HEIDENHAIN

# HEIDENHAIN Motors

For Axis and Spindle Drives

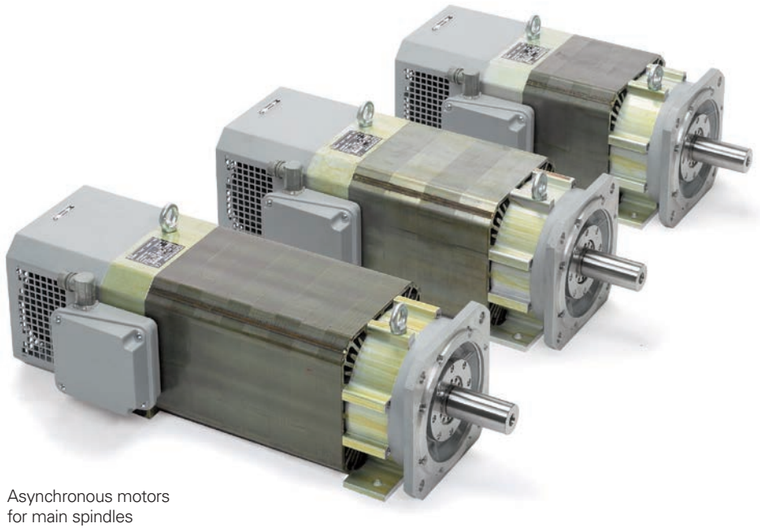
**Information for the Machine Tool Builder**

07/2023

**Motors for feed axes and main spindles**
HEIDENHAIN supplies motors for feed axes and main spindles as accessories to its controls with an integrated inverter.

This brochure provides an overview of the available motors as well as information about the specifications and mating dimensions.

For initial setup, please request the *Motors* Technical Manual.



Asynchronous motors for main spindles

Synchronous motors for feed drives

**Intended use**
The products described in this brochure:
- May be used only for NC-controlled machine tools
- Should be operated only with controls and inverters from HEIDENHAIN (operation with non-HEIDENHAIN controls or inverters requires prior consultation with HEIDENHAIN)
- May be used only in an industrial setting, for commercial applications or in research institutions
- May be operated only in accordance with the product requirements (specifications, environmental data, safety instructions, etc.)

If the devices are used as a part of a safety function, then the machine manufacturer must ensure that the final product fulfills all requirements of the Machinery Directive (2006/42/EC).

**Improper use**
The devices are not intended for applications in areas where a failure would result in considerable risk to humans or the environment.
Usage in potentially explosive atmospheres is prohibited.

**Parts subject to wear**
HEIDENHAIN motors contain components that are subject to wear depending on the application and how they are deployed. This especially applies to the following parts:
- Bearings
- Brakes
- Radial shaft seal rings
- Fans

*This brochure supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the brochure edition valid when the order is placed.*

*Standards (ISO, EN, etc.) apply only where explicitly stated in the brochure.*



# Contents

# Synchronous motors
# **QSY overview**

## General technical information

Synchronous motors from HEIDENHAIN fulfill all requirements of an NC-controlled machine tool. Some special characteristics include
- excellent running smoothness,
- an appropriate mass moment of inertia,
- a very good ratio of the rated torque to the stall torque,
- and low torque ripple.

When used in conjunction with Gen 3 drives, motors must be operated only with a DC-link voltage of 650 V.

**Specifications**
The specifications and characteristic curves apply to motors mounted without thermal insulation. The temperature of the winding may differ from the maximum permissible ambient temperature of 40 °C by a maximum of 100 K. If the motor is mounted so that it is thermally insulated, the motor torque must be reduced in order to avoid thermal overloading. For motors with ECN 1313 or EQN 1325 absolute rotary encoders, the rated torque is reduced by 10%.

**Speed measurement**
Synchronous motors from HEIDENHAIN operate with sinusoidal commutation. An integrated rotary encoder from HEIDENHAIN measures the rotor position and shaft speed. The following versions are available (see *Specifications*):
- ERN 1387 incremental rotary encoder with ∿ 1 $V_{PP}$ interface, or
- ECN 1313 absolute singleturn rotary encoder with EnDat2.2/01 interface (only one motor revolution can be evaluated), or
- EQN 1325 absolute multiturn rotary encoder with EnDat2.2/01 interface

**Mechanical service life**
The service life of the bearings depends on the shaft load and the average shaft speed (see the *Motors* Technical Manual). For QSY motors, the rated bearing service life is 30 000 hours, which is motor-specific and applies to a certain maximum shaft load at an average speed.

**EcoDyn motors**
Motors of the EcoDyn series are characterized by reduced current consumption together with a higher rated torque and a maximum permissible rated speed of 3000 rpm (QSY 260: 2000 rpm). The following controls are required in order to drive the motors in EcoDyn mode:
- iTNC 530
- TNC 640
- TNC 620
- MANUALplus 620
- CNC PILOT 640

For all other controls, the rated speed is 2000 rpm.

**Electronic ID label**
The synchronous motors with ECN 1313 or EQN 1325 rotary encoder feature an electronic ID label that allows for easy commissioning and diagnosis. The information, such as motor designation, ID number or serial number, stored in this ID label can be read and displayed by the internal diagnostic function DriveDiag of HSCI controls. Thus, the control automatically recognizes the motor type every time it is switched on.

**Functional safety**
All current QSY motor variants described in this brochure provide a fault exclusion for the loosening of the mechanical connection between the encoder and the motor. This prevents any unintended loosening of the rotor and stator coupling. Safety-related parameters for the motors or the encoders used within them are available upon request (e.g., MTTF values, data for fault exclusion).

**Installation elevation**
HEIDENHAIN motors may be installed at an elevation of up to 1000 m above sea level. For installation at elevations above 1000 m, additional cooling measures are required.

**Thermal specifications**
Natural cooling
Temperature monitoring with KTY 84-130 thermistor in the stator winding
Thermal class F

**Mechanical parameters**
Maintenance-free bearings
Holding brake optionally with low backlash ≤ 1°
*Design:* IM B5 (mounting via flange) as per EN 60034-7

*Mounting the motor*
The following screws are recommended for mounting the motor:

| | |
|---|---|
| QSY 96 | M6 |
| QSY 116 | M8 |
| QSY 130 | M8 |
| QSY 155 | M10 |
| QSY 190 | M12 |
| QSY 260 | M16 |

*Flange:* dimensions as per DIN EN 50347 and IEC 60072-1

*Protection* as per DIN EN 60529
- Motor: IP65
- Shaft exit: IP64

*Suitability with regard to gears*
Only for enclosed gears. The shaft is suitable only for dry connection.

*Vibration severity*
Grade A as per IEC 60034-14

*Radial runout, concentricity and axial runout*
Tolerance N as per IEC 60072-1 (DIN 42955)

*Shaft end*
Cylindrical without keyway as per IEC 60072-1 with center hole and thread
Shaft with keyway and machine key as per DIN 6885 (upon request)
- *QSY 96:* A 6 x 6 x 32
- *QSY 116:* A 8 x 7 x 40
- *QSY 130:* A 8 x 7 x 40
- *QSY 155:* A 10 x 8 x 50
- *QSY 190:* A 10 x 8 x 70
- *QSY 260:* A 14 x 9 x 70

The motors with machine key are half-key balanced as per ISO 21940-32.

**QSY 116 E**

**QSY 155 B**

**QSY 190 EcoDyn**

**QSY 96 G**

Synchronous motors

# When used with 1xx inverter systems

| Synchronous motors | Stall torque | Stall current | Rated speed | Recommended inverters[2] | | | | Page |
|---|---|---|---|---|---|---|---|---|
| | | | | 1-axis module | 2-axis module | Compact inverters/axis UR 2xx D UE 2xx B | Compact inverters/axis UE 1xx | |
| **QSY 96A** | 1.5 Nm | 1.5 A | 4500 rpm | UM 111 D | UM 121 D | 1 to 4 | 1 to 4 | **8** |
| **QSY 96G** | 5.2 Nm | 5.2 A | 4500 rpm | UM 111 D | UM 121 D | 1 to 4 | 1 to 4 | |
| **QSY 116C** | 5.2 Nm | 3.3 A | 3000 rpm | UM 111 D | UM 121 D | 1 to 4 | 1 to 4 | **10** |
| **QSY 116E** | 7.2 Nm | 4.8 A | 3000 rpm | UM 111 D | UM 121 D | 1 to 4 | 4 | |
| **QSY 116J** | 10.0 Nm | 6.8 A | 3000 rpm | UM 111 D | UM 121 D | 1 to 4 | 4 | |
| **QSY 116J EcoDyn** | 10.0 Nm | 5.0 A | 3000 rpm | UM 111 D | UM 121 D | 1 to 4 | 4 | |
| **QSY 130C EcoDyn** | 6.0 Nm | 3.0 A | 3000 rpm | UM 111 D | UM 121 D | 1 to 4 | 1 to 4 | **12** |
| **QSY 130E EcoDyn** | 9.0 Nm | 4.5 A | 3000 rpm | UM 111 D | UM 121 D | 1 to 4 | 1 to 4 | |
| **QSY 155B** | 13.0 Nm | 9.1 A | 3000 rpm | UM 111 BD | UM 121 BD | 4 | – | **14** |
| **QSY 155C** | 17.7 Nm | 11.8 A | 3000 rpm | UM 111 BD | UM 121 BD | 4 | – | |
| **QSY 155D** | 21.6 Nm | 14.6 A | 3000 rpm | UM 111 BD | UM 121 BD | 4 | – | |
| **QSY 155F** | 26.1 Nm | 18.0 A | 3000 rpm | UM 112 D | UM 122 D | 4[1] | – | |
| **QSY 155B EcoDyn** | 13.0 Nm | 6.5 A | 3000 rpm | UM 111 D | UM 121 D | 1 to 4 | – | **16** |
| **QSY 155C EcoDyn** | 17.7 Nm | 8.5 A | 3000 rpm | UM 111 BD | UM 121 BD | 4 | – | |
| **QSY 155D EcoDyn** | 21.6 Nm | 10.6 A | 3000 rpm | UM 111 BD | UM 121 BD | 4 | – | |
| **QSY 155F EcoDyn** | 26.1 Nm | 12.8 A | 3000 rpm | UM 111 BD | UM 121 BD | 4 | – | |
| **QSY 190C EcoDyn** | 28.0 Nm | 14.0 A | 3000 rpm | UM 111 BD | UM 121 BD | 4 | – | **18** |
| **QSY 190D EcoDyn** | 38.0 Nm | 18.1 A | 3000 rpm | UM 112 D | UM 122 D | 4[1] | – | |
| **QSY 190F EcoDyn** | 47.6 Nm | 22.7 A | 3000 rpm | UM 112 D | UM 122 D | 4[1] | – | |
| **QSY 190K EcoDyn** | 62.5 Nm | 29.8 A | 3000 rpm | UM 113 D | – | – | – | |
| **QSY 260B EcoDyn** | 85.0 Nm | 31.0 A | 2000 rpm | UM 114 D | – | – | – | **20** |
| **QSY 260C EcoDyn** | 120 Nm | 43.5 A | 2000 rpm | UM 115 D | – | – | – | |

[1] Only UE 242 B, UR 242 D
[2] The maximum acceleration of the motor might not be achievable with the recommended inverters. If necessary, a more powerful power module must be selected.



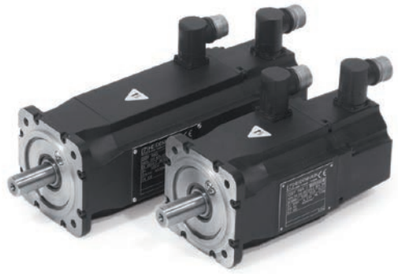
# When used with Gen 3 drives

| Synchronous motors | Stall torque | Stall current | Rated speed | Recommended inverters[1] | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-axis module | 2-axis module | Compact inverters/axis UEC 31x | Compact inverters/axis UEC 32x | Compact inverters/axis UEC 33x | |
| **QSY 96A** | 1.5 Nm | 1.5 A | 4500 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 2 | 1 to 5 | **8** |
| **QSY 96G** | 5.2 Nm | 5.2 A | 4500 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 2 | 1 to 5 | |
| **QSY 116C** | 5.2 Nm | 3.3 A | 3000 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 2 | 1 to 5 | **10** |
| **QSY 116E** | 7.2 Nm | 4.8 A | 3000 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 2 | 1 to 5 | |
| **QSY 116J** | 10.0 Nm | 6.8 A | 3000 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 2 | 1 to 5 | |
| **QSY 116J EcoDyn** | 10.0 Nm | 5.0 A | 3000 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 5 | 1 to 5 | |
| **QSY 130C EcoDyn** | 6.0 Nm | 3.0 A | 3000 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 5 | 1 to 5 | **12** |
| **QSY 130E EcoDyn** | 9.0 Nm | 4.5 A | 3000 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 5 | 1 to 5 | |
| **QSY 155B** | 13.0 Nm | 9.1 A | 3000 rpm | UM 310 | UM 320 | 1 to 2 | 1 to 5 | 1 to 5 | **14** |
| **QSY 155C** | 17.7 Nm | 11.8 A | 3000 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | |
| **QSY 155D** | 21.6 Nm | 14.6 A | 3000 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | |
| **QSY 155F** | 26.1 Nm | 18.0 A | 3000 rpm | UM 312 | UM 322 | – | 1 to 2 | 1 to 2 | |
| **QSY 155B EcoDyn** | 13.0 Nm | 6.5 A | 3000 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 5 | 1 to 5 | **16** |
| **QSY 155C EcoDyn** | 17.7 Nm | 8.5 A | 3000 rpm | UM 310 | UM 320 | 1 to 2 | 1 to 5 | 1 to 5 | |
| **QSY 155D EcoDyn** | 21.6 Nm | 10.6 A | 3000 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | |
| **QSY 155F EcoDyn** | 26.1 Nm | 12.8 A | 3000 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | |
| **QSY 190C EcoDyn** | 28.0 Nm | 14.0 A | 3000 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | **18** |
| **QSY 190D EcoDyn** | 38.0 Nm | 18.1 A | 3000 rpm | UM 312 | UM 322 | – | 1 to 2 | 1 to 2 | |
| **QSY 190F EcoDyn** | 47.6 Nm | 22.7 A | 3000 rpm | UM 312 | UM 322 | – | – | 1 to 2 | |
| **QSY 190K EcoDyn** | 62.5 Nm | 29.8 A | 3000 rpm | UM 313 | – | – | – | 1 | |
| **QSY 260B EcoDyn** | 85.0 Nm | 31.0 A | 2000 rpm | UM 313 | – | – | – | 1 | **20** |
| **QSY 260C EcoDyn** | 120.0 Nm | 43.5 A | 2000 rpm | UM 313 | – | – | – | – | |
| **MSY 155B** | 12.8 Nm | 7.8 A | 2500 rpm | UM 310 | UM 320 | 1 to 5 | 1 to 5 | 1 to 5 | **24** |
| **MSY 155C** | 18.2 Nm | 10.5 A | 2500 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 5 | 1 to 5 | |
| **MSY 155D** | 24.1 Nm | 13.5 A | 2500 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | |
| **MSY 155E** | 28.9 Nm | 15.5 A | 2500 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | |
| **MSY 192C** | 30.3 Nm | 13.2 A | 2000 rpm | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 2 | **26** |
| **MSY 192D** | 39.0 Nm | 18.3 A | 2000 rpm | UM 312 | UM 322 | – | 1 to 2 | 1 to 2 | |
| **MSY 192E** | 46.0 Nm | 20.1 A | 2000 rpm | UM 312 | UM 322 | – | 1 to 2 | 1 to 2 | |
| **MSY 192F** | 54.5 Nm | 24.0 A | 2000 rpm | UM 312 | UM 322 | – | – | 1 to 2 | |

[1] The maximum acceleration of the motor might not be achievable with the recommended inverters. If necessary, a more powerful power module must be selected.

# Synchronous motors
# QSY 96 series

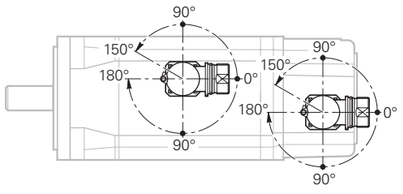
**Feed motors with three pole pairs**
- **Stall torque: 1.5 Nm and 5.2 Nm**
- **Choice of incremental or absolute rotary encoder**



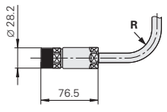
| **Motor** | **QSY 96A** | | **QSY 96G** | |
|---|---|---|---|---|
| **Rated voltage $U_N$** | 310 V/*308 V* | | 291 V/*290 V* | |
| **Rated power output $P_N$** | 0.5 kW/*0.45 kW* | | 1.4 kW/*1.3 kW* | |
| **Rated shaft speed $n_N$** | 4500 rpm | | | |
| **Rated torque $M_N$**[1)] | 1.05 Nm/*0.95 Nm* | | 3.0 Nm/*2.7 Nm* at 4500 rpm | |
| **Rated current $I_N$**[1)] | 1.1 A/*1.0 A* | | 3.3 A/*3.0 A* | |
| **Stall torque $M_0$**[1)] | 1.5 Nm | | 5.2 Nm | |
| **Stall current $I_0$**[1)] | 1.5 A | | 5.2 A | |
| **Max. speed $n_{max}$** | 6000 rpm | | | |
| **Max. torque $M_{max}$**[2)] | 5.5 Nm | | 22 Nm | |
| **Max. current $I_{max}$**[2)] | 6.3 A | | 25.4 A | |
| **Brake** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 0.5 A | – | 0.5 A |
| Holding torque $M_{Br}$ | – | 5.0 Nm | – | 5.0 Nm |
| **Mass m** | 3.6 kg | 4.5 kg | 7.2 kg | 8.1 kg |
| **Rotor inertia J** | 1.8 kg·cm$^2$ | 2.1 kg·cm$^2$ | 6.3 kg·cm$^2$ | 6.6 kg·cm$^2$ |
| **ID** | | | | |
| Motor with ERN 1387 | 344512-0C | 344512-0D | 339875-0C | 339875-0D |
| Motor with ECN 1313 | 344512-8C | 344512-8D | 339875-8C | 339875-8D |
| Motor with EQN 1325 | 344512-5C | 344512-5D | 339875-5C | 339875-5D |

[1)] At 100 K [2)] Max. 200 ms
*Italics:* data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10%)

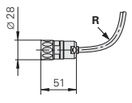
**Rotatable connections**




**Power connector**



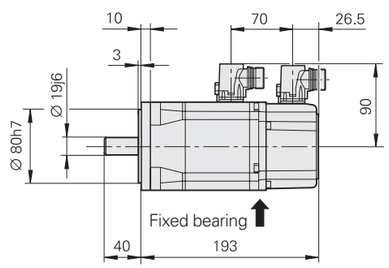

**Encoder connector**



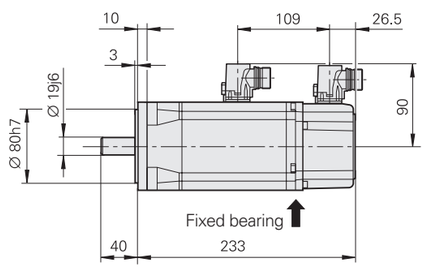

For **R** see page 32

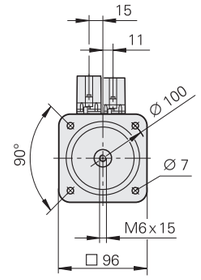


**QSY 96A** Without brake

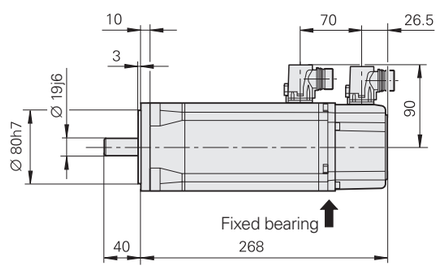



With brake

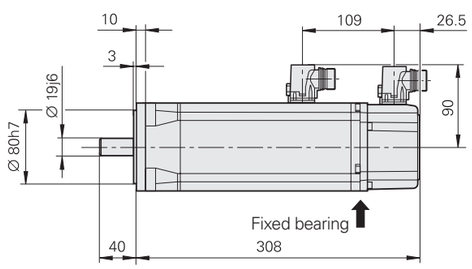


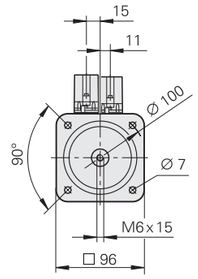




**QSY 96G** Without brake




With brake




mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

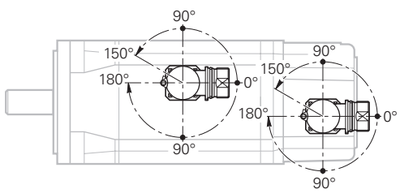
# Synchronous motors
# QSY 116 series

**Feed motors with three pole pairs**
- **Stall torque: 5.2 Nm to 10 Nm**
- **Choice of incremental or absolute rotary encoder**

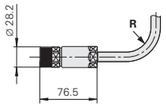
| Motor | QSY 116C | | QSY 116E | | QSY 116J | | QSY 116J EcoDyn | |
|---|---|---|---|---|---|---|---|---|
| **Rated voltage $U_N$** | 315 V/*311 V* | | 302 V/*299 V* | | 290 V/*288 V* | | 408 V/*405 V* | |
| **Rated power output $P_N$** | 1.45 kW/*1.30 kW* | | 1.85 kW/*1.67 kW* | | 2.42 kW/*2.18 kW* | | 2.64 kW/*2.38 kW* | |
| **Rated speed $n_N$** | 3000 rpm | | | | | | 3000 rpm[3] | |
| **Rated torque $M_N$**[1] | 4.6 Nm/*4.1 Nm* | | 5.9 Nm/*5.3 Nm* | | 7.7 Nm/*6.9 Nm* | | 8.4 Nm/*7.6 Nm* | |
| **Rated current $I_N$**[1] | 3.3 A/*3.0 A* | | 4.1 A/*3.7 A* | | 5.4 A/*4.8 A* | | 4.3 A/*3.9 A* | |
| **Stall torque $M_0$**[1] | 5.2 Nm | | 7.2 Nm | | 10.0 Nm | | 10.0 Nm | |
| **Stall current $I_0$**[1] | 3.3 A | | 4.8 A | | 6.8 A | | 5.0 A | |
| **Max. speed $n_{max}$** | 5400 rpm | | | | | | 4200 rpm[3] | |
| **Max. torque $M_{max}$**[2] | 16 Nm | | 25 Nm | | 41 Nm | | 41 Nm | |
| **Max. current $I_{max}$**[2] | 12.7 A | | 19.0 A | | 32.6 A | | 23.0 A | |
| **Brake** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 0.6 A | – | 0.6 A | – | 0.85 A | – | 0.85 A |
| Holding torque $M_{Br}$ | – | 13.5 Nm | – | 13.5 Nm | – | 13.5 Nm | – | 13.5 Nm |
| **Mass m** | 6.9 kg | 7.8 kg | 8.6 kg | 9.5 kg | 12.0 kg | 13.3 kg | 12.0 kg | 13.3 kg |
| **Rotor inertia J** | 7.5 kg·cm² | 7.9 kg·cm² | 9.9 kg·cm² | 10.3 kg·cm² | 15.0 kg·cm² | 15.4 kg·cm² | 15.0 kg·cm² | 15.4 kg·cm² |
| **ID** | | | | | | | | |
| Motor with ERN 1387 | 339876-0C | 339876-0D | 339877-0C | 339877-0D | 339878-0C | 339878-0D | 339878-1C | 339878-1D |
| Motor with ECN 1313 | 339876-8C | 339876-8D | 339877-8C | 339877-8D | – | – | 339878-8C | 339878-8D |
| Motor with EQN 1325 | 339876-5C | 339876-5D | 339877-5C | 339877-5D | 339878-5C | 339878-5D | 339878-6C | 339878-6D |

[1] At 100 K [2] Max. 200 ms [3] In EcoDyn mode
*Italics:* data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10%)

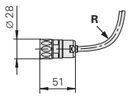
**Rotatable connections**




**Power connector**



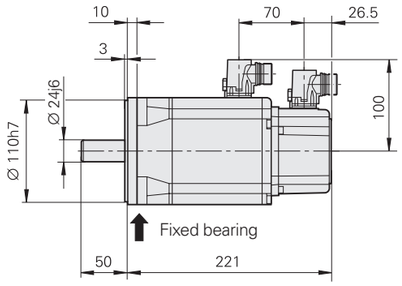

**Encoder connector**



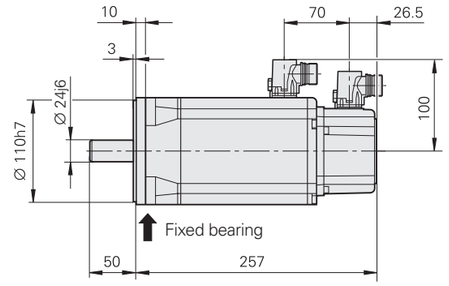

For **R** see page 32

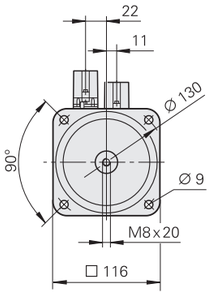


**QSY 116C** Without brake

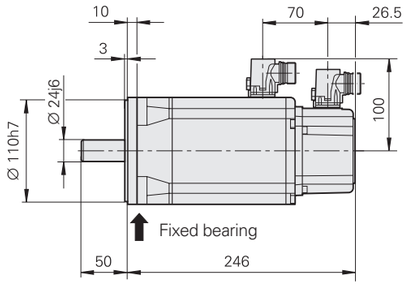



With brake

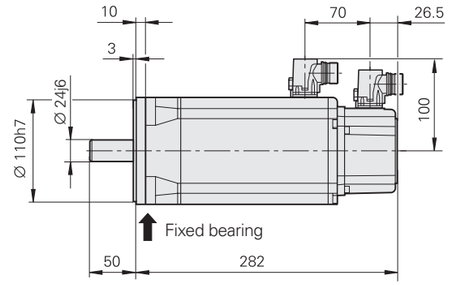


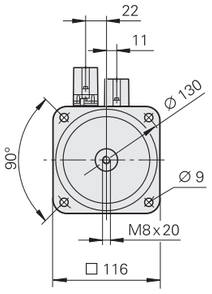




**QSY 116E** Without brake

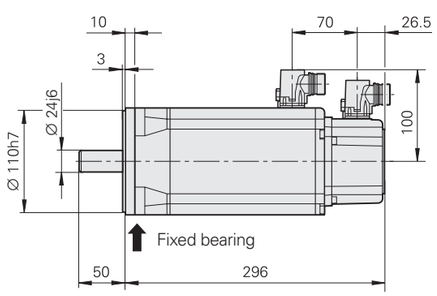



With brake

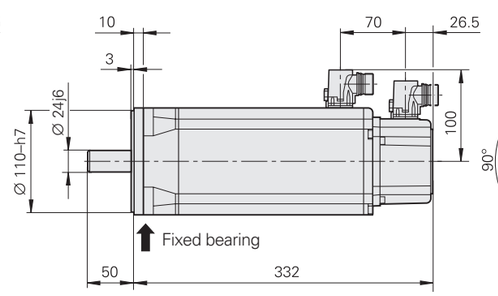


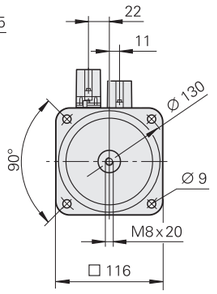




**QSY 116J**
**QSY 116J EcoDyn** Without brake




With brake




mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

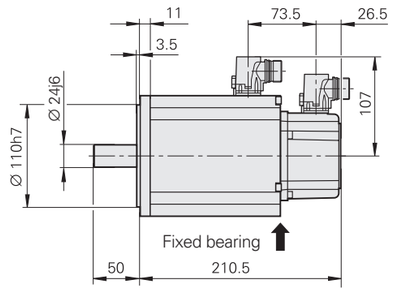
# Synchronous motors
# QSY 130 EcoDyn series

**Feed motors with four pole pairs**
- **Stall torque: 6 Nm and 9 Nm**
- **Choice of incremental or absolute rotary encoder**

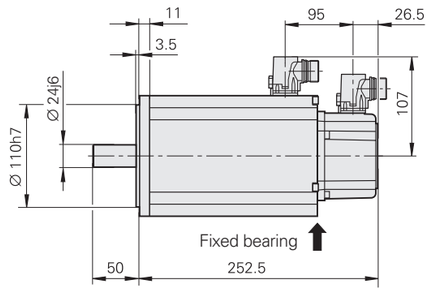
| **Motor** | **QSY 130C EcoDyn** | | **QSY 130E EcoDyn** | |
|---|---|---|---|---|
| **Rated voltage $U_N$** | 415 V/*411 V* | | 407 V/*403 V* | |
| **Rated power output $P_N$** | 1.6 kW/*1.5 kW* | | 2.3 kW/*2.1 kW* | |
| **Rated speed $n_N$** | 3000 rpm (in EcoDyn mode) | | | |
| **Rated torque $M_N$**[1)] | 5.2 Nm/*4.7 Nm* | | 7.4 Nm/*6.7 Nm* | |
| **Rated current $I_N$**[1)] | 2.7 A/*2.4 A* | | 3.8 A/*3.4 A* | |
| **Stall torque $M_0$**[1)] | 6 Nm | | 9 Nm | |
| **Stall current $I_0$**[1)] | 3.0 A | | 4.5 A | |
| **Max. speed $n_{max}$** | 4200 rpm (in EcoDyn mode) | | | |
| **Max. torque $M_{max}$**[2)] | 16 Nm | | 23 Nm | |
| **Max. current $I_{max}$**[2)] | 8.6 A | | 12.7 A | |
| **Brake** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 0.6 A | – | 0.6 A |
| Holding torque $M_{Br}$ | – | 13.5 Nm | – | 13.5 Nm |
| **Mass m** | 7.9 kg | 8.8 kg | 9.7 kg | 10.6 kg |
| **Rotor inertia J** | 16.0 kg·cm² | 16.4 kg·cm² | 21.0 kg·cm² | 21.4 kg·cm² |
| **ID** | | | | |
| Motor with ERN 1387 | 389053-1C | 389053-1D | 388422-1C | 388422-1D |
| Motor with ECN 1313 | 389053-8C | 389053-8D | 388422-8C | 388422-8D |
| Motor with EQN 1325 | 389053-6C | 389053-6D | 388422-6C | 388422-6D |

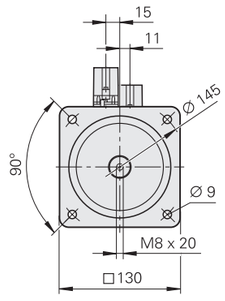
[1)] At 100 K [2)] Max. 200 ms
*Italics:* data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10%)

**QSY 130C** Without brake

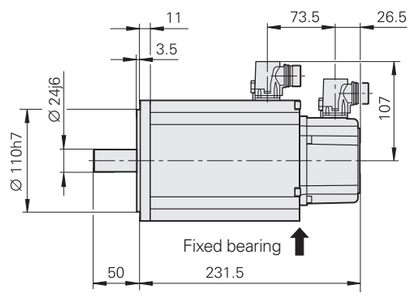



With brake

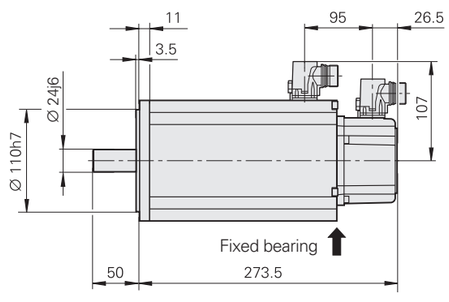


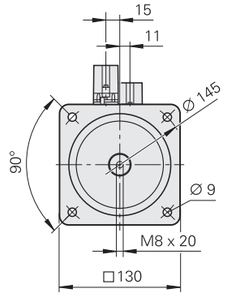




**QSY 130E** Without brake



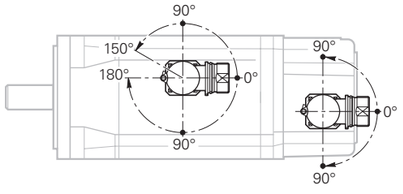

With brake



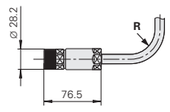




mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

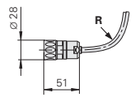
**Rotatable connections**




**Power connector**



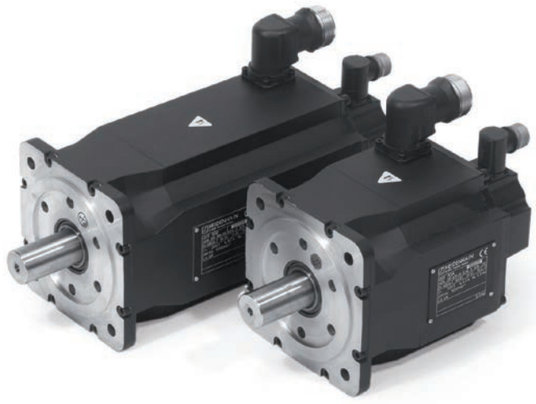

**Encoder connector**




For **R** see page 32

# Synchronous motors
# QSY 155 series

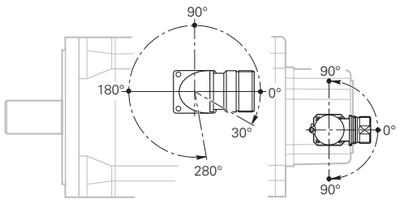
**Feed motors with four pole pairs**
- **Stall torque: 13 Nm to 26.1 Nm**
- **Choice of incremental or absolute rotary encoder**



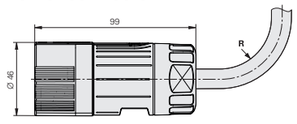
| **Motor** | **QSY 155B** | | **QSY 155C** | | **QSY 155D** | | **QSY 155F** | |
|---|---|---|---|---|---|---|---|---|
| **Rated voltage $U_N$** | 298 V/*295 V* | | 294 V/*291 V* | | 293 V/*291 V* | | 289 V/*287 V* | |
| **Rated power output $P_N$** | 2.9 kW/*2.6 kW* | | 3.9 kW/*3.5 kW* | | 4.6 kW/*4.1 kW* | | 5.2 kW/*4.7 kW* | |
| **Rated speed $n_N$** | 3000 rpm | | | | | | | |
| **Rated torque $M_N$**[1)] | 9.2 Nm/*8.3 Nm* | | 12.5 Nm/*11.3 Nm* | | 14.8 Nm/*13.3 Nm* | | 16.7 Nm/*15.0 Nm* | |
| **Rated current $I_N$**[1)] | 6.9 A/*6.2 A* | | 8.7 A/*7.8 A* | | 10.6 A/*9.5 A* | | 12.0 A/*10.8 A* | |
| **Stall torque $M_0$**[1)] | 13.0 Nm | | 17.7 Nm | | 21.6 Nm | | 26.1 Nm | |
| **Stall current $I_0$**[1)] | 9.1 A | | 11.8 A | | 14.6 A | | 18.0 A | |
| **Max. speed $n_{max}$** | 5000 rpm | | | | | | | |
| **Max. torque $M_{max}$**[2)] | 39 Nm | | 52 Nm | | 64 Nm | | 90 Nm | |
| **Max. current $I_{max}$**[2)] | 29.7 A | | 38.9 A | | 49.5 A | | 68.6 A | |
| **Brake** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 1.17 A | – | 1.17 A | – | 1.17 A | – | 1.17 A |
| Holding torque $M_{Br}$ | – | 40 Nm | – | 40 Nm | – | 40 Nm | – | 40 Nm |
| **Mass m** | 15.0 kg | 18.0 kg | 17.5 kg | 20.5 kg | 20.0 kg | 23.0 kg | 25.0 kg | 28.0 kg |
| **Rotor inertia J** | 33 kg·cm² | 35 kg·cm² | 43 kg·cm² | 45 kg·cm² | 54 kg·cm² | 56 kg·cm² | 75 kg·cm² | 77 kg·cm² |
| **ID** | | | | | | | | |
| Motor with ERN 1387 | 1378139-03 | 1378139-04 | 1378140-03 | 1378140-04 | 1378141-03 | 1378141-04 | 1378142-03 | 1378142-04 |
| Motor with EQN 1325 | 1378139-53 | 1378139-54 | 1378140-53 | 1378140-54 | 1378141-53 | 1378141-54 | 1378142-53 | 1378142-54 |
| Motor with EQN 1337 | 1378139-43 | 1378139-44 | 1378140-43 | 1378140-44 | 1378141-43 | 1378141-44 | 1378142-43 | 1378142-44 |

[1)] At 100 K [2)] Max. 200 ms
*Italics:* data for motors with EQN 1325 or EQN 1337 (rated torque reduced by 10%)

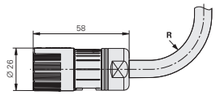
**Rotatable connections**



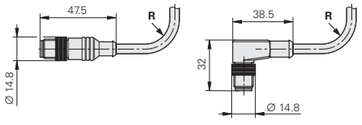

**Power connector**




**Encoder connector for ERN 1387/EQN 1325**



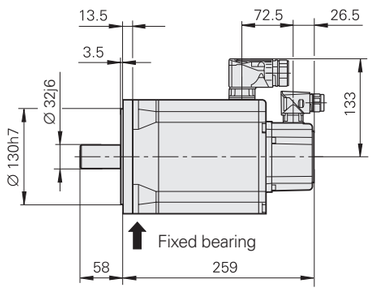

**Encoder connector for EQN 1337**



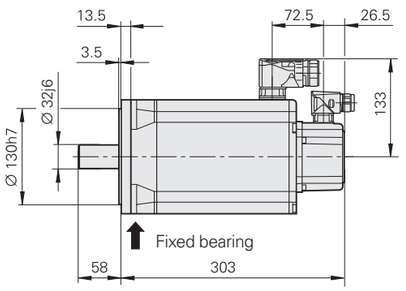

For **R** see page 32

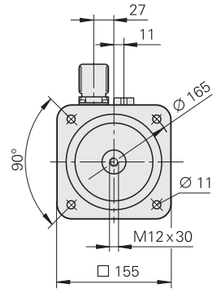


**QSY 155B** Without brake

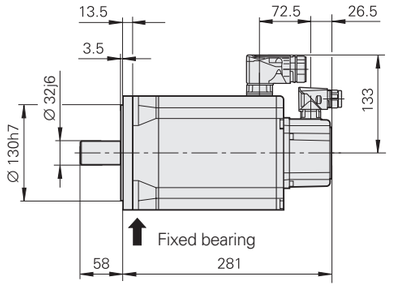



With brake

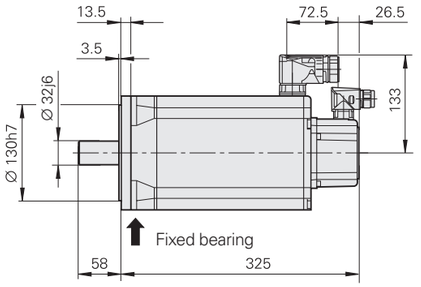


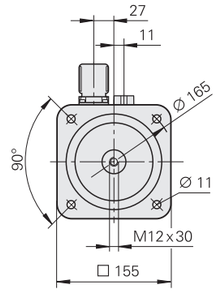




**QSY 155C** Without brake

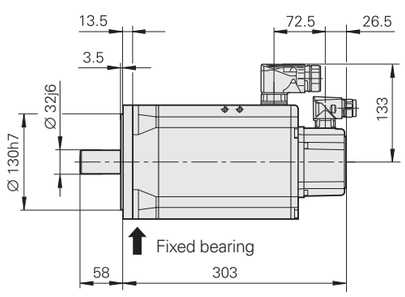



With brake

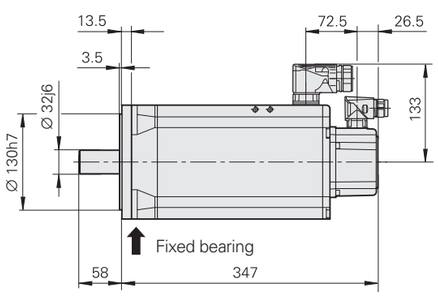


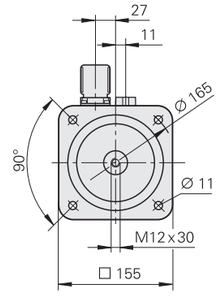




**QSY 155D** Without brake

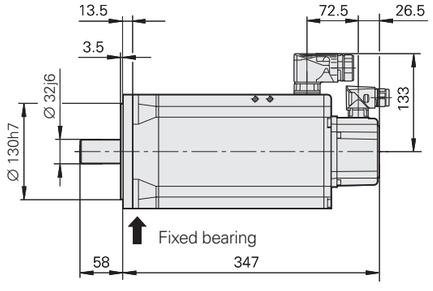



With brake

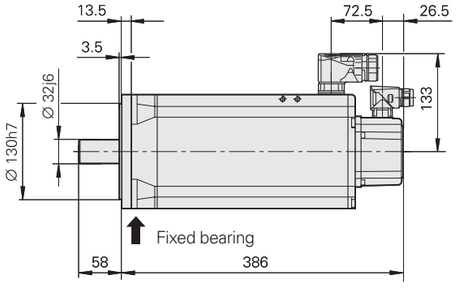


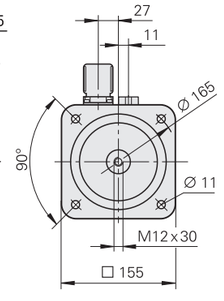




**QSY 155F** Without brake

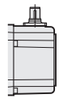



With brake

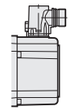



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm



M12 connector for motor-side speed encoder

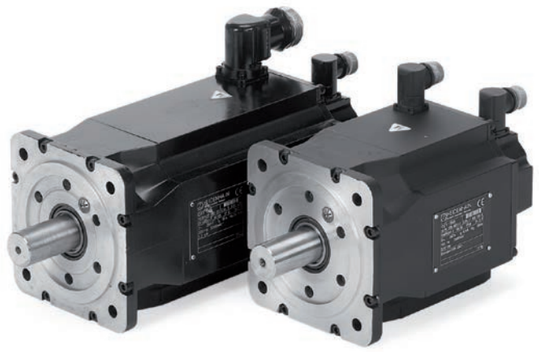


M23 connector for motor-side speed encoder

Synchronous motors

# QSY 155 EcoDyn series

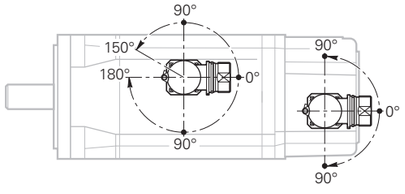
**Feed motors with four pole pairs**
- **Stall torque: 13 Nm to 26.1 Nm**
- **Choice of incremental or absolute rotary encoder**



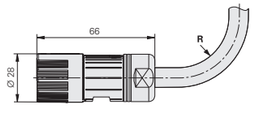
| **Motor** | **QSY 155B EcoDyn** | | **QSY 155C EcoDyn** | | **QSY 155D EcoDyn** | | **QSY 155F EcoDyn** | |
|---|---|---|---|---|---|---|---|---|
| **Rated voltage $U_N$** | 417 V/*412 V* | | 420 V/*415 V* | | 412 V/*407 V* | | 399 V/*397 V* | |
| **Rated power output $P_N$** | 3.5 kW/*3.1 kW* | | 5.0 kW/*4.5 kW* | | 5.7 kW/*5.1 kW* | | 6.0 kW/*5.4 kW* | |
| **Rated speed $n_N$** | 3000 rpm (in EcoDyn mode) | | | | | | | |
| **Rated torque $M_N$**[1)] | 11.0 Nm/*9.9 Nm* | | 16.0 Nm/*14.4 Nm* | | 18.1 Nm/*16.3 Nm* | | 19.2 Nm/*17.3 Nm* | |
| **Rated current $I_N$**[1)] | 5.6 A/*5.0 A* | | 8.2 A/*7.4 A* | | 9.1 A/*8.2 A* | | 9.8 A/*8.8 A* | |
| **Stall torque $M_0$**[1)] | 13.0 Nm | | 17.7 Nm | | 21.6 Nm | | 26.1 Nm | |
| **Stall current $I_0$**[1)] | 6.5 A | | 8.5 A | | 10.6 A | | 12.8 A | |
| **Max. speed $n_{max}$** | 4200 rpm (in EcoDyn mode) | | | | | | | |
| **Max. torque $M_{max}$**[2)] | 39 Nm | | 52 Nm | | 64 Nm | | 90 Nm | |
| **Max. current $I_{max}$**[2)] | 21.2 A | | 27.6 A | | 35.0 A | | 49.5 A | |
| **Brake** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 1.17 A | – | 1.17 A | – | 1.17 A | – | 1.17 A |
| Holding torque $M_{Br}$ | – | 40 Nm | – | 40 Nm | – | 40 Nm | – | 40 Nm |
| **Mass m** | 15.0 kg | 18.0 kg | 17.5 kg | 20.5 kg | 20.0 kg | 23.0 kg | 25.0 kg | 28.0 kg |
| **Rotor inertia J** | 33 kg·cm² | 35 kg·cm² | 43 kg·cm² | 45 kg·cm² | 54 kg·cm² | 56 kg·cm² | 75 kg·cm² | 77 kg·cm² |
| **ID** | | | | | | | | |
| Motor with ERN 1387 | 1378139-13 | 1378139-14 | 1378140-13 | 1378140-14 | 1378141-13 | 1378141-14 | 1378142-13 | 1378142-14 |
| Motor with EQN 1325 | 1378139-63 | 1378139-64 | 1378140-63 | 1378140-64 | 1378141-63 | 1378141-64 | 1378142-63 | 1378142-64 |
| Motor with EQN 1337 | 1378139-33 | 1378139-34 | 1378140-33 | 1378140-34 | 1378141-33 | 1378141-34 | 1378142-33 | 1378142-34 |

[1)] At 100 K [2)] Max. 200 ms
*Italics:* data for motors with EQN 1325 or EQN 1337 (rated torque reduced by 10%)

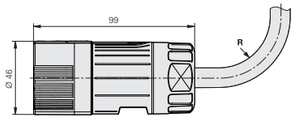
**Rotatable connections**



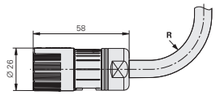

**Power connector for QSY 155B/C/D EcoDyn**



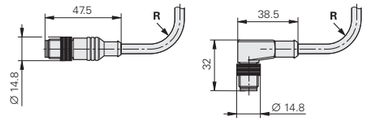

**Power connector for QSY 155F EcoDyn**




**Encoder connector for ERN 1387/EQN 1325**



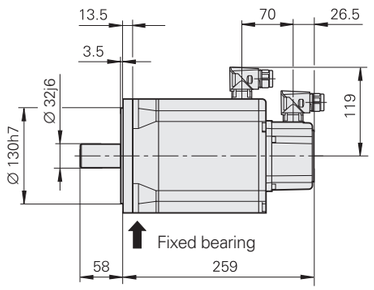

**Encoder connector for EQN 1337**



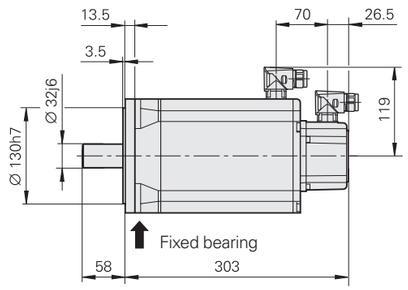

For **R** see page 32

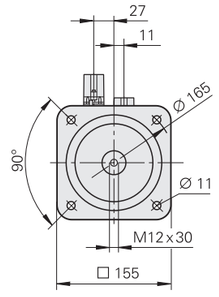


**QSY 155B EcoDyn** Without brake

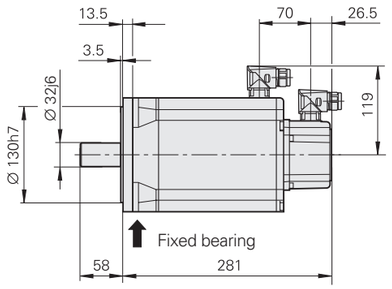



With brake

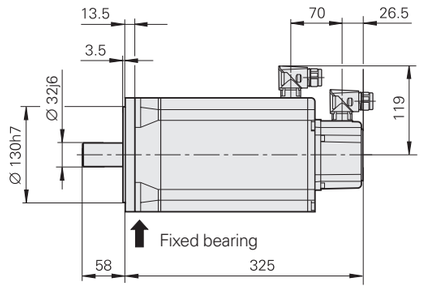


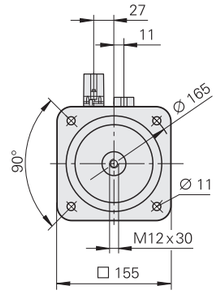




**QSY 155C EcoDyn** Without brake

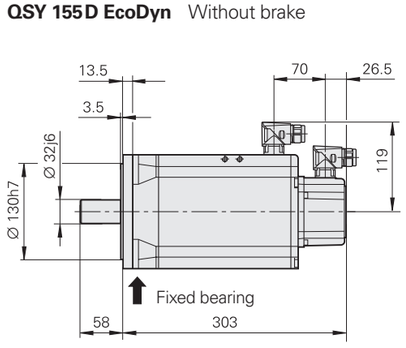



With brake

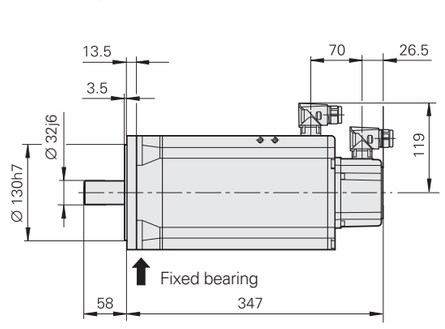


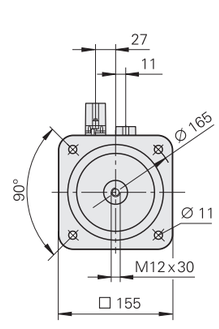




**QSY 155D EcoDyn** Without brake

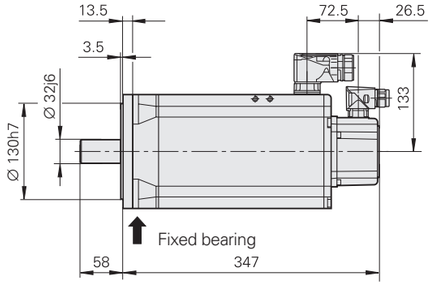



With brake

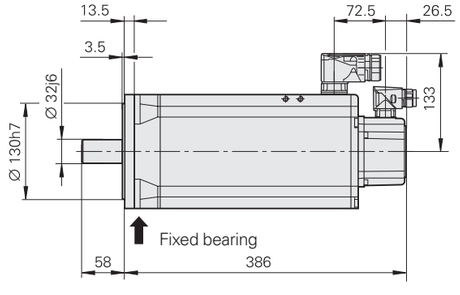


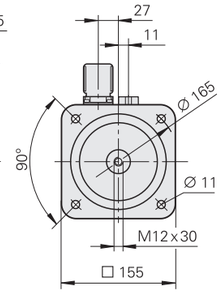




**QSY 155F EcoDyn** Without brake

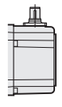



With brake

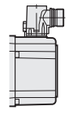



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm



M12 connector for motor-side speed encoder



M23 connector for motor-side speed encoder

Synchronous motors

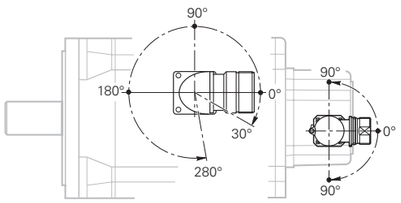
# QSY 190 EcoDyn series

**Feed motors with four pole pairs**
- **Stall torque: 28 Nm to 62.5 Nm**
- **Choice of incremental or absolute rotary encoder**

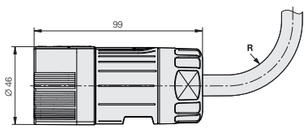
| Motor | QSY 190C EcoDyn | | QSY 190D EcoDyn | | QSY 190F EcoDyn | | QSY 190K EcoDyn | |
|---|---|---|---|---|---|---|---|---|
| **Rated voltage $U_N$** | 427 V/*420 V* | | 421 V/*412 V* | | 408 V/*404 V* | | 399 V/*396 V* | |
| **Rated power output $P_N$** | 7.2 kW/*6.5 kW* | | 9.6 kW/*8.6 kW* | | 9.9 kW/*8.9 kW* | | 12.2 kW/*11.0 kW* | |
| **Rated speed $n_N$** | 3000 rpm (in EcoDyn mode) | | | | | | | |
| **Rated torque $M_N$**[1] | 23.0 Nm/*20.7 Nm* | | 30.6 Nm/*27.5 Nm* | | 31.5 Nm/*28.4 Nm* | | 39.0 Nm/*35.1 Nm* | |
| **Rated current $I_N$**[1] | 11.8 A/*10.6 A* | | 14.4 A/*13.0 A* | | 15.0 A/*13.5 A* | | 20.2 A/*18.2 A* | |
| **Stall torque $M_0$**[1] | 28.0 Nm | | 38.0 Nm | | 47.6 Nm | | 62.5 Nm | |
| **Stall current $I_0$**[1] | 14.0 A | | 18.1 A | | 22.7 A | | 29.8 A | |
| **Max. speed $n_{max}$** | 3900 rpm (in EcoDyn mode) | | | | | | | |
| **Max. torque $M_{max}$**[2] | 85 Nm | | 107 Nm | | 150 Nm | | 240 Nm | |
| **Max. current $I_{max}$**[2] | 50.2 A | | 62.9 A | | 88.4 A | | 134.3 A | |
| **Brake** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 1.38 A | – | 1.38 A | – | 1.38 A | – | 1.38 A |
| Holding torque $M_{Br}$ | – | 70 Nm | – | 70 Nm | – | 70 Nm | – | 70 Nm |
| **Mass m** | 29.0 kg | 37.0 kg | 33.5 kg | 41.5 kg | 42.5 kg | 50.5 kg | 61.0 kg | 69.0 kg |
| **Rotor inertia J** | 106 kg·cm² | 115 kg·cm² | 133 kg·cm² | 142 kg·cm² | 190 kg·cm² | 199 kg·cm² | 290 kg·cm² | 299 kg·cm² |
| **ID** | | | | | | | | |
| Motor with ERN 1387 | 1378156-13 | 1378156-14 | 1378157-13 | 1378157-14 | 1378158-13 | 1378158-14 | 1378159-13 | 1378159-14 |
| Motor with EQN 1325 | 1378156-63 | 1378156-64 | 1378157-63 | 1378157-64 | 1378158-63 | 1378158-64 | 1378159-63 | 1378159-64 |
| Motor with EQN 1337 | 1378156-33 | 1378156-34 | 1378157-33 | 1378157-34 | 1378158-33 | 1378158-34 | 1378159-33 | 1378159-34 |

[1] At 100 K [2] Max. 200 ms
*Italics:* data for motors with EQN 1325 or EQN 1337 (rated torque reduced by 10%)

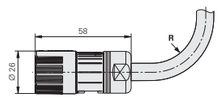
**Rotatable connections**



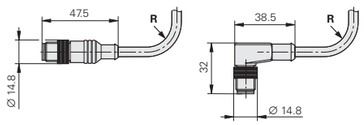

**Power connector**




**Encoder connector for ERN 1387/EQN 1325**



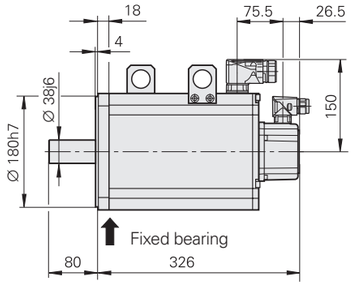

**Encoder connector for EQN 1337**



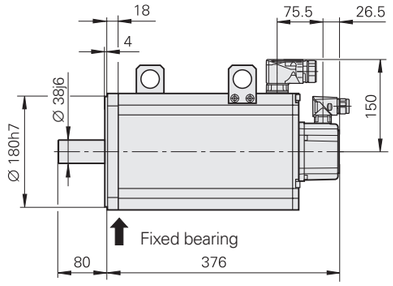

For **R** see page 32

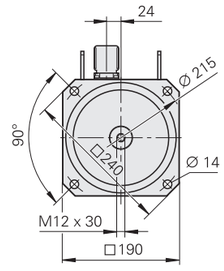


**QSY 190C EcoDyn** Without brake

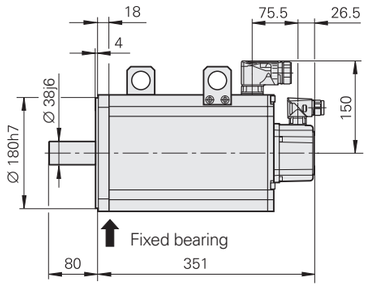



With brake

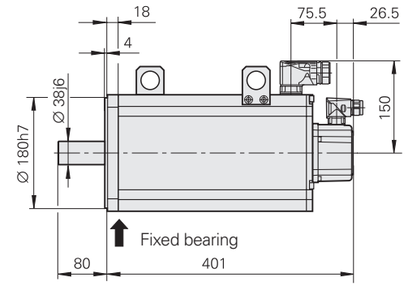


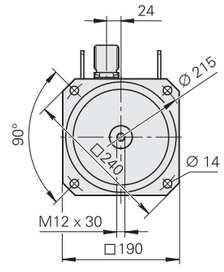




**QSY 190D EcoDyn** Without brake

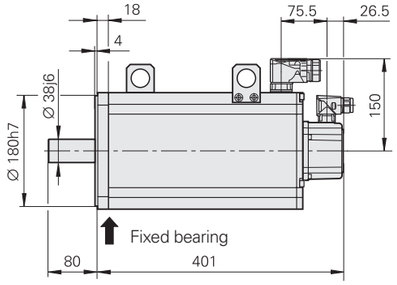



With brake

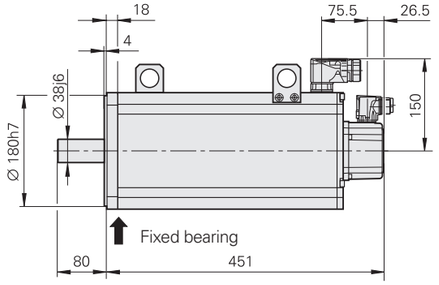


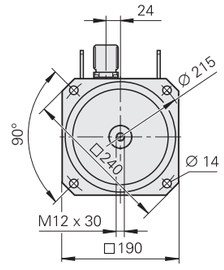




**QSY 190F EcoDyn** Without brake

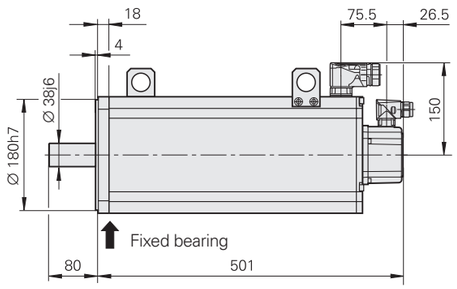



With brake

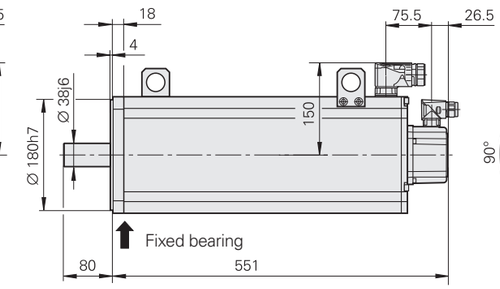


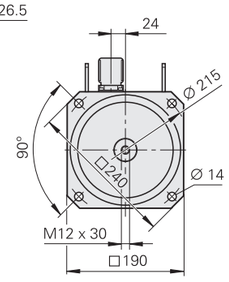




**QSY 190K EcoDyn** Without brake

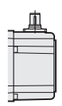



With brake

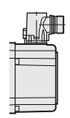



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm



M12 connector for motor-side speed encoder



M23 connector for motor-side speed encoder

Synchronous motors

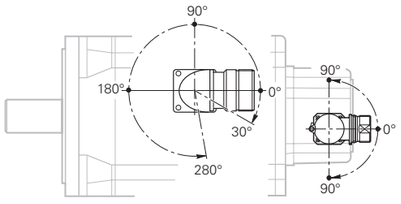
# QSY 260 EcoDyn series

**Feed motors with four pole pairs**
- **Stall torque: 85 Nm to 120 Nm**
- **Choice of incremental or absolute rotary encoder**

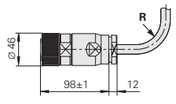
| Motor | QSY 260B EcoDyn | | QSY 260C EcoDyn | |
|---|---|---|---|---|
| **Rated voltage $U_N$** | 352 V/*350 V* | | 376 V/*373 V* | |
| **Rated power output $P_N$** | 12.0 kW/*10.8 kW* | | 16.0 kW/*14.4 kW* | |
| **Rated speed $n_N$** | 2000 rpm (in EcoDyn mode) | | | |
| **Rated torque $M_N$**[1)] | 57.3 Nm/*51.6 Nm* | | 76.4 Nm/*68.8 Nm* | |
| **Rated current $I_N$**[1)] | 21.5 A/*19.4 A* | | 28 A/*25.2 A* | |
| **Stall torque $M_0$**[1)] | 85 Nm | | 120 Nm | |
| **Stall current $I_0$**[1)] | 31.0 A | | 43.5 A | |
| **Max. speed $n_{max}$** | 3000 rpm (in EcoDyn mode) | | | |
| **Max. torque $M_{max}$**[2)] | 250 Nm | | 360 Nm | |
| **Max. current $I_{max}$**[2)] | 130 A | | 173 A | |
| **Brake** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 2.05 A | – | 2.05 A |
| Holding torque $M_{Br}$ | – | 110 Nm | – | 125 Nm |
| **Mass m** | 62 kg | 75 kg | 74 kg | 87 kg |
| **Rotor inertia J** | 357 kg·cm² | 368 kg·cm² | 538 kg·cm² | 557 kg·cm² |
| **ID** | | | | |
| Motor with ERN 1387 | 1110623-1C | 1110623-1D | 1100242-1C | 1100242-1D |
| Motor with EQN 1325 | 1110623-6C | 1110623-6D | 1100242-6C | 1100242-6D |

[1)] At 100 K [2)] Max. 200 ms
*Italics:* data for motors with EQN 1325 (rated torque reduced by 10%)

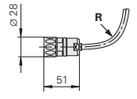
**Rotatable connections**




**Power connector**



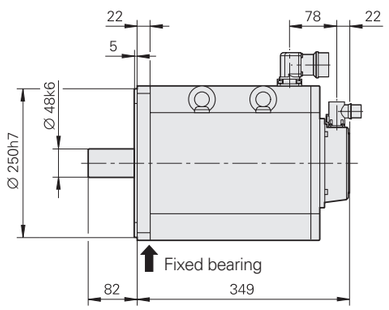

**Encoder connector**



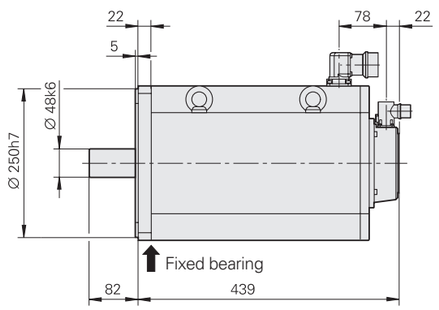

For **R** see page 32

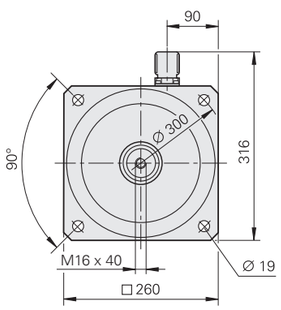


**QSY 260B** Without brake

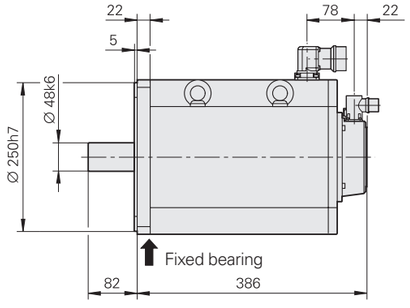



With brake

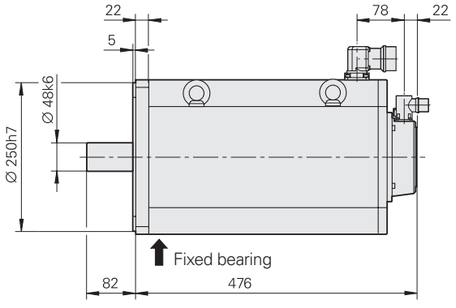


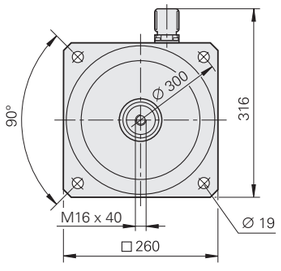




**QSY 260C** Without brake




With brake




mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

# Synchronous motors
# **MSY overview**

## General technical information

HEIDENHAIN MSY servomotors are compact synchronous motors with high dynamic performance for use in machine tools. Thanks to their robust control properties, their excellent speed stability and the moment of inertia perfectly adapted to the application, they are particularly well suited for medium to high-performance feed drives and auxiliary axes. The MSY servomotors have the following characteristics:

- Short and compact design
- Good speed stability
- Plug-and-play functionality
- High-precision fit brake

**Specifications**
The permissible operating range of the MSY motor is limited by thermal, mechanical and electromagnetic factors. The values for the motor characteristics and motor specifications apply to an ambient temperature of up to 40 °C.

**Speed measurement**
Synchronous motors from HEIDENHAIN operate with sinusoidal commutation. An integrated rotary encoder from HEIDENHAIN measures the rotor position and monitors the speed:

- ECI 1323 inductive absolute rotary encoder (singleturn) with functional safety and the EnDat 2.2 interface
- EQI 1335 inductive absolute rotary encoder (multiturn) with functional safety and the EnDat 2.2 interface

**Electronic ID label**
MSY motors are equipped with the EnDat interface and have electronic ID labels. These enable the control to automatically identify the motor. The information stored in this ID label, such as the motor designation, ID number or serial number, can be read and displayed by the internal TNCdiag diagnostic function of the HSCI controls.

**Mechanical service life**
HEIDENHAIN motors contain components that are subject to wear, depending on the application and handling. This especially applies to the following parts:

- Bearings
- Brakes
- Radial shaft seal rings

Depending on the usage conditions of the motors, suitable maintenance intervals should be scheduled. The expected nominal bearing life is 25 000 hours.

**Functional safety**
The rotary encoders used in the motors feature functional safety and are, in principle, therefore suitable for use in safety-related applications. All motors of the MSY series have a fault exclusion feature that prevents loosening of the mechanical connection between the encoder and the motor. Safety-related parameters for the motors or the encoders used within them are available upon request (e.g., MTTF values, data for fault exclusion).

**Installation elevation**
HEIDENHAIN motors may be installed at an elevation of up to 1000 m above sea level. For installation at elevations above 1000 m, additional cooling measures are required.

**Thermal parameters**
The motors are self-cooled, and temperature monitoring of the MSY is performed via a thermal motor model in the HEIDENHAIN control calculated during operation. MSY motors meet the requirements of thermal class F as per DIN EN 60034-1.

**Mechanical parameters**
Maintenance-free bearings
Holding brake optionally with low backlash ≤ 1°

The MSY series motors have a mounting flange in accordance with IEC 60072-1. The HEIDENHAIN MSY synchronous motors exist in the configurations IM B5, IM V1 and IM V3 in accordance with DIN EN 60034-7.

*Mounting the motor*
The following screws are recommended for mounting the motor:
MSY 155 M10
MSY 192 M12

*Protection* as per DIN EN 60529
The MSY motors feature an IP rating of IP64 at their shaft outlet, and an IP65 rating for the entire rest of the motor.

*Vibration severity*
MSY motors conform to vibration severity grade A in accordance with EN 60034-14:2008. This is adhered to up to the nominal speed.

*Radial runout, concentricity and axial runout*
With respect to the flange and shaft precision, MSY motors comply with CEI IEC 72-1:1991-02.

*Shaft end*
The motors have cylindrical shaft ends with front-face center holes according to DIN 332-2. Optionally, the shaft end is available with a keyway. Shaft with keyway and machine key as per DIN 6885-1 (upon request)

- *MSY 155* A 10x8x45
- *MSY 192* A 10x8x50

The motors with machine key are half-key balanced as per ISO 21940-32.

**MSY 155B**

**MSY 155E**

**MSY 192F**

Synchronous motors

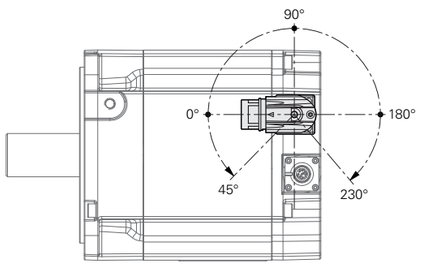
# MSY 155 series

**Feed motors with four pole pairs**
- **Stall torque: 12.8 Nm to 28.9 Nm**
- **With HEIDENHAIN inductive absolute rotary encoders (singleturn or multiturn) and the purely serial EnDat 2.2 interface**

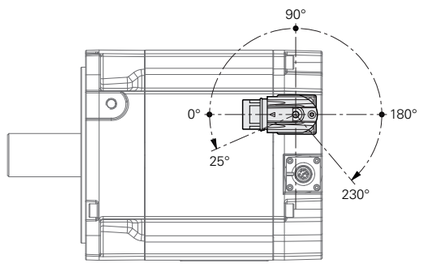
| Motor | MSY 155B | | MSY 155C | | MSY 155D | | MSY 155E | |
|---|---|---|---|---|---|---|---|---|
| **Rated voltage $U_N$** | 299 V | | 296 V | | 298 V | | 305 V | |
| **Rated power output $P_N$** | 3.0 kW | | 3.8 kW | | 4.5 kW | | 4.7 kW | |
| **Rated speed $n_N$** | 2500 rpm | | | | | | | |
| **Rated torque $M_N$**[1] | 11.4 Nm | | 14.6 Nm | | 17.1 Nm | | 18.0 Nm | |
| **Rated current $I_N$**[1] | 7.2 A | | 8.8 A | | 9.9 A | | 10.0 A | |
| **Stall torque $M_0$**[1] | 12.8 Nm | | 18.2 Nm | | 24.1 Nm | | 28.9 Nm | |
| **Stall current $I_0$**[1] | 7.8 A | | 10.5 A | | 13.5 A | | 15.5 A | |
| **Max. speed $n_{max}$** | 5000 rpm | | | | | | | |
| **Max. torque $M_{max}$**[2] | 38 Nm | | 53 Nm | | 67 Nm | | 84 Nm | |
| **Max. current $I_{max}$**[2] | 24.4 A | | 30.9 A | | 36.9 A | | 44.5 A | |
| **Brake** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 1.17 A | – | 1.17 A | – | 1.17 A | – | 1.17 A |
| Holding torque $M_{Br}$ | – | 30 Nm | – | 30 Nm | – | 30 Nm | – | 30 Nm |
| **Mass m** | 12 kg | 15 kg | 15 kg | 18 kg | 18 kg | 20 kg | 20 kg | 23 kg |
| **Rotor inertia J** | 21 kg·cm² | 23 kg·cm² | 30 kg·cm² | 32 kg·cm² | 39 kg·cm² | 42 kg·cm² | 48 kg·cm² | 51 kg·cm² |
| **ID** | | | | | | | | |
| Motor with ECI 1323 (singleturn) | 1361801-01 | 1361802-01 | 1361803-01 | 1361804-01 | 1361805-01 | 1361806-01 | 1361807-01 | 1361808-01 |
| Motor with EQI 1335 (multiturn) | 1361801-11 | 1361802-11 | 1361803-11 | 1361804-11 | 1361805-11 | 1361806-11 | 1361807-11 | 1361808-11 |

[1] At 100 K [2] Max. 200 ms

**Rotatable connections**

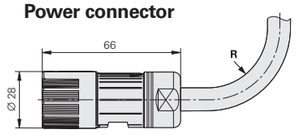



Straight encoder cable

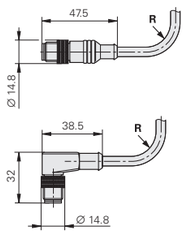



Angled encoder cable (optional)

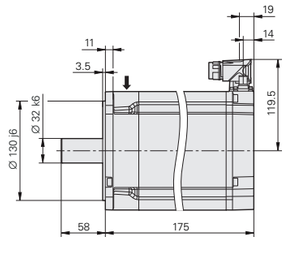
**Power connector**



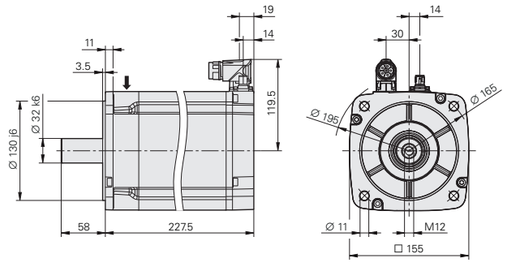

**Encoder connector**



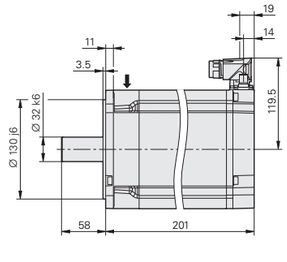

**MSY 155B** Without brake



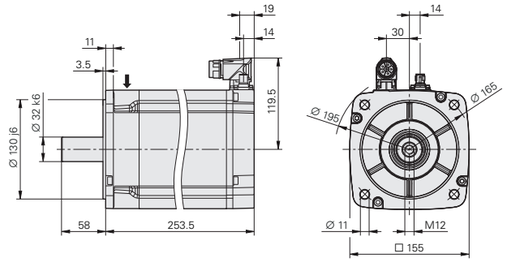

With brake



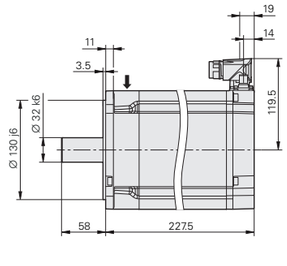

**MSY 155C** Without brake



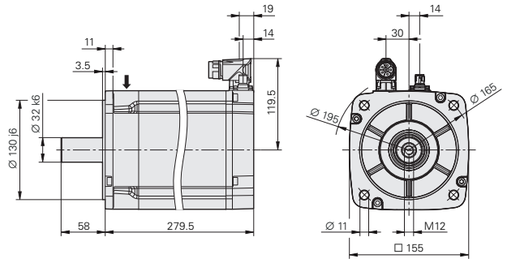

With brake



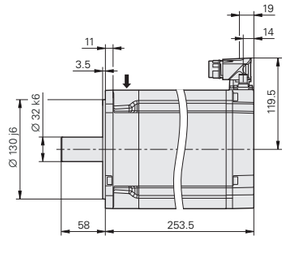

**MSY 155D** Without brake



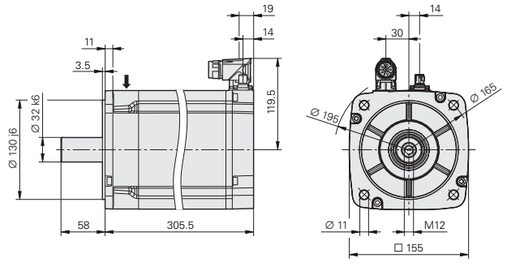

With brake




**MSY 155E** Without brake




With brake




mm

Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

Synchronous motors

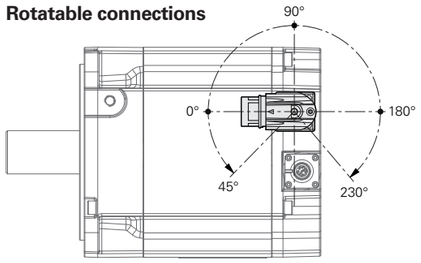
# MSY 192 series

**Feed motors with four pole pairs**
- **Stall torque: 30.3 Nm to 54.5 Nm**
- **With HEIDENHAIN inductive absolute rotary encoders (singleturn or multiturn) and the purely serial EnDat 2.2 interface**

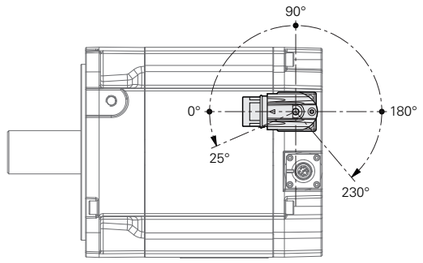
| Motor | MSY 192C | | MSY 192D | | MSY 192E | | MSY 192F | |
|---|---|---|---|---|---|---|---|---|
| **Rated voltage $U_N$** | 308 V | | 280 V | | 293 V | | 289 V | |
| **Rated power output $P_N$** | 5.3 kW | | 6.5 kW | | 6.6 kW | | 7.0 kW | |
| **Rated speed $n_N$** | 2000 rpm | | | | | | | |
| **Rated torque $M_N$**[1] | 25.4 Nm | | 30.9 Nm | | 31.4 Nm | | 33.2 Nm | |
| **Rated current $I_N$**[1] | 11.5 A | | 13.6 A | | 14.4 A | | 15.3 A | |
| **Stall torque $M_0$**[1] | 30.3 Nm | | 39.0 Nm | | 46.0 Nm | | 54.5 Nm | |
| **Stall current $I_0$**[1] | 13.2 A | | 18.3 A | | 20.1 A | | 24.0 A | |
| **Max. speed $n_{max}$** | 5000 rpm | | | | | | | |
| **Max. torque $M_{max}$**[2] | 96 Nm | | 134 Nm | | 162 Nm | | 194 Nm | |
| **Max. current $I_{max}$**[2] | 42.7 A | | 63.8 A | | 71.1 A | | 85.4 A | |
| **Brake** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| Rated voltage $U_{Br}$ | – | DC 24 V | – | DC 24 V | – | DC 24 V | – | DC 24 V |
| Rated current $I_{Br}$ | – | 1.36 A | – | 1.36 A | – | 1.36 A | – | 1.36 A |
| Holding torque $M_{Br}$ | – | 42 Nm | – | 42 Nm | – | 70 Nm | – | 70 Nm |
| **Mass m** | 24 kg | 29 kg | 29 kg | 34 kg | 34 kg | 42 kg | 39 kg | 47 kg |
| **Rotor inertia J** | 82 kg·cm² | 86 kg·cm² | 108 kg·cm² | 112 kg·cm² | 133 kg·cm² | 138 kg·cm² | 159 kg·cm² | 164 kg·cm² |
| **ID** | | | | | | | | |
| Motor with ECI 1323 (singleturn) | 1366801-01 | 1366802-01 | 1366803-01 | 1366804-01 | 1366805-01 | 1366806-01 | 1366807-01 | 1366808-01 |
| Motor with EQI 1335 (multiturn) | 1366801-11 | 1366802-11 | 1366803-11 | 1366804-11 | 1366805-11 | 1366806-11 | 1366807-11 | 1366808-11 |

[1] At 100 K [2] Max. 200 ms

**Rotatable connections**

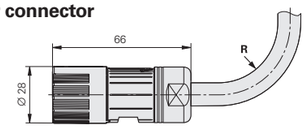


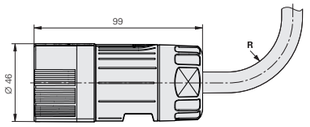

Straight encoder cable



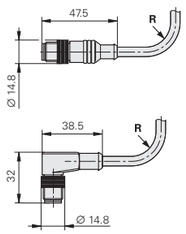

Angled encoder cable (optional)

**Power connector**



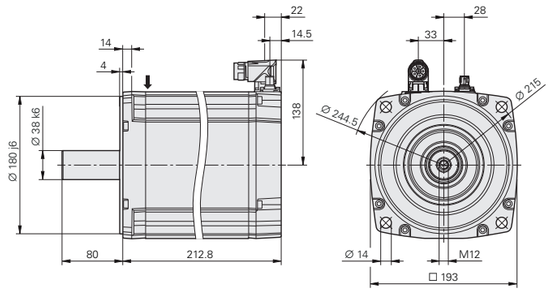




**Encoder connector**

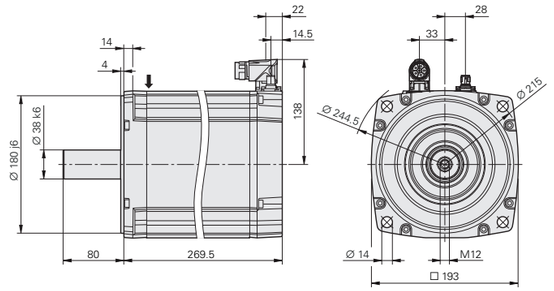




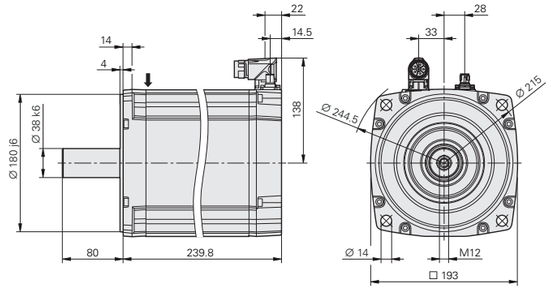

**MSY 192C** Without brake



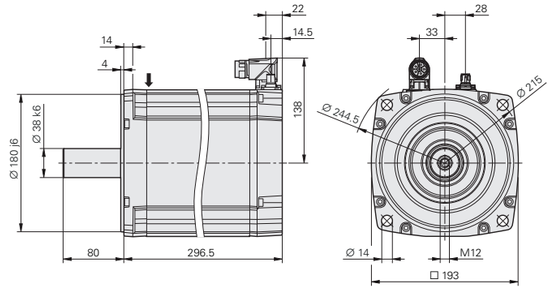

With brake



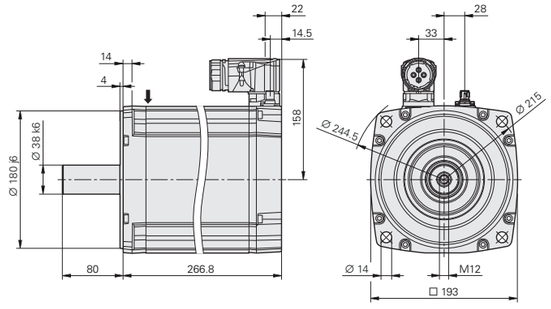

**MSY 192D** Without brake



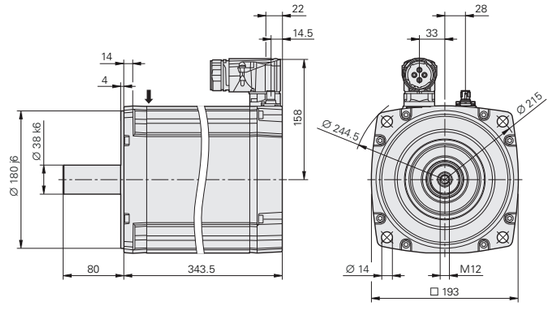

With brake



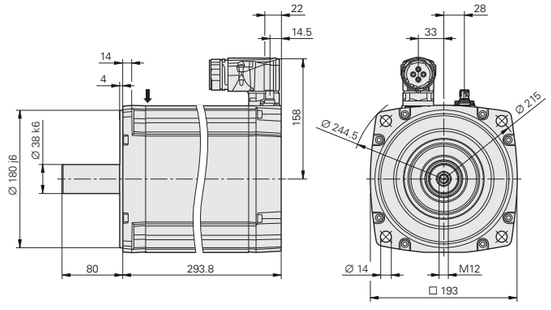

**MSY 192E** Without brake



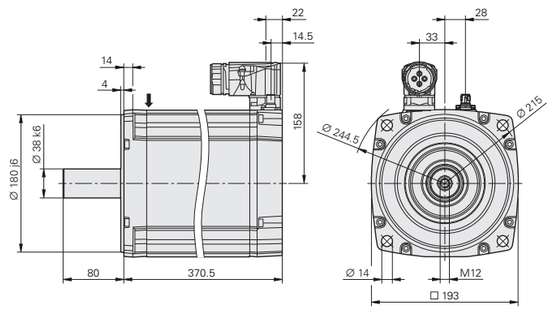

With brake




**MSY 192F** Without brake




With brake




mm

Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

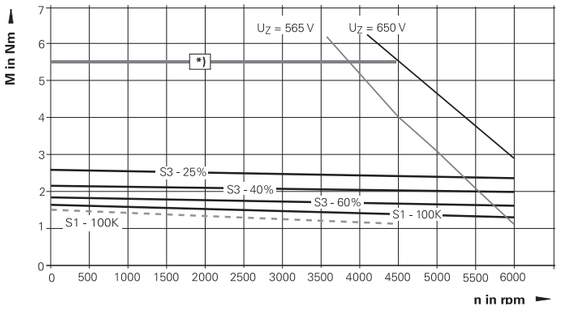
# Synchronous motors
# **Torque characteristic curves**

– – – – – Characteristic curve in accordance with the specification (QSY)
——— Measured characteristic curve of a single motor (QSY)

*) Characteristic curve at maximum motor current (QSY)
**) Characteristic curve during the use of compact inverters (QSY)

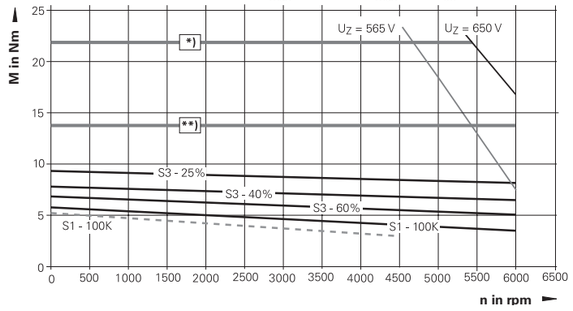
## QSY 96A

*) $M_{max}$ = 5.5 Nm at $I_{max}$ = 6.3 $A_{eff}$



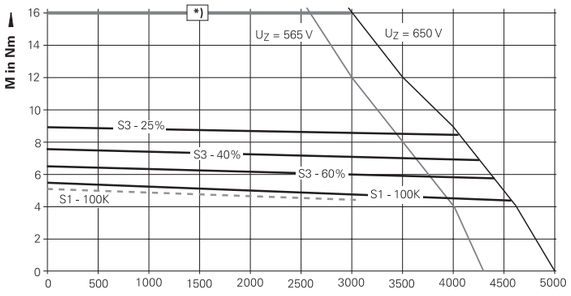

## QSY 96G

*) $M_{max}$ = 22 Nm at $I_{max}$ = 25.4 $A_{eff}$
**) $M_{max}$ = 14 Nm at $I_{max}$ = 15 $A_{eff}$



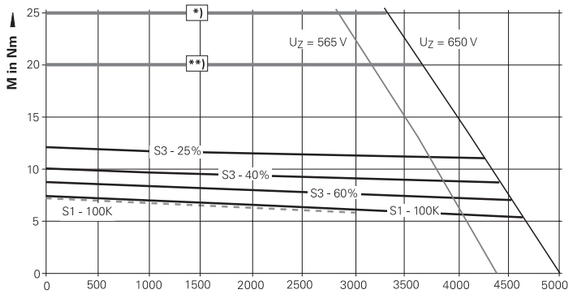

## QSY 116C

*) $M_{max}$ = 16 Nm at $I_{max}$ = 12.7 $A_{eff}$



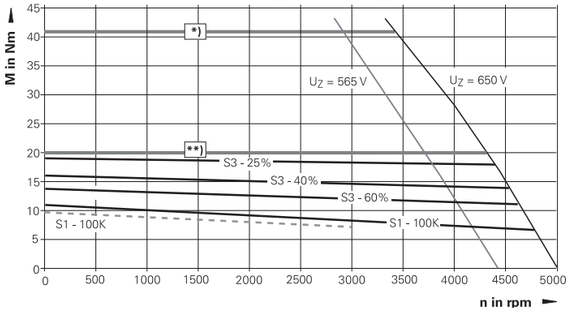

## QSY 116E

*) $M_{max}$ = 25 Nm at $I_{max}$ = 19 $A_{eff}$
**) $M_{max}$ = 21 Nm at $I_{max}$ = 15 $A_{eff}$



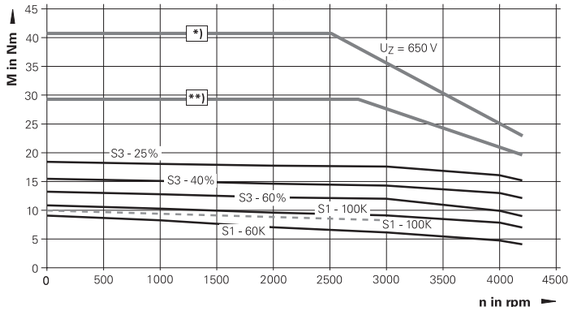

## QSY 116J

*) $M_{max}$ = 41 Nm at $I_{max}$ = 32.6 $A_{eff}$
**) $M_{max}$ = 21 Nm at $I_{max}$ = 15 $A_{eff}$




## QSY 116J EcoDyn

*) $M_{max}$ = 41 Nm at $I_{max}$ = 23 $A_{eff}$
**) $M_{max}$ = 29 Nm at $I_{max}$ = 15 $A_{eff}$



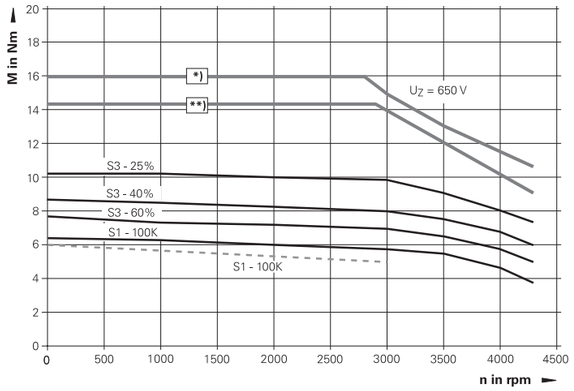

**Notes (valid for QSY)**

- **The characteristic curves apply to motors with the ERN 1387.**
- **S3 mode**
  Cycle duration: 10 minutes
  During the rest period, the motor must be stopped and disconnected from power.



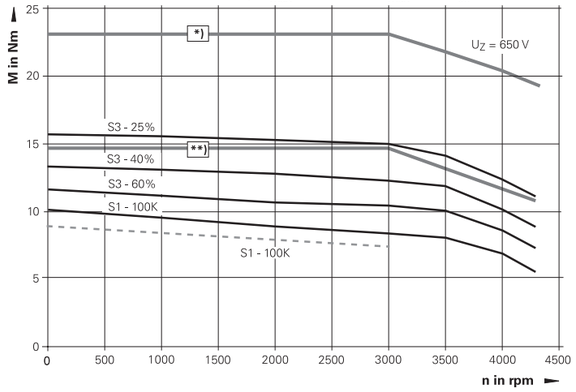
## QSY 130C EcoDyn

*) $M_{max}$ = 16 Nm at $I_{max}$ = 8.6 $A_{eff}$
**) $M_{max}$ = 14.5 Nm at $I_{max}$ = 7.5 $A_{eff}$



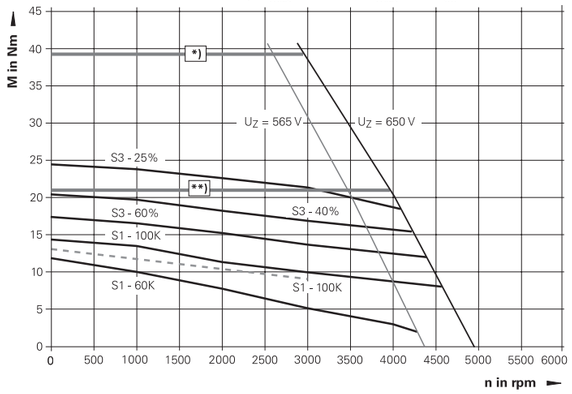

## QSY 130E EcoDyn

*) $M_{max}$ = 23 Nm at $I_{max}$ = 12.7 $A_{eff}$
**) $M_{max}$ = 14.5 Nm at $I_{max}$ = 7.5 $A_{eff}$



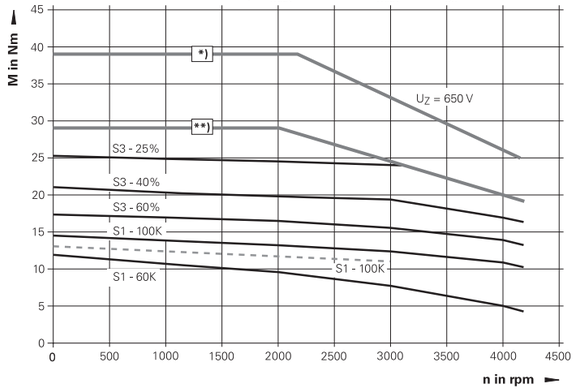

## QSY 155B

*) $M_{max}$ = 39 Nm at $I_{max}$ = 29.7 $A_{eff}$
**) $M_{max}$ = 21 Nm at $I_{max}$ = 15 $A_{eff}$



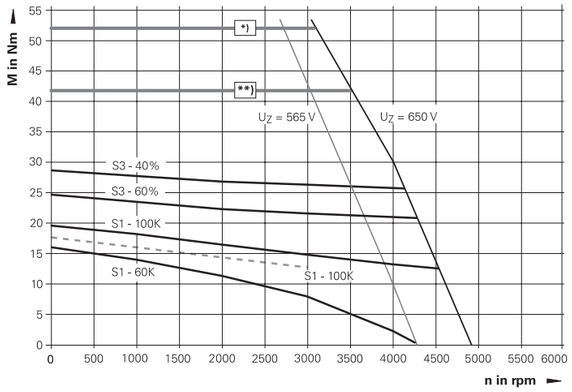

## QSY 155B EcoDyn

*) $M_{max}$ = 39 Nm at $I_{max}$ = 21.2 $A_{eff}$
**) $M_{max}$ = 29 Nm at $I_{max}$ = 15 $A_{eff}$



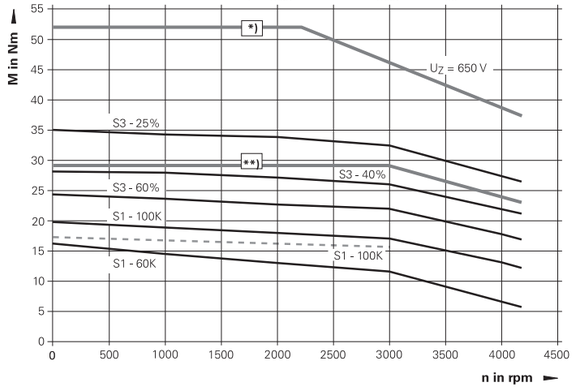

## QSY 155C

*) $M_{max}$ = 52 Nm at $I_{max}$ = 38.9 $A_{eff}$
**) $M_{max}$ = 42 Nm at $I_{max}$ = 30 $A_{eff}$



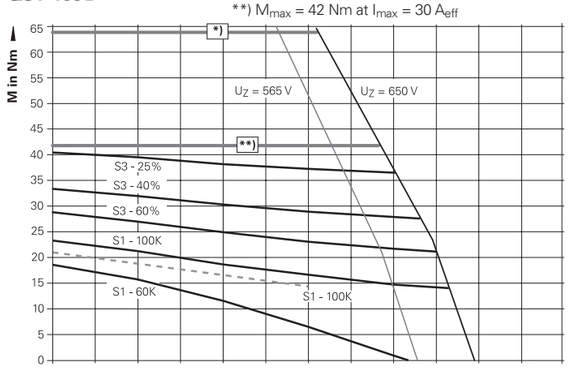

## QSY 155C EcoDyn

*) $M_{max}$ = 52 Nm at $I_{max}$ = 27.6 $A_{eff}$
**) $M_{max}$ = 29 Nm at $I_{max}$ = 15 $A_{eff}$



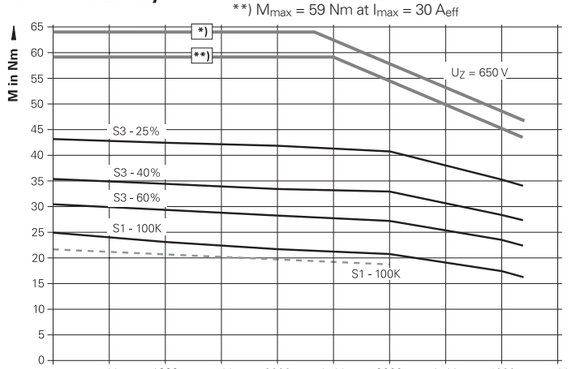

## QSY 155D

*) $M_{max}$ = 64 Nm at $I_{max}$ = 49.5 $A_{eff}$
**) $M_{max}$ = 42 Nm at $I_{max}$ = 30 $A_{eff}$



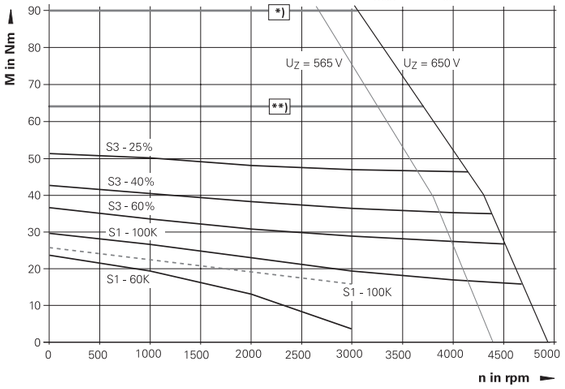

## QSY 155D EcoDyn

*) $M_{max}$ = 64 Nm at $I_{max}$ = 35 $A_{eff}$
**) $M_{max}$ = 59 Nm at $I_{max}$ = 30 $A_{eff}$



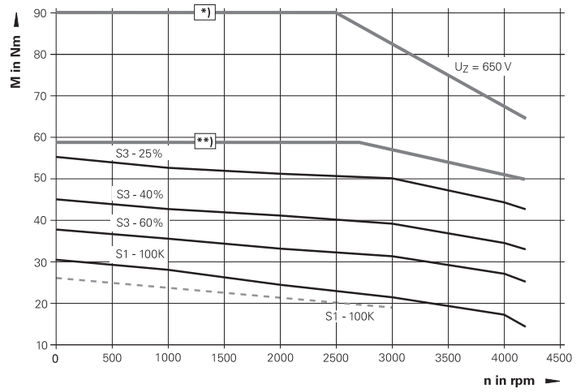
## QSY 155F

*) $M_{max}$ = 90 Nm at $I_{max}$ = 68.6 $A_{eff}$
**) $M_{max}$ = 64 Nm at $I_{max}$ = 46 $A_{eff}$



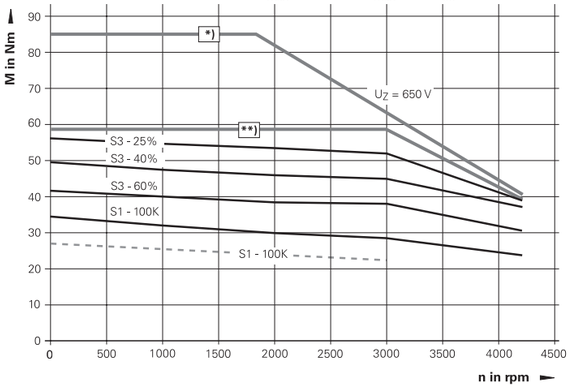

## QSY 155F EcoDyn

*) $M_{max}$ = 90 Nm at $I_{max}$ = 49.5 $A_{eff}$
**) $M_{max}$ = 59 Nm at $I_{max}$ = 30 $A_{eff}$



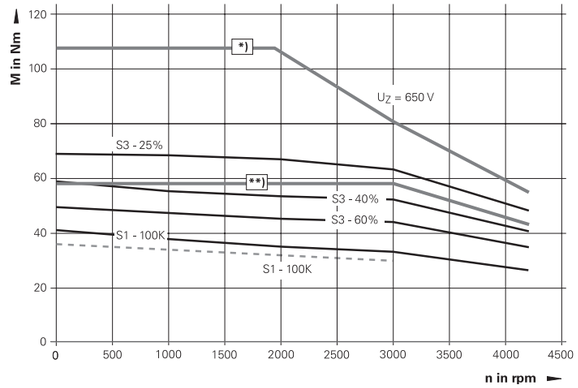

## QSY 190C EcoDyn

*) $M_{max}$ = 85 Nm at $I_{max}$ = 50.2 $A_{eff}$
**) $M_{max}$ = 59 Nm at $I_{max}$ = 30 $A_{eff}$



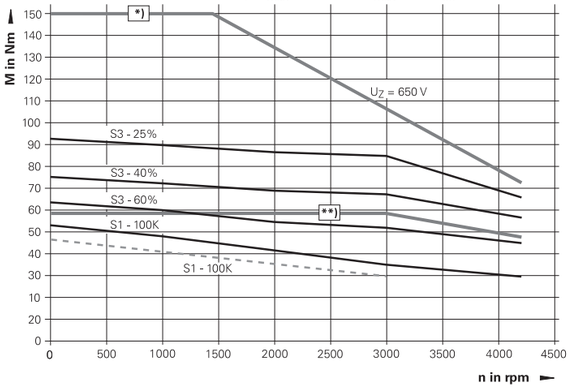

## QSY 190D EcoDyn

*) $M_{max}$ = 107 Nm at $I_{max}$ = 62.9 $A_{eff}$
**) $M_{max}$ = 59 Nm at $I_{max}$ = 30 $A_{eff}$



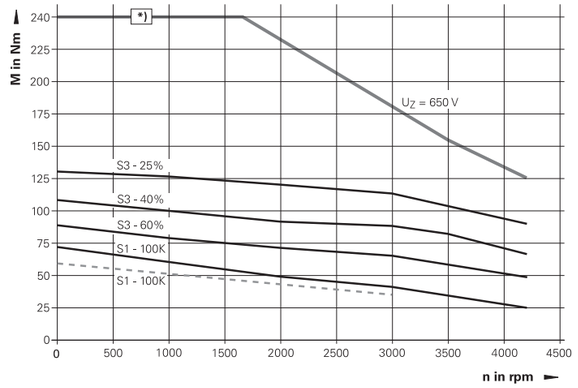

## QSY 190F EcoDyn

*) $M_{max}$ = 150 Nm at $I_{max}$ = 88.4 $A_{eff}$
**) $M_{max}$ = 59 Nm at $I_{max}$ = 30 $A_{eff}$



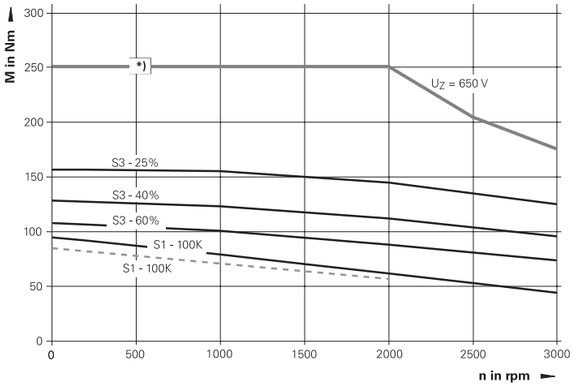

## QSY 190K EcoDyn

*) $M_{max}$ = 240 Nm at $I_{max}$ = 134.3 $A_{eff}$



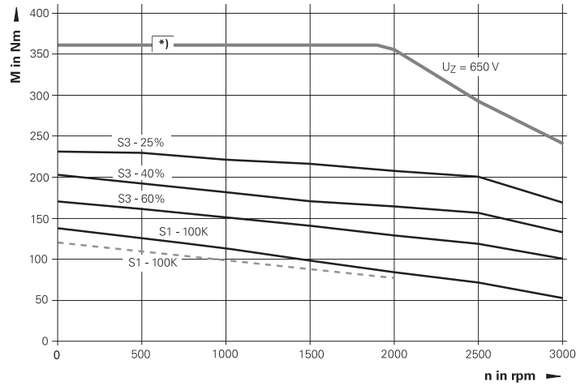

## QSY 260B EcoDyn

*) $M_{max}$ = 250 Nm at $I_{max}$ = 130 $A_{eff}$




## QSY 260C EcoDyn

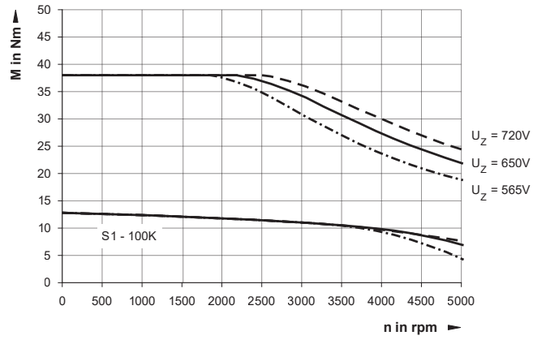
*) $M_{max}$ = 360 Nm at $I_{max}$ = 173 $A_{eff}$





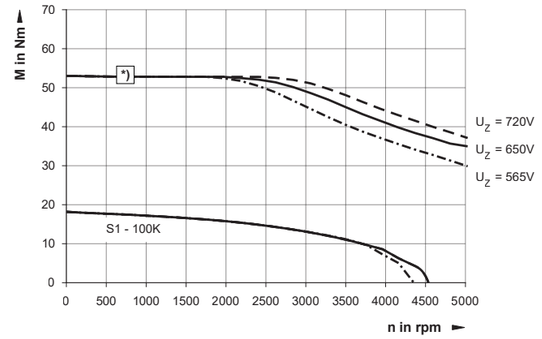

## MSY 155B

*) Characteristic curve at maximum motor current (for MSY)



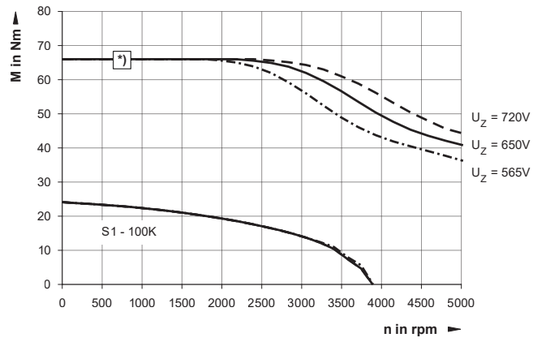

## MSY 155C

*) Characteristic curve at maximum motor current (for MSY)



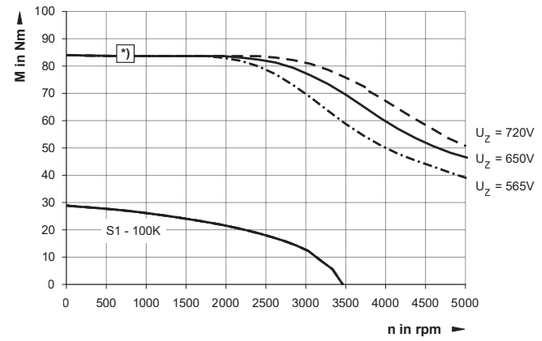

## MSY 155D

*) Characteristic curve at maximum motor current (for MSY)



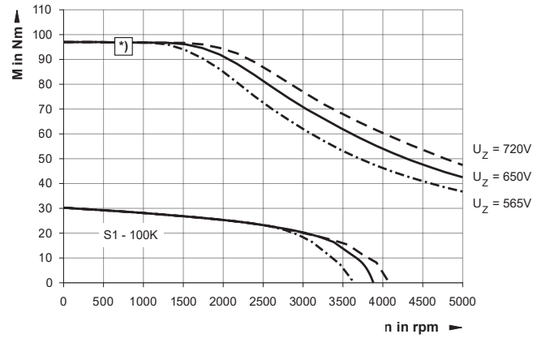

## MSY 155E

*) Characteristic curve at maximum motor current (for MSY)



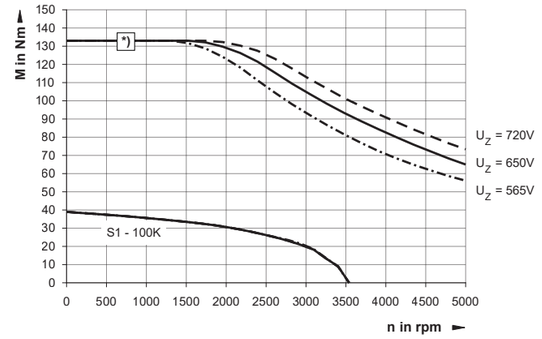

## MSY 192C

*) Characteristic curve at maximum motor current (for MSY)



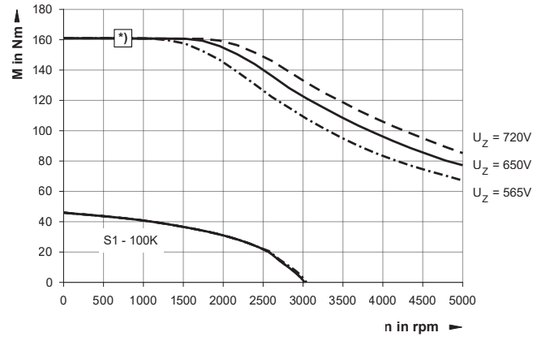

## MSY 192D

*) Characteristic curve at maximum motor current (for MSY)



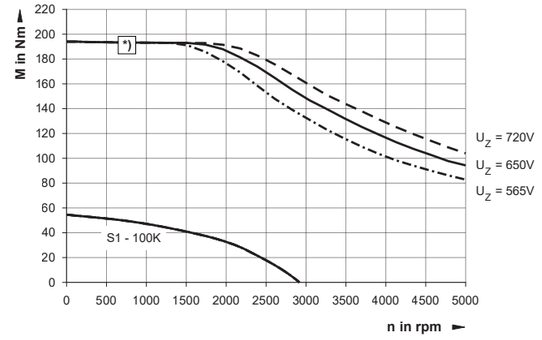

## MSY 192E

*) Characteristic curve at maximum motor current (for MSY)




## MSY 192F

*) Characteristic curve at maximum motor current (for MSY)



# Cables and connectors

## Power cables

Current load at ambient temperature of up to 40 °C

| | Cable with one connector<br>ID | Connector<br>ID | Cable only<br>ID | Bend radius | Cable type | Diameter |
|---|---|---|---|---|---|---|
| **Current load of up to 13.8 A** | | | | | | |
| **QSY 96**<br>**QSY 116**<br>**QSY 130** | 352960-xx<br>*575796-xx* | 325165-02 | 818792-xx<br>*1214270-xx* | ≥ 65 mm<br>≥ *105 mm* | PUR [4 x 1.5 $mm^2$ +<br>(2 x 1.0 $mm^2$)] | 13.0 mm<br>*14.0 mm* |
| **QSY 155 B**<br>**QSY 155 C**<br>**QSY 155 F EcoDyn** | 1362659-xx<br>*1363327-xx* | 1361070-01 | | | | |
| **QSY 155 B EcoDyn**<br>**QSY 155 C EcoDyn**<br>**QSY 155 D EcoDyn** | 1362656-xx<br>*1363300-xx* | 1290178-04 | | | | |
| **MSY 155 B**<br>**MSY 155 C** | 1363300-xx | | *1214270-xx* | ≥ *105 mm* | | |
| **Current load of up to 26.0 A** | | | | | | |
| **QSY 155 D**<br>**QSY 155 F**<br>**QSY 190 C EcoDyn**<br>**QSY 190 D EcoDyn**<br>**QSY 190 F EcoDyn** | 1362661-xx<br>*1363337-xx* | 1361070-01 | 818791-xx<br>*1214271-xx* | ≥ 74 mm<br>≥ *123 mm* | PUR [4 x 4 $mm^2$ +<br>(2 x 1.0 $mm^2$)] | 14.8 mm<br>*15.8 mm* |
| **MSY 155 D**<br>**MSY 155 E**<br>**MSY 192 C**<br>**MSY 192 D** | *1382095-xx* | 1290178-05 | *1214271-xx* | ≥ *123mm* | | |
| **MSY 192 E** | *1363337-xx* | 1361070-03 | | | | |
| **Current load of up to 32.8 A** | | | | | | |
| **QSY 190 K EcoDyn** | 1362662-xx<br>*1363342-xx* | 1361070-04 | 818790-xx<br>*1214272-xx* | ≥ 82 mm<br>≥ *132 mm* | PUR [4 x 6 $mm^2$ +<br>(2 x 1.0 $mm^2$)] | 16.4 mm<br>*17.2 mm* |
| **QSY 260 B EcoDyn** | 393570-xx<br>*690141-xx* | 333090-03 | | | | |
| **MSY 192 F** | *1363342-xx* | 1361070-04 | *1214272-xx* | ≥ *132 mm* | | |
| **Current load of up to 45.8 A** | | | | | | |
| **QSY 260 C EcoDyn** | 1119325-xx<br>*1214663-xx* | 333090-03 | 1214269-xx<br>*1213905-xx* | ≥ 104 mm<br>≥ *177 mm* | PUR [4 x 10 $mm^2$ +<br>(2 x 1.0 $mm^2$)]<br>*PUR [4 x 10 $mm^2$ +*<br>*(2 x 1.5 $mm^2$)]* | 20.8 mm<br>*23.5 mm* |

*Italics:* shielded power cable

## Encoder cables

| | Cable length | Cable complete with connectors<br>ID | Line drop compensator<br>ID | Extension cable<br>ID | Bend radius R for frequent flexing |
|---|---|---|---|---|---|
| **QSY 96**<br>**QSY 116**<br>**QSY 130**<br>**QSY 260**<br>**(with ECN 1313 or EQN 1325)** | < 60 m | 336376-xx | – | 340302-xx<br>(as needed) | ≥ 100 mm |
| **QSY 155**<br>**QSY 190**<br>**(with EQN 1325)** | | 1356866-xx | | 1356400-xx | |
| **QSY 96**<br>**QSY 116**<br>**QSY 130**<br>**QSY 260**<br>**(with ERN 1387)** | < 30 m | 289440-xx | – | 336847-xx<br>(as needed) | |
| **QSY 155**<br>**QSY 190**<br>**(with ERN 1387)** | | 1356866-xx | | 1355363-xx<br>(as needed) | |
| **QSY 96**<br>**QSY 116**<br>**QSY 130**<br>**QSY 260**<br>**(with ERN 1387)** | 30 m to 60 m | 289440-xx | 370226-01 | 336847-xx | |
| **QSY 155**<br>**QSY 190**<br>**(with ERN 1387)** | | 1356866-xx | 370226-02 | 1355363-xx | |
| **MSY with Exl 13xx and QSY with EQN 1337** | < 55 m[1)] | 1133104-xx<br>(D-sub 25) | – | 1036386-xx<br>(angled)<br>1036372-xx<br>(straight) | ≥ 75 mm |
| | < 100 m | 1245639-xx<br>(Mini IO) | | | |

[1)] < 100 m in conjunction with 1313166-01 and Gen 3

# Asynchronous motors
# **QAN overview**

## General technical information

**Specifications**
The specifications and characteristic curves apply to motors mounted without thermal insulation. The maximum permissible temperature divergence from the maximum permissible ambient temperature or coolant temperature of 40 °C is 105 K. If the motor is mounted so that it is thermally insulated, the motor torque must be reduced in order to avoid thermal overloading.

When used in conjunction with Gen 3 drives, motors must be operated only with a DC-link voltage of 650 V.

**Shaft bearing**
HEIDENHAIN asynchronous motors feature maintenance-free bearings. The shaft bearing on **solid-shaft motors** can be selected as either a standard bearing or a spindle bearing. The version with a spindle bearing can withstand greater radial forces and permits higher spindle speeds. Motors with a spindle bearing exhibit a slightly larger overall length.

The **hollow-shaft motors** are generally equipped with a spindle bearing.

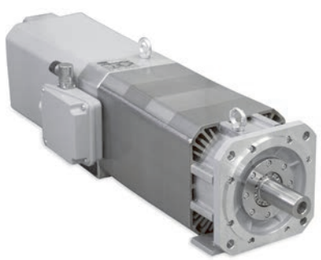
**Shaft end**
HEIDENHAIN QAN asynchronous motors have a cylindrical shaft end according to DIN EN 50347 and IEC 60072-1. The solid-shaft motors have a centering hole in accordance with DIN 332-DS.

The QAN asynchronous solid-shaft motors can be selected in two shaft versions:
- **Plain shaft end:** This version without a keyway is the standard shaft for all asynchronous motors with a spindle bearing.
- **Shaft end with a keyway:**
  Asynchronous motors with a keyway are **half-key balanced** and come with a key as per DIN 6885-1:
  *QAN 200:* AS 10 x 8 x 70
  *QAN 260:* AS 12 x 8 x 90
  *QAN 320:* AS 16 x 10 x 90
  The version with a keyway is the standard shaft for all asynchronous motors with a standard bearing.
- **Shaft end with a double keyway:**
  *QAN 360 UHW:* AS 12 x 8 x 96 (2x)

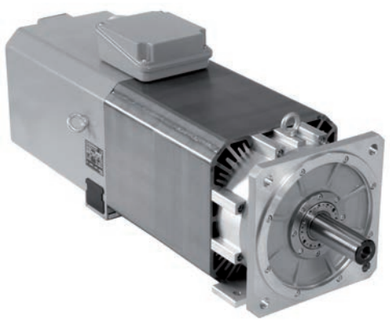
**Mechanical service life**
The service life of the bearings depends on the shaft load and the average shaft speed. For QAN motors, the rated bearing service life is 10 000 hours, which is motor-specific and applies to a certain maximum shaft load at an average speed.

**Speed measurement**
The shaft speed is measured by an integrated HEIDENHAIN rotary encoder:
- ERN 1381 with 1024 lines, for solid-shaft motors
- ERM 2480 with 600 lines, for motors with hollow shaft

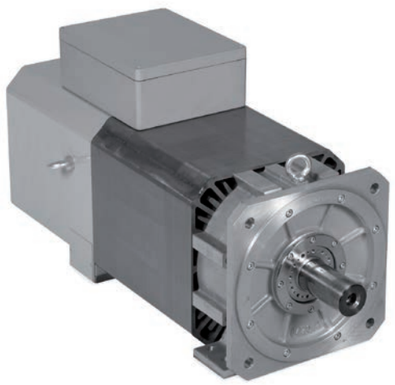
**Please note:**
**Until mid-2014**, the asynchronous motors delivered with a keyway were **full-key balanced**. The current motors are **half-key balanced**. These motors are uniquely identified by their ID number, which always ends in -xH (e.g., 374328-0H)



**QAN 200 UH**



**QAN 260 UH**



**QAN 320 M**

**Precision balancing**
QAN asynchronous motors from HEIDENHAIN can still be balanced at a later time.

**Hollow-shaft motors**
The QAN 200 UH, QAN 260 xH and QAN 360 UHW hollow-shaft motors are suitable for direct mounting on mechanical spindles. Their hollow shaft permits the conveyance of coolant to internally cooled tools.

The coolant is fed in at the rear of the motor through a rotating union (e.g., from the company Deublin, order no.: 1109-020-188). The shaft end is designed for this.

**Installation elevation**
HEIDENHAIN motors may be installed at an elevation of up to 1000 m above sea level. For installation at elevations above 1000 m, additional cooling measures are required.

**Functional safety**
None of the current QAN motor variants described in this brochure feature fault exclusion for the loosening of the mechanical connection between the encoder and the motor.

Safety-related parameters for the motors or the encoders used within them are available upon request (e.g., MTTF values, data for fault exclusion).

**Thermal parameters**
Cooling method:
QAN 200-320: air-cooled
(internal fan)
QAN 360 UHW: water-cooled
Temperature monitoring with KTY 84-130 thermistor in the stator winding
Thermal class F

**Mechanical parameters**
*QAN 200-320 design:*
IM B35 (flange/base mounting) as per EN 60034-7

*QAN 360 UHW design:*
IM B5, IM V1

*Mounting the motor*
The following screws are recommended for mounting the motor:

| *Mounting type:* | *Flange* | *Base* |
|---|---|---|
| QAN 200 | M12 | M10 |
| QAN 260 | M16 | M10 |
| QAN 320 | M16 | M12 |
| QAN 360 UHW | M10 | – |

*Flange:* dimensions as per DIN EN 50347 and IEC 60072-1

*Protection* as per DIN EN 60529
- Motor: IP54 (QAN 200-320)
  IP43 (QAN 360 UHW)
- Shaft end: IP43

*Vibration severity*
Grade SR (external precision balancing possible)
(IEC 60034-14)

**QAN 360 UHW**

Asynchronous motors

# When used with 1xx inverter systems

| Asynchronous motors with solid shaft | Rated power | Rated speed | Maximum speed | | Rated torque | Rated current | Recommended inverters[3] | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Standard bearing | Spindle bearing | | | 1-axis module | 2-axis module | Compact inverter | |
| **QAN 200M** | 5.5 kW | 1500 rpm | 9000 rpm | 12 000 rpm | 35.0 Nm | 18.0 A | UM 112D | UM 122D | Spindle output | **38** |
| **QAN 200L** | 7.5 kW | 1500 rpm | 9000 rpm | 12 000 rpm | 47.8 Nm | 20.1 A | UM 112D | UM 122D | Spindle output | |
| **QAN 200U** | 10.0 kW | 1500 rpm | 9000 rpm | 12 000 rpm | 63.7 Nm | 25.0 A | UM 112D | UM 122D | Spindle output[1] | |
| **QAN 260M** | 15.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 95.5 Nm | 35.0 A | UM 113D | – | Spindle output[2] | **40** |
| **QAN 260L** | 20.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 127.3 Nm | 46.0 A | UM 113D | – | – | |
| **QAN 260U** | 24.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 152.8 Nm | 58.0 A | UM 114D | – | – | |
| **QAN 320M** | 32.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 203.7 Nm | 77.5 A | UM 114D | – | – | **42** |
| **QAN 320L** | 40.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 254.6 Nm | 99.0 A | UM 115D | – | – | |

| Asynchronous motors with hollow shaft | Rated power | Rated speed | Maximum speed | | Rated torque | Rated current | Recommended inverters[3] | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Standard bearing | Spindle bearing | | | 1-axis module | 2-axis module | Compact inverter | |
| **QAN 200UH** | 10.0 kW | 1500 rpm | – | 12 000 rpm<br>15 000 rpm | 63.7 Nm | 25.0 A | UM 112D | UM 122D | Spindle output[1] | **44** |
| **QAN 260MH** | 15.0 kW | 1500 rpm | – | 12 000 rpm | 96.0 Nm | 35.0 A | UM 113D | – | Spindle output[2] | **46** |
| **QAN 260LH** | 20.0 kW | 1500 rpm | – | 12 000 rpm | 128.0 Nm | 46.0 A | UM 113D | – | – | |
| **QAN 260UH** | 22.0 kW | 1500 rpm | – | 10 000 rpm<br>12 000 rpm | 140.0 Nm | 54.0 A | UM 113D[1]<br>UM 114D | – | – | |
| **QAN 360UHW** | 43.2 kW | Wye connection: 450 rpm<br>Delta connection: 780 rpm | – | 7000 rpm | Wye connection: 917 Nm<br>Delta connection: 529 Nm | Wye connection: 113 A<br>Delta connection: 124 A | UM 115D | – | – | **48** |

[1] Only UE 24xB, UR 24x
[2] Only UR 24x
[3] The maximum acceleration of the motor might not be achievable with the recommended inverters. If necessary, a more powerful power module must be selected.



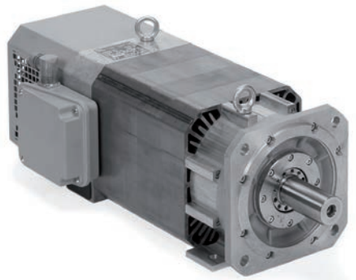
# When used with Gen 3 drives

| Asynchronous motors with solid shaft | Rated power | Rated speed | Maximum speed | | Rated torque | Rated current | Recommended inverters[1] | | | | | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Standard bearing | Spindle bearing | | | 1-axis module | 2-axis module | Compact inverters/axis | | | |
| | | | | | | | | | UEC 31x | UEC 32x | UEC 33x | |
| **QAN 200M** | 5.5 kW | 1500 rpm | 9000 rpm | 12 000 rpm | 35.0 Nm | 18.0 A | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | **38** |
| **QAN 200L** | 7.5 kW | 1500 rpm | 9000 rpm | 12 000 rpm | 47.8 Nm | 20.1 A | UM 311 | UM 321 | 1 to 2 | 1 to 2 | 1 to 5 | |
| **QAN 200U** | 10.0 kW | 1500 rpm | 9000 rpm | 12 000 rpm | 63.7 Nm | 25.0 A | UM 312 | UM 322 | – | 1 to 2 | 1 to 2 | |
| **QAN 260M** | 15.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 95.5 Nm | 35.0 A | UM 312 | UM 322 | – | – | 1 to 2 | **40** |
| **QAN 260L** | 20.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 127.3 Nm | 46.0 A | UM 313 | – | – | – | 1 | |
| **QAN 260U** | 24.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 152.8 Nm | 58.0 A | UM 313 | – | – | – | – | |
| **QAN 320M** | 32.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 203.7 Nm | 77.5 A | UM 314 | – | – | – | – | **42** |
| **QAN 320L** | 40.0 kW | 1500 rpm | 8000 rpm | 10 000 rpm | 254.6 Nm | 99.0 A | UM 315 | – | – | – | – | |

| Asynchronous motors with hollow shaft | Rated power | Rated speed | Maximum speed | | Rated torque | Rated current | Recommended inverters[1] | | Page |
|---|---|---|---|---|---|---|---|---|---|
| | | | Standard bearing | Spindle bearing | | | 1-axis module | 2-axis module | |
| **QAN 200UH** | 10.0 kW | 1500 rpm | – | 12 000 rpm<br>15 000 rpm | 63.7 Nm | 25.0 A | UM 312 | UM 322 | **44** |
| **QAN 260MH** | 15.0 kW | 1500 rpm | – | 12 000 rpm | 96.0 Nm | 35.0 A | UM 312 | UM 322 | **46** |
| **QAN 260LH** | 20.0 kW | 1500 rpm | – | 12 000 rpm | 128.0 Nm | 46.0 A | UM 313 | – | |
| **QAN 260UH** | 22.0 kW | 1500 rpm | – | 10 000 rpm<br>12 000 rpm | 140.0 Nm | 54.0 A | UM 313<br>UM 313 | – | |
| **QAN 360UHW** | 43.2 kW | Wye connection: 450 rpm<br>Delta connection: 780 rpm | – | 7000 rpm | Wye connection: 917 Nm<br>Delta connection: 529 Nm | Wye connection: 113 A<br>Delta connection: 124 A | UM 315 | – | **48** |

[1] The maximum acceleration of the motor might not be achievable with the recommended inverters. If necessary, a more powerful power module must be selected.

# Asynchronous motors with solid shaft
# QAN 200 series

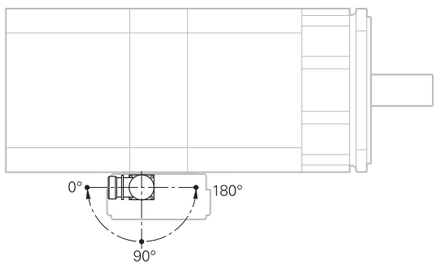


**Spindle motors with two pole pairs**
- **Rated power output: 5.5 kW to 10 kW**
- **Choice of standard bearing or spindle bearing**

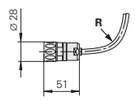
| **Motor** | **QAN 200M** | | **QAN 200L** | | **QAN 200U** | |
|---|---|---|---|---|---|---|
| **Rated voltage $U_N$** | 250 V | | 305 V | | 330 V | |
| **Rated power output $P_N$** | 5.5 kW | | 7.5 kW | | 10.0 kW | |
| **Rated speed $n_N$** | 1500 rpm | | | | | |
| **Rated torque $M_N$** (105 K) | 35.0 Nm | | 47.8 Nm | | 63.7 Nm | |
| **Rated current $I_N$** (105 K) | 18.0 A | | 20.1 A | | 25.0 A | |
| **Efficiency** | 0.85 | | | | | |
| **Max. speed $n_{max}$ [1)]**<br>Standard bearing<br>Spindle bearing | <br>9000 rpm<br>12000 rpm | | <br>9000 rpm<br>12000 rpm | | | |
| **Max. current $I_{max}$** | 33 A | | 36 A | | 44 A | |
| **Mass m** | 51 kg | | 68 kg | | 83 kg | |
| **Rotor inertia J** | 245 kg·cm$^2$ | | 353 kg·cm$^2$ | | 405 kg·cm$^2$ | |
| **Protection** | IP54 | | | | | |
| **Fan**<br>Rated voltage $U_L$<br>Rated current $I_L$<br>Frequency $f_L$ | <br>3AC 400 V<br>0.17 A/0.2 A<br>50 Hz/60 Hz | | | | | |
| **ID**<br>Motor with standard bearing<br>Motor with spindle bearing | **Plain shaft**<br>374328-03<br>**374328-13** | **With keyway**<br>**374328-0H**<br>374328-1H | **Plain shaft**<br>374329-03<br>**374329-13** | **With keyway**<br>**374329-0H**<br>374329-1H | **Plain shaft**<br>374330-03<br>**374330-13** | **With keyway**<br>**374330-0H**<br>374330-1H |

[1)] The maximum shaft speed depends on the application conditions of the motor, such as the shaft load (see the *Motors* Technical Manual)
**Bold**: standard version

**Rotatable connections**



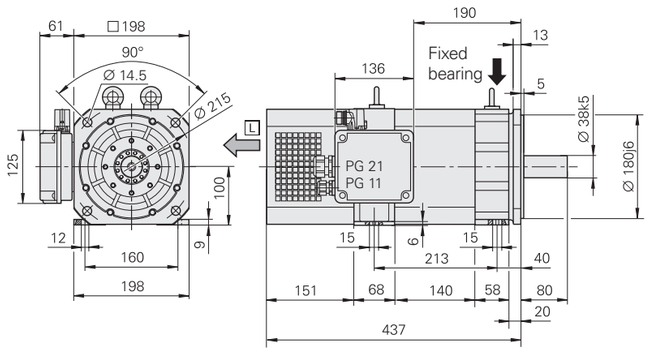

**Encoder connector**



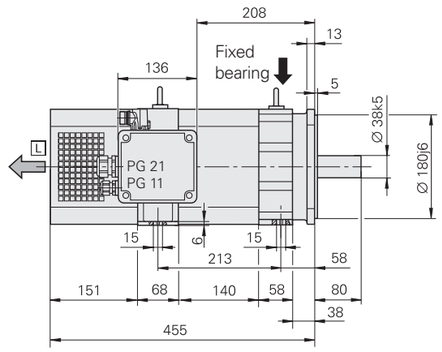

For **R** see page 56

**QAN 200M**

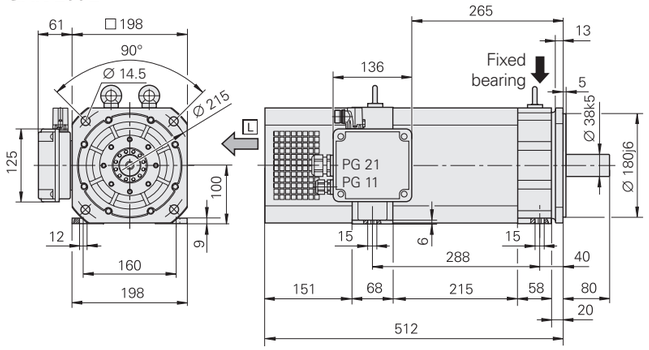
**With standard bearing**

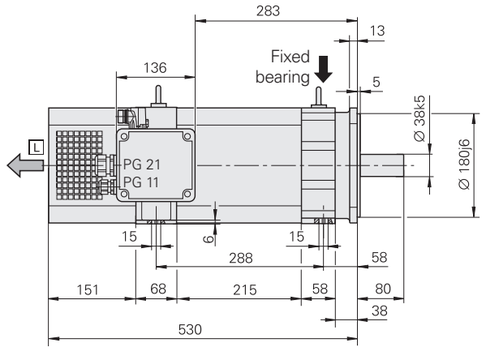



**With spindle bearing**

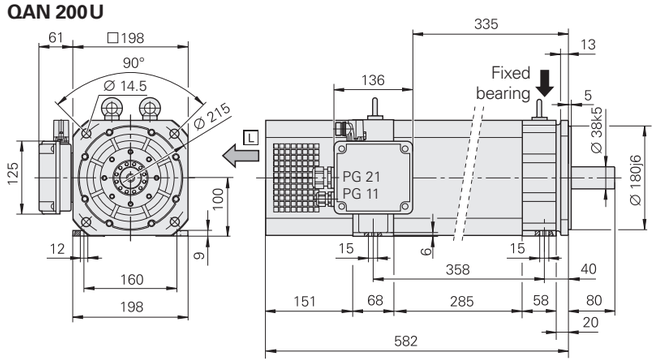


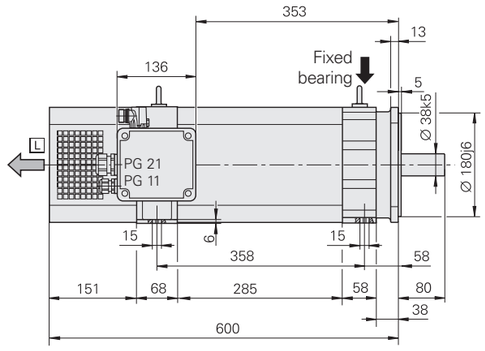

**QAN 200L**




**QAN 200U**



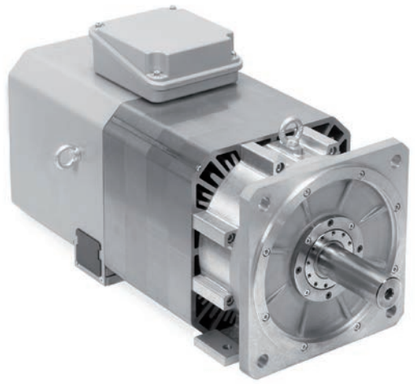




L = Air flow
PG 11: 5 mm to 10 mm
PG 21: 13 mm to 18 mm

mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

# Asynchronous motors with solid shaft
# QAN 260 series

**Spindle motors with two pole pairs**
- **Rated power output: 12 kW to 24 kW**
- **Choice of standard or spindle bearing**

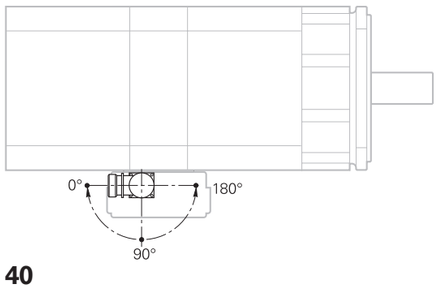


| Motor | QAN 260M | QAN 260L | QAN 260U |
|---|---|---|---|
| **Rated voltage $U_N$** | 348 V | 331 V | 318 V |
| **Rated power output $P_N$** | 15 kW | 20 kW | 24 kW |
| **Rated speed $n_N$** | 1500 rpm | | |
| **Rated torque $M_N$** (105 K) | 96 Nm | 128 Nm | 153 Nm |
| **Rated current $I_N$** (105 K) | 35 A | 46 A | 58 A |
| **Efficiency** | 0.85 | | |
| **Max. speed $n_{max}$** [1)] Standard bearing Spindle bearing* | 8000 rpm 10000 rpm or 12000 rpm | | 8000 rpm 10000 rpm |
| **Max. current $I_{max}$** | 70 A | 96 A | 116 A |
| **Mass m** | 112 kg | 135 kg | 158 kg |
| **Rotor inertia J** | 700 kg·cm² | 920 kg·cm² | 1100 kg·cm² |
| **Protection** | IP54 | | |
| **Fan** Rated voltage $U_L$ Rated current $I_L$ Frequency $f_L$ | 3AC 400 V 0.22 A/0.26 A 50 Hz/60 Hz | | |

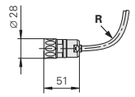
| ID | Solid shaft | With keyway | Solid shaft | With keyway | Solid shaft | With keyway |
|---|---|---|---|---|---|---|
| Motor with standard bearing | 510019-63 | **510019-4H** | 510020-43 | **510020-4H** | 510021-43 | **510021-4H** |
| Motor with spindle bearing | | | | | | |
| 10000 rpm | **510019-53** | 510019-5H | **510020-53** | 510020-5H | **510021-53** | 510021-5H |
| 12000 rpm | **510019-73** | – | **510020-73** | – | – | – |

[1)] The maximum shaft speed depends on the application conditions of the motor, such as the shaft load (see the *Motors* Technical Manual)
* Please select when ordering
**Bold**: standard version

**Rotatable connections**



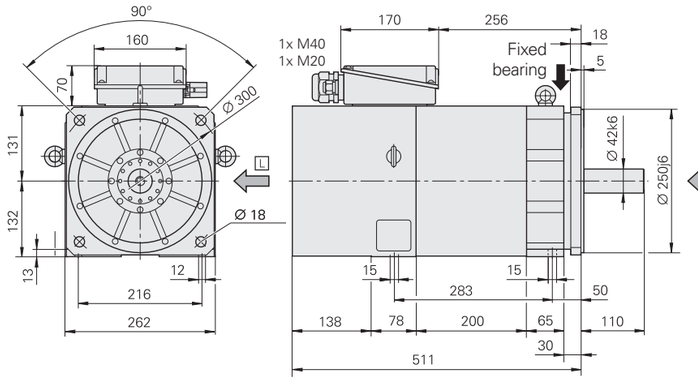

**Encoder connector**



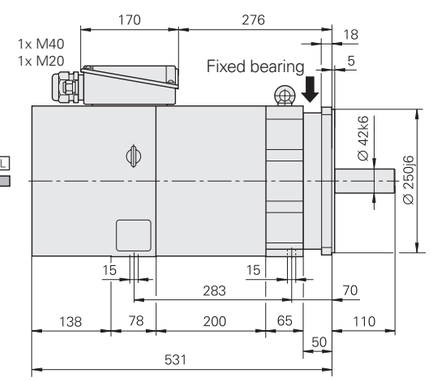

For **R** see page 56

**QAN 260M**

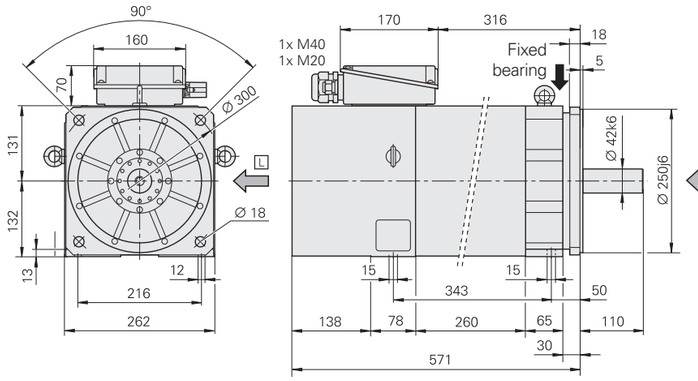
**With standard bearing**

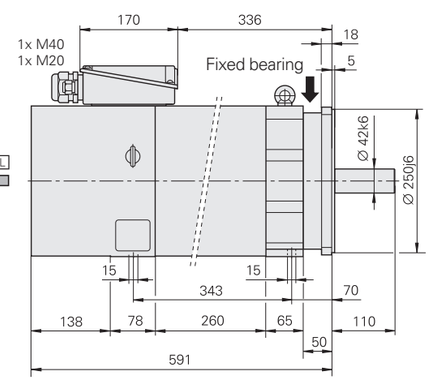



**With spindle bearing**

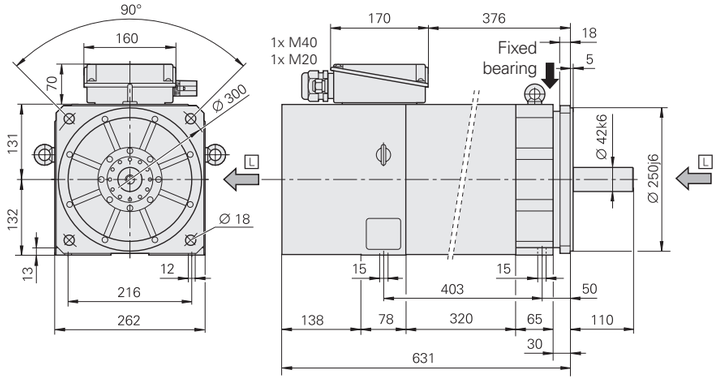


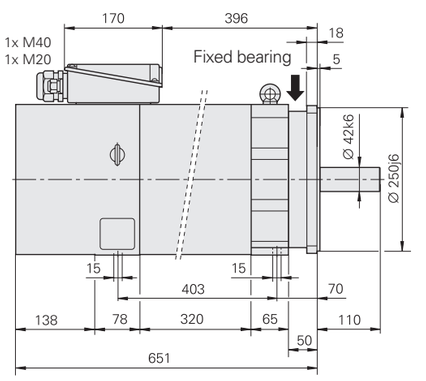

**QAN 260L**




**QAN 260U**




L = Air flow

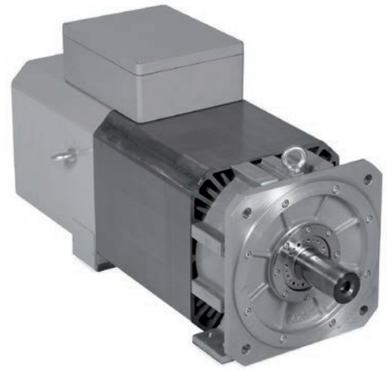
**QAN 260M**
M20: 6 mm to 12 mm
M40: 20 mm to 26 mm

**QAN 260L/U**
M20: 6 mm to 12 mm
M40: 22 mm to 32 mm

mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

# Asynchronous motors with solid shaft
# QAN 320 series

**Spindle motors with two pole pairs**
- **Rated power output: 18 kW to 40 kW**

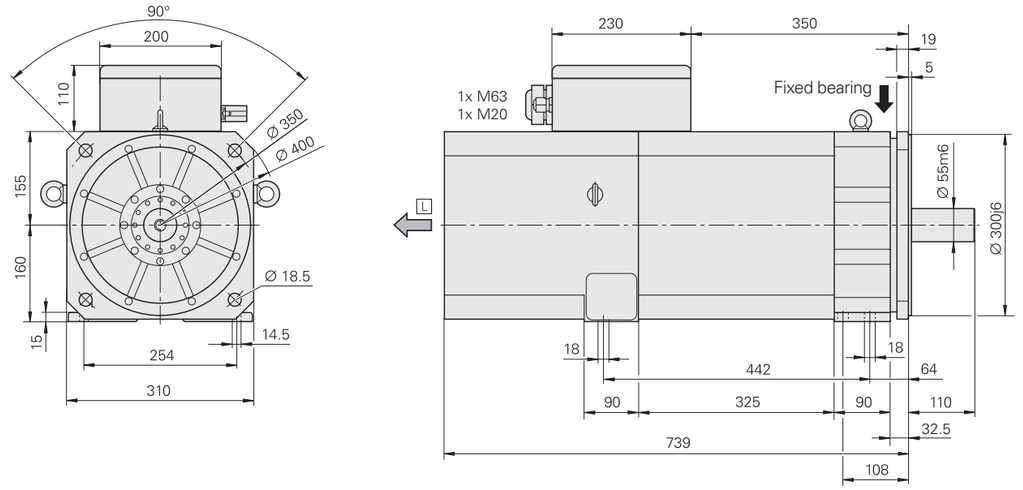


| Motor | QAN 320M | | QAN 320L | |
|---|---|---|---|---|
| **Rated voltage $U_N$** | 317 V | | 315 V | |
| **Rated power output $P_N$** | 32 kW | | 40 kW | |
| **Rated speed $n_N$** | 1500 rpm | | 1500 rpm | |
| **Rated torque $M_N$** (105 K) | 203.7 Nm | | 254.6 Nm | |
| **Rated current $I_N$** (105 K) | 77.5 A | | 99.0 A | |
| **Efficiency** | 0.85 | | 0.91 | |
| **Max. speed $n_{max}$** [1)] | | | | |
| Standard bearing | 8000 rpm | | | |
| Spindle bearing | 10000 rpm | | | |
| **Max. current $I_{max}$** | 155 A | | 186 A | |
| **Mass m** | 240 kg | | 280 kg | |
| **Rotor inertia J** | 1870 kg·cm$^2$ | | 2300 kg·cm$^2$ | |
| **Fan** | | | | |
| Rated voltage $U_L$ | 3AC 400 V | | | |
| Rated current $I_L$ | 0.33 A/0.43 A | | | |
| Frequency $f_L$ | 50 Hz/60 Hz | | | |
| **ID** | **Plain shaft** | **With keyway** | **Plain shaft** | **With keyway** |
| Motor with standard bearing | 513302-43 | **513302-4H** | 577484-43 | **577484-4H** |
| Motor with spindle bearing | **513302-53** | 513302-5H | **577484-53** | 577484-5H |

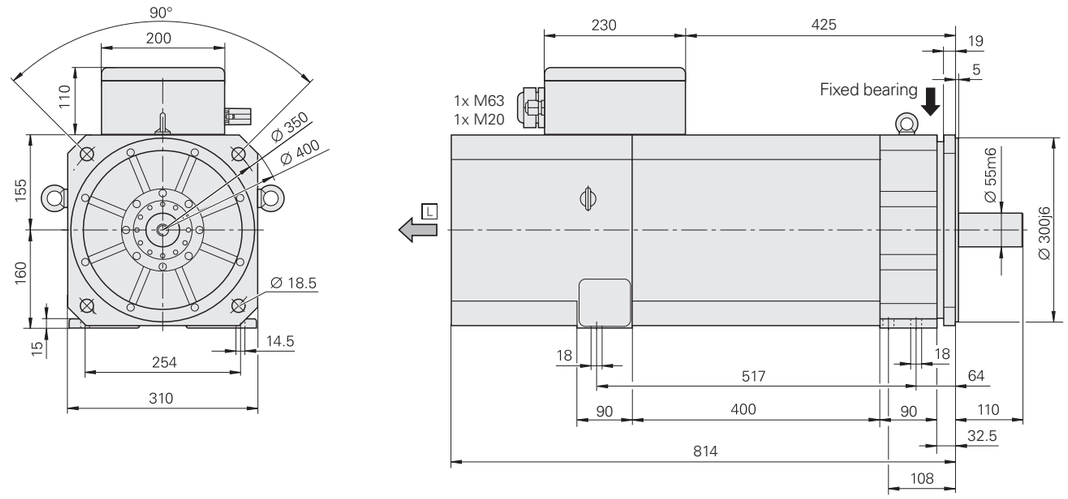
1) The maximum shaft speed depends on the application conditions of the motor, such as the shaft load (see the *Motors* Technical Manual)

**Bold**: standard version

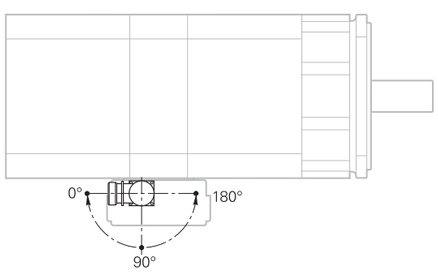
**QAN 320M**



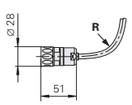

**QAN 320L**




**Rotatable connections**




**Encoder connector**

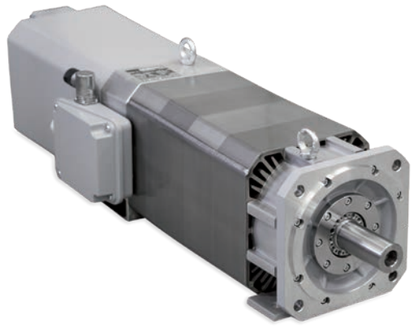



For **R** see page 56

L = Air flow
M20: 6 mm to 12 mm
M63: 34 mm to 45 mm

mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

# Asynchronous motors with hollow shaft
# QAN 200 UH

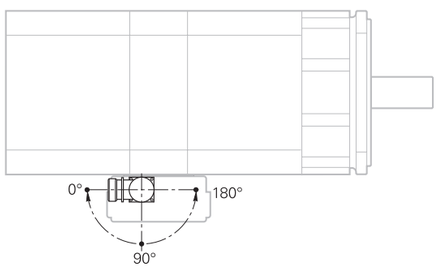


**Hollow-shaft spindle motor with two pole pairs**
- **Rated power output: up to 10 kW**
- **With spindle bearing**

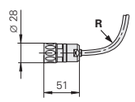
| **Motor** | **QAN 200 UH** | |
|---|---|---|
| **Rated voltage $U_N$** | 330 V | |
| **Rated power output $P_N$** | 10 kW | |
| **Rated speed $n_N$** | 1500 rpm | |
| **Rated torque $M_N$** (105 K) | 63.7 Nm | |
| **Rated current $I_N$** (105 K) | 25 A | |
| **Efficiency** | 0.85 | |
| **Max. speed $n_{max}$** [1)] Spindle bearing | 12 000 rpm | 15 000 rpm |
| **Max. current $I_{max}$** | 44 A | |
| **Hollow shaft bore** | Ø 9 mm | |
| **Mass m** | 91 kg | |
| **Rotor inertia J** | 405 kg·cm² | |
| **Protection** | IP54 | |
| **Fan**<br>Rated voltage $U_L$<br>Rated current $I_L$<br>Frequency $f_L$ | <br>3AC 400 V<br>0.17 A/0.2 A<br>50 Hz/60 Hz | |
| **ID**<br>Motor with spindle bearing | 536257-18 | 536257-58 |

[1)] The maximum shaft speed depends on the application conditions of the motor, such as the shaft load (see the *Motors* Technical Manual)

**Rotatable connections**




**Encoder connector**

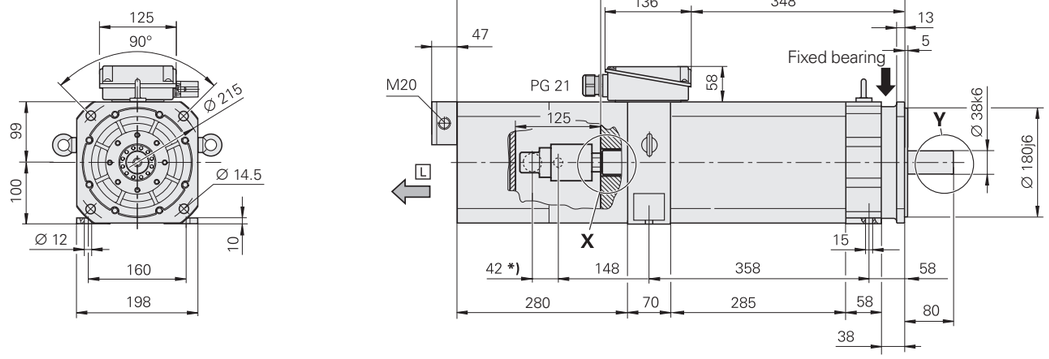


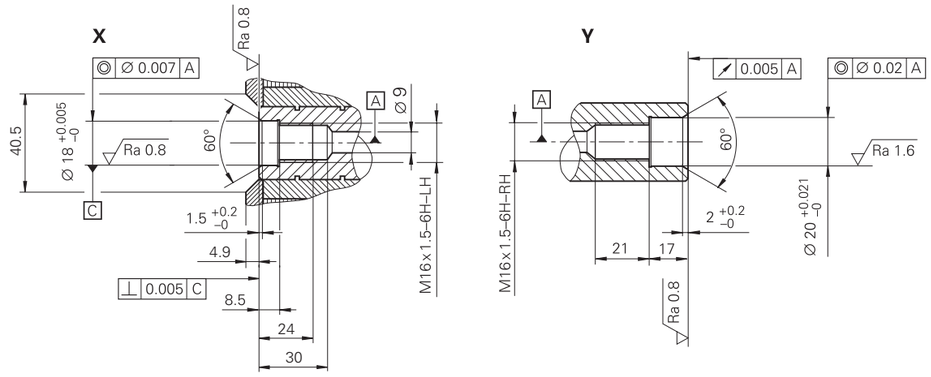

For **R** see page 56



**QAN 200 UH** 12 000 rpm

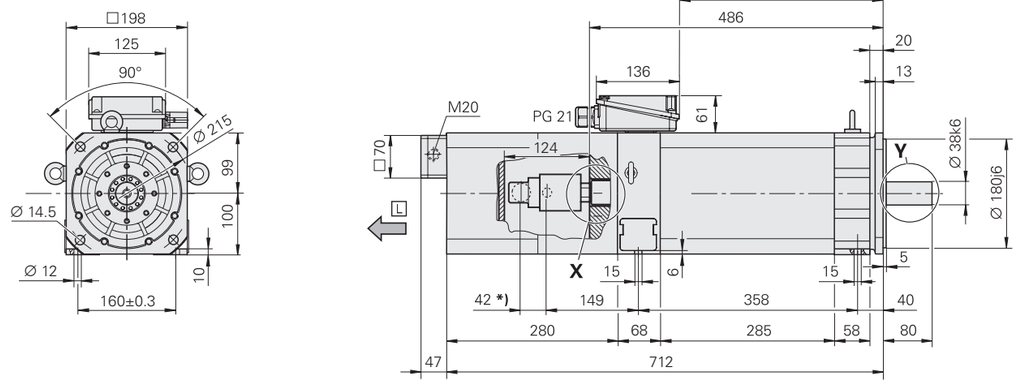
**With spindle bearing**




**QAN 200 UH** 15 000 rpm

**With spindle bearing**

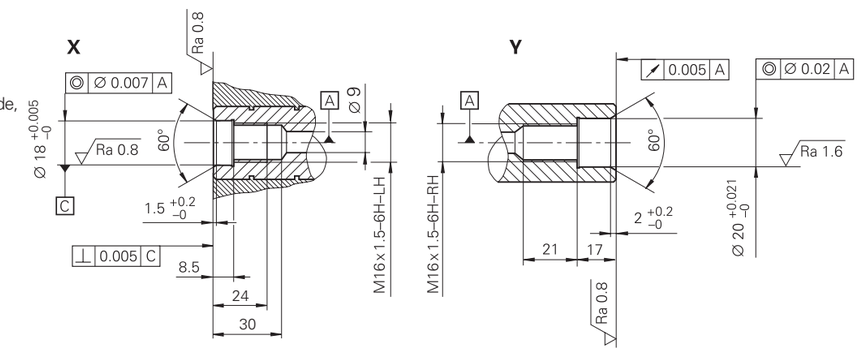



L = Air flow
PG 21: 13 mm to 18 mm
M20: 6 mm to 12 mm

*) = Coolant connection on the right side, e.g., from Deublin 1109-020-188

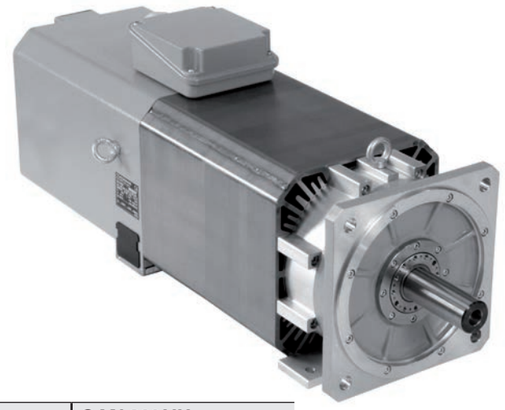
mm

Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm



# Asynchronous motors with hollow shaft

# QAN 260 xH series

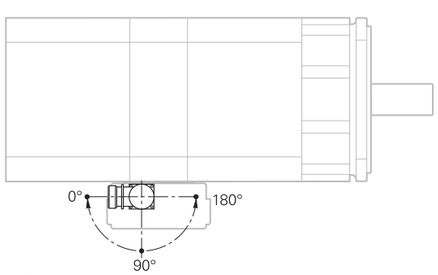


**Hollow-shaft spindle motor with two pole pairs**
- **Rated power output: 15 kW to 22 kW**
- **With spindle bearing**

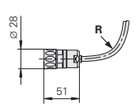
| Motor | QAN 260 MH | QAN 260 LH | QAN 260 UH |
|---|---|---|---|
| **Rated voltage $U_N$** | 348 V | 331 V | 318 V |
| **Rated power output $P_N$** | 15 kW | 20 kW | 22 kW |
| **Rated speed $n_N$** | 1500 rpm | | |
| **Rated torque $M_N$** (105 K) | 96 Nm | 128 Nm | 140 Nm |
| **Rated current $I_N$** (105 K) | 35 A | 46 A | 54 A |
| **Efficiency** | 0.85 | | |
| **Max. speed $n_{max}$ [1)]** Spindle bearing* | 12 000 rpm | | 10 000 rpm or 12 000 rpm |
| **Max. current $I_{max}$** | 70 A | 96 A | 116 A |
| **Mass m** | 120 kg | 143 kg | 158 kg |
| **Rotor inertia J** | 700 kg·cm² | 920 kg·cm² | 1100 kg·cm² |
| **Protection** | IP54 | | |
| **Fan** Rated voltage $U_L$ Rated current $I_L$ Frequency $f_L$ | 3AC 400 V 0.22 A/0.26 A 50 Hz/60 Hz | | |
| **ID** Motor with spindle bearing | | | |
| 10 000 rpm | – | – | 536259-53 |
| 12 000 rpm | 642855-73 | 631449-73 | 536259-73 |

[1)] The maximum shaft speed depends on the application conditions of the motor, such as the shaft load (see the *Motors* Technical Manual)
* Please select when ordering

**Rotatable connections**



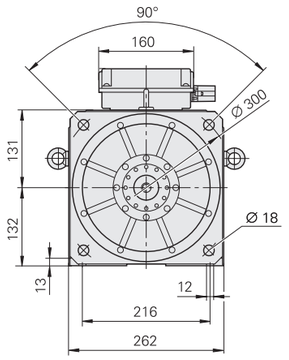

**Encoder connector**



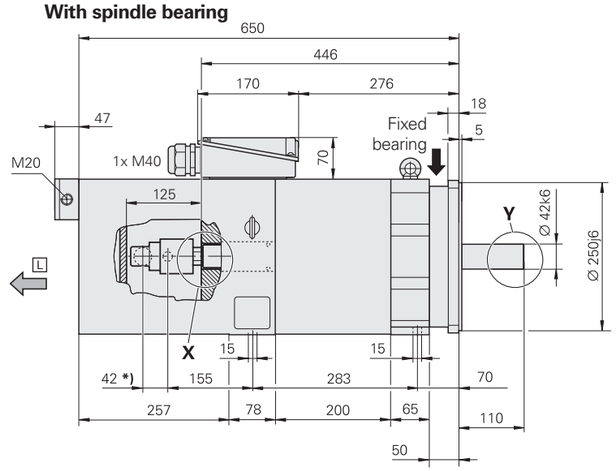

For **R** see page 56



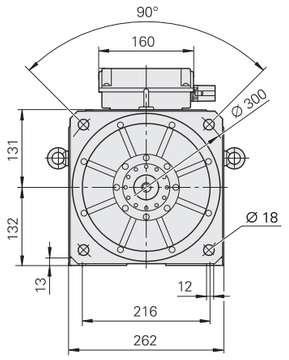
**QAN 260 MH**

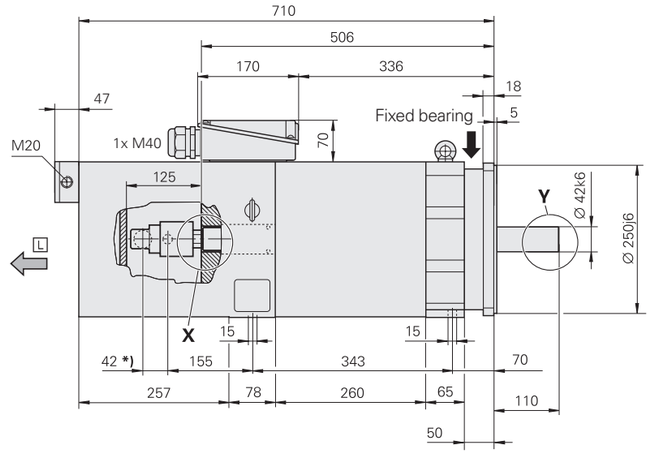



**With spindle bearing**

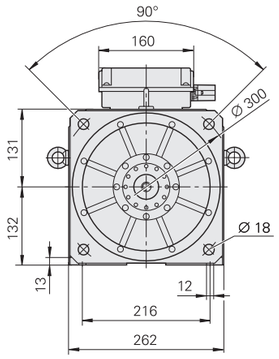


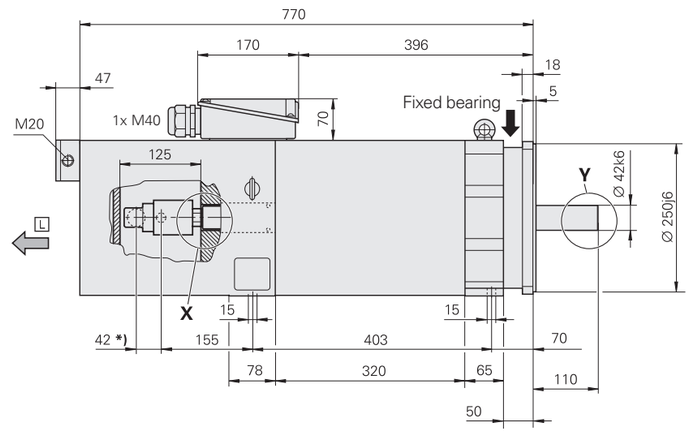

**QAN 260 LH**




**QAN 260 UH**



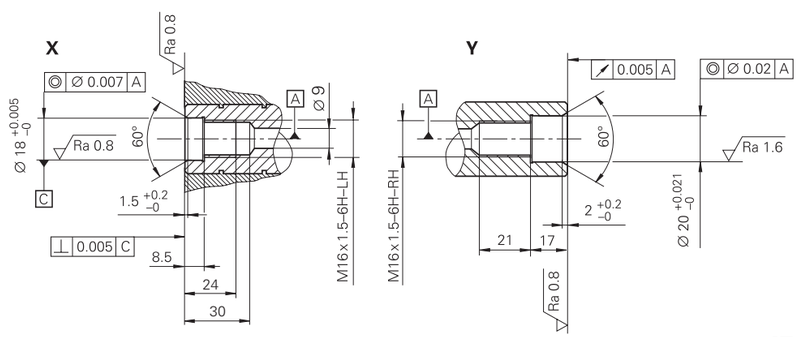

L = Air flow

**QAN 260 MH**
M20: 6 mm to 12 mm
M40: 20 mm to 26 mm

**QAN 260 LH/UH**
M20: 6 mm to 12 mm
M40: 22 mm to 32 mm

***)** = Coolant connection on the right side, e.g., from Deublin 1109-020-188

mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm



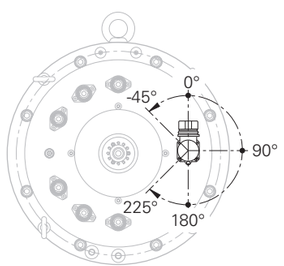
# Asynchronous hollow-shaft motors
# QAN 360 UHW series

**Hollow-shaft spindle motor with four pole pairs**
- **With spindle bearing**
- **Water-cooled**

| Motor | QAN 360 UHW | |
|---|---|---|
| | **Wye connection** | **Delta connection** |
| **Rated voltage $U_N$** | 420 V | 320 V |
| **Rated power output $P_N$** | 43.2 kW | |
| **Rated shaft speed $n_N$** | 450 rpm | 780 rpm |
| **Rated torque $M_N$** (105 K) | 917 Nm | 529 Nm |
| **Rated current $I_N$** (105 K) | 113 A | 124 A |
| **Efficiency** | 0.82 | 0.89 |
| **Max. speed $n_{max}$** [1)] Spindle bearing | 7000 rpm | |
| **Max. current $I_{max}$** | 190 A | |
| **Mass m** | 483 kg | |
| **Rotor inertia J** | 5990 kg·cm² | |
| **Protection** | IP43 | |
| **Mounting direction** | Horizontal: IM B5<br>Vertical: IM V1 | |
| **ID**<br>with key | <br>641936-26<br>641936-06 | |

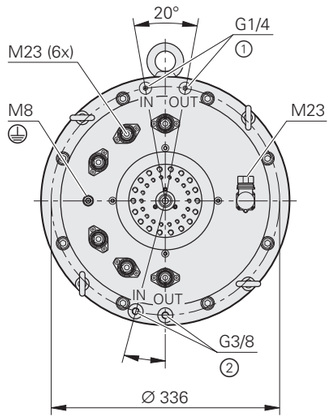
[1)] The maximum shaft speed depends on the application conditions of the motor, such as the shaft load (see the *Motors* Technical Manual)

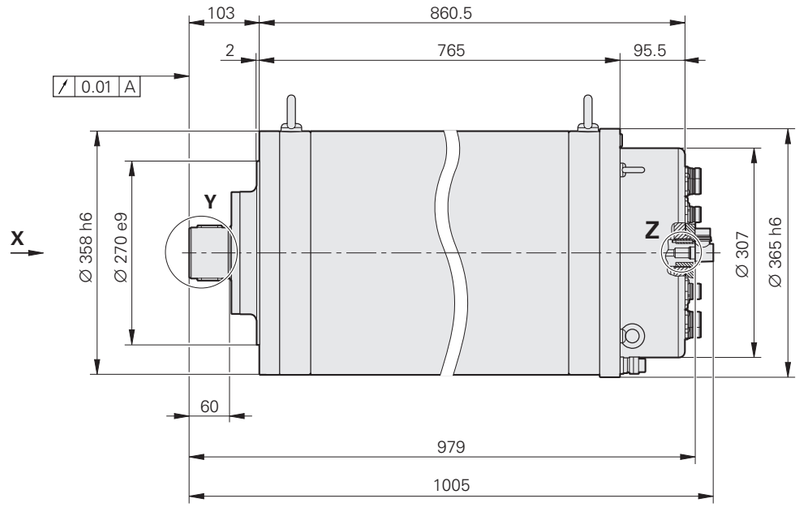
**Rotatable connections**

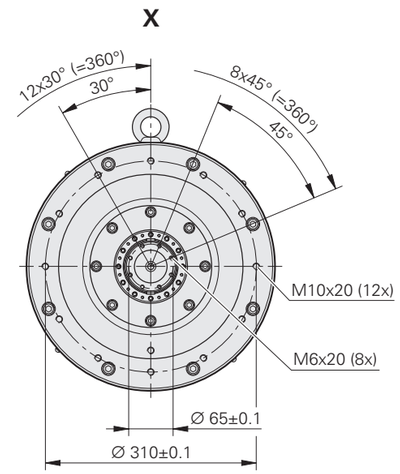


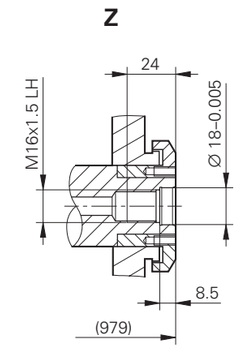


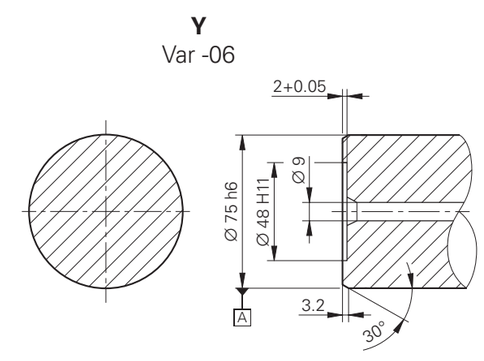

**QAN 360 UHW** **With spindle bearing**

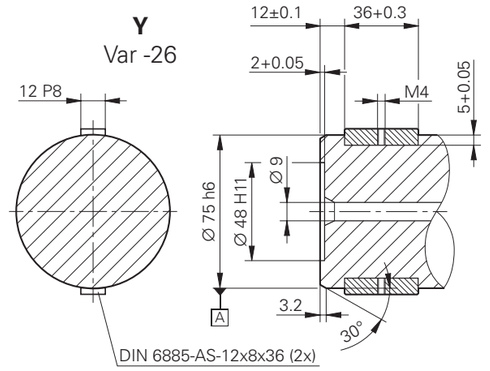



1 = Connection for sealing air
2 = Connection for coolant

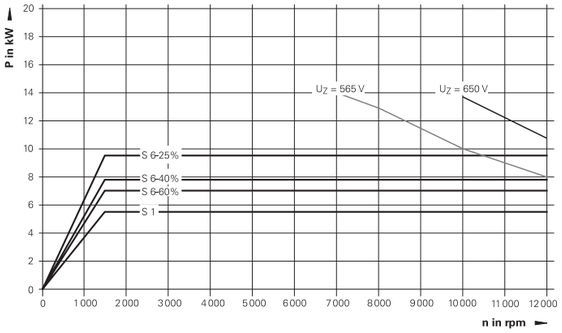
mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

# Power and torque characteristics

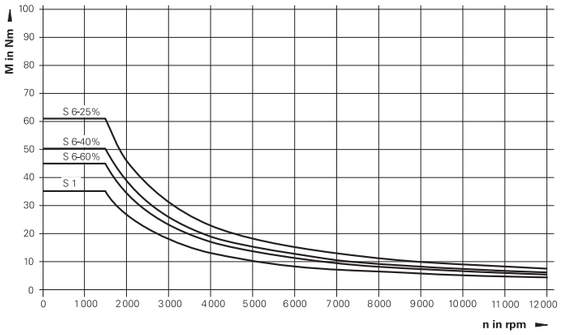
## QAN 200M

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 5.5 kW | 35.0 Nm | 18.0 A |
| | 6000 rpm | 5.5 kW | 8.8 Nm | – |
| | 12000 rpm | 5.5 kW | 4.4 Nm | – |
| **S6-60%** | 1500 rpm | 7.0 kW | 44.7 Nm | 22.0 A |
| | 6000 rpm | 7.0 kW | 11.2 Nm | – |
| | 12000 rpm | 7.0 kW | 5.6 Nm | – |
| **S6-40%** | 1500 rpm | 7.9 kW | 50.4 Nm | 24.0 A |
| | 6000 rpm | 7.9 kW | 12.6 Nm | – |
| | 12000 rpm | 7.9 kW | 6.3 Nm | – |
| **S6-25%** | 1500 rpm | 9.5 kW | 60.7 Nm | 28.0 A |
| | 6000 rpm | 9.5 kW | 15.2 Nm | – |
| | 12000 rpm | 9.5 kW | 7.6 Nm | – |

**Power characteristic curve**



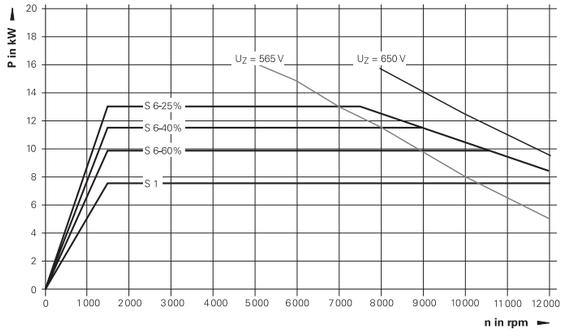

**Torque characteristic curve**



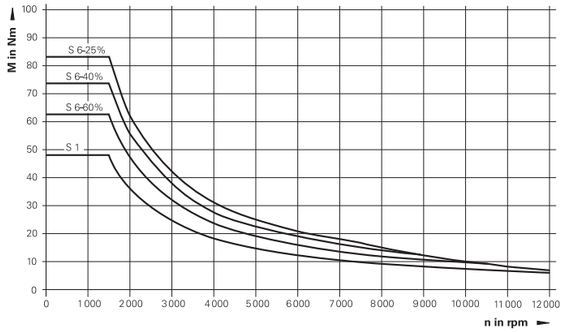

## QAN 200L

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 7.5 kW | 47.8 Nm | 20.1 A |
| | 6000 rpm | 7.5 kW | 12.0 Nm | – |
| | 12000 rpm | 7.5 kW | 6.0 Nm | – |
| **S6-60%** | 1500 rpm | 9.8 kW | 62.6 Nm | 24.0 A |
| | 10700 rpm | 9.8 kW | 9.5 Nm | – |
| | 12000 rpm | 8.5 kW | 6.8 Nm | – |
| **S6-40%** | 1500 rpm | 11.5 kW | 73.4 Nm | 27.0 A |
| | 9000 rpm | 11.5 kW | 11.0 Nm | – |
| | 12000 rpm | 8.5 kW | 6.8 Nm | – |
| **S6-25%** | 1500 rpm | 13.0 kW | 83.0 Nm | 31.0 A |
| | 7500 rpm | 13.0 kW | 16.6 Nm | – |
| | 12000 rpm | 8.5 kW | 6.8 Nm | – |

**Power characteristic curve**




**Torque characteristic curve**




**Note**

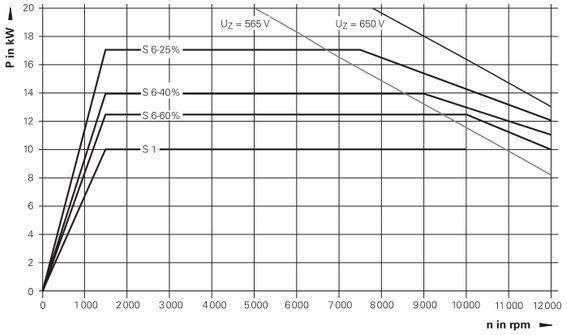
- **S6 mode**
  Cycle duration: 10 minutes
  During the rest period the motor is idle.



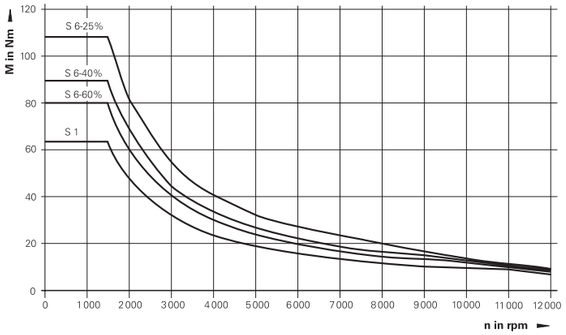
## QAN 200U

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 10.0 kW | 63.7 Nm | 25.0 A |
| | 10000 rpm | 10.0 kW | 9.5 Nm | – |
| | 12000 rpm | 8.0 kW | 6.4 Nm | – |
| **S6-60%** | 1500 rpm | 12.5 kW | 79.8 Nm | 29.0 A |
| | 10000 rpm | 12.5 kW | 11.9 Nm | – |
| | 12000 rpm | 10.0 kW | 8.0 Nm | – |
| **S6-40%** | 1500 rpm | 14.0 kW | 89.4 Nm | 32.0 A |
| | 9000 rpm | 14.0 kW | 14.6 Nm | – |
| | 12000 rpm | 11.0 kW | 8.8 Nm | – |
| **S6-25%** | 1500 rpm | 17.0 kW | 108.6 Nm | 37.0 A |
| | 7500 rpm | 17.0 kW | 21.7 Nm | – |
| | 12000 rpm | 12.0 kW | 9.5 Nm | – |

**Power characteristic curve**



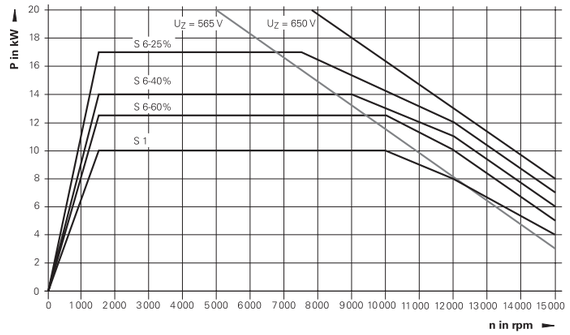

**Torque characteristic curve**



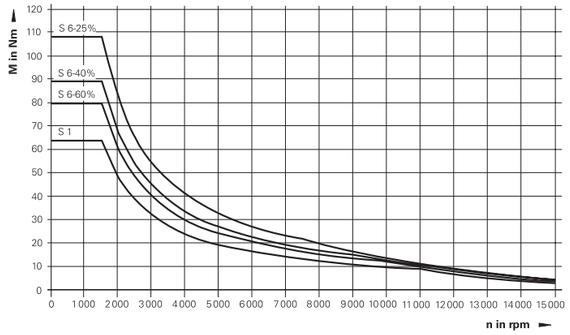

## QAN 200UH

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 10.0 kW | 63.7 Nm | 25.0 A |
| | 10000 rpm | 10.0 kW | 9.5 Nm | – |
| | 12000 rpm | 8.0 kW | 6.4 Nm | – |
| | 15000 rpm | 4.0 kW | 2.5 Nm | – |
| **S6-60%** | 1500 rpm | 12.5 kW | 79.8 Nm | 29.0 A |
| | 10000 rpm | 12.5 kW | 11.9 Nm | – |
| | 12000 rpm | 10.0 kW | 8.0 Nm | – |
| | 15000 rpm | 5.0 kW | 3.2 Nm | – |
| **S6-40%** | 1500 rpm | 14.0 kW | 89.4 Nm | 32.0 A |
| | 9000 rpm | 14.0 kW | 19.1 Nm | – |
| | 12000 rpm | 11.0 kW | 8.8 Nm | – |
| | 15000 rpm | 6.0 kW | 3.8 Nm | – |
| **S6-25%** | 1500 rpm | 17.0 kW | 108.6 Nm | 37.0 A |
| | 7500 rpm | 17.0 kW | 21.7 Nm | – |
| | 12000 rpm | 12.0 kW | 9.5 Nm | – |
| | 15000 rpm | 7.0 kW | 4.5 Nm | – |

**Power characteristic curve**



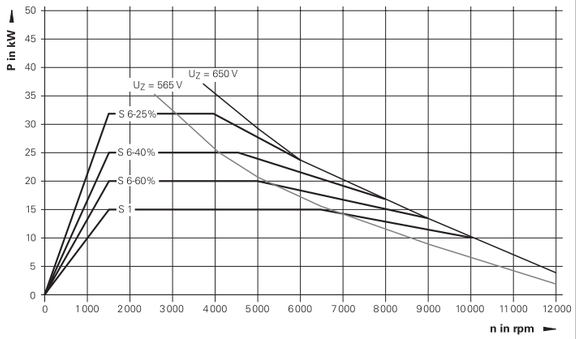

**Torque characteristic curve**



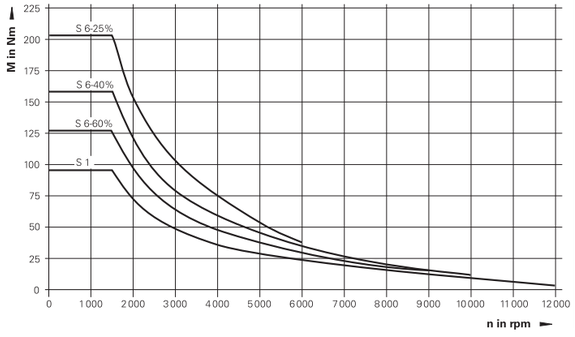
# QAN 260 M, QAN 260 MH

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 15.0 kW | 95.5 Nm | 35.0 A |
| | 6500 rpm | 15.0 kW | 22.0 Nm | – |
| | 10000 rpm | 10.0 kW | 9.5 Nm | – |
| | 12000 rpm | 4.0 kW | 3.2 Nm | – |
| **S6-60%** | 1500 rpm | 20.0 kW | 127.3 Nm | 43.3 A |
| | 5000 rpm | 20.0 kW | 38.2 Nm | – |
| | 9000 rpm | 13.5 kW | 14.3 Nm | – |
| **S6-40%** | 1500 rpm | 25.0 kW | 159.2 Nm | 52.3 A |
| | 4500 rpm | 25.0 kW | 53.1 Nm | – |
| | 8000 rpm | 16.8 kW | 20.1 Nm | – |
| **S6-25%** | 1500 rpm | 32.0 kW | 203.7 Nm | 65.0 A |
| | 4000 rpm | 32.0 kW | 76.4 Nm | – |
| | 6000 rpm | 23.7 kW | 37.7 Nm | – |

**Power characteristic curve**



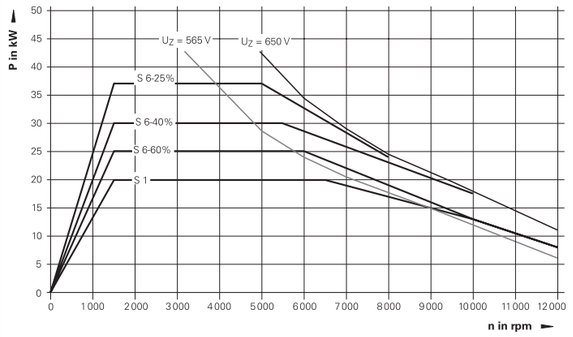

**Torque characteristic curve**



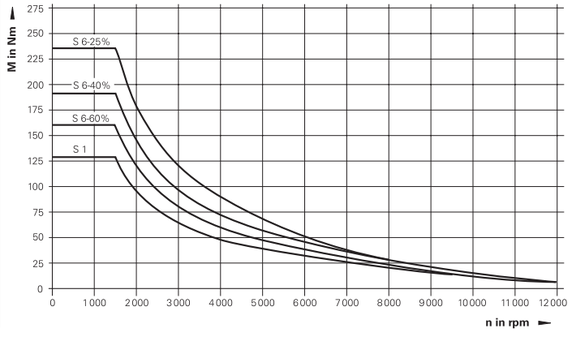

# QAN 260 L, QAN 260 LH

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 20.0 kW | 127.3 Nm | 46.0 A |
| | 6500 rpm | 20.0 kW | 29.4 Nm | – |
| | 10000 rpm | 13.0 kW | 12.4 Nm | – |
| | 12000 rpm | 8.0 kW | 6.4 Nm | – |
| **S6-60%** | 1500 rpm | 25.0 kW | 159.2 Nm | 56.0 A |
| | 6000 rpm | 25.0 kW | 39.4 Nm | – |
| | 10000 rpm | 16.0 kW | 15.3 Nm | – |
| | 12000 rpm | 8.0 kW | 6.4 Nm | – |
| **S6-40%** | 1500 rpm | 30.0 kW | 191.0 Nm | 65.0 A |
| | 5500 rpm | 30.0 kW | 52.1 Nm | – |
| | 10000 rpm | 17.5 kW | 16.7 Nm | – |
| **S6-25%** | 1500 rpm | 37.0 kW | 235.5 Nm | 79.0 A |
| | 5000 rpm | 37.0 kW | 70.7 Nm | – |
| | 8000 rpm | 24.0 kW | 28.6 Nm | – |

**Power characteristic curve**



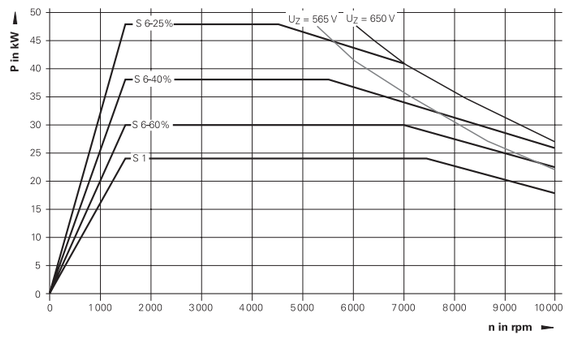

**Torque characteristic curve**



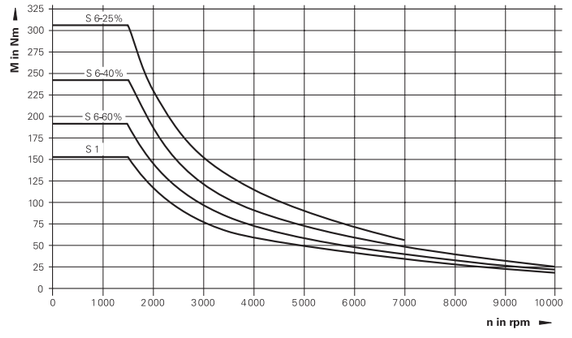

# QAN 260 U

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 24.0 kW | 152.8 Nm | 58.0 A |
| | 7400 rpm | 24.0 kW | 31.0 Nm | – |
| | 10000 rpm | 18.0 kW | 17.2 Nm | – |
| **S6-60%** | 1500 rpm | 30.0 kW | 191.0 Nm | 67.2 A |
| | 7000 rpm | 30.0 kW | 40.9 Nm | – |
| | 10000 rpm | 22.5 kW | 21.5 Nm | – |
| **S6-40%** | 1500 rpm | 38.0 kW | 241.9 Nm | 81.8 A |
| | 5500 rpm | 38.0 kW | 66.0 Nm | – |
| | 10000 rpm | 26.0 kW | 24.8 Nm | – |
| **S6-25%** | 1500 rpm | 48.0 kW | 305.6 Nm | 100.6 A |
| | 4500 rpm | 48.0 kW | 101.9 Nm | – |
| | 7000 rpm | 41.0 kW | 55.9 Nm | – |

**Power characteristic curve**



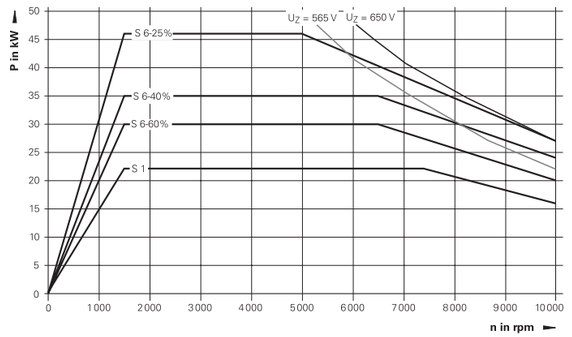

**Torque characteristic curve**



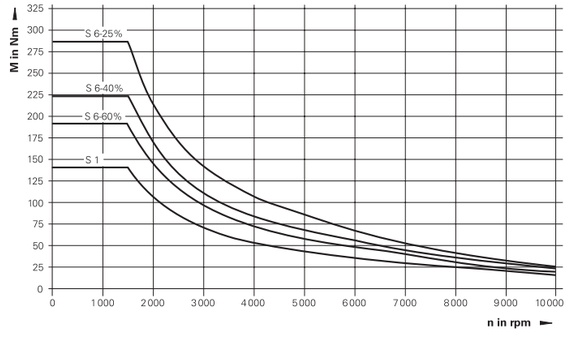

# QAN 260 UH

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 22.0 kW | 140.1 Nm | 54.0 A |
| | 7400 rpm | 22.0 kW | 28.4 Nm | – |
| | 10000 rpm | 16.0 kW | 15.3 Nm | – |
| **S6-60%** | 1500 rpm | 30.0 kW | 191.0 Nm | 67.0 A |
| | 6500 rpm | 30.0 kW | 44.1 Nm | – |
| | 10000 rpm | 20.0 kW | 19.5 Nm | – |
| **S6-40%** | 1500 rpm | 35.0 kW | 222.8 Nm | 77.0 A |
| | 6500 rpm | 35.0 kW | 66.8 Nm | – |
| | 10000 rpm | 24.0 kW | 22.9 Nm | – |
| **S6-25%** | 1500 rpm | 46.0 kW | 286.5 Nm | 97.0 A |
| | 5000 rpm | 46.0 kW | 85.9 Nm | – |
| | 10000 rpm | 27.0 kW | 25.8 Nm | – |

**Power characteristic curve**



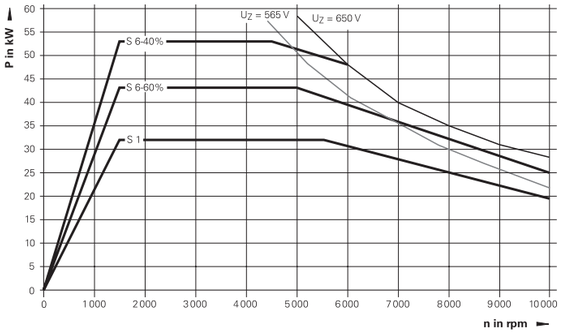

**Torque characteristic curve**



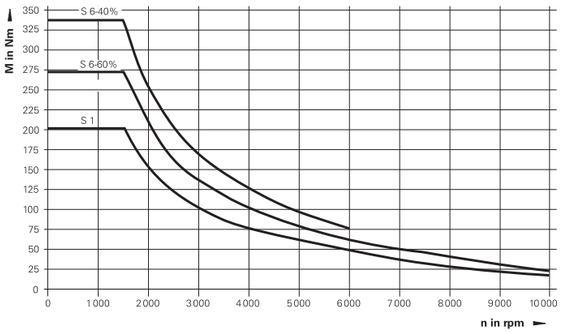
# QAN 320 M

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 32.0 kW | 203.7 Nm | 77.5 A |
| | 5500 rpm | 32.0 kW | 55.0 Nm | – |
| | 10000 rpm | 19.5 kW | 18.6 Nm | – |
| **S6-60%** | 1500 rpm | 43.0 kW | 273.7 Nm | 98.0 A |
| | 5500 rpm | 43.0 kW | 71.5 Nm | – |
| | 10000 rpm | 25.0 kW | 23.9 Nm | – |
| **S6-40%** | 1500 rpm | 53.0 kW | 337.4 Nm | 118.0 A |
| | 5500 rpm | 53.0 kW | 86.2 Nm | – |
| | 6000 rpm | 48.0 kW | 76.4 Nm | – |

**Power characteristic curve**



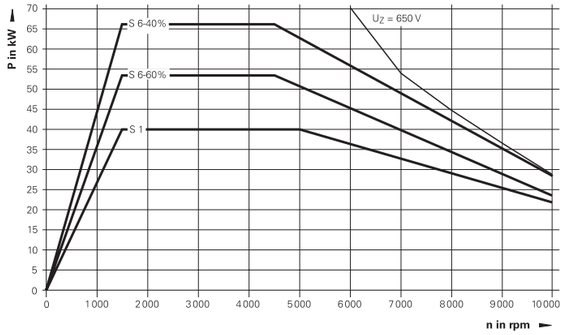

**Torque characteristic curve**



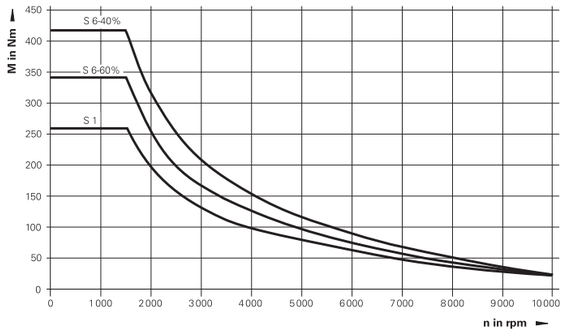

# QAN 320 L

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 1500 rpm | 40.0 kW | 254.6 Nm | 99.0 A |
| | 5000 rpm | 40.0 kW | 77.9 Nm | – |
| | 10000 rpm | 21.0 kW | 21.0 Nm | – |
| **S6-60%** | 1500 rpm | 53.0 kW | 337.4 Nm | 123.0 A |
| | 4500 rpm | 53.0 kW | 112.5 Nm | – |
| | 10000 rpm | 24.0 kW | 22.9 Nm | – |
| **S6-40%** | 1500 rpm | 66.0 kW | 420.2 Nm | 148.0 A |
| | 4500 rpm | 66.0 kW | 140.1 Nm | – |
| | 10000 rpm | 28.0 kW | 26.7 Nm | – |

**Power characteristic curve**




**Torque characteristic curve**



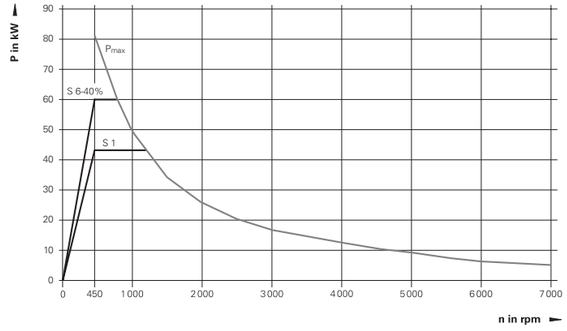



# QAN 360 UHW

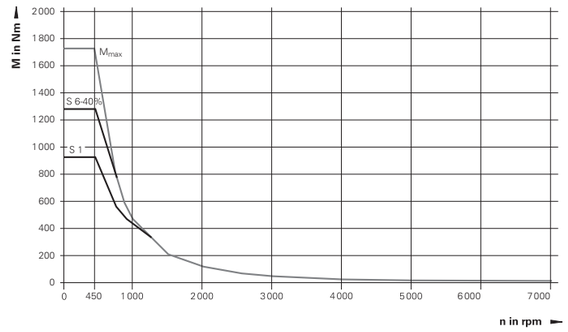
Wye connection

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 450 rpm | 43.2 kW | 917 Nm | 113 A |
| | 800 rpm | 43.2 kW | 515 Nm | – |
| **S6-40%** | 450 rpm | 60 kW | 1290 Nm | – |
| | 600 rpm | 60 kW | 955 Nm | |

**Power characteristic curve**




**Torque characteristic curve**

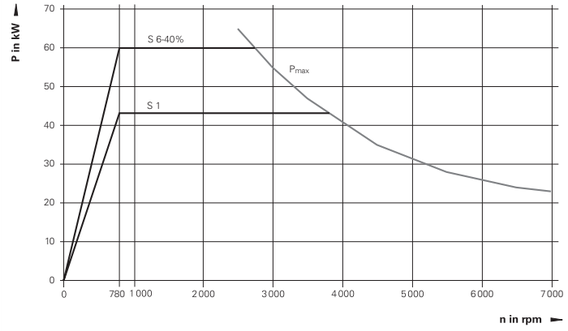



# QAN 360 UHW

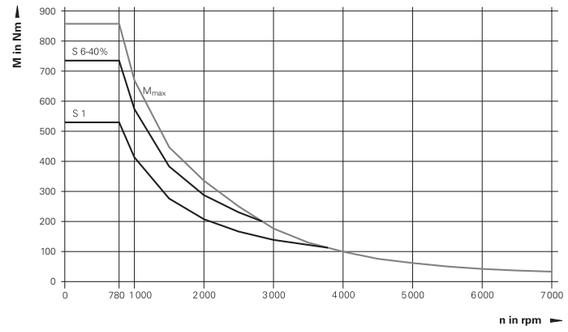
Delta connection

| Duty cycle | Speed n | Power P | Torque M | Current I |
|---|---|---|---|---|
| **S1** | 780 rpm | 43.2 kW | 529 Nm | 124 A |
| | 3500 rpm | 43.2 kW | 110 Nm | – |
| **S6-40%** | 780 rpm | 60 kW | 720 Nm | – |
| | 2500 rpm | 60 kW | 220 Nm | |

**Power characteristic curve**




**Torque characteristic curve**



# Cables

## Power cables

Current load at ambient temperature of up to 40 °C

| | Cable without connectors | Bend radius R for frequent flexing | Cable type | Diameter |
|---|---|---|---|---|
| **Current load of up to 26 A (installation type B2)** | | | | |
| **QAN 200M**<br>**QAN 200L**<br>**QAN 200U**<br>**QAN 200UH** | ID 818787-xx<br>*ID 1213900-xx* | ≥ 69 mm<br>≥ *109 mm* | PUR [4 x 4 $mm^2$] | 13.8 mm<br>*14.5 mm* |
| **Current load of up to 45.2 A (installation type B2)** | | | | |
| **QAN 260M**<br>**QAN 260MH** | ID 818782-xx<br>*ID 1213901-xx* | ≥ 102 mm<br>≥ *157 mm* | PUR [4 x 10 $mm^2$] | 20.3 mm<br>*20.9 mm* |
| **Current load of up to 59.9 A (installation type B2)** | | | | |
| **QAN 260L**<br>**QAN 260LH**<br>**QAN 260U**<br>**QAN 260UH** | ID 818510-xx<br>*ID 1213902-xx* | ≥ 133 mm<br>≥ *207 mm* | PUR [4 x 16 $mm^2$] | 26.5 mm<br>*27.5 mm* |
| **Current load of up to 93.8 A (installation type B2)** | | | | |
| **QAN 320M** | ID 818781-xx<br>*ID 1213903-xx* | ≥ 173 mm<br>≥ *258 mm* | PUR [4 x 35 $mm^2$] | 34.5 mm<br>*34.3 mm* |
| **Current load of up to 117.5 A (installation types C and E)** | | | | |
| **QAN 320L** | ID 818781-xx<br>*ID 1213903-xx* | ≥ 173 mm<br>≥ *258 mm* | PUR [4 x 35 $mm^2$] | 34.5 mm<br>*34.3 mm* |
| **Current load of up to 125.7 A (installation types C and E)** | | | | |
| **QAN 360UHW** | ID 1213903-xx | ≥ 258 mm | PUR [4 x 35 $mm^2$] | 34.3 mm |
| **Current load of up to 124.5 A (installation types C and E)** | | | | |
| **QAN 360UHW** | ID 696060-03 | ≥ 111 mm | – | 35 mm |

*Italics:* shielded power cable

**Further information:**

For detailed information about the electrical connection of the QAN 360UHW, see the *Motors* Technical Manual.

## Encoder cables

| | Cable length | Cable complete with connectors | Line drop compensator | Extension cable | Bend radius R for frequent flexing |
|---|---|---|---|---|---|
| **All QANs** | < 30 m | ID 289440-xx | – | ID 336847-xx (as needed) | ≥ 100 mm |
| | > 30 m | ID 289440-xx | ID 370226-01 | ID 336847-xx | |

## Cables for fans

| | Cable without connectors | Bend radius R for frequent flexing | Cable type | Diameter |
|---|---|---|---|---|
| **All QANs** | ID 818789-xx<br>*ID 1213898-xx* | ≥ 50 mm<br>≥ *82 mm* | PUR [4 x 0.75 $mm^2$] | 9.9 mm<br>*10.9 mm* |

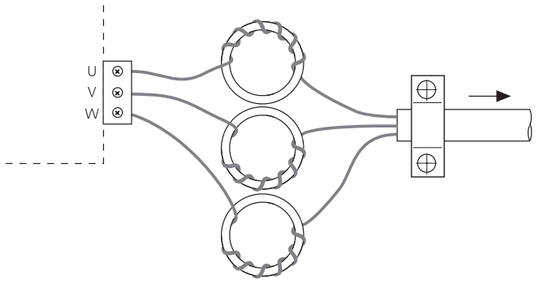
*Italics:* shielded power cable

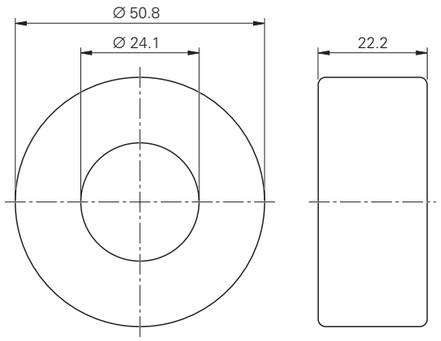
# Accessories

## Toroidal cores

Large line lengths can result in voltage peaks that may damage the motor. For this reason, toroidal cores need to be used with motor lines longer than 15 m. One toroidal core is required per phase. The toroidal cores must be located in close proximity to the inverter (max. 2 m).

**Toroidal core**
For motor line > 15 m
ID 827054-01



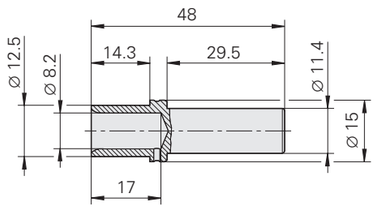




## M23 connector set

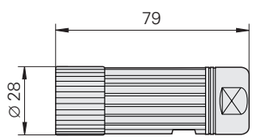
For crimping the 1-pin M23 connector for the motor connection, the connector set contains the following components:

- Six connectors
- Six female contacts
- Mounting Instructions

ID 1288941-01




Female contact




Connector

mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm



# Direct-drive torque motors

Besides synchronous and asynchronous motors, HEIDENHAIN offers a comprehensive assortment of standard torque motors. With more than 100 models, almost any requirement can be met.

Overview of the most important features:
- Outside diameter of up to 1290 mm
- Large hollow shaft of up to 1070 mm
- Maximum rated speed of up to 5170 rpm
- Peak torque of up to 31 200 Nm
- Very high continuous torque
- Field-weakening compliant
- With or without cage with coolant ducts
- Conceived for highly demanding applications

Direct coupling of the load with the rotor eliminates the need for any mechanical transfer elements such as transmissions, toothed belts or worm gears. The maintenance-free direct-drive motors therefore offer excellent dynamic performance while guaranteeing a long service life.

The torque motors offer the advantage of a patented, cogging-free design. This design provides outstanding peak power density in the magnet gap as well as unique thermal efficiency, thereby constituting a significant advantage with respect to precision that reacts negatively to thermal drift.

Further advantages of torque motors are:
- Patented and proven technology
- Excellent performance
- High quality
- Easy integration
- Wide product range

The torque motors are developed and produced by ETEL, a company of the HEIDENHAIN Corporate Group.

**Further information:**
For more information about the torque motors from ETEL, visit *www.etel.ch*

Direct-drive torque motors

HEIDENHAIN

Mastering nanometer accuracy


HEIDENHAIN

**DR. JOHANNES HEIDENHAIN GmbH**
Dr.-Johannes-Heidenhain-Straße 5
**83301 Traunreut, Germany**
☏ +49 8669 31-0
FAX +49 8669 32-5061
info@heidenhain.de

**www.heidenhain.com**

**HEIDENHAIN worldwide**

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