

Rotary Tables

HIWIN rotary tables DMN

4. HIWIN rotary tables DMN

4.1 Characteristics of the DMN rotary tables

The particularly flat and light precision rotary tables of the DMN series are suited to all applications in which high rigidity and accuracy are needed along with the smallest dimensions possible. Typical areas of use range from automation tasks to high-precision semiconductor production. The zero-maintenance DMN rotary tables use precision bearings and optical encoders to achieve very high positioning and repeat accuracy.

Key features:

- Backlash-free and extremely dynamic
- Extremely flat design
- Different integrated rotary encoder options
- Optional with functional safety encoder

Typical applications:

- Handling tasks
- Logistic automation
- Semiconductor component production



4.2 Order code for DMN rotary tables

DMN	71	Z	0	S	P	0	0	S	0	0	L	X	0	0	(KCI120)
Type: Rotary table															Encoder type
Rotor height:															Empty:
Encoder:															Clamp:
X: Incremental															0: Without (standard)
Z: Absolute															Hollow shaft:
Hall sensor:															S, X: see tables "Technical data encoder"
0: Without hall sensor															Connector type:
Winding code:															E: Inkremental encoder (ATOM, RIK4)
S: Standard															L: EnDat, single-turn encoder (KCI120, KCI1319)
Temperature sensor:															Wire:
P: PTC sensor															0: M17, straight outlet
Protection class:															Error Mapping:
0: IP40															0: Without (standard)
Empty:															1: ±10 arcsec
															2: ±5 arcsec
															Axial/Radial Runout:
															S: 30 µm/ 30 µm (standard)
															P: 5 µm/ 30 µm
															A: 5 µm/ 15 µm

Example order code:

DMN71-ZOSP00-S0-0LX-0-0 (KCI120)

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Here you can select your variant of the rotary table



4.3 Technical data for DMN

4.3.1 Technical data for DMN2

Torque-speed curve (DC bus voltage: 320/560 VDC)

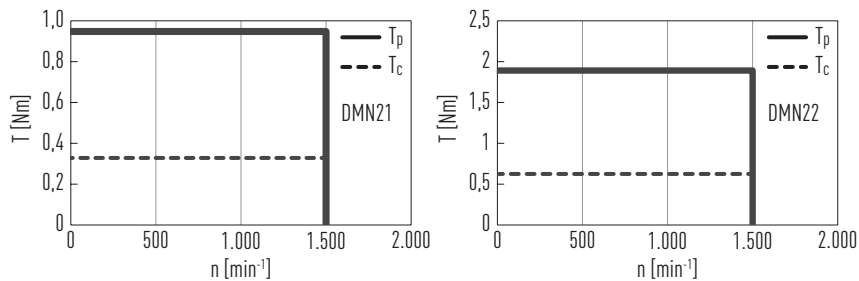


Table 4.1 Technical data DMN2

	Symbol	Unit	DMN21	DMN22
Technical data of rotary table				
Peak torque (for 1 sec.)	T_p	Nm	0.96	1.92
Continuous torque	T_c	Nm	0.32	0.64
Stall torque	T_s	Nm	0.22	0.44
Inertia of rotating parts	J	kgm ²	0.000025	0.00003
Weight	M_m	kg	0.65	0.85
Max. axial load	F_a	N	100	
Max. radial load	F_r	N	50	
Max. moment of tilt	M_k	Nm	1.5	
Max. speed (600 VDC)	n	min ⁻¹	1,500	1,500
Max. speed (325 VDC)	n	min ⁻¹	1,500	1,500
Radial run-out		mm	0.03/ 0.015 ²⁾	
Axial run-out		mm	0.03/ 0.005 ²⁾	
Height	H	mm	45	
Protection class			IP40	
Technical data of motor				
Peak current (for 1 sec.)	I_p	A_{eff}	5.7	
Continuous current	I_c	A_{eff}	1.9	
Motor constant	K_m	Nm/ $\sqrt{W}$	0.05	0.14
Resistance ¹⁾	R_{25}	Ω	8.4	4.1
Inductance ¹⁾	L	mH	2.55	16.7
Electrical time constant	T_e	ms	0.3	4.1
Torque constant	K_t	Nm/ A_{eff}	0.17	0.34
Back emf constant	K_u	$V_{eff}/(rad/s)$	0.1	0.14
Number of poles	2p		10	
Thermal resistance	R_{th}	°C/W	1.65	3.38
Thermal time constant	T_{th}	s	25	30
Thermal sensor			PTC SNM 100	
Max. DC Bus		V	600	

All values $\pm 10\%$ at 25 °C ambient temperature

¹⁾ Line-to-line

²⁾ Optional

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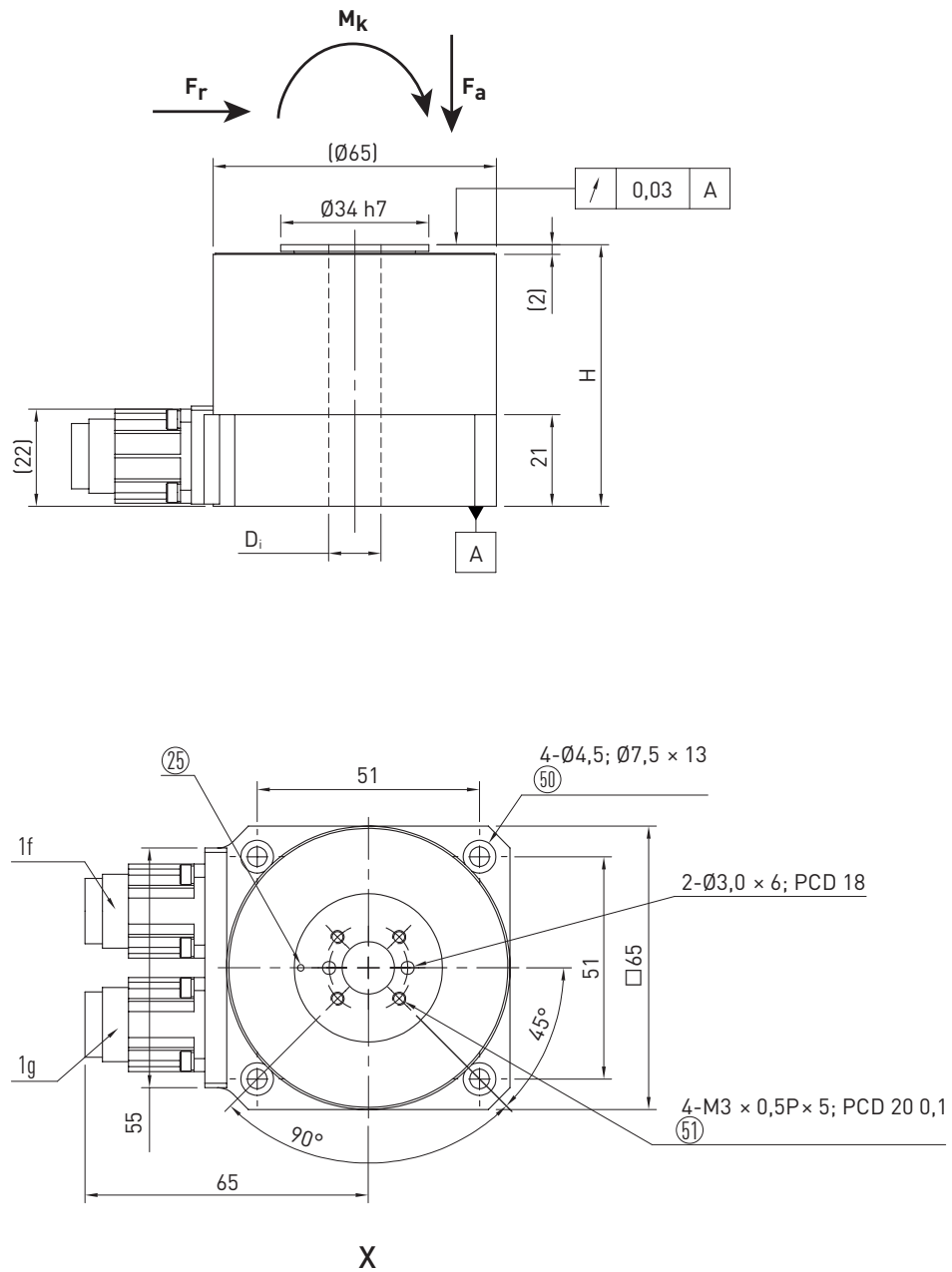
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Table 4.2 Technical data encoder DMN2				
	Symbol	Unit	ATOM	KCI1319
Encoder type			Incremental	Absolute, single-turn
Functional principle			Optical	Inductive
Resolution			3,600 strokes/rotation	19 bit
Interface			sin/cos 1 V _{pp}	EnDat 2.2
Functional safety				
Accuracy ¹⁾		arcsec	±45	±90
Repeatability		arcsec	±2,5	±5
Hollow shaft diameter	D _i	mm	12	12
Product key hollow shaft			S	S
Product key pin assignment			E	L

¹⁾ Optionally with error compensation ±10 arcsec or ±5 arcsec

Dimensions of the DMN2

(For values, see Table 4.1)



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4.3.2 Technical data for DMN4

Torque-speed curve (DC bus voltage: 600 VDC)

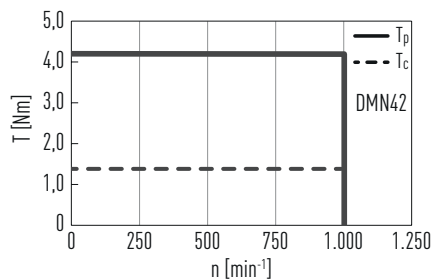


Table 4.3 Technical data for DMN4

	Symbol	Unit	DMN42
Technical data of rotary table			
Peak torque (for 1 sec.)	T_p	Nm	4.2
Continuous torque	T_c	Nm	1.4
Stall torque	T_s	Nm	0.98
Inertia of rotating parts	J	kgm ²	0.003
Weight	M_m	kg	2
Max. axial load	F_a	N	600
Max. radial load	F_r	N	600
Max. moment of tilt	M_k	Nm	30
Max. speed (600 VDC)	n	min ⁻¹	1,000
Max. speed (325 VDC)	n	min ⁻¹	700
Radial run-out		mm	0.03/ 0.015 ²⁾
Axial run-out		mm	0.03/ 0.005 ²⁾
Height	H	mm	45
Protection class			IP40
Technische Daten Motor			
Peak current (for 1 sec.)	I_p	A_{eff}	4.5
Continuous current	I_c	A_{eff}	1.5
Motor constant	K_m	Nm/ $\sqrt{W}$	0.4
Resistance ¹⁾	R_{25}	Ω	4.59
Inductance ¹⁾	L	mH	8.18
Electrical time constant	T_e	ms	1.80
Torque constant	K_t	Nm/ A_{eff}	0.97
Back emf constant	K_u	V _{eff} /rad/s	0.56
Number of poles	$2p$		16
Thermal resistance	R_{th}	°C/W	4.84
Thermal time constant	T_{th}	s	1,170
Thermal sensor			PTC SNM 100
Max. DC Bus		V	600

All values $\pm 10\%$ at 25 °C ambient temperature

¹⁾ Line-to-line

²⁾ Optional

Table 4.4 **Technical data encoder DMN4**

	Symbol	Unit	RIK4
Encoder type			Incremental
Functional principle			Optical
Resolution			2,048 strokes/rotation
Interface			sin/cos 1 V _{pp}
Accuracy ¹⁾		arcsec	±45
Repeatability		arcsec	±2,5
Hollow shaft diameter	D _i	mm	12
Product key hollow shaft			S
Product key pin assignment			E

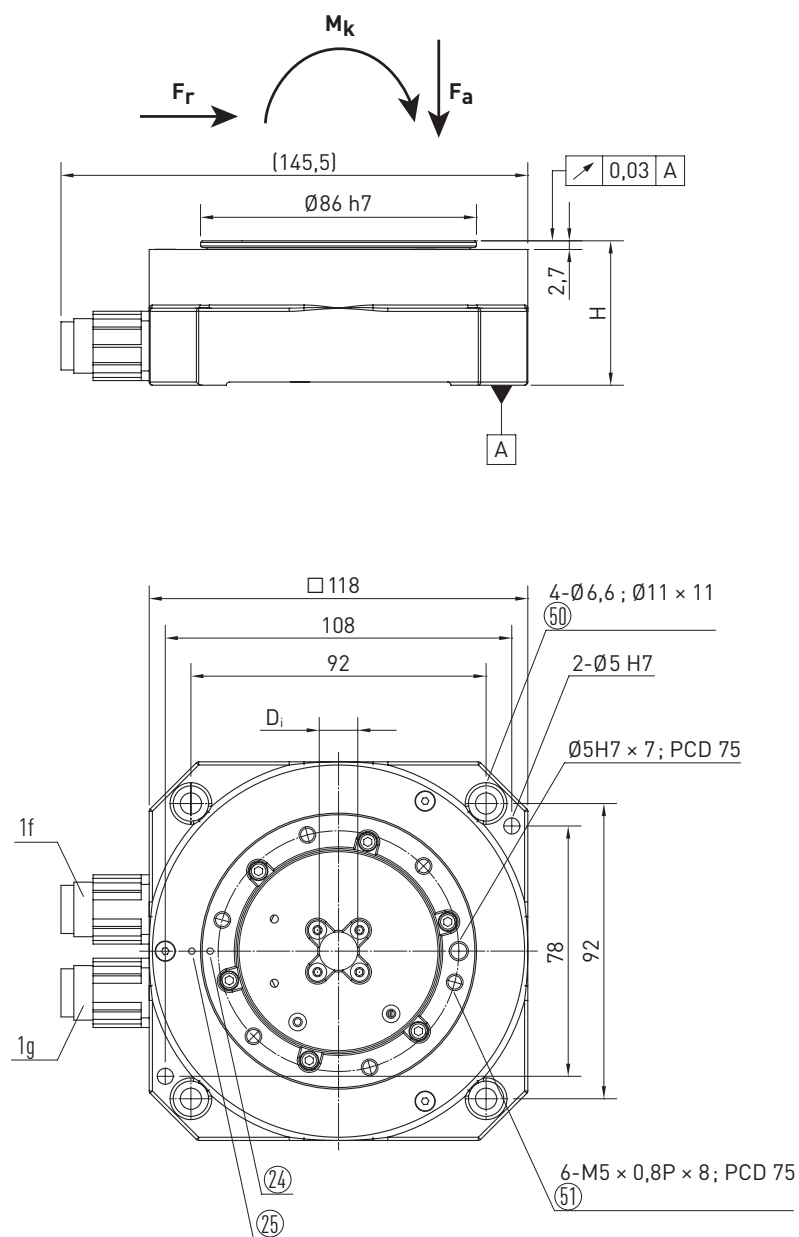
¹⁾ Optionally with error compensation ±10 arcsec or ±5 arcsec

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Dimensions of the DMN4

(For values, see Table 4.3)



4.3.3 Technical data for DMN7

Torque-speed curve (DC bus voltage: 600 VDC)

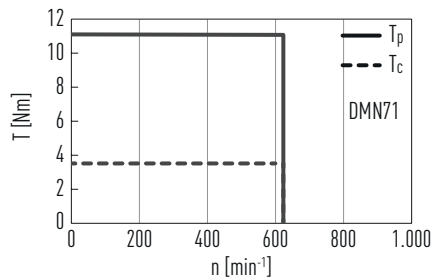


Table 4.5 Technical data for DMN7

	Symbol	Unit	DMN71
Technical data of rotary table			
Peak torque (for 1 sec.)	T_p	Nm	11.1
Continuous torque	T_c	Nm	3.7
Stall torque	T_s	Nm	2.59
Inertia of rotating parts	J	kgm^2	0.008
Weight	M_m	kg	3.5
Max. axial load	F_a	N	1,000
Max. radial load	F_r	N	1,000
Max. moment of tilt	M_k	Nm	50
Max. speed (600 VDC)	n	min^{-1}	650
Max. speed (325 VDC)	n	min^{-1}	600
Radial run-out		mm	0.03
Axial run-out		mm	0.03
Height	H	mm	50
Protection class			IP40
Technical data of motor			
Peak current (for 1 sec.)	I_p	A_{eff}	10.2
Continuous current	I_c	A_{eff}	3.4
Motor constant	K_m	$\text{Nm}/\sqrt{\text{W}}$	0.6
Resistance ¹⁾	R_{25}	Ω	2.55
Inductance ¹⁾	L	mH	9.02
Electrical time constant	T_e	ms	3.5
Torque constant	K_t	Nm/A_{eff}	1.09
Back emf constant	K_u	$V_{\text{eff}}/(\text{rad/s})$	0.63
Number of poles	$2p$		16
Thermal resistance	R_{th}	$^{\circ}\text{C}/\text{W}$	1.7
Thermal time constant	T_{th}	s	1,420
Thermal sensor			PTC SNM 100
Max. DC Bus		V	600

All values $\pm 10\%$ at 25°C ambient temperature

¹⁾ Line-to-line

²⁾ Optional

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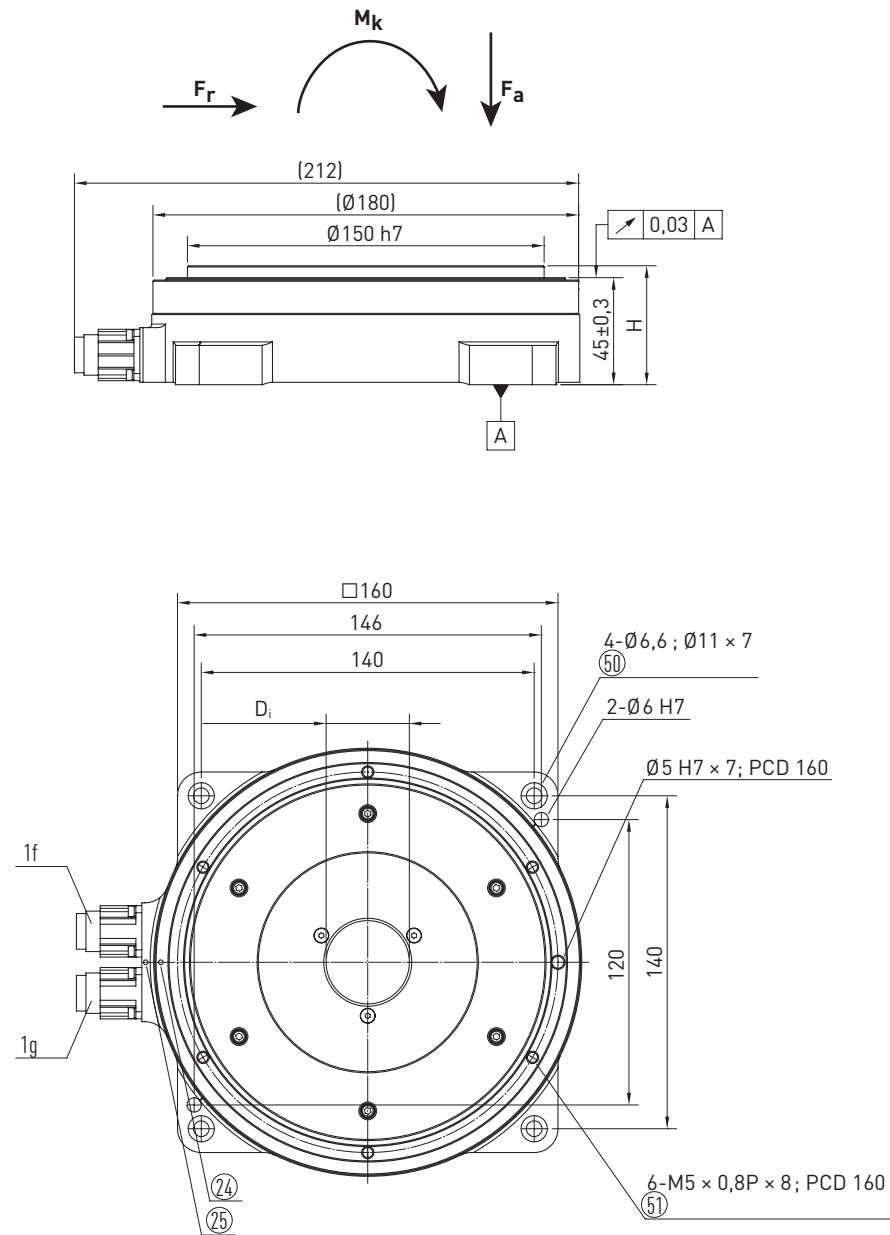
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Table 4.6 Technical data encoder DMN7				
	Symbol	Unit	RIK4	KCI120
Encoder type			Incremental	Absolute, single-turn
Functional principle			Optical	Inductive
Resolution			2,048 strokes/rotation	20 bit
Interface			sin/cos 1 V _{pp}	EnDat 2.2
Functional safety				
Accuracy ¹⁾		arcsec	±45	±45
Repeatability		arcsec	±2,5	±3
Hollow shaft diameter	D _i	mm	35	20
Product key hollow shaft			S	X
Product key pin assignment			E	L

¹⁾ Optionally with error compensation ±10 arcsec or ±5 arcsec

Dimensions of the DMN7

(For values, see Table 4.5)



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4.3.4 Technical data for DMN9

Torque-speed curve (DC bus voltage: 600 VDC)

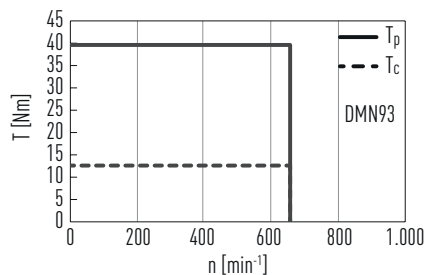


Table 4.7 Technical data for DMN9

	Symbol	Unit	DMN93
Technical data of rotary table			
Peak torque (for 1 sec.)	T_p	Nm	39.6
Continuous torque	T_c	Nm	13.2
Stall torque	T_s	Nm	9.24
Inertia of rotating parts	J	kgm ²	0.012
Weight	M_m	kg	7.5
Max. axial load	F_a	N	1,000
Max. radial load	F_r	N	1,000
Max. moment of tilt	M_k	Nm	50
Max. speed (600 VDC)	n	min ⁻¹	650
Max. speed (325 VDC)	n	min ⁻¹	500
Position accuracy		arcsec	±45
Repeatability		arcsec	±2.5
Radial run-out		mm	0.03/ 0.015 ²⁾
Axial run-out		mm	0.03/ 0.005 ²⁾
Height	H	mm	55
Protection class			IP40
Technical data of motor			
Peak current (for 1 sec.)	I_p	A_{eff}	10.2
Continuous current	I_c	A_{eff}	3.4
Motor constant	K_m	Nm/√W	1.5
Resistance ¹⁾	R_{25}	Ω	4.3
Inductance ¹⁾	L	mH	23.2
Electrical time constant	T_e	ms	5.4
Torque constant	K_t	Nm/ A_{eff}	3.9
Back emf constant	K_u	$V_{eff}/(rad/s)$	2.25
Number of poles	$2p$		22
Thermal resistance	R_{th}	°C/W	1.01
Thermal time constant	T_{th}	s	1,700
Thermal sensor			PTC SNM 100
Max. DC Bus		V	600

All values ±10 % at 25 °C ambient temperature

¹⁾ Line-to-line

²⁾ Optional

Table 4.8 **Technical data encoder DMN9**

	Symbol	Unit	RIK4	KC1120
Encoder type			Incremental	Absolute, single-turn
Functional principle			Optical	Inductive
Resolution			3,600 strokes/rotation	20 bit
Interface			sin/cos 1 V _{pp}	EnDat 2.2
Functional safety				
Accuracy ¹⁾		arcsec	±45	±45
Repeatability		arcsec	±2,5	±3
Hollow shaft diameter	D _i	mm	35	35
Product key hollow shaft			S	X
Product key pin assignment			E	L

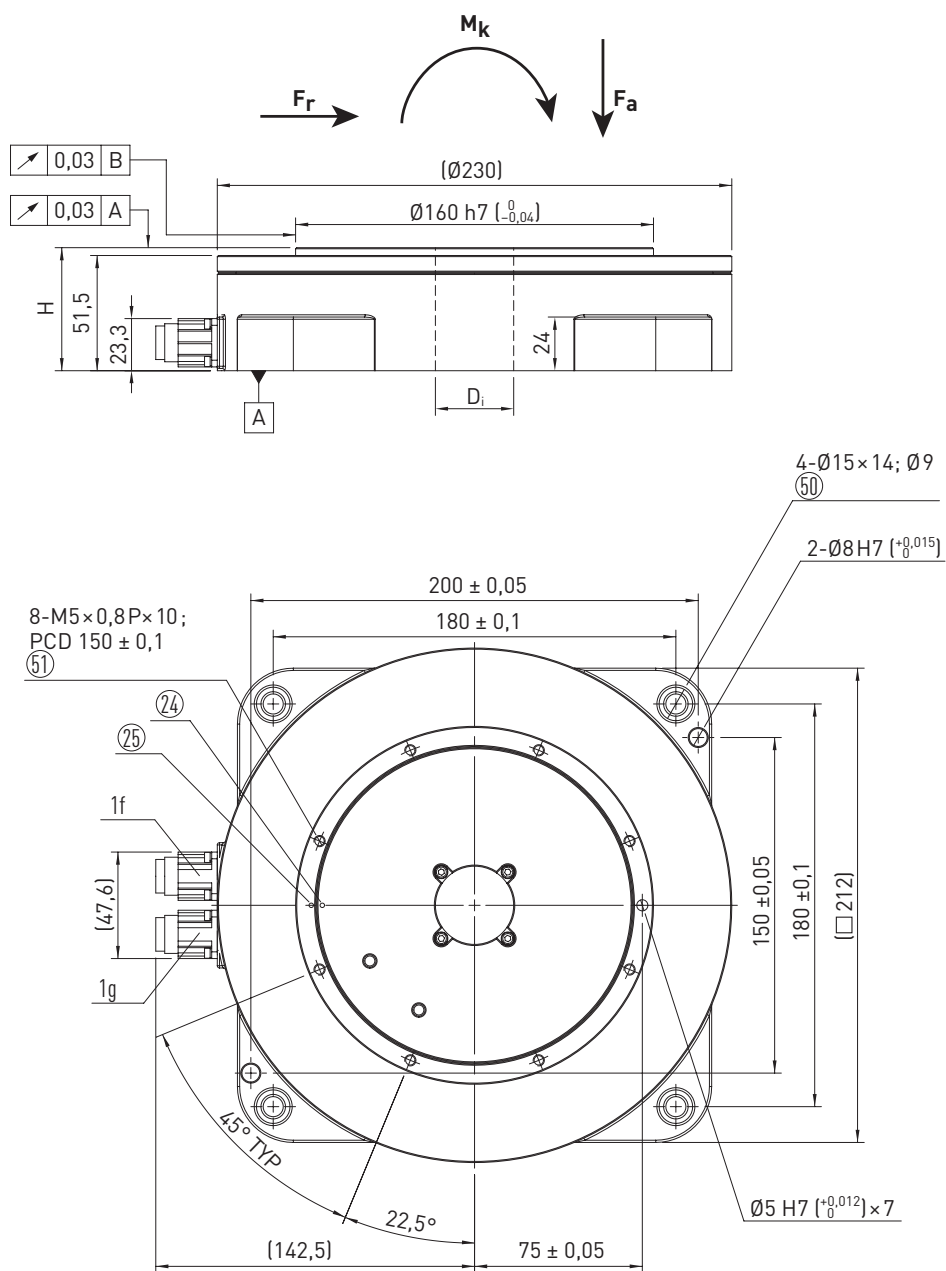
¹⁾ Optionally with error compensation ±10 arcsec or ±5 arcsec

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Dimensions of the DMN9

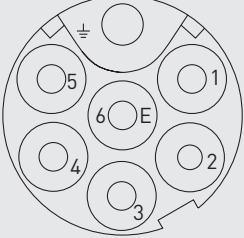
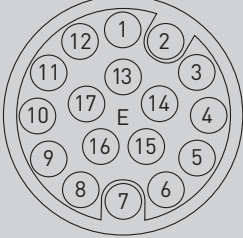
(For values, see Table 4.7)



5. Pin assignment

5.1 Pole images

Table 5.1 Pole diagrams for motor and encoder connectors

Motor connector pin assignment (M17, 7-pin)	Pole diagram encoder connector (M17, 17-pin)
	

5.2 Pin assignment

Table 5.2 Motor pin assignment (M17, 7-pin)

Pin no.	Signal	Function
1	U	Motor phase
4	V	Motor phase
3	W	Motor phase
5	T+	Green
6	T-	Yellow
PE	–	Green/Yellow

Table 5.3 Pin assignment encoder RIK4 (M17, 17-pin)

Pin no.	Signal	Function
4	5 V	Operating voltage
5	5 V	Operating voltage
12	0 V	Mass
13	0 V	Mass
2	U2-	Cosinus-
1	U1-	Sinus-
10	U2+	Cosinus+
9	U1+	Sinus+
11	U0-	Reference mark
3	U0+	Reference mark
14	SCL	Programming line clock
16	SDA	Programming line data
17	CS	Failure signal
7	NAS	Failure signal negated
Housing	–	Shielding

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Pin assignment

Table 5.4 Pin assignment „L“ for absolute single-turn encoder

Pin no.	KCI120, KCI1319, ECN125		Resolute	
	Signal	Function	Signal	Function
4	5 V	Operating voltage	5 V	Operating voltage
5	5 V	Operating voltage	5 V	Operating voltage
12	0 V	Mass	0 V	Mass
13	0 V	Mass	0 V	Mass
11	DATA	Data transmission	SLO+	Data transmission
3	$\overline{\text{DATA}}$	Data transmission	SLO-	Data transmission
7	CLOCK	Data transmission	MA+	Data transmission
6	CLOCK	Data transmission	MA-	Data transmission
15	KCI120, KCI1349, ECN125		–	Inner shield
Housing	–	Shielding	–	Outer shield

Table 5.5 Pin assignment „M“ for absolute encoder with incremental track

Pin no.	ECN113	
	Signal	Function
4	5 V	Operating voltage
5	5 V	Operating voltage
12	0 V	Mass
13	0 V	Mass
11	DATA	Data transmission
3	$\overline{\text{DATA}}$	Data transmission
7	CLOCK	Data transmission
6	CLOCK	Data transmission
1	A-	Cosinus-
9	A+	Cosinus+
2	B-	Sinus-
10	B+	Sinus+
Housing	–	Shielding

6. Accessories

6.1 Motor cable

Table 6.1 Motor cables M17, 7-pin

Item number	Length (m)	Cable end
8-10-0325	1	Open
8-10-0326	3	Open
8-10-0327	5	Open
8-10-0328	8	Open
8-10-0329	10	Open
8-10-0330	12	Open
8-10-0331	15	Open

6.2 Encoder cable

Table 6.2 Encoder cables M17, 17-pin for incremental encoders

Item number	Length (m)	Cable end	Suitable for encoder
8-10-0115	3	Open	RIK4, ATOM
8-10-0116	5		
8-10-0117	8		
8-10-0118	10		
8-10-0120	15		
8-10-1856	3	Connector suitable for ESC-SS for ED1	
8-10-1857	5		
8-10-1858	8		
8-10-1859	10		
8-10-1861	15		

Table 6.3 Encoder cables M17, 17-pin for absolute encoder single-turn

Item number	Length (m)	Cable end	Suitable for encoder
8-10-0315	3	Open	ECN, KCI, Resolute
8-10-0316	5		
8-10-0317	8		
8-10-0318	10		
8-10-0320	15		
8-10-1868	3	Connector suitable for ESC-SS for ED1	
8-10-1869	5		
8-10-1870	8		
8-10-1871	10		
8-10-1873	15		