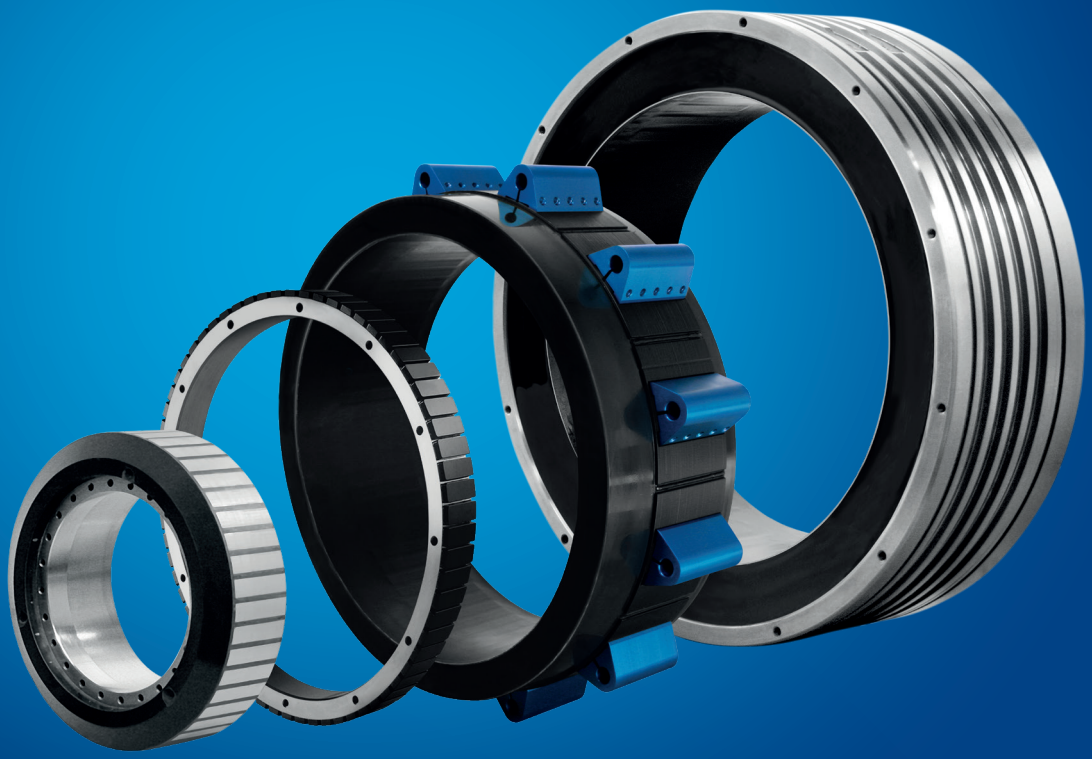

Torque Motors

TMC DATA SHEETS

ETEL

ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0360-030

MOTOR PERFORMANCE		Winding codes	VB	VD		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	954	954		
Ti	Intermittent torque	Nm	704	704		
Tc	Continuous torque	Nm	502	502		
Ts	Standstill torque	Nm	396	396		
Ip	Peak current	Arms	57.8	116		
Ii	Intermittent current	Arms	36.5	72.9		
Ic	Continuous current	Arms	23.1	46.1		
Is	Standstill current	Arms	17.5	34.9		
ns	Rated low speed	rpm	0.18	0.18		
nm	Maximum speed without flux weakening	rpm	283	568		
nm,FW	Maximum speed with flux weakening	rpm	870	900		
τon,p	Maximum ON time for peak cycle	s	15	15		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	13400	13400		
Pi	Power dissipation @ Ii	W	6870	6870		
Pc	Power dissipation @ Ic	W	2750	2750		
Td	Max. detent torque (average to peak)	Nm	3.0	3.0		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	24.2	12.1		
Ku	Back EMF constant (*)	Vrms/(rad/s)	14.0	7.01		
Km	Motor constant	Nm/√W	12.7	12.7		
R20	Electrical resistance at 20°C (*)	Ohm	2.42	0.605		
Ld/Lq	Electrical inductance (*)	mH	29.5 / 27.8	7.38 / 6.94		
Isc	Maximum short-circuit current	Arms	27.4	54.8		
nb	Base speed	rpm	207	484		
nb,i	Base speed at intermittent duty cycle	rpm	168	392		
nb,p	Base speed at peak duty cycle	rpm	140	319		
nn	Rated speed	rpm	182	434		
Tn	Rated torque	Nm	483	380		
In	Rated current	Arms	22.8	35.0		
τth	Thermal time constant	s	168	168		
Rth	Thermal resistance	K/W	0.0384	0.0384		
2p	Number of poles	-	40	40		
J	Rotor inertia	kg·m²	0.110	0.110		
mr	Rotor mass	kg	6.01	6.01		
ms	Stator mass	kg	24.0	24.0		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.112	0.112		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	8.6	8.6		
Δpw	Max. pressure drop at qw	bar	0.3	0.3		

Notes: (*) terminal to terminal.
Hypotheses and tolerances are in ETEL Integration Manual.
Please refer to ETEL Integration Manual for the mass of the optional cooling jacket and the possible additional pressure drop.

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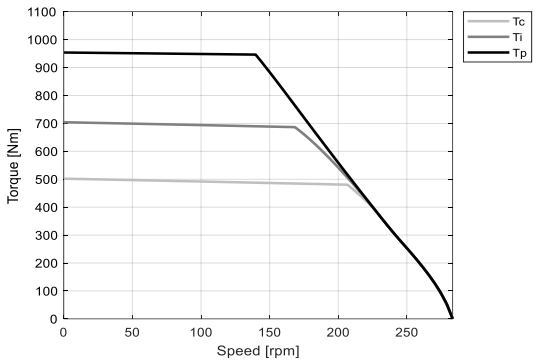
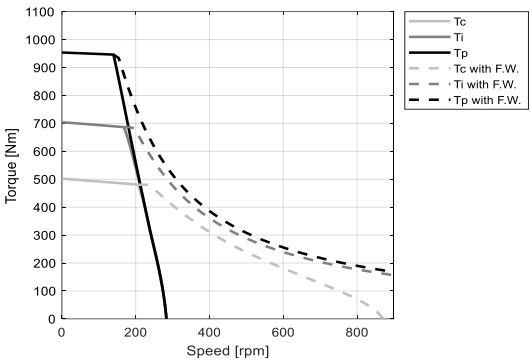
HIGH DENSITY TORQUE MOTOR

TMC0360-030

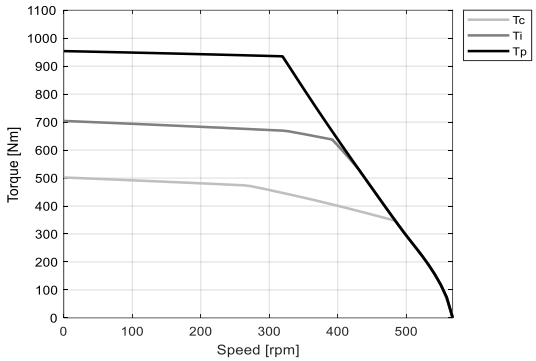
VB - WATER COOLING



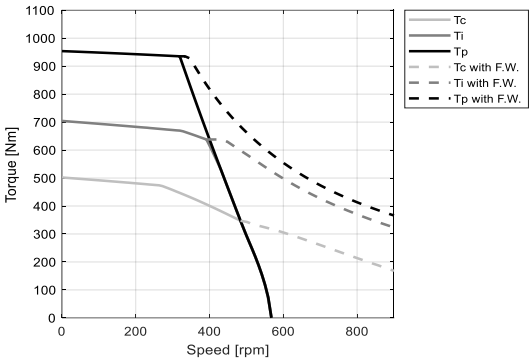
VB - WATER COOLING



VD - WATER COOLING



VD - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR

TMC0360-050

MOTOR PERFORMANCE		Winding codes	VB	VD		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	1330	1330		
Ti	Intermittent torque	Nm	981	981		
Tc	Continuous torque	Nm	699	699		
Ts	Standstill torque	Nm	553	553		
Ip	Peak current	Arms	58.8	118		
Ii	Intermittent current	Arms	37.2	74.4		
Ic	Continuous current	Arms	23.5	47.0		
Is	Standstill current	Arms	17.8	35.6		
ns	Rated low speed	rpm	0.18	0.18		
nm	Maximum speed without flux weakening	rpm	202	405		
nm,FW	Maximum speed with flux weakening	rpm	693	880		
τon,p	Maximum ON time for peak cycle	s	14	14		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	17700	17700		
Pi	Power dissipation @ Ii	W	9070	9070		
Pc	Power dissipation @ Ic	W	3630	3630		
Td	Max. detent torque (average to peak)	Nm	4.2	4.2		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	33.6	16.8		
Ku	Back EMF constant (*)	Vrms/(rad/s)	19.6	9.81		
Km	Motor constant	Nm/√W	15.6	15.6		
R20	Electrical resistance at 20°C (*)	Ohm	3.08	0.770		
Ld/Lq	Electrical inductance (*)	mH	40.3 / 37.5	10.1 / 9.38		
Isc	Maximum short-circuit current	Arms	28.1	56.2		
nb	Base speed	rpm	141	328		
nb,i	Base speed at intermittent duty cycle	rpm	111	265		
nb,p	Base speed at peak duty cycle	rpm	90.8	222		
nn	Rated speed	rpm	123	289		
Tn	Rated torque	Nm	680	616		
In	Rated current	Arms	23.3	42.3		
τth	Thermal time constant	s	164	164		
Rth	Thermal resistance	K/W	0.0288	0.0288		
2p	Number of poles	-	40	40		
J	Rotor inertia	kg·m²	0.152	0.152		
mr	Rotor mass	kg	8.32	8.32		
ms	Stator mass	kg	31.1	31.1		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.152	0.152		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	11	11		
Δpw	Max. pressure drop at qw	bar	0.5	0.5		

Notes: (*) terminal to terminal.
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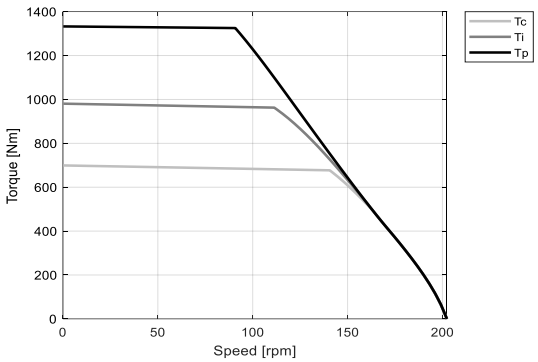
ETEL

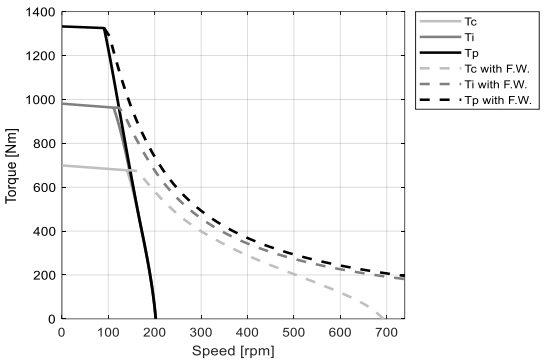
HIGH DENSITY TORQUE MOTOR

TMC0360-050

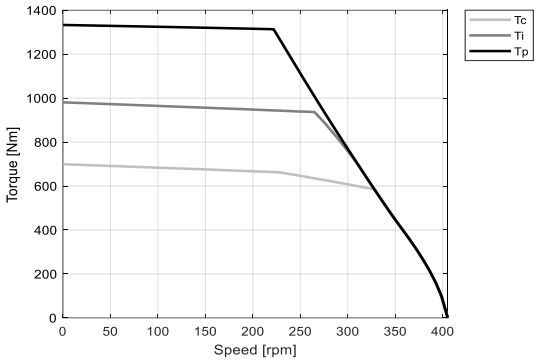
VB - WATER COOLING



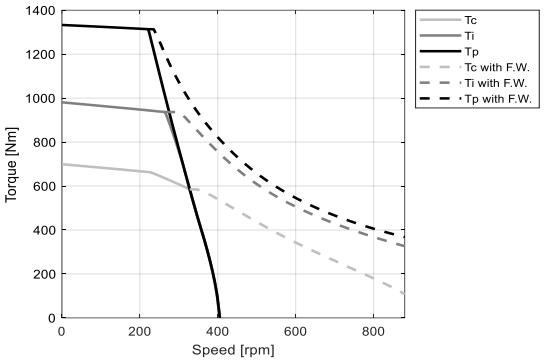
VB - WATER COOLING



VD - WATER COOLING



VD - WATER COOLING



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TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0360-070

MOTOR PERFORMANCE		Winding codes	VB	VD		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	1750	1750		
Ti	Intermittent torque	Nm	1280	1280		
Tc	Continuous torque	Nm	914	914		
Ts	Standstill torque	Nm	723	723		
Ip	Peak current	Arms	59.8	120		
Ii	Intermittent current	Arms	37.7	75.5		
Ic	Continuous current	Arms	23.9	47.7		
Is	Standstill current	Arms	18.1	36.2		
ns	Rated low speed	rpm	0.19	0.19		
nm	Maximum speed without flux weakening	rpm	157	315		
nm,FW	Maximum speed with flux weakening	rpm	575	803		
τon,p	Maximum ON time for peak cycle	s	13	13		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	22300	22300		
Pi	Power dissipation @ Ii	W	11300	11300		
Pc	Power dissipation @ Ic	W	4530	4530		
Td	Max. detent torque (average to peak)	Nm	5.5	5.5		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	43.2	21.6		
Ku	Back EMF constant (*)	Vrms/(rad/s)	25.2	12.6		
Km	Motor constant	Nm/√W	18.2	18.2		
R20	Electrical resistance at 20°C (*)	Ohm	3.75	0.937		
Ld/Lq	Electrical inductance (*)	mH	51.2 / 47.2	12.8 / 11.8		
Isc	Maximum short-circuit current	Arms	28.5	56.9		
nb	Base speed	rpm	104	246		
nb,i	Base speed at intermittent duty cycle	rpm	78.8	199		
nb,p	Base speed at peak duty cycle	rpm	62.1	166		
nn	Rated speed	rpm	90.1	215		
Tn	Rated torque	Nm	894	854		
In	Rated current	Arms	23.7	45.9		
τth	Thermal time constant	s	158	158		
Rth	Thermal resistance	K/W	0.0228	0.0228		
2p	Number of poles	-	40	40		
J	Rotor inertia	kg·m²	0.197	0.197		
mr	Rotor mass	kg	10.7	10.7		
ms	Stator mass	kg	37.1	37.1		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.191	0.191		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	14	14		
Δpw	Max. pressure drop at qw	bar	0.6	0.6		

Notes: (*) terminal to terminal.
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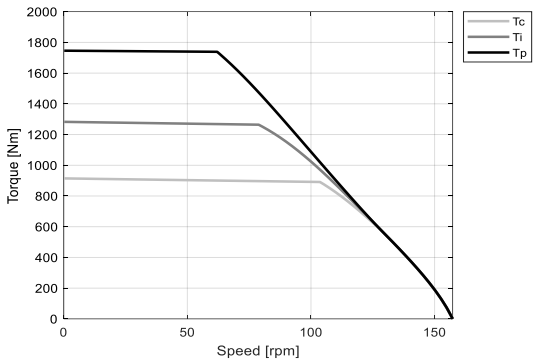
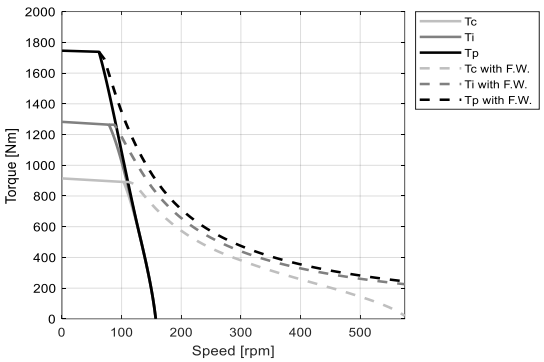
ETEL HIGH DENSITY TORQUE MOTOR TMC0360-070

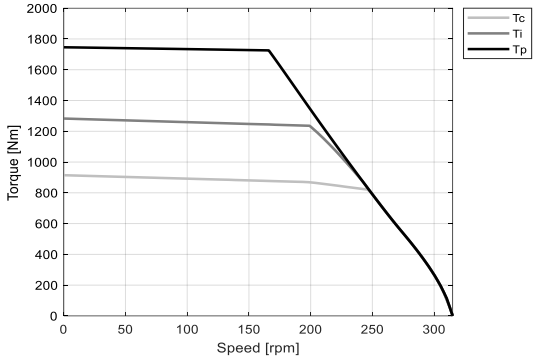
VB - WATER COOLING



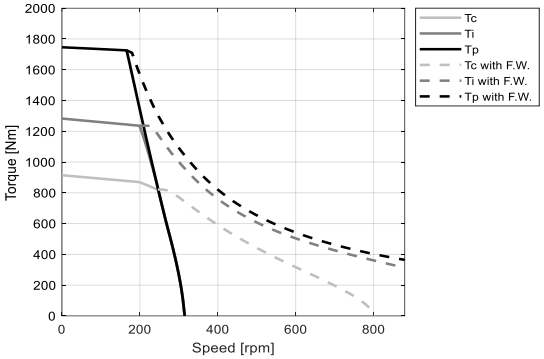
VB - WATER COOLING



VD - WATER COOLING



VD - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0360-100

MOTOR PERFORMANCE		Winding codes	VB	VD		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	2360	2360		
Ti	Intermittent torque	Nm	1730	1730		
Tc	Continuous torque	Nm	1230	1230		
Ts	Standstill torque	Nm	975	975		
Ip	Peak current	Arms	60.3	121		
Ii	Intermittent current	Arms	38.1	76.2		
Ic	Continuous current	Arms	24.1	48.2		
Is	Standstill current	Arms	18.3	36.5		
ns	Rated low speed	rpm	0.19	0.19		
nm	Maximum speed without flux weakening	rpm	118	236		
nm,FW	Maximum speed with flux weakening	rpm	431	664		
τon,p	Maximum ON time for peak cycle	s	11	11		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	28600	28600		
Pi	Power dissipation @ Ii	W	14500	14500		
Pc	Power dissipation @ Ic	W	5810	5810		
Td	Max. detent torque (average to peak)	Nm	7.4	7.4		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	57.8	28.9		
Ku	Back EMF constant (*)	Vrms/(rad/s)	33.6	16.8		
Km	Motor constant	Nm/√W	21.7	21.7		
R20	Electrical resistance at 20°C (*)	Ohm	4.74	1.19		
Ld/Lq	Electrical inductance (*)	mH	67.5 / 61.8	16.9 / 15.4		
Isc	Maximum short-circuit current	Arms	28.8	57.5		
nb	Base speed	rpm	71.4	174		
nb,i	Base speed at intermittent duty cycle	rpm	50.0	142		
nb,p	Base speed at peak duty cycle	rpm	35.9	117		
nn	Rated speed	rpm	61.1	153		
Tn	Rated torque	Nm	1210	1180		
In	Rated current	Arms	24.0	47.5		
τth	Thermal time constant	s	155	155		
Rth	Thermal resistance	K/W	0.0174	0.0174		
2p	Number of poles	-	40	40		
J	Rotor inertia	kg·m²	0.263	0.263		
mr	Rotor mass	kg	14.3	14.3		
ms	Stator mass	kg	47.3	47.3		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.251	0.251		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	18	18		
Δpw	Max. pressure drop at qw	bar	1.2	1.2		

Notes: (*) terminal to terminal.
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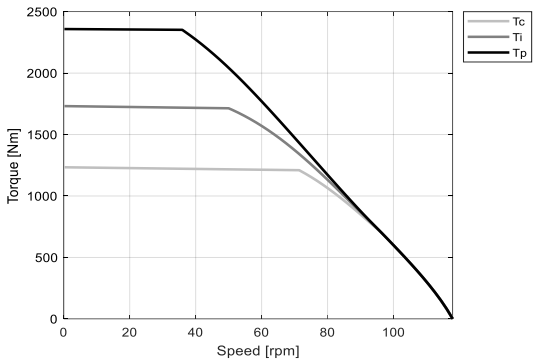
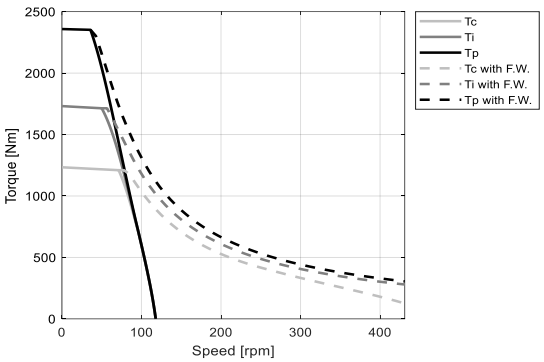
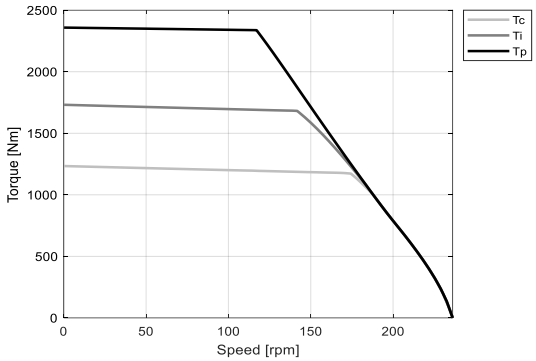
VB - WATER COOLING



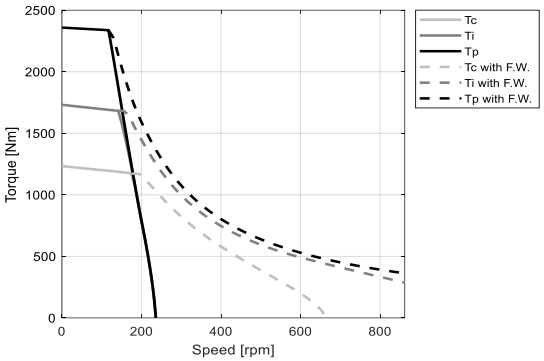
VB - WATER COOLING



VD - WATER COOLING



VD - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0360-150

MOTOR PERFORMANCE		Winding codes	VB	VD		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	3370	3370		
Ti	Intermittent torque	Nm	2460	2460		
Tc	Continuous torque	Nm	1750	1750		
Ts	Standstill torque	Nm	1380	1380		
Ip	Peak current	Arms	60.3	121		
Ii	Intermittent current	Arms	38.1	76.2		
Ic	Continuous current	Arms	24.1	48.2		
Is	Standstill current	Arms	18.3	36.5		
ns	Rated low speed	rpm	0.20	0.20		
nm	Maximum speed without flux weakening	rpm	83.2	167		
nm,FW	Maximum speed with flux weakening	rpm	304	511		
τon,p	Maximum ON time for peak cycle	s	9.9	9.9		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	38500	38500		
Pi	Power dissipation @ Ii	W	19400	19400		
Pc	Power dissipation @ Ic	W	7750	7750		
Td	Max. detent torque (average to peak)	Nm	11	11		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	82.0	41.0		
Ku	Back EMF constant (*)	Vrms/(rad/s)	47.7	23.8		
Km	Motor constant	Nm/√W	26.5	26.5		
R20	Electrical resistance at 20°C (*)	Ohm	6.39	1.60		
Ld/Lq	Electrical inductance (*)	mH	94.8 / 86.3	23.7 / 21.6		
Isc	Maximum short-circuit current	Arms	29.0	58.1		
nb	Base speed	rpm	43.1	116		
nb,i	Base speed at intermittent duty cycle	rpm	23.8	91.2		
nb,p	Base speed at peak duty cycle	rpm	10.1	73.1		
nn	Rated speed	rpm	35.7	102		
Tn	Rated torque	Nm	1730	1700		
In	Rated current	Arms	24.0	47.8		
τth	Thermal time constant	s	153	153		
Rth	Thermal resistance	K/W	0.0126	0.0126		
2p	Number of poles	-	40	40		
J	Rotor inertia	kg·m²	0.371	0.371		
mr	Rotor mass	kg	20.3	20.3		
ms	Stator mass	kg	63.8	63.8		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.350	0.350		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	24	24		
Δpw	Max. pressure drop at qw	bar	2.0	2.0		

Notes: (*) terminal to terminal.
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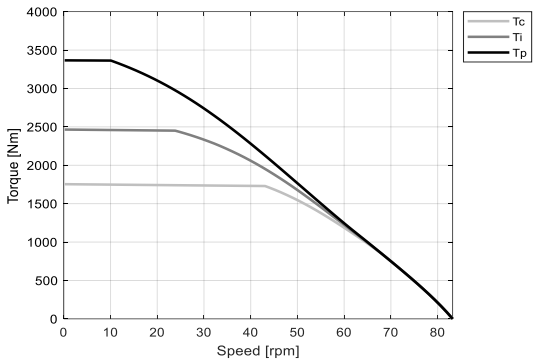
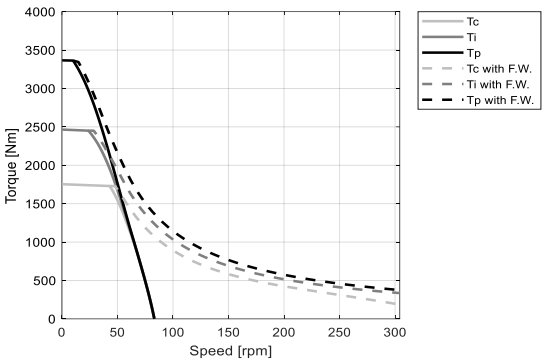
ETEL HIGH DENSITY TORQUE MOTOR TMC0360-150

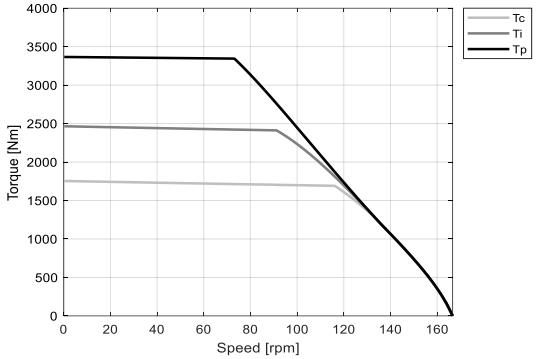
VB - WATER COOLING



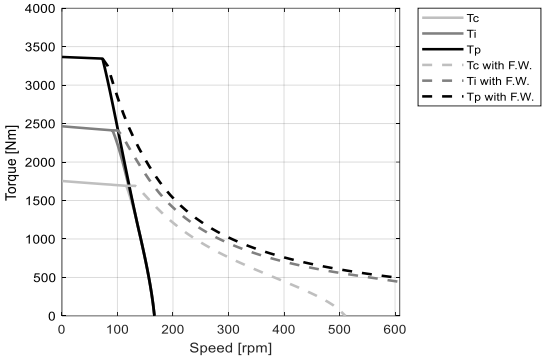
VB - WATER COOLING



VD - WATER COOLING



VD - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0360-200

		Winding codes	VB	VD		
MOTOR PERFORMANCE		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	4150	4350		
Ti	Intermittent torque	Nm	3180	3180		
Tc	Continuous torque	Nm	2260	2260		
Ts	Standstill torque	Nm	1780	1780		
Ip	Peak current	Arms	54.8	120		
Ii	Intermittent current	Arms	37.8	75.6		
Ic	Continuous current	Arms	23.9	47.8		
Is	Standstill current	Arms	18.1	36.2		
ns	Rated low speed	rpm	0.20	0.20		
nm	Maximum speed without flux weakening	rpm	64.3	129		
nm,FW	Maximum speed with flux weakening	rpm	235	414		
τon,p	Maximum ON time for peak cycle	s	12	8.8		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	39400	47500		
Pi	Power dissipation @ Ii	W	23800	23800		
Pc	Power dissipation @ Ic	W	9500	9500		
Td	Max. detent torque (average to peak)	Nm	14	14		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	106	53.1		
Ku	Back EMF constant (*)	Vrms/(rad/s)	61.7	30.8		
Km	Motor constant	Nm/√W	30.6	30.6		
R20	Electrical resistance at 20°C (*)	Ohm	8.05	2.01		
Ld/Lq	Electrical inductance (*)	mH	122 / 111	30.5 / 27.7		
Isc	Maximum short-circuit current	Arms	29.2	58.4		
nb	Base speed	rpm	27.7	84.7		
nb,i	Base speed at intermittent duty cycle	rpm	8.69	63.6		
nb,p	Base speed at peak duty cycle	rpm	0.0	48.5		
nn	Rated speed	rpm	21.8	73.4		
Tn	Rated torque	Nm	2240	2200		
In	Rated current	Arms	23.9	47.5		
τth	Thermal time constant	s	153	153		
Rth	Thermal resistance	K/W	0.00985	0.00985		
2p	Number of poles	-	40	40		
J	Rotor inertia	kg·m²	0.481	0.481		
mr	Rotor mass	kg	26.3	26.3		
ms	Stator mass	kg	81.3	81.3		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.451	0.451		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	30	30		
Δpw	Max. pressure drop at qw	bar	3.8	3.8		

Notes: (*) terminal to terminal.
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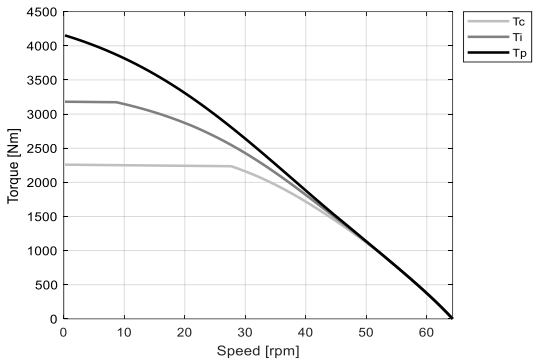
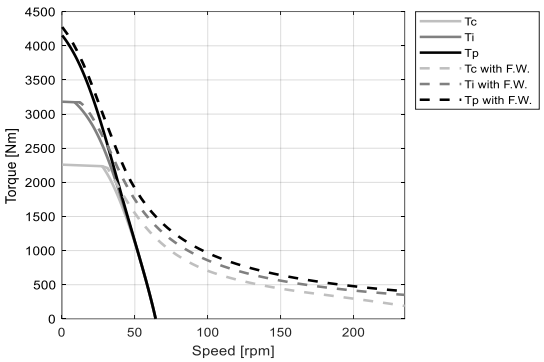
HIGH DENSITY TORQUE MOTOR TMC0360-200

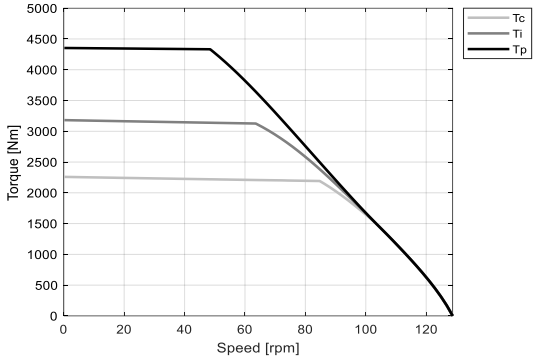
VB - WATER COOLING



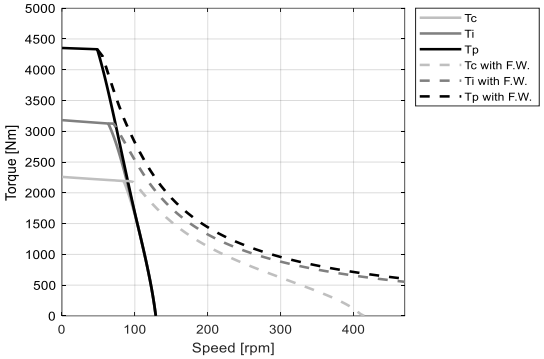
VB - WATER COOLING



VD - WATER COOLING



VD - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0450-030

MOTOR PERFORMANCE		Winding codes	VB	VE		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	1450	1450		
Ti	Intermittent torque	Nm	1080	1080		
Tc	Continuous torque	Nm	782	782		
Ts	Standstill torque	Nm	626	626		
Ip	Peak current	Arms	56.0	140		
Ii	Intermittent current	Arms	35.4	88.4		
Ic	Continuous current	Arms	22.4	55.9		
Is	Standstill current	Arms	16.9	42.4		
ns	Rated low speed	rpm	0.13	0.13		
nm	Maximum speed without flux weakening	rpm	164	412		
nm,FW	Maximum speed with flux weakening	rpm	600	600		
τon,p	Maximum ON time for peak cycle	s	14	14		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	17400	17400		
Pi	Power dissipation @ Ii	W	8890	8890		
Pc	Power dissipation @ Ic	W	3550	3550		
Td	Max. detent torque (average to peak)	Nm	7.0	7.0		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	41.0	16.4		
Ku	Back EMF constant (*)	Vrms/(rad/s)	24.2	9.67		
Km	Motor constant	Nm/√W	18.3	18.3		
R20	Electrical resistance at 20°C (*)	Ohm	3.32	0.532		
Ld/Lq	Electrical inductance (*)	mH	47.4 / 44.2	7.59 / 7.08		
Isc	Maximum short-circuit current	Arms	23.6	58.9		
nb	Base speed	rpm	109	347		
nb,i	Base speed at intermittent duty cycle	rpm	86.1	277		
nb,p	Base speed at peak duty cycle	rpm	70.4	222		
nn	Rated speed	rpm	95.6	309		
Tn	Rated torque	Nm	761	563		
In	Rated current	Arms	22.2	39.3		
τth	Thermal time constant	s	184	184		
Rth	Thermal resistance	K/W	0.0298	0.0298		
2p	Number of poles	-	50	50		
J	Rotor inertia	kg·m²	0.262	0.262		
mr	Rotor mass	kg	8.54	8.54		
ms	Stator mass	kg	38.0	38.0		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.148	0.148		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	11	11		
Δpw	Max. pressure drop at qw	bar	0.4	0.4		

Notes: (*) terminal to terminal.
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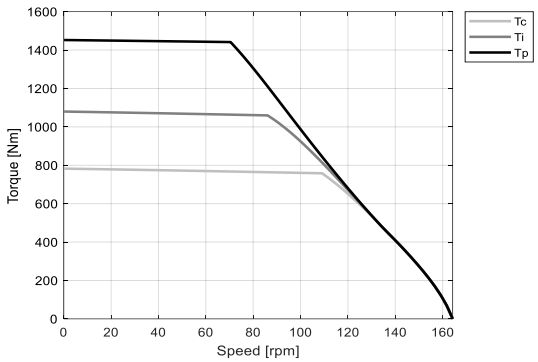
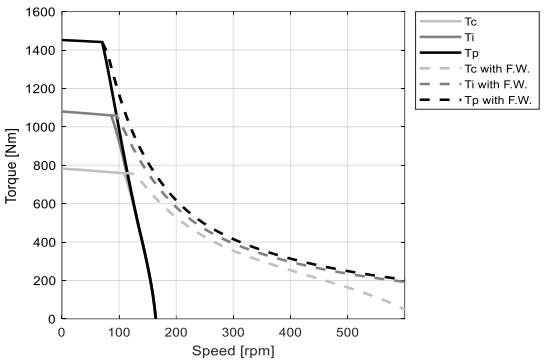
ETEL HIGH DENSITY TORQUE MOTOR TMC0450-030

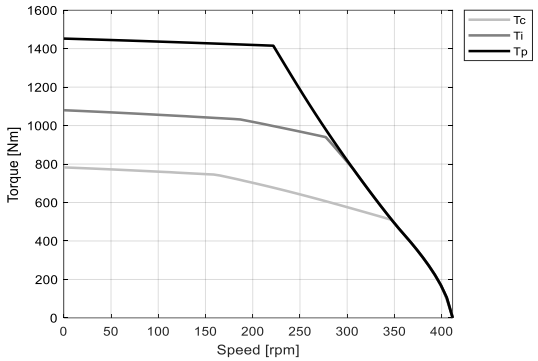
VB - WATER COOLING



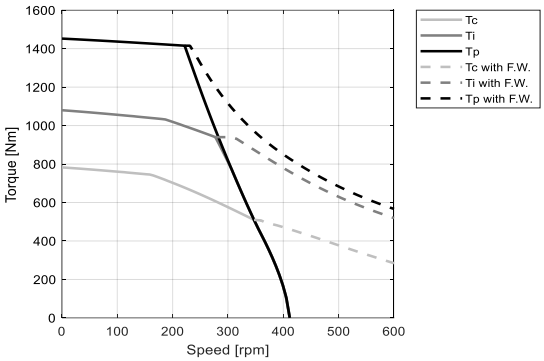
VB - WATER COOLING



VE - WATER COOLING



VE - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR

TMC0450-050

MOTOR PERFORMANCE		Winding codes	VB	VE		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	2100	2100		
Ti	Intermittent torque	Nm	1560	1560		
Tc	Continuous torque	Nm	1130	1130		
Ts	Standstill torque	Nm	903	903		
Ip	Peak current	Arms	57.0	143		
Ii	Intermittent current	Arms	36.0	90.0		
Ic	Continuous current	Arms	22.8	56.9		
Is	Standstill current	Arms	17.3	43.1		
ns	Rated low speed	rpm	0.13	0.13		
nm	Maximum speed without flux weakening	rpm	117	294		
nm,FW	Maximum speed with flux weakening	rpm	429	550		
τon,p	Maximum ON time for peak cycle	s	13	13		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	22900	22900		
Pi	Power dissipation @ Ii	W	11700	11700		
Pc	Power dissipation @ Ic	W	4680	4680		
Td	Max. detent torque (average to peak)	Nm	10	10		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	57.7	23.1		
Ku	Back EMF constant (*)	Vrms/(rad/s)	33.9	13.5		
Km	Motor constant	Nm/√W	22.9	22.9		
R20	Electrical resistance at 20°C (*)	Ohm	4.23	0.677		
Ld/Lq	Electrical inductance (*)	mH	65.5 / 60.5	10.5 / 9.68		
Isc	Maximum short-circuit current	Arms	23.9	59.7		
nb	Base speed	rpm	72.6	232		
nb,i	Base speed at intermittent duty cycle	rpm	54.2	185		
nb,p	Base speed at peak duty cycle	rpm	42.2	152		
nn	Rated speed	rpm	63.0	203		
Tn	Rated torque	Nm	1110	968		
In	Rated current	Arms	22.6	49.0		
τth	Thermal time constant	s	180	180		
Rth	Thermal resistance	K/W	0.0224	0.0224		
2p	Number of poles	-	50	50		
J	Rotor inertia	kg·m²	0.365	0.365		
mr	Rotor mass	kg	11.9	11.9		
ms	Stator mass	kg	49.0	49.0		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.200	0.200		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	15	15		
Δpw	Max. pressure drop at qw	bar	0.7	0.7		

Notes: (*) terminal to terminal.
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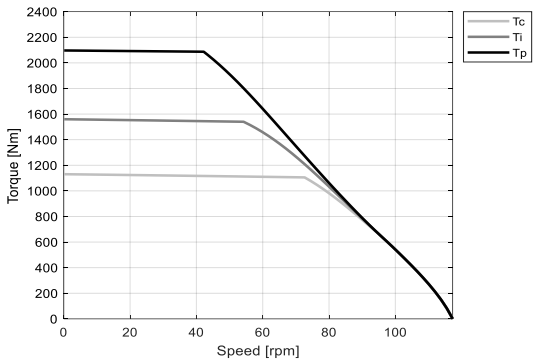
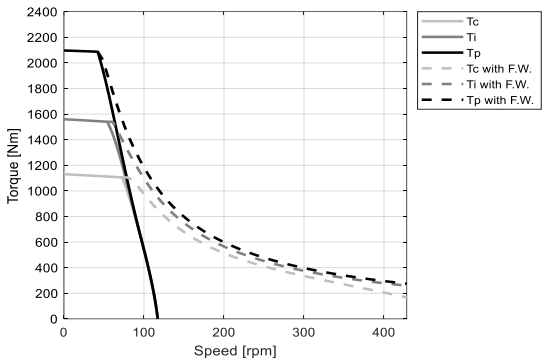
ETEL HIGH DENSITY TORQUE MOTOR TMC0450-050

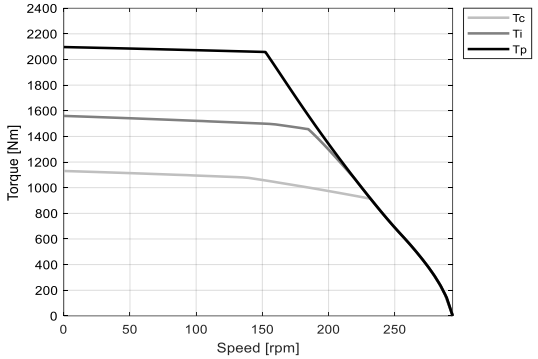
VB - WATER COOLING



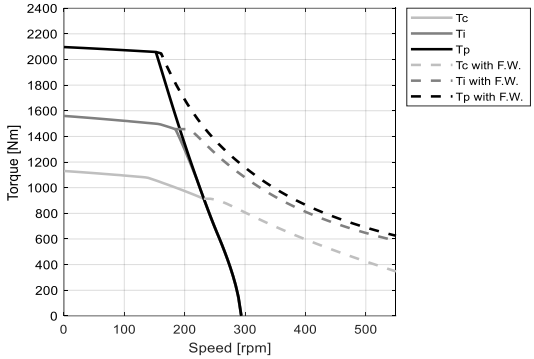
VB - WATER COOLING



VE - WATER COOLING



VE - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0450-070

MOTOR PERFORMANCE		Winding codes	VB	VE		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	2750	2750		
Ti	Intermittent torque	Nm	2050	2050		
Tc	Continuous torque	Nm	1480	1480		
Ts	Standstill torque	Nm	1180	1180		
Ip	Peak current	Arms	57.8	144		
Ii	Intermittent current	Arms	36.5	91.4		
Ic	Continuous current	Arms	23.1	57.8		
Is	Standstill current	Arms	17.5	43.8		
ns	Rated low speed	rpm	0.14	0.14		
nm	Maximum speed without flux weakening	rpm	91.2	228		
nm,FW	Maximum speed with flux weakening	rpm	333	550		
τon,p	Maximum ON time for peak cycle	s	13	13		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	28500	28500		
Pi	Power dissipation @ Ii	W	14600	14600		
Pc	Power dissipation @ Ic	W	5830	5830		
Td	Max. detent torque (average to peak)	Nm	13	13		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	74.4	29.8		
Ku	Back EMF constant (*)	Vrms/(rad/s)	43.5	17.4		
Km	Motor constant	Nm/√W	26.8	26.8		
R20	Electrical resistance at 20°C (*)	Ohm	5.14	0.823		
Ld/Lq	Electrical inductance (*)	mH	83.7 / 76.7	13.4 / 12.3		
Isc	Maximum short-circuit current	Arms	24.0	60.0		
nb	Base speed	rpm	52.2	172		
nb,i	Base speed at intermittent duty cycle	rpm	35.9	136		
nb,p	Base speed at peak duty cycle	rpm	25.5	114		
nn	Rated speed	rpm	44.6	150		
Tn	Rated torque	Nm	1460	1360		
In	Rated current	Arms	23.0	53.6		
τth	Thermal time constant	s	175	175		
Rth	Thermal resistance	K/W	0.0178	0.0178		
2p	Number of poles	-	50	50		
J	Rotor inertia	kg·m²	0.469	0.469		
mr	Rotor mass	kg	15.3	15.3		
ms	Stator mass	kg	58.7	58.7		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.252	0.252		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	18	18		
Δpw	Max. pressure drop at qw	bar	0.9	0.9		

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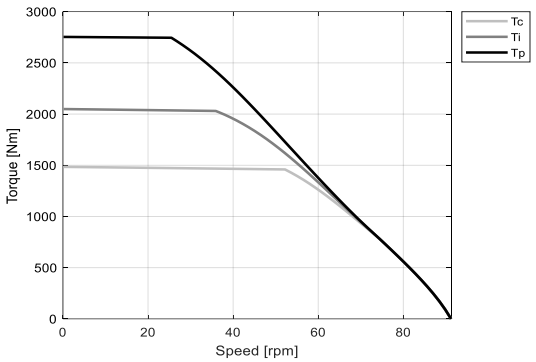
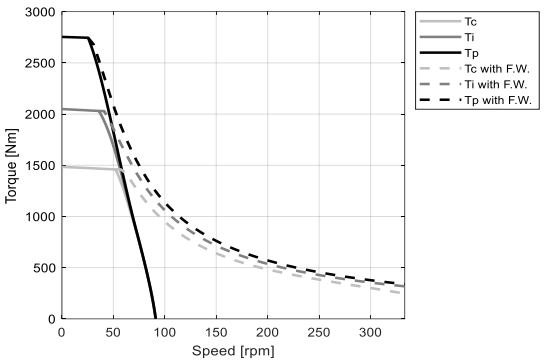
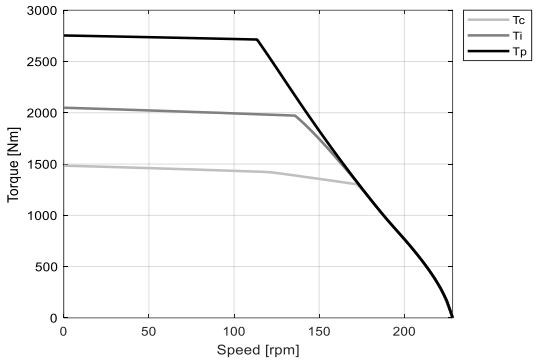
VB - WATER COOLING



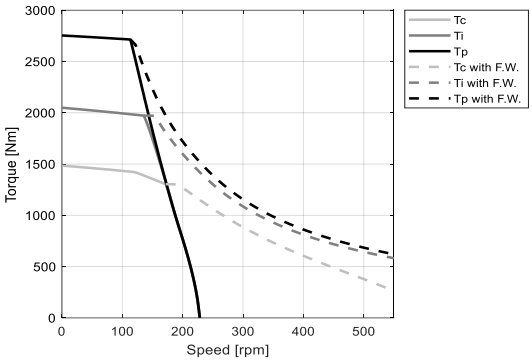
VB - WATER COOLING



VE - WATER COOLING



VE - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0450-100

MOTOR PERFORMANCE		Winding codes	WB	WE		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	3710	3710		
Ti	Intermittent torque	Nm	2750	2750		
Tc	Continuous torque	Nm	1990	1990		
Ts	Standstill torque	Nm	1580	1580		
Ip	Peak current	Arms	73.8	184		
Ii	Intermittent current	Arms	46.6	117		
Ic	Continuous current	Arms	29.5	73.7		
Is	Standstill current	Arms	22.3	55.9		
ns	Rated low speed	rpm	0.14	0.14		
nm	Maximum speed without flux weakening	rpm	87.9	220		
nm,FW	Maximum speed with flux weakening	rpm	321	530		
τon,p	Maximum ON time for peak cycle	s	11	11		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	36600	36600		
Pi	Power dissipation @ Ii	W	18600	18600		
Pc	Power dissipation @ Ic	W	7430	7430		
Td	Max. detent torque (average to peak)	Nm	18	18		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	77.5	31.0		
Ku	Back EMF constant (*)	Vrms/(rad/s)	45.2	18.1		
Km	Motor constant	Nm/√W	31.5	31.5		
R20	Electrical resistance at 20°C (*)	Ohm	4.04	0.647		
Ld/Lq	Electrical inductance (*)	mH	67.3 / 61.5	10.8 / 9.84		
Isc	Maximum short-circuit current	Arms	31.0	77.6		
nb	Base speed	rpm	50.5	168		
nb,i	Base speed at intermittent duty cycle	rpm	34.7	133		
nb,p	Base speed at peak duty cycle	rpm	24.4	109		
nn	Rated speed	rpm	43.2	146		
Tn	Rated torque	Nm	1960	1780		
In	Rated current	Arms	29.4	66.7		
τth	Thermal time constant	s	171	171		
Rth	Thermal resistance	K/W	0.0137	0.0137		
2p	Number of poles	-	50	50		
J	Rotor inertia	kg·m²	0.623	0.623		
mr	Rotor mass	kg	20.3	20.3		
ms	Stator mass	kg	74.4	74.4		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.330	0.330		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	23	23		
Δpw	Max. pressure drop at qw	bar	1.7	1.7		

Notes: (*) terminal to terminal.
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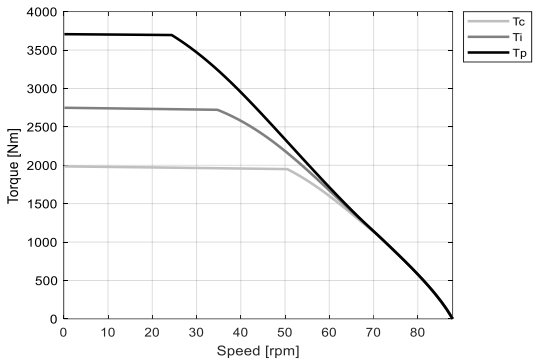
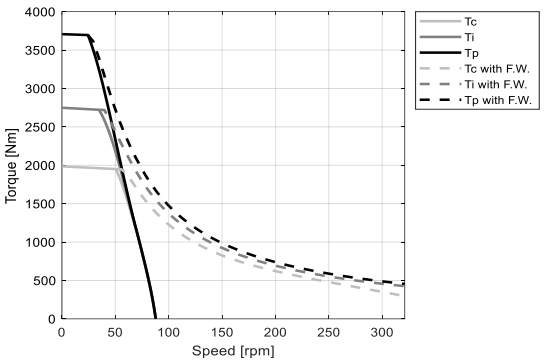
ETEL HIGH DENSITY TORQUE MOTOR TMC0450-100

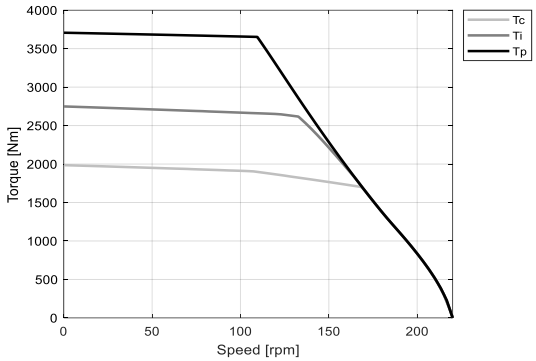
WB - WATER COOLING



WB - WATER COOLING



WE - WATER COOLING



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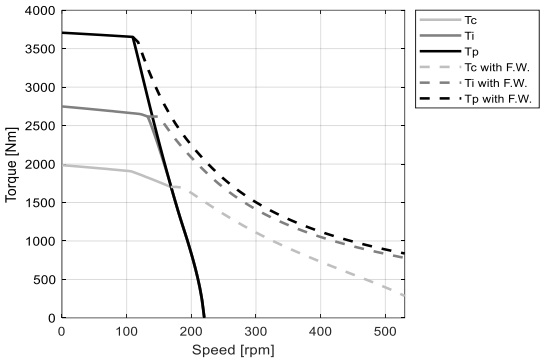

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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0450-150

		Winding codes	WB	WE		
MOTOR PERFORMANCE		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	5310	5310		
Ti	Intermittent torque	Nm	3930	3930		
Tc	Continuous torque	Nm	2830	2830		
Ts	Standstill torque	Nm	2250	2250		
Ip	Peak current	Arms	73.8	184		
Ii	Intermittent current	Arms	46.6	117		
Ic	Continuous current	Arms	29.5	73.7		
Is	Standstill current	Arms	22.3	55.9		
ns	Rated low speed	rpm	0.14	0.14		
nm	Maximum speed without flux weakening	rpm	62.0	155		
nm,FW	Maximum speed with flux weakening	rpm	227	454		
τon,p	Maximum ON time for peak cycle	s	9.7	9.7		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	49200	49200		
Pi	Power dissipation @ Ii	W	24800	24800		
Pc	Power dissipation @ Ic	W	9920	9920		
Td	Max. detent torque (average to peak)	Nm	25	25		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	110	44.1		
Ku	Back EMF constant (*)	Vrms/(rad/s)	64.0	25.6		
Km	Motor constant	Nm/√W	38.5	38.5		
R20	Electrical resistance at 20°C (*)	Ohm	5.46	0.873		
Ld/Lq	Electrical inductance (*)	mH	94.8 / 86.5	15.2 / 13.8		
Isc	Maximum short-circuit current	Arms	31.2	77.9		
nb	Base speed	rpm	30.2	111		
nb,i	Base speed at intermittent duty cycle	rpm	15.8	86.6		
nb,p	Base speed at peak duty cycle	rpm	5.11	70.8		
nn	Rated speed	rpm	24.9	96.2		
Tn	Rated torque	Nm	2800	2680		
In	Rated current	Arms	29.4	71.1		
τth	Thermal time constant	s	170	170		
Rth	Thermal resistance	K/W	0.00989	0.00989		
2p	Number of poles	-	50	50		
J	Rotor inertia	kg·m²	0.883	0.883		
mr	Rotor mass	kg	28.8	28.8		
ms	Stator mass	kg	100	100		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.459	0.459		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	31	31		
Δpw	Max. pressure drop at qw	bar	2.7	2.7		

Notes: (*) terminal to terminal.
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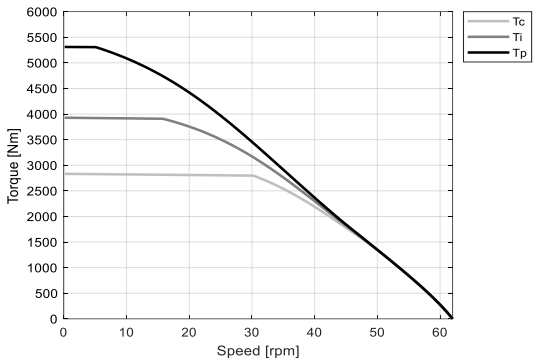
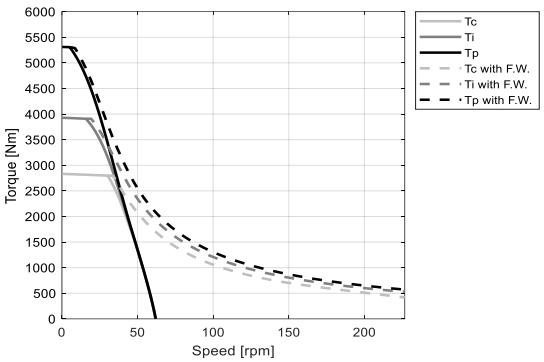
ETEL HIGH DENSITY TORQUE MOTOR TMC0450-150

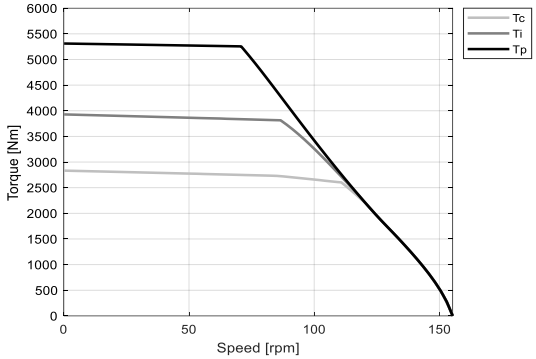
WB - WATER COOLING



WB - WATER COOLING



WE - WATER COOLING



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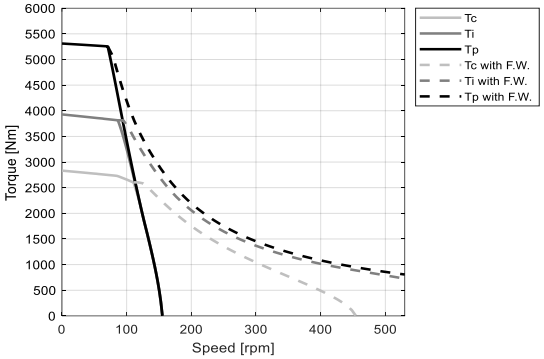

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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0450-200

MOTOR PERFORMANCE		Winding codes	WB	WE		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	6450	6870		
Ti	Intermittent torque	Nm	5080	5080		
Tc	Continuous torque	Nm	3660	3660		
Ts	Standstill torque	Nm	2910	2910		
Ip	Peak current	Arms	64.7	183		
Ii	Intermittent current	Arms	46.3	116		
Ic	Continuous current	Arms	29.3	73.3		
Is	Standstill current	Arms	22.2	55.5		
ns	Rated low speed	rpm	0.14	0.14		
nm	Maximum speed without flux weakening	rpm	47.9	120		
nm,FW	Maximum speed with flux weakening	rpm	175	376		
τon,p	Maximum ON time for peak cycle	s	14	8.6		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	46500	60800		
Pi	Power dissipation @ Ii	W	30500	30500		
Pc	Power dissipation @ Ic	W	12200	12200		
Td	Max. detent torque (average to peak)	Nm	33	33		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	143	57.2		
Ku	Back EMF constant (*)	Vrms/(rad/s)	82.8	33.1		
Km	Motor constant	Nm/√W	44.6	44.6		
R20	Electrical resistance at 20°C (*)	Ohm	6.86	1.10		
Ld/Lq	Electrical inductance (*)	mH	122 / 112	19.6 / 17.9		
Isc	Maximum short-circuit current	Arms	31.2	78.1		
nb	Base speed	rpm	19.2	80.9		
nb,i	Base speed at intermittent duty cycle	rpm	4.56	62.2		
nb,p	Base speed at peak duty cycle	rpm	0.0	49.5		
nn	Rated speed	rpm	14.9	69.9		
Tn	Rated torque	Nm	3640	3540		
In	Rated current	Arms	29.3	72.5		
τth	Thermal time constant	s	170	170		
Rth	Thermal resistance	K/W	0.00775	0.00775		
2p	Number of poles	-	50	50		
J	Rotor inertia	kg·m²	1.15	1.15		
mr	Rotor mass	kg	37.4	37.4		
ms	Stator mass	kg	128	128		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.592	0.592		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	38	38		
Δpw	Max. pressure drop at qw	bar	5.0	5.0		

Notes: (*) terminal to terminal.
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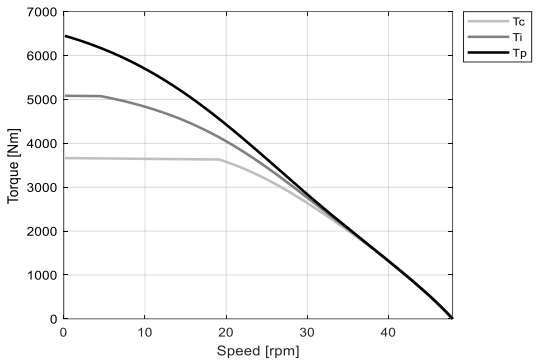
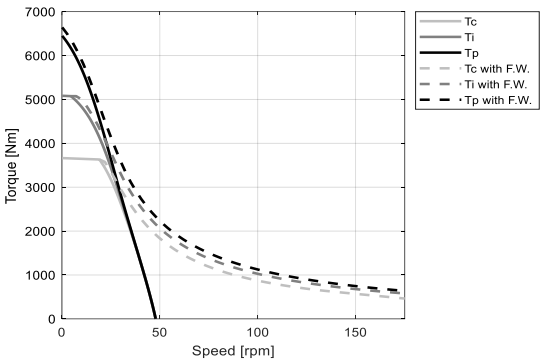
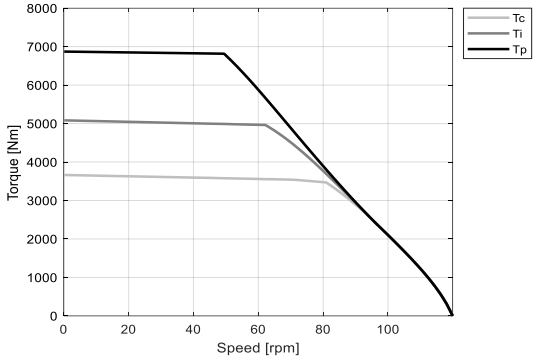
WB - WATER COOLING



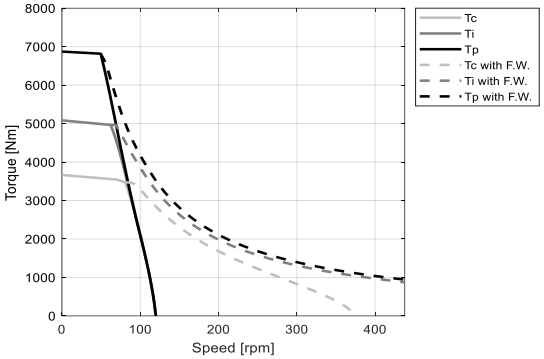
WB - WATER COOLING



WE - WATER COOLING



WE - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR

TMC0530-030

MOTOR PERFORMANCE		Winding codes	VC	VF		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	2190	2190		
Ti	Intermittent torque	Nm	1620	1620		
Tc	Continuous torque	Nm	1170	1170		
Ts	Standstill torque	Nm	931	931		
Ip	Peak current	Arms	78.0	156		
Ii	Intermittent current	Arms	49.3	98.5		
Ic	Continuous current	Arms	31.2	62.3		
Is	Standstill current	Arms	23.6	47.2		
ns	Rated low speed	rpm	0.092	0.092		
nm	Maximum speed without flux weakening	rpm	154	308		
nm,FW	Maximum speed with flux weakening	rpm	544	544		
τon,p	Maximum ON time for peak cycle	s	18	18		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	20100	20100		
Pi	Power dissipation @ Ii	W	10300	10300		
Pc	Power dissipation @ Ic	W	4100	4100		
Td	Max. detent torque (average to peak)	Nm	7.4	7.4		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	43.0	21.5		
Ku	Back EMF constant (*)	Vrms/(rad/s)	25.8	12.9		
Km	Motor constant	Nm/√W	25.0	25.0		
R20	Electrical resistance at 20°C (*)	Ohm	1.98	0.495		
Ld/Lq	Electrical inductance (*)	mH	32.0 / 27.5	7.99 / 6.86		
Isc	Maximum short-circuit current	Arms	31.1	62.2		
nb	Base speed	rpm	108	252		
nb,i	Base speed at intermittent duty cycle	rpm	87.8	207		
nb,p	Base speed at peak duty cycle	rpm	73.8	172		
nn	Rated speed	rpm	94.8	225		
Tn	Rated torque	Nm	1130	928		
In	Rated current	Arms	30.7	49.3		
τth	Thermal time constant	s	218	218		
Rth	Thermal resistance	K/W	0.0258	0.0258		
2p	Number of poles	-	60	60		
J	Rotor inertia	kg·m²	0.528	0.528		
mr	Rotor mass	kg	11.8	11.8		
ms	Stator mass	kg	46.3	46.3		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.184	0.184		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	13	13		
Δpw	Max. pressure drop at qw	bar	0.4	0.4		

Notes: (*) terminal to terminal.
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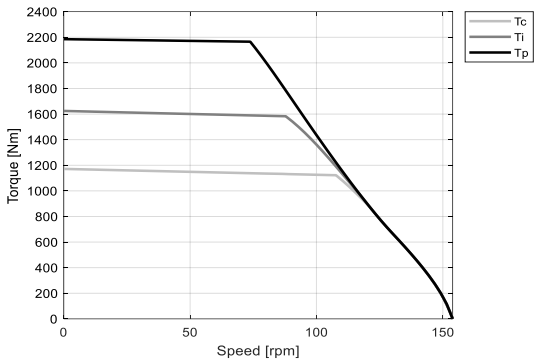
ETEL

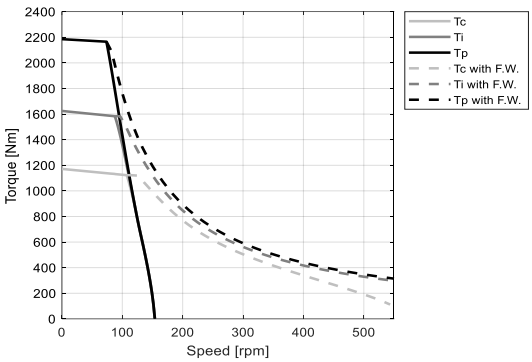
HIGH DENSITY TORQUE MOTOR

TMC0530-030

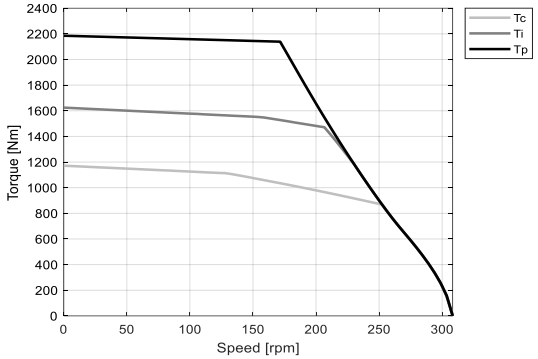
VC - WATER COOLING



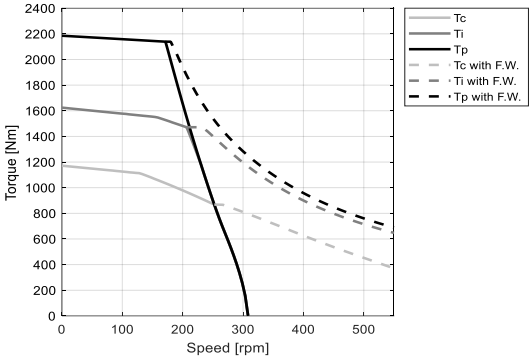
VC - WATER COOLING



VF - WATER COOLING



VF - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR

TMC0530-050

MOTOR PERFORMANCE		Winding codes	VC	VF		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	3120	3120		
Ti	Intermittent torque	Nm	2320	2320		
Tc	Continuous torque	Nm	1680	1680		
Ts	Standstill torque	Nm	1340	1340		
Ip	Peak current	Arms	79.3	159		
Ii	Intermittent current	Arms	50.1	100		
Ic	Continuous current	Arms	31.7	63.4		
Is	Standstill current	Arms	24.0	48.0		
ns	Rated low speed	rpm	0.094	0.094		
nm	Maximum speed without flux weakening	rpm	110	220		
nm,FW	Maximum speed with flux weakening	rpm	401	500		
τon,p	Maximum ON time for peak cycle	s	17	17		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	26400	26400		
Pi	Power dissipation @ Ii	W	13500	13500		
Pc	Power dissipation @ Ic	W	5400	5400		
Td	Max. detent torque (average to peak)	Nm	11	11		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	61.0	30.5		
Ku	Back EMF constant (*)	Vrms/(rad/s)	36.1	18.1		
Km	Motor constant	Nm/√W	31.3	31.3		
R20	Electrical resistance at 20°C (*)	Ohm	2.52	0.631		
Ld/Lq	Electrical inductance (*)	mH	42.3 / 36.5	10.6 / 9.11		
Isc	Maximum short-circuit current	Arms	32.9	65.8		
nb	Base speed	rpm	73.8	174		
nb,i	Base speed at intermittent duty cycle	rpm	58.1	142		
nb,p	Base speed at peak duty cycle	rpm	47.6	120		
nn	Rated speed	rpm	64.4	154		
Tn	Rated torque	Nm	1630	1470		
In	Rated current	Arms	31.4	56.1		
τth	Thermal time constant	s	213	213		
Rth	Thermal resistance	K/W	0.0195	0.0195		
2p	Number of poles	-	60	60		
J	Rotor inertia	kg·m²	0.737	0.737		
mr	Rotor mass	kg	16.5	16.5		
ms	Stator mass	kg	59.8	59.8		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.246	0.246		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	17	17		
Δpw	Max. pressure drop at qw	bar	0.7	0.7		

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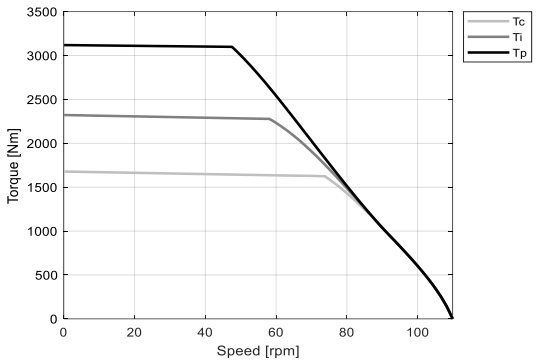
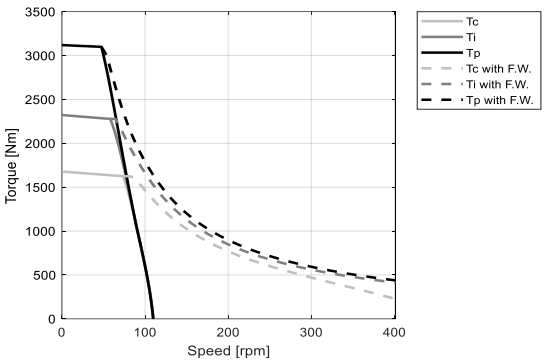
ETEL HIGH DENSITY TORQUE MOTOR TMC0530-050

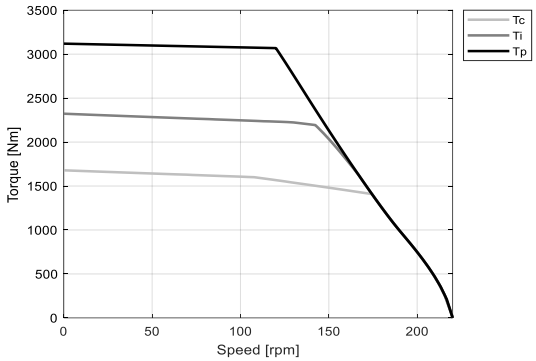
VC - WATER COOLING



VC - WATER COOLING



VF - WATER COOLING



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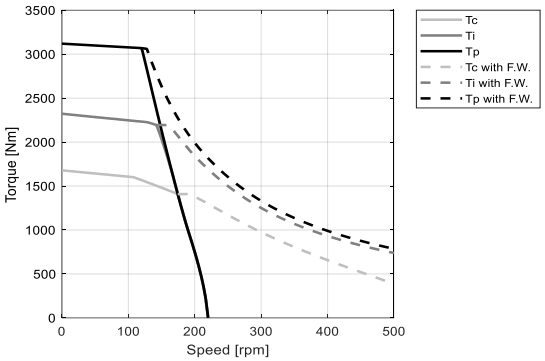

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TMC Standard

HIGH DENSITY TORQUE MOTOR

TMC0530-070

		Winding codes	VC	VF		
MOTOR PERFORMANCE		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	4070	4070		
Ti	Intermittent torque	Nm	3030	3030		
Tc	Continuous torque	Nm	2190	2190		
Ts	Standstill torque	Nm	1750	1750		
Ip	Peak current	Arms	80.5	161		
Ii	Intermittent current	Arms	50.8	102		
Ic	Continuous current	Arms	32.2	64.3		
Is	Standstill current	Arms	24.4	48.7		
ns	Rated low speed	rpm	0.097	0.097		
nm	Maximum speed without flux weakening	rpm	85.5	171		
nm,FW	Maximum speed with flux weakening	rpm	312	480		
τon,p	Maximum ON time for peak cycle	s	16	16		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	33100	33100		
Pi	Power dissipation @ Ii	W	16800	16800		
Pc	Power dissipation @ Ic	W	6730	6730		
Td	Max. detent torque (average to peak)	Nm	14	14		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	78.9	39.4		
Ku	Back EMF constant (*)	Vrms/(rad/s)	46.5	23.2		
Km	Motor constant	Nm/√W	36.8	36.8		
R20	Electrical resistance at 20°C (*)	Ohm	3.07	0.767		
Ld/Lq	Electrical inductance (*)	mH	52.5 / 45.4	13.1 / 11.4		
Isc	Maximum short-circuit current	Arms	34.0	68.1		
nb	Base speed	rpm	54.3	132		
nb,i	Base speed at intermittent duty cycle	rpm	40.8	106		
nb,p	Base speed at peak duty cycle	rpm	31.7	90.1		
nn	Rated speed	rpm	47.0	115		
Tn	Rated torque	Nm	2150	2010		
In	Rated current	Arms	31.9	59.9		
τth	Thermal time constant	s	207	207		
Rth	Thermal resistance	K/W	0.0154	0.0154		
2p	Number of poles	-	60	60		
J	Rotor inertia	kg·m²	0.946	0.946		
mr	Rotor mass	kg	21.1	21.1		
ms	Stator mass	kg	71.8	71.8		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.309	0.309		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	21	21		
Δpw	Max. pressure drop at qw	bar	0.9	0.9		

Notes: (*) terminal to terminal.
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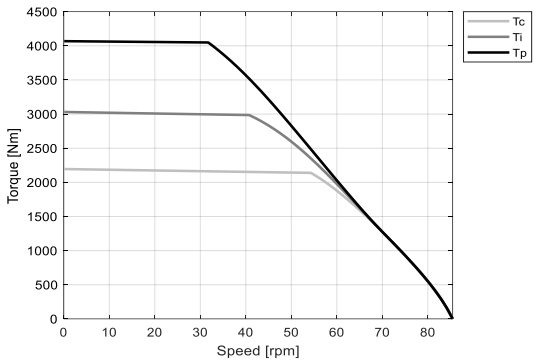
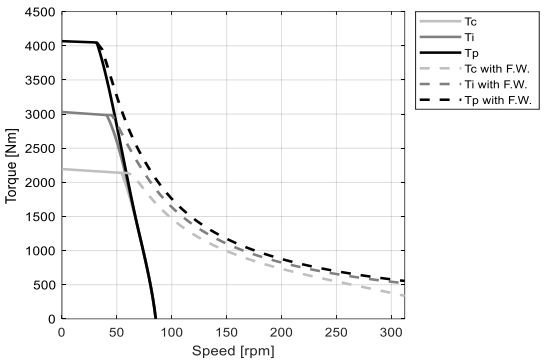
ETEL HIGH DENSITY TORQUE MOTOR TMC0530-070

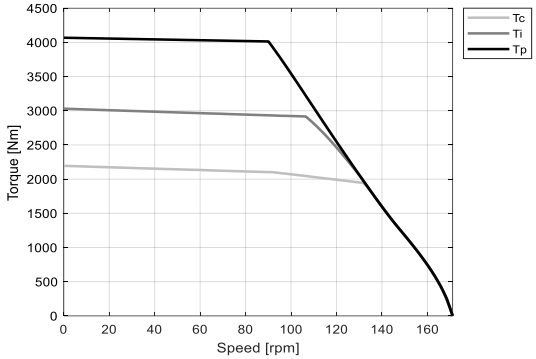
VC - WATER COOLING



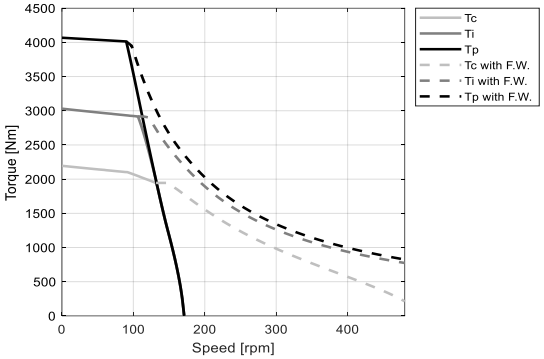
VC - WATER COOLING



VF - WATER COOLING



VF - WATER COOLING



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TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0530-100

MOTOR PERFORMANCE		Winding codes	VC	VF		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	5480	5480		
Ti	Intermittent torque	Nm	4080	4080		
Tc	Continuous torque	Nm	2960	2960		
Ts	Standstill torque	Nm	2360	2360		
Ip	Peak current	Arms	81.3	163		
Ii	Intermittent current	Arms	51.3	103		
Ic	Continuous current	Arms	32.5	64.9		
Is	Standstill current	Arms	24.6	49.2		
ns	Rated low speed	rpm	0.099	0.099		
nm	Maximum speed without flux weakening	rpm	64.1	128		
nm,FW	Maximum speed with flux weakening	rpm	234	412		
τon,p	Maximum ON time for peak cycle	s	14	14		
τon,i	Maximum ON time for intermittent cycle	s	2.7	2.7		
Pp	Power dissipation @ Ip	W	42600	42600		
Pi	Power dissipation @ Ii	W	21600	21600		
Pc	Power dissipation @ Ic	W	8640	8640		
Td	Max. detent torque (average to peak)	Nm	19	19		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	106	52.9		
Ku	Back EMF constant (*)	Vrms/(rad/s)	61.9	31.0		
Km	Motor constant	Nm/√W	43.9	43.9		
R20	Electrical resistance at 20°C (*)	Ohm	3.88	0.970		
Ld/Lq	Electrical inductance (*)	mH	68.0 / 58.9	17.0 / 14.7		
Isc	Maximum short-circuit current	Arms	35.1	70.2		
nb	Base speed	rpm	37.1	94.1		
nb,i	Base speed at intermittent duty cycle	rpm	25.0	75.7		
nb,p	Base speed at peak duty cycle	rpm	16.9	63.2		
nn	Rated speed	rpm	31.5	81.9		
Tn	Rated torque	Nm	2910	2820		
In	Rated current	Arms	32.3	63.4		
τth	Thermal time constant	s	203	203		
Rth	Thermal resistance	K/W	0.0118	0.0118		
2p	Number of poles	-	60	60		
J	Rotor inertia	kg·m²	1.26	1.26		
mr	Rotor mass	kg	28.1	28.1		
ms	Stator mass	kg	91.1	91.1		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.403	0.403		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	27	27		
Δpw	Max. pressure drop at qw	bar	1.7	1.7		

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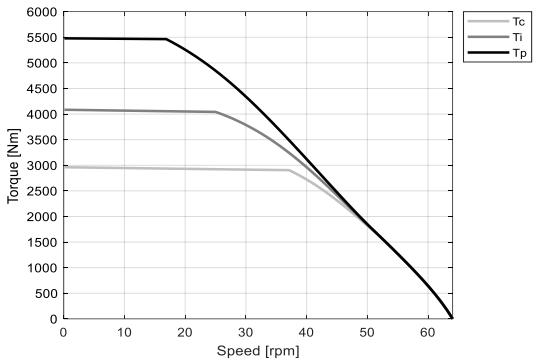
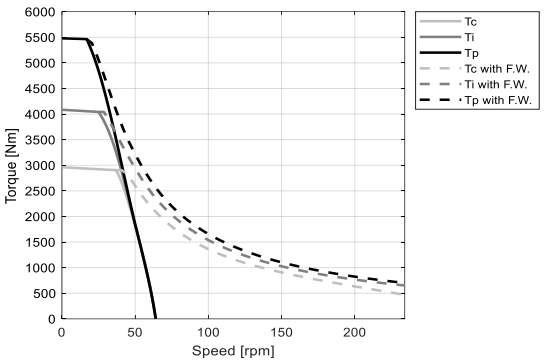
HIGH DENSITY TORQUE MOTOR TMC0530-100

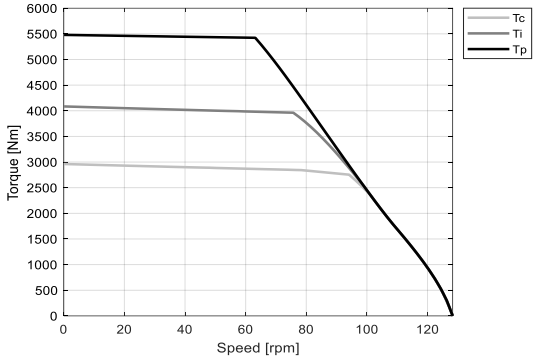
VC - WATER COOLING



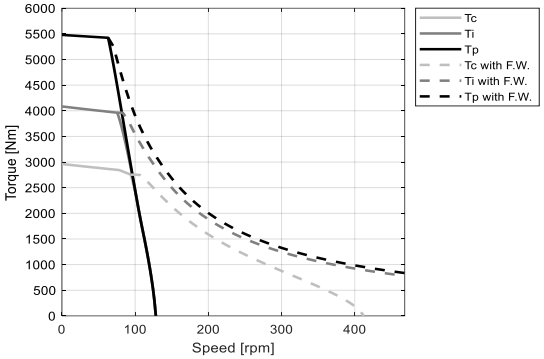
VC - WATER COOLING



VF - WATER COOLING



VF - WATER COOLING



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TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0530-150

MOTOR PERFORMANCE		Winding codes	VC	VF		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	7790	7790		
Ti	Intermittent torque	Nm	5810	5810		
Tc	Continuous torque	Nm	4210	4210		
Ts	Standstill torque	Nm	3360	3360		
Ip	Peak current	Arms	81.0	162		
Ii	Intermittent current	Arms	51.3	103		
Ic	Continuous current	Arms	32.4	64.9		
Is	Standstill current	Arms	24.6	49.2		
ns	Rated low speed	rpm	0.099	0.099		
nm	Maximum speed without flux weakening	rpm	45.2	90.5		
nm,FW	Maximum speed with flux weakening	rpm	165	312		
τon,p	Maximum ON time for peak cycle	s	12	12		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	57000	57000		
Pi	Power dissipation @ Ii	W	28900	28900		
Pc	Power dissipation @ Ic	W	11600	11600		
Td	Max. detent torque (average to peak)	Nm	26	26		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	151	75.3		
Ku	Back EMF constant (*)	Vrms/(rad/s)	87.8	43.9		
Km	Motor constant	Nm/√W	53.7	53.7		
R20	Electrical resistance at 20°C (*)	Ohm	5.24	1.31		
Ld/Lq	Electrical inductance (*)	mH	93.7 / 81.6	23.4 / 20.4		
Isc	Maximum short-circuit current	Arms	36.0	72.1		
nb	Base speed	rpm	21.8	61.6		
nb,i	Base speed at intermittent duty cycle	rpm	10.2	48.2		
nb,p	Base speed at peak duty cycle	rpm	1.27	38.7		
nn	Rated speed	rpm	17.7	53.7		
Tn	Rated torque	Nm	4160	4080		
In	Rated current	Arms	32.4	64.3		
τth	Thermal time constant	s	201	201		
Rth	Thermal resistance	K/W	0.00854	0.00854		
2p	Number of poles	-	60	60		
J	Rotor inertia	kg·m²	1.78	1.78		
mr	Rotor mass	kg	39.8	39.8		
ms	Stator mass	kg	123	123		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.561	0.561		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	36	36		
Δpw	Max. pressure drop at qw	bar	2.8	2.8		

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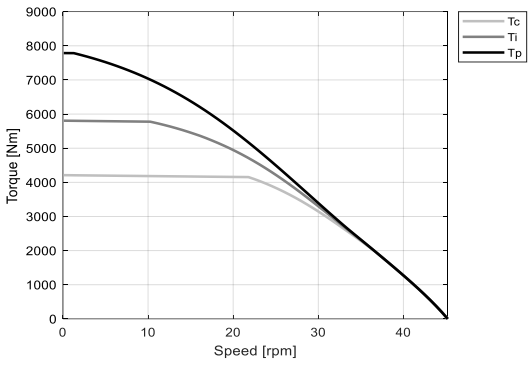
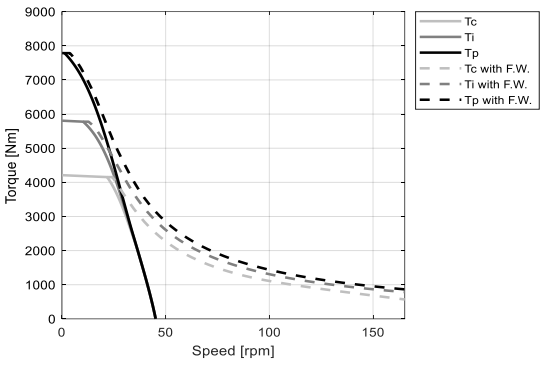
ETEL HIGH DENSITY TORQUE MOTOR TMC0530-150

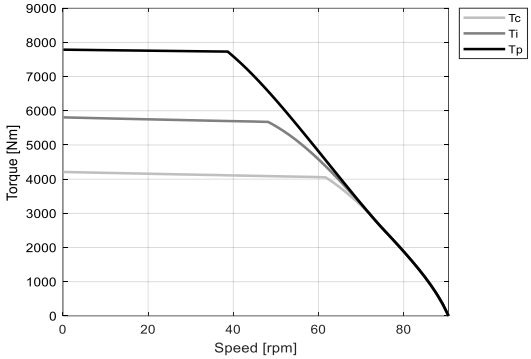
VC - WATER COOLING



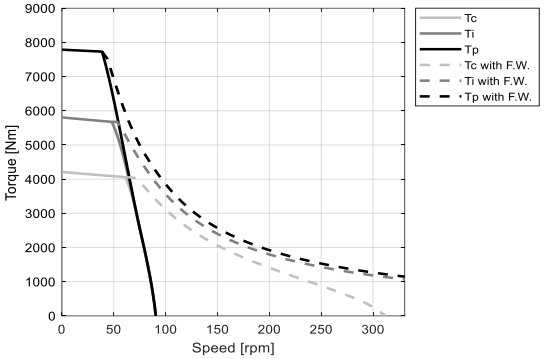
VC - WATER COOLING



VF - WATER COOLING



VF - WATER COOLING



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ETEL

TMC Standard

HIGH DENSITY TORQUE MOTOR — TMC0530-200

MOTOR PERFORMANCE		Winding codes	VF	VL		
		UNIT	WATER COOLING	WATER COOLING		
Tp	Peak torque	Nm	10100	10100		
Ti	Intermittent torque	Nm	7490	7490		
Tc	Continuous torque	Nm	5430	5430		
Ts	Standstill torque	Nm	4330	4330		
Ip	Peak current	Arms	161	322		
Ii	Intermittent current	Arms	102	204		
Ic	Continuous current	Arms	64.4	129		
Is	Standstill current	Arms	48.8	97.6		
ns	Rated low speed	rpm	0.099	0.099		
nm	Maximum speed without flux weakening	rpm	69.9	140		
nm,FW	Maximum speed with flux weakening	rpm	248	353		
τon,p	Maximum ON time for peak cycle	s	10	10		
τon,i	Maximum ON time for intermittent cycle	s	2.8	2.8		
Pp	Power dissipation @ Ip	W	70700	70700		
Pi	Power dissipation @ Ii	W	35500	35500		
Pc	Power dissipation @ Ic	W	14200	14200		
Td	Max. detent torque (average to peak)	Nm	34	34		

MOTOR SETTING		UNIT				
Kt	Torque constant	Nm/Arms	97.7	48.9		
Ku	Back EMF constant (*)	Vrms/(rad/s)	56.8	28.4		
Km	Motor constant	Nm/√W	62.1	62.1		
R20	Electrical resistance at 20°C (*)	Ohm	1.65	0.413		
Ld/Lq	Electrical inductance (*)	mH	29.9 / 26.1	7.47 / 6.53		
Isc	Maximum short-circuit current	Arms	73.2	146		
nb	Base speed	rpm	44.7	113		
nb,i	Base speed at intermittent duty cycle	rpm	32.9	92.3		
nb,p	Base speed at peak duty cycle	rpm	24.6	74.2		
nn	Rated speed	rpm	38.5	99.7		
Tn	Rated torque	Nm	5290	4560		
In	Rated current	Arms	63.9	107		
τth	Thermal time constant	s	201	201		
Rth	Thermal resistance	K/W	0.00669	0.00669		
2p	Number of poles	-	60	60		
J	Rotor inertia	kg·m²	2.31	2.31		
mr	Rotor mass	kg	51.6	51.6		
ms	Stator mass	kg	156	156		

MOTOR ENVIRONMENT		UNIT				
Udc	Nominal DC bus voltage	VDC	600	600		
Di	Intermittent duty cycle	%	40	40		
Dp	Peak duty cycle	%	5.0	5.0		
Sr	Rotor exchange surface	m²	0.721	0.721		
θamb	Ambient temperature	°C	20	20		
θmax	Maximum coil temperature	°C	130	130		
θw	Inlet water temperature	°C	20	20		
Δθw	Water temperature difference for Pc	K	5.0	5.0		
qw	Minimum water flow for Δθw	l/min	44	44		
Δpw	Max. pressure drop at qw	bar	5.2	5.2		

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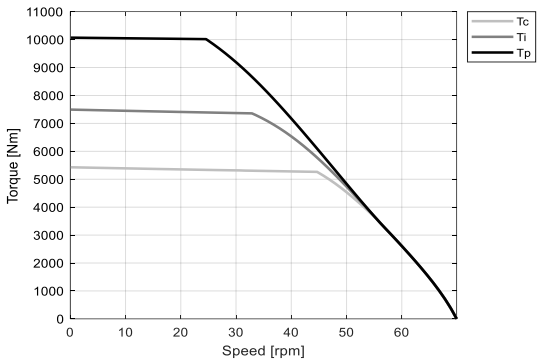
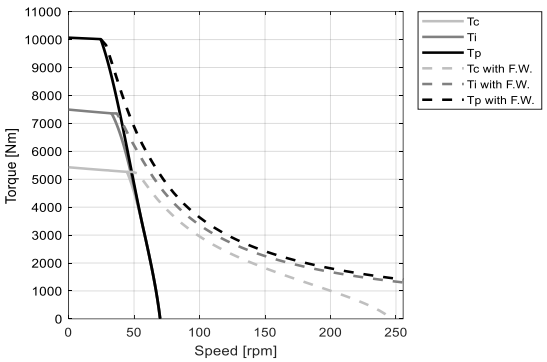
ETEL HIGH DENSITY TORQUE MOTOR TMC0530-200

VF - WATER COOLING



VF - WATER COOLING



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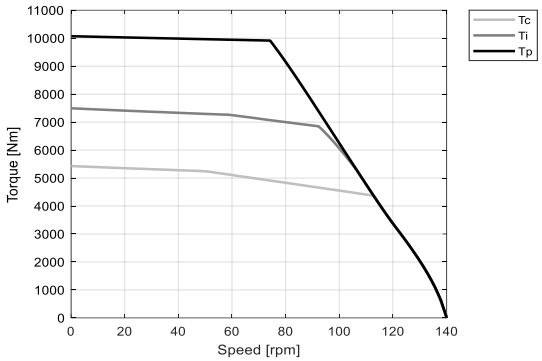
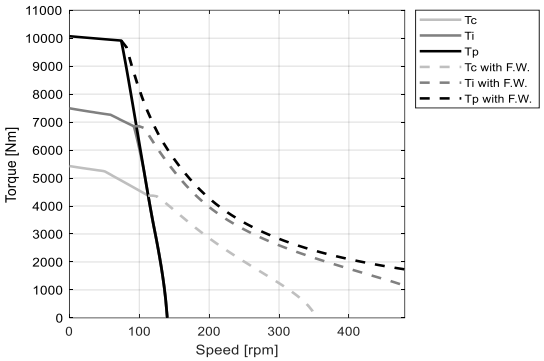


VL - WATER COOLING



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