



HEIDENHAIN



HEIDENHAIN Motors

for Axis and
Spindle Drivers

August 2005



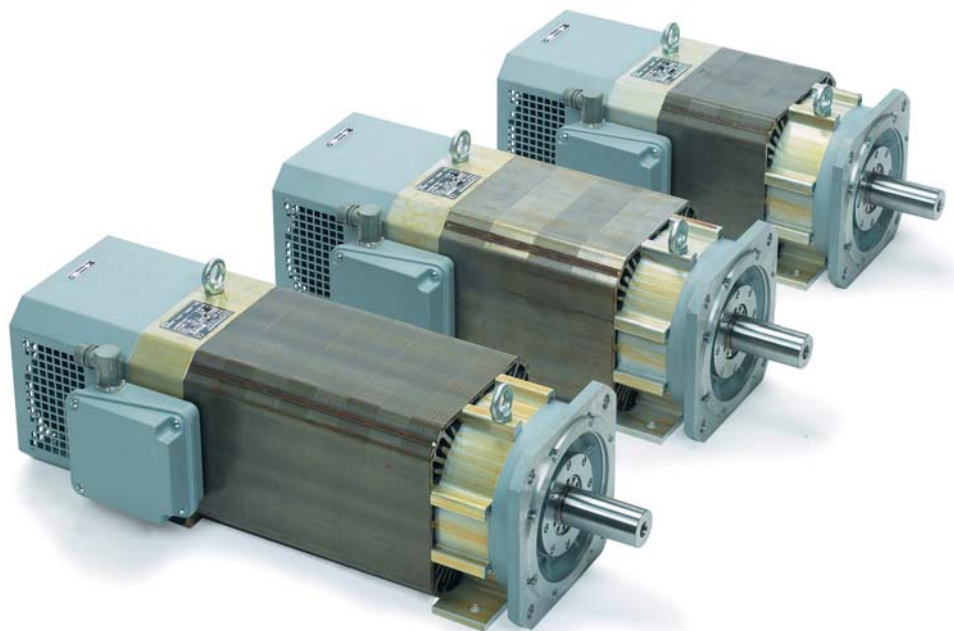
Synchronous motors for feed drives

Motors for axis and spindle drives

HEIDENHAIN supplies motors for axis and spindle drives as accessories to the iTNC 530, MANUALplus 4110 and CNC PILOT 4290 controls with integrated inverter.

This brochure provides an overview of all the available motors and contains technical data and dimensions.

For commissioning, please request the *Inverter Systems and Motors* Technical Manual.



Asynchronous motors for spindles

This catalog supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the catalog edition valid when the contract is made.

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

Parts subject to wear

Motors from HEIDENHAIN include in particular the following consumable parts:

- Bearings
- Fan

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Synchronous Motors

QSY Series Overview

General technical information

Synchronous motors from HEIDENHAIN fulfill all requirements of an NC-controlled machine tool. Some special characteristics include

- an excellent running smoothness,
- an appropriate mass moment of inertia,
- a very good ratio of the rated torque to the stall torque,
- and a low torque ripple.

Specifications

The specifications and the 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, it is necessary to reduce the motor torque in order to avoid thermal overloading of the motor.

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 or
- ECN 1313 absolute singleturn rotary encoder (only one motor revolution can be evaluated) or
- EQN 1325 absolute multiturn rotary encoder

Mechanical life

The service life of the bearings depends on the shaft load and the mean rotational speed (see the *Inverter Systems and Motors* Technical Manual).

EcoDyn motors

Motors of the EcoDyn series are characterized by reduced current consumption together with higher rated torque and a max. permissible rated speed of 3000 rpm. The following controls are required to drive the motors in EcoDyn mode:

- iTNC 530 as of software version 340420-06
- MANUALplus 4110 as of software version 354809-11
- CNC PILOT 4209 as of software versions 340460-14 and 362796-10

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

Electronic ID label

The synchronous motors with ECN 1313 or EQN 1325 feature an electronic ID label to make commissioning and diagnosis easier. The information, such as motor designation, part number or serial number, stored in this ID label can be read and displayed with the TNCdiag diagnostic software as well as with the internal diagnostic functions of the iTNC 530 (as of software 340422-07 and 340480-07).

The control automatically recognizes the motor type and, if required, updates the machine parameters every time it is switched on.

Mechanical data

Dimensions IM B5 (for securing by flange) as per EN 60034-7

Flange: Dimensions as per DIN 42948 and IEC 72

Protection as per EN 60529

Motor: IP 65

Shaft exit: IP 64

Shaft end

- Cylindrical as per DIN 748 and IEC 72
- Without feather key (with feather key upon request)
- With centering hole as per ISO 866 BS 5 and thread

Bearing free of maintenance

Holding brake as option

Thermal variables

Natural cooling

Temperature monitoring with KTY 84-130 thermistor in the stator winding

Thermal class F

Synchronous motors	Stall torque	Stall current	Rated speed	Recommended inverters ²⁾				Page
				1-axis module	2-axis module	Compact inverters/ axis		
						UR 2xxD UE 2xxB	UE 1xx	
QSY 96A	1.5 Nm	1.5 A	4500 rpm	UM 111 D	UM 121 D	1 to 4	1 to 4	6
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	8
QSY 116E	7,2 Nm	4.8 A	3000 rpm	UM 111 D	UM 121 D	1 to 4	4	
QSY 116J	10.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	10
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	–	12
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	–	14
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	–	16
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	–	–	–	

¹⁾ Only UE 242B, UR 242D

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.

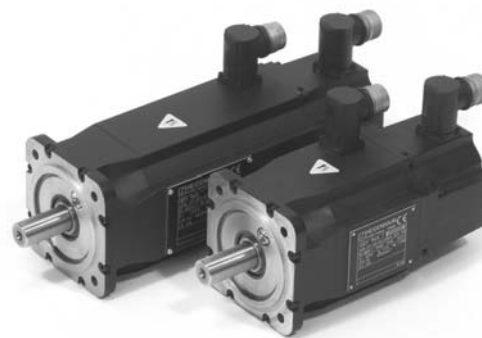
Synchronous Motors

QSY 96 Series

Feed motors with 3 pole pairs

Stall torque of 1.5 Nm and 5.2 Nm

Choice of incremental or absolute rotary encoder

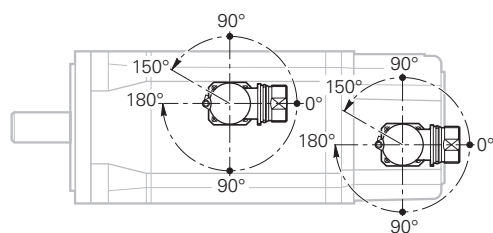


Motor	QSY 96 A		QSY 96 G	
Rated voltage U _N	303 V/300 V		288 V/287 V	
Rated power output P _N	0.5 kW/0.45 kW		1.4 kW/1.3 kW	
Rated shaft speed n _N	4500 rpm			
Rated torque M _N ¹⁾	1.05 Nm/0.95 Nm		3.0 Nm/2.7 Nm at 4500 rpm	
Rated current I _N ¹⁾	1.1 A/1.0 A		3.3 A/3.0 A	
Stall torque M ₀ ¹⁾	1.5 Nm		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	
Weight m	3.6 kg	4.5 kg	7.2 kg	8.1 kg
Rotor inertia J	1.8 kgcm ²	2.1 kgcm ²	6.3 kgcm ²	6.6 kgcm ²
Brake Rated voltage U _{Br} Rated current I _{Br} Holding torque M _{Br}	Without — — —	With 24 Vdc 0.5 A 5.0 Nm	Without — — —	With 24 Vdc 0.5 A 5.0 Nm
ID number For motor with ERN 1387 For motor with ECN 1313 For motor with EQN 1325	344 512-03 344 512-83 344 512-53	344 512-04 344 512-84 344 512-54	339 875-03 339 875-83 339 875-53	339 875-04 339 875-84 339 875-54

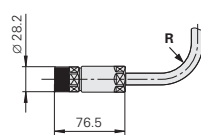
¹⁾ At 100 K ²⁾ Max. 200 ms

In italics: Data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10 %)

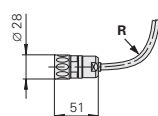
Rotatable connections



Power connector



Encoder connector



For R, see page 34

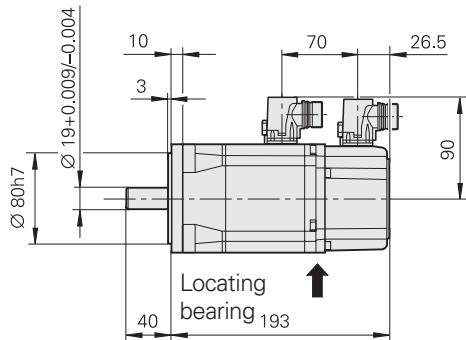
Dimensions

Dimensions in mm

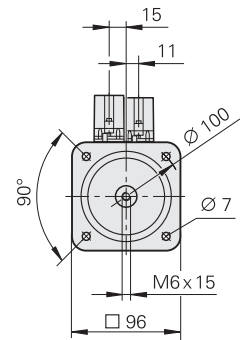
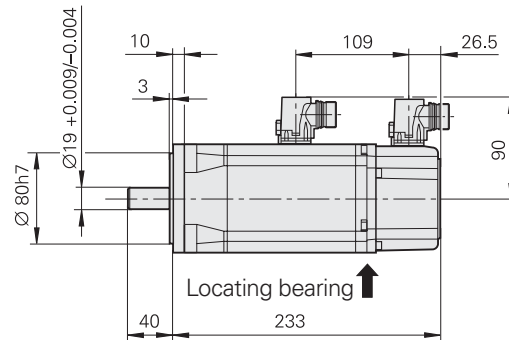


Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ± 0.2 mm

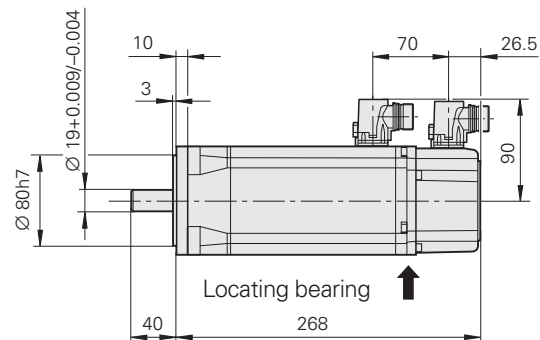
QSY 96A Without brake



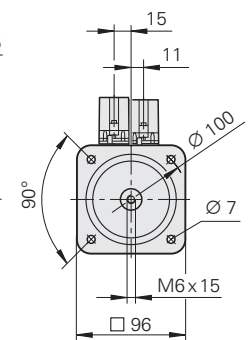
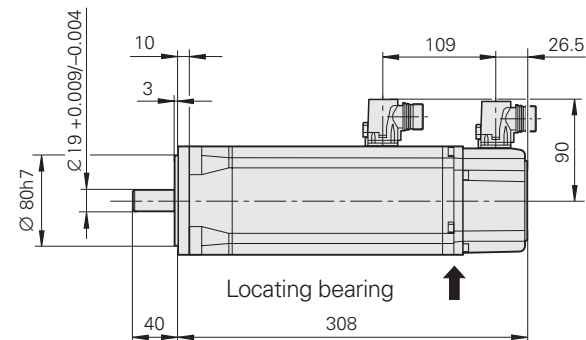
With brake



QSY 96G Without brake



With brake



Synchronous Motors

QSY 116 Series

Feed motors with 3 pole pairs

Stall torque of 5.2 Nm to 10 Nm

Choice of incremental or absolute rotary encoder

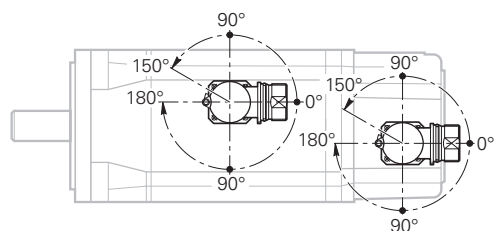


Motor	QSY 116C		QSY 116E		QSY 116J		QSY 116J EcoDyn	
Rated voltage U _N	307 V/303 V		296 V/294 V		287 V/286 V		401 V/399 V	
Rated power output P _N	1.45 kW/1.30 kW		1.85 kW/1.67 kW		2.42 kW/2.18 kW		2.64 kW/2.38 kW	
Rated shaft speed n _N	3000 rpm						3000 rpm ³⁾	
Rated torque M _N ¹⁾	4.6 Nm/4.1 Nm		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		5.35 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	
Weight m	6.9 kg	7.8 kg	8.6 kg	9.5 kg	12.0 kg	12.9 kg	12.0 kg	12.9 kg
Rotor inertia J	7.5 kgcm ²	7.9 kgcm ²	9.9 kgcm ²	10.3 kgcm ²	15.0 kgcm ²	15.4 kgcm ²	15.0 kgcm ²	15.4 kgcm ²
Brake Rated voltage U _{Br} Rated current I _{Br} Holding torque M _{Br}	Without – – –	With 24 Vdc 0.6 A 13.5 Nm	Without – – –	With 24 Vdc 0.6 A 13.5 Nm	Without – – –	With 24 Vdc 0.6 A 13.5 Nm	Without – – –	With 24 Vdc 0.6 A 13.5 Nm
ID number For motor with ERN 1387 For motor with ECN 1313 For motor with EQN 1325	339876-03 339876-83 339876-53	339876-04 339876-84 339876-54	339877-03 339877-83 339877-53	339877-04 339877-84 339877-54	339878-03 – 339878-53	339878-04 – 339878-54	339878-13 339878-83 339878-63	339878-14 339878-84 339878-64

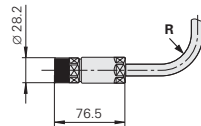
¹⁾ At 100 K ²⁾ Max. 200 ms ³⁾ In EcoDyn mode

In italics: Data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10 %)

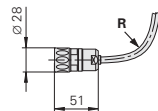
Rotatable connections



Power connector



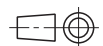
Encoder connector



For R, see page 34

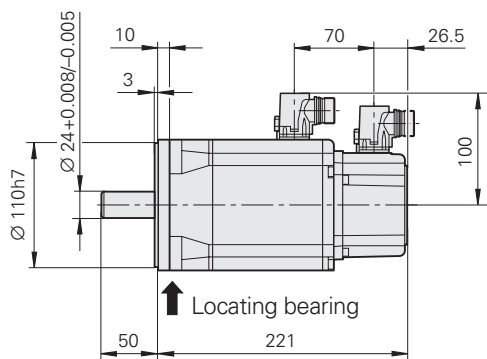
Dimensions

Dimensions in mm

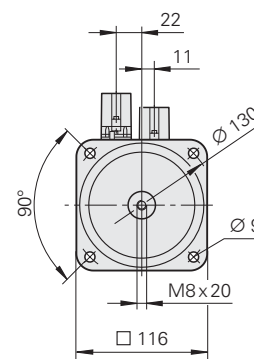
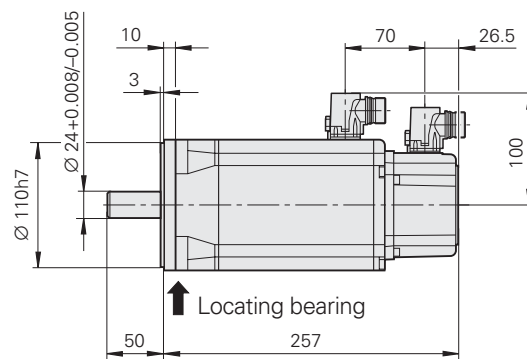


Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ± 0.2 mm

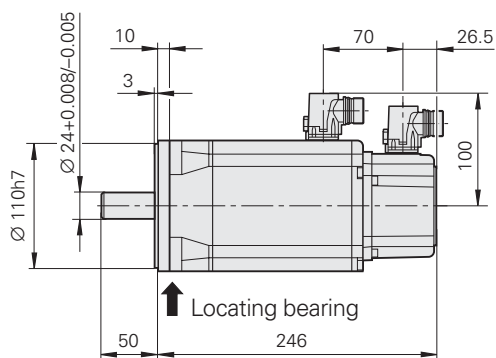
QSY 116C Without brake



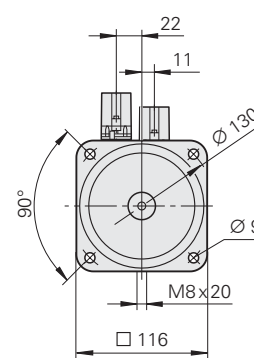
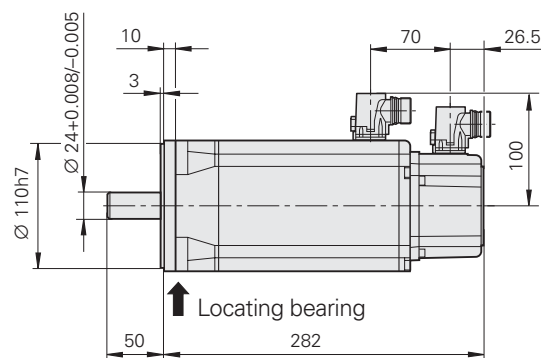
With brake



QSY 116E Without brake

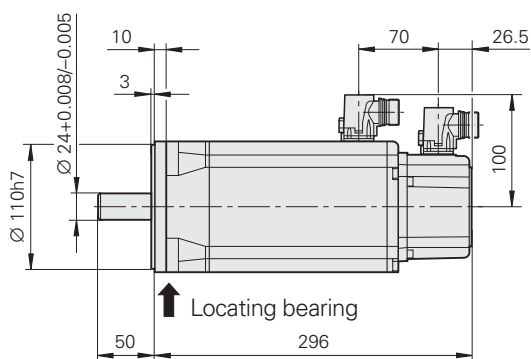


With brake

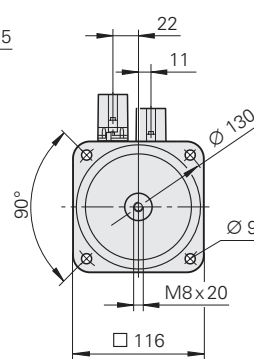
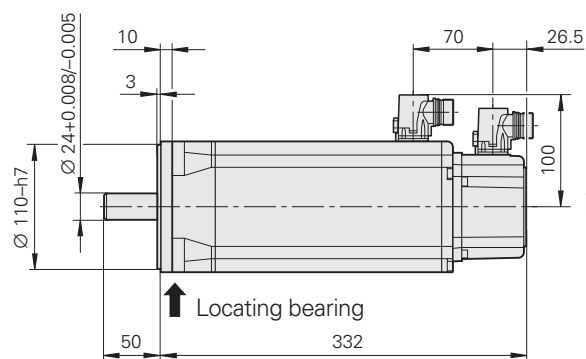


QSY 116J

QSY 116J EcoDyn Without brake



With brake



Synchronous Motors

QSY 130 EcoDyn Series

Feed motors with 4 pole pairs
Stall torque of 6 Nm and 9 Nm
Choice of incremental or absolute rotary encoder

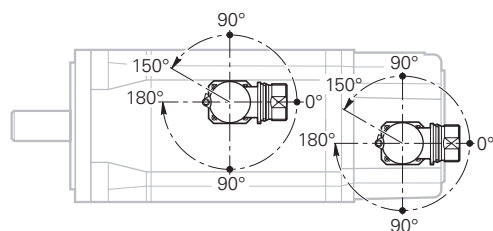


Motor	QSY 130C EcoDyn		QSY 130E EcoDyn	
Rated voltage U _N	408 V/404 V		401 V/399 V	
Rated power output P _N	1.6 kW/1.5 kW		2.3 kW/2.1 kW	
Rated shaft speed n _N	3 000 rpm (in EcoDyn mode)			
Rated torque M _N ¹⁾	5.2 Nm/4.7 Nm		7.4 Nm/6.7 Nm	
Rated current I _N ¹⁾	2.7 A/2.4 A		3.8 A/3.4 A	
Stall torque M ₀ ¹⁾	6.0 Nm		9.0 Nm	
Stall current I ₀ ¹⁾	3.0 A		4.5 A	
Max. speed n _{max}	4 200 rpm (in EcoDyn mode)			
Max. torque M _{max} ²⁾	16 Nm		23 Nm	
Max. current I _{max} ²⁾	8.6 A		12.7 A	
Weight m	7.9 kg	8.8 kg	9.7 kg	10.6 kg
Rotor inertia J	16.0 kgcm ²	16.4 kgcm ²	21.0 kgcm ²	21.4 kgcm ²
Brake Rated voltage U _{Br} Rated current I _{Br} Holding torque M _{Br}	Without — — —	With 24 Vdc 0.6 A 13.5 Nm	Without — — —	With 24 Vdc 0.6 A 13.5 Nm
ID number For motor with ERN 1387 For motor with ECN 1313 For motor with EQN 1325	389 053-13 389 053-83 389 053-63	389 053-14 389 053-84 389 053-64	388 422-13 388 422-83 388 422-63	388 422-14 388 422-84 388 422-64

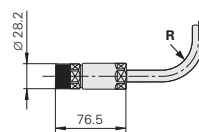
¹⁾ At 100 K ²⁾ Max. 200 ms

In italics: Data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10 %)

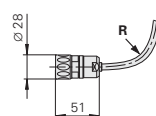
Rotatable connections



Power connector



Encoder connector



For R, see page 34

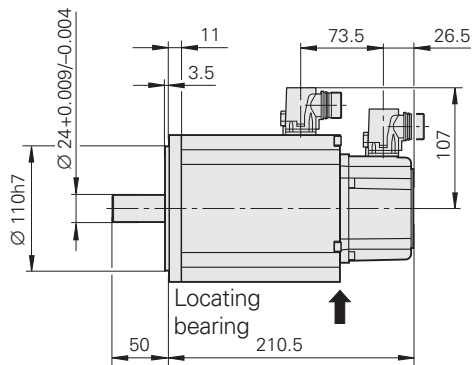
Dimensions

Dimensions in mm

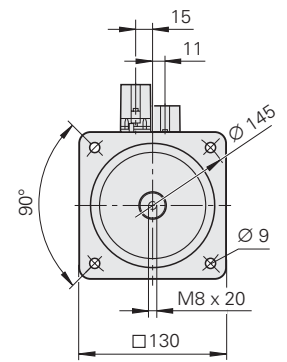
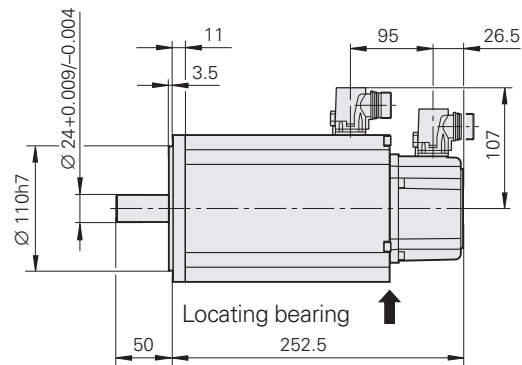


Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ± 0.2 mm

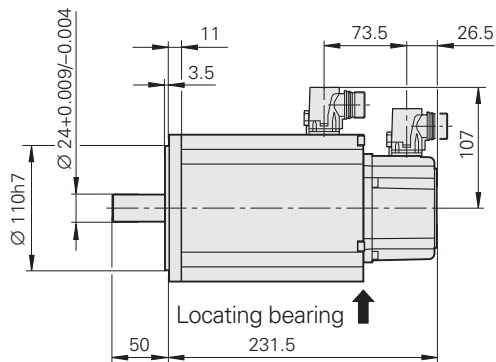
QSY 130C Without brake



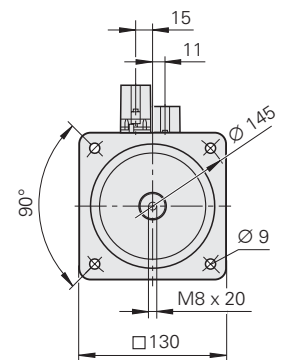
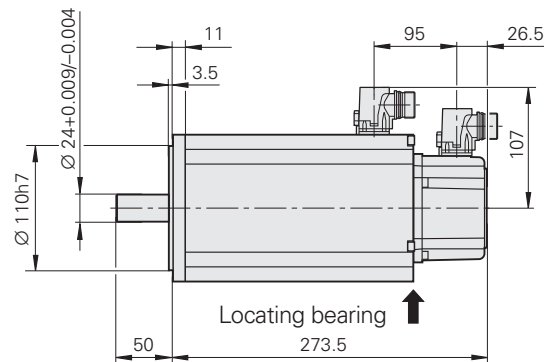
With brake



QSY 130E Without brake



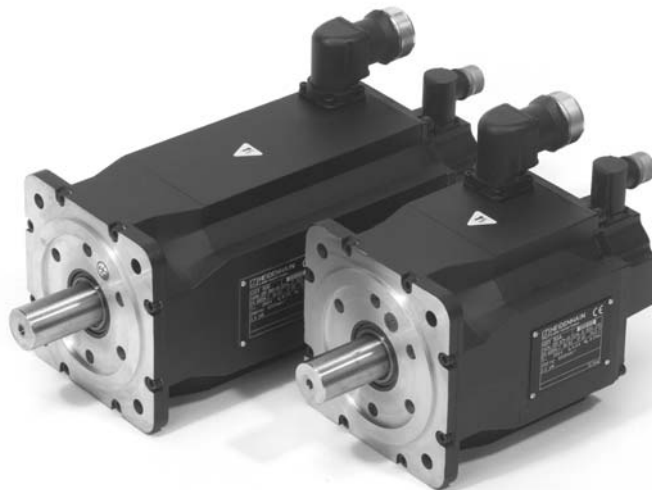
With brake



Synchronous Motors

QSY 155 Series

Feed motors with 4 pole pairs
Stall torque of 13 Nm to 26.1 Nm
Choice of incremental or absolute rotary encoder

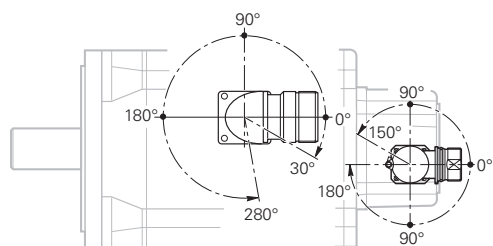


Motor	QSY 155 B		QSY 155 C		QSY 155 D		QSY 155 F	
Rated voltage U_N	295 V/292 V		291 V/289 V		291 V/288 V		287 V/285 V	
Rated power output P_N	2.9 kW/2.6 kW		3.9 kW/3.5 kW		4.6 kW/4.1 kW		5.2 kW/4.7 kW	
Rated shaft speed n_N	3000 rpm							
Rated torque $M_N^{1)}$	9.2 Nm/8.3 Nm		12.5 Nm/11.3 Nm		14.8 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	
Weight m	15.0 kg	17.4 kg	17.5 kg	19.9 kg	20.0 kg	22.4 kg	25.0 kg	27.4 kg
Rotor inertia J	33 kgcm ²	35 kgcm ²	43 kgcm ²	45 kgcm ²	54 kgcm ²	56 kgcm ²	75 kgcm ²	77 kgcm ²
Brake Rated voltage U_{Br} Rated current I_{Br} Holding torque M_{Br}	Without — — —	With 24 Vdc 1.1 A 40 Nm	Without — — —	With 24 Vdc 1.1 A 40 Nm	Without — — —	With 24 Vdc 1.1 A 40 Nm	Without — — —	With 24 Vdc 1.1 A 40 Nm
ID number For motor with ERN 1387 For motor with EQN 1325	339880-03 339880-53	339880-04 339880-54	365308-03 365308-53	365308-04 365308-54	339881-03 339881-53	339881-04 339881-54	339882-03 339882-53	339882-04 339882-54

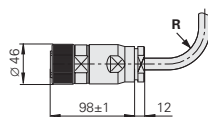
¹⁾ At 100 K ²⁾ Max. 200 ms

In italics: Data for motors with EQN 1325 (rated torque reduced by 10 %)

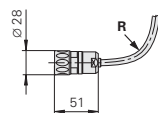
Rotatable connections



Power connector



Encoder connector



For R, see page 34

Dimensions

Dimensions in mm

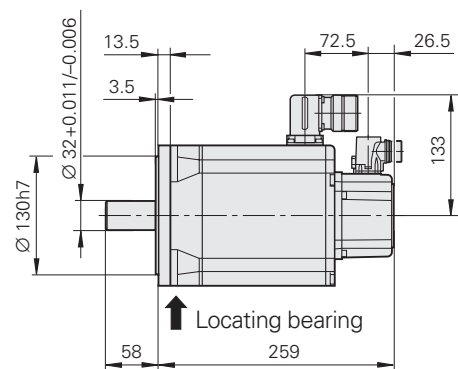


Tolerancing ISO 8015

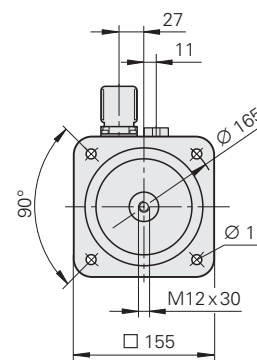
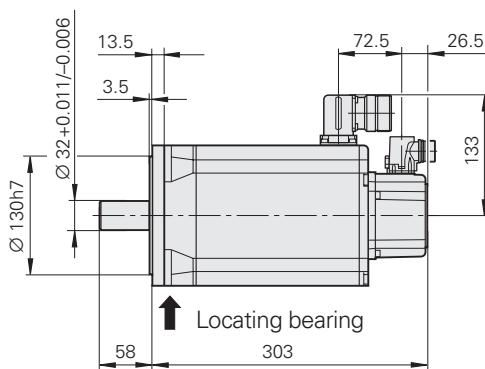
ISO 2768 - m H

< 6 mm: ± 0.2 mm

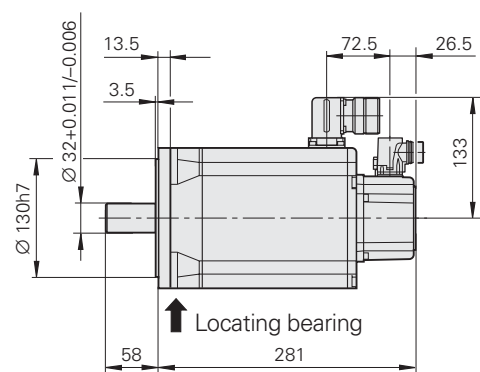
QSY 155B Without brake



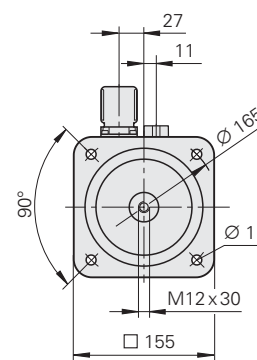
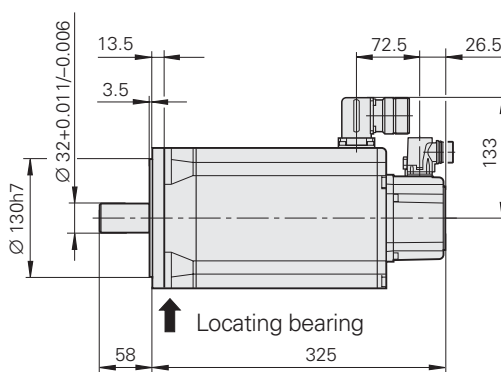
With brake



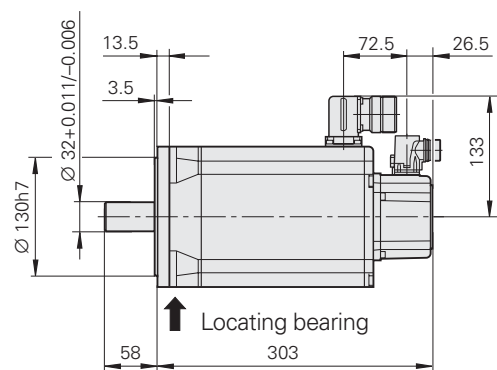
QSY 155C Without brake



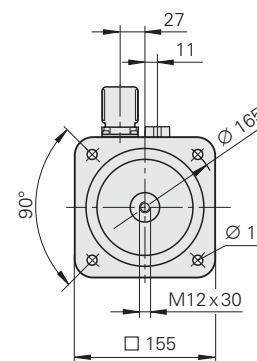
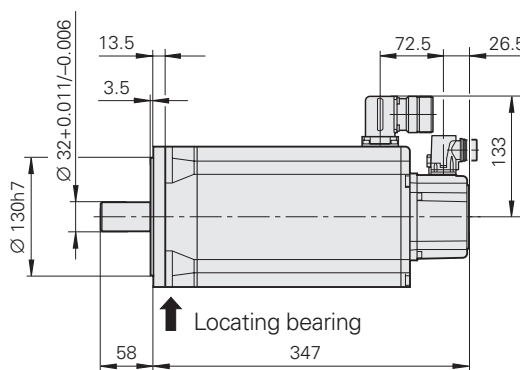
With brake



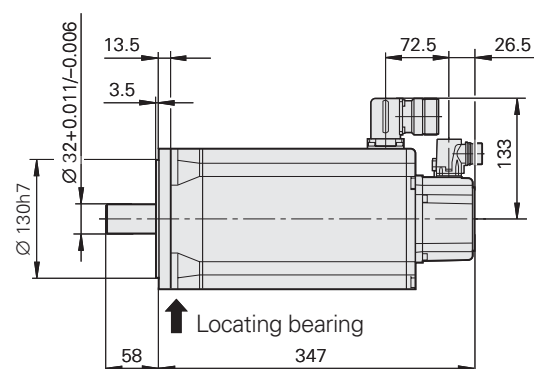
QSY 155D Without brake



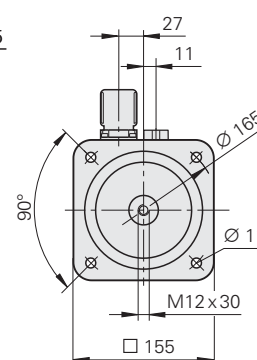
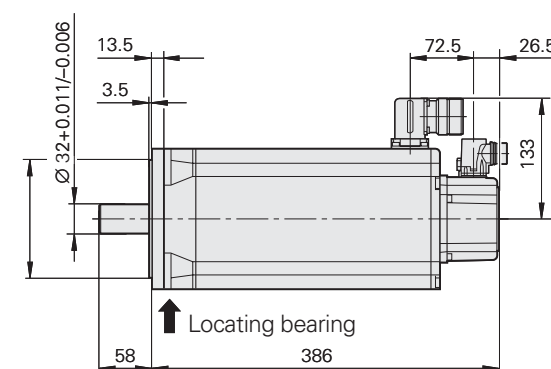
With brake



QSY 155F Without brake



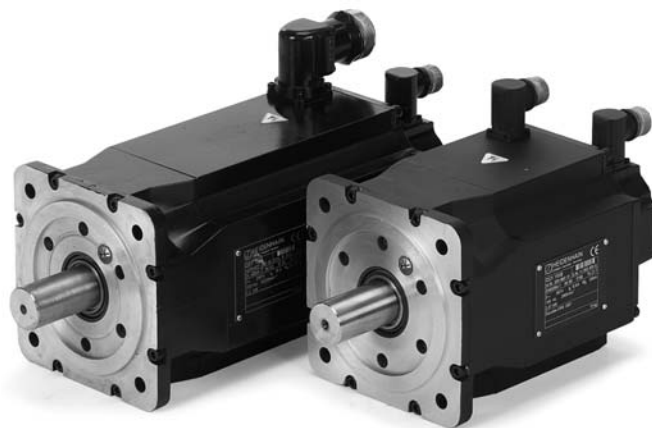
With brake



Synchronous Motors

QSY 155 EcoDyn Series

Feed motors with 4 pole pairs
Stall torque of 13 Nm to 26.1 Nm
Choice of incremental or absolute rotary encoder

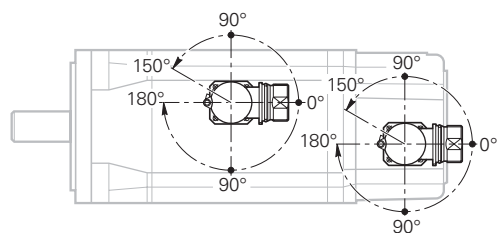


Motor	QSY 155 B EcoDyn		QSY 155 C EcoDyn		QSY 155 D EcoDyn		QSY 155 F EcoDyn	
Rated voltage U_N	412 V/408 V		416 V/411 V		408 V/404 V		396 V/394 V	
Rated power output P_N	3.5 kW/3.1 kW		5.0 kW/4.5 kW		5.7 kW/5.1 kW		6.0 kW/5.4 kW	
Rated shaft speed n_N	3000 rpm (in EcoDyn mode)							
Rated torque $M_N^{1)}$	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	
Weight m	15.0 kg	17.4 kg	17.5 kg	19.9 kg	20.0 kg	22.4 kg	25.0 kg	27.4 kg
Rotor inertia J	33 kgcm ²	35 kgcm ²	43 kgcm ²	45 kgcm ²	54 kgcm ²	56 kgcm ²	75 kgcm ²	77 kgcm ²
Brake Rated voltage U_{Br} Rated current I_{Br} Holding torque M_{Br}	Without – – –	With 24 Vdc 1.1 A 40 Nm	Without – – –	With 24 Vdc 1.1 A 40 Nm	Without – – –	With 24 Vdc 1.1 A 40 Nm	Without – – –	With 24 Vdc 1.1 A 40 Nm
ID number For motor with ERN 1387 For motor with ECN 1313 For motor with EQN 1325	339880-13 339880-83 339880-63	339880-14 339880-84 339880-64	365308-13 365308-83 365308-63	365308-14 365308-84 365308-64	339881-13 339881-83 339881-63	339881-14 339881-84 339881-64	339882-13 339882-83 339882-63	339882-14 339882-84 339882-64

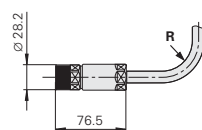
¹⁾ At 100 K ²⁾ Max. 200 ms

In italics: Data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10 %)

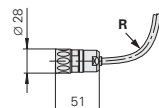
Rotatable connections



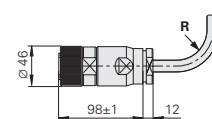
Power connector for QSY 155 B/C/D EcoDyn



Encoder connector



Power connector for QSY 155 F EcoDyn



For R, see page 34

Dimensions

Dimensions in mm

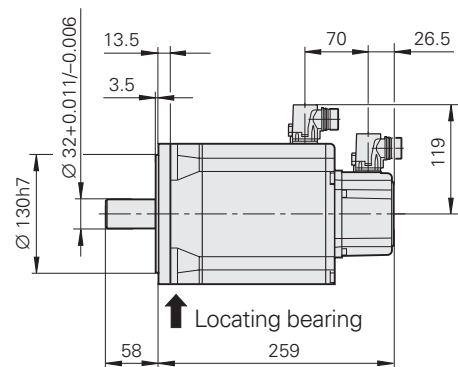


Tolerancing ISO 8015

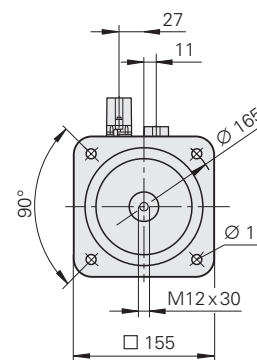
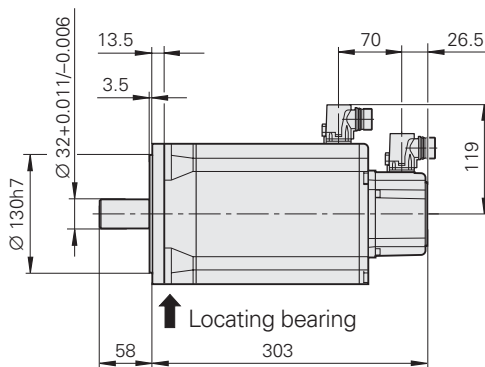
ISO 2768 - m H

< 6 mm: ± 0.2 mm

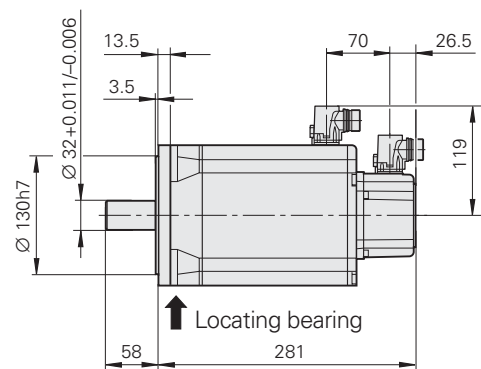
QSY 155B EcoDyn Without brake



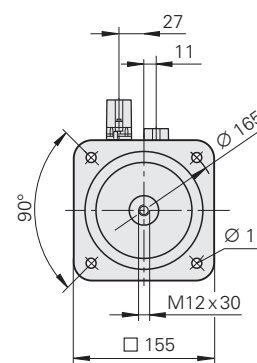
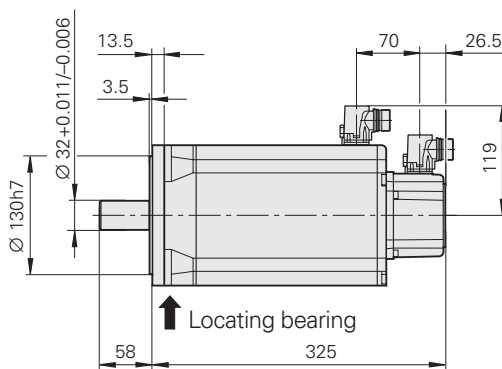
With brake



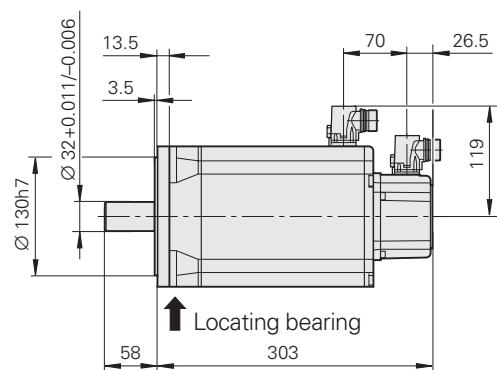
QSY 155C EcoDyn Without brake



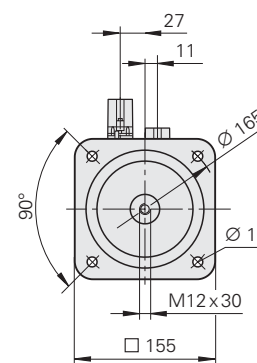
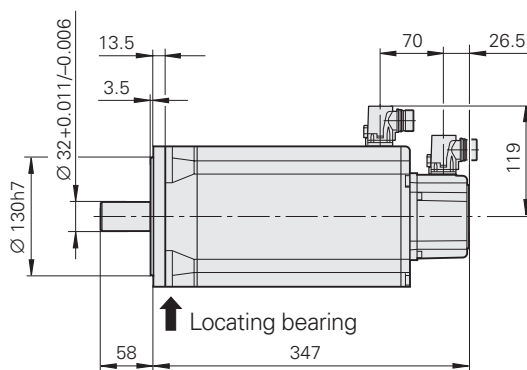
With brake



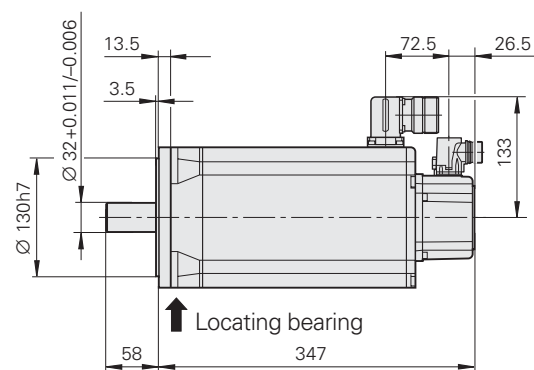
QSY 155D EcoDyn Without brake



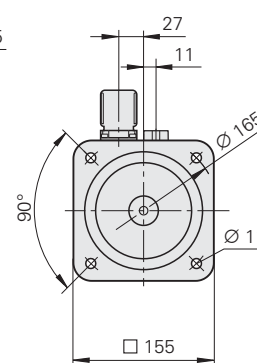
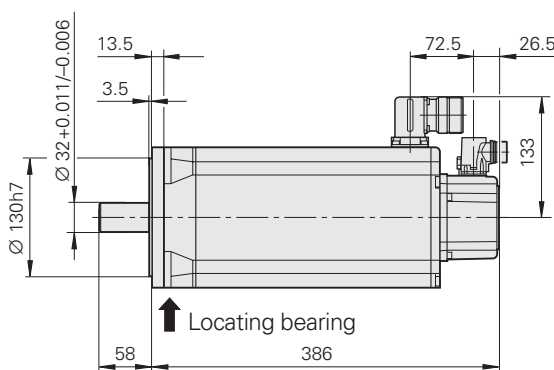
With brake



QSY 155F EcoDyn Without brake



With brake



Synchronous Motors

QSY 190 EcoDyn Series

Feed motors with 4 pole pairs
Stall torque of 28 Nm to 62.5 Nm
with incremental or absolute rotary encoder upon request

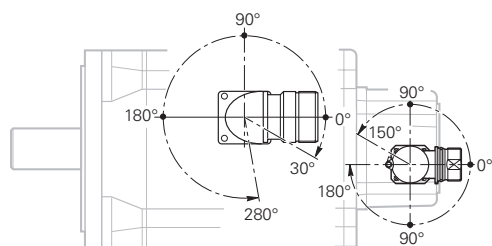


Motor	QSY 190C EcoDyn		QSY 190D EcoDyn		QSY 190F EcoDyn		QSY 190K EcoDyn	
Rated voltage U_N	423 V/416 V		418 V/412 V		405 V/401 V		397 V/395 V	
Rated power output P_N	7.2 kW/6.5 kW		9.6 kW/8.6 kW		9.9 kW/8.9 kW		12.2 kW/11.0 kW	
Rated shaft speed n_N	3000 rpm (in EcoDyn mode)							
Rated torque $M_N^{1)}$	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		14.6 A/13.1 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 $M_{max}^{2)}$	78 Nm		104 Nm		135 Nm		210 Nm	
Max. current $I_{max}^{2)}$	40.0 A		54.4 A		75.0 A		113.0 A	
Weight m	29.3 kg	37.6 kg	33.5 kg	41.8 kg	42.5 kg	50.8 kg	61 kg	69.3 kg
Rotor inertia J	106 kgcm ²	115 kgcm ²	130 kgcm ²	139 kgcm ²	190 kgcm ²	199 kgcm ²	290 kgcm ²	299 kgcm ²
Brake Rated voltage U_{Br} Rated current I_{Br} Holding torque M_{Br}	Without – – –	With 24 Vdc 1.7 A 70 Nm	Without – – –	With 24 Vdc 1.7 A 70 Nm	Without – – –	With 24 Vdc 1.7 A 70 Nm	Without – – –	With 24 Vdc 1.7 A 70 Nm
ID number For motor with ERN 1387 For motor with ECN 1313 For motor with EQN 1325	392 023-13 392 023-83 392 023-63	392 023-14 392 023-84 392 023-64	392 024-13 392 024-83 392 024-63	392 024-14 392 024-84 392 024-64	388 244-13 388 244-83 388 244-63	388 244-14 388 244-84 388 244-64	392 025-13 392 025-83 392 025-63	392 025-14 392 025-84 392 025-64

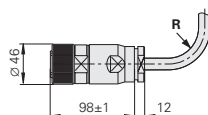
¹⁾ At 100 K ²⁾ Max. 200 ms

In italics: Data for motors with ECN 1313 or EQN 1325 (rated torque reduced by 10 %)

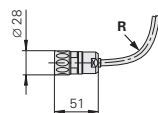
Rotatable connections



Power connector



Encoder connector



For R, see page 34

Dimensions

Dimensions in mm

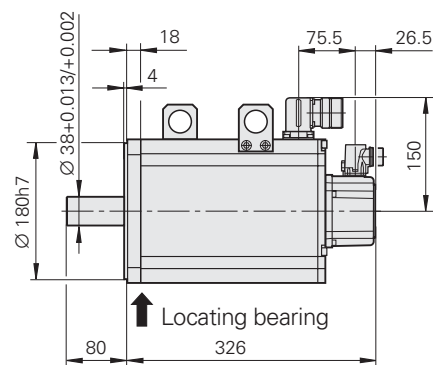


Tolerancing ISO 8015

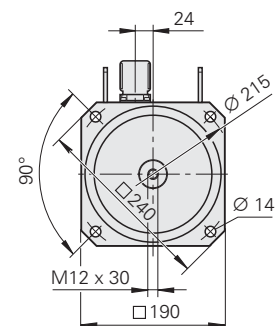
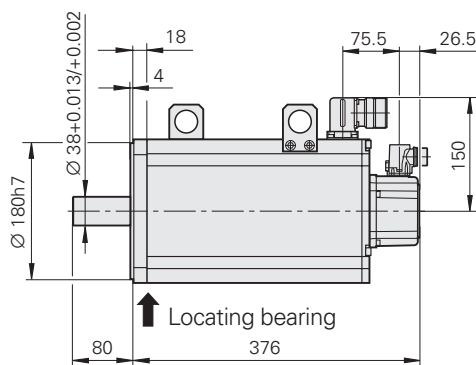
ISO 2768 - m H

< 6 mm: ± 0.2 mm

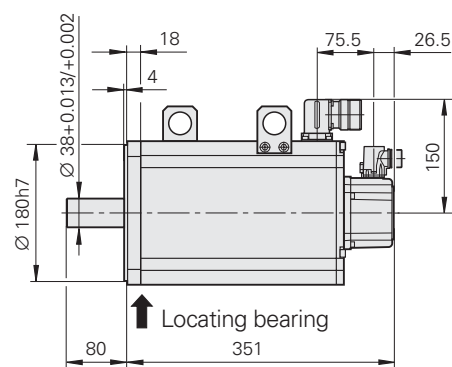
QSY 190C EcoDyn Without brake



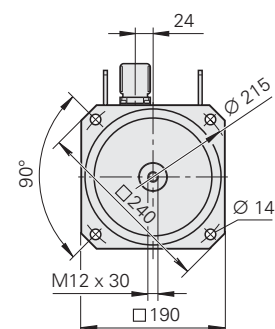
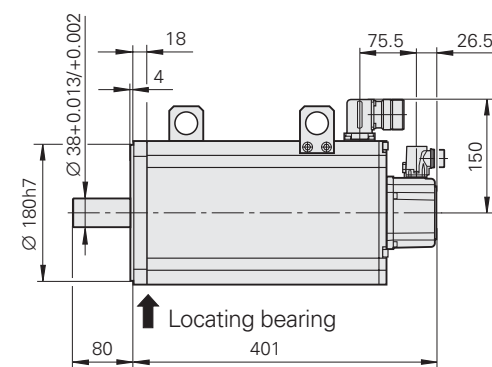
With brake



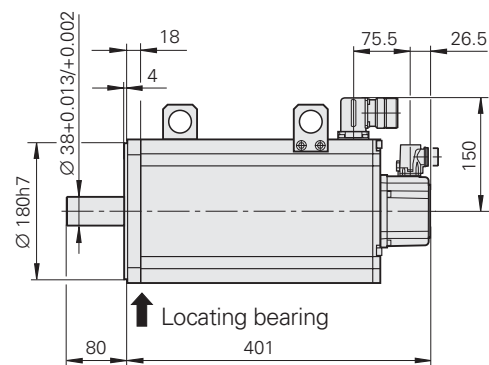
QSY 190D EcoDyn Without brake



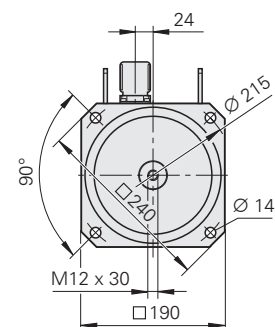
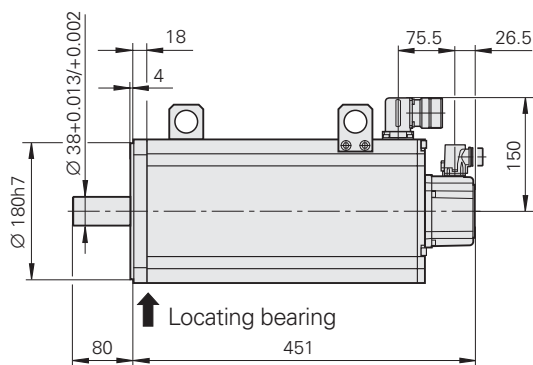
With brake



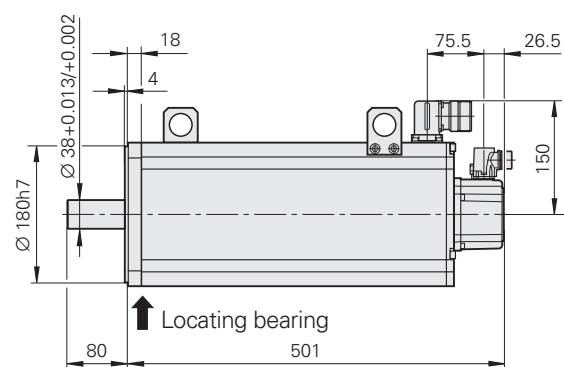
QSY 190F EcoDyn Without brake



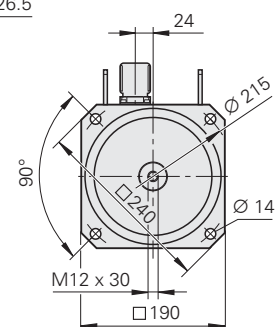
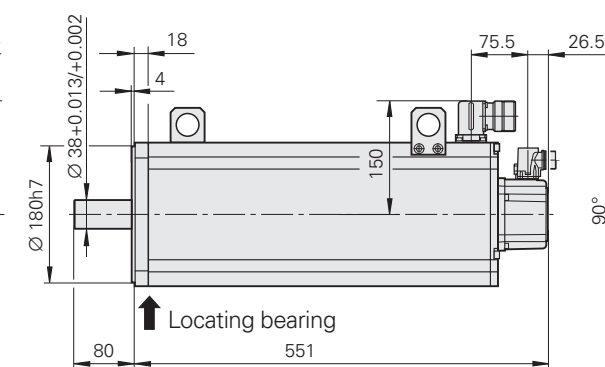
With brake



QSY 190K EcoDyn Without brake



With brake



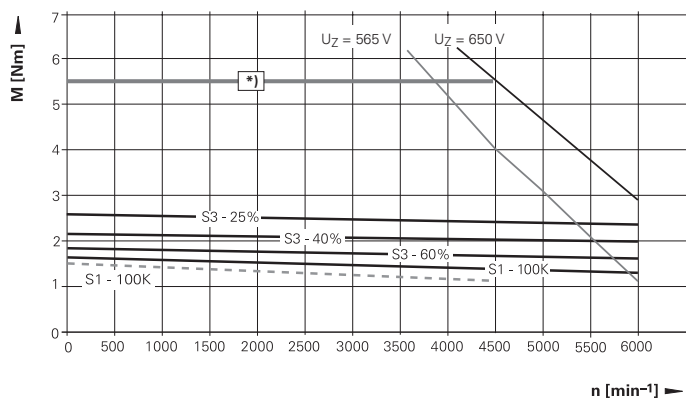
Synchronous Motors

Torque Characteristics

----- Characteristic curve according to the specifications
 ————— Measured characteristic curve of one motor

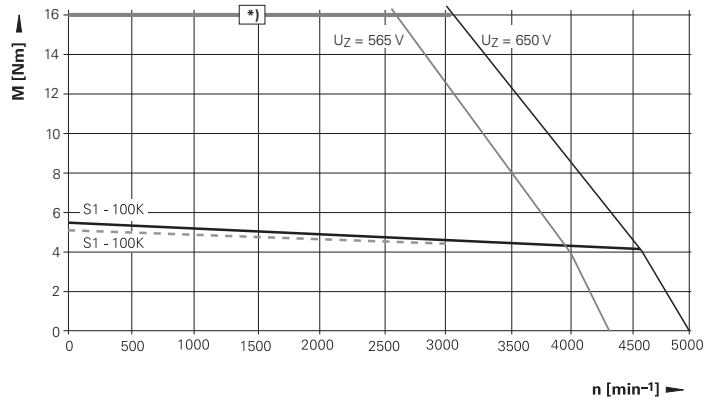
QSY 96A

*) $M_{\max} = 5.5 \text{ Nm}$ at $I_{\max} = 6.3 \text{ A}_{\text{eff}}$



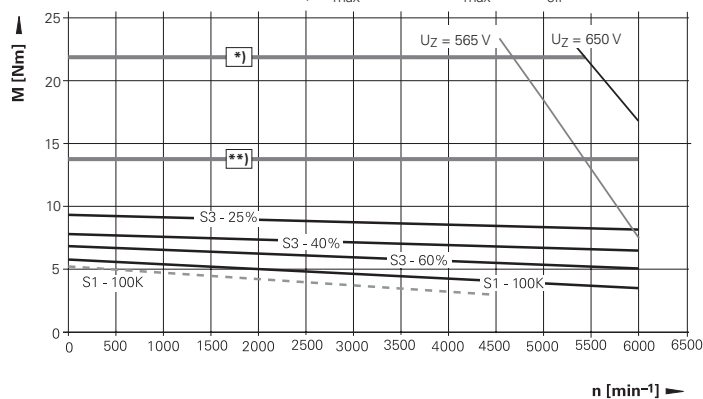
QSY 116C

*) $M_{\max} = 16 \text{ Nm}$ at $I_{\max} = 12.7 \text{ A}_{\text{eff}}$



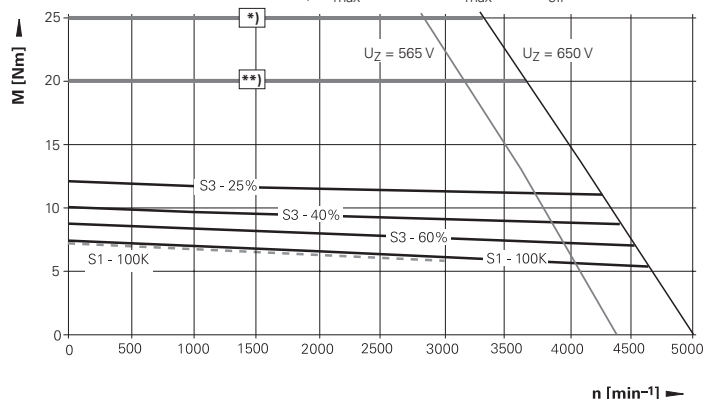
QSY 96G

*) $M_{\max} = 22 \text{ Nm}$ at $I_{\max} = 25.4 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 14 \text{ Nm}$ at $I_{\max} = 15 \text{ A}_{\text{eff}}$



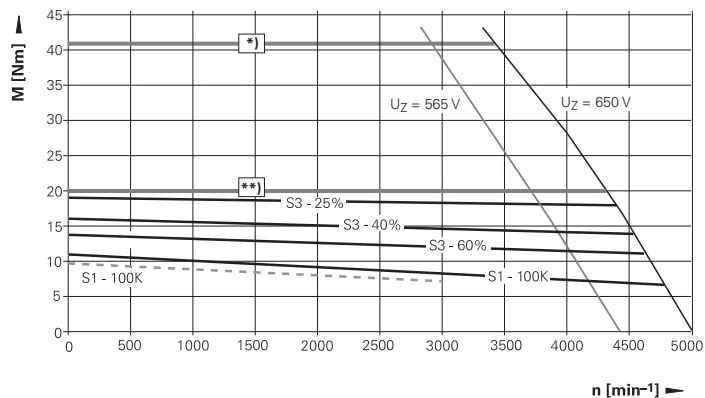
QSY 116E

*) $M_{\max} = 25 \text{ Nm}$ at $I_{\max} = 19 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 21 \text{ Nm}$ at $I_{\max} = 15 \text{ A}_{\text{eff}}$



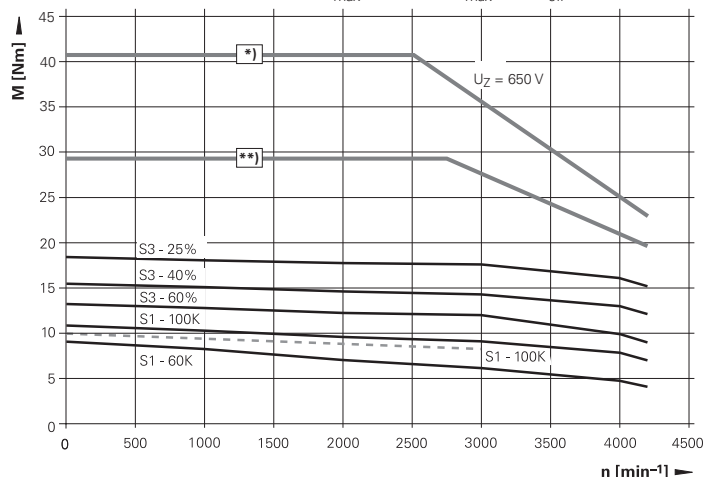
QSY 116J

*) $M_{\max} = 41 \text{ Nm}$ at $I_{\max} = 32.6 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 21 \text{ Nm}$ at $I_{\max} = 15 \text{ A}_{\text{eff}}$



QSY 116J EcoDyn

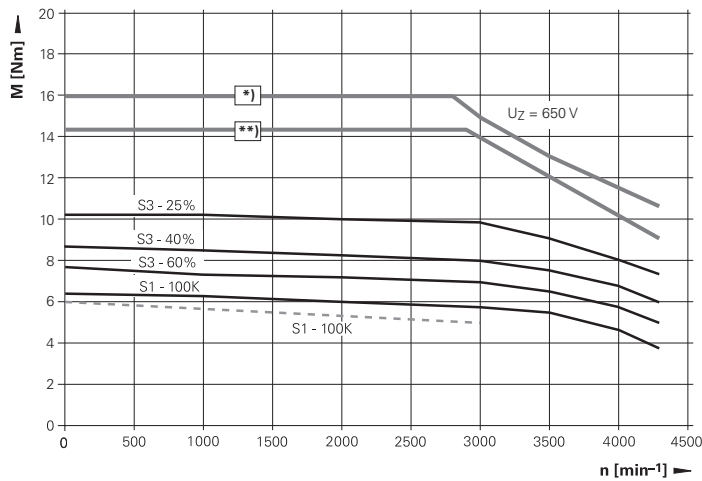
*) $M_{\max} = 41 \text{ Nm}$ at $I_{\max} = 23 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 29 \text{ Nm}$ at $I_{\max} = 15 \text{ A}_{\text{eff}}$



The characteristic curves apply to motors with ERN 1387.

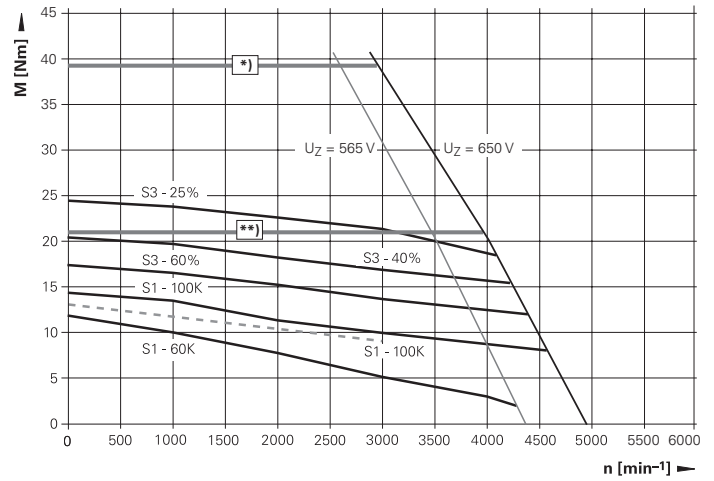
QSY 130C EcoDyn

*) $M_{\max} = 16 \text{ Nm}$ at $I_{\max} = 8.6 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 14.5 \text{ Nm}$ at $I_{\max} = 7.5 \text{ A}_{\text{eff}}$



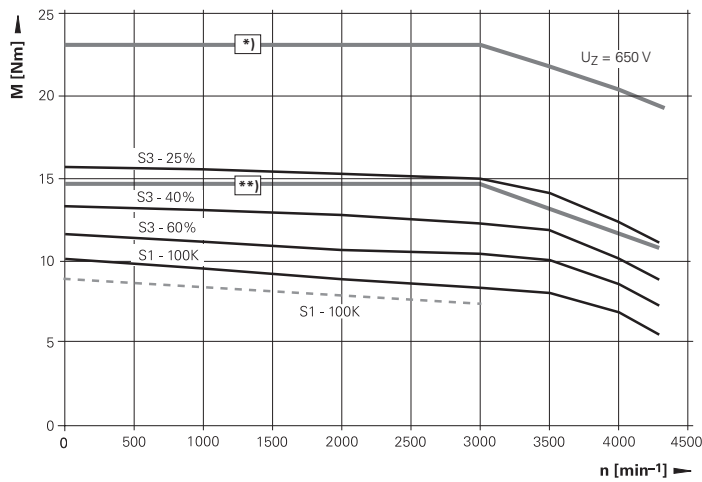
QSY 155B

*) $M_{\max} = 39 \text{ Nm}$ at $I_{\max} = 29.7 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 21 \text{ Nm}$ at $I_{\max} = 15 \text{ A}_{\text{eff}}$



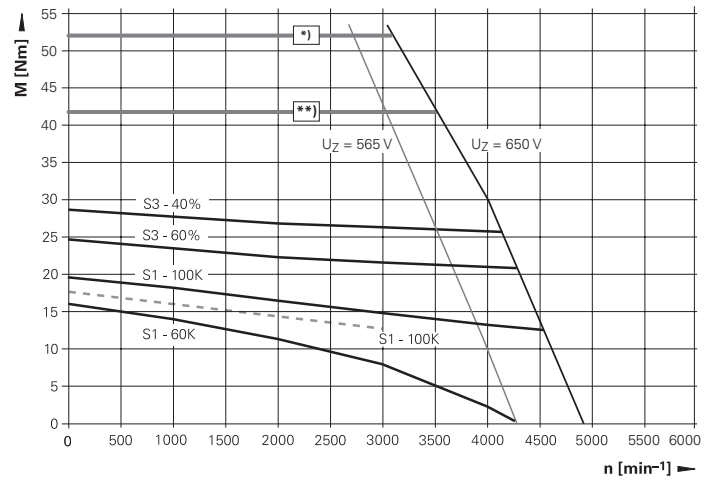
QSY 130E EcoDyn

*) $M_{\max} = 23 \text{ Nm}$ at $I_{\max} = 12.7 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 14.5 \text{ Nm}$ at $I_{\max} = 7.5 \text{ A}_{\text{eff}}$



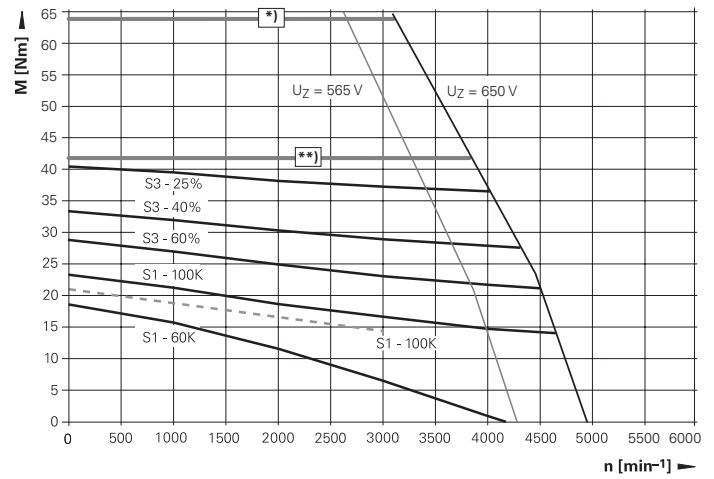
QSY 155C

*) $M_{\max} = 52 \text{ Nm}$ at $I_{\max} = 38.9 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 42 \text{ Nm}$ at $I_{\max} = 30 \text{ A}_{\text{eff}}$



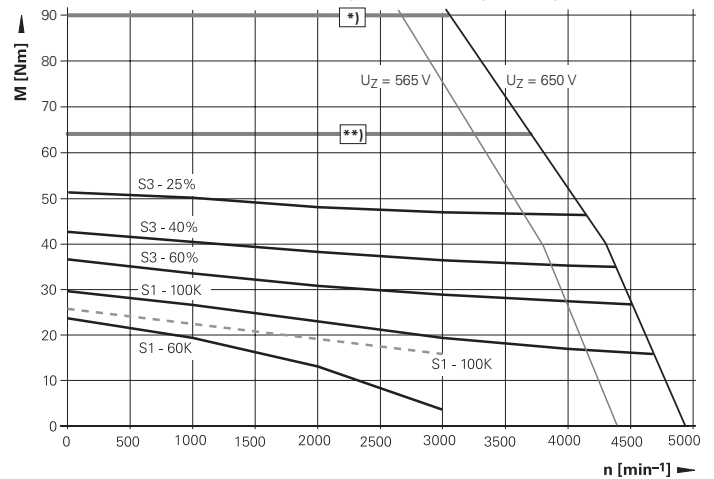
QSY 155D

*) $M_{\max} = 64 \text{ Nm}$ at $I_{\max} = 49.5 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 42 \text{ Nm}$ at $I_{\max} = 30 \text{ A}_{\text{eff}}$



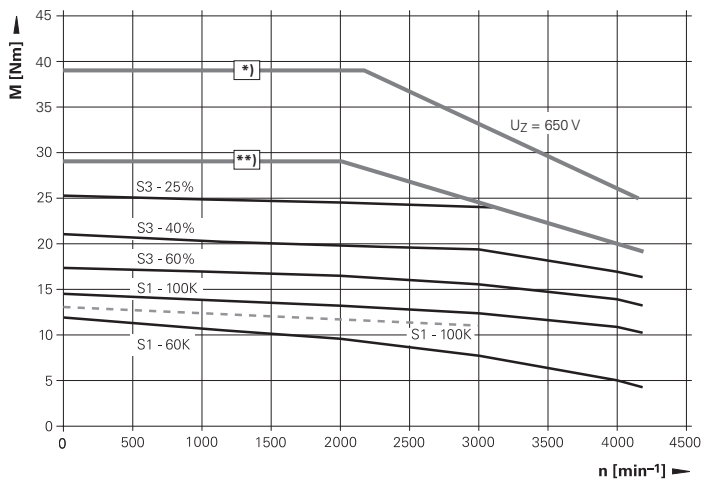
QSY 155F

*) $M_{\max} = 90 \text{ Nm}$ at $I_{\max} = 68.6 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 64 \text{ Nm}$ at $I_{\max} = 46 \text{ A}_{\text{eff}}$



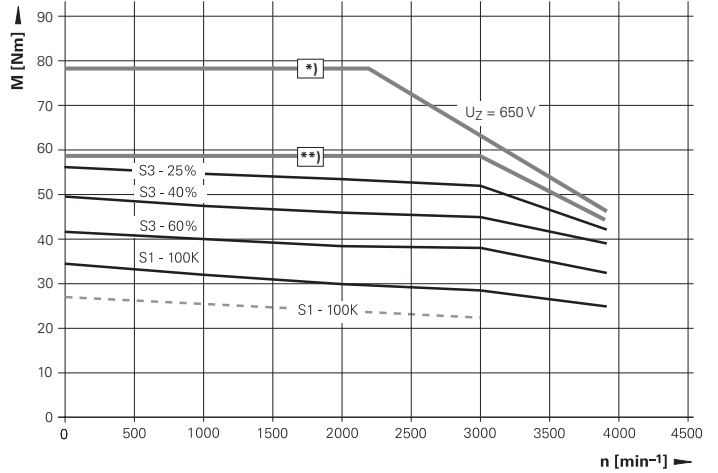
QSY 155B EcoDyn

*) $M_{\max} = 39 \text{ Nm}$ at $I_{\max} = 21.2 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 29 \text{ Nm}$ at $I_{\max} = 15 \text{ A}_{\text{eff}}$



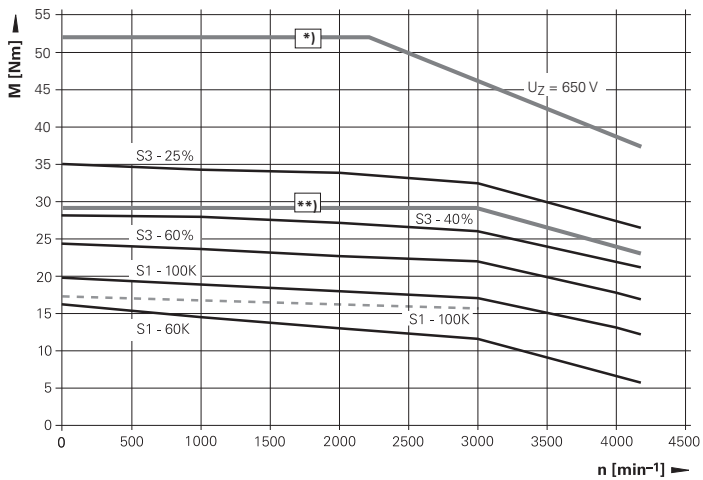
QSY 190C EcoDyn

*) $M_{\max} = 78 \text{ Nm}$ at $I_{\max} = 40 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 59 \text{ Nm}$ at $I_{\max} = 30 \text{ A}_{\text{eff}}$



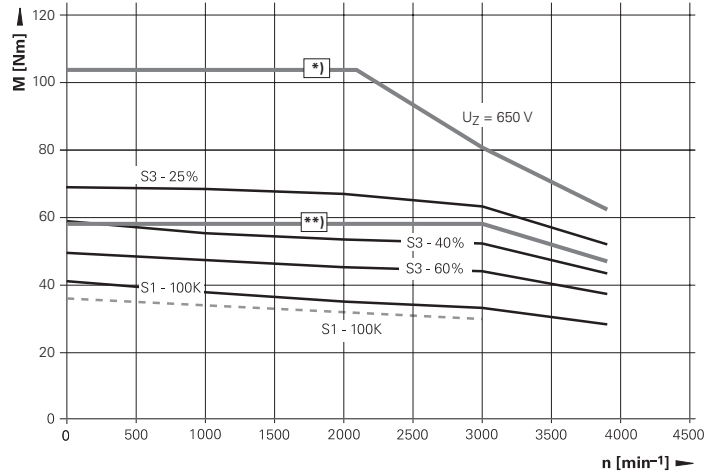
QSY 155C EcoDyn

*) $M_{\max} = 52 \text{ Nm}$ at $I_{\max} = 27.6 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 29 \text{ Nm}$ at $I_{\max} = 15 \text{ A}_{\text{eff}}$



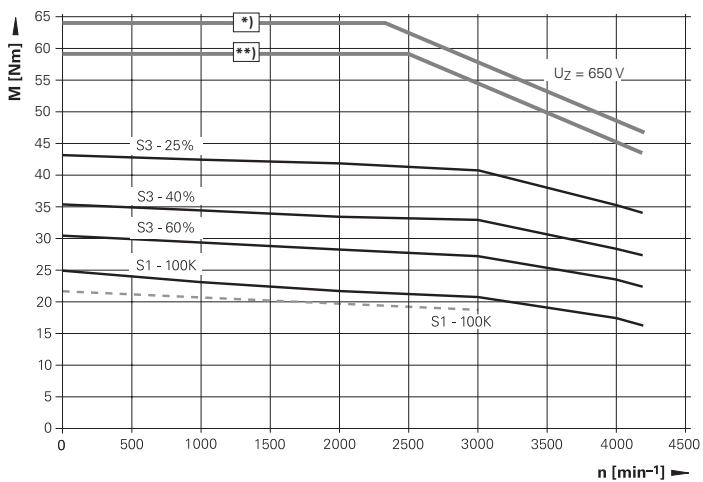
QSY 190D EcoDyn

*) $M_{\max} = 104 \text{ Nm}$ at $I_{\max} = 54.4 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 59 \text{ Nm}$ at $I_{\max} = 30 \text{ A}_{\text{eff}}$



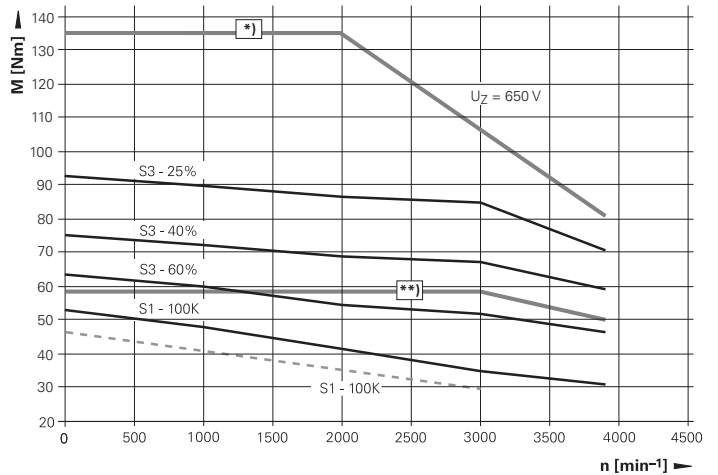
QSY 155D EcoDyn

*) $M_{\max} = 64 \text{ Nm}$ at $I_{\max} = 35 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 59 \text{ Nm}$ at $I_{\max} = 30 \text{ A}_{\text{eff}}$



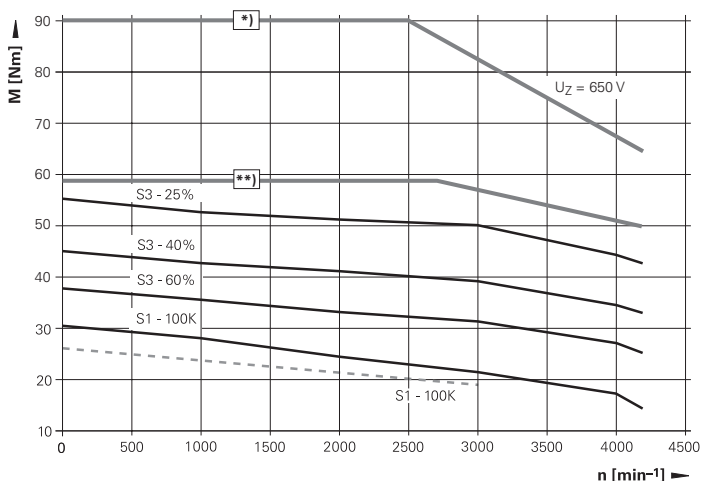
QSY 190F EcoDyn

*) $M_{\max} = 135 \text{ Nm}$ at $I_{\max} = 75 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 59 \text{ Nm}$ at $I_{\max} = 30 \text{ A}_{\text{eff}}$



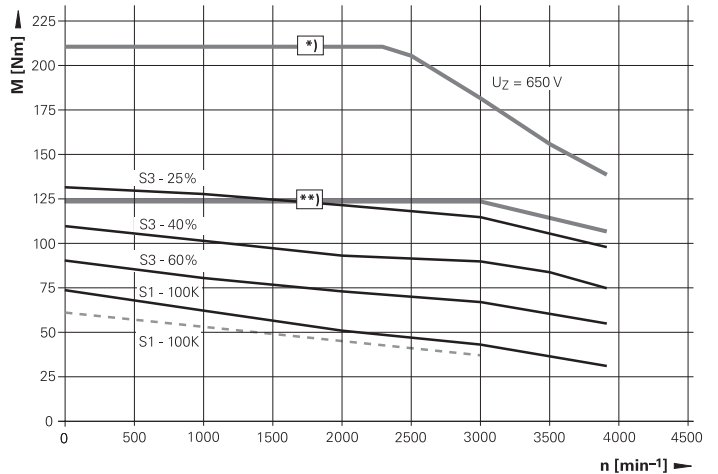
QSY 155F EcoDyn

*) $M_{\max} = 90 \text{ Nm}$ at $I_{\max} = 49.5 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 59 \text{ Nm}$ at $I_{\max} = 30 \text{ A}_{\text{eff}}$



QSY 190K EcoDyn

*) $M_{\max} = 210 \text{ Nm}$ at $I_{\max} = 113 \text{ A}_{\text{eff}}$
 **) $M_{\max} = 123 \text{ Nm}$ at $I_{\max} = 64 \text{ A}_{\text{eff}}$



Synchronous Motors

1FK7 Series Overview

General technical information

The 1FK7 synchronous motors from HEIDENHAIN fulfill all requirements of an NC-controlled machine tool.

Specifications

The specifications and the 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, it is necessary to reduce the motor torque in order to avoid thermal overloading of the motor.

Speed measurement

The 1FK7 synchronous motors operate with sinusoidal commutation. An integrated ERN 1387 incremental rotary encoder from HEIDENHAIN measures the rotor position and shaft speed.

Mechanical life

The service life of the bearings depends on the shaft load and the mean rotational speed (see the *Inverter Systems and Motors* Technical Manual).

Mechanical data

Dimensions IM B5 (for securing by flange) as per EN 60034-7

Flange: Dimensions as per DIN 42948 and IEC 72

Protection as per EN 60529

Motor: IP 65

Shaft exit: IP 64

Shaft end

- Cylindrical as per DIN 748 and IEC 72
- Without feather key (with feather key upon request)
- With centering hole as per ISO 866 BS 5 and thread

Bearing free of maintenance

Holding brake as option

Thermal variables

Natural cooling

Temperature monitoring with KTY 84-130 thermistor in the stator winding

Thermal class F

Synchronous motors	Stall torque	Stall current	Rated speed	Recommended inverters ²⁾				Page
				1-axis module	2-axis module	Compact inverters/ axis		
						UR 2xxD UE 2xxB	UE 1xx	
1FK7 042-5AF71	3.0 Nm	2.2 A	3000 rpm	UM 111 D	UM 121 D	Axes 1 to 4	Axes 1 to 4	22
1FK7 060-5AF71	6.0 Nm	4.5 A	3000 rpm	UM 111 D	UM 121 D	Axes 1 to 4	Axes 1 to 4	24
1FK7 063-5AF71	11.0 Nm	8.0 A	3000 rpm	UM 111 BD	UM 121 BD	Axis 4	–	
1FK7 080-5AF71	8.0 Nm	4.8 A	3000 rpm	UM 111 D	UM 121 D	Axes 1 to 4	Axes 1 to 4	26
1FK7 083-5AF71	16.0 Nm	10.4 A	3000 rpm	UM 111 BD	UM 121 BD	Axis 4	–	
1FK7 100-5AF71	18.0 Nm	11.2 A	3000 rpm	UM 111 BD	UM 121 BD	Axis 4	–	28
1FK7 101-5AF71	27.0 Nm	19.0 A	3000 rpm	UM 112 D	UM 121 D	Axis 4 ¹⁾	–	
1FK7 103-5AF71	36.0 Nm	27.5 A	3000 rpm	UM 113 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.

Synchronous Motor

1FK7 042-5AF71

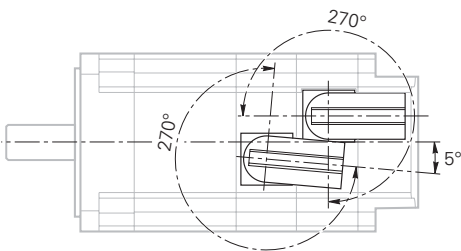
Feed motors with 4 pole pairs
 Stall torque of 3.0 Nm
 With incremental rotary encoder



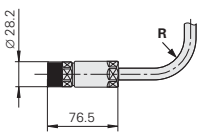
Motor	1FK7 042-5AF71	
Rated voltage U_N	297 V	
Rated power output P_N	0.82 kW	
Rated shaft speed n_N	3000 rpm	
Rated torque $M_N^{1)}$	2.6 Nm	
Rated current $I_N^{1)}$	2 A	
Stall torque $M_0^{1)}$	3.0 Nm	
Stall current $I_0^{1)}$	2.2 A	
Max. torque $M_{max}^{2)}$	10.5 Nm	
Max. current $I_{max}^{2)}$	735 A	
Weight m	4.8 kg	5.4 kg
Rotor inertia J	3.01 kgcm ²	3.73 kgcm ²
Brake Rated voltage U_{Br} Rated current I_{Br} Holding torque M_{Br}	Without – – –	With 24 Vdc 0.6 A 4.0 Nm
ID number	539964-03	539964-04

1) At 100 K 2)Max. 200 ms

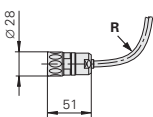
Rotatable connections



Power connector



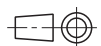
Encoder connector



For R, see page 34

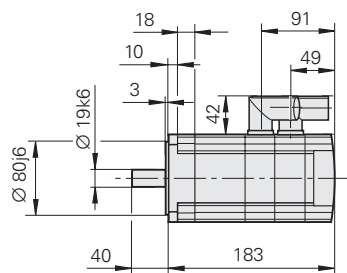
Dimensions

Dimensions in mm

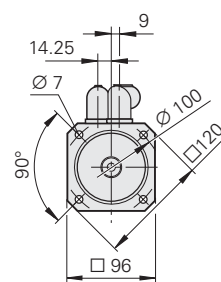
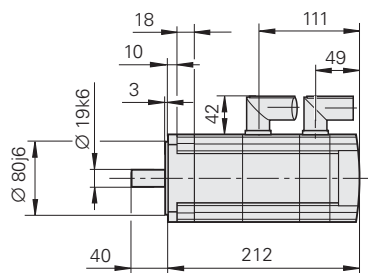


Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ± 0.2 mm

1FK7 042-5AF71 Without brake



With brake



Synchronous Motors

1FK7 06x-5AF71 Series

Feed motors with 4 pole pairs
Stall torque of 6 Nm or 11 Nm
With incremental rotary encoder

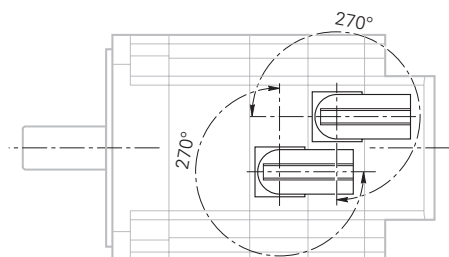


Motor	1FK7 060-5AF71		1FK7 063-5AF71	
Rated voltage U _N	274 V		275 V	
Rated power output P _N	1.48 kW		2.3 kW	
Rated shaft speed n _N	3000 rpm			
Rated torque M _N ¹⁾	4.7 Nm		7.3 Nm	
Rated current I _N ¹⁾	3.7 A		5.6 A	
Stall torque M ₀ ¹⁾	6.0 Nm		11.0 Nm	
Stall current I ₀ ¹⁾	4.5 A		8.0 A	
Max. torque M _{max} ²⁾	18.0 Nm		35.0 Nm	
Max. current I _{max} ²⁾	15.0 A		28.0 A	
Weight m	8.0 kg	8.5 kg	12.0 kg	12.5 kg
Rotor inertia J	7.95 kgcm ²	10.2 kgcm ²	15.1 kgcm ²	17.3 kgcm ²
Brake Rated voltage U _{Br} Rated current I _{Br} Holding torque M _{Br}	Without – – –	With 24 Vdc 0.6 A 12.0 Nm	Without – – –	With 24 Vdc 0.6 A 12.0 Nm
ID number	539965-03	539965-04	539966-03	539966-04

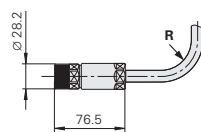
¹⁾ At 100 K

²⁾ Max. 200 ms

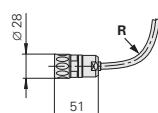
Rotatable connections



Power connector



Encoder connector



For R, see page 34

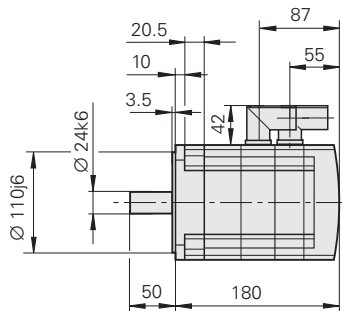
Dimensions

Dimensions in mm

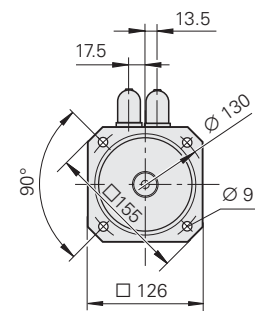
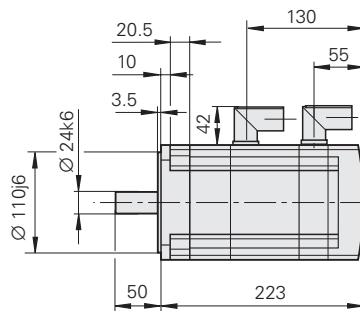


Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ± 0.2 mm

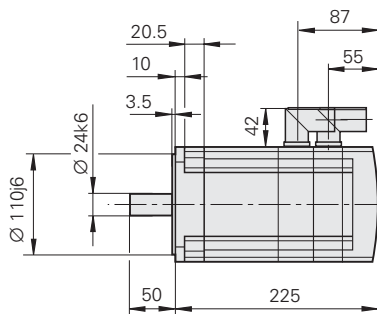
1FK7 060-5AF71 Without brake



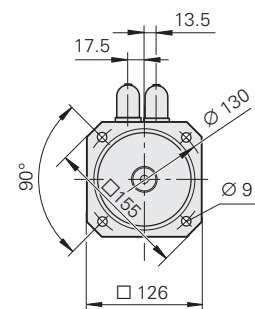
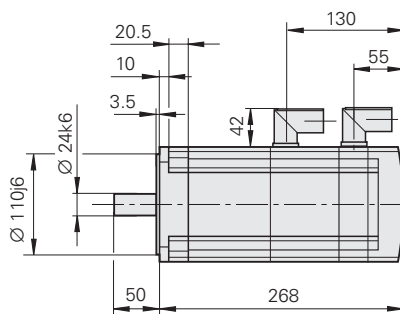
With brake



1FK7 063-5AF71 Without brake



With brake



Synchronous Motors

1FK7 08x-5AF71 Series

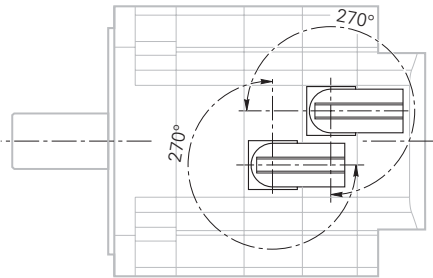
Feed motors with 4 pole pairs
 Stall torque of 8 Nm or 16 Nm
 With incremental rotary encoder



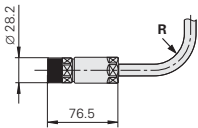
Motor	1FK7 080-5AF71		1FK7 083-5AF71	
Rated voltage U _N	327 V		303 V	
Rated power output P _N	2.14 kW		3.0 kW	
Rated shaft speed n _N	3000 rpm			
Rated torque M _N ¹⁾	6.8 Nm		10.5 Nm	
Rated current I _N ¹⁾	4.4 A		7.4 A	
Stall torque M ₀ ¹⁾	8.0 Nm		16.0 Nm	
Stall current I ₀ ¹⁾	4.8 A		10.4 A	
Max. torque M _{max} ²⁾	25.0 Nm		50.0 Nm	
Max. current I _{max} ²⁾	18.0 A		37.0 A	
Weight m	11.3 kg	12.5 kg	16.0 kg	16.5 kg
Rotor inertia J	15.0 kgcm ²	18.1 kgcm ²	27.3 kgcm ²	35.9 kgcm ²
Brake Rated voltage U _{Br} Rated current I _{Br} Holding torque M _{Br}	Without – – –	With 24 Vdc 1.2 A 22.0 Nm	Without – – –	With 24 Vdc 1.2 A 22.0 Nm
ID number	539967-03	539967-04	539968-03	539968-04

1) At 100 K 2) Max. 200 ms

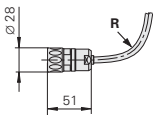
Rotatable connections



Power connector



Encoder connector



For R, see page 34

Dimensions

Dimensions in mm

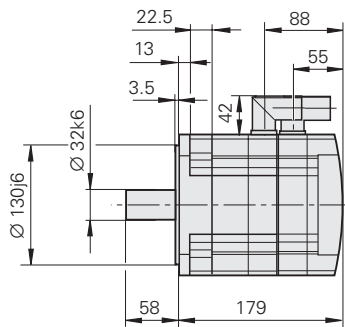


Tolerancing ISO 8015

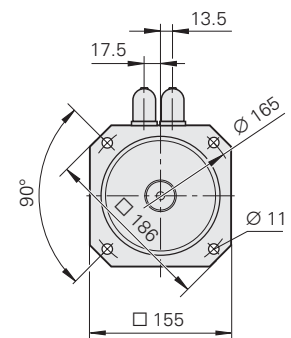
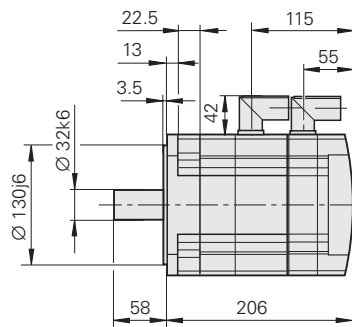
ISO 2768 - m H

< 6 mm: ± 0.2 mm

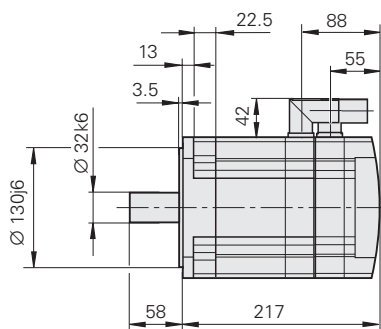
1FK7 080-5AF71 Without brake



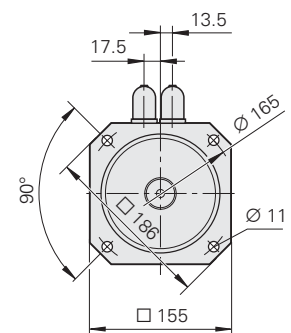
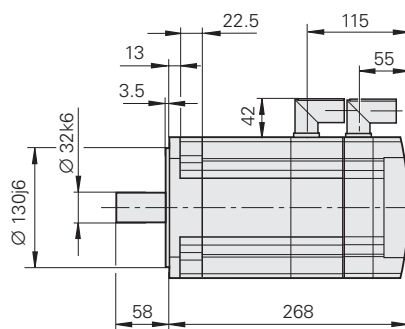
With brake



1FK7 083-5AF71 Without brake



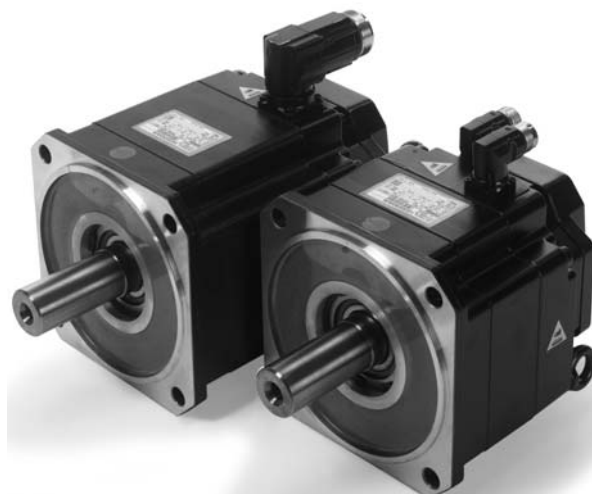
With brake



Synchronous Motors

1FK7 10x-5AF71 Series

Feed motors with 4 pole pairs
Stall torque of 18 Nm to 36 Nm
With incremental rotary encoder

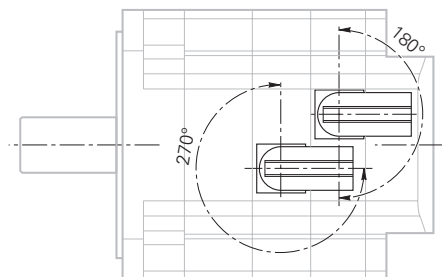


Motor	1FK7 100-5AF71		1FK7 101-5AF71		1FK7 103-5AF71	
Rated voltage U _N	318 V		277 V		262 V	
Rated power output P _N	3.77 kW		4.87 kW		4.4 kW	
Rated shaft speed n _N	3000 rpm					
Rated torque M _N ¹⁾	12.0 Nm		15.5 Nm		14.0 Nm	
Rated current I _N ¹⁾	8.0 A		11.8 A		12.0 A	
Stall torque M ₀ ¹⁾	18.0 Nm		27.0 Nm		36.0 Nm	
Stall current I ₀ ¹⁾	11.2 A		19.0 A		27.5 A	
Max. torque M _{max} ²⁾	55.0 Nm		80.0 Nm		108.0 Nm	
Max. current I _{max} ²⁾	37.0 A		63.0 A		84.0 A	
Weight m	18.9 kg	21.5 kg	21.0 kg	24.0 kg	29.0 kg	32.0 kg
Rotor inertia J	55.3 kgcm ²	63.9 kgcm ²	79.9 kgcm ²	92.3 kgcm ²	105.0 kgcm ²	118.0 kgcm ²
Brake Rated voltage U _{Br} Rated current I _{Br} Holding torque M _{Br}	Without – – –	With 24 Vdc 0.9 A 22.0 Nm	Without – – –	With 24 Vdc 1.0 A 41.0 Nm	Without – – –	With 24 Vdc 1.0 A 41.0 Nm
ID number	539969-03	539969-04	539970-03	539970-04	539971-03	539971-04

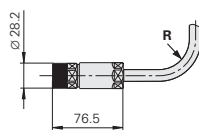
¹⁾ At 100 K

²⁾ Max. 200 ms

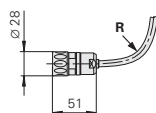
Rotatable connections



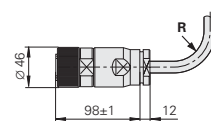
Power connector for 1FK7 100-5AF71



Encoder connector

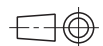


Power connector for 1FK7 101-5AF71/1FK7 103-5AF71



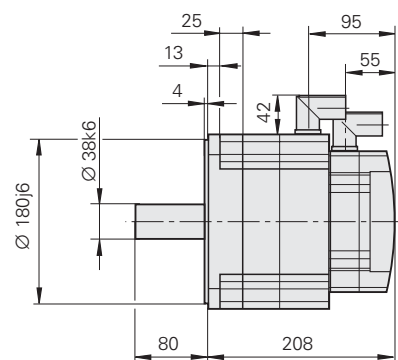
Dimensions

Dimensions in mm

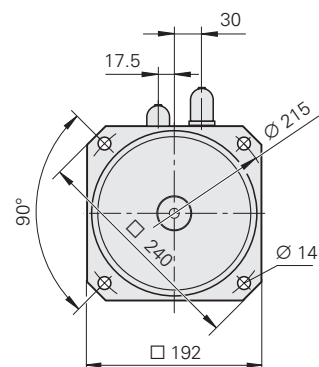
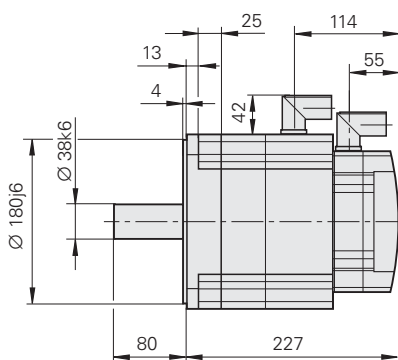


Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ± 0.2 mm

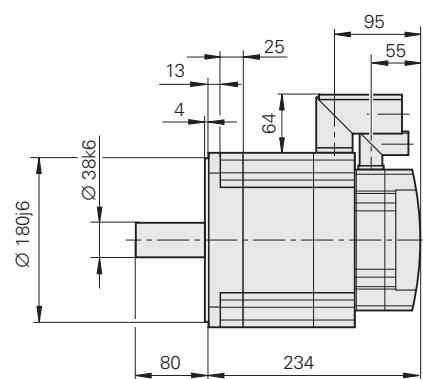
1FK7 100-5AF71 Without brake



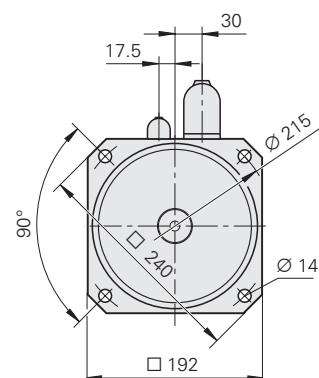
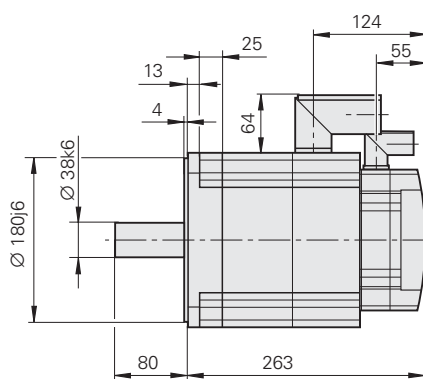
With brake



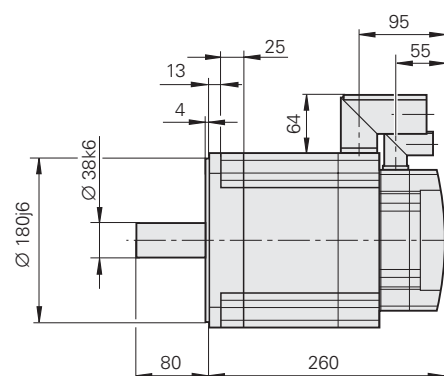
1FK7 101-5AF71 Without brake



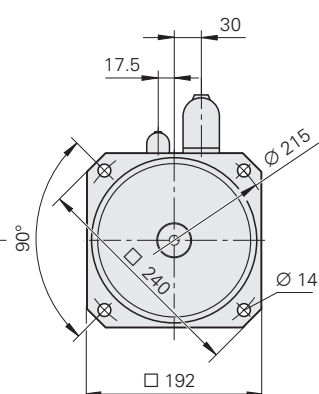
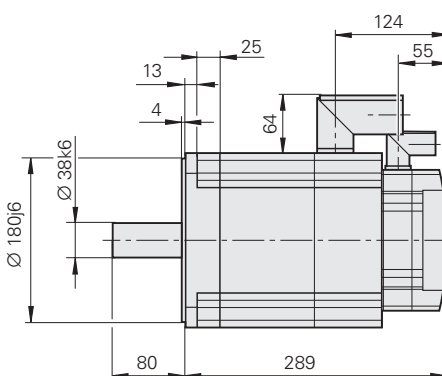
With brake



1FK7 103-5AF71 Without brake



With brake

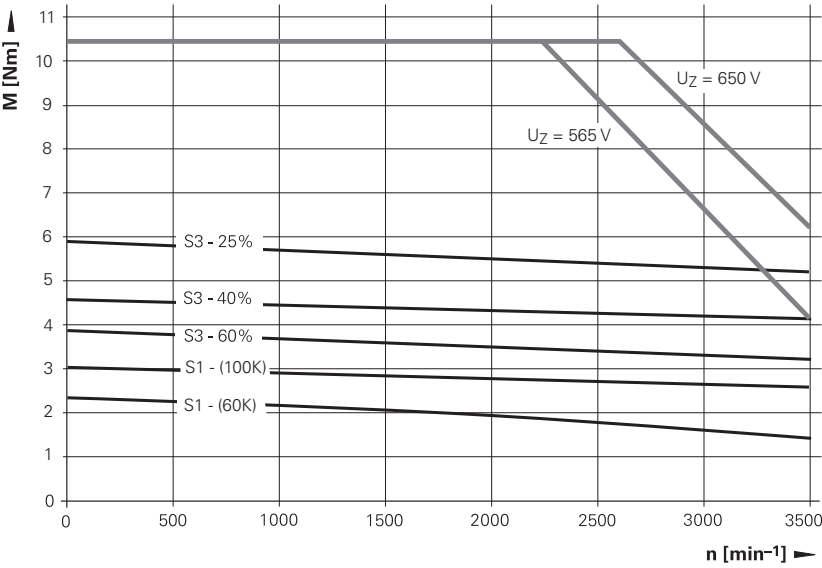


Synchronous Motors

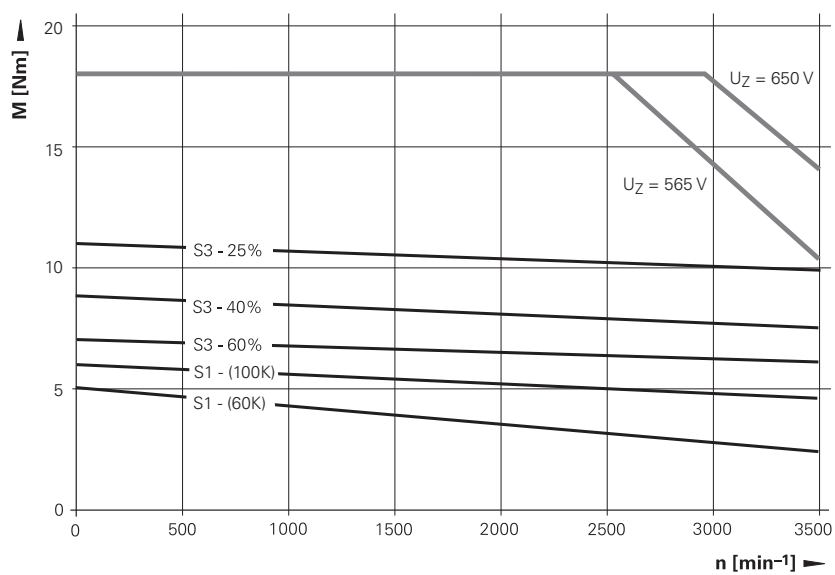
Torque Characteristics

Measured characteristic curve of one motor

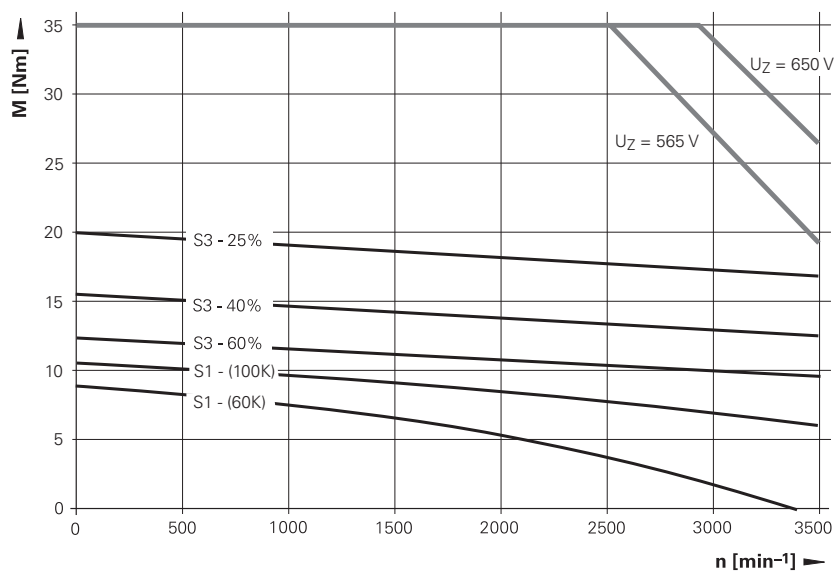
1FK7 042-5AF71



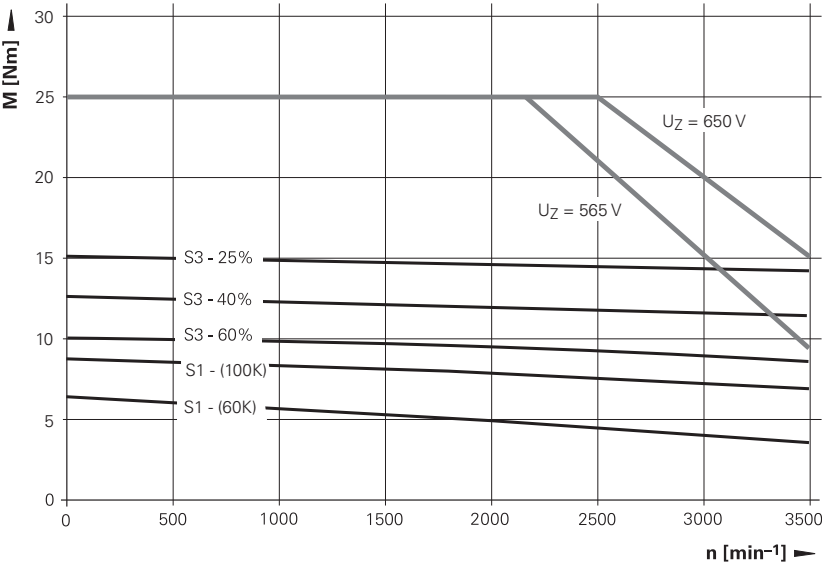
1FK7 060-5AF71



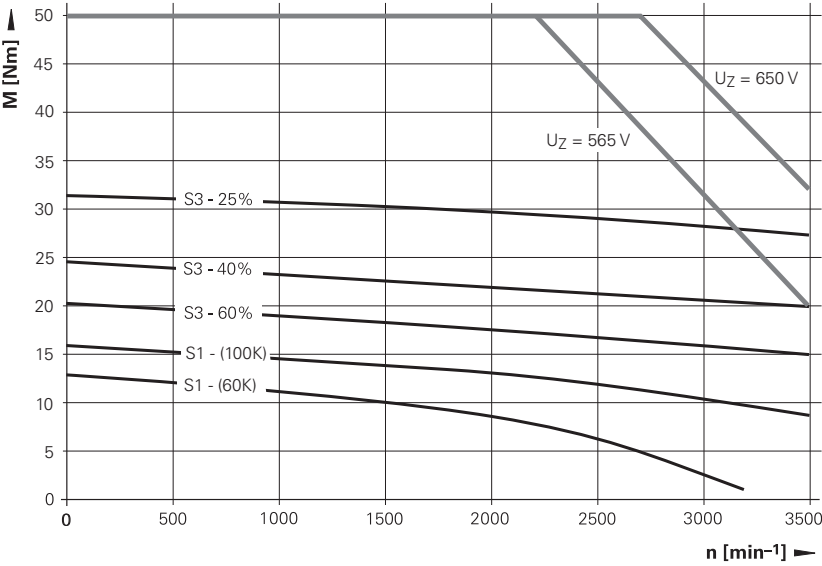
1FK7 063-5AF71



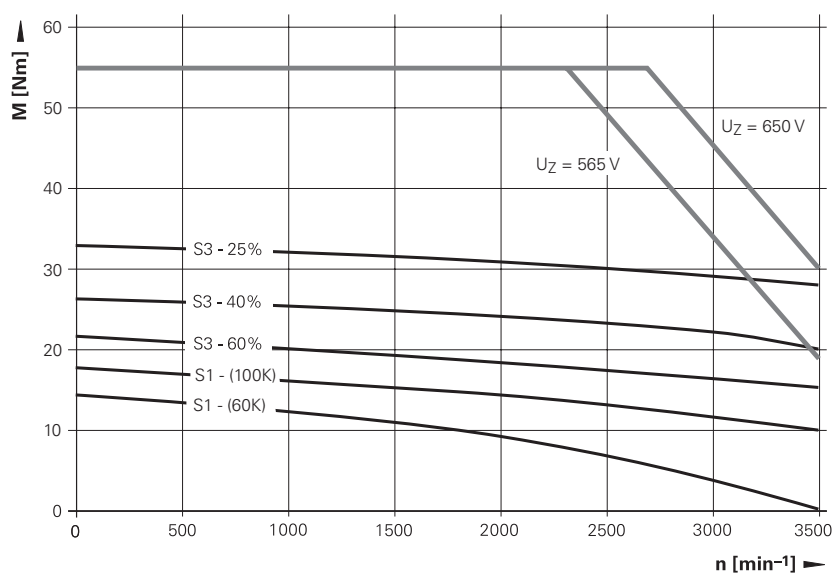
1FK7 080-5AF71



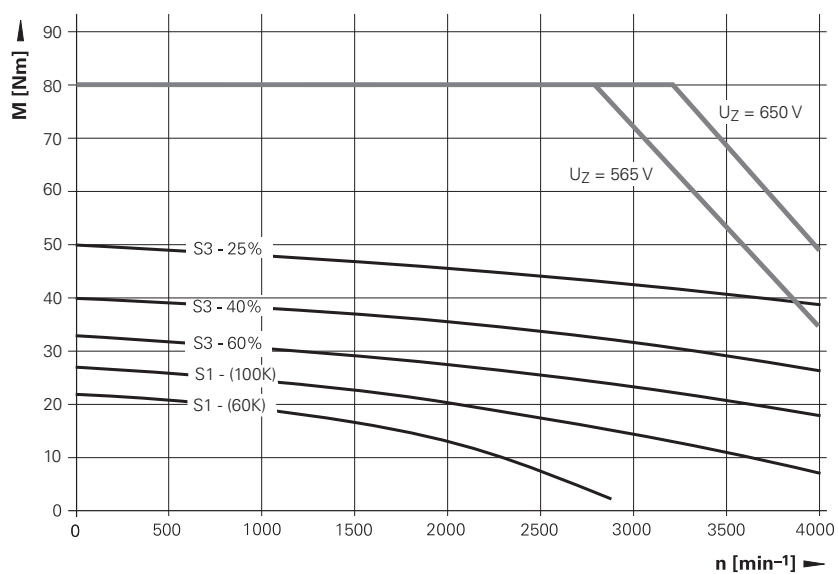
1FK7 083-5AF71



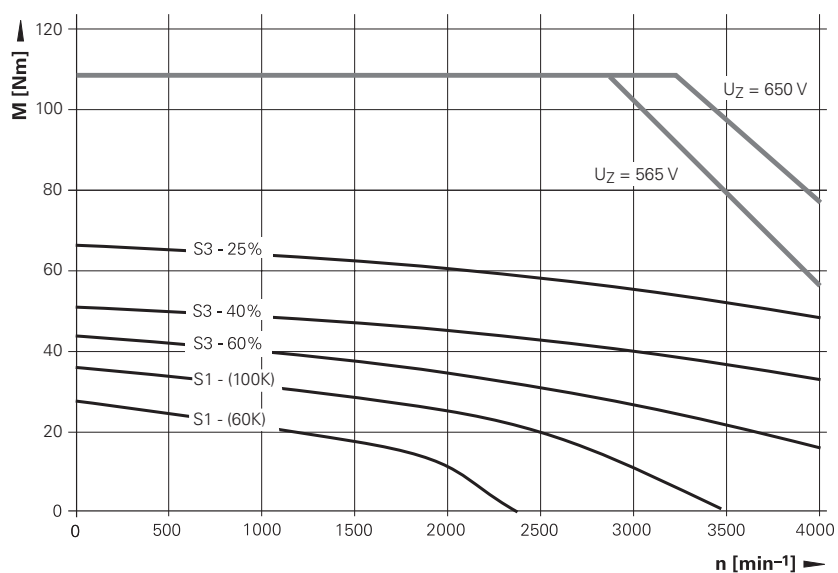
1FK7 100-5AF71



1FK7 101-5AF71



1FK7 103-5AF71



Synchronous Motors

Cables and Connectors

Power cable

Current load at ambient temperature up to 40 °C (104 °F)

	Cable with one connector Id. Nr.	Connector Id. Nr.	Cable without connectors Id. Nr.	Bend radius R for frequent flexing	Type of cable	Diameter
Current load up to 13.8 A						
QSY 96 QSY 116 QSY 116J EcoDyn QSY 130C EcoDyn QSY 130E EcoDyn QSY 155B EcoDyn QSY 155C EcoDyn QSY 155D EcoDyn	352 960-xx	325 165-02	348 948-01	≥ 65 mm	PUR [4 x 1.5 mm ² + (2 x 1.0 mm ²)]	12.5 mm
1FK7 042-5AF71 1FK7 060-5AF71 1FK7 063-5AF71 1FK7 080-5AF71 1FK7 083-5AF71 1FK7 100-5AF71						
QSY 155B QSY 155C	352 962-xx	333 090-02				
bCurrent load up to 26.0 A						
QSY 155D QSY 155F QSY 155F EcoDyn QSY 190C EcoDyn QSY 190D EcoDyn QSY 190F EcoDyn	352 963-xx	333 090-02	348 948-03	≥ 75 mm	PUR [4 x 4 mm ² + (2 x 1.0 mm ²)]	14.8 mm
1FK7 101-5AF71 1FK7 103-5AF71						
Current load up to 32.8 A						
QSY 190K EcoDyn	393 570-xx	333 090-03	348 948-04	≥ 85 mm	PUR [4 x 6 mm ² + (2 x 1.0 mm ²)]	16.4 mm

Encoder cables

	Cable lengths	Cable complete with connectors Id. Nr.	Line drop compensator Id. Nr.	Extension cable Id. Nr.	Bend radius R for frequent flexing
QSY with ECN 1313 or EQN 1325	< 15 m	336 376-xx	–	340 302-xx (as required)	≥ 100 mm
	> 15 m	336 376-xx	370 224-01	340 302-xx	
Synchronous motor QSY or 1FK7 with ERN 1387	< 30 m	289 440-xx	–	336 847-xx (as required)	≥ 100 mm
	> 30 m	289 440-xx	370 226-01	336 847-xx	

Asynchronous Motors

QAN Series Overview

General technical information

Speed measurement

An integrated rotary encoder from HEIDENHAIN measures the shaft speed. An ERN 1381 with 1024 lines is used.

Specifications

The specifications and the characteristic curves apply to motors mounted without thermal insulation. The temperature may differ from the maximum permissible ambient temperature of 40 °C by a maximum of 105 K. If the motor is mounted so that it is thermally insulated, it is necessary to reduce the motor torque in order to avoid thermal overloading of the motor.

Shaft bearing

HEIDENHAIN asynchronous motors are equipped with maintenance-free bearings. The shaft bearing is optionally available as either standard bearing or as spindle bearing. The version with spindle bearing can withstand greater lateral forces and allows higher spindle speeds:

- Standard bearing: max. 8000/9000 rpm
 - Spindle bearing: max 10000/12000 rpm
- Motors with spindle bearing have a slightly larger overall length.

Hollow-shaft motors upon request (QAN 200UH, QAN 260UH each with spindle bearing)

Mechanical life

The service life of the bearings depends on the shaft load and the mean rotational speed (see the *Inverter Systems and Motors* Technical Manual).

Shaft end

QAN asynchronous motors from HEIDENHAIN have a cylindrical shaft end as per DIN 748 with a centering hole as per DIN 332-DR.

Asynchronous motors with **standard bearing** are supplied with keyway and feather key as per DIN 6885 Sheet 1 and are balanced. They are also available with smooth shaft upon request.

Feather key:

QAN 200: AS 10 x 8 x 70

QAN 260: AS 12 x 8 x 90

QAN 320: A 16 x 8 x 90

The standard version of the **asynchronous motors** with spindle bearing has a smooth shaft (without keyway and feather key). Upon request it is also available with keyway and feather key as per DIN 6885 Sheet 1.

Precision balancing

QAN asynchronous motors from HEIDENHAIN can be balanced at any time.

Mechanical data

Dimensions IM B35 (for securing by flange/base) as per EN 60034-7

Flange: Dimensions as per DIN 42948 and IEC 72

Protection as per EN 60529: IP 54

Vibration severity

Grade SR (external precision balancing possible)

Thermal variables

Separate cooling via integrated fan

Temperature monitoring with KTY 84-130 thermistor in the stator winding

Thermal class F

Asynchronous motors	Rated power output	Rated speed	Max. speed		Rated torque	Rated current	Recommended inverters			Page
			Standard bearing	Spindle bearing			1-axis module	2-axis module	Compact inverter	
QAN 200M	5.5 kW	1500 rpm	9000 rpm	12000 rpm	35.0 Nm	18.0 A	UM 112 D	UM 122 D	Spindle output	36
QAN 200L	7.5 kW	1500 rpm	9000 rpm	12000 rpm	47.8 Nm	20.1 A	UM 112 D	UM 122 D	Spindle output	
QAN 200U	10.0 kW	1500 rpm	9000 rpm	12000 rpm	63.7 Nm	25.0 A	UM 112 D	UM 122 D	Spindle output ¹⁾	
QAN 260M	15.0 kW	1500 rpm	8000 rpm	10000 rpm	95.5 Nm	35.0 A	UM 113 D	–	Spindle output ²⁾	38
QAN 260L	20.0 kW	1500 rpm	8000 rpm	10000 rpm	127.3 Nm	46.0 A	UM 113 D	–	–	
QAN 260U	24.0 kW	1500 rpm	8000 rpm	10000 rpm	152.8 Nm	58.0 A	UM 114 D	–	–	
QAN 260W	12.0 kW	750 rpm	8000 rpm	10000 rpm	152.8 Nm	29.0 A	UM 114 D	–	–	
QAN 320M	32.0 kW	1500 rpm	8000 rpm	10000 rpm	203.7 Nm	77.5 A	UM 114 D	–	–	40
QAN 320W	18.0 kW	750 rpm	8000 rpm	10000 rpm	229.2 Nm	43.0 A	UM 113 D	–	–	

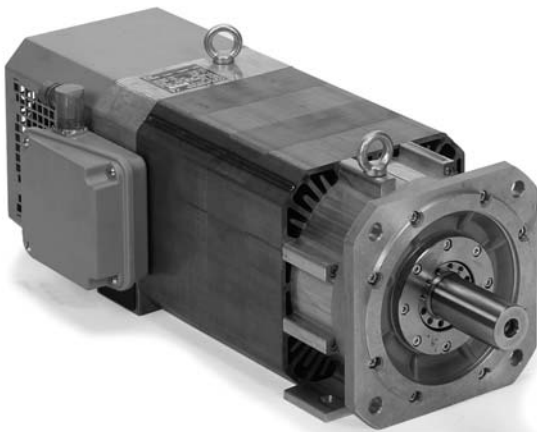
¹⁾ Only UE 24xB, UR 24x

²⁾ Only UR 24x

Asynchronous Motors

QAN 200 Series

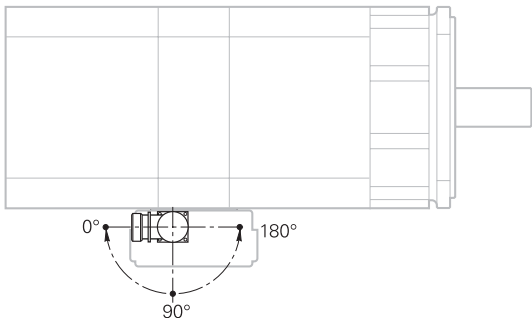
Spindle motors with 2 pole pairs
 Rated power output 5.5 kW to 10 kW
 Choice of standard or spindle bearing



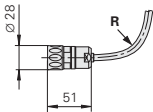
Motor	QAN 200M	QAN 200L	QAN 200U
Rated voltage U_N	250 V	305 V	330 V
Rated power output P_N	5.5 kW	7.5 kW	10.0 kW
Rated shaft speed n_N	1 500 rpm		
Rated torque M_N (105 K)	35.0 Nm	47.8 Nm	63.7 Nm
Rated current I_N (105 K)	18.0 A	20.1 A	25.0 A
Efficiency	0.85		
Max. speed n_{max} ¹⁾ Standard bearing Spindle bearing	9 000 rpm 12 000 rpm		
Max. current I_{max}	33 A	36 A	44 A
Weight m	51 kg	68 kg	83 kg
Rotor inertia J	245 kgcm ²	353 kgcm ²	405 kgcm ²
Protection	IP 54		
Fan Rated voltage U_L Rated current I_L Frequency f_L	3 × 400 V 0.25 A 50 Hz/60 Hz		
ID number Motor with standard bearing Motor with spindle bearing	374 328-01 374 328-13	374 329-01 374 329-13	374 330-01 374 330-13

1) The max speed depends on the motor’s application conditions, such as the shaft load
 (see the *Inverter Systems and Motors* Technical Manual)

Rotatable connections



Encoder connector

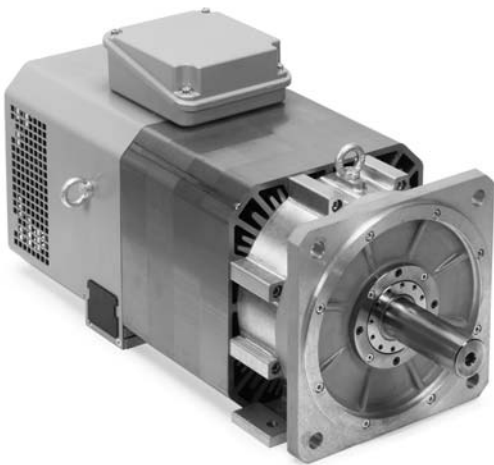


For R, see page 47

Asynchronous Motors

QAN 260 Series

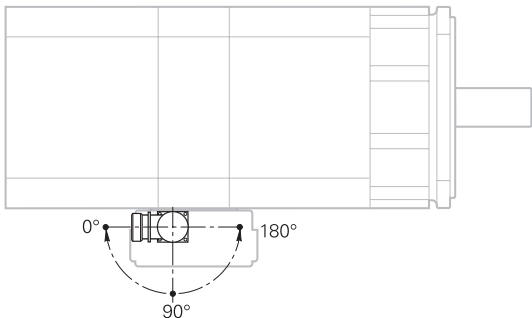
Spindle motors with 2 pole pairs
 Rated power output 12 kW to 24 kW
 Choice of standard or spindle bearing



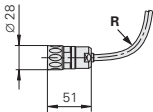
Motor	QAN 260 M	QAN 260 L	QAN 260 U	QAN 260 W
Rated voltage U_N	348 V	331 V	318 V	335 V
Rated power output P_N	15 kW	20 kW	24 kW	12 kW
Rated shaft speed n_N	1 500 rpm			750 rpm
Rated torque M_N (105 K)	95.5 Nm	127.3 Nm	152.8 Nm	152.8 Nm
Rated current I_N (105 K)	35.0 A	46.0 A	58.0 A	29.0 A
Efficiency	0.85			
Max. speed n_{max} ¹⁾ Standard bearing Spindle bearing	8 000 rpm 10 000 rpm			
Max. current I_{max}	70 A	96 A	116 A	62 A
Weight m	112 kg	135 kg	158 kg	158 kg
Rotor inertia J	700 kgcm ²	920 kgcm ²	1 100 kgcm ²	1 100 kgcm ²
Protection	IP 54			
Fan Rated voltage U_L Rated current I_L Frequency f_L	3 × 400 V 0.45 A 50 Hz/60 Hz			
ID number Motor with standard bearing Motor with spindle bearing	510019-01 510019-13	510020-01 510020-13	510021-01 510021-13	510022-01 510022-13

¹⁾ The max speed depends on the motor’s application conditions, such as the shaft load
 (see the *Inverter Systems and Motors* Technical Manual)

Rotatable connections



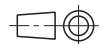
Encoder connector



For R, see page 47

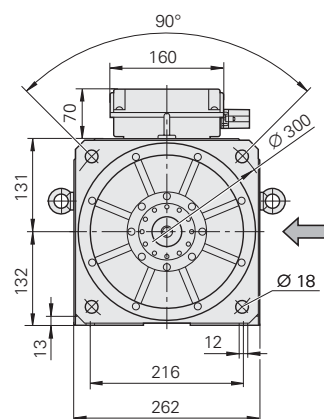
Dimensions

Dimensions in mm

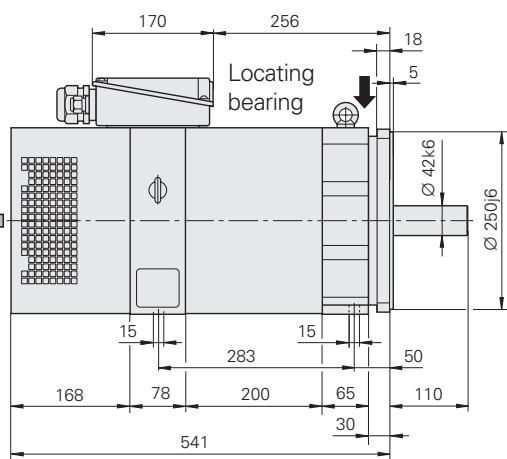


Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ± 0.2 mm

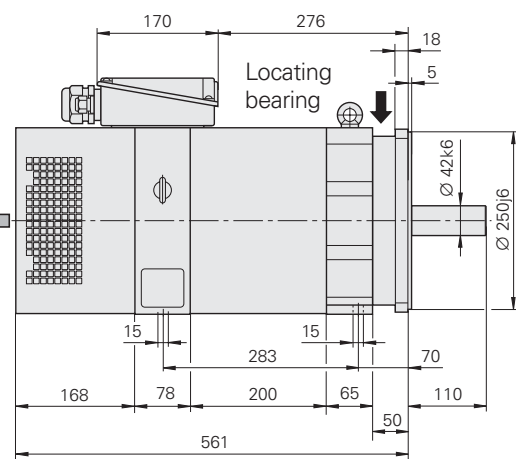
QAN 260M



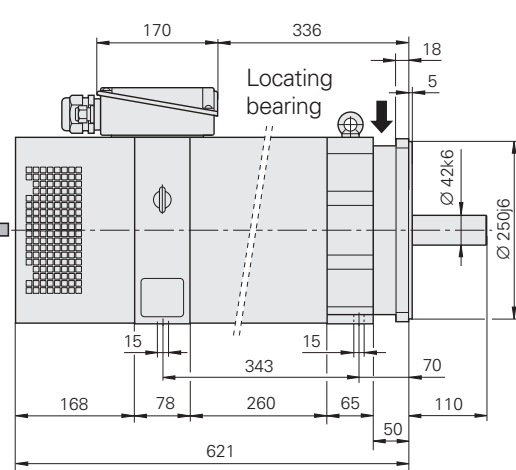
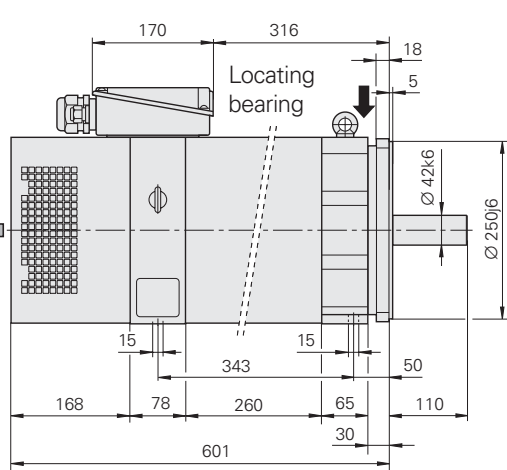
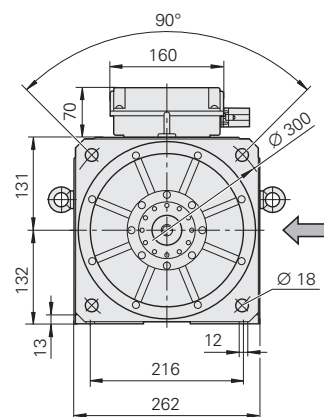
With standard bearing



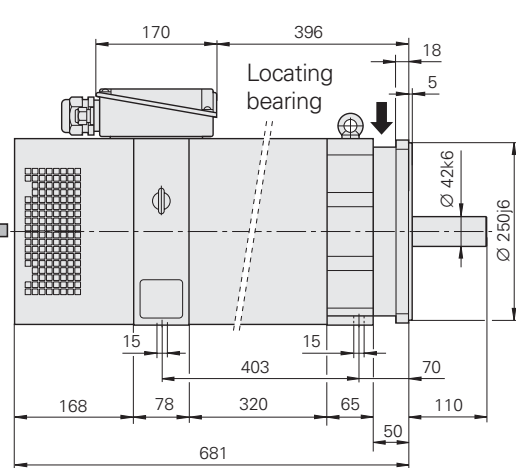
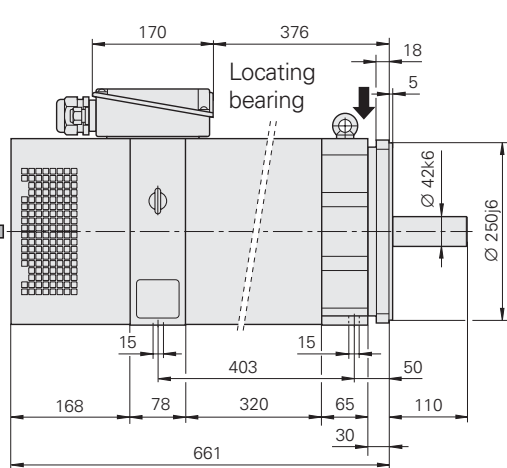
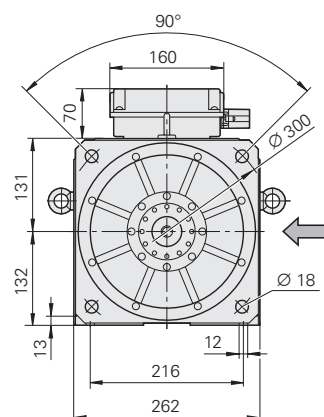
With spindle bearing



QAN 260L



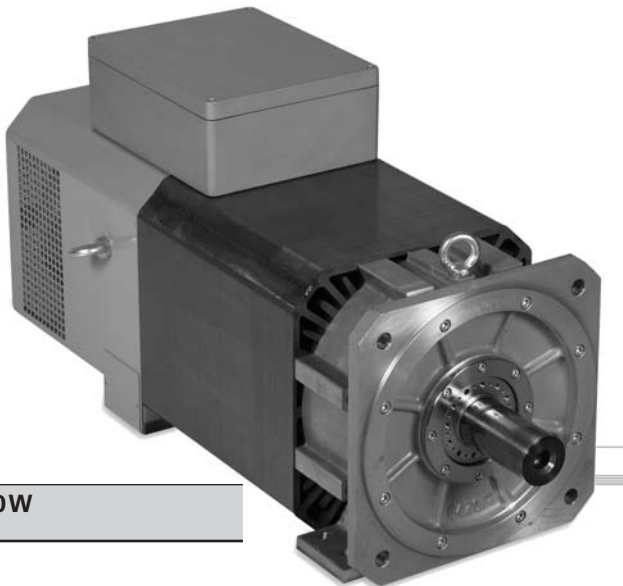
QAN 260U QAN 260W



Asynchronous Motors

QAN 320 Series

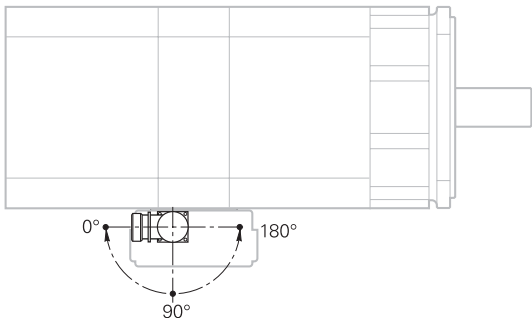
Spindle motors with 2 pole pairs
Rated power output 18 kW to 32 kW



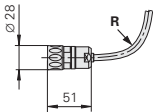
Motor	QAN 320 M	QAN 320 W
Rated voltage U_N	317 V	320 V
Rated power output P_N	32 kW	18 kW
Rated shaft speed n_N	1 500 rpm	750 rpm
Rated torque M_N (105 K)	203.7 Nm	229.2 Nm
Rated current I_N (105 K)	77.5 A	43.0 A
Efficiency	0.85	
Max. speed n_{max} ¹⁾ Standard bearing Spindle bearing	8 000 rpm 10 000 rpm	
Max. current I_{max}	155 A	86 A
Weight m	240 kg	
Rotor inertia J	1 870 kgcm ²	
Fan Rated voltage U_L Rated current I_L Frequency f_L	3 × 400 V 0.75 A 50 Hz/60 Hz	
ID number Motor with standard bearing Motor with spindle bearing	513 302-01 513 302-13	517 952-01 517 952-13

¹⁾ The max speed depends on the motor's application conditions, such as the shaft load
(see the *Inverter Systems and Motors* Technical Manual)

Rotatable connections



Encoder connector



For R, see page 47

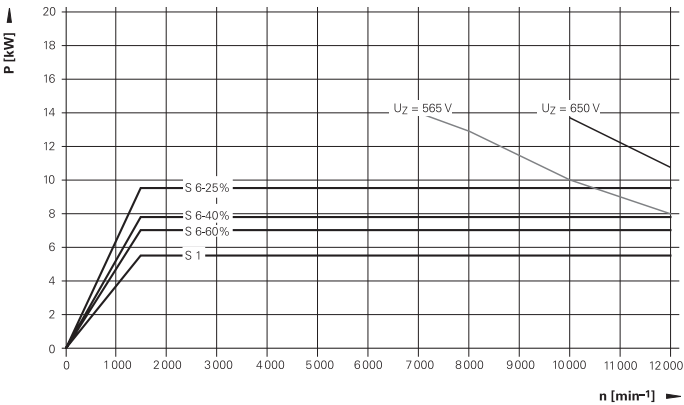
Asynchronous Motors

Characteristics of Power and Torque

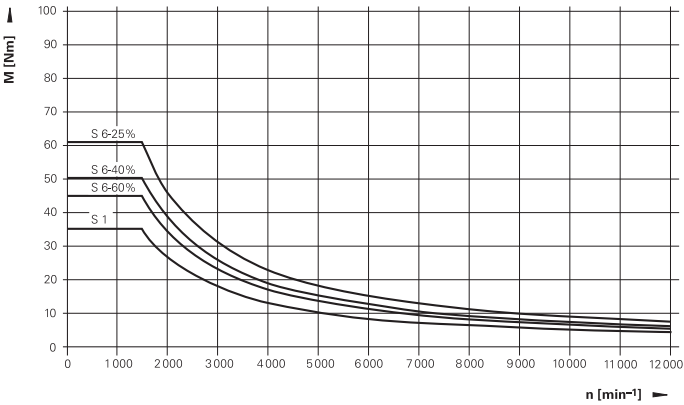
QAN 200 M

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



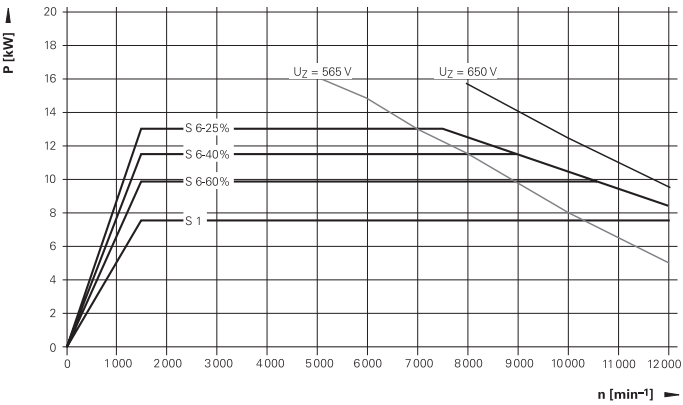
Torque characteristic



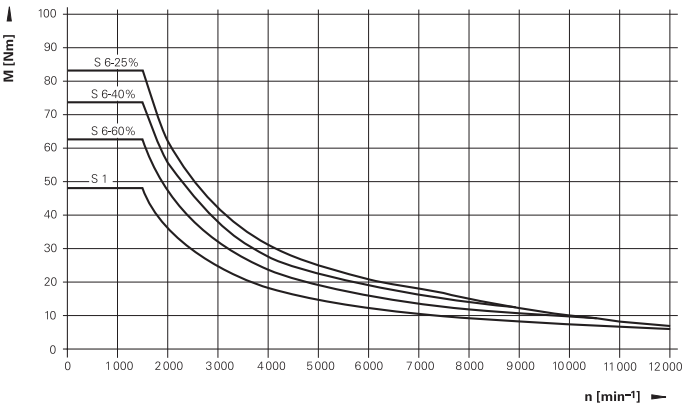
QAN 200 L

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	23.4 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	27.5 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



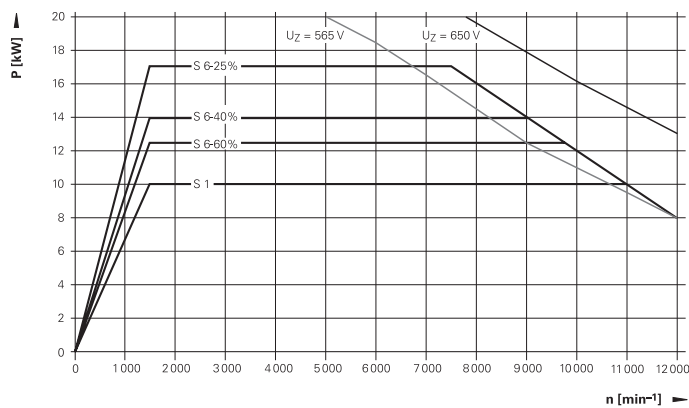
Torque characteristic



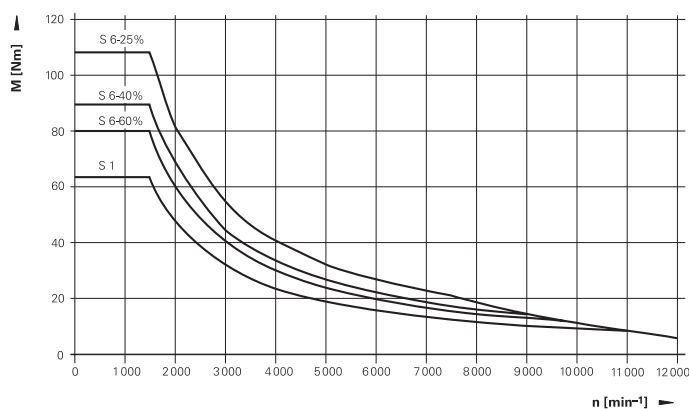
QAN 200 U

Duty cycle	Speed n	Power P	Torque M	Current I
S1	1 500 rpm	10.0 kW	63.7 Nm	25.0 A
	11 000 rpm	10.0 kW	8.7 Nm	–
	12 000 rpm	8.0 kW	6.4 Nm	–
S6-60%	1500 rpm	12.5 kW	79.8 Nm	29.0 A
	9800 rpm	12.5 kW	12.2 Nm	–
	12 000 rpm	8.0 kW	6.4 Nm	–
S6-40%	1500 rpm	14.0 kW	89.4 Nm	32.0 A
	9000 rpm	14.0 kW	19.1 Nm	–
	12 000 rpm	8.0 kW	6.4 Nm	–
S6-25%	1500 rpm	17.0 kW	108.6 Nm	37.0 A
	7500 rpm	17.0 kW	21.7 Nm	–
	12 000 rpm	8.0 kW	6.4 Nm	–

Power characteristic



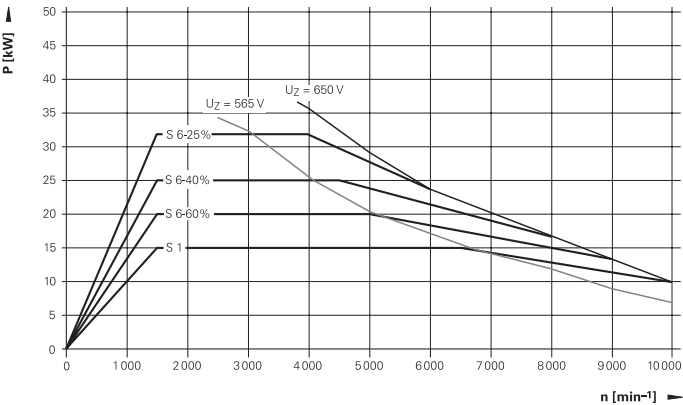
Torque characteristic



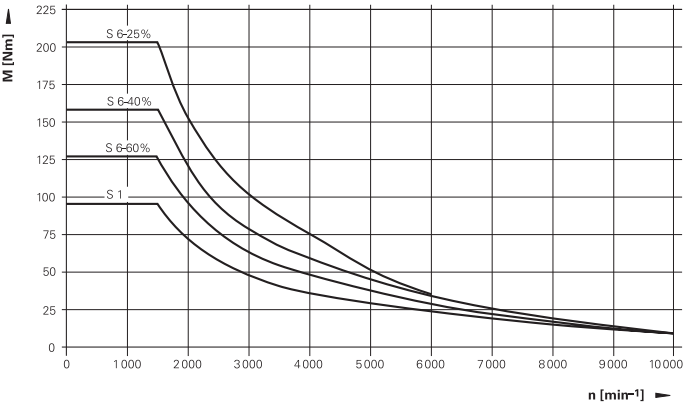
QAN 260 M

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	—
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



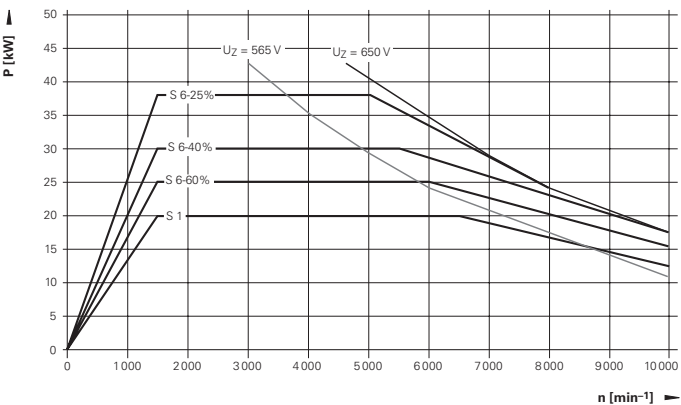
Torque characteristic



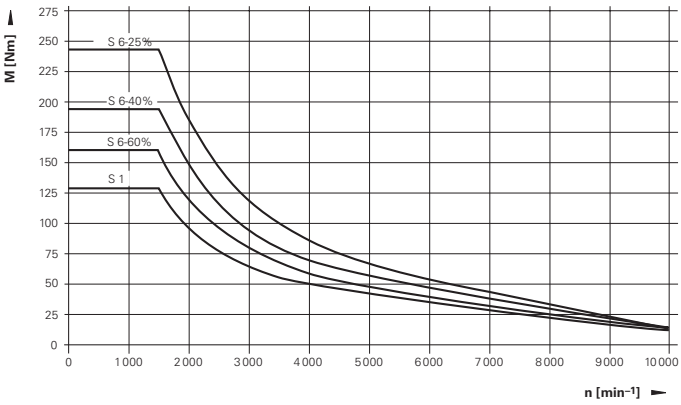
QAN 260 L

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	—
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	—
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



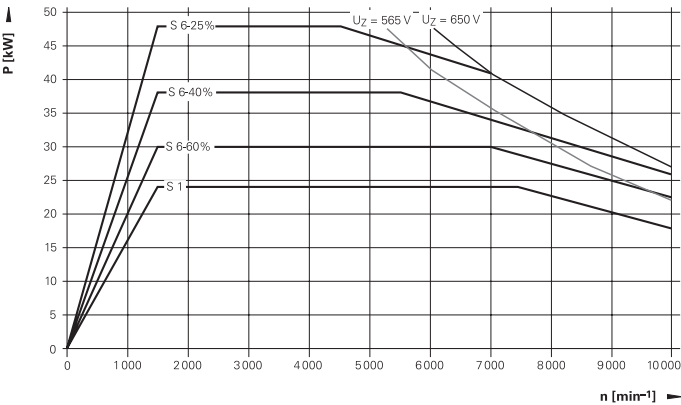
Torque characteristic



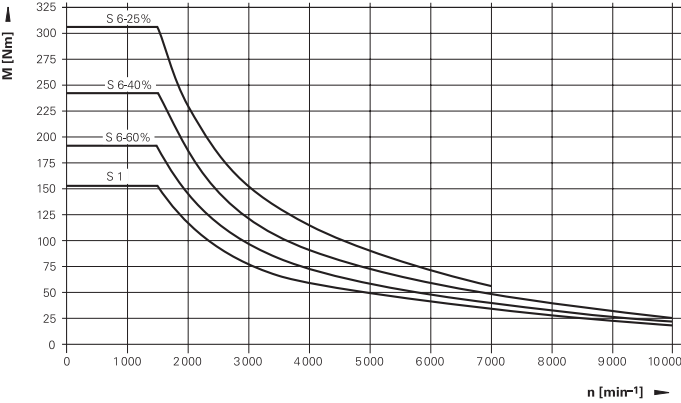
QAN 260 U

Duty cycle	Speed n	Power P	Torque M	Current I
S1	1500 rpm	24.0 kW	152.8 Nm	58.0 A
	7 400 rpm	24.0 kW	31.0 Nm	—
	10 000 rpm	18.0 kW	17.2 Nm	—
S6-60%	1500 rpm	30.0 kW	191.0 Nm	67.2 A
	7 000 rpm	30.0 kW	40.9 Nm	—
	10 000 rpm	22.5 kW	21.5 Nm	—
S6-40%	1500 rpm	38.0 kW	241.9 Nm	81.8 A
	5 500 rpm	38.0 kW	66.0 Nm	—
	10 000 rpm	26.0 kW	24.8 Nm	—
S6-25%	1500 rpm	48.0 kW	305.6 Nm	100.6 A
	4 500 rpm	48.0 kW	101.9 Nm	—
	7 000 rpm	41.0 kW	55.9 Nm	—

Power characteristic



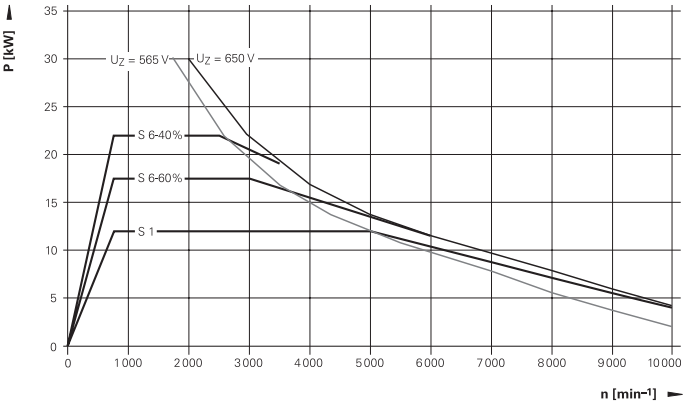
Torque characteristic



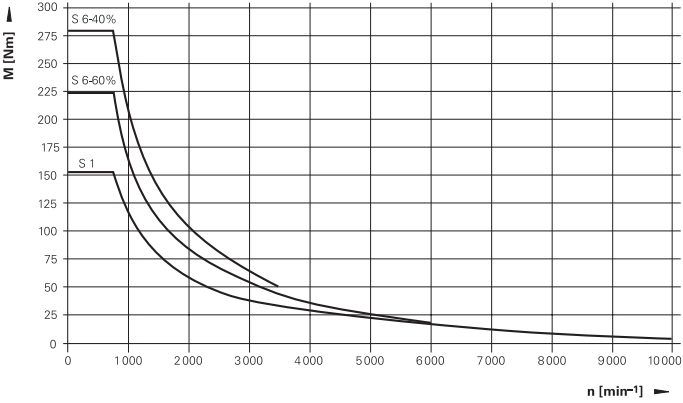
QAN 260 W

Duty cycle	Speed n	Power P	Torque M	Current I
S1	750 rpm	12.0 kW	152.8 Nm	29.0 A
	5000 rpm	12.0 kW	22.9 Nm	—
	10000 rpm	4.0 kW	3.8 Nm	—
S6-60%	750 rpm	17.5 kW	222.8 Nm	38.1 A
	3000 rpm	17.5 kW	55.7 Nm	—
	6000 rpm	11.3 kW	18.0 Nm	—
S6-40%	750 rpm	22.0 kW	280.1 Nm	46.4 A
	2500 rpm	22.0 kW	84.0 Nm	—
	3500 rpm	19.0 kW	51.8 Nm	—

Power characteristic



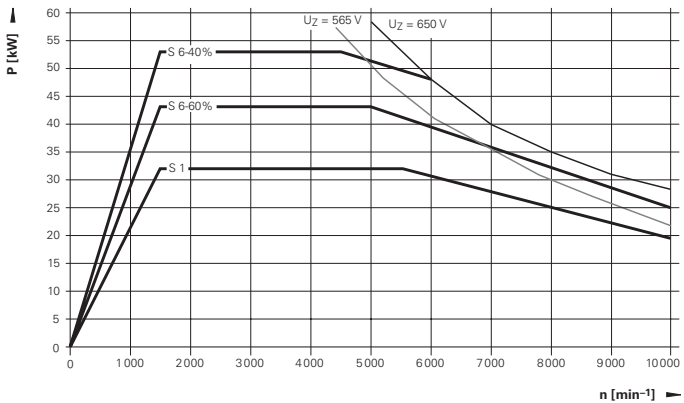
Torque characteristic



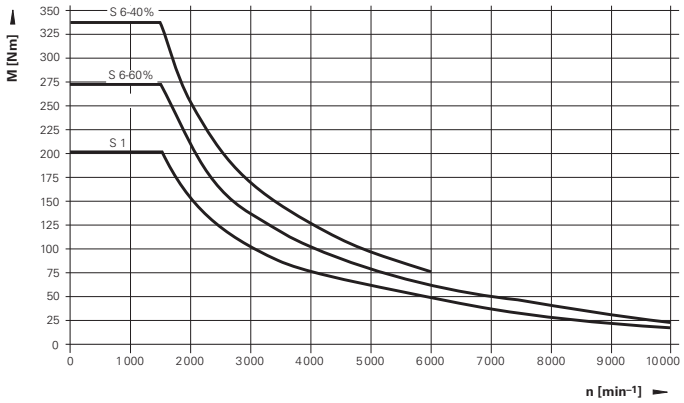
QAN 320 M

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



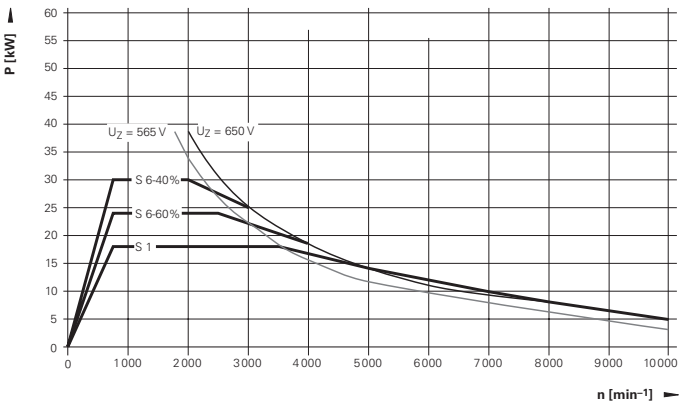
Torque characteristic



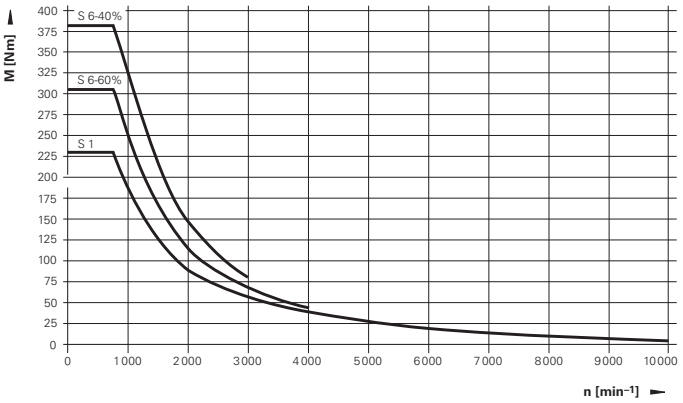
QAN 320 W

Duty cycle	Speed n	Power P	Torque M	Current I
S1	750 rpm	18.0 kW	229.2 Nm	43.0 A
	3500 rpm	18.0 kW	49.1 Nm	—
	10000 rpm	5.0 kW	4.8 Nm	—
S6-60%	750 rpm	24.0 kW	305.6 Nm	54.0 A
	2000 rpm	24.0 kW	114.6 Nm	—
	4000 rpm	18.5 kW	44.2 Nm	—
S6-40%	750 rpm	30.0 kW	382.0 Nm	71.0 A
	2000 rpm	30.0 kW	143.2 Nm	—
	3000 rpm	25.0 kW	79.6 Nm	—

Power characteristic



Torque characteristic



Asynchronous Motors

Cables

Power cables

Current load at ambient temperature up to 40 °C (104 °F)

	Cable without connectors Id. Nr.	Bend radius R for frequent flexing	Type of cable	Diameter
Current load up to 26 A				
QAN 200 M QAN 200 L	348949-04	≥ 70 mm	PUR [4 x 4 mm ²]	14.1 mm
Current load up to 32.8 A				
QAN 200 U QAN 260 W	348949-05	≥ 75 mm	PUR [4 x 6 mm ²]	15.6 mm
Current load up to 59.9 A				
QAN 260 M QAN 260 L QAN 320 W QAN 260 U	348949-07	≥ 135 mm	PUR [4 x 16 mm ²]	27.3 mm
Current load up to 93.8 A				
QAN 320 M	348949-09	≥ 175 mm	PUR [4 x 35 mm ²]	35.5 mm

Encoder cables

	Cable lengths	Cable complete with connectors Id. Nr.	Line drop compensator Id. Nr.	Extension cable Id. Nr.	Bend radius R for frequent flexing
All QAN	< 30 m	289440-xx	–	336847-xx (as required)	≥ 100 mm
	> 30 m	289440-xx	370226-01	336847-xx	

Cables for fans

	Cable without connectors Id. Nr.	Bend radius R for frequent flexing	Type of cable	Diameter
All QAN	348949-01	≥ 50 mm	PUR [4 x 0.75 mm ²]	10 mm

Dostawca urządzeń:



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