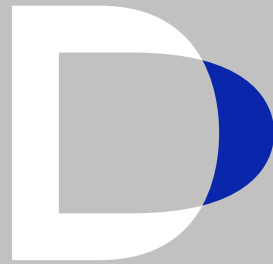


2021/2022
Product
Catalogue



Delta Line

Moving together

Stepper



Permanent Magnet Stepper

p.265



Flat Hybrid Stepper

p.353



Hybrid Stepper S series

p.277



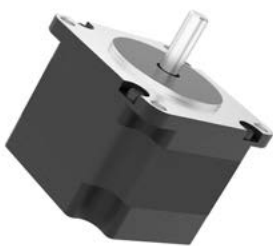
Hybrid Stepper SH series

p.287



Hybrid Stepper STC series

p.327



3-Phase Hybrid Stepper

p.337



Hollow Shaft Stepper

p.345 - NEW



Hybrid Stepper with Encoder

p.357



IP65 Hybrid Stepper

p.373

Stepper Motors

| | | |
|--|---------------------|------------|
| Technical introduction | | 262 |
| Permanent Magnet Stepper motors | Torque* (Nm) | 265 |
| 15PM12 | 0,003...0,004 | 266 |
| 20PM18 | 0,005 | 267 |
| 25PM15 | 0,01...0,016 | 268 |
| 35PM16...22 | 0,04...0,055 | 269 |
| 42PM17...22 | 0,05...0,06 | 271 |
| 57PM25 | 0,12...0,15 | 273 |
| Hybrid Stepper motors - S series | Torque* (Nm) | 277 |
| 57S41...76 | 0,288...1,25 | 278 |
| 86S67...125 | 2,3...7,6 | 282 |
| Hybrid Stepper motors - SH series High Torque | Torque* (Nm) | 287 |
| 20SH33...42 | 0,018...0,03 | 288 |
| 25SH23 | 0,033 | 290 |
| 28SH32...51 | 0,043...0,12 | 291 |
| 35SH26...36 | 0,07...0,14 | 294 |
| 39SH20...38 | 0,065...0,29 | 297 |
| 42SH33...60 | 0,158...0,8 | 300 |
| 42SH33...47M - step 0,9° | 0,158...0,44 | 304 |
| 57SH41...76 | 0,39...1,89 | 307 |
| 57SH41...76M - step 0,9° | 0,39...1,8 | 311 |
| 60SH45...86 | 0,78...3,1 | 314 |
| 86SH65...156 | 2,6...12,1 | 318 |
| 110SH99...201 | 11,2...28 | 323 |
| Hybrid Stepper motors - STC series Hyper Torque | Torque* (Nm) | 327 |
| 20STC33...40 | 0,022...0,036 | 328 |
| 28STC32...51 | 0,08...0,18 | 330 |
| 57STC41...76 | 0,6...2,3 | 333 |
| 3-Phase Hybrid Stepper motors | Torque* (Nm) | 337 |
| 42 3P24...39 | 0,08...0,2 | 338 |
| 57 3P42...79 | 0,45...1,5 | 340 |
| 60 3P53 | 0,9 | 343 |
| Hollow Shaft Stepper motors - NEW | Torque* (Nm) | 345 |
| 20STC40 H | 0,036 | 346 |
| 28STC51 H | 0,12 | 347 |
| 35STC38 H | 0,23 | 348 |
| 42STC47 H | 0,44 | 349 |
| 57STC76 H | 2,3 | 350 |
| 86SH118 H | 6 | 351 |
| Flat Hybrid Stepper motors | Torque* (Nm) | 353 |
| 28S10 | 0,01 | 354 |
| 63S10 | 0,064 | 355 |
| Stepper motors with Encoder | Torque* (Nm) | 357 |
| SM42 054...080 -E | 0,22...0,75 | 358 |
| SM60 066...107 -E | 1...3 | 362 |
| SM86 084...172 -E | 3,5...12 | 366 |
| IP65 Hybrid Stepper motors | Torque* (Nm) | 373 |
| SM28 051...070 - IP65 | 0,071...0,127 | 374 |
| SM42 097...127 - IP65 | 0,16...0,72 | 376 |
| SM42 097...127 -E - IP65 with Encoder | 0,16...0,72 | 379 |
| SM57 070...093 - IP65 | 1,2...2,2 | 382 |
| SM57 101...136 -E - IP65 with Encoder | 0,7...1,95 | 384 |

* Holding Torque

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

Glossary

Product families

Permanent Magnet Stepper motors
Hybrid Stepper motors
3-Phase Hybrid Stepper motors
Hollow Shaft Stepper motors
Flat Hybrid Stepper motors
Stepper motors with Encoder
IP65 Hybrid Stepper motors

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

Main advantages

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

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

Permanent Magnets stepper motors

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

Hybrid Stepper motors (2-Phase)

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

3-Phase Hybrid Stepper motors

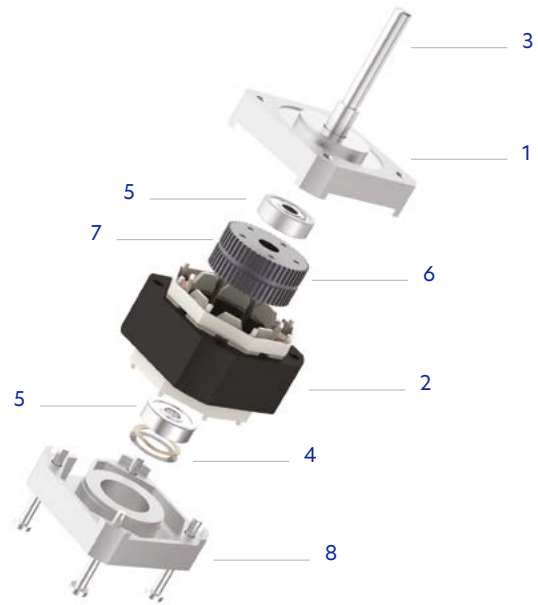
Our Hybrid stepper motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested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

Stepper motors with integrated Encoder

Technical introduction

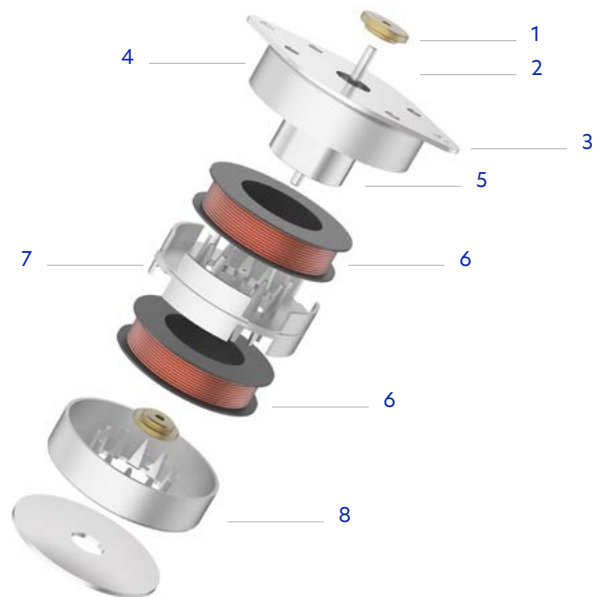
Composition Hybrid Stepper

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



Composition PM Stepper

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





Stepper motors
Hybrid with Encoder

Advantages at a glance

- Compact design
- Complete closed loop system
- Smooth and precise

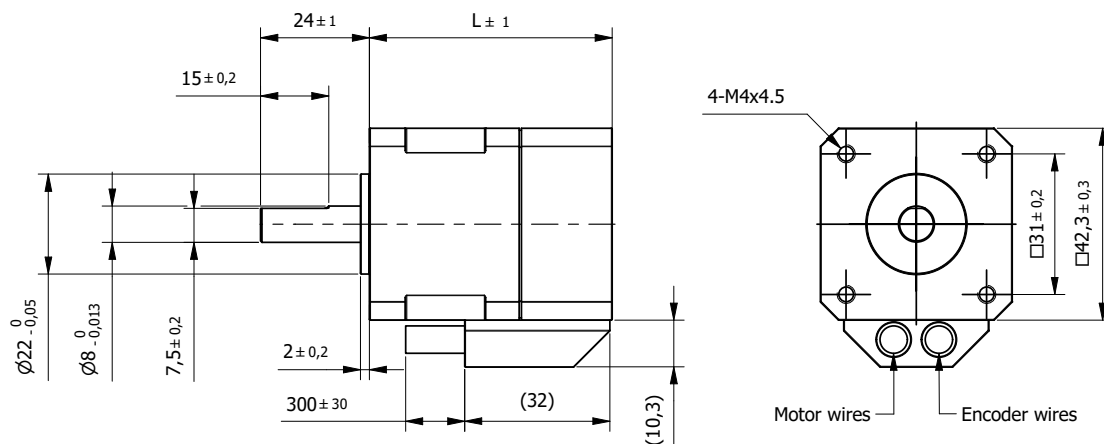
Our Hybrid stepper motors are also available equipped with an optical incremental encoder to increase the motion precision. Thanks to the encoder, the drive knows the position (or the speed) of the motor in real time and can perform adjustments to align the real condition with the condition requested 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 Encoder | Torque* (Nm) | |
|-----------------------------|--------------|-----|
| SM42 054 - E | 0,22 | 358 |
| SM42 060 - E | 0,36 | 359 |
| SM42 068 - E | 0,44 | 360 |
| SM42 080 - E | 0,75 | 361 |
| SM60 066 - E | 1,00 | 362 |
| SM60 075 - E | 1,65 | 363 |
| SM60 086 - E | 2,00 | 364 |
| SM60 107 - E | 3,00 | 365 |
| SM86 084 - E | 3,50 | 366 |
| SM86 097 - E | 4,50 | 367 |
| SM86 115 - E | 6,50 | 368 |
| SM86 133 - E | 8,50 | 369 |
| SM86 172 - E | 12,00 | 370 |

* Holding Torque

Hybrid Stepper Motor SM42 054-E with Encoder

□ 42mm



| Specification | | |
|---------------|------------------|---------------------|
| Model | ...13E4F | |
| 1 | Rated Voltage | V 2,8 |
| 2 | Current/Phase | A 1,33 |
| 3 | Resistance/Phase | Ω 2,1 |
| 4 | Inductance/Phase | mH 2,5 |
| 5 | Holding Torque | Nm 0,22 |
| 6 | Rotor Inertia | gcm ² 35 |
| 7 | Detent Torque | Nm 0,012 |
| 8 | n°of Leads | 4 |
| 9 | Length (L) | mm 53,5 |
| 10 | Weight | Kg 0,22 |

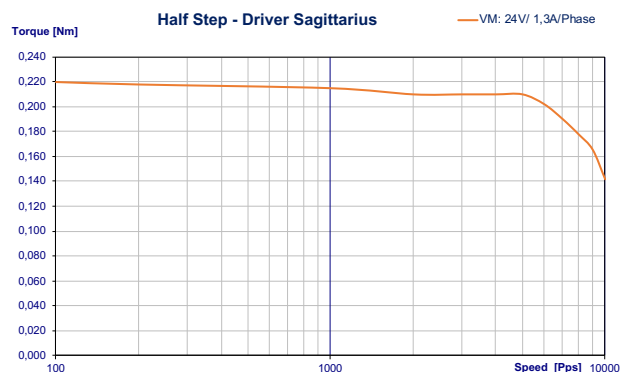
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP20 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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

| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP42 | Aries |
| 42JMS | Libra |
| | Orion |
| | Sagittarius |

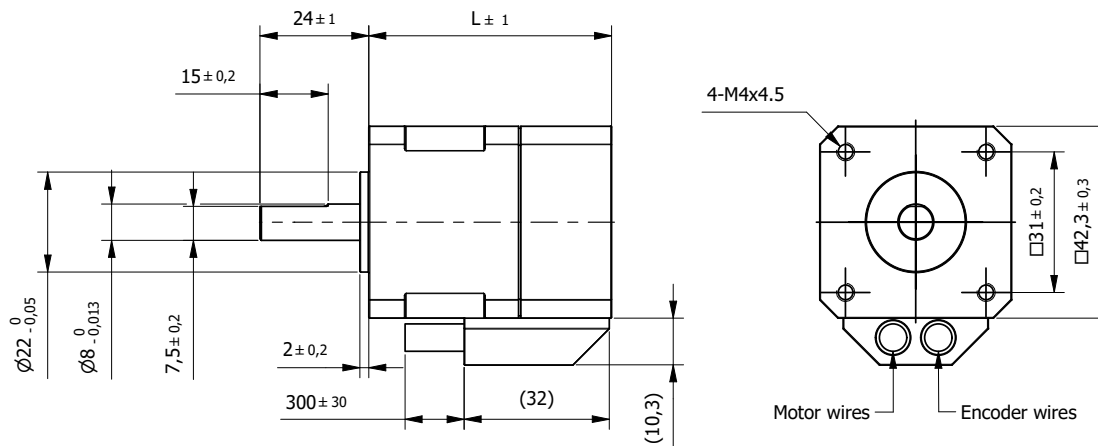
* other options on request

| 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 SM42 060-E with Encoder

□ 42mm



| Specification | | | |
|---------------|------------------|------------------|-------|
| Model | ...16E4F | | |
| 1 | Rated Voltage | V | 2,8 |
| 2 | Current/Phase | A | 1,68 |
| 3 | Resistance/Phase | Ω | 1,65 |
| 4 | Inductance/Phase | mH | 3,2 |
| 5 | Holding Torque | Nm | 0,36 |
| 6 | Rotor Inertia | gcm ² | 54 |
| 7 | Detent Torque | Nm | 0,015 |
| 8 | n° of Leads | | 4 |
| 9 | Length (L) | mm | 59,5 |
| 10 | Weight | Kg | 0,28 |

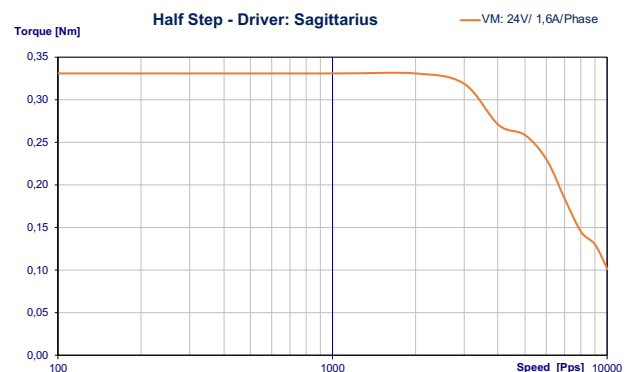
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP20 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

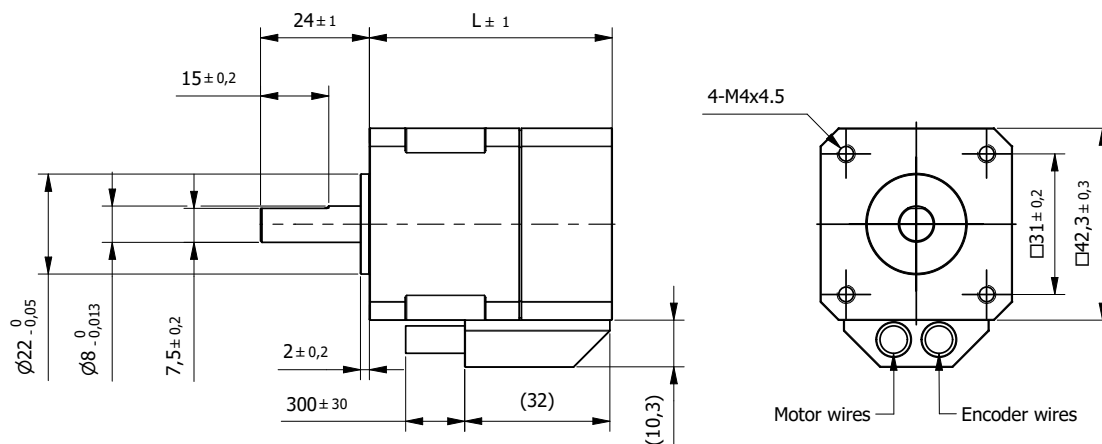
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP42 | Aries |
| 42JMS | Libra |
| | Orion |
| | Sagittarius |

* other options on request



Hybrid Stepper Motor SM42 068-E with Encoder

□ 42mm



| Specification | | |
|---------------|------------------|---------------------|
| Model | ...16E4F | |
| 1 | Rated Voltage | V 2,8 |
| 2 | Current/Phase | A 1,68 |
| 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 67,5 |
| 10 | Weight | Kg 0,35 |

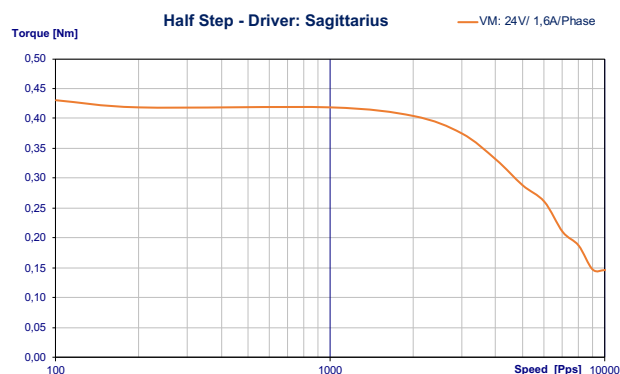
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP20 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

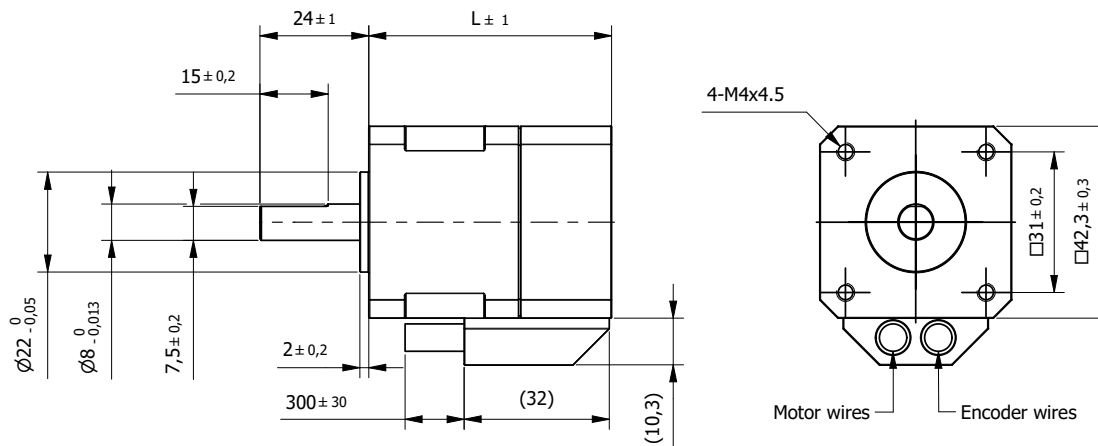
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP42 | Aries |
| 42JMS | Libra |
| | Orion |
| | Sagittarius |

* other options on request



Hybrid Stepper Motor SM42 080-E with Encoder

□ 42mm



| Specification | | | |
|---------------|------------------|------------------|-------|
| Model | ...30E4F | | |
| 1 | Rated Voltage | V | 3,5 |
| 2 | Current/Phase | A | 3 |
| 3 | Resistance/Phase | Ω | 1,2 |
| 4 | Inductance/Phase | mH | 2,9 |
| 5 | Holding Torque | Nm | 0,75 |
| 6 | Rotor Inertia | gcm ² | 102 |
| 7 | Detent Torque | Nm | 0,028 |
| 8 | n° of Leads | | 4 |
| 9 | Length (L) | mm | 80 |
| 10 | Weight | Kg | 0,5 |

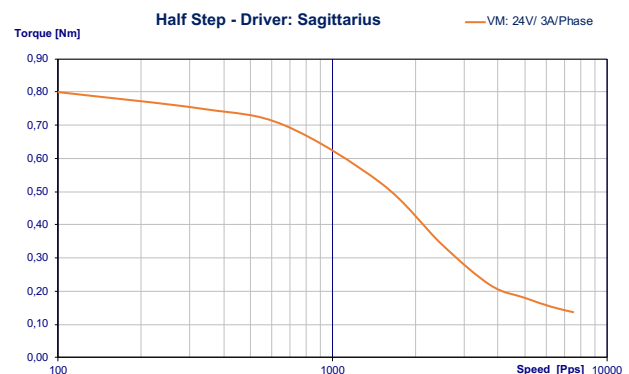
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP20 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

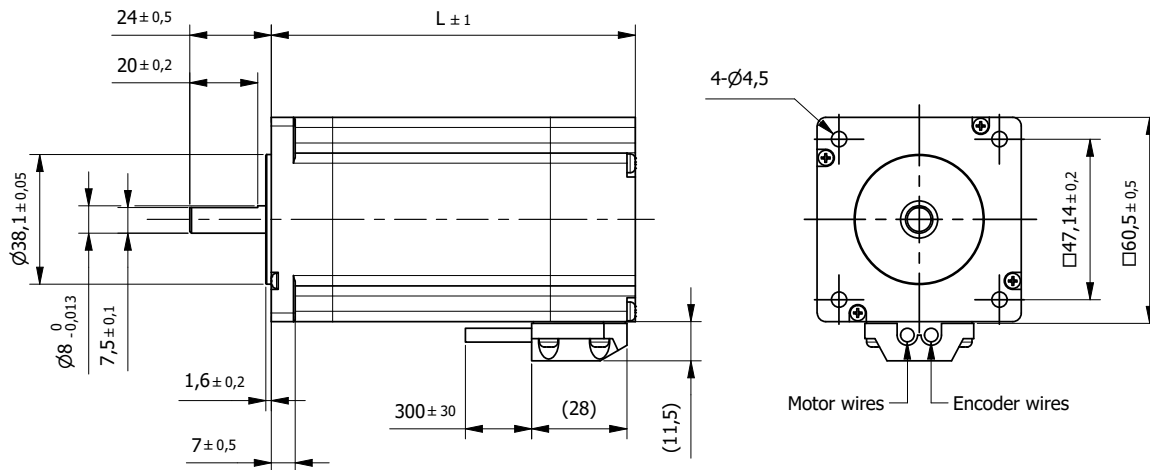
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP42 | Aries |
| 42JMS | Libra |
| | Orion |
| | Sagittarius |

* other options on request



Hybrid Stepper Motor SM60 075-E with Encoder

□ 60mm



| Specification | | |
|---------------|------------------|----------------------|
| Model | ...28E4F | |
| 1 | Rated Voltage | V 2,8 |
| 2 | Current/Phase | A 2,8 |
| 3 | Resistance/Phase | Ω 1 |
| 4 | Inductance/Phase | mH 3,6 |
| 5 | Holding Torque | Nm 1,65 |
| 6 | Rotor Inertia | gcm ² 450 |
| 7 | Detent Torque | Nm 0,05 |
| 8 | n° of Leads | 4 |
| 9 | Length (L) | mm 75 |
| 10 | Weight | Kg 0,82 |

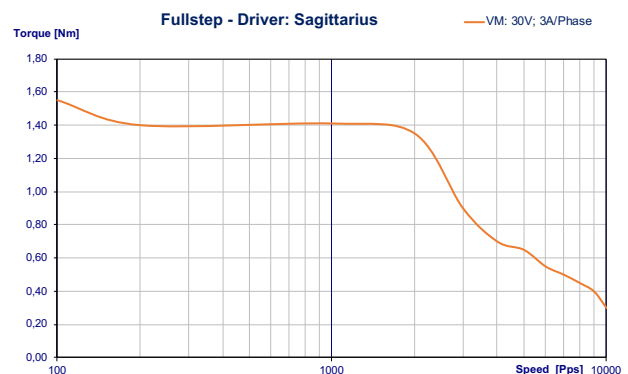
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

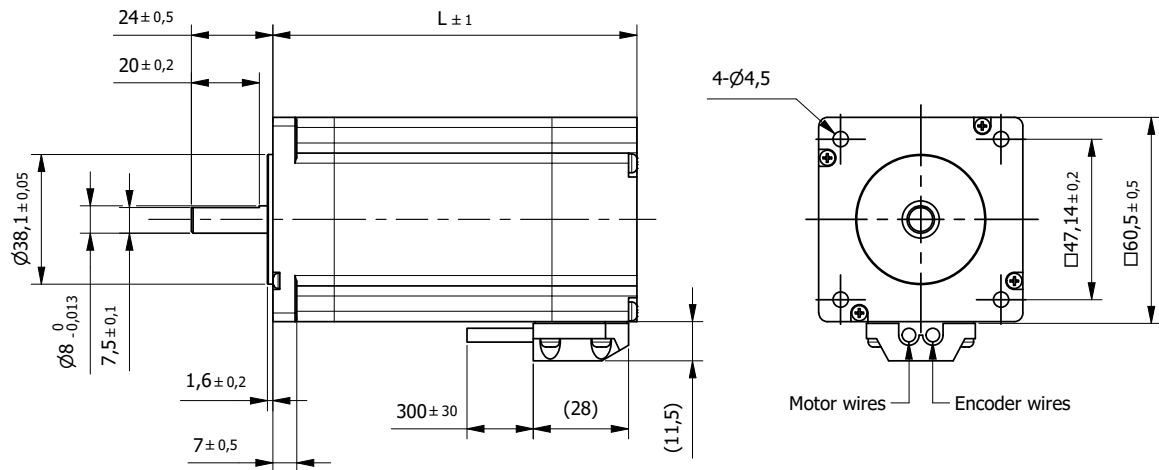
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP56 | Aries |
| 56JMS | Libra |
| | Orion |
| | Sagittarius |

* other options on request



Hybrid Stepper Motor SM60 086-E with Encoder

□ 60mm



| Specification | | | |
|---------------|------------------|------------------|------|
| Model | ...28E4F | | |
| 1 | Rated Voltage | V | 3,4 |
| 2 | Current/Phase | A | 2,8 |
| 3 | Resistance/Phase | Ω | 1,2 |
| 4 | Inductance/Phase | mH | 4,6 |
| 5 | Holding Torque | Nm | 2 |
| 6 | Rotor Inertia | gcm ² | 570 |
| 7 | Detent Torque | Nm | 0,05 |
| 8 | n°of Leads | | 4 |
| 9 | Length (L) | mm | 86 |
| 10 | Weight | Kg | 1,3 |

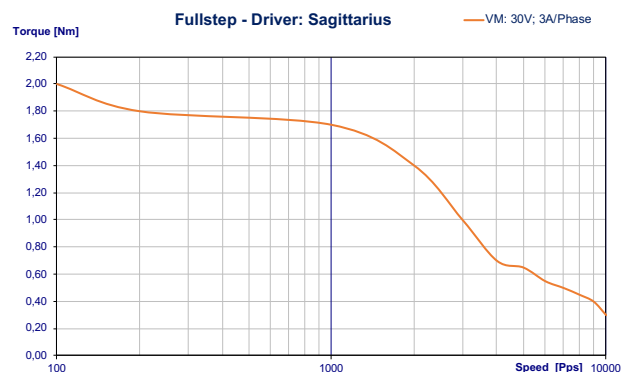
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C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

| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP56 | Aries |
| 56JMS | Libra |
| | Orion |
| | Sagittarius |

* other options on request

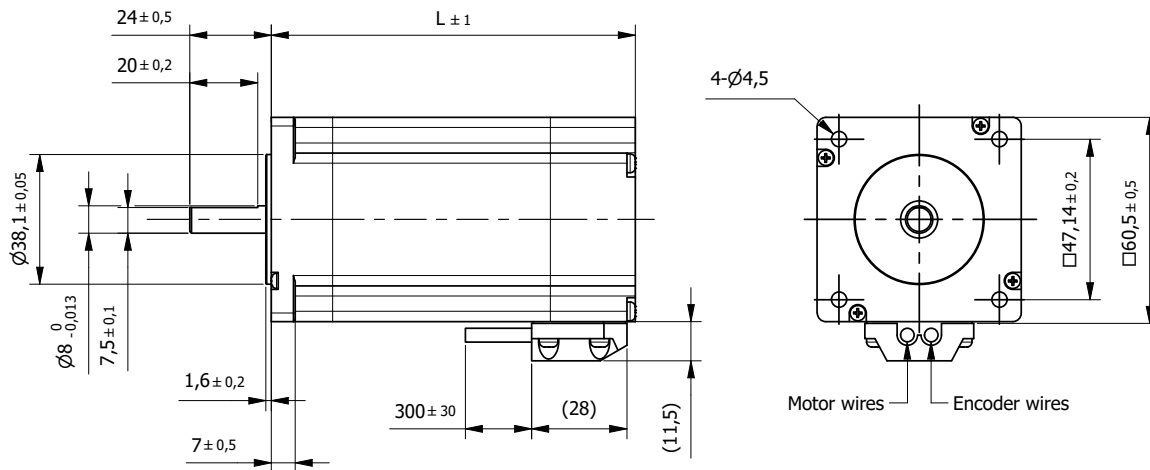
* 3-channel encoder or other types on request

| 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 SM60 107-E with Encoder

□ 60mm



| Specification | | | |
|---------------|------------------|------------------|-----|
| Model | ...28E4F | | |
| 1 | Rated Voltage | V | 4,2 |
| 2 | Current/Phase | A | 2,8 |
| 3 | Resistance/Phase | Ω | 1,5 |
| 4 | Inductance/Phase | mH | 6,8 |
| 5 | Holding Torque | Nm | 3 |
| 6 | Rotor Inertia | gcm ² | 840 |
| 7 | Detent Torque | Nm | 0,1 |
| 8 | n° of Leads | | 4 |
| 9 | Length (L) | mm | 107 |
| 10 | Weight | Kg | 1,4 |

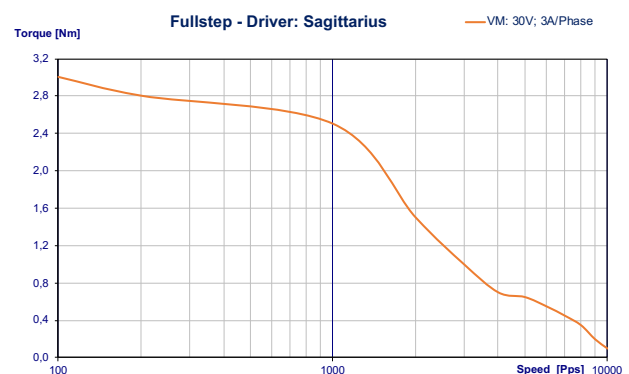
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

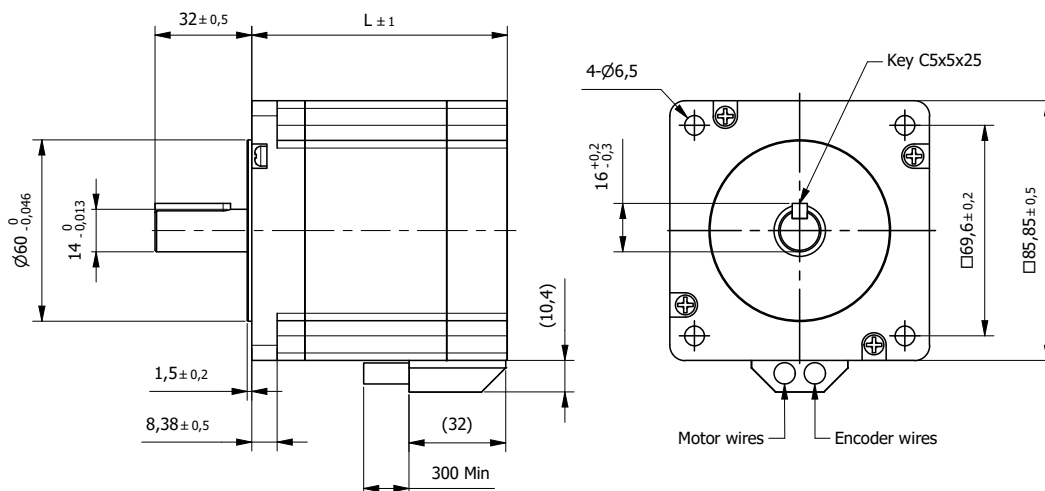
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP56 | Aries |
| 56JMS | Libra |
| | Orion |
| | Sagittarius |

* other options on request



Hybrid Stepper Motor SM86 084-E with Encoder

□ 86mm



| Specification | | | |
|---------------|------------------|------------------|------|
| Model | ...60E4K | | |
| 1 | Rated Voltage | V | 1,7 |
| 2 | Current/Phase | A | 6 |
| 3 | Resistance/Phase | Ω | 0,3 |
| 4 | Inductance/Phase | mH | 1,8 |
| 5 | Holding Torque | Nm | 3,5 |
| 6 | Rotor Inertia | gcm ² | 1000 |
| 7 | n° of Leads | | 4 |
| 8 | Length (L) | mm | 84,5 |
| 9 | Weight | Kg | 1,7 |

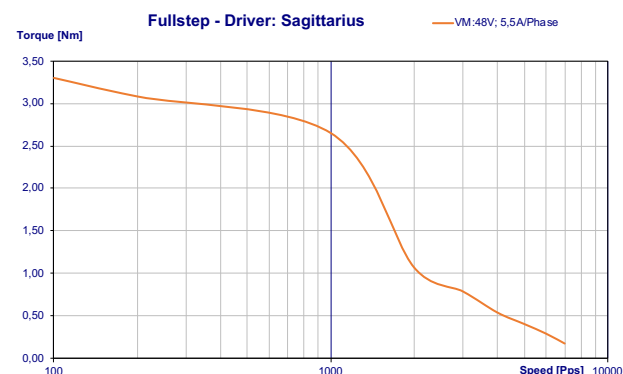
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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

| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP80 | Libra |
| | Sagittarius |
| | Aquarius |
| | Andromeda |

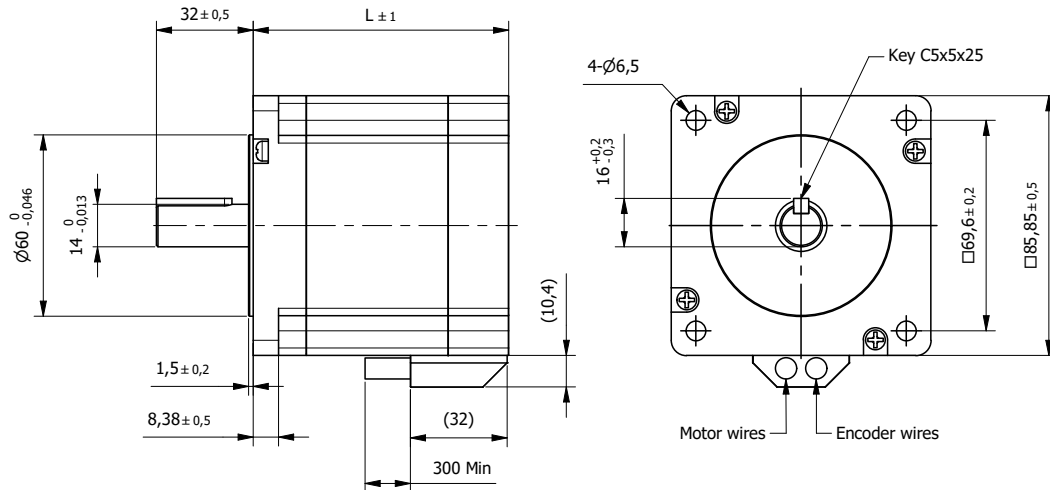
* other options on request

| 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- |



Hybrid Stepper Motor SM86 097-E with Encoder

□ 86mm



| Specification | | | |
|---------------|------------------|------------------|------|
| Model | ...55E4K | | |
| 1 | Rated Voltage | V | 2,3 |
| 2 | Current/Phase | A | 5,5 |
| 3 | Resistance/Phase | Ω | 0,4 |
| 4 | Inductance/Phase | mH | 3,5 |
| 5 | Holding Torque | Nm | 4,5 |
| 6 | Rotor Inertia | gcm ² | 1400 |
| 7 | Detent Torque | Nm | 0,12 |
| 8 | n° of Leads | | 4 |
| 9 | Length (L) | mm | 97 |
| 10 | Weight | Kg | 2,3 |

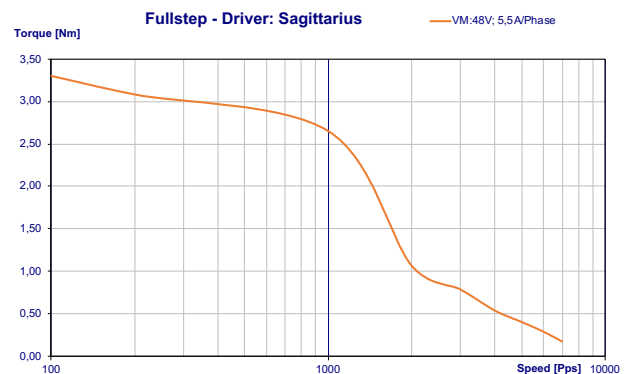
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

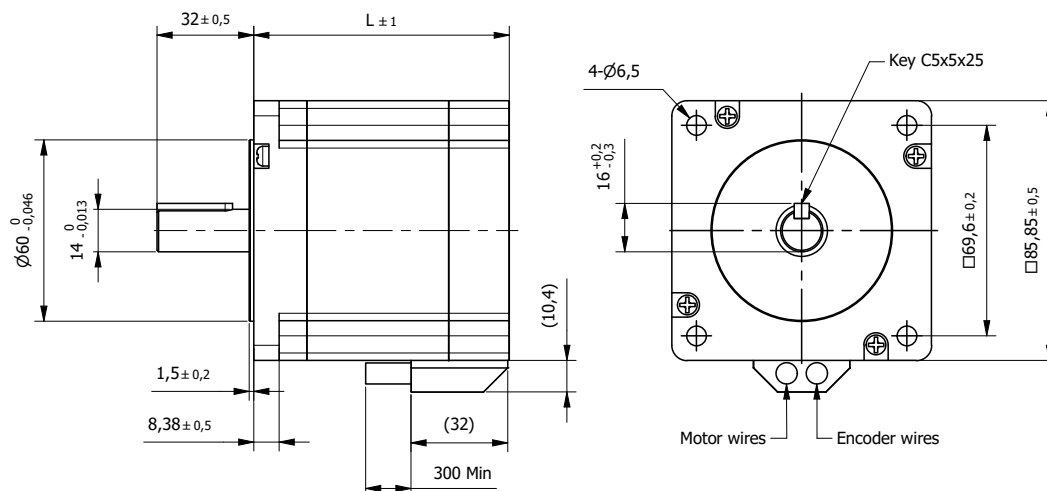
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP80 | Libra |
| | Sagittarius |
| | Aquarius |
| | Andromeda |

* other options on request



Hybrid Stepper Motor SM86 115-E with Encoder

□ 86mm



| Specification | | | |
|---------------|------------------|------------------|-------|
| Model | ...55E4K | | |
| 1 | Rated Voltage | V | 2,6 |
| 2 | Current/Phase | A | 5,5 |
| 3 | Resistance/Phase | Ω | 0,5 |
| 4 | Inductance/Phase | mH | 3,4 |
| 5 | Holding Torque | Nm | 6,5 |
| 6 | Rotor Inertia | gcm ² | 1900 |
| 7 | Detent Torque | Nm | 0,12 |
| 8 | n°of Leads | | 4 |
| 9 | Length (L) | mm | 115,5 |
| 10 | Weight | Kg | 2,8 |

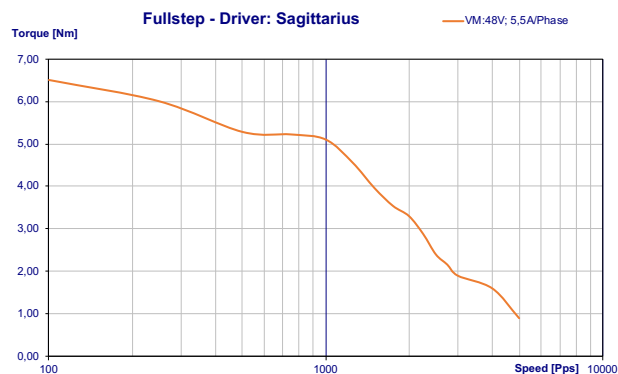
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

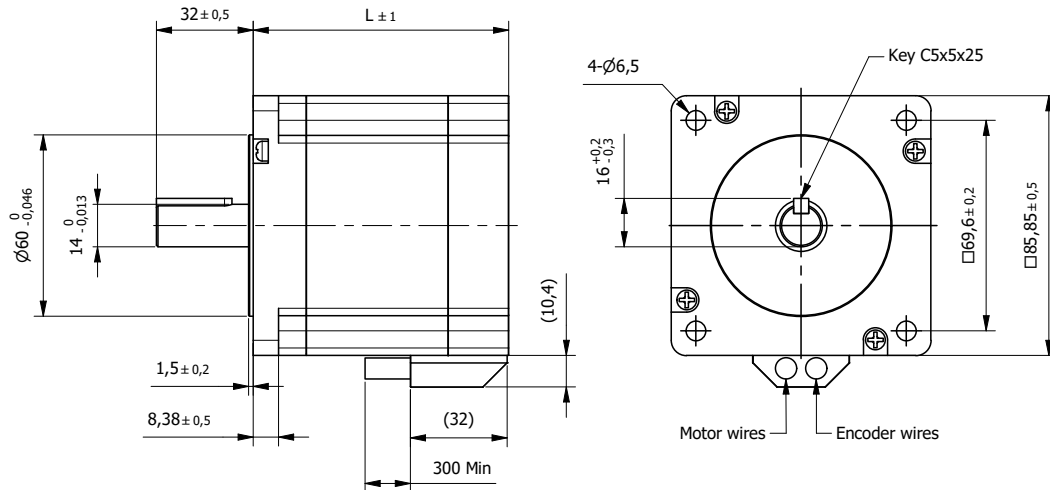
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP80 | Libra |
| | Sagittarius |
| | Aquarius |
| | Andromeda |

* other options on request



Hybrid Stepper Motor SM86 133-E with Encoder

□ 86mm



| Specification | | |
|---------------|------------------|-----------------------|
| Model | ...60E4K | |
| 1 | Rated Voltage | V 3,3 |
| 2 | Current/Phase | A 6 |
| 3 | Resistance/Phase | Ω 0,55 |
| 4 | Inductance/Phase | mH 6 |
| 5 | Holding Torque | Nm 8,5 |
| 6 | Rotor Inertia | gcm ² 2700 |
| 7 | Detent Torque | Nm 0,24 |
| 8 | n° of Leads | 4 |
| 9 | Length (L) | mm 133 |
| 10 | Weight | Kg 3,8 |

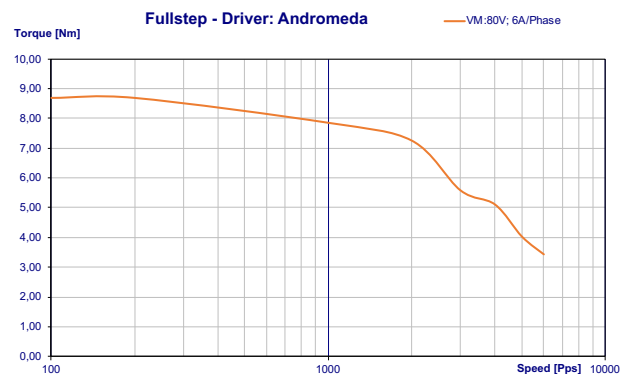
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

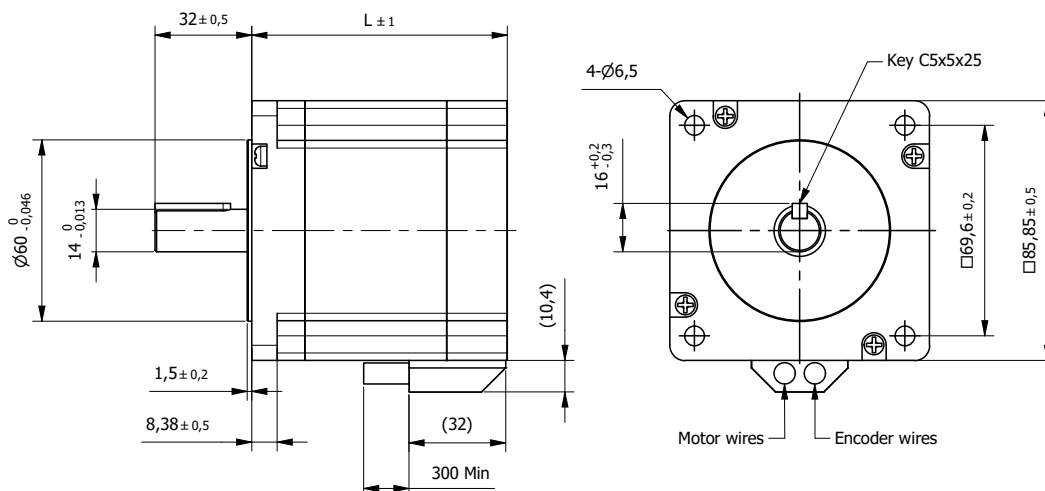
| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP80 | Libra |
| | Sagittarius |
| | Aquarius |
| | Andromeda |

* other options on request



Hybrid Stepper Motor SM86 172-E with Encoder

□ 86mm



| Specification | | | |
|---------------|------------------|------------------|------|
| Model | ...62E4K | | |
| 1 | Rated Voltage | V | 4,3 |
| 2 | Current/Phase | A | 6,2 |
| 3 | Resistance/Phase | Ω | 0,7 |
| 4 | Inductance/Phase | mH | 9 |
| 5 | Holding Torque | Nm | 12 |
| 6 | Rotor Inertia | gcm ² | 4000 |
| 7 | Detent Torque | Nm | 0,36 |
| 8 | n°of Leads | | 4 |
| 9 | Length (L) | mm | 172 |
| 10 | Weight | Kg | 5,3 |

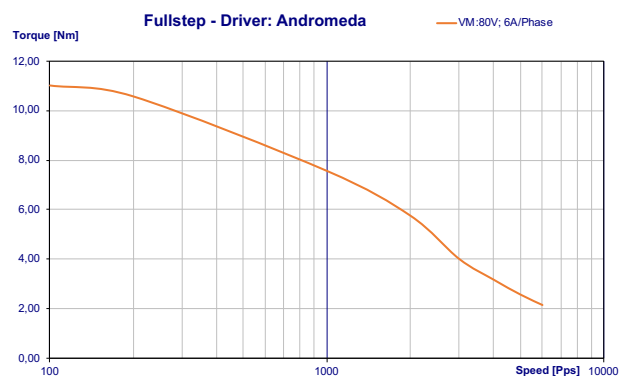
| Characteristics | |
|---|--|
| Item | |
| Encoder Type* | Optical - Incremental 1000 CPR / 2 channels |
| Step angle | 1,8° |
| Step angle Accuracy | ±5% |
| Insulation Class | B |
| Protection Class | IP30 |
| Ambient Temperature | -20°C to +50°C |
| Max. Temp. Rise (rated current, 2-phase on) | 80°C |
| 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- |

| Standard Combination | |
|----------------------|-------------|
| Gearbox | Drive |
| GYP80 | Libra |
| | Sagittarius |
| | Aquarius |
| | Andromeda |

* other options on request



Delta Line SA

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

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

ph. +1 303 256 6212

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

