



HMP - Servo drive systems

■ Introduction

The HeiMotion Premium series of brushless AC servo motors are engineered to meet the most demanding application requirements. Five frame sizes are covering a wide range of torque levels and speeds. Use of our proven compressed winding technology enables the realization of a more compact motor with lower production costs compared to other motors on the market.

The HeiMotion Premium motors are available in five standard frame sizes:

- 40 mm - HMP04
- 60 mm - HMP06
- 80 mm - HMP08
- 100 mm - HMP10
- 130 mm - HMP13

Overview of features:

- Outstanding servo performance in synchronization and precision
- Versatile configurable and customizable
- High efficiency
- Optimized moment of inertia
- Long service life
- Compact design
- High power density
- High overload capacity
- Low cogging torque
- Energy efficiency

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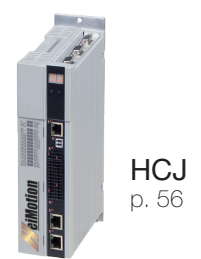
Overview

HeiMotion Premium motors basic performance values

| Type | Model | U_{bus} [V _{DC}] | I_o [A] | I_n [A] | M_o [Nm] | M_n [Nm] | M_{max} [Nm] | n_n [rpm] | J [kg-cm ²] | P_n (S1) [W] |
|-------|-----------|---------------------------------|--------------|--------------|---------------|---------------|-------------------|----------------|----------------------------|-------------------|
| HMP04 | HMP04-002 | 48 | 1.8 | 1.7 | 0.18 | 0.16 | 0.6 | 3,000 | 3.00E-02 | 50 |
| | | 48 | 3.4 | 3.0 | 0.18 | 0.14 | 0.7 | 6,000 | 3.00E-02 | 85 |
| | | 320 | 0.8 | 0.7 | 0.18 | 0.12 | 0.7 | 9,000 | 3.00E-02 | 110 |
| | HMP04-004 | 48 | 3.5 | 3.3 | 0.35 | 0.32 | 1.3 | 3,000 | 5.40E-02 | 100 |
| | | 48 | 6.3 | 5.7 | 0.35 | 0.28 | 1.3 | 6,000 | 5.40E-02 | 175 |
| | | 320 | 1.6 | 1.2 | 0.35 | 0.21 | 1.4 | 9,000 | 5.40E-02 | 200 |
| HMP06 | HMP06-007 | 320 | 0.9 | 0.8 | 0.7 | 0.6 | 2.8 | 3,000 | 2.20E-01 | 200 |
| | | 320 | 1.6 | 1.3 | 0.7 | 0.5 | 2.8 | 6,000 | 2.20E-01 | 325 |
| | HMP06-015 | 320 | 1.8 | 1.5 | 1.5 | 1.2 | 6.0 | 3,000 | 4.13E-01 | 400 |
| | | 320 | 3.3 | 2.2 | 1.5 | 0.9 | 6.0 | 6,000 | 4.13E-01 | 550 |
| HMP08 | HMP08-028 | 320 | 3.1 | 2.6 | 2.8 | 2.4 | 11.2 | 3,000 | 1.40E00 | 750 |
| | | 320 | 5.6 | 3.7 | 2.8 | 1.7 | 11.2 | 5,500 | 1.40E00 | 1,000 |
| | | 560 | 1.8 | 1.6 | 2.8 | 2.3 | 11.2 | 3,000 | 1.40E00 | 750 |
| | | 560 | 3.3 | 2.2 | 2.8 | 1.7 | 11.2 | 5,500 | 1.40E00 | 1,000 |
| | HMP08-035 | 320 | 3.9 | 3.7 | 3.5 | 3.2 | 14.0 | 3,000 | 1.93E00 | 1,000 |
| | | 320 | 7.1 | 4.8 | 3.5 | 2.1 | 14.0 | 5,500 | 1.93E00 | 1,200 |
| | | 560 | 2.2 | 2.1 | 3.5 | 3.2 | 14.0 | 3,000 | 1.93E00 | 1,000 |
| | | 560 | 3.9 | 2.8 | 3.5 | 2.1 | 14.0 | 5,500 | 1.93E00 | 1,200 |
| HMP10 | HMP10-056 | 560 | 3.4 | 3.0 | 5.6 | 4.8 | 22.4 | 3,000 | 4.84E00 | 1,500 |
| | | 560 | 5.4 | 3.7 | 5.6 | 3.4 | 22.4 | 5,000 | 4.84E00 | 1,800 |
| | HMP10-075 | 560 | 4.6 | 4.1 | 7.5 | 6.4 | 30.0 | 3,000 | 6.41E00 | 2,000 |
| | | 560 | 7.5 | 5.3 | 7.5 | 4.8 | 30.0 | 5,000 | 6.41E00 | 2,500 |
| HMP13 | HMP13-055 | 320 | 4.8 | 4.1 | 5.5 | 4.8 | 22.0 | 2,000 | 9.82E00 | 1,000 |
| | | 320 | 8.2 | 6.0 | 5.5 | 4.0 | 22.0 | 3,600 | 9.82E00 | 1,500 |
| | | 560 | 2.7 | 2.3 | 5.5 | 4.8 | 22.0 | 2,000 | 9.82E00 | 1,000 |
| | | 560 | 4.7 | 3.4 | 5.5 | 4.0 | 22.0 | 3,600 | 9.82E00 | 1,500 |
| | HMP13-091 | 560 | 4.4 | 3.4 | 9.1 | 7.2 | 36.4 | 2,000 | 1.40E01 | 1,500 |
| | | 560 | 7.7 | 5.0 | 9.1 | 6.0 | 36.4 | 3,600 | 1.40E01 | 2,250 |
| | HMP13-123 | 560 | 4.7 | 4.5 | 12.3 | 9.6 | 49.2 | 2,000 | 2.11E01 | 2,000 |
| | | 560 | 10.3 | 6.7 | 12.3 | 8.0 | 49.2 | 3,600 | 2.11E01 | 3,000 |
| | HMP13-185 | 560 | 8.4 | 6.5 | 18.5 | 14.4 | 74.0 | 2,000 | 3.38E01 | 3,000 |
| | | 560 | 14.8 | 8.0 | 18.5 | 10.0 | 74.0 | 3,600 | 3.38E01 | 3,750 |


HeiMotion Premium motors mating servo drive matrix

| Type | Model | n [rpm] | U _{bus} [V _{DC}] | I _o | HCD | HCB | HCB | HCF | HCJ | HCJ |
|-----------|-----------|------------|--|----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | | | | | 1 X 230 V _{AC} | 1 X 230 V _{AC} | 3 X 400 V _{AC} | 24 - 48 V _{DC} | 1 X 230 V _{AC} | 3 X 400 V _{AC} |
| HMP04 | HMP04-002 | 3,000 | 48 | 1.8 | | HCB 2/6-1 | HCB 4/12-3 | HCF | | |
| | | 6,000 | 48 | 3.4 | | HCB 4/12-1 | HCB 4/12-3 | HCF | | |
| | | 9,000 | 320 | 0.8 | HCD | HCB 2/6-1 | HCB 4/12-3 | | HCJ 22.003 | |
| | HMP04-004 | 3,000 | 48 | 3.5 | | HCB 4/12-1 | HCB 4/12-3 | HCF | | |
| | | 6,000 | 48 | 6.3 | | | HCB 8/24-3 | HCF | | |
| | | 9,000 | 320 | 1.6 | HCD | HCB 2/6-1 | HCB 4/12-3 | | HCJ 22.003 | |
| HMP06 | HMP06-007 | 3,000 | 320 | 0.9 | HCD | HCB 2/6-1 | HCB 4/12-3 | | HCJ 22.003 | |
| | | 6,000 | 320 | 1.6 | HCD | HCB 2/6-1 | HCB 4/12-3 | | HCJ 22.003 | |
| | HMP06-015 | 3,000 | 320 | 1.8 | HCD | HCB 2/6-1 | HCB 4/12-3 | | HCJ 22.003 | |
| | | 6,000 | 320 | 3.3 | HCD | HCB 4/12-1 | HCB 4/12-3 | | HCJ 22.006 | |
| HMP08 | HMP08-028 | 3,000 | 320 | 3.1 | HCD | HCB 4/12-1 | HCB 4/12-3 | | HCJ 22.006 | |
| | | 5,500 | 320 | 5.6 | | | HCB 8/24-3 | | HCJ 22.006 | |
| | | 3,000 | 560 | 1.8 | | | HCB 4/12-3 | | | HCJ 24.002 |
| | HMP08-035 | 5,500 | 560 | 3.3 | | | HCB 4/12-3 | | | HCJ 24.004 |
| | | 3,000 | 320 | 3.9 | | HCB 4/12-1 | HCB 4/12-3 | | HCJ 22.006 | |
| | | 5,500 | 320 | 7.1 | | | HCB 8/24-3 | | HCJ 22.008 | |
| | | 3,000 | 560 | 2.2 | | | HCB 4/12-3 | | | HCJ 24.004 |
| | | 5,500 | 560 | 3.9 | | HCB 4/12-3 | | | HCJ 24.007 | |
| HMP10 | HMP10-056 | 3,000 | 560 | 3.4 | | | HCB 4/12-3 | | | HCJ 24.004 |
| | | 5,000 | 560 | 5.4 | | | HCB 8/24-3 | | | HCJ 24.007 |
| | HMP10-075 | 3,000 | 560 | 4.6 | | | HCB 8/24-3 | | | HCJ 24.007 |
| | | 5,000 | 560 | 7.5 | | | HCB 8/24-3 | | | HCJ 24.012 |
| HMP13 | HMP13-055 | 2,000 | 320 | 4.8 | | | HCB 8/24-3 | | HCJ 22.006 | |
| | | 3,600 | 320 | 8.2 | | | HCB 12/30-3 | | HCJ 22.008 | |
| | | 2,000 | 560 | 2.7 | | | HCB 4/12-3 | | | HCJ 24.004 |
| | | 3,600 | 560 | 4.7 | | | HCB 8/24-3 | | | HCJ 24.007 |
| | HMP13-091 | 2,000 | 560 | 4.4 | | | HCB 8/24-3 | | | HCJ 24.007 |
| | | 3,600 | 560 | 7.7 | | | HCB 8/24-3 | | | HCJ 24.012 |
| | HMP13-123 | 2,000 | 560 | 4.7 | | | HCB 8/24-3 | | | HCJ 24.007 |
| | | 3,600 | 560 | 10.3 | | | HCB 12/30-3 | | | HCJ 24.012 |
| HMP13-185 | 2,000 | 560 | 8.4 | | | HCB 12/30-3 | | | HCJ 24.012 | |
| | 3,600 | 560 | 14.8 | | | | | | HCJ 24.016 | |



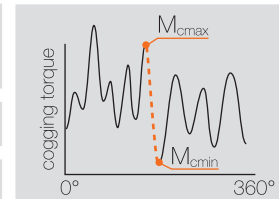
■ General information

Ambient conditions and technical characteristics

| | | |
|--|---|--|
| Motor type | Permanent magnet three-phase synchronous servo motor | |
| Ambient operating temperature | - 10 °C to + 40 °C | |
| Ambient storage temperature | - 20 °C to + 70 °C | |
| Humidity | < 90 % relative humidity (without condensation) | |
| Insulation class | F (155 °C) $\Delta T = 115 \text{ K}$ | |
| Pollution level | 2 | |
| Protection class | IP65 (standard version), (except drive end, protection class is IP21, without shaft oil seal) | |
| Cooling | Natural convective | |
| Overvoltage category | HMP04: II max. 3000 meter above sea level; I max. 4000 meter above sea level HMP06 to 13: II max. 4000 meter above sea level | |
| Bearing life | 20,000 h under rated operation conditions (M_n) | |
| Temperature sensor | KTY84-130 | |
| Voltage slew rate dU / dt | 8 kV / μs | |
| Maximum altitude | 4,000 meters above sealevel; derate 1% per 100 meters above 1,000 meters | |
| Concentricity, coaxiality, and axial run-out | N (normal) per DIN 42955 | |
| Vibration | Stage N in accordance to ISO 2373 | |
| Cogging torque factor c_t | HMP04 HMP06 HMP08 HMP10 HMP13 | < 2.8 % based on the stall torque (M_σ) < 2.5 % based on the stall torque (M_σ) < 2.0 % based on the stall torque (M_σ) < 1.7 % based on the stall torque (M_σ) < 1.5 % based on the stall torque (M_σ) |
| Coating | Black top coat, RAL 9005 | |
| Magnet material | Neodymium-Iron-Boron (NdFeB) | |
| Shaft end | Cylindrical shaft end with / without keyway | |
| Balancing quality | Q 2.5 | |
| Encoder systems | Resolver, HIPERFACE®, HIPERFACE DSL®, Incremental encoder, SSI/BISS, EnDat 2.2 | |
| Approvals | CE,  - certification (see E341694) | |

Abbreviations and definitions

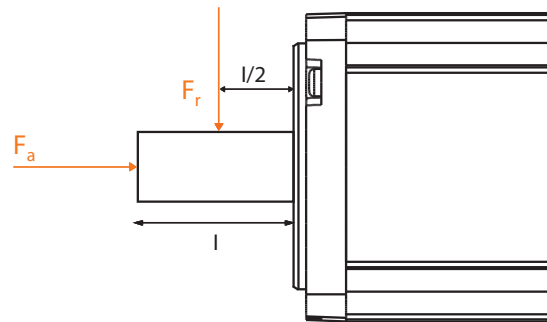
| Abbr. | Unit | Explanation |
|------------|---------------------------|---|
| f_n | [Hz] | Rated frequency |
| I_0 | [A _{rms}] | Stall current per phase (motor current at stall torque M_0) |
| I_n | [A _{rms}] | Rated current (rated current per phase) |
| I_{max} | [A _{rms}] | Peak current (maximum permissible current per phase) |
| J | [kg·cm ²] | Moment of inertia rotor (motor without brake) |
| k_e | [V _{rms} / krpm] | Voltage constant (induced voltage between two phases at 1,000 rpm) rms (root mean square value) |
| k_{tn} | [Nm / A _{rms}] | Torque constant (rms) at nominal point at 20 °C |
| L_{p-p} | [mH] | Winding inductance (phase-to-phase) at rated current I_n |
| m | [kg] | Weight (motor without brake) |
| M_0 | [Nm] | Stall torque (stall torque at S1) |
| M_n | [Nm] | Rated torque (continuous torque at S1) |
| M_{max} | [Nm] | Peak torque (maximum permissible torque for short periods) |
| n_n | [rpm] | Rated speed |
| n_{max} | [rpm] | Maximum speed |
| P_n | [W] | Rated power (mechanical power at the shaft) |
| R_{p-p} | [Ω] | Winding resistance (phase-to-phase, at winding temperature of 20 °C) |
| c_t | [%] | Local cogging torque $c_t = \frac{M_{cmax} - M_{cmin}}{M_0} \times 100 \%$ |
| M_{cmax} | [Nm] | Local maximum of the cogging torque |
| M_{cmin} | [Nm] | Local minimum of the cogging torque |
| T_{el} | [ms] | Electrical time constant |
| T_{th} | [min] | Thermal time constant |
| U_{mot} | [V _{rms}] | Rated motor voltage (phase-to-phase at rated working point), rms |
| U_{bus} | [V _{DC}] | DC bus voltage |



Life span

Shaft loading forces

Life span of the motors is at least 20,000 hours if operated under rated conditions. The table below shows admissible radial forces for the bearing load. Point of force application is in the middle of the shaft (see drawing).



Maximum radial force F_r , [N]

| | 1,000 [rpm] | 2,000 [rpm] | 3,000 [rpm] | 4,000 [rpm] | 5,000 [rpm] | 6,000 [rpm] | 7,000 [rpm] | 8,000 [rpm] | 9,000 [rpm] |
|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| HMP04-002 | 215 | 170 | 150 | 135 | 125 | 120 | 115 | 110 | 105 |
| HMP04-004 | 235 | 185 | 160 | 150 | 135 | 130 | 125 | 120 | 115 |
| HMP06-007 | 350 | 290 | 250 | 230 | 210 | 200 | 190 | 180 | - |
| HMP06-015 | 390 | 310 | 270 | 250 | 230 | 220 | 205 | 195 | - |
| HMP08-028 | 500 | 400 | 350 | 320 | 300 | 270 | 260 | - | - |
| HMP08-035 | 520 | 410 | 360 | 320 | 300 | 280 | 265 | - | - |
| HMP10-056 | 940 | 740 | 650 | 590 | 550 | 515 | - | - | - |
| HMP10-075 | 970 | 770 | 680 | 615 | 570 | 540 | - | - | - |
| HMP13-055 | 820 | 650 | 570 | 510 | 480 | - | - | - | - |
| HMP13-091 | 860 | 680 | 590 | 540 | 500 | - | - | - | - |
| HMP13-123 | 1,100 | 900 | 790 | 710 | 660 | - | - | - | - |
| HMP13-185 | 1,200 | 960 | 840 | 760 | 700 | - | - | - | - |

Maximum axial force: $F_a = 0.2 \times F_r$

At stall, a one-time axial force of 40 % of the radial force may be applied during motor mounting. Maximum allowed axial and radial forces must not occur together at the same time.

Order code

HMP08-028-320-30-B0H2MW23W

| | |
|--|---|
| <p>Frame/flange size</p> <p>40 mm → 04 60 mm → 06 80 mm → 08 100 mm → 10 130 mm → 13</p> <p>Stall torque</p> <p>0.2 Nm → 002 0.4 Nm → 004 0.7 Nm → 007 1.5 Nm → 015 2.8 Nm → 028 3.5 Nm → 035 5.6 Nm → 056 7.5 Nm → 075 5.5 Nm → 055 9.1 Nm → 091 12.3 Nm → 123 18.5 Nm → 185</p> <p>DC bus voltage</p> <p>48 V → 048 320 V → 320 560 V → 560</p> <p>Rated speed</p> <p>2,000 rpm → 20 3,000 rpm → 30 3,600 rpm → 36 5,000 rpm → 50 5,500 rpm → 55 6,000 rpm → 60 9,000 rpm → 90</p> | <p>Options</p> <p>Without brake 0XXXXXXXXX With brake BXXXXXXXXX Without feather key X0XXXXXXXXX With feather key XPXXXXXXXXX Resolver XXR1PXXXXX Resolver safely mounted XXRAPXXXXX HES 1 (1.0 V_{p-p}) XXM2SXXXXX HEM 1 (1.0 V_{p-p} without battery) XXM1MXXXXX HEM 1 (1.0 V_{p-p} with battery) XXM2MXXXXX HES 3 XXM1IXXXXX HS16 XXS1SXXXXX HM16 XXB1MXXXXX ECI 1118 XXE1SXXXXX EQI 1131 XXE1MXXXXX SEK 37 XXH1SXXXXX SEL 37 XXH1MXXXXX SKS 36 XXH2SXXXXX SKS 36S safely mounted XXHBSXXXXX SKM 36 XXH2MXXXXX SKM 36S safely mounted XXHBMXXXXX SRS 50 XXH3SXXXXX SRM 50 XXH3MXXXXX EES 37 XXD1SXXXXX EES 37-2 safely mounted XXDASXXXXX EEM 37 XXD1MXXXXX EEM 37-2 safely mounted XXDAMXXXXX EKS 36 XXD2SXXXXX EKS 36-2 safely mounted XXDBSXXXXX EKM 36 XXD2MXXXXX EKM 36-2 safely mounted XXDBMXXXXX CKS 36 XXI1SXXXXX M23 angled XXXXXXW23X Y-Tec XXXXXX Y17X I-Tec XXXXXX I17X Cable outlet 1.5m¹⁾ XXXXXXK15X Cable outlet 5m¹⁾ XXXXXXK50X Without radial shaft seal XXXXXXXX0 With radial shaft seal XXXXXXXXW</p> |
|--|---|

1) Upon request

Example: HMP08-028-320-30-B0H2MW23W

| | |
|--|---|
| <p>Frame/flange size 80 mm</p> <p>Stall torque 2.8 Nm</p> <p>DC bus voltage 320 V</p> <p>Rated speed 3,000 rpm</p> | <p>Options:</p> <p>With brake</p> <p>Without feather key</p> <p>Encoder SKM 36</p> <p>Angled connector M23</p> <p>With radial shaft seal</p> |
|--|---|

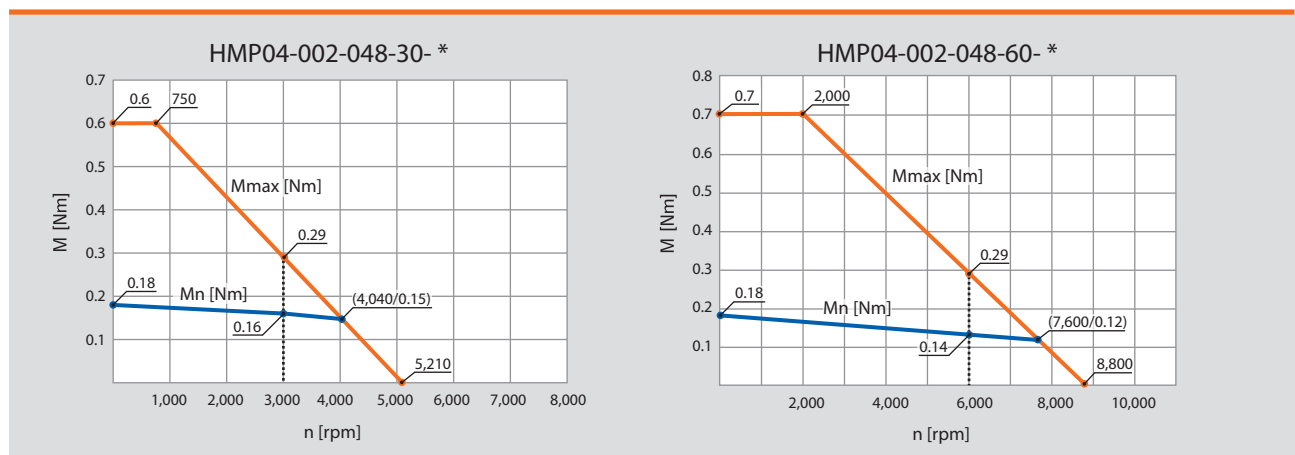
■ HMP04-002



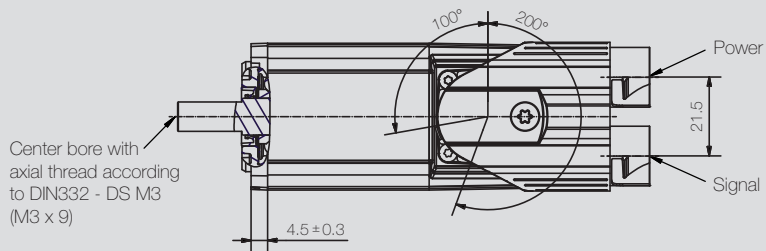
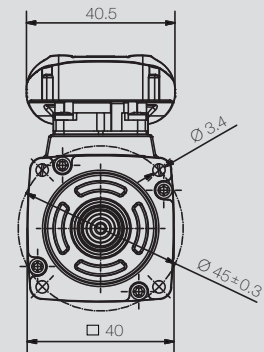
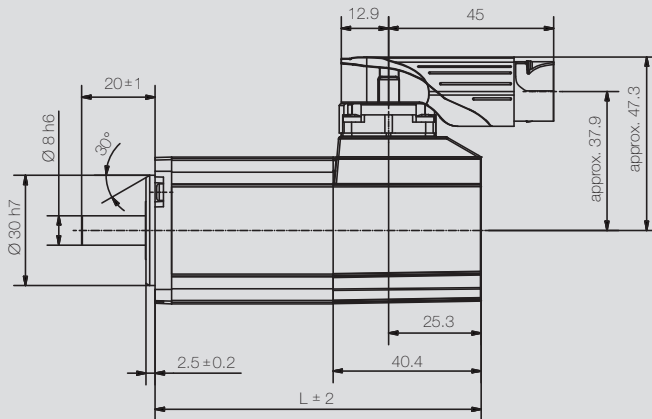
Specifications

| | HMP04-002 | | | |
|---|-------------------------|-------------|-------------|-------------|
| Rated speed [rpm] | n_n | 3,000 | 6,000 | 9,000 |
| Number of pole pairs | | 2 | 2 | 2 |
| Wiring of the motor winding | | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 48 | 48 | 320 |
| Rated voltage motor [V _{rms}] | U_{mot} | 27 | 23 | 140 |
| Rated power [W] | P_n | 50 | 85 | 110 |
| Rated torque [Nm] | M_n | 0.16 | 0.14 | 0.12 |
| Rated current per phase [A _{rms}] | I_n | 1.7 | 3.0 | 0.7 |
| Stall torque [Nm] | M_0 | 0.18 | 0.18 | 0.18 |
| Stall current per phase [A _{rms}] | I_0 | 1.8 | 3.4 | 0.8 |
| Peak torque [Nm] | M_{max} | 0.6 | 0.7 | 0.7 |
| Peak current [A _{rms}] | I_{max} | 5.7 | 13.0 | 3.2 |
| Maximum speed [rpm] | n_{max} | 5,210 | 8,800 | 10,000 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 6.2 | 3.3 | 13.5 |
| Torque constant [Nm / A _{rms}] | k_t | 0.09 | 0.05 | 0.17 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 4.9 | 1.4 | 25.6 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 3.0 | 0.8 | 14.8 |
| Electrical time constant [ms] | t_{el} | 0.6 | 0.6 | 0.6 |
| Thermal time constant [min] | t_{th} | 15 | 15 | 15 |
| Moment of inertia rotor [kg-cm ²] | J | 3.00E-02 | 3.00E-02 | 3.00E-02 |
| Weight of motor [kg] | m | 0.5 | 0.5 | 0.5 |

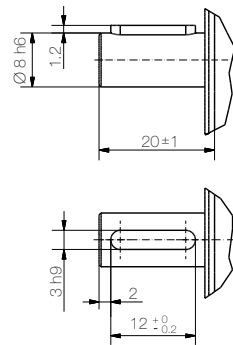
Performance



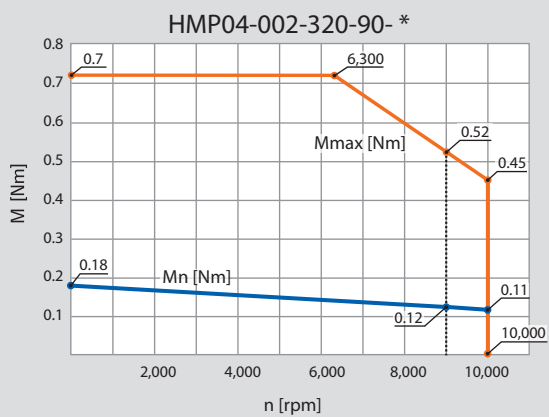
Dimensions



Feather key (option)



| Motor model | | L |
|-------------|---------------|--------|
| HMP04-002 | without brake | 89 mm |
| HMP04-002 | with brake | 124 mm |



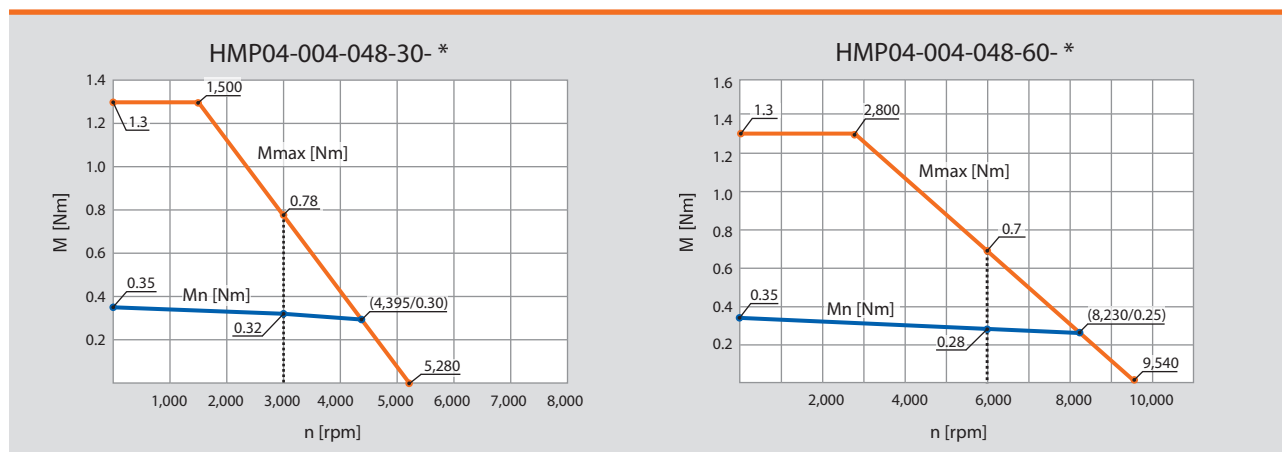
HMP04-004



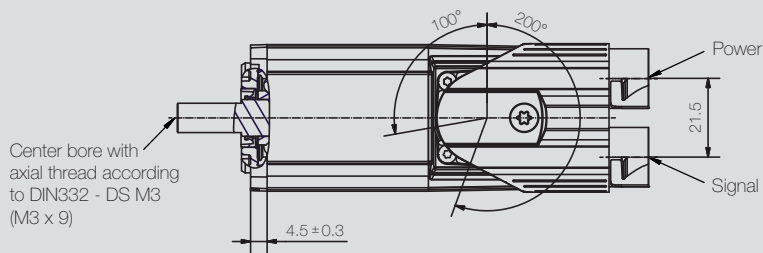
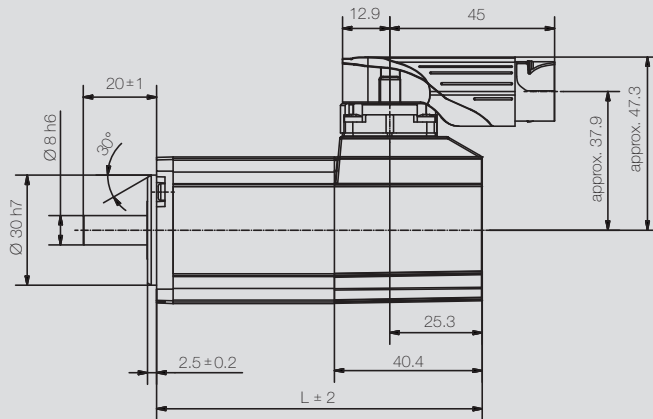
Specifications

| | HMP04-004 | | | |
|---|-------------------------|-------------|-------------|-------------|
| Rated speed [rpm] | n_n | 3,000 | 6,000 | 9,000 |
| Number of pole pairs | | 2 | 2 | 2 |
| Wiring of the motor winding | | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 48 | 48 | 320 |
| Rated voltage motor [V _{rms}] | U_{mot} | 25 | 23 | 132 |
| Rated power [W] | P_n | 100 | 175 | 200 |
| Rated torque [Nm] | M_n | 0.32 | 0.28 | 0.21 |
| Rated current per phase [A _{rms}] | I_n | 3.3 | 5.7 | 1.2 |
| Stall torque [Nm] | M_0 | 0.35 | 0.35 | 0.35 |
| Stall current per phase [A _{rms}] | I_0 | 3.5 | 6.3 | 1.6 |
| Peak torque [Nm] | M_{max} | 1.3 | 1.3 | 1.4 |
| Peak current [A _{rms}] | I_{max} | 12.9 | 23.5 | 6.4 |
| Maximum speed [rpm] | n_{max} | 5,280 | 9,540 | 10,000 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 6.1 | 3.4 | 13.2 |
| Torque constant [Nm / A _{rms}] | k_t | 0.10 | 0.05 | 0.18 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 1.6 | 0.4 | 8.6 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 1.4 | 0.4 | 6.6 |
| Electrical time constant [ms] | t_{el} | 0.9 | 1.1 | 0.8 |
| Thermal time constant [min] | t_{th} | 15 | 15 | 15 |
| Moment of inertia rotor [kg-cm ²] | J | 5,40E-02 | 5,40E-02 | 5,40E-02 |
| Weight of motor [kg] | m | 0.7 | 0.7 | 0.7 |

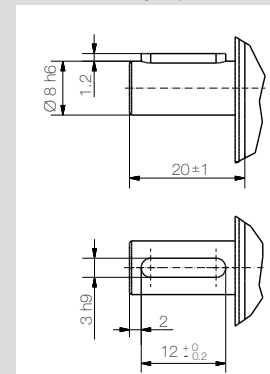
Performance



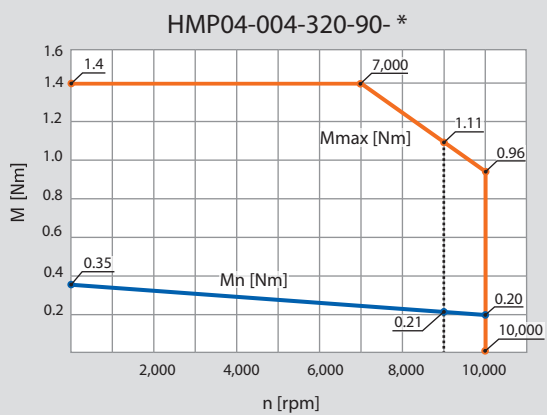
Dimensions



Feather key (option)



| Motor model | | L |
|-------------|---------------|--------|
| HMP04-004 | without brake | 114 mm |
| HMP04-004 | with brake | 149 mm |



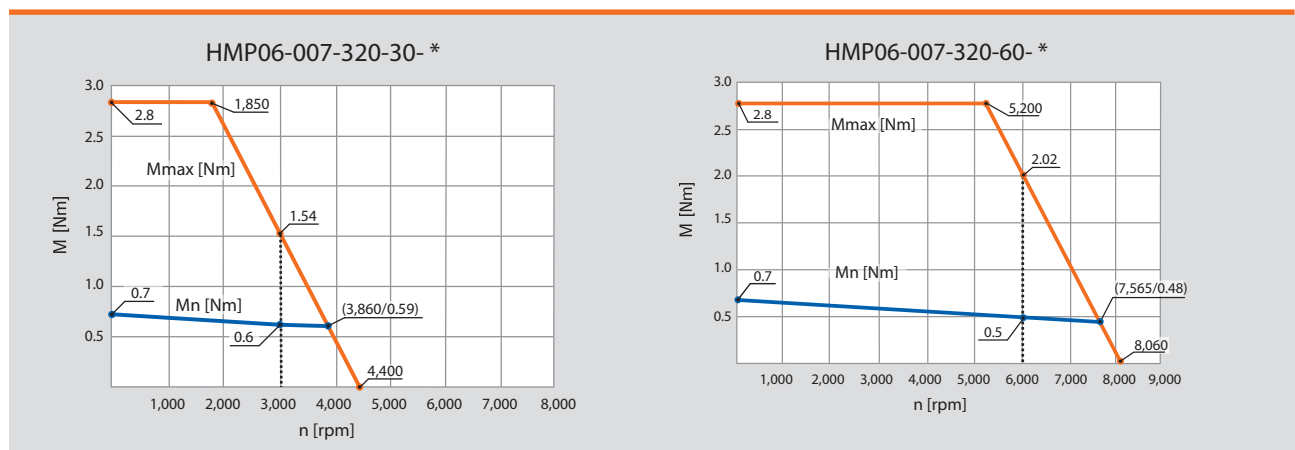
■ HMP06-007 / -015



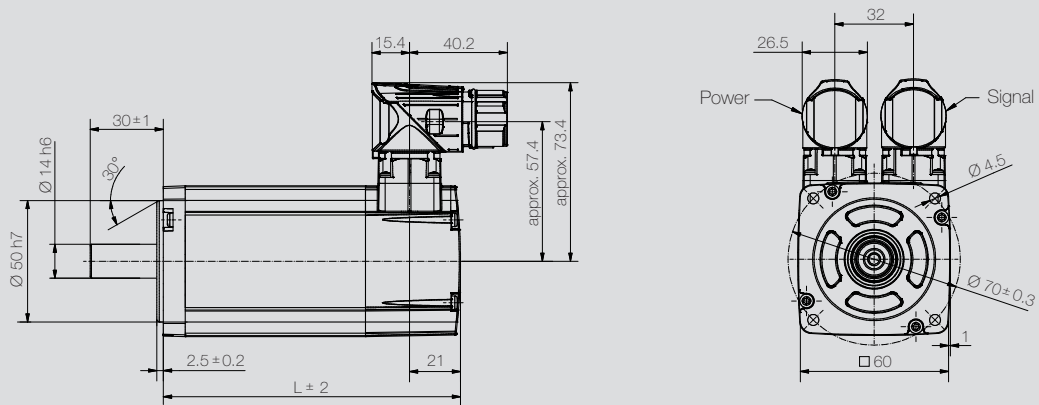
Specifications

| | | HMP06-007 | | HMP06-015 | |
|---|-------------------------|------------|------------|------------|------------|
| Rated speed [rpm] | n_n | 3,000 | 6,000 | 3,000 | 6,000 |
| Number of pole pairs | | 3 | 3 | 3 | 3 |
| Wiring of the motor winding | | Y | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 320 | 320 | 320 | 320 |
| Rated voltage motor [V _{rms}] | U_{mot} | 181 | 179 | 181 | 180 |
| Rated power [W] | P_n | 200 | 325 | 400 | 550 |
| Rated torque [Nm] | M_n | 0.6 | 0.5 | 1.2 | 0.9 |
| Rated current per phase [A _{rms}] | I_n | 0.8 | 1.3 | 1.5 | 2.2 |
| Stall torque [Nm] | M_0 | 0.7 | 0.7 | 1.5 | 1.5 |
| Stall current per phase [A _{rms}] | I_0 | 0.9 | 1.6 | 1.8 | 3.3 |
| Peak torque [Nm] | M_{max} | 2.8 | 2.8 | 6.0 | 6.0 |
| Peak current [A _{rms}] | I_{max} | 3.6 | 6.4 | 7.2 | 13.2 |
| Maximum speed [rpm] | n_{max} | 4,400 | 8,060 | 4,220 | 7,350 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 49.6 | 27.1 | 51.7 | 27.9 |
| Torque constant [Nm / A _{rms}] | k_t | 0.75 | 0.38 | 0.80 | 0.41 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 26.4 | 8.0 | 9.8 | 3.0 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 37.6 | 11.0 | 18.6 | 5.4 |
| Electrical time constant [ms] | t_{el} | 1.4 | 1.4 | 1.9 | 1.8 |
| Thermal time constant [min] | t_{th} | 25 | 25 | 25 | 25 |
| Moment of inertia rotor [kg-cm ²] | J | 2.20E-01 | 2.20E-01 | 4.13E-01 | 4.13E-01 |
| Weight of motor [kg] | m | 1.45 | 1.45 | 2.0 | 2.0 |

Performance



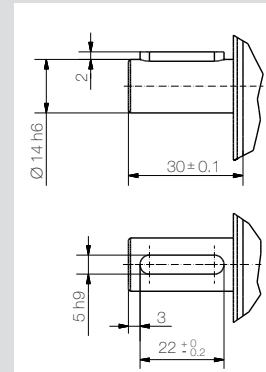
Dimensions



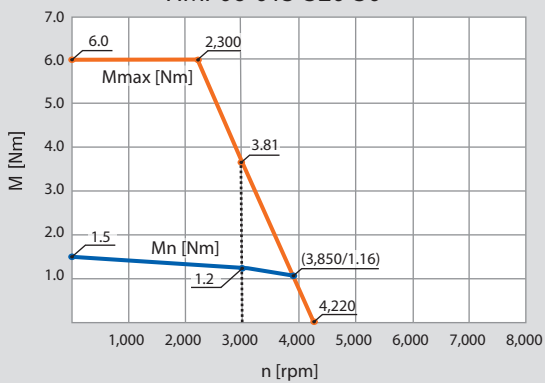
Center bore with axial thread according to DIN332 - DS M5 (M5 x 12.5)

| Motor model | | L |
|-------------|---------------|--------|
| HMP06-007 | without brake | 122 mm |
| HMP06-007 | with brake | 156 mm |
| HMP06-015 | without brake | 152 mm |
| HMP06-015 | with brake | 186 mm |

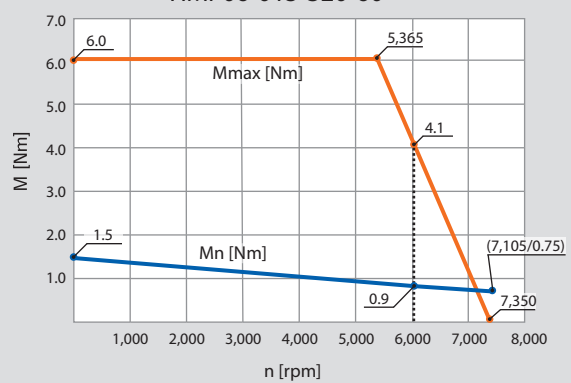
Feather key (option)



HMP06-015-320-30-*



HMP06-015-320-60-*



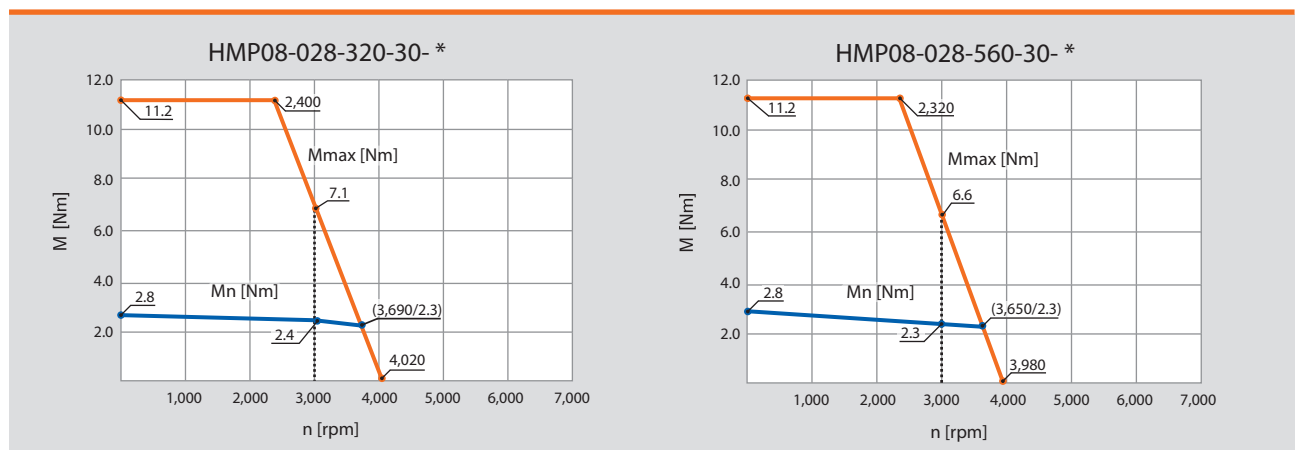
HMP08-028



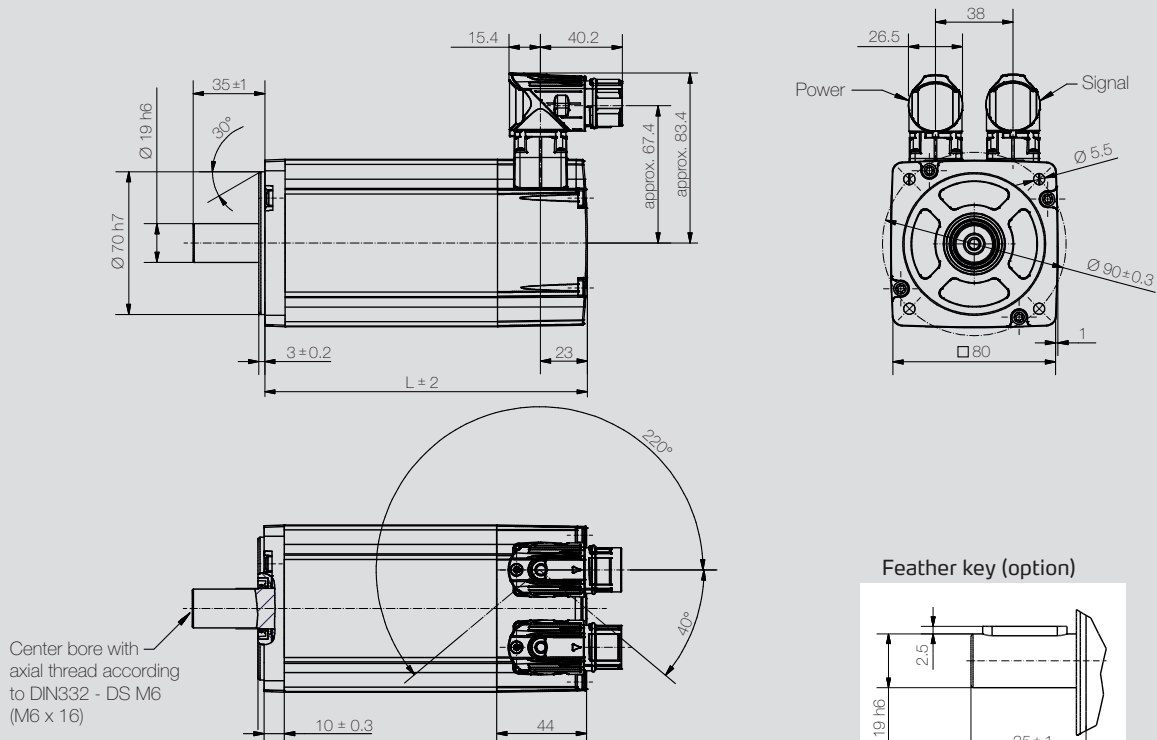
Specifications

| | HMP08-028 | | | | |
|---|-------------------------|------------|------------|------------|------------|
| Rated speed [rpm] | n_n | 3,000 | 5,500 | 3,000 | 5,500 |
| Number of pole pairs | | 3 | 3 | 3 | 3 |
| Wiring of the motor winding | | Y | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 320 | 320 | 560 | 560 |
| Rated voltage motor [V _{rms}] | U_{mot} | 181 | 179 | 320 | 314 |
| Rated power [W] | P_n | 750 | 1,000 | 750 | 1,000 |
| Rated torque [Nm] | M_n | 2.4 | 1.7 | 2.3 | 1.7 |
| Rated current per phase [A _{rms}] | I_n | 2.6 | 3.7 | 1.6 | 2.2 |
| Stall torque [Nm] | M_0 | 2.8 | 2.8 | 2.8 | 2.8 |
| Stall current per phase [A _{rms}] | I_0 | 3.1 | 5.6 | 1.8 | 3.3 |
| Peak torque [Nm] | M_{max} | 11.2 | 11.2 | 11.2 | 11.2 |
| Peak current [A _{rms}] | I_{max} | 12.4 | 22.4 | 7.2 | 13.2 |
| Maximum speed [rpm] | n_{max} | 4,020 | 6,685 | 3,980 | 6,760 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 54.3 | 30.7 | 95.3 | 54.3 |
| Torque constant [Nm / A _{rms}] | k_t | 0.92 | 0.46 | 1.44 | 0.78 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 4.6 | 1.6 | 14.2 | 4.6 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 11.8 | 3.8 | 36.2 | 11.8 |
| Electrical time constant [ms] | t_{el} | 2.6 | 2.4 | 2.5 | 2.6 |
| Thermal time constant [min] | t_{th} | 30 | 30 | 30 | 30 |
| Moment of inertia rotor [kg-cm ²] | J | 1.40E00 | 1.40E00 | 1.40E00 | 1.40E00 |
| Weight of motor [kg] | m | 3.2 | 3.2 | 3.2 | 3.2 |

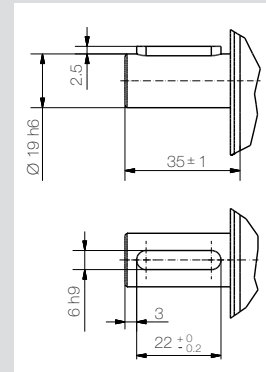
Performance



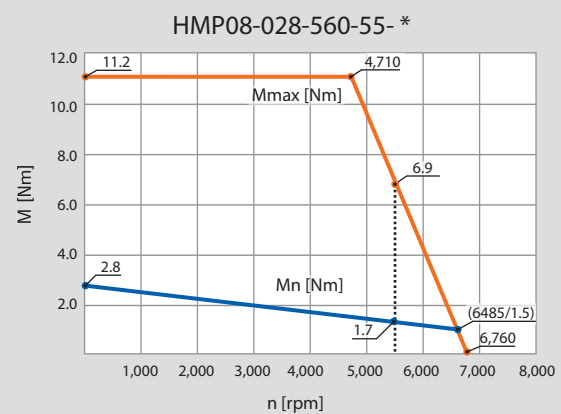
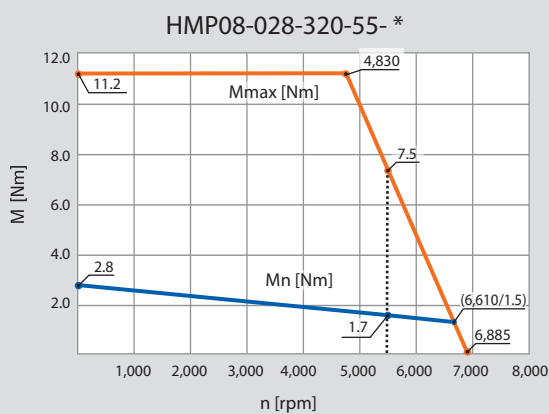
Dimensions



Feather key (option)



| Motor model | | L |
|-------------|---------------|--------|
| HMP08-028 | without brake | 158 mm |
| HMP08-028 | with brake | 200 mm |



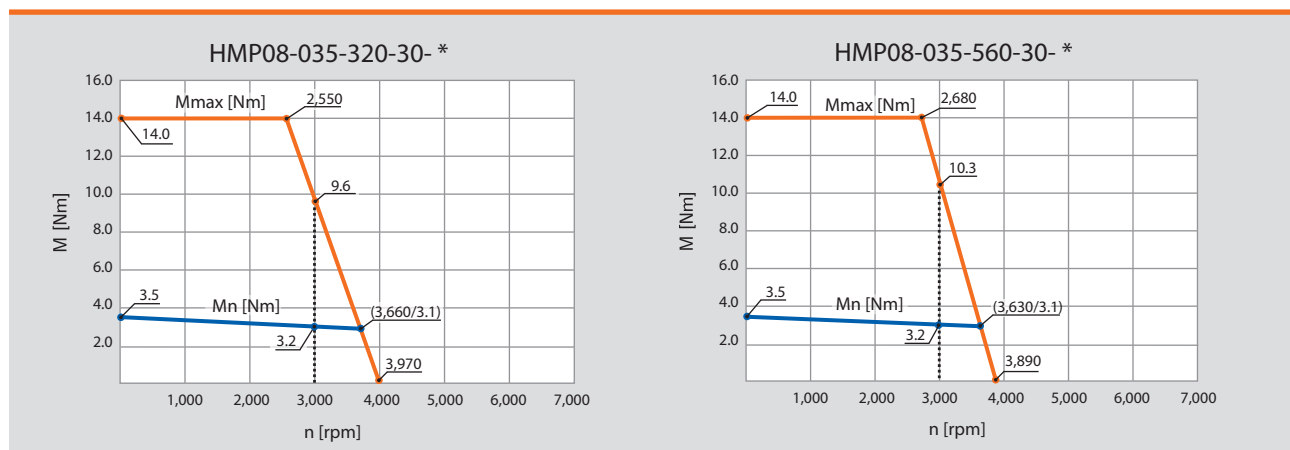
HMP08-035



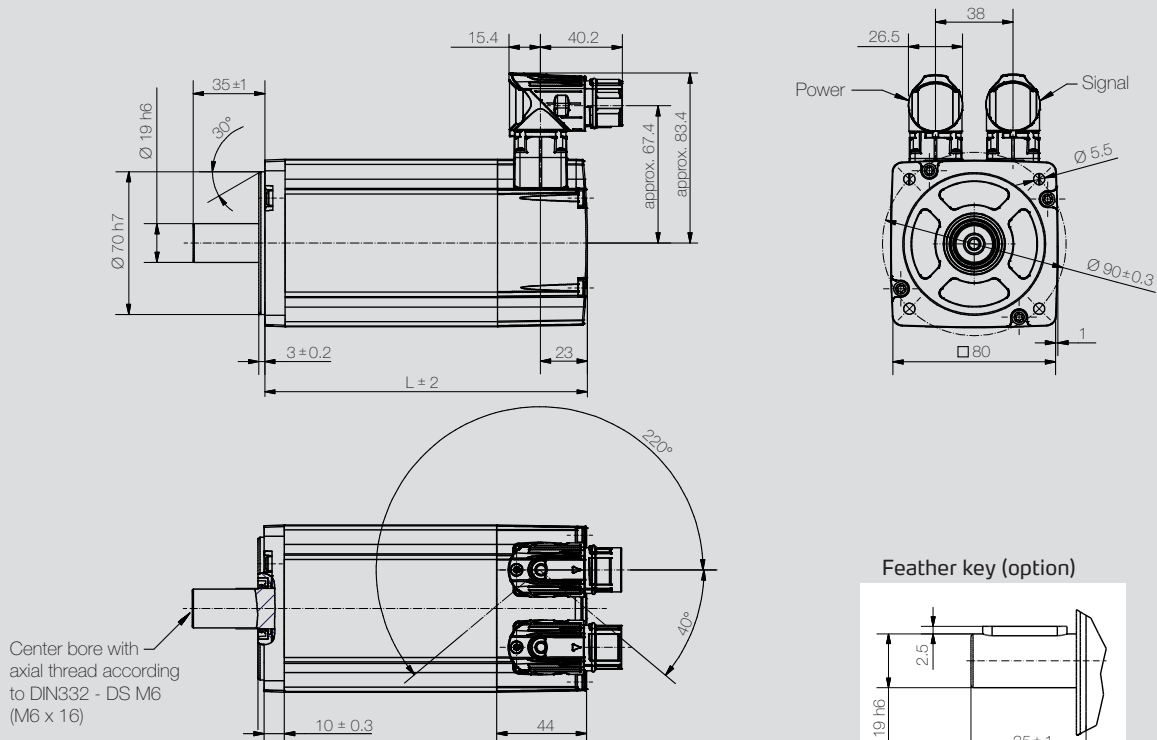
Specifications

| | HMP08-035 | | | | |
|---|-------------------------|------------|------------|------------|------------|
| Rated speed [rpm] | n_n | 3,000 | 5,500 | 3,000 | 5,500 |
| Number of pole pairs | | 3 | 3 | 3 | 3 |
| Wiring of the motor winding | | Y | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 320 | 320 | 560 | 560 |
| Rated voltage motor [V _{rms}] | U_{mot} | 181 | 174 | 320 | 316 |
| Rated power [W] | P_n | 1,000 | 1,200 | 1,000 | 1,200 |
| Rated torque [Nm] | M_n | 3.2 | 2.1 | 3.2 | 2.1 |
| Rated current per phase [A _{rms}] | I_n | 3.7 | 4.8 | 2.1 | 2.8 |
| Stall torque [Nm] | M_0 | 3.5 | 3.5 | 3.5 | 3.5 |
| Stall current per phase [A _{rms}] | I_0 | 3.9 | 7.1 | 2.2 | 3.9 |
| Peak torque [Nm] | M_{max} | 14.0 | 14.0 | 14.0 | 14.0 |
| Peak current [A _{rms}] | I_{max} | 15.6 | 28.4 | 8.8 | 15.6 |
| Maximum speed [rpm] | n_{max} | 3,970 | 7,180 | 3,890 | 6,680 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 55.0 | 30.4 | 97.5 | 55.0 |
| Torque constant [Nm / A _{rms}] | k_t | 0.86 | 0.44 | 1.52 | 0.75 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 2.8 | 0.8 | 9.0 | 2.8 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 8.4 | 2.6 | 26.0 | 8.4 |
| Electrical time constant [ms] | t_{el} | 3.0 | 3.3 | 2.9 | 3.0 |
| Thermal time constant [min] | t_{th} | 30 | 30 | 30 | 30 |
| Moment of inertia rotor [kg-cm ²] | J | 1.93E00 | 1.93E00 | 1.93E00 | 1.93E00 |
| Weight of motor [kg] | m | 3.85 | 3.85 | 3.85 | 3.85 |

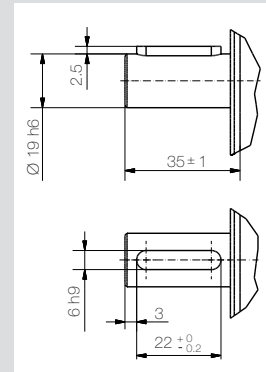
Performance



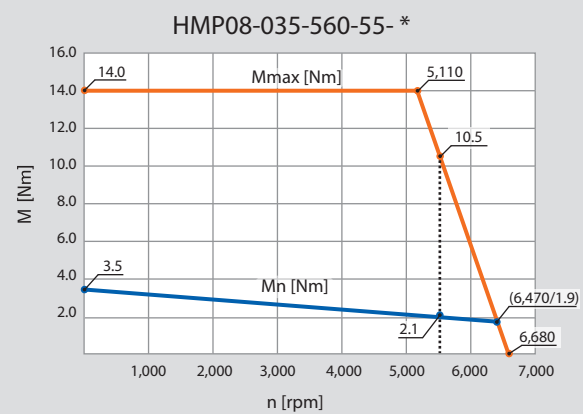
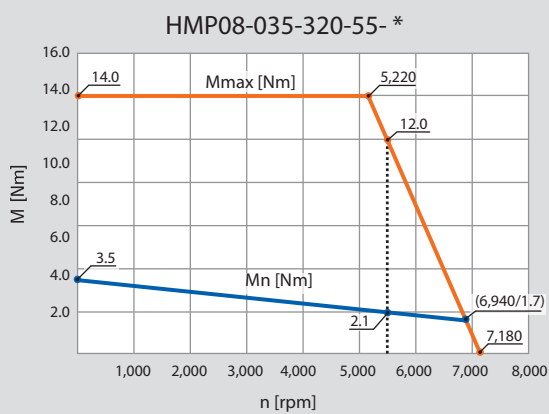
Dimensions



Feather key (option)



| Motor model | | L |
|-------------|---------------|--------|
| HMP08-035 | without brake | 178 mm |
| HMP08-035 | with brake | 220 mm |



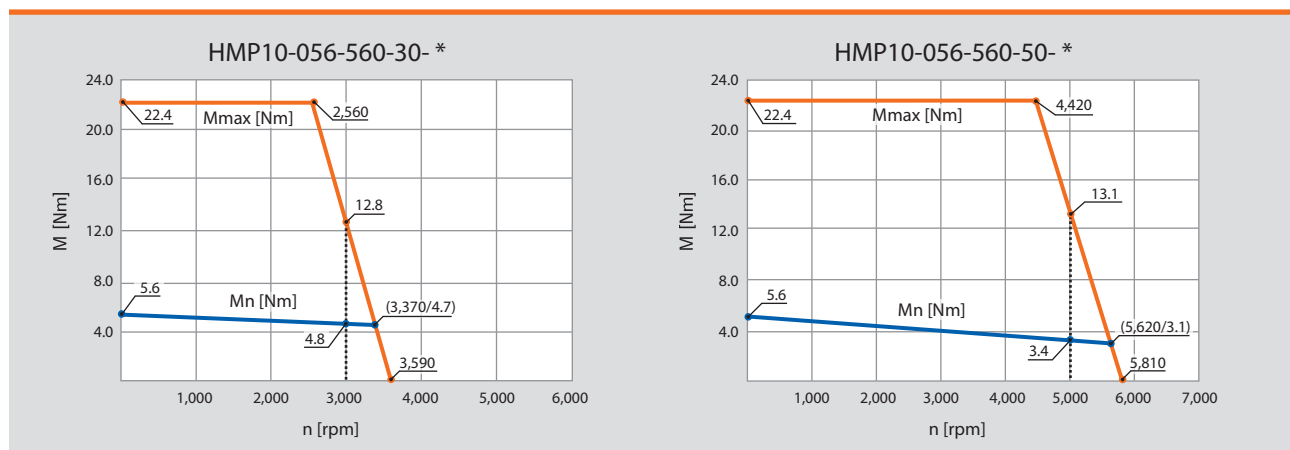
HMP10-056 / -075



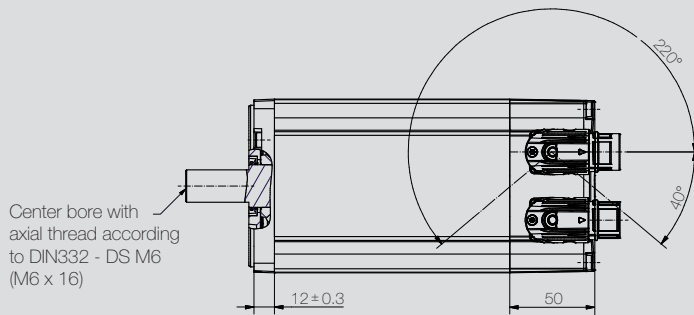
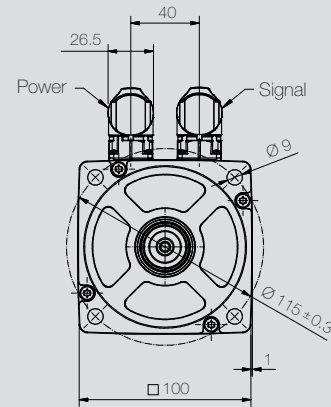
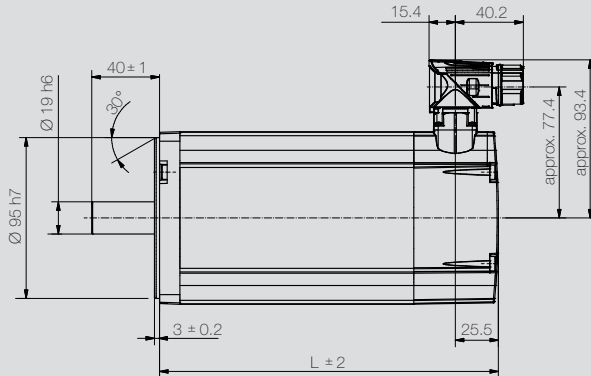
Specifications

| | | HMP10-056 | | HMP10-075 | |
|---|-------------------------|------------|------------|------------|------------|
| Rated speed [rpm] | n_n | 3,000 | 5,000 | 3,000 | 5,000 |
| Number of pole pairs | | 3 | 3 | 3 | 3 |
| Wiring of the motor winding | | Y | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 560 | 560 | 560 | 560 |
| Rated voltage motor [V _{rms}] | U_{mot} | 316 | 316 | 320 | 318 |
| Rated power [W] | P_n | 1,500 | 1,800 | 2,000 | 2,500 |
| Rated torque [Nm] | M_n | 4.8 | 3.4 | 6.4 | 4.8 |
| Rated current per phase [A _{rms}] | I_n | 3.0 | 3.7 | 4.1 | 5.3 |
| Stall torque [Nm] | M_0 | 5.6 | 5.6 | 7.5 | 7.5 |
| Stall current per phase [A _{rms}] | I_0 | 3.4 | 5.4 | 4.6 | 7.5 |
| Peak torque [Nm] | M_{max} | 22.4 | 22.4 | 30.0 | 30.0 |
| Peak current [A _{rms}] | I_{max} | 13.6 | 21.6 | 18.4 | 30.0 |
| Maximum speed [rpm] | n_{max} | 3,590 | 5,810 | 3,620 | 5,950 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 102.2 | 63.2 | 101.4 | 61.7 |
| Torque constant [Nm / A _{rms}] | k_t | 1.60 | 0.92 | 1.56 | 0.91 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 4.6 | 1.8 | 3.2 | 1.4 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 19.8 | 7.4 | 15.0 | 5.6 |
| Electrical time constant [ms] | t_{el} | 4.3 | 4.1 | 4.7 | 4.0 |
| Thermal time constant [min] | t_{th} | 30 | 30 | 35 | 35 |
| Moment of inertia rotor [kg-cm ²] | J | 4.84E00 | 4.84E00 | 6.41E00 | 6.41E00 |
| Weight of motor [kg] | m | 6.4 | 6.4 | 7.75 | 7.75 |

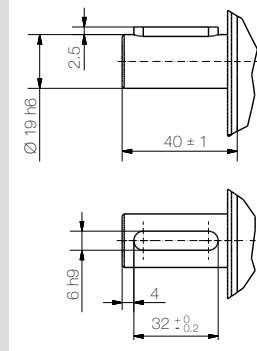
Performance



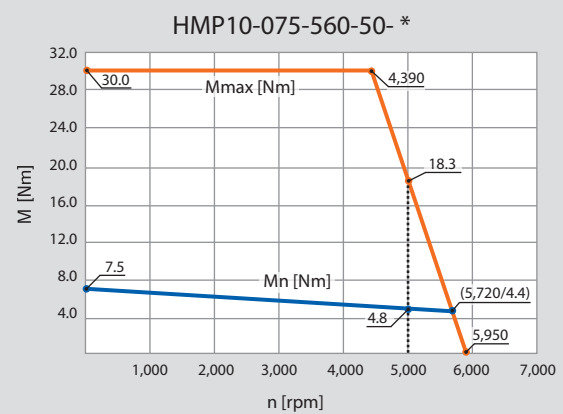
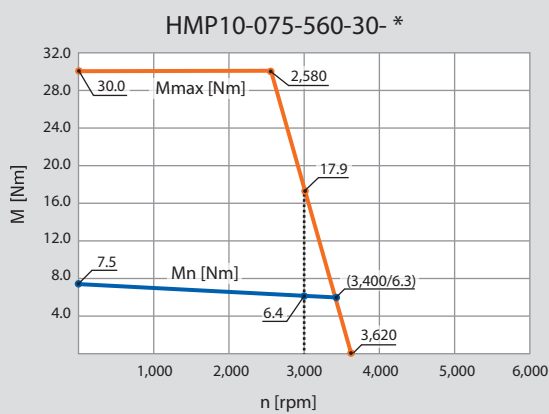
Dimensions



Feather key (option)



| Motor model | | L |
|-------------|---------------|--------|
| HMP10-056 | without brake | 200 mm |
| HMP10-056 | with brake | 242 mm |
| HMP10-075 | without brake | 225 mm |
| HMP10-075 | with brake | 267 mm |



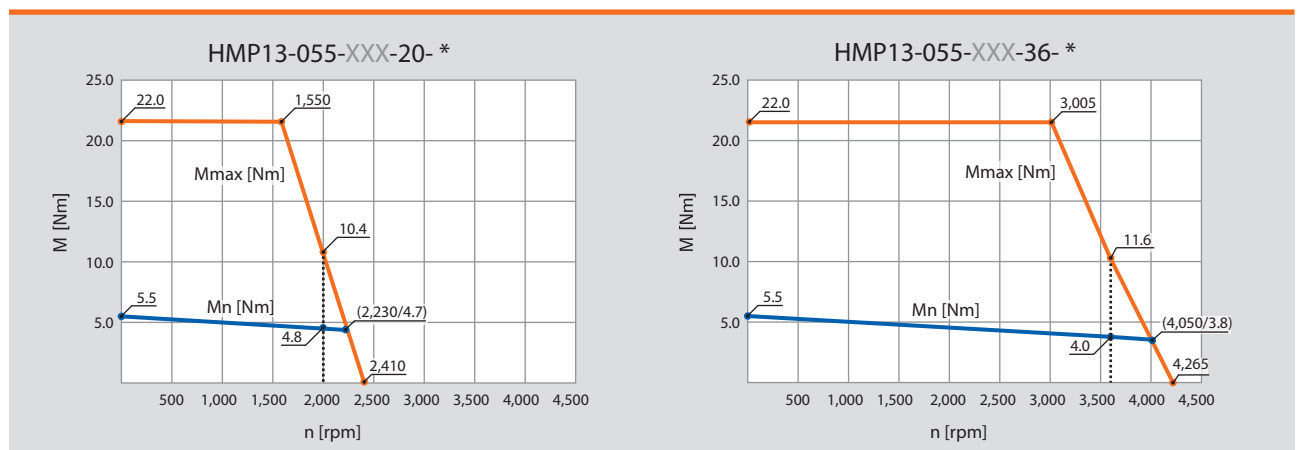
HMP13-055 / -091



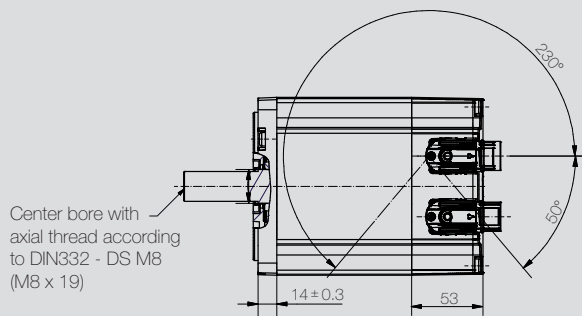
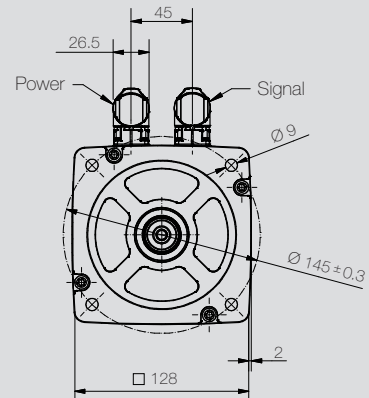
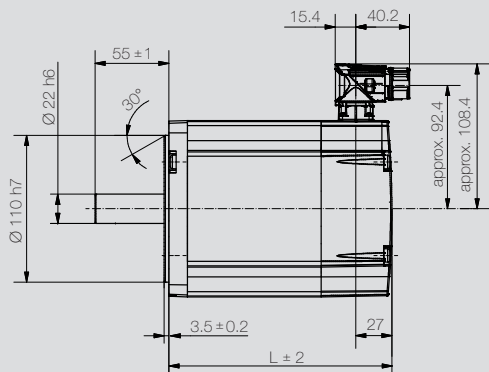
Specifications

| | | HMP13-055 | | | | HMP13-091 | |
|---|-------------------------|------------|------------|------------|------------|------------|------------|
| | | 2,000 | 3,600 | 2,000 | 3,600 | 2,000 | 3,600 |
| Rated speed [rpm] | n_n | 2,000 | 3,600 | 2,000 | 3,600 | 2,000 | 3,600 |
| Number of pole pairs | | 3 | 3 | 3 | 3 | 3 | 3 |
| Wiring of the motor winding | | Y | Y | Y | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 320 | 320 | 560 | 560 | 560 | 560 |
| Rated voltage motor [V _{rms}] | U_{mot} | 178 | 175 | 317 | 307 | 315 | 310 |
| Rated power [W] | P_n | 1,000 | 1,500 | 1,000 | 1,500 | 1,500 | 2,250 |
| Rated torque [Nm] | M_n | 4.8 | 4.0 | 4.8 | 4.0 | 7.2 | 6.0 |
| Rated current per phase [A _{rms}] | I_n | 4.1 | 6.0 | 2.3 | 3.4 | 3.4 | 5.0 |
| Stall torque [Nm] | M_0 | 5.5 | 5.5 | 5.5 | 5.5 | 9.1 | 9.1 |
| Stall current per phase [A _{rms}] | I_0 | 4.8 | 8.2 | 2.7 | 4.7 | 4.4 | 7.7 |
| Peak torque [Nm] | M_{max} | 22.0 | 22.0 | 22.0 | 22.0 | 36.4 | 36.4 |
| Peak current [A _{rms}] | I_{max} | 19.0 | 32.8 | 10.8 | 18.8 | 17.6 | 30.8 |
| Maximum speed [rpm] | n_{max} | 2,480 | 4,220 | 2,340 | 4,310 | 2,440 | 4,150 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 85.0 | 49.0 | 164.0 | 85.0 | 155.0 | 86.0 |
| Torque constant [Nm / A _{rms}] | k_t | 1.17 | 0.67 | 2.09 | 1.18 | 2.12 | 1.20 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 3.5 | 1.1 | 10.9 | 3.5 | 6.1 | 1.9 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 15.0 | 5.0 | 47.8 | 15.0 | 32.2 | 10.4 |
| Electrical time constant [ms] | t_{el} | 3.9 | 3.9 | 4.2 | 4.2 | 4.9 | 4.9 |
| Thermal time constant [min] | t_{th} | 35 | 35 | 35 | 35 | 42 | 42 |
| Moment of inertia rotor [kg-cm ²] | J | 9.82E00 | 9.82E00 | 9.82E00 | 9.82E00 | 1.40E01 | 1.40E01 |
| Weight of motor [kg] | m | 7.0 | 7.0 | 7.0 | 7.0 | 8.6 | 8.6 |

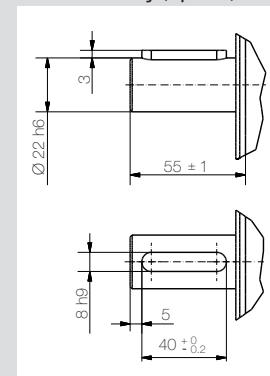
Performance



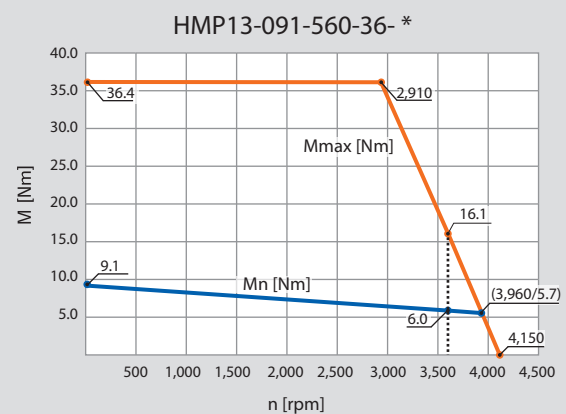
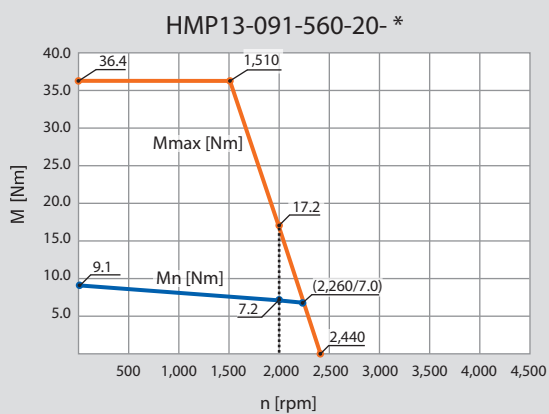
Dimensions



Feather key (option)



| Motor model | | L |
|-------------|---------------|--------|
| HMP13-055 | without brake | 167 mm |
| HMP13-055 | with brake | 197 mm |
| HMP13-091 | without brake | 182 mm |
| HMP13-091 | with brake | 212 mm |



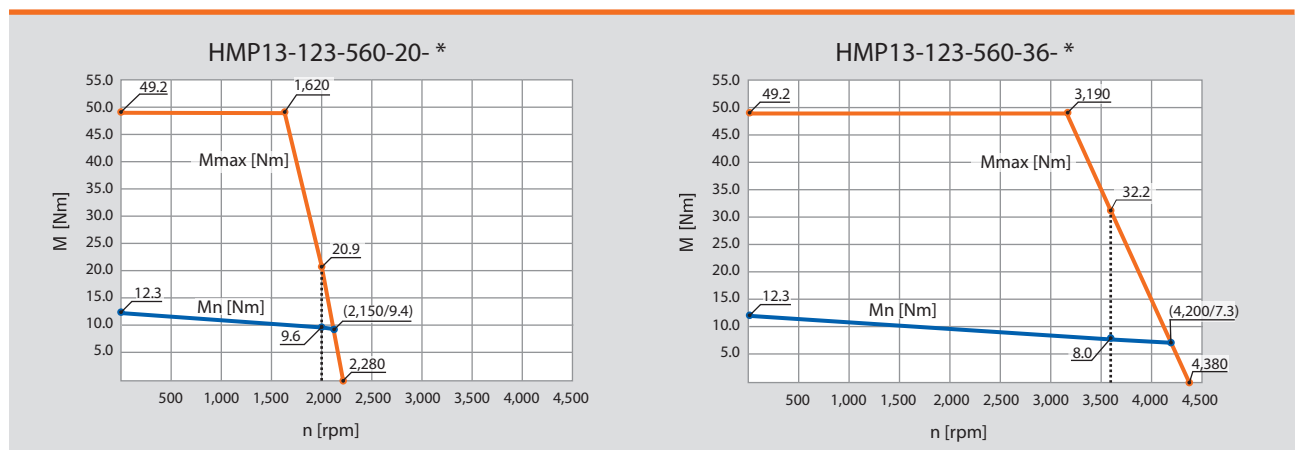
HMP13-123 / -185



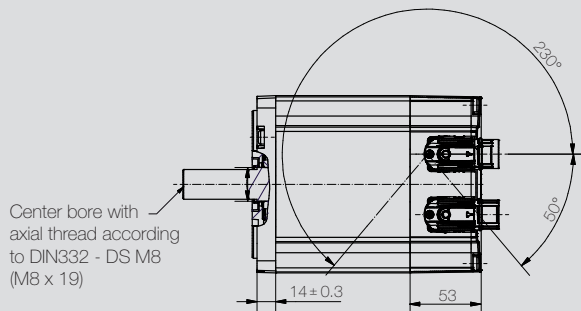
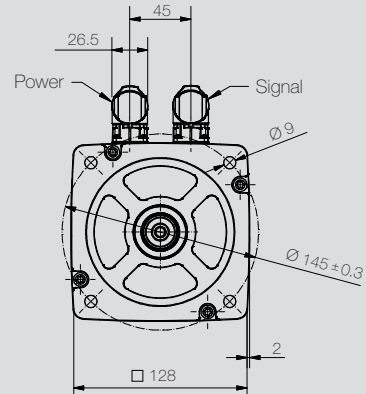
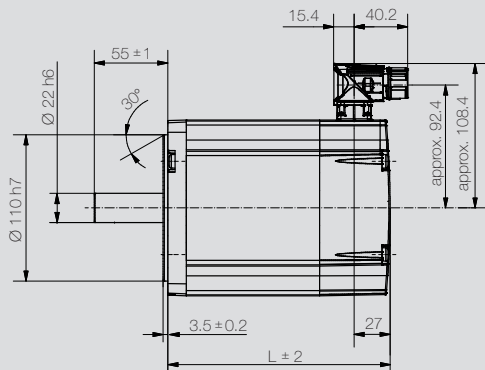
Specifications

| | | HMP13-123 | | HMP13-185 | |
|---|-------------------------|-------------|-------------|-------------|-------------|
| Rated speed [rpm] | n_n | 2,000 | 3,600 | 2,000 | 3,600 |
| Number of pole pairs | | 3 | 3 | 3 | 3 |
| Wiring of the motor winding | | Y | Y | Y | Y |
| DC bus voltage [V _{DC}] | U_{bus} | 560 | 560 | 560 | 560 |
| Rated voltage motor [V _{rms}] | U_{mot} | 316 | 308 | 319 | 318 |
| Rated power [W] | P_n | 2,000 | 3,000 | 3,000 | 3,750 |
| Rated torque [Nm] | M_n | 9.6 | 8.0 | 14.4 | 10.0 |
| Rated current per phase [A _{rms}] | I_n | 4.5 | 6.7 | 6.5 | 8.0 |
| Stall torque [Nm] | M_0 | 12.3 | 12.3 | 18.5 | 18.5 |
| Stall current per phase [A _{rms}] | I_0 | 4.7 | 10.3 | 8.4 | 14.8 |
| Peak torque [Nm] | M_{max} | 49.2 | 49.2 | 74.0 | 74.0 |
| Peak current [A _{rms}] | I_{max} | 18.8 | 41.2 | 33.6 | 59.2 |
| Maximum speed [rpm] | n_{max} | 2,280 | 4,380 | 2,410 | 4,100 |
| Voltage constant at 1,000 rpm [V _{rms}] | k_e | 161.0 | 85.0 | 150.0 | 93.0 |
| Torque constant [Nm / A _{rms}] | k_t | 2.13 | 1.19 | 2.22 | 1.25 |
| Winding resistance (2 phases) at 20 °C [Ω] | R_{p-p} | 3.6 | 1.0 | 1.75 | 0.6 |
| Winding inductance (2 phases) [mH] | L_{p-p} | 21.2 | 6.6 | 13.2 | 4.2 |
| Electrical time constant [ms] | t_{el} | 5.4 | 5.4 | 5.4 | 5.4 |
| Thermal time constant [min] | t_{th} | 49 | 49 | 49 | 49 |
| Moment of inertia rotor [kg-cm ²] | J | 2.11E01 | 2.11E01 | 3.38E01 | 3.38E01 |
| Weight of motor [kg] | m | 10.7 | 10.7 | 14.8 | 14.8 |

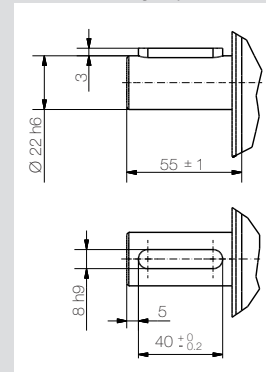
Performance



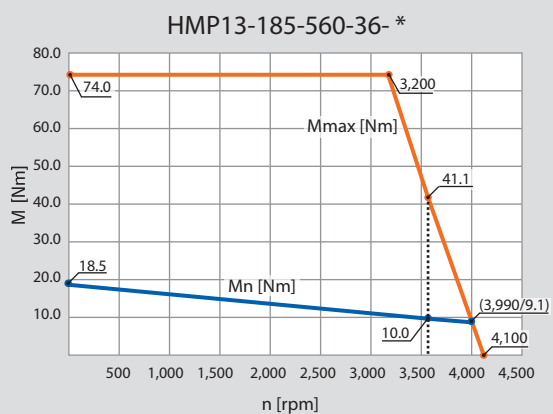
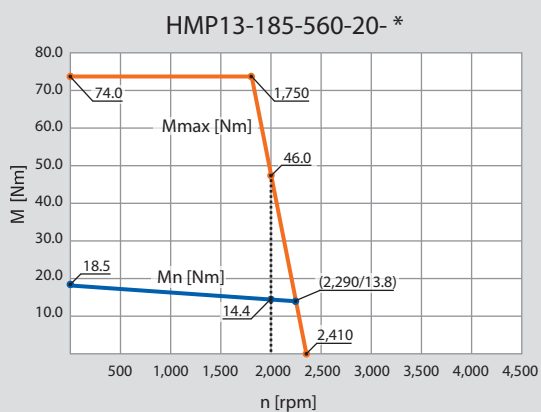
Dimensions



Feather key (option)



| Motor model | | L |
|-------------|---------------|--------|
| HMP13-123 | without brake | 207 mm |
| HMP13-123 | with brake | 242 mm |
| HMP13-185 | without brake | 252 mm |
| HMP13-185 | with brake | 287 mm |



■ Configuration options

Feedback options

As standard, HeiMotion Premium motors are supplied with a resolver. As an option, various encoders with different interfaces can be mounted to the series.

| Motor model | Resolver * | CKS36 | ECl 1118 | EQI 1131 | HS/M16 |
|-------------|------------|---------------------|-----------|-----------|--------|
| | Standard | Incremental encoder | EnDat 2.2 | EnDat 2.2 | |
| HMP04 | X | | X | | X |
| HMP06 | X | X | X | X | X |
| HMP08 | X | X | X | X | X |
| HMP10 | X | X | X | X | X |
| HMP13 | X | X | X | X | X |
| | p. 28 | p. 29 | p. 30 | | p. 38 |

* Safety enhanced version available to allow use of motors in applications up to cat. 3/PL d. acc. to EN ISO 13849-1 and SIL2 acc. to EN 62061/EN 61800-5-2

| Motor model | SEK/ SEL37 | SKS/ SKM36* | SRS/ SRM50 | EES/ EEM37 | EKS/ EKM36* | EFS/ EFM50 | HES/ HEM |
|-------------|---------------|----------------|---------------|-------------------|-------------------|-------------------|--------------|
| | HIPERFACE® | HIPERFACE® | HIPERFACE® | HIPERFACE DSL® | HIPERFACE DSL® | HIPERFACE DSL® | hall encoder |
| HMP04 | X | | | | | | X |
| HMP06 | X | X | | X | X | | X |
| HMP08 | X | X | X | X | X | X | X |
| HMP10 | X | X | X | X | X | X | X |
| HMP13 | X | X | X | X | X | X | X |
| | | p. 32 | | p. 34 | | | p. 36 |

* Safety enhanced version available to allow use of motors in applications up to cat. 3/PL d. acc. to EN ISO 13849-1 and SIL2 acc. to EN 62061/EN 61800-5-2

Feedback system overview

| Feedback device type | HCD | HCB | HCF | HCJ |
|------------------------|-------|-------|--------------|-------|
| Resolver | | X | X | X |
| HIPERFACE® encoder | | X | | X |
| HIPERFACE DSL® encoder | | X | | X |
| Incremental encoder | | X | X | X |
| SSI/BiSS | X | X | X (only SSI) | X |
| EnDat encoder | | X | | X |
| | p. 48 | p. 50 | p. 54 | p. 56 |

Connection options

| Motor model | Y-Tec | 2 x M23 | I-Tec | 1 x M23 |
|-------------|-------|---------|-------|---------|
| HMP04 | X | | | |
| HMP06 | X | X | X | X |
| HMP08 | X | X | X | X |
| HMP10 | X | X | X | X |
| HMP13 | X | X | X | X |
| | p. 40 | p. 42 | p. 44 | p. 45 |

Standard connectors are rotatable; fixed connector orientation available upon request Twintus and direct cable outlet available upon request.

Standard Resolver

Specifications

RE-15

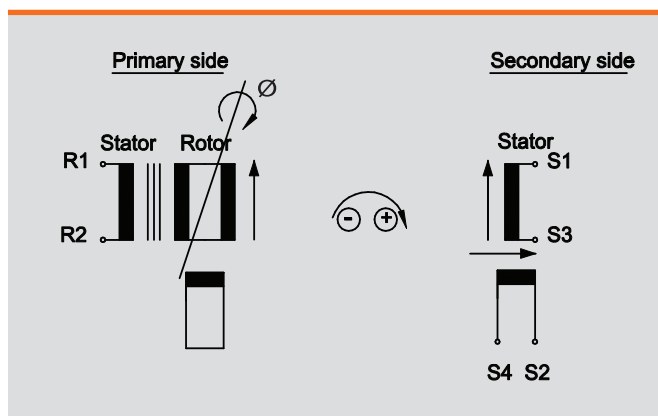
| | |
|--|-----------------------------------|
| Number of pole pairs | 1 |
| Input frequency | 10 kHz |
| Input voltage | 7 V _{rms} |
| Maximum current input | 50 mA |
| Transformation ratio | 0.5 ± 10 % |
| Phase shift (nominal) | 3 ± 3° |
| Ohmic resistance (at 25 °C) | |
| Stator winding | 70 ± 10 % |
| Rotor winding | 24 ± 10 % |
| Impedances | |
| Z _{ro} (no-load impedance rotor) | typ. 86 j 120 |
| Z _{rs} (short-circuit impedance rotor) | typ. 70 j 105 |
| Z _{so} (no-load impedance stator) | typ. 140 j 273 |
| Z _{ss} (short-circuit impedance stator) | typ. 122 j 244 |
| Maximum residual voltage | 30 mV |
| Maximum electrical error | ± 10' |
| Weight | 77 g |
| Protection class | IP20 |
| Insulation class | F |
| Insulation test housing / winding | 500 V _{AC} / 50 Hz / 1 s |
| Moment of inertia rotor | 15 g·cm ² |



Environmental

| | |
|-------------------------------------|-------------------------------------|
| Working environment | IE 32 according to EN 60721-3-3 |
| Operating temperature | - 55 °C to 155 °C |
| Vibration according to EN 60068-2-6 | 100 m/s ² 10 - 150 Hz |
| Impact strength | 400 m/s ² 6 ms |
| Maximum operating speed | 20,000 rpm |

Dimensions



Safety norms

| | |
|------------------------|---------------------------------|
| Safety Integrity Level | SIL 2 (EN 61800-5-2 / EN 62061) |
| Category | 3 (EN ISO 13849-1) |
| Performance Level | PL d (EN ISO 13849-1) |

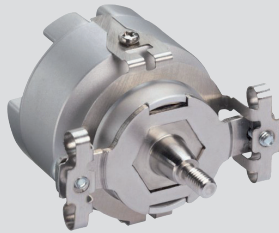


■ Option Incremental encoder

Optical sensing encoder

CKS36

(Incremental encoder)



Specifications:

- Resolution 2,048 pulses per revolution
- Commutation signals for 3 pole pairs
- Index pulse 90°

Specifications according to DIN 32878

CKS36

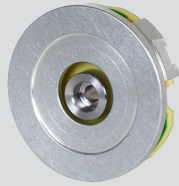
| | | |
|--|---|---|
| Number of lines per revolution | | 2,048 |
| Commutation signals | | 3 pole pairs |
| Measurement step | | 90° / number of lines |
| Reference signal | Number Position | 1 90° electrical, logically linked with A and B |
| Error limits | „binary“ number of lines „non-binary“ number of lines | ± 0.09° ± 0.13° |
| Measurement step deviation | „binary“ number of lines „non-binary“ number of lines | ± 0.035° ± 0.07° |
| Maximum output frequency | TTL/RS 422 | 400 kHz |
| Resistance | to shocks to vibration | 100 g (6 ms) 50 g (10 ... 2,000 Hz) |
| Operating voltage range | | 5 V ± 10 % |
| Maximum operating current without load | | 60 mA |
| Interface signals | Incremental and commutation signals Parameterization interface | according to EIA 422 IIC-Bus |

■ Option absolute encoders

Inductive sensing encoder - EnDat 2.2

ECI1118

(Single-turn encoder)



Specifications:

- Inductive rotary encoder without integral bearing
- Purely serial EnDat 2.2 interface
- For machines with high demanding dynamics and robustness
- High system accuracy
- Digital data transfer
- Electronic type label

EnDat 2.2

EQI1131

(Multi-turn encoder)



Specifications:

- Inductive rotary encoder without integral bearing
- Multi-turn via gearbox
- Purely serial EnDat 2.2 interface
- For machines with high demanding dynamics and robustness
- High system accuracy
- Digital data transfer
- Electronic type label

EnDat 2.2

| Specifications | ECl1118 | EQI1131 |
|--------------------------------------|----------------------------|----------------------------|
| Encoder type | inductive | inductive |
| Position values / revolution | 262,144 18 bit | 524,288 19 bit |
| Revolutions | - | 4,096 12 bit |
| Calculation time t_{cal} | $\leq 6 \mu s$ | $\leq 5 \mu s$ |
| Clock frequency | $\leq 8 \text{ MHz}$ | $\leq 16 \text{ MHz}$ |
| System accuracy | $\pm 120''$ | $\pm 120''$ |
| Maximum operating temperature | + 115 °C - 20 °C | + 110 °C - 40 °C |
| Mechanically permissible speed | 15,000 rpm | 12,000 rpm |
| Voltage supply | 3.6 - 14 V _{DC} | 3.6 - 14 V _{DC} |
| Max. power consumption | 520 - 600 mW | 700 - 850 mW |
| Current consumption (typical) at 5 V | 80 mA | 115 mA |
| Multiturn | - | gearbox |
| Vibration 55 Hz to 2,000 Hz | $\leq 300 \text{ m/s}^2$ | $\leq 400 \text{ m/s}^2$ |
| Shock 6 ms | $\leq 1,000 \text{ m/s}^2$ | $\leq 2,000 \text{ m/s}^2$ |
| Digital interface | EnDat 2.2 | EnDat 2.2 |

■ Option absolute encoders

Capacitive sensing encoder - HIPERFACE®

SEK / SEL37

(Single- or multi-turn encoder)



Specifications:

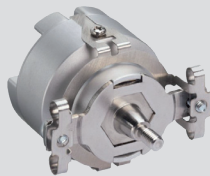
- 16 sin/cos periods per revolution
- Absolute position with a resolution of 512 steps per revolution
- Measuring of 4,096 revolutions (multi-turn)
- Programming of the position value
- Electronic type label
- HIPERFACE®-interface



Optical sensing encoder - HIPERFACE®

SKS / SKM36

(Single- or multi-turn encoder)



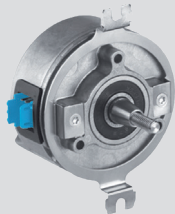
Specifications:

- 128 sin/cos periods per revolution
- Absolute position with a resolution of 4,096 steps per revolution
- Measuring of 4,096 revolutions (multi-turn)
- Programming of the position value
- Electronic type label
- HIPERFACE®-interface



SRS / SRM50

(Single- or multi-turn encoder)



Specifications:

- 1,024 sin/cos periods per revolution
- Absolute position with a resolution of 32,768 steps per revolution
- Measuring of 4,096 revolutions (multi-turn)
- Programming of the position value
- Electronic type label
- HIPERFACE®-interface



| Specifications | SEK/SEL37 | SKS/SKM36 | SRS/SRM50 |
|---|------------------------------------|------------------------------------|------------------------------------|
| Number of sin/cos periods per revolution | 16 | 128 | 1,024 |
| Maximum number of turns | Single SEK 1 Multi SEL 4,096 | Single SKS 1 Multi SKM 4,096 | Single SRS 1 Multi SRM 4,096 |
| Code type for absolute value | binary | binary | binary |
| Code sequence ¹⁾ | ascending | ascending | ascending |
| Measuring step during interpolation of the sin/cos signals (for 12 bit) | 20 arc seconds | 2.5 arc seconds | 0.3 arc seconds |
| Maximum sin/cos signals interpretation error, integral non-linearity | ± 288 arc seconds | ± 80 arc seconds | ± 45 arc seconds |
| Non-linearity of a sin/cos period differential non-linearity | ± 144 arc seconds ²⁾ | ± 40 arc seconds ²⁾ | ± 7 arc seconds ²⁾ |
| Output frequency | - | 0 ... 65 kHz | 0 ... 200 kHz |
| Resistance to shocks | 100 g / 10 ms | 100 g / 6 ms | 100 g / 10 ms |
| Resistance to vibration | 50 g / 10...2,000 Hz | 50 g / 10...2,000 Hz | 50 g / 10...2,000 Hz |
| Operating voltage range | 7...12 V | 7...12 V | 7...12 V |
| Recommended supply voltage | 8 V | 8 V | 8 V |
| Maximum operating current without load | < 50 mA | 60 mA | 80 mA |
| Available memory area within EEPROM 2048 ³⁾ | 1,792 bytes | 1,792 bytes | 1,792 bytes |
| Interface signals Process data cable = SIN, REFSIN, COS, REFCOS Parameter channel = RS 485 | analog, differential digital | analog, differential digital | analog, differential digital |

Safety norms

SKS/SKM36S

| | | | |
|--------------------------------------|---|-----------------------------------|---|
| Safety Integrity Level ⁴⁾ | - | SIL2 (EN 61800-5-2 / EN 62061) | - |
| Category ⁴⁾ | - | 3 (EN ISO 13849-1) | - |
| Performance Level ⁴⁾ | - | PL d (EN ISO 13849-1) | - |

1) For rotation of the shaft in clockwise direction when facing in the direction of "A"

2) In the nominal position ± 0.1 mm

3) When using the electronic nameplate in operative connection with numerical controls, consider the patent EP 425 912 B 2; use in operative connection with speed controllers is excluded from this rule.

4) Safety norms are only valid for motors with safely mounted encoders.

■ Option absolute encoders

Capacitive sensing encoder - HIPERFACE DSL®

EES / EEM₃₇

(Single- or multi-turn encoder)



Specifications:

- Absolute position with a resolution of 131,072 steps per revolution
- Measuring of 4,096 revolutions (multi-turn)
- Programming of the position value
- Electronic type label
- HIPERFACE DSL®-interface



Optical sensing encoder - HIPERFACE DSL®

EKS / EKM₃₆

(Single- or multi-turn encoder)



Specifications:

- Absolute position with a resolution of 262,144 steps per revolution
- Measuring of 4,096 revolutions (multi-turn)
- Programming of the position value
- Electronic type label
- HIPERFACE DSL®-interface



EFS / EFM₅₀

(Single- or multi-turn encoder)



Specifications:

- Absolute position with a resolution of 8,388,608 steps per revolution
- Measuring of 4,096 revolutions (multi-turn)
- Programming of the position value
- Electronic type label
- HIPERFACE DSL®-interface



| Specifications | EES/EEM ₃₇ | EKS/EKM ₃₆ | EFS/EFM ₅₀ |
|---|---------------------------------|--|--|
| Number of sin/cos periods per revolution | - | - | - |
| Maximum number of turns | Single EES 1 Multi EEM 4,096 | Single EKS 1 Multi EKM 4,096 | Single EFS 1 Multi EFM 4,096 |
| Code type for absolute value | binary | binary | binary |
| Code sequence ¹⁾ | ascending | ascending | ascending |
| Measuring step during interpolation of the sin/cos signals (for 12 bit) | - | - | - |
| Maximum sin/cos signals interpretation error, integral non-linearity | ± 160 arc seconds ²⁾ | ± 80 arc seconds | ± 45 arc seconds |
| Non-linearity of a sin/cos period differential non-linearity | - | ± 40 arc seconds | ± 7 arc seconds |
| Output frequency | - | 0 ... 75 kHz (digital position value) | 0 ... 75 kHz (digital position value) |
| Resistance to shocks | 100 g / 6 ms | 100 g / 6 ms | 100 g / 6 ms |
| Resistance to vibration | 50 g / 10...2,000 Hz | 50 g / 10...2,000 Hz | 30 g / 10...2,000 Hz |
| Operating voltage range | 7...12 V | 7...12 V | 7...12 V |
| Recommended supply voltage | - | 8 V | 9 V |
| Maximum operating current without load | 150 mA | 150 mA | 150 mA |
| Available memory area within EEPROM 2048 ³⁾ | 8,192 Byte | 8,192 Byte | 8,192 Byte |
| Interface signals Process data cable = SIN, REFSIN, COS, REFCOS Parameter channel = RS 485 | differential, digital | differential, digital | differential, digital |

Safety norms

EKS/EKM₃₆₋₂

| | | | |
|--------------------------------------|---|-----------------------------------|---|
| Safety Integrity Level ⁴⁾ | - | SIL2 (EN 61800-5-2 / EN 62061) | - |
| Category ⁴⁾ | - | 3 (EN ISO 13849-1) | - |
| Performance Level ⁴⁾ | - | PL d (EN ISO 13849-1) | - |

1) For rotation of the shaft in clockwise direction when facing in the direction of "A"

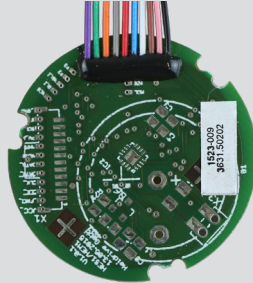
2) System accuracy

3) When using the electronic nameplate in operative connection with numerical controls, consider the patent EP 425 912 B 2; use in operative connection with speed controllers is excluded from this rule.

4) Safety norms are only valid for motors with safely mounted encoders.

Option Heidrive encoders

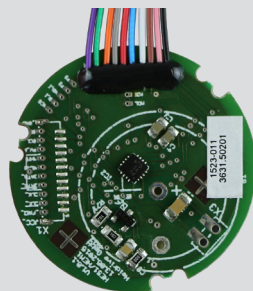
HES1-002



Specifications:

- Single-turn encoder with a resolution of 12 bit (interpolated 14 bit)
- SSI interface differential and single-ended
- Differential sin/cos signals with 1.0 V_{p-p}

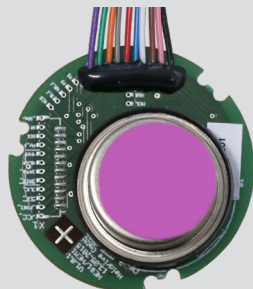
HEM1-001



Specifications:

- Multi-turn encoder with a resolution of 32 bit (≈ 4.2 billion revolutions measurable)
- Single-turn encoder with a resolution of 12 bit (interpolated 14 bit)
- SSI interface differential and single-ended
- Differential sin/cos signals with 1.0 V_{p-p}
- External battery connector

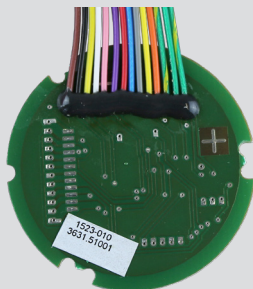
HEM1-002*



Specifications:

- Multi-turn encoder with a resolution of up to 32 bit (≈ 4.2 billion revolutions measurable)
- Single-turn encoder with a resolution of 12 bit (interpolated 14 bit)
- SSI interface differential and single-ended
- Differential sin/cos signals with 1.0 V_{p-p}
- Battery on board

HES3



Specifications:

- Single-turn encoder with a resolution of 10 bit (interpolated 12 bit)
- Commutation and incremental signals ABZ, differential and single-ended
- Commutation signals for 2/4/6 or 8-pole motors

*Further information for your application upon request

Specifications

(according to DIN 32878)

| | HES1-002 | HEM1-001 | HEM1-002 | HES3 |
|--|--------------------------------|--------------------------------|--------------------------------|---------------------------|
| Diameter (mm) | 34.95 ± 0.05 | 34.95 ± 0.05 | 34.95 ± 0.05 | 34.95 ± 0.05 |
| Power supply voltage | 5.0 V _{DC} ± 10% | 5.0 V _{DC} ± 10% | 5.0 V _{DC} ± 10% | 5.0 V _{DC} ± 10% |
| Maximum output current | 50 mA | 50 mA | 50 mA | 50 mA |
| Maximum resolution single-turn | 12 bit 0.088° | 12 bit 0.088° | 12 bit 0.088° | 10 bit 0.35 |
| Maximum resolution single-turn interpolated | 14 bit 0.022° | 14 bit 0.022° | 14 bit 0.022° | 12 bit 0.088° |
| Maximum number of turns | - | 32 bit ≈ 4.2 billion | 32 bit ≈ 4.2 billion | - |
| Backup battery for multi-turn encoder | - | external | on board | - |
| SSI interface | differential & single ended | differential & single ended | differential & single ended | - |
| Maximum SSI operating frequency | 4 MHz | 4 MHz | 4 MHz | - |
| Sin/cos signals | differential | differential | differential | - |
| Number of sin/cos periods per turn | 1 | 1 | 1 | - |
| Amplitude sin/cos | 1.0 V _{p-p} | 1.0 V _{p-p} | 1.0 V _{p-p} | - |
| Incremental signals ABZ | - | - | - | differential |
| High-level output voltage ABZ | - | - | - | min. 3.8 V |
| Low-level output voltage ABZ | - | - | - | max. 0.7 V |
| Commutation signals | - | - | - | differential |
| Commutation high-level output voltage (U _{VV}) | - | - | - | min. 3.8 V |
| Commutation low-level output voltage (U _{VV}) | - | - | - | max. 0.7 V |
| ESD voltage | 2 kV | 2 kV | 2 kV | 2 kV |
| Permissible operating temperature range | -30°C to +105°C | | | |
| Permissible bearing temperature | -30°C to +125°C | | | |
| Permissible relative humidity | 15 to 85% without condensation | | | |
| Order code segment | XXM2SXXX | XXM1MXXX | XXM2MXXX | XXM1IXXX |

■ HS/M 16 Encoder



Features:

- Integrated, compact dual encoder in the standard HeiMotion modular system
- Singleturn with SSI and Sin/Cos
- Multiturn with BiSS-C
- Speeds up to 12000 min⁻¹
- Temperature evaluation via BiSS-C possible
- Electronic nameplate possible on request

Specifications

| | HS 16 (Singleturn) | HM 16 (Multiturn) |
|--|------------------------------|------------------------------|
| Supply voltage | 5.0 V _{DC} +10/-5% | 5.0 V _{DC} +10/-5% |
| Power consumption | 0.6 W | 0.6 W |
| Max. resolution singleturn | 16 Bit | 16 Bit |
| Max. number of absolute revolutions detected | - | 12 Bit (mechanisch) |
| Data interface | SSI gray + SinCos 1Vpp | BiSS-C + SinCos 1Vpp |
| Sin/Cos tracks | differential | differential |
| Number of sin/cos periods per revolution | 256 (8 Bit) | 256 (8 Bit) |
| Max. angular acceleration | 100,000 rad/sec ² | 100,000 rad/sec ² |
| Resistance to shocks (DIN EN 60068-2-27) | 3000 m/s ² (6ms) | 3000 m/s ² (6ms) |
| Resistance to vibration (DIN EN 60068-2-6) | 300 m/s ² | 300 m/s ² |
| Order code | XXS1SXXXX | XXB1MXXXX |

Option holding brake

Any HeiMotion Premium motor can be equipped with a permanent-magnet DC holding brake.

| | |
|-------------------|----------------------------------|
| Insulation class: | F (155 °C) |
| Maximum speed: | 10,000 rpm |
| Voltage supply: | 24 V _{DC} + 6 % / -10 % |

| Specifications brake | HMP04 | | HMP06 | | HMP08 | |
|---|----------|----------|----------|----------|---------|---------|
| | -002 | -004 | -007 | -015 | -028 | -035 |
| Moment of inertia motor <u>with</u> brake * [kg-cm ²] | 5.50E-02 | 7.90E-02 | 3.19E-01 | 5.12E-01 | 1.68E00 | 2.20E00 |
| Static braking torque min. at 20°C [Nm] | 0.4 | 0.4 | 2.0 | 2.0 | 4.5 | 4.5 |
| Dynamic braking torque at 20°C [Nm] | 0.3 | 0.3 | 1.7 | 1.7 | 3.8 | 3.8 |
| Rated input power at rated voltage and 20°C [W] | 8 | 8 | 11 | 11 | 12 | 12 |
| Working voltage [V _{DC}] | 24 | 24 | 24 | 24 | 24 | 24 |
| Input current brake [A] | 0.33 | 0.33 | 0.46 | 0.46 | 0.50 | 0.50 |
| Energy rating [kJ] | 180 | 180 | 410 | 410 | 580 | 580 |
| Separating time brake [ms] | ≤10 | ≤10 | ≤40 | ≤40 | ≤38 | ≤38 |
| Brake delay [ms] | ≤2 | ≤2 | ≤3 | ≤3 | ≤3 | ≤3 |
| Application delay time [ms] | ≤6 | ≤6 | ≤15 | ≤15 | ≤20 | ≤20 |
| Weight of motor <u>with</u> brake * [kg] | 0.65 | 0.85 | 1.8 | 2.35 | 3.85 | 4.5 |
| Slipping time ** [s] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Idle time ** [s] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Speed ** [min ⁻¹] | 250 | 250 | 100 | 100 | 100 | 100 |
| Cycle quantity ** [-] | 5 | 5 | 5 | 5 | 5 | 5 |

| Specifications brake | HMP10 | | HMP13 | | | |
|---|---------|---------|---------|---------|---------|---------|
| | -056 | -075 | -055 | -091 | -123 | -185 |
| Moment of inertia motor <u>with</u> brake * [kg-cm ²] | 5.63E00 | 7.20E00 | 1.05E01 | 1.48E01 | 2.31E01 | 3.58E01 |
| Static braking torque min. at 20°C [Nm] | 9.0 | 9.0 | 9.0 | 9.0 | 20 | 20 |
| Dynamic braking torque at 20°C [Nm] | 7.5 | 7.5 | 7.5 | 7.5 | 15 | 15 |
| Rated input power at rated voltage and 20°C [W] | 18 | 18 | 18 | 18 | 28 | 28 |
| Working voltage [V _{DC}] | 24 | 24 | 24 | 24 | 24 | 24 |
| Input current brake [A] | 0.75 | 0.75 | 0.75 | 0.75 | 1.17 | 1.17 |
| Energy rating [kJ] | 890 | 890 | 890 | 890 | 1,290 | 1,290 |
| Separating time brake [ms] | ≤70 | ≤70 | ≤70 | ≤70 | ≤90 | ≤90 |
| Brake delay [ms] | ≤3 | ≤3 | ≤3 | ≤3 | 3 | 3 |
| Application delay time [ms] | ≤30 | ≤30 | ≤30 | ≤30 | ≤35 | ≤35 |
| Weight of motor <u>with</u> brake * [kg] | 7.4 | 8.75 | 8.0 | 9.4 | 12.2 | 16.4 |
| Slipping time ** [s] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Idle time ** [s] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Speed ** [min ⁻¹] | 100 | 100 | 100 | 100 | 75 | 75 |
| Cycle quantity ** [-] | 5 | 5 | 5 | 5 | 5 | 5 |

* Incl. all attachment parts

** In order to ensure the optimum function of the brake at all times, it is recommended that the respective maintenance cycle (refreshment) be carried out when the brake is first put into operation and at four-week intervals.

The motor may not be operated with the brake applied. The brake is designed as a holding brake. An emergency stop of a running motor using the brake is permitted in exceptional cases. The number of emergency stops is limited by the moment of inertia of the entire system.

Option connector Y-Tec



| Power | | Signal Resolver | Signal HIPERFACE® | Signal SSI/BiSS | Signal EnDat 2.2 | | |
|---------|------------------------------|-----------------|-------------------------|-----------------|-------------------------|----|----------------|
| Pin | Function | Pin | Function | Pin | Function | | |
| A | U | 1 | cos + | 1 | cos + | 1 | - |
| B | V | 2 | cos - / refcos | 2 | cos - / refcos | 2 | - |
| C | W | 3 | sin + | 3 | sin + | 3 | - |
| Ground. | PE | 4 | sin- / refs sin | 4 | sin- / refs in | 4 | - |
| 1 | Therm. Prot. + ²⁾ | 5 | R1 (ref +) | 5 | Data + | 5 | U _p |
| 2 | Therm. Prot. - ²⁾ | 6 | R2 (ref -) | 6 | Data - | 6 | GND / 0 V |
| 3 | Brake + ¹⁾ | 7 | - | 7 | U _s | 7 | Data + |
| 4 | Brake - ¹⁾ | 8 | - | 8 | GND | 8 | Data - |
| 5 | - | 9 | Therm. Prot. + / Temp + | 9 | Therm. Prot. + / Temp + | 9 | CLK + |
| | | 10 | Therm. Prot. - / Temp - | 10 | Therm. Prot. - / Temp - | 10 | CLK - |
| | | 11 | - | 11 | - | 11 | Therm. Prot. + |
| | | 12 | - | 12 | - | 12 | Therm. Prot. - |

1) If applicable
2) Only with CKS 36, HES3 and HEM1-001

3) Battery + at HEM1-001
4) Battery - at HEM1-001

Motor connector

View mating face

| | | | | |
|-------------------------------|------------------------|------------------------|------------------------|------------------------|
| | | | | |
| 9-pole 9 x Ø 1 mm (3+PE+5) | 12-pole 12 x Ø 1 mm | 12-pole 12 x Ø 1 mm | 12-pole 12 x Ø 1 mm | 12-pole 12 x Ø 1 mm |

Mating connector

View mating face

| | | | | |
|---|--|--|--|--|
| | | | | |
| Intercontec type designation ESTA 202 NN00 34 0500 000 (Cable clamping range 10.5 - 12 mm) | Intercontec type designation ESTA 002 NN00 33 0001 000 (Cable clamping range 8.5 - 10.5 mm) | Intercontec type designation ESTA 002 NN00 33 0001 000 (Cable clamping range 8.5 - 10.5 mm) | Intercontec type designation ESTA 002 NN00 33 0001 000 (Cable clamping range 8.5 - 10.5 mm) | Intercontec type designation ESTA 002 NN00 33 0001 000 (Cable clamping range 8.5 - 10.5 mm) |

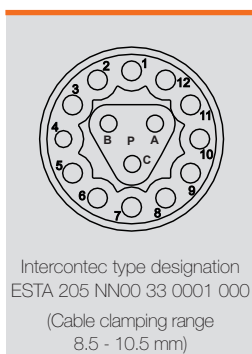
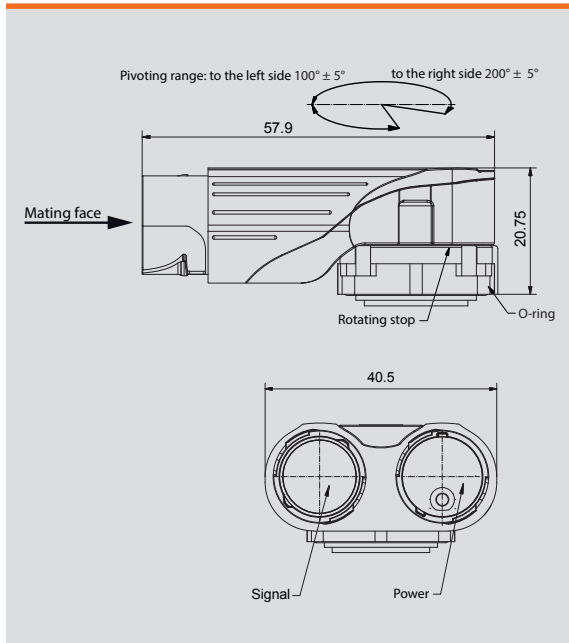
Signal Incremental

| Pin | Function |
|-----|-------------------------|
| 1 | Z |
| 2 | \bar{Z} |
| 3 | A |
| 4 | \bar{A} |
| 5 | B |
| 6 | \bar{B} |
| 7 | U (R) |
| 8 | \bar{U} (\bar{R}) |
| 9 | V (S) |
| 10 | \bar{V} (\bar{S}) |
| 11 | W (T) |
| 12 | \bar{W} (\bar{T}) |
| A | $V_{CC} / 5 V$ |
| B | GND |
| C | - |

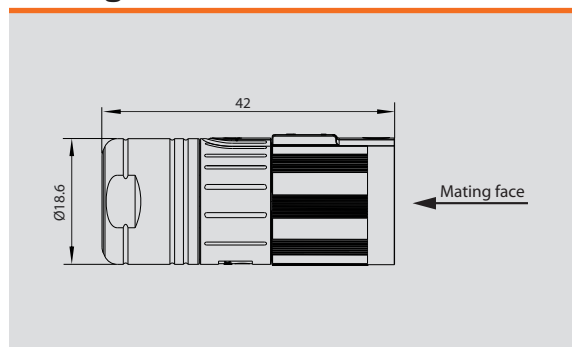


Mating connector with metal gland as shown or with plastic gland.

Motor connector Angled receptacle Y-Tec, rotatable



Mating connector



Option connector M23



| Power | | Signal Resolver | Signal HIPERFACE® | Signal SSI/BiSS | Signal EnDat 2.2 |
|---------|-----------------------|-----------------|-------------------------|-----------------|-------------------------|
| Pin | Function | Pin | Function | Pin | Function |
| A | Brake + ¹⁾ | 1 | cos + | 1 | cos + |
| B | Brake - ¹⁾ | 2 | cos - / refcos | 2 | cos - / refcos |
| C | Therm. Prot. + | 3 | sin + | 3 | sin + |
| D | Therm. Prot. - | 4 | sin - / refsin | 4 | sin - / refsin |
| 1 | U | 5 | - | 5 | V _{CC} / 5 V |
| 4 | V | 6 | R1 (ref +) | 6 | GND |
| 3 | W | 7 | R2 (ref -) | 7 | Data + |
| Ground. | PE | 8 | - | 8 | Data - |
| | | 9 | - | 9 | CLK + |
| | | 10 | - | 10 | CLK - |
| | | 11 | Therm. Prot. + / Temp + | 11 | Data - |
| | | 12 | Therm. Prot. - / Temp - | 12 | Therm. Prot. + / Temp + |
| | | 13 | - | 13 | Therm. Prot. - / Temp - |
| | | 14 | Therm. Prot. + / Temp + | 13 | - ²⁾ |
| | | 15 | Therm. Prot. - / Temp - | 14 | - ³⁾ |
| | | 16 | - | 15 | - |
| | | 17 | - | 16 | - |
| | | | | 17 | - |

1) If applicable
 2) Battery + at HEM1-001
 3) Battery - at HEM1-001

Motor connector

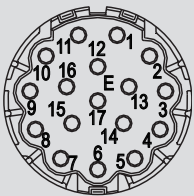
| | | | | | |
|------------------|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| View mating face | | | | | |
| | 8-pole 4 x Ø 2 mm (3+PE) + 4 x Ø 1 mm | 12-pole 12 x Ø 1 mm, 0° coded | 17-pole 17 x Ø 1 mm, 0° coded | 17-pole 17 x Ø 1 mm, 0° coded | 17-pole 17 x Ø 1 mm, 0° coded |

Mating connector

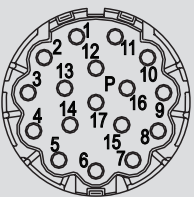
| | | | | | |
|------------------|--|--|--|--|--|
| View mating face | | | | | |
| | Intercontec type designation BSTA 078 NN00 42 0100 000 (Cable clamping range 9.5-14.5 mm) | Intercontec type designation ASTA 013 NN00 41 0100 000 (Cable clamping range 6-10 mm) | Intercontec type designation ASTA 014 NN00 41 0100 000 (Cable clamping range 6-10 mm) | Intercontec type designation ASTA 014 NN00 41 0100 000 (Cable clamping range 6-10 mm) | Intercontec type designation ASTA 014 NN00 41 0100 000 (Cable clamping range 6-10 mm) |

Signal Incremental

| Pin | Function |
|-----|-------------------------|
| 1 | Z |
| 2 | \bar{Z} |
| 3 | A |
| 4 | \bar{A} |
| 5 | B |
| 6 | \bar{B} |
| 7 | U (R) |
| 8 | \bar{U} (\bar{R}) |
| 9 | V (S) |
| 10 | \bar{V} (\bar{S}) |
| 11 | W (T) |
| 12 | \bar{W} (\bar{T}) |
| 13 | V _{CC} / 5 V |
| 14 | GND |
| 15 | Therm. Prot. + |
| 16 | Therm. Prot. - |
| 17 | - |



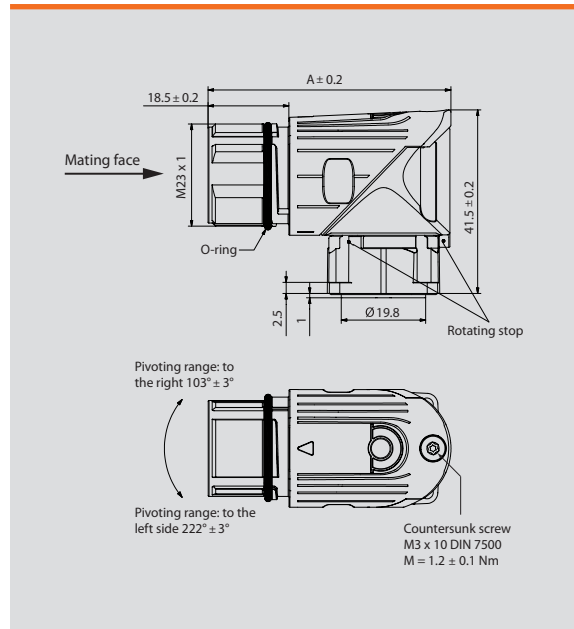
17-pole
17 x Ø 1 mm, 0° coded



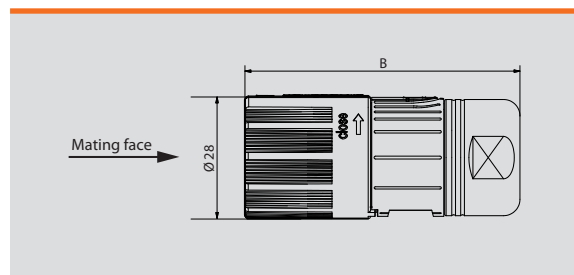
Intertec type designation
ASTA 014 NN00 41 0100 000
(Cable clamping range
6-10 mm)



Motor connector



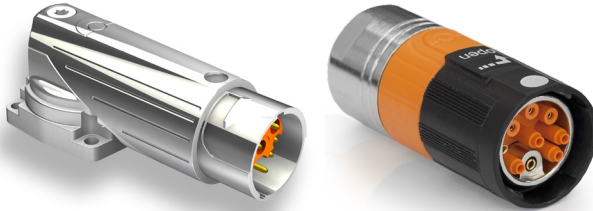
Mating connector



| Connector type | A | B |
|----------------|------|----|
| Signal | 55.6 | 59 |
| Power | 55.3 | 78 |

Option connectors for one cable solution

I-Tec connector



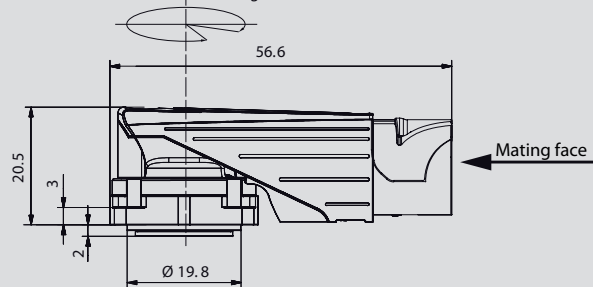
Power / Signal

| Pin | Function |
|-----------|------------------------|
| A | U |
| B | V |
| C | W |
| Grounding | PE |
| 1 | U _s (DSL +) |
| 2 | GND (DSL -) |
| 3 | Brake + * |
| 4 | Brake - * |
| 5 | - |

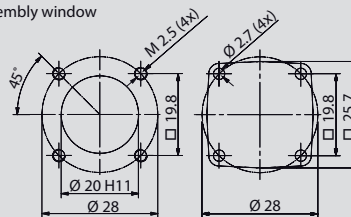
Motor connector

Pivoting range:

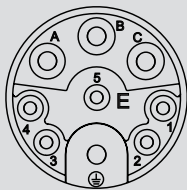
to the left $100^\circ \pm 5^\circ$ to the right $200^\circ \pm 5^\circ$



Assembly window

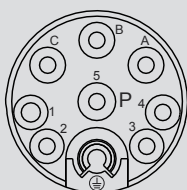


Motor connector



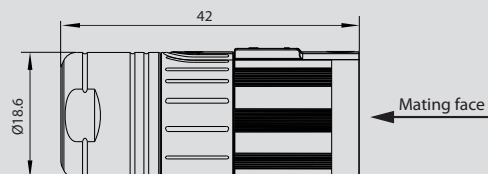
9-pole
9 x Ø 1 mm (3+PE+5)

Mating connector



Intercontec type designation
ESTA 202 NN00 34 0500 000
(Cable clamping range 10.5 - 12 mm)

Mating connector



* If available

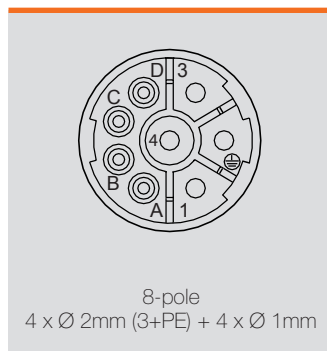
M23 connector



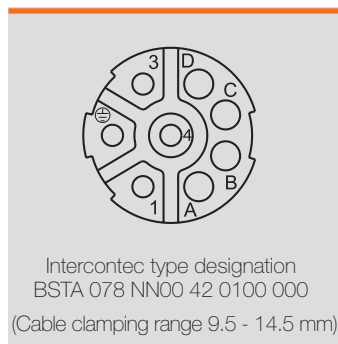
Power / Signal

| Pin | Function |
|-----------|-----------------------|
| A | Brake + * |
| B | Brake - * |
| C | U _s (DSL+) |
| D | GND (DSL-) |
| 1 | U |
| 4 | V |
| 3 | W |
| Grounding | PE |

Motor connector

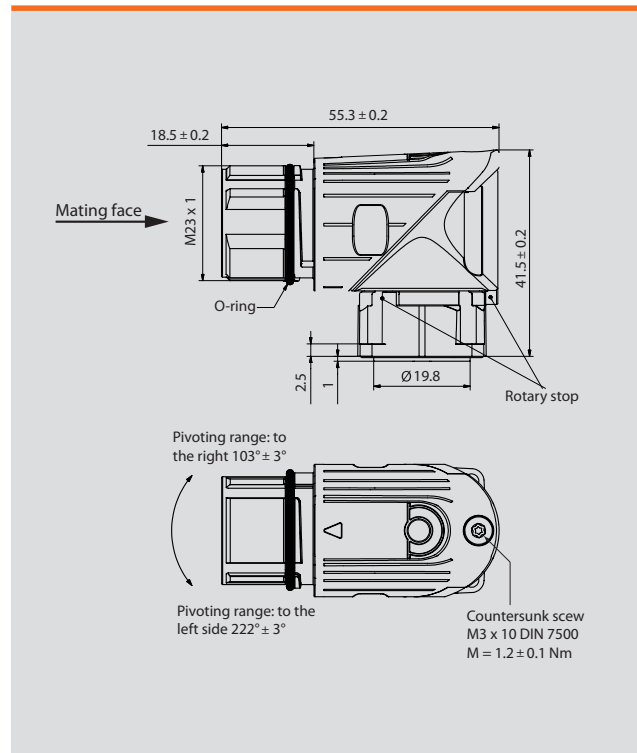


Mating connector

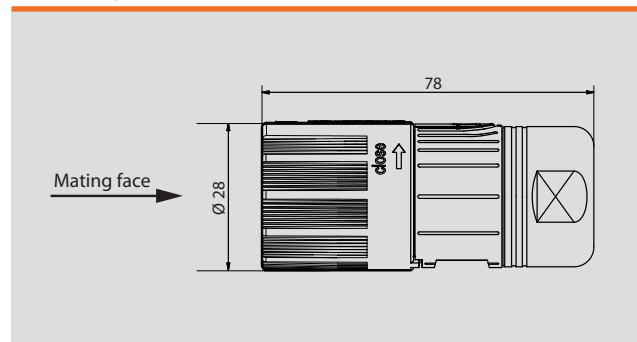


* If available

Motor connector



Mating connector



Option connectors for one cable solution

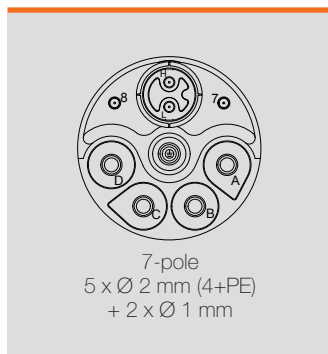
M23 H-Tec (hybrid) connector



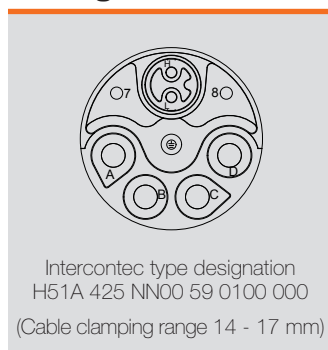
Power / Signal

| Pin | Function |
|-----------|------------------------|
| A | U |
| B | V |
| C | W |
| D | - |
| Grounding | PE |
| 7 | Brake + * |
| 8 | Brake - * |
| H | U _s (DSL +) |
| L | GND (DSL -) |

Motor connector

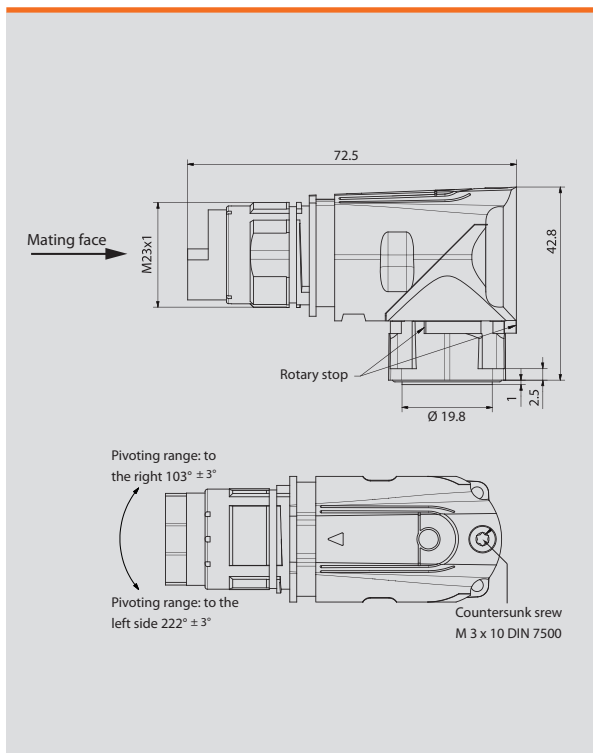


Mating connector

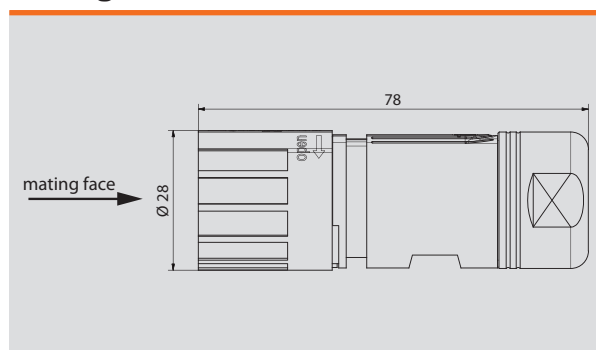


* If available

Motor connector



Mating connector



Servo drives

HCD servo drive - AC 230 V

p. 48



The servo drive HCD is specially designed for supply with single-phase mains supply. It can be controlled either via digital and analog inputs, PLC Motion or via the CANopen fieldbus.

HCB servo drive - The compact

p. 50



The compact single-axis servo drives of the HCB series are true all-rounders in drive technology. They combine maximum power density with extensive motion control functions.

HCF servo drive - DC 24 / 48 V

p. 54



The HCF servo drive is specially designed for direct supply from a 24 / 48 V mains. This enables an extremely compact and cost-optimised design which is limited to the essential elements of the drive unit.

HCJ servo drive - The allrounder

p. 56



The modular single-axis servo drives of the HCJ series combine high performance volume and extensive motion control functions in four compact sizes. The high variance of the fieldbus connection and the encoder interfaces enables fast integration into existing industrial plants as well as a solid and future-proof basis for new plants and projects.

HCD servo drive

230 V_{AC}



Specifications servo drive

| Type | Supply voltage | DC bus voltage | Output Voltage | Continuous output current | Maximum output current | Rated power | Order Code |
|------|--------------------|----------------|---------------------|---------------------------|------------------------|-------------|------------------|
| | [V _{AC}] | [V] | [V _{rms}] | [A _{rms}] | [A _{rms}] | [W] | |
| HCD | 1 x 230 | 320 | 3 x 0-230 | 4 | 8 | 800 | HCD2-004-0011-00 |

Switch frequency [kHz]: 4, 8, 12, 16 (Factory setting 8 kHz)

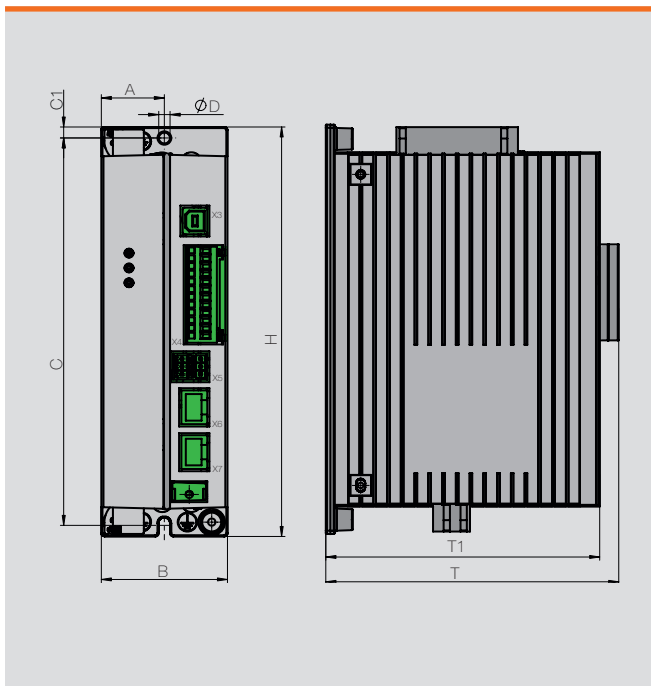
Power rating [kVA]: 1.84

Cable cross-section [mm²]: 0.2...1.5

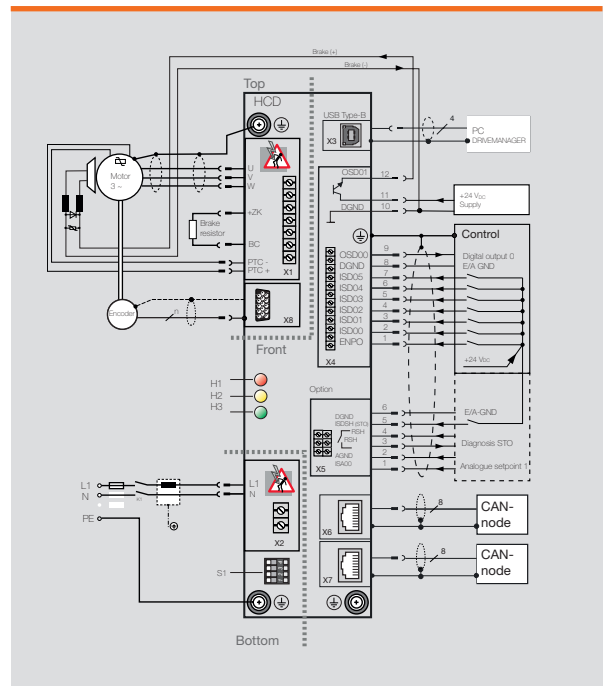
Mains frequency [Hz]: 50 / 60 ± 10 %

The small 4-Q-servo-drive HCD has been specially developed for cost-sensitive and simple control tasks, such as speed-, torque-, and position-controlled applications. Its drive control uses digital- and analogue inputs, PLC Motion or fieldbus (CANopen). Depending on the motor, the HCD has an output power up to 800 W in S1 mode. Our specially developed HES/HEM encoder systems is suitable for this purpose.

Dimensions



Connection plan



Connections

| Type | Connection | Function |
|------------|------------------------------------|---|
| H1, H2, H3 | Light emitting diodes (integrated) | Device status display |
| S1 | DIP circuit | Setting the CAN address |
| X2 | Plug-in terminal (2-pole) | Single phase supply |
| PE | PE connection pins | Protective grounding |
| X4 | Plug-in terminal (12-pole) | 6 digital inputs 1 digital output Interface for motor brake |
| X1 | Plug-in terminal (7-pole) | Motor phases (U/V/W) Brake resistor (+ZK, BC) Temperature monitoring (PTC+, PTC-) |
| X3 | USB connector (Type-B) | Connection for PC with DriveManager |
| X6/ X7 | 2x RJ45 connector | CANopen interface |
| X8 | D-Sub connector (15-pole) | Interface for rotary encoder |
| X5 (opt.) | Plug-in terminal (6-pole) | Connections for STO functionality (ISDSH, RSH) |
| X5 (opt.) | Plug-in terminal (6-pole) | Analogue input (ISA00), resolution 10-bit ADC |

Ambient conditions

| | |
|-----------------------------------|---|
| Humidity in operation: | relative humidity 5 - 85 % without condensation |
| Ambient temperature in operation: | + 5 °C ... - + 40 °C |
| Storage humidity: | relative humidity 5 - 95 % |
| Storage temperature: | - 25 °C ... + 55 °C |
| Protection class: | IPO0 |
| Installation altitude: | up to 1,000 m, up to 2,000 meter with power reduction |

Supported encoder systems

SSI, TTL

Interface

CANopen (CiA 402)

Functions

- PLC Motion
- Speed control
- Torque control
- Positioning
- Ramp generator
- Integrated mains filter
- Integrated braking chopper
- UL approval*: Certified according to UL 508c
- Safety function STO

* Valid as long as the prescribed operating conditions are observed.

■ HCB servo drive



General information

The compact single-axis servo drives of the HCB series are true all-rounders in drive technology. They combine maximum power density with extensive motion control functions.

The HCB series consists of two sizes, which are divided into two power stages for the 1-phase units and two power stages for the 3-phase units. All proven fieldbus interfaces are „on board“ - from CANopen to EtherCAT to PROFINET, which promise problem-free communication. Its versatility is further underlined by the numerous encoder interfaces, also for single-cable solutions. Complex positioning tasks through linked position sets can be interconnected. The position-synchronous or speed- synchronous motion of various drives with variable gear ratios can be quickly parameterised via the software assistant. Rotary table applications, position triggers, rotor position triggers or switching cams - a wide range of dynamic application tasks can be handled via the integrated software functions.

In combination with the HeiMotion servo motors with precisely matched encoder variant and a gearbox from the HMPG series mounted in the gearbox direct attachment, you get a customized drive axis from a single source at an unbeatable price-performance ratio.

Connections / inputs and outputs

| Connection | Function |
|------------|--|
| X1 | I/O communication |
| X2A | Resolver connection |
| X2B | Multi-encoder connection |
| X3 | STO interface (STOA, STOB), limit switch (DIN6, DIN7) Dig. output (DOU0) |
| X4 | CANopen |
| X5 | RS232/RS485 / Serial interface |
| X6 | Motor connection |
| X6A | Motor brake / HIPERFACE DSL® (BL 4300-C) |
| X9 | Voltage supply |
| X9A | Brake resistor |
| X9B | 24V supply |
| X18 | Ethernet interface |
| X19 | USB interface |
| X21 | Realtime Ethernet interface |

Specifications servo drive

| | single-phase | | three-phase | | |
|---------------------------------------|--|---------------------|--|---|---|
| | HCB 2/6-1 | HCB 4/12-1 | HCB 4/12-3 | HCB 8/24-3 | HCB 12/30-3 |
| Voltage supply | 230 V _{AC} [± 10 %], 50...60 Hz | | 3 x 230...480 V _{AC} [± 10 %], 45...66 Hz | | |
| Control voltage | 24 V _{DC} [± 20 %] (0,35 A) | | 24 V _{DC} [± 20 %] (0,35 A) | 24 V _{DC} [± 20 %] (0,45 A) | 24 V _{DC} [± 20 %] (0,65 A) |
| DC link voltage | 325 V _{DC} (with U _{mains} = 230 V _{AC}) | | 565 V _{DC} (with U _{mains} = 400 V _{AC}) | | |
| Output power | 400 W | 800 W | 1.6 kW | 3.2 kW | 4.8 kW |
| Max. output power for 2 s | 1 kW | 2 kW | 4.8 kW | 9.6 kW | 12 kW |
| Rated output current 2 Arms 4 Arms | 2 A _{rms} | 4 A _{rms} | 4 A _{rms} | 8 A _{rms} | 12 A _{rms} |
| Max. output current for 2 s Arms | 6 A _{rms} | 12 A _{rms} | 12 A _{rms} | 24 A _{rms} | 30 A _{rms} |
| Internal brake resistor | 75 Ω | | 30 Ω | | |
| Continuous power / pulse power | until 2 kW | | until 24 kW | | |
| External brake resistor | 75 Ω, max. 2 kW | | ≥ 30 Ω | | |
| Holding brake | 24 V _{DC} , max. 2 A | | 24 VDC, max. 2A | | |
| Dimensions servo drive H x W x D | 200 x 50 x 163 mm 245 x 50 x 163 mm with mounting plate | | 230 x 67 x 200 mm 275 x 67 x 200 mm with mounting plate | | |
| Weight | 1.5 kg | | 2.9 kg | | |
| Encoder evaluation | EnDat 2.2, HIPERFACE®, HIPERFACE DSL®, resolver, analogue and digital incremental encoders with/without commutation signals, BISS (Type C) | | EnDat 2.2, HIPERFACE®, HIPERFACE DSL®, resolver, analogue and digital incremental encoders with/without commutation signals, BISS (Type C) | | |
| Interfaces | USB 2.0, Ethernet, CAN-Bus, EtherCAT, PROFINET, MicroSD-Card | | USB 2.0, Ethernet, CAN-Bus, EtherCAT, PROFINET, MicroSD-Card | | |
| Inputs / outputs | 8 x digital in (24 VDC), 2 x analogue in (± 10 V) 3 x digital out (24 VDC) | | 8 x digital in (24 VDC), 2 x analogue in (± 10 V) 3 x digital out (24 VDC) | | |
| Product numbers | 12-225-020-01-0 | 12-225-020-02-0 | 12-405-020-11-0 | 12-405-020-12-0 | 12-405-020-13-0 |

■ HCB servo drive

Ambient conditions

| | |
|-----------------------------------|---|
| Ambient temperature in operation: | 0 °C to +40 °C +40 °C to +50 °C with power reduction 2.5 %/K |
| Storage temperature: | -25 °C to +70 °C |
| Operating and storage humidity: | relative humidity 90 % (without condensation) |
| Protection class: | IP20 |
| Installation altitude: | Mounting height max. 2000 m above sea level, above 1000 m above sea level with power reduction 1 % per 100 m |

Functions*

- Safety function „Safe Torque-Off (STO)
- Realization of functionality SS1 possible
- Switching cams
- Safe Brake Control (SBC) if configured
- Direct control of the holding brake in the motor
- Automatic determination of motor parameters
- Flying Saw
- Path program / linking
- Integrated position control
- Parameterizable belt locks

* Some functions are not available for all models

Power Cable

| Length | Heidrive-Nr. |
|--------|-----------------|
| 3 m | 14-007-051-18-0 |
| 5 m | 14-007-051-19-0 |
| 10 m | 14-007-051-23-0 |

Signal cable (resolver)

| Length | Heidrive-Nr. |
|--------|-----------------|
| 3 m | 14-007-051-60-0 |
| 5 m | 14-007-051-62-0 |
| 10 m | 14-007-051-67-0 |

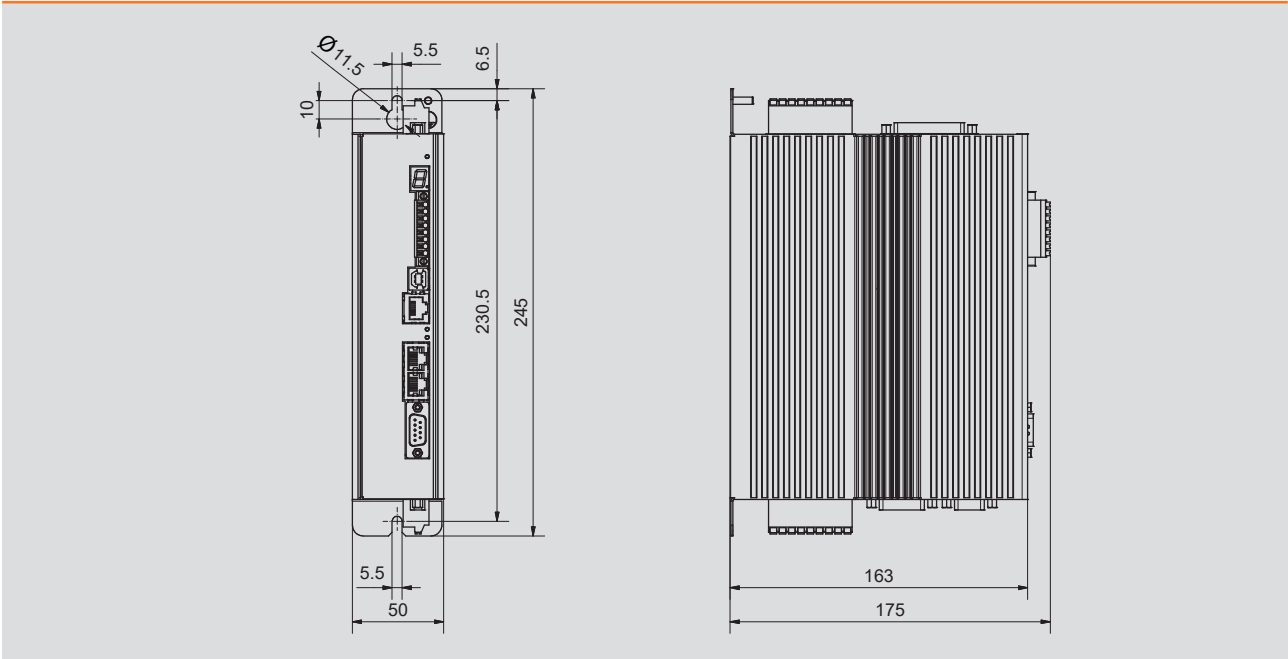
Signal cable (HIPERFACE)

| Length | Heidrive-Nr. |
|--------|-----------------|
| 3 m | 14-007-051-78-0 |
| 5 m | 14-007-051-80-0 |
| 10 m | 14-007-051-85-0 |

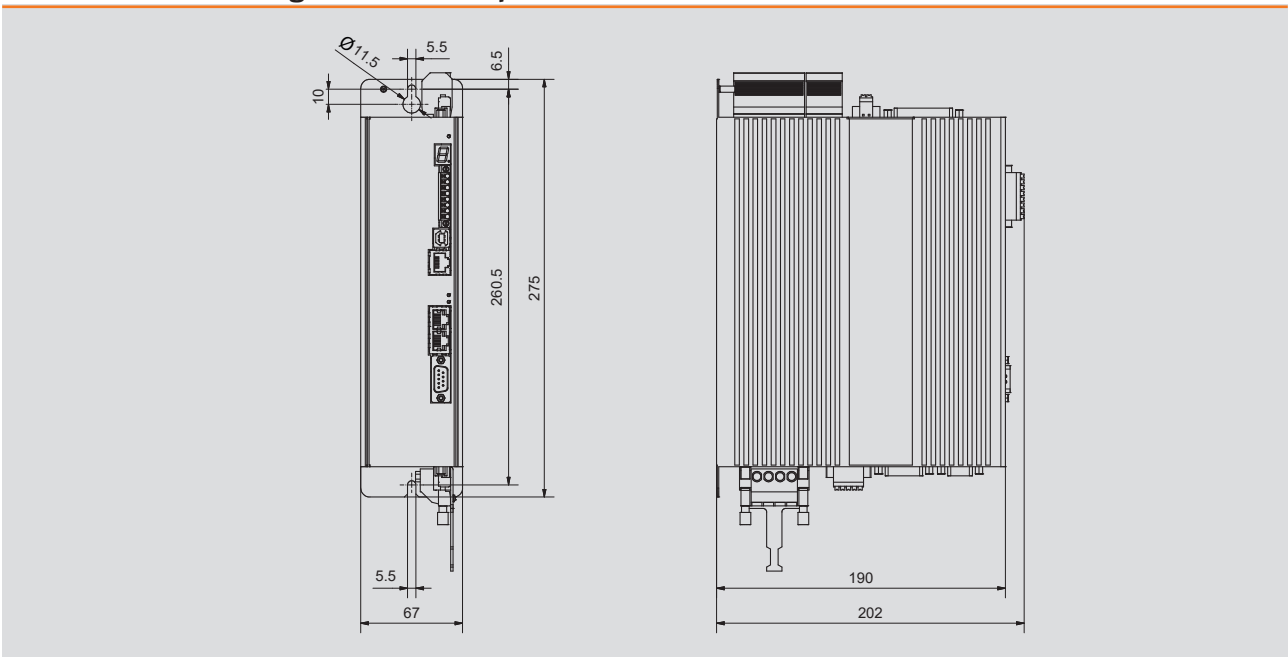
Connector sets

| single-phase | three-phase |
|-----------------|-----------------|
| 14-001-015-22-0 | 14-001-015-35-0 |

Dimensional Drawing HCB / single phase



Dimensional Drawing HCB / three-phase



HCF servo drive

24 to 48 V_{DC}



Specifications servo drive

| Typ | Supply voltage | DC bus voltage | Output voltage | Continuous output current | Maximum output current | Rated power | Order code |
|-----|--------------------|--------------------|---------------------|---------------------------|------------------------|-------------|------------------|
| | [V _{DC}] | [V _{DC}] | [V _{rms}] | [A _{rms}] | [A _{rms}] | [W] | |
| HCF | 24 - 48 | 24 - 48 | 3x0 - 33 | 8 | 16 | 240 | HCF0-008-1x.x.-0 |

Switch frequency [kHz]: 8, 16 (Factory setting 8 kHz)

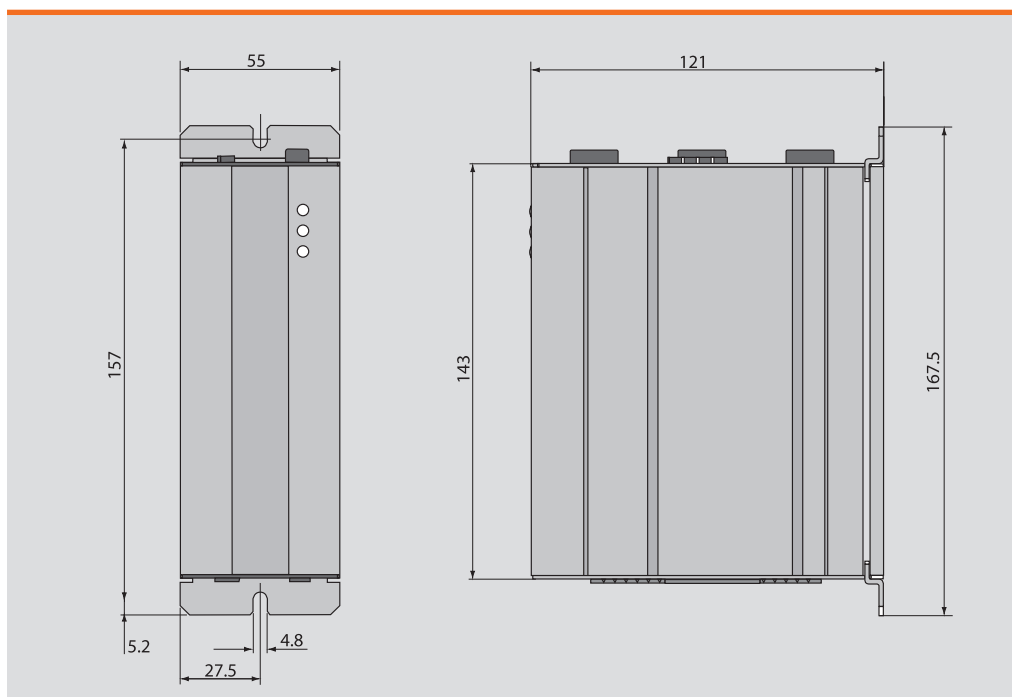
Power rating [kVA]: 0.55

Cable cross-section [mm²]: 1.5...2.5

Logic supply [V_{DC}]: 24

The HCF servo drive is a cost-optimized, DC powered 24 V or 48 V motor controller for use in the demanding world of precision automation technology. The HCF features high precision positioning functionality, a sturdy mechanical design, CANopen CiA 402 support, safe stop according to Category 3 of IEC 954-1, and much more.

Dimensions (mm)



Connections / inputs and outputs

| Type | Connection | Function |
|------|--------------------------------|---|
| X1 | Plug-in terminal (6-pole) | DC supply (L+ / L-) Brake resistor (L+ / RB) |
| X2 | Plug-in terminal (2 x 10-pole) | Safe Stop with relay output 8 digital inputs 2 analog inputs 10-bit ADC 3 digital outputs 1 relay output (24 V / 1 A) Logic power supply |
| X3 | Plug-in terminal (4-pole) | Motor phases (U/V/W/PE) |
| X4 | D-sub connector (9-pole) | RS232 interface |
| X5 | D-sub panel connector (9-pole) | CANopen interface |
| X6 | D-sub connector (15-pole) | Interface for rotary encoders with temperature monitoring (PTC / KTY / Klixon) |
| S1 | Rotary code switch | Setting the CANopen address |

Ambient conditions

| | |
|-----------------------------------|--|
| Ambient temperature in operation: | - 10 °C ... + 40 °C |
| Storage temperature: | - 25 °C ... + 55 °C |
| Operating and storage humidity: | 15 ... 85 % relative humidity (without condensation) |
| Protection class: | IP20 |
| Installation altitude: | up to 1,000 m |

Supported encoder systems

Resolver, Incremental encoder, SSI absolute encoder

Interface

CANopen (CiA 402), RS232

Functions

- Brake driver
- PLC Motion
- DriveManager software
- Online position profile generator
- Integrated braking resistor
- Electronic cam
- Sequenced driving set positioning
- Safe stop according to EN 954-1, category 3

HCJ drive 230 / 400 V_{AC}

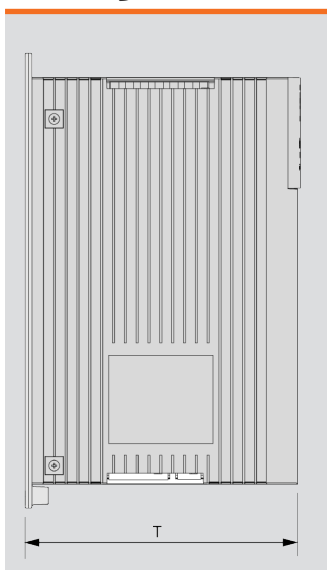


Specifications servo drive

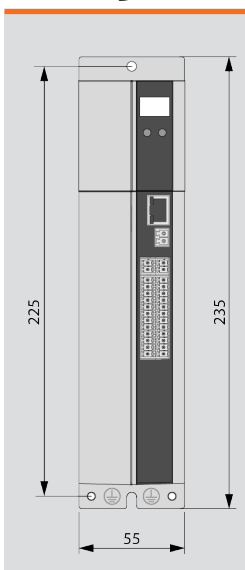
| Typ | DC bus voltage | Input voltage | Continuous output current I_N | Maximum output current I_{MAX} | Frame size |
|-----------|----------------|---------------|------------------------------------|-------------------------------------|------------|
| | [V] | [V] | [A _{rms}] | [A _{rms}] | |
| HCJ22.003 | 325 | 1 / 3 x 230 | 3 | 9 | size 2 |
| HCJ24.002 | 560 | 3 x 400 | 2 | 6 | size 2 |
| HCJ22.006 | 325 | 1 / 3 x 230 | 5.9 | 17.7 | size 3 |
| HCJ24.004 | 560 | 3 x 400 | 3.5 | 10.5 | size 3 |
| HCJ22.008 | 325 | 1 / 3 x 230 | 8 | 24 | size 4 |
| HCJ24.007 | 560 | 3 x 400 | 6.5 | 19.5 | size 4 |
| HCJ24.012 | 560 | 3 x 400 | 12 | 36 | size 5 |
| HCJ24.016 | 560 | 3 x 400 | 16 | 48 | size 5 |

Mains frequency [Hz]: 50 / 60 ± 10 %

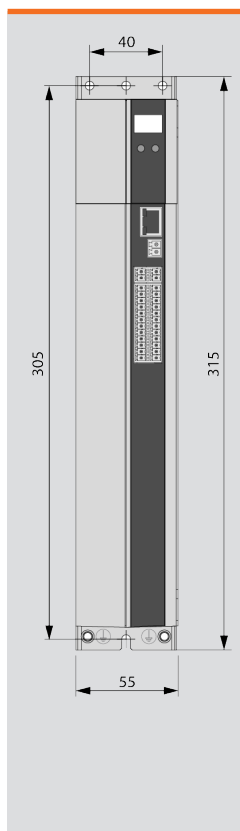
Size 2/3/4



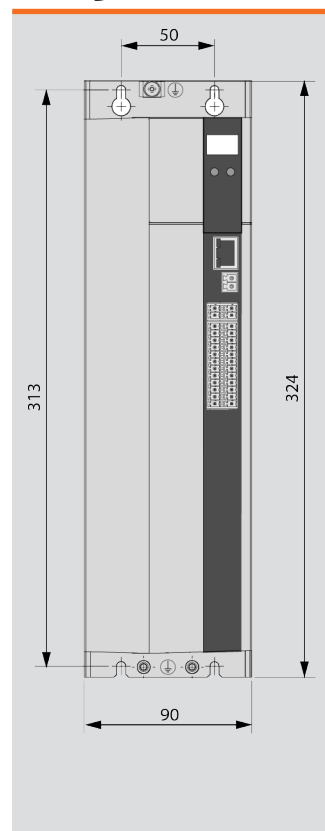
Size 2/3



Size 4



Size 5



| Type | T | Weight |
|--------|----------|-----------------|
| Size 2 | 142 mm | 1.0 kg |
| Size 3 | 189 mm | 1.5 kg |
| Size 4 | 235.5 mm | 2.8 kg |
| ize 5 | 235.5 mm | 5.5 kg / 5.9 kg |

Connections / inputs and outputs

| Connection | Name | Function |
|------------|---------------------------------|---|
| X1 | Plug-in terminal (7-pole) | Motor phases (U/V/W/PE) DC-link (L+/L-) Brake resistor (L+/RB) |
| X2 | Plug-in terminal (2-pole) | Logic supply + 24 V _{DC} |
| X3 | Plug-in terminal (4-pole) | Mains supply (L1/L2/L3/PE) |
| X4 | Plug-in terminal (2x 10-pole) | 7 digital inputs 2 analog inputs (10-bit ADC) 3 digital outputs 1 relay (24 V / 1 A) diagnosis STO |
| X5 | Plug-in terminal (2-pole) | Temperature monitoring (PTC / KTY / Klixon) |
| X6 | D-sub connector (9-pole) | Interface for resolver |
| X7 | D-sub connector (15-pole) | Interface for rotary encoders (TTL / SSI / HIPERFACE / ENDAT) |
| X9 | RJ-45 connector | Interface for Ethernet |
| X13 | Plug-in terminal (4-pole) | Interface for motor brake |
| Option 1 | Connector (depending on module) | Fieldbus interface e.g. CANopen, EtherCAT, SERCOS, ... |
| Option 2 | Connector (depending on module) | Encoder interface e.g. second (safe) encoder, Encoder simulation, TwinSync, axis monitoring, ... |

Ambient conditions

| | |
|-----------------------------------|---|
| Ambient temperature in operation: | - 10 °C ... + 40 °C |
| Storage temperature: | - 25 °C ... + 55 °C |
| Operating and storage humidity: | < 85 % relative humidity (without condensation) |
| Protection class: | IP20 except clamps (IP00) |
| Installation altitude: | up to 1,000 m |

Supported encoder systems

Resolver, HIPERFACE[®] encoder, HIPERFACE DSL[®] encoder, Incremental encoder, SSI absolute encoder
EnDat 2.2 encoder

Interface

CANopen (CiA 402), Ethernet (parameterization via DriveManager software)

Optional: EtherCAT, SERCOS III, Profibus DP or Profinet IRT

Functions

- PLC Motion
- Brake driver
- Sequenced driving set positioning
- Online position profile generator
- DriveManager software
- Integrated braking resistor (size 3+4)
- Safe stop according to EN 954-1, category 3
- Radio interference filters (RFI) up to 7.5 kW
- Electronic cam

Technical data subject to change! Last changes: 11/2023

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