

Torque Motors

HIWIN torque motors TMR

2. HIWIN torque motors TMR

2.1 Special characteristics of the TMR torque motors

TMR series torque motors are ready-to-install motor elements consisting of a stator and rotor. The rotor is in the form of a ring. Their high power density enables high acceleration rates and hence short cycle times. In most cases a transmission system can be omitted when using a torque motor. For matching crossed roller bearings please see our catalogue "Crossed Roller Bearings".



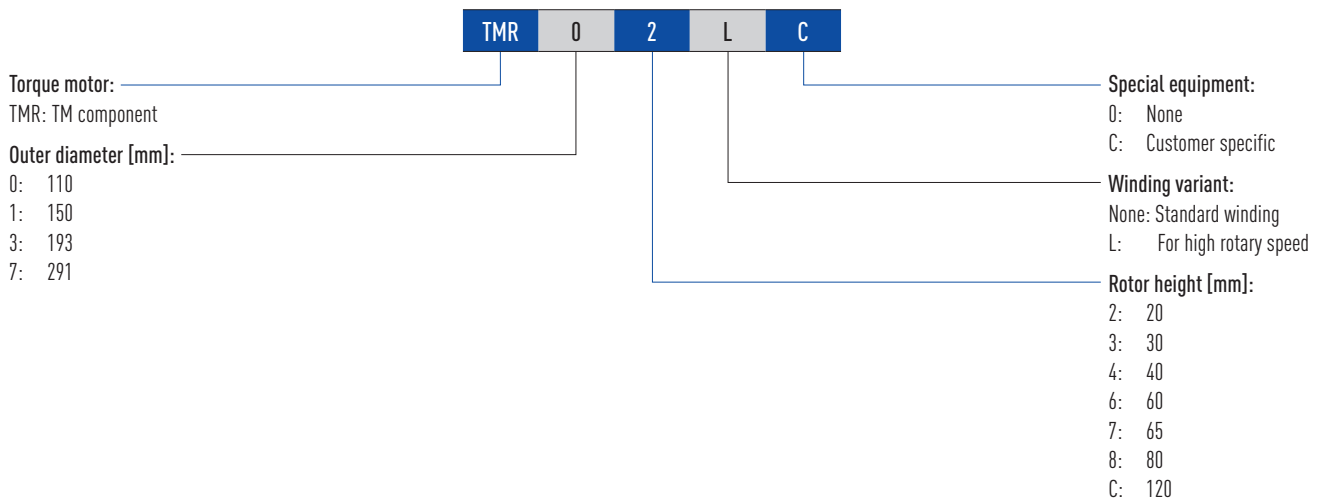
Key features of the TMR torque motor:

- High continuous and peak torques
- High dynamics
- High efficiency
- Maintenance-free and wear-free operation
- Integrated thermal sensors
- UL-certified (TMR3, TMR7)

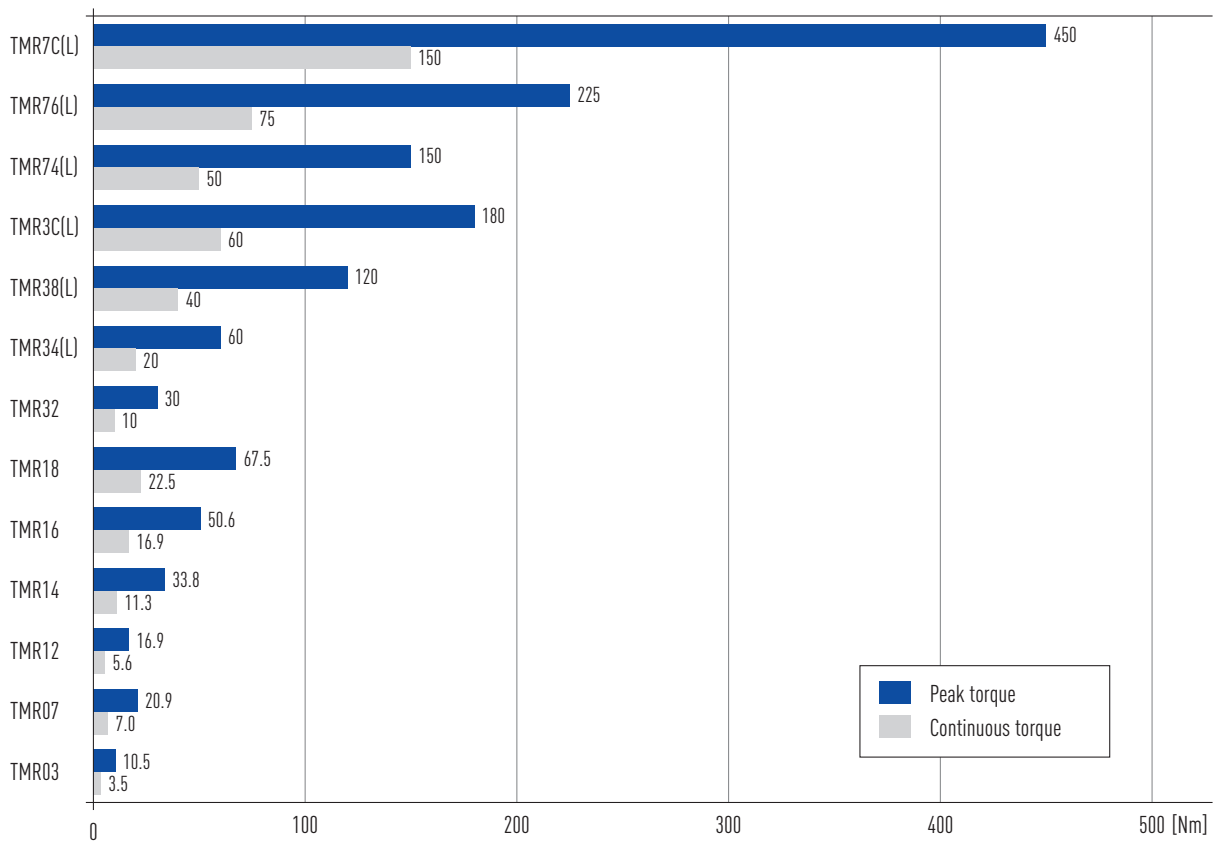
Typical fields of application:

- Automation technology
- Rotary tables

2.2 Order code TMR torque motor



2.3 TMR torques



Torque Motors

HIWIN torque motors TMR

2.4 TMR torque motor specifications

2.4.1 TMR0 specifications

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

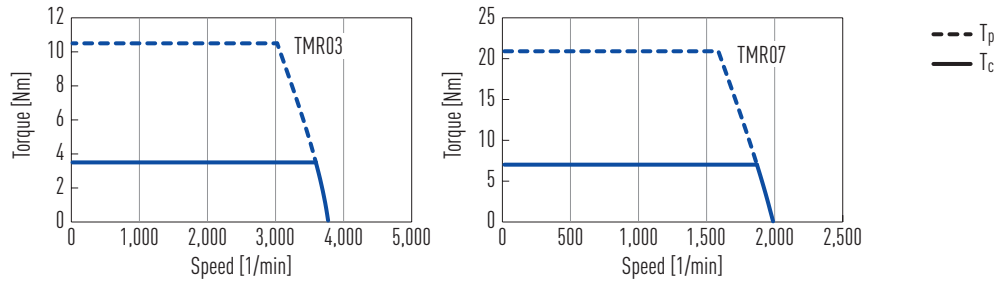


Table 2.1 Technical data for TMR0

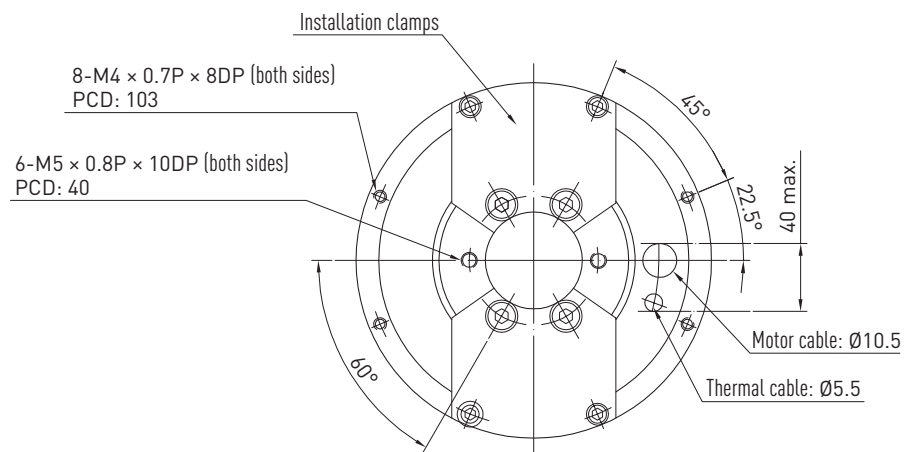
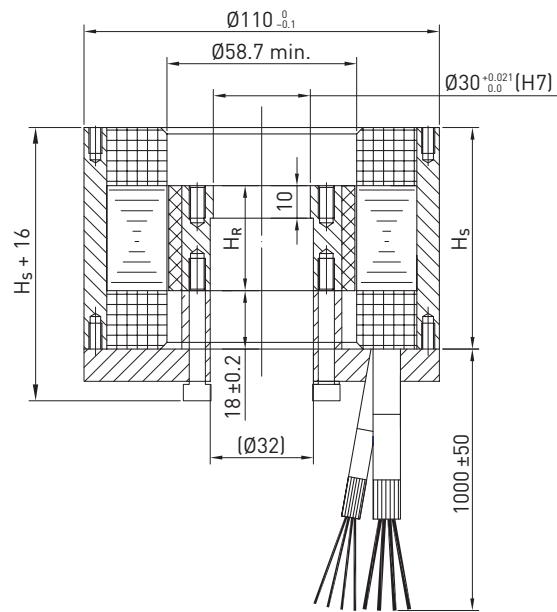
	Symbol	Unit	TMR03	TMR07
Torques and electrical parameters				
Peak torque (for 1 sec.)	T_p	Nm	10.5	20.9
Continuous torque ¹⁾	T_c	Nm	3.5	7.0
Stall torque	T_s	Nm	2.5	4.9
Peak current (for 1 sec.)	I_p	A	6.8	6.8
Continuous current ¹⁾	I_c	A	2.3	2.3
Stall current	I_s	A	1.6	1.6
Resistance ²⁾	R_{25}	Ω	7.1	11.1
Inductance ²⁾	L_{25}	mH	15.2	22.2
Motor constant	K_m	Nm/ \sqrt{W}	0.5	0.8
Electrical time constant	K_e	ms	2.1	2.0
Torque constant	K_t	Nm/A	1.55	3.1
Back emf constant	K_u	$V_{eff}/(rad/s)$	0.82	1.7
Inertia of rotor	J	kgm ²	0.00018	0.00036
Thermal resistance	R_{th}	°C/W	1.76	1.13
Thermal time constant	T_{th}	s	1,930	1,980
Max. DC Bus	U_{max}	VDC	600	
Mechanical parameters				
Number of poles	2p		10	
Thermal sensor			PTC SNM 120	
Stator height	H_S	mm	68.5	101.0
Rotor height	H_R	mm	32.5	65.0
Weight of motor	M_m	kg	2.6	4.3

All the specifications in the table (except dimensions) are in $\pm 10\%$ of tolerance at 25 °C ambient temperature

¹⁾ Coil temperature 120 °C

²⁾ Line to line

Dimensions TMR0



Torque Motors

HIWIN torque motors TMR

2.4.2 TMR1 specifications

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

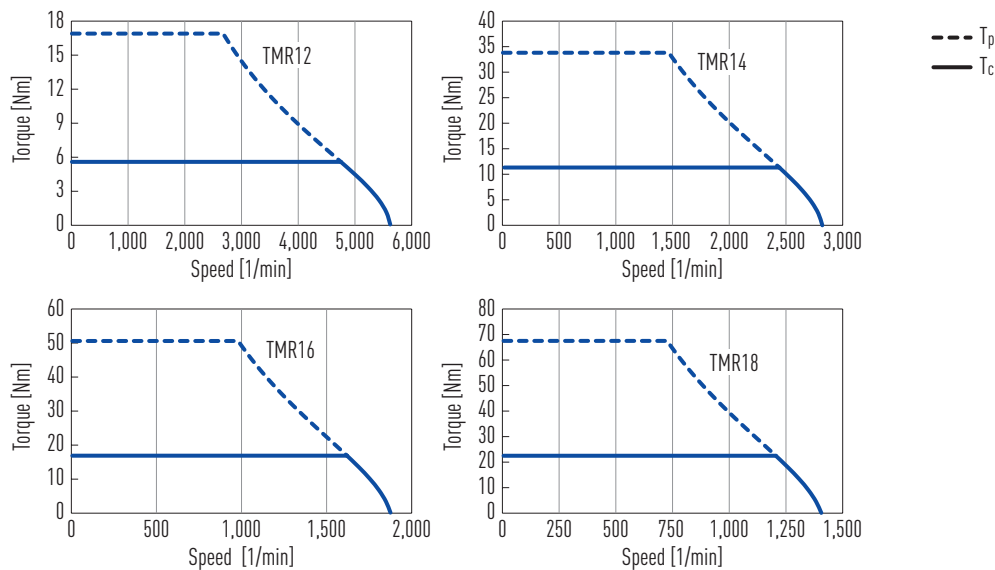


Table 2.2 Technical data for TMR1

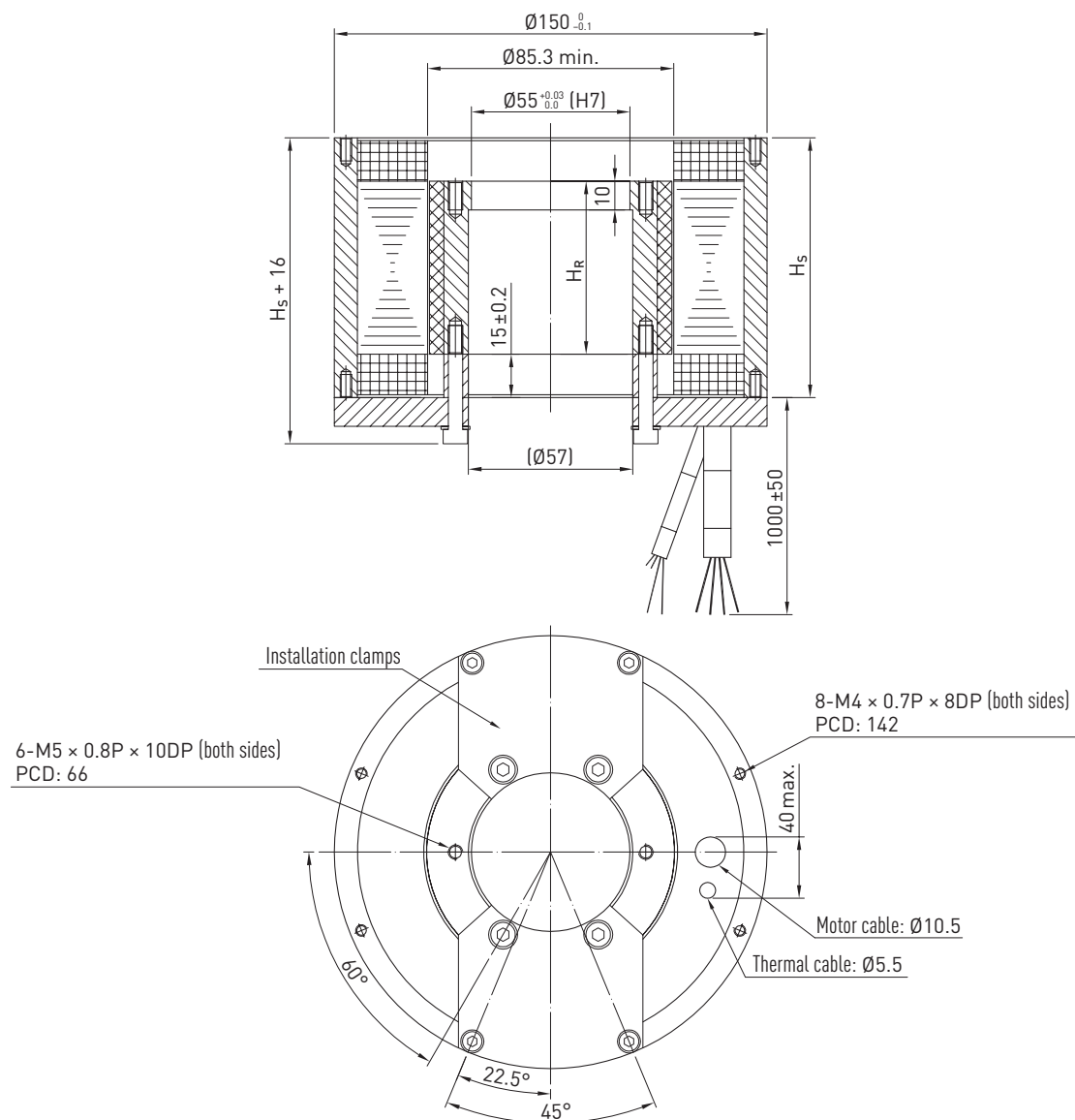
	Symbol	Unit	TMR12	TMR14	TMR16	TMR18
Torques and electrical parameters						
Peak torque (for 1 sec.)	T_p	Nm	16.9	33.8	50.6	67.5
Continuous torque ¹⁾	T_c	Nm	5.6	11.3	16.9	22.5
Stall torque	T_s	Nm	3.9	7.9	11.8	15.8
Peak current (for 1 sec.)	I_p	A	13.5	13.5	13.5	13.5
Continuous current ¹⁾	I_c	A	4.5	4.5	4.5	4.5
Stall current	I_s	A	3.2	3.2	3.2	3.2
Resistance ²⁾	R_{25}	Ω	2.6	3.9	5.2	6.5
Inductance ²⁾	L_{25}	mH	8.2	14	20	26
Motor constant	K_m	Nm/ \sqrt{W}	0.6	1.0	1.3	1.6
Electrical time constant	K_e	ms	3.2	3.6	3.8	4.0
Torque constant	K_t	Nm/A	1.25	2.50	3.75	5.0
Back emf constant	K_u	$V_{eff}/(\text{rad/s})$	0.6	1.2	1.8	2.4
Inertia of rotor	J	kgm ²	0.00045	0.00088	0.00132	0.00175
Thermal resistance	R_{th}	$^{\circ}\text{C/W}$	1.2	0.8	0.6	0.48
Thermal time constant	T_{th}	s	2,210	2,290	2,460	2,520
Max. DC Bus	U_{max}	VDC	600			
Mechanical parameters						
Number of poles	$2p$		22			
Thermal sensor			PTC SNM 120			
Stator height	H_s	mm	50	70	90	110
Rotor height	H_R	mm	20	40	60	80
Weight of motor	M_m	kg	3.1	4.8	6.6	8.3

All the specifications in the table (except dimensions) are in $\pm 10\%$ of tolerance at 25 $^{\circ}\text{C}$ ambient temperature

¹⁾ Coil temperature 120 $^{\circ}\text{C}$

²⁾ Line-to-line

Dimensions TMR1



Torque Motors

HIWIN torque motors TMR

2.4.3 TMR3 specifications

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

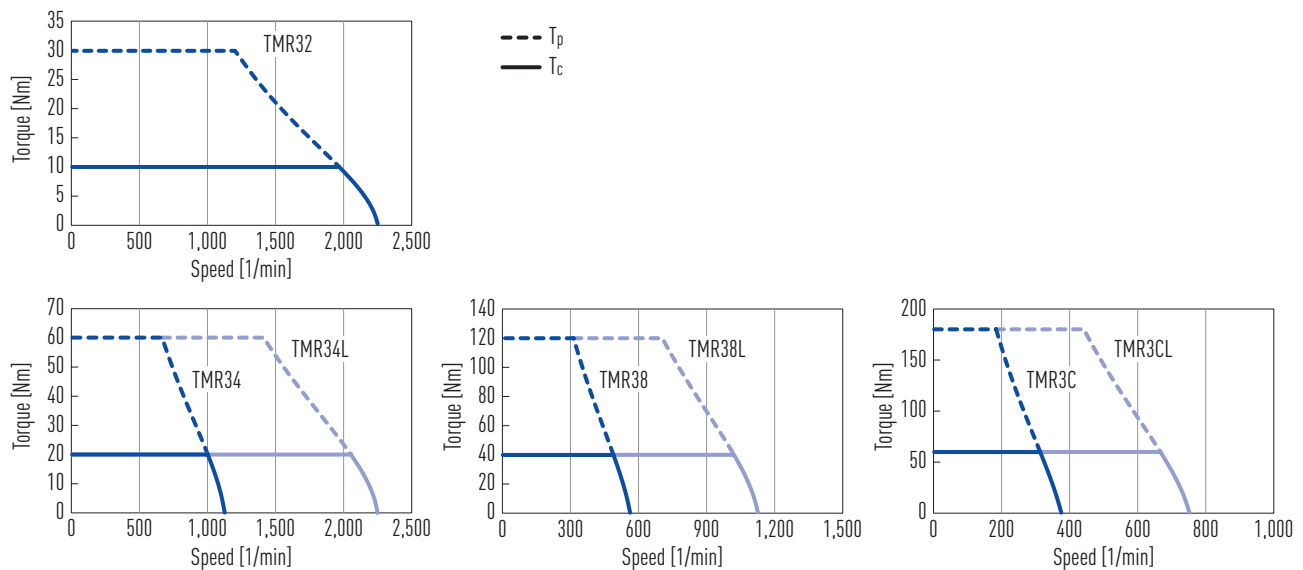


Table 2.3 Technical data for TMR3

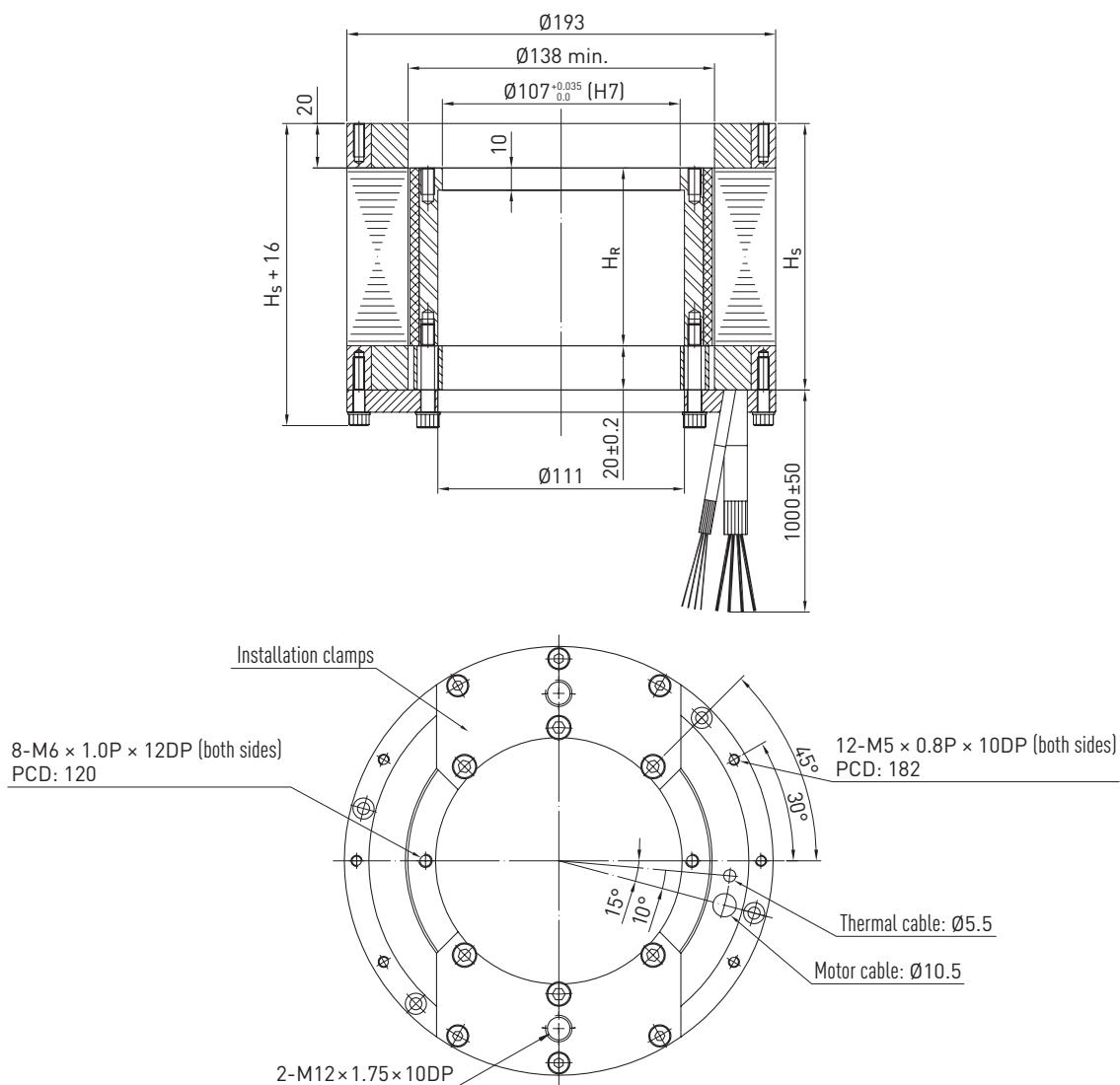
	Symbol	Unit	TMR32	TMR34	TMR34L	TMR38	TMR38L	TMR3C	TMR3CL
Torques and electrical parameters									
Peak torque (for 1 sec.)	T_p	Nm	30	60		120		180	
Continuous torque ¹⁾	T_c	Nm	10	20		40		60	
Stall torque	T_s	Nm	7	14		28		42	
Peak current (for 1 sec.)	I_p	A	10.2	10.2	20.4	10.2	20.4	10.2	20.4
Continuous current ¹⁾	I_c	A	3.4	3.4	6.8	3.4	6.8	3.4	6.8
Stall current	I_s	A	2.4	2.4	4.8	2.4	4.8	2.4	4.8
Resistance ²⁾	R_{25}	Ω	5.0	7.5	1.9	12.0	3.0	17.1	4.3
Inductance ²⁾	L_{25}	mH	20.6	34.6	8.7	53.6	16.3	84.4	25.3
Motor constant	K_m	Nm/ \sqrt{W}	1.1	1.8	1.8	2.8	2.8	3.6	3.5
Electrical time constant	K_e	ms	4.1	4.6	4.6	4.5	5.4	4.9	5.9
Torque constant	K_t	Nm/A	3	6	3	12	6	18	9
Back emf constant	K_u	$V_{eff}/(rad/s)$	1.5	3	1.5	6	3	9	4.5
Inertia of rotor	J	kgm ²	0.002	0.005		0.009		0.014	
Thermal resistance	R_{th}	$^{\circ}C/W$	1.1	0.73		0.46		0.32	
Thermal time constant	T_{th}	s	1,980	2,020		2,130		2,170	
Max. DC Bus	U_{max}	VDC	600						
Mechanical parameters									
Number of poles	2p		22						
Thermal sensor			PTC SNM 120						
Stator height	H_s	mm	60	80		120		160	
Rotor height	H_R	mm	20	40		80		120	
Weight of motor	M_m	kg	5.7	8.2		13.2		18.1	

All the specifications in the table (except dimensions) are in $\pm 10\%$ of tolerance at 25 $^{\circ}C$ ambient temperature

¹⁾ Coil temperature 120 $^{\circ}C$

²⁾ Line-to-line

Dimensions TMR3



Torque Motors

HIWIN torque motors TMR

2.4.4 TMR7 specifications

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

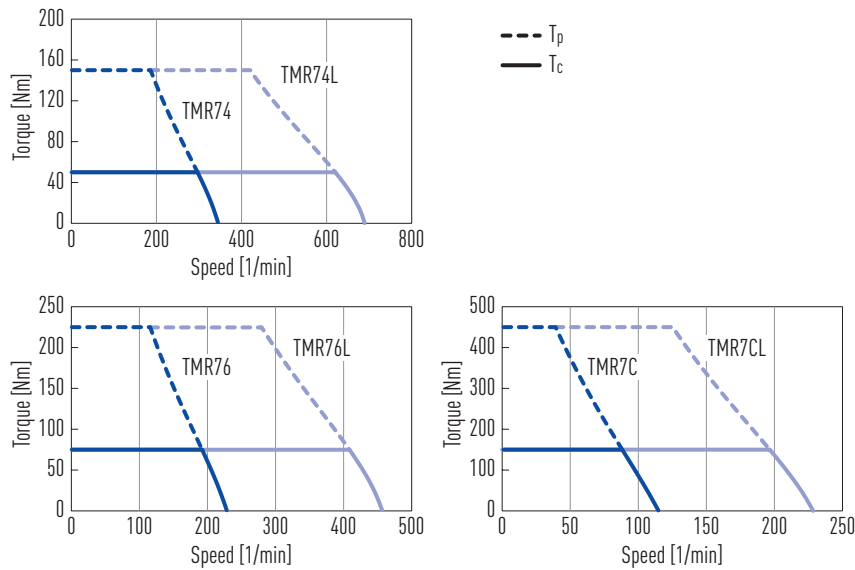


Table 2.4 Technical data for TMR7

	Symbol	Unit	TMR74	TMR74L	TMR76	TMR76L	TMR7C	TMR7CL
Torques and electrical parameters								
Peak torque (for 1 sec.)	T_p	Nm	150		225		450	
Continuous torque ¹⁾	T_c	Nm	50		75		150	
Stall torque	T_s	Nm	35		52.5		105	
Peak current (for 1 sec.)	I_p	A	10.2	20.4	10.2	20.4	10.2	20.4
Continuous current ¹⁾	I_c	A	3.4	6.8	3.4	6.8	3.4	6.8
Stall current	I_s	A	2.4	4.8	2.4	4.8	2.4	4.8
Resistance ²⁾	R_{25}	Ω	12.9	3.2	17	4.3	29	7.3
Inductance ²⁾	L_{25}	mH	55	13.8	76	19	145	36.3
Motor constant	K_m	Nm/ \sqrt{W}	3.9	3.9	5.1	5	7.7	7.7
Electrical time constant	K_e	ms	4.3	4.3	4.5	4.4	5	5
Torque constant	K_t	Nm/A	17	8.5	25.6	12.8	51.1	25.5
Back emf constant	K_u	$V_{eff}/(\text{rad/s})$	9.8	4.9	14.8	7.4	29.5	14.8
Inertia of rotor	J	kgm ²	0.044		0.061		0.11	
Thermal resistance	R_{th}	$^{\circ}\text{C/W}$	0.42		0.32		0.19	
Thermal time constant	T_{th}	s	2,230		2,330		2,350	
Max. DC Bus	U_{max}	VDC	600					
Mechanical parameters								
Number of poles	2p		44					
Thermal sensor			PTC SNM 120					
Stator height	H_s	mm	80		100		160	
Rotor height	H_R	mm	40		60		120	
Weight of motor	M_m	kg	15.9		20.4		33.7	

All the specifications in the table (except dimensions) are in $\pm 10\%$ of tolerance at 25 $^{\circ}\text{C}$ ambient temperature

¹⁾ Coil temperature 120 $^{\circ}\text{C}$

²⁾ Line-to-line

Dimensions TMR7

