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Flat Hybrid Stepper

p.313



Hybrid Stepper S series Standard

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Hybrid Stepper SH series High Torque

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Hybrid Stepper STC series Connector

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3-Phase Hybrid Stepper

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Hollow Shaft Stepper

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Hybrid Stepper with Encoder

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IP65 Hybrid Stepper

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Stepper Motors

| | | |
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| Technical introduction | | 238 |
| Hybrid Stepper motors - S Standard series | Torque* (Nm) | 243 |
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| 86S67...125 | 2,3...7,6 | 248 |
| Hybrid Stepper motors - SH High Torque series | Torque* (Nm) | 253 |
| 14SH30 | 0,006 | 254 |
| 20SH | 0,018...0,03 | 255 |
| 25SH23 | 0,033 | 256 |
| 28SH32...51 | 0,043...0,12 | 257 |
| 35SH | 0,07...0,14 | 260 |
| 39SH20...38 | 0,065...0,29 | 261 |
| 42SH33...60 | 0,158...0,8 | 264 |
| 42SH33...47M - step 0,9° | 0,158...0,44 | 268 |
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| 57SH41...76M - step 0,9° | 0,39...1,8 | 275 |
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| 28STC32...51 | 0,08...0,18 | 291 |
| 57STC41...76 | 0,6...2,3 | 294 |
| 3-Phase Hybrid Stepper motors | Torque* (Nm) | 299 |
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| 57 3P | 0,45...1,5 | 301 |
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| Hollow Shaft Stepper motors | Torque* (Nm) | 305 |
| 20STC40 H | 0,036 | 306 |
| 28STC51 H | 0,12 | 307 |
| 35STC38 H | 0,23 | 308 |
| 42STC47 H | 0,44 | 309 |
| 57STC76 H | 2,3 | 310 |
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| 42SC | 0,22...0,75 | 318 |
| 60SC | 1...3 | 319 |
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| SM28 070 - IP65 | 0,127 | 324 |
| SM42-E - IP65 | 0,16...0,72 | 325 |
| SM57-E - IP65 | 0,7...1,95 | 326 |

* Holding Torque

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

Glossary

Wires Connection table

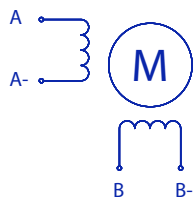
| 4 lead wires | A | A- | B | B- |
|--------------|--------|-------|--------|--------|
| Color Code 1 | White | Red | Blue | Yellow |
| Color Code 2 | Black | Green | Red | Blue |
| Color Code 3 | Red | Blue | Orange | Yellow |
| Color Code 4 | Red | White | Yellow | Green |
| Color Code 5 | Yellow |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

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

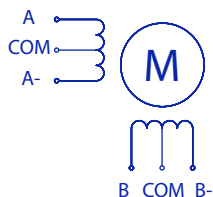
| 6 lead wires | A | A- | B | B- | Com A | Com B |
|----------------|-------|-------|------|--------|--------|-------|
| Color Code 1 | White | Red | Blue | Yellow | Black | Brown |
| Unipolar Motor | Black | Green | Red | Blue | Yellow | White |

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

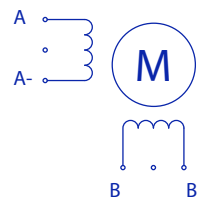
4 Leads Bipolar connection



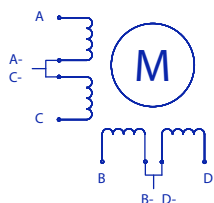
6 Leads Unipolar connection



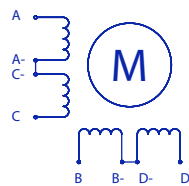
6 Leads Series connection



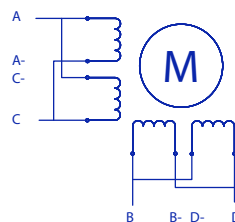
8 Leads Unipolar connection



8 Leads Serial connection



8 Leads Parallel connection



Product families

Hybrid Stepper motors

3-Phase Hybrid Stepper motors

Hollow Shaft Stepper motors

Flat Hybrid Stepper motors

Stepper motors with Encoder

IP65 Hybrid Stepper motors

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

Main advantages

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

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

Hybrid Stepper motors (2-Phase)

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

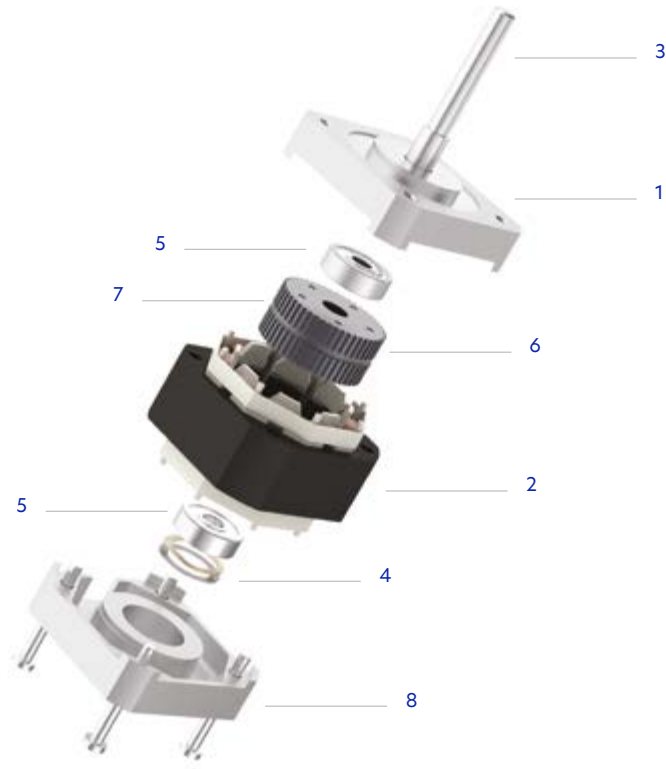
3-Phase Hybrid Stepper motors

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

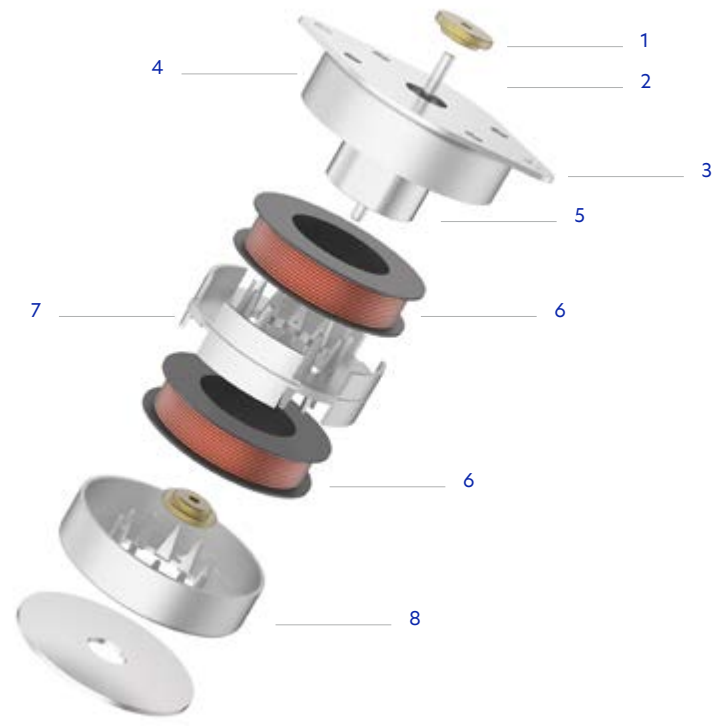
Stepper motors with integrated Encoder

Technical introduction

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



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





Hybrid Stepper
S series
Standard

p.243



Hybrid Stepper
SH series
High Torque

p.253



Hybrid Stepper
STC series
Connector

p.289

Stepper motors

2-Phase Hybrid

Advantages at a glance

- High torque
- High speed
- High reliability

The hybrid stepper motor combines the best features of both the Permanent Magnet 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) | 243 |
|---|--------------|-----|
| 57S41 | 0,29...0,4 | 244 |
| 57S51 | 0,49...0,69 | 245 |
| 57S56 | 0,6...0,84 | 246 |
| 57S76 | 0,9...1,25 | 247 |
| 86S67 | 2,3...2,8 | 248 |
| 86S94 | 3,8...4,8 | 249 |
| 86S125 | 6,2...7,6 | 250 |

| Hybrid Stepper motors - SH High Torque series | Torque* (Nm) | 253 |
|---|---------------|-----|
| 14SH30 | 0,006 | 254 |
| 20SH | 0,018...0,03 | 255 |
| 25SH23 | 0,033 | 256 |
| 28SH32 | 0,043...0,06 | 257 |
| 28SH45 | 0,075...0,095 | 258 |
| 28SH51 | 0,09...0,12 | 259 |
| 35SH | 0,07...0,14 | 260 |
| 39SH20 | 0,065...0,08 | 261 |
| 39SH34 | 0,13...0,21 | 262 |
| 39SH38 | 0,2...0,29 | 263 |
| 42SH33 | 0,158...0,22 | 264 |
| 42SH38 | 0,259...0,36 | 265 |
| 42SH47 | 0,317...0,44 | 266 |
| 42SH60 | 0,65...0,8 | 267 |
| 42SH33M - step 0,9° | 0,158...0,22 | 268 |
| 42SH38M - step 0,9° | 0,259...0,36 | 269 |
| 42SH47M - step 0,9° | 0,317...0,44 | 270 |
| 57SH41 | 0,39...0,55 | 271 |
| 57SH51 | 0,72...1,01 | 272 |
| 57SH56 | 0,9...1,26 | 273 |
| 57SH76 | 1,35...1,89 | 274 |
| 57SH41M - step 0,9° | 0,39...0,55 | 275 |
| 57SH56M - step 0,9° | 0,9...1,26 | 276 |
| 57SH76M - step 0,9° | 1,35...1,8 | 277 |
| 60SH45 | 0,78...1,1 | 278 |
| 60SH56 | 1,17...1,65 | 279 |
| 60SH65 | 1,5...2,1 | 280 |
| 60SH86 | 2,2...3,1 | 281 |
| 86SH65 | 2,6...3,4 | 282 |
| 86SH80 | 4,6 | 283 |
| 86SH96 | 7,0 | 284 |
| 86SH118 | 8,7 | 285 |
| 86SH156 | 12,1 | 286 |
| 110SH | 11,2...28 | 287 |

| Hybrid Stepper motors - STC Connector series | Torque* (Nm) | 289 |
|--|---------------|-----|
| 20STC | 0,022...0,036 | 290 |
| 28STC32 | 0,08 | 291 |
| 28STC40 | 0,13 | 292 |
| 28STC51 | 0,18 | 293 |
| 57STC41 | 0,6 | 294 |
| 57STC56 | 1,4 | 295 |
| 57STC76 | 2,3 | 296 |

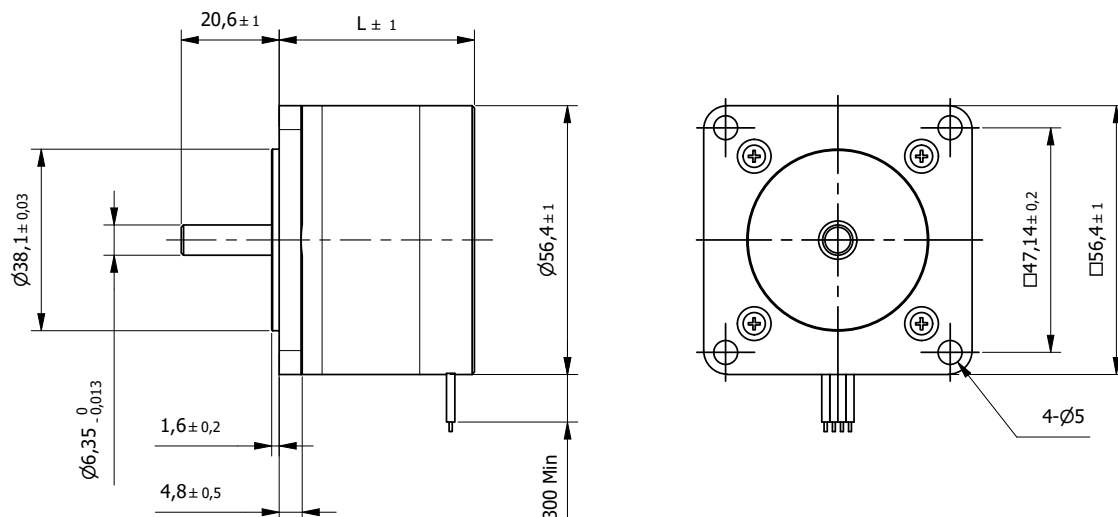
* Holding Torque



Hybrid Stepper motors
S series - Standard

| Hybrid Stepper motors - S Standard series | Torque* (Nm) | |
|---|--------------|-----|
| 57S41 | 0,29...0,4 | 244 |
| 57S51 | 0,49...0,69 | 245 |
| 57S56 | 0,6...0,84 | 246 |
| 57S76 | 0,9...1,25 | 247 |
| 86S67 | 2,3...2,8 | 248 |
| 86S94 | 3,8...4,8 | 249 |
| 86S125 | 6,2...7,6 | 250 |

* Holding Torque

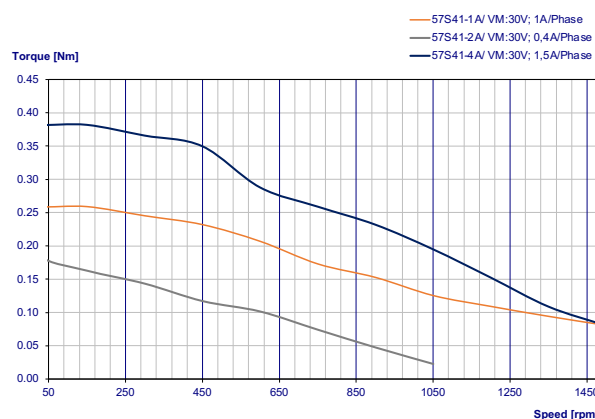


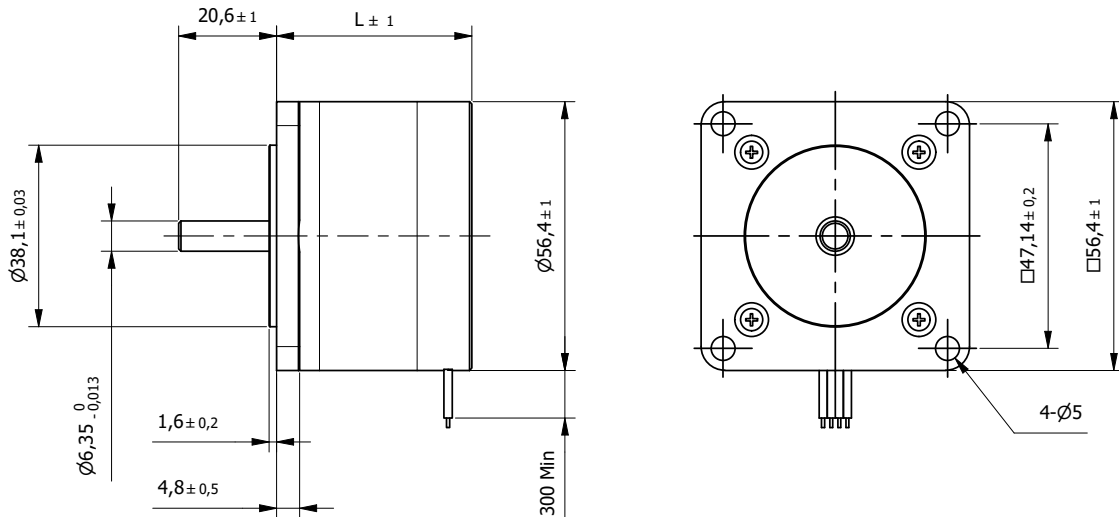
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

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



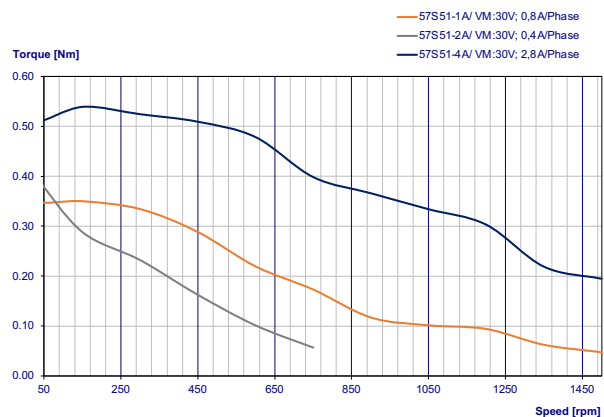


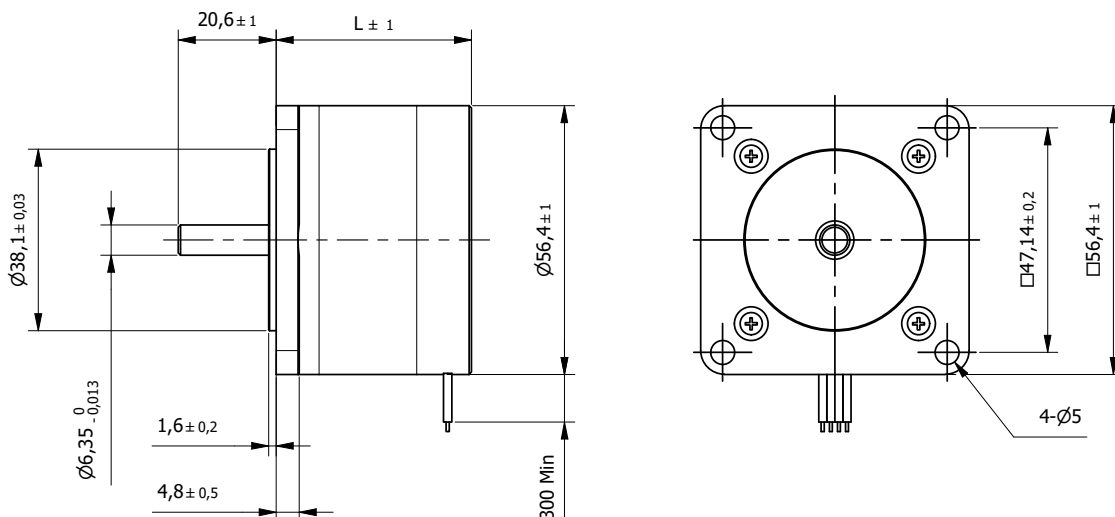
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| Specification | | 57S51-1A | 57S51-2A | 57S51-4A |
|---------------|------------------|------------------|----------|----------|
| 1 | Rated Voltage | V | 6 | 12 |
| 2 | Current/Phase | A | 0,85 | 2,8 |
| 3 | Resistance/Phase | Ω | 7,1 | 29 |
| 4 | Inductance/Phase | mH | 9 | 36 |
| 5 | Holding Torque | Nm | 0,49 | 0,49 |
| 6 | Rotor Inertia | gcm ² | 110 | 110 |
| 7 | Detent Torque | Nm | 0,035 | 0,035 |
| 8 | n° of Leads | | 6 | 4 |
| 9 | Length (L) | mm | 51 | 51 |
| 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 | Black | UL1061 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White | | COM Phase B |



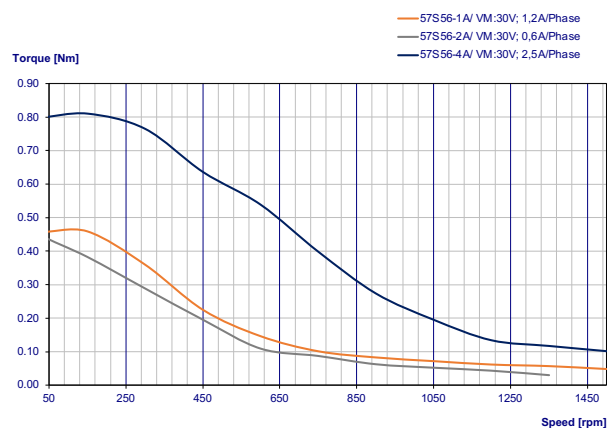


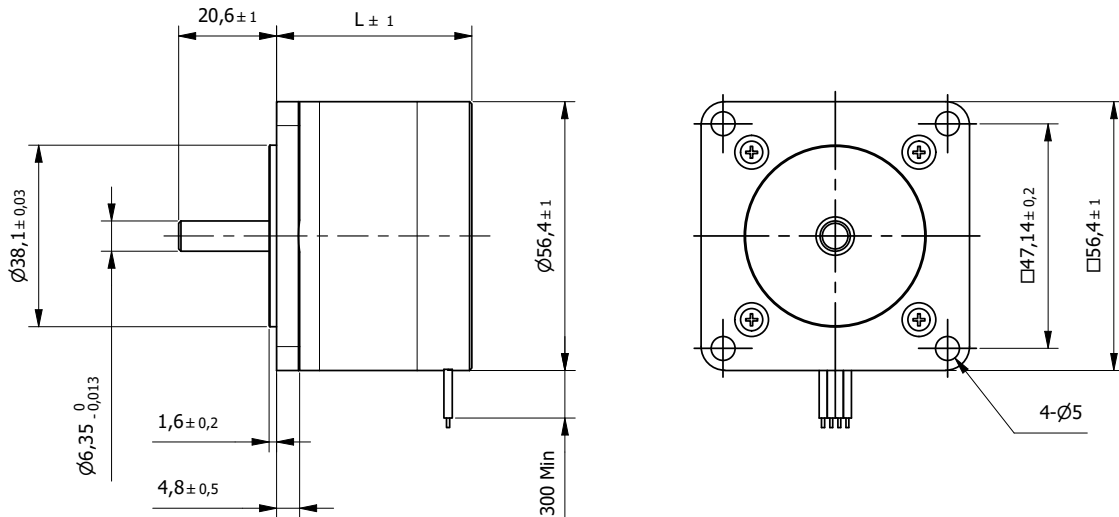
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| Specification | | 57S56-1A | 57S56-2A | 57S56-4A |
|---------------|------------------|------------------|----------|----------|
| 1 | Rated Voltage | V | 6 | 12 |
| 2 | Current/Phase | A | 1,2 | 0,6 |
| 3 | Resistance/Phase | Ω | 5 | 20 |
| 4 | Inductance/Phase | mH | 8 | 32 |
| 5 | Holding Torque | Nm | 0,605 | 0,605 |
| 6 | Rotor Inertia | gcm ² | 135 | 135 |
| 7 | Detent Torque | Nm | 0,042 | 0,042 |
| 8 | n° of Leads | | 6 | 6 |
| 9 | Length (L) | mm | 56 | 56 |
| 10 | Weight | Kg | 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 | UL1061 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White | | COM Phase B |



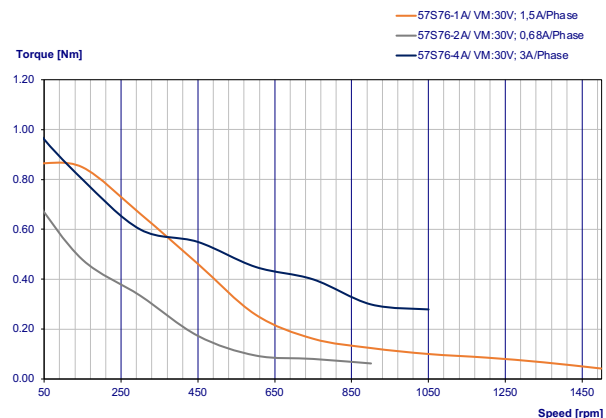


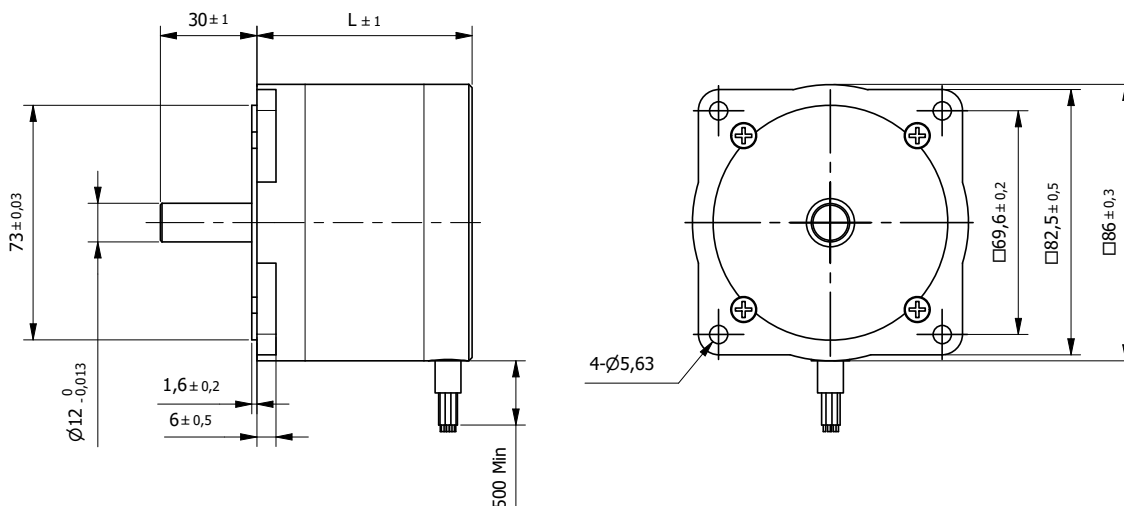
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| Specification | | 57S76-1A | 57S76-2A | 57S76-4A |
|---------------|------------------|------------------|----------|----------|
| 1 | Rated Voltage | V | 5,4 | 12 |
| 2 | Current/Phase | A | 1,5 | 0,68 |
| 3 | Resistance/Phase | Ω | 3,6 | 17,7 |
| 4 | Inductance/Phase | mH | 6 | 30 |
| 5 | Holding Torque | Nm | 0,9 | 0,9 |
| 6 | Rotor Inertia | gcm ² | 200 | 200 |
| 7 | Detent Torque | Nm | 0,072 | 0,072 |
| 8 | n° of Leads | | 6 | 4 |
| 9 | Length (L) | mm | 76 | 76 |
| 10 | Weight | Kg | 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 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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



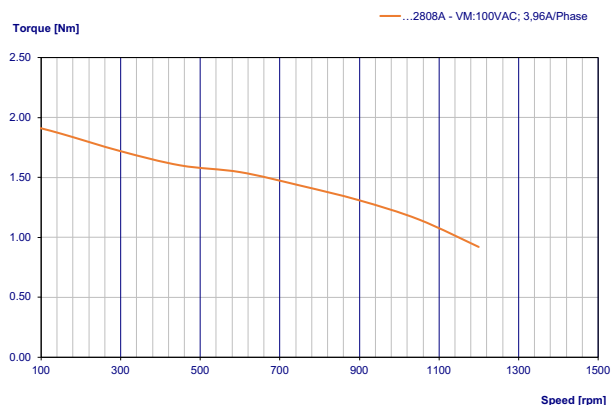


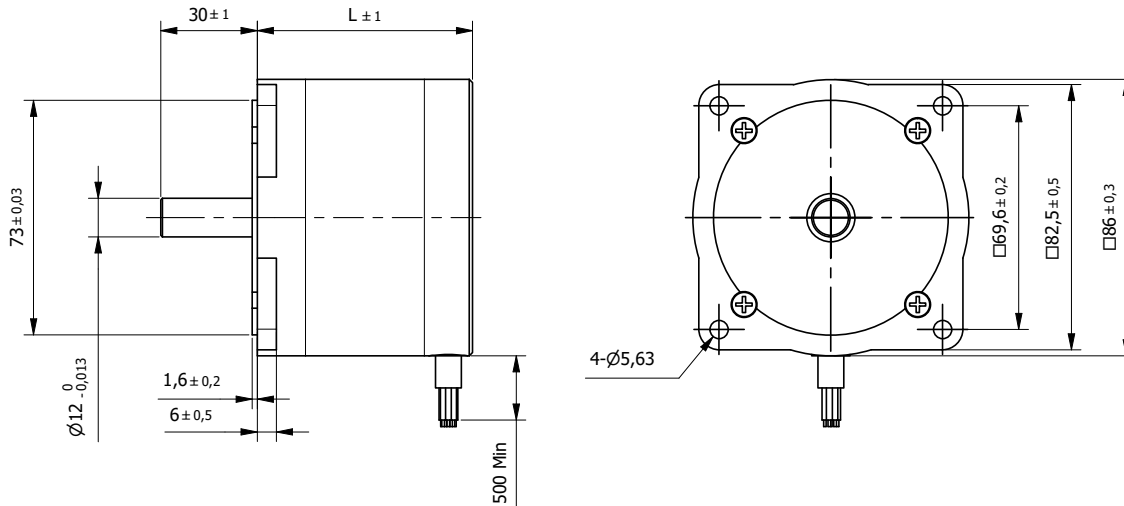
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

| Characteristics | |
|---|----------------|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| Max. Shaft Radial play (450g load) | 0,02mm |
| Max. Shaft Axial play (450g load) | 0,08mm |
| Max. Radial Force (20mm from front flange) | 220N |
| Max Axial Force | 60N |
| Dielectric Strength (for 1 sec.) | 820 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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



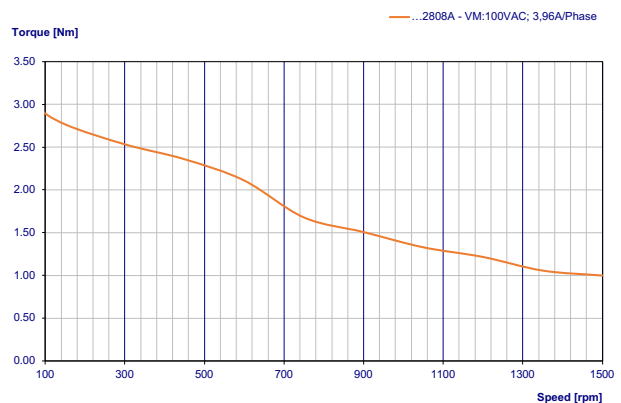


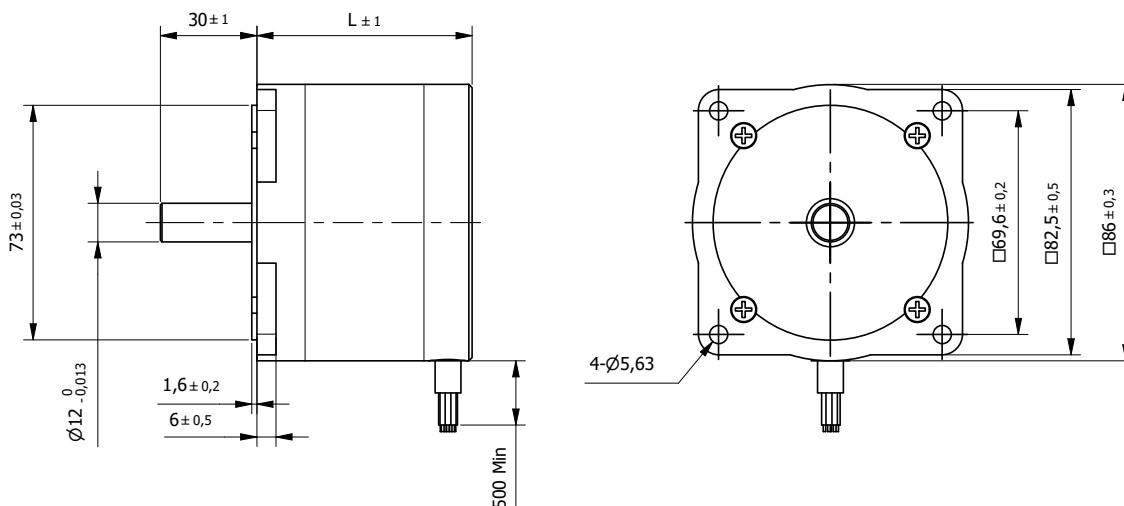
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| Specification | | 86S94-2808A | | | |
|---------------|------------------|------------------|----------|--------|------|
| Model | | Unipolar | Parallel | Series | |
| 1 | Rated Voltage | V | 4,76 | 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 | gcm ² | 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 sec.) | 820 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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



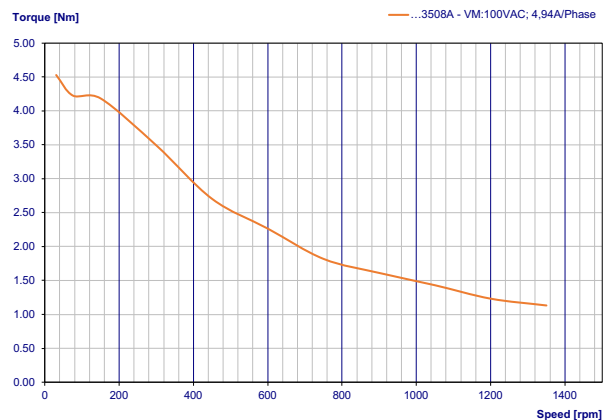


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

| Characteristics | |
|---|----------------|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| Max. Shaft Radial play (450g load) | 0,02mm |
| Max. Shaft Axial play (450g load) | 0,08mm |
| Max. Radial Force (20mm from front flange) | 220N |
| Max Axial Force | 60N |
| Dielectric Strength (for 1 sec.) | 820 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

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





Hybrid Stepper motors

SH series - High Torque

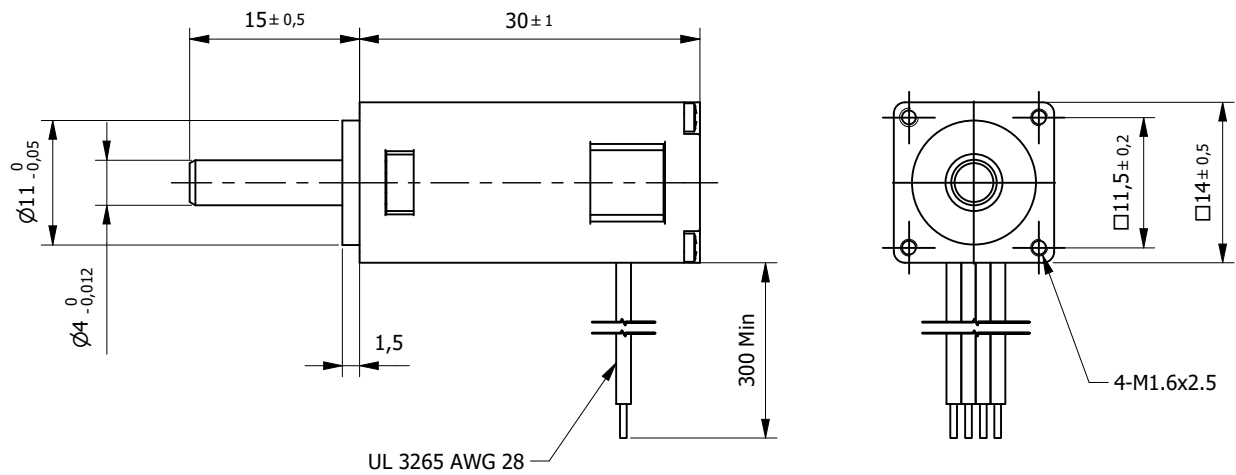
| Hybrid Stepper motors - SH High Torque series | Torque* (Nm) | |
|---|---------------|-----|
| 14SH30 | 0,006 | 254 |
| 20SH | 0,018...0,03 | 255 |
| 25SH23 | 0,033 | 256 |
| 28SH32 | 0,043...0,06 | 257 |
| 28SH45 | 0,075...0,095 | 258 |
| 28SH51 | 0,09...0,12 | 259 |
| 35SH | 0,07...0,14 | 260 |
| 39SH20 | 0,065...0,08 | 261 |
| 39SH34 | 0,13...0,21 | 262 |
| 39SH38 | 0,2...0,29 | 263 |
| 42SH33 | 0,158...0,22 | 264 |
| 42SH38 | 0,259...0,36 | 265 |
| 42SH47 | 0,317...0,44 | 266 |
| 42SH60 | 0,65...0,8 | 267 |
| 42SH33M - step 0,9° | 0,158...0,22 | 268 |
| 42SH38M - step 0,9° | 0,259...0,36 | 269 |
| 42SH47M - step 0,9° | 0,317...0,44 | 270 |
| 57SH41 | 0,39...0,55 | 271 |
| 57SH51 | 0,72...1,01 | 272 |
| 57SH56 | 0,9...1,26 | 273 |
| 57SH76 | 1,35...1,89 | 274 |
| 57SH41M - step 0,9° | 0,39...0,55 | 275 |
| 57SH56M - step 0,9° | 0,9...1,26 | 276 |
| 57SH76M - step 0,9° | 1,35...1,8 | 277 |
| 60SH45 | 0,78...1,1 | 278 |
| 60SH56 | 1,17...1,65 | 279 |
| 60SH65 | 1,5...2,1 | 280 |
| 60SH86 | 2,2...3,1 | 281 |
| 86SH65 | 2,6...3,4 | 282 |
| 86SH80 | 4,6 | 283 |
| 86SH96 | 7,0 | 284 |
| 86SH118 | 8,7 | 285 |
| 86SH156 | 12,1 | 286 |
| 110SH | 11,2...28 | 287 |

* Holding Torque

Hybrid Stepper Motor 14SH30

High Torque

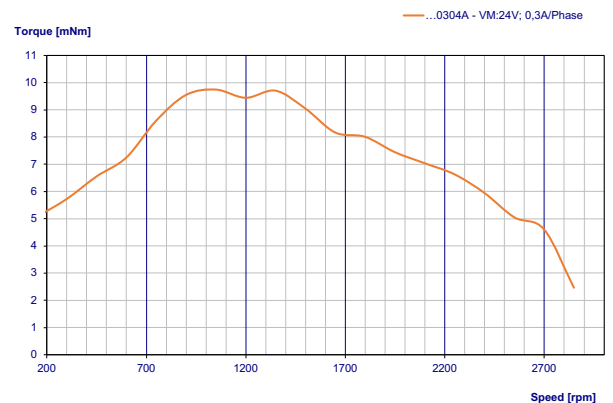
□ 14mm

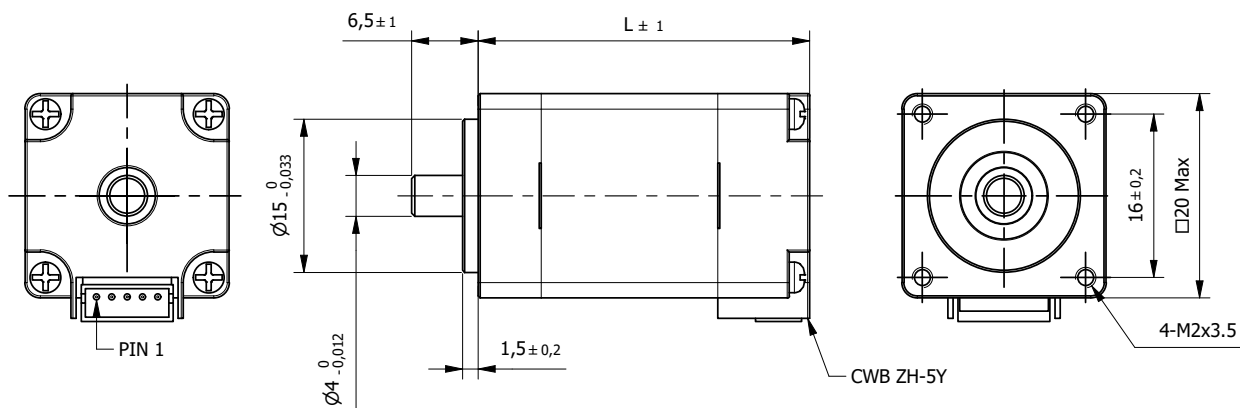


| Specification | | | |
|---------------|------------------|------------------|-------|
| Model | ...0304A | | |
| 1 | Rated Voltage | V | 6,3 |
| 2 | Current/Phase | A | 0,3 |
| 3 | Resistance/Phase | Ω | 21 |
| 4 | Inductance/Phase | mH | 4,2 |
| 5 | Holding Torque | Nm | 0,006 |
| 6 | Rotor Inertia | 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- |

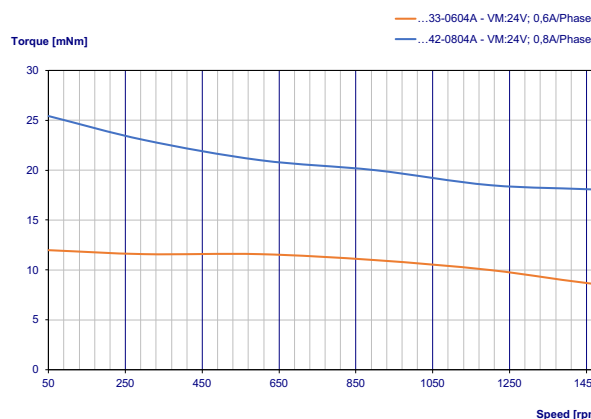




| Specification | | | | |
|---------------|------------------|------------------|-------------|-------|
| Model | | ...33-0604A | ...42-0804A | |
| 1 | Rated Voltage | V | 3,96 | 4,32 |
| 2 | Current/Phase | A | 0,6 | 0,8 |
| 3 | Resistance/Phase | Ω | 6,5 | 5,4 |
| 4 | Inductance/Phase | mH | 1,7 | 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 |

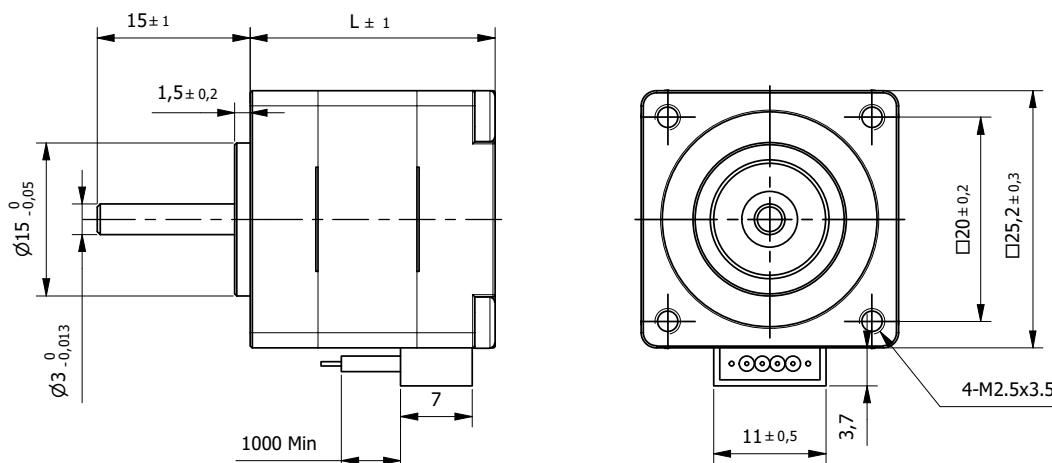
| Connection | | | |
|------------|-------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1061 AWG28 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |



Hybrid Stepper Motor 25SH23

High Torque

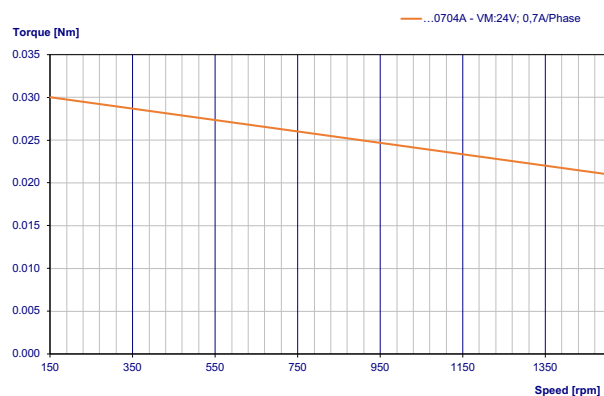
□ 25mm



| 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 | 24 |
| 10 | Weight | Kg | 0,055 |

| Characteristics | |
|---|----------------|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -25°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 (10mm from front flange) | 28N |
| Max Axial Force | 10N |
| Dielectric Strength (for 1 sec.) | 600 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

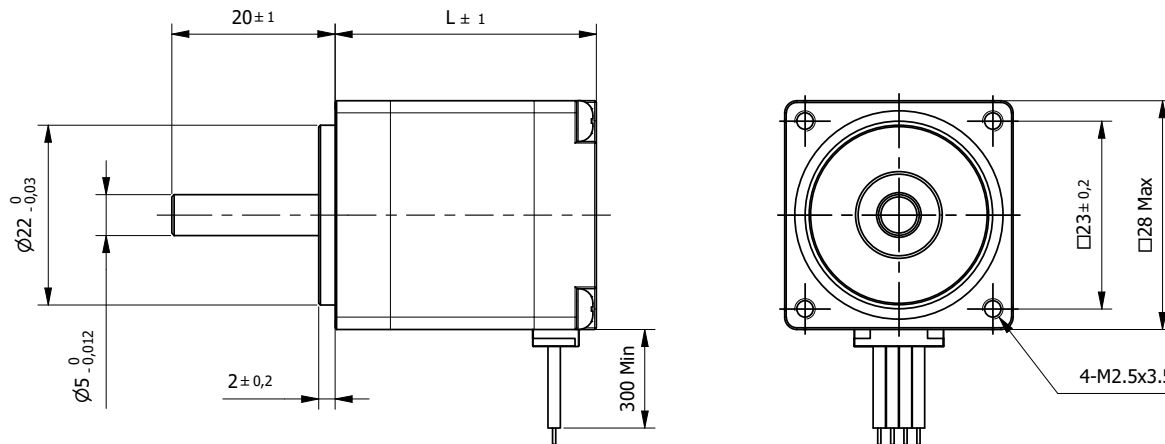
| Connection | | | |
|------------|-------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1061 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |



Hybrid Stepper Motor 28SH32

High Torque

□ 28mm

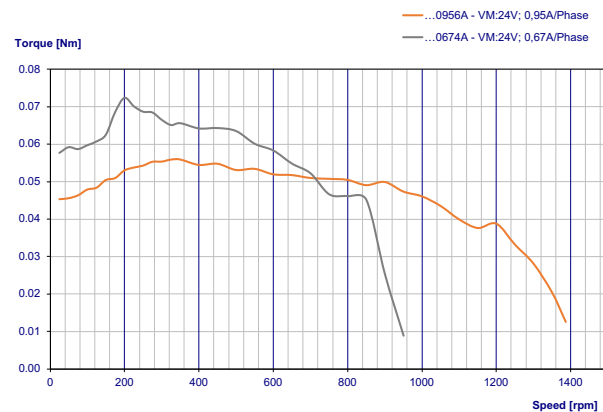


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

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

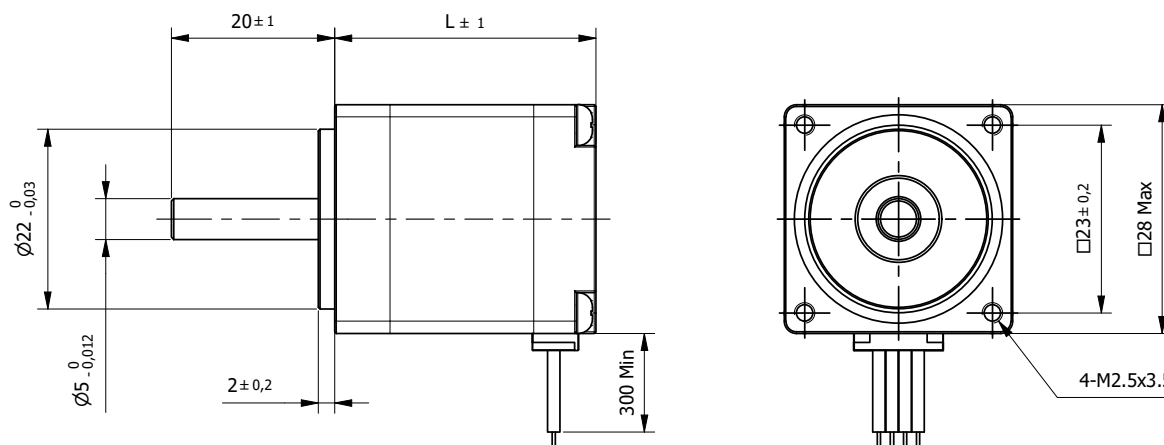
| Connection | | | |
|-----------------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 |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



Hybrid Stepper Motor 28SH45

□ 28mm

High Torque

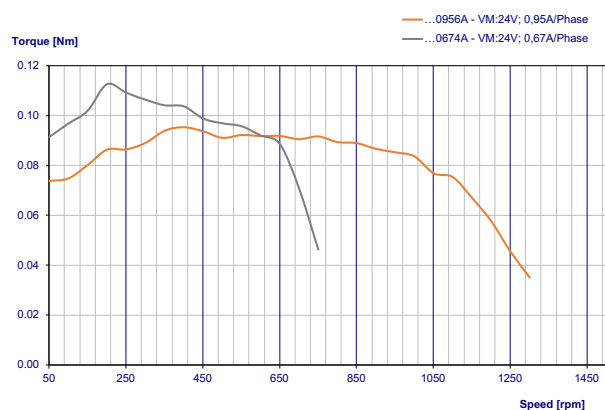


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

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

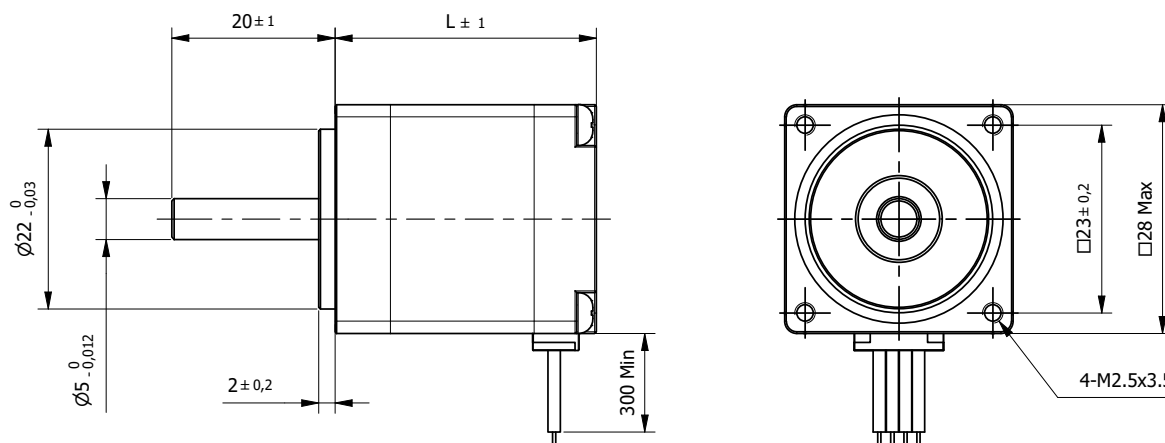
| Connection | | | | |
|----------------|--------|--------------|-------------|--|
| Lead n° | Color | Gauge | Function | |
| 1 | Black | UL1430 AWG26 | Phase A | |
| 2 | Green | | Phase A- | |
| 3 | Red | | Phase B | |
| 4 | Blue | | Phase B- | |
| Unipolar motor | | | | |
| 5 | Yellow | | COM Phase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



Hybrid Stepper Motor 28SH51

High Torque

□ 28mm

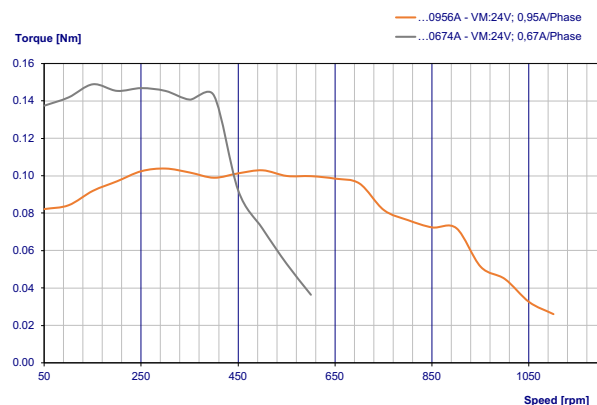


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

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

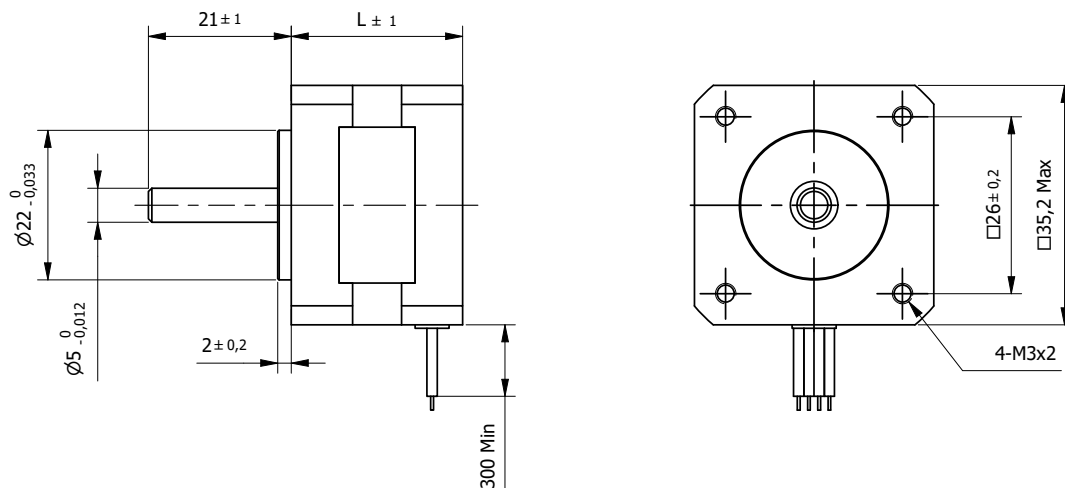
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 35SH

High Torque

□ 35mm

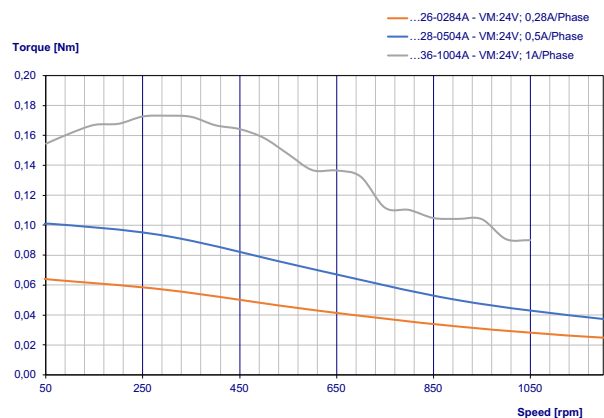


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

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

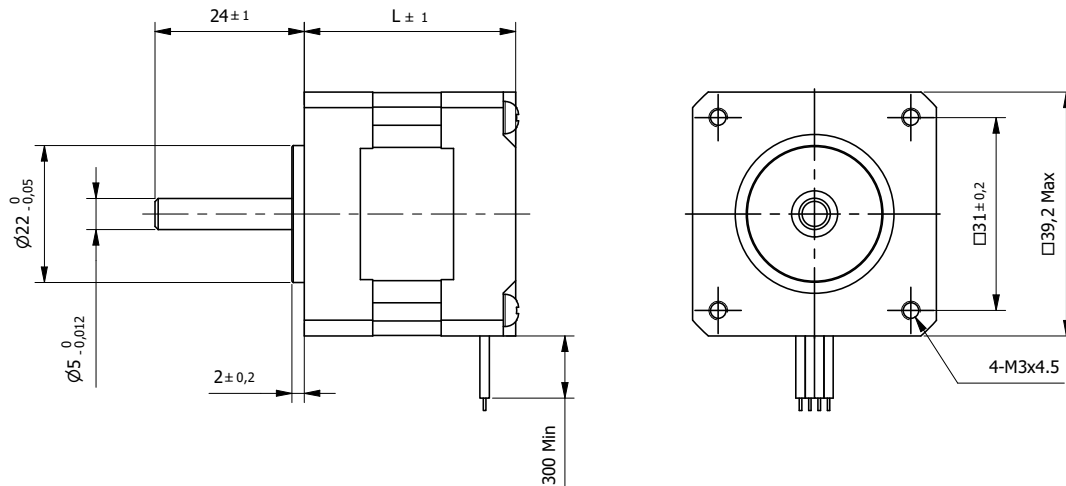
| Connection | | | |
|------------|-------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |



Hybrid Stepper Motor 39SH20

High Torque

□ 39mm

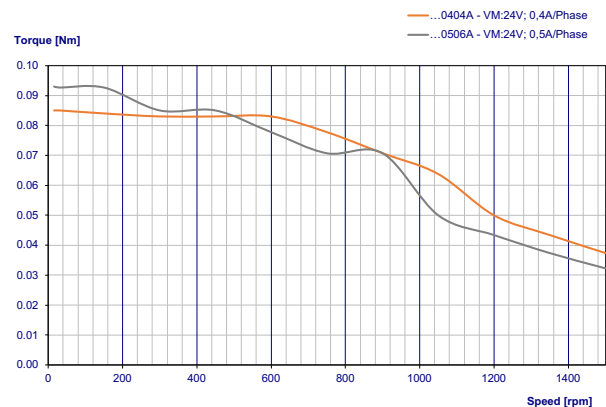


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

| Specification | | | ...0404A | ...0506A |
|---------------|------------------|------------------|----------|----------|
| 1 | Rated Voltage | V | 2,64 | 6,5 |
| 2 | Current/Phase | A | 0,4 | 0,5 |
| 3 | Resistance/Phase | Ω | 6,6 | 13 |
| 4 | Inductance/Phase | mH | 6 | 6 |
| 5 | Holding Torque | Nm | 0,065 | 0,08 |
| 6 | Rotor Inertia | gcm ² | 11 | 11 |
| 7 | Detent Torque | Nm | 0,005 | 0,005 |
| 8 | n° of Leads | | 4 | 6 |
| 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 |

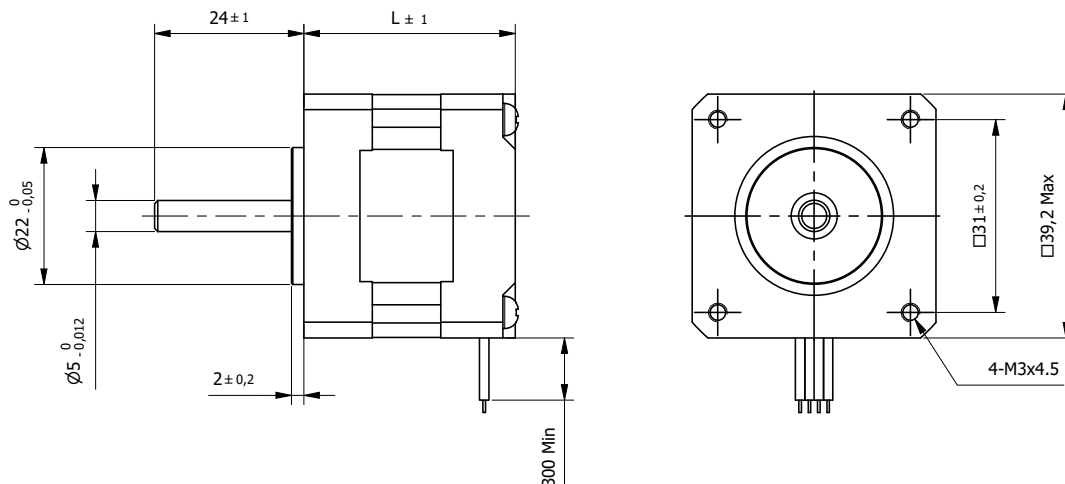
| Connection | | | |
|-----------------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1007 AWG28 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 |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



Hybrid Stepper Motor 39SH34

High Torque

□ 39mm

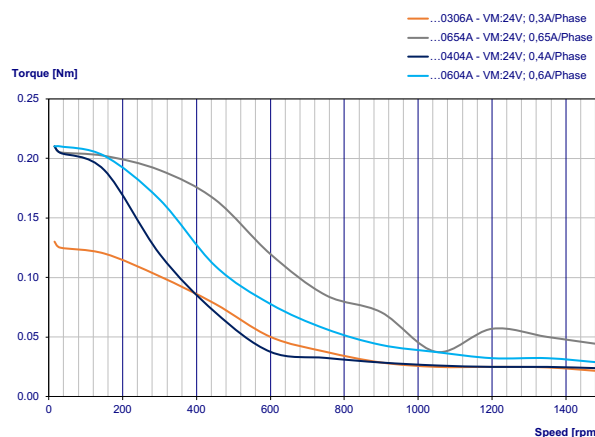


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

| 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 | gcm ² | 20 | 20 | 20 | 20 |
| 7 | Detent Torque | Nm | 0,012 | 0,012 | 0,012 | 0,012 |
| 8 | n° of Leads | | 6 | 4 | 4 | 4 |
| 9 | Length (L) | mm | 34 | 34 | 34 | 34 |
| 10 | Weight | Kg | 0,18 | 0,18 | 0,18 | 0,18 |

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

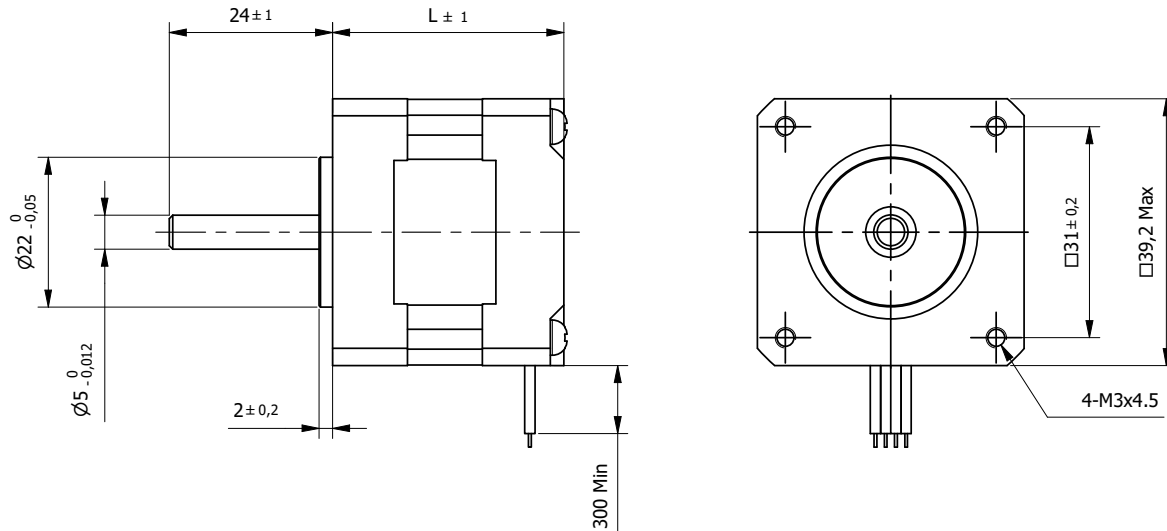
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 39SH38

High Torque

□ 39mm

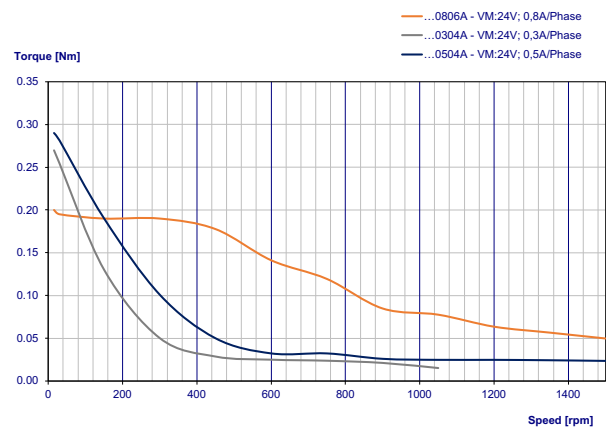


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

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

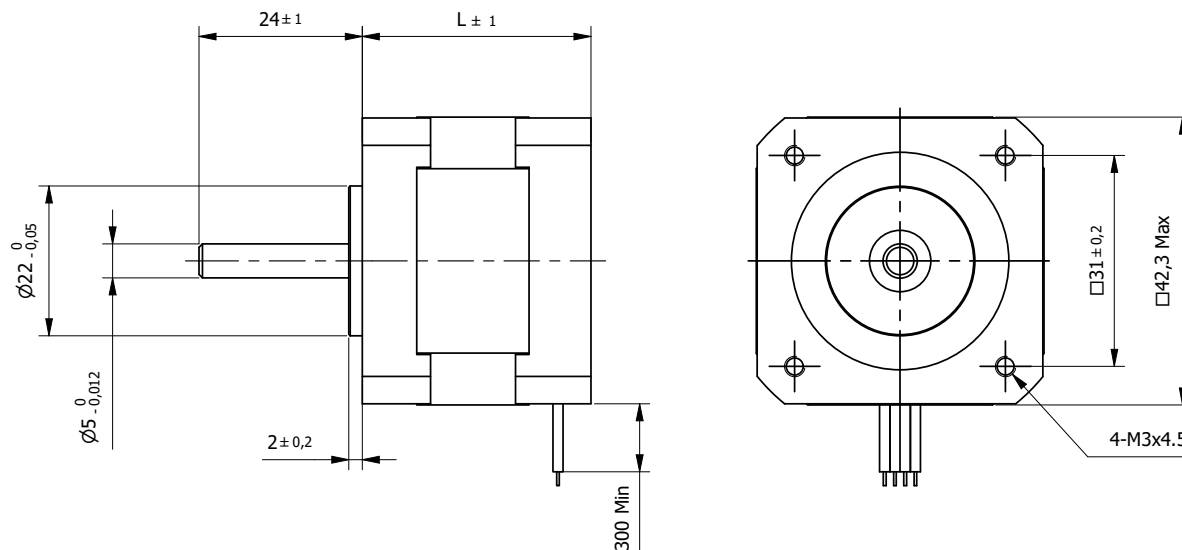
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 42SH33

□ 42mm

High Torque

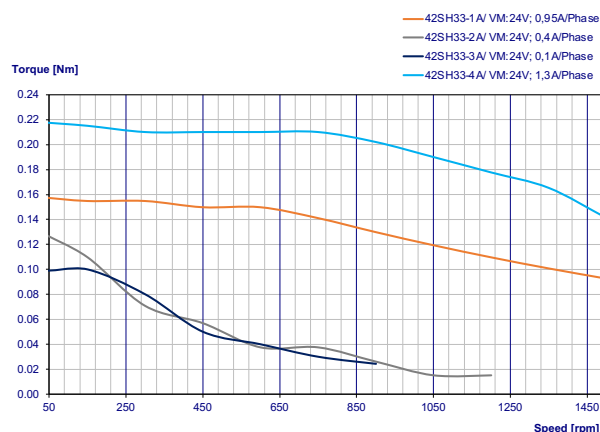


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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

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

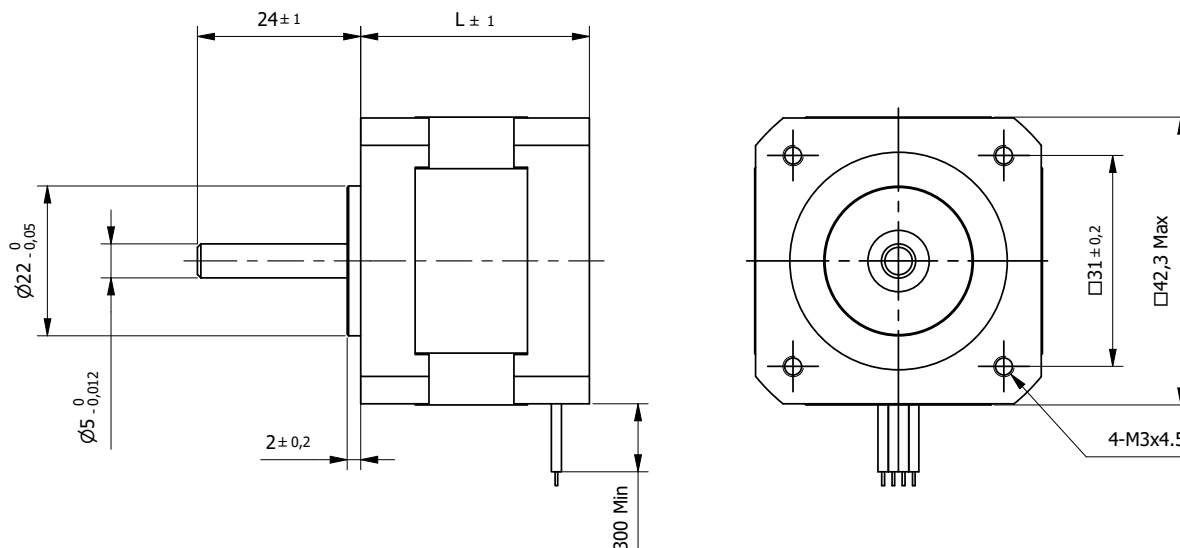
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 42SH38

High Torque

□ 42mm

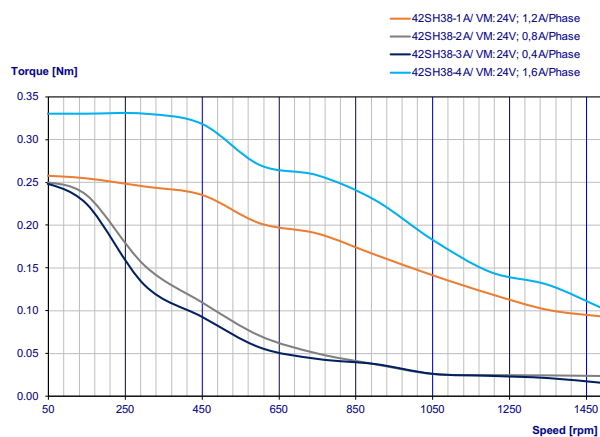


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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

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

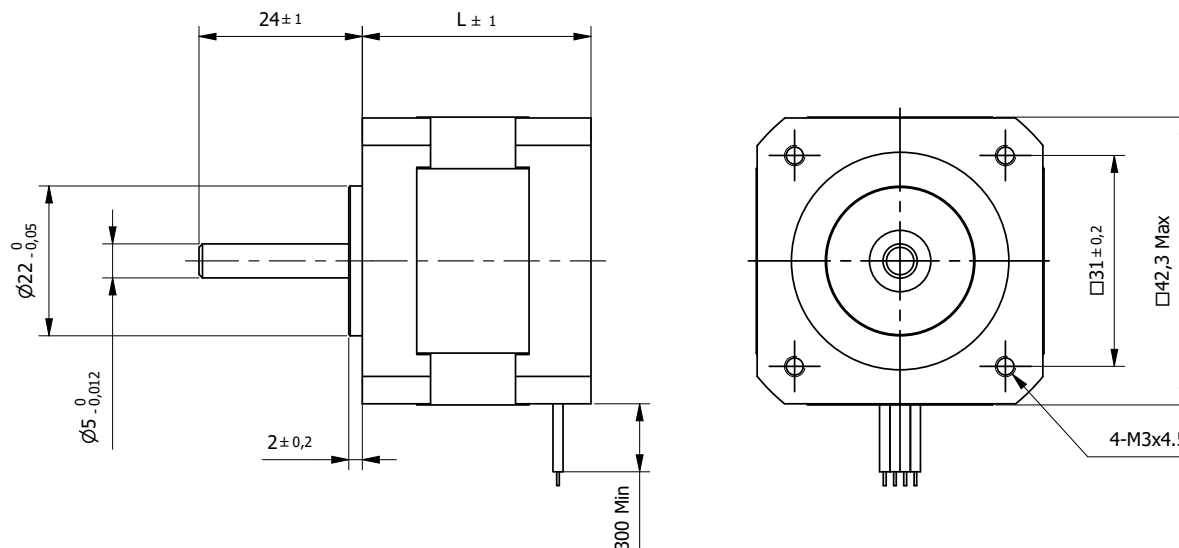
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 42SH47

□ 42mm

High Torque

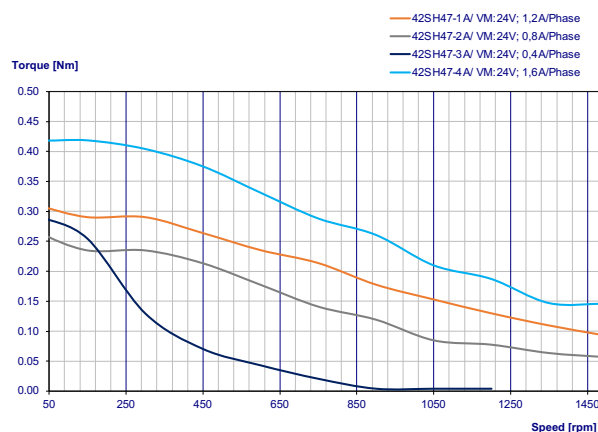


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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

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

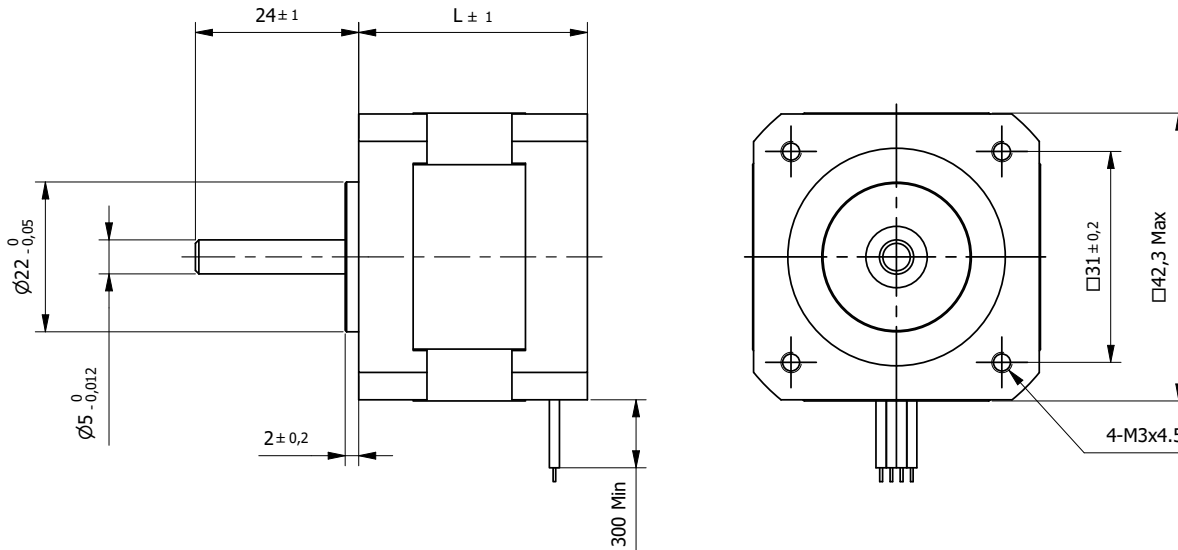
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 42SH60

High Torque

□ 42mm

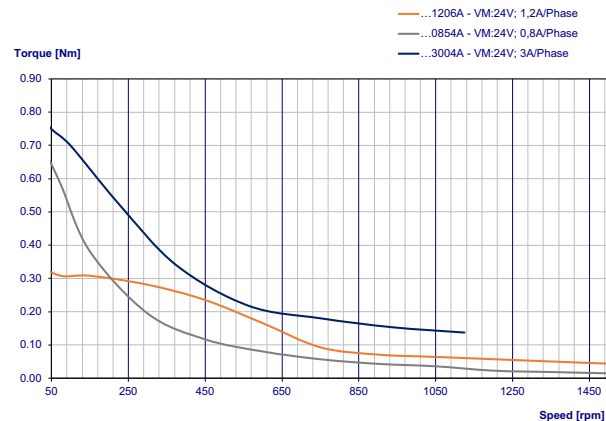


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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

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

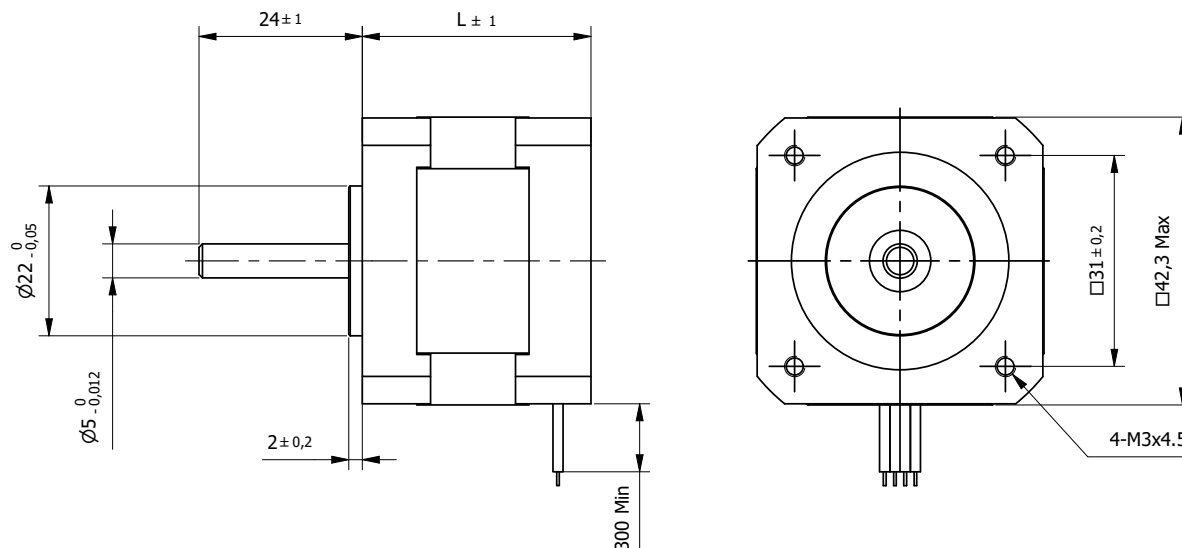
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 42SH33M

□ 42mm

High Torque - step angle 0,9°

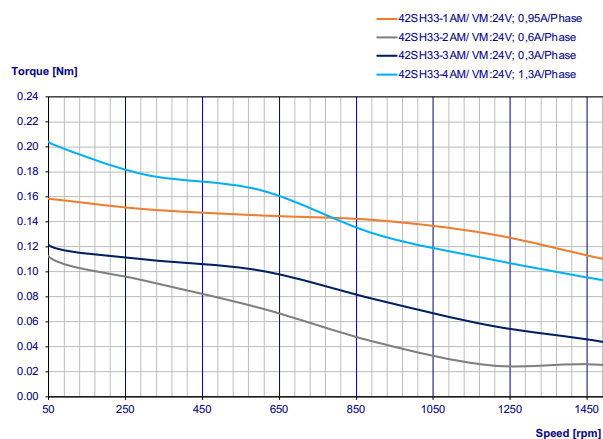


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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

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

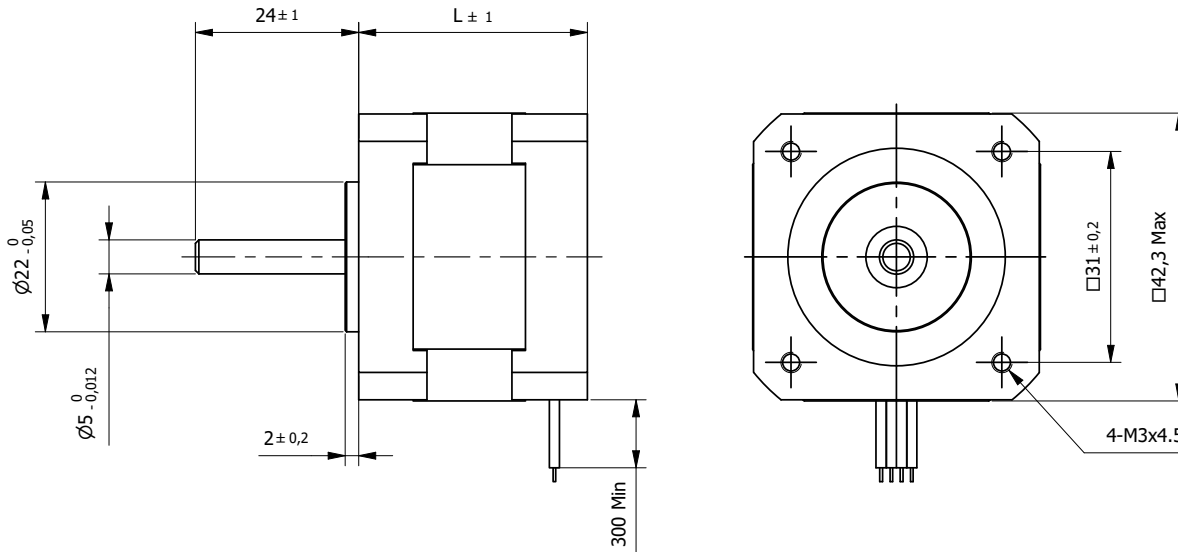
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 42SH38M

High Torque - step angle 0,9°

□ 42mm

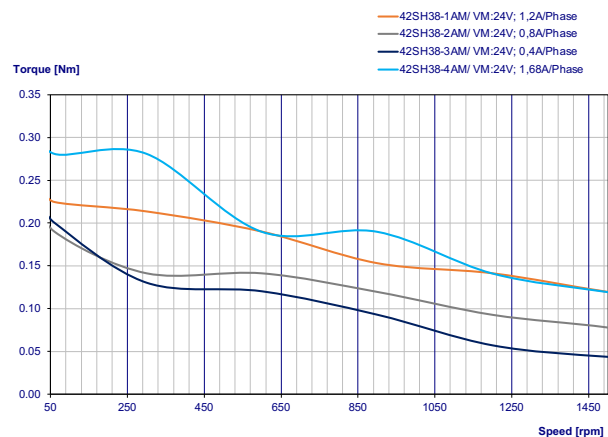


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

| 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 | gcm ² | 54 | 54 | 54 | 54 |
| 7 | Detent Torque | Nm | 0,022 | 0,022 | 0,022 | 0,022 |
| 8 | n° of Leads | | 6 | 6 | 6 | 4 |
| 9 | Length (L) | mm | 39,5 | 39,5 | 39,5 | 39,5 |
| 10 | Weight | Kg | 0,28 | 0,28 | 0,28 | 0,28 |

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

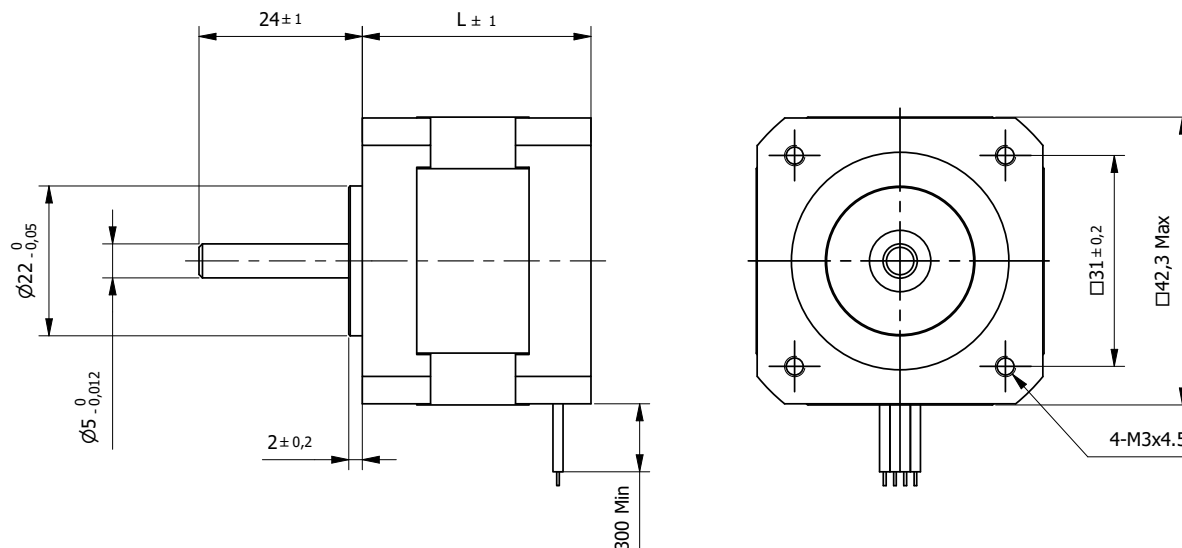
| Connection | | | |
|-----------------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 |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



Hybrid Stepper Motor 42SH47M

□ 42mm

High Torque - step angle 0,9°

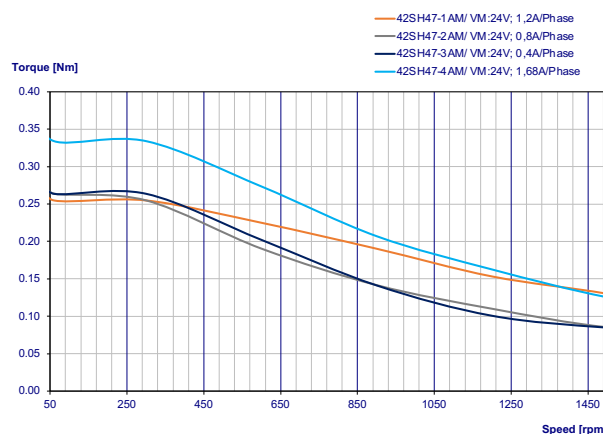


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

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

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

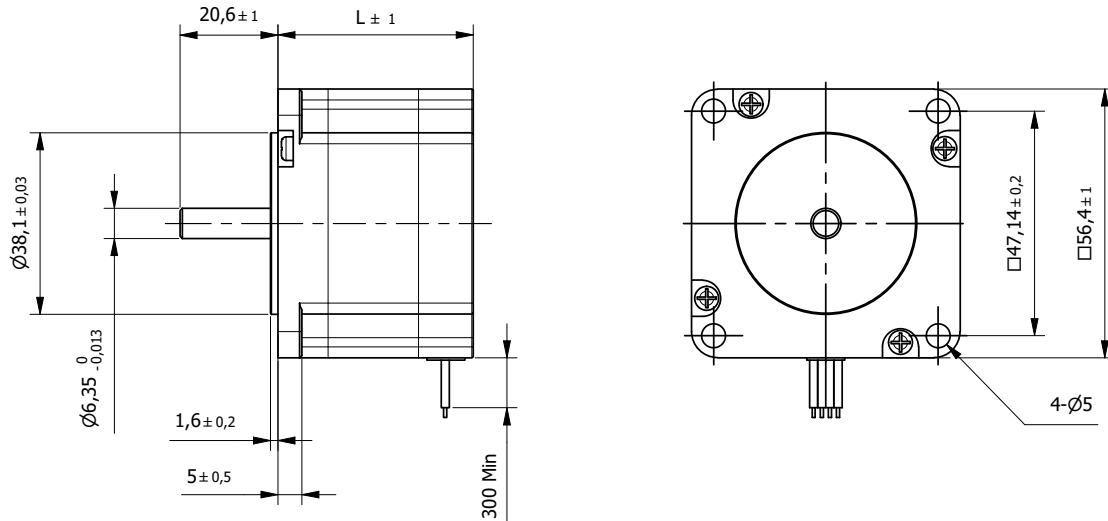
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 57SH41

High Torque

□ 57mm

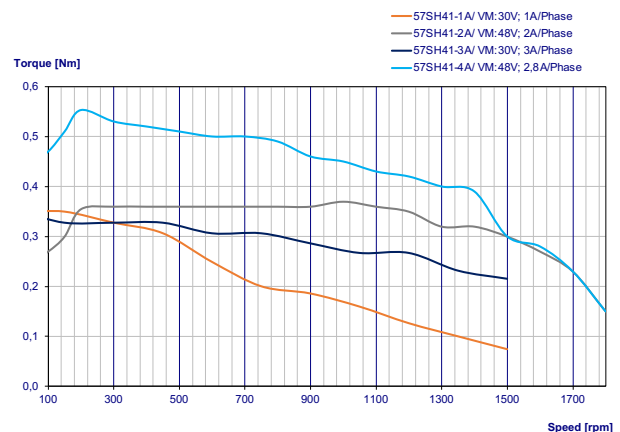


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

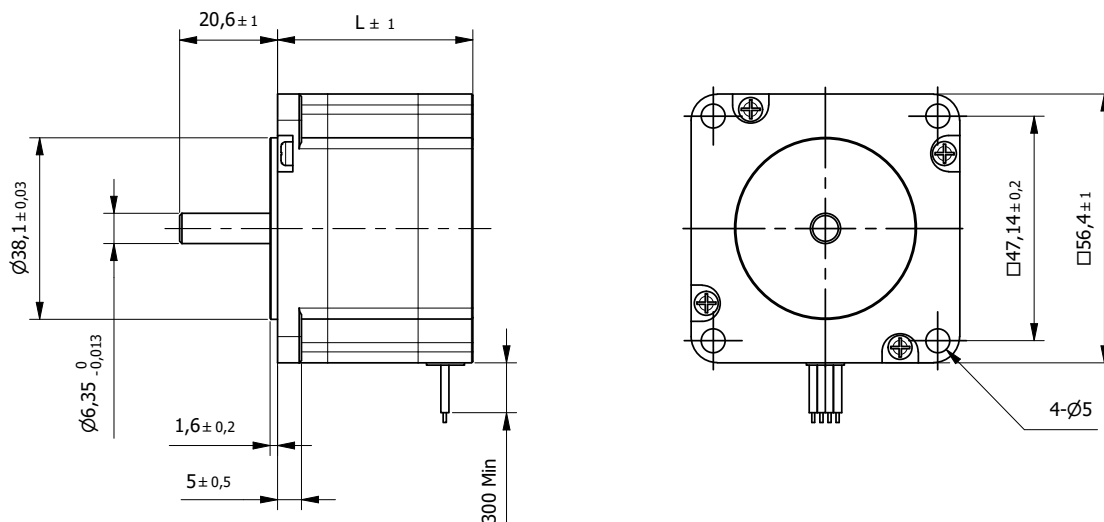
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 57SH51

High Torque

□ 57mm

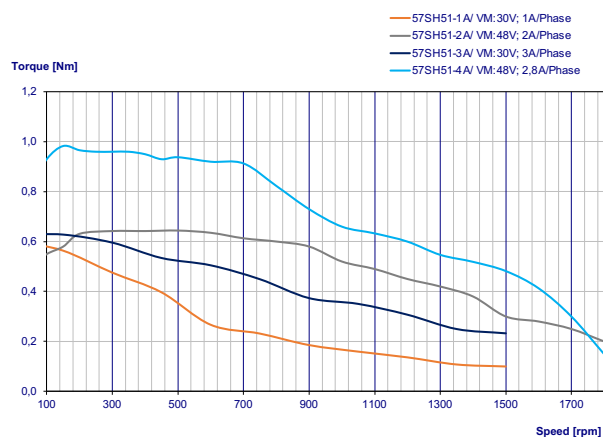


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

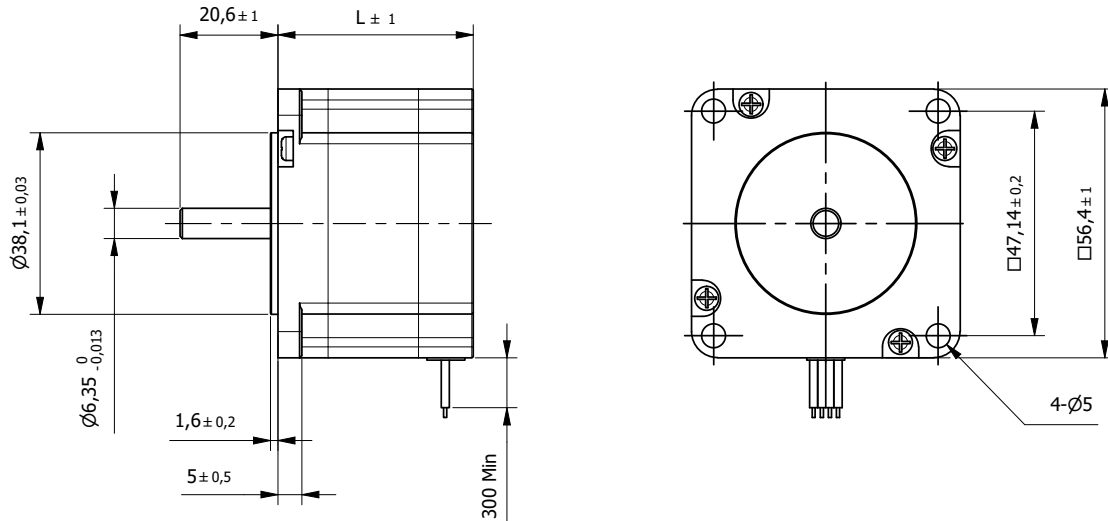
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 57SH56

High Torque

□ 57mm

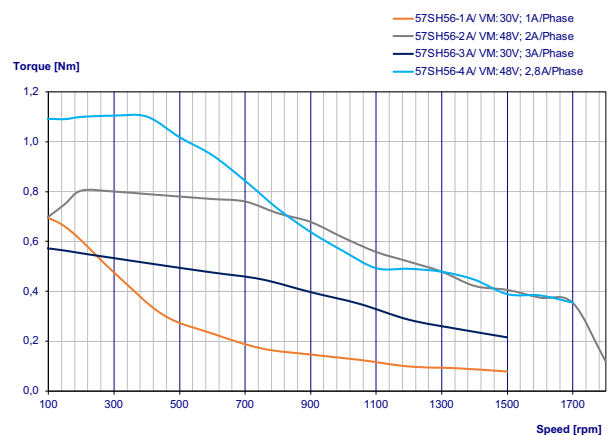


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

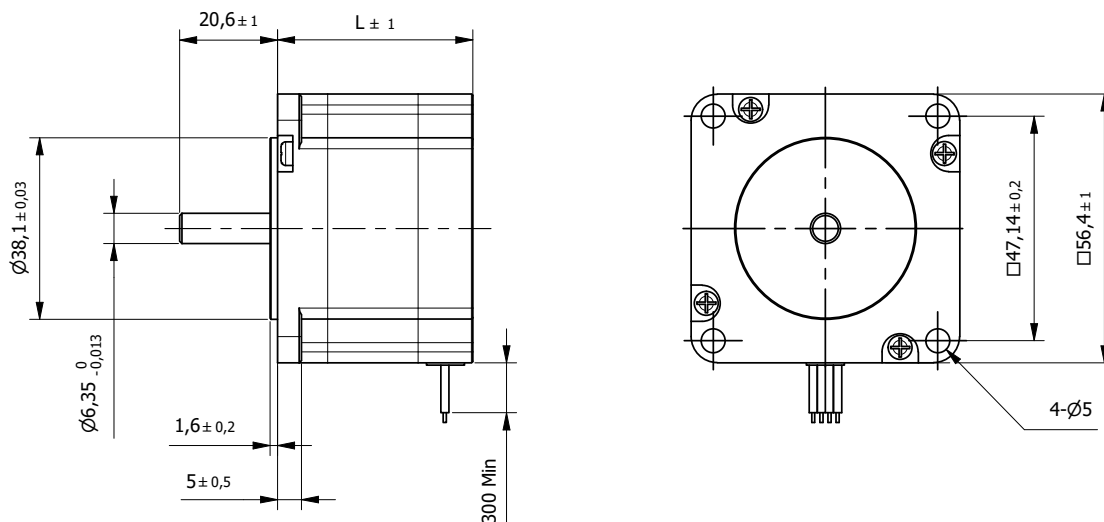
| Connection | | | |
|-----------------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 |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



Hybrid Stepper Motor 57SH76

High Torque

□ 57mm

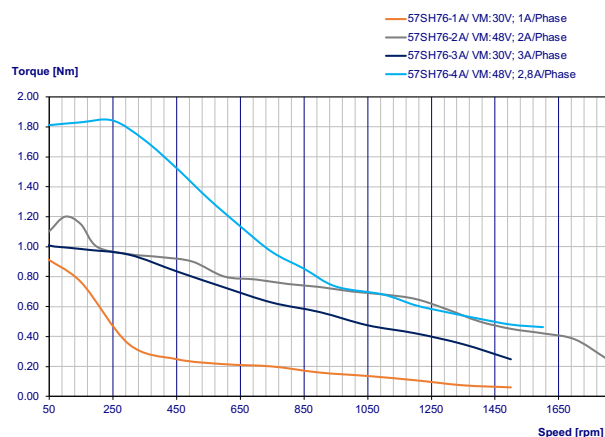


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

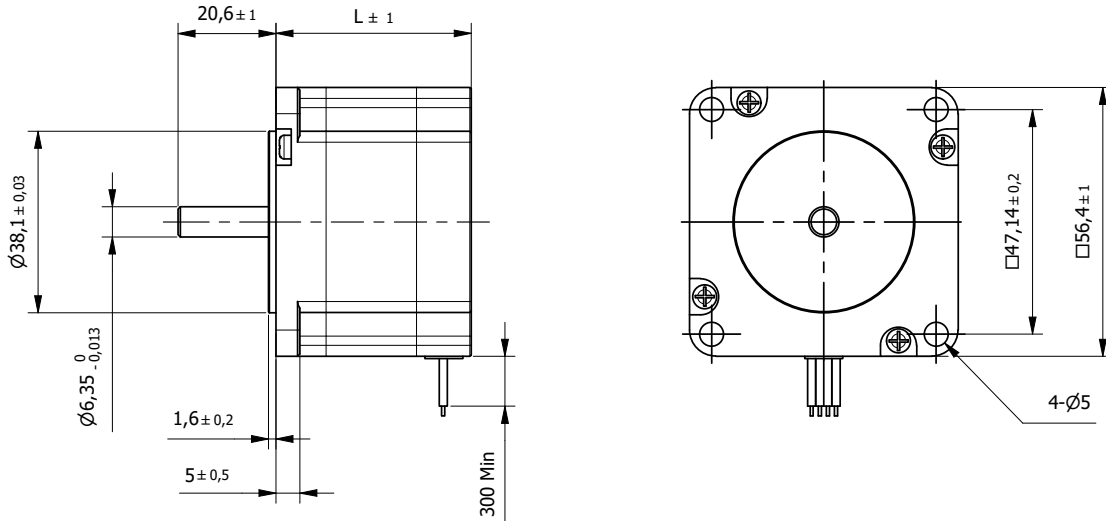
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 57SH41M

High Torque - step angle 0,9°

□ 57mm

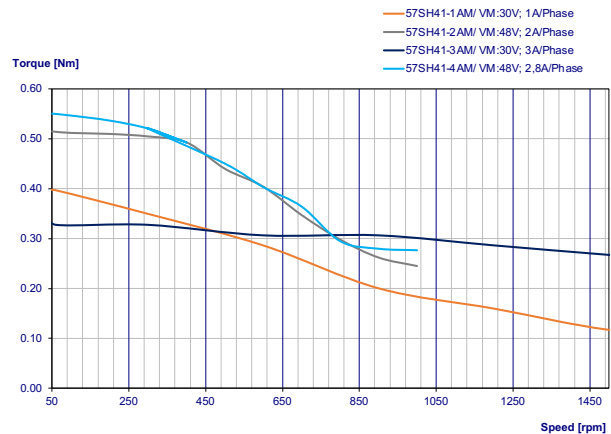


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| 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 | gcm ² | 120 | 120 | 120 | 120 |
| 7 | Detent Torque | Nm | 0,021 | 0,021 | 0,021 | 0,021 |
| 8 | n° of Leads | | 6 | 6 | 6 | 4 |
| 9 | Length (L) | mm | 41 | 41 | 41 | 41 |
| 10 | Weight | Kg | 0,45 | 0,45 | 0,45 | 0,45 |

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

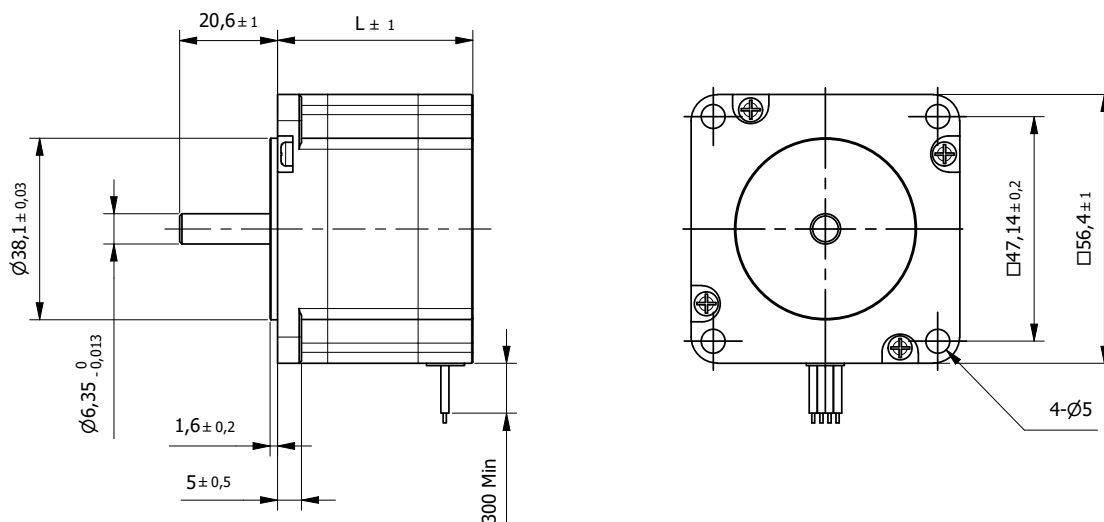
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 57SH56M

□ 57mm

High Torque - step angle 0,9°

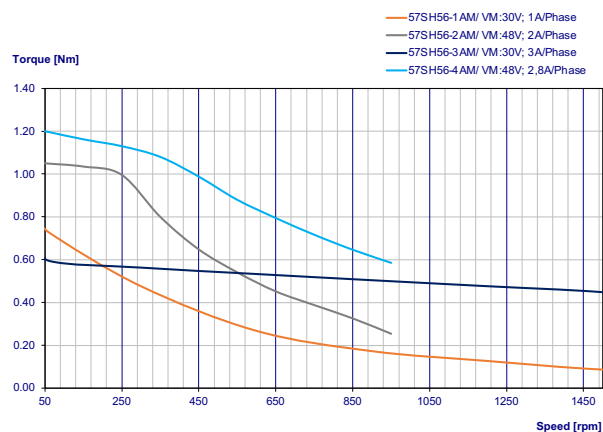


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

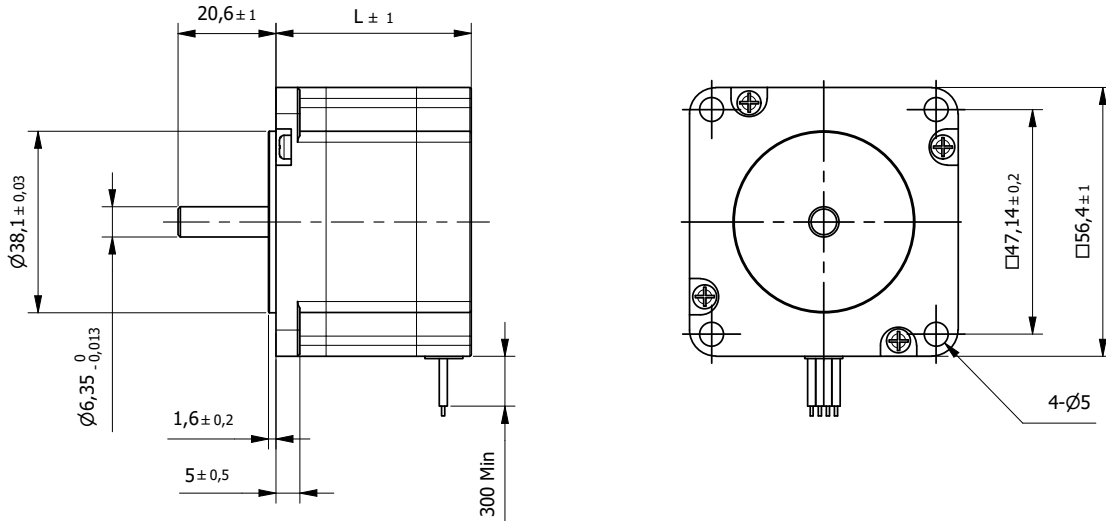
| Connection | | | |
|----------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 | White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



Hybrid Stepper Motor 57SH76M

High Torque - step angle 0,9°

□ 57mm

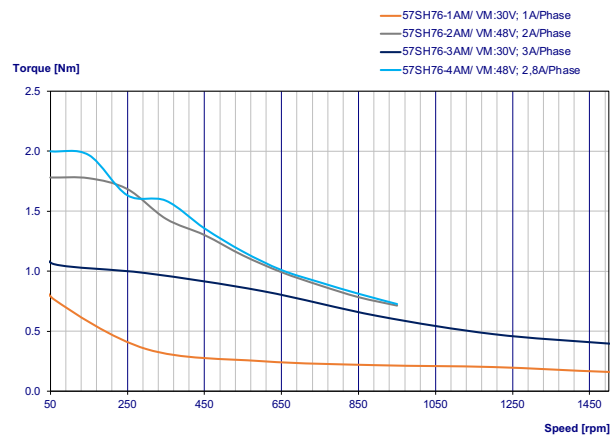


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

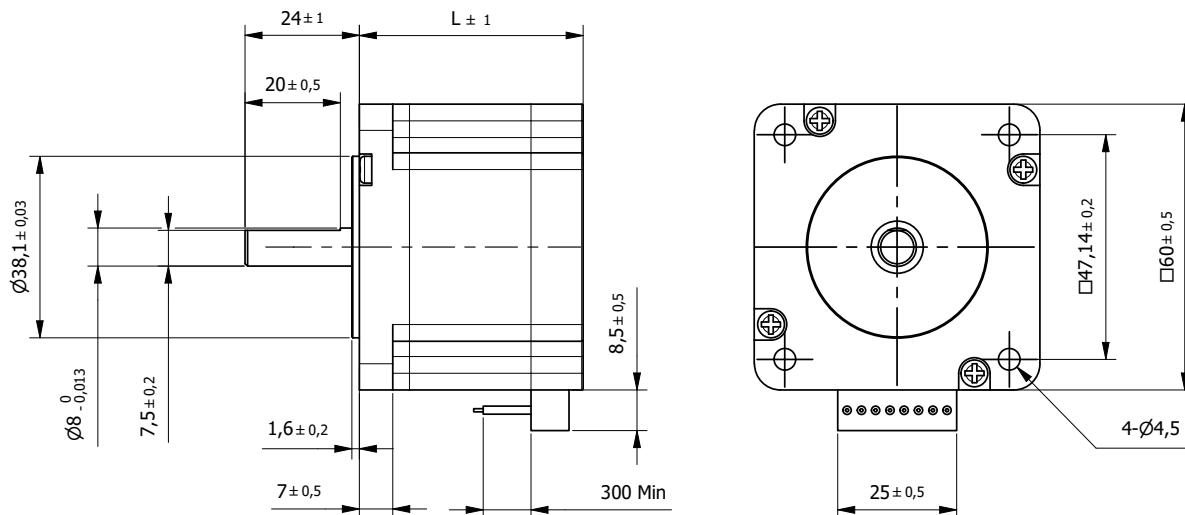
| Connection | | | |
|-----------------------|--------|--------------|-------------|
| Lead n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Green | | Phase A- |
| 3 | Red | | Phase B |
| 4 | Blue | | Phase B- |
| Unipolar motor | | | |
| 5 | Yellow | | COM Phase A |
| 6 |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



Hybrid Stepper Motor 60SH45

□ 60mm

High Torque

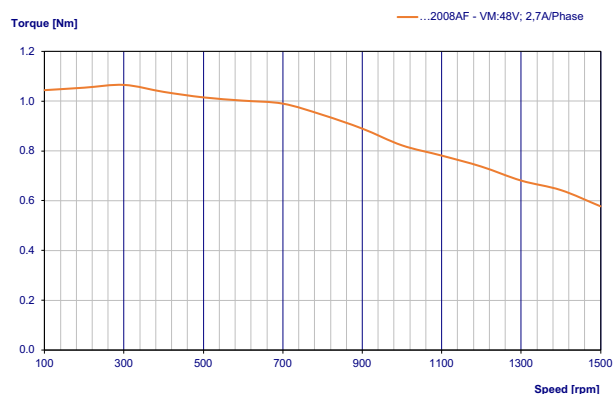


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

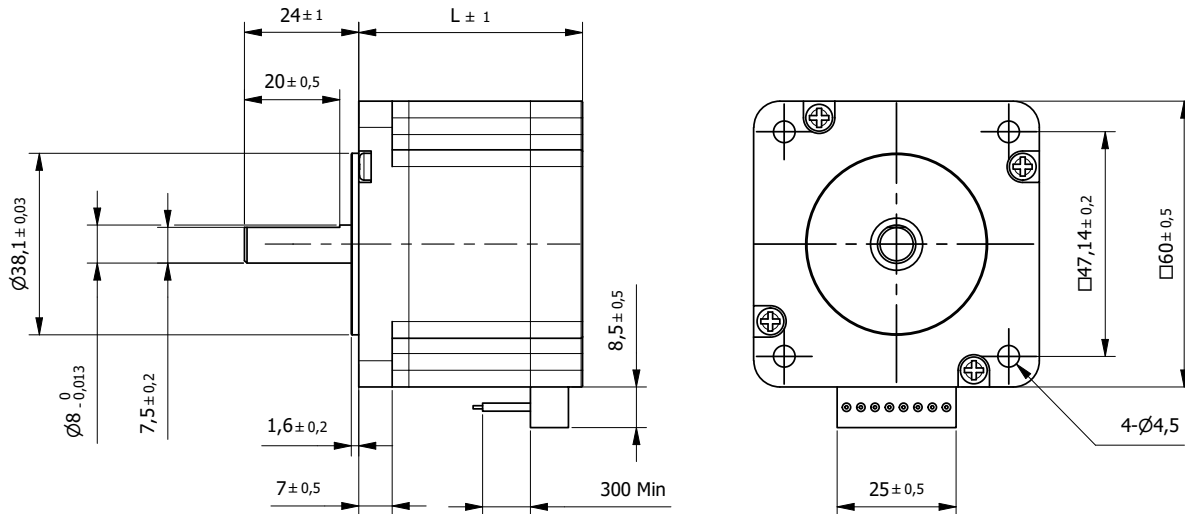
| Connection | | | |
|------------|-------------|--------------|-----------|
| Lead n° | Color | Gauge | Function |
| 1 | Blue/White | UL1430 AWG22 | Phase A |
| 2 | Blue | | Phase A- |
| 3 | Red/White | | Phase C- |
| 4 | Red | | Phase C |
| 5 | Green/White | | Phase B |
| 6 | Green | | Phase B- |
|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



Hybrid Stepper Motor 60SH56

High Torque

□ 60mm

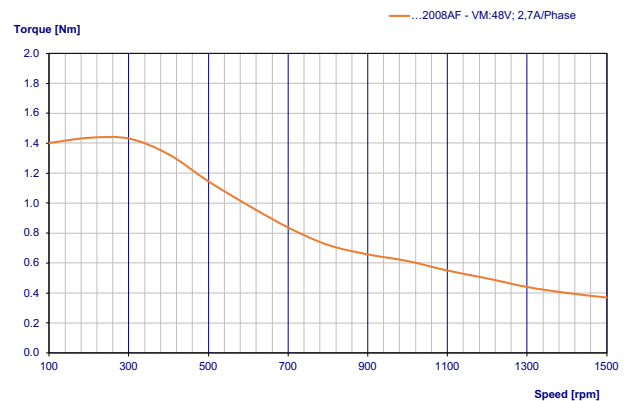


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

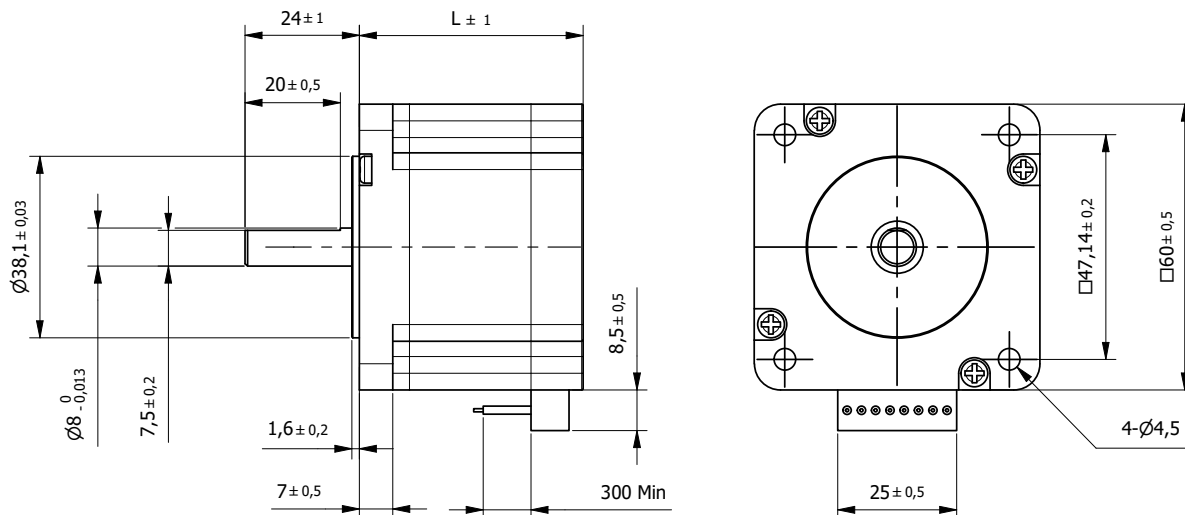
| Connection | | | |
|------------|-------------|--------------|-----------|
| Lead n° | Color | Gauge | Function |
| 1 | Blue/White | UL1430 AWG22 | Phase A |
| 2 | Blue | | Phase A- |
| 3 | Red/White | | Phase C- |
| 4 | Red | | Phase C |
| 5 | Green/White | | Phase B |
| 6 | Green | | Phase B- |
|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



Hybrid Stepper Motor 60SH65

□ 60mm

High Torque

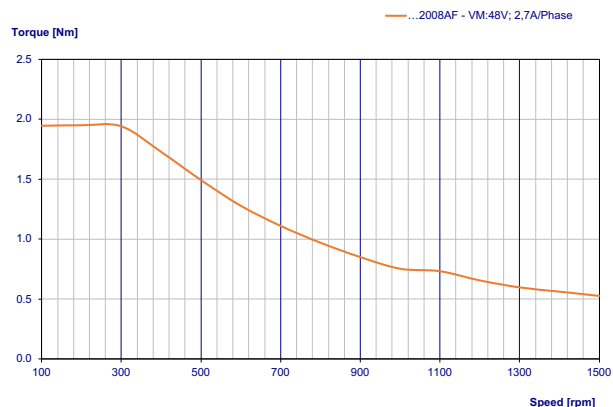


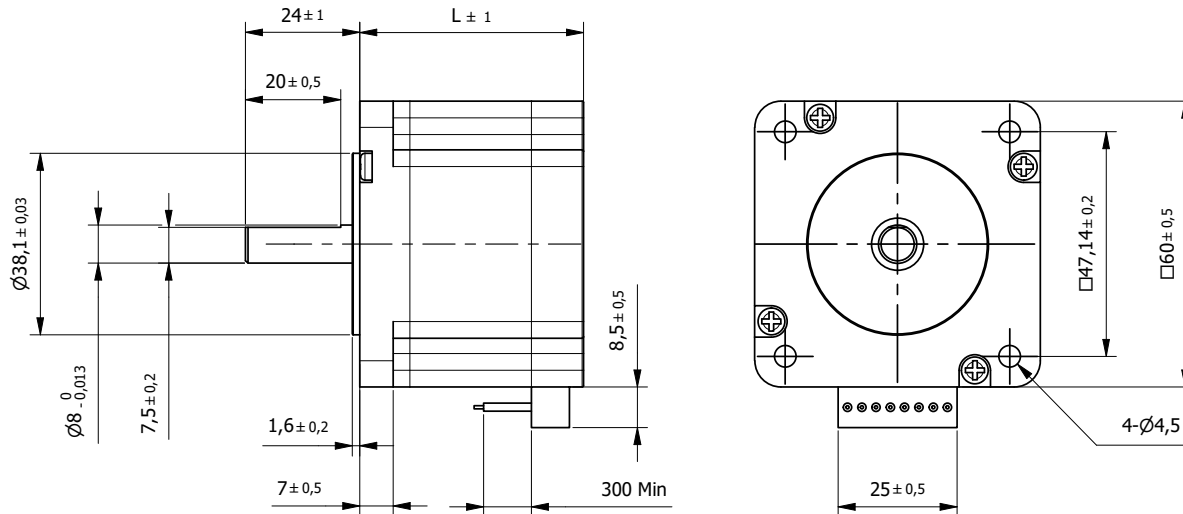
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| Specification | | 60SH65-2008AF | | | |
|---------------|------------------|------------------|----------|--------|------|
| Model | | Unipolar | Parallel | Series | |
| 1 | Rated Voltage | V | 4,8 | 3,36 | 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 |



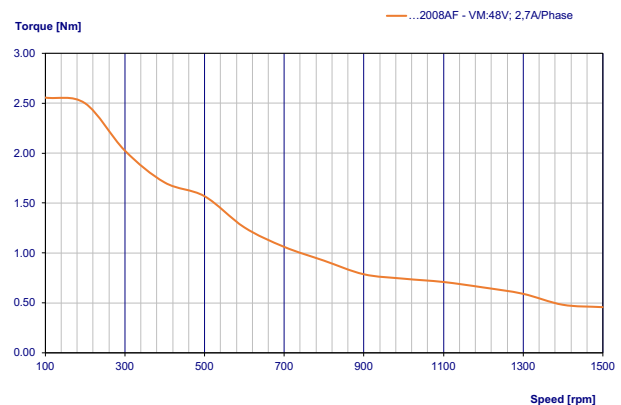


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

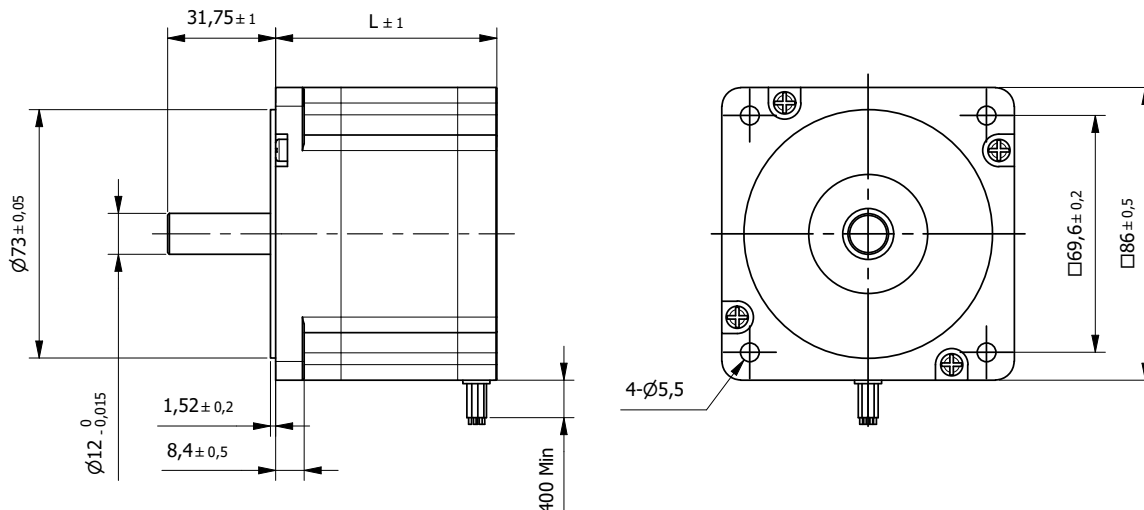
| Connection | | | |
|------------|-------------|--------------|-----------|
| Lead n° | Color | Gauge | Function |
| 1 | Blue/White | UL1430 AWG22 | Phase A |
| 2 | Blue | | Phase A- |
| 3 | Red/White | | Phase C- |
| 4 | Red | | Phase C |
| 5 | Green/White | | Phase B |
| 6 | Green | | Phase B- |
|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



Hybrid Stepper Motor 86SH65

□ 86mm

High Torque

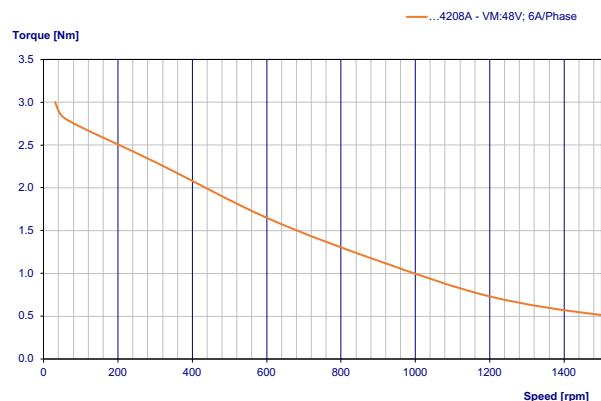


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

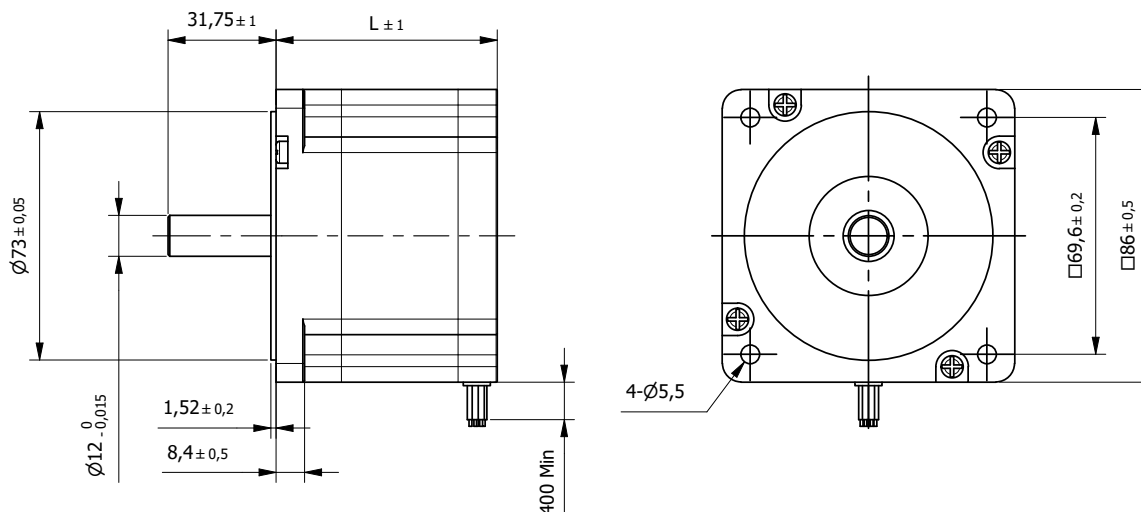
| Connection | | | |
|------------|--------|--------------|-----------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG20 | Phase A |
| 2 | Yellow | | Phase A- |
| 3 | Blue | | Phase C- |
| 4 | Black | | Phase C |
| 5 | White | | Phase B |
| 6 | Orange | | Phase B- |
| 7 | Brown | | Phase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



Hybrid Stepper Motor 86SH80

High Torque

□ 86mm

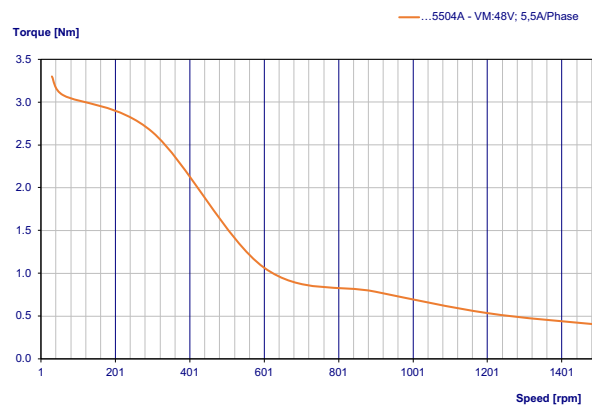


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

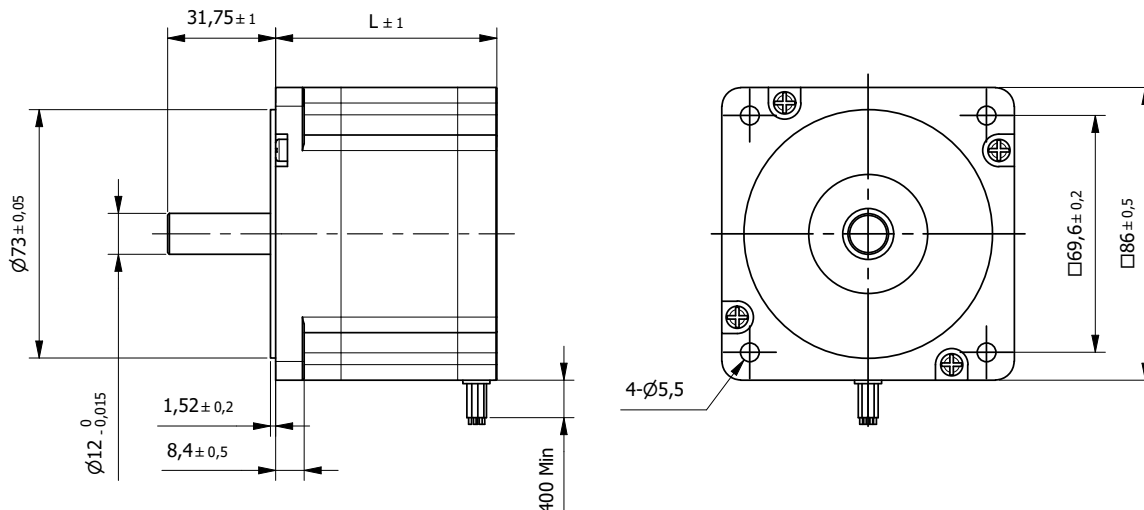
| Connection | | | |
|------------|--------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG20 | Phase A |
| 2 | White | | Phase A- |
| 3 | Yellow | | Phase B |
| 4 | Green | | Phase B- |



Hybrid Stepper Motor 86SH96

□ 86mm

High Torque

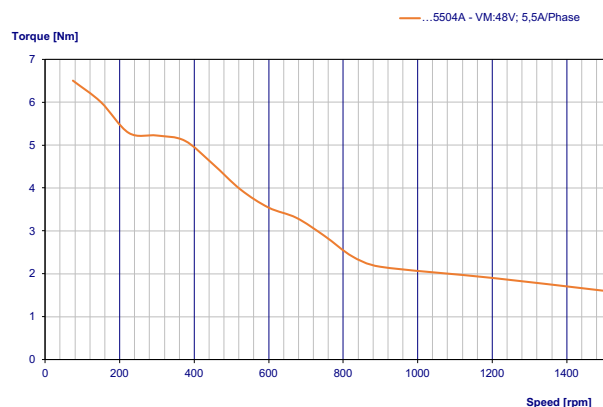


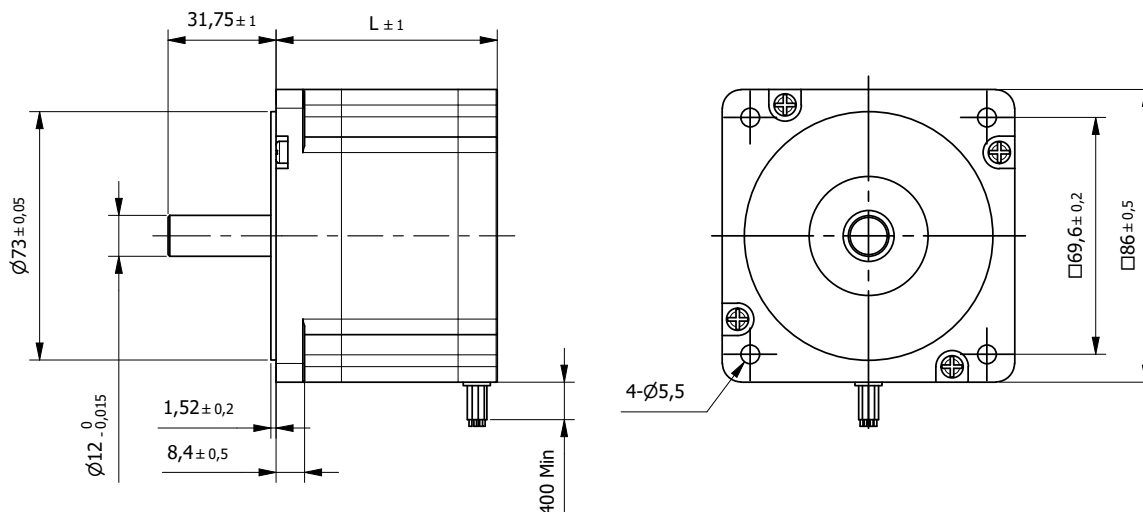
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

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



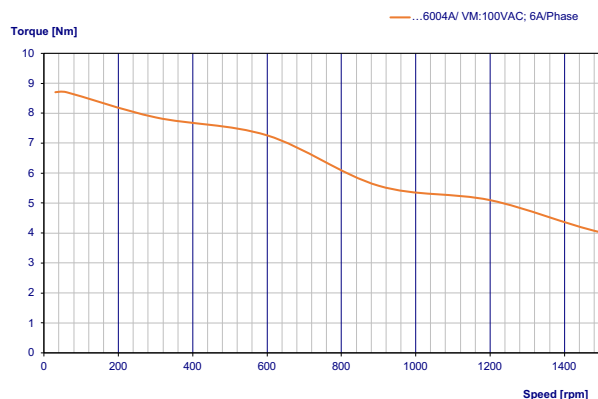


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

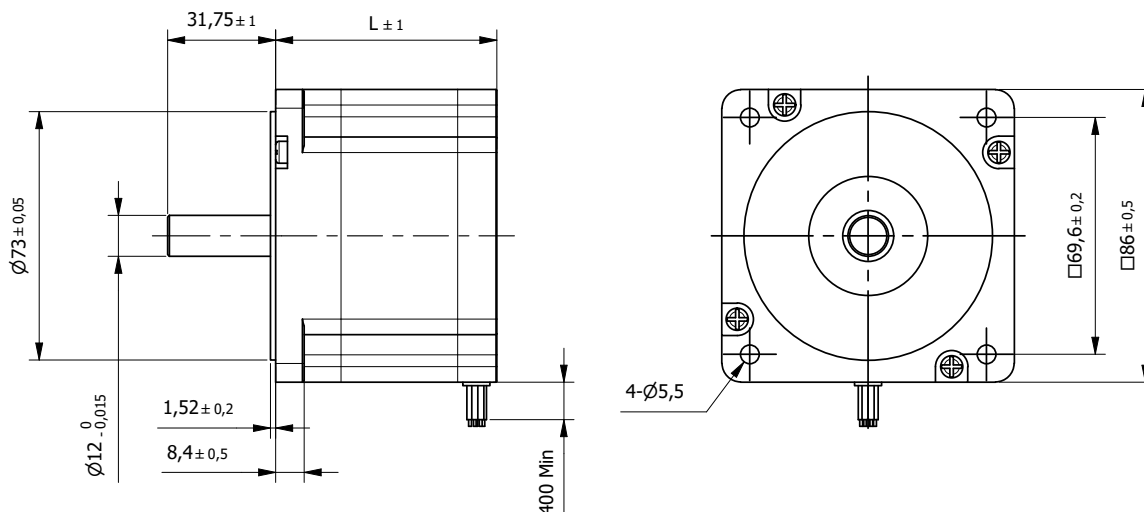
| Connection | | | |
|------------|--------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG20 | Phase A |
| 2 | White | | Phase A- |
| 3 | Yellow | | Phase B |
| 4 | Green | | Phase B- |



Hybrid Stepper Motor 86SH156

□ 86mm

High Torque

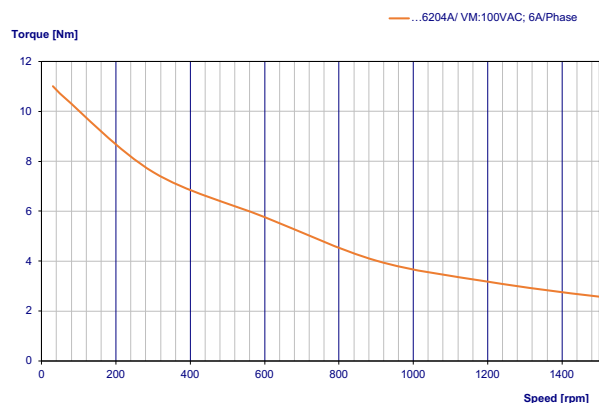


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

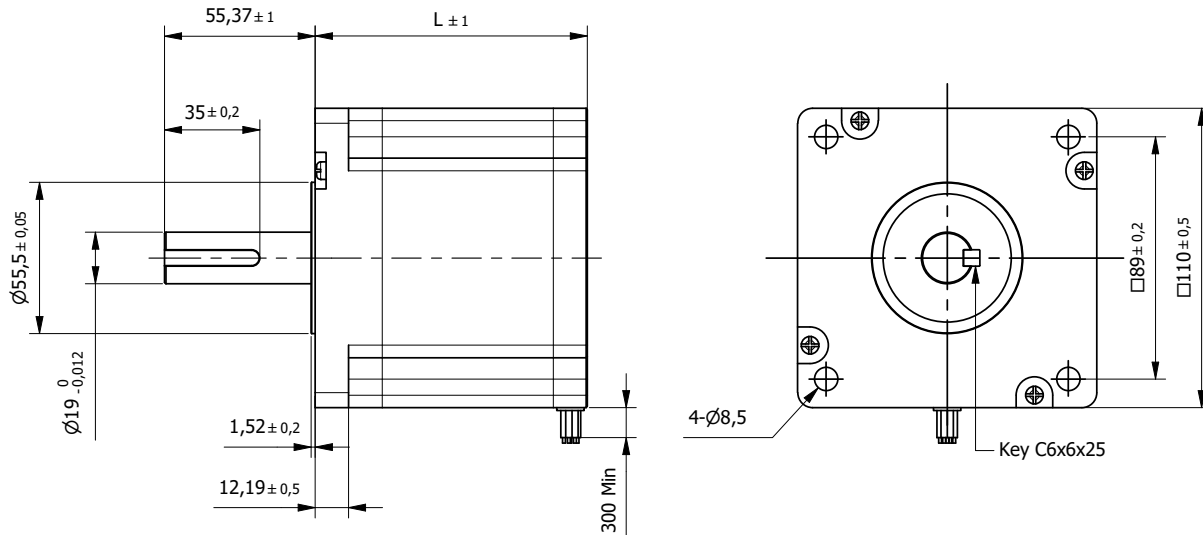
| Connection | | | |
|------------|--------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1430 AWG20 | Phase A |
| 2 | White | | Phase A- |
| 3 | Yellow | | Phase B |
| 4 | Green | | Phase B- |



Hybrid Stepper Motor 110SH

High Torque

□ 110mm

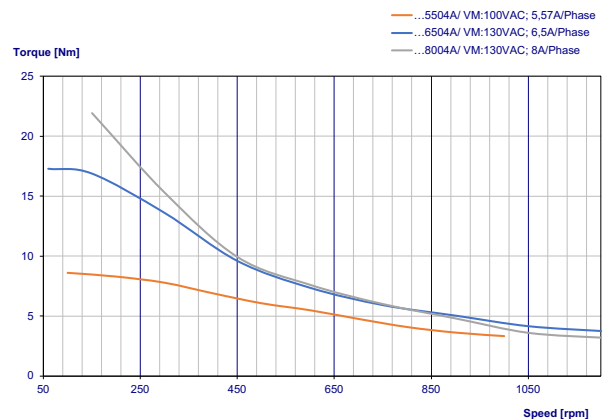


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

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





Hybrid Stepper motors

STC series - Integrated Connector

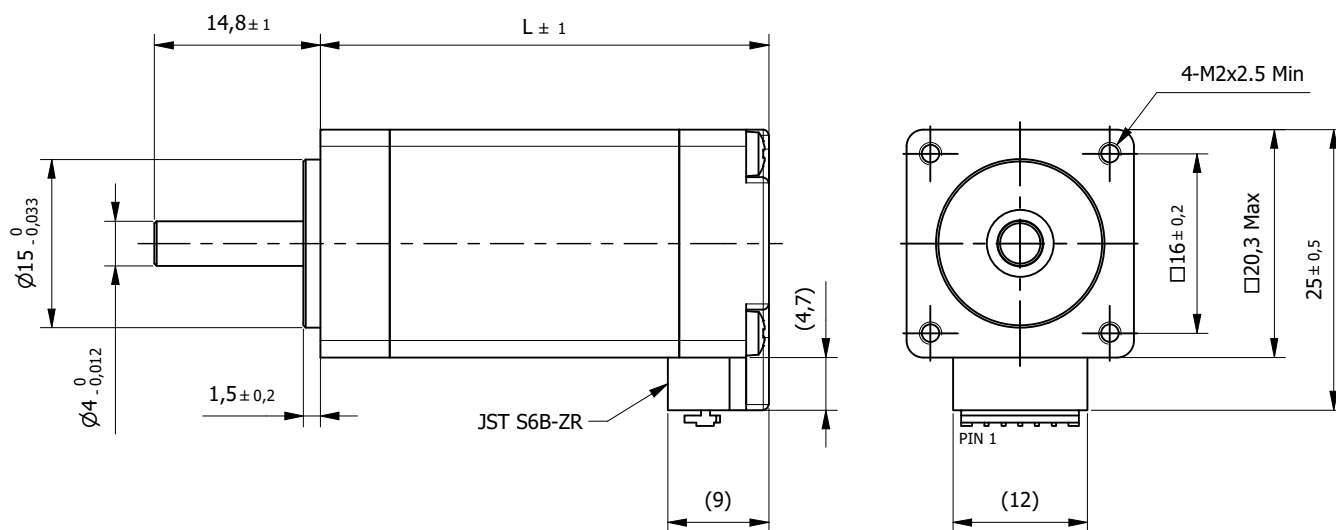
| Hybrid Stepper motors - STC Connector series | Torque* (Nm) | |
|--|---------------|-----|
| 20STC | 0,022...0,036 | 290 |
| 28STC32 | 0,08 | 291 |
| 28STC40 | 0,13 | 292 |
| 28STC51 | 0,18 | 293 |
| 57STC41 | 0,6 | 294 |
| 57STC56 | 1,4 | 295 |
| 57STC76 | 2,3 | 296 |

* Holding Torque

Hybrid Stepper Motor 20STC

□ 20mm

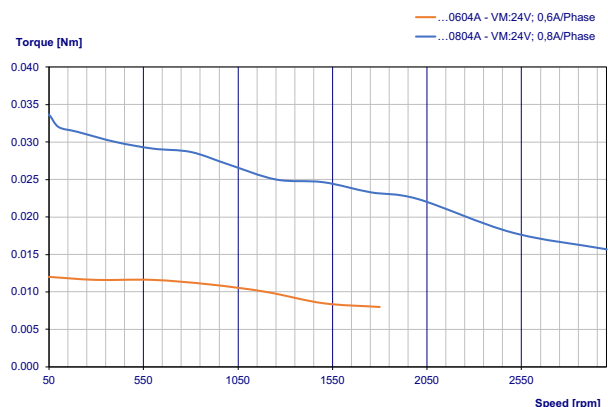
High Torque with Connector



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

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

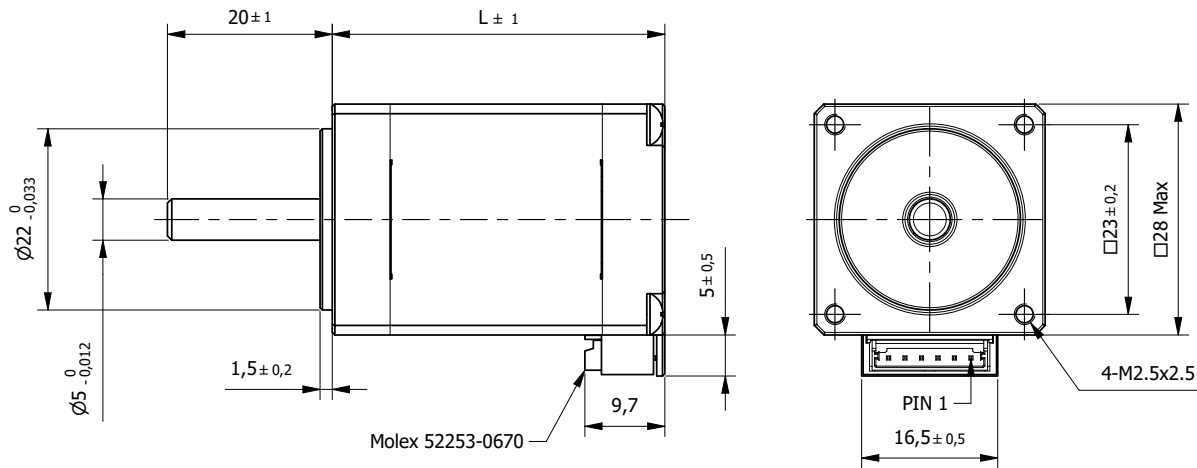
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1061 AWG26 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 28STC32

High Torque with Connector

□ 28mm

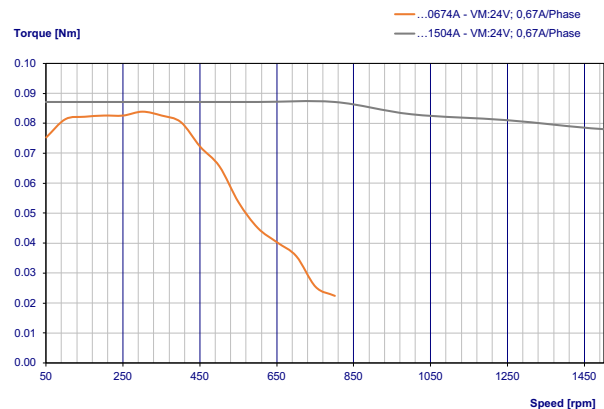


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

| 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 | gcm ² | 9 | 9 |
| 7 | Detent Torque | Nm | 0,005 | 0,005 |
| 8 | n° of Leads | | 4 | 4 |
| 9 | Length (L) | mm | 32 | 32 |
| 10 | Weight | Kg | 0,11 | 0,11 |

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

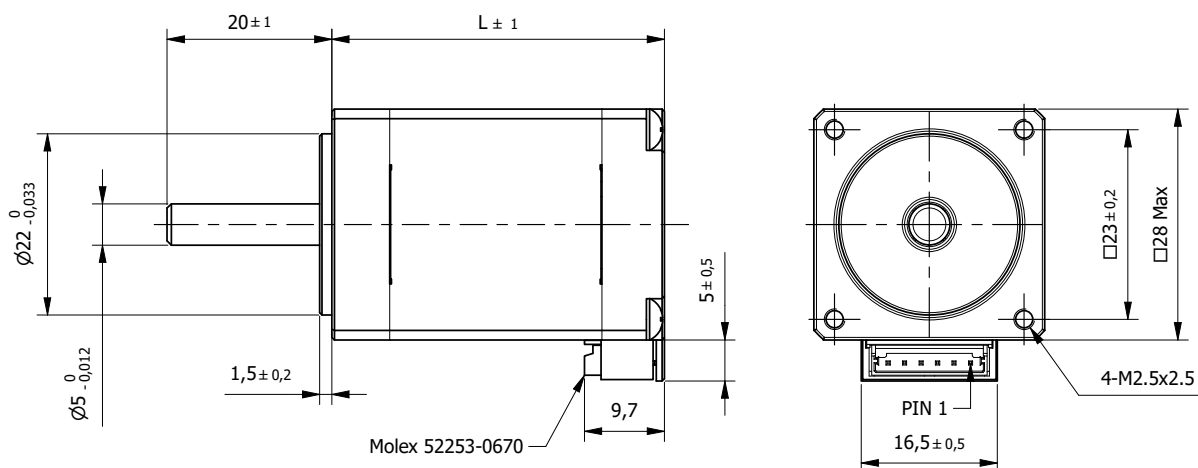
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 28STC40

□ 28mm

High Torque with Connector

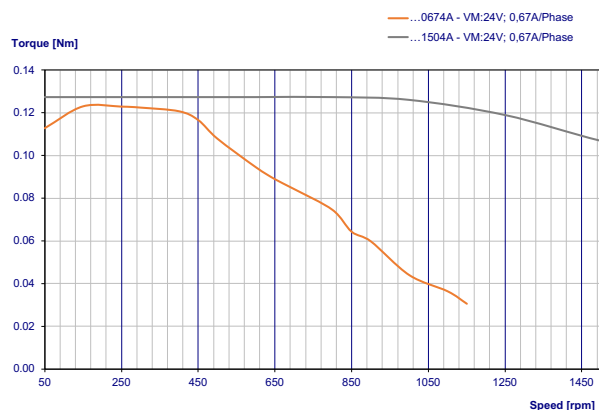


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

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

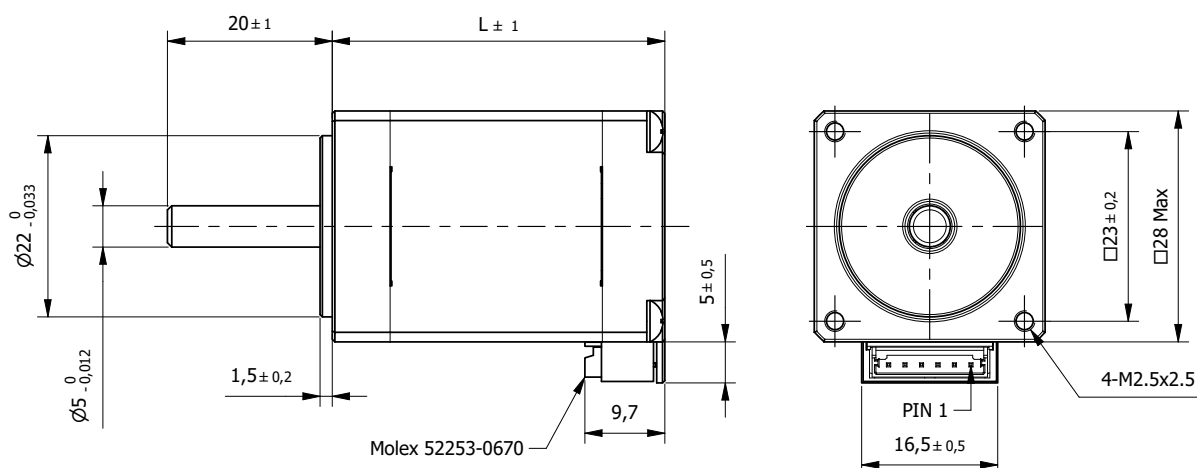
| Connection | | | | |
|------------|--------|--------------|-------------|--|
| Pin n° | Color | Gauge | Function | |
| 1 | Black | UL1430 AWG26 | Phase A | |
| 2 | Yellow | | COM Phase A | |
| 3 | Green | | Phase A- | |
| 4 | Red | | Phase B | |
| 5 | White | | COM Phase B | |
| 6 | Blue | | Phase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



Hybrid Stepper Motor 28STC51

High Torque with Connector

□ 28mm

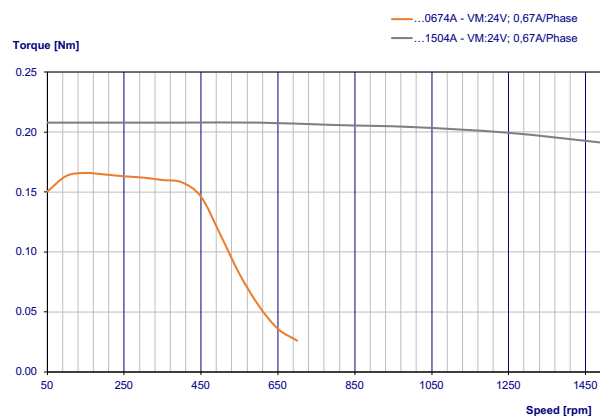


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19,05mm

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

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

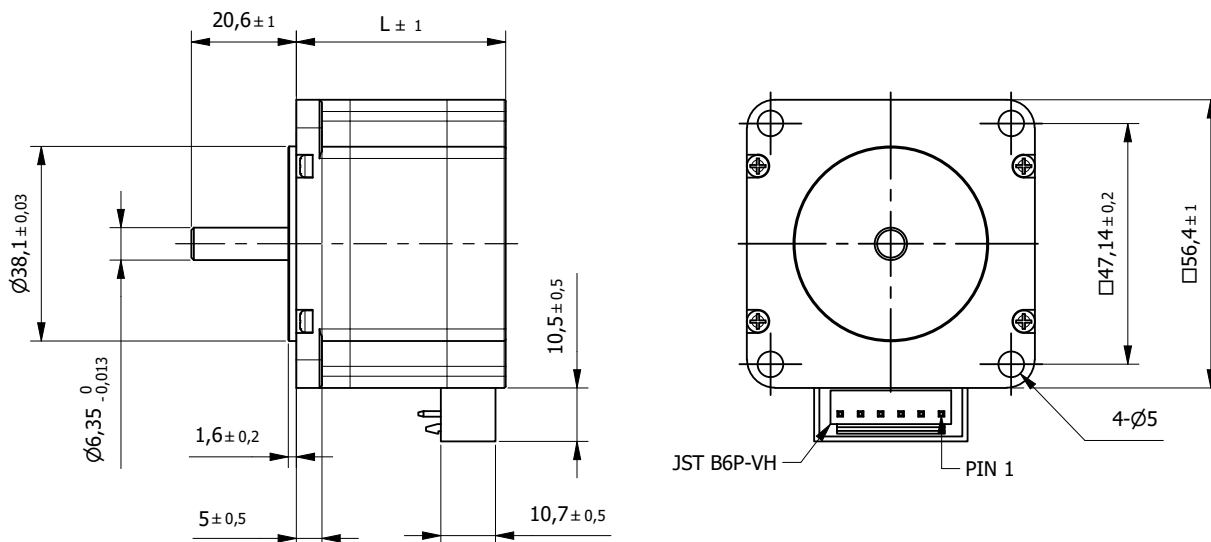
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 57STC41

□ 57mm

High Torque with Connector

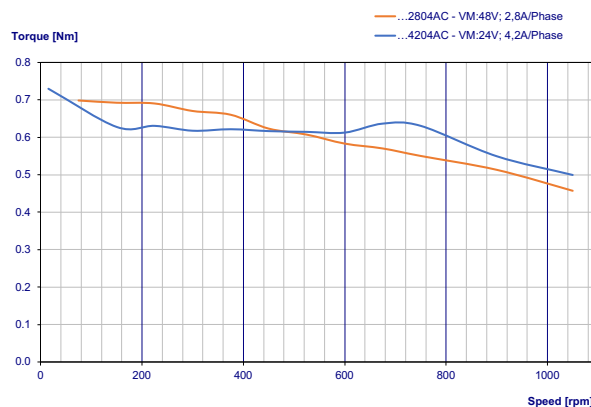


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

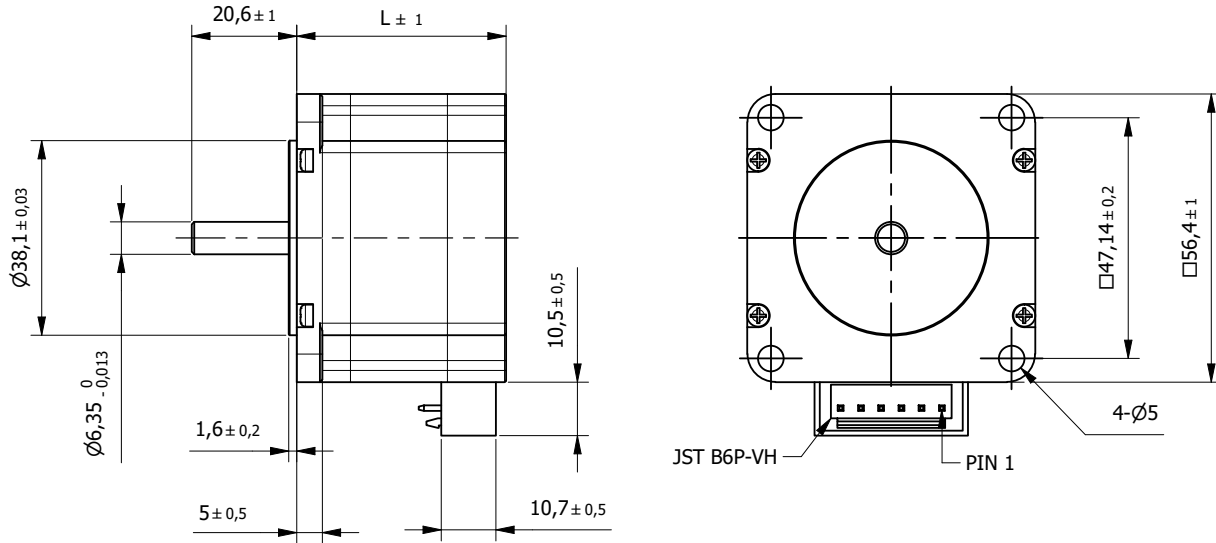
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 57STC56

□ 57mm

High Torque with Connector

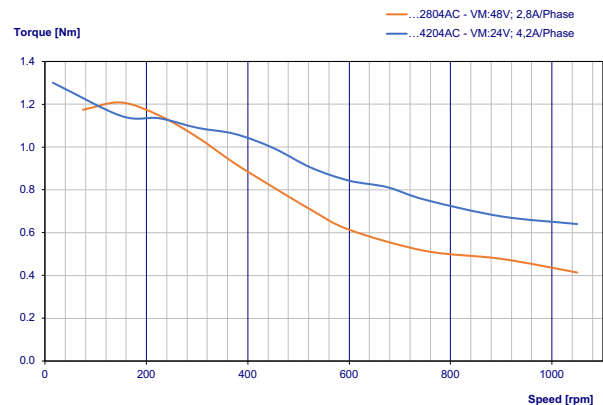


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

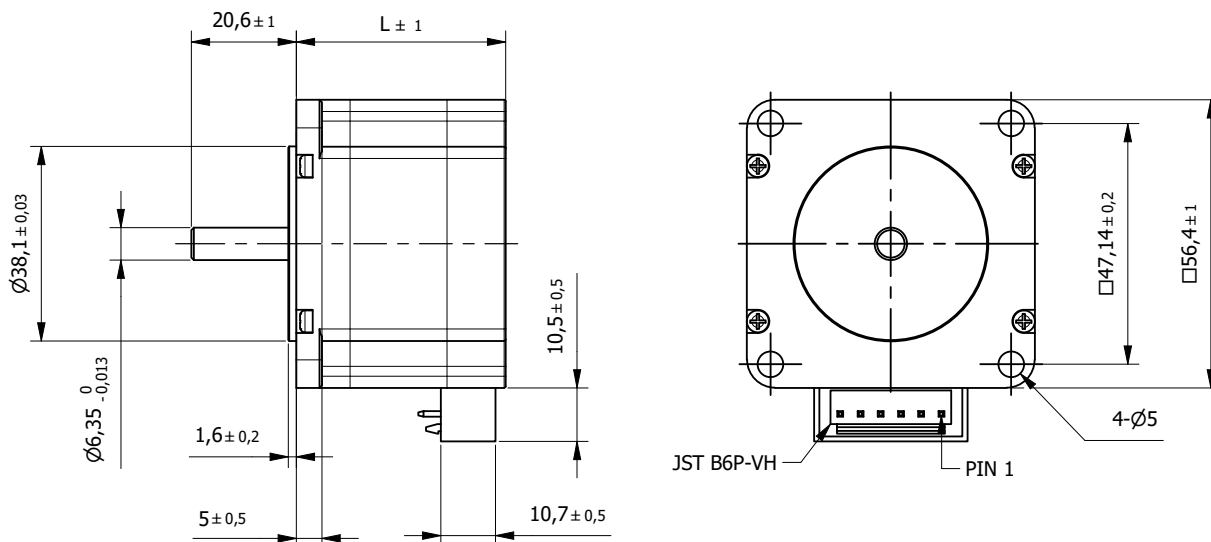
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 57STC76

□ 57mm

High Torque with Connector

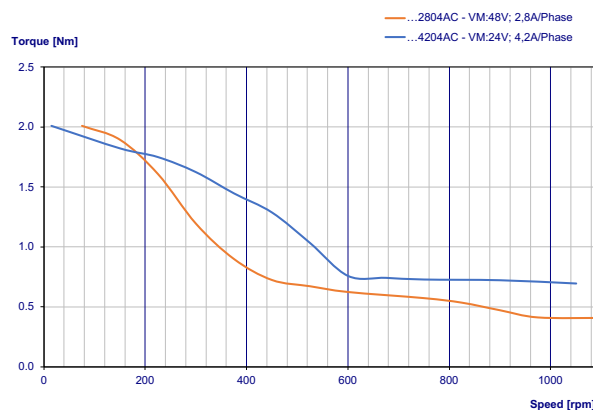


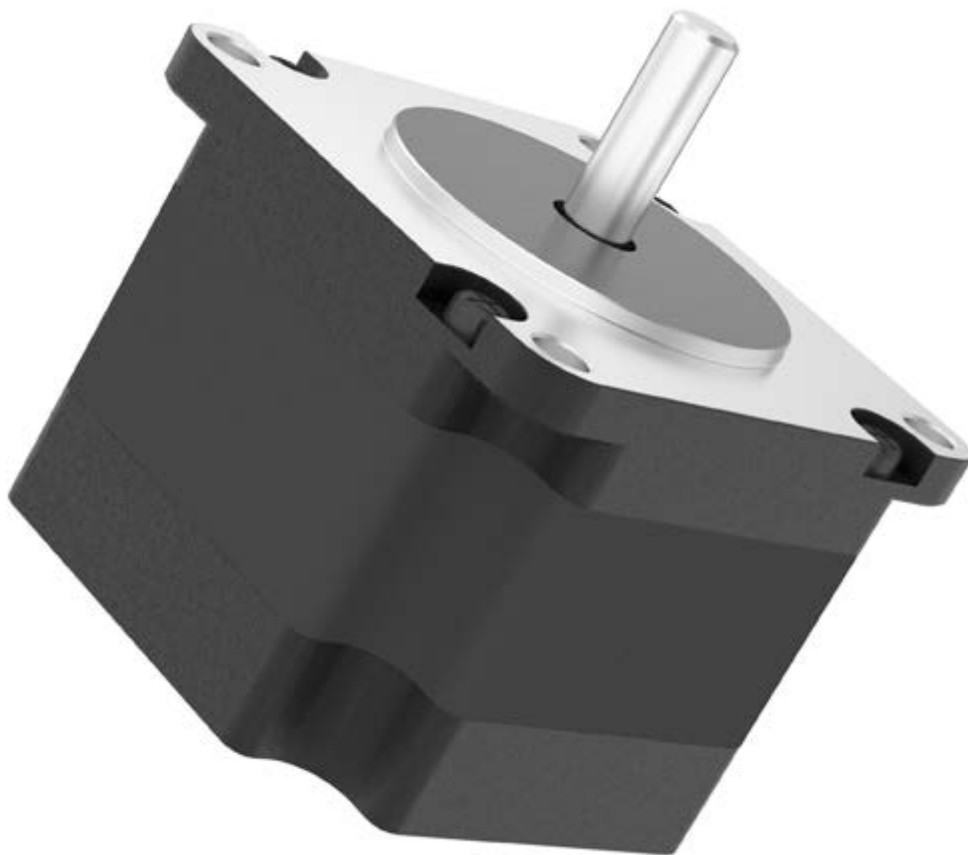
BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

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

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

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





Stepper motors
3-Phase Hybrid

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

| 3-Phase Hybrid Stepper motors | Torque* (Nm) | |
|-------------------------------|--------------|-----|
| 42 3P | 0,08...0,2 | 300 |
| 57 3P | 0,45...1,5 | 301 |
| 60 3P53 | 0,9 | 302 |

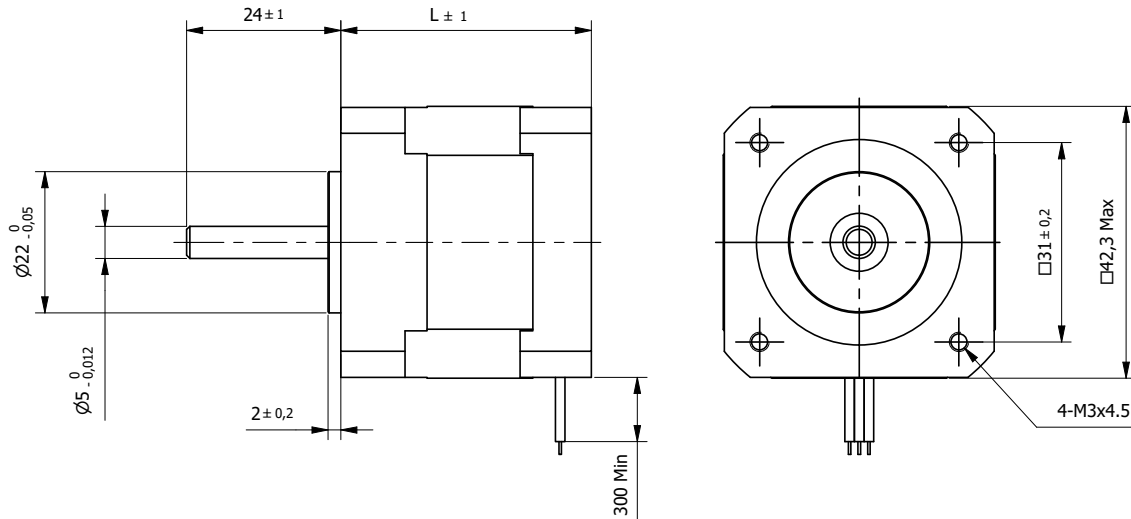
3-Phase technology in hybrid stepper motor is used mainly where ultra-low vibration and very low noise levels are required. The drive circuit of these motors is simplified because it is driven with a star wiring connection. The use of three phases inherently helps to reduce torque ripple and smooth motor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

* Holding Torque

Hybrid Stepper Motor 423P

□ 42mm

3-Phase

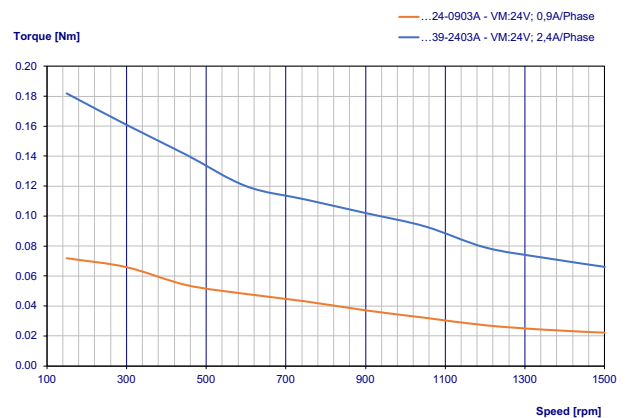


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 19.05mm

| Specification | | | ...24-0903A | ...39-2403A |
|---------------|------------------|------------------|-------------|-------------|
| Model | | | | |
| 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 |

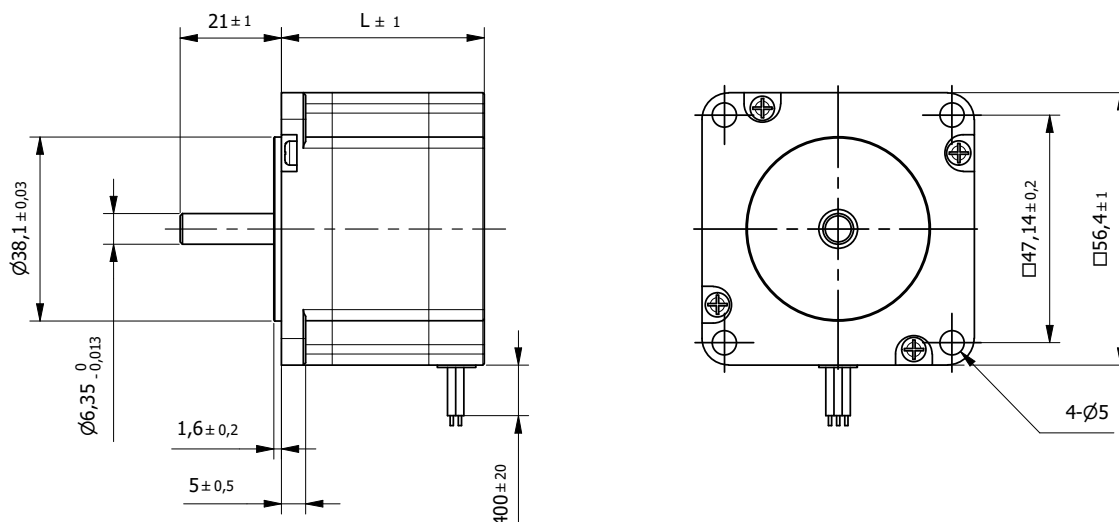
| Connection | | | |
|------------|--------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1061 AWG26 | Phase U |
| 2 | Yellow | | Phase V |
| 3 | Blue | | Phase W |



Hybrid Stepper Motor 573P

3-Phase

□ 57mm

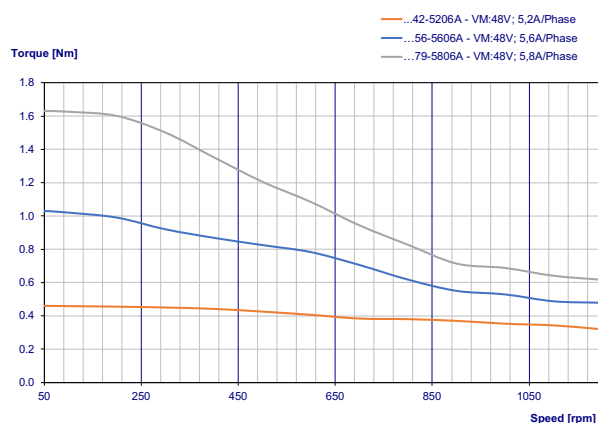


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| Specification | | ...42-5206A | ...56-5606A | ...79-5806A | |
|---------------|------------------|------------------|-------------|-------------|------|
| 1 | Rated Voltage | V | 6,76 | 4 | 6 |
| 2 | Current/Phase | A | 5,2 | 5,6 | 5,8 |
| 3 | Resistance/Phase | Ω | 1,3 | 0,7 | 1,05 |
| 4 | Inductance/Phase | mH | 1,4 | 1,7 | 2,4 |
| 5 | Holding Torque | Nm | 0,45 | 0,9 | 1,5 |
| 6 | Rotor Inertia | gcm ² | 110 | 300 | 480 |
| 7 | n° of Leads | | 6 | 6 | 6 |
| 8 | Length (L) | mm | 42 | 56 | 79 |
| 9 | Weight | Kg | 0,45 | 0,75 | 1,1 |

| Characteristics | |
|---|----------------|
| Item | |
| Step angle | 1,2° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| Max. Shaft Radial play (450g load) | 0,02mm |
| Max. Shaft Axial play (450g load) | 0,08mm |
| Max. Radial Force (20mm from front flange) | 28N |
| Max Axial Force | 10N |
| Dielectric Strength (for 1 sec.) | 900 VAC |
| Insulation Resistance (min. 500 VDC) | 100 Mohm |

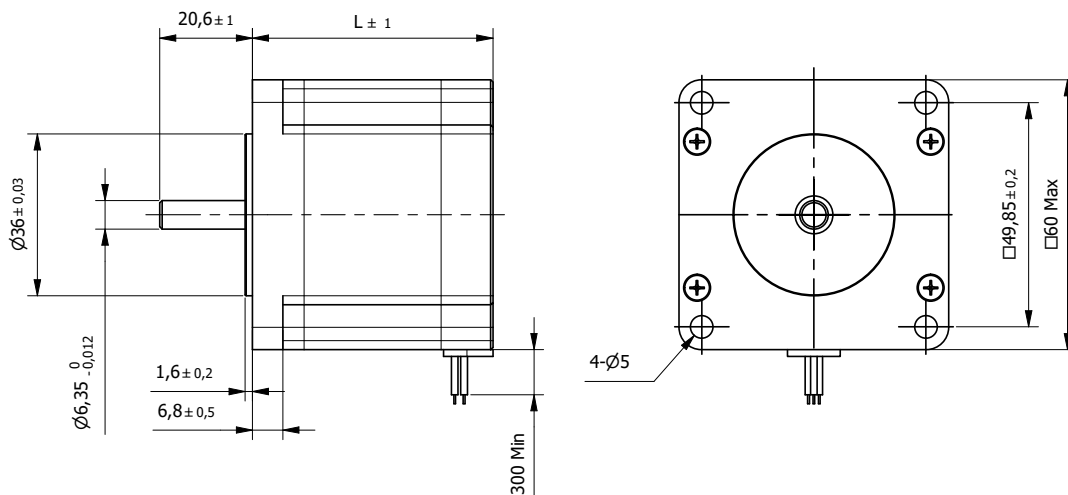
| Connection | | | |
|------------|--------|--------------|----------|
| Lead n° | Color | Gauge | Function |
| 1 | Red | UL1332 AWG18 | Phase U |
| 2 | Orange | | Phase U |
| 3 | White | | Phase V |
| 4 | Blue | | Phase V |
| 5 | Yellow | | Phase W |
| 6 | Green | | Phase W |



Hybrid Stepper Motor 603P53

□ 60mm

3-Phase

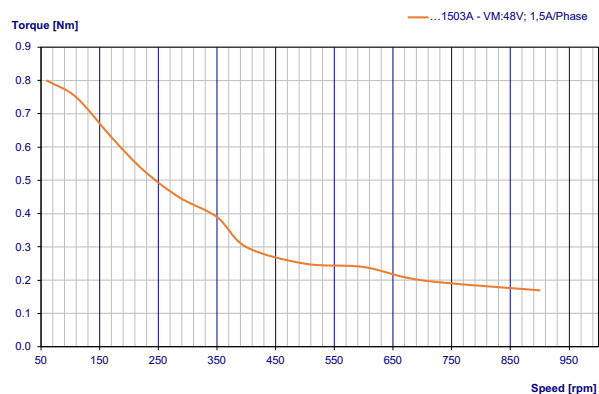


BE Version: Rear shaft length 13mm - 2x M2.5 on diameter 46mm

| Specification | | | |
|---------------|------------------|------------------|------|
| Model | ...1503A | | |
| 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.

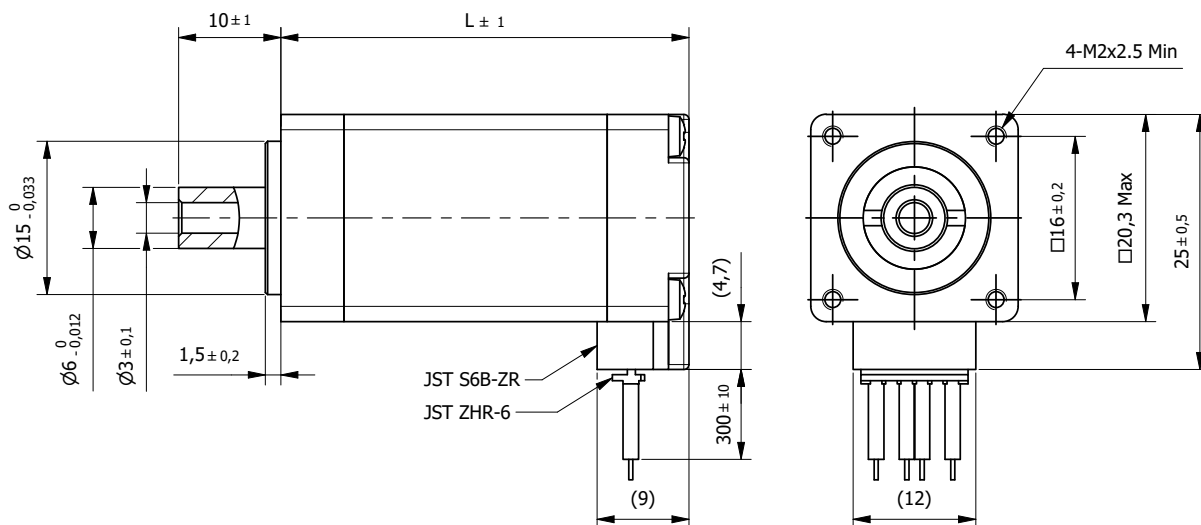
| Hollow Shaft Stepper motors | Torque* (Nm) | |
|-----------------------------|--------------|-----|
| 20STC40 H | 0,036 | 306 |
| 28STC51 H | 0,12 | 307 |
| 35STC38 H | 0,23 | 308 |
| 42STC47 H | 0,44 | 309 |
| 57STC76 H | 2,3 | 310 |
| 86SH118 H | 6 | 311 |

* Holding Torque

Hybrid Stepper Motor 20STC40-H

□ 20mm

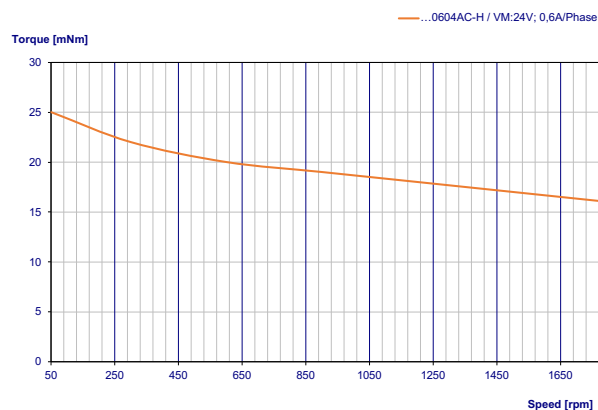
Hollow Shaft - High Torque



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

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

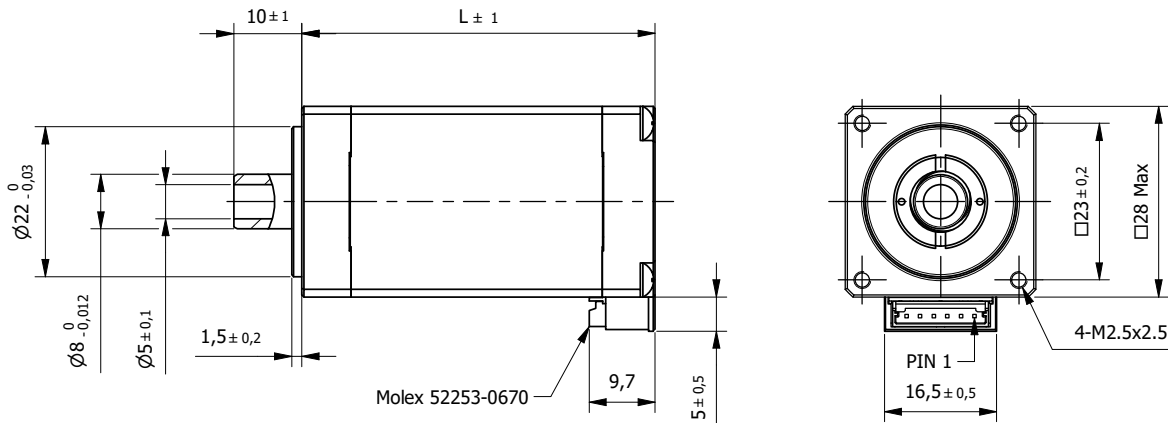
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1061 AWG26 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 28STC51-H

Hollow Shaft - High Torque

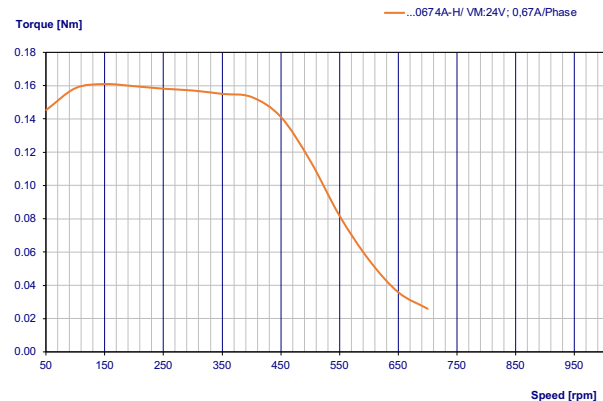
□ 28mm



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

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

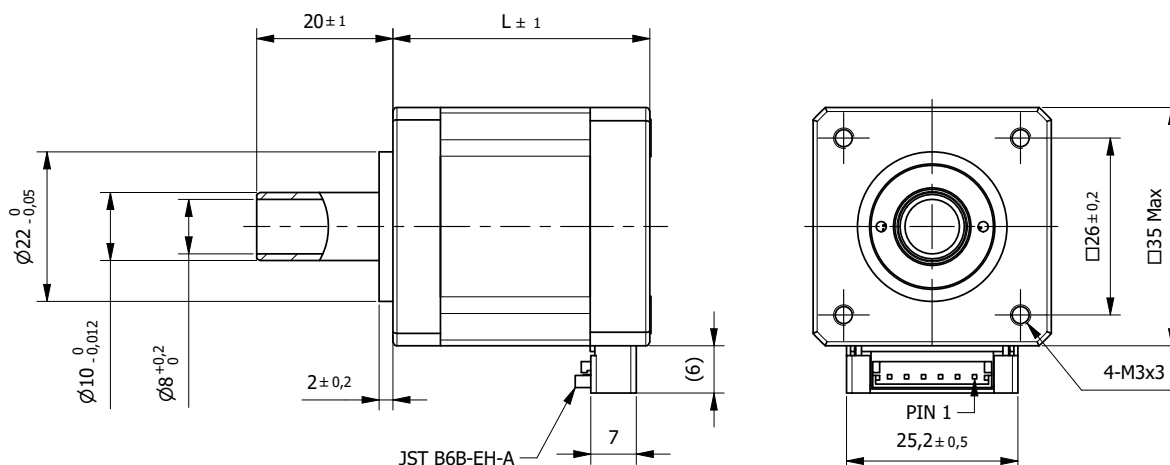
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG26 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 35STC38-H

□ 35mm

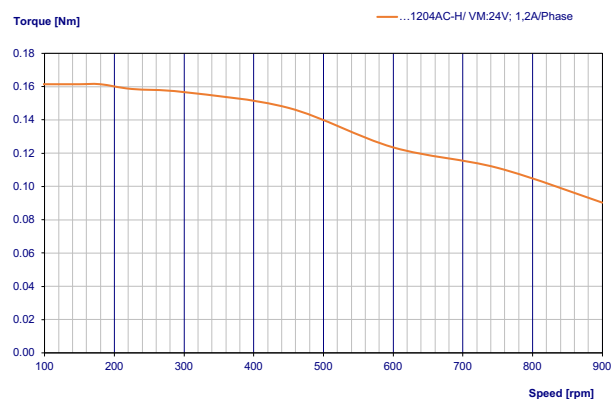
Hollow Shaft - High Torque



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

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

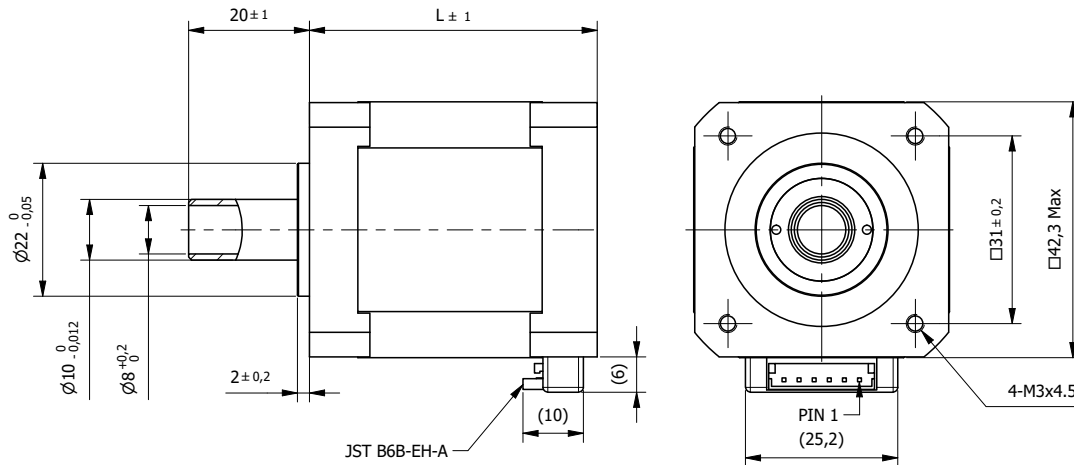
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Yellow | UL1430 AWG26 | COM Phase A |
| 2 | Black | | Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | Blue | | Phase B- |
| 6 | White | | COM Phase B |



Hybrid Stepper Motor 42STC47-H

Hollow Shaft - High Torque

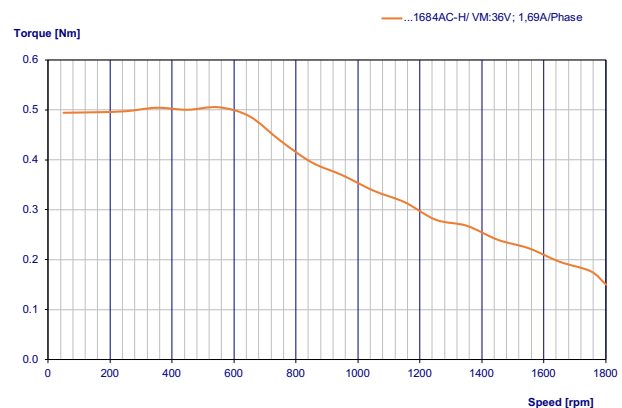
□ 42mm



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

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

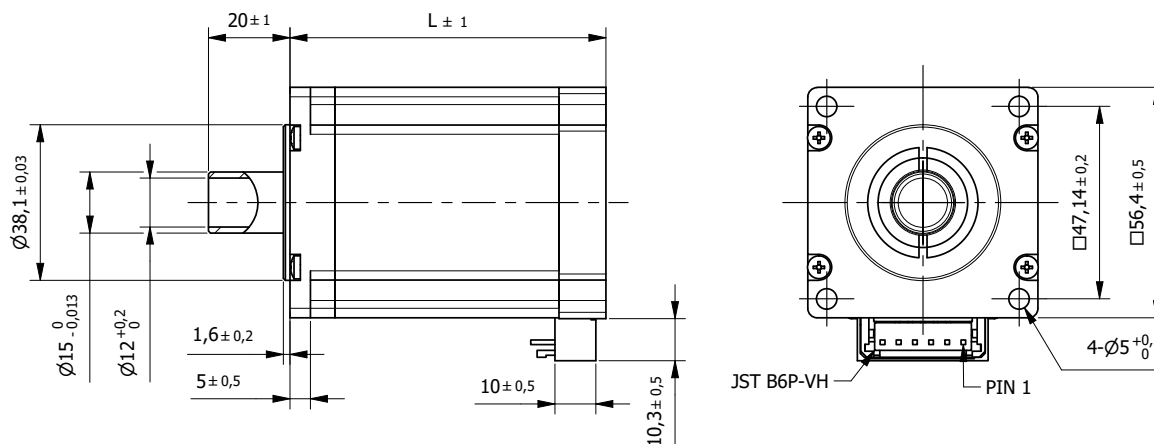
| Connection | | |
|------------|--------|-------------|
| Pin n° | Color | Function |
| 1 | Yellow | COM Phase A |
| 2 | Black | Phase A |
| 3 | Green | Phase A- |
| 4 | Red | Phase B |
| 5 | Blue | Phase B- |
| 6 | White | COM Phase B |



Hybrid Stepper Motor 57STC76-H

57mm

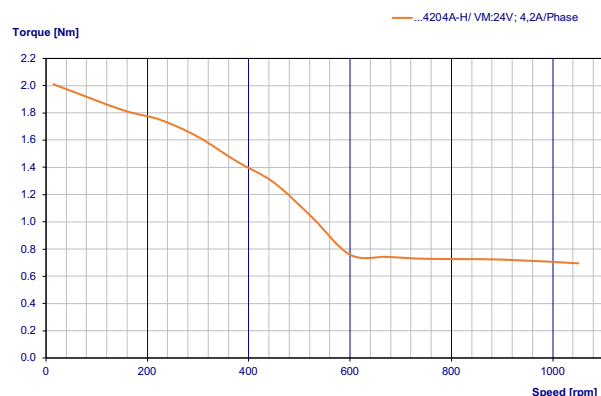
Hollow Shaft - High Torque



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

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

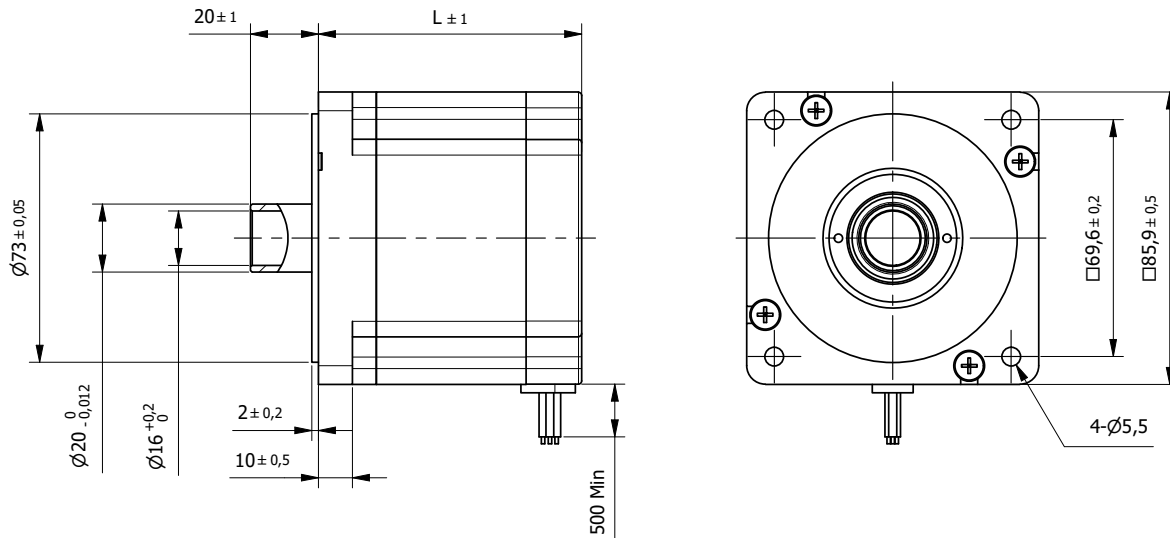
| Connection | | | |
|------------|--------|--------------|-------------|
| Pin n° | Color | Gauge | Function |
| 1 | Black | UL1430 AWG22 | Phase A |
| 2 | Yellow | | COM Phase A |
| 3 | Green | | Phase A- |
| 4 | Red | | Phase B |
| 5 | White | | COM Phase B |
| 6 | Blue | | Phase B- |



Hybrid Stepper Motor 86SH118-H

Hollow Shaft - High Torque

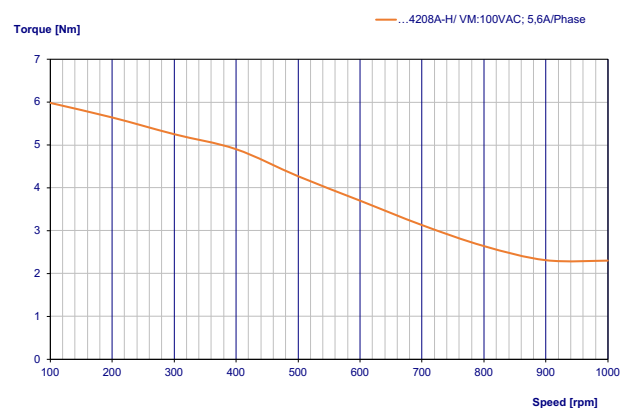
□ 86mm



| 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 | gcm ² | 2700 |
| 7 | Detent Torque | Nm | 0,24 |
| 8 | n° of Leads | | 8 |
| 9 | Length (L) | mm | 114 |
| 10 | Weight | Kg | 3,8 |

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

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





Stepper motors
Flat Hybrid

Advantages at a glance

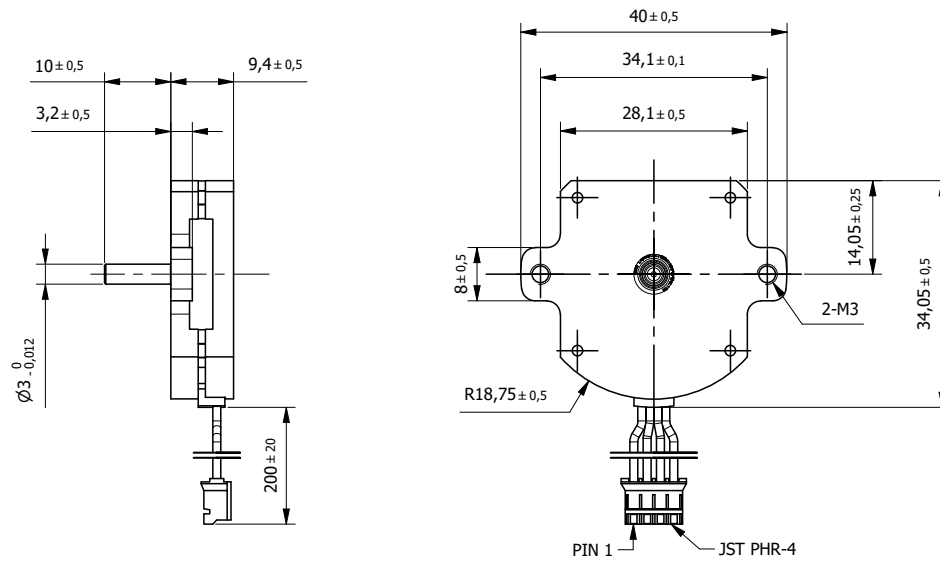
- Very compact size
- High torque
- Great power to volume ratio

Flat Hybrid Stepper motors

| | Torque* (Nm) | |
|-------|--------------|-----|
| 28S10 | 0,01 | 314 |
| 63S10 | 0,064 | 315 |

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

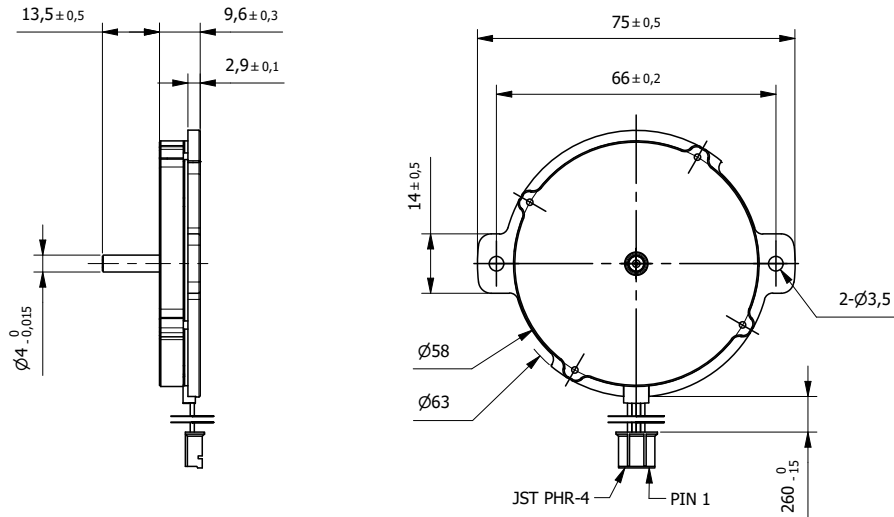
* Holding Torque



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

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

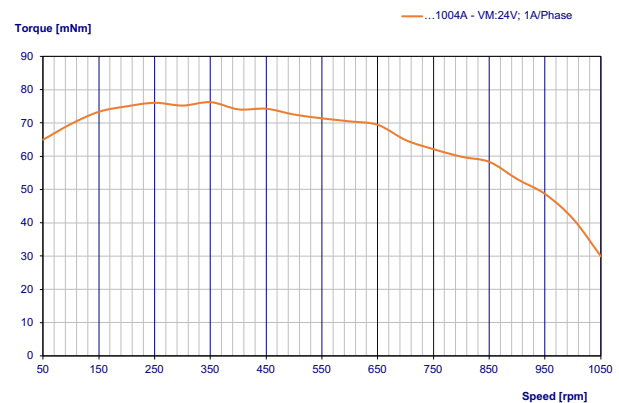
| Connection | | | |
|------------|--------|--------------|----------|
| Pin n° | Color | Gauge | Function |
| 1 | Red | UL1061 AWG26 | Phase A |
| 2 | Blue | | Phase A- |
| 3 | Orange | | Phase B |
| 4 | Yellow | | Phase B- |



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

| Characteristics | |
|---|----------------|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | E |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| Max. Shaft Radial play (at 4N) | 0,02mm |
| Max. Shaft Axial play (at 4N) | 0,08mm |
| Max. Radial Force (5mm from front flange) | 10N |
| Max Axial Force | 2N |
| Dielectric Strength (for 1 sec.) | 600 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 | 318 |
| 60SC | 1...3 | 319 |
| 86SC | 3,5...12 | 320 |

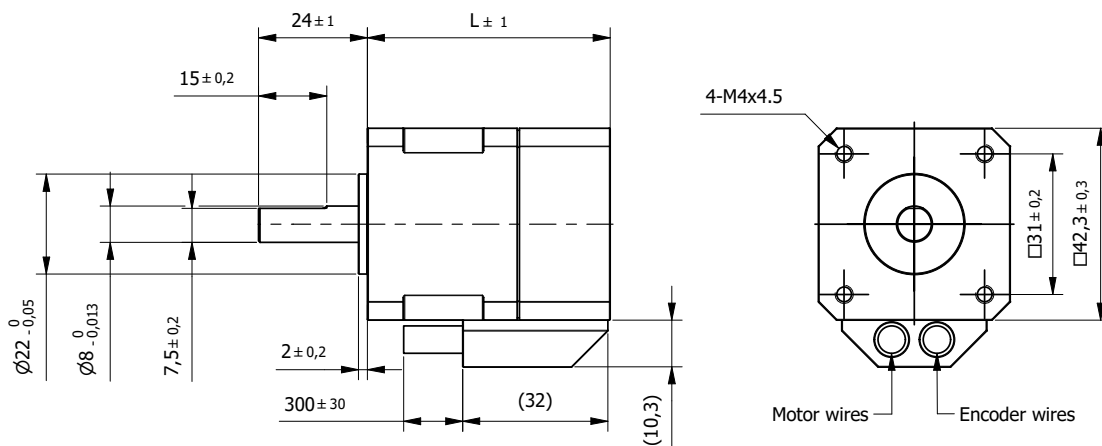
Our Hybrid stepper motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested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

* Holding Torque

Hybrid Stepper Motor 42SC

with Encoder

□ 42mm

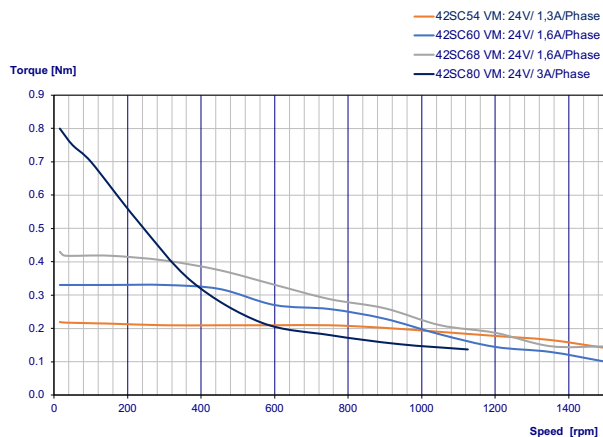


| Specification | | 42SC54 | 42SC60 | 42SC68 | 42SC80 | |
|---------------|------------------|------------------|--------|--------|--------|-------|
| 1 | Model | 42SC54 | 42SC60 | 42SC68 | 42SC80 | |
| 1 | Rated Voltage | V | 2,8 | 2,8 | 2,8 | 3,5 |
| 2 | Current/Phase | A | 1,33 | 1,68 | 1,68 | 3 |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

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

* 3-channel encoder or other types on request

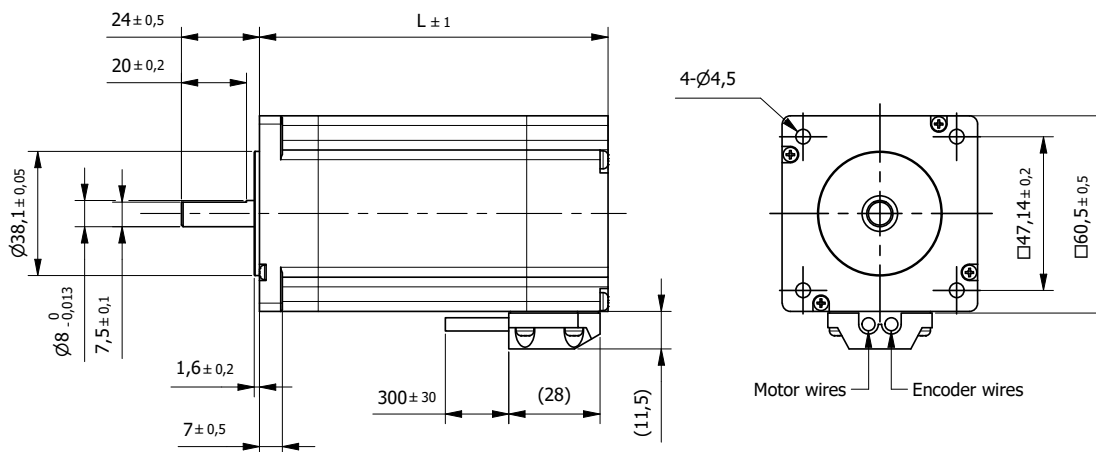
| Connection | | | |
|-----------------|--------------|-------|-----------|
| Lead n° | Color | Gauge | Function |
| Feedback | | | |
| 1 | Black | AWG24 | GND |
| 2 | Red | | VCC:+5VDC |
| 3 | Blue | | EA- |
| 4 | Blue/White | | EA+ |
| 5 | Orange | | EB- |
| 6 | Orange/White | | EB+ |
| Motor | | |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



Hybrid Stepper Motor 60SC

with Encoder

□ 60mm



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

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

* 3-channel encoder or other types on request

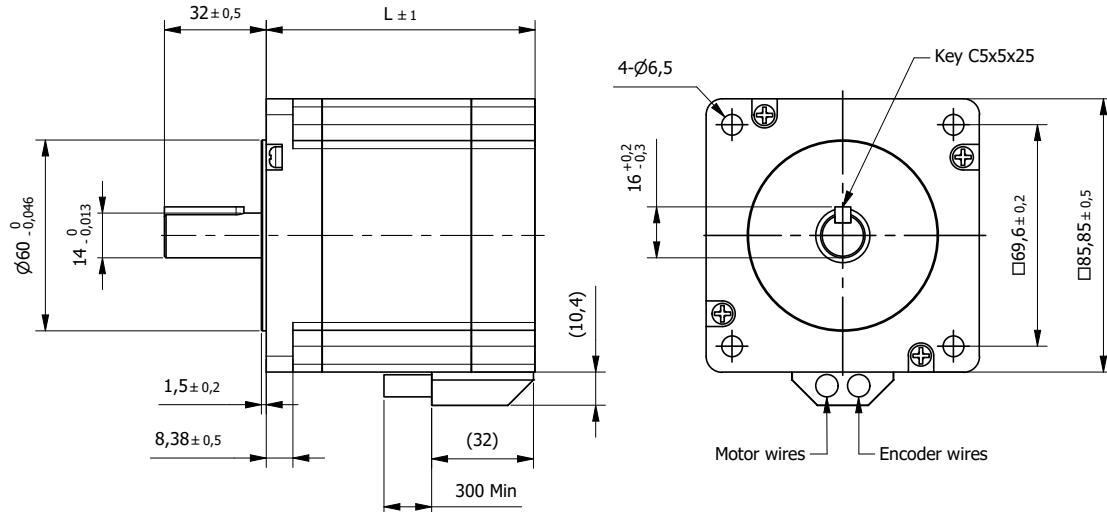
| Connection | | | |
|-----------------|--------------|-------|-----------|
| Lead n° | Color | Gauge | Function |
| Feedback | | | |
| 1 | Black | AWG24 | GND |
| 2 | Red | | VCC:+5VDC |
| 3 | Blue | | EA+ |
| 4 | Blue/White | | EA- |
| 5 | Orange | | EB+ |
| 6 | Orange/White | | EB- |
| Motor | | |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



Hybrid Stepper Motor 86SC

with Encoder

□ 86mm

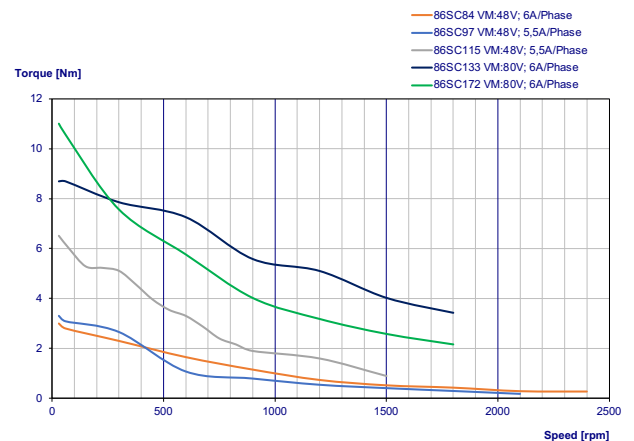


| Specification | | 86SC84 | 86SC97 | 86SC115 | 86SC133 | 86SC172 | |
|---------------|------------------|------------------|--------|---------|---------|---------|------|
| 1 | Rated Voltage | V | 1,7 | 2,3 | 2,6 | 3,3 | 4,3 |
| 2 | Current/Phase | A | 6 | 5,5 | 5,5 | 6 | 6,2 |
| 3 | Resistance/Phase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

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

* 3-channel encoder or other types on request

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





Stepper motors
IP65 Hybrid

Advantages at a glance

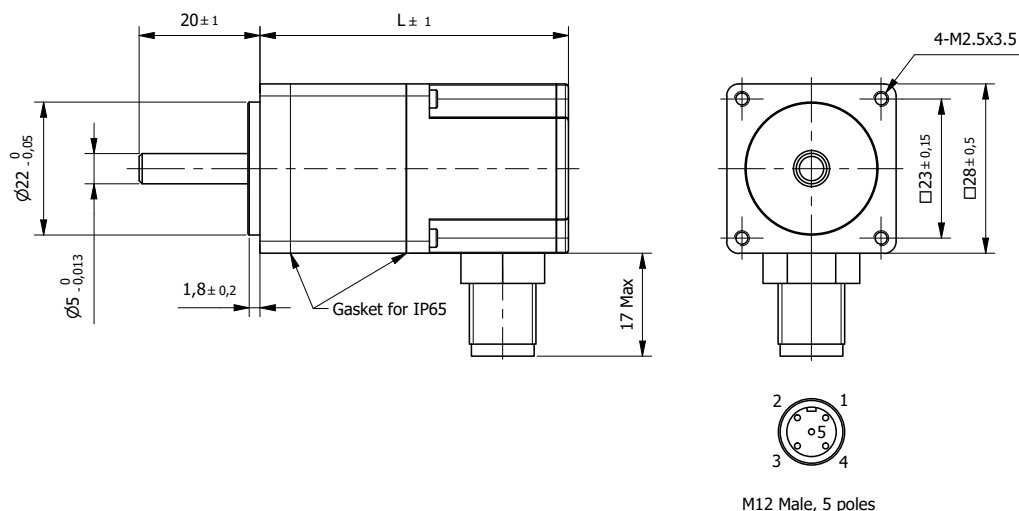
- High protection
- High torque
- High speed

| IP65 Hybrid Stepper motors | Torque* (Nm) | |
|----------------------------|--------------|-----|
| SM28 070 - IP65 | 0,127 | 324 |
| SM42-E - IP65 | 0,16...0,72 | 325 |
| SM57-E - IP65 | 0,7...1,95 | 326 |

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

- Index
- Brushed DC
- Brushless DC
- Servomotors
- Motor + Controller
- Stepper
- Linear actuators
- Gearboxes
- Encoders
- Controllers/Drives



| 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 |

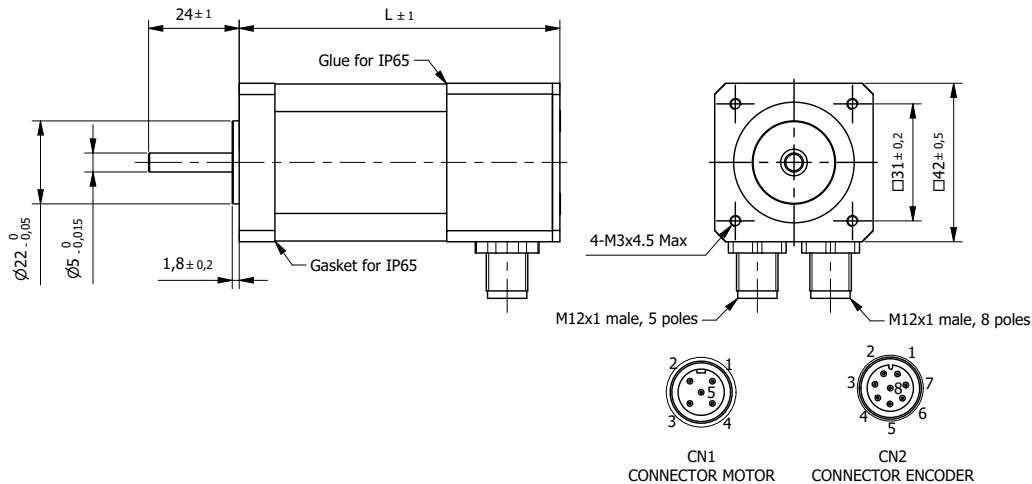
| Characteristics | |
|---|----------------|
| Item | |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP65 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| Max. Shaft Radial play (450g load) | 0,03mm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

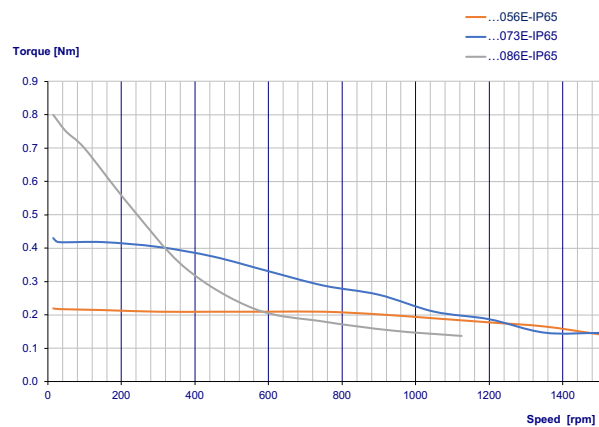


| Specification | | ...056E-IP65 | ...073E-IP65 | ...086E-IP65 |
|---------------|------------------|------------------|--------------|--------------|
| 1 | Rated Voltage | V | 1,5 | 2,7 |
| 2 | Current/Phase | A | 1,8 | 1,8 |
| 3 | Resistance/Phase | Ω | 0,86 | 1,52 |
| 4 | Inductance/Phase | mH | 1,1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

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

* 3-channel encoder or other types on request

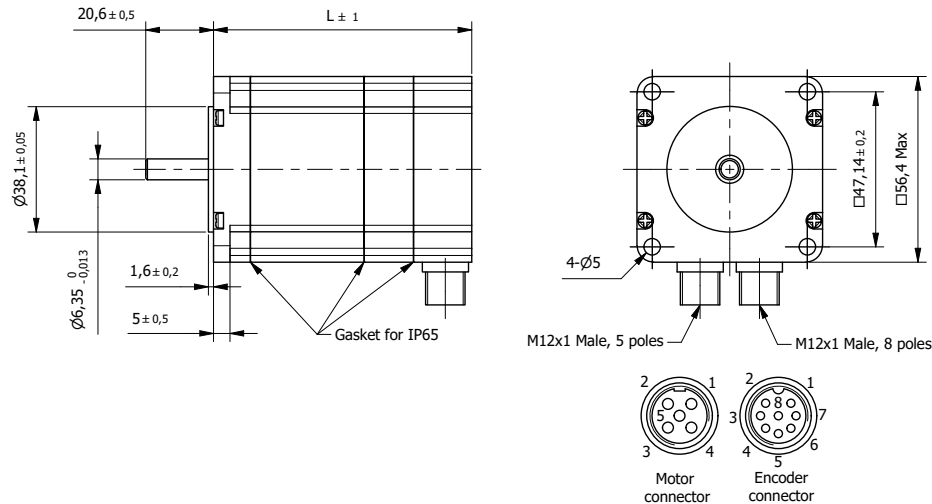
| Connection | |
|-----------------|----------|
| Poles n° | Function |
| Motor | |
| 1 | Phase A |
| 2 | Phase A- |
| 3 | Phase B |
| 4 | Phase B- |
| Feedback | |
| 1 | Vdc |
| 2 | GND |
| 3 | A |
| 4 | A- |
| 5 | B |
| 6 | B- |
| 7 | Z |
| 8 | Z- |



Hybrid Stepper Motor SM57

with Encoder - IP65

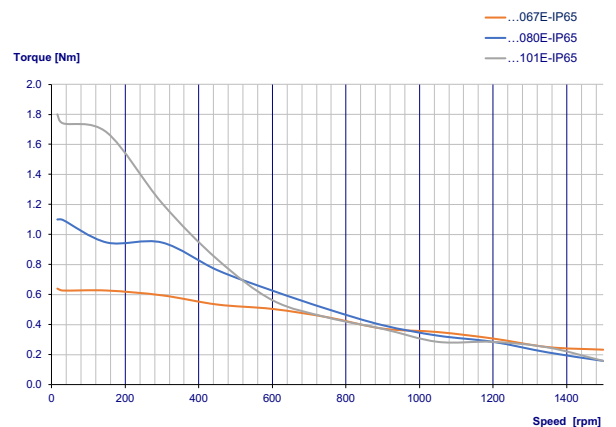
□ 57mm



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

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

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



Linear Actuators



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Brushless DC

Servomotors

Motor + Controller

Stepper

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Linear Actuators

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| 35C | 366 |
| 42C | 368 |
| 57C | 370 |

| Term | |
|-----------------------|---|
| Rated voltage | Voltage necessary to reach the nominal current per phase. |
| Current/Phase | The current supplied to the motor phases that will not exceed, at an ambient temperature of 20°C, the thermal limits of the motor. |
| Resistance/Phase | Winding resistance per phase. Tolerance +/- 12%, steady state. |
| Inductance/Phase | Winding inductance per phase measured at 1kHz. |
| Number of leads | Number of lead wires available to connect the motor. |
| 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. |
| 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 |
| 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. |
| Protection Class | IP (International Protection) degree defines the protection level against dust and water. |
| 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. |
| 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. $PITCH \times STARTS = LEAD$ |
| Screw travel per step | The linear translation of a lead nut or screw for one full step of the motor. |
| Power Off Force | Maximum force in N that can be applied to the screw at standstill without producing screw rotation. |

Glossary

Product families

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

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

Lead Screws Actuators Characteristics

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

Very high accuracy using closed loop function through Delta Line drivers

Customizable screws end machining

Customizable nuts

High reliability and long service life with marginal need for maintenance

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

EXTERNAL Stepper Motor Actuators

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

CAPTIVE Stepper Motor Actuators

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

NON-CAPTIVE Stepper Motor Actuators

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

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

Load

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

Speed

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

Length

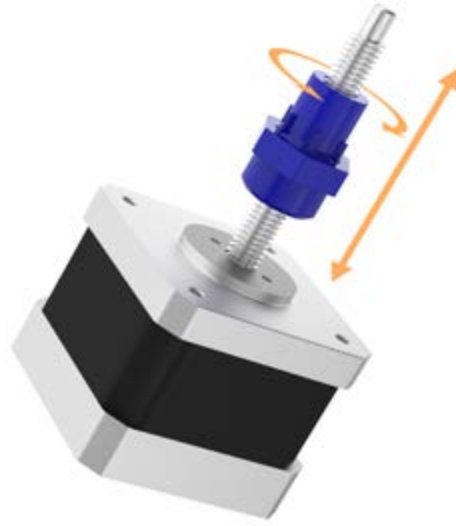
The unsupported length of the screw.

End fixity

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

Technical introduction

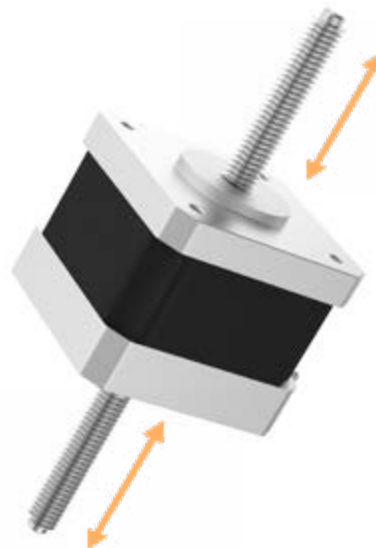
External Stepper Linear Actuators

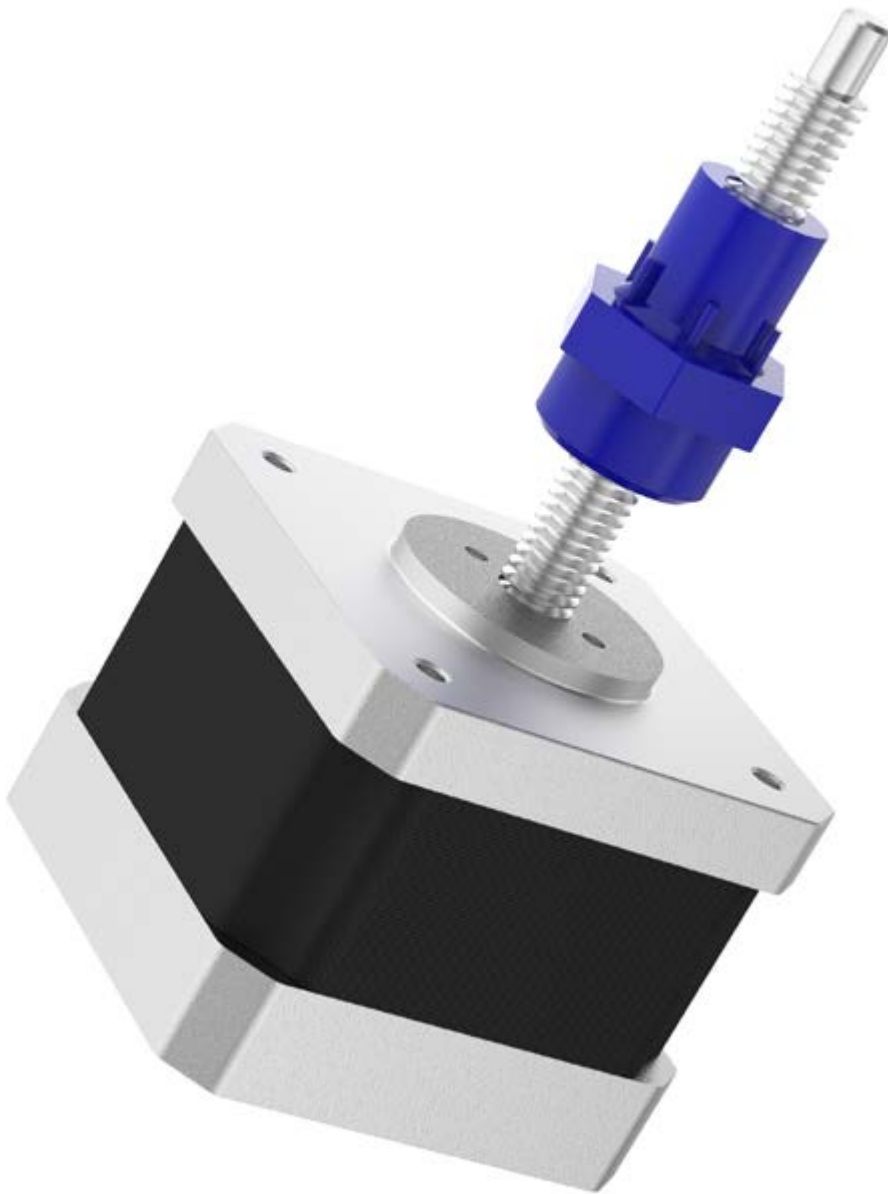


Captive Stepper Linear Actuators



Non-Captive Stepper Linear Actuators





External Linear Actuators

Advantages at a glance

Small to medium load ratings

High accuracy

Customizable

External Hybrid Stepper Linear Actuators

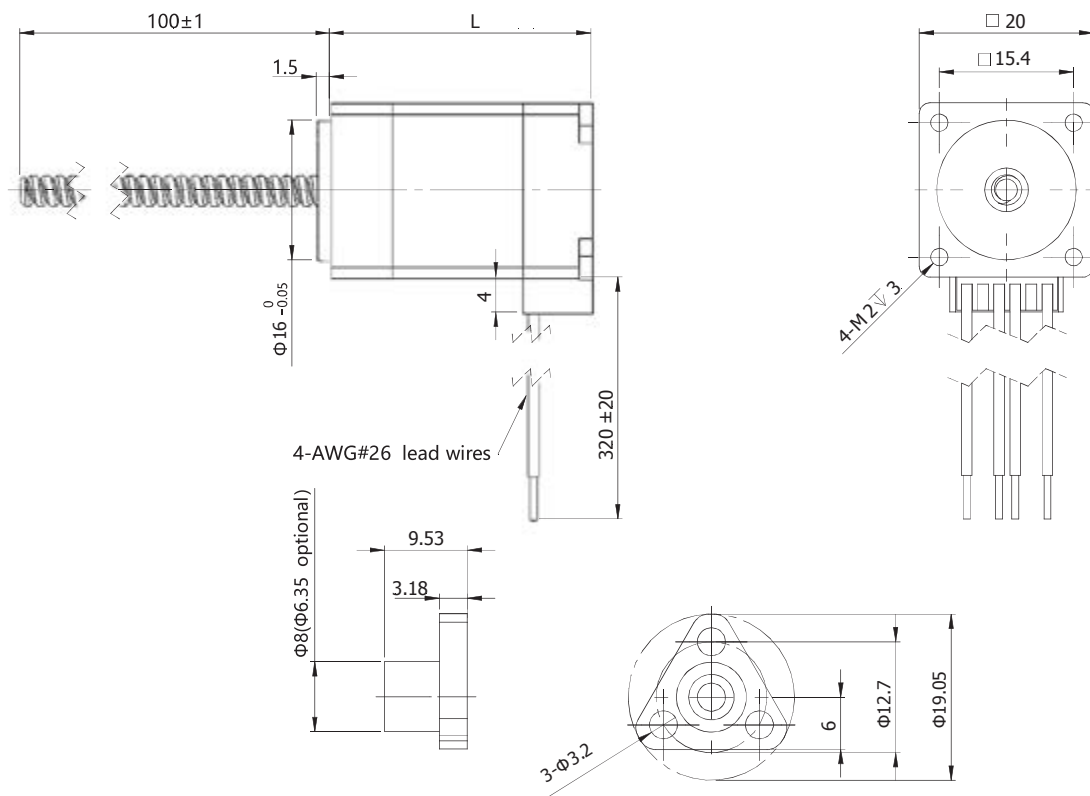
| | |
|-----|-----|
| 20E | 338 |
| 28E | 340 |
| 35E | 342 |
| 42E | 344 |
| 57E | 346 |

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

External Linear Actuator 20E

□ 20mm

Hybrid Stepper motor



Note: nut options available on request

| Actuator Specification | | | | |
|------------------------|--------------------|-------|-------|------|
| Model | | 20E30 | 20E42 | |
| 1 | Rated Voltage | V | 2,5 | 6,3 |
| 2 | Current / Phase | A | 0,5 | 0,5 |
| 3 | Resistance / Phase | Ω | 5,1 | 12,5 |
| 4 | Inductance / Phase | mH | 1,5 | 11 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm2 | 2 | 3 |
| 7 | Motor Length (L) | mm | 30 | 42 |
| 8 | Weight | g | 50 | 80 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

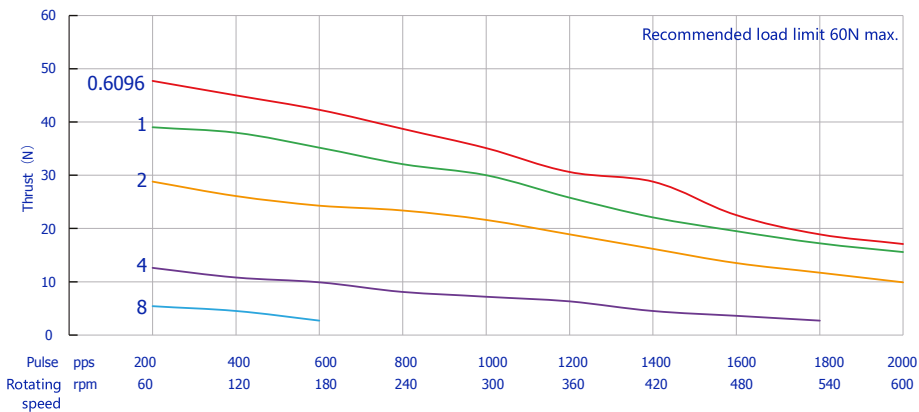
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| AA | 3,5 | 0,6096 | 0,003048 | 80 |
| AB | 3,5 | 1 | 0,005 | 40 |
| AC | 3,5 | 2 | 0,01 | 10 |
| AD | 3,5 | 4 | 0,02 | 1 |
| AE | 3,5 | 8 | 0,04 | 0 |

Note 1: other screw options available on request

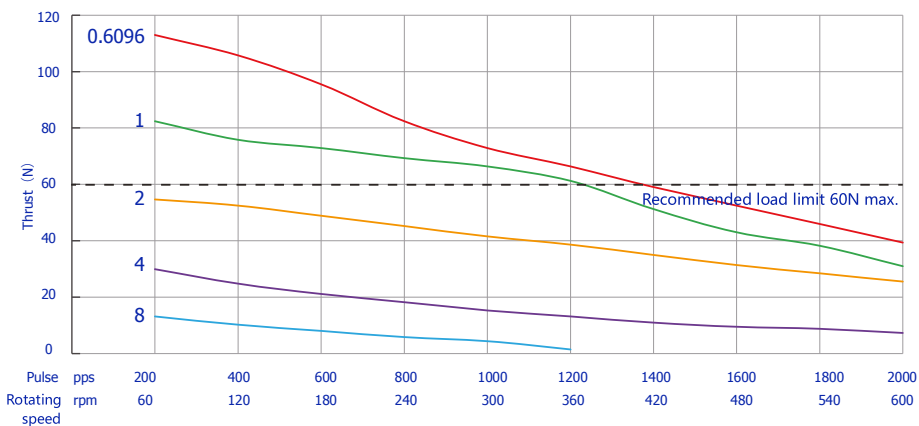
Note 2: customized machining is viable at the end of lead screw

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

| Product code reference | |
|------------------------|----------------------------|
| Code | Description |
| 20E30-05-AA100 | |
| 20 | Frame size |
| E | External |
| 30 | Motor length |
| 05 | Current / Phase (no comma) |
| AA | Lead screw code |
| 100 | Screw length |



20 series 30mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ3.5mm lead screw)



20 series 42mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ3.5mm lead screw)

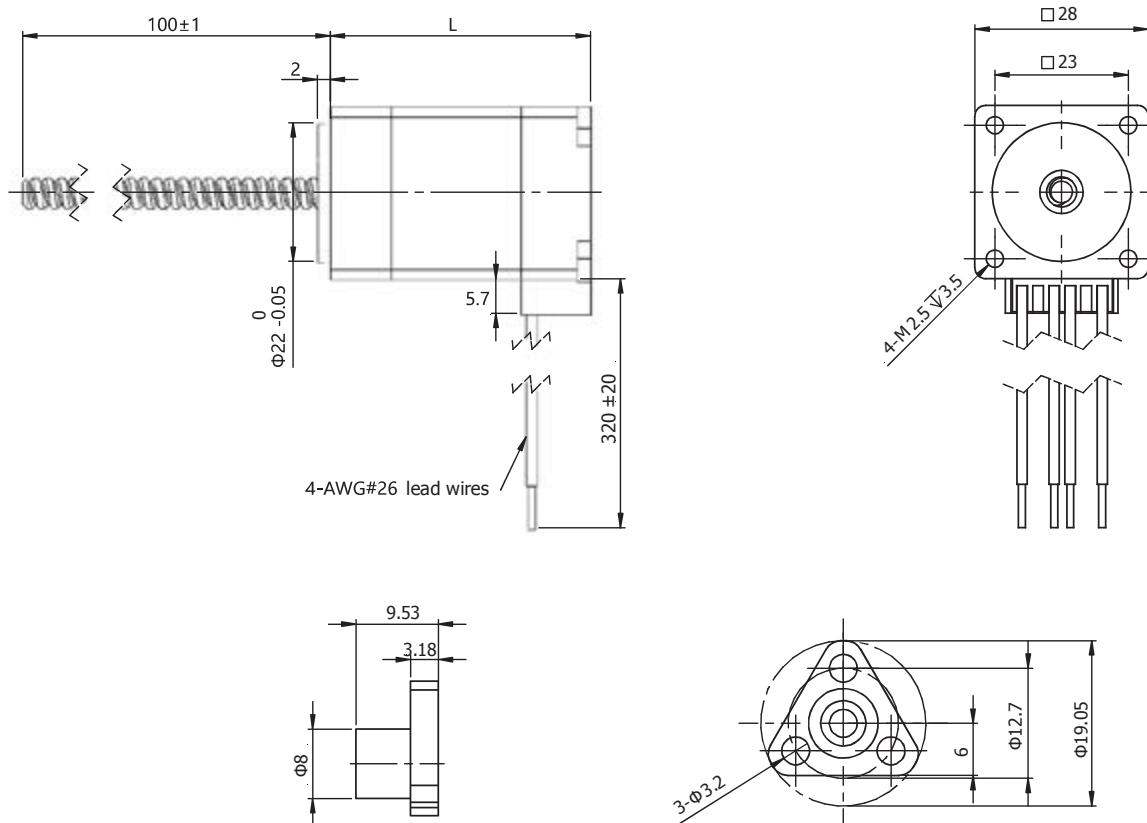
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|--------|--------|--------|-------|--------|--------|--------|--------|-------|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 |
| 0,6096 | 0,6096 | 1,2192 | 1,8288 | 2,4384 | 3,048 | 3,6576 | 4,2672 | 4,8768 | 5,4864 | 6,096 |
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

External Linear Actuator 28E

□ 28mm

Hybrid Stepper motor



Note: nut options available on request

| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-------|-----|
| Model | | 28E34 | 28E45 | |
| 1 | Rated Voltage | V | 2,1 | 3,7 |
| 2 | Current / Phase | A | 1 | 1 |
| 3 | Resistance / Phase | Ω | 2,1 | 3,7 |
| 4 | Inductance / Phase | mH | 1,5 | 2,3 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 9 | 13 |
| 7 | Motor Length (L) | mm | 34 | 45 |
| 8 | Weight | g | 120 | 180 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

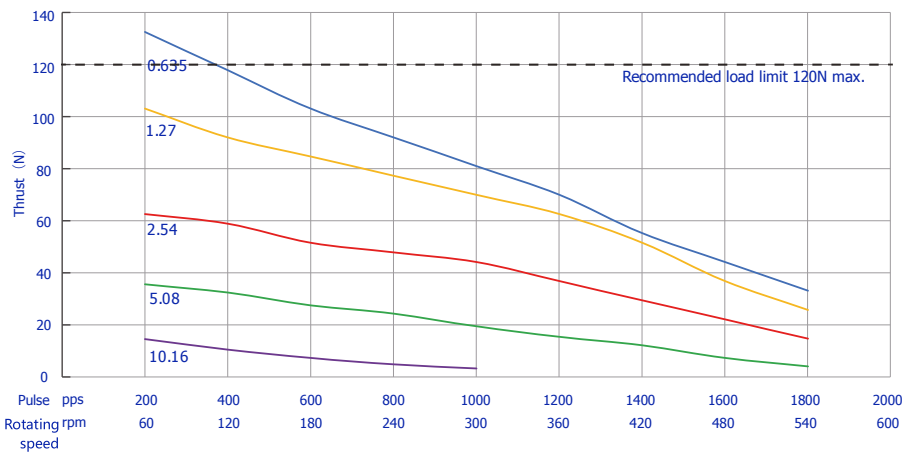
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| BA | 4,76 | 0,635 | 0,003175 | 100 |
| BB | 4,76 | 1,27 | 0,00635 | 40 |
| BC | 4,76 | 2,54 | 0,0127 | 10 |
| BD | 4,76 | 5,08 | 0,0254 | 1 |
| BE | 4,76 | 10,16 | 0,0508 | 0 |

Note 1: other screw options available on request

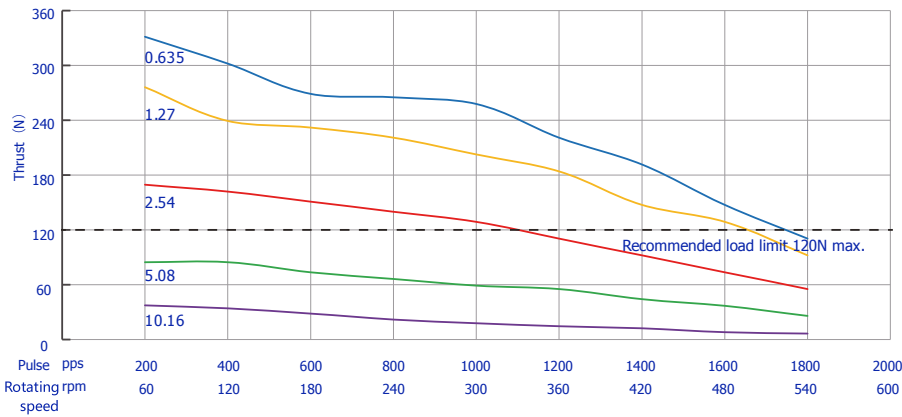
Note 2: customized machining is viable at the end of lead screw

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

| Product code reference | |
|------------------------|------------------------------------|
| 28E34-10-BA100 | |
| 28 | Frame size |
| E | External |
| 34 | Motor length |
| 10 | Current / Phase (2-digit no comma) |
| BA | Lead screw code |
| 100 | Screw length |



28 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 4.76$ mm lead screw)



28 series 45mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 4.76$ mm lead screw)

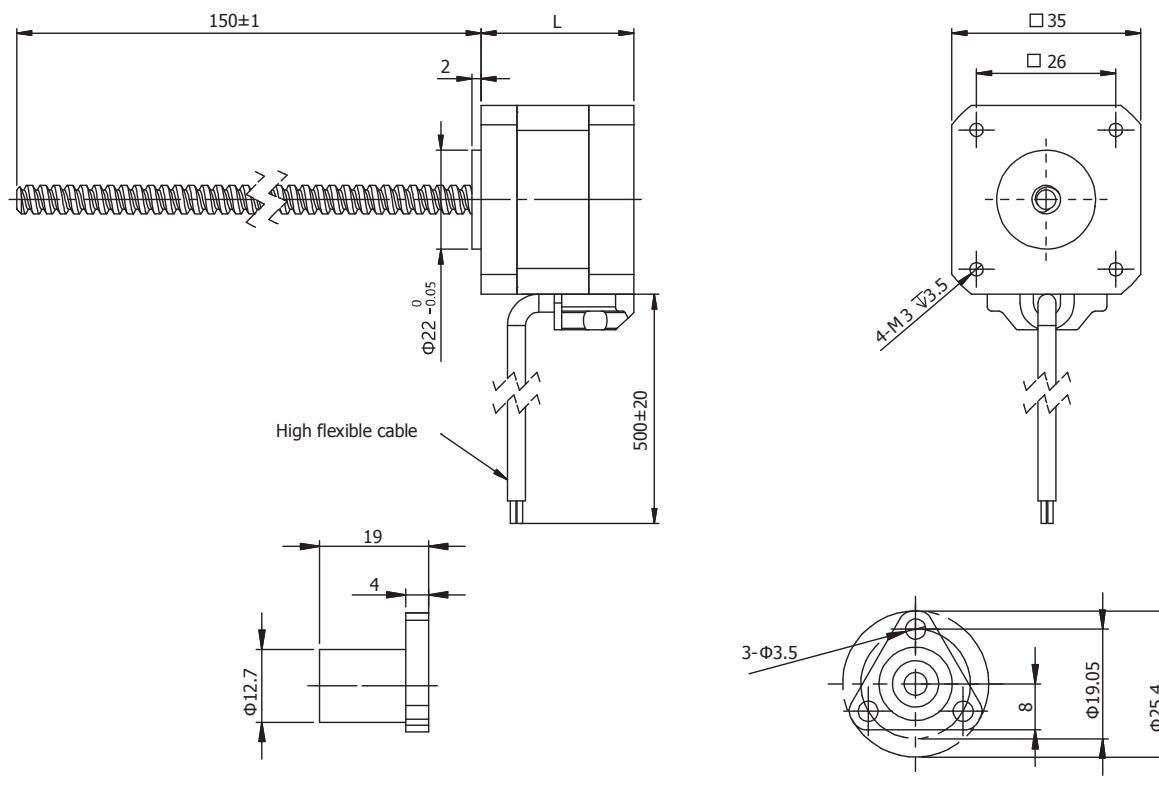
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 |
| 0,635 | 0,635 | 1,27 | 1,905 | 2,54 | 3,175 | 3,81 | 4,445 | 5,08 | 5,715 | 6,35 |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | 12,7 |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | 25,4 |
| 5,08 | 5,08 | 10,16 | 15,24 | 20,32 | 25,4 | 30,48 | 35,56 | 40,64 | 45,72 | 50,8 |
| 10,16 | 10,16 | 20,32 | 30,48 | 40,64 | 50,8 | 60,96 | 71,12 | 81,28 | 91,44 | 101,6 |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

External Linear Actuator 35E

□ 35mm

Hybrid Stepper motor



Note: nut options available on request

| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-------|-------|
| Model | | | 35E34 | 35E47 |
| 1 | Rated Voltage | V | 1,4 | 2,9 |
| 2 | Current / Phase | A | 1,5 | 1,5 |
| 3 | Resistance / Phase | Ω | 0,95 | 1,9 |
| 4 | Inductance / Phase | mH | 1,4 | 3,2 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 20 | 30 |
| 7 | Motor Length (L) | mm | 34 | 47 |
| 8 | Weight | g | 190 | 230 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

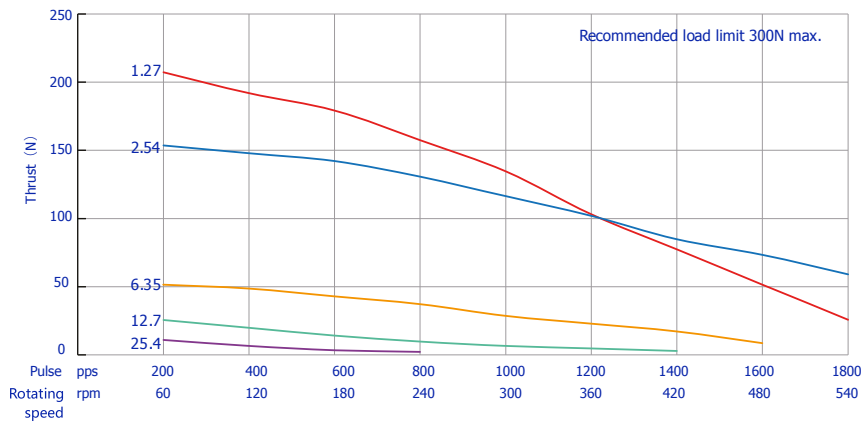
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| CA | 6,35 | 1,27 | 0,00635 | 150 |
| CB | 6,35 | 2,54 | 0,0127 | 40 |
| CC | 6,35 | 6,35 | 0,03175 | 15 |
| CD | 6,35 | 12,7 | 0,0635 | 3 |
| CE | 6,35 | 25,4 | 0,127 | 0 |

Note 1: other screw options available on request

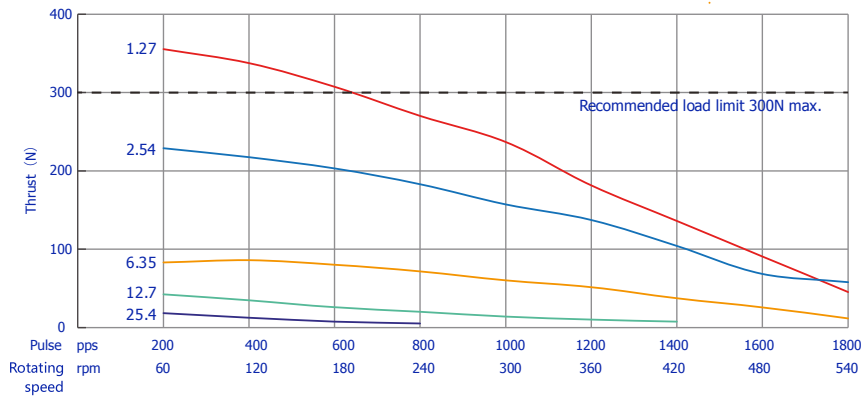
Note 2: customized machining is viable at the end of lead screw

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

| Product code reference | |
|------------------------|------------------------------------|
| 35E34-15-CA100 | |
| 35 | Frame size |
| E | External |
| 34 | Motor length |
| 15 | Current / Phase (2-digit no comma) |
| CA | Lead screw code |
| 100 | Screw length |



35 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



35 series 47mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)

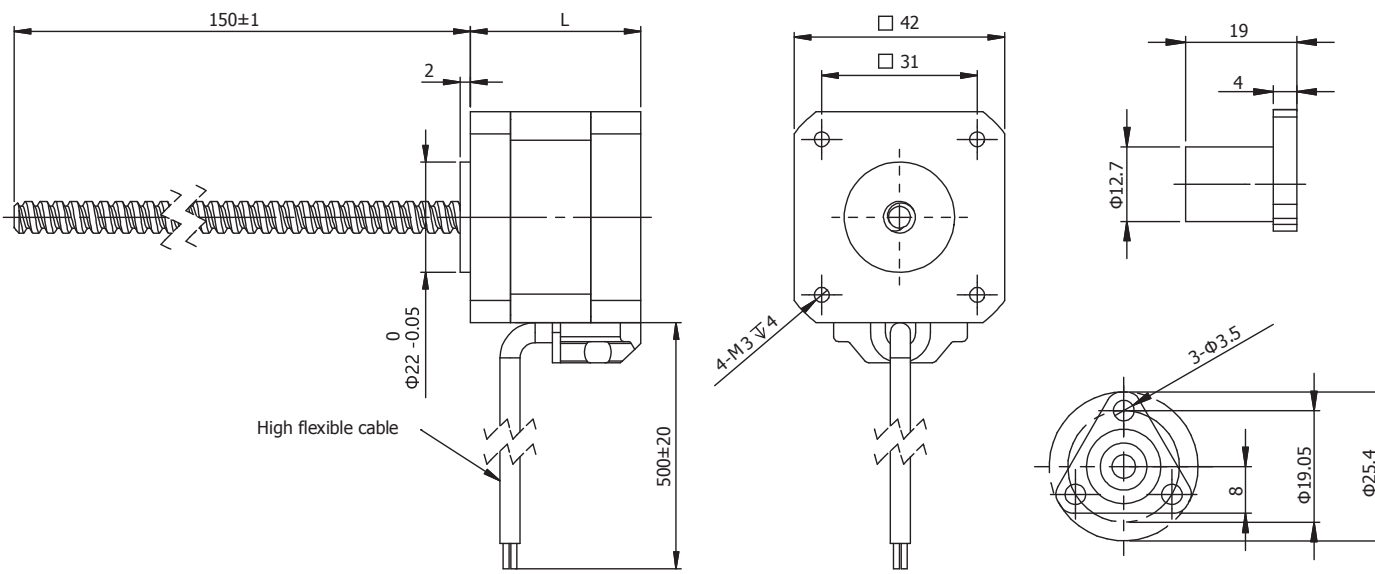
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|------|-------|-------|-------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 6,35 | 6,35 | 12,7 | 19,05 | 25,4 | 31,75 | 38,1 | 44,45 | 50,8 | 57,15 | |
| 12,7 | 12,7 | 25,4 | 38,1 | 50,8 | 63,5 | 76,2 | 88,9 | 101,6 | 114,3 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

External Linear Actuator 42E

□ 42mm

Hybrid Stepper motor



Note: nut options available on request

| Actuator Specification | | | 42E34 | 42E40 | 42E48 | 42E60 |
|------------------------|--------------------|------------------|-------|-------|-------|-------|
| 1 | Rated Voltage | V | 2,6 | 3,3 | 2 | 2,5 |
| 2 | Current / Phase | A | 1,5 | 1,5 | 2,5 | 2,5 |
| 3 | Resistance / Phase | Ω | 1,8 | 2,2 | 0,8 | 1 |
| 4 | Inductance / Phase | mH | 2,6 | 4,6 | 1,8 | 2,8 |
| 5 | n° of Lead Wires | | 4 | 4 | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 35 | 55 | 70 | 105 |
| 7 | Motor Length (L) | mm | 34 | 40 | 48 | 60 |
| 8 | Weight | g | 250 | 290 | 385 | 450 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

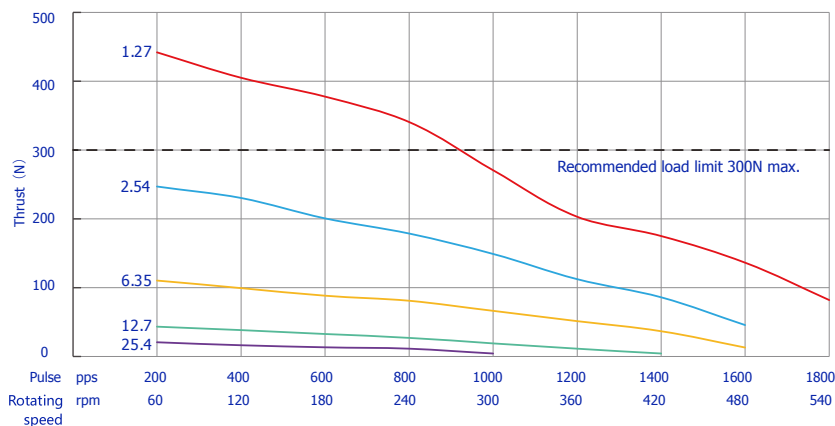
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| CA | 6,35 | 1,27 | 0,00635 | 150 |
| CB | 6,35 | 2,54 | 0,0127 | 40 |
| CC | 6,35 | 6,35 | 0,03175 | 15 |
| CD | 6,35 | 12,7 | 0,0635 | 3 |
| CE | 6,35 | 25,4 | 0,127 | 0 |

Note 1: other screw options available on request

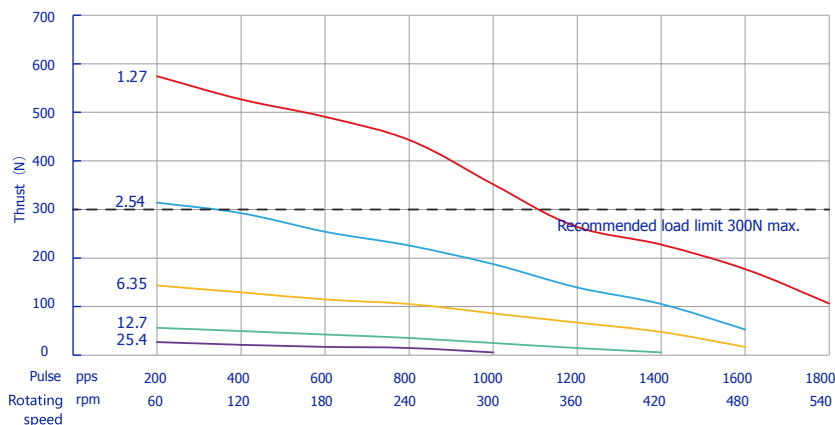
Note 2: customized machining is viable at the end of lead screw

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

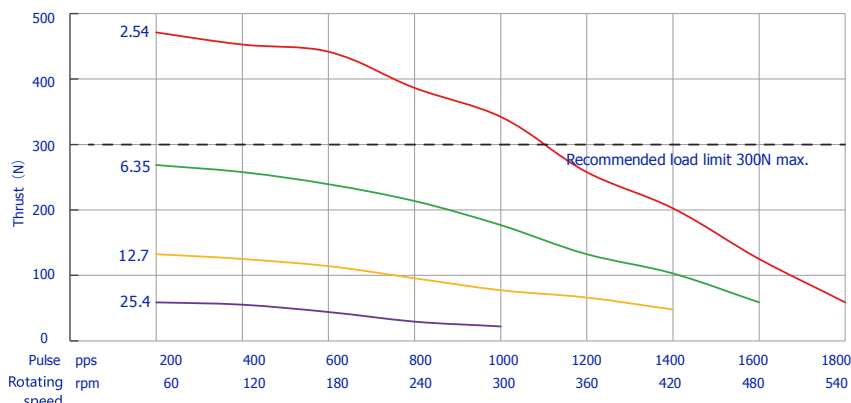
| Product code reference | |
|------------------------|------------------------------------|
| 42E34-15-CA100 | |
| 42 | Frame size |
| E | External |
| 34 | Motor length |
| 15 | Current / Phase (2-digit no comma) |
| CA | Lead screw code |
| 100 | Screw length |



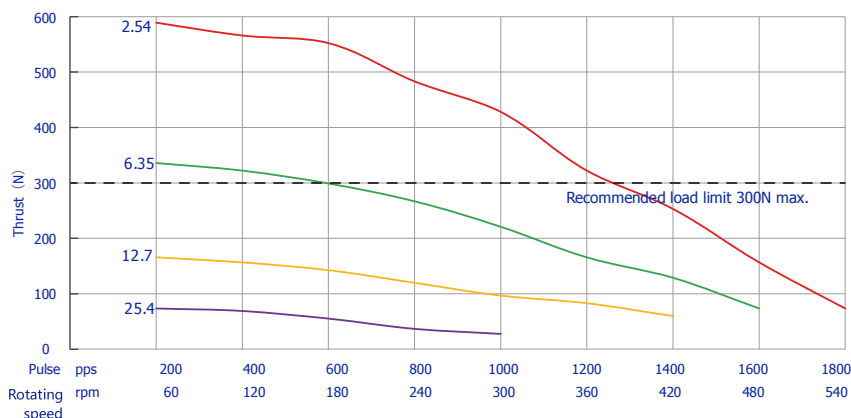
42 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 6.35\text{mm}$ lead screw)



42 series 40mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 6.35\text{mm}$ lead screw)



42 series 48mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 6.35\text{mm}$ lead screw)



42 series 60mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 6.35\text{mm}$ lead screw)

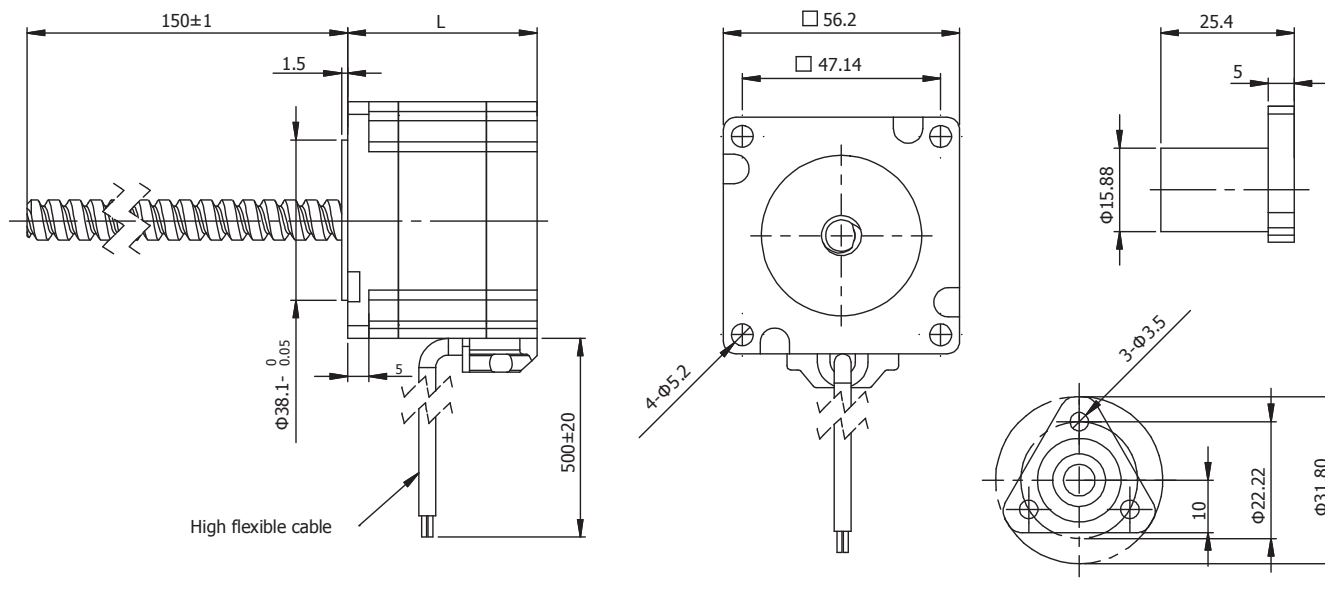
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|------|-------|-------|-------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 6,35 | 6,35 | 12,7 | 19,05 | 25,4 | 31,75 | 38,1 | 44,45 | 50,8 | 57,15 | |
| 12,7 | 12,7 | 25,4 | 38,1 | 50,8 | 63,5 | 76,2 | 88,9 | 101,6 | 114,3 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 40V

External Linear Actuator 57E

□ 57mm

Hybrid Stepper motor



Note: nut options available on request

| Actuator Specification | | 57E45 | 57E55 | 57E65 | 57E75 | |
|------------------------|--------------------|------------------|-------|-------|-------|------|
| 1 | Rated Voltage | V | 2,3 | 3 | 3,1 | 3,8 |
| 2 | Current / Phase | A | 3 | 3 | 4 | 4 |
| 3 | Resistance / Phase | Ω | 0,75 | 1 | 0,78 | 0,95 |
| 4 | Inductance / Phase | mH | 2,5 | 4,5 | 3,3 | 4,5 |
| 5 | n° of Lead Wires | | 4 | 4 | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 150 | 300 | 400 | 480 |
| 7 | Motor Length (L) | mm | 45 | 55 | 65 | 75 |
| 8 | Weight | g | 580 | 710 | 880 | 950 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

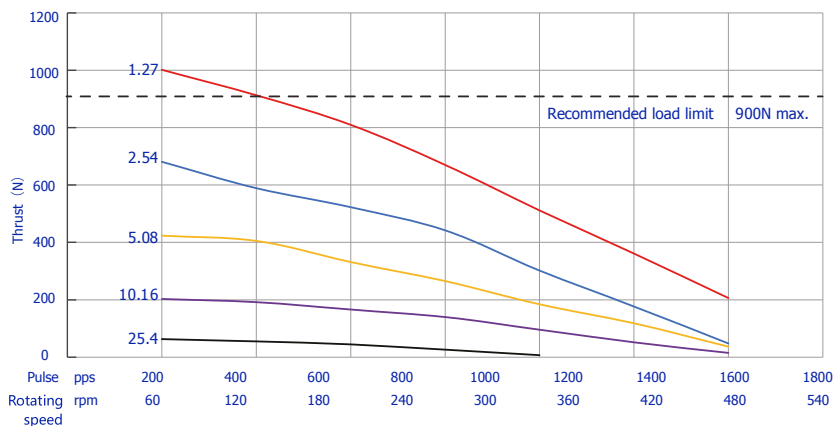
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| DA | 9,525 | 1,27 | 0,00635 | 800 |
| DB | 9,525 | 2,54 | 0,0127 | 300 |
| DC | 9,525 | 5,08 | 0,0254 | 90 |
| DD | 9,525 | 10,16 | 0,0508 | 30 |
| DE | 9,525 | 25,4 | 0,127 | 6 |

Note 1: other screw options available on request

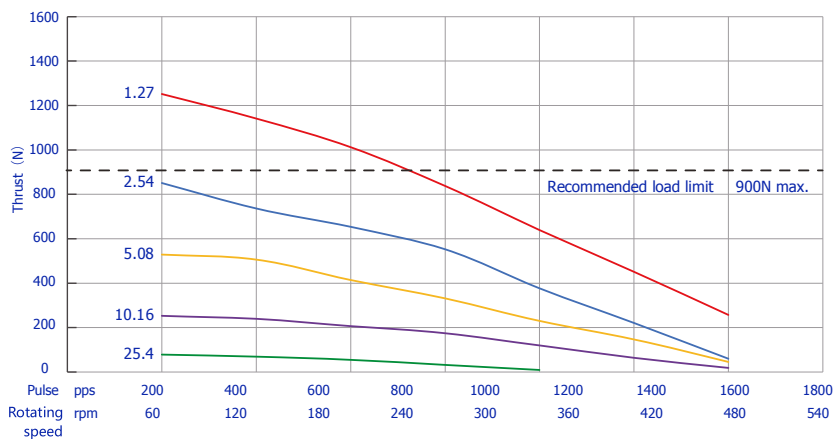
Note 2: customized machining is viable at the end of lead screw

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

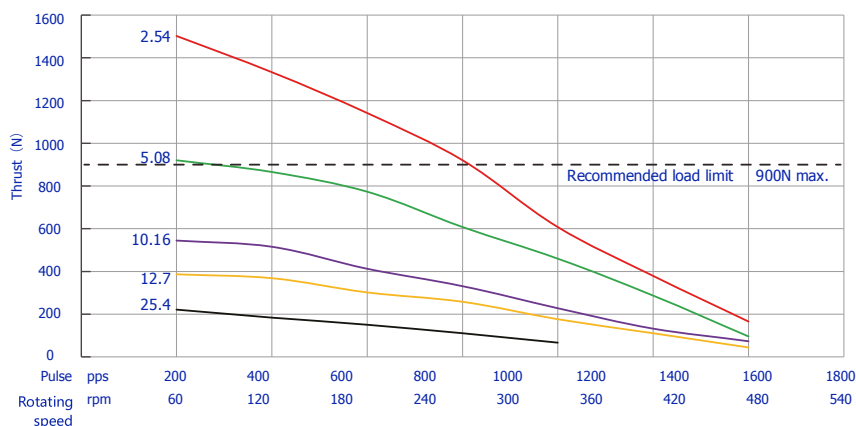
| Product code reference | |
|------------------------|------------------------------------|
| 57E45-30-DA100 | |
| 57 | Frame size |
| E | External |
| 45 | Motor length |
| 30 | Current / Phase (2-digit no comma) |
| DA | Lead screw code |
| 100 | Screw length |



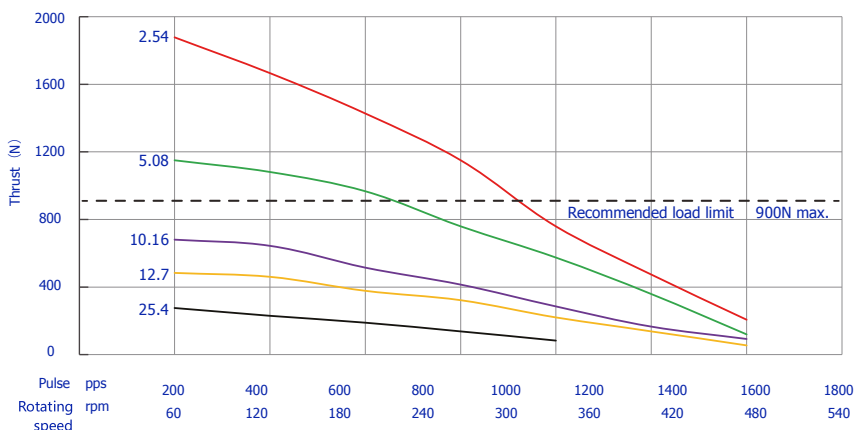
57 series 45mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 55mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



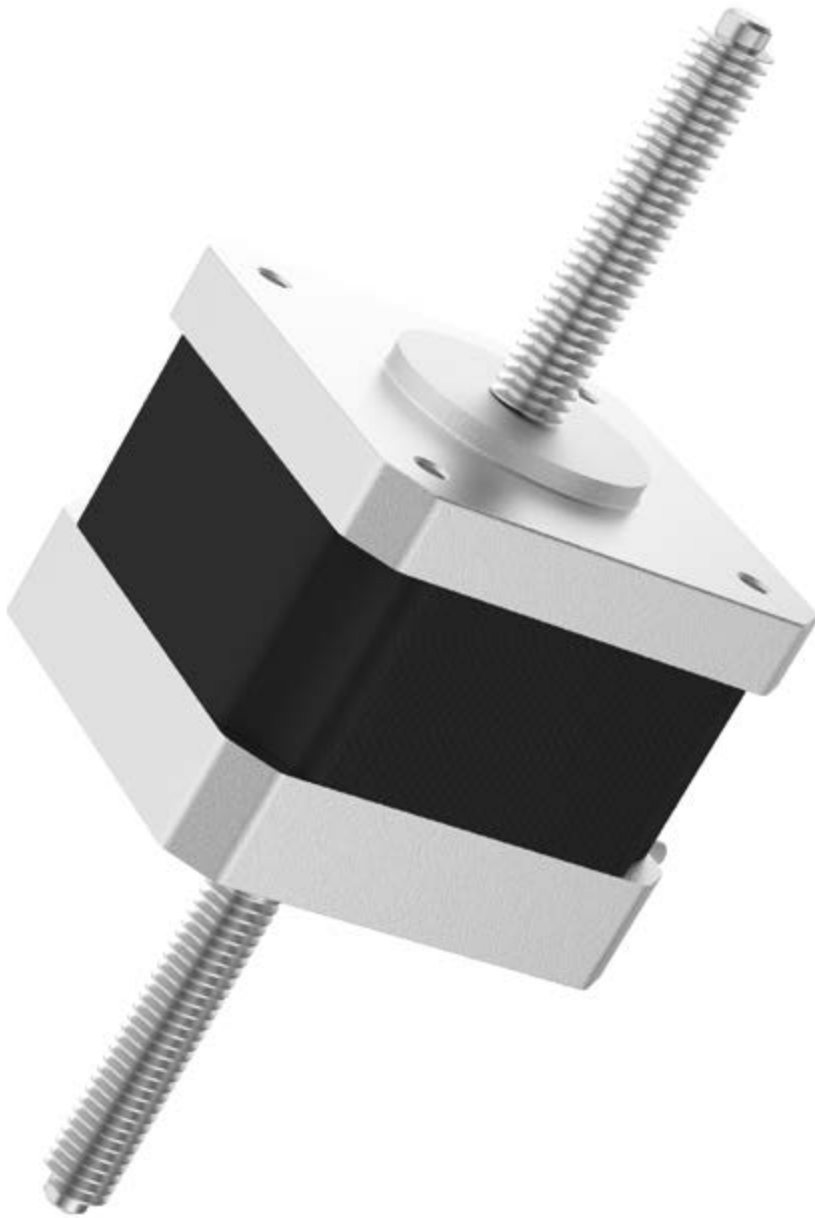
57 series 65mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 75mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)

| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|-------|-------|-------|------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 5,08 | 5,08 | 10,16 | 15,24 | 20,32 | 25,4 | 30,48 | 35,56 | 40,64 | 45,72 | |
| 10,16 | 10,16 | 20,32 | 30,48 | 40,64 | 50,8 | 60,96 | 71,12 | 81,28 | 91,44 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 40V



Non-Captive Linear Actuators

Advantages at a glance

Small to medium load ratings

High accuracy

Customizable

Non-Captive Hybrid Stepper Linear Actuators

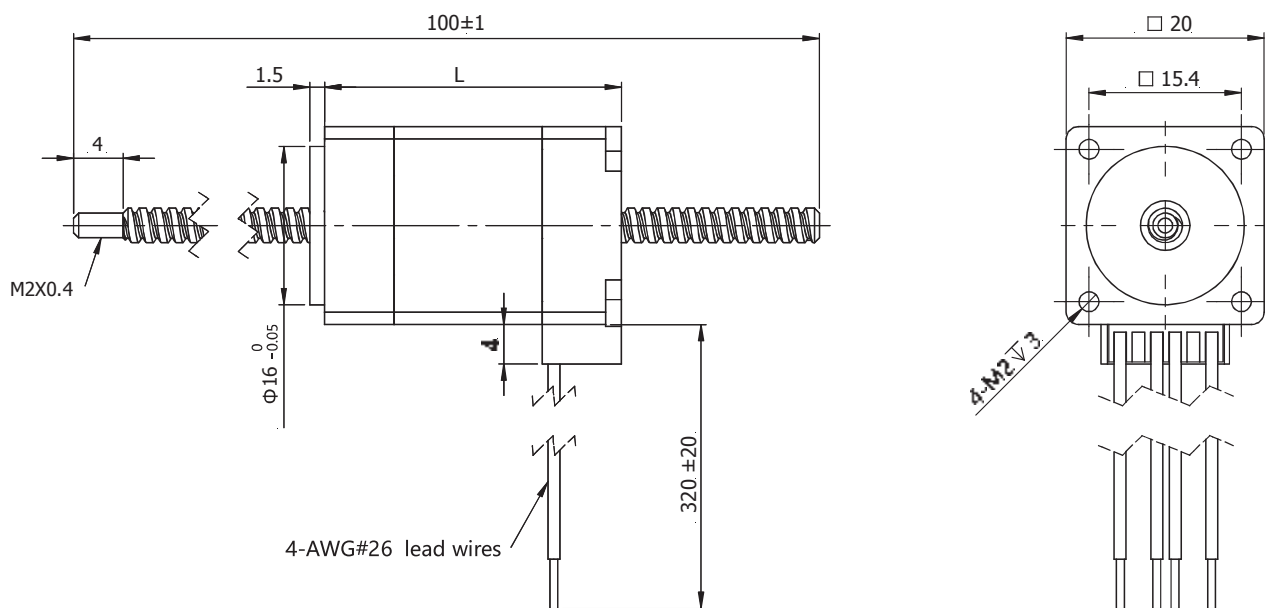
| | |
|-----|-----|
| 20N | 350 |
| 28N | 352 |
| 35N | 354 |
| 42N | 356 |
| 57N | 358 |

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

Non-Captive Linear Actuator 20N

□ 20mm

Hybrid Stepper motor



| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-------|------|
| Model | | 20N30 | 20N42 | |
| 1 | Rated Voltage | V | 2,5 | 6,3 |
| 2 | Current / Phase | A | 0,5 | 0,5 |
| 3 | Resistance / Phase | Ω | 5,1 | 12,5 |
| 4 | Inductance / Phase | mH | 1,5 | 11 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 2 | 3 |
| 7 | Motor Length (L) | mm | 30 | 42 |
| 8 | Weight | g | 50 | 80 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

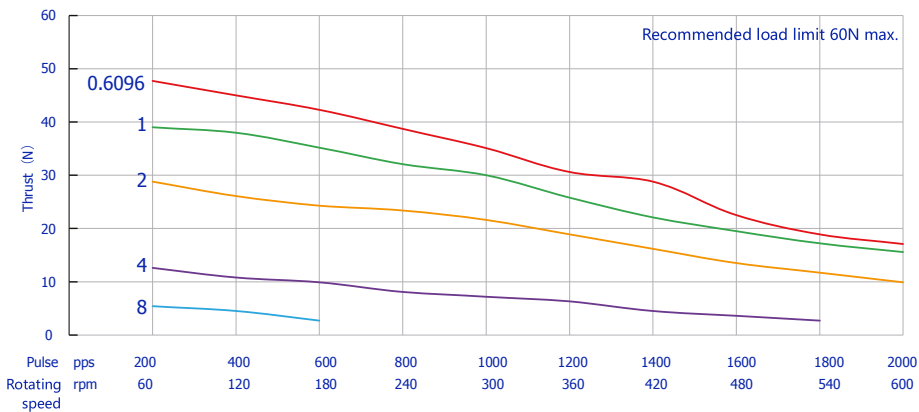
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| AA | 3,5 | 0,6096 | 0,003048 | 80 |
| AB | 3,5 | 1 | 0,005 | 40 |
| AC | 3,5 | 2 | 0,01 | 10 |
| AD | 3,5 | 4 | 0,02 | 1 |
| AE | 3,5 | 8 | 0,04 | 0 |

Note 1: other screw options available on request

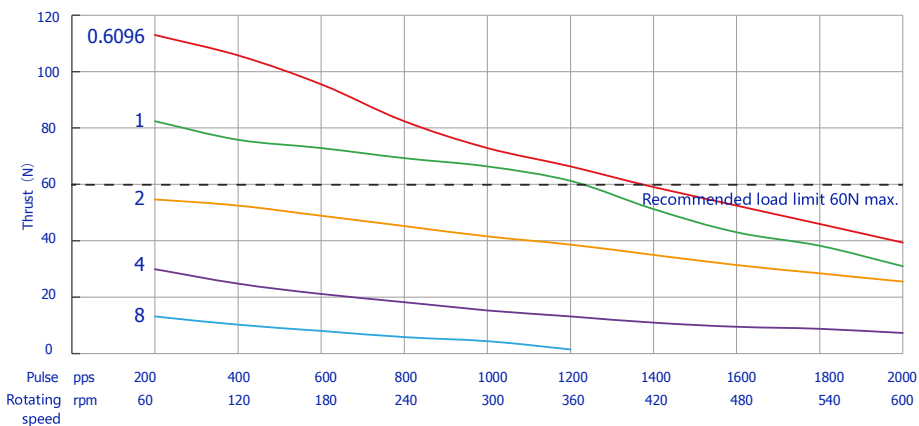
Note 2: customized machining is viable at the end of lead screw

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

| Product code reference | |
|------------------------|------------------------------------|
| 20N30-05-AA100 | |
| 20 | Frame size |
| N | Non-Captive |
| 30 | Motor length |
| 05 | Current / Phase (2-digit no comma) |
| AA | Lead screw code |
| 100 | Screw length |



20 series 30mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ3.5mm lead screw)



20 series 42mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ3.5mm lead screw)

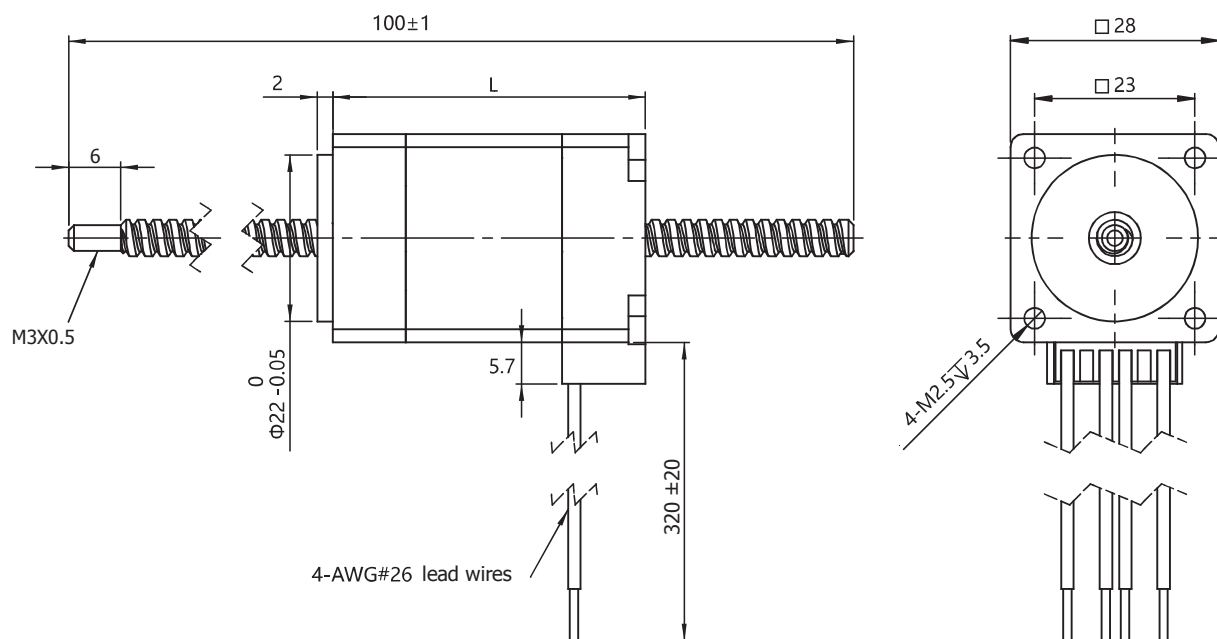
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|--------|--------|--------|-------|--------|--------|--------|--------|-------|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 |
| 0,6096 | 0,6096 | 1,2192 | 1,8288 | 2,4384 | 3,048 | 3,6576 | 4,2672 | 4,8768 | 5,4864 | 6,096 |
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

Non-Captive Linear Actuator 28N

□ 28mm

Hybrid Stepper motor



| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-------|-------|
| | Model | | 28N34 | 28N45 |
| 1 | Rated Voltage | V | 2,1 | 3,7 |
| 2 | Current / Phase | A | 1 | 1 |
| 3 | Resistance / Phase | Ω | 2,1 | 3,7 |
| 4 | Inductance / Phase | mH | 1,5 | 2,3 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 9 | 13 |
| 7 | Motor Length (L) | mm | 34 | 45 |
| 8 | Weight | g | 120 | 180 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

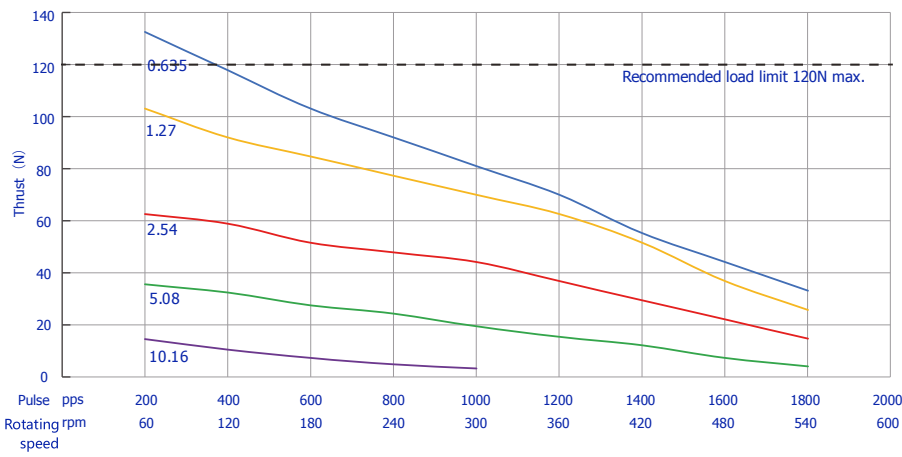
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| BA | 4,76 | 0,635 | 0,003175 | 100 |
| BB | 4,76 | 1,27 | 0,00635 | 40 |
| BC | 4,76 | 2,54 | 0,0127 | 10 |
| BD | 4,76 | 5,08 | 0,0254 | 1 |
| BE | 4,76 | 10,16 | 0,0508 | 0 |

Note 1: other screw options available on request

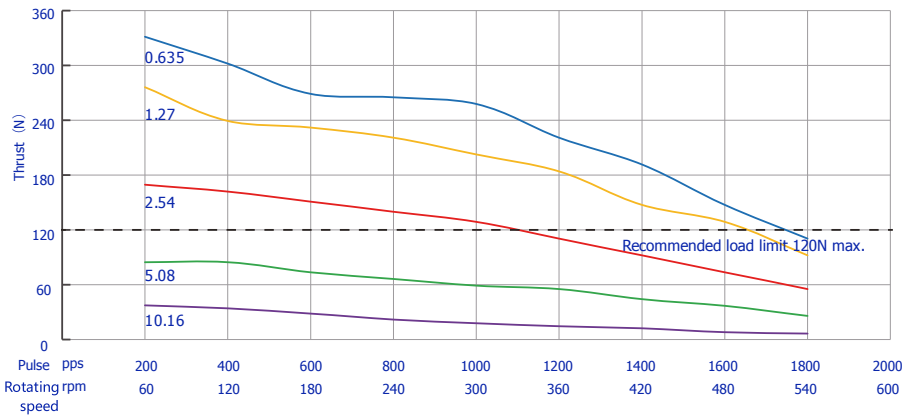
Note 2: customized machining is viable at the end of lead screw

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

| Product code reference | |
|------------------------|------------------------------------|
| 28N34-1-BA100 | |
| 28 | Frame size |
| N | Non-Captive |
| 34 | Motor length |
| 10 | Current / Phase (2-digit no comma) |
| BA | Lead screw code |
| 100 | Screw length |



28 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 4.76$ mm lead screw)



28 series 45mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 4.76$ mm lead screw)

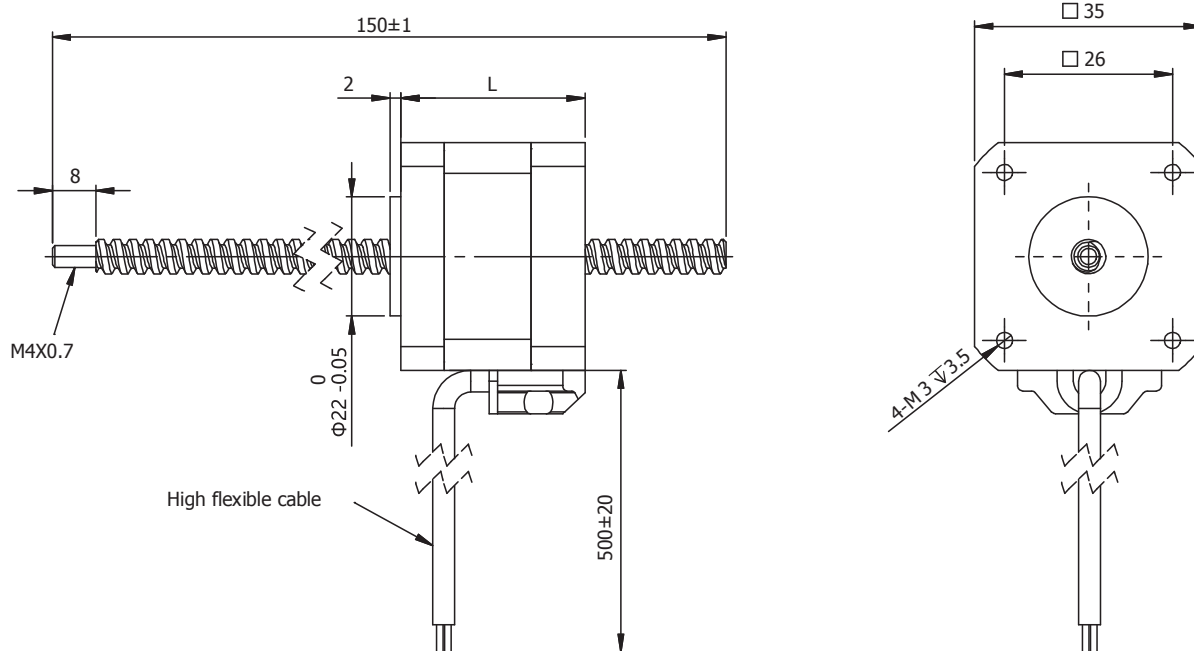
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 |
| 0,635 | 0,635 | 1,27 | 1,905 | 2,54 | 3,175 | 3,81 | 4,445 | 5,08 | 5,715 | 6,35 |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | 12,7 |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | 25,4 |
| 5,08 | 5,08 | 10,16 | 15,24 | 20,32 | 25,4 | 30,48 | 35,56 | 40,64 | 45,72 | 50,8 |
| 10,16 | 10,16 | 20,32 | 30,48 | 40,64 | 50,8 | 60,96 | 71,12 | 81,28 | 91,44 | 101,6 |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

Non-Captive Linear Actuator 35N

□ 35mm

Hybrid Stepper motor



| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-------|-----|
| Model | | 35N34 | 35N47 | |
| 1 | Rated Voltage | V | 1,4 | 2,9 |
| 2 | Current / Phase | A | 1,5 | 1,5 |
| 3 | Resistance / Phase | Ω | 0,95 | 1,9 |
| 4 | Inductance / Phase | mH | 1,4 | 3,2 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 20 | 30 |
| 7 | Motor Length (L) | mm | 34 | 47 |
| 8 | Weight | g | 190 | 230 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

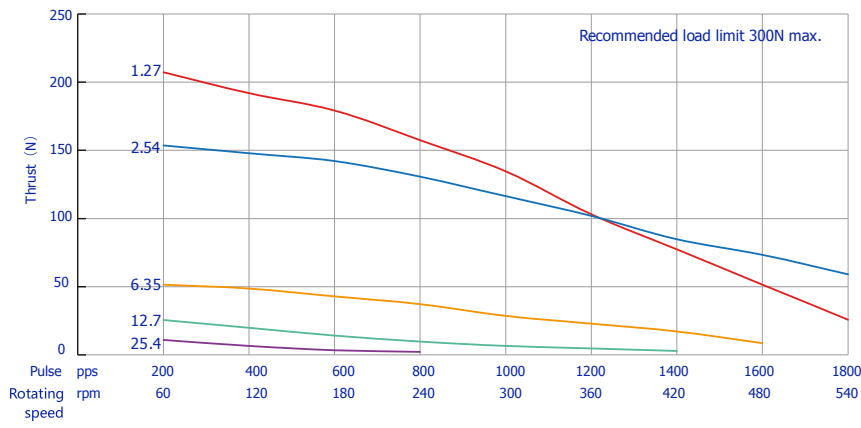
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| CA | 6,35 | 1,27 | 0,00635 | 150 |
| CB | 6,35 | 2,54 | 0,0127 | 40 |
| CC | 6,35 | 6,35 | 0,03175 | 15 |
| CD | 6,35 | 12,7 | 0,0635 | 3 |
| CE | 6,35 | 25,4 | 0,127 | 0 |

Note 1: other screw options available on request

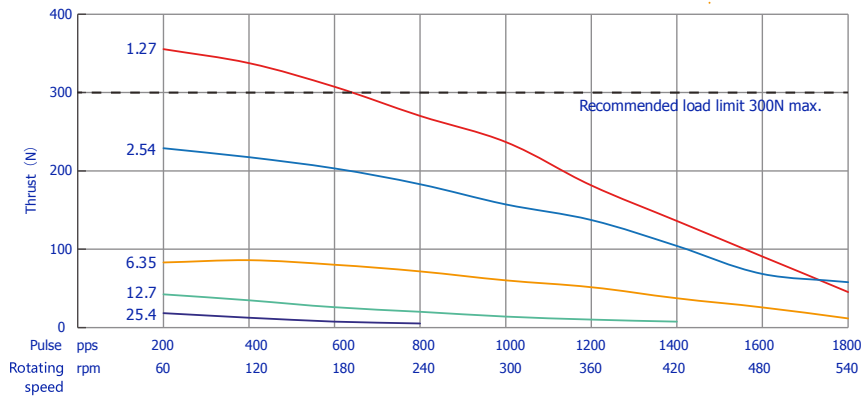
Note 2: customized machining is viable at the end of lead screw

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

| Product code reference | |
|------------------------|------------------------------------|
| 35N34-15-CA100 | |
| 35 | Frame size |
| N | Non-Captive |
| 34 | Motor length |
| 15 | Current / Phase (2-digit no comma) |
| CA | Lead screw code |
| 100 | Screw length |



35 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



35 series 47mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)

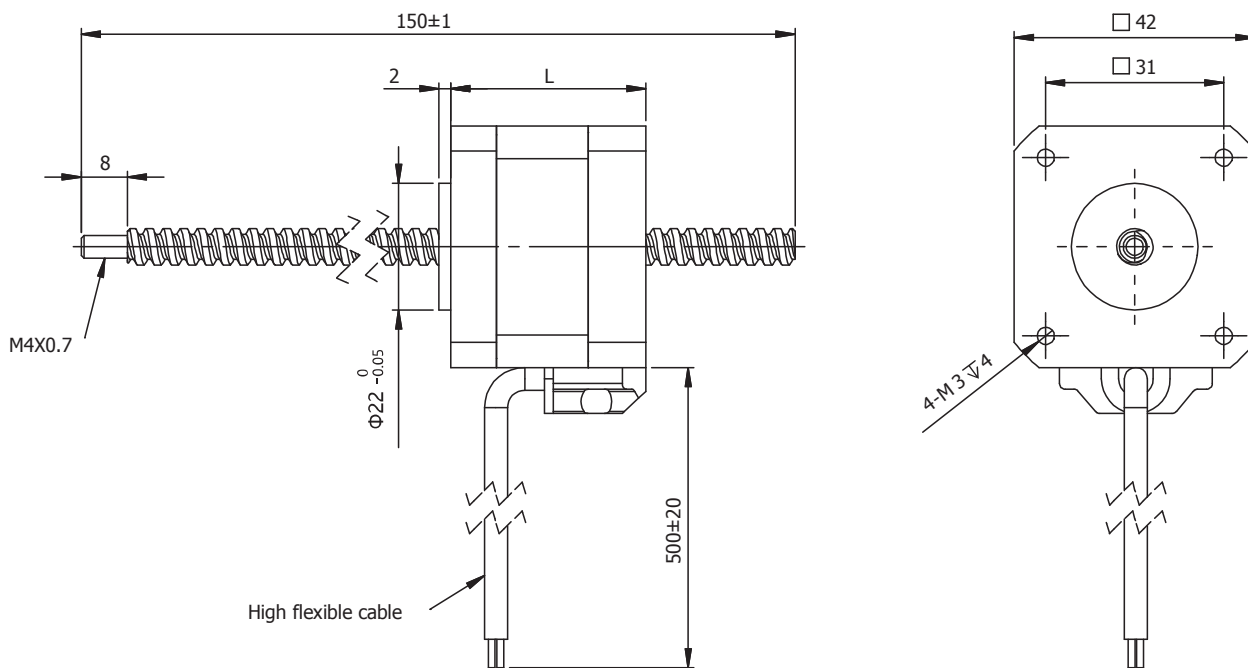
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|------|-------|-------|-------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 6,35 | 6,35 | 12,7 | 19,05 | 25,4 | 31,75 | 38,1 | 44,45 | 50,8 | 57,15 | |
| 12,7 | 12,7 | 25,4 | 38,1 | 50,8 | 63,5 | 76,2 | 88,9 | 101,6 | 114,3 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

Non-Captive Linear Actuator 42N

□ 42mm

Hybrid Stepper motor



| Actuator Specification | | 42N34 | 42N40 | 42N48 | 42N60 | |
|------------------------|--------------------|------------------|-------|-------|-------|-----|
| 1 | Rated Voltage | V | 2,6 | 3,3 | 2 | 2,5 |
| 2 | Current / Phase | A | 1,5 | 1,5 | 2,5 | 2,5 |
| 3 | Resistance / Phase | Ω | 1,8 | 2,2 | 0,8 | 1 |
| 4 | Inductance / Phase | mH | 2,6 | 4,6 | 1,8 | 2,8 |
| 5 | n° of Lead Wires | | 4 | 4 | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 35 | 55 | 70 | 105 |
| 7 | Motor Length (L) | mm | 34 | 40 | 48 | 60 |
| 8 | Weight | g | 250 | 290 | 385 | 450 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

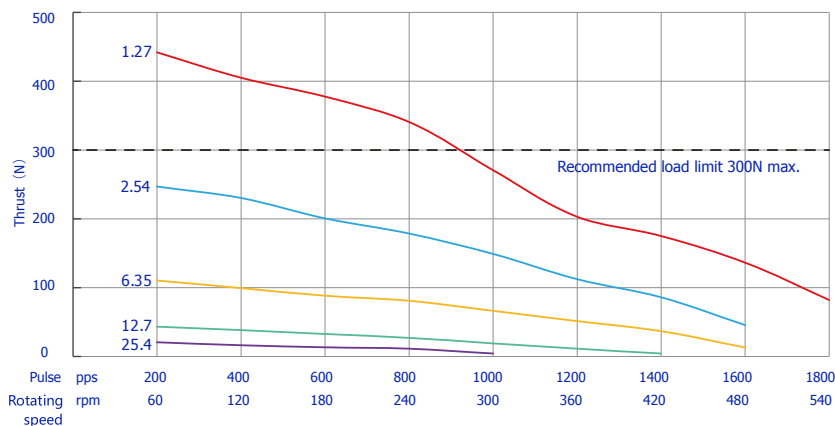
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| CA | 6,35 | 1,27 | 0,00635 | 150 |
| CB | 6,35 | 2,54 | 0,0127 | 40 |
| CC | 6,35 | 6,35 | 0,03175 | 15 |
| CD | 6,35 | 12,7 | 0,0635 | 3 |
| CE | 6,35 | 25,4 | 0,127 | 0 |

Note 1: other screw options available on request

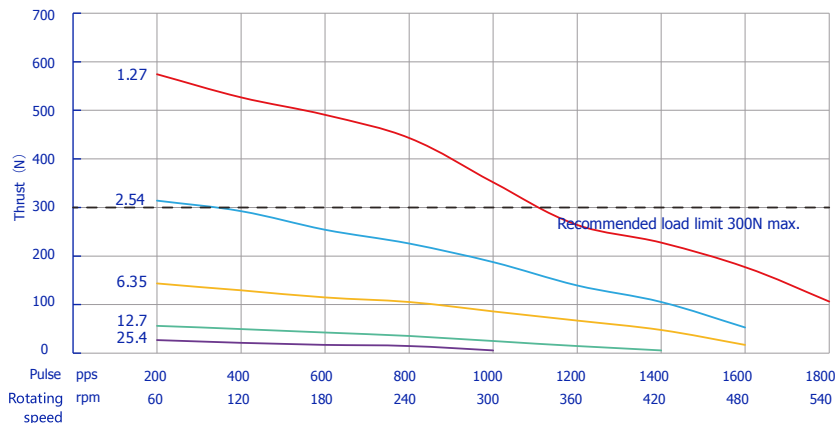
Note 2: customized machining is viable at the end of lead screw

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

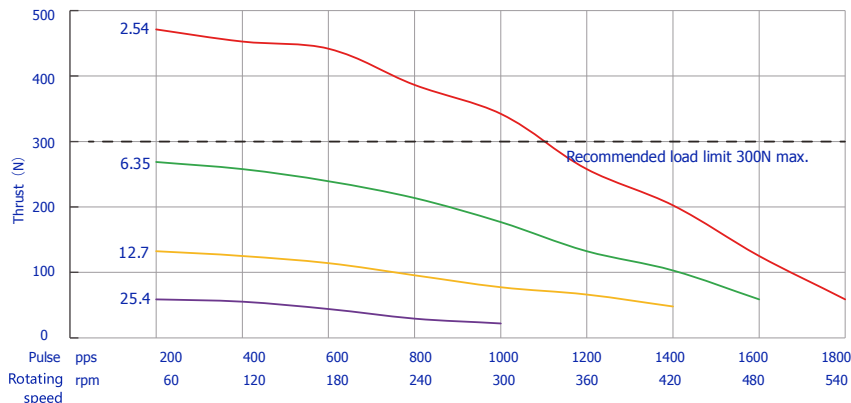
| Product code reference | |
|------------------------|------------------------------------|
| 42N34-15-CA100 | |
| 42 | Frame size |
| N | Non-Captive |
| 34 | Motor length |
| 15 | Current / Phase (2-digit no comma) |
| CA | Lead screw code |
| 100 | Screw length |



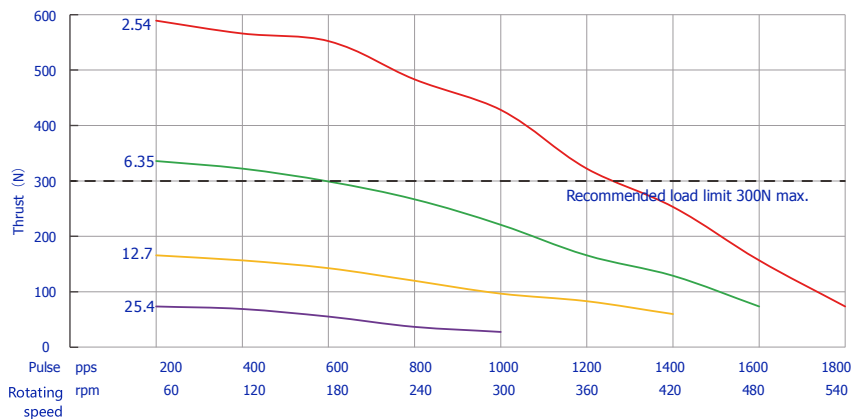
42 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



42 series 40mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



42 series 48mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



42 series 60mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)

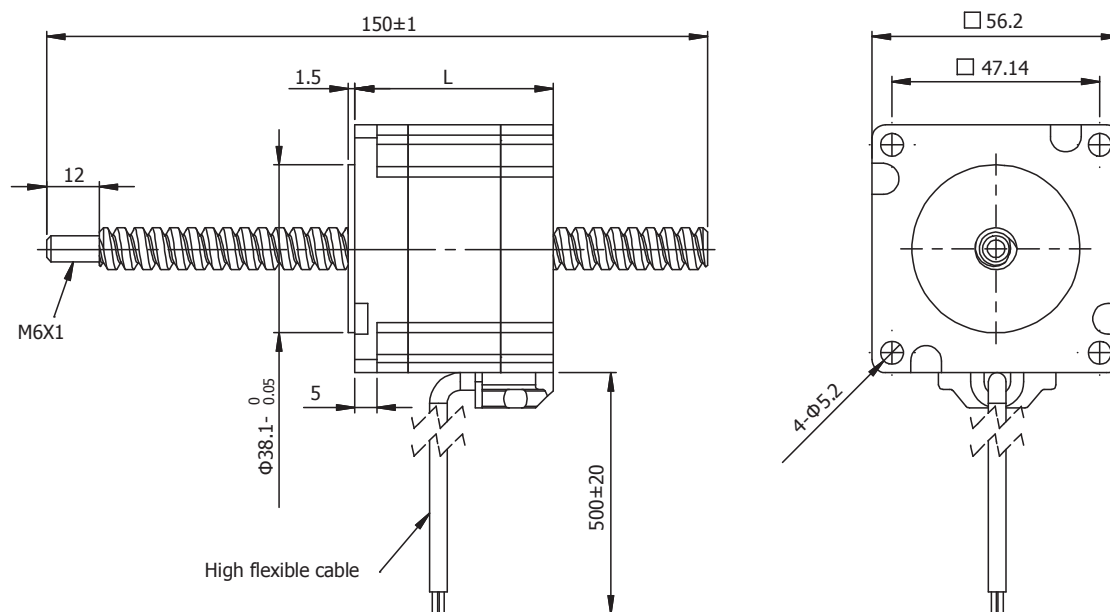
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|------|-------|-------|-------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 6,35 | 6,35 | 12,7 | 19,05 | 25,4 | 31,75 | 38,1 | 44,45 | 50,8 | 57,15 | |
| 12,7 | 12,7 | 25,4 | 38,1 | 50,8 | 63,5 | 76,2 | 88,9 | 101,6 | 114,3 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 40V

Non-Captive Linear Actuator 57N

□ 57mm

Hybrid Stepper motor



| Actuator Specification | | | 57N45 | 57N55 | 57N65 | 57N75 |
|------------------------|--------------------|------------------|-------|-------|-------|-------|
| 1 | Model | | | | | |
| 1 | Rated Voltage | V | 2,3 | 3 | 3,1 | 3,8 |
| 2 | Current / Phase | A | 3 | 3 | 4 | 4 |
| 3 | Resistance / Phase | Ω | 0,75 | 1 | 0,78 | 0,95 |
| 4 | Inductance / Phase | mH | 2,5 | 4,5 | 3,3 | 4,5 |
| 5 | n° of Lead Wires | | 4 | 4 | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 150 | 300 | 400 | 480 |
| 7 | Motor Length (L) | mm | 45 | 55 | 65 | 75 |
| 8 | Weight | g | 580 | 710 | 880 | 950 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

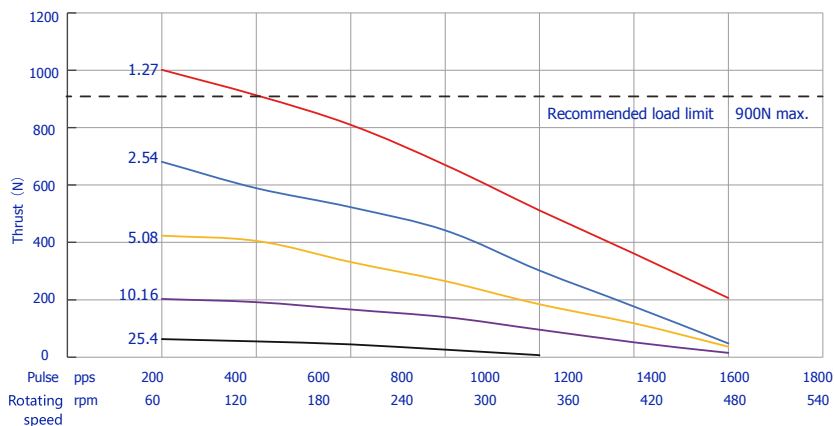
| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| DA | 9,525 | 1,27 | 0,00635 | 800 |
| DB | 9,525 | 2,54 | 0,0127 | 300 |
| DC | 9,525 | 5,08 | 0,0254 | 90 |
| DD | 9,525 | 10,16 | 0,0508 | 30 |
| DE | 9,525 | 25,4 | 0,127 | 6 |

Note 1: other screw options available on request

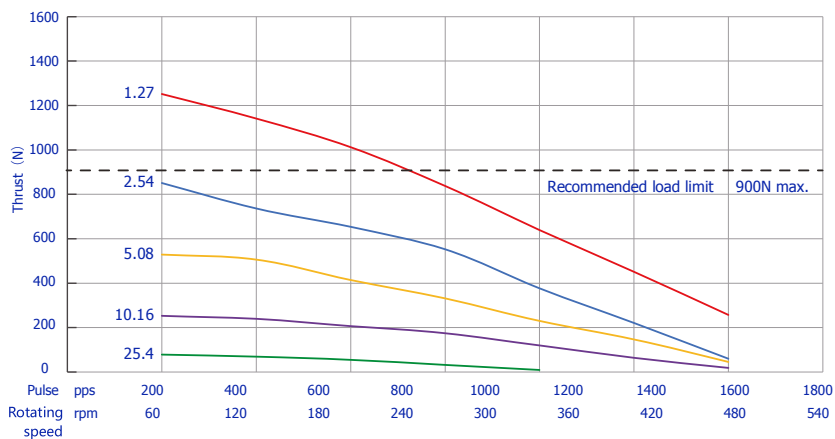
Note 2: customized machining is viable at the end of lead screw

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

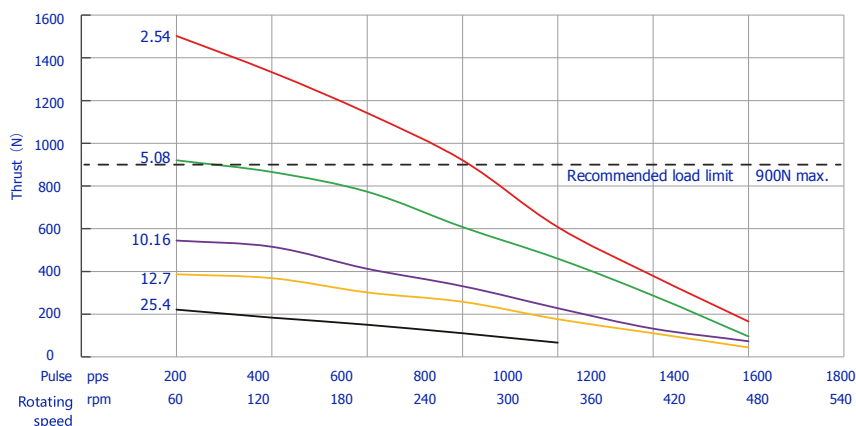
| Product code reference | |
|------------------------|------------------------------------|
| 57N45-30-DA100 | |
| 57 | Frame size |
| N | Non-Captive |
| 45 | Motor length |
| 30 | Current / Phase (2-digit no comma) |
| DA | Lead screw code |
| 100 | Screw length |



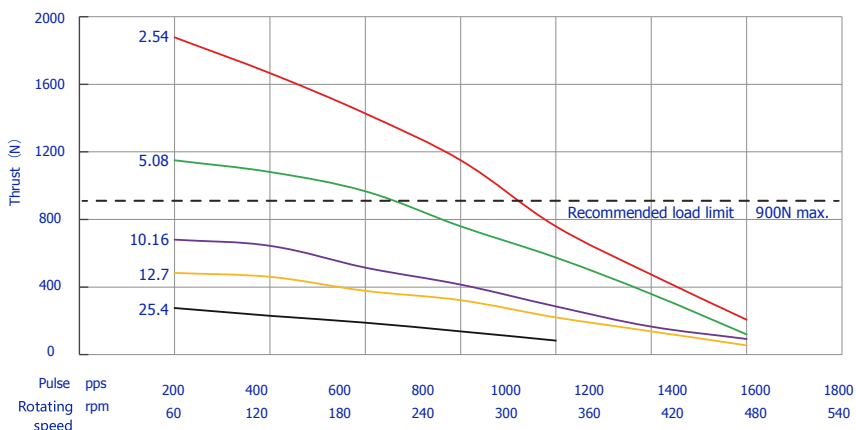
57 series 45mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 55mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 65mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 75mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)

| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|-------|-------|-------|------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 5,08 | 5,08 | 10,16 | 15,24 | 20,32 | 25,4 | 30,48 | 35,56 | 40,64 | 45,72 | |
| 10,16 | 10,16 | 20,32 | 30,48 | 40,64 | 50,8 | 60,96 | 71,12 | 81,28 | 91,44 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 40V



Captive Linear Actuators

Advantages at a glance

Small to medium load ratings

High accuracy

Customizable

Captive Hybrid Stepper Linear Actuators

| | |
|-----|-----|
| 20C | 362 |
| 28C | 364 |
| 35C | 366 |
| 42C | 368 |
| 57C | 370 |

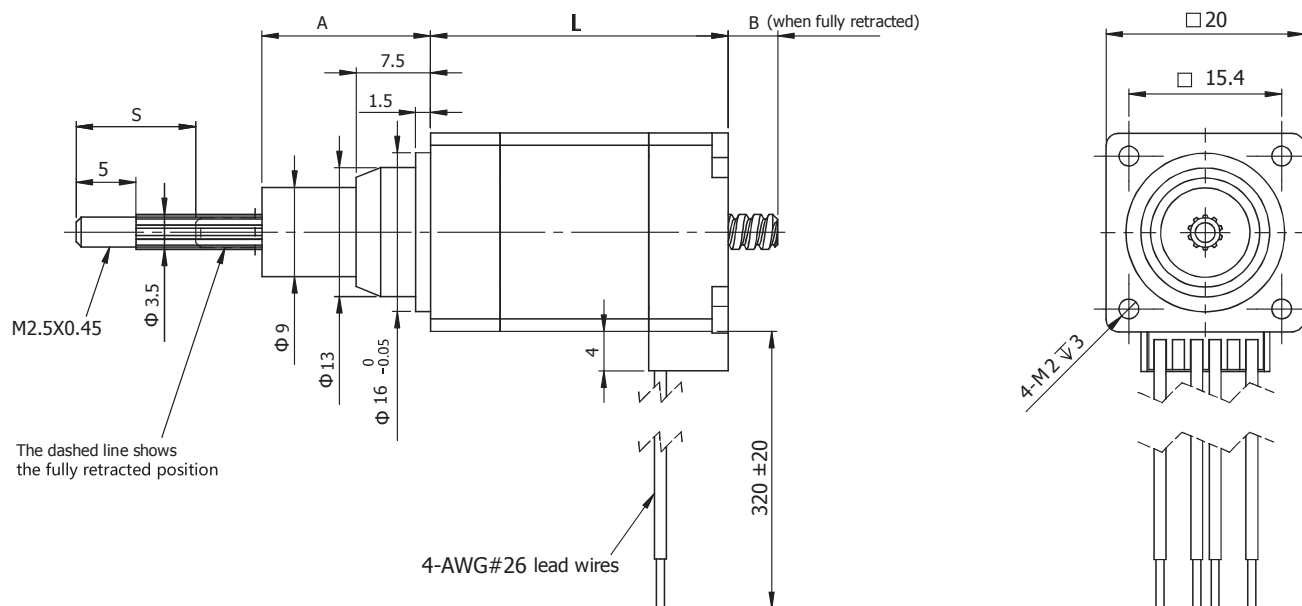
Our Captive Stepper Motor Actuators feature a precision lead screw, nut and a spline shaft to produce accurate and repeatable linear motion. Actuators are manufactured in NEMA sizes 8, 11, 14, 17 and 23. These captive linear stepper motor actuators operate with a precision lead screw and spline shaft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

* Max. Axial Load

Captive Linear Actuator 20C

□ 20mm

Hybrid Stepper motor



| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-----|------|
| Model | 20C30 | 20C42 | | |
| 1 | Rated Voltage | V | 2,5 | 6,3 |
| 2 | Current / Phase | A | 0,5 | 0,5 |
| 3 | Resistance / Phase | Ω | 5,1 | 12,5 |
| 4 | Inductance / Phase | mH | 1,5 | 11 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 2 | 3 |
| 7 | Motor Length (L) | mm | 30 | 42 |
| 8 | Weight | g | 50 | 80 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| AA | 3,5 | 0,6096 | 0,003048 | 80 |
| AB | 3,5 | 1 | 0,005 | 40 |
| AC | 3,5 | 2 | 0,01 | 10 |
| AD | 3,5 | 4 | 0,02 | 1 |
| AE | 3,5 | 8 | 0,04 | 0 |

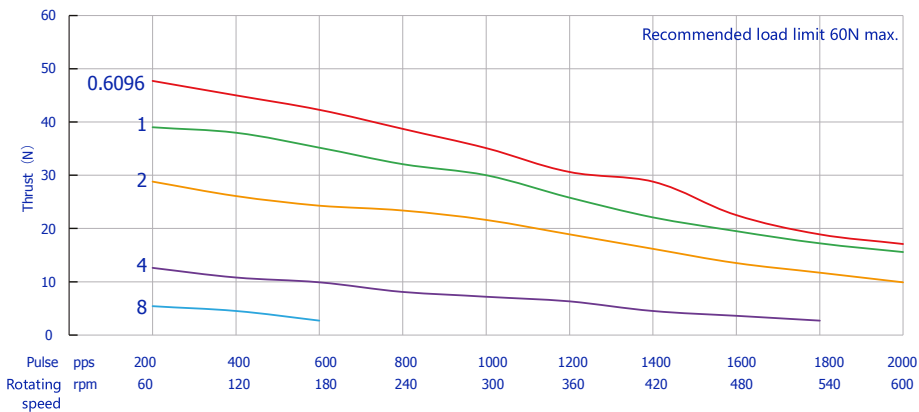
Note 1: other screw options available on request

Note 2: customized machining is viable at the end of lead screw

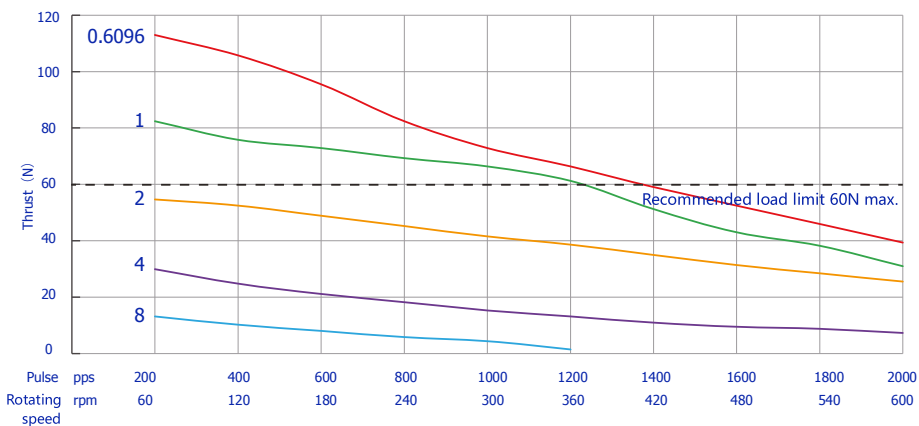
| Product code reference | |
|------------------------|------------------------------------|
| 20C30-05-AA127 | |
| 20 | Frame size |
| C | Captive |
| 30 | Motor length |
| 05 | Current / Phase (2-digit no comma) |
| AA | Lead screw code |
| 127 | Stroke S (3-digit no comma) |

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

| Standard Stroke options | | | |
|-------------------------|--------|------------|------------|
| Stroke S (mm) | A (mm) | B (mm) | |
| | | Motor L=30 | Motor L=42 |
| 9 | 14,6 | 0,4 | 0 |
| 12,7 | 18,3 | 4,1 | 0 |
| 19,1 | 24,7 | 10,5 | 0,3 |
| 25,4 | 31 | 16,8 | 6,6 |
| 31,8 | 37,4 | 23,2 | 13 |
| 38,1 | 43,7 | 29,5 | 19,3 |
| 50,8 | 56,4 | 42,2 | 32 |



20 series 30mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 3.5mm lead screw)



20 series 42mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 3.5mm lead screw)

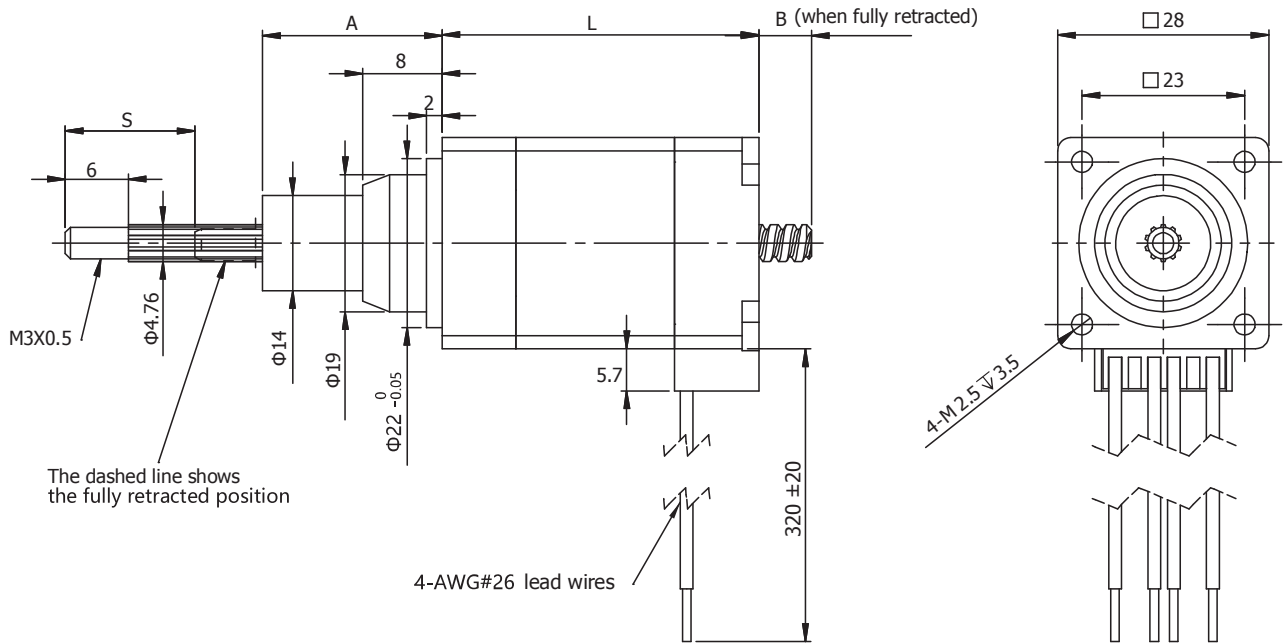
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|--------|--------|--------|-------|--------|--------|--------|--------|-------|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 |
| 0,6096 | 0,6096 | 1,2192 | 1,8288 | 2,4384 | 3,048 | 3,6576 | 4,2672 | 4,8768 | 5,4864 | 6,096 |
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

Captive Linear Actuator 28C

Hybrid Stepper motor

□ 28mm



| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-------|-------|
| | Model | | 28C34 | 28C45 |
| 1 | Rated Voltage | V | 2,1 | 3,7 |
| 2 | Current / Phase | A | 1 | 1 |
| 3 | Resistance / Phase | Ω | 2,1 | 3,7 |
| 4 | Inductance / Phase | mH | 1,5 | 2,3 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 9 | 13 |
| 7 | Motor Length (L) | mm | 34 | 45 |
| 8 | Weight | g | 120 | 180 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| BA | 4,76 | 0,635 | 0,003175 | 100 |
| BB | 4,76 | 1,27 | 0,00635 | 40 |
| BC | 4,76 | 2,54 | 0,0127 | 10 |
| BD | 4,76 | 5,08 | 0,0254 | 1 |
| BE | 4,76 | 10,16 | 0,0508 | 0 |

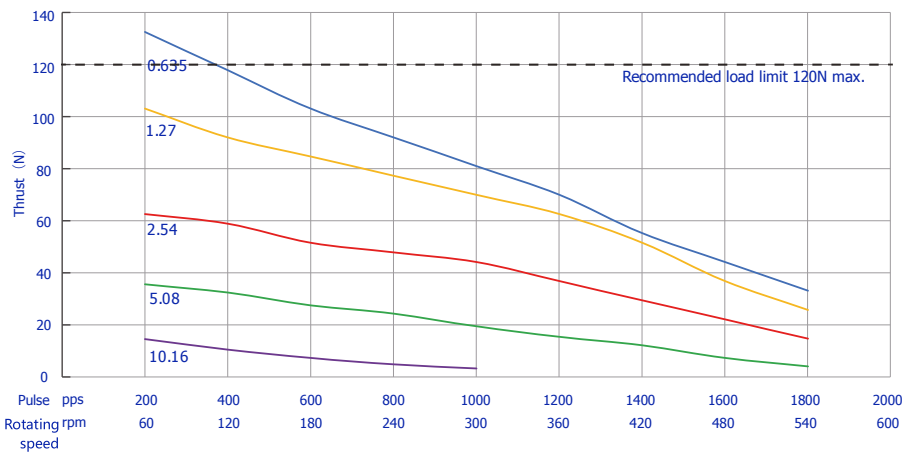
Note 1: other screw options available on request

Note 2: customized machining is viable at the end of lead screw

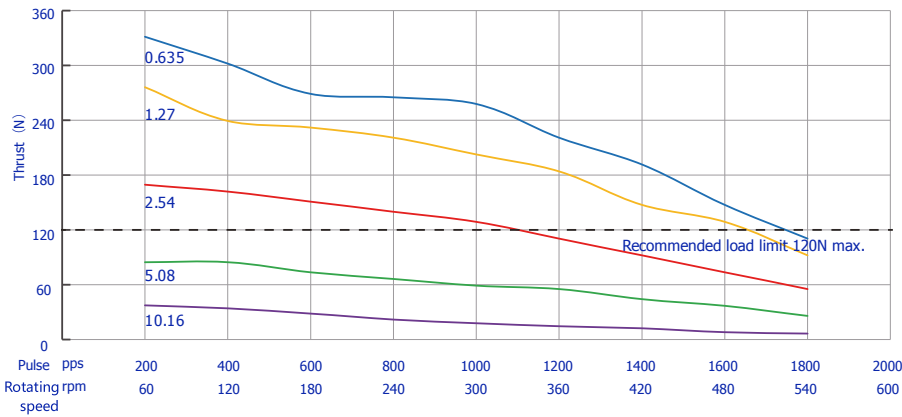
| Product code reference | |
|------------------------|------------------------------------|
| 28C34-10-BA127 | |
| 28 | Frame size |
| C | Captive |
| 34 | Motor length |
| 10 | Current / Phase (2-digit no comma) |
| BA | Lead screw code |
| 127 | Stroke S (3-digit no comma) |

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

| Standard Stroke options | | | |
|-------------------------|--------|------------|------------|
| Stroke S (mm) | A (mm) | B (mm) | |
| | | Motor L=34 | Motor L=45 |
| 12,7 | 19,8 | 6,5 | 0 |
| 19,1 | 26,2 | 12,9 | 0 |
| 25,4 | 32,5 | 19,2 | 5,9 |
| 31,8 | 38,9 | 25,6 | 12,3 |
| 38,1 | 45,2 | 31,9 | 18,6 |
| 50,8 | 57,9 | 44,6 | 31,3 |
| 63,5 | 70,6 | 57,3 | 44 |



28 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 4.76$ mm lead screw)



28 series 45mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
($\Phi 4.76$ mm lead screw)

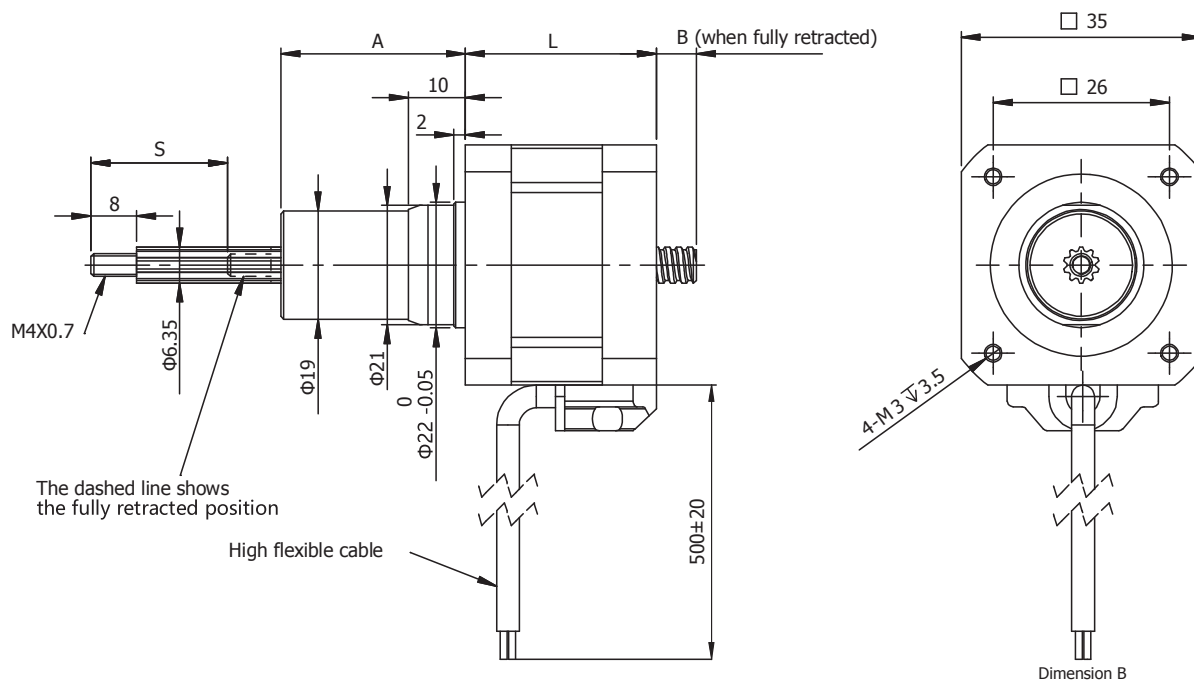
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 |
| 0,635 | 0,635 | 1,27 | 1,905 | 2,54 | 3,175 | 3,81 | 4,445 | 5,08 | 5,715 | 6,35 |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | 12,7 |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | 25,4 |
| 5,08 | 5,08 | 10,16 | 15,24 | 20,32 | 25,4 | 30,48 | 35,56 | 40,64 | 45,72 | 50,8 |
| 10,16 | 10,16 | 20,32 | 30,48 | 40,64 | 50,8 | 60,96 | 71,12 | 81,28 | 91,44 | 101,6 |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

Captive Linear Actuator 35C

□ 35mm

Hybrid Stepper motor



| Actuator Specification | | | | |
|------------------------|--------------------|------------------|-------|-------|
| | Model | | 35C34 | 35C47 |
| 1 | Rated Voltage | V | 1,4 | 2,9 |
| 2 | Current / Phase | A | 1,5 | 1,5 |
| 3 | Resistance / Phase | Ω | 0,95 | 1,9 |
| 4 | Inductance / Phase | mH | 1,4 | 3,2 |
| 5 | n° of Lead Wires | | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 20 | 30 |
| 7 | Motor Length (L) | mm | 34 | 47 |
| 8 | Weight | g | 190 | 230 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| CA | 6,35 | 1,27 | 0,00635 | 150 |
| CB | 6,35 | 2,54 | 0,0127 | 40 |
| CC | 6,35 | 6,35 | 0,03175 | 15 |
| CD | 6,35 | 12,7 | 0,0635 | 3 |
| CE | 6,35 | 25,4 | 0,127 | 0 |

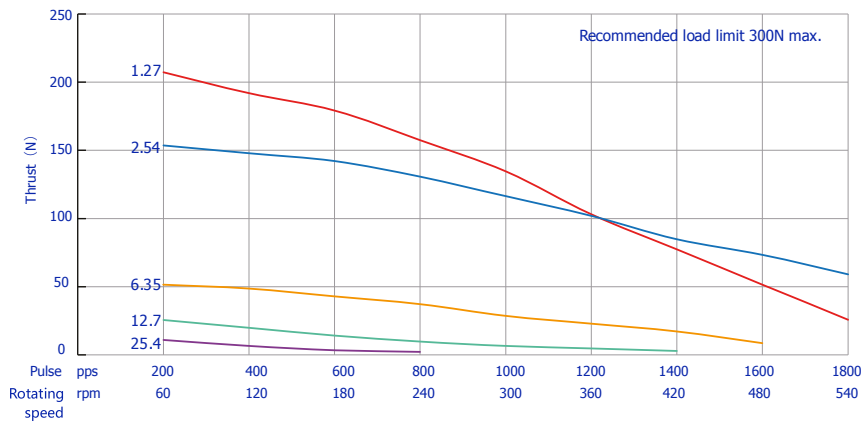
Note 1: other screw options available on request

Note 2: customized machining is viable at the end of lead screw

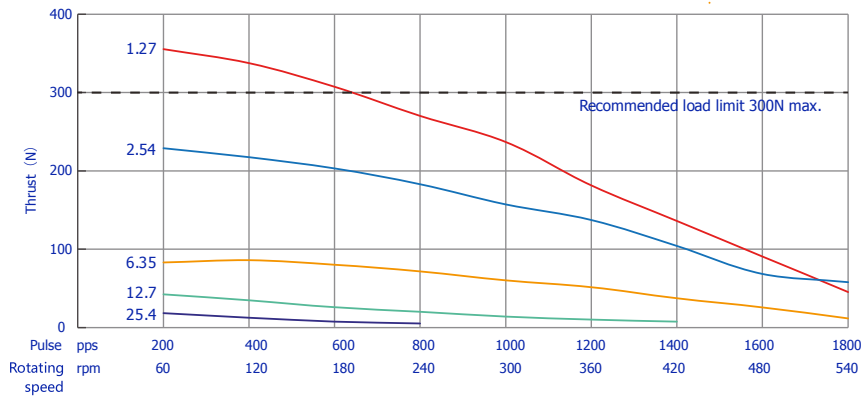
| Product code reference | |
|------------------------|------------------------------------|
| 35C34-15-CA127 | |
| 35 | Frame size |
| C | Captive |
| 34 | Motor length |
| 15 | Current / Phase (2-digit no comma) |
| CA | Lead screw code |
| 127 | Stroke S (3-digit no comma) |

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

| Standard Stroke options | | | |
|-------------------------|--------|------------|------------|
| Stroke S (mm) | A (mm) | B (mm) | |
| | | Motor L=34 | Motor L=47 |
| 12,7 | 20,6 | 8,4 | 0 |
| 19,1 | 27 | 14,8 | 0,8 |
| 25,4 | 33,3 | 21,1 | 7,1 |
| 31,8 | 39,7 | 27,5 | 13,5 |
| 38,1 | 46 | 33,8 | 19,8 |
| 50,8 | 58,7 | 46,5 | 32,5 |
| 63,5 | 71,4 | 59,2 | 45,2 |



35 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



35 series 47mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)

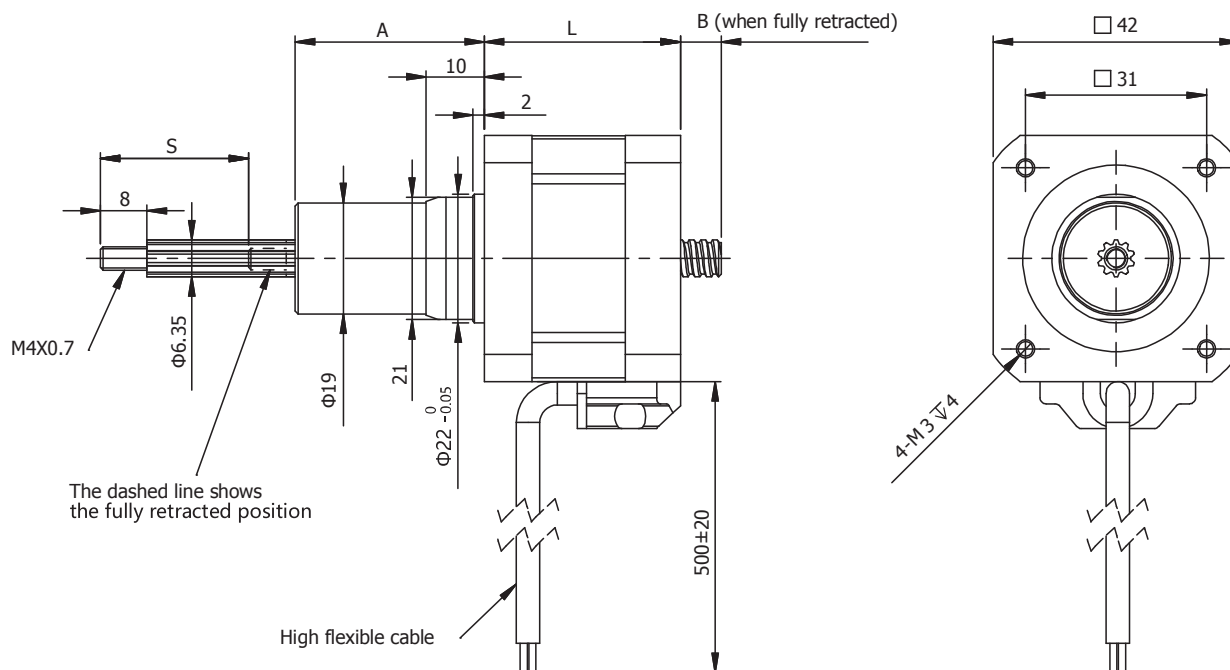
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|------|-------|-------|-------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 6,35 | 6,35 | 12,7 | 19,05 | 25,4 | 31,75 | 38,1 | 44,45 | 50,8 | 57,15 | |
| 12,7 | 12,7 | 25,4 | 38,1 | 50,8 | 63,5 | 76,2 | 88,9 | 101,6 | 114,3 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 24V

Captive Linear Actuator 42C

□ 42mm

Hybrid Stepper motor



| Actuator Specification | | | 42C34 | 42C40 | 42C48 | 42C60 |
|------------------------|--------------------|------------------|-------|-------|-------|-------|
| 1 | Rated Voltage | V | 2,6 | 3,3 | 2 | 2,5 |
| 2 | Current / Phase | A | 1,5 | 1,5 | 2,5 | 2,5 |
| 3 | Resistance / Phase | Ω | 1,8 | 2,2 | 0,8 | 1 |
| 4 | Inductance / Phase | mH | 2,6 | 4,6 | 1,8 | 2,8 |
| 5 | n° of Lead Wires | | 4 | 4 | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 35 | 55 | 70 | 105 |
| 7 | Motor Length (L) | mm | 34 | 40 | 48 | 60 |
| 8 | Weight | g | 250 | 290 | 385 | 450 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| CA | 6,35 | 1,27 | 0,00635 | 150 |
| CB | 6,35 | 2,54 | 0,0127 | 40 |
| CC | 6,35 | 6,35 | 0,03175 | 15 |
| CD | 6,35 | 12,7 | 0,0635 | 3 |
| CE | 6,35 | 25,4 | 0,127 | 0 |

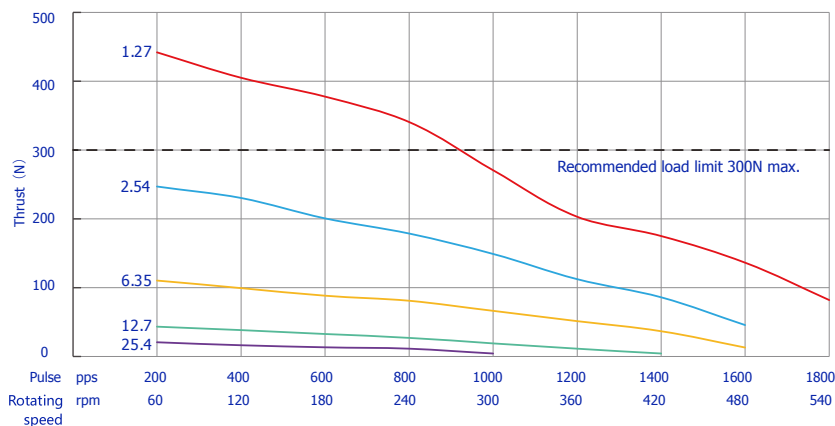
Note 1: other screw options available on request

Note 2: customized machining is viable at the end of lead screw

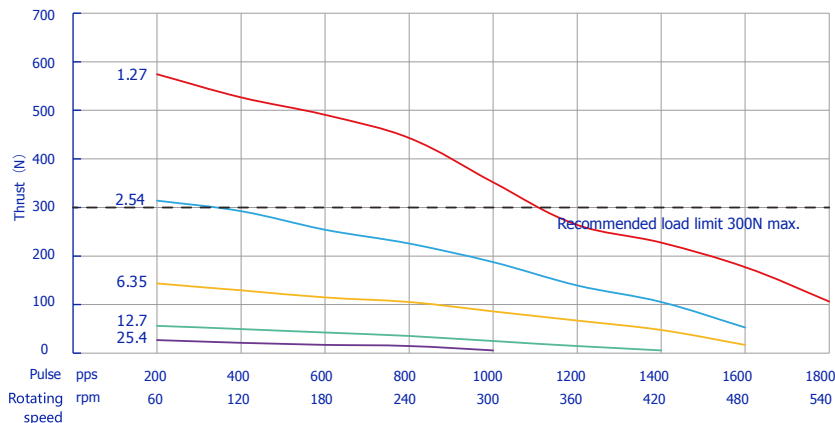
| Product code reference | |
|------------------------|------------------------------------|
| 42C34-15-CA127 | |
| 42 | Frame size |
| C | Captive |
| 34 | Motor length |
| 15 | Current / Phase (2-digit no comma) |
| CA | Lead screw code |
| 127 | Stroke S (3-digit no comma) |

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

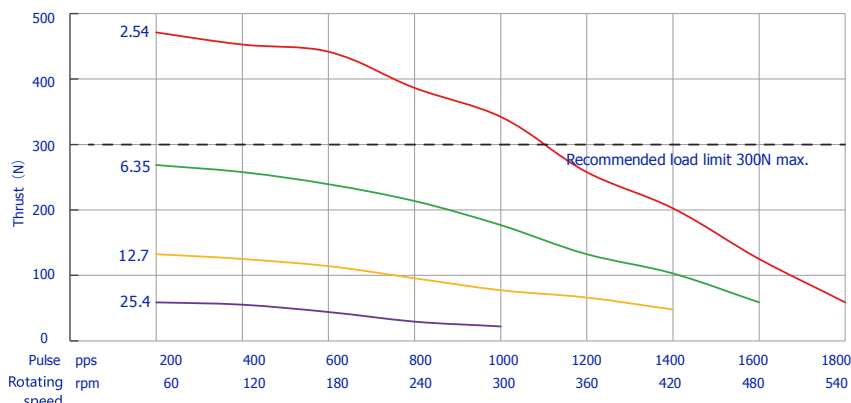
| Standard Stroke options | | | | | |
|-------------------------|--------|------------|------------|------------|------------|
| Stroke S (mm) | A (mm) | B (mm) | | | |
| | | Motor L=34 | Motor L=40 | Motor L=48 | Motor L=60 |
| 12,7 | 20,6 | 6,4 | 0,4 | 0 | 0 |
| 19,1 | 27 | 12,8 | 6,8 | 0 | 0 |
| 25,4 | 33,3 | 19,1 | 13,1 | 5,1 | 0 |
| 31,8 | 39,7 | 25,5 | 19,5 | 11,5 | 0 |
| 38,1 | 46 | 31,8 | 25,8 | 17,8 | 5,8 |
| 50,8 | 58,7 | 44,5 | 38,5 | 30,5 | 18,5 |
| 63,5 | 71,4 | 57,2 | 51,2 | 43,2 | 31,2 |



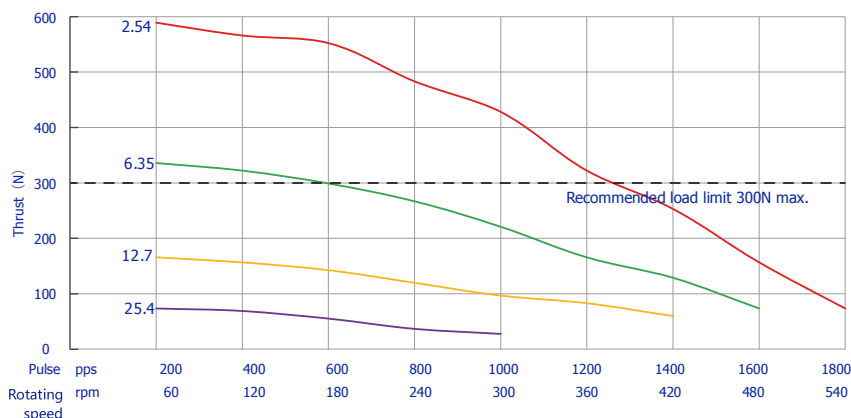
42 series 34mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



42 series 40mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



42 series 48mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)



42 series 60mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ 6.35mm lead screw)

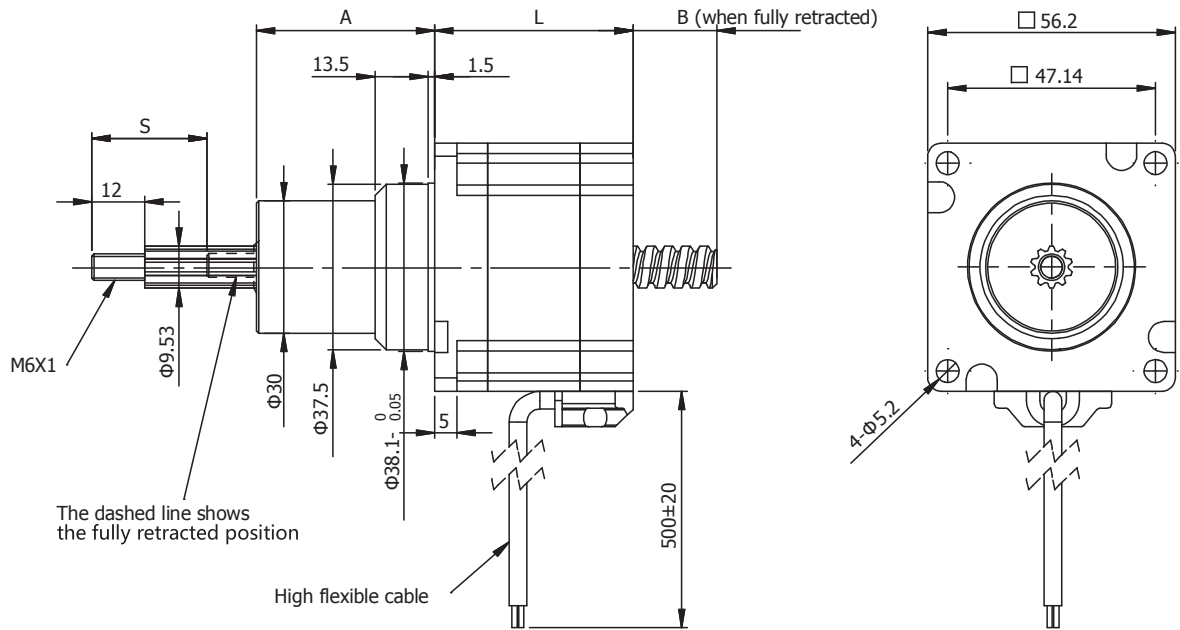
| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|------|-------|-------|-------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 6,35 | 6,35 | 12,7 | 19,05 | 25,4 | 31,75 | 38,1 | 44,45 | 50,8 | 57,15 | |
| 12,7 | 12,7 | 25,4 | 38,1 | 50,8 | 63,5 | 76,2 | 88,9 | 101,6 | 114,3 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 40V

Captive Linear Actuator 57C

Hybrid Stepper motor

□ 57mm



| Actuator Specification | | | 57C45 | 57C55 | 57C65 | 57C75 |
|------------------------|--------------------|------------------|-------|-------|-------|-------|
| 1 | Rated Voltage | V | 2,3 | 3 | 3,1 | 3,8 |
| 2 | Current / Phase | A | 3 | 3 | 4 | 4 |
| 3 | Resistance / Phase | Ω | 0,75 | 1 | 0,78 | 0,95 |
| 4 | Inductance / Phase | mH | 2,5 | 4,5 | 3,3 | 4,5 |
| 5 | n° of Lead Wires | | 4 | 4 | 4 | 4 |
| 6 | Rotor Inertia | gcm ² | 150 | 300 | 400 | 480 |
| 7 | Motor Length (L) | mm | 45 | 55 | 65 | 75 |
| 8 | Weight | g | 580 | 710 | 880 | 950 |

| Actuator Characteristics | |
|----------------------------------|-------------|
| Item | |
| Wiring | Bipolar |
| Step angle | 1,8° |
| Insulation Class | B |
| Protection Class | IP20 |
| Operating Temperature | -20 to 50°C |
| Temperature Rise | max. 80°C |
| Dielectric Strength (for 1 sec.) | 500VAC |

| Standard Lead Screws - ACME | | | | |
|-----------------------------|--------|-----------|-----------|---------------------|
| Code | Ø (mm) | Lead (mm) | Step (mm) | Power off force (N) |
| DA | 9,525 | 1,27 | 0,00635 | 800 |
| DB | 9,525 | 2,54 | 0,0127 | 300 |
| DC | 9,525 | 5,08 | 0,0254 | 90 |
| DD | 9,525 | 10,16 | 0,0508 | 30 |
| DE | 9,525 | 25,4 | 0,127 | 6 |

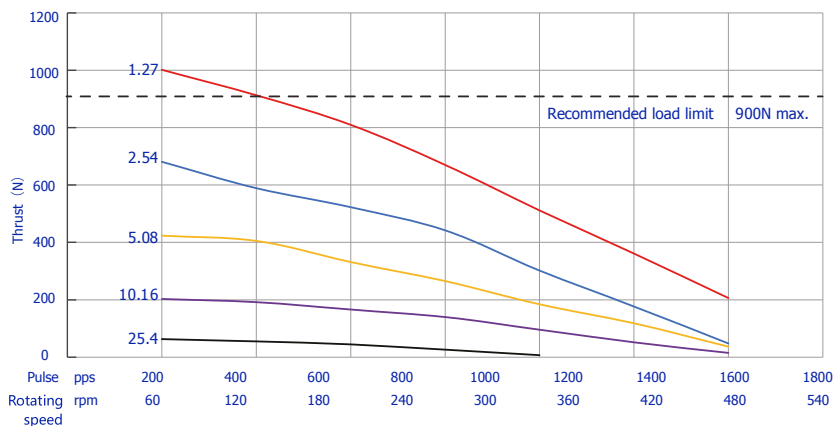
Note 1: other screw options available on request

Note 2: customized machining is viable at the end of lead screw

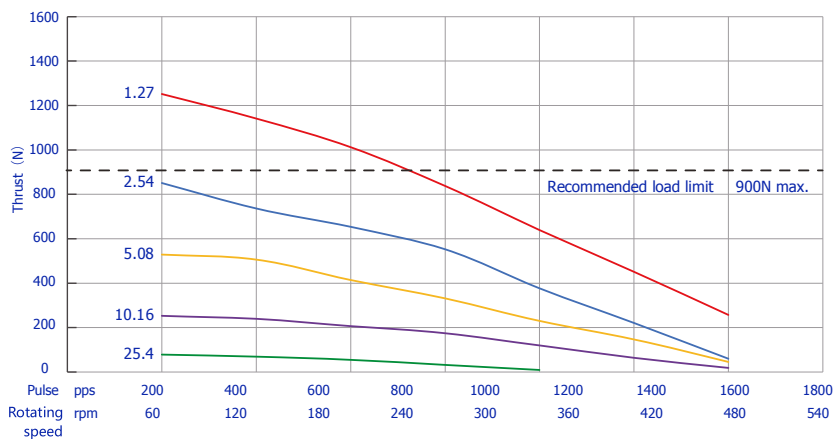
| Product code reference | |
|------------------------|------------------------------------|
| 57C45-30-DA127 | |
| 57 | Frame size |
| C | Captive |
| 45 | Motor length |
| 30 | Current / Phase (2-digit no comma) |
| DA | Lead screw code |
| 127 | Stroke S (3-digit no comma) |

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

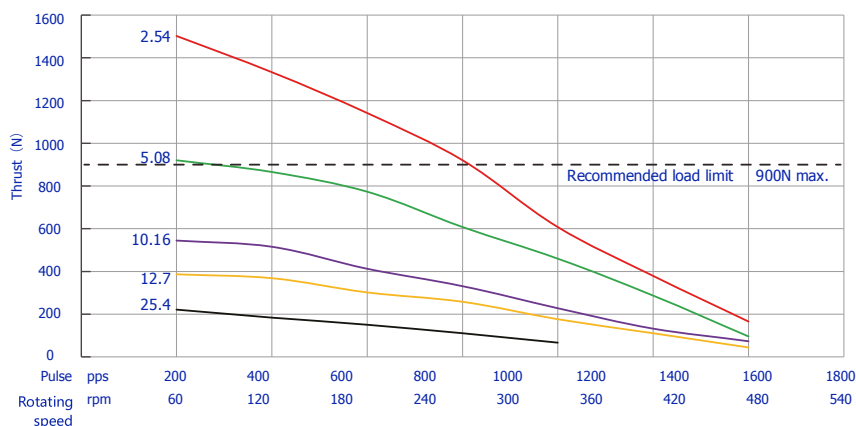
| Standard Stroke options | | | | | |
|-------------------------|--------|------------|------------|------------|------------|
| Stroke S (mm) | A (mm) | B (mm) | | | |
| | | Motor L=45 | Motor L=55 | Motor L=65 | Motor L=75 |
| 12,7 | 24,1 | 1,1 | 0 | 0 | 0 |
| 19,1 | 30,5 | 7,5 | 0 | 0 | 0 |
| 25,4 | 36,8 | 13,8 | 4,8 | 0 | 0 |
| 31,8 | 43,2 | 20,2 | 11,2 | 0,2 | 0 |
| 38,1 | 49,5 | 26,5 | 17,5 | 6,5 | 0 |
| 50,8 | 62,2 | 39,2 | 30,2 | 19,2 | 9,2 |
| 63,5 | 74,9 | 51,9 | 42,9 | 31,9 | 21,9 |



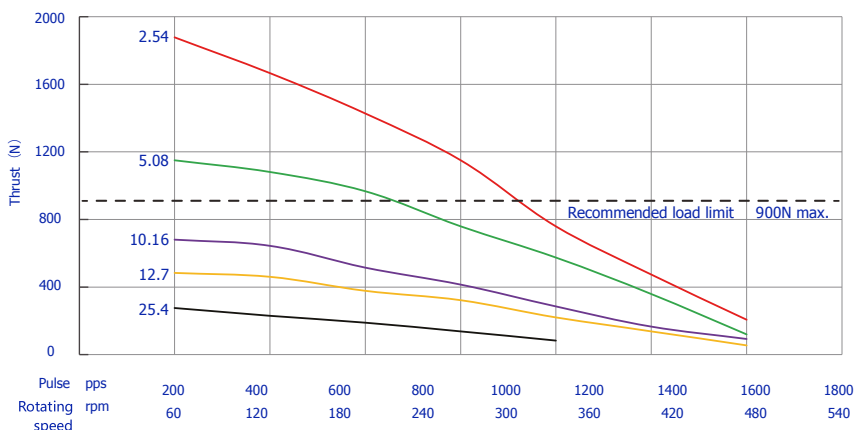
57 series 45mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 55mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 65mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)



57 series 75mm motor
length bipolar Chopper drive
100% current pulse frequency and thrust curve
(Φ9.525mm lead screw)

| Lead (mm) | Linear Velocity (mm/s) | | | | | | | | | |
|----------------------|------------------------|-------|-------|-------|------|-------|-------|-------|-------|--|
| Pulse (pps) | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | |
| Rotating Speed (rpm) | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | |
| 1,27 | 1,27 | 2,54 | 3,81 | 5,08 | 6,35 | 7,62 | 8,89 | 10,16 | 11,43 | |
| 2,54 | 2,54 | 5,08 | 7,62 | 10,16 | 12,7 | 15,24 | 17,78 | 20,32 | 22,86 | |
| 5,08 | 5,08 | 10,16 | 15,24 | 20,32 | 25,4 | 30,48 | 35,56 | 40,64 | 45,72 | |
| 10,16 | 10,16 | 20,32 | 30,48 | 40,64 | 50,8 | 60,96 | 71,12 | 81,28 | 91,44 | |
| 25,4 | 25,4 | 50,8 | 76,2 | 101,6 | 127 | 152,4 | 177,8 | 203,2 | 228,6 | |

Test condition: chopper drive, no ramping, half micro-stepping, drive voltage 40V

Gearboxes



Controllers/Drives

Encoders

Gearboxes

Linear actuators

Stepper

Motor + Controller

Servomotors

Brushless DC

Brushed DC

Index



Spur gearboxes

p.407



Worm & Wheel gearboxes

p.415



Planetary gearboxes
GP series
Standard

p.383



Planetary gearboxes
JMS series
Economy

p.399

Gearboxes

| Planetary gearboxes - GP Standard series | | | Torque* (Nm) | 383 |
|--|--|--|--------------|-----|
| 08GPS | | | 0,008...0,1 | 384 |
| 10GPS | | | 0,01...0,15 | 385 |
| 12GPS | | | 0,08...0,17 | 386 |
| 16GPS | | | 0,2...0,45 | 387 |
| 22GPS | | | 0,5...1,5 | 388 |
| 26GPS | | | 0,75...4,5 | 389 |
| 32GPS | | | 1,25...5 | 390 |
| GP42-S/N - NEW | | | 0,79...15 | 391 |
| GP56-S/N/T | | | 1,5...26,38 | 393 |
| GP80-T | | | 23...67 | 396 |
| Planetary gearboxes - JMS Economy series | | | Torque* (Nm) | 399 |
| 22JMS | | | 0,6...2 | 400 |
| 28JMS | | | 1,2...4 | 401 |
| 36JMS | | | 2...6 | 402 |
| 42JMS | | | 3...10 | 403 |
| 56JMS | | | 9...30 | 404 |
| Spur gearboxes | | | Torque* (Nm) | 407 |
| 12GSS | | | 0,01...0,025 | 408 |
| 16GSS/GSP/GST | | | 0,01...0,1 | 409 |
| 24GSP | | | 0,1 | 412 |
| Worm & Wheel gearboxes - NEW | | | Torque* (Nm) | 415 |
| GWS | | | 2...4,5 | 416 |
| GW58 | | | 4 | 417 |
| GW80 | | | 5...12 | 418 |
| GW12 | | | 18...30 | 419 |
| GWL | | | 15...19 | 420 |
| GW65 | | | 120 | 421 |

* 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

Worm & Wheel 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

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

A worm and wheel gearbox consists of a worm (screw-like shaft) that meshes with a worm wheel (similar to a spur gear). The shafts of the worm and wheel are arranged at a 90° angle, making this type of gearbox suitable when a change in the direction of drive is required. The gear ratio is determined by the number of teeth on the worm wheel in relation to the number of starts (threads) on the worm. This configuration allows for high reduction ratios in a compact size. Another characteristic of worm gearboxes is their self-locking ability in certain setups, meaning the output shaft cannot drive the input shaft, which can be useful in applications requiring holding torque without additional brakes.

Worm & Wheel gearboxes

Advantages at a glance

Compact size

High efficiency

Low backlash

High torque to weight ratio

Advantages at a glance

Simple design and less expensive

Best for low-torque and

low-speed applications

Advantages at a glance

Right-angle transmission

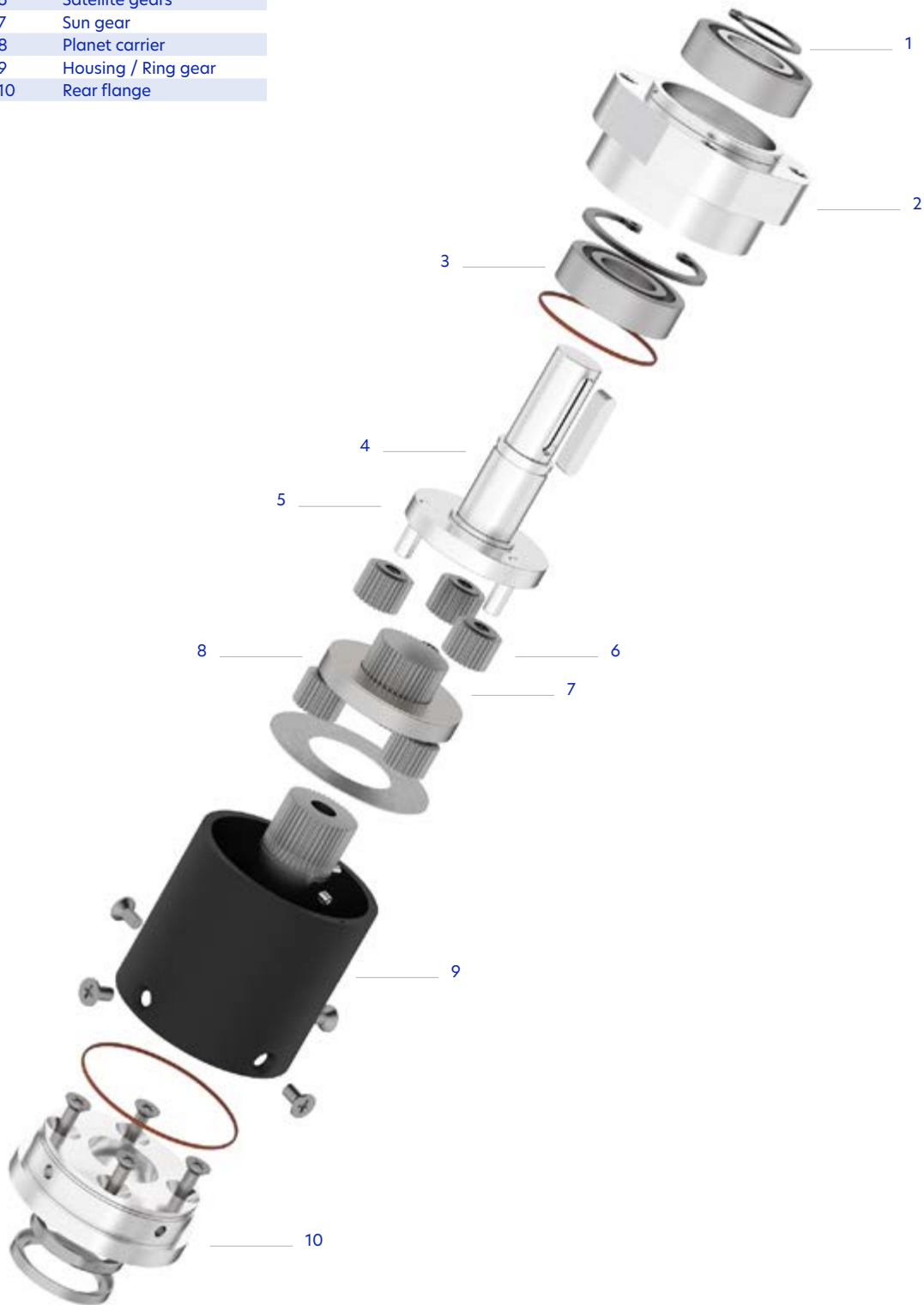
High reduction ratios

Self-locking capability

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.383



Planetary gearboxes
JMS series
Economy

p.399

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) | 383 |
|--|---------------|-----|
| 08GPS | 0,008...0,1 | 384 |
| 10GPS | 0,01...0,15 | 385 |
| 12GPS | 0,08...0,17 | 386 |
| 16GPS | 0,2...0,45 | 387 |
| 22GPS | 0,5...1,5 | 388 |
| 26GPS | 0,75...4,5 | 389 |
| 32GPS | 1,25...5 | 390 |
| GP42-S | 6,5...15 | 391 |
| GP42-N (Low noise) - NEW | 0,79...4,9 | 392 |
| GP56-S | 13,55...26,38 | 393 |
| GP56-N (Low noise) | 1,5...11,8 | 394 |
| GP56-T (High radial load) | 13,55...26,38 | 395 |
| GP80-T (High radial load) | 23...67 | 396 |

| Planetary gearboxes - JMS Economy series | Torque* (Nm) | 399 |
|--|--------------|-----|
| 22JMS | 0,6...2 | 400 |
| 28JMS | 1,2...4 | 401 |
| 36JMS | 2...6 | 402 |
| 42JMS | 3...10 | 403 |
| 56JMS | 9...30 | 404 |

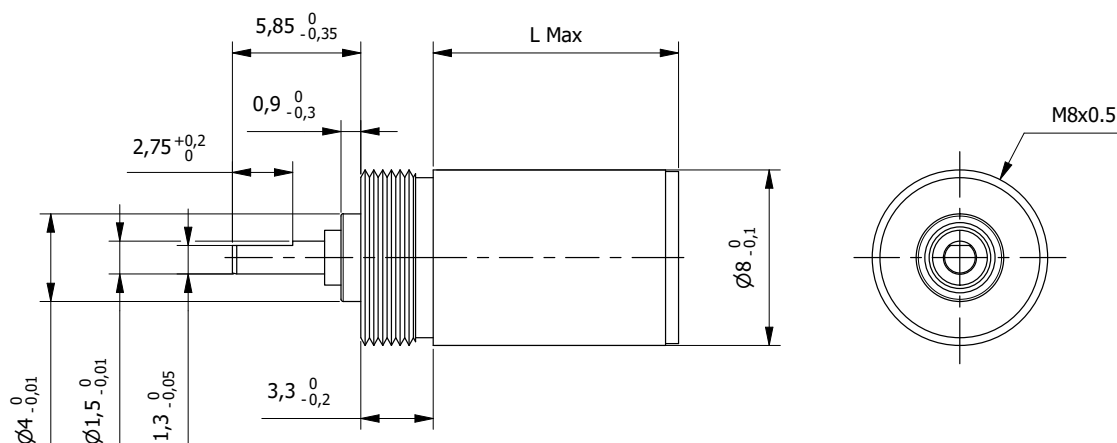
*Nominal Output Torque



Planetary Gearboxes
GP series - Standard

| Planetary gearboxes - GP Standard series | Torque* (Nm) | |
|--|---------------|-----|
| 08GPS | 0,008...0,1 | 384 |
| 10GPS | 0,01...0,15 | 385 |
| 12GPS | 0,08...0,17 | 386 |
| 16GPS | 0,2...0,45 | 387 |
| 22GPS | 0,5...1,5 | 388 |
| 26GPS | 0,75...4,5 | 389 |
| 32GPS | 1,25...5 | 390 |
| GP42-S | 6,5...15 | 391 |
| GP42-N (Low noise) - NEW | 0,79...4,9 | 392 |
| GP56-S | 13,55...26,38 | 393 |
| GP56-N (Low noise) | 1,5...11,8 | 394 |
| GP56-T (High radial load) | 13,55...26,38 | 395 |
| GP80-T (High radial load) | 23...67 | 396 |

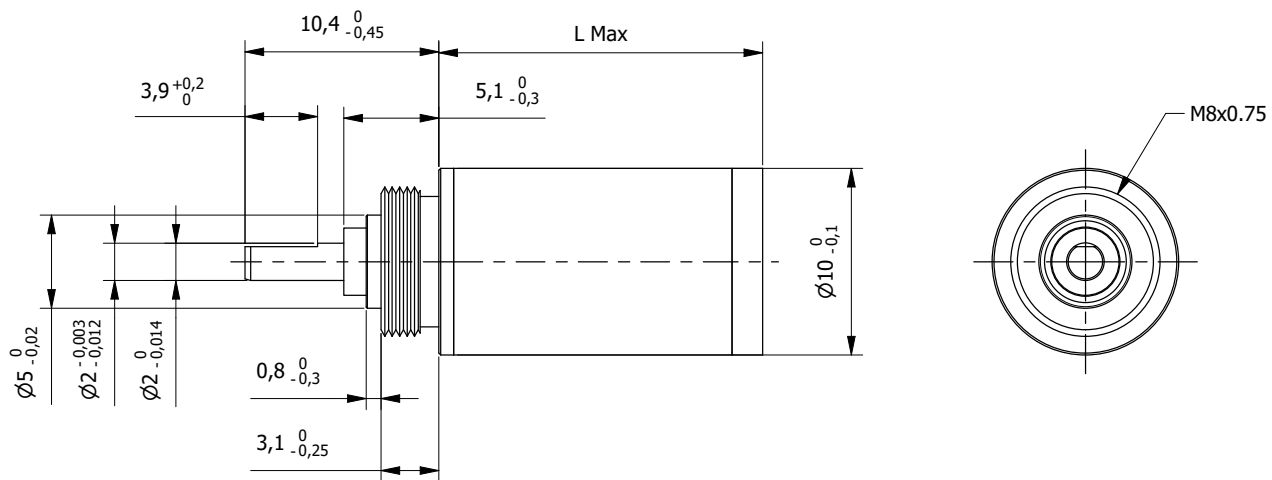
* Nominal Output Torque



| Specification | | Model | ...1N-4 | ...2N-16 | ...2N-36 | ...3N-64 | ...3N-216 |
|---------------|------------------------------------|-------|---------|----------|----------|----------|-----------|
| 1 | Stages | | 1 | 2 | 2 | 3 | 3 |
| 2 | Reduction Ratio | | 4 | 16 | 36 | 64 | 216 |
| 3 | Nominal Output Torque | Nm | 0,01 | 0,02 | 0,008 | 0,06 | 0,02 |
| 4 | Max. Output Torque | Nm | 0,015 | 0,03 | 0,012 | 0,09 | 0,03 |
| 5 | Recommended Input Speed | rpm | 12000 | 12000 | 12000 | 12000 | 12000 |
| 6 | Max. Input Speed | rpm | 20000 | 20000 | 20000 | 20000 | 20000 |
| 7 | Efficiency | % | 90 | 81 | 76 | 73 | 66 |
| 8 | Average Backlash no-load | ° | 1,8 | 2 | 2,4 | 2,2 | 2,6 |
| 9 | Max. Axial load (dynamic) | N | 5 | 5 | 5 | 5 | 5 |
| 10 | Max. Radial load (5mm from flange) | N | 5 | 6 | 6 | 7 | 7 |
| 11 | Length (L) | mm | 5,5 | 8,1 | 8,3 | 10,7 | 11,1 |
| 12 | Weight | g | 2,6 | 3,2 | 3,2 | 3,8 | 3,8 |

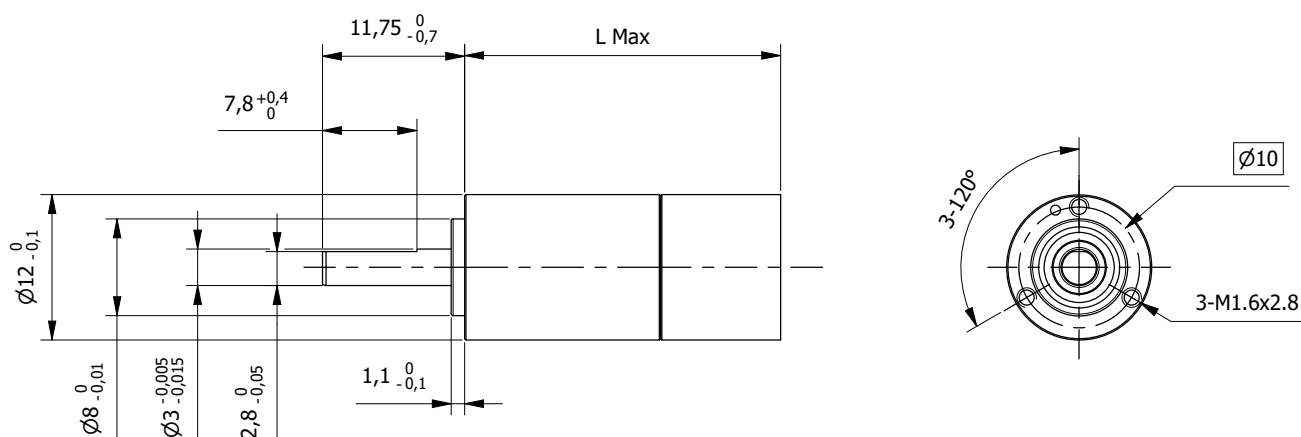
| Specification | | Model | ...4N-256 | ...4N-1296 | ...5N-1024 |
|---------------|------------------------------------|-------|-----------|------------|------------|
| 1 | Stages | | 4 | 4 | 5 |
| 2 | Reduction Ratio | | 256 | 1296 | 1024 |
| 3 | Nominal Output Torque | Nm | 0,08 | 0,04 | 0,1 |
| 4 | Max. Output Torque | Nm | 0,12 | 0,06 | 0,15 |
| 5 | Recommended Input Speed | rpm | 12000 | 12000 | 12000 |
| 6 | Max. Input Speed | rpm | 20000 | 20000 | 20000 |
| 7 | Efficiency | % | 65 | 57 | 59 |
| 8 | Average Backlash no-load | ° | 2,5 | 2,8 | 2,8 |
| 9 | Max. Axial load (dynamic) | N | 5 | 5 | 5 |
| 10 | Max. Radial load (5mm from flange) | N | 8 | 8 | 8 |
| 11 | Length (L) | mm | 13,3 | 13,9 | 15,9 |
| 12 | Weight | g | 4,4 | 4,4 | 5 |

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



| Specification | | ...1N-4 | ...2N-16 | ...3N-64 | ...4N-256 | ...5N-1024 |
|---------------|------------------------------------|-----------|----------|----------|-----------|------------|
| 1 | Stages | 1 | 2 | 3 | 4 | 5 |
| 2 | Reduction Ratio | 4 | 16 | 64 | 256 | 1024 |
| 3 | Nominal Output Torque | Nm 0,01 | 0,03 | 0,1 | 0,15 | 0,15 |
| 4 | Max. Output Torque | Nm 0,02 | 0,05 | 0,15 | 0,2 | 0,2 |
| 5 | Recommended Input Speed | rpm 12000 | 12000 | 12000 | 12000 | 12000 |
| 6 | Max. Input Speed | rpm 15000 | 15000 | 15000 | 15000 | 15000 |
| 7 | Efficiency | % 90 | 81 | 73 | 65 | 59 |
| 8 | Average Backlash no-load | ° 1,5 | 1,8 | 2 | 2,2 | 2,5 |
| 9 | Max. Axial load (dynamic) | N 5 | 5 | 5 | 5 | 5 |
| 10 | Max. Radial load (5mm from flange) | N 5 | 10 | 15 | 20 | 25 |
| 11 | Length (L) | mm 9,9 | 13,4 | 16,6 | 19,8 | 23 |
| 12 | Weight | g 6,7 | 7,2 | 7,7 | 8,2 | 8,7 |

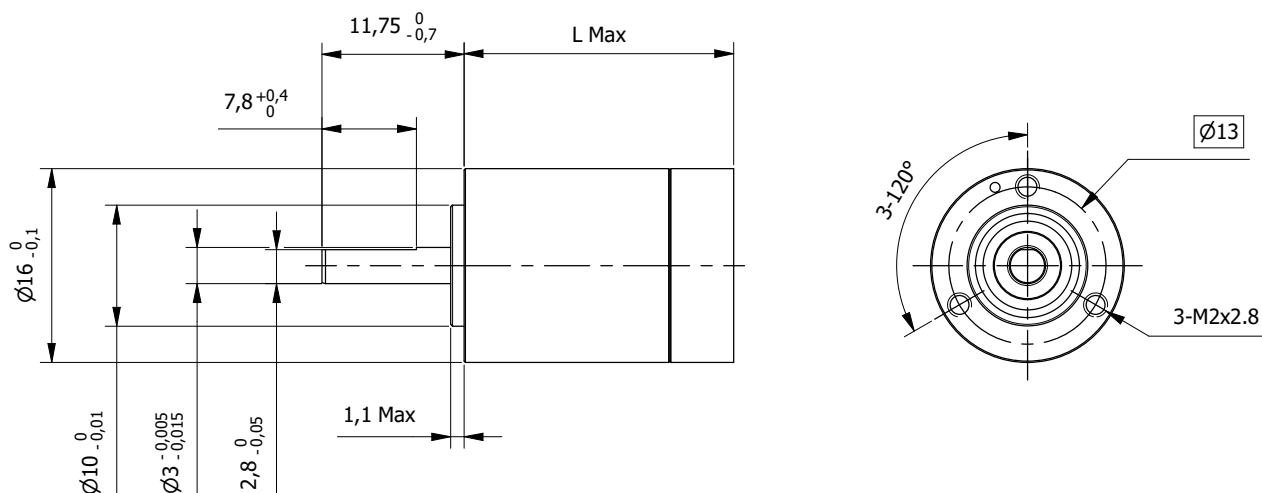
| Characteristics | |
|-----------------------|---------------|
| Item | |
| Operating temperature | -40 to +80°C |
| Bearing output | Ball bearings |



| Specification | | ...1N-5,3 | ...2N-21 | ...2N-28 | ...3N-83 | ...3N-138 | ...3N-172 |
|---------------|------------------------------------|-----------|----------|----------|----------|-----------|-----------|
| 1 | Stages | 1 | 2 | 2 | 3 | 3 | 3 |
| 2 | Reduction Ratio | 5,3 | 21 | 28 | 83 | 138 | 172 |
| 3 | Nominal Output Torque | Nm 0,08 | 0,11 | 0,11 | 0,14 | 0,14 | 0,14 |
| 4 | Max. Output Torque | Nm 0,1 | 0,14 | 0,14 | 0,18 | 0,18 | 0,18 |
| 5 | Recommended Input Speed | rpm 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
| 6 | Max. Input Speed | rpm 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| 7 | Efficiency | % 90 | 80 | 80 | 75 | 75 | 75 |
| 8 | Average Backlash no-load | ° 1,2 | 1,5 | 1,5 | 1,8 | 1,8 | 1,8 |
| 9 | Max. Axial load (dynamic) | N 20 | 20 | 20 | 20 | 20 | 20 |
| 10 | Max. Radial load (5mm from flange) | N 30 | 35 | 35 | 50 | 50 | 50 |
| 11 | Length (L) | mm 15,5 | 20,4 | 20,4 | 25,2 | 25,2 | 25,2 |
| 12 | Weight | g 11 | 14 | 14 | 17 | 17 | 17 |

| Specification | | ...4N-326 | ...4N-439 | ...4N-679 | ...4N-913 |
|---------------|------------------------------------|-----------|-----------|-----------|-----------|
| 1 | Stages | 4 | 4 | 4 | 4 |
| 2 | Reduction Ratio | 326 | 439 | 679 | 913 |
| 3 | Nominal Output Torque | Nm 0,17 | 0,17 | 0,17 | 0,17 |
| 4 | Max. Output Torque | Nm 0,21 | 0,21 | 0,21 | 0,21 |
| 5 | Recommended Input Speed | rpm 16000 | 16000 | 16000 | 16000 |
| 6 | Max. Input Speed | rpm 20000 | 20000 | 20000 | 20000 |
| 7 | Efficiency | % 65 | 65 | 65 | 65 |
| 8 | Average Backlash no-load | ° 2,1 | 2,1 | 2,1 | 2,1 |
| 9 | Max. Axial load (dynamic) | N 20 | 20 | 20 | 20 |
| 10 | Max. Radial load (5mm from flange) | N 50 | 50 | 50 | 50 |
| 11 | Length (L) | mm 30,1 | 30,1 | 30,1 | 30,1 |
| 12 | Weight | g 19 | 19 | 19 | 19 |

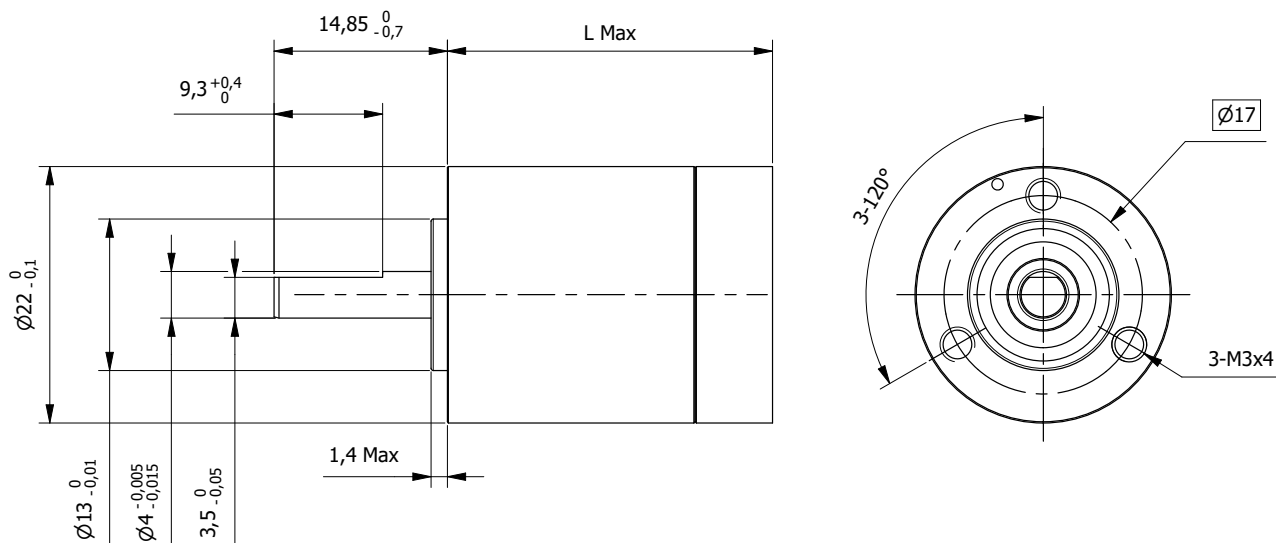
| Characteristics | |
|-----------------------|---------------|
| Item | |
| Operating temperature | -40 to +100°C |
| Bearing output | Ball bearings |



| Specification | | ...1N-5,3 | ...2N-21 | ...2N-28 | ...3N-83 | ...3N-138 | ...3N-172 |
|---------------|------------------------------------|-----------|----------|----------|----------|-----------|-----------|
| 1 | Stages | 1 | 2 | 2 | 3 | 3 | 3 |
| 2 | Reduction Ratio | 5,3 | 21 | 28 | 83 | 138 | 172 |
| 3 | Nominal Output Torque | Nm | 0,25 | 0,25 | 0,35 | 0,35 | 0,35 |
| 4 | Max. Output Torque | Nm | 0,25 | 0,35 | 0,35 | 0,45 | 0,45 |
| 5 | Recommended Input Speed | rpm | 12000 | 14000 | 14000 | 16000 | 16000 |
| 6 | Max. Input Speed | rpm | 15000 | 17500 | 17500 | 20000 | 20000 |
| 7 | Efficiency | % | 90 | 80 | 80 | 75 | 75 |
| 8 | Average Backlash no-load | ° | 1 | 1,2 | 1,2 | 1,3 | 1,3 |
| 9 | Max. Axial load (dynamic) | N | 20 | 20 | 20 | 20 | 20 |
| 10 | Max. Radial load (5mm from flange) | N | 30 | 45 | 45 | 70 | 70 |
| 11 | Length (L) | mm | 15,8 | 20,7 | 20,7 | 25,7 | 25,7 |
| 12 | Weight | g | 20 | 25 | 25 | 27 | 27 |

| Specification | | ...4N-326 | ...4N-439 | ...4N-679 | ...4N-913 |
|---------------|------------------------------------|-----------|-----------|-----------|-----------|
| 1 | Stages | 4 | 4 | 4 | 4 |
| 2 | Reduction Ratio | 326 | 439 | 679 | 913 |
| 3 | Nominal Output Torque | Nm | 0,45 | 0,45 | 0,45 |
| 4 | Max. Output Torque | Nm | 0,55 | 0,55 | 0,55 |
| 5 | Recommended Input Speed | rpm | 16000 | 16000 | 16000 |
| 6 | Max. Input Speed | rpm | 20000 | 20000 | 20000 |
| 7 | Efficiency | % | 65 | 65 | 65 |
| 8 | Average Backlash no-load | ° | 1,4 | 1,4 | 1,4 |
| 9 | Max. Axial load (dynamic) | N | 20 | 20 | 20 |
| 10 | Max. Radial load (5mm from flange) | N | 70 | 70 | 70 |
| 11 | Length (L) | mm | 30,6 | 30,6 | 30,6 |
| 12 | Weight | g | 31 | 31 | 31 |

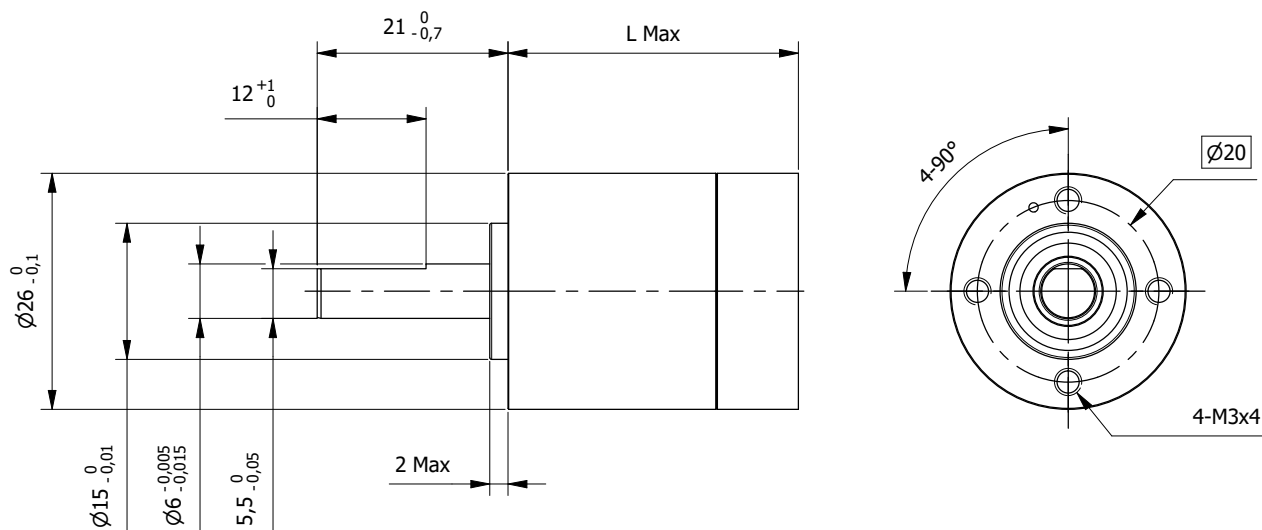
| Characteristics | |
|-----------------------|---------------|
| Item | |
| Operating temperature | -40 to +100°C |
| Bearing output | Ball bearings |



| Specification | | ...1N-5,3 | ...2N-21 | ...2N-28 | ...3N-83 | ...3N-138 | ...3N-172 |
|---------------|-------------------------------------|-----------|----------|----------|----------|-----------|-----------|
| 1 | Stages | 1 | 2 | 2 | 3 | 3 | 3 |
| 2 | Reduction Ratio | 5,3 | 21 | 28 | 83 | 138 | 172 |
| 3 | Nominal Output Torque | Nm | 0,5 | 0,7 | 1,2 | 1,2 | 1,2 |
| 4 | Max. Output Torque | Nm | 0,6 | 0,9 | 1,5 | 1,5 | 1,5 |
| 5 | Recommended Input Speed | rpm | 8000 | 10000 | 10000 | 12000 | 12000 |
| 6 | Max. Input Speed | rpm | 10000 | 12500 | 12500 | 15000 | 15000 |
| 7 | Efficiency | % | 90 | 81 | 81 | 74 | 74 |
| 8 | Average Backlash no-load | ° | 0,85 | 1,05 | 1,05 | 1,2 | 1,2 |
| 9 | Max. Axial load (dynamic) | N | 40 | 40 | 40 | 40 | 40 |
| 10 | Max. Radial load (10mm from flange) | N | 65 | 100 | 100 | 120 | 120 |
| 11 | Length (L) | mm | 19,9 | 26,4 | 26,4 | 32,2 | 32,2 |
| 12 | Weight | g | 45 | 58 | 58 | 67 | 67 |

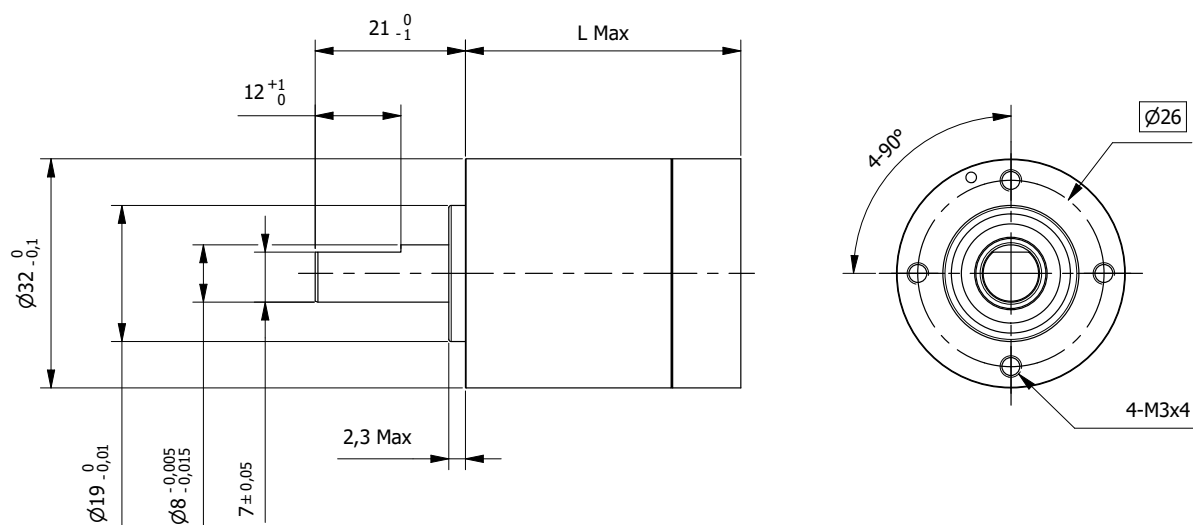
| Specification | | ...4N-326 | ...4N-439 | ...4N-679 | ...4N-913 |
|---------------|-------------------------------------|-----------|-----------|-----------|-----------|
| 1 | Stages | 4 | 4 | 4 | 4 |
| 2 | Reduction Ratio | 326 | 439 | 679 | 913 |
| 3 | Nominal Output Torque | Nm | 1,5 | 1,5 | 1,5 |
| 4 | Max. Output Torque | Nm | 1,9 | 1,9 | 1,9 |
| 5 | Recommended Input Speed | rpm | 12000 | 12000 | 12000 |
| 6 | Max. Input Speed | rpm | 15000 | 15000 | 15000 |
| 7 | Efficiency | % | 66 | 66 | 66 |
| 8 | Average Backlash no-load | ° | 1,35 | 1,35 | 1,35 |
| 9 | Max. Axial load (dynamic) | N | 40 | 40 | 40 |
| 10 | Max. Radial load (10mm from flange) | N | 120 | 120 | 120 |
| 11 | Length (L) | mm | 43 | 43 | 43 |
| 12 | Weight | g | 89 | 89 | 89 |

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



| Specification | | ...1N-5,3 | ...2N-21 | ...2N-28 | ...3N-83 | ...3N-138 | ...3N-172 |
|---------------|-------------------------------------|-----------|----------|----------|----------|-----------|-----------|
| 1 | Stages | 1 | 2 | 2 | 3 | 3 | 3 |
| 2 | Reduction Ratio | 5,3 | 21 | 28 | 83 | 138 | 172 |
| 3 | Nominal Output Torque | Nm | 0,75 | 2,25 | 2,25 | 4,5 | 4,5 |
| 4 | 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 |

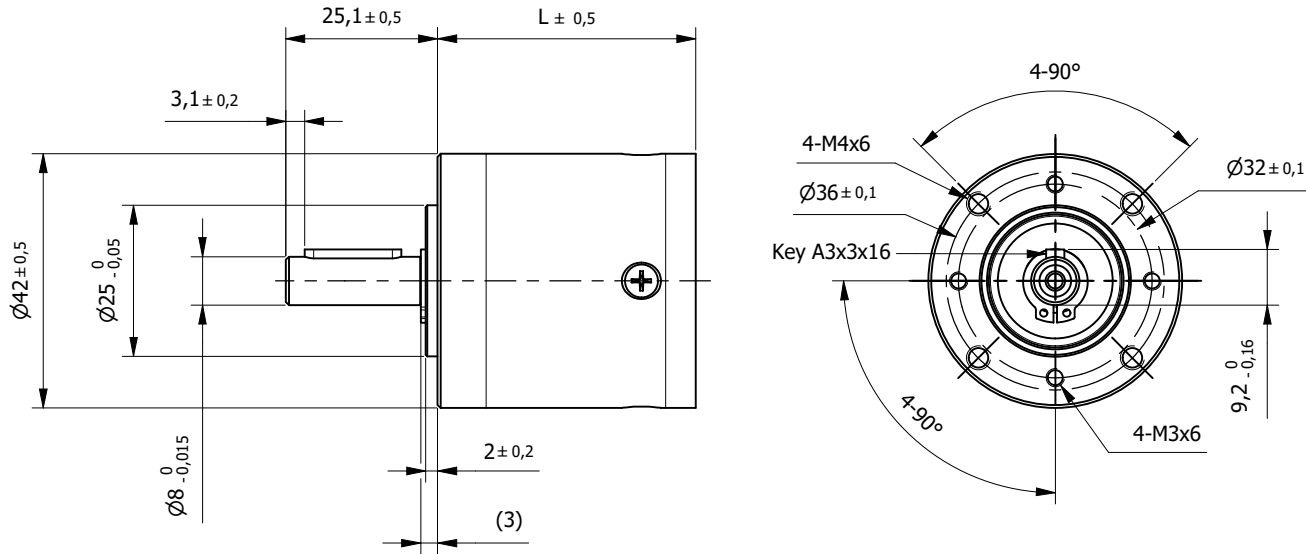
| Characteristics | |
|-----------------------|---------------|
| Item | |
| Operating temperature | -40 to +100°C |
| Bearing output | Ball bearings |



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

| Specification | | | | |
|---------------|-------------------------------------|----------|-----------|-----------|
| Model | | ...3N-62 | ...3N-138 | ...3N-186 |
| 1 | Stages | 3 | 3 | 3 |
| 2 | Reduction Ratio | 62 | 138 | 186 |
| 3 | Nominal Output Torque | Nm | 5 | 5 |
| 4 | Max. Output Torque | Nm | 6,25 | 6,25 |
| 5 | Recommended Input Speed | rpm | 8000 | 8000 |
| 6 | Max. Input Speed | rpm | 10000 | 10000 |
| 7 | Efficiency | % | 75 | 75 |
| 8 | Average Backlash no-load | ° | 0,9 | 0,9 |
| 9 | Max. Axial load (dynamic) | N | 110 | 110 |
| 10 | Max. Radial load (10mm from flange) | N | 180 | 180 |
| 11 | Length (L) | mm | 43,9 | 43,9 |
| 12 | Weight | g | 230 | 230 |

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



| Specification | | ...1 / 3.9 | ...1 / 4.3 | ...1 / 5.3 | ...1 / 6 | ...1 / 7.1 | ...1 / 8.7 |
|---------------|--------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 1 | Stages | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | Reduction Ratio | 3,93 | 4,27 | 5,25 | 6 | 7,07 | 8,73 |
| 3 | Nominal Output Torque | Nm 6,5 | Nm 6,5 | Nm 6,9 | Nm 7 | Nm 7,3 | Nm 7 |
| 4 | Max. Output Torque | Nm 13 | Nm 13 | Nm 13,8 | Nm 14 | Nm 14,6 | Nm 14 |
| 5 | Recommended Input Speed | rpm 3000 | rpm 3000 | rpm 3000 | rpm 3000 | rpm 3000 | rpm 3000 |
| 6 | Max. Input Speed | rpm 8236 | rpm 9187 | rpm 11943 | rpm 14050 | rpm 17061 | rpm 18000 |
| 7 | Efficiency | % ≈90% | % ≈90% | % ≈90% | % ≈90% | % ≈90% | % ≈90% |
| 8 | Moment of Inertia ≤φ6,35 | kgmm ² 1,23 | kgmm ² 1,05 | kgmm ² 0,78 | kgmm ² 0,67 | kgmm ² 0,56 | kgmm ² 0,46 |
| 9 | Length (L) | mm 42,7 | mm 42,7 | mm 42,7 | mm 42,7 | mm 42,7 | mm 42,7 |
| 10 | Weight | kg 0,3 | kg 0,3 | kg 0,3 | kg 0,3 | kg 0,3 | kg 0,3 |

| Specification | | ...2 / 15.5 | ...2 / 20.6 | ...2 / 25.6 | ...2 / 45.8 | ...3 / 100 | ...3 / 250 |
|---------------|--------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 1 | Stages | 2 | 2 | 2 | 2 | 3 | 3 |
| 2 | Reduction Ratio | 15,45 | 20,64 | 25,62 | 45,82 | 95,688 | 240,545 |
| 3 | Nominal Output Torque | Nm 9,1 | Nm 9,4 | Nm 8,6 | Nm 12,2 | Nm 12,2 | Nm 15 |
| 4 | Max. Output Torque | Nm 18,2 | Nm 18,8 | Nm 17,2 | Nm 24,4 | Nm 24,4 | Nm 30 |
| 5 | Recommended Input Speed | rpm 3000 | rpm 3000 | rpm 3000 | rpm 3000 | rpm 3000 | rpm 3000 |
| 6 | Max. Input Speed | rpm 8236 | rpm 11943 | rpm 14050 | rpm 18000 | rpm 8236 | rpm 11943 |
| 7 | Efficiency | % ≈85% | % ≈85% | % ≈85% | % ≈85% | % ≈78% | % ≈78% |
| 8 | Moment of Inertia ≤φ6,35 | kgmm ² 1,26 | kgmm ² 0,44 | kgmm ² 0,67 | kgmm ² 0,46 | kgmm ² 0,71 | kgmm ² 0,43 |
| 9 | Length (L) | mm 56,6 | mm 56,6 | mm 56,6 | mm 56,6 | mm 70,6 | mm 70,6 |
| 10 | Weight | kg 0,4 | kg 0,4 | kg 0,4 | kg 0,4 | kg 0,5 | kg 0,5 |

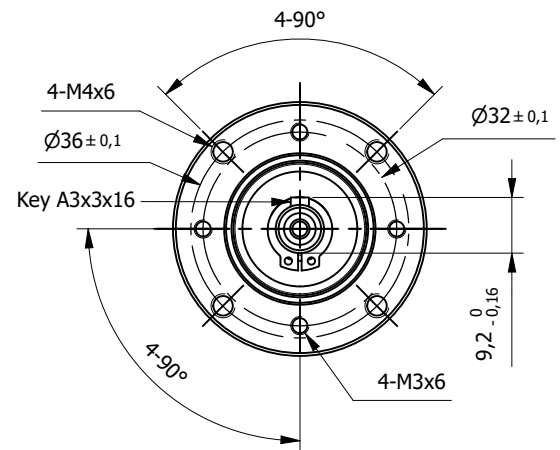
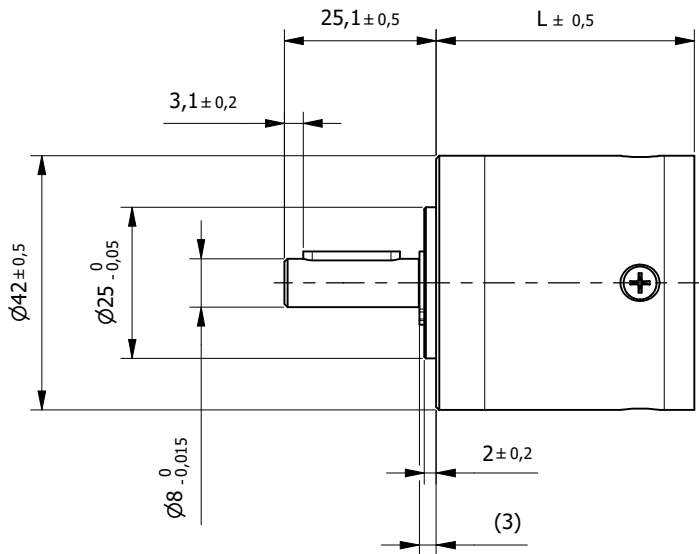
| Characteristics | |
|---|---|
| Item | |
| Backlash at 2% nominal output torque | ≤1° |
| Max. Radial load (middle of the key) | 305N at n out=100rpm 210N at n out=300rpm 140N at n out=1000rpm |
| Max. Axial load (output shaft center) | 890N at n out=100rpm 575N at n out=300rpm 340N at n out=1000rpm |
| Max. Press fit force | 320N |
| Noise level (at recommended speed and 1m) | ≤55 dB |
| Operating temperature | -15 to +90°C |
| Service Life (at recommended input speed) | 10000h |
| Protection class | IP54 |
| Bearing output | Ball bearings |

Planetary Gearbox GP42-N

Low Noise

Ø 42mm

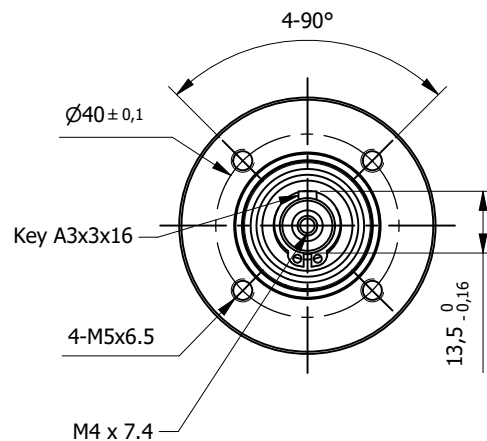
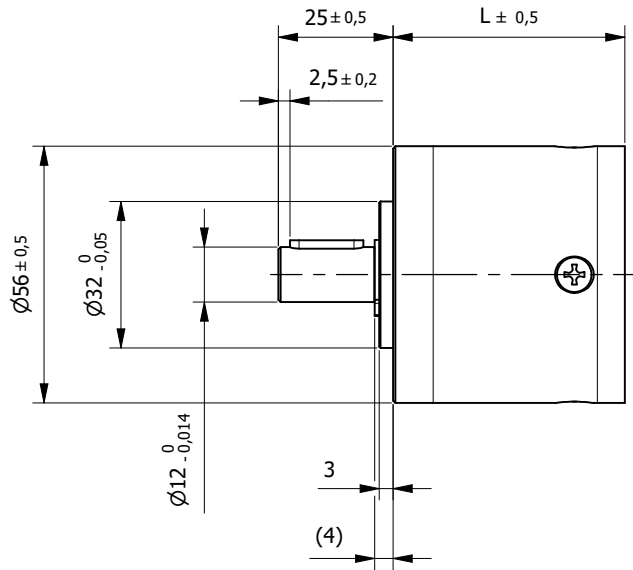
0,79 to 4,9Nm



| Specification | | | | | |
|---------------|---|-------------------|----------|----------|-------|
| Model | | ...1 / 4 | ...1 / 5 | ...1 / 7 | |
| 1 | Stages | 1 | 1 | 1 | |
| 2 | Reduction Ratio | 4 | 5 | 7 | |
| 3 | Nominal Output Torque | Nm | 1,22 | 1,09 | 0,79 |
| 4 | Max. Output Torque | Nm | 3,66 | 3,27 | 2,37 |
| 5 | Recommended Input Speed | rpm | 3000 | 3000 | 3000 |
| 6 | Max. Input Speed | rpm | 7650 | 10200 | 15300 |
| 7 | Efficiency | % | ≈92% | ≈92% | ≈92% |
| 8 | Moment of Inertia $\leq \varnothing 6,35$ | kgmm ² | 0,72 | 0,42 | 0,21 |
| 9 | Length (L) | mm | 51 | 51 | 51 |
| 10 | Weight | kg | 0,3 | 0,3 | 0,3 |

| Specification | | | | | | |
|---------------|---|-------------------|-----------|-----------|-----------|-------|
| Model | | ...2 / 16 | ...2 / 20 | ...2 / 24 | ...2 / 30 | |
| 1 | Stages | 2 | 2 | 2 | 2 | |
| 2 | Reduction Ratio | 16 | 20 | 24 | 30 | |
| 3 | Nominal Output Torque | Nm | 3,93 | 3,93 | 4,9 | 4,9 |
| 4 | Max. Output Torque | Nm | 7,86 | 7,86 | 9,8 | 9,8 |
| 5 | Recommended Input Speed | rpm | 3000 | 3000 | 3000 | 3000 |
| 6 | Max. Input Speed | rpm | 7650 | 10200 | 7650 | 10200 |
| 7 | Efficiency | % | ≈86% | ≈86% | ≈86% | ≈86% |
| 8 | Moment of Inertia $\leq \varnothing 6,35$ | kgmm ² | 0,58 | 0,34 | 0,55 | 0,32 |
| 9 | Length (L) | mm | 65 | 65 | 65 | 65 |
| 10 | Weight | kg | 0,4 | 0,4 | 0,4 | 0,4 |

| Characteristics | |
|---|---|
| Item | |
| Backlash at 2% nominal output torque | ≤1,75° |
| 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) | ≤50 dB |
| Operating temperature | -10 to +50°C |
| Service Life (at recommended input speed) | 5000h |
| Protection class | IP54 |
| Bearing output | Ball bearings |



| Specification | | ...1 / 3.3 | ...1 / 3.9 | ...1 / 4.2 | ...1 / 5.1 | ...1 / 6.5 | ...1 / 7.7 | ...1 / 9.5 |
|---------------|---------------------------------|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1 | Stages | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | Reduction Ratio | 3,29 | 3,94 | 4,24 | 5,09 | 6,53 | 7,71 | 9,55 |
| 3 | Nominal Output Torque | Nm 14,19 | 14,68 | 14,76 | 15,28 | 16,29 | 16,58 | 13,55 |
| 4 | Max. Output Torque | Nm 28,38 | 29,36 | 29,52 | 30,56 | 32,58 | 33,16 | 27,1 |
| 5 | Recommended Input Speed | rpm 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 |
| 6 | Max. Input Speed | rpm 4658 | 5968 | 6589 | 8307 | 8988 | 10919 | 13000 |
| 7 | Efficiency | % $\approx 92\%$ | $\approx 92\%$ | $\approx 92\%$ | $\approx 92\%$ | $\approx 92\%$ | $\approx 92\%$ | $\approx 92\%$ |
| 8 | Moment of Inertia $\leq \phi 8$ | kgmm ² 15,05 | 5,48 | 4,67 | 3,13 | 2,62 | 2,27 | 4,3 |
| 9 | Length (L) | mm 50,6 | 50,6 | 50,6 | 50,6 | 50,6 | 50,6 | 50,6 |
| 10 | Weight | kg 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 |

| Specification | | ...2 / 10.8 | ...2 / 15.5 | ...2 / 20 | ...2 / 25.7 | ...2 / 32.7 | ...2 / 42.6 | ...2 / 62.3 |
|---------------|---------------------------------|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1 | Stages | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | Reduction Ratio | 10,84 | 15,51 | 20,03 | 25,71 | 32,72 | 42,63 | 62,33 |
| 3 | Nominal Output Torque | Nm 20,27 | 22,01 | 23,03 | 23,13 | 22,24 | 26,38 | 26,38 |
| 4 | Max. Output Torque | Nm 40,54 | 44,02 | 46,06 | 46,26 | 44,48 | 52,76 | 52,76 |
| 5 | Recommended Input Speed | rpm 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 |
| 6 | Max. Input Speed | rpm 4658 | 5968 | 8307 | 8988 | 10919 | 8988 | 13000 |
| 7 | Efficiency | % $\approx 85\%$ | $\approx 85\%$ | $\approx 85\%$ | $\approx 85\%$ | $\approx 85\%$ | $\approx 85\%$ | $\approx 85\%$ |
| 8 | Moment of Inertia $\leq \phi 8$ | kgmm ² 8,7 | 5,04 | 3,81 | 2,51 | 2,19 | 2,46 | 1,87 |
| 9 | Length (L) | mm 67,8 | 67,8 | 67,8 | 67,8 | 67,8 | 67,8 | 67,8 |
| 10 | Weight | kg 0,8 | 0,8 | 0,8 | 0,8 | 0,8 | 0,8 | 0,8 |

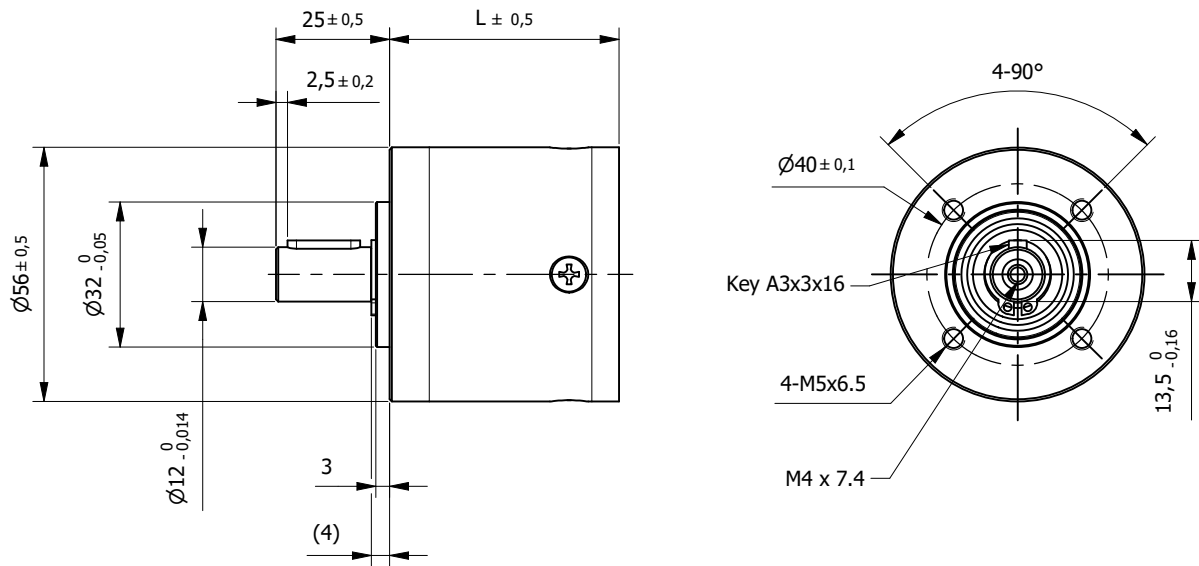
| Characteristics | |
|---|--|
| Item | |
| Backlash at 2% nominal output torque | $\leq 0,5^\circ$ |
| Max. Radial load (middle of the key) | 515N at n out=100rpm 355N at n out=300rpm 240N at n out=1000rpm |
| Max. Axial load (output shaft center) | 1460N at n out=100rpm 935N at n out=300rpm 555N at n out=1000rpm |
| Max. Press fit force | 500N |
| Noise level (at recommended speed and 1m) | ≤ 55 dB |
| Operating temperature | -15 to +90°C |
| Service Life (at recommended input speed) | 10000h |
| Protection class | IP 54 |
| Bearing output | Ball bearings |

Planetary Gearbox GP56-N

Low Noise

Ø 56mm

1,5 to 11,8Nm



| Specification | | | | | |
|---------------|-------------------------|-------------------|----------|------------|------------|
| Model | | ...1 / 3.2 | ...1 / 4 | ...1 / 5.4 | ...1 / 6.2 |
| 1 | Stages | 1 | 1 | 1 | 1 |
| 2 | Reduction Ratio | 3,24 | 3,96 | 5,37 | 6,19 |
| 3 | Nominal Output Torque | Nm | 2 | 2 | 1,5 |
| 4 | Max. Output Torque | Nm | 6,09 | 5,9 | 5 |
| 5 | Recommended Input Speed | rpm | 3500 | 3500 | 3500 |
| 6 | Max. Input Speed | rpm | 4700 | 6050 | 8800 |
| 7 | Efficiency | % | ≈92% | ≈92% | ≈92% |
| 8 | Moment of Inertia ≤φ8 | kgmm ² | 4,09 | 2,08 | 0,88 |
| 9 | Length (L) | mm | 56 | 56 | 56 |
| 10 | Weight | kg | 0,3 | 0,3 | 0,3 |

| Specification | | | | | | |
|---------------|-------------------------|-------------------|-------------|-------------|-------------|-----------|
| Model | | ...2 / 10.7 | ...2 / 15.6 | ...2 / 20.2 | ...2 / 25.9 | ...2 / 35 |
| 1 | Stages | 2 | 2 | 2 | 2 | 2 |
| 2 | Reduction Ratio | 10,68 | 15,61 | 20,17 | 25,88 | 35,05 |
| 3 | Nominal Output Torque | Nm | 6,4 | 7,4 | 9,2 | 11,8 |
| 4 | Max. Output Torque | Nm | 12,6 | 15,1 | 14,8 | 19 |
| 5 | Recommended Input Speed | rpm | 3500 | 3500 | 3500 | 3500 |
| 6 | Max. Input Speed | rpm | 4700 | 6050 | 6050 | 8800 |
| 7 | Efficiency | % | ≈85% | ≈85% | ≈85% | ≈85% |
| 8 | Moment of Inertia ≤φ8 | kgmm ² | 4,2 | 2,04 | 1,97 | 1,92 |
| 9 | Length (L) | mm | 73 | 73 | 73 | 73 |
| 10 | Weight | kg | 0,4 | 0,4 | 0,4 | 0,4 |

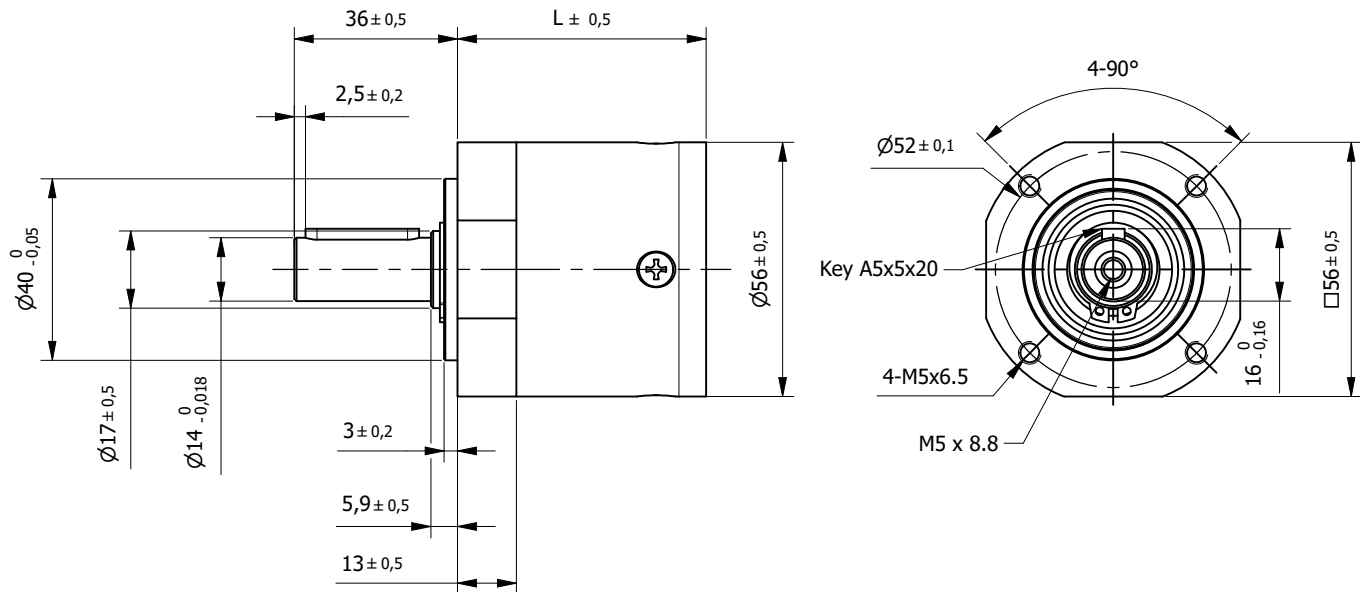
| Characteristics | |
|---|--|
| Item | |
| Backlash at 2% nominal output torque | ≤1° |
| Max. Radial load (middle of the key) | 515N at n out=100rpm 355N at n out=300rpm 240N at n out=1000rpm |
| Max. Axial load (output shaft center) | 1460N at n out=100rpm 935N at n out=300rpm 555N at n out=1000rpm |
| Max. Press fit force | 500N |
| Noise level (at recommended speed and 1m) | ≤50 dB |
| Operating temperature | -15 to +50°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 26,38Nm



| Specification | | ...1 / 3.3 | ...1 / 3.9 | ...1 / 4.2 | ...1 / 5.1 | ...1 / 6.5 | ...1 / 7.7 | ...1 / 9.5 |
|---------------|-------------------------|-------------------------|------------|------------|------------|------------|------------|------------|
| 1 | Stages | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | Reduction Ratio | 3,29 | 3,94 | 4,24 | 5,09 | 6,53 | 7,71 | 9,55 |
| 3 | Nominal Output Torque | Nm 14,19 | 14,68 | 14,76 | 15,28 | 16,29 | 16,58 | 13,55 |
| 4 | Max. Output Torque | Nm 28,38 | 29,36 | 29,52 | 30,56 | 32,58 | 33,16 | 27,1 |
| 5 | Recommended Input Speed | rpm 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 |
| 6 | Max. Input Speed | rpm 4658 | 5968 | 6589 | 8307 | 8988 | 10919 | 13000 |
| 7 | Efficiency | % ≈92% | ≈92% | ≈92% | ≈92% | ≈92% | ≈92% | ≈92% |
| 8 | Moment of Inertia ≤φ8 | kgmm ² 15,06 | 5,48 | 4,67 | 3,13 | 2,6 | 2,27 | 4,3 |
| 9 | Length (L) | mm 54,8 | 54,8 | 54,8 | 54,8 | 54,8 | 54,8 | 54,8 |
| 10 | Weight | kg 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 |

| Specification | | ...2 / 10.8 | ...2 / 15.5 | ...2 / 20 | ...2 / 25.7 | ...2 / 32.7 | ...2 / 42.6 | ...2 / 62.3 |
|---------------|-------------------------|-----------------------|-------------|-----------|-------------|-------------|-------------|-------------|
| 1 | Stages | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | Reduction Ratio | 10,84 | 15,51 | 20,03 | 25,71 | 32,72 | 42,63 | 62,33 |
| 3 | Nominal Output Torque | Nm 20,27 | 22,01 | 23,03 | 23,13 | 22,24 | 26,38 | 26,38 |
| 4 | Max. Output Torque | Nm 40,54 | 44,02 | 46,06 | 46,26 | 44,48 | 52,76 | 52,76 |
| 5 | Recommended Input Speed | rpm 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 |
| 6 | Max. Input Speed | rpm 4658 | 5968 | 8307 | 8988 | 10919 | 8988 | 13000 |
| 7 | Efficiency | % ≈85% | ≈85% | ≈85% | ≈85% | ≈85% | ≈85% | ≈85% |
| 8 | Moment of Inertia ≤φ8 | kgmm ² 8,7 | 5,04 | 3,81 | 2,51 | 2,19 | 2,46 | 1,87 |
| 9 | Length (L) | mm 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| 10 | Weight | kg 0,8 | 0,8 | 0,8 | 0,8 | 0,8 | 0,8 | 0,8 |

| Specification | | ...3 / 100 | ...3 / 250 |
|---------------|-------------------------|-------------------------|------------|
| 1 | Stages | 3 | 3 |
| 2 | Reduction Ratio | 101,23 | 256,23 |
| 3 | Nominal Output Torque | Nm 26,38 | 26,38 |
| 4 | Max. Output Torque | Nm 52,76 | 52,76 |
| 5 | Recommended Input Speed | rpm 3500 | 3500 |
| 6 | Max. Input Speed | rpm 5968 | 10919 |
| 7 | Efficiency | % ≈70% | ≈70% |
| 8 | Moment of Inertia ≤φ8 | kgmm ² 6,446 | 4,129 |
| 9 | Length (L) | mm 86 | 86 |
| 10 | Weight | kg 1,1 | 1,1 |

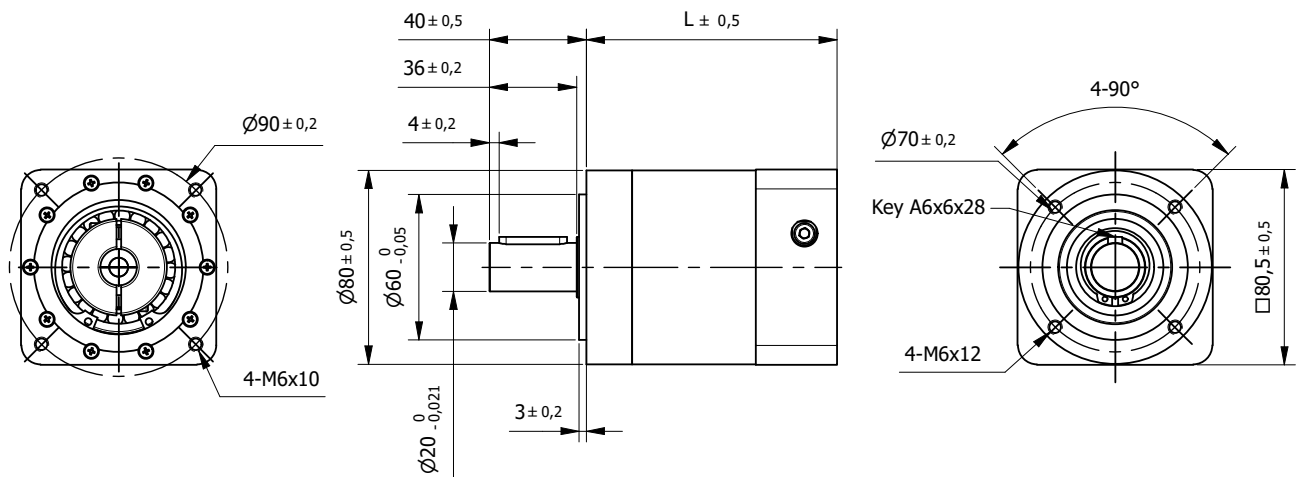
| Characteristics | |
|--|--|
| Item | |
| Backlash | ≤0,5° [1-2 stages] |
| at 2% nominal output torque | ≤0,75° [3 stages] |
| Max. Radial load (middle of the key) | 540N [711N 3-stage] at n out=100rpm 375N [493N 3-stage] at n out=300rpm 250N [330N 3-stage] at n out=1000rpm |
| Max. Axial load (output shaft center) | 1630N [1931N 3-stage] at n out=100rpm 1015N [1329N 3-stage] at n out=300rpm 595N [764N 3-stage] at n out=1000rpm |
| Max. Press fit force | 500N |
| Noise level (at 1m and 3'000rpm input) | ≤55 dB |
| Operating temperature | -15 to +90°C |
| Service Life | 10000h |
| Protection class | IP 54 |
| Bearing output | Ball bearings |

Planetary Gearbox GP80-T

High Radial Load

Ø 80mm

23 to 67Nm



| Specification | | Model | ...1 / 3.3 | ...1 / 4.2 | ...1 / 4.9 | ...1 / 6.8 | ...1 / 8 | ...1 / 9.7 |
|---------------|---|-------------------|------------|------------|------------|------------|----------|------------|
| 1 | Stages | | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | Reduction Ratio | | 3,333 | 4,182 | 4,889 | 6,833 | 8 | 9,75 |
| 3 | Nominal Output Torque | Nm | 40 | 41 | 42 | 33 | 32 | 23 |
| 4 | Max. Output Torque | Nm | 80 | 82 | 84 | 66 | 64 | 46 |
| 5 | Recommended Input Speed | rpm | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| 6 | Max. Input Speed | rpm | 3184 | 4342 | 5307 | 7000 | 7000 | 7000 |
| 7 | Efficiency | % | ≈92% | ≈92% | ≈92% | ≈92% | ≈92% | ≈92% |
| 8 | Moment of Inertia $\leq \varnothing 15$ | kgmm ² | 74,51 | 64,96 | 60,74 | 28,17 | 53,37 | 51,86 |
| 9 | Length (L) | mm | 103,5 | 103,5 | 103,5 | 103,5 | 103,5 | 103,5 |
| 10 | Weight | kg | 2,1 | 2,1 | 2,1 | 2,1 | 2,1 | 2,1 |

| Specification | | Model | ...2 / 11.1 | ...2 / 16.3 | ...2 / 20.4 | ...2 / 26.3 | ...2 / 30.7 | ...2 / 66.6 |
|---------------|---|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1 | Stages | | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | Reduction Ratio | | 11,111 | 16,296 | 20,444 | 26,278 | 30,75 | 66,625 |
| 3 | Nominal Output Torque | Nm | 42 | 56 | 57 | 58 | 67 | 42 |
| 4 | Max. Output Torque | Nm | 84 | 112 | 114 | 116 | 134 | 84 |
| 5 | Recommended Input Speed | rpm | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| 6 | Max. Input Speed | rpm | 3184 | 3184 | 4342 | 5307 | 7000 | 7000 |
| 7 | Efficiency | % | ≈85% | ≈85% | ≈85% | ≈85% | ≈85% | ≈85% |
| 8 | Moment of Inertia $\leq \varnothing 15$ | kgmm ² | 93,33 | 92,09 | 83,39 | 77,8 | 74,37 | 71,35 |
| 9 | Length (L) | mm | 129,0 | 129,0 | 129,0 | 129,0 | 129,0 | 129,0 |
| 10 | Weight | kg | 2,6 | 2,6 | 2,6 | 2,6 | 2,6 | 2,6 |

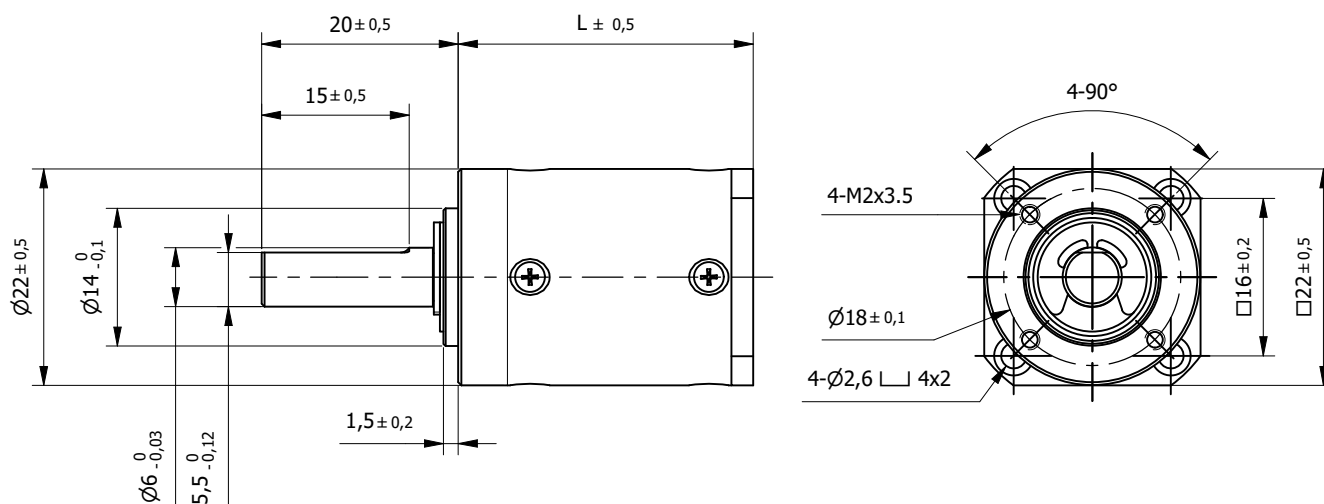
| Characteristics | |
|---|--|
| Item | |
| Backlash at 2% nominal output torque | $\leq 1^\circ$ |
| Max. Radial load (middle of the key) | 970N at n out=100rpm 680N at n out=300rpm 455N at n out=1000rpm |
| Max. Axial load (output shaft center) | 2950N at n out=100rpm 1800N at n out=300rpm 1055N at n out=1000rpm |
| Max. Press fit force | 1500N |
| Noise level (at recommended speed and 1m) | ≤ 60 dB |
| Operating temperature | -15 to +90°C |
| Service Life (at recommended input speed) | 10000h |
| Protection class | IP 54 |
| Bearing output | Ball bearings |



Planetary Gearboxes
JMS series - Economy

| Planetary gearboxes - JMS Economy series | Torque* (Nm) | |
|--|--------------|-----|
| 22JMS | 0,6...2 | 400 |
| 28JMS | 1,2...4 | 401 |
| 36JMS | 2...6 | 402 |
| 42JMS | 3...10 | 403 |
| 56JMS | 9...30 | 404 |

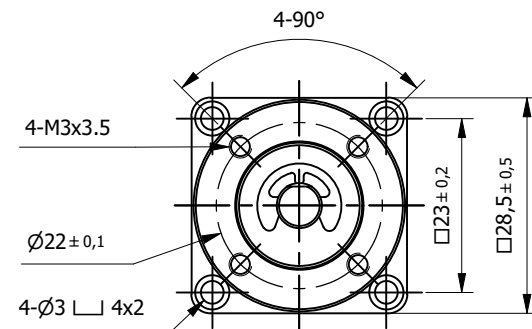
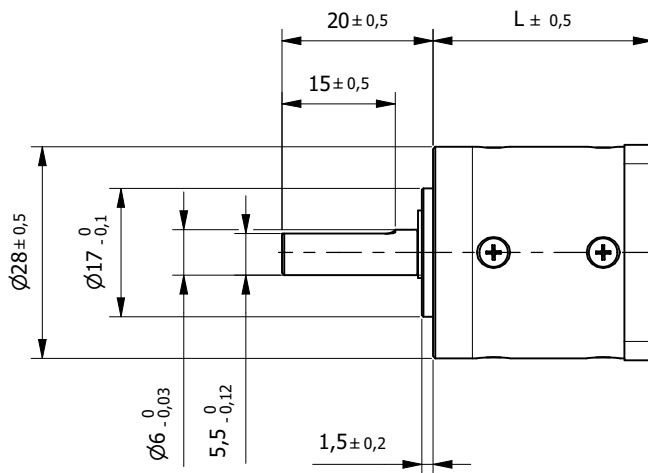
* Nominal Output Torque



| Specification | | | | | | |
|---------------|-------------------------|------------|------------|-----------|-----------|-----------|
| Model | | ...1 / 3.7 | ...1 / 5.2 | ...2 / 14 | ...2 / 19 | ...2 / 27 |
| 1 | Stages | 1 | 1 | 2 | 2 | 2 |
| 2 | Exact Ratio | 3,71 | 5,18 | 13,76 | 19,22 | 26,83 |
| 3 | Nominal Output Torque | Nm | 0,6 | 0,6 | 1 | 1 |
| 4 | Max. Output Torque | Nm | 2 | 2 | 3 | 3 |
| 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 | 23,4 | 23,4 | 30,0 | 30,0 |
| 9 | Weight | kg | 0,031 | 0,031 | 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 |
| 4 | Max. Output Torque | Nm | 6 | 6 | 6 |
| 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 | 36,4 | 36,4 | 36,4 |
| 9 | Weight | kg | 0,043 | 0,043 | 0,043 |

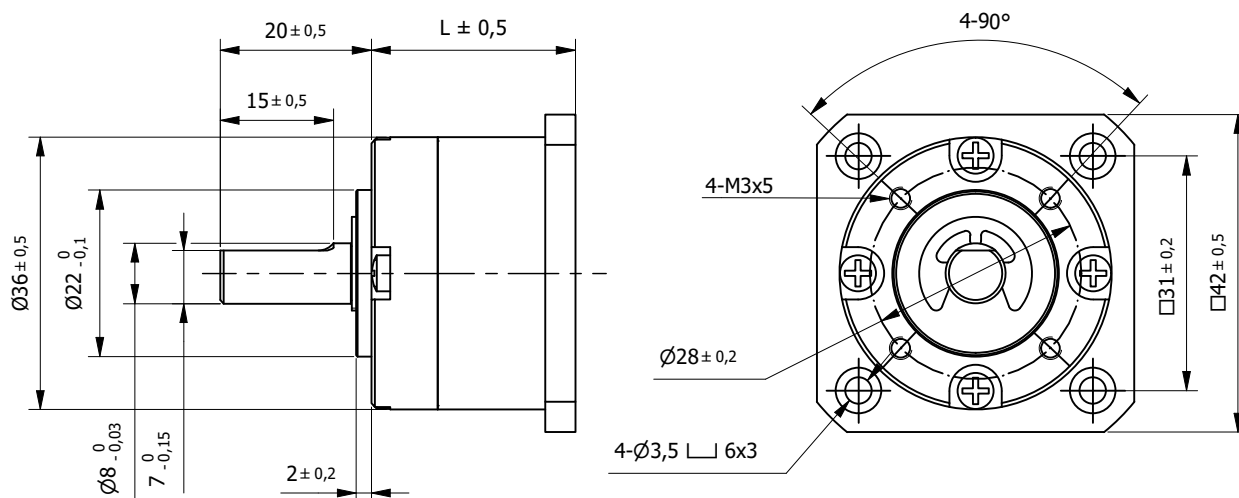
| Characteristics | |
|---------------------------------------|---------------|
| Item | |
| Max. Radial load (middle of the key) | 50N |
| Max. Axial load (output shaft center) | 30N |
| Radial Play | <0,08mm |
| Axial Play | <0,3mm |
| Max. Press fit force | 60N |
| Operating temperature | -20 to +80°C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



| Specification | | Model | ...1 / 3.7 | ...1 / 5.2 | ...2 / 14 | ...2 / 19 | ...2 / 27 |
|---------------|-------------------------|-------|------------|------------|-----------|-----------|-----------|
| 1 | Stages | | 1 | 1 | 2 | 2 | 2 |
| 2 | Exact Ratio | | 3,71 | 5,18 | 13,76 | 19,22 | 26,83 |
| 3 | Nominal Output Torque | Nm | 1,2 | 1,2 | 2 | 2 | 2 |
| 4 | Max. Output Torque | Nm | 4 | 4 | 6 | 6 | 6 |
| 5 | Recommended Input Speed | rpm | 4000 | 4000 | 4000 | 4000 | 4000 |
| 6 | Efficiency | % | ≈90% | ≈90% | ≈81% | ≈81% | ≈81% |
| 7 | Backlash at No-load | | ≤1° | ≤1° | ≤1,2° | ≤1,2° | ≤1,2° |
| 8 | Length (L) | mm | 29,0 | 29,0 | 36,1 | 36,1 | 36,1 |
| 9 | Weight | kg | 0,075 | 0,075 | 0,097 | 0,097 | 0,097 |

| Specification | | Model | ...3 / 51 | ...3 / 71 | ...3 / 100 | ...3 / 139 |
|---------------|-------------------------|-------|-----------|-----------|------------|------------|
| 1 | Stages | | 3 | 3 | 3 | 3 |
| 2 | Exact Ratio | | 51,06 | 71,3 | 99,55 | 138,99 |
| 3 | Nominal Output Torque | Nm | 4 | 4 | 4 | 4 |
| 4 | Max. Output Torque | Nm | 12 | 12 | 12 | 12 |
| 5 | Recommended Input Speed | rpm | 4000 | 4000 | 4000 | 4000 |
| 6 | Efficiency | % | ≈73% | ≈73% | ≈73% | ≈73% |
| 7 | Backlash at No-load | | ≤1,5° | ≤1,5° | ≤1,5° | ≤1,5° |
| 8 | Length (L) | mm | 43 | 43 | 43 | 43 |
| 9 | Weight | kg | 0,119 | 0,119 | 0,119 | 0,119 |

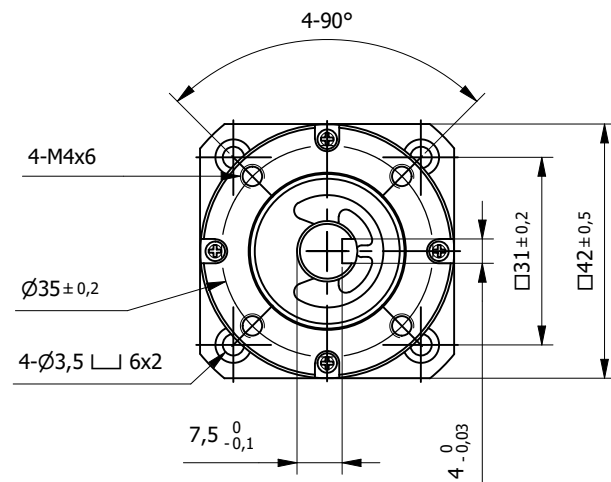
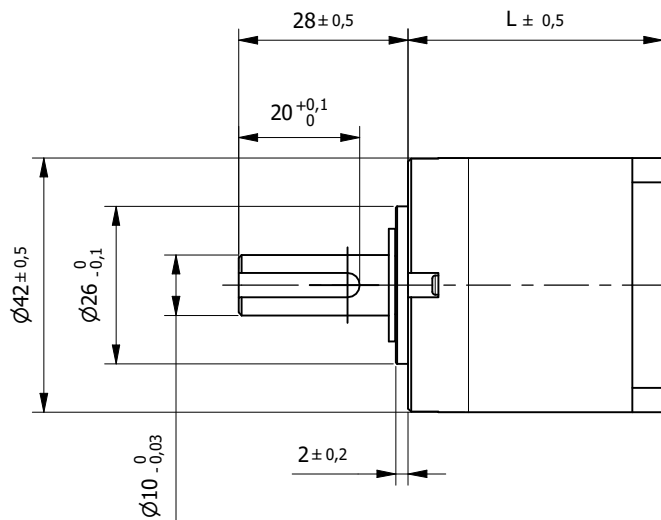
| Characteristics | |
|---------------------------------------|---------------|
| Item | |
| Max. Radial load (middle of the key) | 100N |
| Max. Axial load (output shaft center) | 50N |
| Radial Play | <0,07mm |
| Axial Play | <0,3mm |
| Max. Press fit force | 100N |
| Operating temperature | -20 to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



| Specification | | | | | | |
|---------------|-------------------------|------------|------------|-----------|-----------|-----------|
| Model | | ...1 / 3.7 | ...1 / 5.2 | ...2 / 14 | ...2 / 19 | ...2 / 27 |
| 1 | Stages | 1 | 1 | 2 | 2 | 2 |
| 2 | Exact Ratio | 3,71 | 5,18 | 13,76 | 19,22 | 26,83 |
| 3 | Nominal Output Torque | Nm | 2 | 2 | 3 | 3 |
| 4 | Max. Output Torque | Nm | 6 | 6 | 9 | 9 |
| 5 | Recommended Input Speed | rpm | 4000 | 4000 | 4000 | 4000 |
| 6 | Efficiency | % | ≈90% | ≈90% | ≈81% | ≈81% |
| 7 | Backlash at No-load | | ≤1° | ≤1° | ≤1,2° | ≤1,2° |
| 8 | Length (L) | mm | 27,0 | 27,0 | 34,2 | 34,2 |
| 9 | Weight | kg | 0,134 | 0,134 | 0,173 | 0,173 |

| Specification | | | | | |
|---------------|-------------------------|-----------|-----------|------------|------------|
| Model | | ...3 / 51 | ...3 / 71 | ...3 / 100 | ...3 / 139 |
| 1 | Stages | 3 | 3 | 3 | 3 |
| 2 | Exact Ratio | 51,06 | 71,3 | 99,55 | 138,99 |
| 3 | Nominal Output Torque | Nm | 6 | 6 | 6 |
| 4 | Max. Output Torque | Nm | 18 | 18 | 18 |
| 5 | Recommended Input Speed | rpm | 4000 | 4000 | 4000 |
| 6 | Efficiency | % | ≈73% | ≈73% | ≈73% |
| 7 | Backlash at No-load | | ≤1,5° | ≤1,5° | ≤1,5° |
| 8 | Length (L) | mm | 41,1 | 41,1 | 41,1 |
| 9 | Weight | kg | 0,212 | 0,212 | 0,212 |

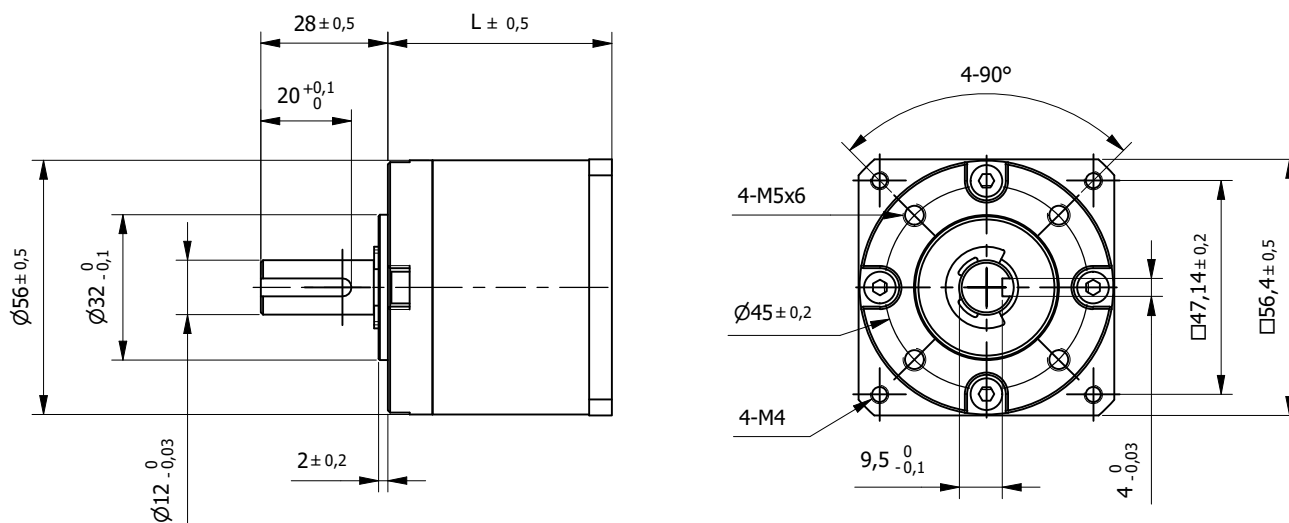
| Characteristics | |
|---------------------------------------|---------------|
| Item | |
| Max. Radial load (middle of the key) | 100N |
| Max. Axial load (output shaft center) | 50N |
| Radial Play | <0,07mm |
| Axial Play | <0,3mm |
| Max. Press fit force | 120N |
| Operating temperature | -20 to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



| Specification | | ...1 / 3.7 | ...1 / 5.2 | ...2 / 14 | ...2 / 19 | ...2 / 27 |
|---------------|-------------------------|------------|------------|-----------|-----------|-----------|
| 1 | Stages | 1 | 1 | 2 | 2 | 2 |
| 2 | Exact Ratio | 3,71 | 5,18 | 13,76 | 19,22 | 26,83 |
| 3 | Nominal Output Torque | Nm | 3 | 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 | | | | | | | |
|---------------|-------------------------|------------|------------|-----------|-----------|-----------|-----------|
| Model | | ...1 / 3.6 | ...1 / 4.3 | ...2 / 13 | ...2 / 15 | ...2 / 18 | ...2 / 23 |
| 1 | Stages | 1 | 1 | 2 | 2 | 2 | 2 |
| 2 | Exact Ratio | 3,6 | 4,25 | 12,96 | 15,3 | 18,06 | 22,67 |
| 3 | Nominal Output Torque | Nm | 9 | 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° | ≤1,2° | ≤1,2° | ≤1,2° |
| 8 | Length (L) | mm | 37,8 | 37,8 | 49,4 | 49,4 | 49,4 |
| 9 | Weight | kg | 0,455 | 0,455 | 0,610 | 0,610 | 0,610 |

| Specification | | | | | |
|---------------|-------------------------|-----------|-----------|-----------|-----------|
| Model | | ...3 / 47 | ...3 / 55 | ...3 / 65 | ...3 / 77 |
| 1 | Stages | 3 | 3 | 3 | 3 |
| 2 | Exact Ratio | 46,66 | 55,08 | 65,03 | 76,77 |
| 3 | Nominal Output Torque | Nm | 30 | 30 | 30 |
| 4 | Max. Output Torque | Nm | 90 | 90 | 90 |
| 5 | Recommended Input Speed | rpm | 4000 | 4000 | 4000 |
| 6 | Efficiency | % | ≈73% | ≈73% | ≈73% |
| 7 | Backlash at No-load | | ≤1,5° | ≤1,5° | ≤1,5° |
| 8 | Length (L) | mm | 60,8 | 60,8 | 60,8 |
| 9 | Weight | kg | 0,765 | 0,765 | 0,765 |

| Characteristics | |
|---------------------------------------|---------------|
| Item | |
| Max. Radial load (middle of the key) | 300N |
| Max. Axial load (output shaft center) | 200N |
| Radial Play | <0,08mm |
| Axial Play | <0,4mm |
| Max. Press fit force | 300N |
| Operating temperature | -20 to +80°C |
| Operating Ambient Humidity | 20-80% RH |
| Bearing output | Ball bearings |



Gearboxes
Spur gearboxes

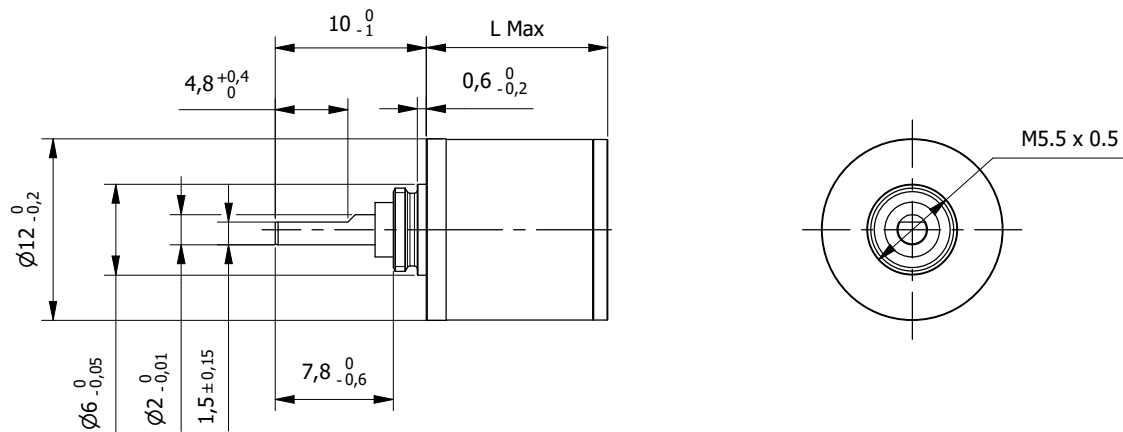
Advantages at a glance

- Compact & simple design
- Cost-efficient
- Best for low-torque/speed applications

Our extensive spur gearbox range offers good torque to size ratios coupled with high efficiencies. If the standard configuration does not meet the application requirement then a customized design could be proposed, even for low volumes.

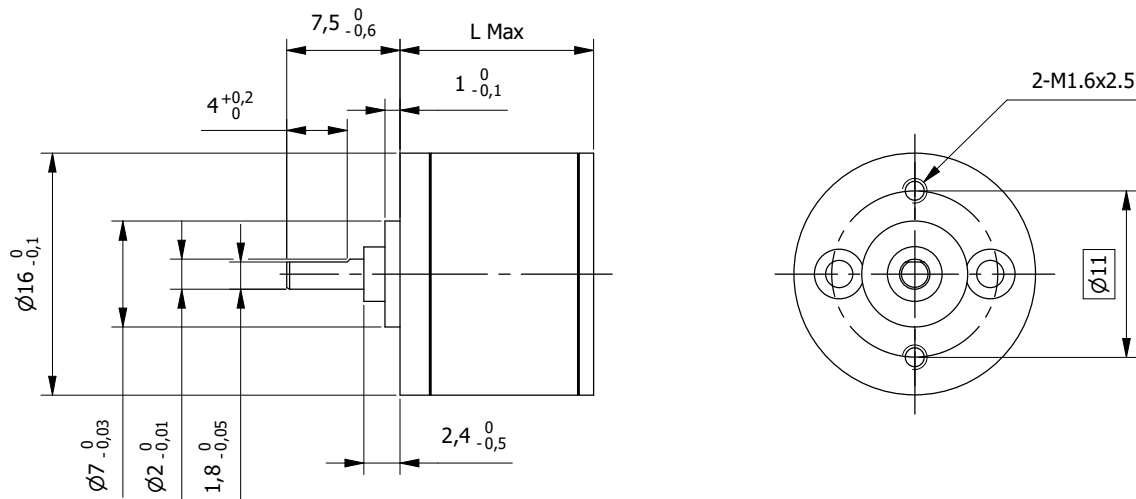
| Spur gearboxes | Torque* (Nm) | |
|-------------------------|--------------|-----|
| 12GSS | 0,01...0,025 | 408 |
| 16GSS | 0,01...0,03 | 409 |
| 16GSP (plastic version) | 0,01...0,03 | 410 |
| 16GST (reinforced) | 0,06...0,1 | 411 |
| 24GSP | 0,1 | 412 |

*Nominal Output Torque



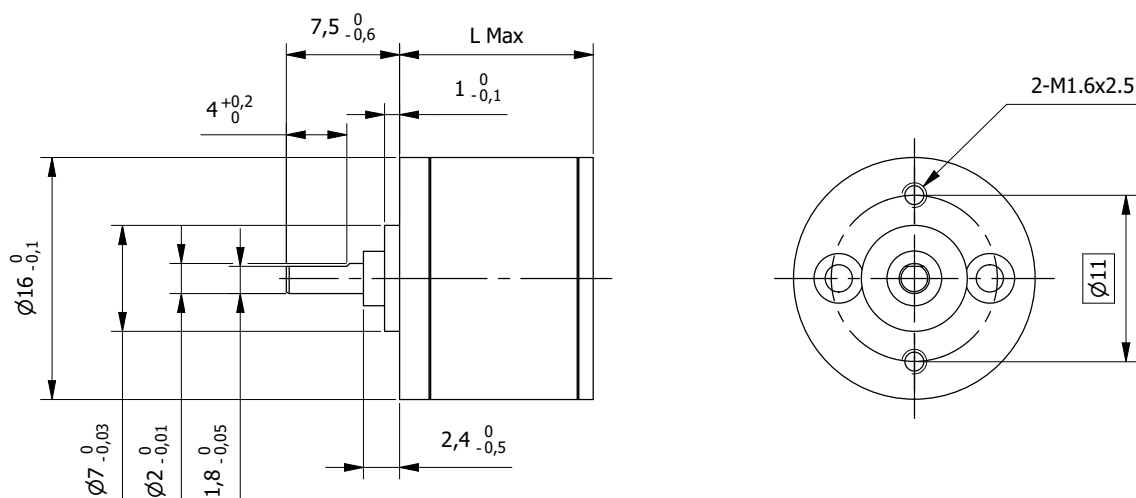
| Specification | | ...2-6,4 | ...3-22 | ...4-76 | ...5-141 |
|---------------|--------------------------------------|------------------|---------|---------|----------|
| 1 | Model | 2 | 3 | 4 | 5 |
| 2 | Stages | 2 | 3 | 4 | 5 |
| 3 | Reduction Ratio | 6,4 | 22 | 76 | 141 |
| 4 | Nominal Output Torque | Nm | 0,01 | 0,015 | 0,02 |
| 5 | Max. Output Torque | Nm | 0,03 | 0,035 | 0,04 |
| 6 | Recommended Input Speed | rpm | 8000 | 8000 | 8000 |
| 7 | Efficiency | % | 81 | 73 | 66 |
| 8 | Mass Inertia | gcm ² | 0,002 | 0,002 | 0,002 |
| 9 | Average Backlash no-load | ° | 1 | 1 | 1,2 |
| 10 | Max. Axial load (dynamic) | N | 2 | 2 | 2 |
| 11 | Max. Radial load (6,5mm from flange) | N | 2 | 2 | 2 |
| 12 | Length (L) | mm | 10 | 12 | 14 |
| 13 | Weight | g | 6,5 | 7,4 | 8,3 |

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



| Specification | | ...2-9,1 | ...3-31 | ...4-76 | ...4-141 |
|---------------|--------------------------------------|------------------------|---------|---------|----------|
| 1 | 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 | gcm ² 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 |



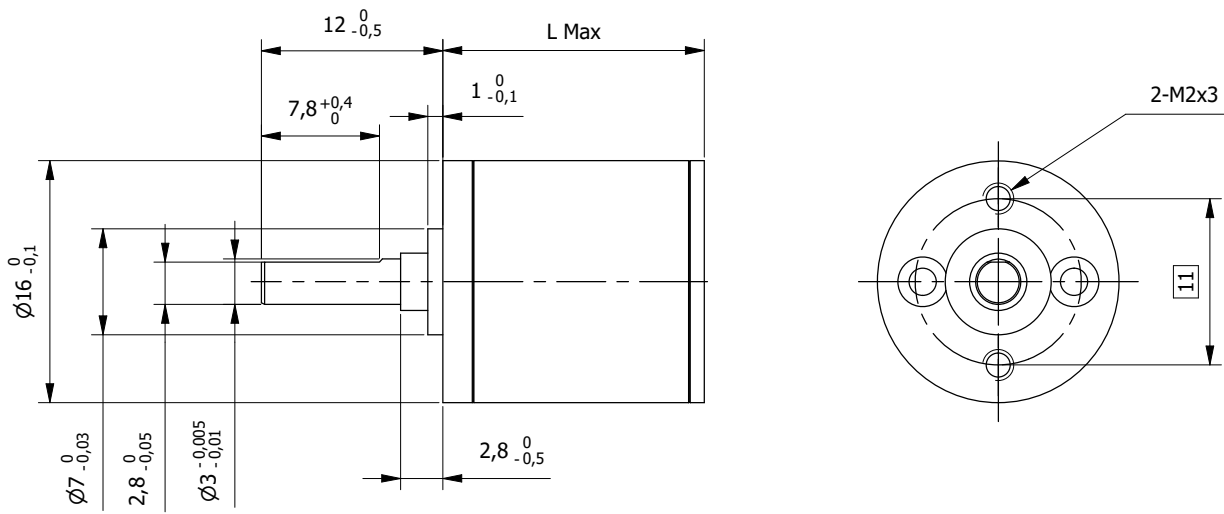
| Specification | | ...2-6,4 | ...2-9,1 | ...3-31 | ...4-76 | ...4-141 |
|---------------|--------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 1 | Stages | 2 | 2 | 3 | 4 | 4 |
| 2 | Reduction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

| Characteristics | |
|-----------------------|-----------------|
| Item | |
| Max. Press fit force | 15N |
| Operating temperature | -15 to +80°C |
| Bearing output | Sleeve bearings |

Spur Gearbox 16GST

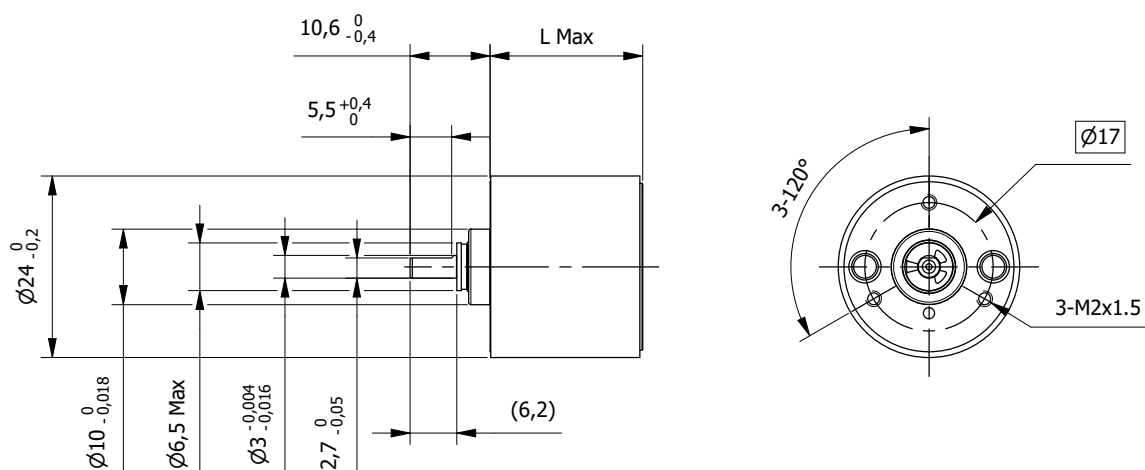
Reinforced

Ø 16mm
0,06 to 0,1Nm



| Specification | | ...2-9,1 | ...3-31 | ...4-76 | ...4-141 |
|---------------|--------------------------------------|------------------------|---------|---------|----------|
| 1 | Stages | 2 | 3 | 4 | 4 |
| 2 | Reduction Ratio | 9,1 | 31 | 76 | 141 |
| 3 | Nominal Output Torque | Nm 0,06 | 0,06 | 0,1 | 0,1 |
| 4 | Max. Output Torque | Nm 0,15 | 0,15 | 0,3 | 0,3 |
| 5 | Recommended Input Speed | rpm 8000 | 8000 | 8000 | 8000 |
| 6 | Efficiency | % 81 | 73 | 66 | 66 |
| 7 | Mass Inertia | gcm ² 0,006 | 0,005 | 0,004 | 0,004 |
| 8 | Average Backlash no-load | ° 1 | 1 | 1,2 | 1,2 |
| 9 | Max. Axial load (dynamic) | N 5 | 5 | 5 | 5 |
| 10 | Max. Radial load (6,5mm from flange) | N 10 | 15 | 20 | 20 |
| 11 | Length (L) | mm 14,3 | 17,3 | 19,3 | 19,3 |
| 12 | Weight | g 13,8 | 14,5 | 15,8 | 15,8 |

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



| Specification | | ...2-7,2 | ...2-20 | ...4-32 | ...4-64 | ...4-131 | ...6-325 |
|---------------|------------------------------------|------------------|---------|---------|---------|----------|----------|
| 1 | Model | ...2-7,2 | ...2-20 | ...4-32 | ...4-64 | ...4-131 | ...6-325 |
| 1 | Stages | 2 | 2 | 4 | 4 | 4 | 6 |
| 2 | Reduction Ratio | 7,2 | 20 | 32 | 64 | 131 | 325 |
| 3 | Nominal Output Torque | Nm | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| 4 | Max. Output Torque | Nm | 0,15 | 0,15 | 0,15 | 0,15 | 0,15 |
| 5 | Recommended Input Speed | rpm | 4000 | 4000 | 4000 | 4000 | 4000 |
| 6 | Efficiency | % | 81 | 66 | 66 | 66 | 53 |
| 7 | Mass Inertia | gcm ² | 0,008 | 0,01 | 0,008 | 0,007 | 0,006 |
| 8 | Average Backlash no-load | ° | 1 | 2 | 2 | 2 | 3 |
| 9 | Max. Axial load (dynamic) | N | 8 | 8 | 8 | 8 | 8 |
| 10 | Max. Radial load (8mm from flange) | N | 5 | 5 | 5 | 5 | 5 |
| 11 | Length (L) | mm | 16,5 | 16,5 | 20,2 | 20,2 | 24 |
| 12 | Weight | g | 25 | 28 | 28 | 28 | 30 |

| Characteristics | |
|-----------------------|-----------------|
| Item | |
| Max. Press fit force | 500N |
| Operating temperature | -15 to +80°C |
| Bearing output | Sleeve bearings |



Gearboxes
Worm & Wheel

Advantages at a glance

- Right-angle transmission
- High reduction ratios
- Self-locking capability

Our right-angle worm and wheel gearboxes provide a compact solution for applications requiring a 90° transmission. They deliver high reduction ratios in a single stage and offer smooth, quiet operation. In certain configurations, they also feature self-locking capability, preventing back-driving and ensuring reliable holding torque. Designed to perform efficiently across industries such as mobility solutions and materials handling, these gearboxes combine robustness, durability, and cost-effectiveness. A wide range of gearing and material options is available, with customisation to match your specific application needs.

| Worm & Wheel gearboxes - NEW | Torque* (Nm) | |
|------------------------------|--------------|-----|
| GWS | 2...4,5 | 416 |
| GW58 | 4 | 417 |
| GW80 | 5...12 | 418 |
| GW12 | 18...30 | 419 |
| GWL | 15...19 | 420 |
| GW65 | 120 | 421 |

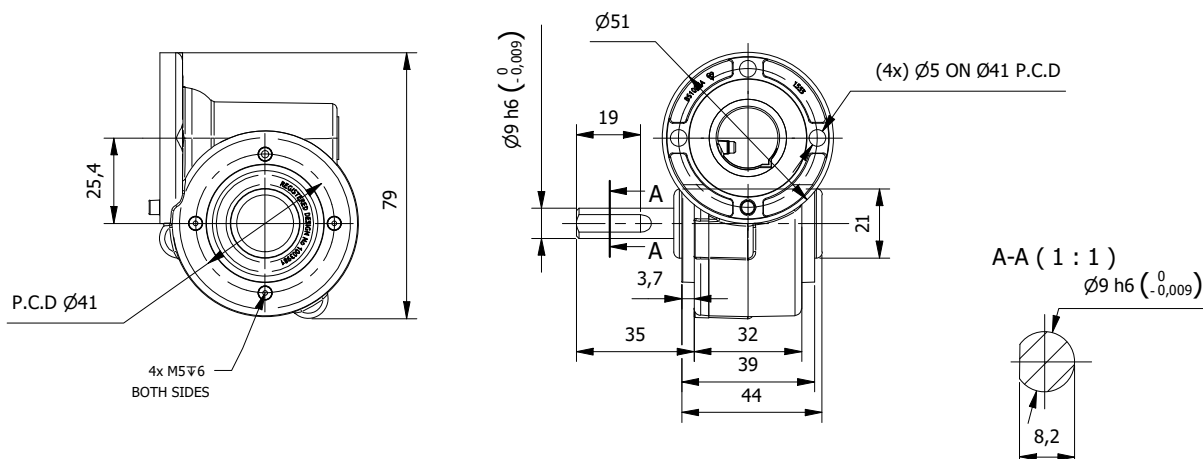
*Nominal Output Torque

Worm and Wheel Gearbox GWS

Composite or Bronze gears

Ø 51mm

2 to 4,5Nm



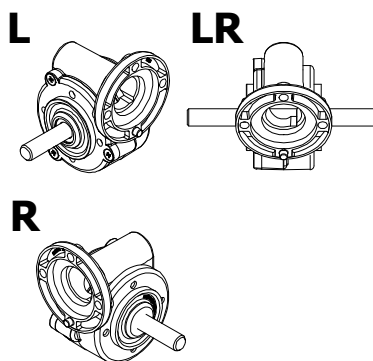
Available in Overhung configuration

| Specification: values shown as Composite/Bronze | | | | | | | | |
|---|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|
| Gear Ratio | | :1 | 4 | 5 | 10 | 15 | 20 | 30 |
| 1 | Nominal Output Torque | Nm | 3/4,5 | 3/4,5 | 3/4,5 | 3/4,5 | 3/4,5 | 3/4,5 |
| 2 | Max. Output Torque | Nm | 4,8/7,2 | 4,8/7,2 | 4,8/7,2 | 4,8/7,2 | 4,8/7,2 | 4,8/7,2 |
| 3 | Efficiency | % | 80/70 | 80/70 | 80/70 | 75/65 | 70/61 | 65/57 |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 150 | 150 | 150 | 150 | 150 | 150 |
| 6 | Max. Radial load (12mm from flange) | N | 250 | 250 | 250 | 250 | 250 | 250 |
| 7 | Weight | kg | 0,3/0,4 | 0,3/0,4 | 0,3/0,4 | 0,3/0,4 | 0,3/0,4 | 0,3/0,4 |

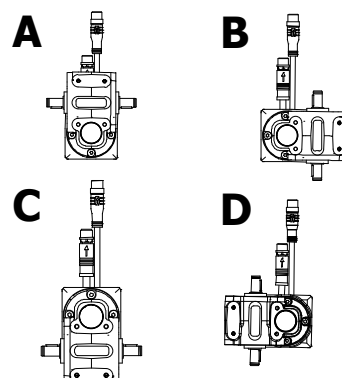
| Specification: values shown as Composite/Bronze | | | | | | |
|---|-------------------------------------|---------|---------|---------|---------|---------|
| Gear Ratio | | :1 | 40 | 48 | 60 | 70 |
| 1 | Nominal Output Torque | Nm | 3/4,5 | 2,5/3,8 | 2,2/3,3 | 2/3 |
| 2 | Max. Output Torque | Nm | 4,8/7,2 | 4/6 | 3,5/5,3 | 3,2/4,8 |
| 3 | Efficiency | % | 60/52 | 55/48 | 48/42 | 40/35 |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 150 | 150 | 150 | 150 |
| 6 | Max. Radial load (12mm from flange) | N | 250 | 250 | 250 | 250 |
| 7 | Weight | kg | 0,3/0,4 | 0,3/0,4 | 0,3/0,4 | 0,3/0,4 |

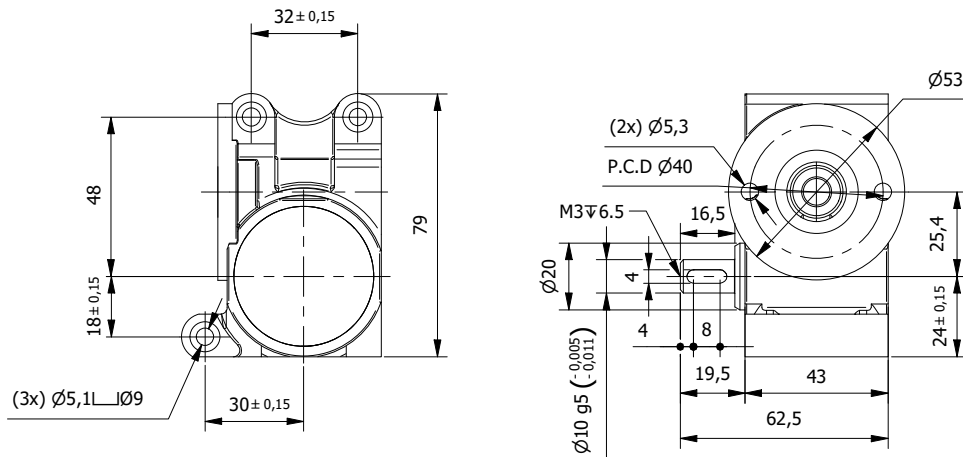
| Product code reference | |
|------------------------|--------------------------|
| GWS-O-10-B-L-A | |
| O | O=Overhung Configuration |
| 10 | 10 Gear Ratio |
| B | B=Bronze Material |
| C | C=Composite Material |
| L | L=Left Shaft exit |
| R | R=Right Shaft exit |
| LR | LR=Both Shaft exit |
| A | A,B,C,D Orientation |

Shaft exit options



Orientation options





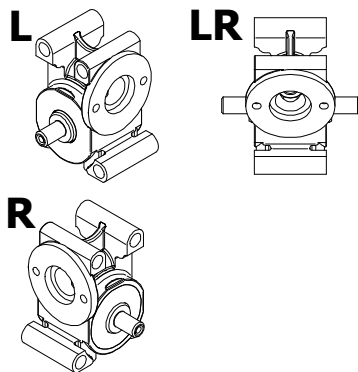
Available in Overhung configuration

| Specification | | :1 | 4 | 5 | 7 | 9 | 10 | 14 |
|---------------|-------------------------------------|---------|-------|-------|-------|-------|-------|-------|
| 1 | Nominal Output Torque | Nm | 4 | 4 | 4 | 4 | 4 | 4 |
| 2 | Max. Output Torque | Nm | 8 | 8 | 8 | 8 | 8 | 8 |
| 3 | Efficiency | % | 85 | 84 | 82 | 80 | 80 | 76 |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 300 | 300 | 300 | 300 | 300 | 300 |
| 6 | Max. Radial load (12mm from flange) | N | 400 | 400 | 400 | 400 | 400 | 400 |
| 7 | Weight | kg | 0,4 | 0,4 | 0,4 | 0,4 | 0,4 | 0,4 |

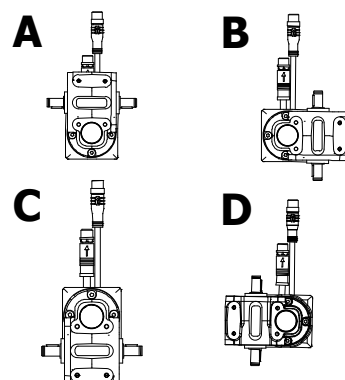
| Specification | | :1 | 15 | 18 | 20 | 25 |
|---------------|-------------------------------------|---------|-------|-------|-------|-------|
| 1 | Nominal Output Torque | Nm | 4 | 4 | 4 | 4 |
| 2 | Max. Output Torque | Nm | 8 | 8 | 8 | 8 |
| 3 | Efficiency | % | 75 | 73 | 72 | 68 |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 300 | 300 | 300 | 300 |
| 6 | Max. Radial load (12mm from flange) | N | 400 | 400 | 400 | 400 |
| 7 | Weight | kg | 0,4 | 0,4 | 0,4 | 0,4 |

| Product code reference | |
|------------------------|--------------------------|
| GW58-O-10-C-L-A | |
| O | O=Overhung Configuration |
| 10 | Gear Ratio |
| C | C=Composite Material |
| L | L=Left Shaft exit |
| | R=Right |
| | LR=Both |
| A | A,B,C,D Orientation |

Shaft exit options



Orientation options

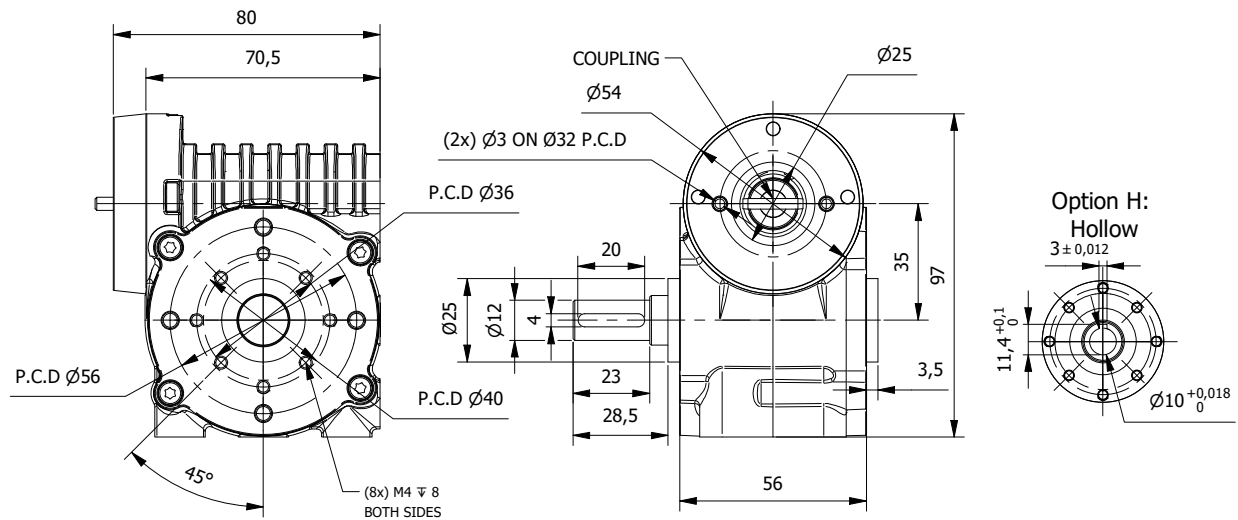


Worm and Wheel Gearbox GW80

Ø 54mm

Composite or Bronze gears

5 to 12Nm



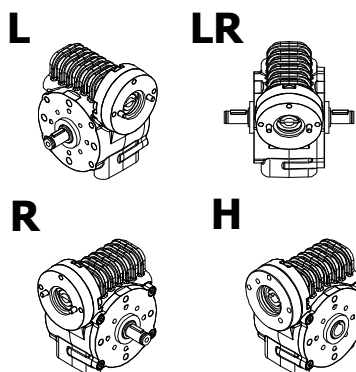
Available in Coupling or Overhung configuration

| Specification: values shown as Composite/Bronze | | | | | | | | |
|---|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|
| Gear Ratio | | :1 | 4 | 6/5 | 10 | 15/16 | 20 | 30 |
| 1 | Nominal Output Torque | Nm | 8/12 | 8/12 | 8/12 | 8/12 | 8/12 | 8/12 |
| 2 | Max. Output Torque | Nm | 13/19 | 13/19 | 13/19 | 13/19 | 13/19 | 13/19 |
| 3 | Efficiency | % | 85/74 | 85/74 | 82/71 | 77/67 | 74/64 | 70/61 |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 300 | 300 | 300 | 300 | 300 | 300 |
| 6 | Max. Radial load (12mm from flange) | N | 350 | 350 | 350 | 350 | 350 | 350 |
| 7 | Weight | kg | 0,7/0,9 | 0,7/0,9 | 0,7/0,9 | 0,7/0,9 | 0,7/0,9 | 0,7/0,9 |

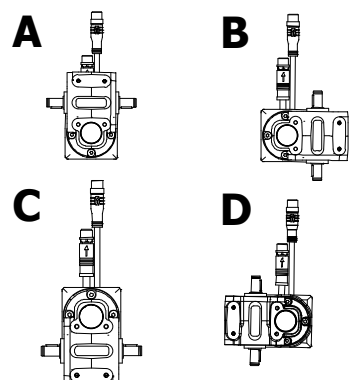
| Specification: values shown as Composite/Bronze | | | | | | |
|---|-------------------------------------|---------|---------|---------|---------|---------|
| Gear Ratio | | :1 | 40 | 54/48 | 60 | 72 |
| 1 | Nominal Output Torque | Nm | 8/12 | 7/12 | 6/9 | 5/8 |
| 2 | Max. Output Torque | Nm | 13/19 | 11/19 | 10/14 | 8/12 |
| 3 | Efficiency | % | 65/57 | 56/50 | 54/47 | 46/40 |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 300 | 300 | 300 | 300 |
| 6 | Max. Radial load (12mm from flange) | N | 350 | 350 | 350 | 350 |
| 7 | Weight | kg | 0,7/0,9 | 0,7/0,9 | 0,7/0,9 | 0,7/0,9 |

| Product code reference | |
|------------------------|---|
| GW80-C-10-B-L-A | |
| C | C= Coupling Configuration O=Overhung |
| 10 | Gear Ratio |
| B | B=Bronze Material C=Composite |
| L | L=Left Shaft exit R=Right LR=Both H=Hollow |
| A | A,B,C,D Orientation |

Shaft exit options



Orientation options

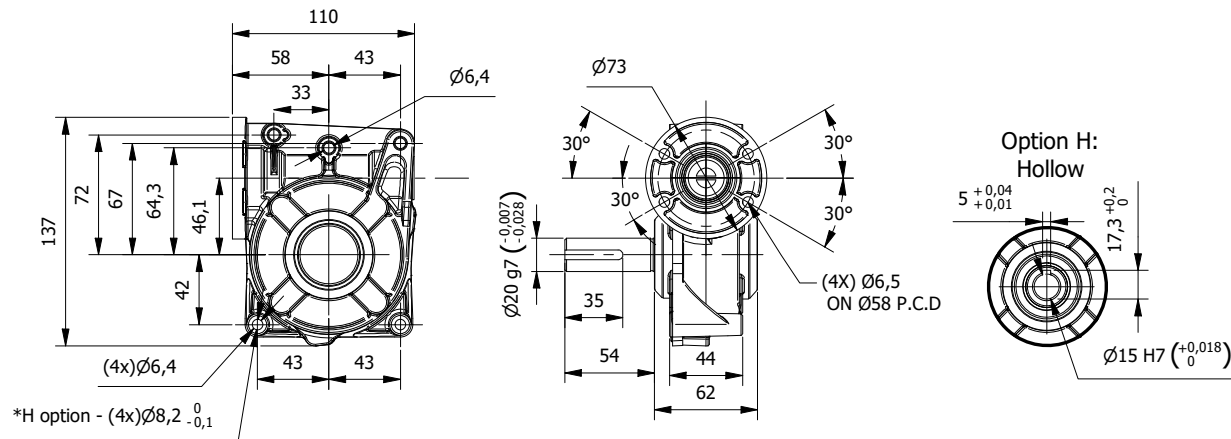


Worm and Wheel Gearbox GW12

Composite or Bronze gears

Ø 73mm

18 to 30Nm



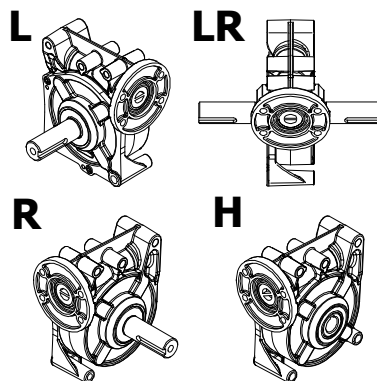
Available in Coupling configuration

| Specification: values shown as Composite/Bronze | | | :1 | 12.5 | 14 | 15 | 19 | 21 | 25 |
|---|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | Nominal Output Torque | Nm | 20/30 | 20/30 | 20/30 | 20/30 | 20/30 | 20/30 | 20/30 |
| 2 | Max. Output Torque | Nm | 32/48 | 32/48 | 32/48 | 32/48 | 32/48 | 32/48 | 32/48 |
| 3 | Efficiency | % | 85/80 | 83/75 | 83/75 | 80/73 | 78/73 | 75/72 | |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 300/600 | 300/600 | 300/600 | 300/600 | 300/600 | 300/600 | 300/600 |
| 6 | Max. Radial load (12mm from flange) | N | 500/800 | 500/800 | 500/800 | 500/800 | 500/800 | 500/800 | 500/800 |
| 7 | Weight | kg | 1,1/1,5 | 1,1/1,5 | 1,1/1,5 | 1,1/1,5 | 1,1/1,5 | 1,1/1,5 | 1,1/1,5 |

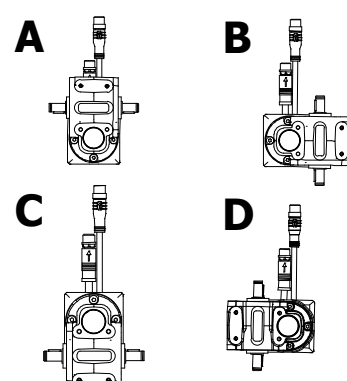
| Specification: values shown as Composite/Bronze | | | :1 | 30 | 50 | 60 | 75 |
|---|-------------------------------------|---------|---------|---------|---------|---------|----|
| 1 | Nominal Output Torque | Nm | 20/30 | 20/30 | 20/30 | 18/27 | |
| 2 | Max. Output Torque | Nm | 32/48 | 32/48 | 32/48 | 29/43 | |
| 3 | Efficiency | % | 72/65 | 60/55 | 55/50 | 50/45 | |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 | |
| 5 | Max. Axial load | N | 300/600 | 300/600 | 300/600 | 300/600 | |
| 6 | Max. Radial load (12mm from flange) | N | 500/800 | 500/800 | 500/800 | 500/800 | |
| 7 | Weight | kg | 1,1/1,5 | 1,1/1,5 | 1,1/1,5 | 1,1/1,5 | |

| Product code reference | |
|------------------------|---------------------------|
| GW12-C-15-B-L-A | |
| C | C= Coupling Configuration |
| 15 | Gear Ratio |
| B | B=Bronze Material |
| | C=Composite Material |
| L | L=Left Shaft exit |
| | R=Right Shaft exit |
| | LR=Both Shaft exit |
| | H=Hollow Shaft exit |
| A | A,B,C,D Orientation |

Shaft exit options



Orientation options

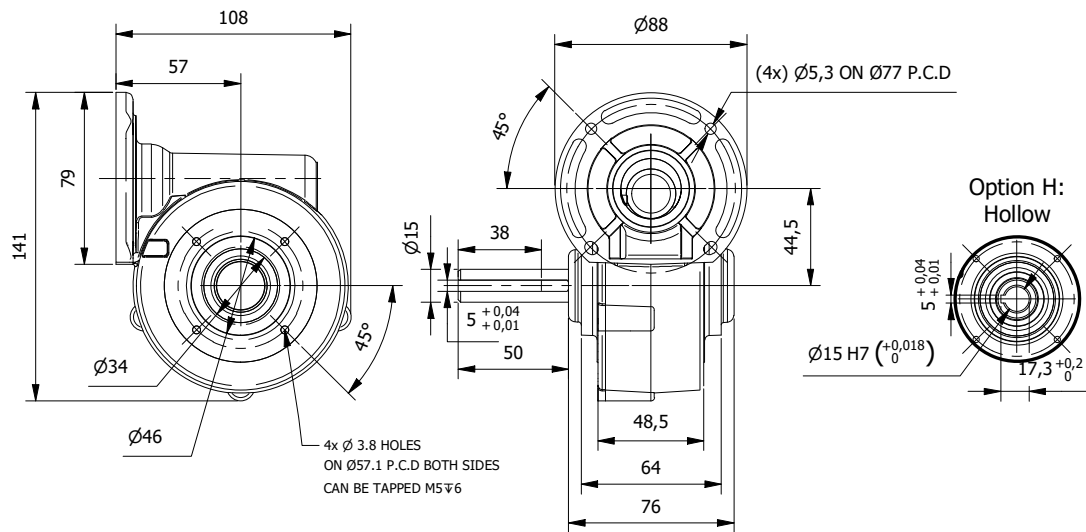


Worm and Wheel Gearbox GWL

Composite or Bronze gears

Ø 88mm

15 to 19Nm



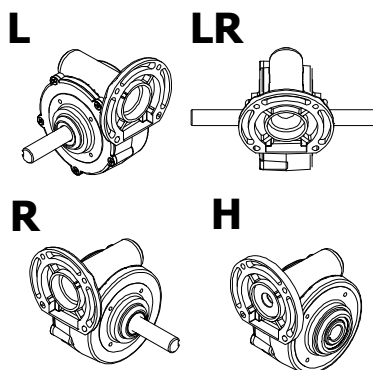
Available in Overhung configuration

| Specification: values shown as Composite/Bronze | | | | | | | | |
|---|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|
| Gear Ratio | | :1 | 5 | 12 | 15 | 20 | 25 | 30 |
| 1 | Nominal Output Torque | Nm | 15/19 | 15/19 | 15/19 | 15/19 | 15/19 | 15/19 |
| 2 | Max. Output Torque | Nm | 15/22 | 15/22 | 15/22 | 15/22 | 15/22 | 15/22 |
| 3 | Efficiency | % | 90/84 | 85/80 | 83/75 | 79/73 | 75/72 | 72/65 |
| 4 | Backlash | arc.min | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 196 | 196 | 196 | 196 | 196 | 196 |
| 6 | Max. Radial load (12mm from flange) | N | 314 | 314 | 314 | 314 | 314 | 314 |
| 7 | Weight | kg | 1,5/1,9 | 1,5/1,9 | 1,5/1,9 | 1,5/1,9 | 1,5/1,9 | 1,5/1,9 |

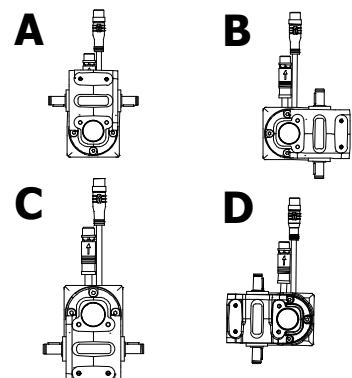
| Specification: values shown as Composite/Bronze | | | | |
|---|-------------------------------------|---------|---------|---------|
| Gear Ratio | | :1 | 40 | 60 |
| 1 | Nominal Output Torque | Nm | 15/19 | 15/19 |
| 2 | Max. Output Torque | Nm | 15/22 | 15/22 |
| 3 | Efficiency | % | 67/60 | 55/45 |
| 4 | Backlash | arc.min | 10-25 | 10-25 |
| 5 | Max. Axial load | N | 196 | 196 |
| 6 | Max. Radial load (12mm from flange) | N | 314 | 314 |
| 7 | Weight | kg | 1,5/1,9 | 1,5/1,9 |

| Product code reference | |
|------------------------|--------------------------|
| GWL-O-20-B-L-A | |
| O | O=Overhung Configuration |
| 20 | 20 Gear Ratio |
| B | B=Bronze Material |
| C | C=Composite Material |
| L | L=Left Shaft exit |
| R | R=Right Shaft exit |
| LR | LR=Both Shaft exit |
| H | H=Hollow Shaft exit |
| A | A,B,C,D Orientation |

Shaft exit options



Orientation options

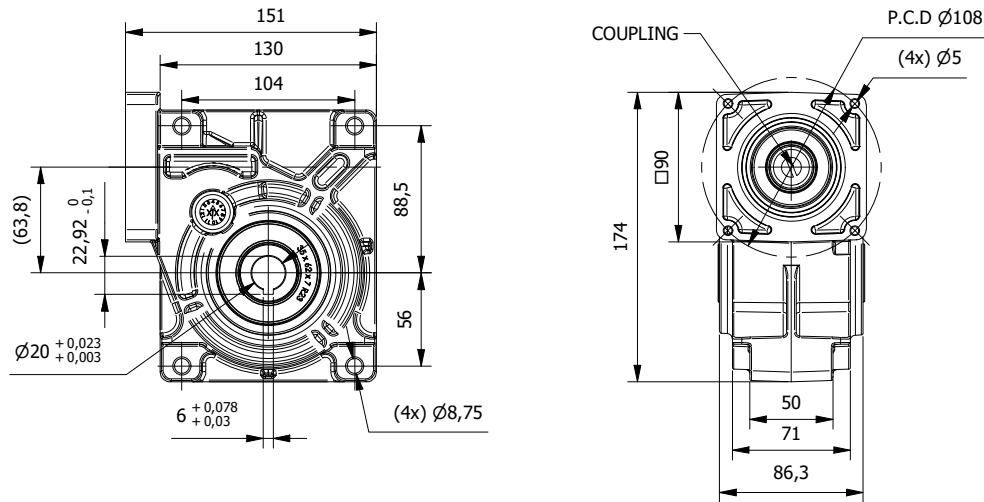


Worm and Wheel Gearbox GW65

Steel and Bronze gears

□ 90mm

120Nm



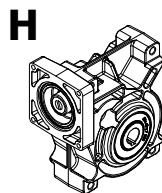
Available in Coupling configuration

| Specification | | | :1 | 20 | 40 | 60 | 80 | 100 | 120 |
|---------------|-------------------------------------|---------|-------|-------|-------|-------|-------|-------|-------|
| 1 | Nominal Output Torque | Nm | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| 2 | Max. Output Torque | Nm | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| 3 | Efficiency | % | 81 | 76 | 75 | 70 | 65 | 65 | 65 |
| 4 | Backlash | arc.min | 35-65 | 35-65 | 35-65 | 35-65 | 35-65 | 35-65 | 35-65 |
| 5 | Max. Axial load | N | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| 6 | Max. Radial load (12mm from flange) | N | 2335 | 2335 | 2335 | 2335 | 2335 | 2335 | 2335 |
| 7 | Weight | kg | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 |

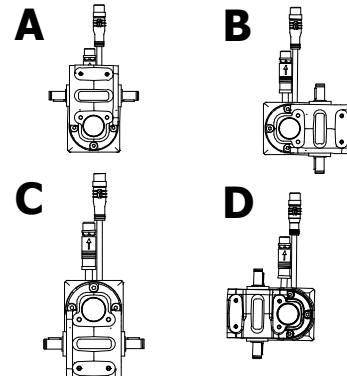
| Specification | | | :1 | 160 |
|---------------|-------------------------------------|---------|-------|-----|
| 1 | Nominal Output Torque | Nm | 120 | |
| 2 | Max. Output Torque | Nm | 300 | |
| 3 | Efficiency | % | 60 | |
| 4 | Backlash | arc.min | 35-65 | |
| 5 | Max. Axial load | N | 1750 | |
| 6 | Max. Radial load (12mm from flange) | N | 2335 | |
| 7 | Weight | kg | 3,5 | |

| Product code reference | |
|------------------------|-----------------------------|
| GW65-C-60-B-H-A | |
| C | C= Coupling Configuration |
| 60 | 60 Gear Ratio |
| B | B=Bronze and Steel Material |
| H | H=Hollow Shaft exit |
| A | A,B,C,D Orientation |

Shaft exit options



Orientation options



Encoders



Controllers/Drives

Encoders

Gearboxes

Linear actuators

Stepper

Motor + Controller

Servomotors

Brushless DC

Brushed DC

Index



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

428

Incremental Encoders

425

E3 - Optical encoder - 3 channels

430

E4T - Optical encoder - 2 channels

431

E5 - Optical encoder - 3 channels

432

| 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 output | Voltage value of the low level signal. |
| High level output | 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 E4T 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.

E4T

The E5 rotary encoder has a rugged glass-filled polymer enclosure with either a 5-pin or 10-pin latching connector. The module contains a highly collimated solid state light source and monolithic phased array sensor, which together provide a system extremely tolerant to mechanical misalignments.

E5

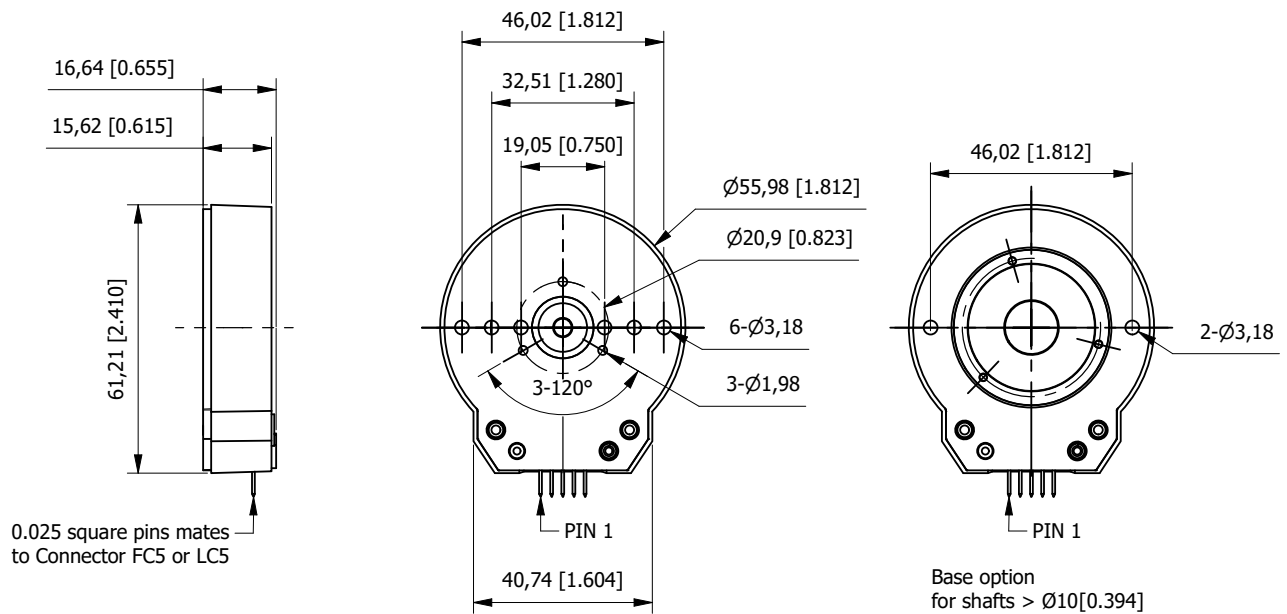
Composition

| | |
|---|-------------------|
| 1 | Base |
| 2 | PCB & Connector |
| 3 | Hub |
| 4 | Code wheel / disc |
| 5 | Cover |



Incremental Encoder E3

Optical - 3 channel



| Specification | | E3-100 | E3-500 | E3-1024 | E3-2500 | E3-4096 | E3-8000 |
|-----------------------|-----|------------|------------|------------|------------|------------|------------|
| Model | | E3-100 | E3-500 | E3-1024 | E3-2500 | E3-4096 | E3-8000 |
| Cycles per revolution | CPR | 100 | 500 | 1024 | 2500 | 4096 | 8000 |
| Number of channels | | 2 + index* | 2 + index* | 2 + index* | 2 + index* | 2 + index* | 2 + index* |
| Max. Frequency | kHz | 300 | 300 | 300 | 300 | 300 | 300 |
| Max. Speed | rpm | 60'000 | 36'000 | 17'575 | 7'200 | 5'273 | 5'400 |

Available CPR: 64, 100, 200, 400, 500, 512, 1000, 1024, 1800, 2000, 2048, 2500, 3600, 4000, 4096, 5000, 7200, 8000, 8192, 10000

Available with different bore options to suit all our motors

* optional

| Electrical Specification | | |
|---|------|--------|
| Item | | |
| Supply Voltage | V | 5 ±10% |
| Supply Current (CPR ≤1000, no load) | mA | 27-33 |
| Supply Current (CPR ≥1000 and <3600, no load) | mA | 54-62 |
| Supply Current (CPR ≥3600, no load) | mA | 72-85 |
| Low Level Output | Vmax | 0,5 |
| High Level Output | Vmin | 2 |
| Output Rise Time (CPR <3600) | ns | 110 |
| Output Rise Time (CPR ≥3600) | ns | 50 |
| Output Fall Time (CPR <3600) | ns | 35 |
| Output Fall Time (CPR ≥3600) | ns | 50 |
| Phase shift | °e | 90 ±60 |

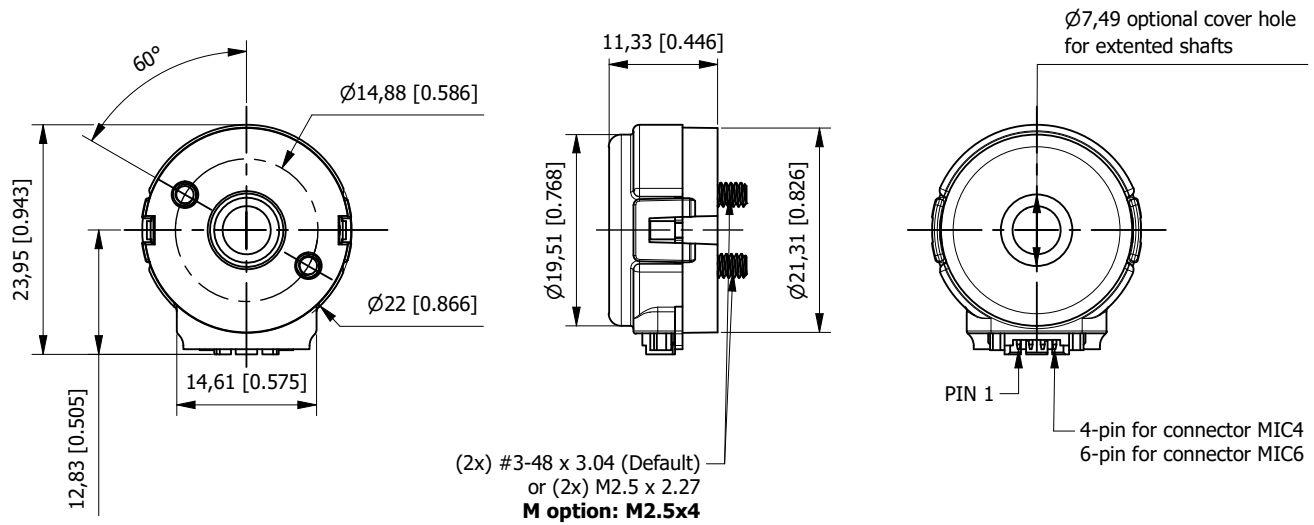
| Connection | |
|------------------|-------------------|
| Pin | |
| 1 | Ground |
| 2 | Index |
| 3 | A channel |
| 4 | +5VDC power |
| 5 | B channel |
| Mating Connector | CON-C5 or CON-LC5 |

Available with different cable options

| Characteristics | | |
|--|--------------------|--------------|
| Item | | |
| Operating Temperature (CPR <3600) | °C | -40° to 100° |
| Operating Temperature (CPR ≥3600) | °C | -25° to 100° |
| Max. Shaft Axial Play | mm | ±0,254 |
| Max. Shaft Run out | mm | 0,1 T.I.R. |
| Max. Acceleration | rad/s ² | 250'000 |
| Codewheel Moment of Inertia (bore <12mm) | gcm ² | 6,285 |
| Codewheel Moment of Inertia (bore ≥12mm) | gcm ² | 28,246 |
| Minimum Shaft Length | mm | 11,3 |
| Maximum Shaft Length | mm | 17,02 |

Incremental Encoder E4T

Optical - 2 channel



| Specification | | E4T-100 | E4T-200 | E4T-256 | E4T-400 | E4T-500 | E4T-1000 |
|-----------------------|-----|---------|---------|---------|---------|---------|----------|
| Model | | E4T-100 | E4T-200 | E4T-256 | E4T-400 | E4T-500 | E4T-1000 |
| Cycles per revolution | CPR | 100 | 200 | 256 | 400 | 500 | 1000 |
| Number of channels | | 2 | 2 | 2 | 2 | 2 | 2 |
| Max. Frequency | kHz | 100 | 100 | 100 | 100 | 100 | 100 |
| Max. Speed | rpm | 60'000 | 30'000 | 23'437 | 15'000 | 12'000 | 6'000 |

Available CPR: 100, 108, 120, 125, 128, 200, 250, 256, 300, 360, 400, 500, 512, 720, 800, 1000
 Available with different bore options to suit all our motors

| Electrical Specification | | Single-Ended | Differential |
|-------------------------------------|------------------|--------------|--------------|
| Supply Voltage | V | 5 ±10% | 5 ±10% |
| Supply Current (CPR ≤ 500, no load) | mA | 25-30 | 27-32 |
| Supply Current (CPR > 500, no load) | mA | 34-42 | 36-44 |
| Low Level Output | V _{max} | 0,4 | 0,6 |
| High Level Output | V _{min} | 2,4 | 4,75 |
| Differential Output Voltage | V _{min} | --- | 3 |
| Output Rise Time | ns | 100 | 20 |
| Output Fall Time | ns | 50 | 20 |
| Phase shift | °e | 90 ±60 | 90 ±60 |

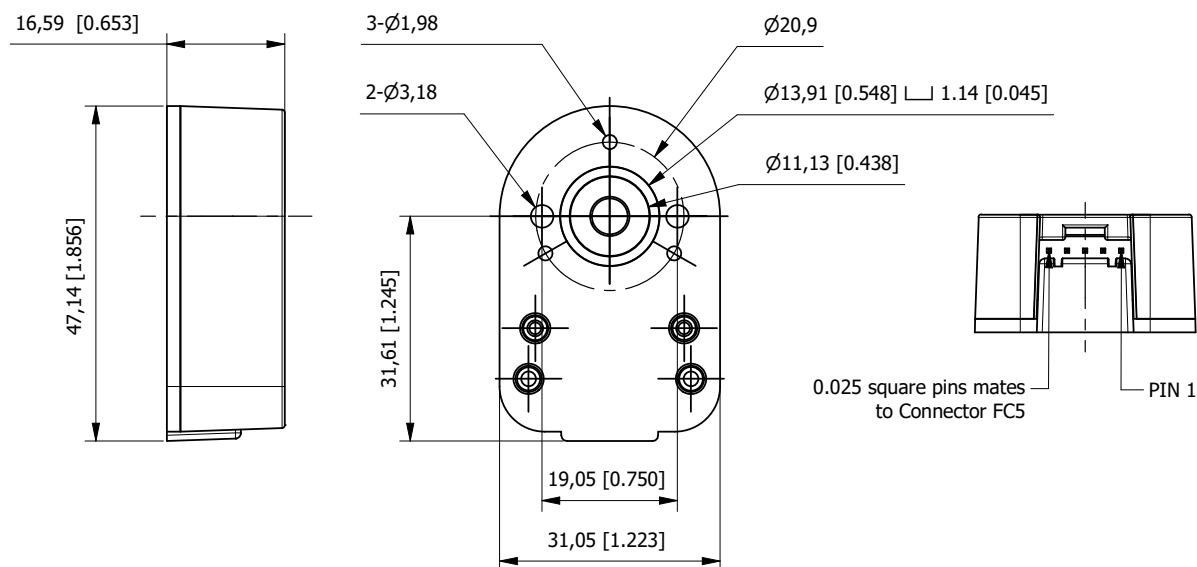
| Characteristics | |
|-----------------------------|----------------------------|
| Item | |
| Operating Temperature | °C -20° to 100° |
| Max. Shaft Axial Play | mm ±0,254 |
| Max. Shaft Run out | mm 0,05 T.I.R. |
| Max. Acceleration | rad/s ² 250'000 |
| Codewheel Moment of Inertia | gcm ² 0,036 |
| Minimum Shaft Length | mm 6,985 |
| Maximum Shaft Length | mm 10 |

| 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

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 | High-Voltage |
|--|------------------|--------------|--------------|--------------|
| Supply Voltage | V | 5 ±10% | 5 ±10% | 7,5-30 |
| Supply Current (CPR <500, no load) | mA | 27-33 | 29-36 | 8-10 |
| Supply Current (CPR ≥500 and <2000, no load) | mA | 54-62 | 56-65 | 16-19 |
| Supply Current (CPR ≥2000, no load) | mA | 72-85 | 74-88 | 22-25 |
| Low Level Output | V _{max} | 0,5 | 0,4 | 0,4 |
| High Level Output | V _{min} | 2 | 2,4 | --- |
| Output Rise Time (CPR <2000, no load) | ns | 110 | ≤20 | --- |
| Output Rise Time (CPR ≥2000, ±5mA load) | ns | 50 | ≤20 | --- |
| Output Fall Time (CPR <2000, no load) | ns | 100 | ≤20 | --- |
| Output Fall Time (CPR ≥2000, ±5mA load) | ns | 50 | ≤20 | --- |
| Phase shift | °e | 90 ±60 | 90 ±60 | --- |

| Connection | | |
|------------------|--------------|--------------|
| Pin | Single-Ended | Differential |
| 1 | Ground | Ground |
| 2 | Index | Ground |
| 3 | A channel | Index- |
| 4 | +5VDC power | Index+ |
| 5 | B channel | A- channel |
| 6 | | A+ channel |
| 7 | | +5VDC power |
| 8 | | +5VDC power |
| 9 | | B- channel |
| 10 | | B+ channel |
| Mating Connector | CON-FC5 | CON-FC10 |

Available with different cable options

| Characteristics | |
|-----------------------------------|----------------------------|
| Item | |
| Operating Temperature (CPR <2000) | °C -40° to 100° |
| Operating Temperature (CPR ≥2000) | °C -25° to 100° |
| Max. Shaft Axial Play | mm ±0,254 |
| Max. Shaft Run out | mm 0,1 T.I.R. |
| Max. Acceleration | rad/s ² 250'000 |
| Codewheel Moment of Inertia | gcm ² 0,565 |
| Minimum Shaft Length | mm 11,3 |
| Maximum Shaft Length | mm 19,05 |

Controllers — Drives



Controllers/Drives

Encoders

Gearboxes

Linear actuators

Stepper

Motor + Controller

Servomotors

Brushless DC

Brushed DC

Index



Brushless DC motor
Controllers

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Brushless DC motor
Multi-Axis Controllers

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Brushless AC motor
Controllers

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Stepper motor
Controllers

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Controllers – Drives

| | | |
|---|------------------------|------------|
| Technical introduction | | 440 |
| Brushless DC motor Drives | | |
| | Current* (Arms) | 443 |
| Pegasus B072 | up to 2 | 444 |
| Pegasus B144 | up to 3 | 445 |
| Pegasus B360 | up to 12 | 446 |
| Gemini B400 | up to 10 | 447 |
| Leo B860 - NEW | up to 18 | 448 |
| Leo B1400 | up to 30 | 449 |
| Leo B2000 | up to 40 | 450 |
| Leo B3800 - NEW | up to 80 | 451 |
| Brushless DC motor Multi-Axis Drives | | |
| | Current* (Arms) | 453 |
| Phoenix - B100 | up to 3 (each motor) | 454 |
| Phoenix - B500 | up to 12 (each motor) | 455 |
| Brushless AC motor Drives | | |
| | Current* (Arms) | 457 |
| Scorpius A750 | up to 3 | 458 |
| Serpens A1300 | up to 5,2 | 459 |
| Stepper motor Drives | | |
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| Hercules SOD202 | up to 2 | 462 |
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| Aquarius SBD204 | up to 4,2 | 465 |
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| Sagittarius SBA207 | up to 7,1 | 467 |
| Andromeda SBA208 | up to 8,5 | 468 |
| Lyra SBAC203 | up to 3 | 469 |
| Draco SBAC205 | up to 5,2 | 470 |
| Dorado SBAC208 | up to 8 | 471 |

* 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. |
| Output 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. |
| Closed-loop | Closed loop motor control, also known as feedback control, incorporates a feedback mechanism to continuously monitor and adjust the motor's output. It uses sensors or encoders to measure the actual performance of the motor and compares it to the desired output. |

Product families

BLDC motor Controllers

BLDC motor Multi-Axis Controllers

BLAC motor Controllers

Stepper motor Controllers

Delta Line Electronics can provide solutions to accomplish every customers' need: our drives portfolio can cover a wide range of different motors, from Stepper to Brushless motors.

Our portfolio is divided in Brushless DC Drives for 3-phase BLDC motors with phase current up to 80A rms, Brushless DC Multi-Axis Drives able to simultaneously control up to three BLDC 3-phase motors with phase current up to 12A rms (each motor), Brushless AC Drives for 3-phase BLAC motors with phase current up to 5,2A rms and Stepper Drives for 2-phase Stepper motors suitable for DC and AC power supply and with a phase current up to 8,5A rms. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

Portfolio

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

Software

One of the many peculiarities of our drives is the possibility to choose different control methods:

the drive receives one signal to control the direction and one signal to control the speed from a master (a PLC or any other master capable of this control methodologies). These methods are extremely simple but limited by the performance of the master.

Clock and Direction / Analogue Reference

the drive is controlled through a fieldbus network: the master exchanges data with the drives connected to the bus. This control method has a great robustness, and the initial high cost is often justified by a reduction of the cablings and of the cost of assembly/maintenance procedures.

Fieldbus

the drive contains a custom application that can control the drive itself and the motor, even without the presence of a master. Programmable drives can be coupled with a PLC master to lighten the complexity of the PLC program, or they can be use standalone, even for complex usages.

Programmable

Technical introduction

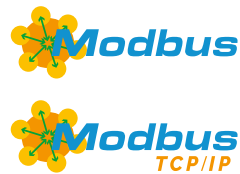
In modern industrial systems, communication protocols are essential for connecting and controlling devices efficiently. Each protocol offers unique advantages, whether it's for real-time performance, scalability, or compatibility across different applications. All Delta Line Drives equipped with any fieldbus act like slave for the bus, so it is necessary to have at least one master that handles the data exchange. Here below an overview of the available communication protocols across our range.

FIELDBUSES



CANopen

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.



Modbus

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.



EtherCAT

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.



Profinet

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.



Powerlink

Powerlink is a real-time Ethernet protocol designed for high-precision applications. It provides microsecond-level cycle times and supports unlimited nodes, making it ideal for complex automation systems requiring strict timing accuracy.



EtherNet/IP

EtherNet/IP is a highly versatile industrial network protocol that leverages standard Ethernet for real-time communication and control. It enables integration across diverse systems and manufacturers, offering robust and reliable data exchange for a wide range of automation applications.



Brushless DC motor **Controllers – Drives**

Advantages at a glance

- Position, Speed and Torque control
- Analogue, fieldbus or programmable
- Flexible configuration

Our Brushless DC Drives are specifically developed for 3-phases brushless motors with phase current up to 40A rms. All our drives feature ARM Core M4 Technology and are capable to drive motors with smooth and silent movements.

Brushless DC motor Drives

| | Current* (Arms) | |
|------------------------|-----------------|-----|
| Pegasus B072 | up to 2 | 444 |
| Pegasus B144 | up to 3 | 445 |
| Pegasus B360 | up to 12 | 446 |
| Gemini B400 | up to 10 | 447 |
| Leo B860 - NEW | up to 18 | 448 |
| Leo B1400 | up to 30 | 449 |
| Leo B2000 | up to 40 | 450 |
| Leo B3800 - NEW | up to 80 | 451 |

PEGASUS

Benefits

- Compact design
- Price/performance
- Programmable

Characteristics

- Phase Current up to 12A rms
- Power Supply: 12-48 VDC
- Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet, PowerLink, EtherNet/IP

GEMINI

Benefits

- Digital I/O and up to 2 analogue inputs
- Programmable

Characteristics

- Phase Current up to 10A rms
- Power Supply: 12-48 VDC
- Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP

LEO

Benefits

- Compact design
- High performance
- High motor power

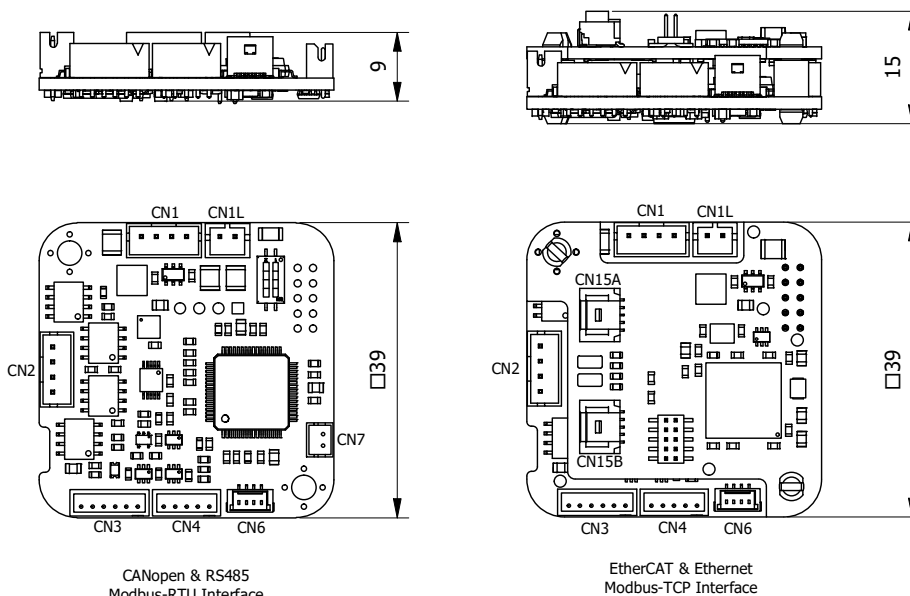
Characteristics

- Phase Current up to 80A rms
- Power Supply: 12-60 VDC
- Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet, PowerLink, EtherNet/IP

* Phase Current

Motion Controller

- CN1: Power supply connector
- CN1L: Logic supply connector
- CN2: Motor connector
- CN3/CN7: Input and Output connector
- CN4: Feedback interfaces connector
- CN6: Service interface
- CN15A/B: Fieldbus connector



| Electrical Data | | | |
|-----------------|-------------------------------|--------|----------|
| Item | | | |
| 1 | Phase Current | A rms | up to 2 |
| 2 | Peak Current | A peak | 2 |
| 3 | Output Power | W | up to 72 |
| 4 | Power Supply | VDC | 12÷36 |
| 5 | Logic Power Supply (optional) | VDC | 12÷36 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | M...-S200 | 3 | 2 | 1 |
| CANopen (programmable) | C...-S200 | 3 | 2 | 1 |
| CANopen (DS 402) | C...-S402 | 3 | 2 | 1 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 3 | 2 | 0 |
| EtherCAT (DS 402) | E...-S402 | 3 | 2 | 0 |
| Profinet (programmable) | P...-S200 | 3 | 2 | 0 |
| PowerLink (DS 402) | R...-S402 | 3 | 2 | 0 |
| EtherNet IP (programmable) | H...-S200 | 3 | 2 | 0 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 15g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage: -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Supply inversion |
| Software* | Setup & config. - DL Studio Programming - DL Space |

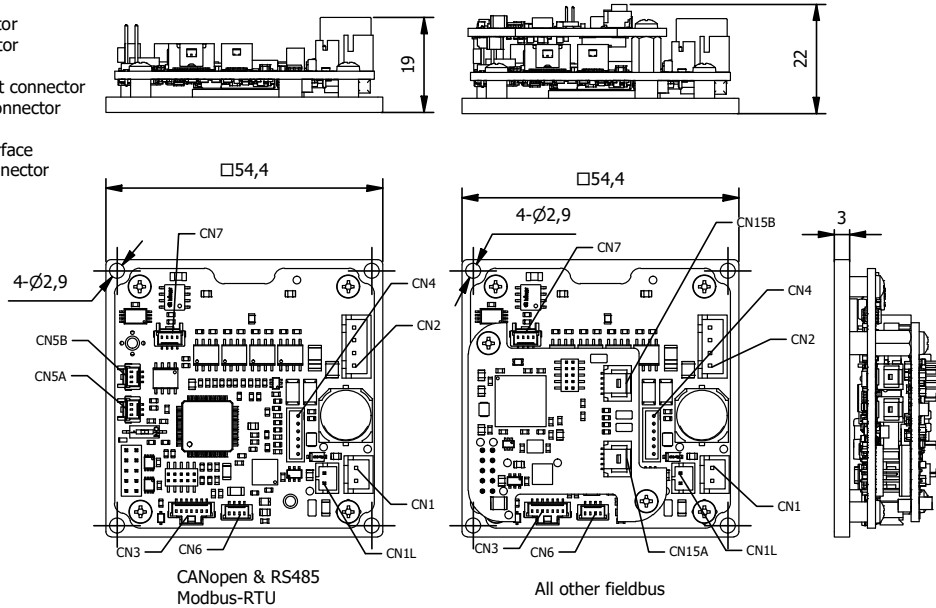
*Service SCI cable required and available on request

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |

| Product code reference | |
|------------------------|--------------------|
| B072O06 M 001-S200 | |
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 2A rms | |

- CN1: Power Supply connector
- CN1L: Logic Supply connector
- CN2: Motor connector
- CN3/CN7: Input and Output connector
- CN4: Feedback Interface connector
- CN6: Service Interface
- CN5A/B: CAN/Modbus Interface
- CN15A/B: Multiprotocol connector



| Electrical Data | | | |
|-----------------|-------------------------------|--------|-----------|
| Item | | | |
| 1 | Phase Current | A rms | up to 3 |
| 2 | Peak Current | A peak | 3 |
| 3 | Output Power | W | up to 144 |
| 4 | Power Supply | VDC | 12÷48 |
| 5 | Logic Power Supply (optional) | VDC | 12÷48 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | M...-S200 | 4 | 3 | 1 |
| CANopen (programmable) | C...-S200 | 4 | 3 | 1 |
| CANopen (DS 402) | C...-S402 | 4 | 3 | 1 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 1 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 1 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 1 |
| PowerLink (DS 402) | R...-S402 | 4 | 3 | 1 |
| EtherNet IP (programmable) | H...-S200 | 4 | 3 | 1 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 27g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage: -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Supply inversion |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Standard Combination | |
|----------------------|--|
| Motor | |

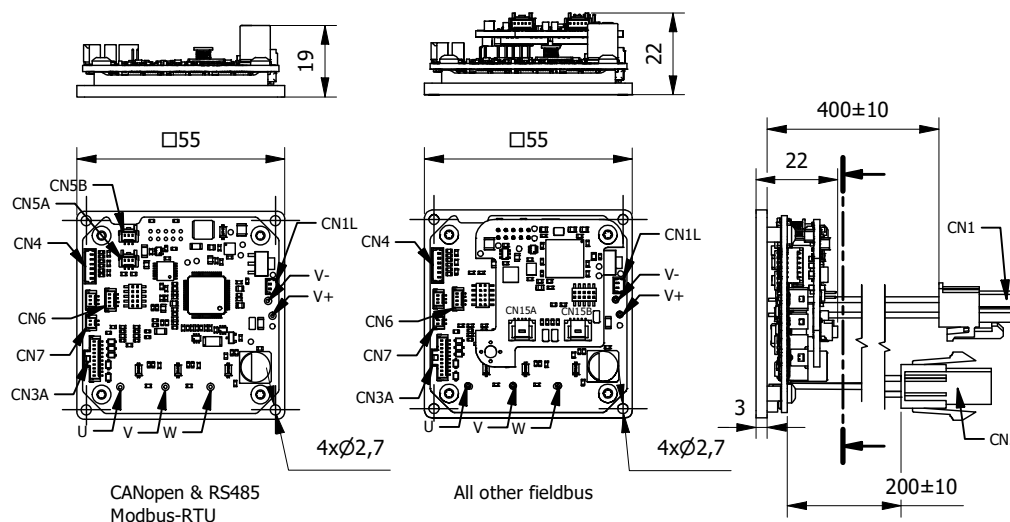
All motors with Phase Current up to 3A rms

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute Encoder Biss-C | 002 |

| Product code reference | |
|------------------------|--------------------|
| B144O03 M 001-S200 | |
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

Motion Controller

- CN1: Power Supply connector
- CN2: Motor Phases connector
- CN1L: Logic Supply connector
- CN3A: Input/Output
- CN4: Encoder connector
- CN5A/B: CAN/Modbus Interface
- CN6: Service Serial Interface
- CN7: Analog In connector
- CN15A/B: Multiprotocol connector



CANopen & RS485
Modbus-RTU

All other fieldbus

| Electrical Data | | | |
|-----------------|-------------------------------|--------|-----------|
| Item | | | |
| 1 | Phase Current | A rms | up to 12 |
| 2 | Peak Current | A peak | 30 |
| 3 | Output Power | W | up to 360 |
| 4 | Power Supply | VDC | 12÷36 |
| 5 | Logic Power Supply (optional) | VDC | 12÷36 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | M...-S200 | 4 | 2 | 2 |
| CANopen (programmable) | C...-S200 | 4 | 2 | 2 |
| CANopen (DS 402) | C...-S402 | 4 | 2 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 2 | 1 |
| EtherCAT (DS 402) | E...-S402 | 4 | 2 | 1 |
| Profinet (programmable) | P...-S200 | 4 | 2 | 1 |
| PowerLink (DS 402) | R...-S402 | 4 | 2 | 1 |
| EtherNet IP (programmable) | H...-S200 | 4 | 2 | 1 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 43g |
| Closed-loop | Available |
| 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 |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Supply inversion |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

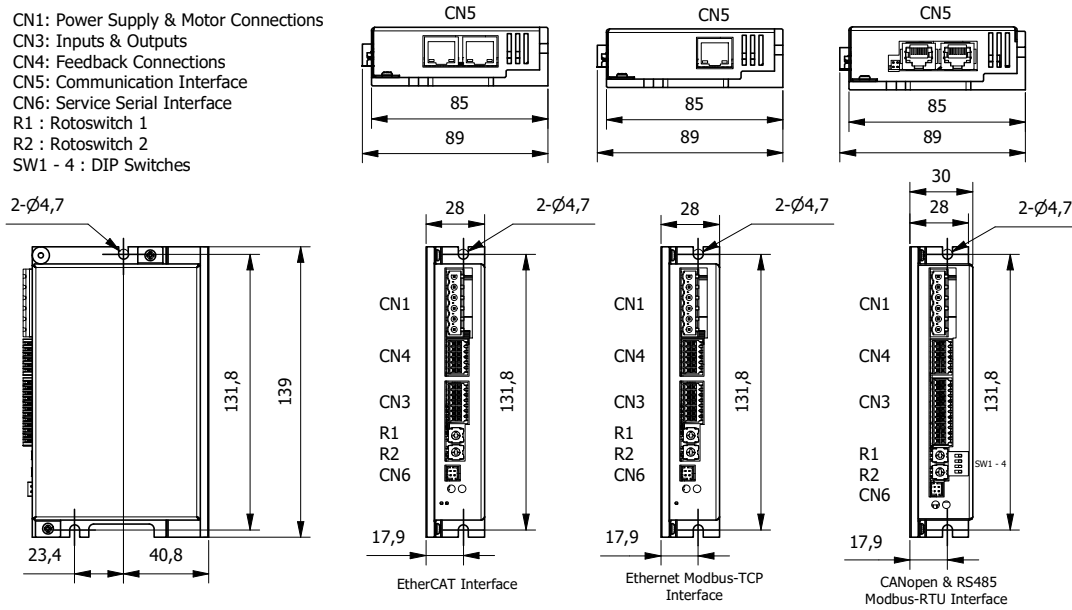
| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute Encoder Biss-C | 002 |

| Product code reference | |
|------------------------|--------------------|
| B360O30 M 001-S200 | |
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|---|--|
| Motor | |
| All motors with Phase Current up to 12A 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 | Output Power | W | up to 400 |
| 4 | Power Supply | VDC | 12÷48 |
| 5 | Logic Power Supply (optional) | VDC | 12÷48 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|------------------------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs (not isolated) |
| RS485 Modbus-RTU (programmable) | M...-S200 | 6 | 3 | 2 |
| CANopen (programmable) | C...-S200 | 6 | 3 | 2 |
| CANopen (DS 402) | C...-S402 | 6 | 3 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 0 |
| EtherCAT (programmable) | E...-S200 | 4 | 3 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 0 |

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

| Characteristics | |
|--------------------------|---|
| Item | |
| Weight (CAN-Modbus only) | 380g |
| Closed-loop | Available |
| 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 |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

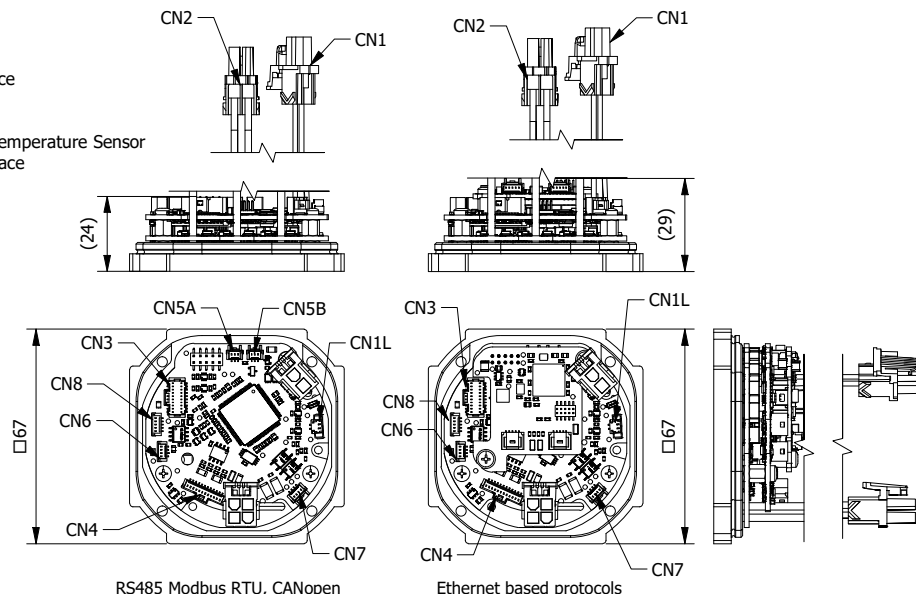
| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |

| Product code reference | |
|------------------------|--------------------|
| B400B30 M 001-S200 | |
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|---|--|
| Motor | |
| All motors with Phase Current up to 10A rms | |

Motion Controller

- CN1: Power Supply connector
- CN2: Motor Phases connector
- CN3: Inputs and Outputs
- CN4: Feedback Input
- CN5A/B: Communication Interface
- CN6: Service Serial Interface
- CN7: STO Interface
- CN8: Brake Output + External Temperature Sensor
- CN15A/B: Communication Interface



with Safe Torque Off function

| Electrical Data | | | |
|-----------------|-------------------------------|--------|--------------|
| Item | | | |
| 1 | Phase Current | A rms | up to 18 |
| 2 | Peak Current | A peak | 54 (for 2s.) |
| 3 | Output Power | W | up to 860 |
| 4 | Power Supply | VDC | 12÷60 |
| 5 | Logic Power Supply (optional) | VDC | 12÷60 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|------------------------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs (not isolated) |
| RS485 Modbus-RTU (programmable) | M...-S200 | 4 | 3 | 2 |
| CANopen (programmable) | C...-S200 | 4 | 3 | 2 |
| CANopen (DS 402) | C...-S402 | 4 | 3 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 2 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 2 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 2 |
| PowerLink (DS 402) | R...-S402 | 4 | 3 | 2 |
| EtherNet IP (programmable) | H...-S200 | 4 | 3 | 2 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 125g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PlE |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Standard Combination | |
|---|--|
| Motor | |
| All motors with Phase Current up to 18A rms | |

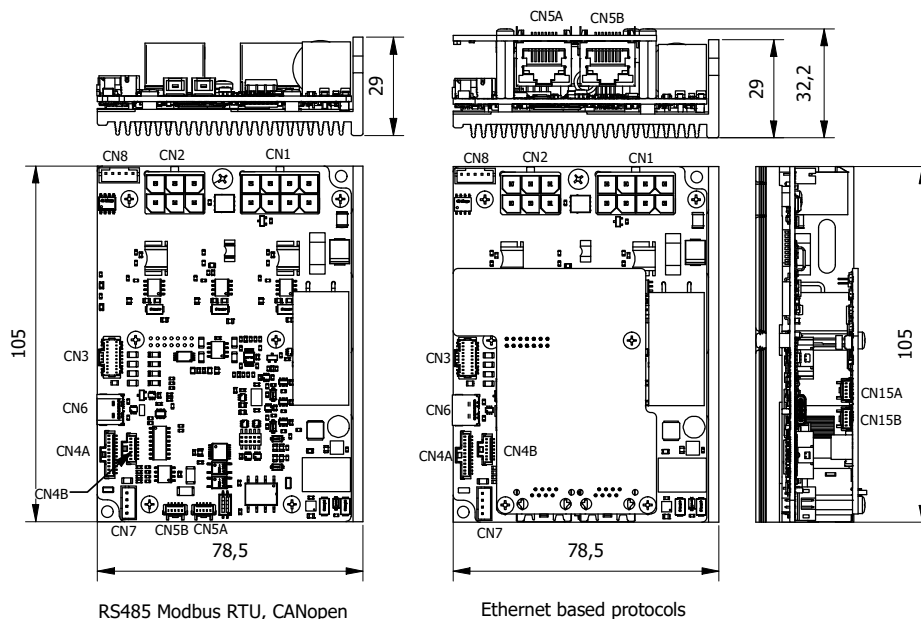
| Other options | |
|--|------|
| Item | Code |
| With STO (Safe Torque Off function) | 0 |
| Without STO (Safe Torque Off function) | 1 |

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 01 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 01 |
| Absolute Encoder BiSS | 02 |

| Product code reference | |
|------------------------|--------------------|
| B860O54 C 0 01-S200 | |
| C | Fieldbus |
| 0 | Other options |
| 01 | Feedback options |
| S200 | Protocol reference |

Motion Controller

- CN1: Power Supply + Logic Supply + Brake Resistor Outputs
- CN2: Motor connector
- CN3: Inputs and Outputs
- CN4A: Incremental Encoder + Hall Sensor
- CN4B: Absolute Encoder
- CN5A/B: Communication Interface
- CN6: Service Serial Interface
- CN7: STO Interface
- CN8: Brake Output + External Temperature Sensor
- CN15A/B: Communication Interface



with Safe Torque Off function
UL certified: UL E531627

| Electrical Data | | | |
|-----------------|-------------------------------|--------|--------------|
| Item | | | |
| 1 | Phase Current | A rms | up to 30 |
| 2 | Peak Current | A peak | 90 (for 2s.) |
| 3 | Output Power | W | up to 1400 |
| 4 | Power Supply | VDC | 12÷48 |
| 5 | Logic Power Supply (optional) | VDC | 12÷48 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|------------------------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs (not isolated) |
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 2 |
| CANopen (programmable) | L...-S200 | 4 | 3 | 2 |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 2 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 2 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 2 |
| PowerLink (DS 402) | R...-S402 | 4 | 3 | 2 |
| EtherNet IP (programmable) | H...-S200 | 4 | 3 | 2 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 200g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/Plc |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

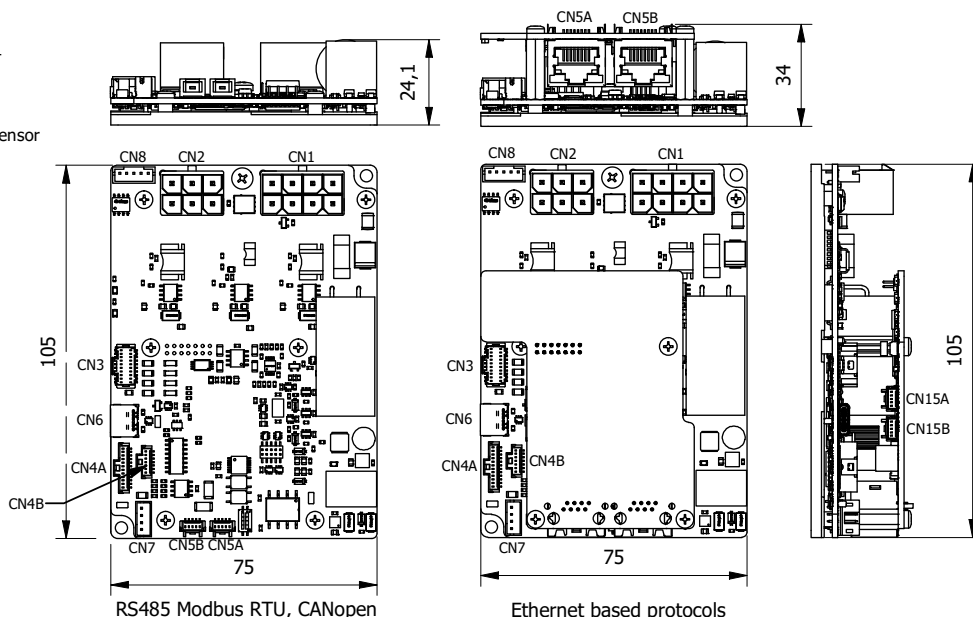
| Standard Combination | |
|---|--|
| Motor | |
| All motors with Phase Current up to 30A rms | |

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 003 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 003 |
| Absolute Encoder BiSS | 003 |

| Product code reference | |
|------------------------|--------------------|
| B1400090 L 003-S200 | |
| L | Fieldbus |
| 003 | Feedback options |
| S200 | Protocol reference |

Motion Controller

- CN1: Power Supply + Logic Supply + Brake Resistor Outputs
- CN2: Motor connector
- CN3: Inputs and Outputs
- CN4A: Incremental Encoder + Hall Sensor
- CN4B: Absolute Encoder
- CN5A/B: Communication Interface
- CN6: Service Serial Interface
- CN7: STO Interface
- CN8: Brake Output + External Temperature Sensor
- CN15A/B: Communication Interface



with Safe Torque Off function
UL certified: UL E531627

| Electrical Data | | | |
|-----------------|-------------------------------|--------|--------------|
| Item | | | |
| 1 | Phase Current | A rms | up to 40 |
| 2 | Peak Current | A peak | 90 (for 2s.) |
| 3 | Output Power | W | up to 2000 |
| 4 | Power Supply | VDC | 12÷48 |
| 5 | Logic Power Supply (optional) | VDC | 12÷48 |
| 6 | Chopper Frequency | kHz | 20 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|------------------------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs (not isolated) |
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 2 |
| CANopen (programmable) | L...-S200 | 4 | 3 | 2 |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 2 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 2 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 2 |
| PowerLink (DS 402) | R...-S402 | 4 | 3 | 2 |
| EtherNet IP (programmable) | H...-S200 | 4 | 3 | 2 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 180g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/Plc |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

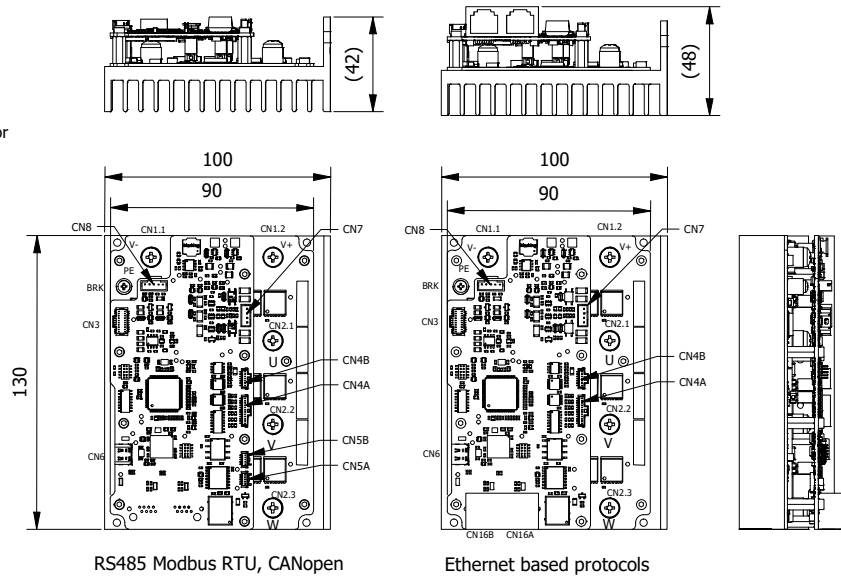
| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 003 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 003 |
| Absolute Encoder BiSS | 003 |

| Product code reference | |
|------------------------|--------------------|
| B2000O90 L 003-S200 | |
| L | Fieldbus |
| 003 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|---|--|
| Motor | |
| All motors with Phase Current up to 40A rms | |

Motion Controller

- CN1: Power Terminal Block
- CN2: Motor Terminal Block
- CN3: Inputs and Outputs
- CN4A: Incremental Encoder + Hall Sensor
- CN4B: Absolute Encoder
- CN6: Service Serial Interface
- CN5A/B: Communication Interface
- CN7: STO Interface
- CN8: Brake Output + External Temperature Sensor
- CN16A/B: Communication Interface



with Safe Torque Off function

| Electrical Data | | | |
|-----------------|-------------------------------|--------|---------------|
| Item | | | |
| 1 | Phase Current | A rms | up to 80 |
| 2 | Peak Current | A peak | 240 (for 2s.) |
| 3 | Output Power | W | up to 3800 |
| 4 | Power Supply | VDC | 12÷60 |
| 5 | Logic Power Supply (optional) | VDC | 12÷60 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|------------------------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs (not isolated) |
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 2 |
| CANopen (programmable) | L...-S200 | 4 | 3 | 2 |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 2 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 2 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 2 |
| PowerLink (DS 402) | R...-S402 | 4 | 3 | 2 |
| EtherNet IP (programmable) | H...-S200 | 4 | 3 | 2 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 540g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/Ple |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Standard Combination | |
|---|--|
| Motor | |
| All motors with Phase Current up to 80A rms | |

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute Encoder BiSS | 001 |

| Product code reference | |
|------------------------|--------------------|
| B3800O240 L 001-S200 | |
| L | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |



BLDC motor Multi-Axis Controllers – Drives

Advantages at a glance

Position, Speed and Torque control
EtherCAT fieldbus
Flexible configuration

Brushless DC motor Multi-Axis Drives

| | Current* (Arms) | |
|----------------|-----------------------|-----|
| Phoenix - B100 | up to 3 (each motor) | 454 |
| Phoenix - B500 | up to 12 (each motor) | 455 |

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

PHOENIX B100

Benefits

- Compact dimensions
- Digital I/O
- Simultaneous control of up to 3 motors/axis

Characteristics

- Phase Current up to 3A rms for each motor
- Power Supply: 12-48VDC
- Fieldbus: EtherCAT

PHOENIX B500

Benefits

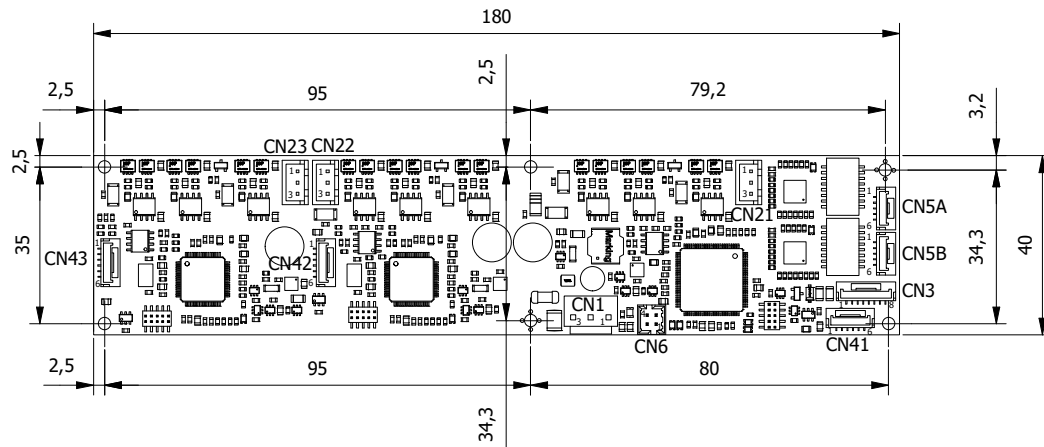
- Compact dimensions
- Digital I/O
- Simultaneous control of up to 3 motors/axis

Characteristics

- Phase Current up to 12A rms for each motor
- Power Supply: 12-48VDC
- Fieldbus: EtherCAT

* Phase Current

CN1: Power Supply
 CN21, CN22, CN23: Motor connections
 CN3: Digital Inputs and Outputs
 CN41, CN42, CN43: Feedback connections
 CN5A, CN5B: EtherCAT Interface Interface
 CN6: Service SCI Connection



| Electrical Data | | | |
|-----------------|-------------------------------|--------|-------------|
| Item | | | |
| 1 | Phase Current (each axis) | A rms | up to 3 |
| 2 | Peak Current (each axis) | A peak | 5 (for 2s.) |
| 3 | Output Power | W | up to 100 |
| 4 | Power Supply | VDC | 12÷48 |
| 5 | Logic Power Supply (optional) | VDC | 12÷48 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|-------------------------------------|-----------|-------------------------------|--------------------------------|------------------------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs (not isolated) |
| EtherCAT (DS 402) | E...-S402 | 3 | 3 | 0 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 200g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Software* | Setup & config. - DL Studio |

*Service SCI cable required and available on request

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |

| Product code reference | |
|------------------------|--------------------|
| B100O05 M3 E 001-S402 | |
| M | Multi-axis |
| 3 | Number of axis |
| E | Fieldbus |
| 001 | Feedback options |
| S402 | Protocol reference |

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 3A rms | |

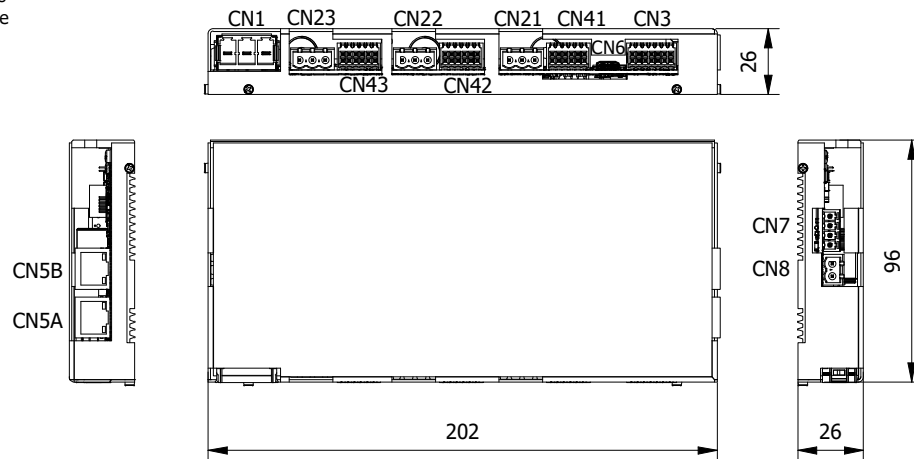
Drive for BLDC Motor Phoenix B500B36M3

3-Axis Motion Controller

up to 12A rms

each motor

- CN1: Power Supply
- CN21, CN22, CN23: Motor connections
- CN3: Digital Inputs and Outputs
- CN41, CN42, CN43: Feedback connections
- CN5A, CN5B: EtherCAT Interface Interface
- CN6: Service SCI Connection
- CN7: STO Connection
- CN8: Brake Resistor connector



with Safe Torque Off function

| Electrical Data | | | |
|-----------------|-------------------------------|--------|--------------|
| Item | | | |
| 1 | Phase Current (each axis) | A rms | up to 12 |
| 2 | Peak Current (each axis) | A peak | 36 (for 2s.) |
| 3 | Output Power | W | up to 500 |
| 4 | Power Supply | VDC | 12÷48 |
| 5 | Logic Power Supply (optional) | VDC | 12÷48 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|-------------------------------------|----------|-------------------------------|--------------------------------|------------------------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs (not isolated) |
| EtherCAT (DS 402) | E...S402 | 3 | 3 | 0 |

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

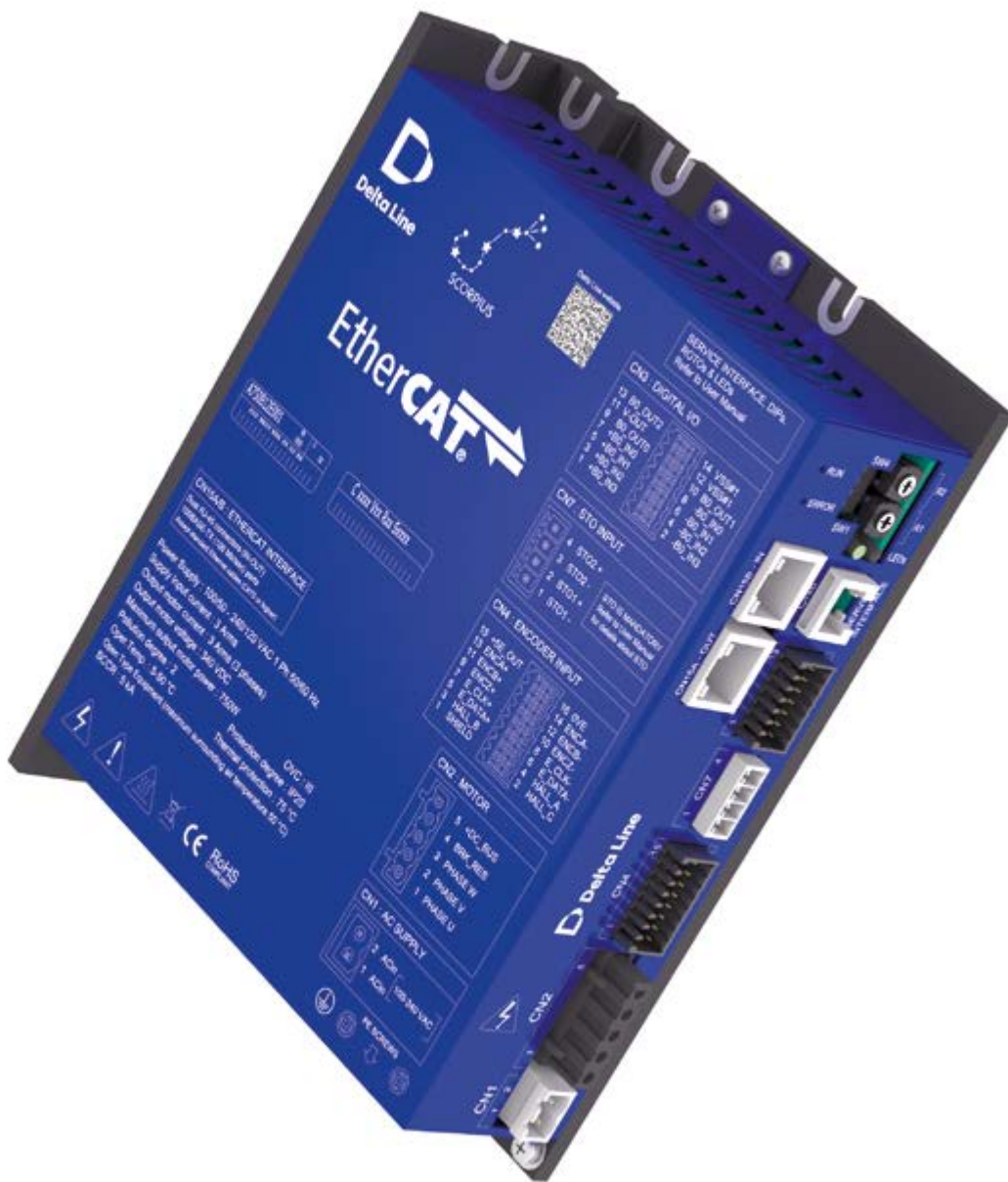
| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 300g |
| Closed-loop | Available |
| Protection Class | IPO0 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/Ple |
| Software* | Setup & config. - DL Studio |

*Service SCI cable required and available on request

| Standard Combination | |
|---|--|
| Motor | |
| All motors with Phase Current up to 12A rms | |

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 002 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 002 |

| Product code reference | |
|------------------------|--------------------|
| B500B36 M3 E 002-S402 | |
| M | Multi-axis |
| 3 | Number of axis |
| E | Fieldbus |
| 002 | Feedback options |
| S402 | Protocol reference |



Brushless AC motor **Controllers – Drives**

Advantages at a glance

Position, Speed and Torque control
Analogue, fieldbus or programmable
Flexible configuration

Brushless AC motor Drives

| | Current* (Arms) | |
|---------------|-----------------|-----|
| Scorpius A750 | up to 3 | 458 |
| Serpens A1300 | up to 5,2 | 459 |

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

SCORPIUS

Benefits

- Compact dimensions
- Digital I/O
- Programmable

Characteristics

- Phase Current up to 3A rms
- Power Supply: 100-240 VAC
- Fieldbus: RS485 Modbus RTU, CANopen and EtherCAT

SERPENS

Benefits

- Compact dimensions
- Digital I/O
- Programmable

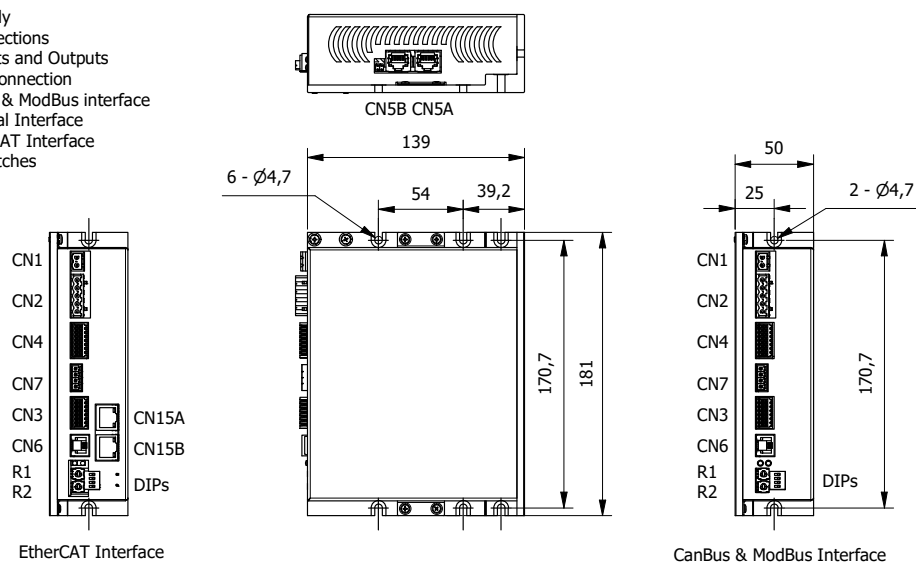
Characteristics

- Phase Current up to 5,2A rms
- Power Supply: 85-265 VAC
- Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP and Profinet

* Phase Current

Motion Controller

- CN1: Power Supply
- CN2: Motor Connections
- CN3: Digital Inputs and Outputs
- CN4 : Feedback connection
- CN5A/B : CanBus & ModBus interface
- CN6: Service Serial Interface
- CN15A/B : EtherCAT Interface
- R1/R2 : Roto-Switches



with Safe Torque Off function

| Electrical Data | | | |
|-----------------|-------------------------------|--------|-----------|
| Item | | | |
| 1 | Phase Current | A rms | up to 3 |
| 2 | Peak Current | A peak | 12 |
| 3 | Output Power | W | up to 750 |
| 4 | Power Supply | VAC | 100÷240 |
| 5 | Logic Power Supply (optional) | VDC | 24 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|-------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 0 |
| CANopen (programmable) | L...-S200 | 4 | 3 | 0 |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 0 |

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

| Characteristics | |
|----------------------|---|
| Item | |
| Weight | 800g |
| Closed-loop | Available |
| 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 |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLe |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute encoder: 5V BiSS-C or SSI interface (isolated) | 001 |

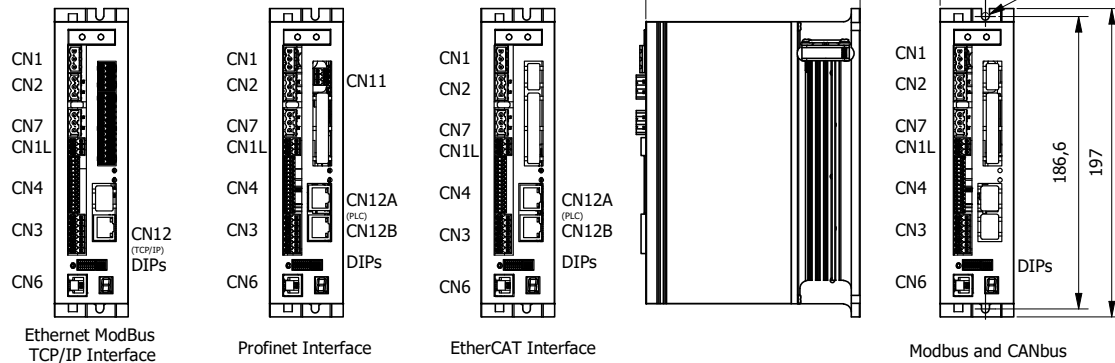
| Product code reference | |
|------------------------|--------------------|
| A750B12 L 001-S200 | |
| L | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|--|--|
| Motor | |
| All motors 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 | Output Power | W | up to 1300 |
| 4 | Power Supply | VAC | (mono or triphase) 85÷265 |
| 5 | Logic Power Supply (optional) | VDC | 24 |
| 6 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|--------------------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs (isolated) |
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 1 |
| CANopen (programmable) | L...-S200 | 4 | 3 | 1 |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 1 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 0 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 0 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 550g |
| Closed-loop | Available |
| 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 |
| Operating mode | Profile position/velocity/homing mode, Cyclic sync position/velocity/torque mode |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/Ple |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 5,2A rms | |

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Hall effect sensors: 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute encoder: 5V BiSS-C or SSI interface (isolated) | 001 |

| Product code reference | |
|------------------------|--------------------|
| A1300B12 L 001-S200 | |
| L | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |



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) | |
|----------------------|-----------------|-----|
| Hercules SOD202 | up to 2 | 462 |
| Hercules SOD203 | up to 3 | 463 |
| Libra SBD205 | up to 5,5 | 464 |
| Aquarius SBD204 | up to 4,2 | 465 |
| Aquarius SBD207 | up to 7,1 | 466 |
| Sagittarius SBA207 | up to 7,1 | 467 |
| Andromeda SBA208 | up to 8,5 | 468 |
| Lyra SBAC203 | up to 3 | 469 |
| Draco SBAC205 | up to 5,2 | 470 |
| Dorado SBAC208 | up to 8 | 471 |

HERCULES AQUARIUS

- | | |
|--|--|
| Benefits <ul style="list-style-type: none"> • Compact design • Price/performance • Programmable • DC power supply | Benefits <ul style="list-style-type: none"> • Digital I/O and up to 2 analogue inputs • Programmable • DC power supply |
|--|--|

- | | |
|--|--|
| Characteristics <ul style="list-style-type: none"> • Phase Current up to 3A rms • Power Supply: 12-48 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet, PowerLink, EtherNet/IP | Characteristics <ul style="list-style-type: none"> • Phase Current up to 7,1A rms • Power Supply: 12-48 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet |
|--|--|

LIBRA SAGITTARIUS ANDROMEDA

- | | | |
|--|--|--|
| Benefits <ul style="list-style-type: none"> • Price/performance • Simple usage • DC power supply | Benefits <ul style="list-style-type: none"> • Digital I/O and up to 2 analogue inputs • Programmable • AC or DC power supply | Benefits <ul style="list-style-type: none"> • Digital I/O and up to 2 analogue inputs • Programmable • AC or DC power supply |
|--|--|--|

- | | | |
|---|---|---|
| Characteristics <ul style="list-style-type: none"> • Phase Current up to 5,5A rms • Power Supply: 24-80 VDC • Clock & Direction control | Characteristics <ul style="list-style-type: none"> • Phase Current up to 7,1A rms • Power Supply: 18-56 VAC or 24-80 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP | Characteristics <ul style="list-style-type: none"> • Phase Current up to 8,5A rms • Power Supply: 18-100 VAC or 24-140 VDC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP |
|---|---|---|

LYRA DRACO DORADO

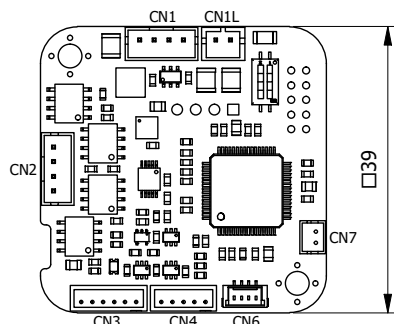
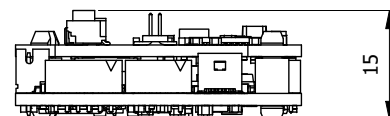
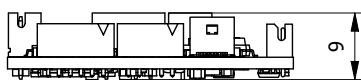
- | | | |
|--|--|--|
| Benefits <ul style="list-style-type: none"> • Digital I/O • Programmable • AC power supply | Benefits <ul style="list-style-type: none"> • Digital I/O and up to 1 analogue inputs • Programmable • AC power supply | Benefits <ul style="list-style-type: none"> • Digital I/O and up to 1 analogue inputs • Programmable • AC power supply |
|--|--|--|

- | | | |
|--|---|---|
| Characteristics <ul style="list-style-type: none"> • Phase Current up to 3A rms • Power Supply: 100-240 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Clock&Direction | Characteristics <ul style="list-style-type: none"> • Phase Current up to 5,2A rms • Power Supply: 85-265 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet | Characteristics <ul style="list-style-type: none"> • Phase Current up to 8A rms • Power Supply: 85-120 VAC • Fieldbus: RS485 ModBus RTU, CANopen, EtherCAT, Ethernet ModBus TCP, Profinet |
|--|---|---|

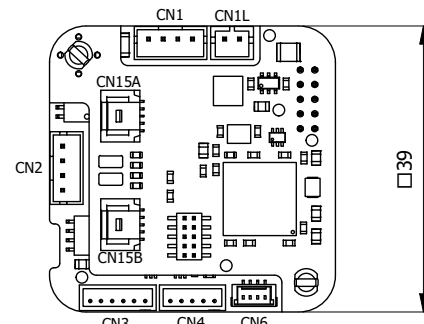
* Phase Current

Motion Controller

- CN1: Power supply connector
- CN1L: Logic supply connector
- CN2: Motor connector
- CN3/CN7: Input and Output connector
- CN4: Feedback interfaces connector
- CN6: Service interface
- CN15A/B: Fieldbus connector



CANopen & RS485
Modbus-RTU Interface



EtherCAT & Ethernet
Modbus-TCP Interface

Electrical Data

Item

| | | | |
|---|-------------------------------|--------|---------|
| 1 | Phase Current | A rms | up to 2 |
| 2 | Peak Current | A peak | 2 |
| 3 | Power Supply | VDC | 12÷36 |
| 4 | Logic Power Supply (optional) | VDC | 12÷36 |
| 5 | Chopper Frequency | kHz | 40 |

Interface Control Mode & Connection

| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| RS485 Modbus-RTU (programmable) | M...-S200 | 3 | 2 | 1 |
| CANopen (programmable) | C...-S200 | 3 | 2 | 1 |
| CANopen (DS 402) | C...-S402 | 3 | 2 | 1 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 3 | 2 | 0 |
| EtherCAT (DS 402) | E...-S402 | 3 | 2 | 0 |
| Profinet (programmable) | P...-S200 | 3 | 2 | 0 |
| PowerLink (DS 402) | R...-S402 | 3 | 2 | 0 |
| EtherNet IP (programmable) | H...-S200 | 3 | 2 | 0 |

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

Characteristics

Item

| | |
|----------------------|---|
| Weight | 15g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage: -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Supply inversion |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

Feedback options

| Type | Code |
|--|------|
| Incremental encoder (not isolated): 5V Single-Ended (TTL/CMOS) | 001 |

Product code reference

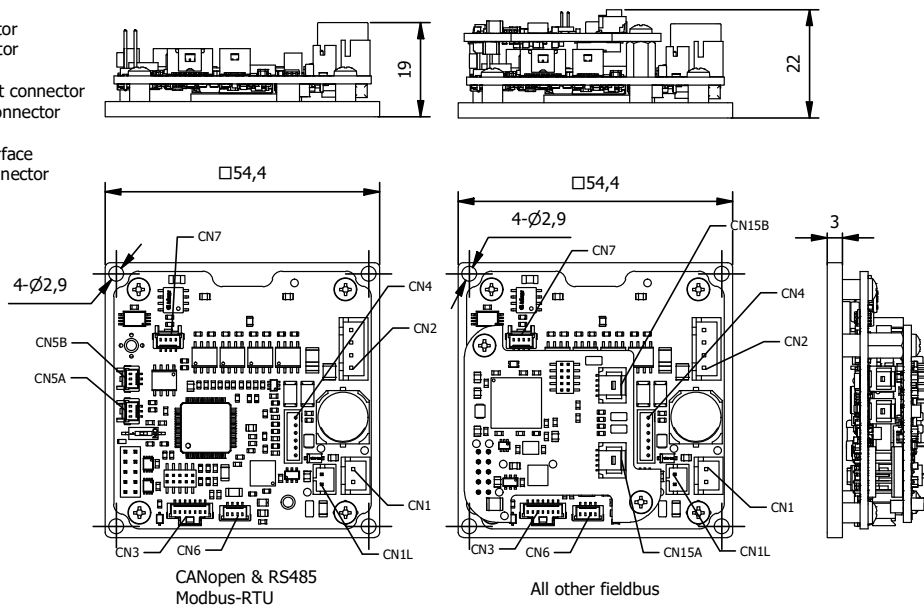
| SOD202 M 001-S200 | |
|-------------------|--------------------|
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

Standard Combination

Motor

All motors with Phase Current up to 2A rms

- CN1: Power Supply connector
- CN1L: Logic Supply connector
- CN2: Motor connector
- CN3/CN7: Input and Output connector
- CN4: Feedback Interface connector
- CN6: Service Interface
- CN5A/B: CAN/Modbus Interface
- CN15A/B: Multiprotocol connector



| Electrical Data | | | |
|-----------------|-------------------------------|--------|---------|
| Item | | | |
| 1 | Phase Current | A rms | up to 3 |
| 2 | Peak Current | A peak | 3 |
| 3 | Power Supply | VDC | 12÷48 |
| 4 | Logic Power Supply (optional) | VDC | 12÷48 |
| 5 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (not isolated) | Digital Outputs (not isolated) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | M...-S200 | 4 | 3 | 1 |
| CANopen (programmable) | C...-S200 | 4 | 3 | 1 |
| CANopen (DS 402) | C...-S402 | 4 | 3 | 1 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 0 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 0 |
| PowerLink (DS 402) | R...-S402 | 4 | 3 | 0 |
| EtherNet IP (programmable) | H...-S200 | 4 | 3 | 0 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 27g |
| Closed-loop | Available |
| Protection Class | IP00 |
| Pollution Degree | 2 |
| Category | C3 following standard EN 61800-3 |
| Temperatures | Working: 5°C ÷ 40°C Storage: -25°C ÷ 55°C |
| Humidity | 5% ÷ 85% not condensing |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Supply inversion |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

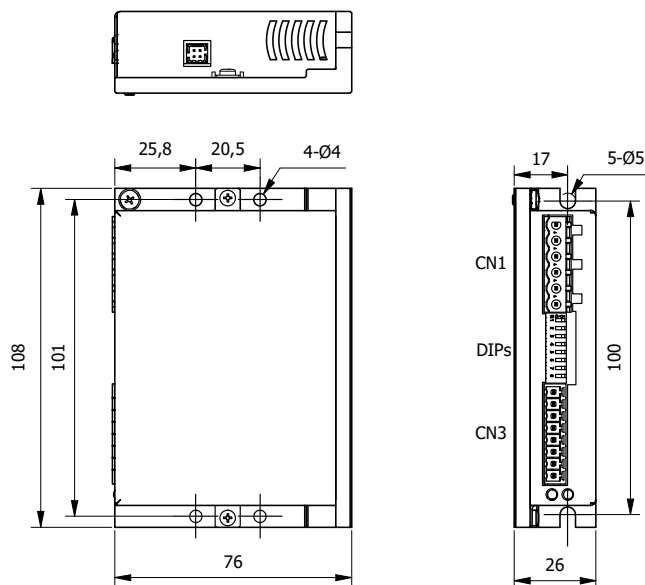
| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 3A rms | |

| Feedback options | |
|--|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Single-Ended (TTL/CMOS) | 002 |
| Absolute Encoder Biss-C | 003 |

| Product code reference | |
|------------------------|--------------------|
| SOD203 M 002-S200 | |
| M | Fieldbus |
| 002 | Feedback options |
| S200 | Protocol reference |

Motion Controller

CN1: Power Supply
CN3: Digital I/O



Electrical Data

| Item | | | |
|------|-------------------|--------|-----------|
| 1 | Phase Current | A rms | up to 5,5 |
| 2 | Peak Current | A peak | 7.8 |
| 3 | Power Supply | VDC | 24 ÷ 80 |
| 4 | Chopper Frequency | kHz | 40 |

Interface Control Mode & Connection

| Operating Mode | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
|-------------------|-----------|-------------------------------|--------------------------------|---------------|
| Clock & Direction | N...-S100 | 3 | 1 | 0 |

Connector kit included. More information can be found in the product manual on our website.

Characteristics

| Item | |
|--|--|
| Weight | 200g |
| Closed-loop | Not available |
| 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 |
| Operating mode | Step resolution: from Fullstep to 1/100 step (config. with dip switches) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Service SCI cable required for monitoring and available on request | |

Product code reference

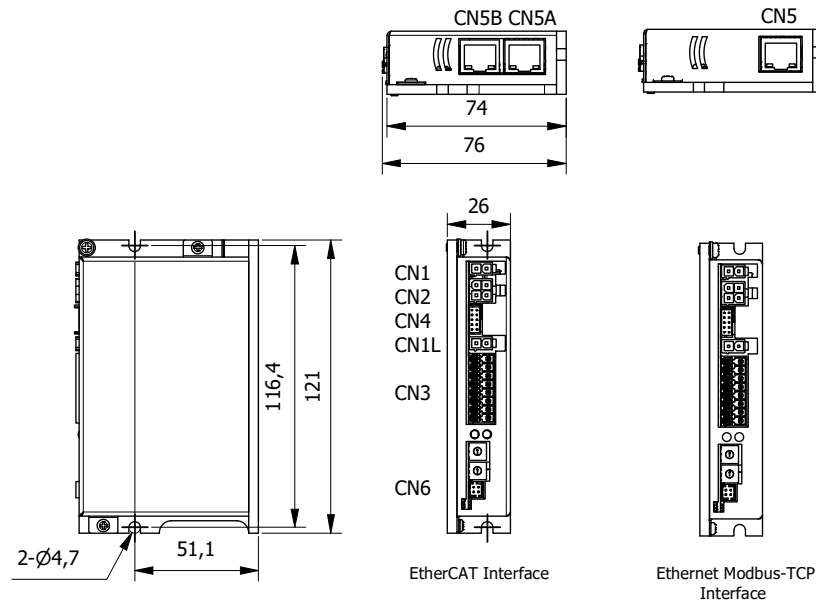
| SBD205 N 001-S100 | |
|-------------------|--------------------|
| N | Operating mode |
| 001 | Standard version |
| S100 | Protocol reference |

Standard Combination

| Motor | |
|--|--|
| All motors with Phase Current up to 5,5A rms | |

Motion Controller

- CN1: Power Supply
- CN2: Motor Connections
- CN1L: Logic Power Supply
- CN3: Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interface



| Electrical Data | | | |
|-----------------|-------------------------------|--------|-----------|
| Item | | | |
| 1 | Phase Current | A rms | up to 4,2 |
| 2 | Peak Current | A peak | 6 |
| 3 | Power Supply | VDC | 12÷48 |
| 4 | Logic Power Supply (optional) | VDC | 12÷48 |
| 5 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
| Ethernet Modbus TCP/IP (programmable) | T...S200 | 4 | 2 | 0 |
| EtherCAT (DS 402) | E...S402 | 4 | 2 | 0 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 350g |
| Closed-loop | Available |
| 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 |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

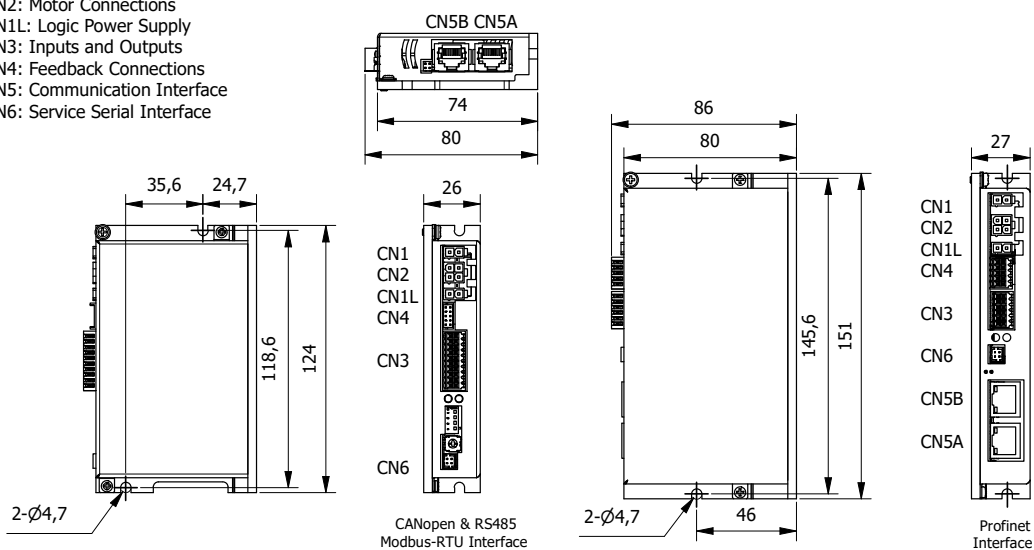
| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 4,2A rms | |

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute Encoder Biss-C | 002 |

| Product code reference | |
|------------------------|--------------------|
| SBD204 T 001-S200 | |
| T | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

Motion Controller

- CN1: Power Supply
- CN2: Motor Connections
- CN1L: Logic Power Supply
- CN3: Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interface



| Electrical Data | | | |
|-----------------|-------------------------------|--------|-----------|
| Item | | | |
| 1 | Phase Current | A rms | up to 7,1 |
| 2 | Peak Current | A peak | 10 |
| 3 | Power Supply | VDC | 12÷48 |
| 4 | Logic Power Supply (optional) | VDC | 12÷48 |
| 5 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | |
|-------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | M...-S200 | 4 | 3 | 2 |
| CANopen (programmable) | C...-S200 | 4 | 3 | 2 |
| CANopen (DS 402) | C...-S402 | 4 | 3 | 2 |
| Profinet (programmable) | P...-S200 | 4 | 2 | 0 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 280g |
| Closed-loop | Available |
| 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 |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Software* | Setup & config. - DL Studio Programming - DL Space |

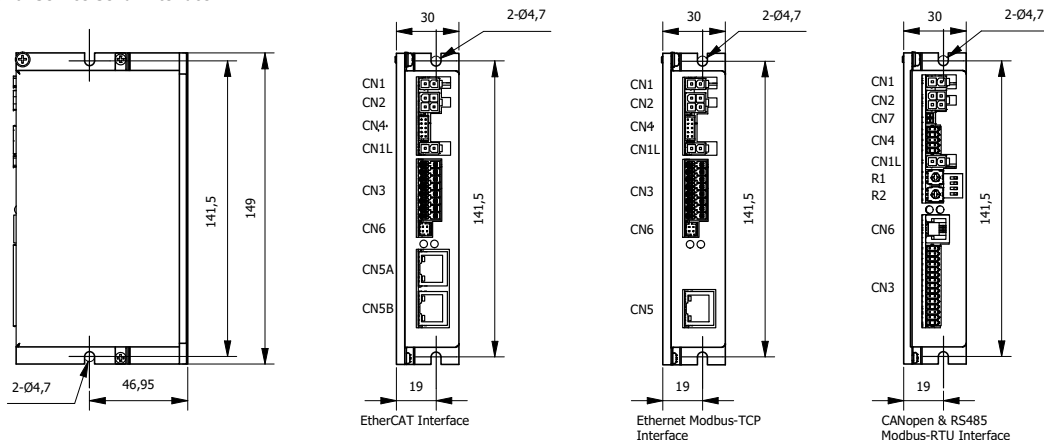
*Service SCI cable required and available on request

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute Encoder Biss-C | 002 |

| Product code reference | |
|------------------------|--------------------|
| SBD207 M 001-S200 | |
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current 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 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | M...-S200 | 4 | 2 | 2 |
| CANopen (programmable) | C...-S200 | 4 | 2 | 2 |
| CANopen (DS 402) | C...-S402 | 4 | 2 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 2 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 2 | 0 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 450g |
| Closed-loop | Available |
| 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 |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Software* | Setup & config. - DL Studio Programming - DL Space |

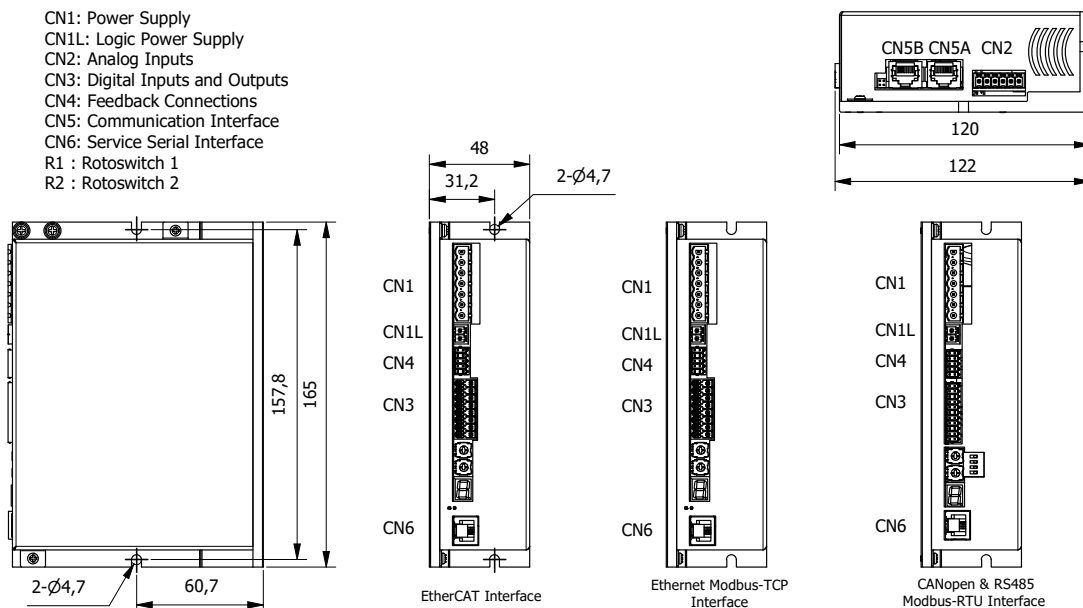
*Service SCI cable required and available on request

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute Encoder Biss-C | 002 |

| Product code reference | |
|------------------------|--------------------|
| SBA207 M 001-S200 | |
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 7,1A rms | |

Motion Controller



| 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 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | M...-S200 | 6 | 4 | 2 |
| CANopen (programmable) | C...-S200 | 6 | 4 | 2 |
| CANopen (DS 402) | C...-S402 | 6 | 4 | 2 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 2 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 2 | 0 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 550g |
| Closed-loop | Available |
| 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 |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Software* | Setup & config. - DL Studio Programming - DL Space |

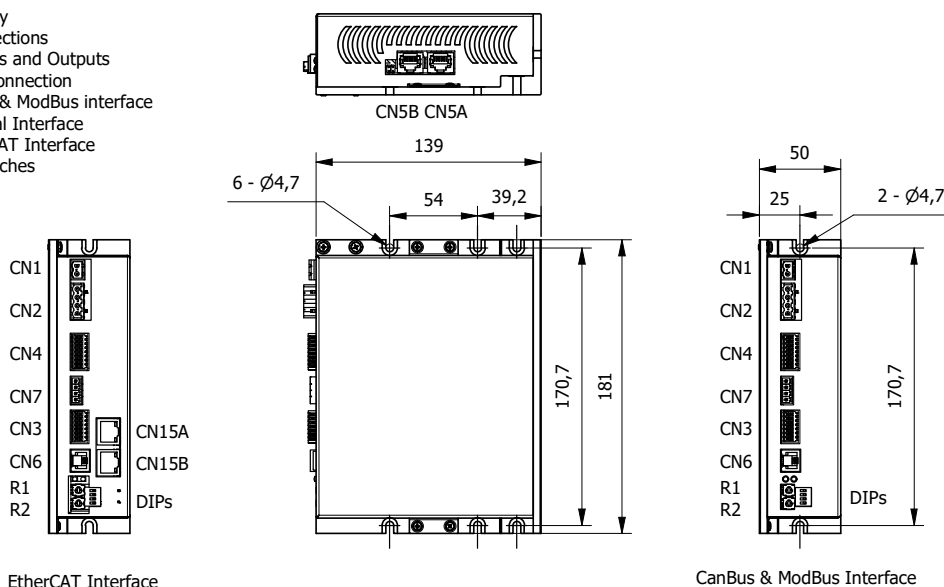
*Service SCI cable required and available on request

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute Encoder Biss-C | 002 |

| Product code reference | |
|------------------------|--------------------|
| SBA208 M 001-S200 | |
| M | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 8,5A rms | |

- CN1: Power Supply
- CN2: Motor Connections
- CN3: Digital Inputs and Outputs
- CN4 : Feedback connection
- CN5A/B : CanBus & ModBus interface
- CN6: Service Serial Interface
- CN15A/B : EtherCAT Interface
- R1/R2 : Roto-Switches



with Safe Torque Off function

| Electrical Data | | | |
|-----------------|-------------------|--------|---------|
| Item | | | |
| 1 | Phase Current | A rms | up to 3 |
| 2 | Peak Current | A peak | 4.2 |
| 3 | Power Supply | VAC | 100÷240 |
| 4 | Chopper Frequency | kHz | 40 |

| Interface Control Mode & Connection | | | | | |
|-------------------------------------|-----------|-------------------------------|--------------------------------|---------------|--|
| Fieldbus / Operating Mode | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs | |
| Clock and Direction | N...-S100 | 4 | 3 | 0 | |
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 0 | |
| CANopen (programmable) | L...-S200 | 4 | 3 | 0 | |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 0 | |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 0 | |

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

| Characteristics | |
|-------------------------------|--|
| Item | |
| Weight | 800g |
| Closed-loop | Available |
| 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 |
| Operating mode (N) | Clock and Direction |
| Operating mode (L-E fieldbus) | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLe |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

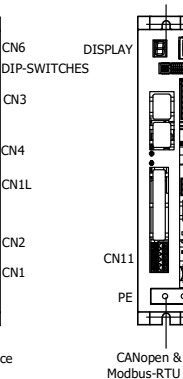
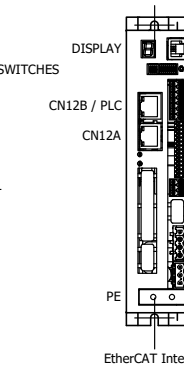
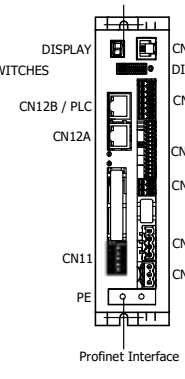
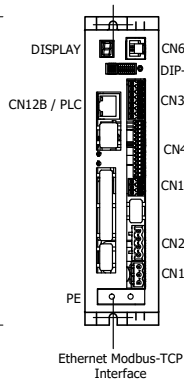
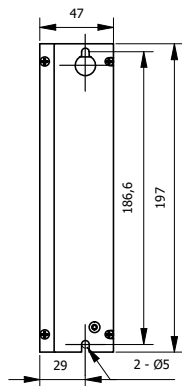
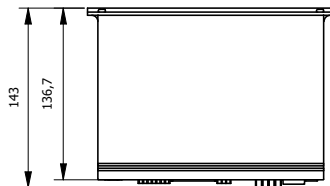
| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute encoder: 5V SSI or BISS-C (isolated) | 001 |

| Product code reference | |
|------------------------|---------------------------|
| SBAC203 L 001-S200 | |
| L | Fieldbus / Operating mode |
| 001 | Feedback options |
| S200 | Protocol reference |

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 3A rms | |

Motion Controller - High voltage

- CN1: Power Supply
- CN1L: Logic Power Supply
- CN2: Motor connections
- CN3: Inputs and Outputs
- CN4: Feedback Connections
- CN5: Communication Interface
- CN6: Service Serial Interfaced
- CN11: Analog Input and Outputs
- CN12: Communication Interface



with Safe Torque Off function

Electrical Data

| Item | | | |
|------|----------------------------------|--------|-----------|
| 1 | Phase Current | A rms | up to 5,2 |
| 2 | Peak Current | A peak | 7,3 |
| 3 | Power Supply (monophase-triphas) | VAC | 85÷265 |
| 4 | Logic Power Supply (mandatory) | VDC | 24 |
| 5 | Chopper Frequency | kHz | 40 |

Interface Control Mode & Connection

| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 1 |
| CANopen (programmable) | L...-S200 | 4 | 3 | 1 |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 1 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 0 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 0 |

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

Characteristics

| Item | |
|----------------------|--|
| Weight | 550g |
| Closed-loop | Available |
| 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 |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLE |
| Software | Setup & config. - DL Studio Programming - DL Space |

*Service SCL cable required and available on request

Feedback options

| Type | Code |
|---|------|
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute encoder: 5V SSI or BISS-C (isolated) | 001 |

Product code reference

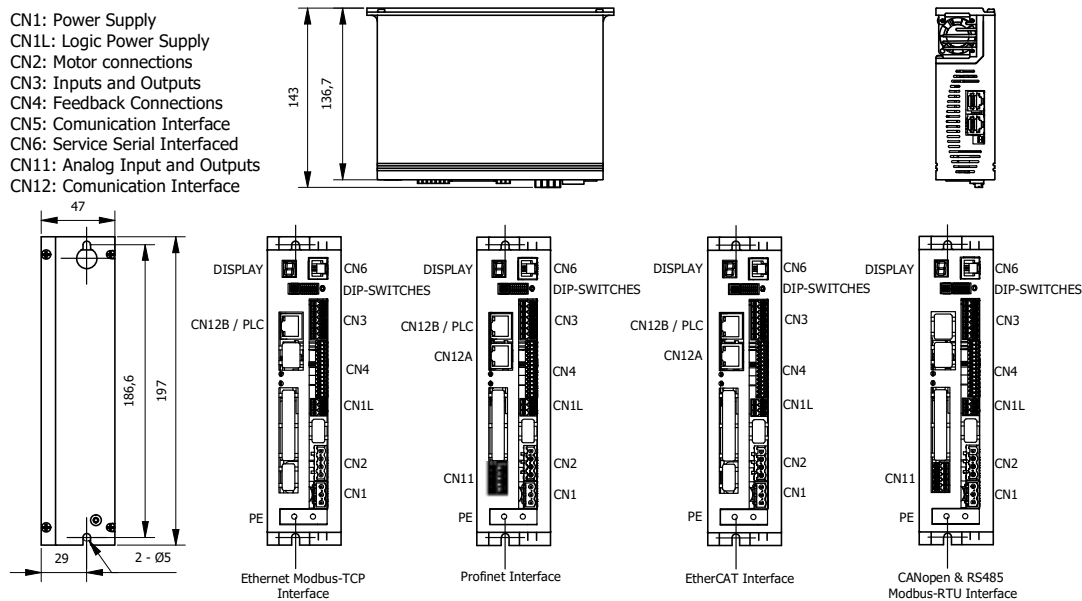
| SBAC205 L 001-S200 | |
|--------------------|--------------------|
| L | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

Standard Combination

Motor
All motors with Phase Current up to 5,2A 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 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 |

| Interface Control Mode & Connection | | | | |
|---------------------------------------|-----------|-------------------------------|--------------------------------|---------------|
| Fieldbus | Code | Digital Inputs (opto-coupled) | Digital Outputs (opto-coupled) | Analog Inputs |
| RS485 Modbus-RTU (programmable) | L...-S200 | 4 | 3 | 1 |
| CANopen (programmable) | L...-S200 | 4 | 3 | 1 |
| CANopen (DS 402) | L...-S402 | 4 | 3 | 1 |
| Ethernet Modbus TCP/IP (programmable) | T...-S200 | 4 | 3 | 0 |
| EtherCAT (DS 402) | E...-S402 | 4 | 3 | 0 |
| Profinet (programmable) | P...-S200 | 4 | 3 | 0 |

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

| Characteristics | |
|----------------------|--|
| Item | |
| Weight | 550g |
| Closed-loop | Available |
| 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 |
| Operating mode | Step resolution: Stepless Control Technology (65536 emulated positions per turn) |
| Protective functions | Over current, Over/Under Voltage, Overheating, Short circuit |
| Safety feature | Safe Torque Off (STO) SIL3/PLe |
| Software* | Setup & config. - DL Studio Programming - DL Space |

*Service SCI cable required and available on request

| Standard Combination | |
|--|--|
| Motor | |
| All motors with Phase Current up to 8A rms | |

| Feedback options | |
|---|------|
| Type | Code |
| Incremental encoder (not isolated): 5V Differential (RS422) or 5V Single-Ended (TTL/CMOS) | 001 |
| Absolute encoder: 5V SSI or BISS-C (isolated) | 001 |

| Product code reference | |
|------------------------|--------------------|
| SBAC208 L 001-S200 | |
| L | Fieldbus |
| 001 | Feedback options |
| S200 | Protocol reference |

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- _ Coreless
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Ø 8-63mm



- _ Slotted & Slotless
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- _ Frameless
- _ with encoder

Brushless DC Motors
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Motors



- _ for Stepper motors
- _ for Brushless motors

Controllers / Drives
Phase current 2 to 80A rms



- _ Speed Controller
- _ Motion Controller

**BLDC, Servo &
Stepper with Controller**
Ø 16-110mm / □ 42-86mm

Electronics

Our technologies



- _ Medium voltage 220VAC
- _ Low voltage 24-48VDC

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- _ with encoder

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Nema 6-42 Ø 14-110mm



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- _ Non-Captive

Linear Actuators

Nema 8-23



- _ Planetary
- _ Spur
- _ Worm & Wheel

Gearboxes

Ø 8-90mm

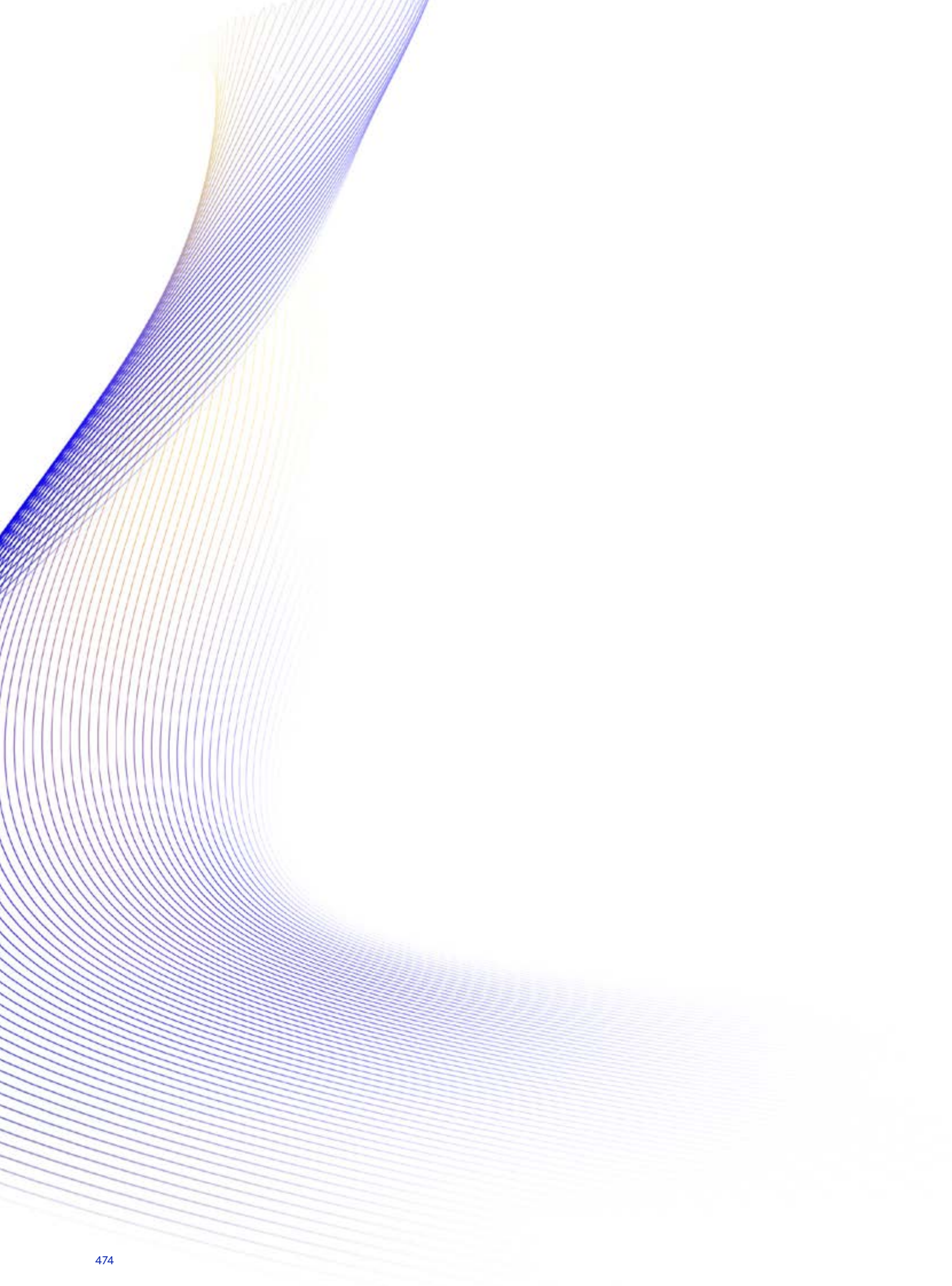
Gearboxes



- _ Standard variations
- _ Modular assembly
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Customizations

Custom



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Via Prè d'Ià 1
CH - 6814 Lamone
Switzerland

ph. +41 (0)91 612 85 00
fax. +41 (0)91 612 85 19

www.delta-line.com
info@delta-line.com

Delta Line North America, Inc

4600 South Syracuse, 9th Floor
Denver, CO 80237, USA

ph. +1 303 256 6212

www.delta-line.com
infous@delta-line.com



Delta Line SA

Via Prè d'là 1
CH - 6814 Lamone
Switzerland

ph. +41 (0)91 612 85 00
fax. +41 (0)91 612 85 19

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info@delta-line.com

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4600 South Syracuse, 9th Floor
Denver, CO 80237, USA

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