HIWIN®

Linear Technology

Positioning Systems

Rotary tables

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Note:
The technical data in this catalog may
be changed without prior notice.

HIWIN®
Linear Technology

Welcome to HIWIN

Welcome to HIWIN

Directly driven HIWIN rotary tables provide versatile applications due to their backlash-free, very rigid structure. Upon desire, they are also provided as a complete system with amplifier.

Positioning systems

We make linear progress affordable

HIWIN®
Linear Technology

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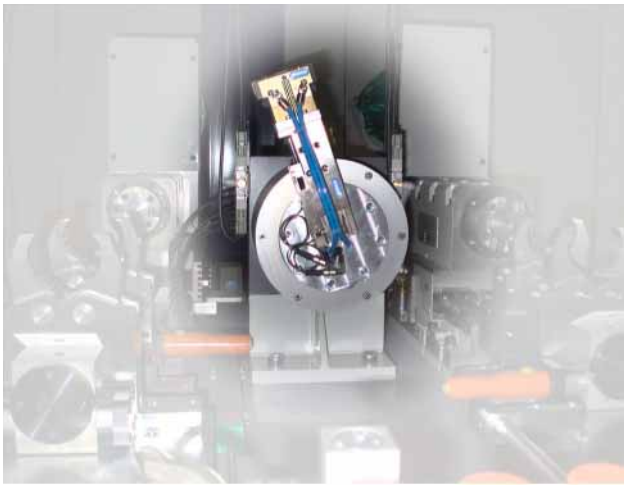
Positioning systems
HIWIN rotary tables

1. Application examples

1.1 HIWIN rotary tables optimize transport sequences



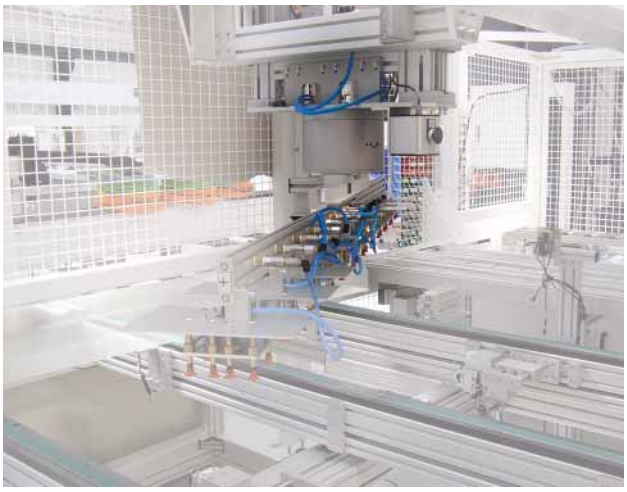
Requirements

- Fast positioning during the transport of the workpieces between the linked plant parts on a vertical circular track = special requirements on acceleration and braking power due to short travelling distances
- Flexible solution that allows things to be changed or added, even during commissioning
- The tables can be stopped in any position for parts inspection.

Our implementation

- The swivel drive minimizes the cycle times = time and costs saved
- Centrifugal forces are minimized = components can be transported to the next station quickly and gently using the gripping arm
- Precision bearing and optical distance measuring system = highest repeatability
- Hollow shaft design = simply feed through cables or mechanical components
- Direct drive = no more gear play and mechanical gear components subject to wear

1.2 HIWIN rotary table in wafer handling



Requirements

- Lay-up station, in which the finished strings can be suctioned with special vacuum box after soldering, then swivelled, and alternatively deposited in string boxes or on glass plates
- The current seat of the Z axis of the cross beam driven by toothed belt and servo motor should be replaced because the solution takes up too much space an is too heavy
- In the case of the compact version, a high torque is required due to the long swivel arm and high intrinsic weight of the arm
- High speeds required due to short, necessary cycle times

Our implementation

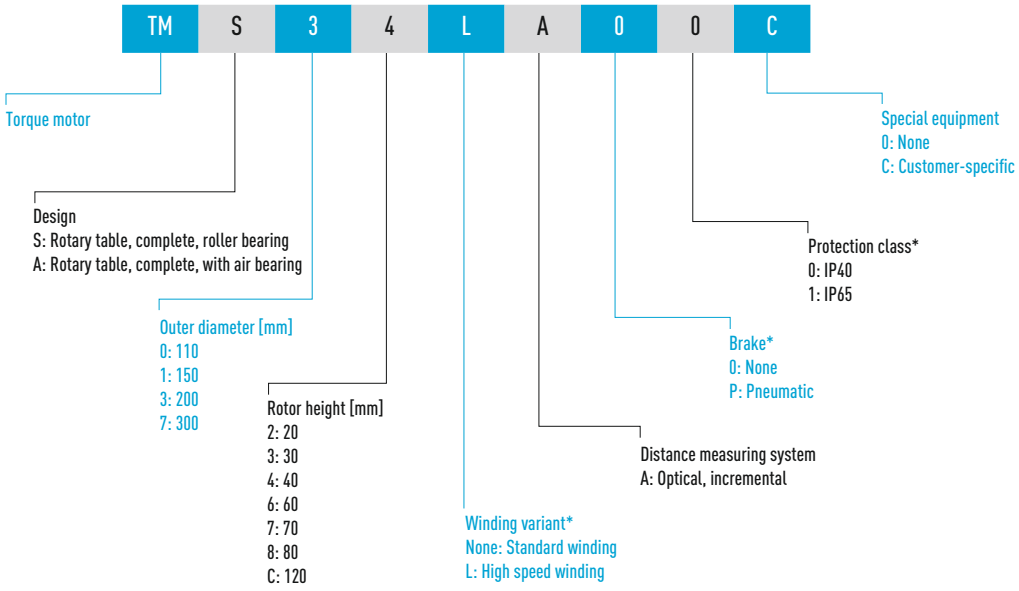
- Design as rotary switching tables = high torque with compact shape = high throughput and space and cost savings
- Hollow shaft design = feed-through of pneumatic hoses and cables possible
- Direct drive = no more gear play and mechanical gear components subject to wear
- Adaptation to the existing control system

2. Properties of the HIWIN rotary tables

HIWIN rotary tables are directly driven rotary tables and thus do not need gearing. The extremely rigid connection between motor and load coupled with a high-quality servo drive control provides for excellent acceleration capability and a good uniformity of movement. HIWIN rotary tables are particularly suited for automation tasks due to the hollow shaft design. The feed-through of media, cable systems, or mechanical components is possible without a problem.

- Drive free from backlash
- High-torque
- Extremely dynamic
- Integrated encoder
- Freely selectable amplifier
- UL-certified (TMS3 and TMS7)
- Housing made of anodized aluminium
- Optional, type of protection IP65 (TMS3 and TMS7)
- Optional with pneumatic clamp (TMS3 and TMS7)
- Brushless drive

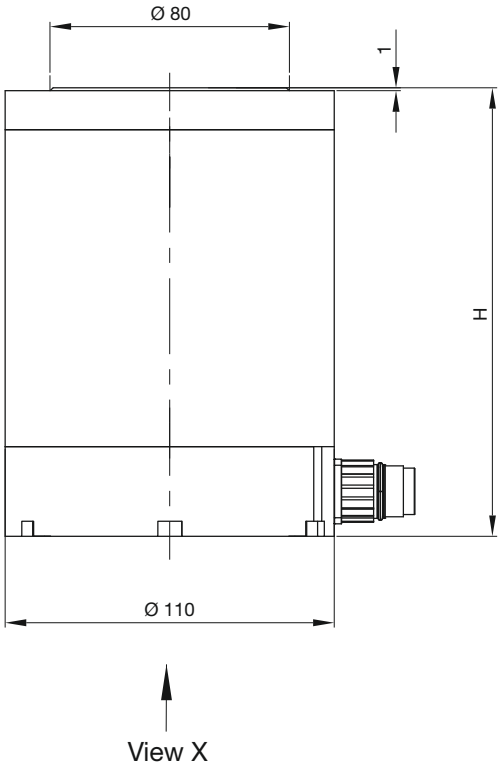
3. Order codes of the TMS and TMA HIWIN rotary tables

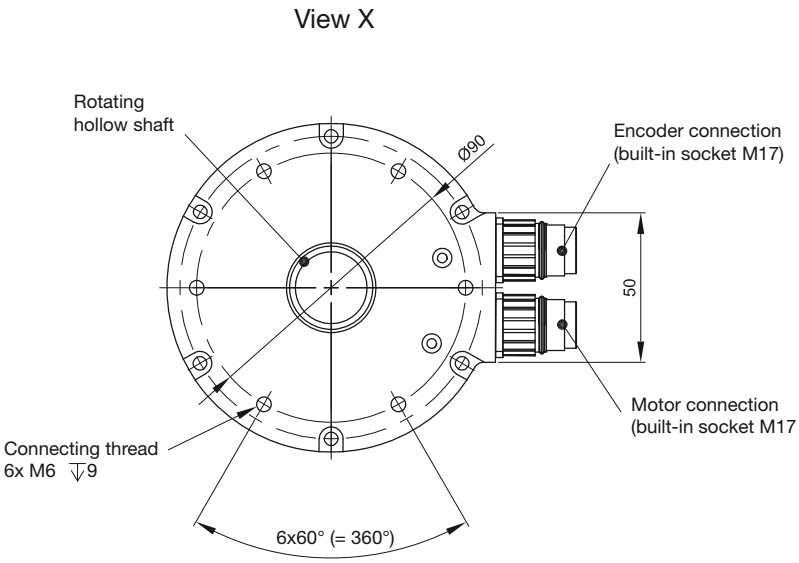


* Options depend on the series; see technical data

4. TMS0X HIWIN rotary tables

Dimensions of the TMS0X HIWIN rotary table
(for values, see Table 4.1)





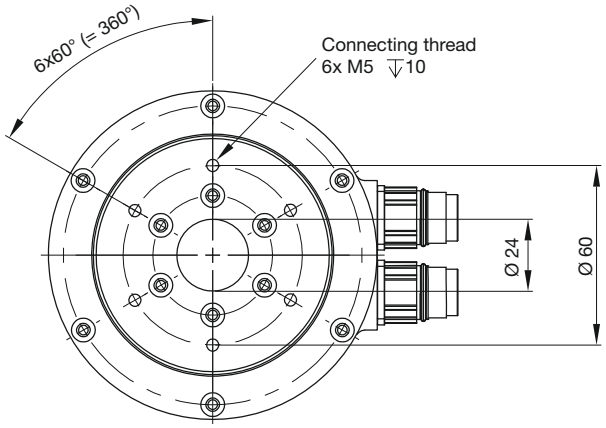


Table 4.1 **Specifications for HIWIN TMS0X Rotary Tables**

Specifications for HIWIN Rotary Tables

	Symbol	Unit	TMS03	TMS07
Peak torque for 1 second	T_p	Nm	7.7	15.5
Continuous torque (coil temp. 80 °C)	T_c	Nm	3.1	6.2
Stall torque (coil temp. 80 °C)	T_s	Nm	2.2	4.3
Moment of inertia of rotating parts	J	kgm^2	0.003	0.006
Mass	M_m	kg	4	7
Max. axial load	F_a	N	3700	3700
Max. radial load	F_r	N	820	820
Max. speed (at 400 V_{AC}) for 1 second	n_{max}	rpm	1000	1000
Nominal speed (at 400 V_{AC} and 30% DR)		rpm	500	500
Accuracy		arc sec	150	150
Repeatability		arc sec	6	6
Radial run-out		mm	0.03	0.03
Axial run-out		mm	0.03	0.03
Height	H	mm	117.5	150
Protection class			IP40	

Motor Specifications

	Symbol	Unit	TMS03	TMS07
Peak current for 1 second	I_p	A_{eff}	5	5
Continuous current (coil temp. 80 °C)	I_c	A_{eff}	2	2
Motor constant (coil temp. 25 °C)	K_m	$Nm/\sqrt{W}$	1	0.73
Winding resistance (coil temp. 25 °C) [1]	R_{25}	Ω	4	6.1
Winding resistance (coil temp. 100 °C) [1]	R_{100}	Ω	5.5	7.6
Motor inductance [2]	L	mH	10	15
Electric time constant	T_e	ms	2.8	2.4
Torque constant	K_t	Nm/A_{eff}	1.55	3.1
Voltage constant	K_v	$V_{rms}/(rad/s)$	0.61	1.24
Number of poles	2p	–	10	10
Thermal resistance	R_{th}	K/W	1.1	0.84
Thermal circuit breaker [3]			Bimetal (break contact), switching point 100 °C, 12 VDC/6 A, 24 VDC/3 A or PTC	
Max. intermediate circuit voltage up to [3]		V	800	800

[1] Line resistance

[2] Line inductance

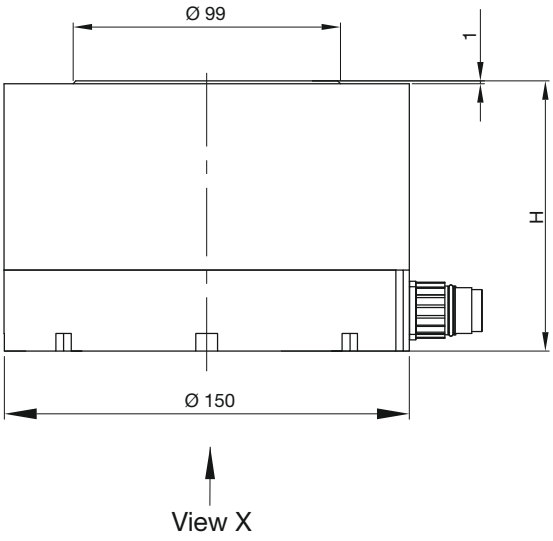
[3] depends on version

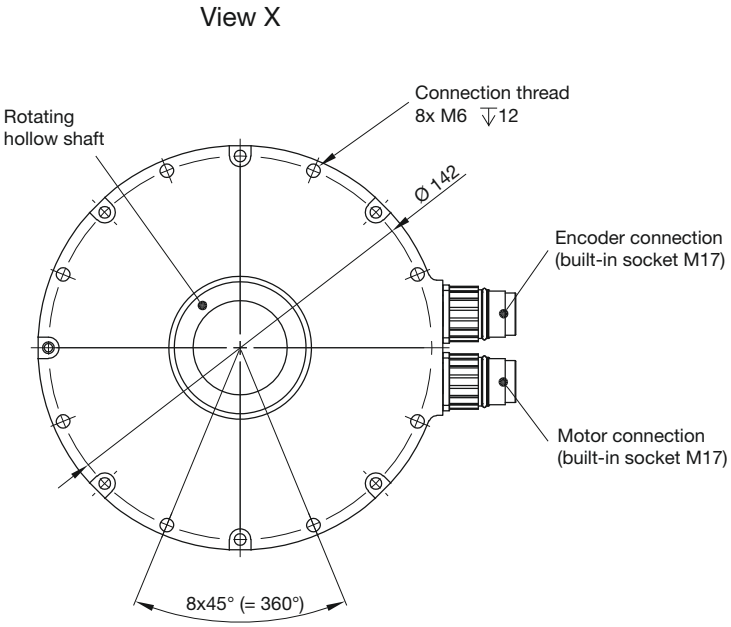
Encoder specifications (optical, incremental)

- 2048 lines/cycle
- Index mark
- Signal output sin/cos 1 V_{ss}

5. TMS1X HIWIN rotary tables

Dimensions of the TMS1X HIWIN rotary table
(for values, see Table 5.1)





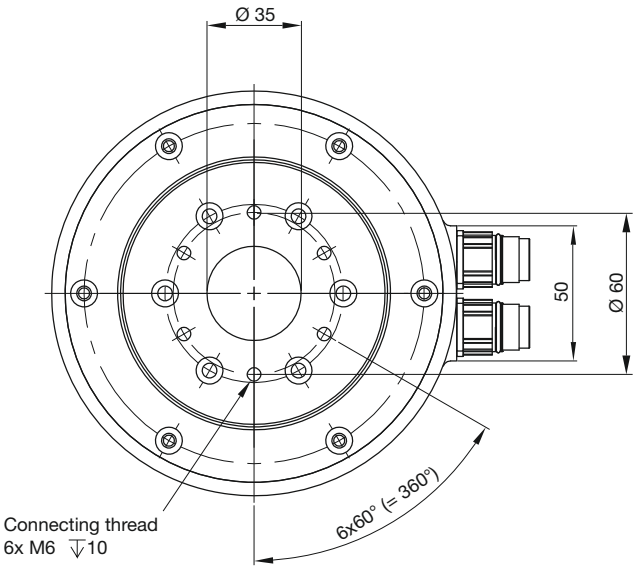


Table 5.1 **Specifications for HIWIN TMS1X Rotary Tables**

Specifications for HIWIN Rotary Tables

	Symbol	Unit	TMS12	TMS14	TMS16	TMS18
Peak torque for 1 second	T_p	Nm	9	18	27	36
Continuous torque (coil temp. 80 °C)	T_c	Nm	3.7	7.2	10.8	14.4
Stall torque (coil temp. 80 °C)	T_s	Nm	2.5	5.1	7.6	10.1
Moment of inertia of rotating parts	J	kgm^2	0.006	0.0065	0.007	0.0075
Mass	M_m	kg	5.7	7	8.3	9.5
Max. axial load	F_a	N	3700	3700	3700	3700
Max. radial load	F_r	N	1700	1700	1700	1700
Max. speed (at 400 V_{AC}) for 1 second	n_{max}	rpm	1000	1000	1000	1000
Nominal speed (at 400 V_{AC} and 30% DR)		rpm	500	500	500	500
Accuracy		arc sec	150	150	150	150
Repeatability		arc sec	6	6	6	6
Radial run-out		mm	0.03	0.03	0.03	0.03
Axial run-out		mm	0.03	0.03	0.03	0.03
Height	H	mm	100	120	140	160
Protection class			IP40			

Motor Specifications

	Symbol	Unit	TMS12	TMS14	TMS16	TMS18
Peak current for 1 second	I_p	A_{eff}	10	10	10	10
Continuous current (coil temp. 80 °C)	I_c	A_{eff}	4	4	4	4
Motor constant (coil temp. 25 °C)	K_m	$Nm/\sqrt{W}$	0.66	1.02	1.29	1.64
Winding resistance (coil temp. 25 °C) [1]	R_{25}	Ω	1.2	2	2.8	3.1
Winding resistance (coil temp. 100 °C) [1]	R_{100}	Ω	1.5	2.5	3.5	4.38
Motor inductance [2]	L	mH	4.3	7.5	10.5	11.6
Electric time constant	T_e	ms	3.6	3.75	3.75	3.6
Torque constant	K_t	Nm/A_{eff}	0.91	1.8	2.7	3.6
Voltage constant	K_v	$V_{rms}/(rad/s)$	0.53	1	1.5	2
Number of poles	2p	–	22	22	22	22
Thermal resistance	R_{th}	K/W	0.52	0.74	0.55	0.5
Thermal circuit breaker [3]			Bimetal (break contact), switching point 100 °C, 12 VDC/6 A, 24 VDC/3 A or PTC			
Max. intermediate circuit voltage up to [3]		V	800	800	800	800

[1] Line resistance

[2] Line inductance

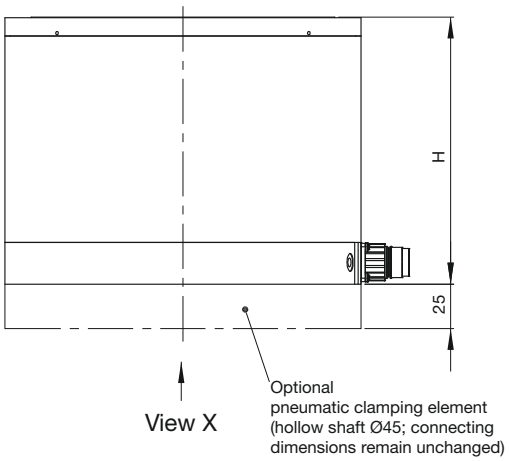
[3] depends on version

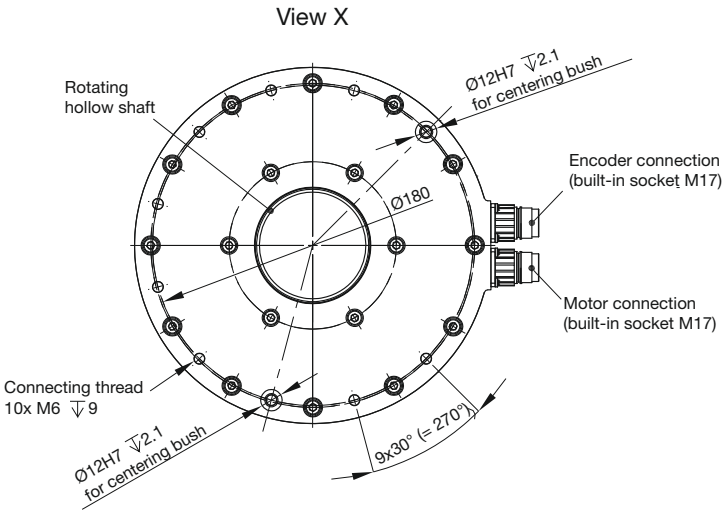
Encoder specifications (optical, incremental)

- 3600 lines/cycle
- Index mark
- Signal output sin/cos 1 V_{ss}

6. TMS3X HIWIN rotary tables

Dimensions of the TMS3X HIWIN rotary tables
(for values, see Table 6.1)





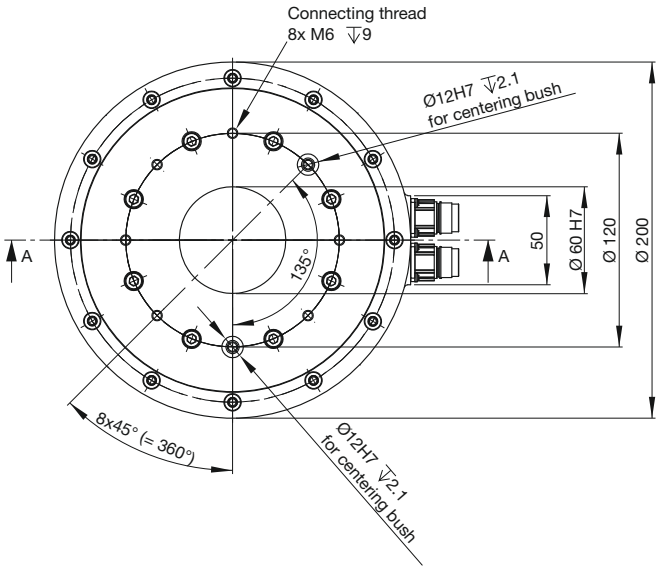


Table 6.1 **Specifications for HIWIN TMS3X Rotary Tables**

Specifications for HIWIN Rotary Tables

	Symbol	Unit	TMS32	TMS34	TMS34L	TMS38	TMS38L	TMS3C	TMS3CL
Peak torque for 1 second	T_p	Nm	25	50	50	100	100	150	150
Continuous torque (coil temp. 80 °C)	T_c	Nm	10	20	20	40	40	60	60
Stall torque (coil temp. 80 °C)	T_s	Nm	7	14	14	28	28	42	42
Moment of inertia of rotating parts	J	kgm^2	0.014	0.020	0.020	0.026	0.026	0.035	0.035
Mass	M_m	kg	15	21	21	26	26	32	32
Max. axial load	F_a	N	15 000	15 000	15 000	15 000	15 000	15 000	15 000
Max. radial load	F_r	N	12 000	12 000	12 000	11 000	11 000	10 000	10 000
Max. speed (at 400 V_{AC}) for 1 sec.	n_{max}	rpm	1500	1100	1500	600	1100	400	700
Nominal speed (at 400 V_{AC} and 30% DR)		rpm	700	700	700	500	700	300	600
Accuracy		arc sec	50	50	50	50	50	50	50
Repeatability		arc sec	± 2	± 2	± 2	± 2	± 2	± 2	± 2
Radial run-out		mm	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Axial run-out		mm	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Height	H	mm	130	150	150	190	190	230	230
Protection class			IP40; optionally IP65						

Motor Specifications

	Symbol	Unit	TMS32	TMS34	TMS34L	TMS38	TMS38L	TMS3C	TMS3CL
Peak current for 1 second	I_p	A_{eff}	7.5	7.5	15.0	7.5	15.0	7.5	15.0
Continuous current (coil temp. 80 °C)	I_c	A_{eff}	3.0	3.0	6.0	3.0	6.0	3.0	6.0
Motor constant (coil temp. 25 °C)	K_m	$Nm/\sqrt{W}$	1.0	2.1	2.1	3.4	3.4	4.2	4.2
Winding resistance (coil temp. 25 °C) [1]	R_{25}	Ω	2.9	4.3	1.1	7.2	1.8	10.1	2.6
Winding resistance (coil temp. 100 °C) [1]	R_{100}	Ω	3.7	5.1	1.3	8.5	2.2	12	3
Motor inductance [2]	L	mH	10	16	4	27	6.8	37	9.3
Electric time constant	T_e	ms	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Torque constant	K_t	Nm/A_{eff}	3.5	7.0	3.5	14.0	7.0	21.0	11.5
Voltage constant	K_v	$V_{rms}/(rad/s)$	1.6	3.2	1.8	6.4	3.7	9.6	5.5
Number of poles	2p	–	22	22	22	22	22	22	22
Thermal resistance	R_{th}	K/W	0.7	0.58	0.58	0.41	0.41	0.29	0.29
Thermal circuit breaker			PTC; switching point at 100 °C						
Max. intermediate circuit voltage		V	800	800	800	800	800	800	800

[1] Line resistance

[2] Line inductance

Encoder specifications (optical, incremental)

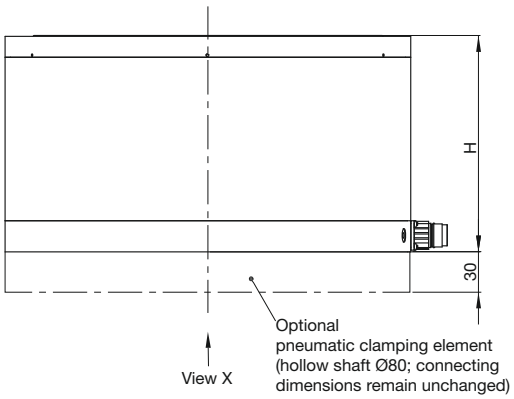
- 3600 lines/cycle
- Index mark
- Signal output sin/cos 1 V_{ss}

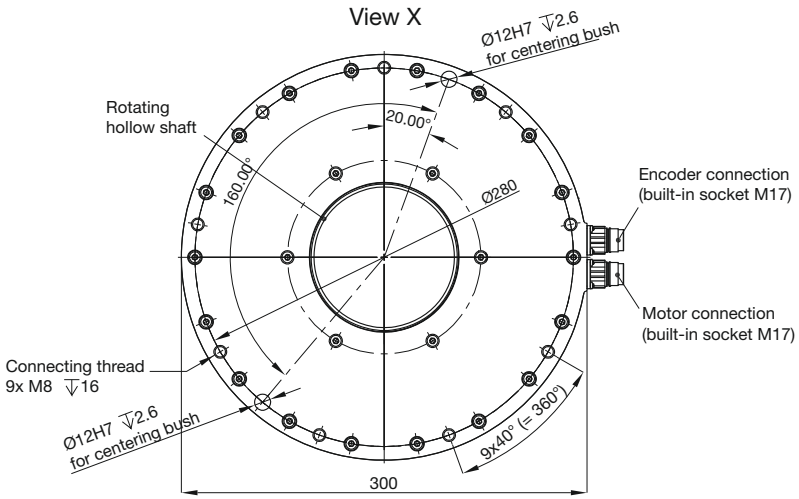
Specifications for pneumatic clamping element (optional)

- Clamping torque 110 Nm at 6 bar
- Clamping torque with additional air: 200 Nm at 6 bar
- Suitable for emergency stop due to spring preload

7. TMS7X HIWIN rotary tables

Dimensions of the TMS7X HIWIN rotary table
(for values, see Table 7.1)





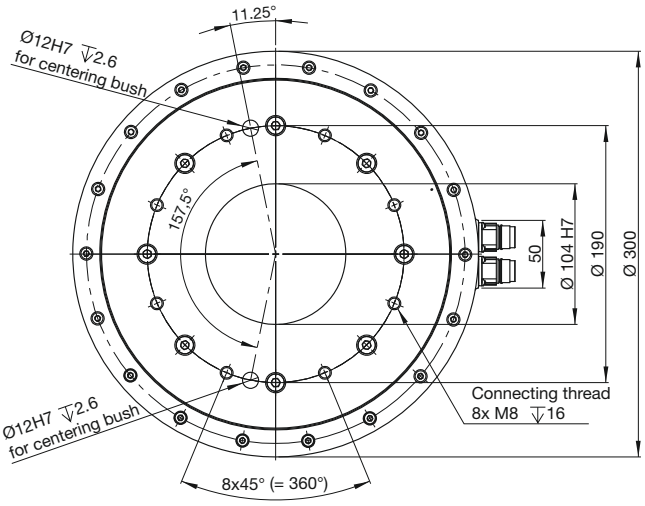


Table 7.1 **Specifications for HIWIN TMS7X Rotary Tables**

Specifications for HIWIN Rotary Tables

	Symbol	Unit	TMS74	TMS74L	TMS76	TMS76L	TMS7C	TMS7CL
Peak torque for 1 second	T_p	Nm	130	130	190	190	380	380
Continuous torque (coil temp. 80 °C)	T_c	Nm	50	50	75	75	150	150
Stall torque (coil temp. 80 °C)	T_s	Nm	35	35	53	53	106	106
Moment of inertia of rotating parts	J	kgm^2	0.152	0.152	0.174	0.174	0.241	0.241
Mass	M_m	kg	39	39	44.5	44.5	61.5	61.5
Max. axial load	F_a	N	25000	25000	25000	25000	25000	25000
Max. radial load	F_r	N	20000	20000	20000	20000	18000	18000
Max. speed (at 400 V_{AC}) for 1 second	n_{max}	rpm	500	900	350	600	170	300
Nominal speed (at 400 V_{AC} and 30% DR)		rpm	400	500	280	500	120	200
Accuracy		arc sec	60	60	60	60	60	60
Repeatability		arc sec	± 7	± 7	± 7	± 7	± 7	± 7
Radial run-out		mm	0.05	0.05	0.05	0.05	0.05	0.05
Axial run-out		mm	0.05	0.05	0.05	0.05	0.05	0.05
Height	H	mm	160	160	180	180	240	240
Protection class			IP40; optionally IP65					

Motor Specifications

	Symbol	Unit	TMS74	TMS74L	TMS76	TMS76L	TMS7C	TMS7CL
Peak current for 1 second	I_p	A_{eff}	8	16	8	16	8	16
Continuous current (coil temp. 80 °C)	I_c	A_{eff}	3.0	6.0	3.0	6.0	3.0	6.0
Motor constant (coil temp. 25 °C)	K_m	$Nm/\sqrt{W}$	3.4	3.4	4.5	4.5	8.5	8.5
Winding resistance (coil temp. 25 °C) [1]	R_{25}	Ω	8.0	2	10.4	2.6	20.2	5.1
Winding resistance (coil temp. 100 °C) [1]	R_{100}	Ω	9.5	2.4	12.4	3.1	25.0	6.3
Motor inductance [2]	L	mH	32	8	42	10.5	84	21
Electric time constant	T_e	ms	4	4	4	4	4	4
Torque constant	K_t	Nm/A_{eff}	16.9	8.5	25.4	12.7	50.1	25.05
Voltage constant	K_v	$V_{rms}/(rad/s)$	7.2	3.6	10.8	5.4	21.6	10.8
Number of poles	2p	–	44	44	44	44	44	44
Thermal resistance	R_{th}	K/W	0.31	0.31	0.25	0.25	0.18	0.18
Thermal circuit breaker			PTC; switching point at 100 °C					
Max. intermediate circuit voltage		V	800	800	800	800	800	800

[1] Line resistance

[2] Line inductance

Encoder specifications (optical, incremental)

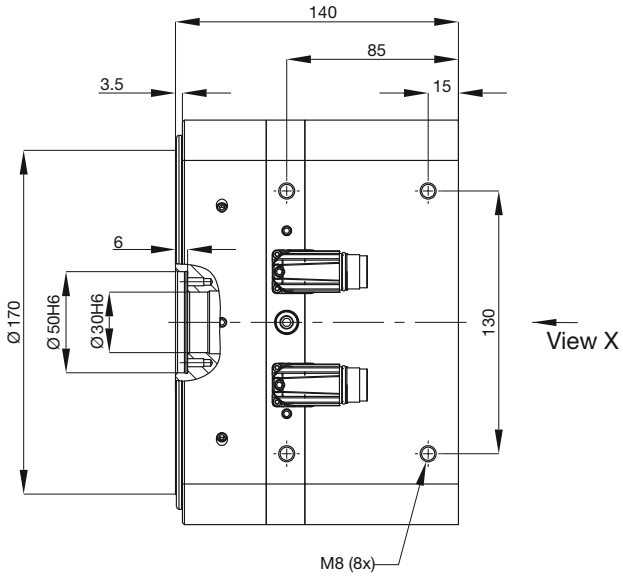
- 5400 lines/cycle
- Index mark
- Signal output sin/cos 1 V_{ss}

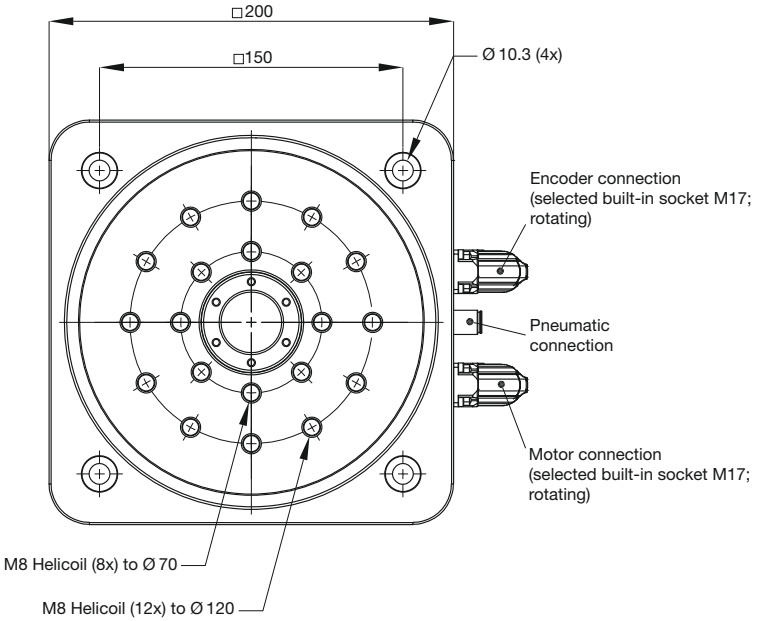
Specifications for pneumatic clamping element (optional)

- Clamping torque 330 Nm at 6 bar
- Clamping torque with additional air: 580 Nm at 6 bar
- Suited for emergency stop due to spring preload

8. TMA3X HIWIN air bearing rotary table

Dimensions of the TMA3X HIWIN rotary table
(for values, see Table 8.1)





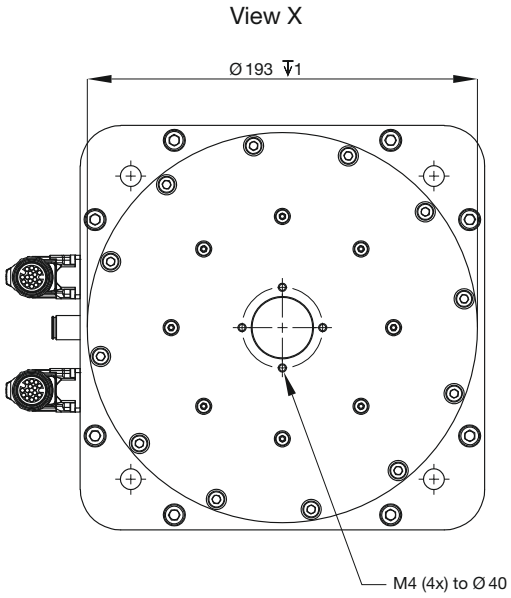


Table 8.1 **Specifications for HIWIN TMA3X Rotary Table**

Specifications for HIWIN rotary table

	Symbol	Unit	TMA32
Peak torque for 1 second	T_p	Nm	27
Continuous torque (coil temp. 80 °C)	T_c	Nm	11
Stall torque (coil temp. 80 °C)	T_s	Nm	8
Moment of inertia of rotating parts	J	kgm^2	0.019
Mass	M_m	kg	16
Max. axial load	F_a	N	2500
Max. radial load	F_r	N	2500
Rigidity of axial bearing		N/µm	350
Rigidity of radial bearing		N/µm	125
Tipping rigidity		Nm/µrad	0.58
Max. tipping moment		Nm	70
Max. speed (at 400 V_{AC}) for 1 second	n_{max}	rpm	
Nominal speed (at 400 V_{AC} and 30% DR)		rpm	
Accuracy		arc sec	20
Repeatability		arc sec	2
Radial run-out		mm	0.002
Axial run-out		mm	0.002
Operating pressure	H	bar	5
Air consumption	v_n	Nl/min	18
Protection class			IP40

Motor Specifications

	Symbol	Unit	TMA32
Peak current for 1 second	I_p	A_{eff}	8
Continuous current (coil temp. 80 °C)	I_c	A_{eff}	3.0
Motor constant (coil temp. 25 °C)	K_m	Nm/$\sqrt{}$ W	1.0
Winding resistance (coil temp. 25 °C) [1)]	R_{25}	Ω	2.9
Winding resistance (coil temp. 100 °C) [1]	R_{100}	Ω	3.7
Motor inductance [2)]	L	mH	10.0
Electric time constant	T_e	ms	3.9
Torque constant	K_t	Nm/A_{eff}	3.5
Voltage constant	K_v	V_{rms}/(rad/s)	1.6
Number of poles	2p	–	22
Thermal resistance	R_{th}	K/W	0.7
Thermal circuit breaker			PTC, switching point at 100 °C
Max. intermediate circuit voltage		V	800

[1)] Line resistance

[2)] Line inductance

Encoder specifications (optical, incremental)

- 5400 lines/cycle
- Index mark
- Signal output sin/cos 1 V_{ss}

Positioning systems

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TM-01-1-E-0901-F