

TDE MACRO

TOM

Permanent Magnet AC
Synchronous Motors



Standards and directives

TOM motors are manufactured in accordance with applicable standards and Directive listed in the following tables.

Standard

IEC 60034-1, EN 60034-1

Rotating electrical machines Part 1: Rating and performance

IEC 60034-5, EN 60034-5

Rotating electrical machines Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification

IEC 60034-6, EN 60034-6

Rotating electrical machines Part 6: Methods of cooling (IC Code)

IEC 60034-8, EN 60034-8

Rotating electrical machines Part 8: Terminal markings and direction of rotation

IEC 60034-14, IEC 60034-14

Rotating electrical machines Part 14: Mechanical vibration - Measurement, evaluation and limits of vibration severity

IEC 60072-1

Dimensions and output series for rotating electrical machines - Part 1

IEC TS 60034-25

Rotating electrical machines Part 25: Guidance for the design and performance of a.c. motors specifically designed for converter supply

Directives

Low Voltage Directive: 2006/95/EC

The TOM servomotors series comply with UL/CSA standards for the North American market (UL file number E358266).

UL 1004-1

Rotating Electrical Machines General Requirements

UL 1004-6

Servo and Stepper Motors

CSA C22.2 No. 100

Motors and Generators

Symbols and units of measure

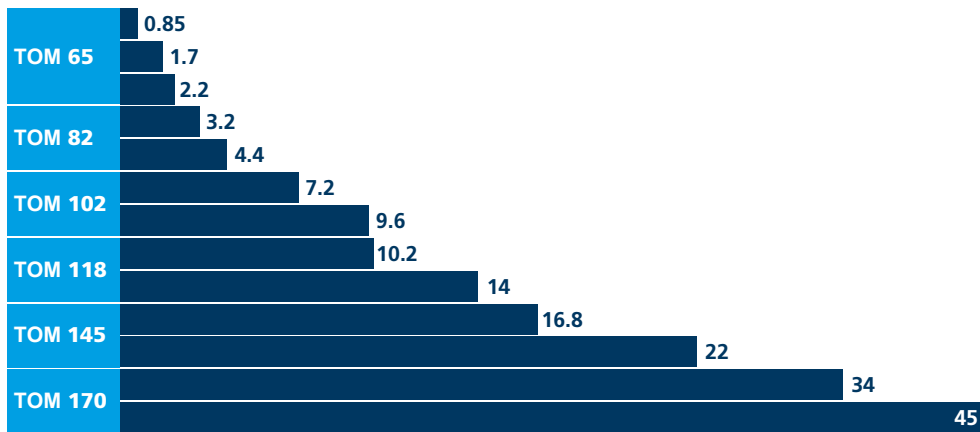
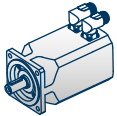
Symbol	U.m.	Description
n_n	[min ⁻¹]	Rated speed
M_n	[Nm]	Rated torque
P_n	[kW]	Rated power
I_n	[A]	Rated current
M_0	[Nm]	Stall torque
I_0	[A]	Stall current
M_{max}	[Nm]	Max torque
I_{max}	[A]	Max current
K_T	[Nm/A]	Torque constant
K_C	[V/1000min ⁻¹]	Back EMF constant
R_{pp}	[W]	Stator phase-phase resistance
L_{pp}	[mH]	Stator phase-phase inductance
t_{el}	[ms]	Electric time constant
t_{therm}	[min]	Thermal time constant
J_M	[kgm ² x 10 ⁻⁴]	Motor moment of inertia
m_M	[kg]	Motor mass without brake
J_b	[kgm ² x 10 ⁻⁴]	Brake moment of inertia
m_b	[kg]	Brake mass
M_b	[Nm]	Brake torque
P_b	[W]	Brake electrical power at 20°C
V_b	[V]	Brake DC voltage
I_b	[A]	Brake current
m_{MB}	[kg]	Motor mass with brake
t_1	[ms]	Brake engaging time
t_2	[ms]	Brake release time

Tde Macno permanent magnet synchronous motors range

The Tde Macno permanent magnet synchronous motors are available in six sizes with stall torque comprises between 0.85 ÷ 45 Nm.

- TOM servomotor
Tde Macno Permanent Magnet High Density Product Line Up
- Competitive technology
 - Low inertia
 - Highest dynamics;
 - High torque density;
 - Precision;
 - Compact design
 - Compatibility with gears & inverters

TOM series Permanent Magnet AC Motors



Product designation of Tde Macno permanent magnet synchronous motors

TOM servo motors are technically identified by their designation. This consists of a succession of alphanumeric characters, whose positions and values conform to precise rules and define the characteristics of the product.

The complete designation provides a unique identification of the exact servomotor configuration.

The designation is made up of two main parts, containing fields for:

- BASIC variants
- OPTIONAL variants

Both the BASIC variant and OPTIONAL variant sections of the designation are divided into fields, each of which defines a particular design feature of the motor.

All basic variant and optional variant fields can assume only one value at a time. These values are selected from a limited set of pre-defined values for each field in the designation.

Is mandatory to select one of the possible choices in all variants fields. The variant can be missed only where a blank is a possible choice.

Housing of TOM servomotors is painted RAL 9005, black.

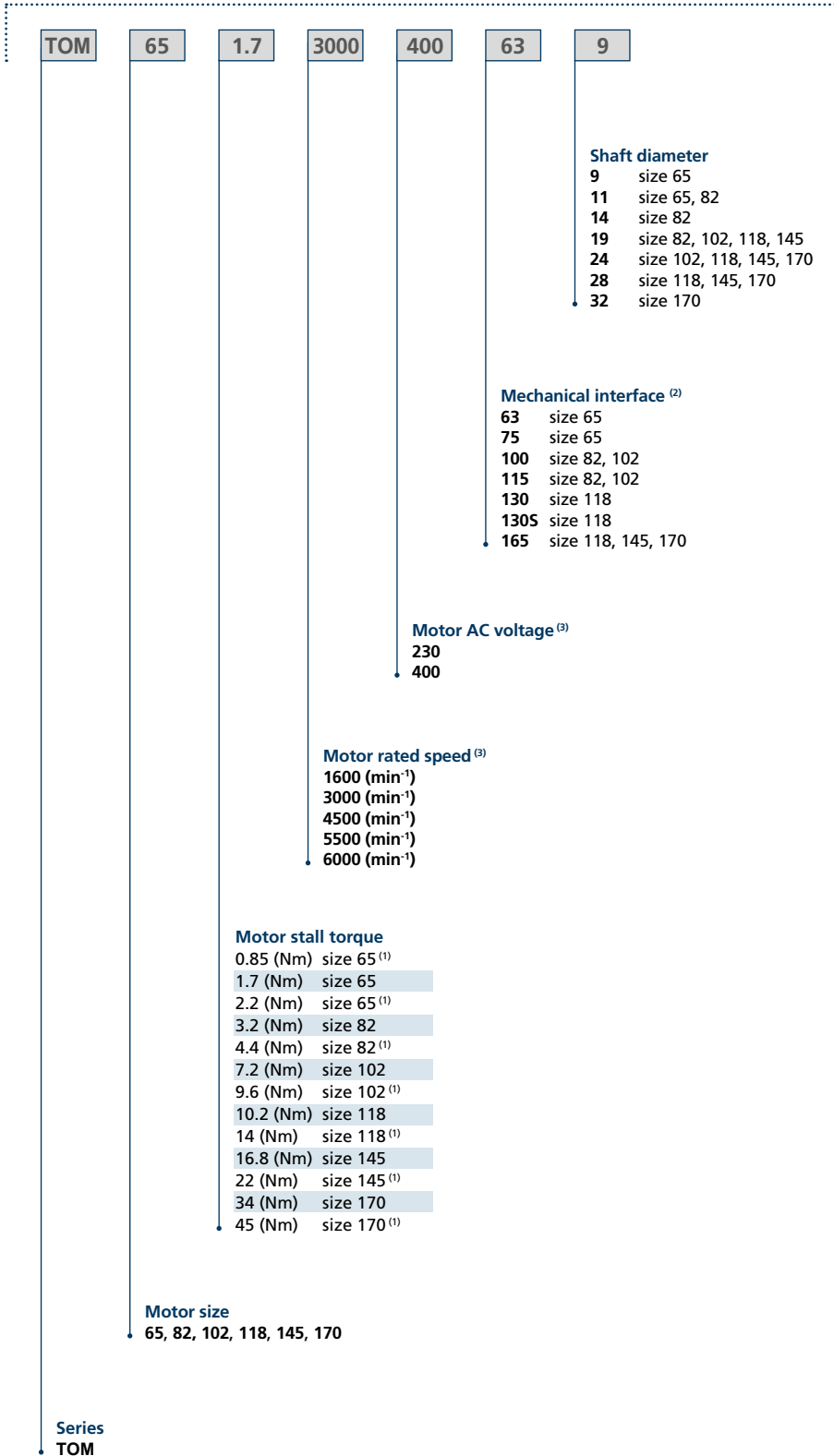
A brief overview of the available combinations of the basic variants such as motor size, motor stall torque, nominal voltage and nominal speed can be found in the following table.

		TOM 65			TOM 82			TOM 102		TOM 118		TOM 145		TOM 170	
		0.85 Nm	1.7 Nm	2.2 Nm	3.2 Nm	4.4 Nm	7.2 Nm	9.6 Nm	10.2 Nm	14 Nm	16.8 Nm	22 Nm	34 Nm	45 Nm	
400 V	1600 rpm		X	X	X	X	X	X	X	X	X	X	X	X	
	3000 rpm	X	X	X	X	X	X	X	X	X	X	X	X	X	
	4500 rpm	X	X	X	X	X	X	X	X	X	X	X			
	5500 rpm	X	X	X	X	X	X	X	X	X	X	X			
	6000 rpm	X	X	X	X	X	X	X	X	X	X				
230 V	1600 rpm	X	X	X	X	X	X	X	X	X	X	X	X		
	3000 rpm	X	X	X	X	X	X	X	X	X	X	X	X		
	4500 rpm	X	X	X	X	X	X	X	X						
	5500 rpm	X	X	X	X	X	X	X	X						
	6000 rpm	X	X	X	X	X	X	X							

Product designation of Tde Macno servomotors

Brushless Motors designation

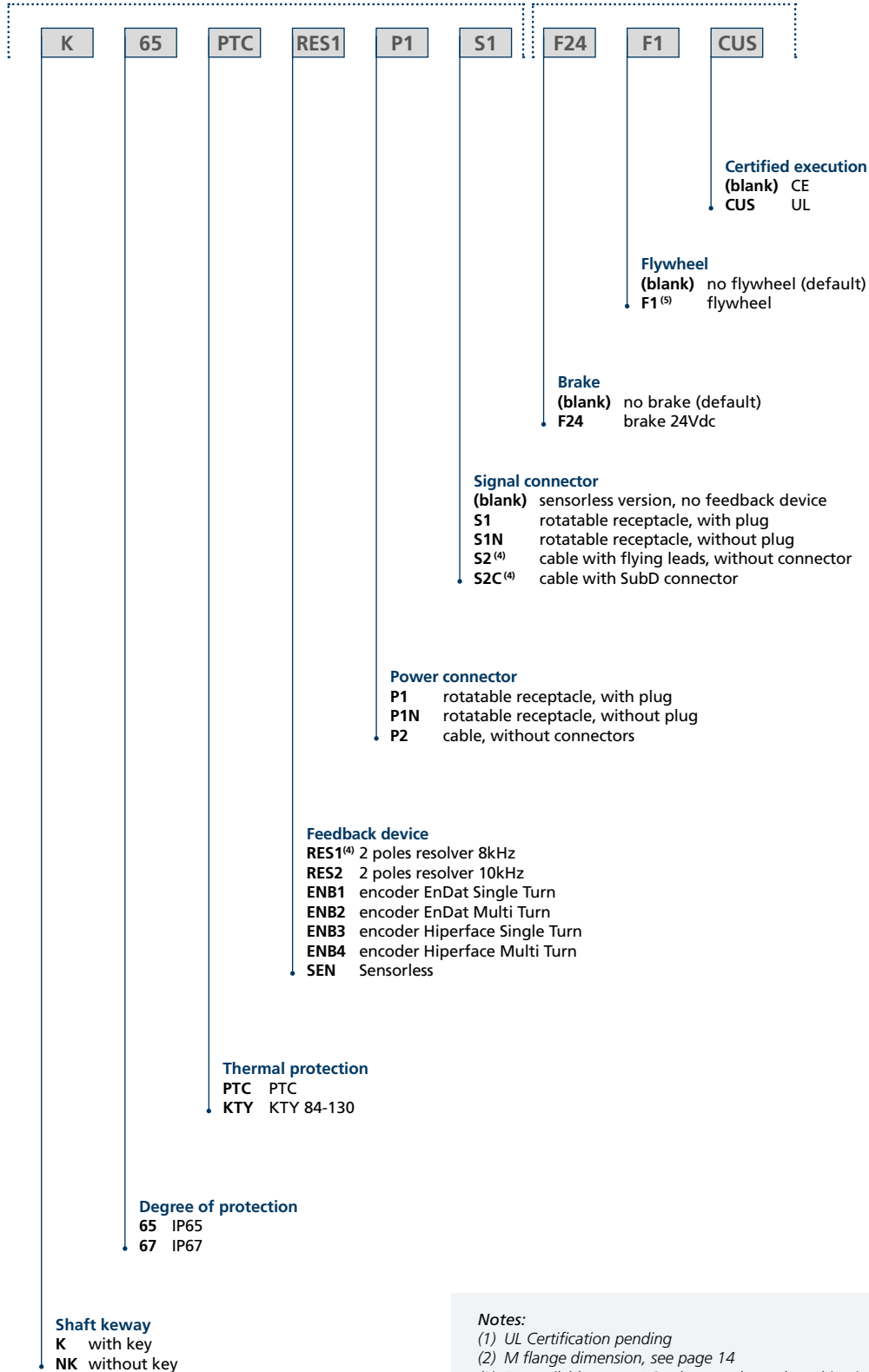
Basic Variants





Basic Variants

Optional Variants



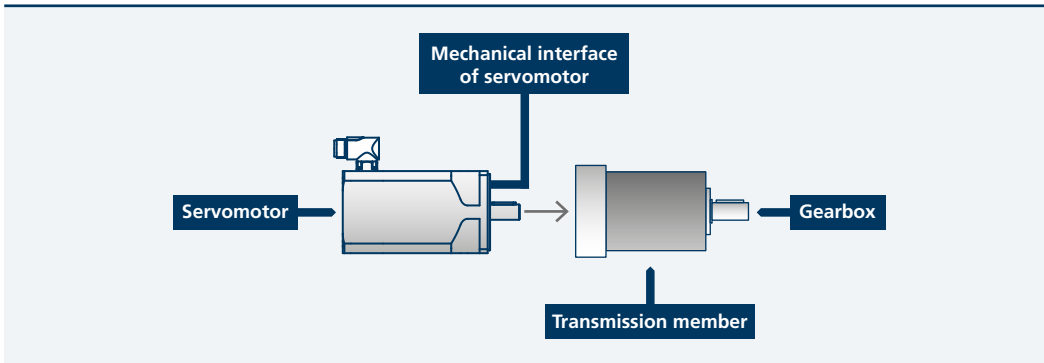
Notes:

- (1) UL Certification pending
- (2) M flange dimension, see page 14
- (3) For available motor AC voltage and speed combinations refer to general overview of page 11
- (4) Not available for motor size BMD 65
- (5) Not available when brake is provided

Mechanical interface

Concerning TOM servomotors, fixing dimensions for coupling motor with other transmission components (gearboxes, joints, ...) is named Mechanical Interface.
Therefore the Mechanical Interface is a part of the motor and includes both flange and shaft

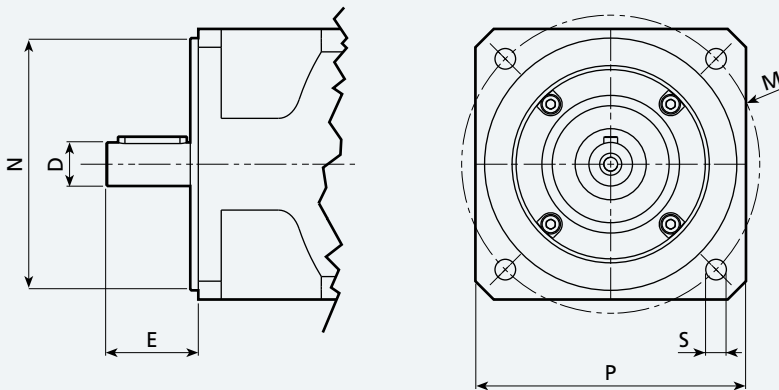
univocally defined by its geometrical dimensions. The flanges and the shafts of TOM are described by fixed geometrics according to standard IEC 60072-1.



Mechanical interface: connection flange + transmission shaft.

According to IEC 60072-1, the interface geometry is defined by quantities D, E, P, M, N, S published in the following drawing whose numerical values (mm) depend on motor size.

The basic mechanical interface of TOM servomotors is defined by the dimensional sketch:



Basic Mechanical Interface

		Servomotors											
		TOM65		TOM82		TOM102		TOM118			TOM145		TOM170
Shaft diameter x shaft length	DxE [mm]	9x20 11x23		11x23 14x30 19x40		19x40 24x50		19x40 24x50 28x60			19x40 24x50 28x60		24x50 28x60 32x60
Flange square	P [mm]	65	65	82	100	102	102	118	118	145	145	145	170
Flange pitch holes diameter	M [mm]	63	75	100	115	100	115	130 ⁽¹⁾	130	165	165	165	165
Diameter of the spigot	N [mm]	40	60	80	95	80	95	95	110	130	130	130	130
Fixing holes diameters	S [mm]	5.5	6	6.5	9	7	9	9	9	11.5	11.5	11.5	11.5

Notes:

(1) Mechanical interface 130S

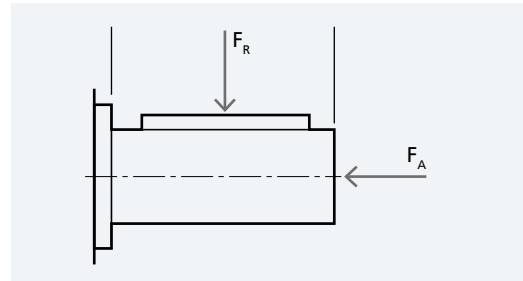
Mechanical tolerances

Dimensions and tolerances of shaft extension, key and flange are in accordance with IEC 60072-1. Shaft extension features an axial threaded hole in accordance with UNI 3221, DIN 332. Tolerances for the different parts are reported in the table.

Component	Dimensions	Tolerance
Shaft end	D [mm]	Ø 9 - 28
		Ø 32
Key	F [mm]	h9
Flange	N [mm]	Ø < 250

Shaft loads

The loads in the following tables have been calculated using ISO 281 calculation L_{10h} (20.000h). The loads and speeds used are considered to be constant throughout the life of the bearing. The radial load F_R is applied to the half shaft end length.



Maximum radial load F_R [N]

Size	Speed [min ⁻¹]					
	[Nm]	1600	3000	4500	5500	6000
TOM 65	0.85	300	240	210	200	190
	1.7	330	270	230	220	210
	2.2	350	280	250	230	220
TOM 82	3.2	580	470	410	390	370
	4.4	610	500	430	410	390
TOM 102	7.2	750	610	530	500	480
	9.6	800	650	570	530	520
TOM 118	10.2	860	700	610	570	550
	14	910	740	650	600	590
TOM 145	16.8	1400	1150	1000	940	910
	22	1500	1200	1050	980	960
TOM 170	34	900	730	640		
	45	1500	1200	1050		

Maximum axial load F_A [N]

Size	Speed [min ⁻¹]					
	[Nm]	1600	3000	4500	5500	6000
TOM 65	0.85	59	48	42	39	38
	1.7	65	53	46	43	42
	2.2	69	56	49	46	44
TOM 82	3.2	115	94	82	77	75
	4.4	120	100	85	81	79
TOM 102	7.2	150	120	105	100	95
	9.6	160	130	110	105	100
TOM 118	10.2	170	139	121	115	110
	14	180	145	130	120	115
TOM 145	16.8	280	230	200	185	180
	22	295	240	210	195	190
TOM 170	34	180	145	125		
	45	295	240	210		

Torque-speed characteristic

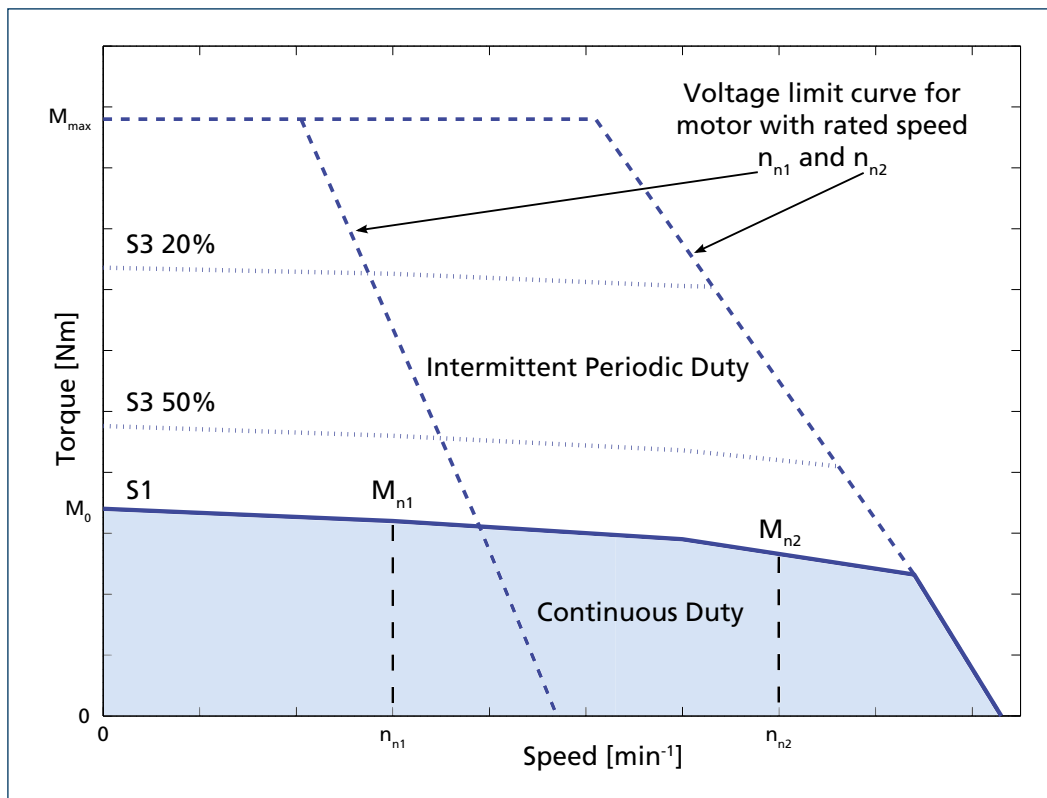
The permissible operating range of a brushless servomotor is limited by thermal, mechanical, and electromagnetic limits.

The thermal limit is dependent on the thermal class of the insulation system (F). To adhere to the temperature limits, the torque must be reduced as the speed increases, starting from stall torque M_0 . The maximum permissible torque is then dependent on the operation mode. The characteristic curves are assigned for continuous duty S1 and intermittent periodic duty (S3-20%, S3-50%). A transient, high overload capacity up to M_{max} is provided.

The speed range is limited by the maximum mechanical speed and the voltage limit. The voltage limit is usually lower than the mechanical limit. The voltage limiting characteristic curve is determined by the motor nominal speed. The

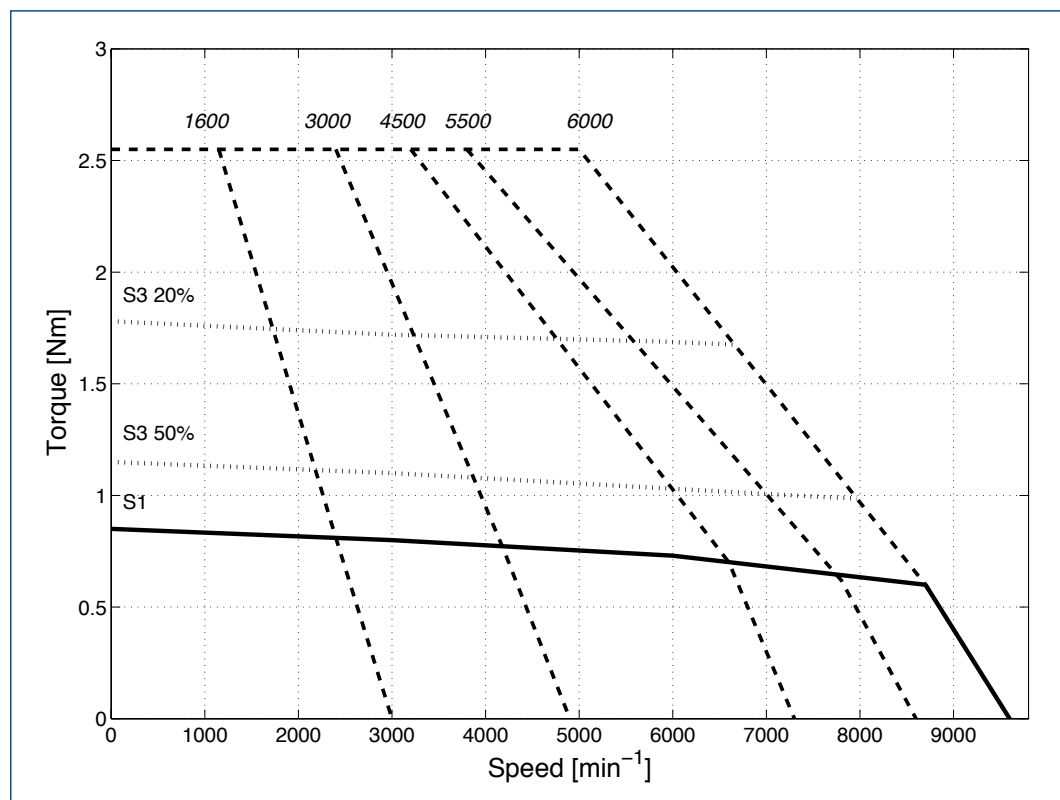
characteristic curves for each nominal speed are reported in the same diagram. For drive sizing convenience, it is preferable to select the motor whose voltage limit curve does not lie too far above the maximum speed required for the application.

Therefore, the performance characteristics of a brushless motor are described by a torque and speed operating area. The continuous duty zone is bordered by the maximum continuous torque curve up to the intersection with the voltage limit curve. Continuous duty in the area above the S1 characteristic curve is not thermally permitted for the motor. The intermittent periodic duty zone is bordered by the peak torque line and the voltage limit curve.



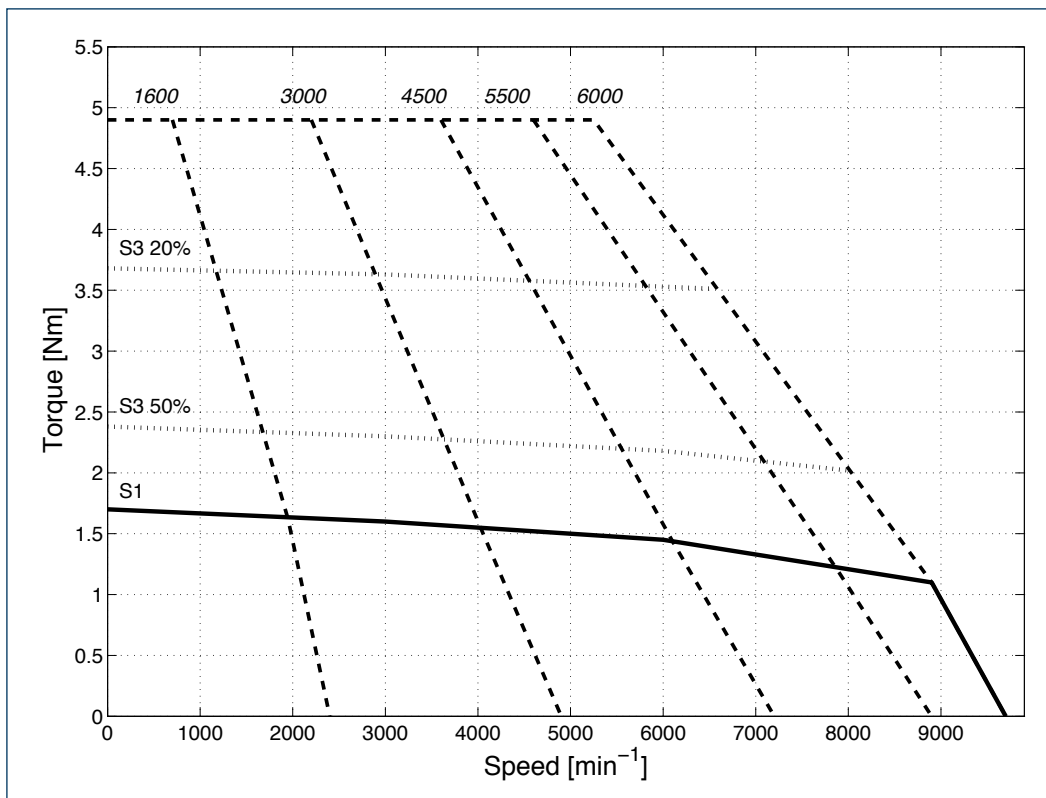
TOM 65 • 0.85 Nm - 230V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	0.85				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	168	181	172	179	177
Rated Torque (dT=105K)	M_n	[Nm]	0.83	0.80	0.76	0.74	0.73
Current at rated speed	I_n	[A]	0.74	1.16	1.74	1.92	2.09
Standstill current	I_0	[A]	0.77	1.23	1.93	2.18	2.39
Max Torque	M_{max}	[Nm]	2.55	2.55	2.55	2.55	2.55
Max Current	I_{max}	[A]	2.5	3.9	6.2	7.0	7.7
Back EMF constant	K_e	[V/1000min ⁻¹]	75	47	30	27	24
Torque constant	K_T	[Nm/A]	2.20	1.38	0.88	0.78	0.71
Rated Power	P_n	[kW]	0.14	0.25	0.36	0.43	0.46
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	48.4	19.2	7.75	6.10	5.04
Stator phase-phase Inductance	L_{pp}	[mH]	145	57.5	23.2	18.3	15.1
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	0.2				
Electric time constant (at 20°C)	t_{el}	[ms]	3.0				
Thermal time constant	t_{therm}	[min]	20				
Motor mass without brake	m_M	[kg]	1.3				
Motor mass with brake	m_{MB}	[kg]	1.5				



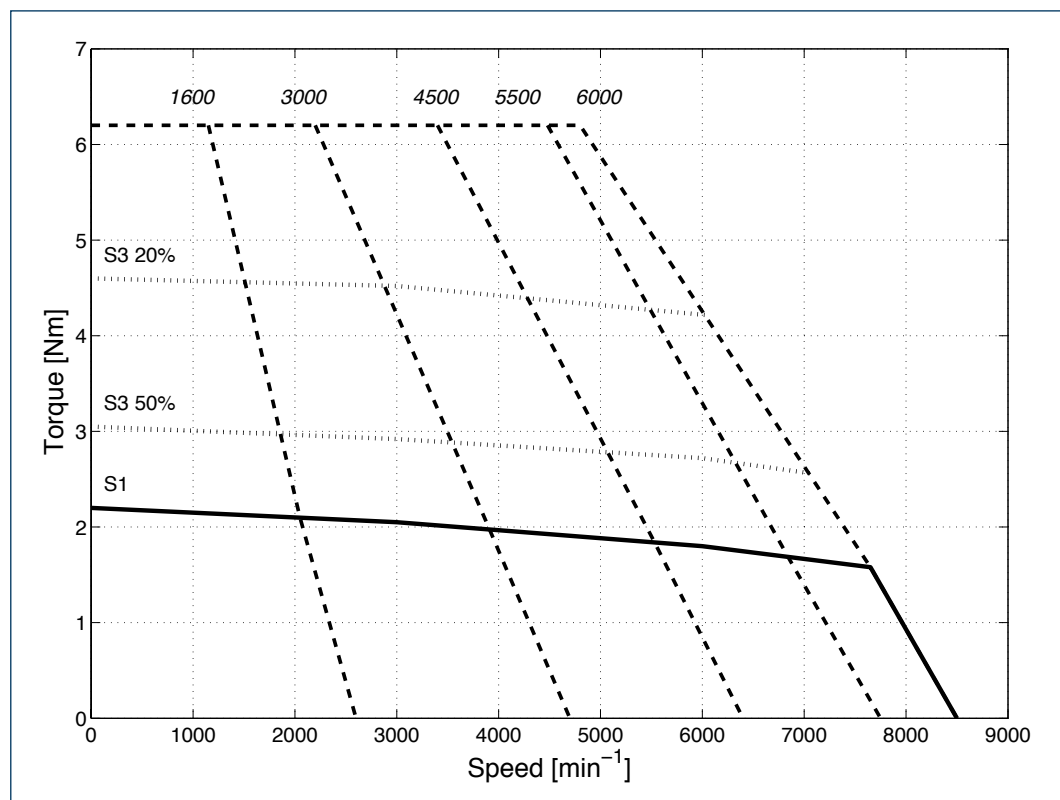
TOM 65 • 1.7 Nm - 230V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	1.7				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	193	180	180	174	171
Rated Torque (dT=105K)	M_n	[Nm]	1.65	1.60	1.52	1.48	1.45
Current at rated speed	I_n	[A]	1.25	2.30	3.2	3.9	4.2
Standstill current	I_0	[A]	1.26	2.34	3.4	4.2	4.7
Max Torque	M_{\max}	[Nm]	4.9	4.9	4.9	4.9	4.9
Max Current	I_{\max}	[A]	4.3	8.0	11.5	14.5	15.9
Back EMF constant	K_e	[V/1000 min^{-1}]	89	48	33	26	24
Torque constant	K_T	[Nm/A]	1.35	0.73	0.50	0.40	0.36
Rated Power	P_n	[kW]	0.28	0.50	0.72	0.85	0.91
Stator phase-phase Resistance (at 20°C)	R_{pp}	[Ω]	30.4	8.79	4.19	2.66	2.20
Stator phase-phase Inductance	L_{pp}	[mH]	91.9	26.6	12.6	8.0	6.6
Rotor inertia	J_m	[$\text{kgm}^2 \times 10^{-4}$]	0.4				
Electric time constant (at 20°C)	τ_{el}	[ms]	3.0				
Thermal time constant	τ_{therm}	[min]	20				
Motor mass without brake	m_M	[kg]	1.9				
Motor mass with brake	m_{MB}	[kg]	2.1				



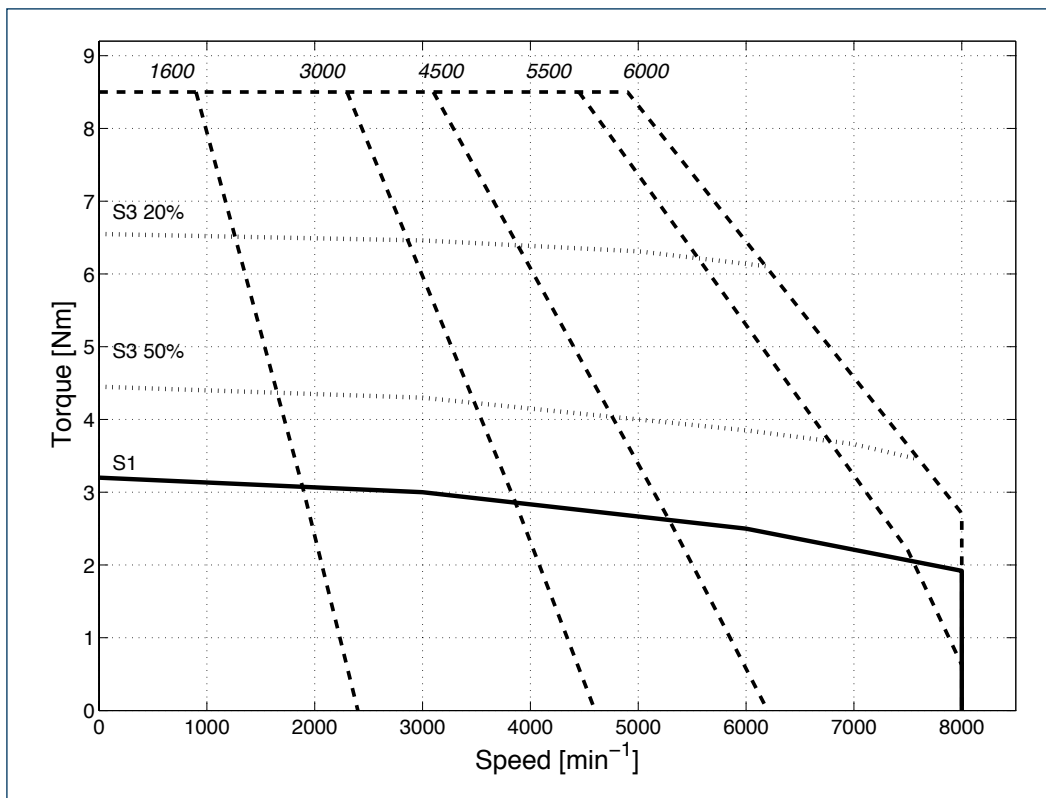
TOM 65 • 2.2 Nm - 230V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	2.2				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	179	180	191	192	190
Rated Torque (dT=105K)	M_n	[Nm]	2.12	2.05	1.95	1.85	1.80
Current at rated speed	I_n	[A]	1.65	2.78	3.6	4.1	4.4
Standstill current	I_0	[A]	1.70	2.96	4.1	4.9	5.4
Max Torque	M_{max}	[Nm]	6.2	6.2	6.2	6.2	6.2
Max Current	I_{max}	[A]	5.4	9.4	12.9	15.6	17.1
Back EMF constant	K_e	[V/1000min ⁻¹]	90	52	38	31	28
Torque constant	K_T	[Nm/A]	1.29	0.74	0.54	0.45	0.41
Rated Power	P_n	[kW]	0.36	0.64	0.92	1.07	1.13
Stator phase-phase Resistance (at 20°C)	R_{pp}	[Ω]	18.8	6.21	3.27	2.26	1.86
Stator phase-phase Inductance	L_{pp}	[mH]	56.9	18.8	9.9	6.8	5.6
Rotor inertia	J_m	[kgm ² × 10 ⁻⁴]	0.6				
Electric time constant (at 20°C)	τ_{el}	[ms]	3.0				
Thermal time constant	τ_{therm}	[min]	26				
Motor mass without brake	m_M	[kg]	2.6				
Motor mass with brake	m_{MB}	[kg]	2.8				



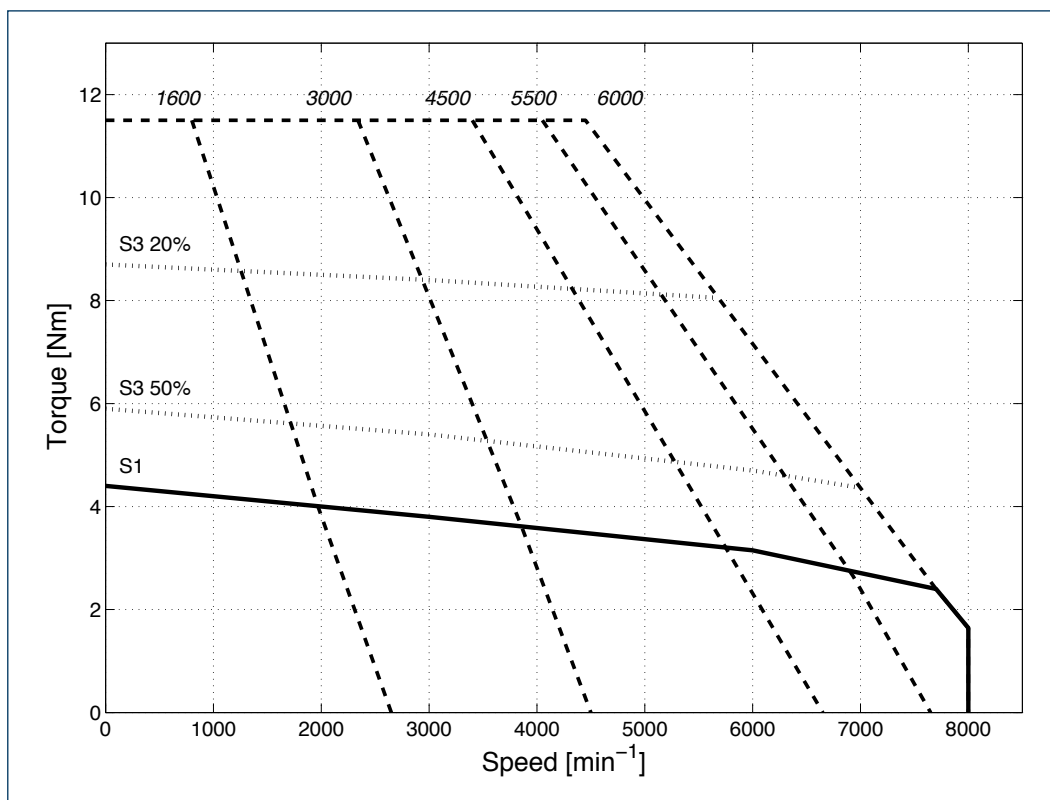
TOM 82 • 3.2 Nm - 230V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	3.2				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	191	181	200	176	176
Rated Torque (dT=105K)	M_n	[Nm]	3.15	3	2.8	2.6	2.5
Current at rated speed	I_n	[A]	2.37	4.3	5.3	7.0	7.6
Standstill current	I_0	[A]	2.41	4.5	6.0	8.3	9.0
Max Torque	M_{max}	[Nm]	8.5	8.5	8.5	8.5	8.5
Max Current	I_{max}	[A]	8.3	15.5	20.6	28.4	31
Back EMF constant	K_e	[V/1000 min^{-1}]	92	49	37	27	24
Torque constant	K_T	[Nm/A]	1.33	0.71	0.53	0.39	0.35
Rated Power	P_n	[kW]	0.53	0.94	1.32	1.50	1.57
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	11.3	3.23	1.81	0.96	0.81
Stator phase-phase Inductance	L_{pp}	[mH]	64.2	18.3	10.3	5.4	4.6
Rotor inertia	J_m	[$\text{kgm}^2 \times 10^{-4}$]	1.4				
Electric time constant (at 20°C)	t_{el}	[ms]	5.7				
Thermal time constant	t_{therm}	[min]	26				
Motor mass without brake	m_M	[kg]	3.5				
Motor mass with brake	m_{MB}	[kg]	4.1				



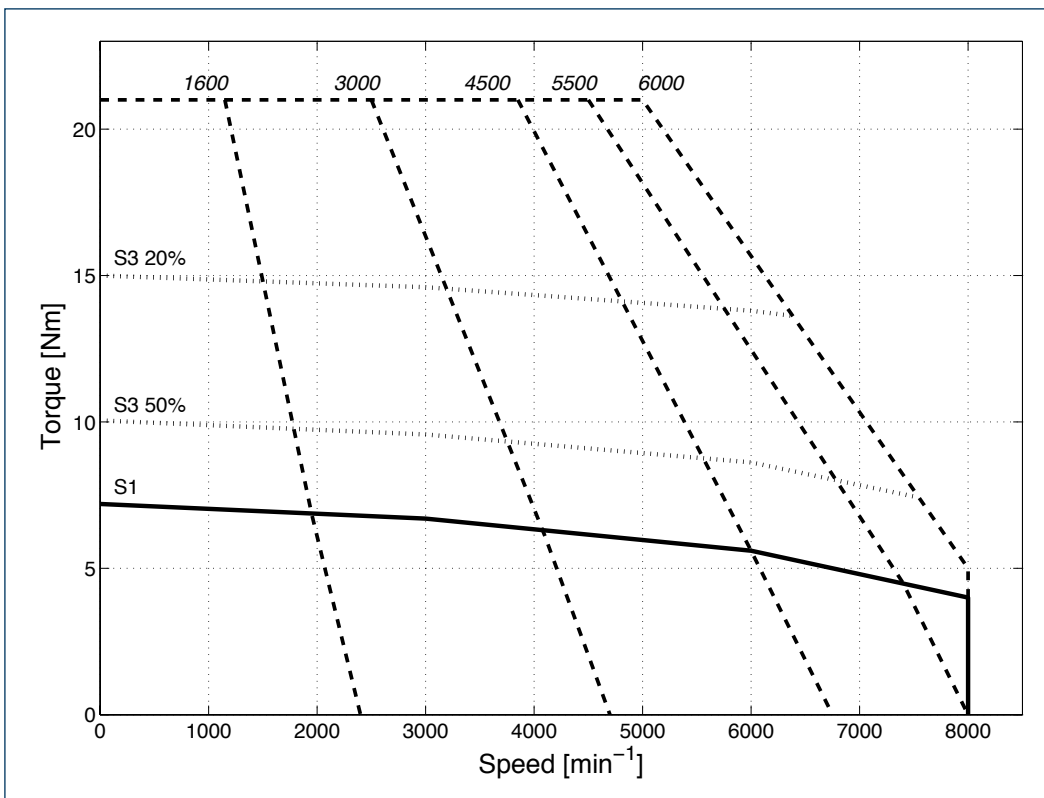
TOM 82 • 4.4 Nm - 230V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	4.4				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	181	184	188	196	197
Rated Torque (dT=105K)	M_n	[Nm]	4.2	3.8	3.55	3.3	3.15
Current at rated speed	I_n	[A]	3.1	5.1	6.8	7.3	7.6
Standstill current	I_0	[A]	3.3	5.8	8.4	9.7	10.6
Max Torque	M_{max}	[Nm]	11.5	11.5	11.5	11.5	11.5
Max Current	I_{max}	[A]	9.8	17.4	25.1	29.2	32
Back EMF constant	K_e	[V/1000min ⁻¹]	93	52	36	31	29
Torque constant	K_T	[Nm/A]	1.35	0.76	0.53	0.45	0.42
Rated Power	P_n	[kW]	0.70	1.19	1.67	1.90	2.0
Stator phase-phase Resistance (at 20°C)	R_{pp}	[Ω]	6.89	2.19	1.05	0.78	0.66
Stator phase-phase Inductance	L_{pp}	[mH]	39.0	12.4	6.0	4.4	3.7
Rotor inertia	J_m	[kgm ² × 10 ⁻⁴]	1.7				
Electric time constant (at 20°C)	τ_{el}	[ms]	5.7				
Thermal time constant	τ_{therm}	[min]	33				
Motor mass without brake	m_M	[kg]	4.6				
Motor mass with brake	m_{MB}	[kg]	5.2				



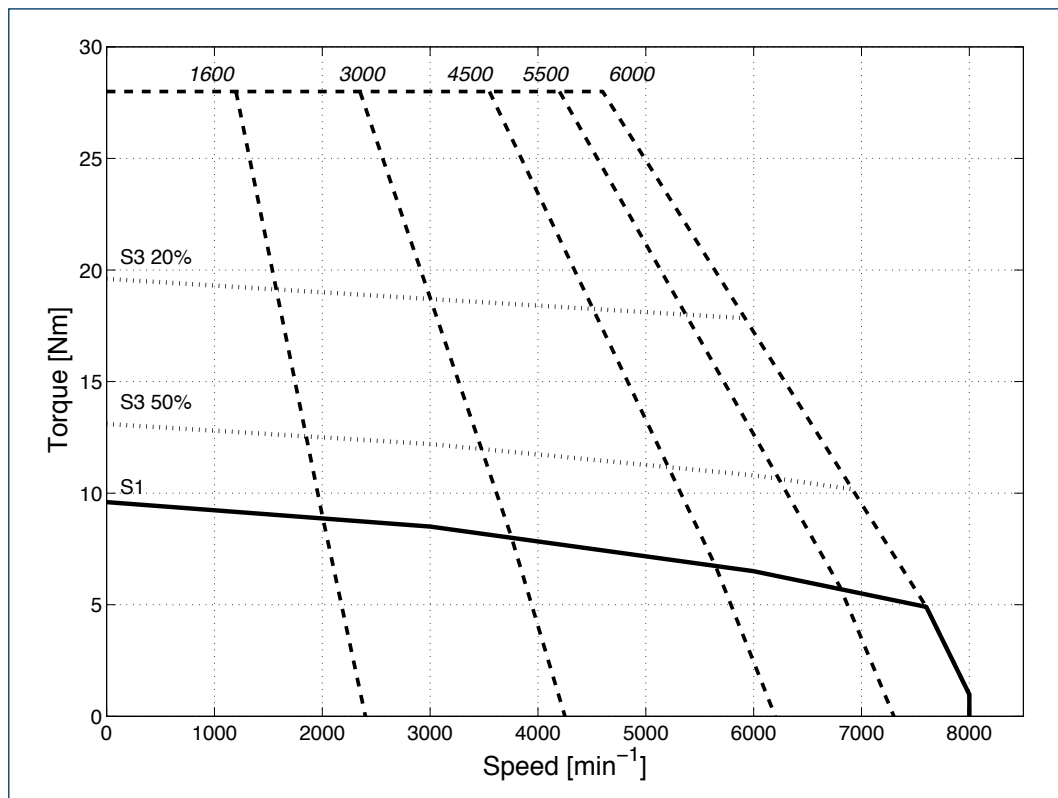
TOM 102 • 7.2 Nm - 230V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	7.2				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	187	177	182	183	185
Rated Torque (dT=105K)	M_n	[Nm]	7	6.7	6	5.8	5.6
Current at rated speed	I_n	[A]	5.0	9.5	12.6	14.4	15.4
Standstill current	I_0	[A]	5.0	9.7	13.9	16.9	18.2
Max Torque	M_{max}	[Nm]	21	21	21	21	21
Max Current	I_{max}	[A]	18.3	35	51	61	66
Back EMF constant	K_e	[V/1000 min^{-1}]	94	49	34	28	26
Torque constant	K_T	[Nm/A]	1.43	0.75	0.52	0.43	0.40
Rated Power	P_n	[kW]	1.17	2.10	2.83	3.3	3.5
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	3.02	0.82	0.40	0.27	0.23
Stator phase-phase Inductance	L_{pp}	[mH]	25.4	6.9	3.3	2.3	1.9
Rotor inertia	J_m	[$\text{kgm}^2 \times 10^{-4}$]	3.4				
Electric time constant (at 20°C)	t_{el}	[ms]	8.4				
Thermal time constant	t_{therm}	[min]	31				
Motor mass without brake	m_M	[kg]	5.8				
Motor mass with brake	m_{MB}	[kg]	7				



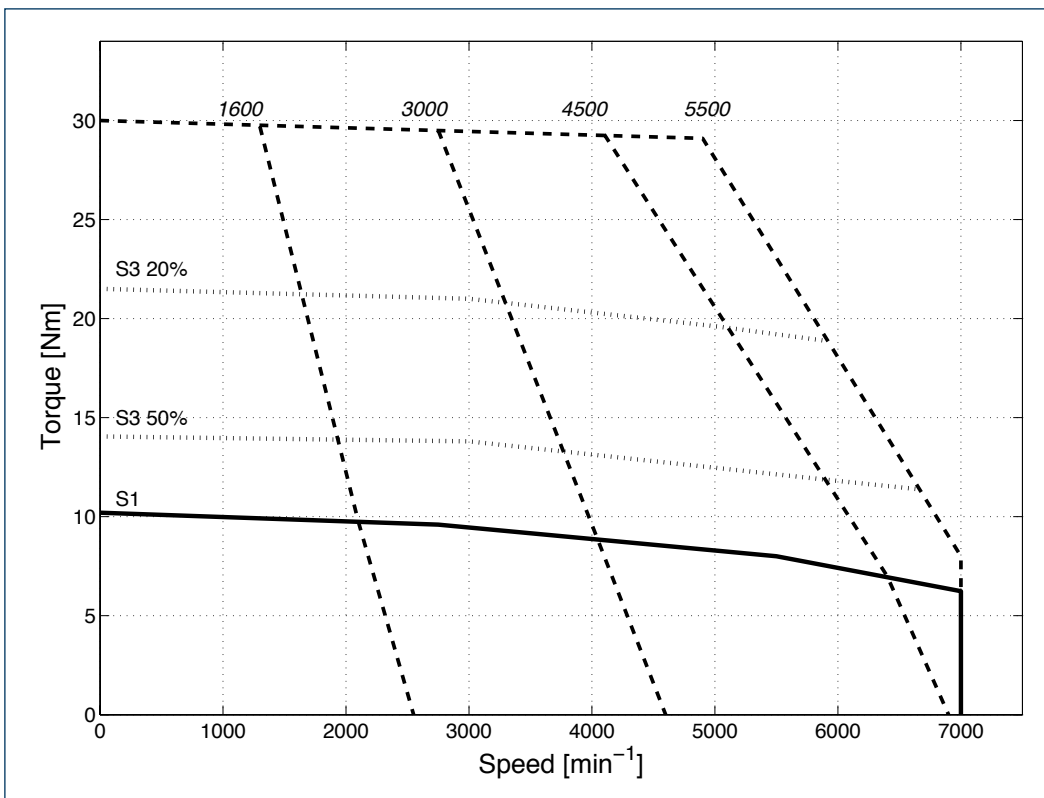
TOM 102 • 9.6 Nm - 230V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M ₀	[Nm]	9.6				
Motor rated frequency	f _n	[Hz]	107	200	300	367	400
Motor rated voltage	V _n	[V _{AC}]	183	184	187	192	190
Rated Torque (dT=105K)	M _n	[Nm]	9.2	8.5	7.7	6.9	6.5
Current at rated speed	I _n	[A]	6.0	10.2	13.5	14.3	14.8
Standstill current	I ₀	[A]	6.3	11.5	16.8	19.8	21.8
Max Torque	M _{max}	[Nm]	28	28	28	28	28
Max Current	I _{max}	[A]	20.4	37	54	64	70
Back EMF constant	K _e	[V/1000min ⁻¹]	102	56	38	33	30
Torque constant	K _T	[Nm/A]	1.52	0.84	0.57	0.48	0.44
Rated Power	P _n	[kW]	1.54	2.7	3.6	4.0	4.1
Stator phase-phase Resistance (at 20°C)	R _{pp}	[W]	2.24	0.68	0.32	0.23	0.19
Stator phase-phase Inductance	L _{pp}	[mH]	18.8	5.7	2.7	1.9	1.6
Rotor inertia	J _m	[kgm ² x 10 ⁻⁴]	4.7				
Electric time constant (at 20°C)	t _{el}	[ms]	8.4				
Thermal time constant	t _{therm}	[min]	38				
Motor mass without brake	m _M	[kg]	7.4				
Motor mass with brake	m _{MB}	[kg]	8.6				



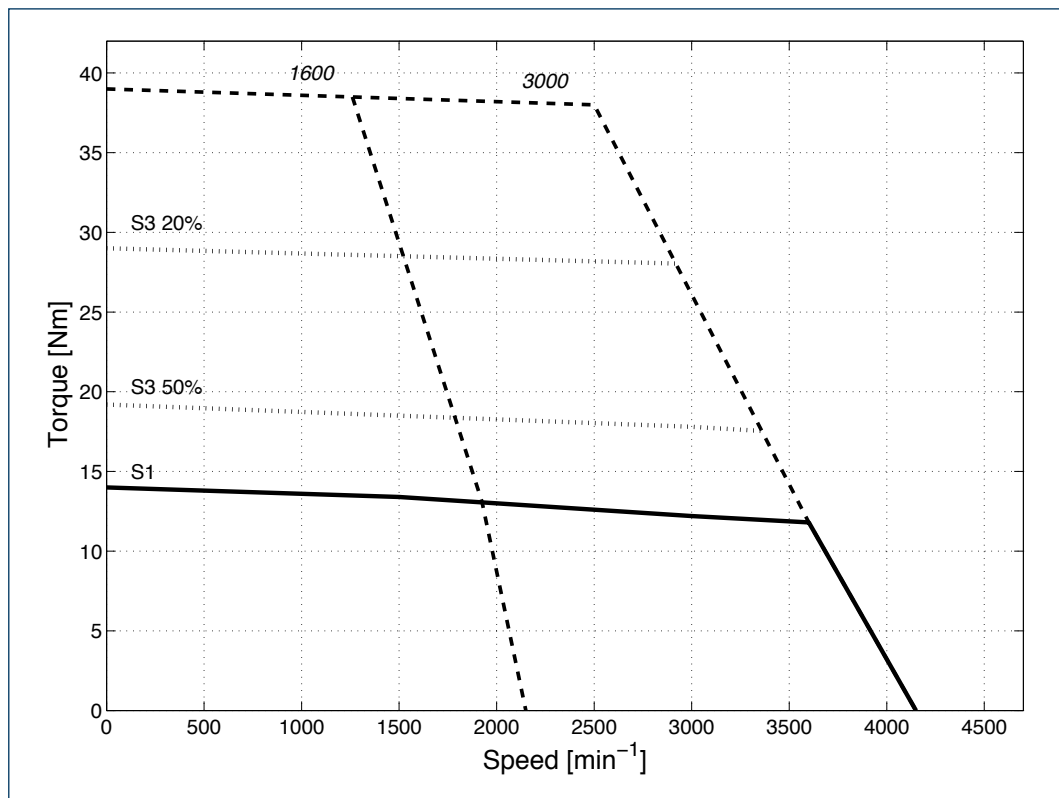
TOM 118 • 10.2 Nm - 230V

Parameter	Symbol	Unit	Speed [min ⁻¹]			
			1600	3000	4500	5500
Standstill torque (dT=105K)	M ₀	[Nm]	10.2			
Motor rated frequency	f _n	[Hz]	107	200	300	367
Motor rated voltage	V _n	[V _{AC}]	184	178	174	196
Rated Torque (dT=105K)	M _n	[Nm]	10	9.5	8.5	8
Current at rated speed	I _n	[A]	7.2	13.5	18.3	17.4
Standstill current	I ₀	[A]	7.2	13.7	20.8	22.6
Max Torque	M _{max}	[Nm]	30	30	30	30
Max Current	I _{max}	[A]	25.3	48	73	79
Back EMF constant	K _e	[V/1000min ⁻¹]	95	50	33.1	30.4
Torque constant	K _T	[Nm/A]	1.41	0.75	0.49	0.45
Rated Power	P _n	[kW]	1.7	3.0	4.0	4.6
Stator phase-phase Resistance (at 20°C)	R _{pp}	[W]	1.56	0.43	0.19	0.16
Stator phase-phase Inductance	L _{pp}	[mH]	20.5	5.7	2.5	2.1
Rotor inertia	J _m	[kgm ² x 10 ⁻⁴]	7.8			
Electric time constant (at 20°C)	t _{el}	[ms]	13			
Thermal time constant	t _{therm}	[min]	34			
Motor mass without brake	m _M	[kg]	9.7			
Motor mass with brake	m _{MB}	[kg]	11.9			



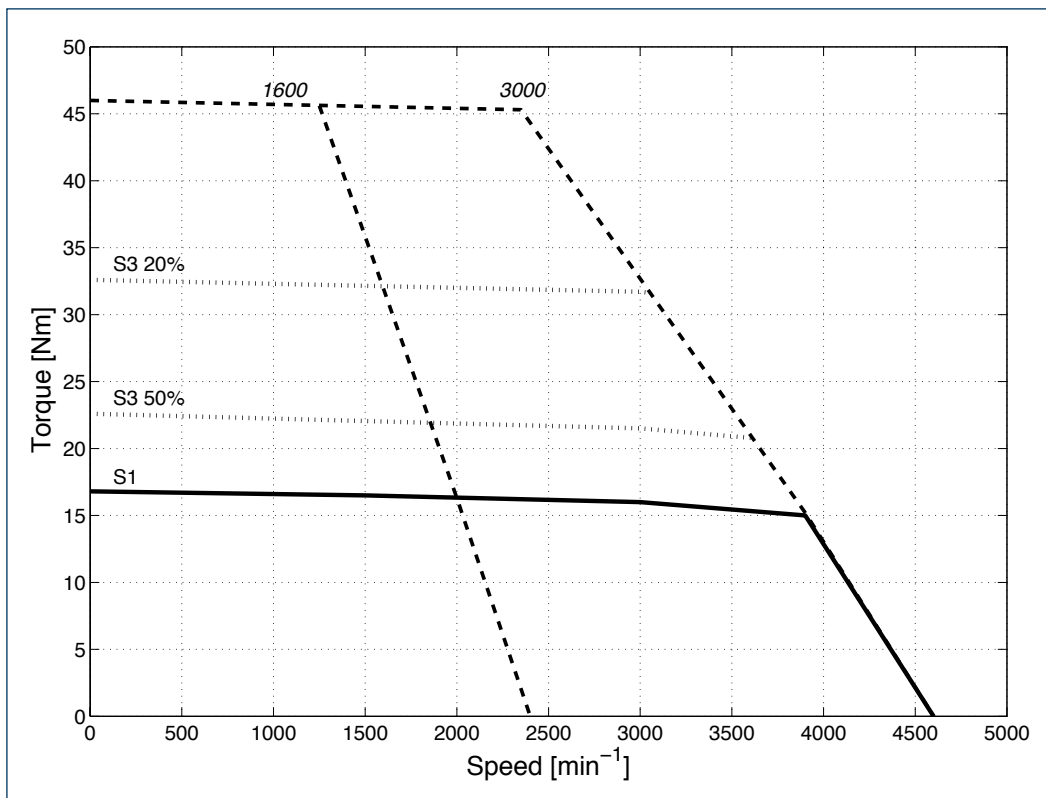
TOM 118 • 14 Nm - 230V

Parameter	Symbol	Unit	Speed [min ⁻¹]	
			1600	3000
Standstill torque (dT=105K)	M_0	[Nm]	14.0	
Motor rated frequency	f_n	[Hz]	107	200
Motor rated voltage	V_n	[V _{AC}]	184	192
Rated Torque (dT=105K)	M_n	[Nm]	13.3	12.2
Current at rated speed	I_n	[A]	8.6	14.0
Standstill current	I_0	[A]	9.2	16.3
Max Torque	M_{max}	[Nm]	39	39
Max Current	I_{max}	[A]	30	53
Back EMF constant	K_e	[V/1000min ⁻¹]	104	59
Torque constant	K_T	[Nm/A]	1.51	0.86
Rated Power	P_n	[kW]	2.2	3.8
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	1.17	0.37
Stator phase-phase Inductance	L_{pp}	[mH]	15.4	4.9
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	9.9	
Electric time constant (at 20°C)	t_{el}	[ms]	13	
Thermal time constant	t_{therm}	[min]	42	
Motor mass without brake	m_M	[kg]	11.7	
Motor mass with brake	m_{MB}	[kg]	12.9	



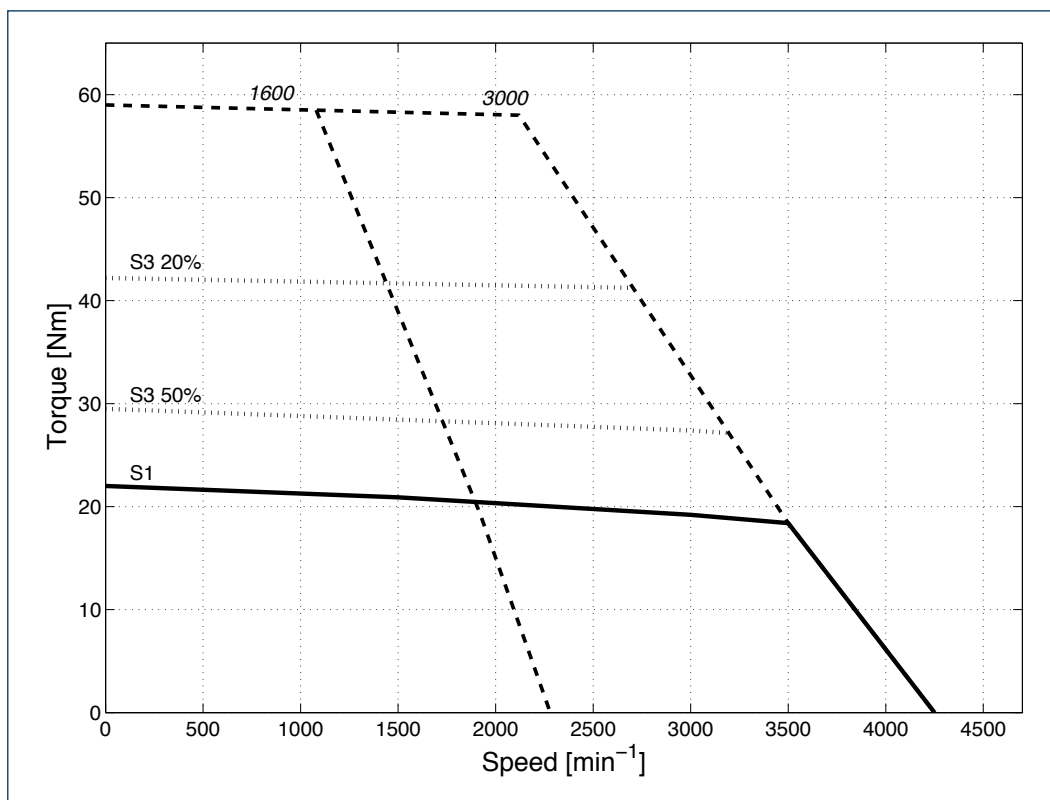
TOM 145 • 16.8 Nm - 230V

Parameter	Symbol	Unit	Speed [min^{-1}]	
			1600	3000
Standstill torque (dT=105K)	M_0	[Nm]	16.8	
Motor rated frequency	f_n	[Hz]	107	200
Motor rated voltage	V_n	[V _{AC}]	180	176
Rated Torque (dT=105K)	M_n	[Nm]	16.5	16
Current at rated speed	I_n	[A]	11.9	21.9
Standstill current	I_0	[A]	12.1	22.8
Max Torque	M_{max}	[Nm]	46	46
Max Current	I_{max}	[A]	46	88
Back EMF constant	K_e	[V/1000 min^{-1}]	89	47
Torque constant	K_T	[Nm/A]	1.39	0.74
Rated Power	P_n	[kW]	2.76	5.0
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	0.84	0.24
Stator phase-phase Inductance	L_{pp}	[mH]	13.3	3.8
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	12.8	
Electric time constant (at 20°C)	t_{el}	[ms]	16	
Thermal time constant	t_{therm}	[min]	36	
Motor mass without brake	m_M	[kg]	15.2	
Motor mass with brake	m_{MB}	[kg]	17.8	



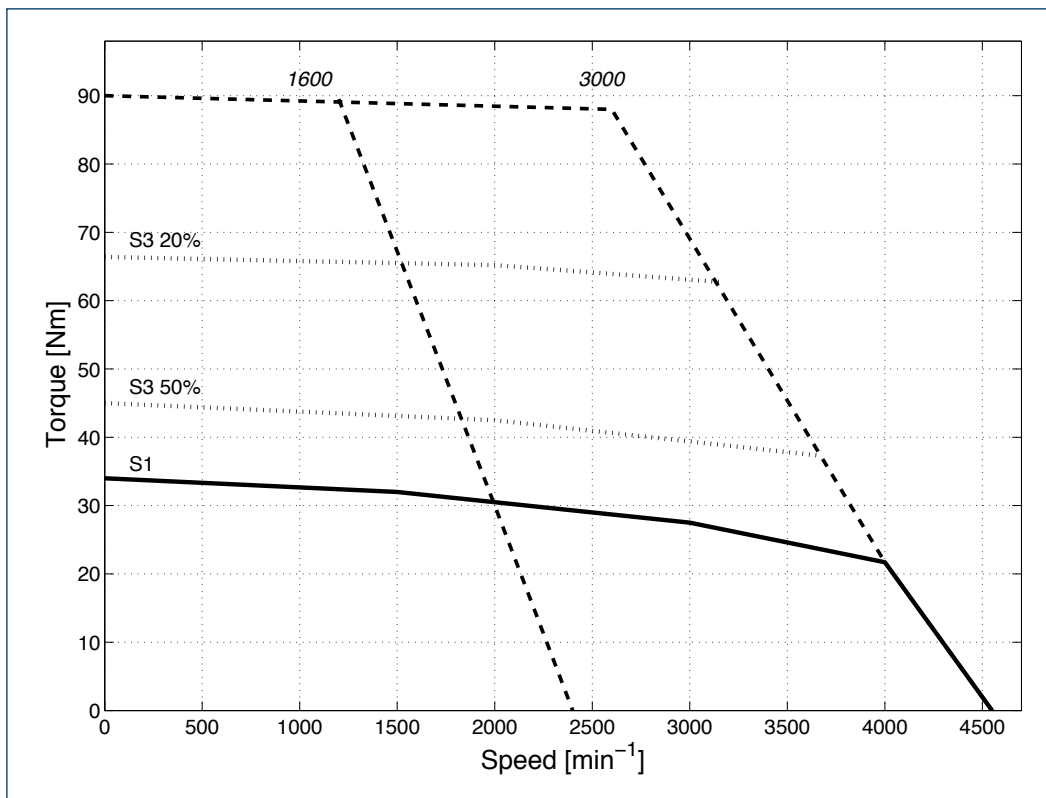
TOM 145 • 22 Nm - 230V

Parameter	Symbol	Unit	Speed [min^{-1}]	
			1600	3000
Standstill torque (dT=105K)	M_0	[Nm]	22.0	
Motor rated frequency	f_n	[Hz]	107	200
Motor rated voltage	V_n	[V _{AC}]	185	202
Rated Torque (dT=105K)	M_n	[Nm]	20.7	19.2
Current at rated speed	I_n	[A]	14.5	22.9
Standstill current	I_0	[A]	15.4	26.5
Max Torque	M_{max}	[Nm]	59	59
Max Current	I_{max}	[A]	51	87
Back EMF constant	K_e	[V/1000 min^{-1}]	102	60
Torque constant	K_T	[Nm/A]	1.42	0.83
Rated Power	P_n	[kW]	3.5	6.0
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	0.67	0.23
Stator phase-phase Inductance	L_{pp}	[mH]	10.6	3.6
Rotor inertia	J_m	[$\text{kgm}^2 \times 10^{-4}$]	17.6	
Electric time constant (at 20°C)	t_{el}	[ms]	16	
Thermal time constant	t_{therm}	[min]	47	
Motor mass without brake	m_M	[kg]	18.2	
Motor mass with brake	m_{MB}	[kg]	20.8	



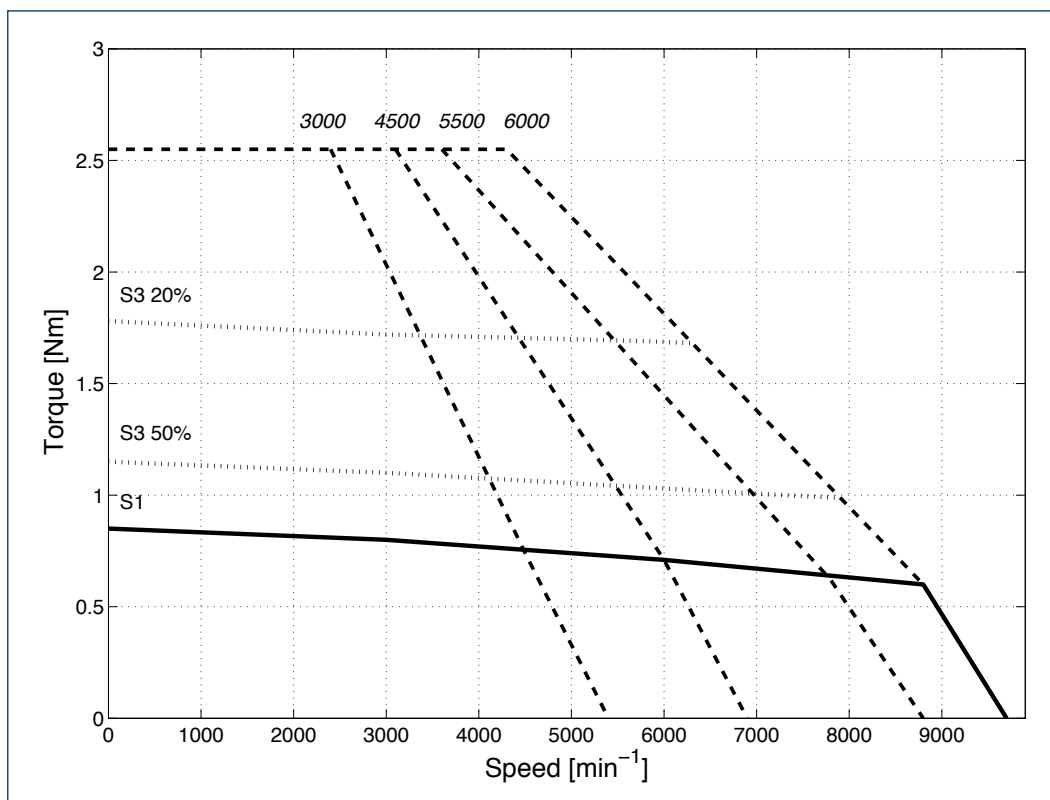
TOM 170 • 34 Nm - 230V

Parameter	Symbol	Unit	Speed [min^{-1}]	
			1600	3000
Standstill torque (dT=105K)	M_0	[Nm]	34.0	
Motor rated frequency	f_n	[Hz]	107	200
Motor rated voltage	V_n	[V _{AC}]	181	182
Rated Torque (dT=105K)	M_n	[Nm]	31	27.5
Current at rated speed	I_n	[A]	19.7	32.2
Standstill current	I_0	[A]	21.8	40.4
Max Torque	M_{max}	[Nm]	90	90
Max Current	I_{max}	[A]	66	121
Back EMF constant	K_e	[V/1000 min^{-1}]	99	54
Torque constant	K_T	[Nm/A]	1.56	0.84
Rated Power	P_n	[kW]	5.2	8.6
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	0.30	0.09
Stator phase-phase Inductance	L_{pp}	[mH]	5.8	1.7
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	28.2	
Electric time constant (at 20°C)	t_{el}	[ms]	20	
Thermal time constant	t_{therm}	[min]	50	
Motor mass without brake	m_M	[kg]	25	
Motor mass with brake	m_{MB}	[kg]	29.5	



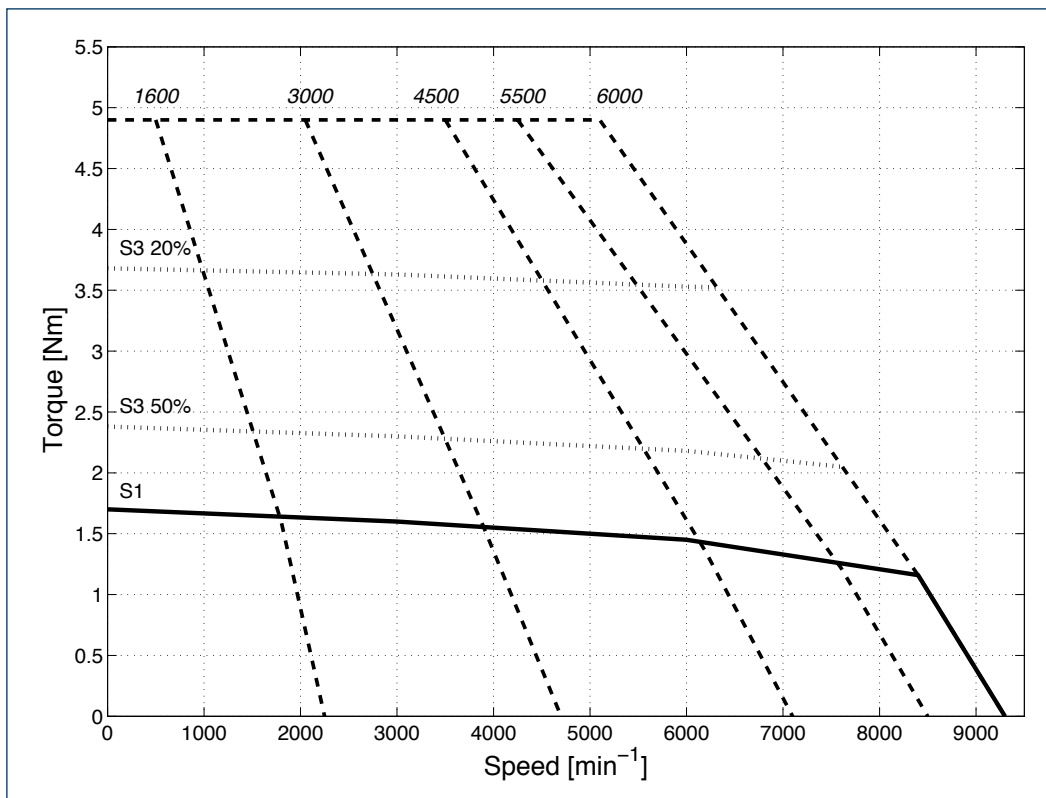
TOM 65 • 0.85 Nm - 400V

Parameter	Symbol	Unit	Speed [min ⁻¹]			
			3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	0.85			
Motor rated frequency	f_n	[Hz]	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	295	331	318	306
Rated Torque (dT=105K)	M_n	[Nm]	0.80	0.76	0.74	0.73
Current at rated speed	I_n	[A]	0.72	0.88	1.08	1.21
Standstill current	I_0	[A]	0.76	0.98	1.23	1.38
Max Torque	M_{max}	[Nm]	2.55	2.55	2.55	2.55
Max Current	I_{max}	[A]	2.43	3.1	3.9	4.4
Back EMF constant	K_e	[V/1000min ⁻¹]	76	59	47	42
Torque constant	K_T	[Nm/A]	2.24	1.74	1.38	1.23
Rated Power	P_n	[kW]	0.25	0.36	0.43	0.46
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	50.0	30.3	19.2	15.1
Stator phase-phase Inductance	L_{pp}	[mH]	150	90.7	57.5	45.2
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	0.2			
Electric time constant (at 20°C)	t_{el}	[ms]	3.0			
Thermal time constant	t_{therm}	[min]	20			
Motor mass without brake	m_M	[kg]	1.3			
Motor mass with brake	m_{MB}	[kg]	1.5			



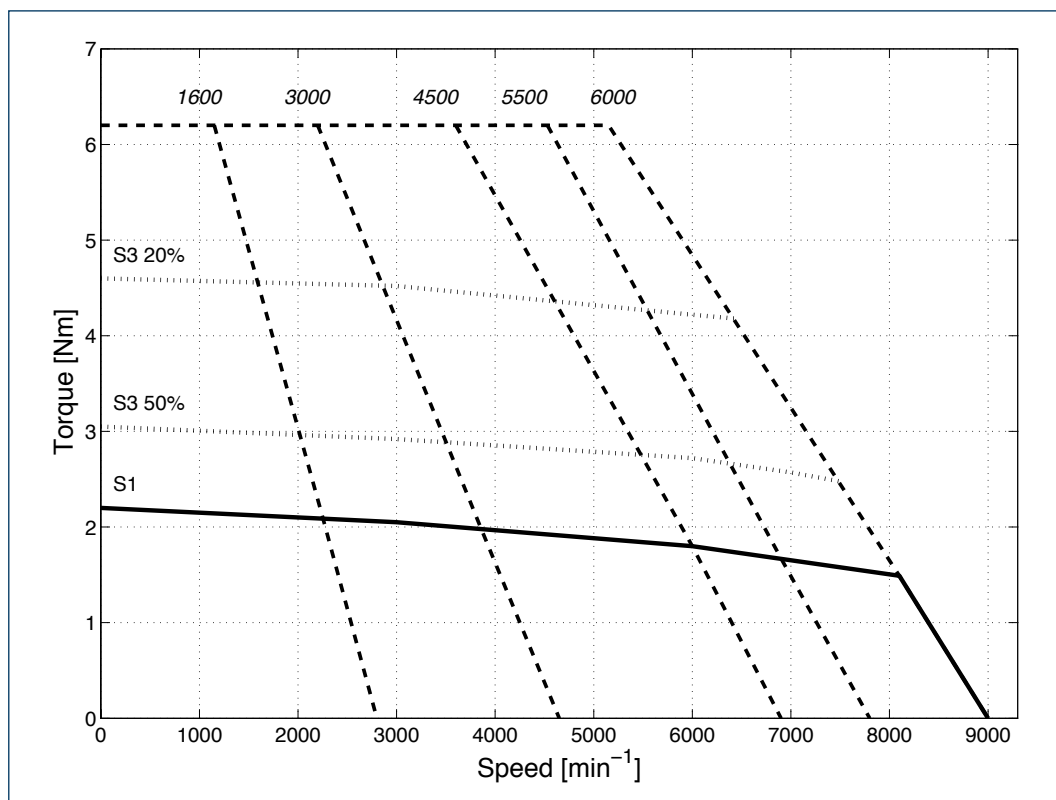
TOM 65 • 1.7 Nm - 400V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	1.7				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	336	311	308	316	300
Rated Torque (dT=105K)	M_n	[Nm]	1.65	1.60	1.52	1.48	1.45
Current at rated speed	I_n	[A]	0.72	1.33	1.85	2.14	2.43
Standstill current	I_0	[A]	0.72	1.35	1.98	2.34	2.68
Max Torque	M_{max}	[Nm]	4.9	4.9	4.9	4.9	4.9
Max Current	I_{max}	[A]	2.46	4.6	6.7	8.0	9.1
Back EMF constant	K_e	[V/1000 min^{-1}]	155	83	57	48	42
Torque constant	K_T	[Nm/A]	2.36	1.26	0.86	0.73	0.63
Rated Power	P_n	[kW]	0.28	0.50	0.72	0.85	0.91
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	92.3	26.3	12.2	8.79	6.65
Stator phase-phase Inductance	L_{pp}	[mH]	279	79.5	37.0	26.6	20.1
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	0.4				
Electric time constant (at 20°C)	t_{el}	[ms]	3.0				
Thermal time constant	t_{therm}	[min]	20				
Motor mass without brake	m_M	[kg]	1.9				
Motor mass with brake	m_{MB}	[kg]	2.1				



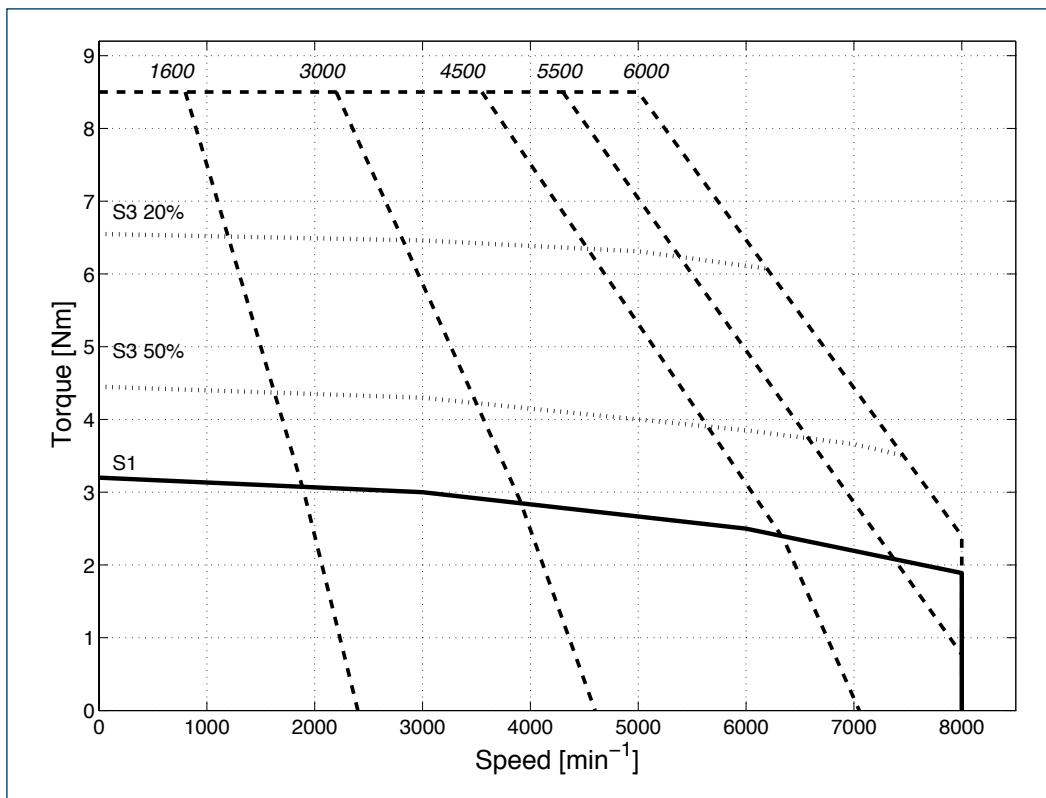
TOM 65 • 2.2 Nm - 400V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	2.2				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	285	314	314	328	313
Rated Torque (dT=105K)	M_n	[Nm]	2.12	2.05	1.95	1.85	1.80
Current at rated speed	I_n	[A]	1.04	1.60	2.20	2.41	2.68
Standstill current	I_0	[A]	1.07	1.70	2.48	2.88	3.27
Max Torque	M_{max}	[Nm]	6.2	6.2	6.2	6.2	6.2
Max Current	I_{max}	[A]	3.4	5.4	7.9	9.1	10.4
Back EMF constant	K_e	[V/1000min ⁻¹]	143	90	62	53	47
Torque constant	K_T	[Nm/A]	2.06	1.29	0.89	0.76	0.67
Rated Power	P_n	[kW]	0.36	0.64	0.92	1.07	1.13
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	47.6	18.8	8.82	6.56	5.08
Stator phase-phase Inductance	L_{pp}	[mH]	144	56.9	26.7	19.8	15.4
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	0.6				
Electric time constant (at 20°C)	t_{el}	[ms]	3.0				
Thermal time constant	t_{therm}	[min]	26				
Motor mass without brake	m_M	[kg]	2.6				
Motor mass with brake	m_{MB}	[kg]	2.8				



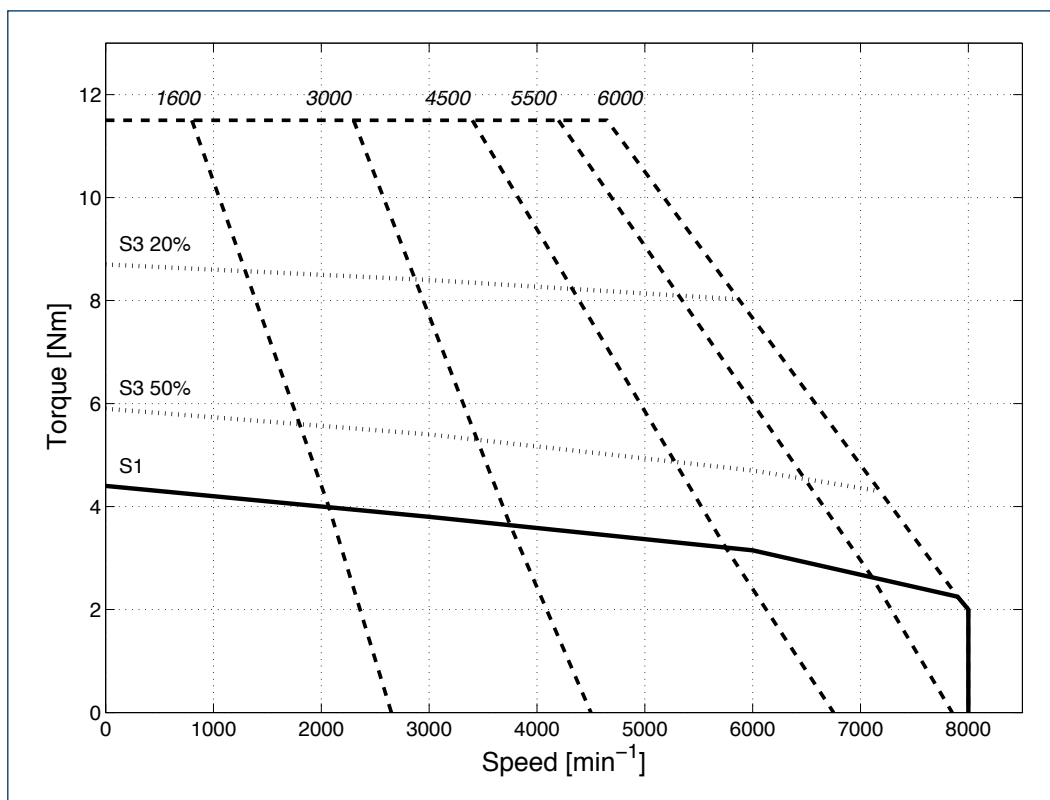
TOM 82 • 3.2 Nm - 400V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	3.2				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	332	315	312	323	308
Rated Torque (dT=105K)	M_n	[Nm]	3.15	3	2.8	2.6	2.5
Current at rated speed	I_n	[A]	1.36	2.50	3.4	3.8	4.3
Standstill current	I_0	[A]	1.39	2.60	3.9	4.5	5.2
Max Torque	M_{max}	[Nm]	8.5	8.5	8.5	8.5	8.5
Max Current	I_{max}	[A]	4.7	8.9	13.2	15.5	17.7
Back EMF constant	K_e	[V/1000 min^{-1}]	159	85	57	49	43
Torque constant	K_T	[Nm/A]	2.31	1.23	0.83	0.71	0.62
Rated Power	P_n	[kW]	0.53	0.94	1.32	1.50	1.57
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	34.3	9.75	4.42	3.23	2.47
Stator phase-phase Inductance	L_{pp}	[mH]	194	55.2	25.0	18.3	14.0
Rotor inertia	J_m	[$\text{kgm}^2 \times 10^{-4}$]	1.4				
Electric time constant (at 20°C)	t_{el}	[ms]	5.7				
Thermal time constant	t_{therm}	[min]	26				
Motor mass without brake	m_M	[kg]	3.5				
Motor mass with brake	m_{MB}	[kg]	4.1				



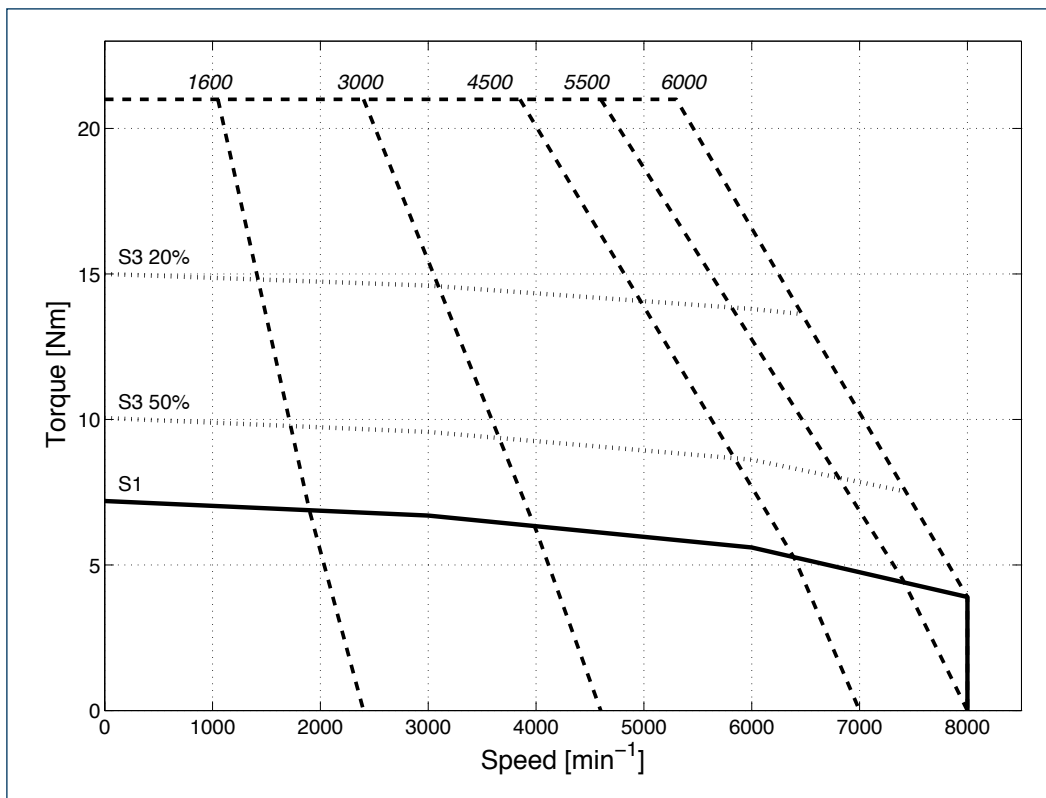
TOM 82 • 4.4 Nm - 400V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	4.4				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	315	323	328	335	335
Rated Torque (dT=105K)	M_n	[Nm]	4.2	3.8	3.55	3.3	3.15
Current at rated speed	I_n	[A]	1.76	2.90	3.9	4.3	4.5
Standstill current	I_0	[A]	1.88	3.3	4.8	5.7	6.2
Max Torque	M_{max}	[Nm]	11.5	11.5	11.5	11.5	11.5
Max Current	I_{max}	[A]	5.6	9.9	14.4	17.1	18.6
Back EMF constant	K_e	[V/1000min ⁻¹]	161	92	63	53	49
Torque constant	K_T	[Nm/A]	2.34	1.33	0.92	0.77	0.71
Rated Power	P_n	[kW]	0.70	1.19	1.67	1.90	2.0
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	20.8	6.77	3.21	2.26	1.92
Stator phase-phase Inductance	L_{pp}	[mH]	118	38.3	18.1	12.8	10.8
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	1.7				
Electric time constant (at 20°C)	t_{el}	[ms]	5.7				
Thermal time constant	t_{therm}	[min]	33				
Motor mass without brake	m_M	[kg]	4.6				
Motor mass with brake	m_{MB}	[kg]	5.2				



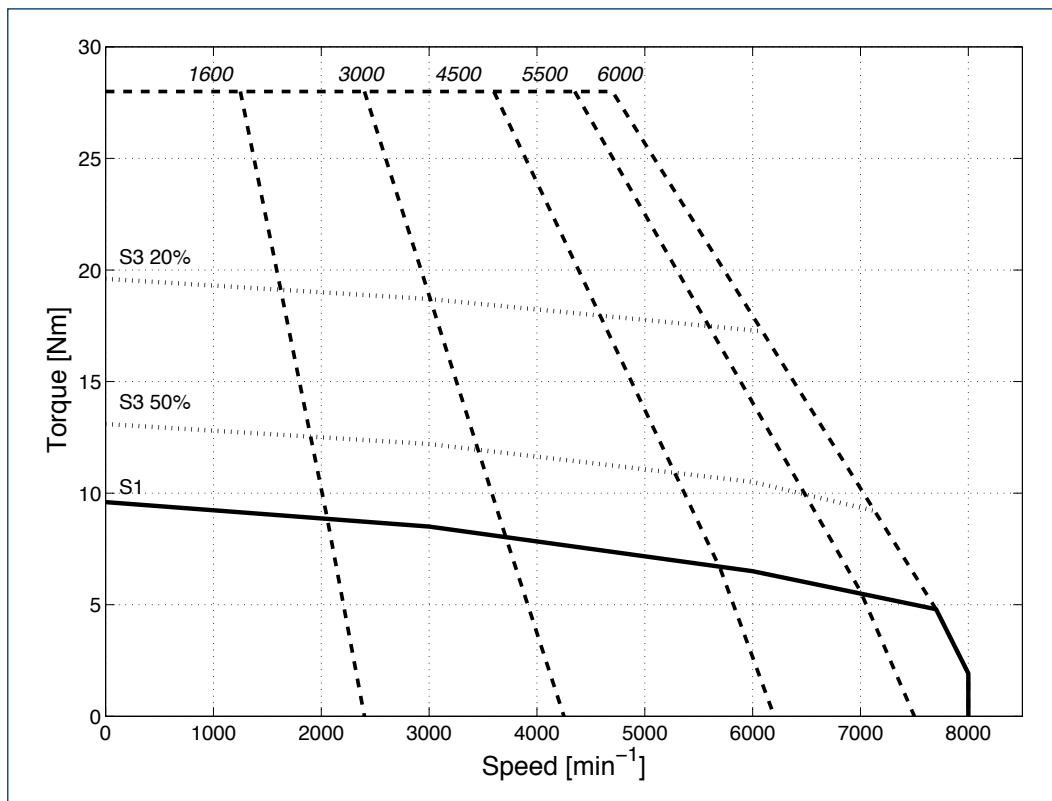
TOM 102 • 7.2 Nm - 400V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	7.2				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	320	311	305	320	305
Rated Torque (dT=105K)	M_n	[Nm]	7	6.7	6	5.8	5.6
Current at rated speed	I_n	[A]	2.92	5.4	7.5	8.2	9.3
Standstill current	I_0	[A]	2.94	5.5	8.3	9.7	11.0
Max Torque	M_{max}	[Nm]	21	21	21	21	21
Max Current	I_{max}	[A]	10.7	20.0	30	35	40
Back EMF constant	K_e	[V/1000 min^{-1}]	161	86	57	49	43
Torque constant	K_T	[Nm/A]	2.45	1.31	0.87	0.75	0.65
Rated Power	P_n	[kW]	1.17	2.10	2.83	3.3	3.5
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	8.87	2.53	1.11	0.82	0.63
Stator phase-phase Inductance	L_{pp}	[mH]	74.7	21.3	9.4	6.9	5.3
Rotor inertia	J_m	[$\text{kgm}^2 \times 10^{-4}$]	3.7				
Electric time constant (at 20°C)	t_{el}	[ms]	1.4				
Thermal time constant	t_{therm}	[min]	31				
Motor mass without brake	m_M	[kg]	5.8				
Motor mass with brake	m_{MB}	[kg]	7				



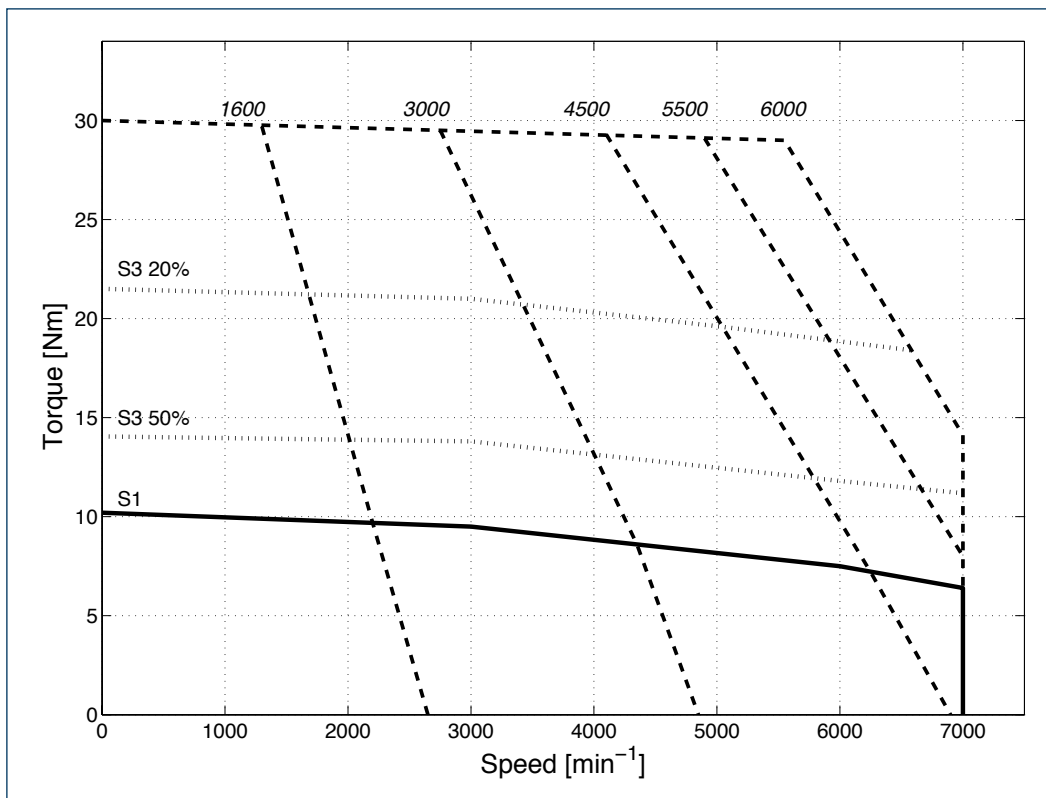
TOM 102 • 9.6 Nm - 400V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	9.6				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	318	324	323	332	333
Rated Torque (dT=105K)	M_n	[Nm]	9.2	8.5	7.7	6.9	6.5
Current at rated speed	I_n	[A]	3.4	5.8	7.8	8.3	8.4
Standstill current	I_0	[A]	3.6	6.5	9.7	11.5	12.4
Max Torque	M_{max}	[Nm]	28	28	28	28	28
Max Current	I_{max}	[A]	11.7	21.0	31	37	40
Back EMF constant	K_e	[V/1000min ⁻¹]	177	99	66	56	52
Torque constant	K_T	[Nm/A]	2.65	1.48	0.99	0.84	0.77
Rated Power	P_n	[kW]	1.54	2.7	3.6	4.0	4.1
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	6.77	2.11	0.95	0.68	0.58
Stator phase-phase Inductance	L_{pp}	[mH]	56.8	17.7	8.0	5.7	4.8
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	4.7				
Electric time constant (at 20°C)	t_{el}	[ms]	8.4				
Thermal time constant	t_{therm}	[min]	38				
Motor mass without brake	m_M	[kg]	7.4				
Motor mass with brake	m_{MB}	[kg]	8.4				



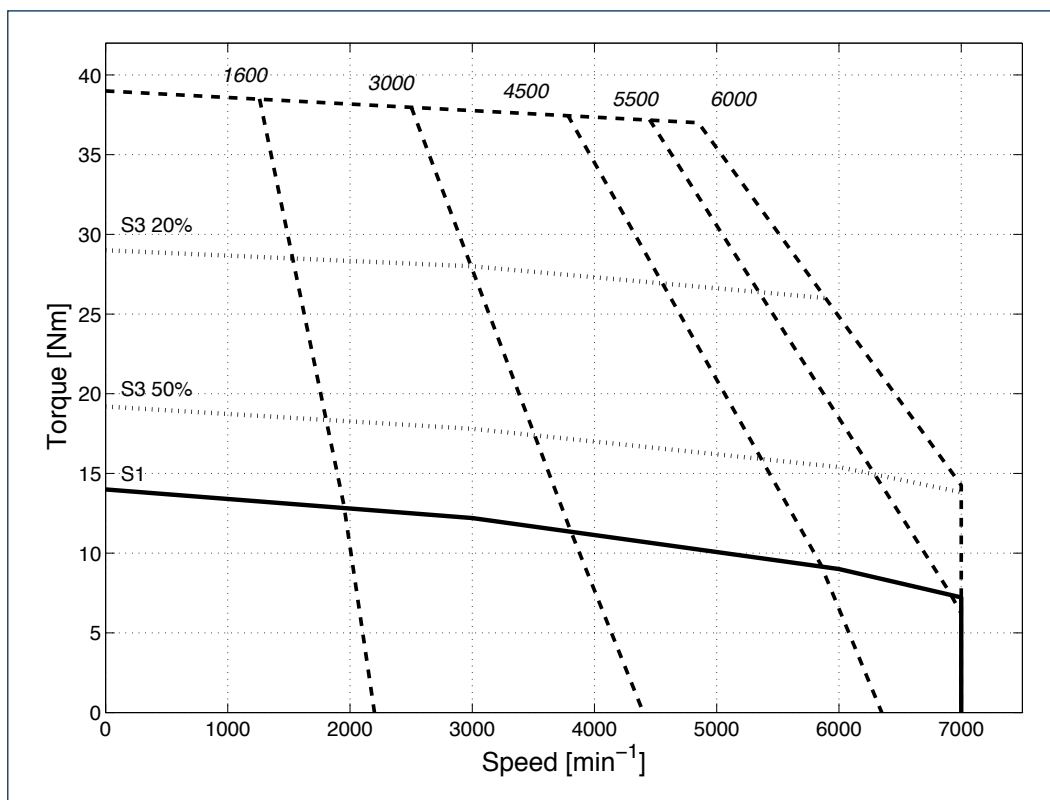
TOM 118 • 10.2 Nm - 400V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	10.2				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	312	305	314	323	306
Rated Torque (dT=105K)	M_n	[Nm]	10	9.5	8.5	8	7.5
Current at rated speed	I_n	[A]	4.2	7.9	10.2	10.5	11.4
Standstill current	I_0	[A]	4.3	8.0	11.6	13.7	15.8
Max Torque	M_{max}	[Nm]	30	30	30	30	30
Max Current	I_{max}	[A]	14.9	28.0	40	48	55
Back EMF constant	K_e	[V/1000 min^{-1}]	161	86	60	50	44
Torque constant	K_T	[Nm/A]	2.39	1.28	0.88	0.75	0.65
Rated Power	P_n	[kW]	1.68	3.0	4.0	4.6	4.7
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	4.47	1.27	0.61	0.43	0.33
Stator phase-phase Inductance	L_{pp}	[mH]	58.8	16.7	8.0	5.7	4.3
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	7.8				
Electric time constant (at 20°C)	t_{el}	[ms]	13				
Thermal time constant	t_{therm}	[min]	34				
Motor mass without brake	m_M	[kg]	9.7				
Motor mass with brake	m_{MB}	[kg]	11.9				



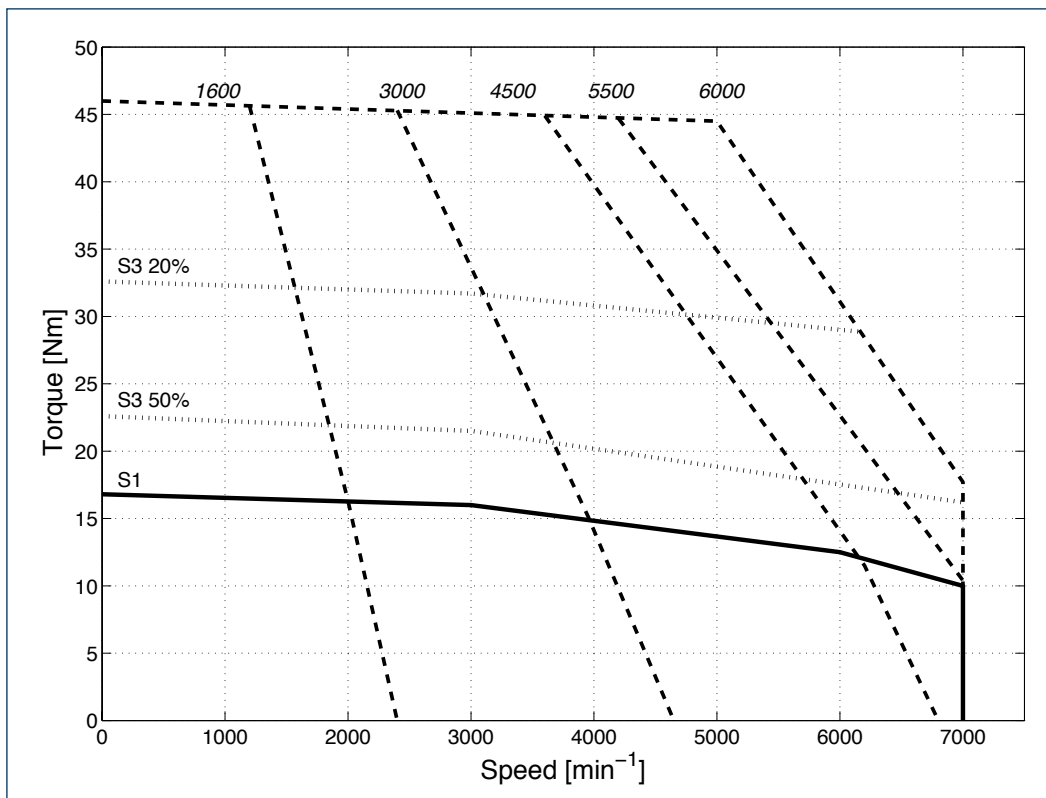
TOM 118 • 14 Nm - 400V

Parameter	Symbol	Unit	Speed [min ⁻¹]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	14.0				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	323	320	325	335	329
Rated Torque (dT=105K)	M_n	[Nm]	13.3	12.2	10.9	9.7	9.0
Current at rated speed	I_n	[A]	4.9	8.4	10.9	11.4	11.8
Standstill current	I_0	[A]	5.3	9.8	14.4	16.9	18.9
Max Torque	M_{max}	[Nm]	39	39	39	39	39
Max Current	I_{max}	[A]	17.2	32	47	55	62
Back EMF constant	K_e	[V/1000min ⁻¹]	182	98	67	57	51
Torque constant	K_T	[Nm/A]	2.66	1.43	0.97	0.83	0.74
Rated Power	P_n	[kW]	2.2	3.8	5.0	5.3	5.3
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	3.60	1.04	0.48	0.35	0.28
Stator phase-phase Inductance	L_{pp}	[mH]	47.4	13.7	6.3	4.6	3.7
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	9.9				
Electric time constant (at 20°C)	t_{el}	[ms]	13				
Thermal time constant	t_{therm}	[min]	42				
Motor mass without brake	m_M	[kg]	11.7				
Motor mass with brake	m_{MB}	[kg]	12.9				



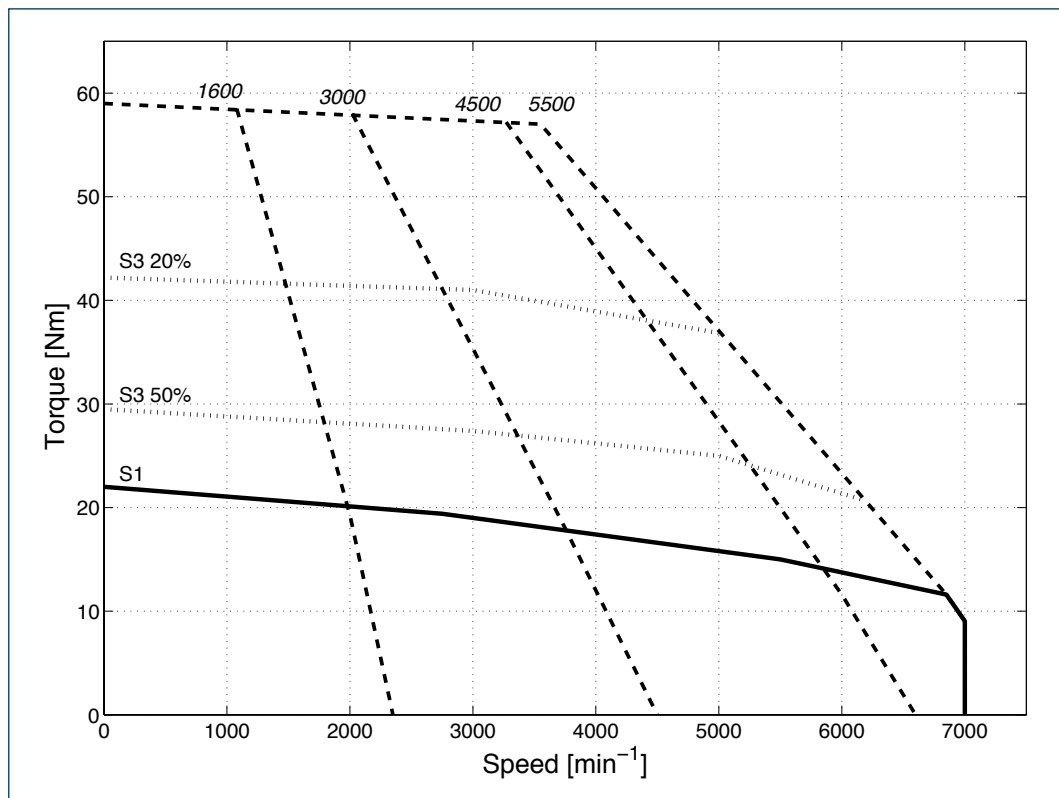
TOM 145 • 16.8 Nm - 400V

Parameter	Symbol	Unit	Speed [min^{-1}]				
			1600	3000	4500	5500	6000
Standstill torque (dT=105K)	M_0	[Nm]	16.8				
Motor rated frequency	f_n	[Hz]	107	200	300	367	400
Motor rated voltage	V_n	[V _{AC}]	314	308	314	319	305
Rated Torque (dT=105K)	M_n	[Nm]	16.5	16	14	13	12.5
Current at rated speed	I_n	[A]	6.8	12.5	16.4	17.5	19
Standstill current	I_0	[A]	6.9	13.0	19.0	22.8	26
Max Torque	M_{max}	[Nm]	46	46	46	46	46
Max Current	I_{max}	[A]	26.7	50	73	88	100
Back EMF constant	K_e	[V/1000 min^{-1}]	156	83	57	47	42
Torque constant	K_T	[Nm/A]	2.42	1.29	0.88	0.74	0.65
Rated Power	P_n	[kW]	2.76	5.0	6.6	7.5	7.9
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	2.53	0.72	0.34	0.24	0.18
Stator phase-phase Inductance	L_{pp}	[mH]	40.4	11.5	5.4	3.8	2.9
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	12.8				
Electric time constant (at 20°C)	t_{el}	[ms]	16				
Thermal time constant	t_{therm}	[min]	36				
Motor mass without brake	m_M	[kg]	15.2				
Motor mass with brake	m_{MB}	[kg]	17.8				



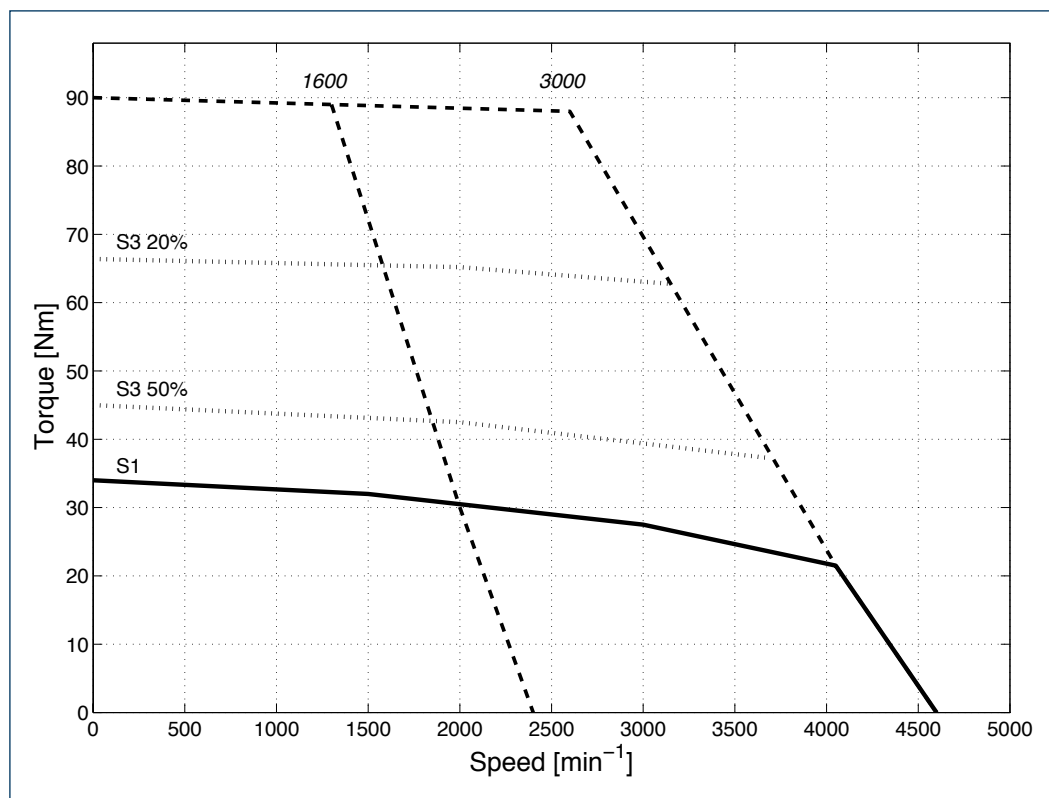
TOM 145 • 22 Nm - 400V

Parameter	Symbol	Unit	Speed [min^{-1}]			
			1600	3000	4500	5500
Standstill torque (dT=105K)	M_0	[Nm]	22.0			
Motor rated frequency	f_n	[Hz]	107	200	300	367
Motor rated voltage	V_n	[V _{AC}]	319	321	323	357
Rated Torque (dT=105K)	M_n	[Nm]	20.7	19.2	17	15
Current at rated speed	I_n	[A]	8.4	14.2	18.3	17.6
Standstill current	I_0	[A]	9.0	16.4	24.3	26.5
Max Torque	M_{max}	[Nm]	59	59	59	59
Max Current	I_{max}	[A]	29.5	54	80	87
Back EMF constant	K_e	[V/1000 min^{-1}]	176	96	65	59
Torque constant	K_T	[Nm/A]	2.45	1.34	0.90	0.83
Rated Power	P_n	[kW]	3.5	6.0	8.0	8.6
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	1.97	0.59	0.27	0.23
Stator phase-phase Inductance	L_{pp}	[mH]	31.5	9.4	4.3	3.6
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	17.6			
Electric time constant (at 20°C)	t_{el}	[ms]	16			
Thermal time constant	t_{therm}	[min]	47			
Motor mass without brake	m_M	[kg]	18.2			
Motor mass with brake	m_{MB}	[kg]	20.8			



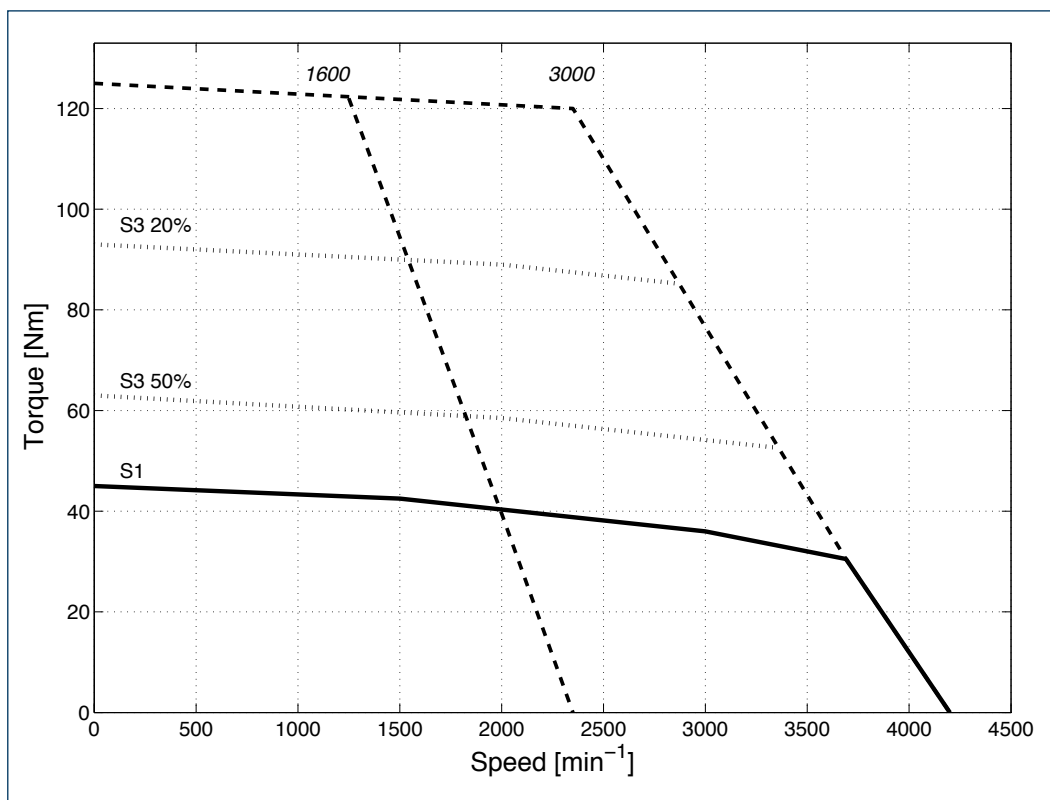
TOM 170 • 34 Nm - 400V

Parameter	Symbol	Unit	Speed [min^{-1}]	
			1600	3000
Standstill torque (dT=105K)	M_0	[Nm]	34.0	
Motor rated frequency	f_n	[Hz]	107	200
Motor rated voltage	V_n	[V _{AC}]	319	315
Rated Torque (dT=105K)	M_n	[Nm]	31	27.5
Current at rated speed	I_n	[A]	11.2	18.6
Standstill current	I_0	[A]	12.4	23.3
Max Torque	M_{max}	[Nm]	90	90
Max Current	I_{max}	[A]	37	70
Back EMF constant	K_e	[V/1000 min^{-1}]	174	93
Torque constant	K_T	[Nm/A]	2.74	1.46
Rated Power	P_n	[kW]	5.2	8.6
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	0.91	0.26
Stator phase-phase Inductance	L_{pp}	[mH]	17.9	5.1
Rotor inertia	J_m	[$\text{kgm}^2 \times 10^{-4}$]	28.2	
Electric time constant (at 20°C)	t_{el}	[ms]	20	
Thermal time constant	t_{therm}	[min]	50	
Motor mass without brake	m_M	[kg]	25	
Motor mass with brake	m_{MB}	[kg]	29.5	

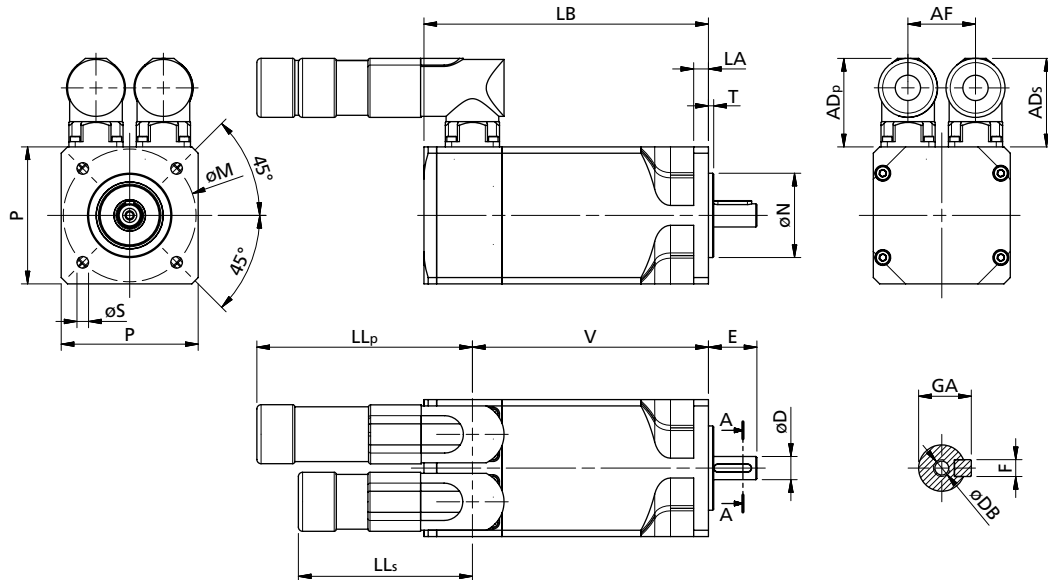


TOM 170 • 45 Nm - 400V

Parameter	Symbol	Unit	Speed [min ⁻¹]	
			1600	3000
Standstill torque (dT=105K)	M_0	[Nm]	45.0	
Motor rated frequency	f_n	[Hz]	107	200
Motor rated voltage	V_n	[V _{AC}]	310	314
Rated Torque (dT=105K)	M_n	[Nm]	42	36
Current at rated speed	I_n	[A]	15.9	24.9
Standstill current	I_0	[A]	17.1	31
Max Torque	M_{max}	[Nm]	125	125
Max Current	I_{max}	[A]	52	96
Back EMF constant	K_e	[V/1000min ⁻¹]	185	101
Torque constant	K_T	[Nm/A]	2.74	1.50
Rated Power	P_n	[kW]	7.0	11.3
Stator phase-phase Resistance (at 20°C)	R_{pp}	[W]	0.57	0.17
Stator phase-phase Inductance	L_{pp}	[mH]	11.1	3.3
Rotor inertia	J_m	[kgm ² x 10 ⁻⁴]	47.5	
Electric time constant (at 20°C)	t_{el}	[ms]	19	
Thermal time constant	t_{therm}	[min]	65	
Motor mass without brake	m_M	[kg]	30	
Motor mass with brake	m_{MB}	[kg]	34.5	



Dimensions (from TOM 65 to TOM 102)



Type	Shaft				
	D	E	DB	GA ⁽¹⁾	F ⁽¹⁾
65	9	20	M3	10.2	3
	11	23	M4	12.5	4
82	11	23	M4	12.5	4
	14	30	M5	16	5
	19	40	M6	21.5	6
102	19	40	M6	21.5	6
	24	50	M8	27	8

Type	Flange					
	M	N	P	S	T	LA
65	63	40	65	5.5	2.5	7
	75	60	65	6	2.5	7
82	100	80	82	6.5	3	10
	115	95	100	9	3	10
102	100	80	102	7	3	10
	115	95	102	9	3	10

Type	Motor																
	T ₀	AC	LB ₂	LB ₃	LB ₄	LB ₅	LB ₆	LB ₇	ADp	ADs	AF	LLp	LLs	V ₈	V ₉	V ₁₀	V ₁₁
65	0.85	65	112	143	130	130	179	179	41.5	41.5	32	96	96	89	89	138	138
	1.7		135	166	153	153	202	202						112	112	161	161
	2.2		161	192	179	179	228	228						138	138	187	187
82	3.2	82	160	200	183	160	223	223	41.5	41.5	36	96	96	132	132	195	195
	4.4		180	220	203	180	243	243						152	152	215	215
102	7.2	102	180	220	203	180	243	220	41.5	41.5	39	96	96	150	150	190	190
	9.6		207	247	230	207	297	247						177	177	217	217

Notes:

(1) Motor shaft extension without key available.

LB₂ Motor length with resolver, or in sensorless version.

LB₃ Motor length with resolver, or in sensorless version, and with brake or flywheel.

LB₄ Motor length with encoder EnDat (ENB1, ENB2).

LB₅ Motor length with encoder Hiperface (ENB3, ENB4).

LB₆ Motor length with encoder EnDat (ENB1, ENB2) and with brake or flywheel

LB₇ Motor length with encoder Hiperface (ENB3, ENB4) and with brake or flywheel

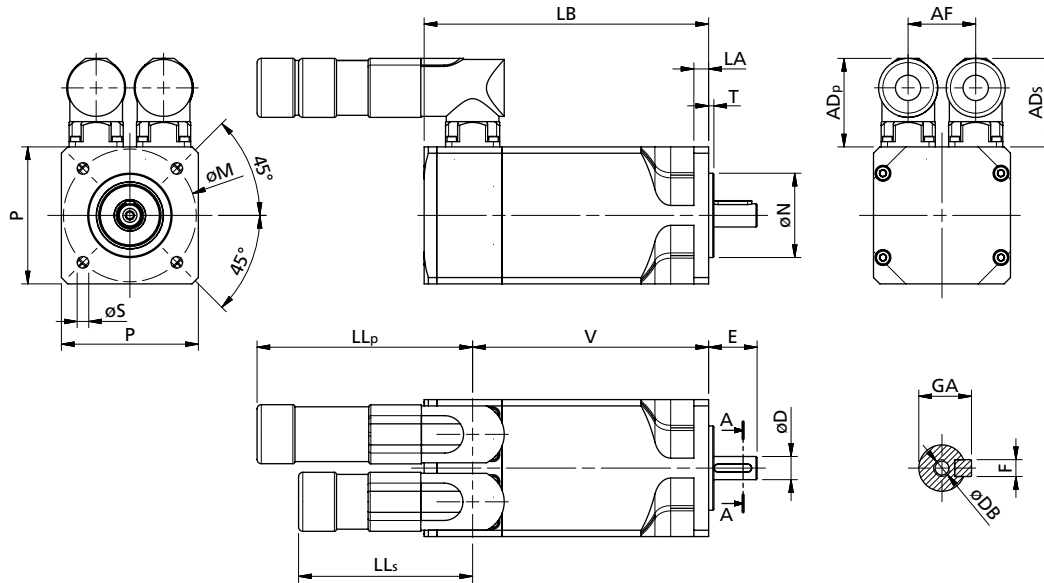
V₈ Motor with resolver, encoder (ENB1, ENB2, ENB3, ENB4) or in sensorless version.

V₉ Motor with resolver, or in sensorless version and with brake or flywheel.

V₁₀ Motor with encoder EnDat (ENB1, ENB2) and with brake or flywheel

V₁₁ Motor with encoder Hiperface (ENB3, ENB4) and with brake or flywheel

Dimensions (from TOM 118 to TOM 170)



Type	Shaft				
	D	E	DB	GA ⁽¹⁾	F ⁽¹⁾
118	19	40	M6	21.5	6
	24	50	M8	27	8
	28	60	M10	31	8
145	19	40	M6	21.5	6
	24	50	M8	27	8
	28	60	M10	31	8
170	24	50	M8	27	8
	28	60	M10	31	8
	32	60	M12	35	10

Type	Flange					
	M	N	P	S	T	LA
118	130 ⁽²⁾	95	118	9	3.5	10
	130	110	118	9	3.5	10
	165	130	145	11.5	3.5	10
145	165	130	145	11.5	3.5	12
170	165	130	170	11.5	3.5	12

Type	Motor																
	T ₀	AC	LB ₂	LB ₃	LB ₄	LB ₅	LB ₆	LB ₇	ADp	ADs	AF	LLp	LLs	V ₈	V ₉	V ₁₀	V ₁₁
118	10.2	118	210	260	235	210	285	260	41.5	41.5	96	96	96	175	225	225	225
	14		243	293	268	243	351	293						208	258	258	258
145	16.8	145	230	280	255	230	305	280	41.5	41.5	96	96	96	195	245	245	245
	22		265	315	290	265	375	315						230	280	280	280
170	34	170	265	340	303	265	378	340	41.5	41.5	140	96	96	233	308	308	308
	45		319	394	357	319	432	394						287	362	362	362

Notes:

(1) Motor shaft extension without key available.

(2) Mechanical interface 130S.

LB₂ Motor length with resolver, or in sensorless version.

LB₃ Motor length with resolver, or in sensorless version, and with brake or flywheel.

LB₄ Motor length with encoder EnDat (ENB1, ENB2).

LB₅ Motor length with encoder Hiperface (ENB3, ENB4).

LB₆ Motor length with encoder EnDat (ENB1, ENB2) and with brake or flywheel

LB₇ Motor length with encoder Hiperface (ENB3, ENB4) and with brake or flywheel

V₈ Motor with resolver, encoder (ENB1, ENB2, ENB3, ENB4) or in sensorless version.

V₉ Motor with resolver, or in sensorless version and with brake or flywheel.

V₁₀ Motor with encoder EnDat (ENB1, ENB2) and with brake or flywheel

V₁₁ Motor with encoder Hiperface (ENB3, ENB4) and with brake or flywheel

Feedback devices

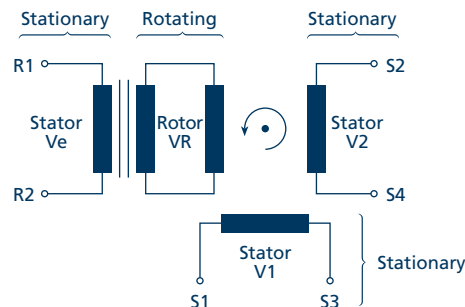
Bonfiglioli TOM servomotor series is available with different feedback devices. Available feedbacks are resolver and optical absolute encoders, single turn or multi turn. All available feedback devices are managed by the Tde Macno Vectron frequency inverter of ACTIVE CUBE series. Dedicated feedback interfaces are available.

The resolver is a passive wound device consisting of a stator and rotor elements excited from an external source. It produces two output signals that correspond to the sine and cosine angle of the motor shaft. This is a robust absolute device of good accuracy, capable of withstanding high temperature and high levels of vibration. Positional information is absolute within one turn.

The optical absolute encoder uses a high precision optical disc. The high resolution performed is based on a combination of absolute information, transmitted via a serial link, and sine/cosine signals with incremental techniques. Single turn absolute encoder has an absolute positional information only within one turn.

Multi turn absolute encoder is provided of extra gear wheels that account for several shaft revolution. Therefore the output is unique for each shaft position and revolution up to available revolutions.

Resolver datasheet



Item	TOM 65		TOM82 - TOM170	
	RES2	RES1	RES1	RES2
Poles number	2	2	2	2
Transformation ratio	0.5 ±5%	0.5 ^{+15%} _{-5%}	0.5 ^{+15%} _{-5%}	0.5 ±5%
Input voltage [V _{ac,rms}]	7	11	11	5.5
Input current [mA]	65	57	57	61
Input frequency [kHz]	10	8	8	10
Phase shift	0°	-11°	-11°	-12°
Input impedance Z _{ro} (W)	70 + j100	75 + j185	75 + j185	43 + j79
Output impedance Z _{ss} (W)	175 + j275	135 + j265	135 + j265	62 + j112
Electrical error	±10'	±10'	±10'	±10'
Accuracy ripple	1' max	1' max	1' max	1' max
Operating temperature	-55°C ... + 155°C	-55°C ... + 155°C	-55°C ... + 155°C	-55°C ... + 155°C
Max Speed [min ⁻¹]	10000	20000	20000	10000
Mass [kg]	0.065	0.28	0.28	0.28
Rotor Inertia [kgm ² x 10 ⁻⁶]	3.0	5.0	5.0	5.0

Encoder datasheet

HEIDENHAIN ENCODERS

Item	TOM 65		TOM82 - TOM170	
	ENB1	ENB2	ENB1	ENB2
Data interface	EnDat		EnDat	
Model	ECN1113	EQN1125	ECN1313	EQN1325
Type	Single turn	Multi turn	Single turn	Multi turn
Power supply	3.6VDC ... 14VDC	3.6VDC ... 14VDC	3.6VDC ... 14VDC	3.6VDC ... 14VDC
Current consumption	85mA (5V)	105mA (5V)	85mA (5V)	105mA (5V)
Periods per revolution	512	512	2048	2048
Position per revolution	8192 (13 bits)	8192 (13 bits)	8192 (13 bits)	8192 (13 bits)
Revolutions	-	4096 (12 bits)	-	4096 (12 bits)
Operating temperature	-40°C ... +115°C		-40°C ... +115°C	
Max Speed [min ⁻¹]	12000		12000	
Mass [kg]	0.10		0.25	
Rotor Inertia [kgm ² x 10 ⁻⁶]	0.40		2.60	

SICK ENCODERS

Item	TOM 65		TOM82 - TOM170	
	ENB3	ENB4	ENB3	ENB4
Data interface	Hiperface		Hiperface	
Model	SKS36	SKM36	SRS50	SRM50
Type	Single turn	Multi turn	Single turn	Multi turn
Power supply	7VDC ... 12VDC	7VDC ... 12VDC	7VDC ... 12VDC	7VDC ... 12VDC
Current consumption	60mA	60mA	80mA	80mA
Periods per revolution	128	128	1024	1024
Position per revolution	4096 (12 bits)	4096 (12 bits)	32768 (15 bit)	32768 (15 bit)
Revolutions	-	4096 (12 bits)	-	4096 (12 bits)
Operating temperature	-30°C ... +110°C		-20°C ... +110°C	
Max Speed [min ⁻¹]	10000		12000	
Mass [kg]	0.07		0.20	
Rotor Inertia [kgm ² x 10 ⁻⁶]	0.45		1.00	

PTC/KTY thermal protection

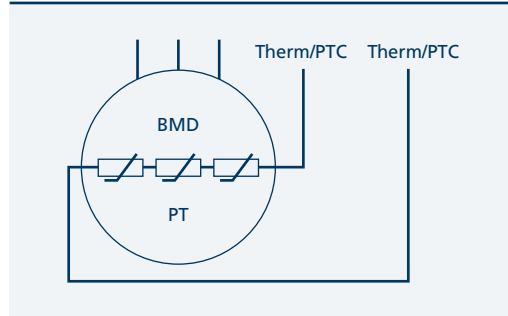
All motors in the TOM Series are equipped with an integrated PTC temperature as standard to protect the windings against overtemperatures exceeding the limit of the motor class F insulation.

These sensors are in conformity to standard DIN 44081-82.

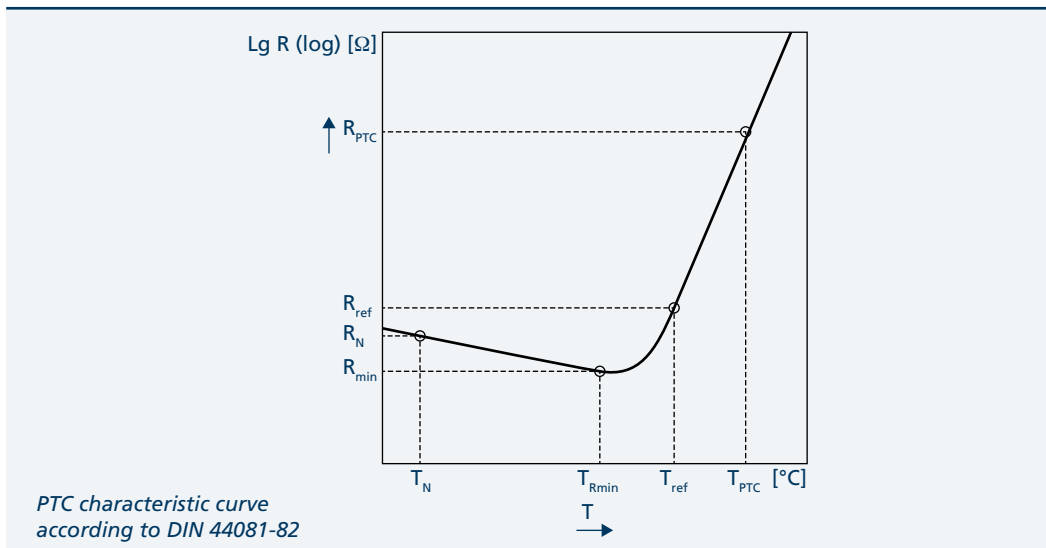
Optionally a KTY sensor is available, to fit any needs for temperature feedback.

The PTC temperature sensor consists of a special ceramic resistor whose ohmic value varies with the temperature of the electrical winding with which it is held on close contact. Each temperature value generates a known resistance, so that provided the resistor is fed at a constant voltage, the output current can be used to determine the corresponding temperature. If temperature

reaches an established limit, the circuit monitoring the signal trips the necessary cutout to disconnect power to the motor and prevent damage.

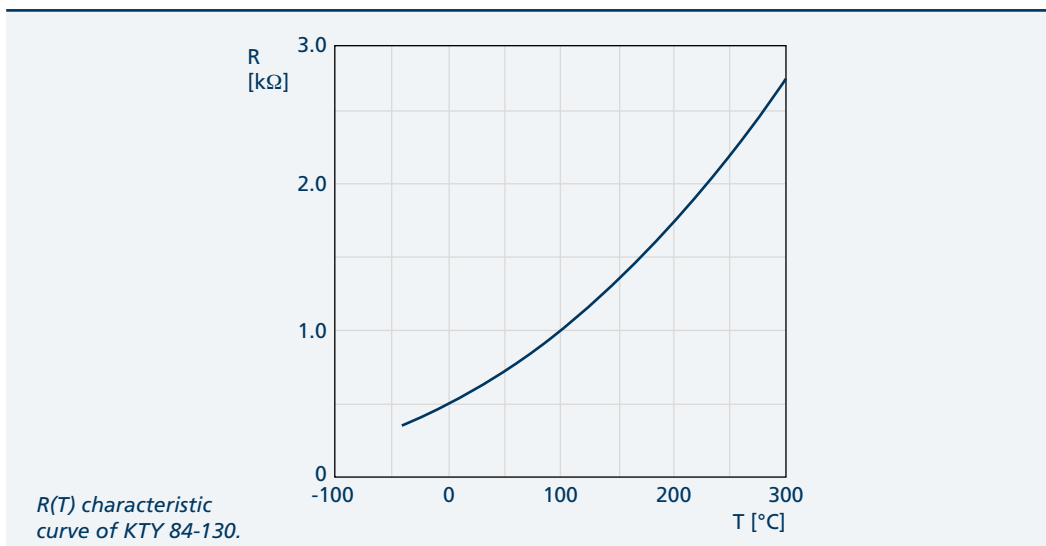


A triple PTC thermistor rated to 150°C is placed into the motor winding. The resistance curve of the PTC thermistor is in accordance with DIN 44081-82.



KTY 84-130

KTY 84-130 silicon sensors are optionally available. Working temperature range: -40°C ÷ +260°C.



Electromechanical holding brake

An electromagnetic holding brake is available. The brake variant can be ordered by selecting the F24 value in the brake option field.

The electromechanical brake is for use as an holding brake with motor shaft stationary. Do not use it as a dynamic brake, except for emergencies such as main supply failure.

Data of the available brake for each motor size are summarized in the following table. When the motor is delivered without brake, the brake fitting is not possible.

The brake coil voltage supply must be 24V DC-voltage.

The brake option is responsible of an increment of the motor length (see in pages 42-43). Brake leads are wired in the power connector together with motor leads.

Please note that the brake option is not available when the "additional inertia" option is selected.

Motor	Motor stall torque	Rated brake torque 20°C M_b	Rated brake torque 100°C M_b	Brake voltage V_b	Brake current I_b	Brake power 20°C P_b	Brake inertia	Mass m_b	Engaging time t_1	Release time t_2
	Nm	Nm	Nm	Vdc	A	W	Kgm ² x10 ⁻⁴	kg	ms	ms
65	0.85	2	1.8	24	0.46	11	0.068	0.15	6	25
	1.7									
	2.2									
82	3.2	4.5	4		0.5	12	0.18	0.35	7	35
	4.4									
102	7.2	9	8		0.75	18	0.54	0.7	7	40
	9.6									
118	10.2	18	15		1.0	24	1.66	1.1	10	50
	14									
145	16.8	18	15		1.0	24	1.66	1.1	10	50
	22									
170	34	36	32	1.1	26	5.56	1.8	22	90	
	45									

Note

t_1 Time from disconnecting the current until the rated torque is attained

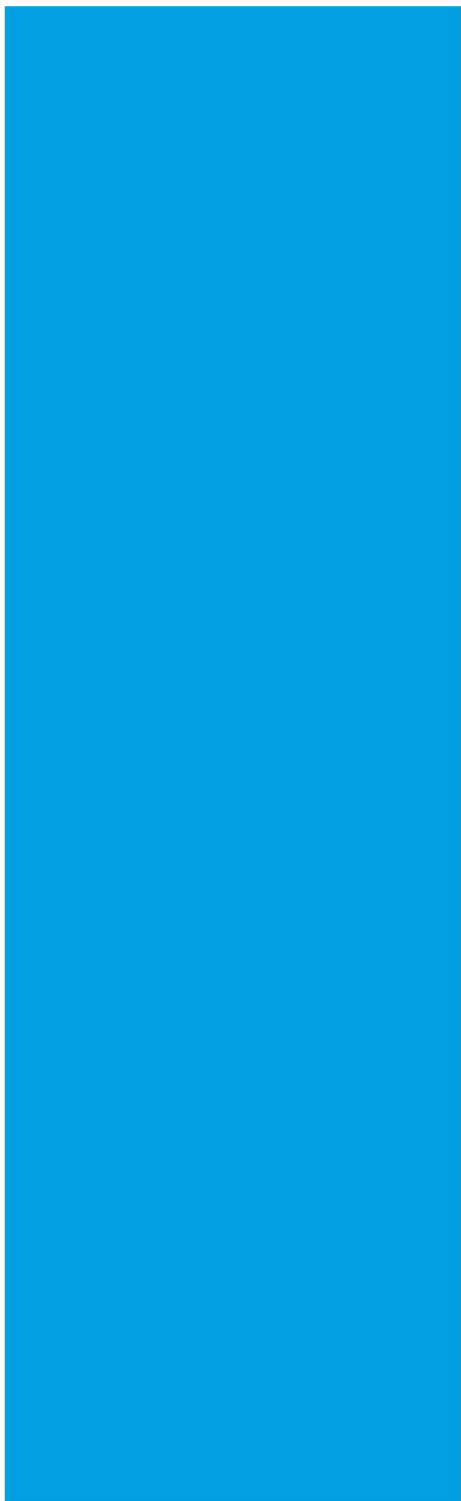
t_2 Time from connecting the current until the torque decreases

Additional inertia feature

TOM Permanent Magnet AC Synchronous Motor series is provided optionally with additional inertia. The TOM motors with additional inertia have higher rotor moment of inertia in comparison with basic version.

Additional inertia is designed to be used in application with high load inertia. The increased rotor moment of inertia provides a comfortable control response due to "higher" inertial matching of the machine.

Motor	Motor stall torque	Additional inertia	Additional weight
	Nm	Kgm ² x10 ⁻⁴	kg
65	0.85	0.5	0.3
	1.7		
	2.2		
82	3.2	3	0.7
	4.4		
102	7.2	7.5	1.3
	9.6		
118	10.2	16	2.4
	14		
145	16.8	36	3.6
	22		
170	34	70	5.5
	45		



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