HIWIN®

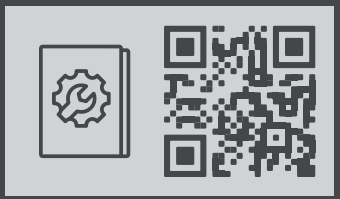
ROTARY TABLES

ROTARY **TABLES**

Directly-driven rotary tables from HIWIN have a backlash-free and very rigid design, making them highly versatile. The compact design makes the tables easy to integrate and allows for a space-saving setup. Various diameters and heights simplify the process of selecting the right rotary table. On request, the rotary tables are also supplied as a complete system with drive. In addition to the tried-and-tested incremental encoders, absolute encoders with functional safety are also available.

DOWNLOADS AND **APPLICATIONS**

Assembly instructions



Contents

1. Product overview

HIWIN rotary tables DMS Page 9

- Standard series
- Torques up to 450 Nm
- Outer diameter 110 – 300 mm
- Functional safety encoder available
- Optionally with improved plan/rotation
- Cleanroom compatible (ISO class 2)

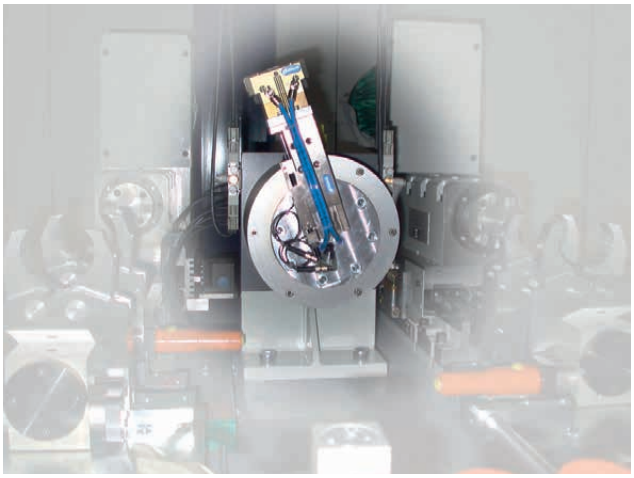
HIWIN rotary tables DMN Page 22

- Extremely flat design
- Torques up to 39.6 Nm
- Outer diameter 65 – 230 mm
- Functional safety encoder available
- Optionally with improved plan/rotation

2. Sample applications

2.1 HIWIN rotary tables optimise transport processes

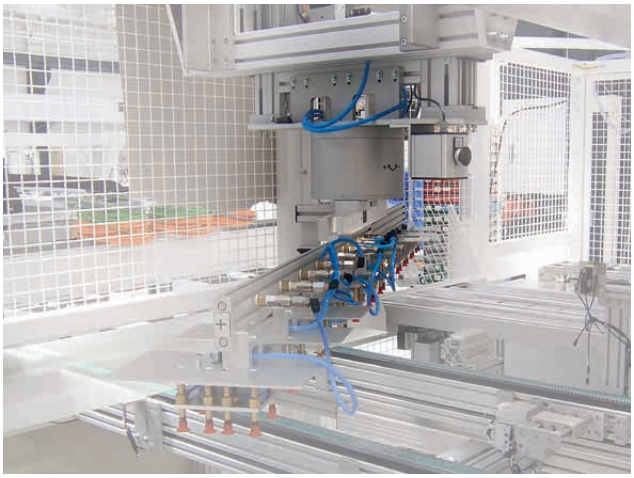
The specification
- Rapid positioning when transporting the work-pieces between the interlinked system parts on a vertical circular path = special requirements apply to acceleration and braking due to the short distances travelled
- Flexible solution, allowing changes or additions to be made during commissioning
- It should be possible for the system to be stopped in any position in order to inspect the parts



Our solution
- Swivel drive minimises the cycle times = saves time and money
- Centrifugal forces are reduced = transport components swiftly and gently to the next station with the gripper arm
- Precision bearing and optical distance measuring system = maximum reproducibility
- Design with hollow shaft = pass cables or mechanisms through with ease
- Direct drive = no gearbox backlash or gearbox mechanisms prone to wear

2.2 HIWIN rotary table in glass plate handling

The specification
- Lay-up station in which the finished strings are drawn in with special vacuum suckers after welding. The strings are then swivelled and deposited either in string boxes or on glass plates
- The current method of holding the Z-axis for the cross bar above toothed belt and servo motor is to be replaced because it takes up too much room and is too heavy
- A high level of torque and a compact design are needed due to the long swivel arm and high inherent weight of the arm
- High speed is needed because of the short cycle times required



Our solution
- Rotary indexing table = high torque and compact design = high throughput, space and cost savings
- Design with hollow shaft = pneumatic hoses and cables can pass through
- Direct drive = no gearbox clearance or gearbox mechanisms prone to wear
- Adaptation to existing control

3. HIWIN rotary tables DMS

3.1 Characteristics of the DMS rotary tables

DMS rotary tables are directly driven rotary tables and do not therefore have a gearbox. The extremely rigid connection between the motor and load, coupled with a high-quality servo drive controller, ensures outstanding acceleration capabilities and movement with good uniformity. Due to the hollow shaft design, DMS rotary tables are especially well suited to automation tasks. Media, cable systems or mechanisms can pass through with ease.

FUNCTIONAL SAFETY

IPA CLEAN ROOM ISO 2

Key features:

- Backlash-free and extremely dynamic
- Brush-less and high-torque
- Various rotary encoder options
- Optionally with functional safety encoder
- Cleanroom compatible (ISO class 2)

Typical applications:

- Automation technology
- Pick&Place

3.2 Order code for DMS rotary tables

DMS	14	Z	0	S	P	0	0	S	0	0	L	S	0	0	(KCI120)

Type: Rotary table

Rotor height:

Encoder type:
X: Incremental
Z: Absolute

Hall sensor:
0: Without hall sensor

Winding code:
S: Standard (DMS0x, DMS1x)
L: For hight rotational speed (DMS0x, DM13x)
G: Standard (DMS3x, DMS7x)
H: For hight rotational speed (DMS3x, DMS7x)

Temperature sensor:
P: PTC sensor

Protection class:
0: IP40

Empty

Axial/Radial Runout:
S: 30 µm/ 30 µm (standard)
P: 5 µm/ 30 µm
A: 5 µm/ 15 µm

Error Mapping:
0: Without (standard)
1: ±10 arcsec
2: ±5 arcsec

Wire:
0: M17, straight outlet

Connector type:
E: Incremental encoder (RIK4)
L: EnDat, BiSS-C single-turn encoder (KCI120, ECN125, Resolute)
M: EnDat encoder with incremental track (ECN113)

Hollow shaft:
S, X: see tables "Technical data encoder"

Clamp:
0: Without (standard)

Empty

Encoder type

Example order code:
DMS14-Z0SP00-S0-0LS-0-0 (KCI120)

Rotary tables DMS
Here you can select your variant of the rotary table

3.3 Technical data for DMS

3.3.1 Technical data for DMS0

Torque-speed curve (DC bus voltage: 600 VDC)
DMS03 – Standard (S)

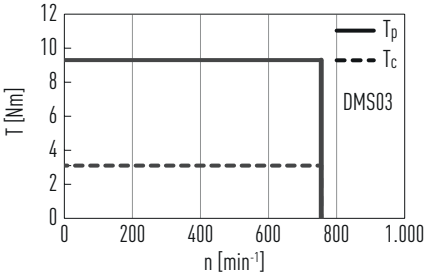


Table 3.1 **Technical data for DMS0**

	Symbol	Unit	DMS03
Technical data of rotary table			
Winding variant			Standard (S)
Peak torque (for 1 sec.)	T_p	Nm	9.3
Continuous torque	T_c	Nm	3.1
Stall torque	T_s	Nm	2.17
Inertia of rotating parts	J	kgm^2	0.003
Weight	M_m	kg	4
Max. axial load	F_a	N	3,700
Max. radial load	F_r	N	820
Max. moment of tilt	M_k	Nm	40
Max. speed (600 VDC)	n	min^{-1}	750
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]
Protection class			IP40
Technical data of motor			
Peak current (for 1 sec.)	I_p	A_{eff}	6.0
Continuous current	I_c	A_{eff}	2.0
Motor constant	K_m	Nm/√W	0.5
Resistance [1]	R_{25}	Ω	7.1
Inductance [1]	L	mH	15.2
Electrical time constant	T_e	ms	2.1
Torque constant	K_t	Nm/A_{eff}	1.55
Back emf constant	K_u	V_{eff}/(rad/s)	0.82
Number of poles	2p		10
Thermal resistance	R_{th}	°C/W	1.76
Thermal time constant	T_{th}	s	1,930
Thermal sensor			PTC SNM 100
Max. DC Bus		V	600

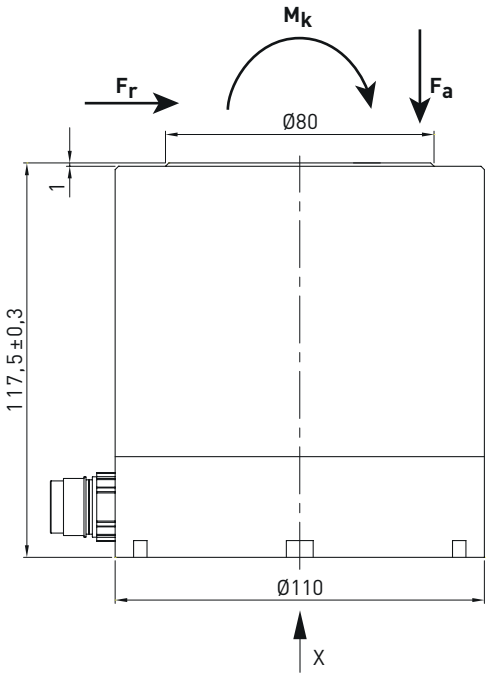
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

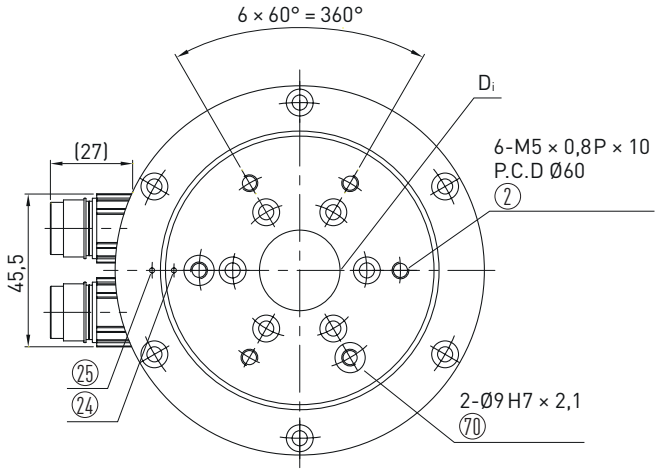
Table 3.2 **Technical data encoder DMS0**

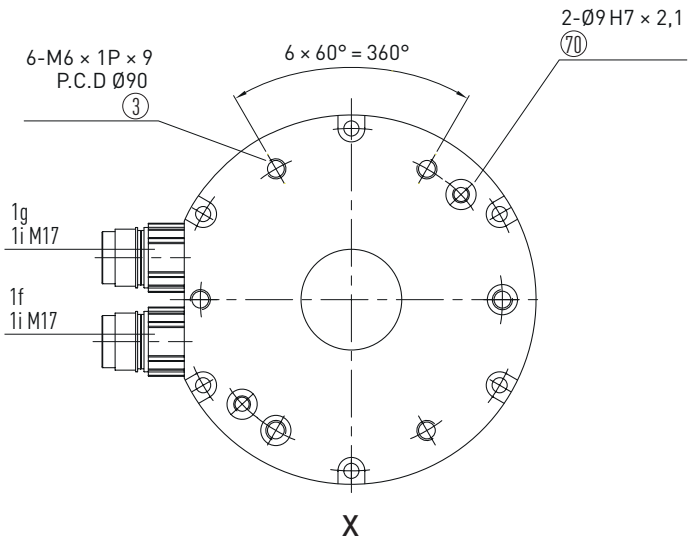
	Symbol	Unit	RIK4	KCI120	KBI136	Resolute
Encoder type			Incremental	Absolute, single-turn	Absolute, multi-turn	Absolute, single-turn
Functional principle			Optical	Inductive	Inductive	Optical
Resolution			2,048 strokes/ rotation	20 bit	20 bit (position)/ 16 bit (rotations)	26 bit
Interface			sin/cos 1 V_{PP}	EnDat 2.2	EnDat 2.2	BiSS-C
Functional safety				FUNCTIONAL SAFETY	FUNCTIONAL SAFETY	
Accuracy [1]		arcsec	±45	±45	±45	±45
Repeatability		arcsec	±3	±3	±3	±3
Hollow shaft diameter	D_i	mm	24	24	24	24
Product key hollow shaft			S	S	S	X
Product key pin assignment			E	L	N	L

[1] Optionally with error compensation ±10 arcsec or ±5 arcsec

Dimensions of the DMS0 HIWIN rotary table
(For values, see Table 3.1)







3.3.2 Technical data for DMS1

Torque-speed curves (DC bus voltage: 600 VDC)
DMS14, DMS18 – Standard (S)

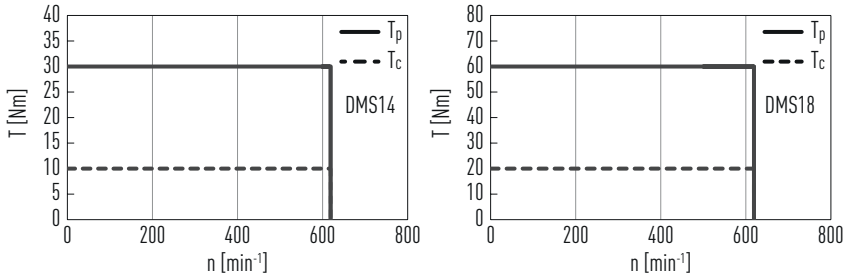


Table 3.3 **Technical data for DMS1**

	Symbol	Unit	DMS14	DMS18
Technical data of rotary table				
Winding variant			Standard (S)	
Peak torque (for 1 sec.)	T_p	Nm	30	60
Continuous torque	T_c	Nm	10	20
Stall torque	T_s	Nm	7	14
Inertia of rotating parts	J	kgm^2	0.0065	0.0075
Weight	M_m	kg	7.0	9.5
Max. axial load	F_a	N	3,700	
Max. radial load	F_r	N	1,700	
Max. moment of tilt	M_k	Nm	60	
Max. speed (600 VDC)	n	min^{-1}	630	630
Max. speed (325 VDC)	n	min^{-1}	600	500
Radial run-out		mm	0.03/ 0.015 [2]	
Axial run-out		mm	0.03/ 0.015 [2]	
Height	H	mm	120	160
Protection class			IP40	
Technical data of motor				
Peak current (for 1 sec.)	I_p	A_{eff}	12	
Continuous current	I_c	A_{eff}	4	
Motor constant	K_m	Nm/√W	1.0	1.6
Resistance [1]	R_{25}	Ω	3.9	6.5
Inductance [1]	L	mH	14.0	26.0
Electrical time constant	T_e	ms	3.6	4.0
Torque constant	K_t	Nm/A_{eff}	2.50	5.00
Back emf constant	K_u	$V_{eff}/(rad/s)$	1.2	2.4
Number of poles	2p		22	
Thermal resistance	R_{th}	°C/W	0.80	0.48
Thermal time constant	T_{th}	s	2,290	2,520
Thermal sensor			PTC SNM 100	
Max. DC Bus		V	600	

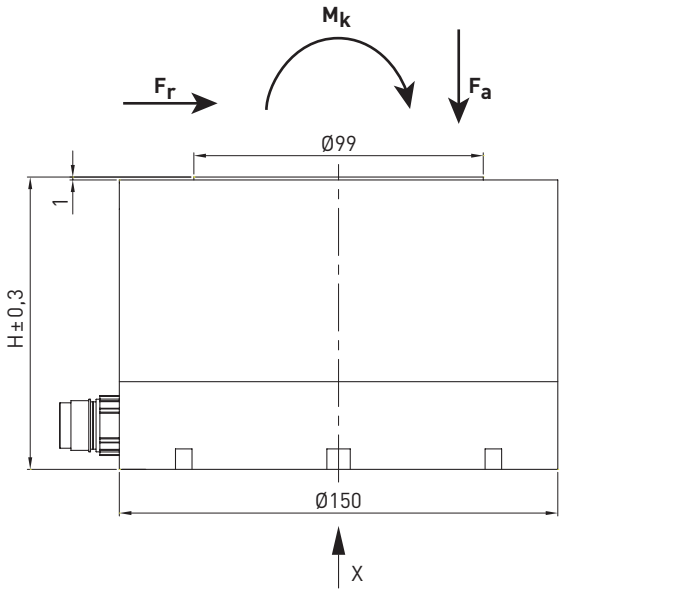
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

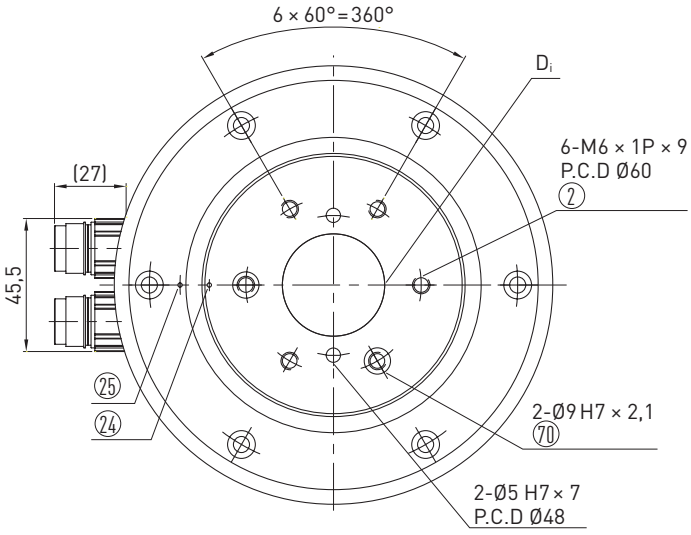
Table 3.4 **Technical data encoder DMS1**

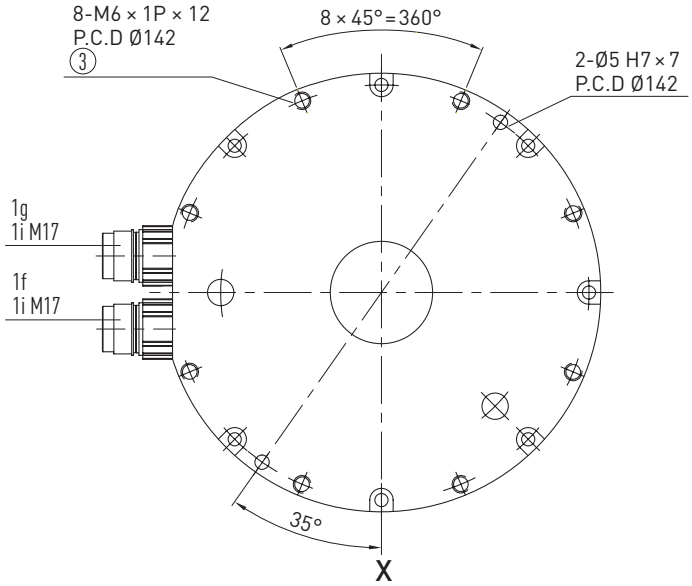
	Symbol	Unit	RIK4	KCI120	ECN113	ECN125	Resolute
Encoder type			Incremental	Absolute, single-turn	Absolute, single-turn	Absolute, single-turn	Absolute, single-turn
Functional principle			Optical	Inductive	Optical	Optical	Optical
Resolution			3,600 strokes/ rotation	20 bit	13 bit absolute with incremental track 2,048 strokes	25 bit	26 bit
Interface			sin/cos 1 V_{PP}	EnDat 2.2	EnDat 2.2 + sin/ cos 1 V_{PP}	EnDat 2.2	BiSS-C
Functional safety				FUNCTIONAL SAFETY			
Accuracy [1)]		arcsec	±45	±45	±45	±45	±45
Repeatability		arcsec	±3	±3	±3	±3	±3
Hollow shaft diameter	D_i	mm	35	35	35	35	35
Product key hollow shaft			S	S	X	X	S
Product key pin assignment			E	L	M	L	L

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

Dimensions of the DMS1
(For values, see Table 3.3)







3.3.3 Technical data for DMS3

Torque-speed curves (DC bus voltage: 600 VDC)
DMS34, DMS38, DMS3C – Standard (G)

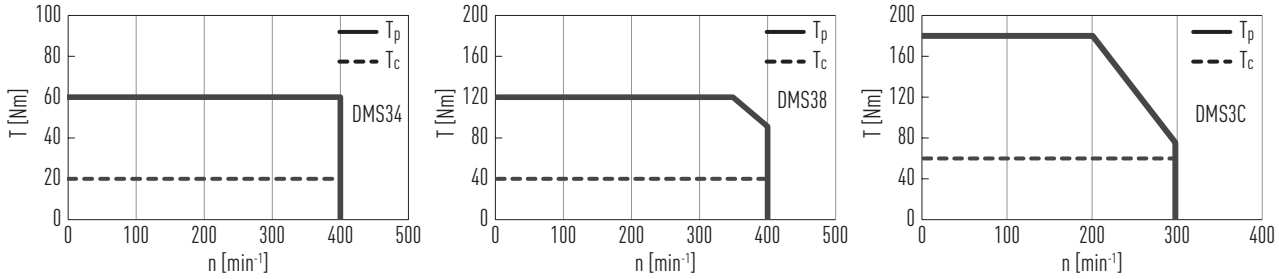


Table 3.5 **Technical data for DMS3**

	Symbol	Unit	DMS34	DMS38	DMS3C
Technical data of rotary table					
Winding variant			Standard (G)		
Peak torque (for 1 sec.)	T_p	Nm	60	120	180
Continuous torque	T_c	Nm	20	40	60
Stall torque	T_s	Nm	14	28	42
Inertia of rotating parts	J	kgm^2	0.020	0.026	0.035
Weight	M_m	kg	17.0	22.5	28.5
Max. axial load	F_a	N	8,000		
Max. radial load	F_r	N	6,500		
Max. moment of tilt	M_k	Nm	240		
Max. speed (600 VDC)	n	min^{-1}	400	400	300
Max. speed (325 VDC)	n	min^{-1}	400	200	120
Radial run-out		mm	0.03/ 0.015 [2]		
Axial run-out		mm	0.03/ 0.005 [2]		
Height	H	mm	150	190	230
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	1.8	2.8	3.6
Resistance [1]	R_{25}	Ω	7.5	12.0	17.1
Inductance [1]	L	mH	32.0	53.6	81.0
Electrical time constant	T_e	ms	4.6	4.5	4.9
Torque constant	K_t	Nm/A_{eff}	6	12	18
Back emf constant	K_u	V_{eff}/(rad/s)	3	6	9
Number of poles	2p		22		
Thermal resistance	R_{th}	°C/W	0.73	0.46	0.32
Thermal time constant	T_{th}	s	2,020	2,130	2,170
Thermal sensor			PTC SNM 120		
Max. DC Bus		V	600		

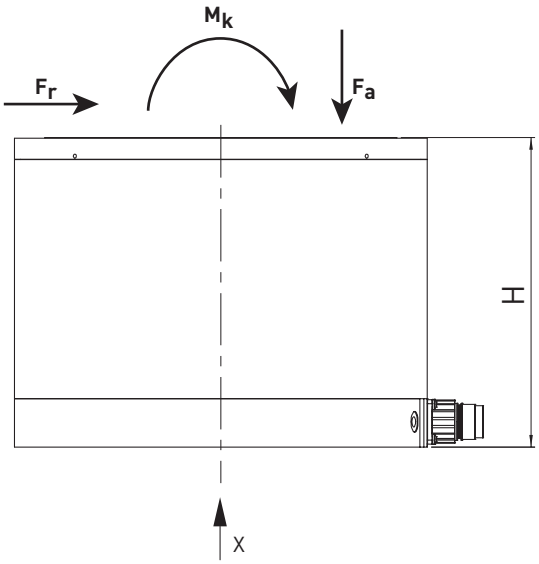
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

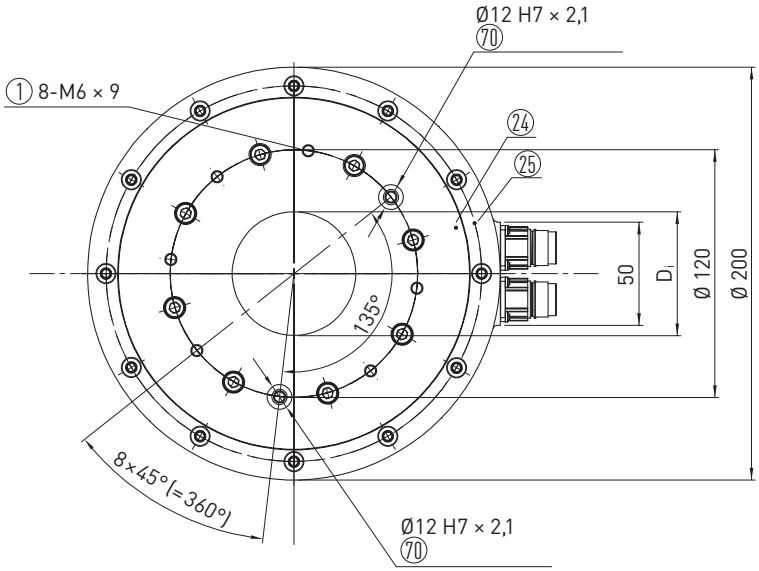
Table 3.6 **Technical data encoder DMS3**

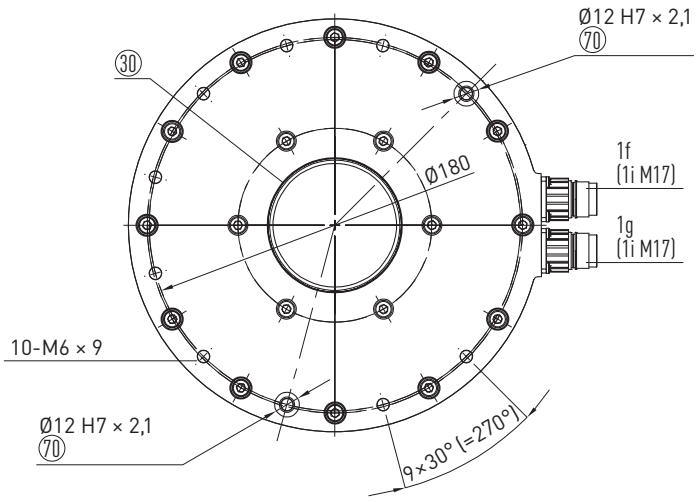
	Symbol	Unit	RIK4	KCI120	ECN113	ECN125	Resolute
Encoder type			Incremental	Absolute, single-turn	Absolute, single-turn	Absolute, single-turn	Absolute, single-turn
Functional principle			Optical	Inductive	Optical	Optical	Optical
Resolution			3,600 strokes/ rotation	20 bit	13 bit absolute with incremental track 2,048 strokes	25 bit	26 bit
Interface			sin/cos 1 V_{PP}	EnDat 2.2	EnDat 2.2 + sin/ cos 1 V_{PP}	EnDat 2.2	BiSS-C
Functional safety				FUNCTIONAL SAFETY			
Accuracy [1]		arcsec	±25	±45	±25	±25	±25
Repeatability		arcsec	±2,5	±3	±2,5	±2,5	±2,5
Hollow shaft diameter	D_i	mm	60	35	40	40	60
Product key hollow shaft			S	X	X	X	S
Product key pin assignment			E	L	M	L	L

[1] Optionally with error compensation ±10 arcsec or ±5 arcsec

Dimensions of the DMS3
(For values, see Table 3.5)







X

3.3.4 Technical data for DMS7

Torque-speed curves (DC bus voltage: 600 VDC)
DMS74 – Standard (G), DMS76 – for high speed (H), DMS7C – Standard (G)

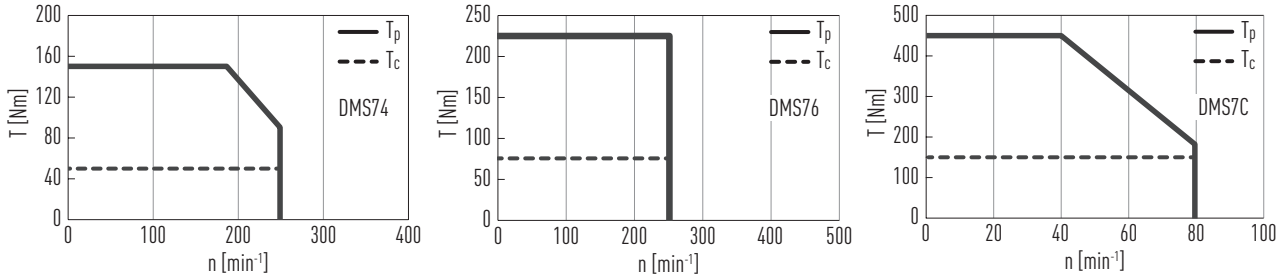


Table 3.7 **Technical data for DMS7**

	Symbol	Unit	DMS74	DMS76	DMS7C
Technical data of rotary table					
Winding variant			Standard (G)	For high speed (H)	Standard (G)
Peak torque (for 1 sec.)	T_p	Nm	150	225	450
Continuous torque	T_c	Nm	50	75	150
Stall torque	T_s	Nm	35.0	52.5	105.0
Inertia of rotating parts	J	kgm^2	0.152	0.174	0.241
Weight	M_m	kg	36	41	57
Max. axial load	F_a	N	8,000		
Max. radial load	F_r	N	6,500		
Max. moment of tilt	M_k	Nm	360		
Max. speed (600 VDC)	n	min^{-1}	250	250	80
Max. speed (325 VDC)	n	min^{-1}	120	170	30
Radial run-out		mm	0.03/ 0.015 [2]		
Axial run-out		mm	0.03/ 0.005 [2]		
Height	H	mm	160	180	240
Protection class			IP40		
Technical data of motor					
Peak current (for 1 sec.)	I_p	A_{eff}	10.2	20.4	10.2
Continuous current	I_c	A_{eff}	3.4	6.8	3.4
Motor constant	K_m	Nm/√W	3.9	5.0	7.7
Resistance [1]	R_{25}	Ω	12.9	4.3	29.0
Inductance [1]	L	mH	55	19	145
Electrical time constant	T_e	ms	4.3	4.4	5.0
Torque constant	K_t	Nm/A_{eff}	17.0	12.8	51.1
Back emf constant	K_u	V_{eff}/(rad/s)	9.8	7.4	29.5
Number of poles	2p		44		
Thermal resistance	R_{th}	°C/W	0.42	0.32	0.19
Thermal time constant	T_{th}	s	2,230	2,330	2,350
Thermal sensor			PTC SNM 120		
Max. DC Bus		V	600		

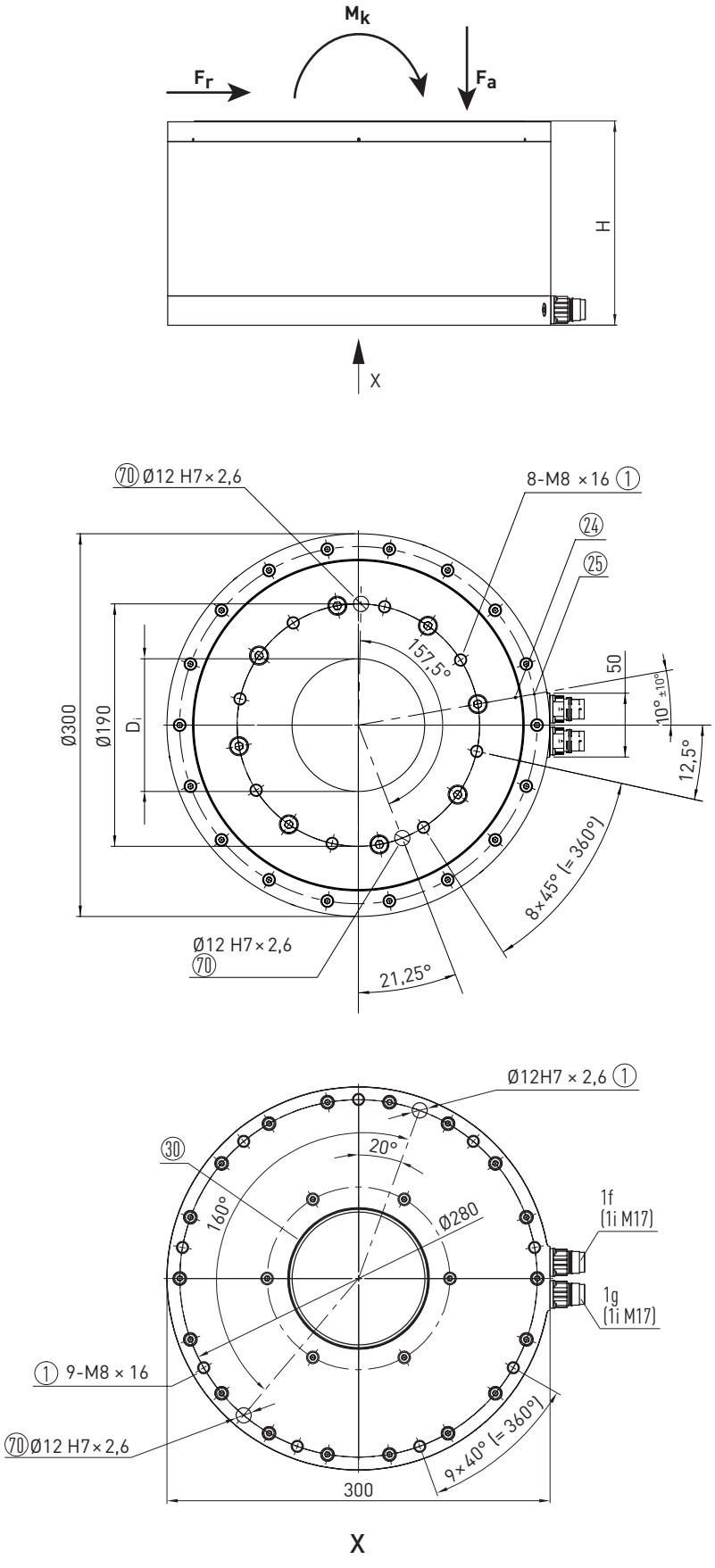
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

Table 3.8 **Technical data encoder DMS7**

	Symbol	Unit	RIK4	KCI120	ECN113	ECN125	Resolute
Encoder type			Incremental	Absolute, single-turn	Absolute, single-turn	Absolute, single-turn	Absolut, single-turn
Functional principle			Optical	Inductive	Optical	Optical	Optical
Resolution			5n400 strokes/ rotation	20 bit	13 bit absolute with incremental track 2,048 Striche	25 bit	26 bit
Interface			sin/cos 1 V_{PP}	EnDat 2.2	EnDat 2.2 + sin/ cos 1 V_{PP}	EnDat 2.2	BiSS-C
Functional safety				FUNCTIONAL SAFETY			
Accuracy [1]		arcsec	±25	±45	±25	±25	±25
Repeatability		arcsec	±2,5	±3	±2,5	±2,5	±2,5
Hollow shaft diameter	D_i	mm	104	35	40	40	104
Product key hollow shaft			S	X	X	X	S
Product key pin assignment			E	L	M	L	L

[1] Optionally with error compensation ±10 arcsec or ±5 arcsec

Dimensions of the DMS7
(For values, see Table 3.7)



4. HIWIN rotary tables DMN

FUNCTIONAL SAFETY

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

Rotor height:

Encoder:
X: Incremental
Z: Absolute

Hall sensor:
0: Without hall sensor

Winding code:
S: Standard

Temperature sensor:
P: PTC sensor

Protection class:
0: IP40

Empty:

Encoder type

Empty:

Clamp:
0: Without (standard)

Hollow shaft:
S, X: see tables "Technical data encoder"

Connector type:
E: Inkremental encoder (ATOM, RIK4)
L: EnDat, single-turn encoder (KCI120, KCI1319)

Wire:
0: M17, straight outlet

Error Mapping:
0: Without (standard)
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

Exaple order code:
DMN71-Z0SP00-S0-0LX-0-0 (KCI120)

Rotary tables DMN
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)

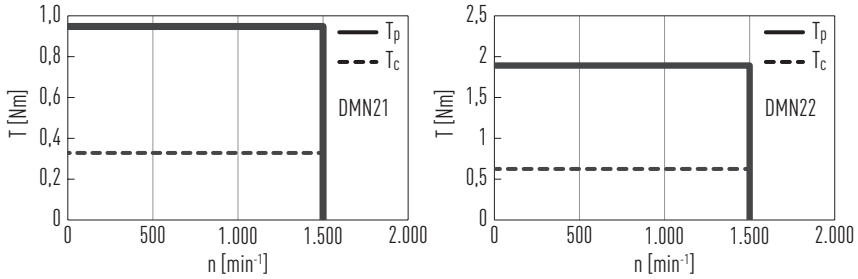


Table 4.1 **Technical data DMN2**

	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/√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	

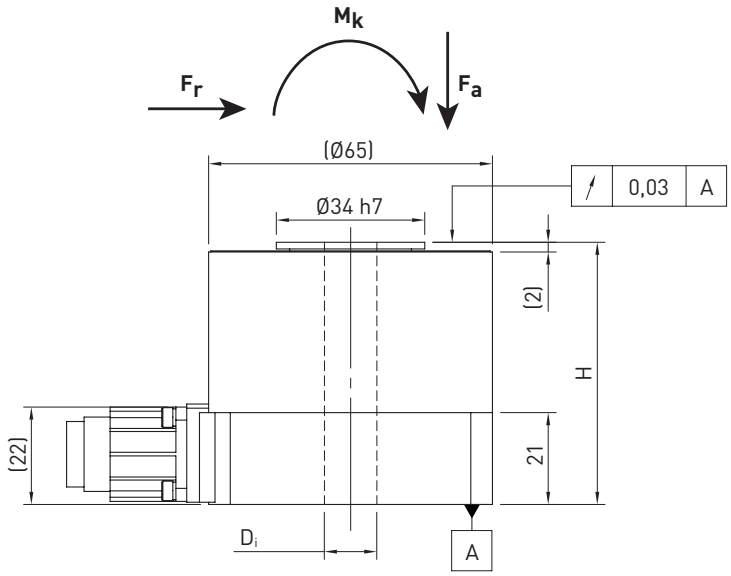
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

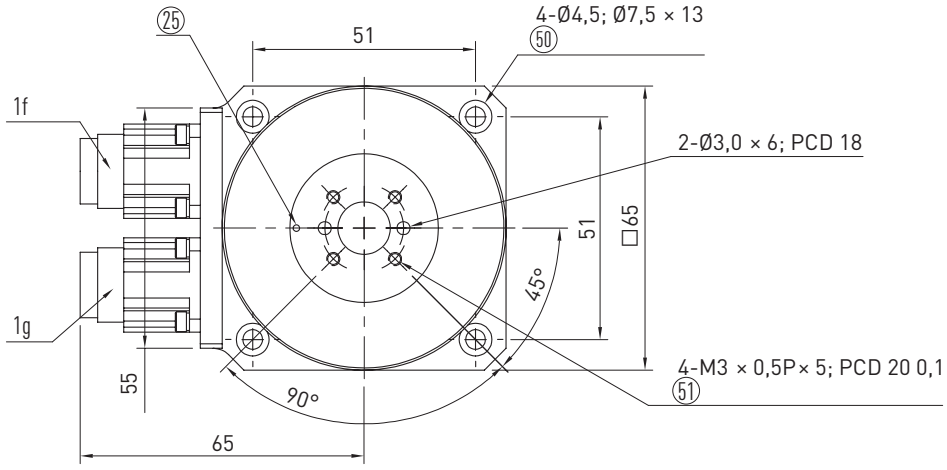
Table 4.2 **Technical data encoder DMN2**

	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				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)





X

4.3.2 Technical data for DMN4

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

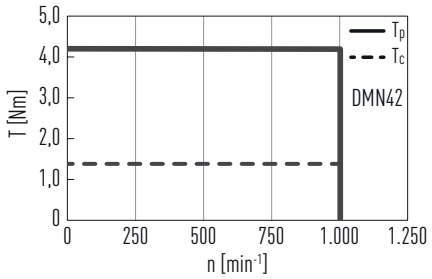


Table 4.3 **Technical data for DMN4**

	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

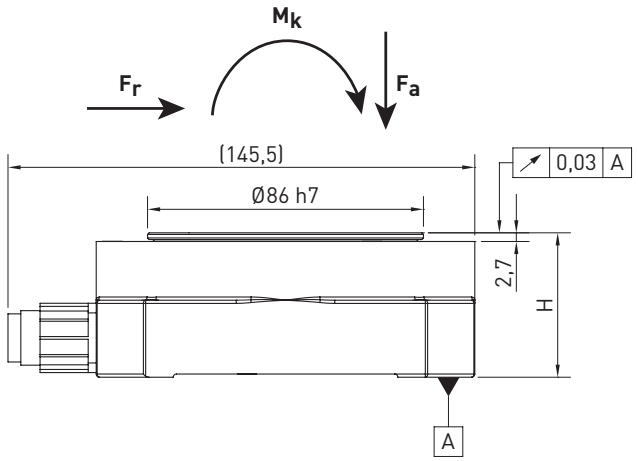
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

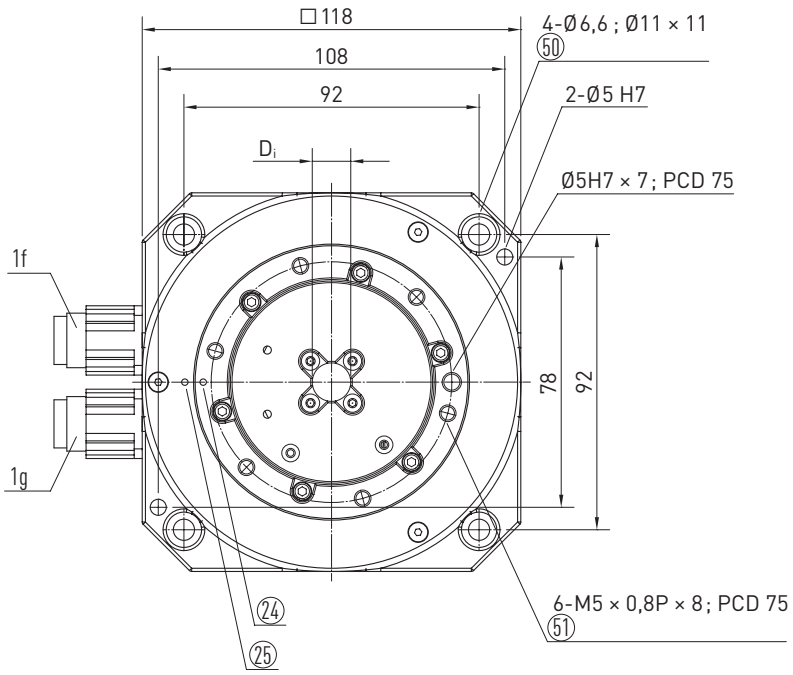
Table 4.4 **Technical data encoder DMN4**

	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

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)

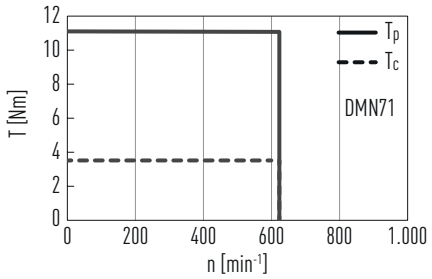


Table 4.5 **Technical data for DMN7**

	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	$Nm/\sqrt{W}$	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	$V_{eff}/(rad/s)$	0.63
Number of poles	2p		16
Thermal resistance	R_{th}	°C/W	1.7
Thermal time constant	T_{th}	s	1,420
Thermal sensor			PTC SNM 100
Max. DC Bus		V	600

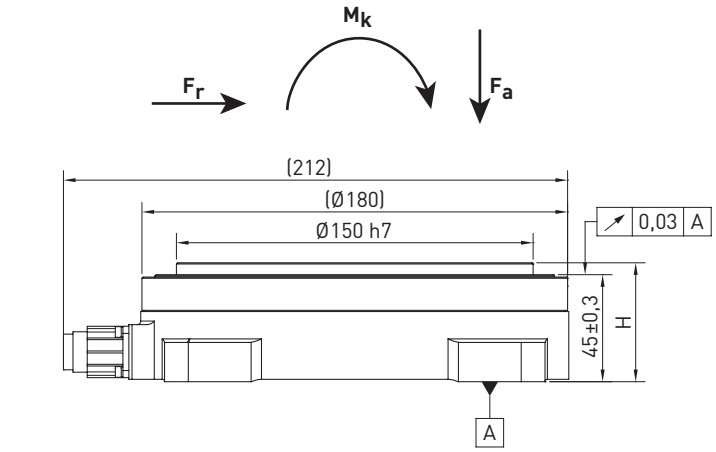
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

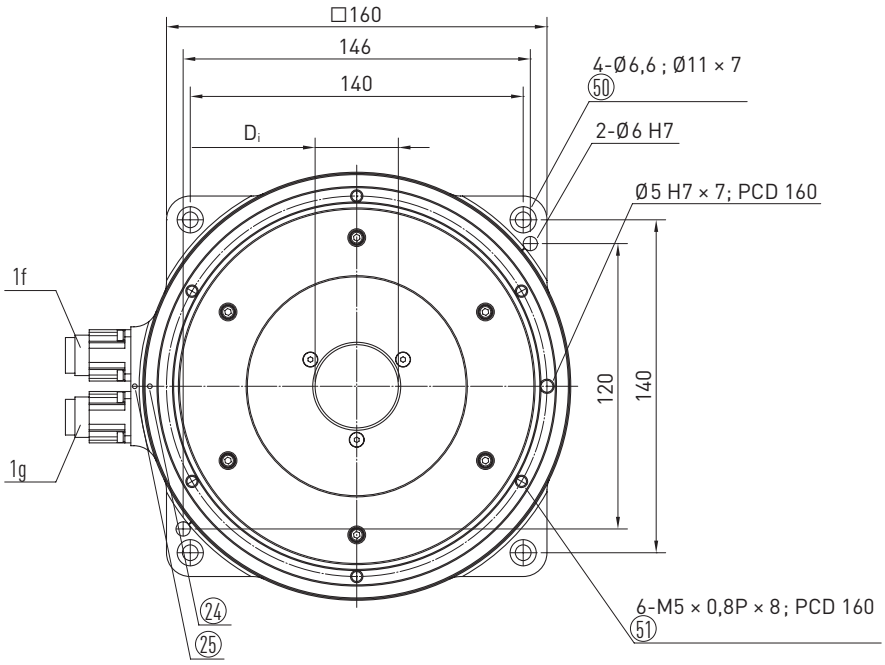
Table 4.6 **Technical data encoder DMN7**

	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				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)





4.3.4 Technical data for DMN9

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

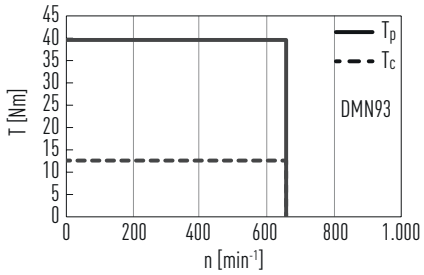


Table 4.7 **Technical data for DMN9**

	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

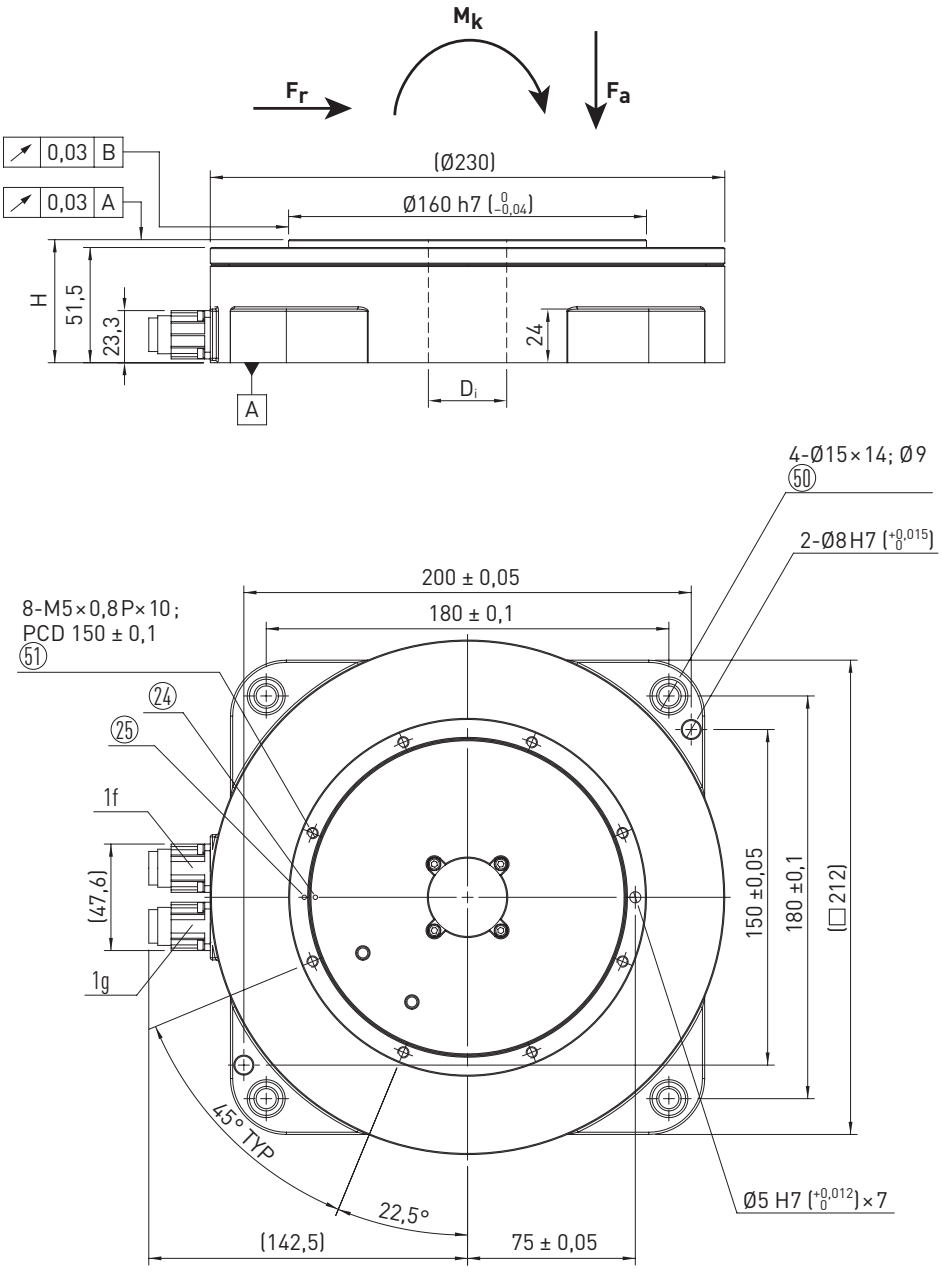
All values ±10 % at 25 °C ambient temperature
[1] Line-to-line
[2] Optional

Table 4.8 **Technical data encoder DMN9**

	Symbol	Unit	RIK4	KCI120
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				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

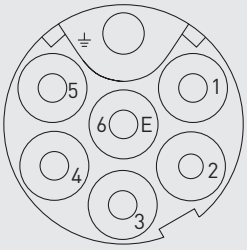
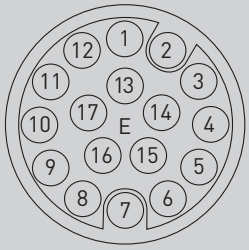
Dimensions of the DMN9
(For values, see Table 4.7)



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

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	$\overline{\text{CLOCK}}$	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	$\overline{\text{CLOCK}}$	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		

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Note:
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