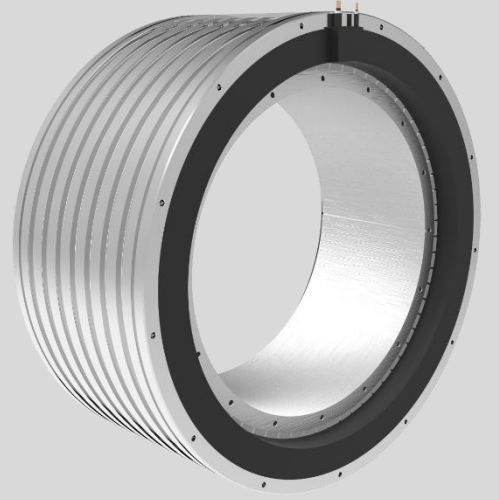


WTRM Series Frameless Torque Motors

224-414 OD Frame Size

www.mdsmotor.com



MDS Motor
Feel the perfect motion...

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Vatan Cad. No:83 |41275 |
Başiskele, Kocaeli, Türkiye

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WTRM Series Torque Motors

MDS has several new water/liquid cooled torque motor series for direct drive applications.

WTRM series torque motor series are engineered to deliver the highest performance direct drive torque motors. Choice of insulation allows operation from 24V up to 560V peak line input voltage. Detailed motor datasheets and variety of motor options and configurations provide the best selection for your needs.

Water/liquid cooling is used to channel the generated heat away from the system. The rated torque can nearly be doubled compared to natural-cooled motor.

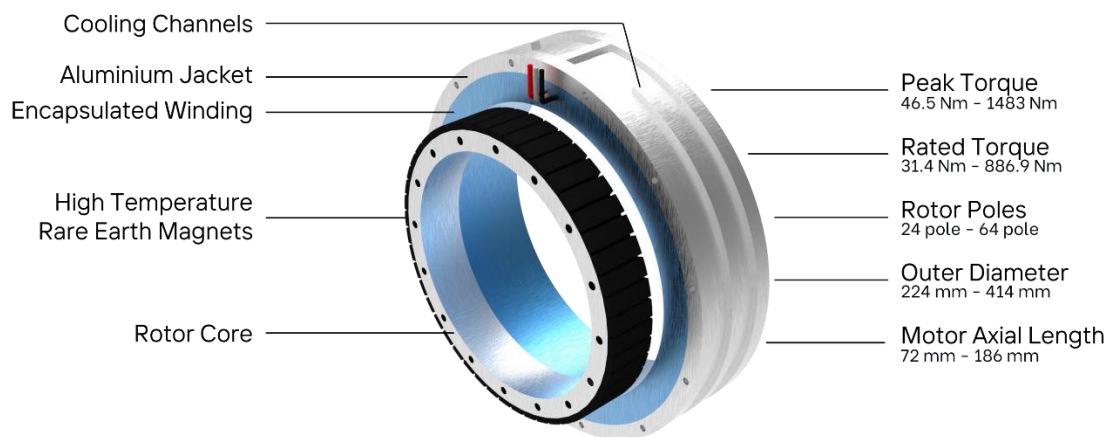
For customized motor selections or new custom motor specifications, contact MDS Motor to help us understand exactly what you need and how we can further optimize any MDS torque motor series. MDS Motor is expert in providing optimized custom solutions for your applications with utilizing different materials, special winding structures, tailored mounting features, height and diameter adjustments and etc.

WTRM series water/liquid cooled torque motor product family includes both low voltage (24/48V) and high voltage (310/560V) torque motors.

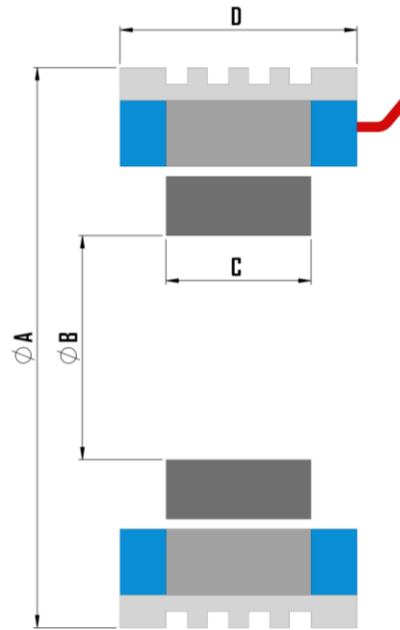
Main Features and Benefits

- 27 Standard motor sizes
- Very high torque-per-weight ratios
- Low thermal resistance
- Thermistor or RTD's against thermal overload
- Excellent dynamic performance
- Very low torque ripple
- Extremely low cogging
- Optimal speed control
- Minimized size and weight
- Direct system integration
- Reduced cost
- Wide product range
- Lowest possible rotor inertia
- Excellent rotor integrity
- Excellent product repeatability

Description of WTRM Frameless Torque Motor Series



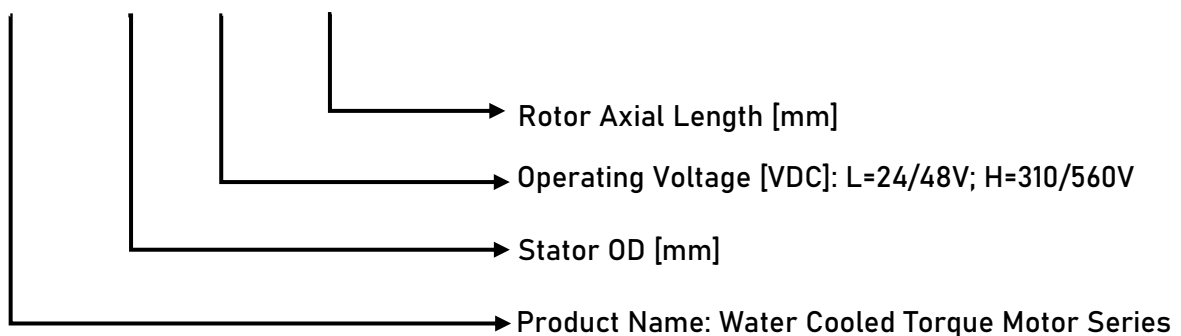
Size Range and Nomenclature



Motor Series	A	B	Small Stack		Medium Stack		Large Stack	
	mm	mm	C	D	C	D	C	D
	Outer Dia.	Inner Dia.	mm	mm	mm	mm	mm	mm
			Rotor Length	Motor Length	Rotor Length	Motor Length	Rotor Length	Motor Length
WTRM-200	224	120	30.1	72	60.2	102	120.4	162
WTRM-230	254	148	30.1	74	60.2	104	120.4	164
WTRM-240	264	158	35.1	77	70.2	112	140.4	182
WTRM-260	284	178	35.1	78	70.2	113	140.4	183
WTRM-290	314	200	35.1	80	70.2	115	140.4	185
WTRM-310	334	220	35.1	80	70.2	115	140.4	185
WTRM-330	354	240	35.1	80	70.2	115	140.4	185
WTRM-360	384	270	35.1	81	70.2	116	140.4	186
WTRM-390	414	290	35.1	81	70.2	116	140.4	186

Note: Depending on the application needs of the customers, minor changes can be made on base dimensions.

WTRM-200-(L/H)-030



Definition of Motor Parameters

Rated Torque	T_r	Torque value at rated speed when continuous power is the output
Peak Torque	T_p	Maximum torque that the motor delivers when maximum current (I_p) is provided. Peak torque is available for a maximum of 2 seconds
Rated Speed	N_r	Speed at continuous power is the output
No-Load Speed	$N_{no-load}$	Maximum possible speed of motor that it can be electrically excited
Torque Constant	K_t	Ratio of the developed torque to input current
Voltage Constant	K_v	Ratio of voltage generated in the winding to rotor speed
Max. Cogging Torque	T_{cog}	Undesirable torque component arising from attractions between magnets and teeth. Cogging torque is minimized for each MDS's torque motor is less than 0.5 % of the rated torque
Torque Ripple	T_{ripple}	Undesirable torque component arising from attractions between stator MMF and magnets
Num. of Pole	$2p$	Number of poles
Rated Current	I_r	Current required to obtain the rated continuous torque
Peak Current	I_p	Current required to obtain peak torque from the motor
Line Resistance	R_{LL}	Cold (25°C) resistance measured between two leads of the winding
Line Inductance	L_{LL}	Inductance measured between two leads of the AC winding (@60Hz)
Stator Weight	W_s	Total weight of stator laminations including windings
Rotor Weight	W_r	Total weight of rotor laminations and magnets
Total Weight	W_{total}	Total weight of stator and rotor weight
Mech. Time Constant	K_{mech}	Motor mechanical dynamic capability level
Thermal Resistance	R_{th}	Ratio of winding temperature rise to average stator power loss at rated motor operation
Inertia	J	Inertia of the rotor including rotor core and magnets
Motor Constant	K_m	Ratio of peak torque to square root of input power: $K_m = T_{peak}/(P_{peak})^{.5}$. It shows the ability of a motor to convert electrical power to torque
Rotor ID		Rotor inner diameter of the motor
Stator OD		Stator outer diameter of the motor

NOTE: All performance data is obtained at 25°C ambient

Motor Parameters		Symbols	Units	WTRM-200-L-030		WTRM-200-L-060		WTRM-200-L-120	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	31.3		62.9		97.3	
	Peak Torque	T_{peak}	Nm	46.5		93.2		129.1	
	Rated Speed	N_r	rpm	85	235	45	140	30	95
	No-Load Speed	$N_{no-load}$	rpm	165	345	105	215	70	140
	Torque Constant	K_t	Nm/A	1.57		2.48		3.97	
	Voltage Constant	K_v	V/rpm	0.135		0.213		0.341	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			24			
ELECTRICAL	Rated Current	I_r	A_{rms}	20		25.4		24.5	
	Peak Current	I_{peak}	A_{rms}	30		38.1		32.7	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.42 ($\pm 20\%$)		0.42 ($\pm 20\%$)		0.41 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	2.30 ($\pm 30\%$)		2.4 ($\pm 30\%$)		3.44 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	6.12		10.64		19.75	
	Mech. Time Constant	K_{mech}	ms	1.62		1.2		0.96	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.120		0.064		0.035	
	Inertia	J	$kg.m^2$	0.0075		0.0151		0.0303	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.3		2.3		2.3	
	Min. Water Volumetric Flow Rate	q_w	l/min	2.6		2.6		2.6	
	Pressure Drop for q_w	ΔP_w	bar	0.0218		0.0218		0.0218	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			120			

Motor Parameters		Symbols	Units	WTRM-200-H-030		WTRM-200-H-060		WTRM-200-H-120	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	38.1		78.2		155.3	
	Peak Torque	T_{peak}	Nm	66.2		135.5		270	
	Rated Speed	N_r	rpm	225	470	185	390	165	335
	No-Load Speed	$N_{no-load}$	rpm	360	670	310	570	250	460
	Torque Constant	K_t	Nm/A	9.53		11.17		13.80	
	Voltage Constant	K_v	V/rpm	0.823		0.965		1.192	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			24			
ELECTRICAL	Rated Current	I_r	A_{rms}	4		7		11.25	
	Peak Current	I_{peak}	A_{rms}	7.2		12.6		20.25	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	16.2 ($\pm 20\%$)		10.1 ($\pm 20\%$)		5.14 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	88.6 ($\pm 30\%$)		60.4 ($\pm 30\%$)		40.6 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	6.12		10.64		19.75	
	Mech. Time Constant	K_{mech}	ms	1.63		1.48		0.99	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.120		0.064		0.035	
	Inertia	J	$kg.m^2$	0.0075		0.0151		0.0303	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	3.4		4.7		2.3	
	Min. Water Volumetric Flow Rate	q_w	l/min	2.6		3.6		2.6	
	Pressure Drop for q_w	ΔP_w	bar	0.0218		0.0211		0.0218	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			120			

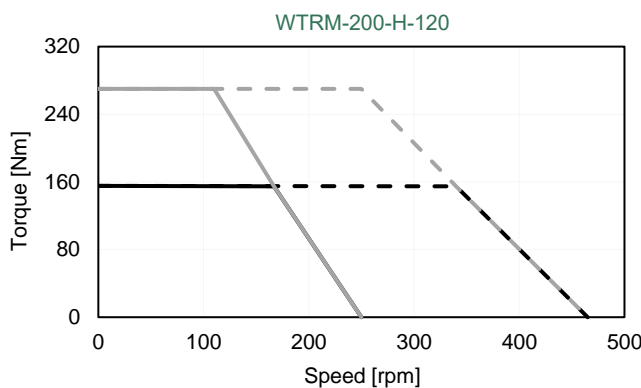
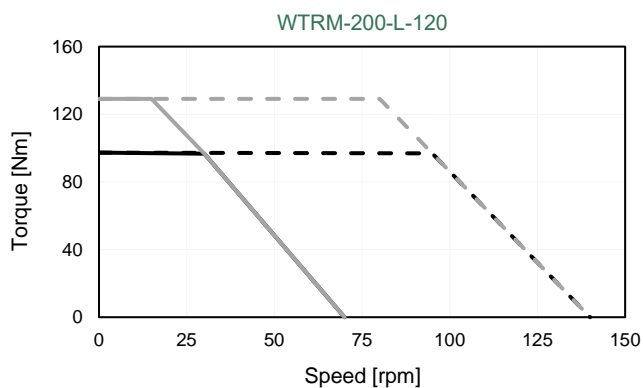
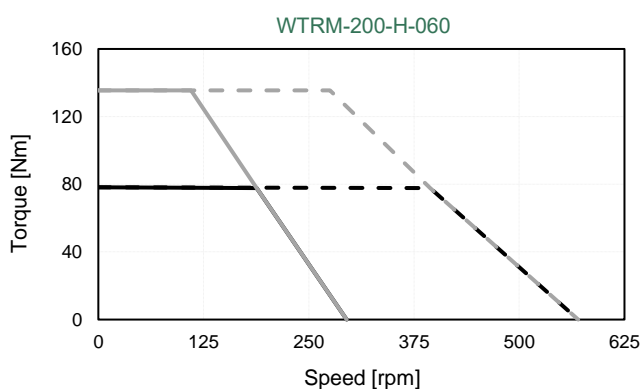
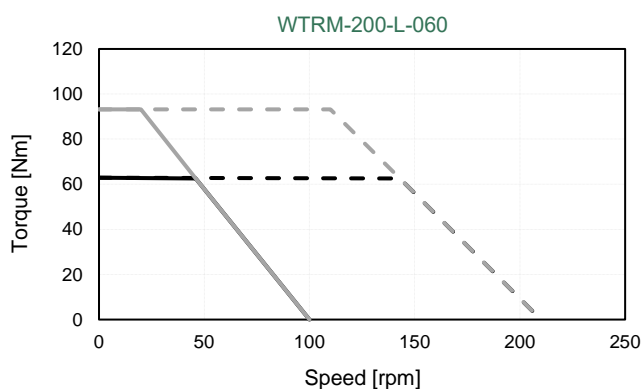
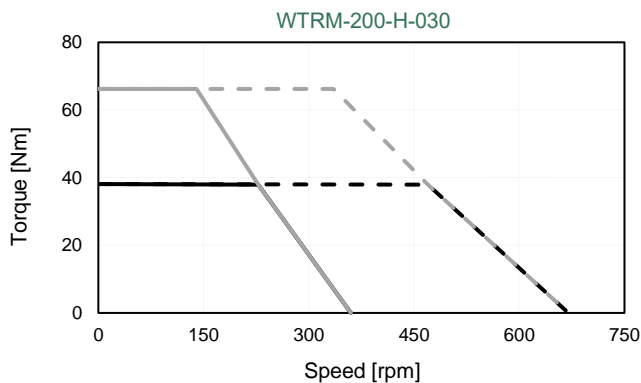
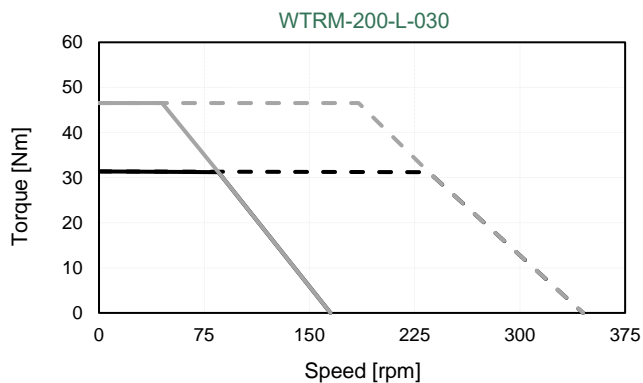
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

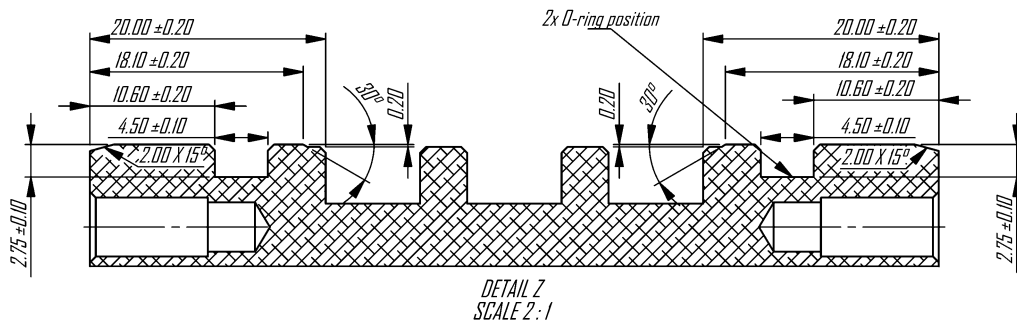
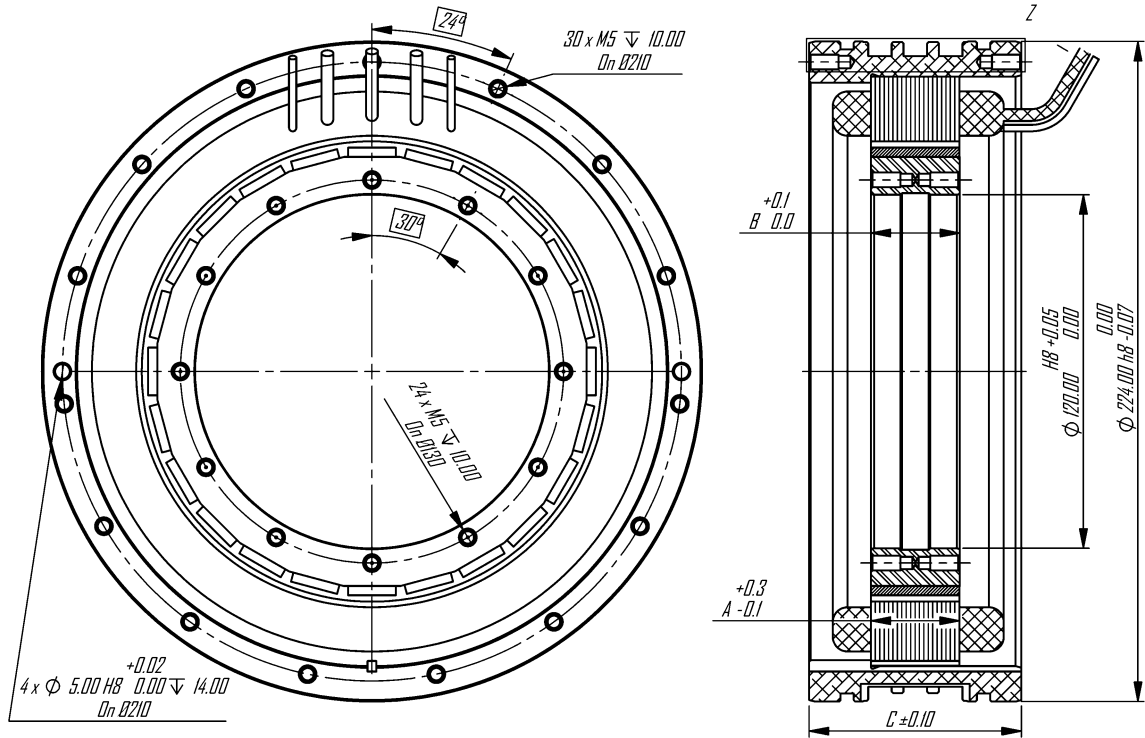
WTRM-200-(L/H)-Torque-Speed Curves

Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V





Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-200-030	30	30.1	72
WTRM-(L/H)-200-060	60	60.2	102
WTRM-(L/H)-200-120	120	120.4	162

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-200-L: #10 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
 WTRM-200-H: #14 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-230-L-030		WTRM-230-L-060		WTRM-230-L-120	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	45.8		92.5		138.6	
	Peak Torque	T_{peak}	Nm	67.5		136		183.9	
	Rated Speed	N_r	rpm	80	215	45	135	30	90
	No-Load Speed	$N_{no-load}$	rpm	155	315	95	200	60	125
	Torque Constant	K_t	Nm/A	1.7		2.61		4.2	
	Voltage Constant	K_v	V/rpm	0.146		0.225		0.36	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
ELECTRICAL	Number of Pole	$2p$	--			32			
	Rated Current	I_r	A_{rms}	27		35.4		33	
	Peak Current	I_{peak}	A_{rms}	40.5		53.1		44	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.32 ($\pm 20\%$)		0.26 ($\pm 20\%$)		0.28 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	1.64 ($\pm 30\%$)		1.79 ($\pm 30\%$)		2.15 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	7.22		12.74		23.61	
	Mech. Time Constant	K_{mech}	ms	1.70		1.23		1.03	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.100		0.054		0.029	
	Inertia	J	$kg.m^2$	0.0130		0.0262		0.0526	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.3		2.5		1.5	
	Min. Water Volumetric Flow Rate	q_w	l/min	3.3		4.6		7.0	
	Pressure Drop for q_w	ΔP_w	bar	0.0286		0.0362		0.0466	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
Rotor ID	R_{ID}	mm			148				

Motor Parameters		Symbols	Units	WTRM-230-H-030		WTRM-230-H-060		WTRM-230-H-120	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	56.6		114.1		225.1	
	Peak Torque	T_{peak}	Nm	95.8		192.8		384.7	
	Rated Speed	N_r	rpm	215	440	200	400	155	315
	No-Load Speed	$N_{no-load}$	rpm	350	640	305	560	240	440
	Torque Constant	K_t	Nm/A	9.84		11.41		14.52	
	Voltage Constant	K_v	V/rpm	0.855		0.99		1.26	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
ELECTRICAL	Number of Pole	$2p$	--			32			
	Rated Current	I_r	A_{rms}	5.8		10		15.5	
	Peak Current	I_{peak}	A_{rms}	10.4		18		27.9	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	10.48 ($\pm 20\%$)		5.26 ($\pm 20\%$)		3.62 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	56.5 ($\pm 30\%$)		34.9 ($\pm 30\%$)		26.9 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	7.22		12.74		23.61	
	Mech. Time Constant	K_{mech}	ms	1.70		1.28		1.09	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.100		0.054		0.029	
	Inertia	J	$kg.m^2$	0.0130		0.0262		0.0526	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	3.6		4.0		4.4	
	Min. Water Volumetric Flow Rate	q_w	l/min	3.3		4.6		7.0	
	Pressure Drop for q_w	ΔP_w	bar	0.0286		0.0362		0.0466	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
Rotor ID	R_{ID}	mm			148				

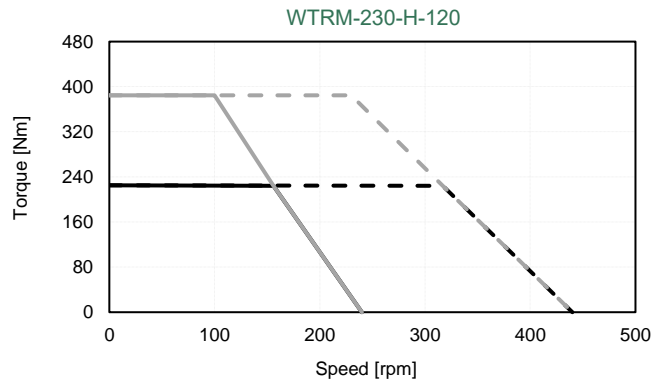
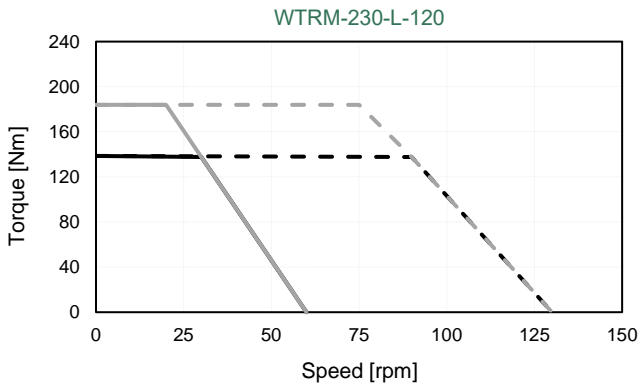
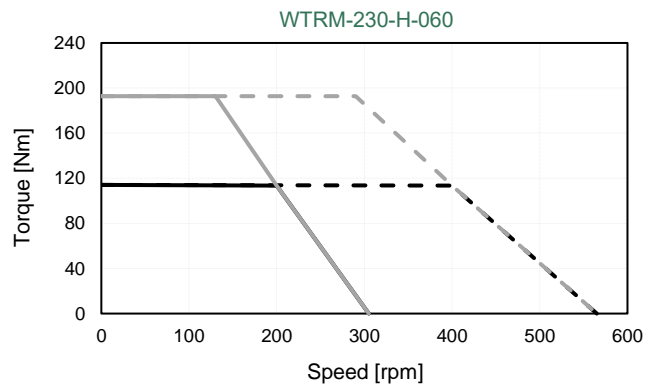
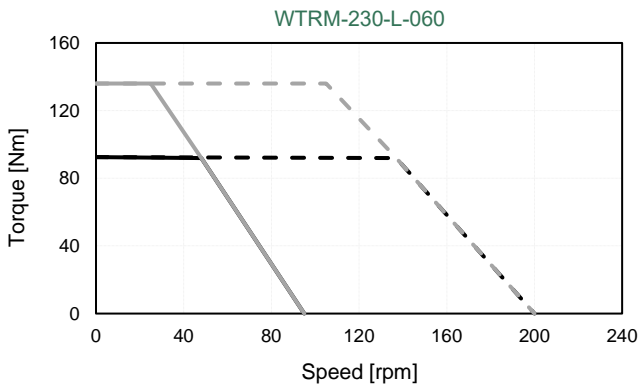
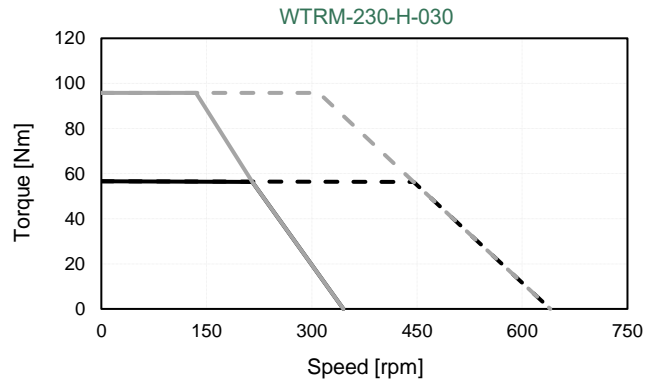
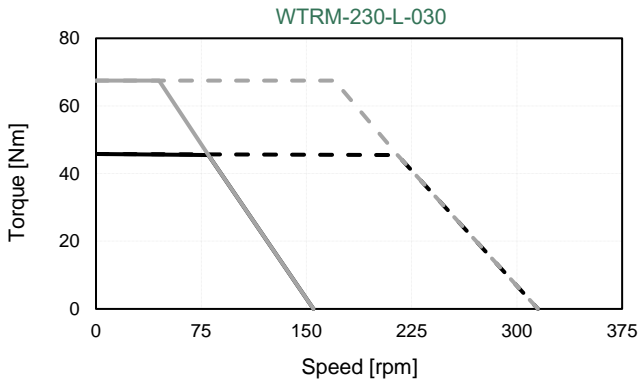
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

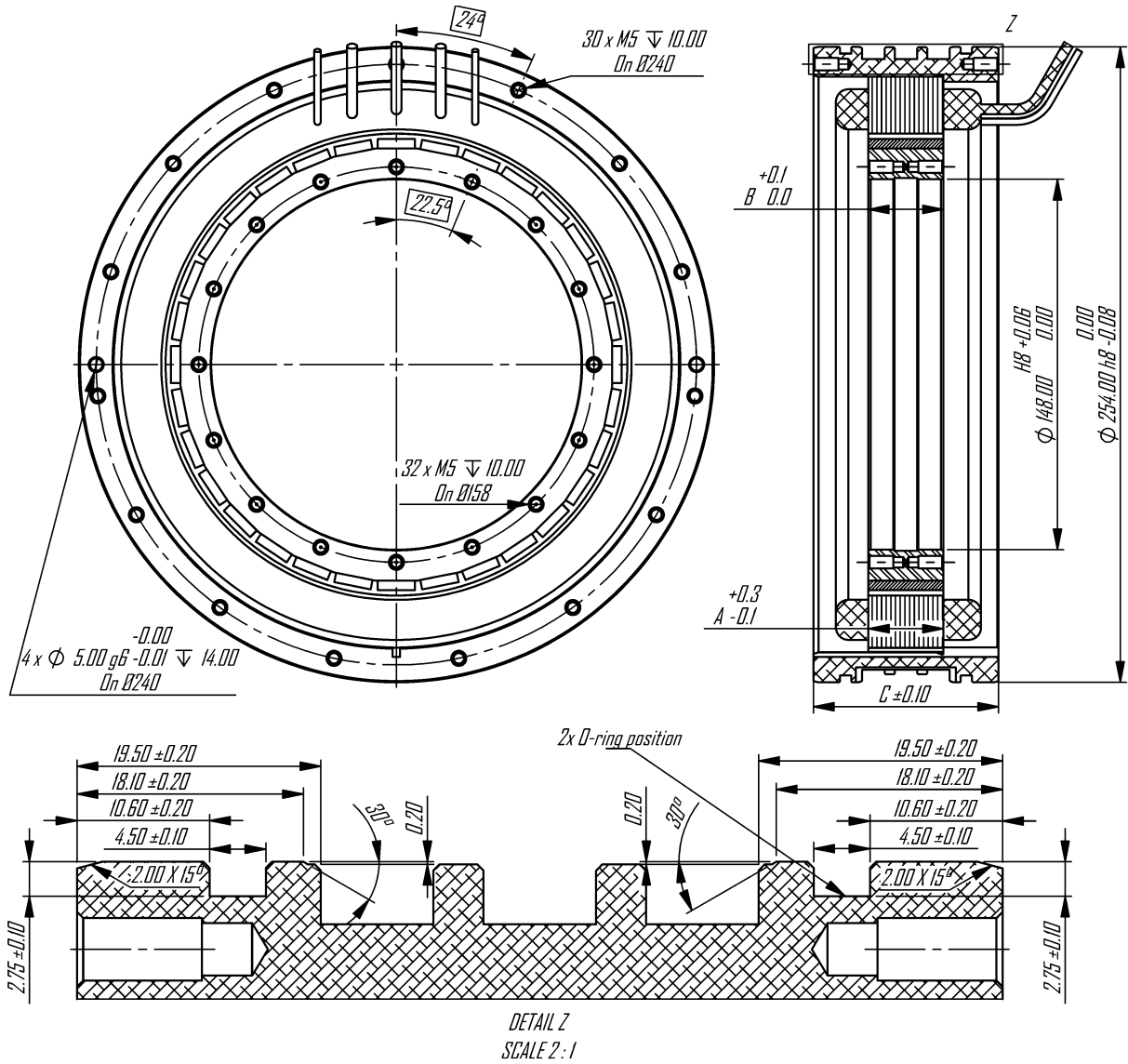
WTRM-230-(L/H)-Torque-Speed Curves

Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V





Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-230-030	30	30.1	74
WTRM-(L/H)-230-060	60	60.2	104
WTRM-(L/H)-230-120	120	120.4	164

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-230-L: #9 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
 WTRM-230-H: #12 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-240-L-034		WTRM-240-L-070		WTRM-240-L-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	54.3		112.1		165.2	
	Peak Torque	T_{peak}	Nm	79.8		164.4		218.6	
	Rated Speed	N_r	rpm	90	225	45	130	30	90
	No-Load Speed	$N_{no-load}$	rpm	155	315	90	185	60	125
	Torque Constant	K_t	Nm/A	1.7		2.77		4.35	
	Voltage Constant	K_v	V/rpm	0.147		0.241		0.373	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			32			
ELECTRICAL	Rated Current	I_r	A_{rms}	32		40.4		38	
	Peak Current	I_{peak}	A_{rms}	48		60.6		50.7	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.22 ($\pm 20\%$)		0.22 ($\pm 20\%$)		0.23 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	1.31 ($\pm 30\%$)		1.63 ($\pm 30\%$)		1.91 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	8.41		14.93		28.06	
	Mech. Time Constant	K_{mech}	ms	1.68		1.26		1.09	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.086		0.046		0.025	
	Inertia	J	$kg.m^2$	0.0182		0.0365		0.0732	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.3		2.6		1.5	
	Min. Water Volumetric Flow Rate	q_w	l/min	3.4		4.8		7.8	
	Pressure Drop for q_w	ΔP_w	bar	0.0309		0.0313		0.0576	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			158			

Motor Parameters		Symbols	Units	WTRM-240-H-035		WTRM-240-H-070		WTRM-240-H-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	68.1		138.4		274.1	
	Peak Torque	T_{peak}	Nm	115.5		233.7		463.7	
	Rated Speed	N_r	rpm	220	440	205	405	140	285
	No-Load Speed	$N_{no-load}$	rpm	340	630	310	560	215	395
	Torque Constant	K_t	Nm/A	10.09		11.3		15.89	
	Voltage Constant	K_v	V/rpm	0.88		0.987		1.387	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			32			
ELECTRICAL	Rated Current	I_r	A_{rms}	6.8		12.3		17.3	
	Peak Current	I_{peak}	A_{rms}	12.2		22.1		31.1	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	7.88 ($\pm 20\%$)		3.76 ($\pm 20\%$)		3.27 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	47.2 ($\pm 30\%$)		27.7 ($\pm 30\%$)		26.3 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	8.41		14.93		28.06	
	Mech. Time Constant	K_{mech}	ms	1.69		1.29		1.14	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.086		0.046		0.025	
	Inertia	J	$kg.m^2$	0.0182		0.0365		0.0732	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	3.7		4.1		4.4	
	Min. Water Volumetric Flow Rate	q_w	l/min	3.4		4.8		7.8	
	Pressure Drop for q_w	ΔP_w	bar	0.0309		0.0313		0.0576	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			158			

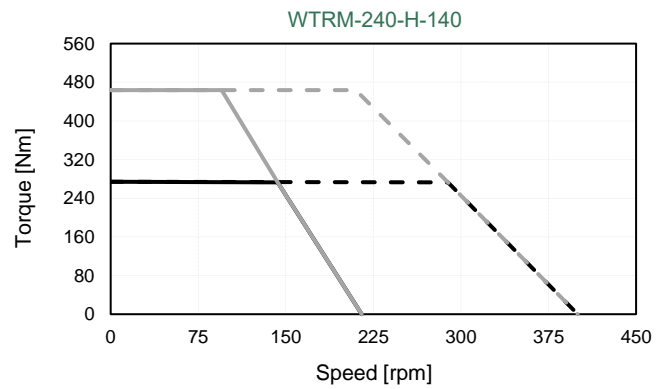
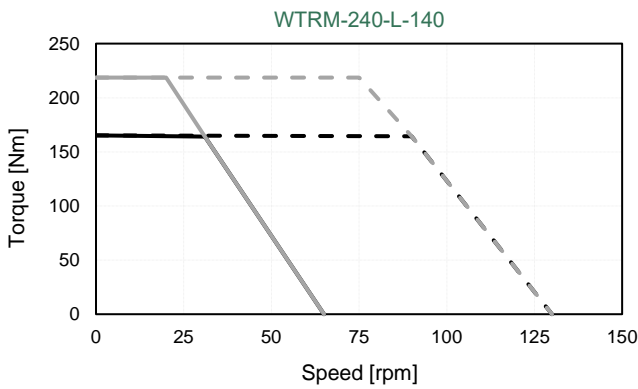
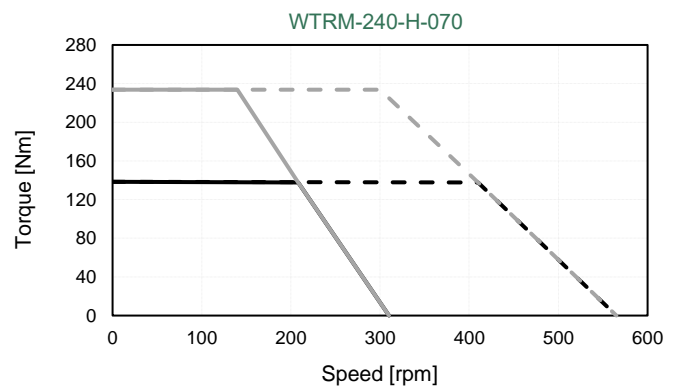
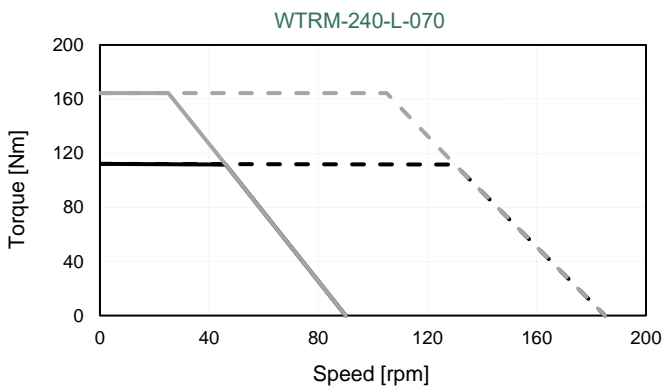
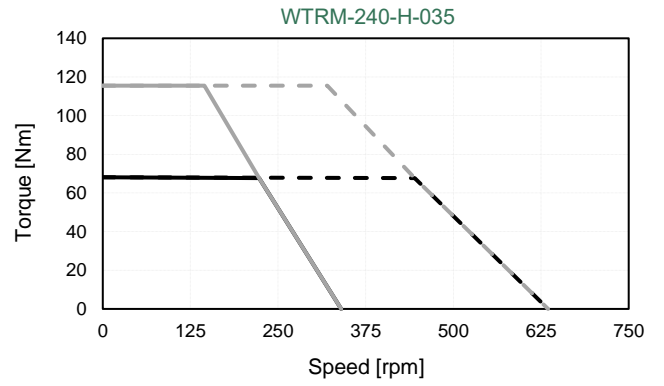
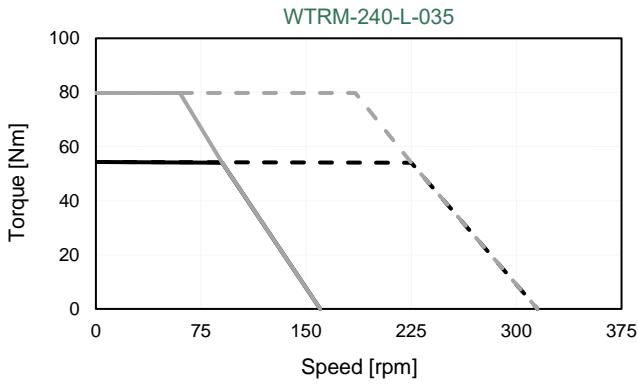
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

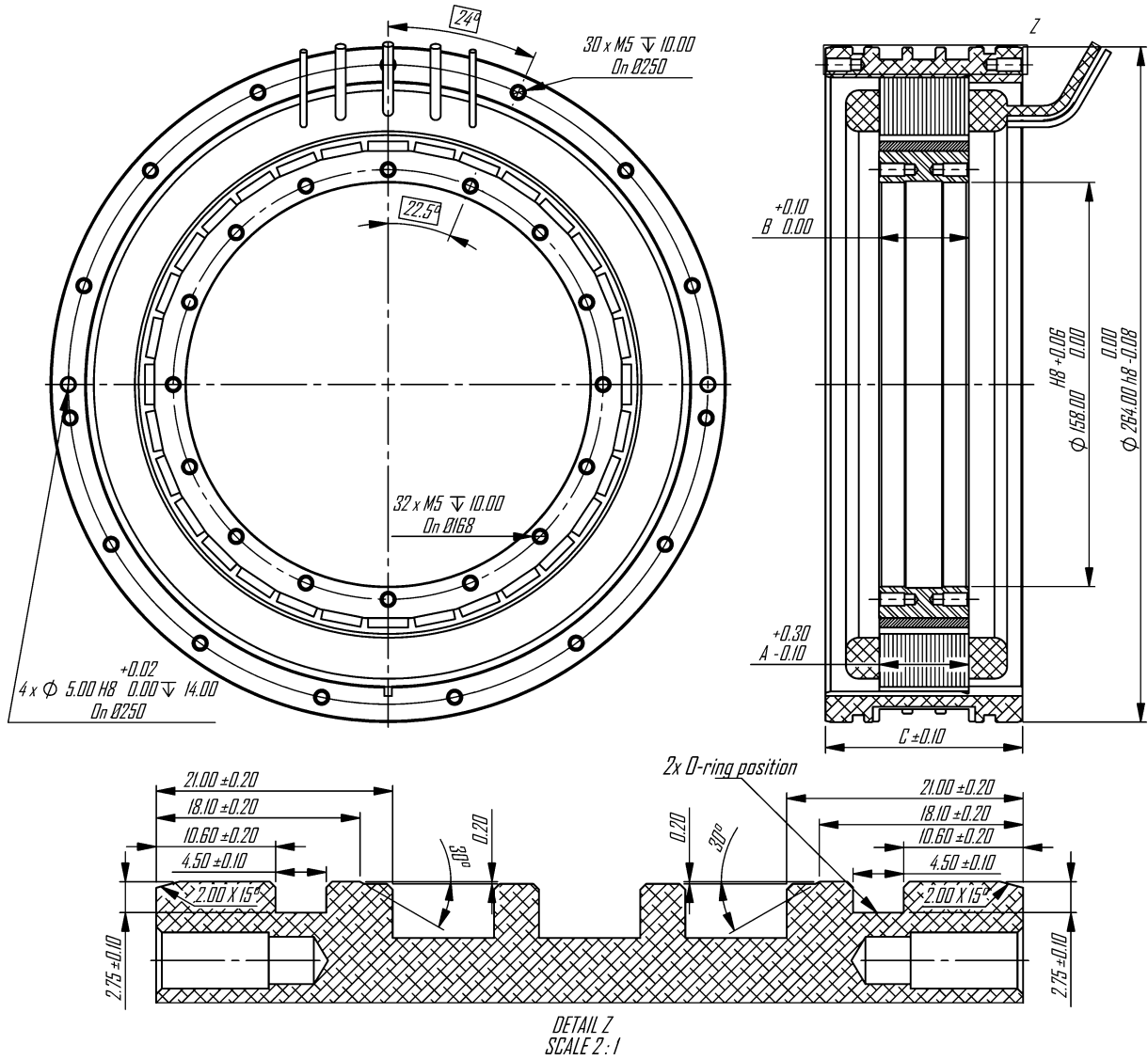
WTRM-240-(L/H)-Torque-Speed Curves

Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V





Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-240-035	35	35.1	77
WTRM-(L/H)-240-070	70	70.2	112
WTRM-(L/H)-240-140	140	140.4	182

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-240-L: #8 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
 WTRM-240-H: #12 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-260-L-034		WTRM-260-L-070		WTRM-260-L-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	69.1		135.7		201.5	
	Peak Torque	T_{peak}	Nm	101.6		199.5		266.9	
	Rated Speed	N_r	rpm	75	200	40	125	35	95
	No-Load Speed	$N_{no-load}$	rpm	145	300	95	190	65	130
	Torque Constant	K_t	Nm/A	1.82		2.83		4.07	
	Voltage Constant	K_v	V/rpm	0.156		0.243		0.348	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
ELECTRICAL	Number of Pole	$2p$	--			40			
	Rated Current	I_r	A_{rms}	38		48		49.5	
	Peak Current	I_{peak}	A_{rms}	57		72		66	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.21 ($\pm 20\%$)		0.19 ($\pm 20\%$)		0.17 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	1.04 ($\pm 30\%$)		1.18 ($\pm 30\%$)		1.15 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	9.35		16.56		30.51	
	Mech. Time Constant	K_{mech}	ms	1.88		1.47		1.23	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.079		0.042		0.022	
	Inertia	J	$kg.m^2$	0.0247		0.0498		0.1000	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.3		2.6		1.6	
	Min. Water Volumetric Flow Rate	q_w	l/min	4.4		5.9		9.0	
	Pressure Drop for q_w	ΔP_w	bar	0.1378		0.1560		0.0727	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
Rotor ID	R_{ID}	mm			178				

Motor Parameters		Symbols	Units	WTRM-260-H-035		WTRM-260-H-070		WTRM-260-H-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	83.9		166.9		335.3	
	Peak Torque	T_{peak}	Nm	142.5		282.8		567.8	
	Rated Speed	N_r	rpm	195	400	175	350	125	255
	No-Load Speed	$N_{no-load}$	rpm	320	590	270	495	195	360
	Torque Constant	K_t	Nm/A	10.83		12.84		17.65	
	Voltage Constant	K_v	V/rpm	0.938		1.112		1.529	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
ELECTRICAL	Number of Pole	$2p$	--			40			
	Rated Current	I_r	A_{rms}	7.8		13		19	
	Peak Current	I_{peak}	A_{rms}	14		23.4		34.2	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	7.72 ($\pm 20\%$)		4.1 ($\pm 20\%$)		3.16 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	37.5 ($\pm 30\%$)		24.5 ($\pm 30\%$)		22.3 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	9.35		16.56		30.51	
	Mech. Time Constant	K_{mech}	ms	1.97		1.50		1.23	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.079		0.042		0.022	
	Inertia	J	$kg.m^2$	0.0247		0.0498		0.1000	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	3.7		4.1		4.4	
	Min. Water Volumetric Flow Rate	q_w	l/min	4.4		5.9		9.0	
	Pressure Drop for q_w	ΔP_w	bar	0.1378		0.1560		0.0727	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
Rotor ID	R_{ID}	mm			178				

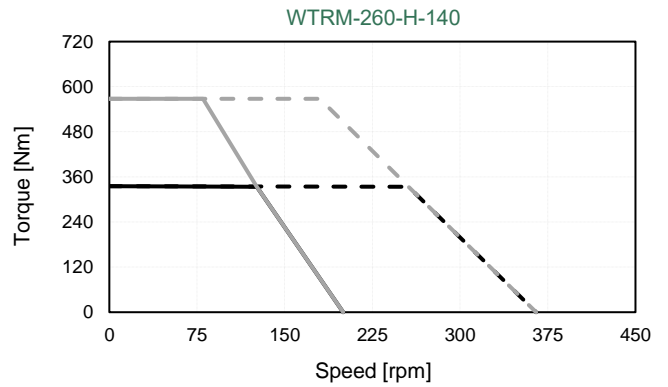
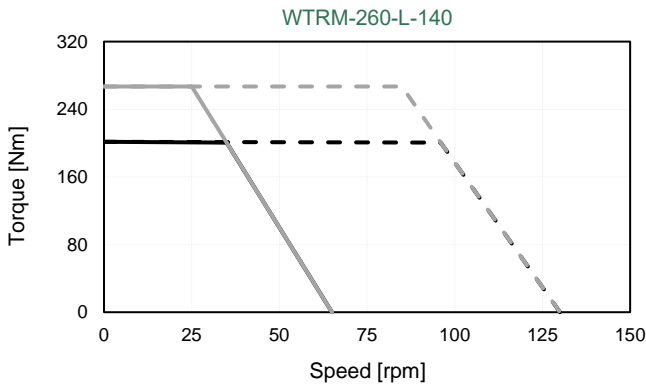
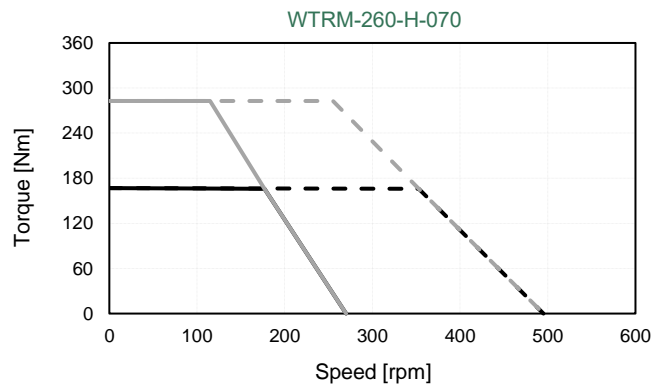
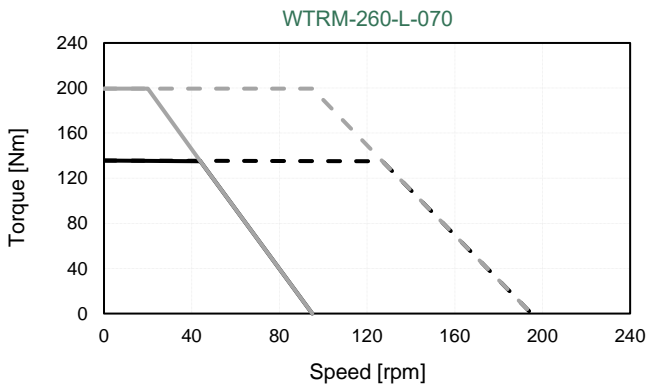
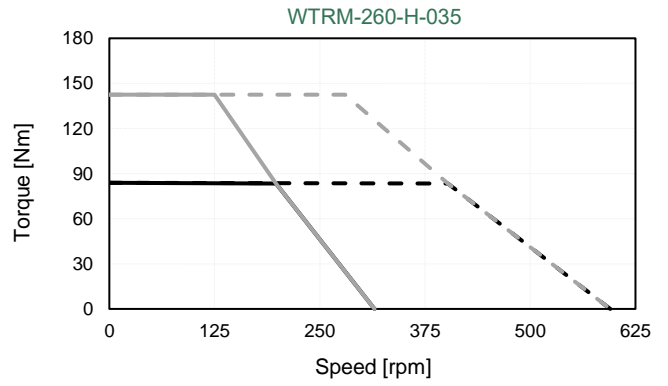
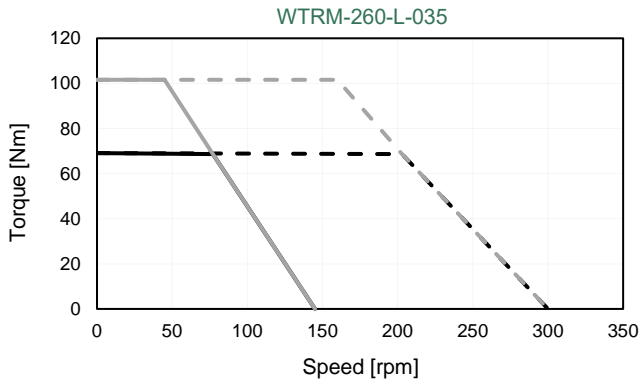
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

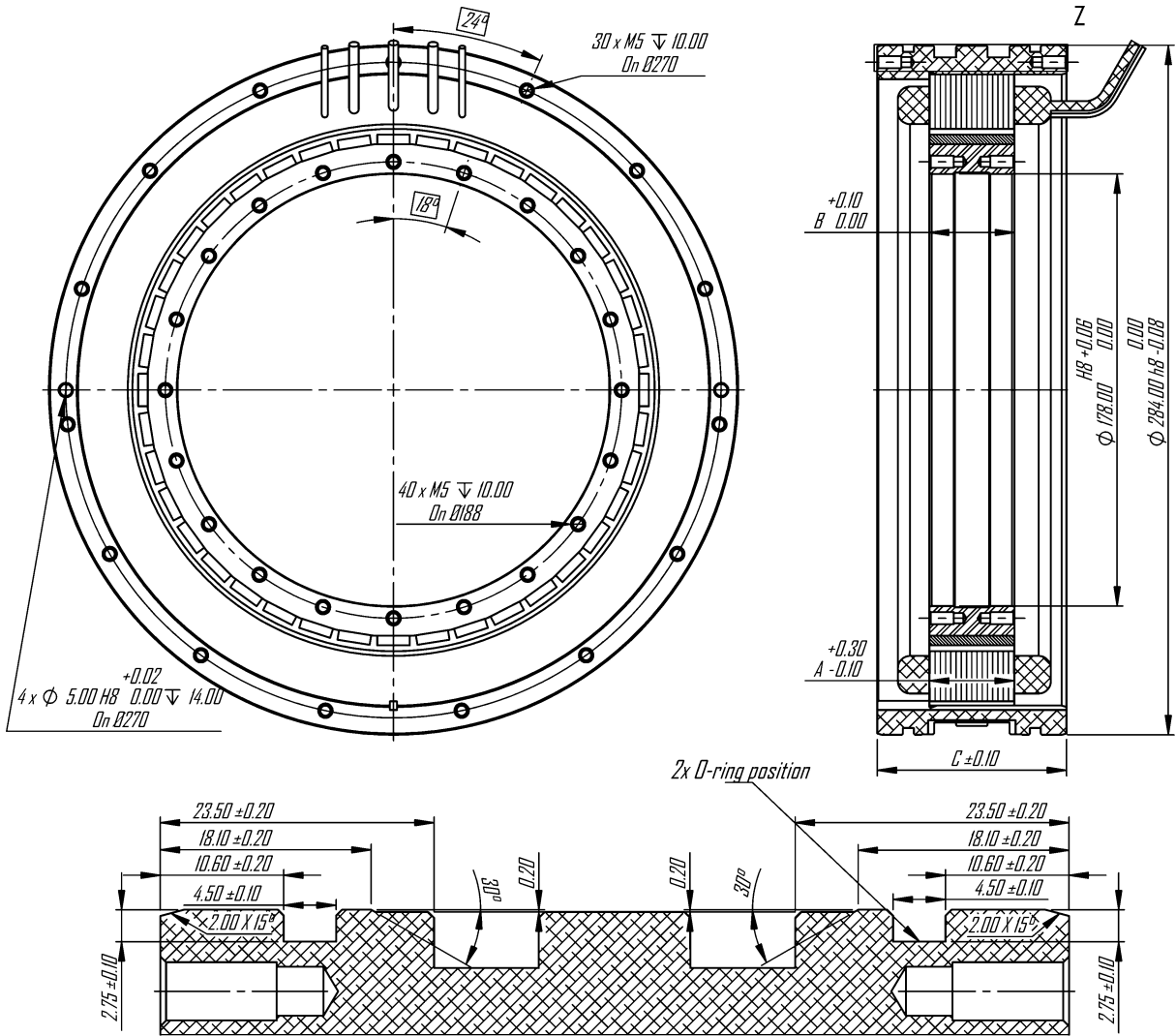
WTRM-260-(L/H)-Torque-Speed Curves

Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V





DETAIL Z
SCALE 2 : 1

Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-260-035	35	35.1	78
WTRM-(L/H)-260-070	70	70.2	113
WTRM-(L/H)-260-140	140	140.4	183

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-260-L: #7 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
 WTRM-260-H: #11 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-290-L-034		WTRM-290-L-070		WTRM-290-L-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	91.2		180.2		271.6	
	Peak Torque	T_{peak}	Nm	134.2		265.2		393	
	Rated Speed	N_r	rpm	75	200	50	130	30	85
	No-Load Speed	$N_{no-load}$	rpm	140	290	90	190	55	110
	Torque Constant	K_t	Nm/A	1.85		2.77		4.64	
	Voltage Constant	K_v	V/rpm	0.16		0.239		0.399	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
ELECTRICAL	Number of Pole	$2p$	--			40			
	Rated Current	I_r	A_{rms}	49.4		65		58.5	
	Peak Current	I_{peak}	A_{rms}	74.1		97.5		78	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.15 ($\pm 20\%$)		0.12 ($\pm 20\%$)		0.14 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	0.85 ($\pm 30\%$)		0.88 ($\pm 30\%$)		1.18 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	11.48		20.42		37.59	
	Mech. Time Constant	K_{mech}	ms	2.27		1.63		1.36	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.068		0.037		0.020	
	Inertia	J	$kg.m^2$	0.0424		0.0852		0.1708	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.4		2.6		1.6	
	Min. Water Volumetric Flow Rate	q_w	l/min	5.2		6.8		10.6	
	Pressure Drop for q_w	ΔP_w	bar	0.1190		0.1322		0.0889	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			200			

Motor Parameters		Symbols	Units	WTRM-290-H-035		WTRM-290-H-070		WTRM-290-H-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	112.7		224.6		449.2	
	Peak Torque	T_{peak}	Nm	190.6		379.1		758.1	
	Rated Speed	N_r	rpm	195	390	180	350	120	245
	No-Load Speed	$N_{no-load}$	rpm	310	580	270	495	185	340
	Torque Constant	K_t	Nm/A	11		12.83		18.33	
	Voltage Constant	K_v	V/rpm	0.956		1.116		1.594	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
ELECTRICAL	Number of Pole	$2p$	--			40			
	Rated Current	I_r	A_{rms}	10.3		17.5		24.5	
	Peak Current	I_{peak}	A_{rms}	18.5		31.5		44.1	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	5.36 ($\pm 20\%$)		2.62 ($\pm 20\%$)		2.24 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	30.7 ($\pm 30\%$)		19.3 ($\pm 30\%$)		18.9 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	11.48		20.42		37.59	
	Mech. Time Constant	K_{mech}	ms	2.26		1.63		1.37	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.068		0.037		0.020	
	Inertia	J	$kg.m^2$	0.0424		0.0852		0.1708	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	3.8		4.1		4.4	
	Min. Water Volumetric Flow Rate	q_w	l/min	5.2		6.8		10.6	
	Pressure Drop for q_w	ΔP_w	bar	0.1190		0.1322		0.0889	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			200			

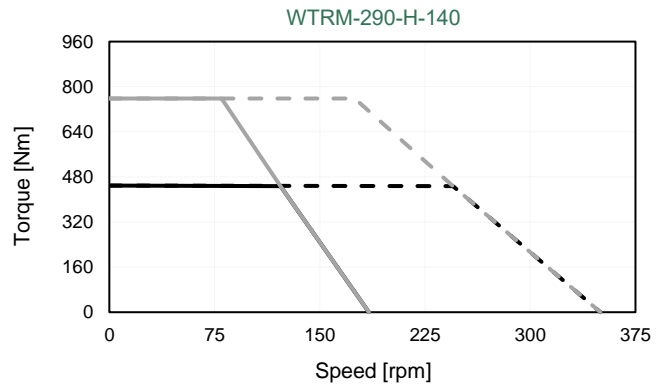
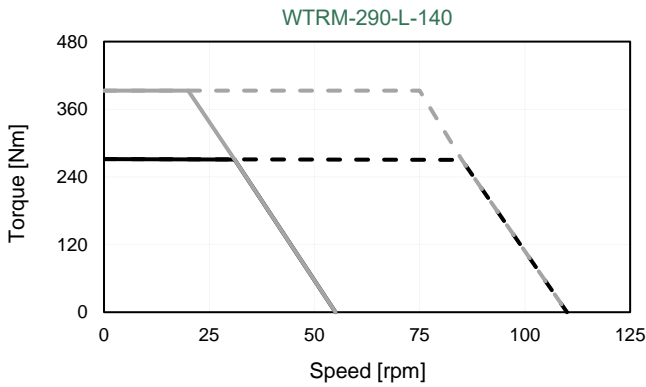
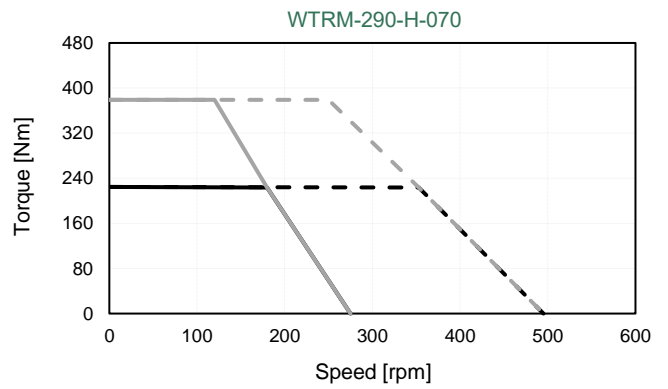
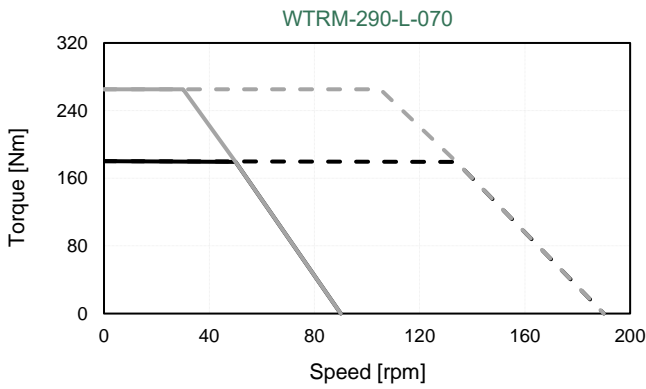
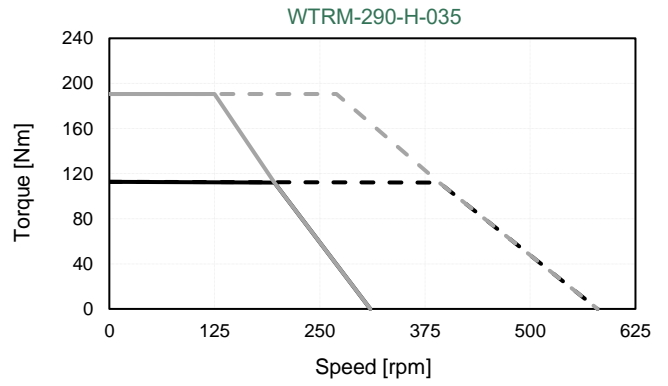
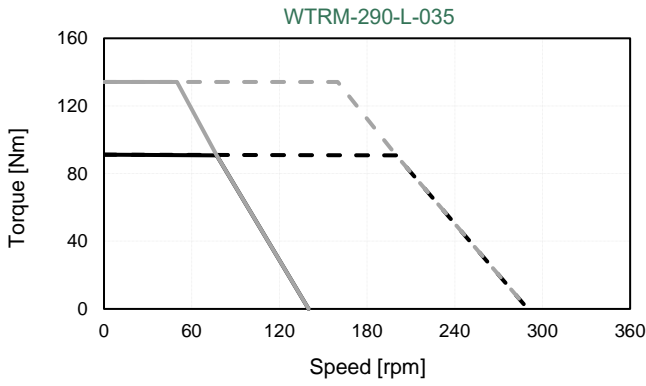
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

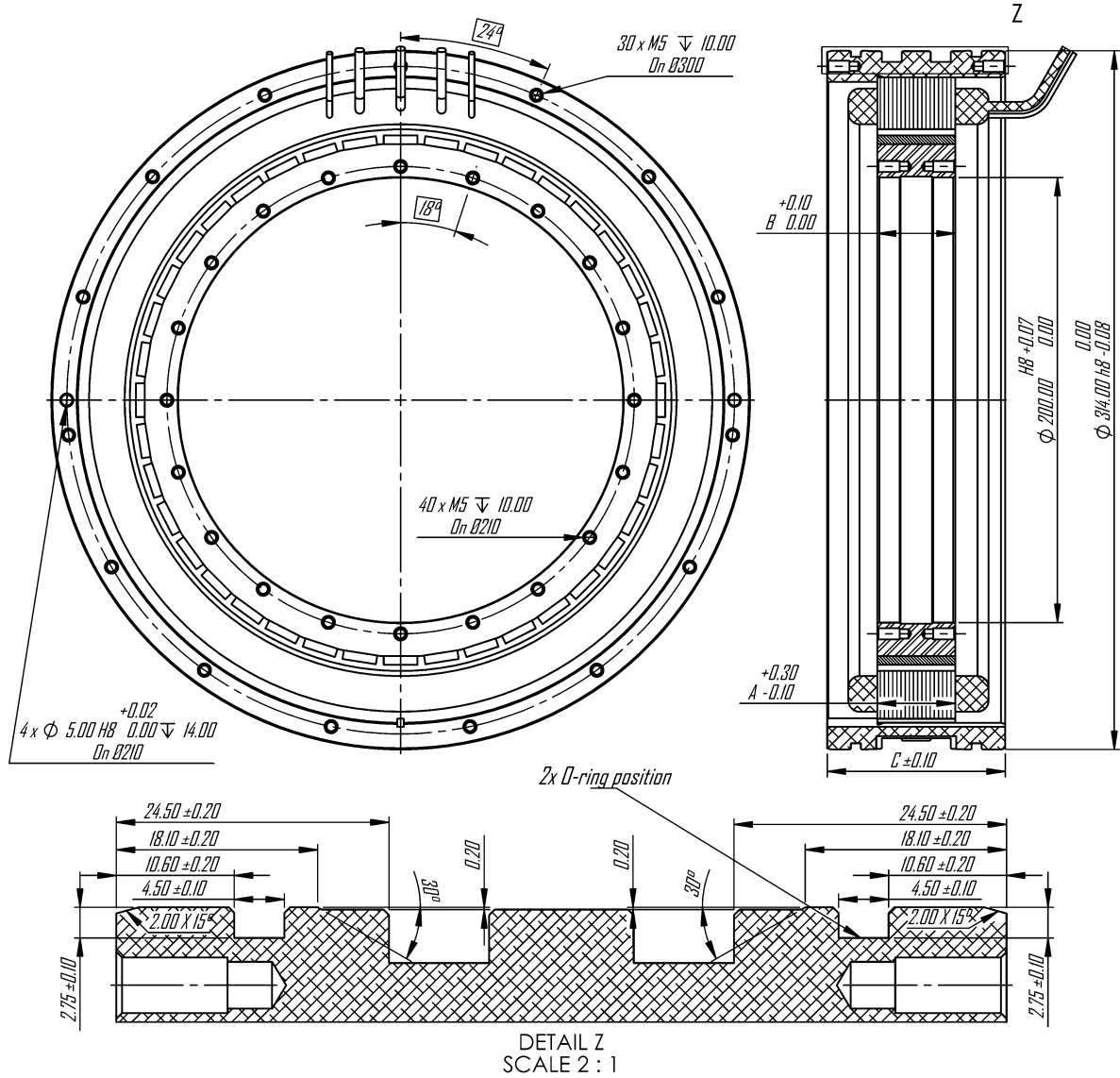
WTRM-290-(L/H)-Torque-Speed Curves

Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V





Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-290-035	35	35.1	80
WTRM-(L/H)-290-070	70	70.2	115
WTRM-(L/H)-290-140	140	140.4	185

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-290-L: #6 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
 WTRM-290-H: #10 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-310-L-034		WTRM-310-L-070		WTRM-310-L-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	109		218		329.4	
	Peak Torque	T_{peak}	Nm	160.2		320.4		437.4	
	Rated Speed	N_r	rpm	70	180	50	125	30	85
	No-Load Speed	$N_{no-load}$	rpm	130	265	90	180	55	115
	Torque Constant	K_t	Nm/A	2.02		2.88		4.63	
	Voltage Constant	K_v	V/rpm	0.174		0.249		0.398	
	Max. Cogging Torque	T_{cog}	%			<1			
ELECTRICAL	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			48			
	Rated Current	I_r	A_{rms}	54		75.6		71.1	
	Peak Current	I_{peak}	A_{rms}	81		113.4		94.8	
MECHANICAL & THERMAL	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.15 ($\pm 20\%$)		0.11 ($\pm 20\%$)		0.12 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	0.74 ($\pm 30\%$)		0.7 ($\pm 30\%$)		0.85 ($\pm 30\%$)	
	Total Weight	W_{total}	kg	11.92		21.45		40.36	
	Mech. Time Constant	K_{mech}	ms	2.35		1.74		1.45	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.063		0.034		0.018	
	Inertia	J	$kg.m^2$	0.0544		0.1106		0.2212	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.4		2.3		1.3	
	Min. Water Volumetric Flow Rate	q_w	l/min	6.2		9.3		15.2	
	Pressure Drop for q_w	ΔP_w	bar	0.11		0.16		0.23	
Environment Temp.	T_{env}	$^{\circ}C$			20				
Rotor ID	R_{ID}	mm			220				

Motor Parameters		Symbols	Units	WTRM-310-H-035		WTRM-310-H-070		WTRM-310-H-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	135.2		271.7		540.7	
	Peak Torque	T_{peak}	Nm	226.8		455.5		907.3	
	Rated Speed	N_r	rpm	175	350	155	305	100	210
	No-Load Speed	$N_{no-load}$	rpm	285	525	240	440	160	300
	Torque Constant	K_t	Nm/A	12.02		14.3		20.6	
	Voltage Constant	K_v	V/rpm	1.044		1.243		1.789	
	Max. Cogging Torque	T_{cog}	%			<1			
ELECTRICAL	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			48			
	Rated Current	I_r	A_{rms}	11.3		19		26.3	
	Peak Current	I_{peak}	A_{rms}	20.3		34.2		47.3	
MECHANICAL & THERMAL	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	5.2 ($\pm 20\%$)		2.8 ($\pm 20\%$)		2.4 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	26.8 ($\pm 30\%$)		17.5 ($\pm 30\%$)		17.4 ($\pm 30\%$)	
	Total Weight	W_{total}	kg	11.92		21.45		40.36	
	Mech. Time Constant	K_{mech}	ms	2.36		1.82		1.51	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.063		0.034		0.018	
	Inertia	J	$kg.m^2$	0.0544		0.1106		0.2212	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	3.8		3.8		3.8	
	Min. Water Volumetric Flow Rate	q_w	l/min	6.2		9.3		15.2	
	Pressure Drop for q_w	ΔP_w	bar	0.11		0.16		0.23	
Environment Temp.	T_{env}	$^{\circ}C$			20				
Rotor ID	R_{ID}	mm			220				

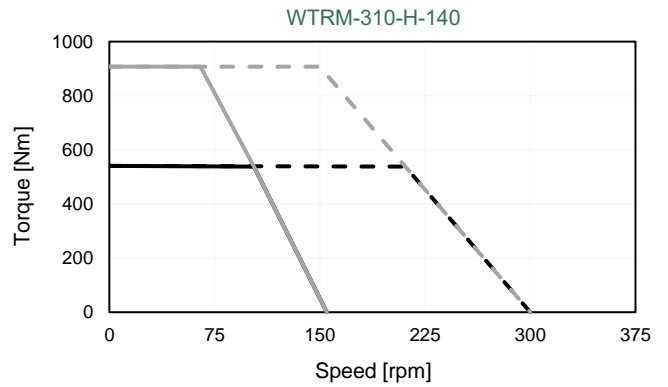
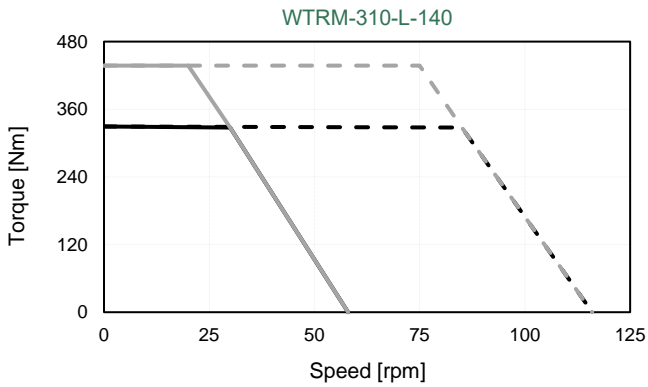
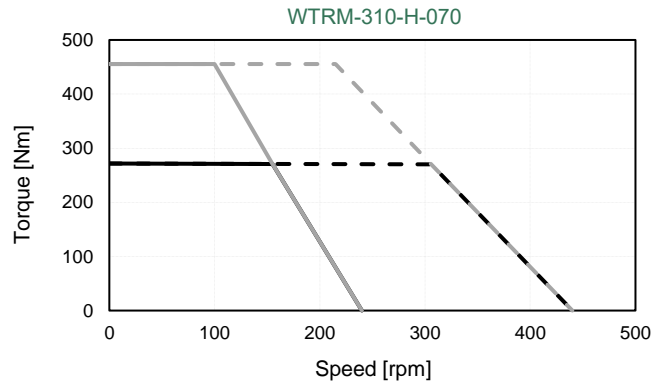
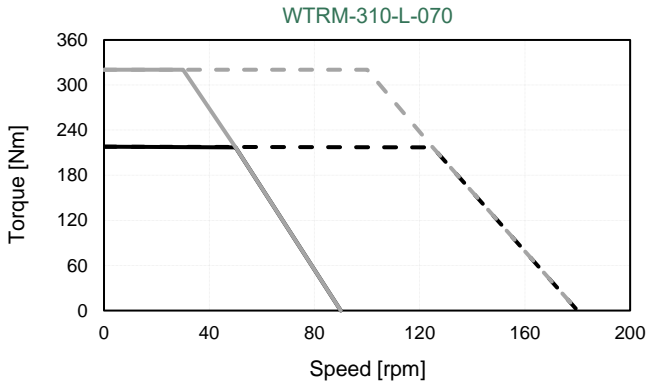
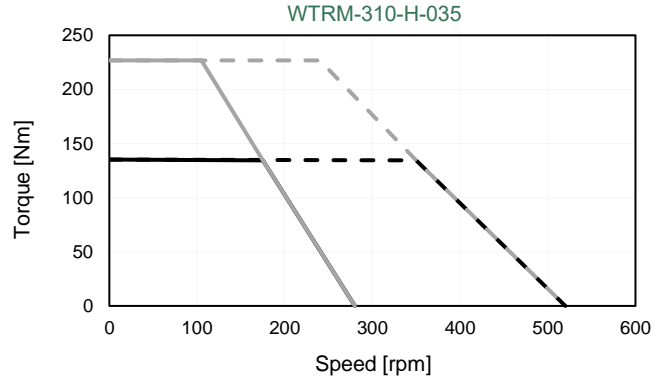
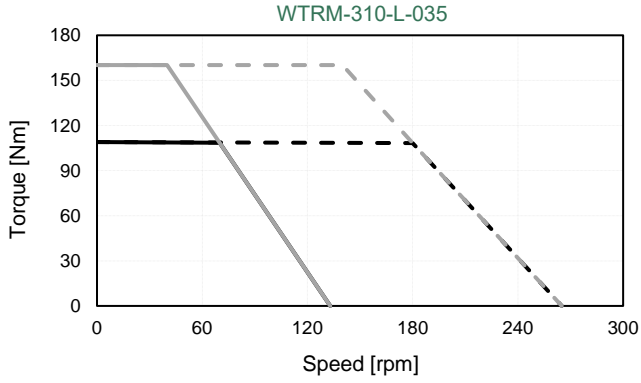
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

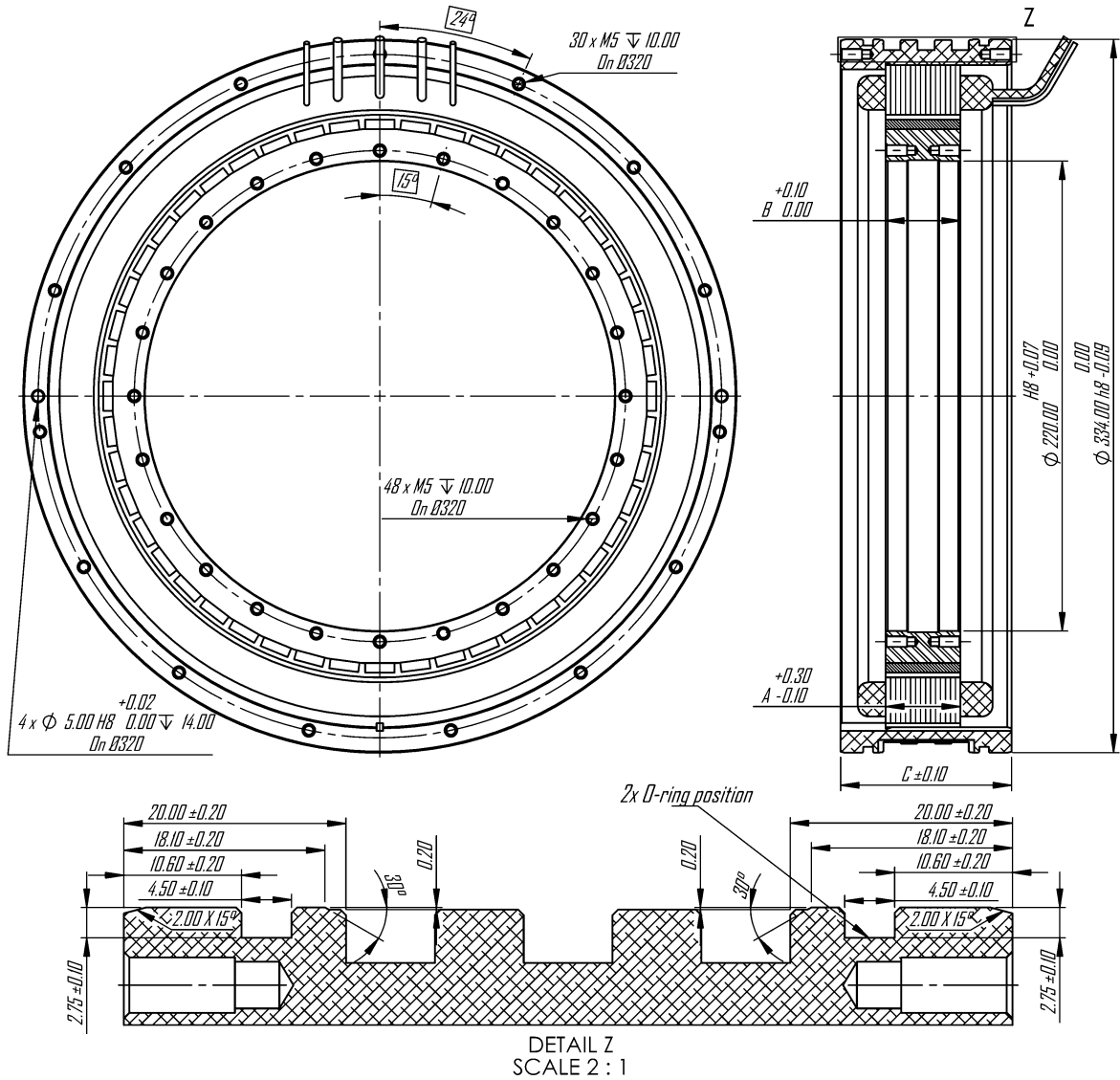
WTRM-310-(L/H)-Torque-Speed Curves

Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V





Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-310-035	35	35.1	80
WTRM-(L/H)-310-070	70	70.2	115
WTRM-(L/H)-310-140	140	140.4	185

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-310-L: #6 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
 WTRM-310-H: #10 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-330-L-034		WTRM-330-L-070		WTRM-330-L-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	124.5		249.7		375	
	Peak Torque	T_{peak}	Nm	183.6		367.2		498.2	
	Rated Speed	N_r	rpm	80	195	40	115	25	75
	No-Load Speed	$N_{no-load}$	rpm	135	280	80	165	50	100
	Torque Constant	K_t	Nm/A	1.95		3.24		5.21	
	Voltage Constant	K_v	V/rpm	0.167		0.278		0.445	
	Max. Cogging Torque	T_{cog}	%			<1			
ELECTRICAL	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			48			
	Rated Current	I_r	A_{rms}	64		77		72	
	Peak Current	I_{peak}	A_{rms}	96		115.5		96	
MECHANICAL & THERMAL	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.1 ($\pm 20\%$)		0.11 ($\pm 20\%$)		0.12 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	0.54 ($\pm 30\%$)		0.7 ($\pm 30\%$)		0.85 ($\pm 30\%$)	
	Total Weight	W_{total}	kg	13.29		23.63		43.56	
	Mech. Time Constant	K_{mech}	ms	2.31		1.76		1.47	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.059		0.032		0.017	
	Inertia	J	$kg.m^2$	0.0699		0.1404		0.2816	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.4		2.7		1.6	
MECHANICAL & THERMAL	Min. Water Volumetric Flow Rate	q_w	l/min	6.1		8.4		13.0	
	Pressure Drop for q_w	ΔP_w	bar	0.1669		0.1995		0.1254	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			240			

Motor Parameters		Symbols	Units	WTRM-330-H-035		WTRM-330-H-070		WTRM-330-H-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	156.4		310		618.4	
	Peak Torque	T_{peak}	Nm	264.9		525.7		1048.9	
	Rated Speed	N_r	rpm	190	380	165	320	110	220
	No-Load Speed	$N_{no-load}$	rpm	295	550	245	400	170	305
	Torque Constant	K_t	Nm/A	11.59		14.16		20.61	
	Voltage Constant	K_v	V/rpm	1.002		1.225		1.782	
	Max. Cogging Torque	T_{cog}	%			<1			
ELECTRICAL	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			48			
	Rated Current	I_r	A_{rms}	13.5		21.9		30	
	Peak Current	I_{peak}	A_{rms}	24.3		39.4		54	
MECHANICAL & THERMAL	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	3.62 ($\pm 20\%$)		2.07 ($\pm 20\%$)		1.84 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	19.1 ($\pm 30\%$)		13.42 ($\pm 30\%$)		13.8 ($\pm 30\%$)	
	Total Weight	W_{total}	kg	13.29		23.63		43.56	
	Mech. Time Constant	K_{mech}	ms	2.28		1.76		1.48	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.059		0.032		0.017	
	Inertia	J	$kg.m^2$	0.0699		0.1404		0.2816	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	3.8		4.2		4.5	
MECHANICAL & THERMAL	Min. Water Volumetric Flow Rate	q_w	l/min	6.1		8.4		13.0	
	Pressure Drop for q_w	ΔP_w	bar	0.1669		0.1995		0.1254	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			240			

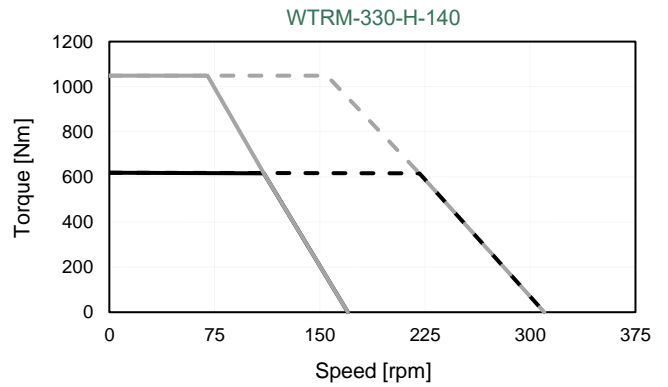
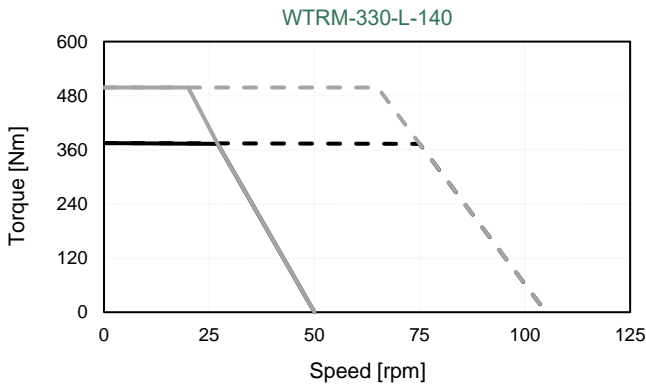
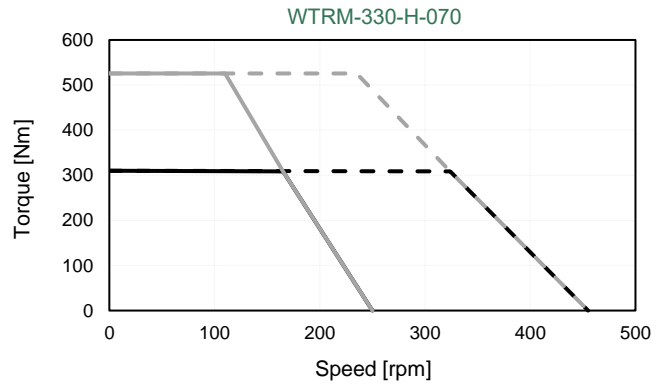
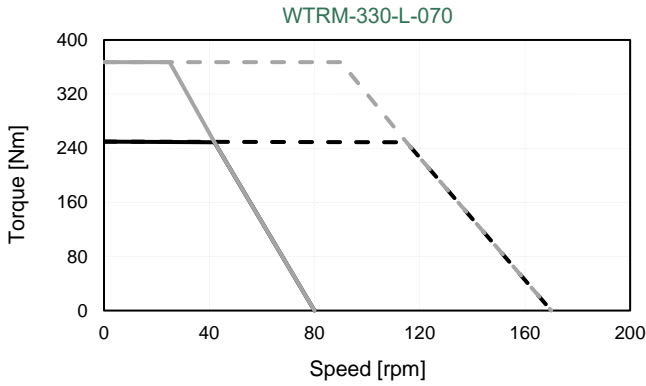
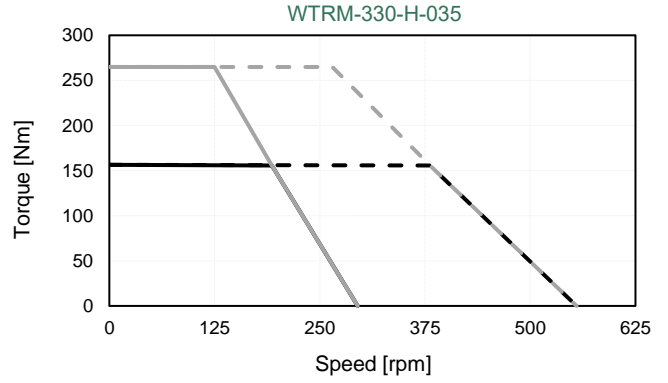
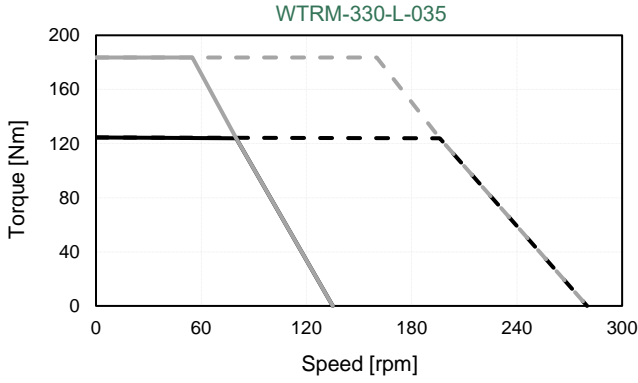
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

WTRM-330-(L/H)-Torque-Speed Curves

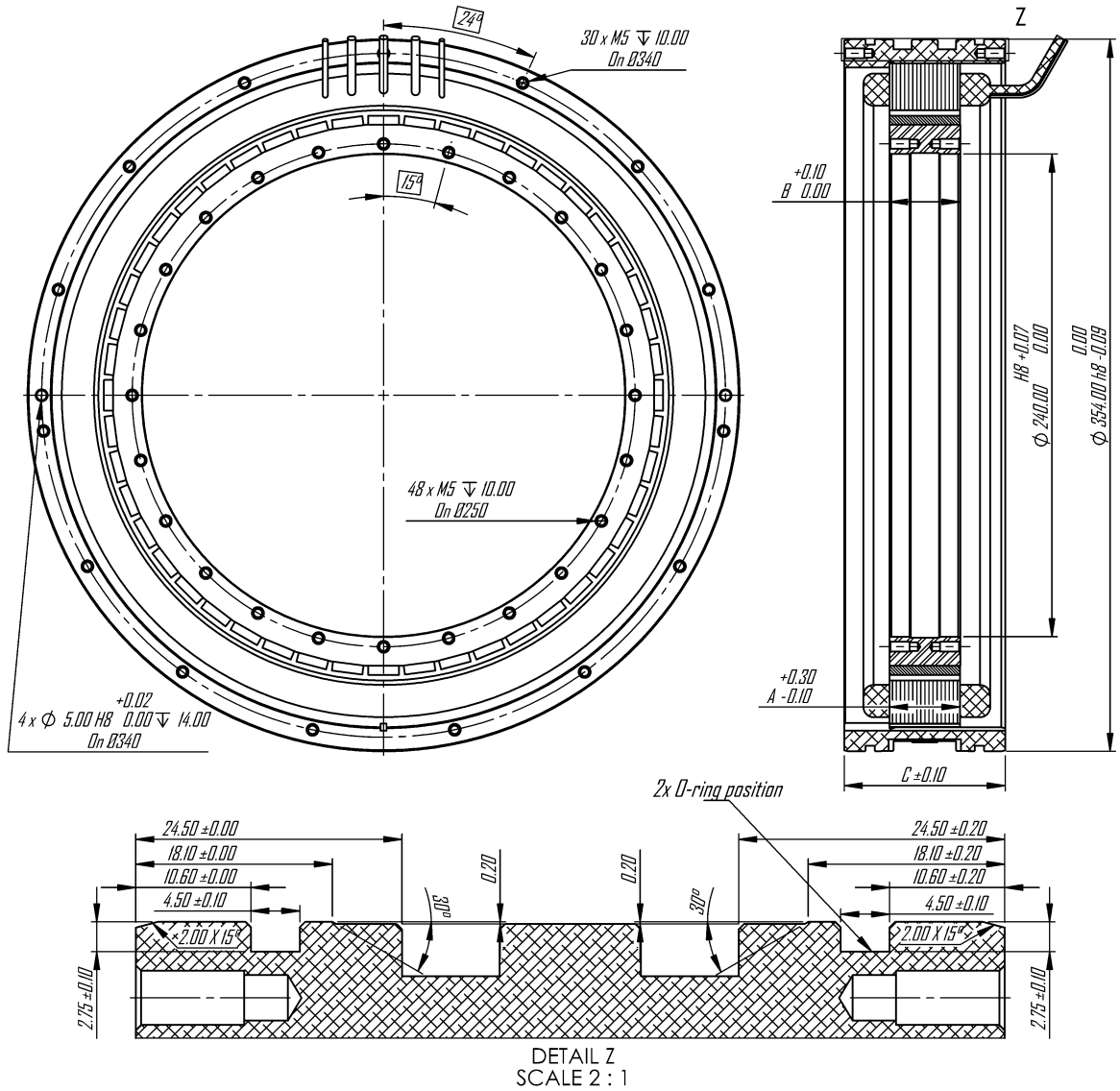
Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V



WTRM-330-(L/H) Outline Drawing



Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-330-035	35	35.1	80
WTRM-(L/H)-330-070	70	70.2	115
WTRM-(L/H)-330-140	140	140.4	185

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-330-L: #6 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
 WTRM-330-H: #10 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-360-L-034		WTRM-360-L-070		WTRM-360-L-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	150.5		297.8		451.6	
	Peak Torque	T_{peak}	Nm	222.4		440.2		600.4	
	Rated Speed	N_r	rpm	65	165	35	100	25	75
	No-Load Speed	$N_{no-load}$	rpm	120	250	70	150	45	100
	Torque Constant	K_t	Nm/A	2.19		3.51		5.28	
	Voltage Constant	K_v	V/rpm	0.184		0.301		0.452	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			64			
ELECTRICAL	Rated Current	I_r	A_{rms}	68.6		84.8		85.5	
	Peak Current	I_{peak}	A_{rms}	102.9		127.2		114	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.11 ($\pm 20\%$)		0.1 ($\pm 20\%$)		0.09 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	0.44 ($\pm 30\%$)		0.56 ($\pm 30\%$)		0.59 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	14.40		25.51		47.70	
	Mech. Time Constant	K_{mech}	ms	2.58		1.90		1.51	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.051		0.028		0.015	
	Inertia	J	$kg.m^2$	0.0919		0.1845		0.3697	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.6		2.7		1.5	
	Min. Water Volumetric Flow Rate	q_w	l/min	6.9		9.7		15.2	
	Pressure Drop for q_w	ΔP_w	bar	0.1535		0.1590		0.2410	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			270			

Motor Parameters		Symbols	Units	WTRM-360-H-035		WTRM-360-H-070		WTRM-360-H-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	186.4		373.2		741.4	
	Peak Torque	T_{peak}	Nm	316.6		632.8		1262.1	
	Rated Speed	N_r	rpm	175	350	140	280	105	210
	No-Load Speed	$N_{no-load}$	rpm	280	520	220	400	165	300
	Torque Constant	K_t	Nm/A	12.22		15.71		20.88	
	Voltage Constant	K_v	V/rpm	1.054		1.356		1.809	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			64			
ELECTRICAL	Rated Current	I_r	A_{rms}	15.3		23.8		35.5	
	Peak Current	I_{peak}	A_{rms}	27.5		42.8		63.9	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	3.38 ($\pm 20\%$)		2.1 ($\pm 20\%$)		1.54 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	15.1 ($\pm 30\%$)		11.4 ($\pm 30\%$)		9.7 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	14.40		25.51		47.70	
	Mech. Time Constant	K_{mech}	ms	2.52		1.90		1.58	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.051		0.028		0.015	
	Inertia	J	$kg.m^2$	0.0919		0.1845		0.3697	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	4.0		4.3		4.5	
	Min. Water Volumetric Flow Rate	q_w	l/min	6.9		9.7		15.2	
	Pressure Drop for q_w	ΔP_w	bar	0.1535		0.1590		0.2410	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			270			

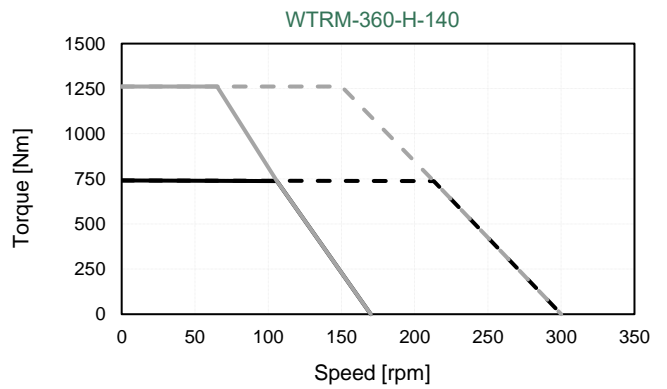
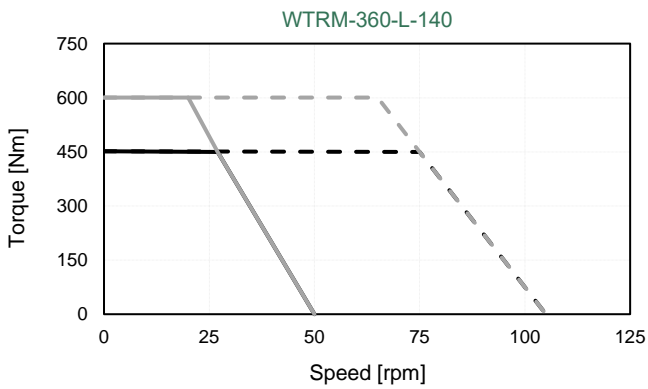
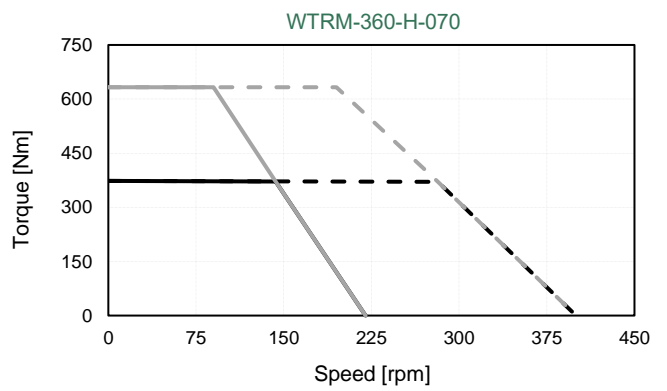
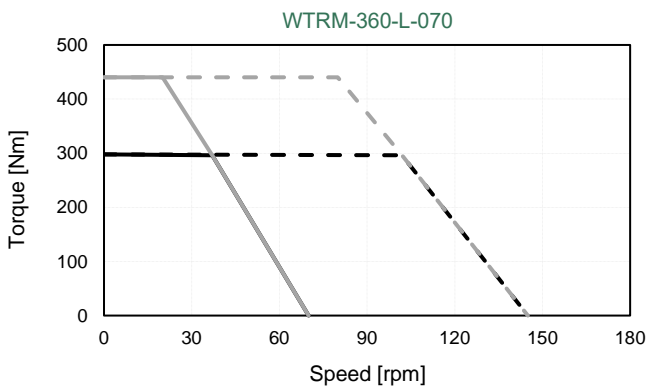
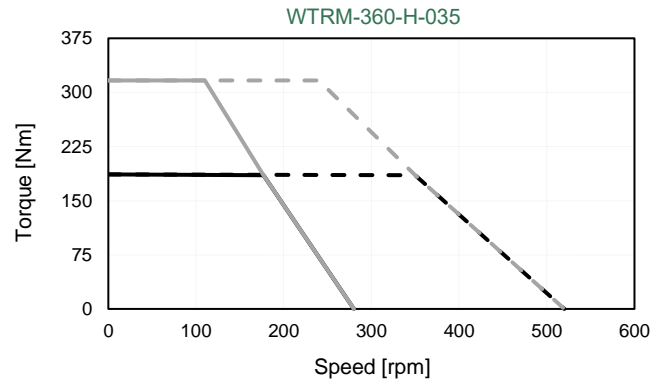
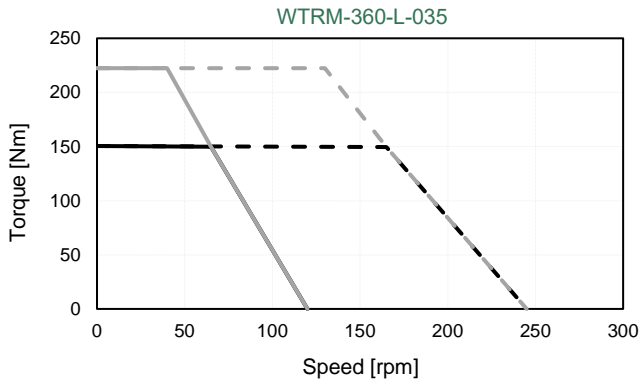
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

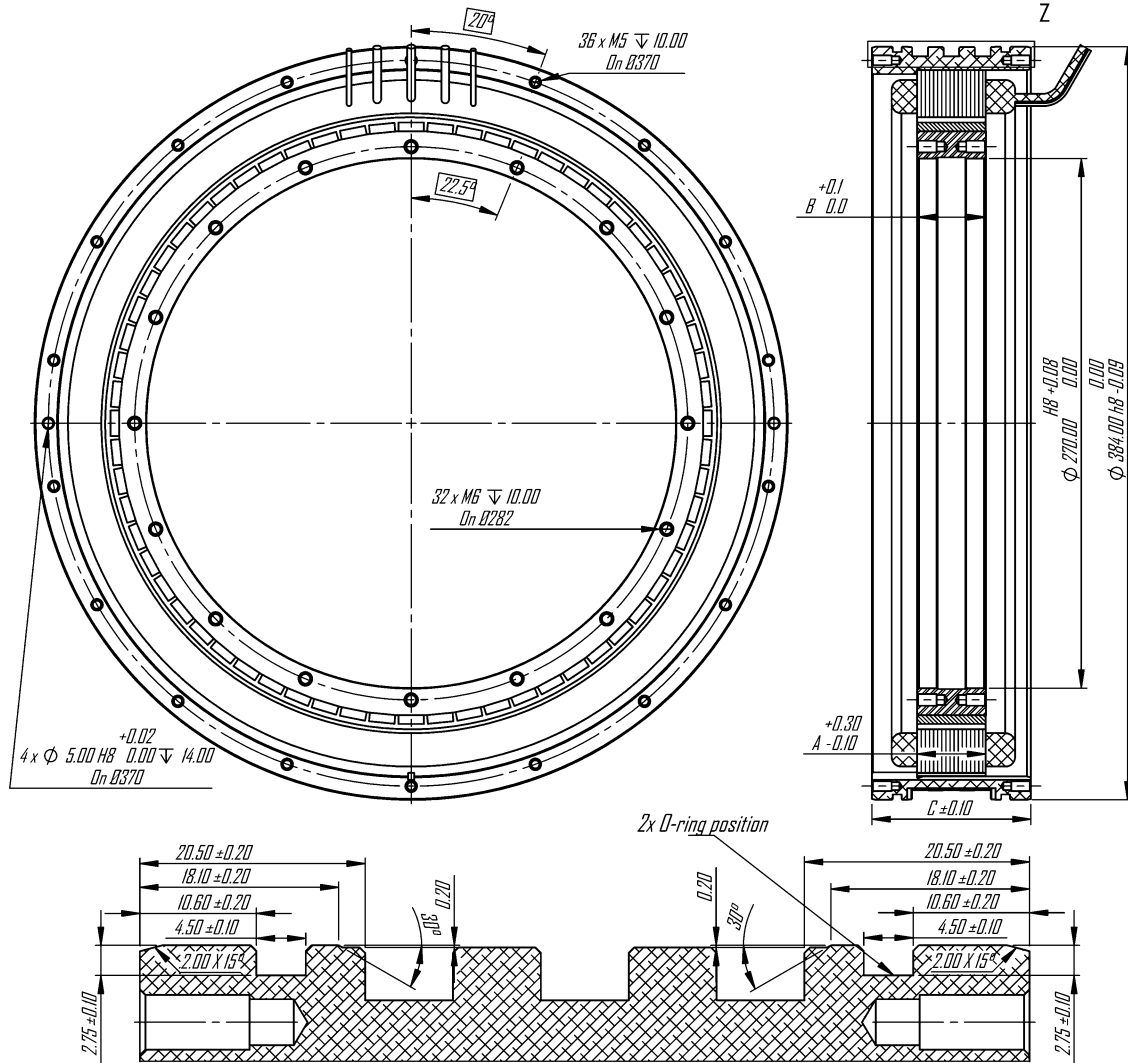
WTRM-360-(L/H)-Torque-Speed Curves

Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V





DETAIL Z
SCALE 2:1

Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-360-035	35	35.1	81
WTRM-(L/H)-360-070	70	70.2	116
WTRM-(L/H)-360-140	140	140.4	186

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-360-L: #5 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
WTRM-360-H: #9 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Parameters		Symbols	Units	WTRM-390-L-034		WTRM-390-L-070		WTRM-390-L-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	24	48	24	48	24	48
	Rated Torque	T_r	Nm	179.3		359.6		541.1	
	Peak Torque	T_{peak}	Nm	262.4		527.1		717.4	
	Rated Speed	N_r	rpm	60	150	30	90	25	65
	No-Load Speed	$N_{no-load}$	rpm	105	215	70	140	40	90
	Torque Constant	K_t	Nm/A	2.39		3.83		5.77	
	Voltage Constant	K_v	V/rpm	0.207		0.331		0.496	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			64			
ELECTRICAL	Rated Current	I_r	A_{rms}	75		94		93.8	
	Peak Current	I_{peak}	A_{rms}	112.5		141		125	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	0.1 ($\pm 20\%$)		0.11 ($\pm 20\%$)		0.08 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	0.48 ($\pm 30\%$)		0.55 ($\pm 30\%$)		0.59 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	16.93		30.25		57.17	
	Mech. Time Constant	K_{mech}	ms	2.49		2.11		1.48	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.051		0.027		0.015	
	Inertia	J	$kg.m^2$	0.12		0.2406		0.4818	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	2.4		3.1		1.6	
	Min. Water Volumetric Flow Rate	q_w	l/min	7.8		10.4		16.2	
	Pressure Drop for q_w	ΔP_w	bar	0.1984		0.1873		0.2790	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			290			

Motor Parameters		Symbols	Units	WTRM-390-H-035		WTRM-390-H-070		WTRM-390-H-140	
PERFORMANCE	DC Bus Voltage	V_{DC}	V	310	560	310	560	310	560
	Rated Torque	T_r	Nm	226.7		447.4		886.9	
	Peak Torque	T_{peak}	Nm	378.3		747.5		1483	
	Rated Speed	N_r	rpm	165	330	130	260	95	195
	No-Load Speed	$N_{no-load}$	rpm	265	490	200	370	150	275
	Torque Constant	K_t	Nm/A	12.77		17.04		22.74	
	Voltage Constant	K_v	V/rpm	1.116		1.488		1.985	
	Max. Cogging Torque	T_{cog}	%			<1			
	Torque Ripple	T_{ripple}	%			<1			
	Number of Pole	$2p$	--			64			
ELECTRICAL	Rated Current	I_r	A_{rms}	17.8		26.3		39	
	Peak Current	I_{peak}	A_{rms}	32		47.3		70.2	
	Line Resistance	$R_{LL}@25^{\circ}C$	Ohm	2.8 ($\pm 20\%$)		1.82 ($\pm 20\%$)		1.35 ($\pm 20\%$)	
	Line Inductance	$L_{LL}@60Hz$	mH	13.7 ($\pm 30\%$)		11.2 ($\pm 30\%$)		9.4 ($\pm 30\%$)	
MECHANICAL & THERMAL	Total Weight	W_{total}	kg	16.93		30.25		57.17	
	Mech. Time Constant	K_{mech}	ms	2.47		1.81		1.50	
	Thermal Resistance ⁽²⁾	R_{th}	$^{\circ}C/W$	0.051		0.027		0.015	
	Inertia	J	$kg.m^2$	0.12		0.2406		0.4818	
	Water Inlet Temp.	T_w	$^{\circ}C$			20			
	Water Temp. Diff. Between Inlet-Outlet	ΔT_w	$^{\circ}C$	4.0		4.2		4.4	
	Min. Water Volumetric Flow Rate	q_w	l/min	7.8		10.4		16.2	
	Pressure Drop for q_w	ΔP_w	bar	0.1984		0.1873		0.2790	
	Environment Temp.	T_{env}	$^{\circ}C$			20			
	Rotor ID	R_{ID}	mm			290			

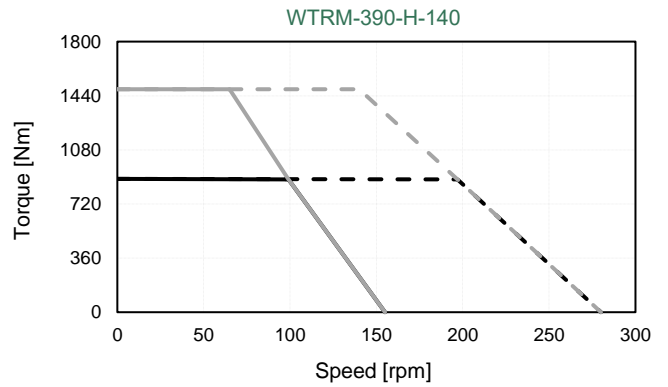
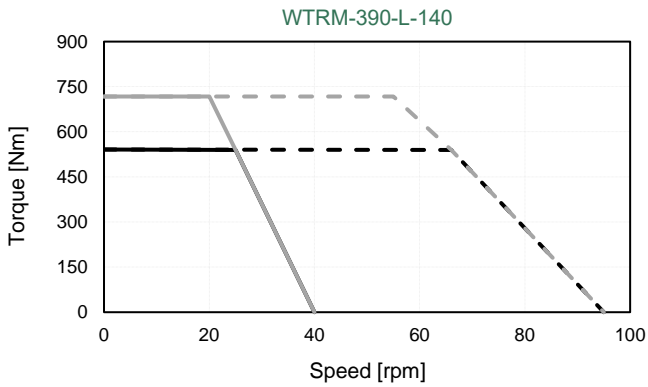
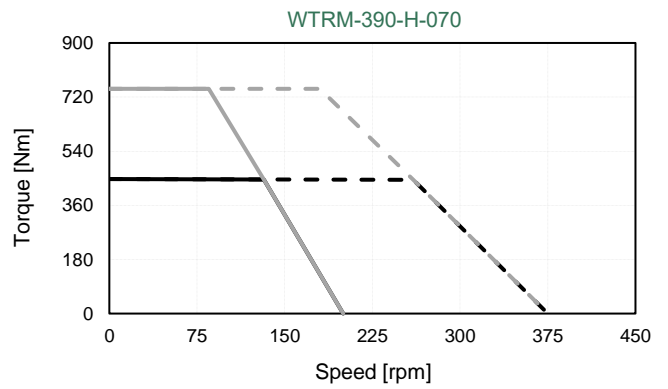
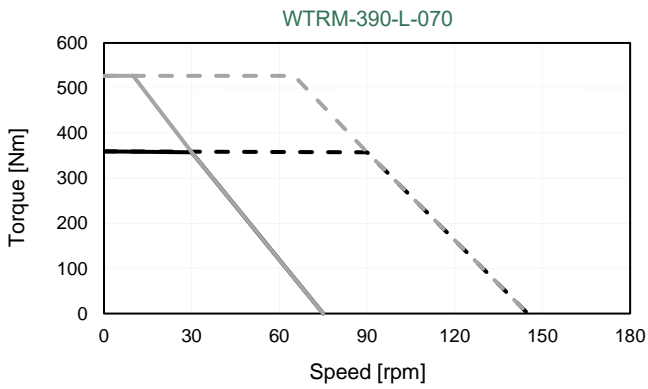
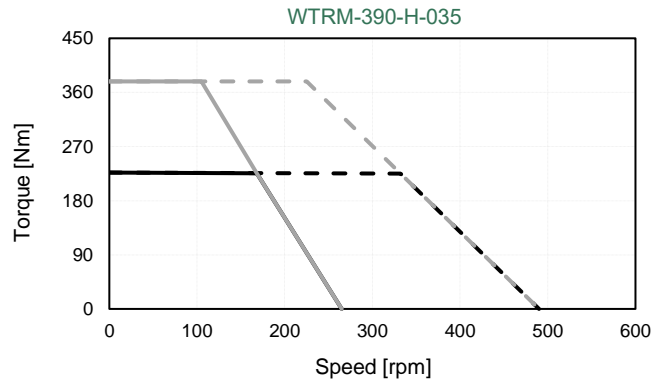
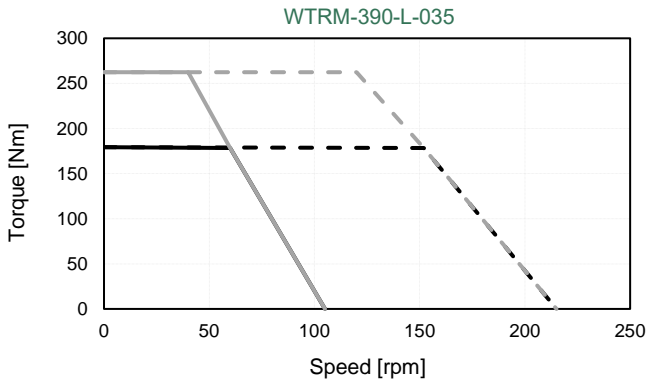
1. All performance and electrical specifications are obtained at 25°C ambient and may change $\pm 10\%$. 2. Maximum coil temperature is 130°C. 3. Higher torque and speed values as well as dimensions on request.

WTRM-390-(L/H)-Torque-Speed Curves

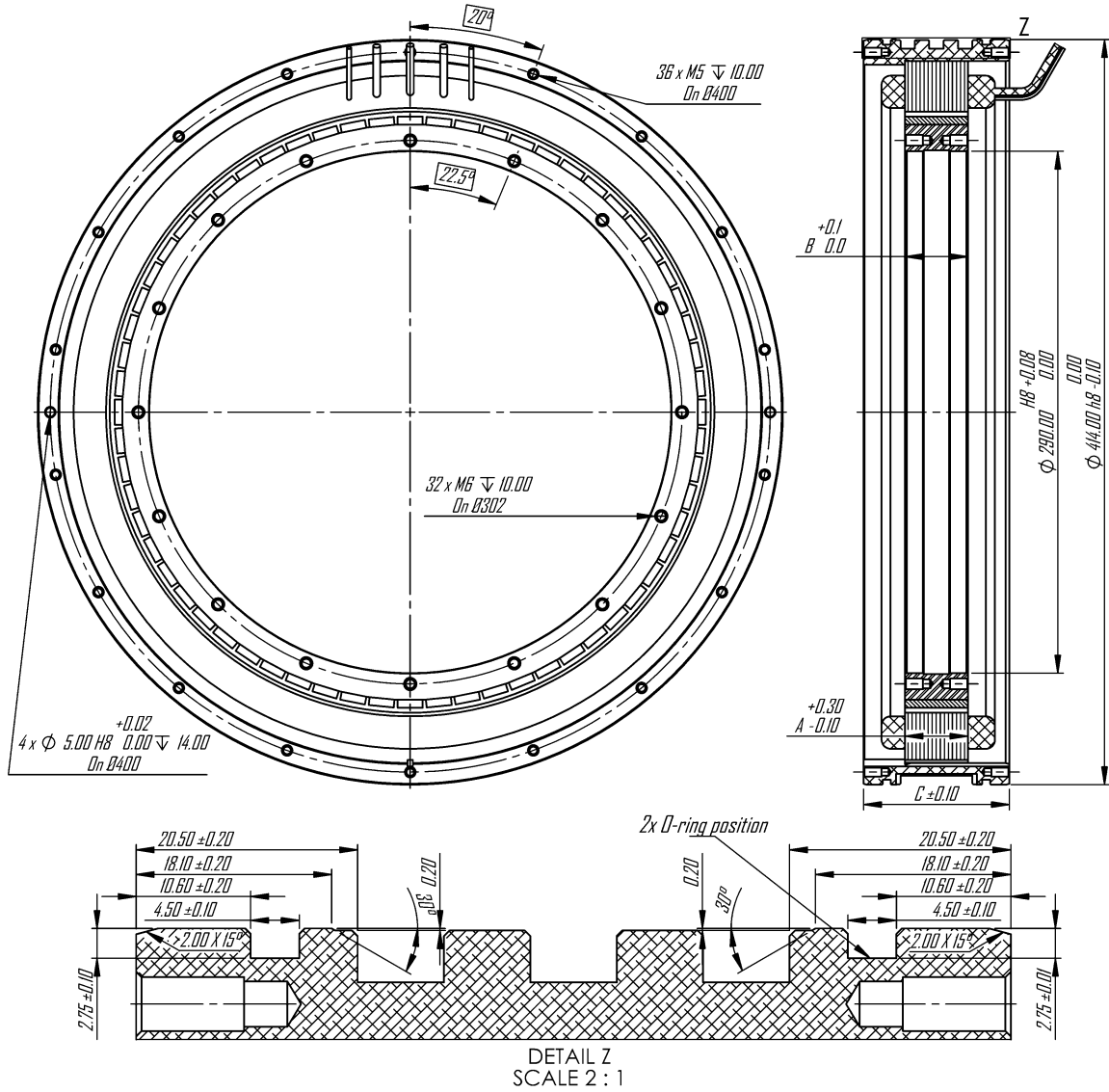
Tr: Rated Torque
Tp: Peak Torque

— @Tr 24V - - - @Tr 48V
— @Tp 24V - - - @Tp 48V

— @Tr 310V - - - @Tr 560V
— @Tp 310V - - - @Tp 560V



WTRM-390-(L/H) Outline Drawing



Model	A (mm)	B (mm)	C (mm)
WTRM-(L/H)-390-035	35	35.1	81
WTRM-(L/H)-390-070	70	70.2	116
WTRM-(L/H)-390-140	140	140.4	186

All dimensions in mm

Notes:

MOTOR LEADS:

WTRM-390-L: #5 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.
WTRM-390-H: #9 AWG Teflon® insulated, 500 mm (optional) length, 1-Red, 1-White, 1-Black.

THERMISTOR LEADS:

#26 AWG Teflon® insulated, 500 mm (optional) length, 2-Brown or Blue.

Motor Design Sheet

Please send your inquiry to
mds@mdsmotor.com or fax: +90 (262) 341 4472

Contact details	
Company:	
Name:	
Tel:	
Email:	
Application/Project:	

Specifications for motor design

Required torques			
Rated torque [Nm]			
Rated speed [rpm]			
Max. torque [Nm]			
Max speed [rpm]			
Electrical specifications			
DC bus voltage [V]			
Rated current [Arms]			
Max current [Arms]			
Current supply	BLDC / BLAC		
Motor size limits			
Max. diameter allowed [mm]			
Max. length allowed [mm]			
Weight limit if any [kg]			
Inertia req. if any			
Cooling / Construction			
Ambient temp. [oC]			
Housing / cooling type	<input type="checkbox"/> None	<input type="checkbox"/> Air cooled	<input type="checkbox"/> Water cooled
Duty cycle			
Other / Comments			
Rotor type	Surface / IPM / other...		
Torque-speed curve – please draw			
Comments			

Revision No	Version No	Made By	Date
Rev2	V1	OS	03.10.2024



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