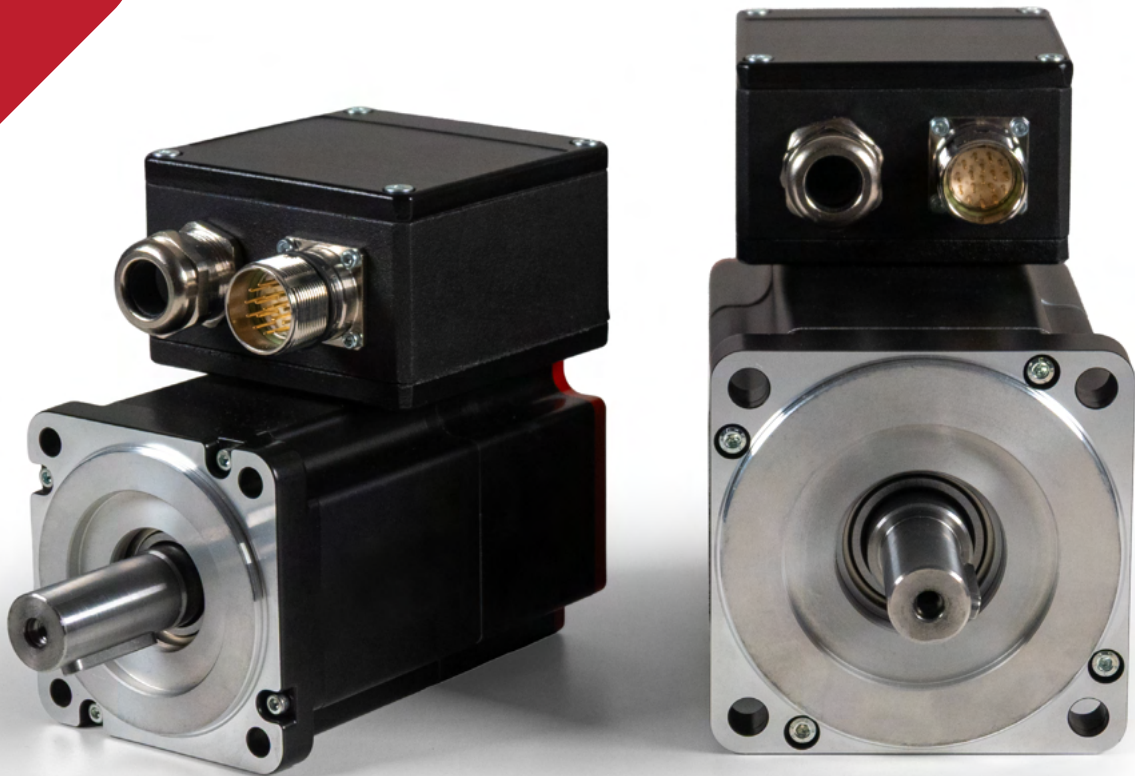


SEE IT BEFORE IT HAPPENS



TETRA
COMPACT 4^{LV}
LOW VOLTAGE
BRUSHLESS SERVOMOTORS

TETRA COMPACT 4 Low Voltage

ADVANCED BRUSHLESS TECHNOLOGY, ENGINEERED FOR LOW-VOLTAGE APPLICATIONS

The **TETRA COMPACT 4 LV** series is the low-voltage evolution of Motor Power Company's TC4 platform, a latest-generation brushless servo motor fully designed, developed, and industrialized in-house. It reflects our long-standing engineering expertise and our ability to translate advanced technology into reliable, high-performance industrial solutions.

Specifically engineered for low-voltage and battery-powered applications, the **TETRA COMPACT 4 LV** combines an extremely compact design with outstanding power density, efficiency, and dynamic performance.

Based on a 10-pole synchronous design and available with multiple feedback options, the **TETRA COMPACT 4 LV** ensures precise motion control, high reliability, and seamless integration with low-voltage servo drives. The wide range of available power ratings makes it the ideal solution for electric and battery-powered vehicles, as well as other demanding mobile applications.

COMPACT DESIGN

HIGH EFFICIENCY

NEXT-GENERATION LOW-VOLTAGE PERFORMANCE

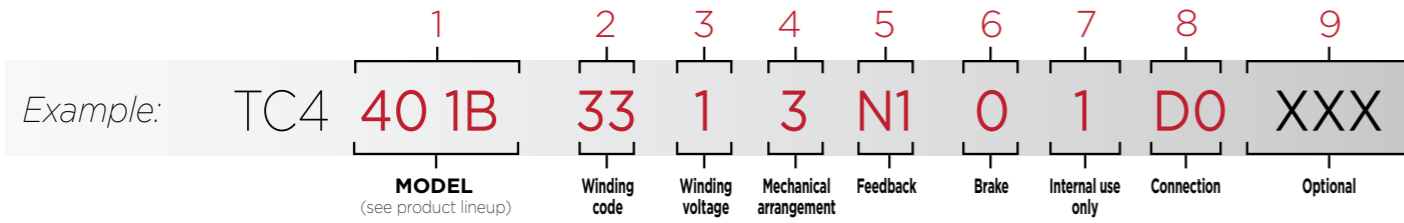
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TC4 80 3A	Ratings and Specifications - Torque/Speed charts 22
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FEATURES

Motor type	Three-phase BPM synchronous servo motor
Poles number	10 (5 poles pair)
Available frame sizes	40 - 60 - 80 - 100
Rated output torque	From 0.215 to 10.16 Nm
Rated output power	From 65 to 2620 W
Rated servomotor speed	Up to 6000 rpm
Maximum servomotor speed	Up to 8000 rpm
Insulation class	F (155 °C)
Protection class	IP 65 (with oil seal)
Ambient operating temperature	-20 ÷ +40 °C
Ambient storage temperature	-40 ÷ +70 °C
Relative humidity	5 ÷ 85 %, non-condensing
Cooling type	Natural convective
Maximum operating altitude	Up to 3000 m above sea level (derating 1%/100m from 1000 m onwards)
Temperature sensor	PT1000 (no sensor for size 40)
Shaft end	Smooth or keyed
Feedback	Resolver, TTL Encoder, Absolute Encoder
Bearing life	20.000 h under rated operation condition
Balancing quality grade	G 6.3 according to ISO 1940
Magnet material	NdFeB with epoxy coating
External coating	RAL 9005 black powder
Approvals	CE, Rohs, Reach, UL file: E216686 MPC IF 155 Insulation File Marking



SERVOMOTOR TYPE DESIGNATION

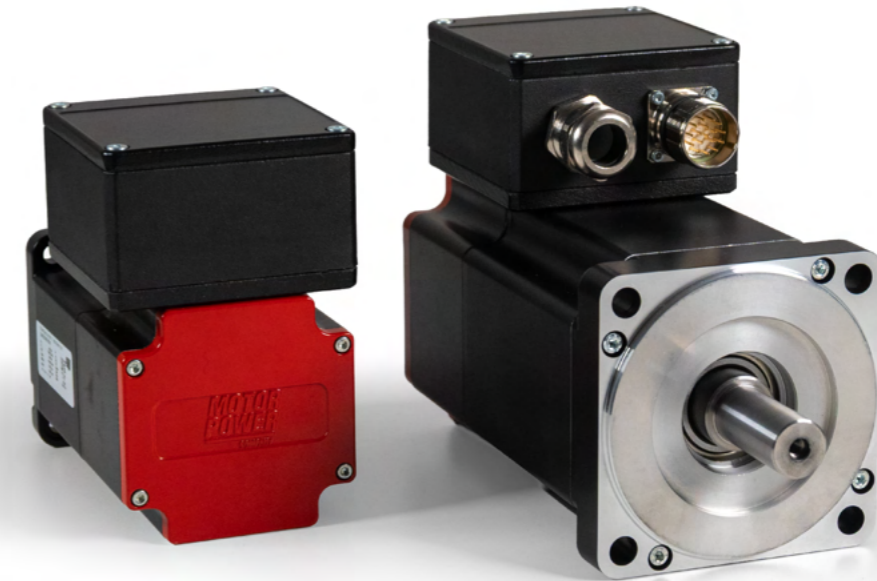


1	MODEL	See PRODUCT LINEUP (p.8)										
2	WINDING CODE	See WINDING TABLE CODE (p.7)										
3	WINDING VOLTAGE	<table border="1"> <tr><td>0</td><td>→ 24 Vdc</td></tr> <tr><td>1</td><td>→ 48 Vdc</td></tr> <tr><td>7</td><td>→ 72 Vdc</td></tr> <tr><td>9</td><td>→ 96 Vdc</td></tr> </table>	0	→ 24 Vdc	1	→ 48 Vdc	7	→ 72 Vdc	9	→ 96 Vdc		
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1	→ 48 Vdc											
7	→ 72 Vdc											
9	→ 96 Vdc											
4	MECHANICAL ARRANGEMENT	<table border="1"> <tr><td>0</td><td>Smooth shaft</td></tr> <tr><td>1</td><td>Smooth shaft + oil seal</td></tr> <tr><td>2</td><td>Keyed shaft</td></tr> <tr><td>3</td><td>Keyed shaft + oil seal</td></tr> </table>	0	Smooth shaft	1	Smooth shaft + oil seal	2	Keyed shaft	3	Keyed shaft + oil seal		
0	Smooth shaft											
1	Smooth shaft + oil seal											
2	Keyed shaft											
3	Keyed shaft + oil seal											
5	FEEDBACK	<table border="1"> <tr><td>A1*</td><td>Hiperface absolute multi-turn encoder</td></tr> <tr><td>M1</td><td>TTL 2000 ppr encoder</td></tr> <tr><td>M2</td><td>Absolute single-turn 17-bit RS-485 encoder</td></tr> <tr><td>N1</td><td>A-format 24-bit absolute multi-turn with external battery (not included). Encoder N1 available for models 40-60-80</td></tr> <tr><td>R1*</td><td>Resolver</td></tr> </table>	A1*	Hiperface absolute multi-turn encoder	M1	TTL 2000 ppr encoder	M2	Absolute single-turn 17-bit RS-485 encoder	N1	A-format 24-bit absolute multi-turn with external battery (not included). Encoder N1 available for models 40-60-80	R1*	Resolver
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R1*	Resolver											

*Not available for TC4 40 models

6	BRAKE	<table border="1"> <tr><td>0</td><td>Without brake</td></tr> <tr><td>1</td><td>With brake</td></tr> </table>	0	Without brake	1	With brake		
0	Without brake							
1	With brake							
8	CONNECTION	<table border="1"> <tr><td>D0</td><td>300mm cable length with 6 pins power AMP connector and 9 pins signal AMP connector. This connection is available only for sizes 40.</td></tr> <tr><td>D2</td><td>300mm cable length with 6 pins power AMP connector and 15 pins signal AMP connector. This connection is available only for sizes 40 with M1 encoder.</td></tr> <tr><td>B3*</td><td>Terminal box (PT1000 on signal connector)</td></tr> </table>	D0	300mm cable length with 6 pins power AMP connector and 9 pins signal AMP connector. This connection is available only for sizes 40.	D2	300mm cable length with 6 pins power AMP connector and 15 pins signal AMP connector. This connection is available only for sizes 40 with M1 encoder.	B3*	Terminal box (PT1000 on signal connector)
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B3*	Terminal box (PT1000 on signal connector)							

*Not available for TC4 40 models



WINDING TABLE CODE

SERVOMOTOR TYPE	TYPE OF WINDING												
	77	32	33	00	78	01	81	02	45	03	04	05	07
TC4 40 1A	0		1		1	7			9	7	9		
TC4 40 1B		0	1			7		1	9	7	9		
TC4 60 2A			1			7			1	9		7	9
TC4 60 2B			1			7			1	9		7	9
TC4 80 3A			1				7		1	9		7	9
TC4 80 3B				1				7	1	9		7	9
TC4 80 3C				1				7	1	9		7	9
TC4 100 4A									1		7		9
TC4 100 4B									1			7	9

PRODUCT LINEUP

Servomotor Type	Stall torque M ₀ [Nm]	Nominal Torque M _n @3000 rpm	Nominal Torque M _n @6000 rpm	Peak Torque M _{max} [Nm]	Nominal Power @3000 rpm	Nominal Power @6000 rpm	Continuous Working Speed n _M [rpm]	Maximum Working Speed n _{Max} [rpm]	Moment of Inertia w/o brake [kg cm ²]	24 Vdc	48 Vdc	72 Vdc	96 Vdc
[/]	[Nm]	[Nm]	[Nm]	[Nm]	[W]	[W]	[rpm]	[rpm]	[kg cm ²]	[/]	[/]	[/]	[/]
TC4 40 1A	0.215	0.210	0.200	0.75	65	125	3000/6000	8000	0.03	√	√	√	√
TC4 40 1B	0.409	0.395	0.370	1.38	125	230	3000/6000	8000	0.05	√	√	√	√
TC4 60 2A	0.87	0.85	0.82	3.05	265	515	3000/6000	8000	0.22		√	√	√
TC4 60 2B	1.62	1.52	1.35	5.60	475	850	3000/6000	8000	0.41		√	√	√
TC4 80 3A	1.80	1.78	1.56	6.30	555	980	3000/6000	8000	0.79		√	√	√
TC4 80 3B	3.80	3.45	2.60	13.30	1080	1630	3000/6000	8000	1.42		√	√	√
TC4 80 3C	4.60	3.91	2.88	16.10	1230	1800	3000/6000	8000	2.03		√	√	√
TC4 100 4A	6.45	5.80	-	16.50	1820	-	3000	6000	2.53		√	√	√
TC4 100 4B	10.16	8.36	-	33.00	2620	-	3000	6000	4.61		√	√	√



**MOTOR
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COMPANY

40

RATINGS and SPECIFICATION

TYPE OF WINDING	24 Vdc		48 Vdc		72 Vdc		96 Vdc		
	77	78	33	03	01	04	45		
ELECTRICAL DATA									
Continuous stall torque (*)	M_o	[Nm]	0.215						
Peak torque	M_{MAX}	[Nm]	0.70	0.75					
Nominal torque	M_n	[Nm]	0.21	0.21	0.20	0.21	0.20	0.21	0.20
Nominal power	P_n	[W]	65	65	125	65	125	65	125
Continuous stall current	I_o	[Arms]	5.20	2.60	3.25	1.53	2.28	1.15	1.71
Maximum current	I_{Max}	[Arms]	20.00	11.11	13.89	6.54	9.75	4.92	7.31
Nominal current	I_n	[Arms]	5.08	2.54	3.02	1.49	2.12	1.12	1.67
Nominal working speed	n_N	[rpm]	3000	3000	6000	3000	6000	3000	6000
Maximum working speed	n_{Max}	[rpm]	6175	6175	7800	5440	8000	5450	8000
Torque constant	K_t	[Nm/Arms]	0.041	0.083	0.066	0.141	0.094	0.187	0.126
Voltage constant	$K_{e u-v}$	[Vrms/krpm]	2.5	5.0	4.0	8.5	5.7	11.3	7.6
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.73	2.93	1.85	7.79	3.70	14.47	6.21
Winding inductance	$L_{q u-v}$	[mH]	0.31	1.24	0.77	3.51	1.59	6.19	2.79
Electrical time constant	Te	[ms]	0.42	0.42	0.42	0.45	0.43	0.43	0.45
Thermal resistance	R_{th}	[°C/W]	2.36						
Mechanical time constant (*)	T_m	[ms]	1.30	1.31	1.29	1.20	1.27	1.26	1.20
Rotor inertia without holding brake	J	[kg·cm ²]	0.0305						
Rotor inertia with holding brake	J	[kg·cm ²]	0.0326						
Mass without holding brake	m	[kg]	0.40						
Mass with holding brake	m	[kg]	0.56						
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	45 / 35						
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	120 / 95						

Rated output with 185 x 185 x 8 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing. (*) without brake. (**) without brake and without feedback.

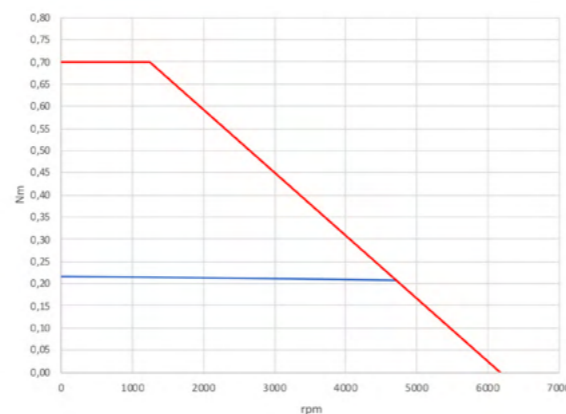
TORQUE/SPEED CHARTS

Operative temperature -20 ÷ +40 °C

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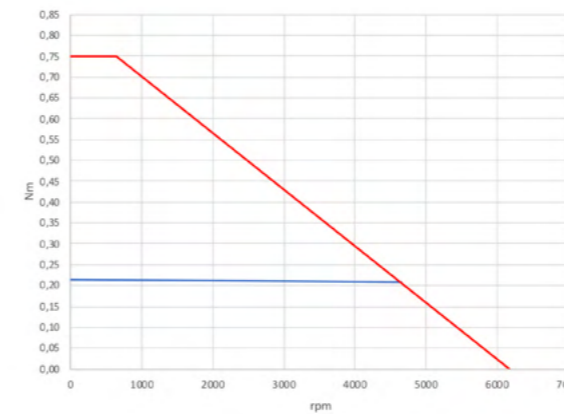
401A 77

Operative curves at 24 Vdc — Cn — Cmax



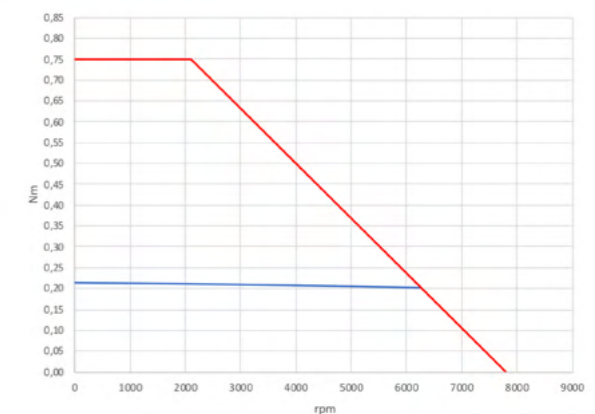
401A 78

Operative curves at 48 Vdc — Cn — Cmax



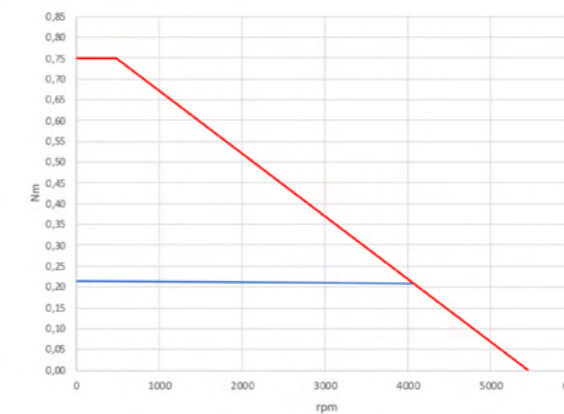
401A 33

Operative curves at 48 Vdc — Cn — Cmax



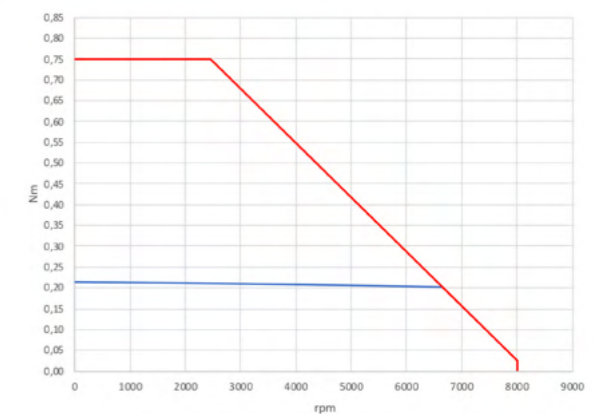
401A 03

Operative curves at 72 Vdc — Cn — Cmax



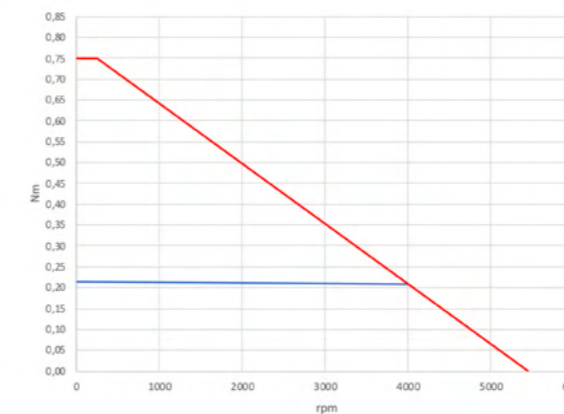
401A 01

Operative curves at 72 Vdc — Cn — Cmax



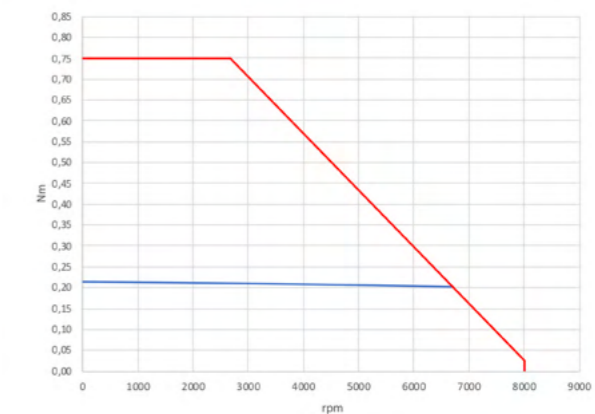
401A 04

Operative curves at 96 Vdc — Cn — Cmax



401A 45

Operative curves at 96 Vdc — Cn — Cmax



RATINGS and SPECIFICATION

TYPE OF WINDING	24 Vdc		48 Vdc		72 Vdc		96 Vdc		
	32	02	33	03	01	04	45		
ELECTRICAL DATA									
Continuous stall torque (*)	M_o	[Nm]	0.409						
Peak torque	M_{MAX}	[Nm]	0.93	1.38	1.18	1.38			
Nominal torque	M_n	[Nm]	0.370	0.395	0.370	0.395	0.370	0.395	0.370
Nominal power	P_n	[W]	125	125	230	125	230	125	230
Continuous stall current	I_o	[Arms]	8.24	3.64	6.18	2.91	4.34	2.19	3.25
Maximum current	I_{Max}	[Arms]	19.89	14.27	19.93	11.41	17.02	8.59	2.94
Nominal current	I_n	[Arms]	7.96	3.51	5.59	2.81	3.92	2.11	12.77
Nominal working speed	n_N	[rpm]	3000	3000	6000	3000	6000	3000	6000
Maximum working speed	n_{Max}	[rpm]	5180	4570	7900	5510	8000	5540	8000
Torque constant	K_t	[Nm/Arms]	0.050	0.112	0.066	0.141	0.094	0.187	0.126
Voltage constant	$K_{e u-v}$	[Vrms/krpm]	3.0	6.8	4.0	8.5	5.7	11.3	7.6
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.39	1.88	0.63	3.01	1.25	5.03	2.38
Winding inductance	$L_{q u-v}$	[mH]	0.22	1.06	0.36	1.66	0.74	2.94	1.06
Electrical time constant	T_e	[ms]	0.57	0.56	0.57	0.55	0.59	0.58	0.56
Thermal resistance	R_{th}	[°C/W]	1.85						
Mechanical time constant (*)	T_m	[ms]	0.89	0.83	0.81	0.85	0.79	0.81	0.85
Rotor inertia without holding brake	J	[kg·cm ²]	0.0561						
Rotor inertia with holding brake	J	[kg·cm ²]	0.0580						
Mass without holding brake	m	[kg]	0.49						
Mass with holding brake	m	[kg]	0.68						
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	45 / 35						
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	120 / 95						

Rated output with 185 x 185 x 8 mm aluminium heat sink flange coupling - Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing. (*) without brake. (**) without brake and without feedback.

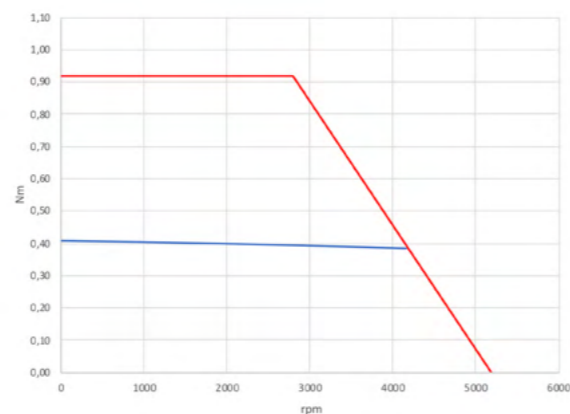
TORQUE/SPEED CHARTS

Operative temperature -20 ÷ +40 °C

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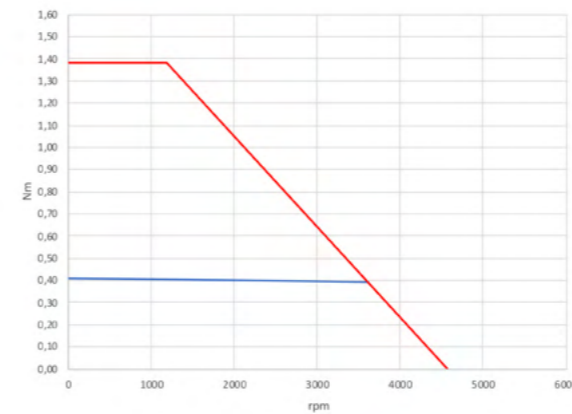
401B 32

Operative curves at 24 Vdc — Cn — Cmax



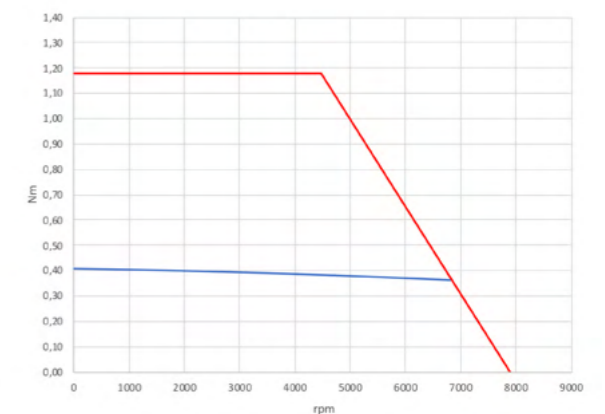
401B 02

Operative curves at 48 Vdc — Cn — Cmax



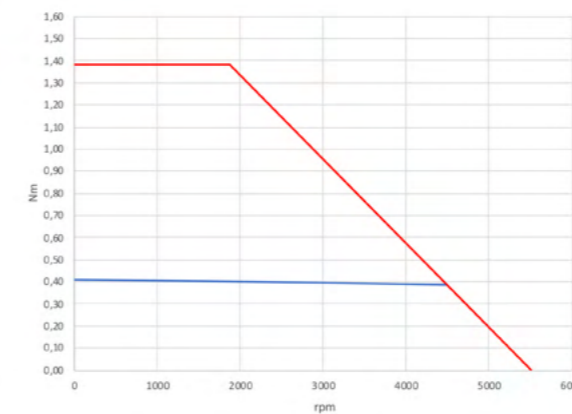
401B 33

Operative curves at 48 Vdc — Cn — Cmax



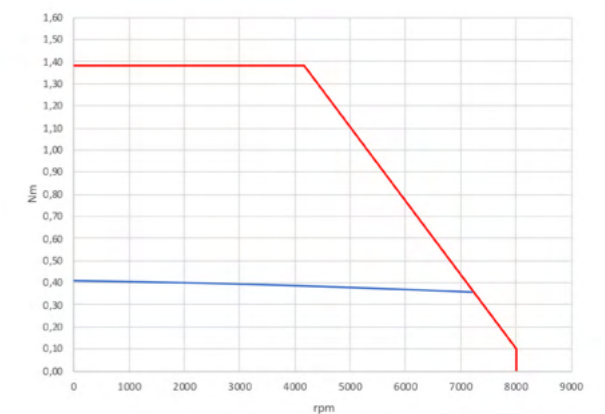
401B 03

Operative curves at 72 Vdc — Cn — Cmax



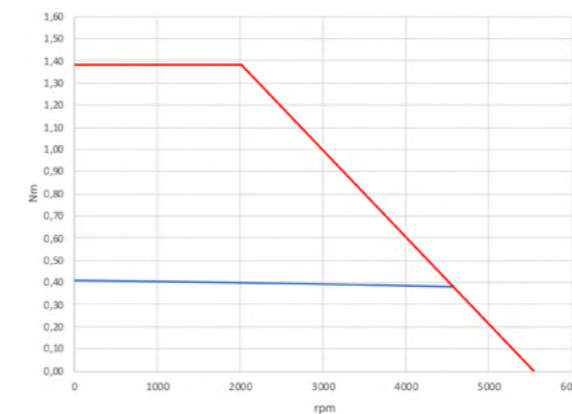
401B 01

Operative curves at 72 Vdc — Cn — Cmax



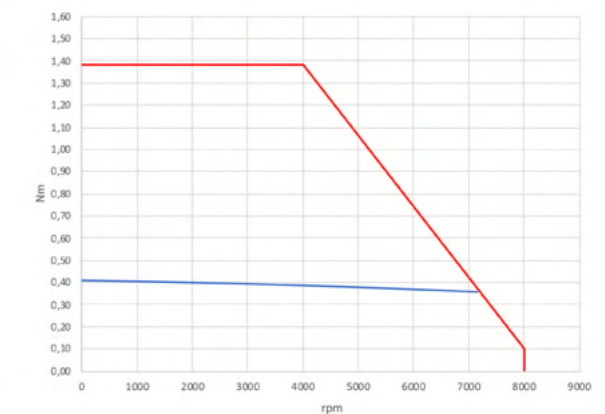
401B 04

Operative curves at 96 Vdc — Cn — Cmax



401B 45

Operative curves at 96 Vdc — Cn — Cmax



RATINGS and SPECIFICATION

		48 Vdc		72 Vdc		96 Vdc		
TYPE OF WINDING		45	33	05	01	07	03	
ELECTRICAL DATA								
Continuous stall torque (*)	M_o	[Nm]		0.87				
Peak torque	M_{MAX}	[Nm]		3.05				
Nominal torque	M_n	[Nm]	0.85	0.82	0.85	0.82	0.85	0.82
Nominal power	P_n	[W]	265	490	265	490	265	490
Continuous stall current	I_o	[Arms]	6.92	13.15	4.38	9.23	3.51	6.19
Maximum current	I_{Max}	[Arms]	30.29	57.55	19.18	40.39	15.35	27.08
Nominal current	I_n	[Arms]	6.76	12.39	4.28	8.70	3.43	5.83
Nominal working speed	n_N	[rpm]	3000	6000	3000	6000	3000	6000
Maximum working speed	n_{Max}	[rpm]	4150	7530	3940	8000	4200	7490
Torque constant	K_t	[Nm/Arms]	0.126	0.066	0.198	0.094	0.248	0.141
Voltage constant	K_{e-u-v}	[Vrms/krpm]	7.6	4.0	12.0	5.7	15.0	8.5
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.56	0.16	1.37	0.33	2.19	0.68
Winding inductance	L_{q-u-v}	[mH]	0.86	0.24	2.13	0.48	3.32	1.08
Electrical time constant	Te	[ms]	1.54	1.51	1.55	1.45	1.51	1.59
Thermal resistance	R_{th}	[°C/W]	1.60					
Mechanical time constant (*)	Tm	[ms]	0.79	0.82	0.78	0.83	0.80	0.77
Rotor inertia without holding brake	J	[kg·cm ²]	0.223					
Rotor inertia with holding brake	J	[kg·cm ²]	0.236					
Mass without holding brake	m	[kg]	0.92					
Mass with holding brake	m	[kg]	1.44					
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	42 / 32					
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	260 / 200					

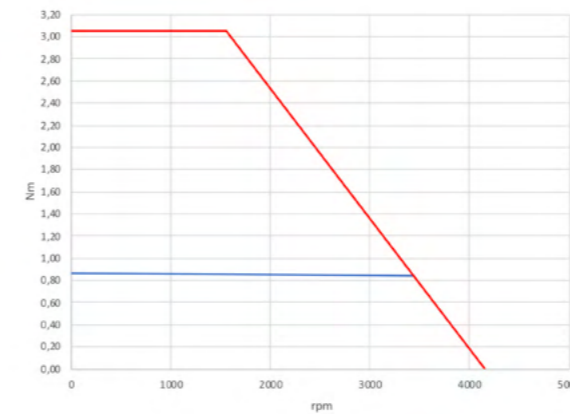
Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling. Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing.
 (*) without brake.
 (°) without brake and without feedback.

Operative temperature -20 ÷ +40 °C

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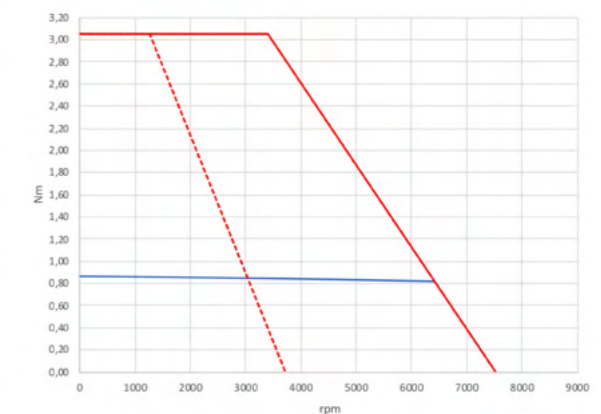
602A 45

Operative curves at 48 Vdc — Cn — Cmax



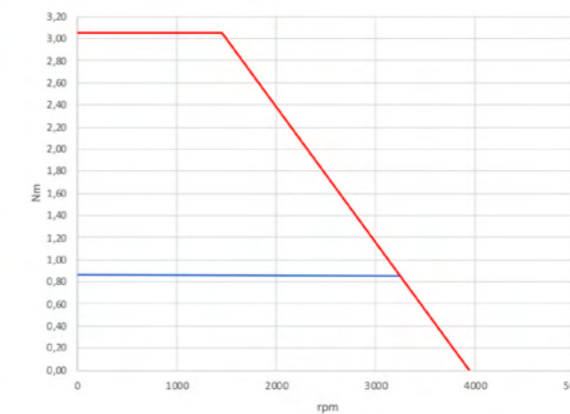
602A 33

Operative curves at 24/48 Vdc — Cn — Cmax @24Vdc — Cmax @48Vdc



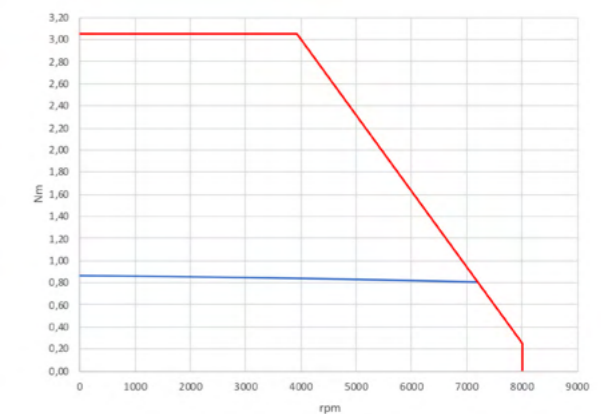
602A 05

Operative curves at 72 Vdc — Cn — Cmax



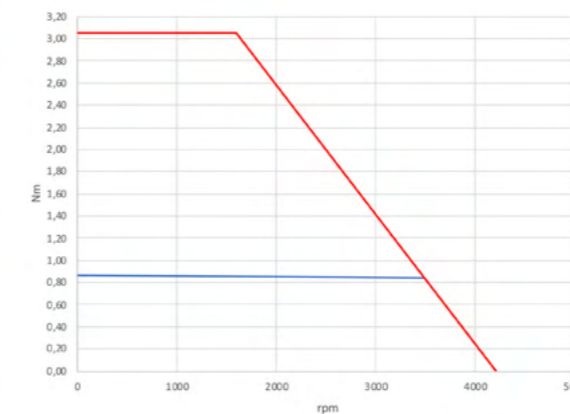
602A 01

Operative curves at 72 Vdc — Cn — Cmax



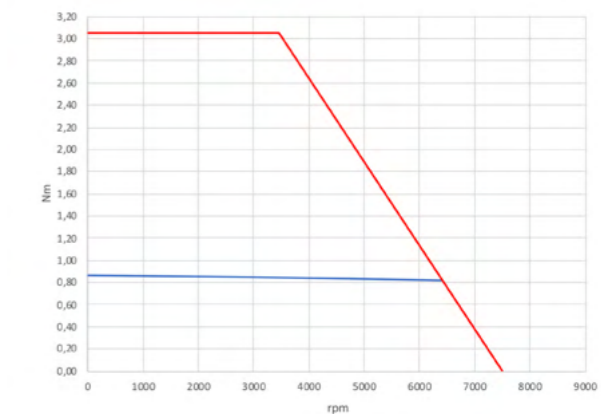
602A 07

Operative curves at 96 Vdc — Cn — Cmax



602A 03

Operative curves at 96 Vdc — Cn — Cmax



RATINGS and SPECIFICATION

		48 Vdc		72 Vdc		96 Vdc		
TYPE OF WINDING		45	33	05	01	07	03	
ELECTRICAL DATA								
Continuous stall torque (*)	M_o	[Nm]		1.62				
Peak torque	M_{MAX}	[Nm]		5.60				
Nominal torque	M_n	[Nm]	1.52	1.35	1.52	1.35	1.52	1.35
Nominal power	P_n	[W]	475	850	475	850	475	850
Continuous stall current	I_o	[Arms]	12.89	24.49	8.16	17.18	6.53	11.52
Maximum current	I_{Max}	[Arms]	51.62	98.08	32.69	68.83	26.15	46.16
Nominal current	I_n	[Arms]	12.09	20.41	7.66	14.32	6.13	9.60
Nominal working speed	n_N	[rpm]	3000	6000	3000	6000	3000	6000
Maximum working speed	n_{Max}	[rpm]	4170	7990	3960	8000	4230	7510
Torque constant	K_t	[Nm/Arms]	0.126	0.066	0.198	0.094	0.248	0.141
Voltage constant	K_{e-u-v}	[Vrms/krpm]	7.6	4.0	12.0	5.7	15.0	8.5
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.23	0.062	0.54	0.14	0.90	0.29
Winding inductance	L_{q-u-v}	[mH]	0.47	0.12	1.12	0.25	1.71	0.56
Electrical time constant	T_e	[ms]	1.96	2.00	2.07	1.86	1.90	1.94
Thermal resistance	R_{th}	[°C/W]	1.24					
Mechanical time constant (*)	T_m	[ms]	0.60	0.59	0.57	0.63	0.61	0.60
Rotor inertia without holding brake	J	[kg·cm ²]	0.414					
Rotor inertia with holding brake	J	[kg·cm ²]	0.427					
Mass without holding brake	m	[kg]	1.33					
Mass with holding brake	m	[kg]	1.85					
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	42 / 32					
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	260 / 200					

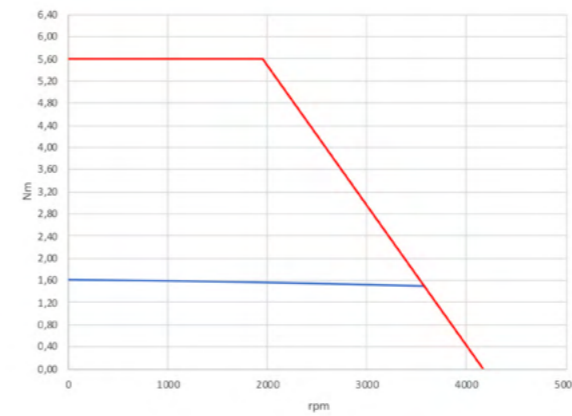
Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling. Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing.
 (*) without brake.
 (°) without brake and without feedback.

Operative temperature -20 ÷ +40 °C

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602B 45

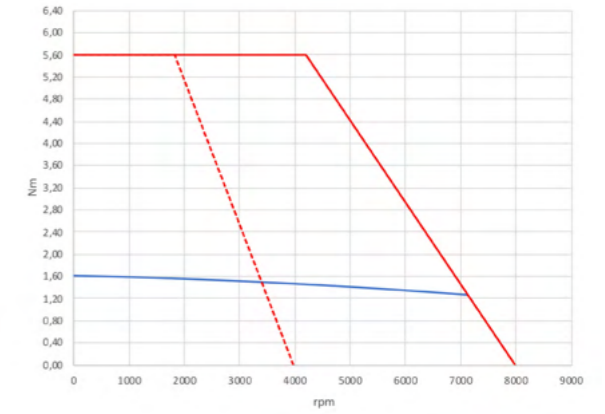
Operative curves at 48 Vdc — Cn — Cmax



602B 33

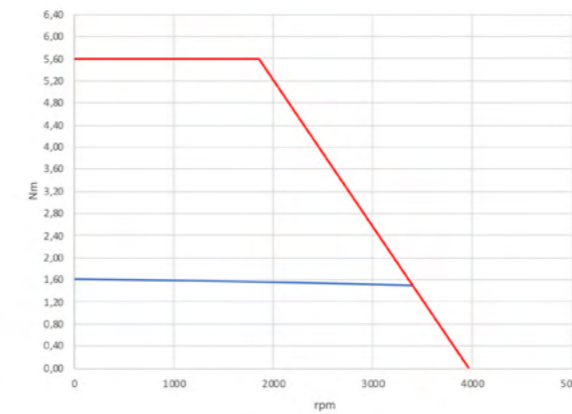
Operative curves at 24/48 Vdc

— Cn — Cmax @24Vdc — Cmax @48Vdc



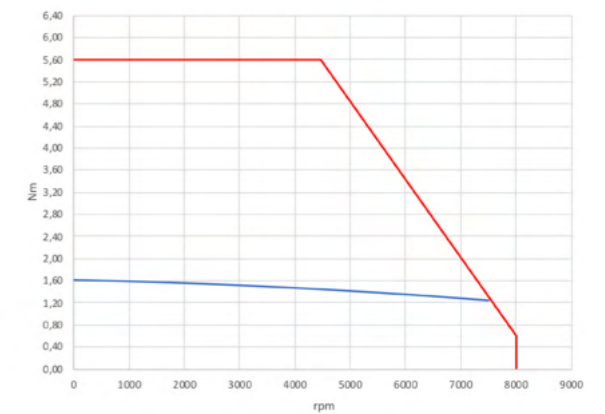
602B 05

Operative curves at 72 Vdc — Cn — Cmax



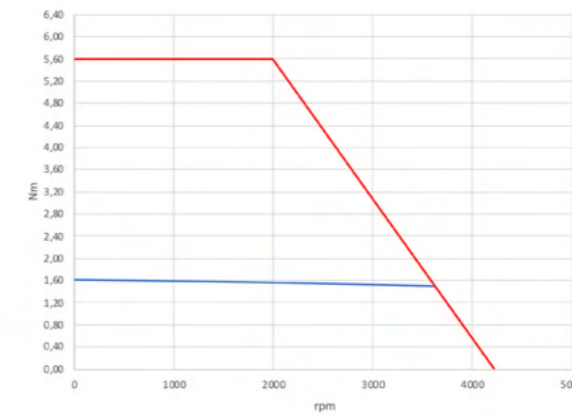
602B 01

Operative curves at 72 Vdc — Cn — Cmax



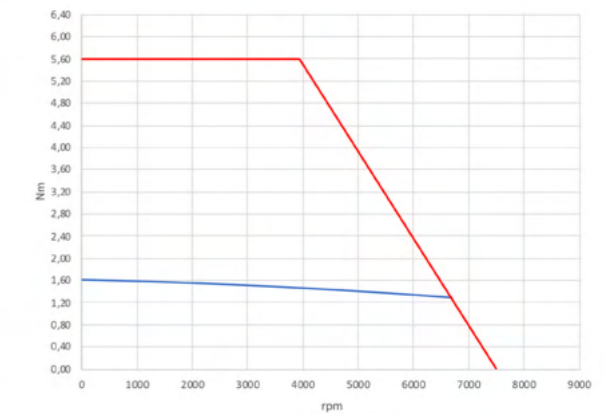
602B 07

Operative curves at 96 Vdc — Cn — Cmax



602B 03

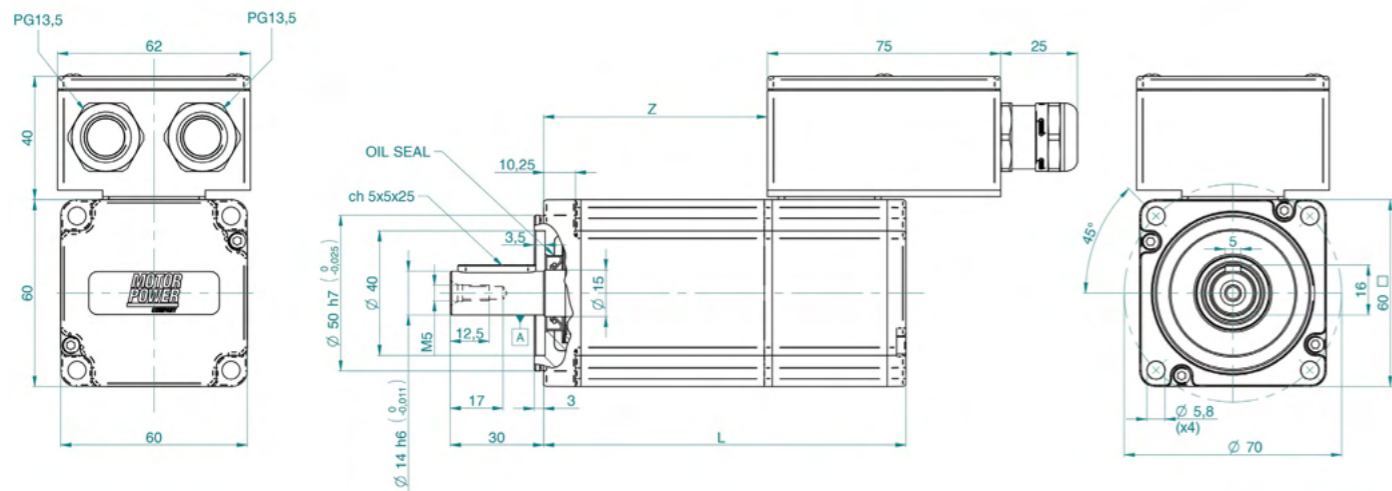
Operative curves at 96 Vdc — Cn — Cmax



EXTERNAL DIMENSIONS

B3 connection

Model	Feedback tipe	L [mm]	L with brake [mm]	Z [mm]	Z with brake [mm]
2A	M1-M2-N1-R1	116.5	146.0	72.0	101.5
2B	M1-M2-N1-R1	139.5	169.0	95.0	124.5
2A	A1	126.5	156.0	82.0	111.5
2B	A1	149.5	179.0	105.0	134.5



RATINGS and SPECIFICATION

		48 Vdc		72 Vdc		96 Vdc		
TYPE OF WINDING		45	33	05	81	07	03	
ELECTRICAL DATA								
Continuous stall torque (*)	M_o	[Nm]		180				
Peak torque	M_{MAX}	[Nm]		6.30				
Nominal torque	M_n	[Nm]	1.78	1.59	1.78	1.59	1.78	1.59
Nominal power	P_n	[W]	555	950	555	950	555	950
Continuous stall current	I_o	[Arms]	14.32	27.21	9.07	17.84	7.26	12.80
Maximum current	I_{Max}	[Arms]	72.53	137.81	45.94	90.37	36.75	64.85
Nominal current	I_n	[Arms]	14.16	24.03	8.97	15.76	7.17	11.31
Nominal working speed	n_N	[rpm]	3000	6000	3000	6000	3000	6000
Maximum working speed	n_{Max}	[rpm]	4160	7980	3950	7840	4220	7500
Torque constant	K_t	[Nm/Arms]	0.126	0.066	0.198	0.101	0.248	0.141
Voltage constant	$K_{e\ u-v}$	[Vrms/krpm]	7.6	4.0	12.0	6.1	15.0	8.5
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.20	0.055	0.46	0.132	0.73	0.25
Winding inductance	$L_{q\ u-v}$	[mH]	0.55	0.149	1.38	0.356	2.14	0.69
Electrical time constant	Te	[ms]	2.69	2.72	2.98	2.71	2.92	2.73
Thermal resistance	R_{th}	[°C/W]	1.09					
Mechanical time constant (*)	Tm	[ms]	1.02	0.99	0.93	1.02	0.94	1.01
Rotor inertia without holding brake	J	[kg·cm ²]	0.79					
Rotor inertia with holding brake	J	[kg·cm ²]	0.86					
Mass without holding brake	m	[kg]	1.83					
Mass with holding brake	m	[kg]	2.62					
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	115 / 90					
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	440 / 350					

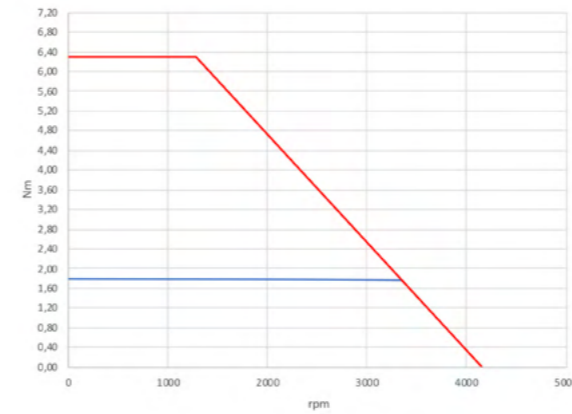
Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling. Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing.
 (*) without brake.
 (°) without brake and without feedback.

Operative temperature -20 ÷ +40 °C

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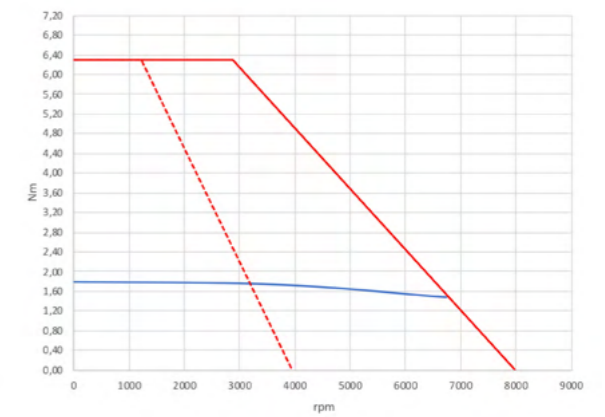
803A 45

Operative curves at 48 Vdc — Cn — Cmax



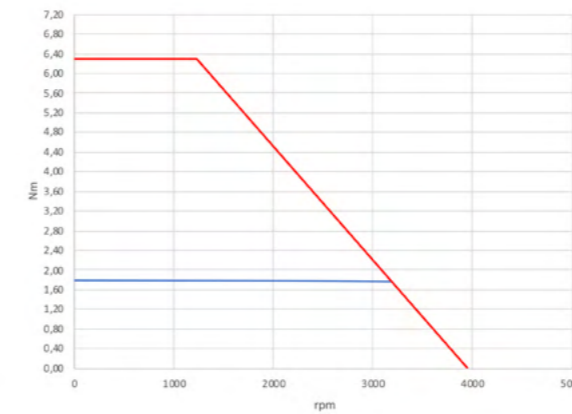
803A 33

Operative curves at 24/48 Vdc — Cn — Cmax @24Vdc — Cmax @48Vdc



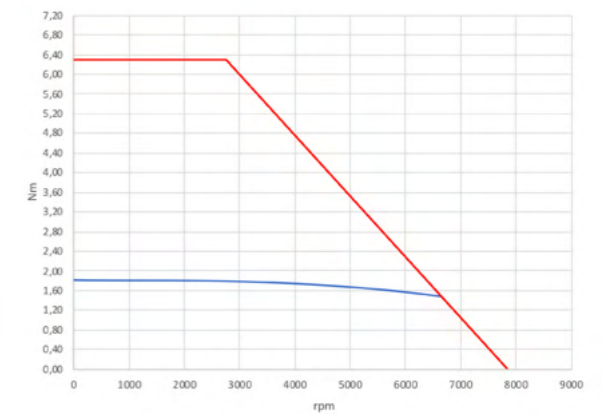
803A 05

Operative curves at 72 Vdc — Cn — Cmax



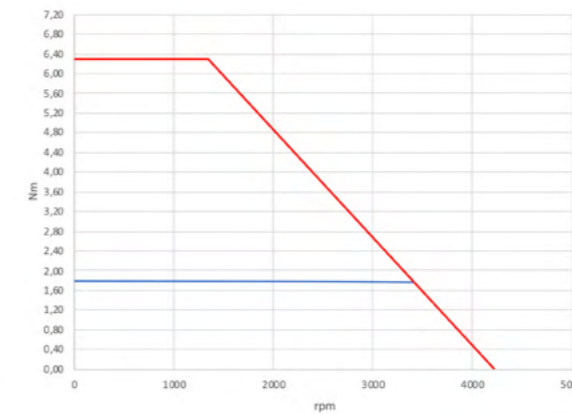
803A 81

Operative curves at 72 Vdc — Cn — Cmax



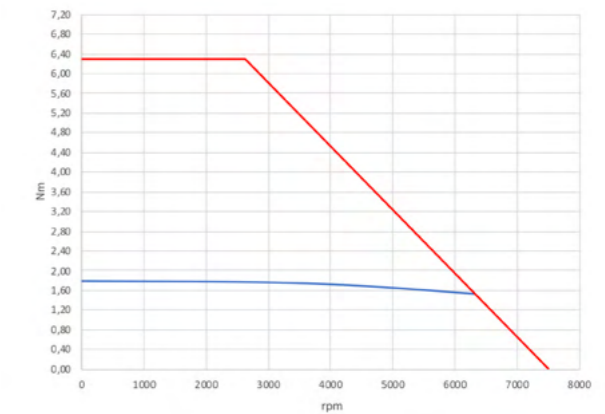
803A 07

Operative curves at 96 Vdc — Cn — Cmax



803A 03

Operative curves at 96 Vdc — Cn — Cmax



RATINGS and SPECIFICATION

		48 Vdc		72 Vdc		96 Vdc		
TYPE OF WINDING		45	00	05	02	07	03	
ELECTRICAL DATA								
Continuous stall torque (*)	M_o	[Nm]		3.80				
Peak torque	M_{MAX}	[Nm]		13.30				
Nominal torque	M_n	[Nm]	3.45	2.60	3.45	2.60	3.45	2.60
Nominal power	P_n	[W]	1080	1630	1080	1630	1080	1630
Continuous stall current	I_o	[Arms]	30.23	51.06	19.15	33.79	15.32	27.03
Maximum current	I_{Max}	[Arms]	137.95	232.98	87.37	154.18	69.89	123.34
Nominal current	I_n	[Arms]	27.45	34.93	17.38	23.12	13.91	18.49
Nominal working speed	n_N	[rpm]	3000	6000	3000	6000	3000	6000
Maximum working speed	n_{Max}	[rpm]	4200	7120	4200	7070	4250	3760
Torque constant	K_t	[Nm/Arms]	0.126	0.074	0.198	0.112	0.248	0.141
Voltage constant	$K_{e u-v}$	[Vrms/krpm]	7.6	4.5	12.0	6.8	15.0	8.5
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.058	0.022	0.138	0.046	0.217	0.070
Winding inductance	$L_{q u-v}$	[mH]	0.188	0.084	0.565	0.188	0.896	0.295
Electrical time constant	T_e	[ms]	4.00	3.80	4.08	4.08	4.13	4.21
Thermal resistance	R_{th}	[°C/W]			0.9			
Mechanical time constant (*)	T_m	[ms]	0.52	0.57	0.50	0.52	0.50	0.50
Rotor inertia without holding brake	J	[kg·cm ²]			1.42			
Rotor inertia with holding brake	J	[kg·cm ²]			1.50			
Mass without holding brake	m	[kg]			2.76			
Mass with holding brake	m	[kg]			3.37			
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]			115 / 90			
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]			440 / 350			

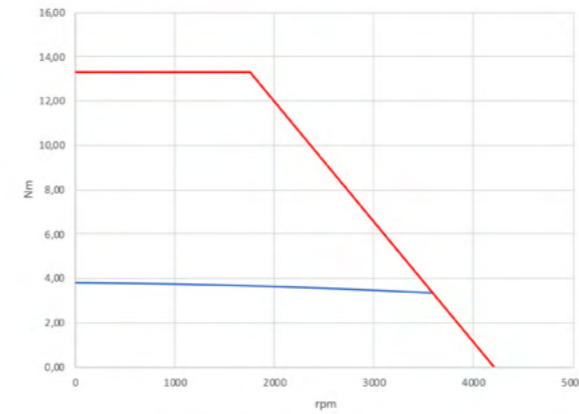
Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling. Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing.
 (*) without brake.
 (°) without brake and without feedback.

Operative temperature -20 ÷ +40 °C

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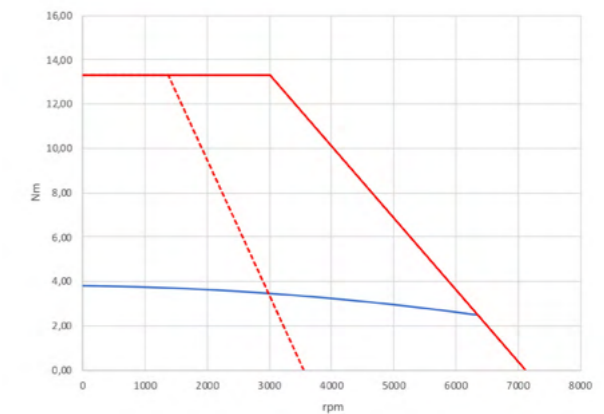
803B 45

Operative curves at 48 Vdc — Cn — Cmax



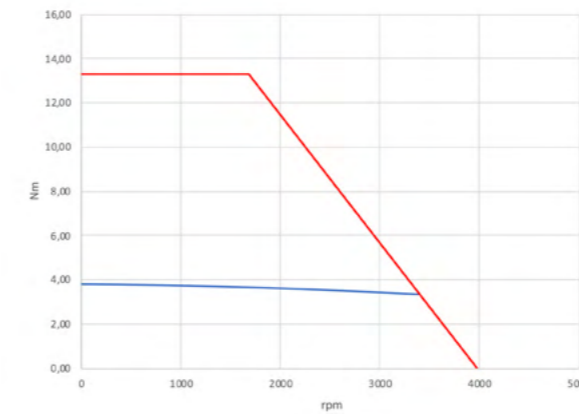
803B 00

Operative curves at 24/48 Vdc — Cn — Cmax @24Vdc — Cmax @48Vdc



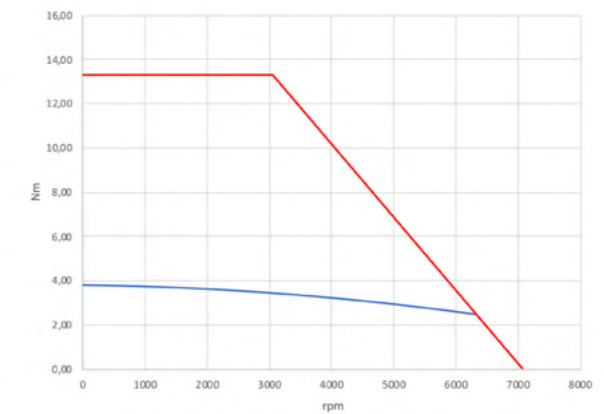
803B 05

Operative curves at 72 Vdc — Cn — Cmax



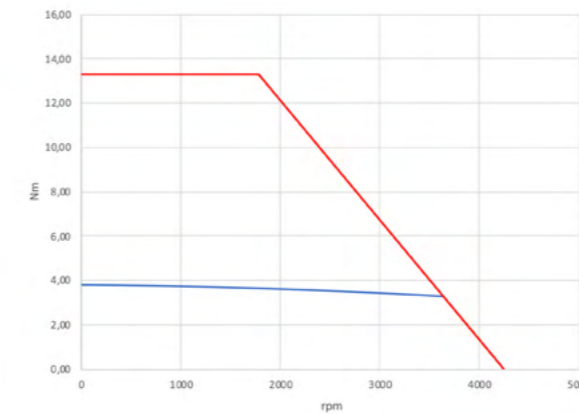
803B 02

Operative curves at 72 Vdc — Cn — Cmax



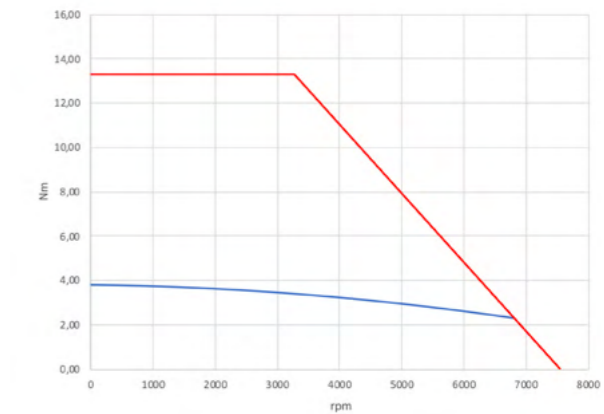
803B 07

Operative curves at 96 Vdc — Cn — Cmax



803B 03

Operative curves at 96 Vdc — Cn — Cmax



RATINGS and SPECIFICATION

		48 Vdc		72 Vdc		96 Vdc			
TYPE OF WINDING		45	00	05	02	07	03		
ELECTRICAL DATA									
Continuous stall torque (*)	M_o	[Nm]		4.60					
Peak torque	M_{MAX}	[Nm]		16.10					
Nominal torque	M_n	[Nm]	3.91	2.88	3.91	2.88	3.91	2.88	
Nominal power	P_n	[W]	1230	1800	1230	1800	1230	1800	
Continuous stall current	I_o	[Arms]	36.59	61.80	23.18	40.90	18.54	32.72	
Maximum current	I_{Max}	[Arms]	158.12	267.05	100.14	176.73	80.12	141.38	
Nominal current	I_n	[Arms]	31.11	38.69	19.70	25.61	15.76	20.49	
Nominal working speed	n_N	[rpm]	3000	6000	3000	6000	3000	6000	
Maximum working speed	n_{Max}	[rpm]	4200	7130	3990	7080	4260	7550	
Torque constant	K_t	[Nm/Arms]	0.126	0.074	0.198	0.112	0.248	0.141	
Voltage constant	K_{e-u-v}	[Vrms/krpm]	7.6	4.5	12.0	6.8	15.0	8.5	
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.042	0.016	0.103	0.033	0.158	0.052	
Winding inductance	L_{q-u-v}	[mH]	0.180	0.067	0.450	0.140	0.690	0.230	
Electrical time constant	T_e	[ms]	4.32	4.13	4.38	4.29	4.38	4.41	
Thermal resistance	R_{th}	[°C/W]	0.88						
Mechanical time constant (*)	T_m	[ms]	0.54	0.59	0.53	0.52	0.52	0.54	
Rotor inertia without holding brake	J	[kg·cm ²]	2.03						
Rotor inertia with holding brake	J	[kg·cm ²]	2.11						
Mass without holding brake	m	[kg]	3.25						
Mass with holding brake	m	[kg]	3.87						
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	115 / 90						
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	440 / 350						

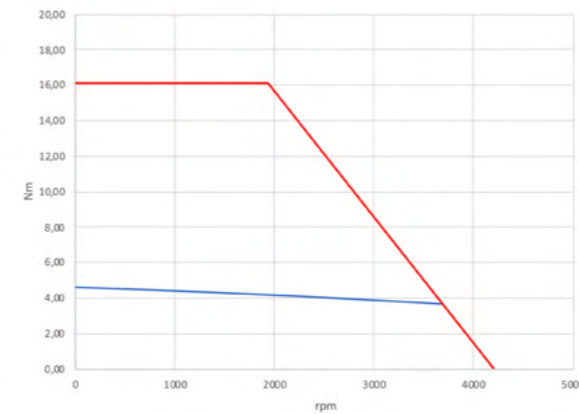
Rated output with 250 x 250 x 12 mm aluminium heat sink flange coupling. Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing.
 (*) without brake.
 (°) without brake and without feedback.

Operative temperature -20 ÷ +40 °C

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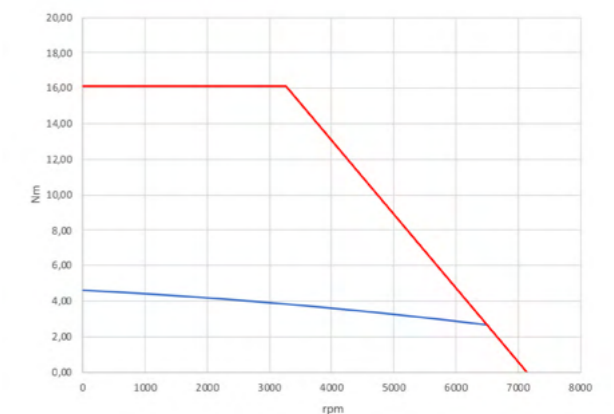
803C 45

Operative curves at 48 Vdc — Cn — Cmax



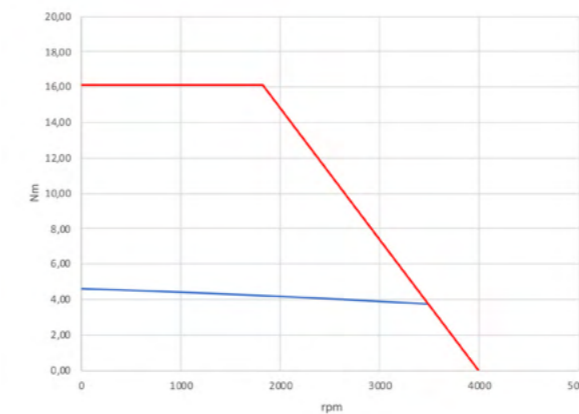
803C 00

Operative curves at 48 Vdc — Cn — Cmax



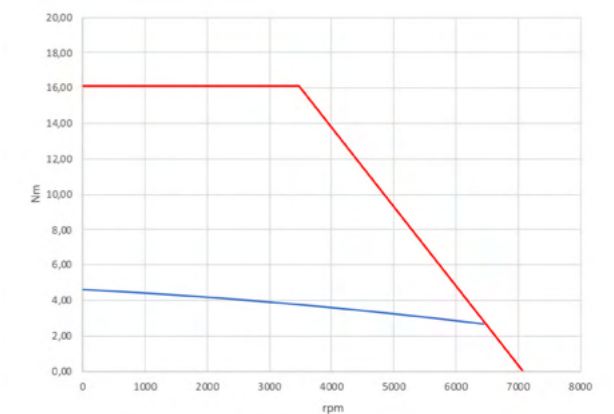
803C 05

Operative curves at 72 Vdc — Cn — Cmax



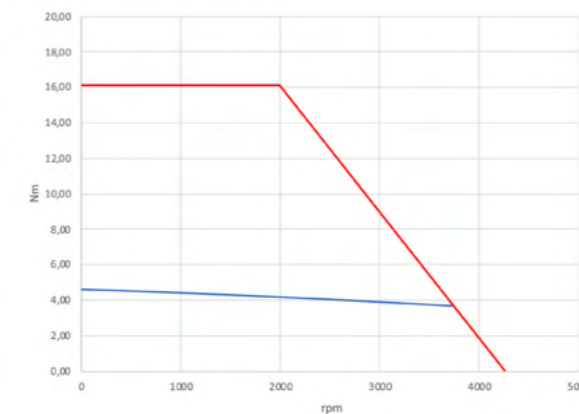
803C 02

Operative curves at 72 Vdc — Cn — Cmax



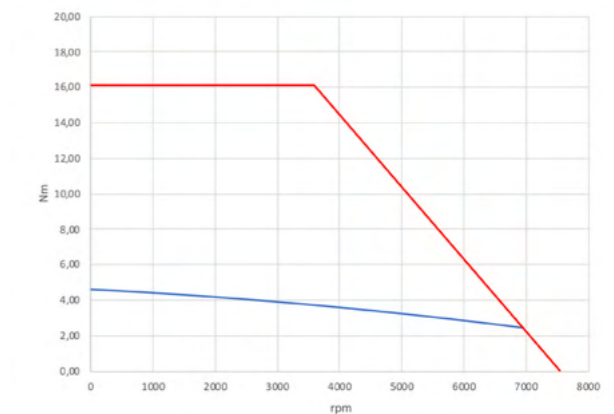
803C 07

Operative curves at 96 Vdc — Cn — Cmax



803C 03

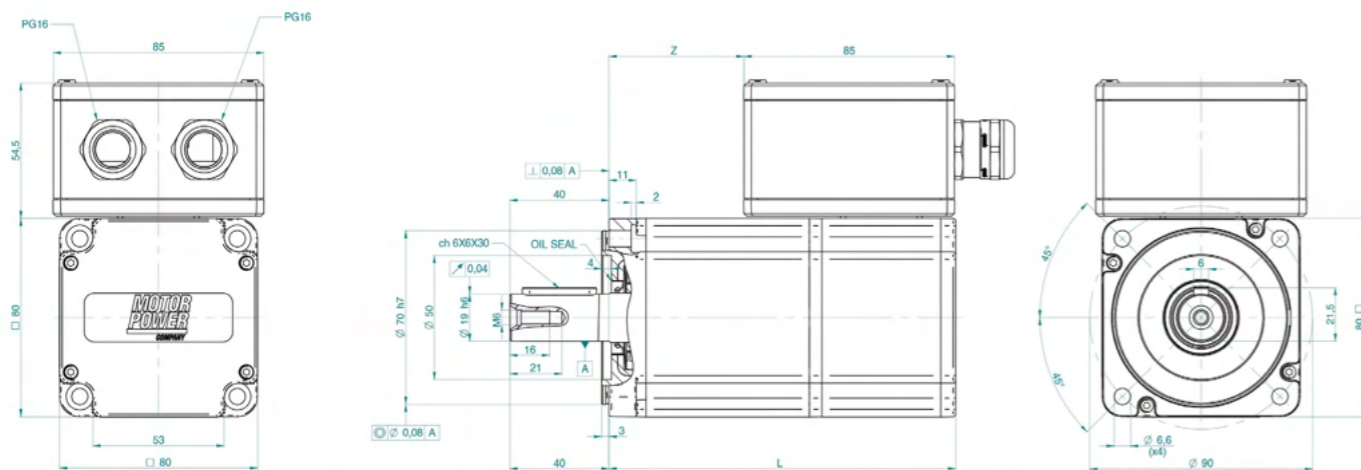
Operative curves at 96 Vdc — Cn — Cmax



EXTERNAL DIMENSIONS

B3 connection

Model	Feedback tipe	L [mm]	L with brake [mm]	Z [mm]	Z with brake [mm]
3A	A1-M1-M2-N1-R1	140.0	169.0	54.5	83.5
3B	A1-M1-M2-N1-R1	162.0	191.0	76.5	105.5
3C	A1-M1-M2-N1-R1	174.0	203.0	88.5	117.5



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RATINGS and SPECIFICATION

		48 Vdc	72 Vdc	96 Vdc	
TYPE OF WINDING		45	04	07	
ELECTRICAL DATA					
Continuous stall torque (*)	M_o	[Nm]	6.45		
Peak torque	M_{MAX}	[Nm]	16.5		
Nominal torque	M_n	[Nm]	5.8		
Nominal power	P_n	[W]	1820		
Continuous stall current	I_o	[Arms]	51.31	34.51	26.00
Maximum current	I_{Max}	[Arms]	181.80	122.27	92.11
Nominal current	I_n	[Arms]	46.14	31.03	23.38
Nominal working speed	n_N	[rpm]	3000	3000	3000
Maximum working speed	n_{Max}	[rpm]	4170	4180	4200
Torque constant	K_t	[Nm/Arms]	0.126	0.187	0.248
Voltage constant	$K_{e u-v}$	[Vrms/krpm]	7.6	11.3	15.0
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.026	0.063	0.114
Winding inductance	$L_{q u-v}$	[mH]	0.266	0.625	1.063
Electrical time constant	T_e	[ms]	10.06	9.94	9.35
Thermal resistance	R_{th}	[°C/W]	0.63		
Mechanical time constant (*)	T_m	[ms]	0.42	0.46	0.47
Rotor inertia without holding brake	J	[kg·cm ²]	2.53		
Rotor inertia with holding brake	J	[kg·cm ²]	2.65		
Mass without holding brake	m	[kg]	5.55		
Mass with holding brake	m	[kg]	6.60		
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	245		
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	690		

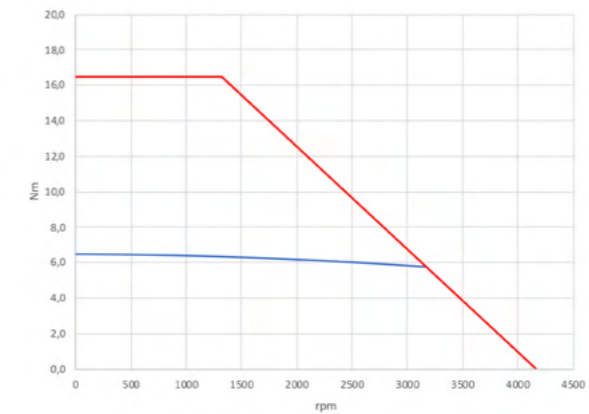
Rated output with 300 x 300 x 20 mm aluminium heat sink flange coupling. Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing.
 (*) without brake.
 (°) without brake and without feedback.

Operative temperature -20 ÷ +40 °C

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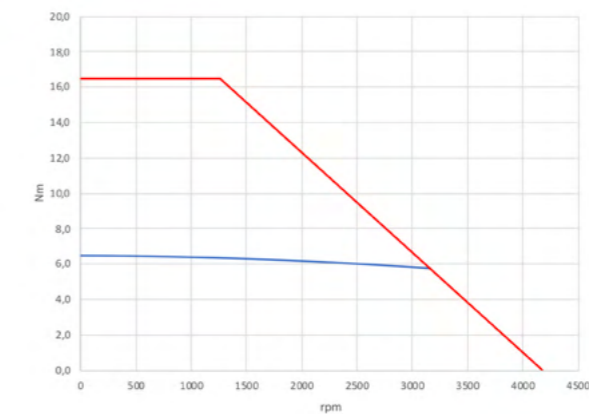
1004A 45

Operative curves at 48 Vdc — Cn — Cmax



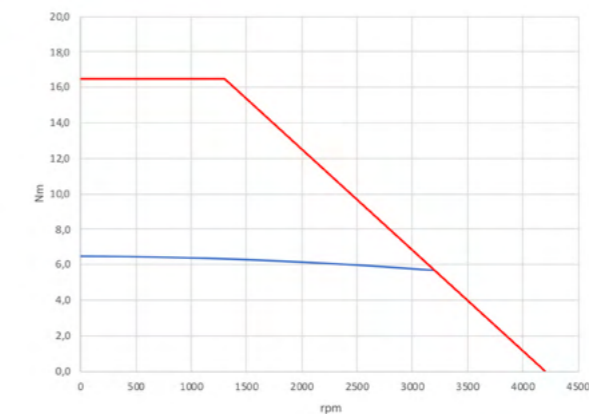
1004A 04

Operative curves at 72 Vdc — Cn — Cmax



1004A 07

Operative curves at 96 Vdc — Cn — Cmax



RATINGS and SPECIFICATION

		48 Vdc	72 Vdc	96 Vdc	
TYPE OF WINDING		45	05	07	
ELECTRICAL DATA					
Continuous stall torque (*)	M_o	[Nm]	10.16		
Peak torque	M_{MAX}	[Nm]	33.00		
Nominal torque	M_n	[Nm]	8.36		
Nominal power	P_n	[W]	2620		
Continuous stall current	I_o	[Arms]	80.83	51.19	40.95
Maximum current	I_{Max}	[Arms]	366.65	232.21	185.77
Nominal current	I_n	[Arms]	66.51	42.12	33.70
Nominal working speed	n_N	[rpm]	3000	3000	3000
Maximum working speed	n_{Max}	[rpm]	4170	3980	4240
Torque constant	K_t	[Nm/Arms]	0.126	0.198	0.248
Voltage constant	$K_{e\ u-v}$	[Vrms/krpm]	7.6	12.0	15.0
Winding resistance @ 20 °C	R_{u-v}	[Ohm]	0.013	0.027	0.042
Winding inductance	$L_{q\ u-v}$	[mH]	0.151	0.334	0.531
Electrical time constant	Te	[ms]	11.71	12.43	12.69
Thermal resistance	R_{th}	[°C/W]	0.61		
Mechanical time constant (*)	Tm	[ms]	0.38	0.31	0.31
Rotor inertia without holding brake	J	[kg·cm ²]	4.61		
Rotor inertia with holding brake	J	[kg·cm ²]	4.73		
Mass without holding brake	m	[kg]	8.09		
Mass with holding brake	m	[kg]	9.14		
Max. axial shaft load 3000 / 6000 rpm	SL_a	[N]	245		
Max. radial shaft load 3000 / 6000 rpm	SL_r	[N]	690		

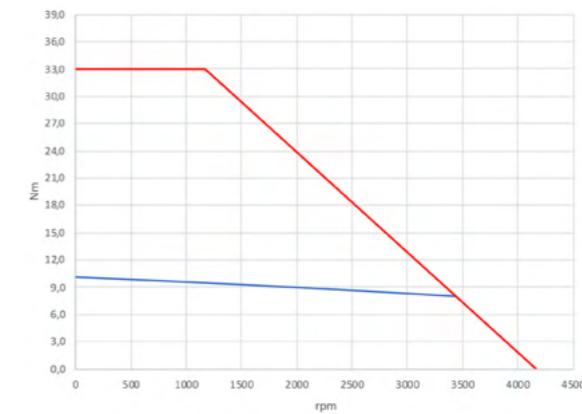
Rated output with 300 x 300 x 20 mm aluminium heat sink flange coupling. Derating must be considered if the oil seal is applied - IP 54 standard shaft bushing.
 (*) without brake.
 (°) without brake and without feedback.

Operative temperature -20 ÷ +40 °C

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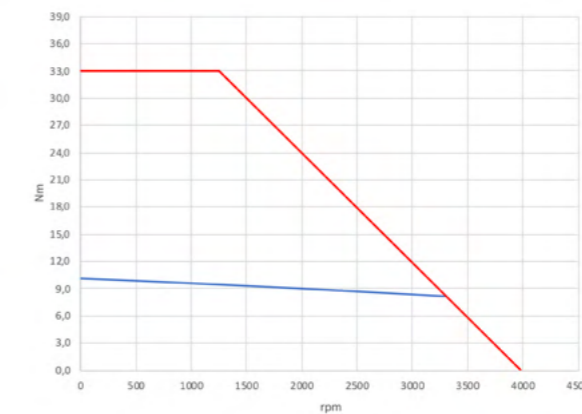
1004B 45

Operative curves at 48 Vdc — Cn — Cmax



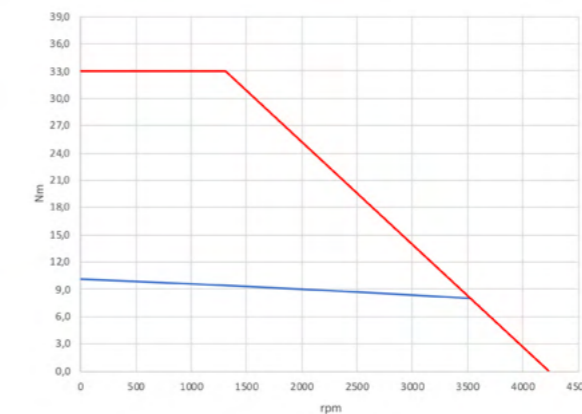
1004B 05

Operative curves at 72 Vdc — Cn — Cmax



1004B 07

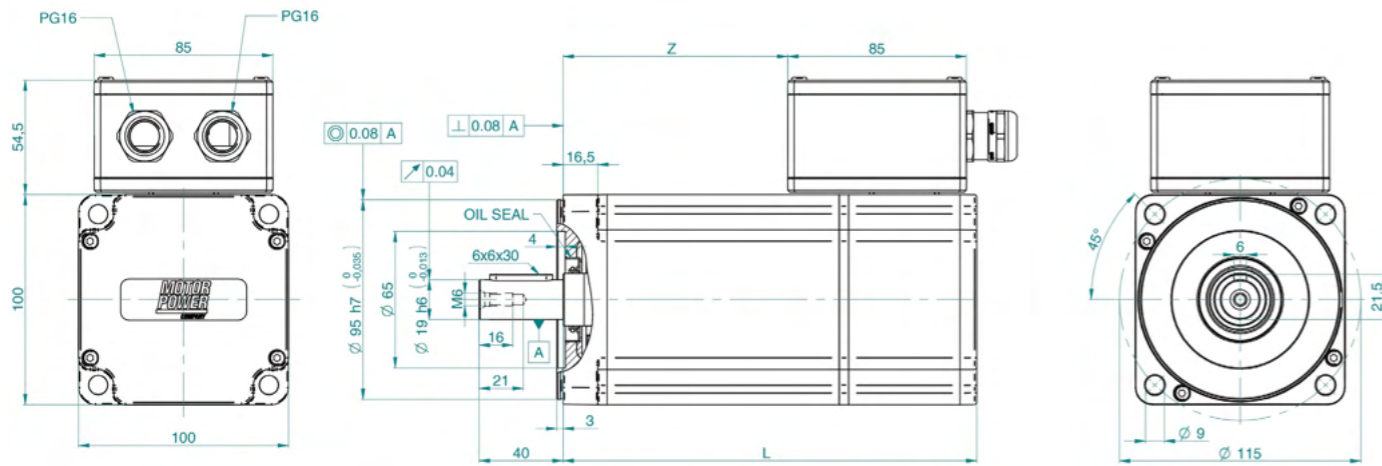
Operative curves at 96 Vdc — Cn — Cmax



EXTERNAL DIMENSIONS

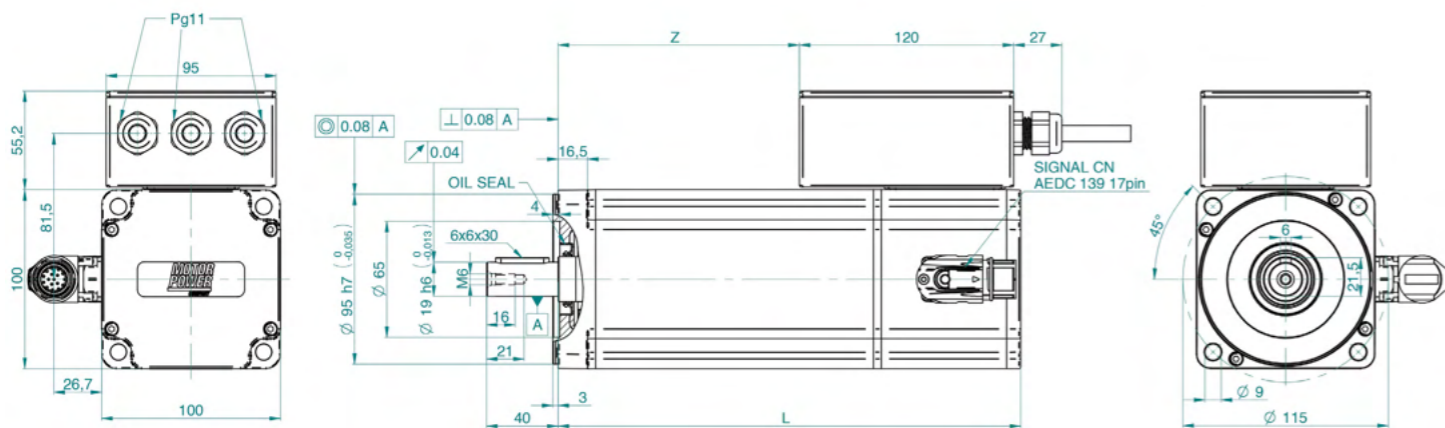
B3 connection

Model	Feedback tipe	L [mm]	L with brake [mm]	Z [mm]	Z with brake [mm]
4A	M1-M2-N1	187.0	217.0	97.0	127.0
4A	A1-R1	197.0	227.0	107.0	137.0



B3 connection

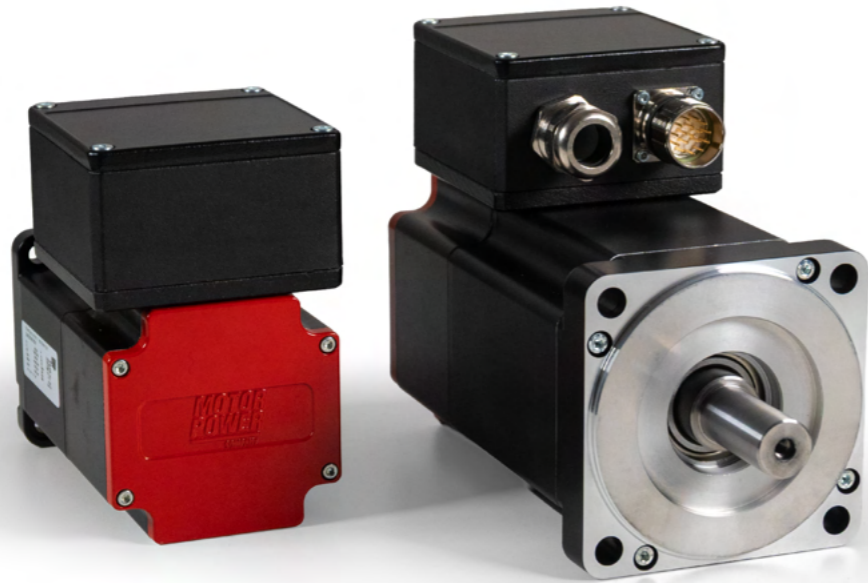
Model	Feedback tipe	L [mm]	L with brake [mm]	Z [mm]	Z with brake [mm]
4B	A1-M1-M2-N1-R1	259.0	289.0	135.0	165.0



FEEDBACK SPECIFICATIONS

WIRING

ENCODER

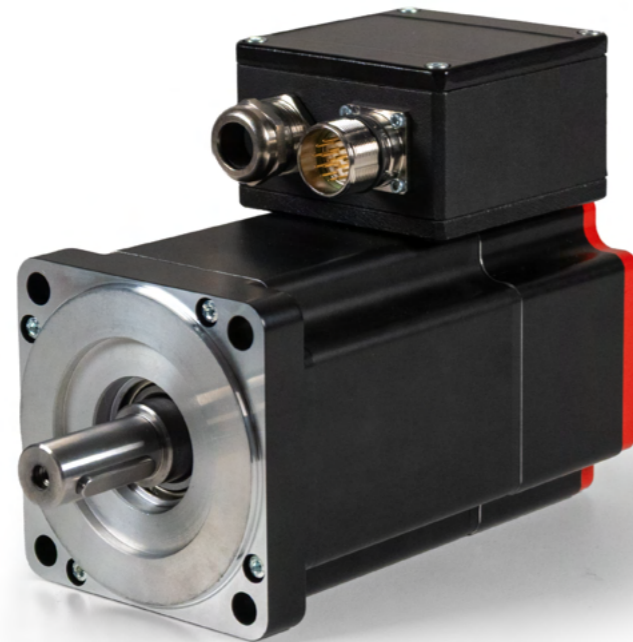


	M1	M2
Type	M-CODER IH INCREMENTAL WITH HALL SENSOR ENCODER	M-CODER ST ABSOLUTE ENCODER
Protocol/Interface	Line Driver A/B/Z - U/V/W	RS 485 2.5 Mbit
Resolution	2-5000 ppr	17-bit
Accuracy	+/- 250"	
Working temperature	-40 °C ÷ +125 °C	
Working speed	< 12.000 rpm	
Max acceleration	100.000 rad/s ²	
Inertia	5.6 x 10 ⁻⁵ kg cm ²	
Weigth	20 g	
Main supply voltage	5 - 12 V	
Current consumption	100 mA (Max)	
External battery voltage	-	
External battery current consumption	-	
Note	Condition monitoring option	

	A1	N1
Type	HIPERFACE ABSOLUTE MULTITURN ENCODER	A-format 24-bit absolute multi-turn (with battery) and absolute single turn encoder (without battery). Encoder N1 available for models 40-60-80
Protocol/Interface	HIPERFACE®	A-FORMAT RS 485 2,5-16Mbits
Resolution	128 line	24 bit
N° absolute multiturn steps	4096 (12 bit)	65536 (16 bit)
Accuracy	4096 (12 bit)	+/- 90"
Working temperature	-20 °C ... +100 °C	-20 °C ... +105 °C
Working speed	<9000 rpm	<8000 rpm
Max acceleration	500.000 rad/s ²	1.0 × 10 ⁵ rad/s ²
Inertia	4,5 gcm ²	2.6 × 10 ⁻⁹ kg*m ²
Weigth	70 g	13 g
Main supply voltage	7 - 12 V	5 +/- 10% V
Current consumption	60 mA (withoul Load)	80uA typical 110 uA max
External battery voltage	-	3,6 +/-10% V
External battery current consumption	-	55uA typical 110 uA max
Note	Mechanical multiturn	Feedback N1 is provided as singleturn device. With the multiturn usage battery must be applied. Please reach out our application team for assistance with the electric scheme connection.

RESOLVER

		R1	
Motor size		TC4 60 - TC4 80	TC4 100
Nominal voltage	[Vrms]	7±5%	
Nominal current	[mA]	50	
Phase shift	[deg]	+3°	-5°
Minimum sin amplitude	[mVrms]	20	
Frequency	[kHz]	10	
Poles number	[/]	2	
Tranformer ratio	[/]	0.5 ± 5%	
Input impedance	[Ohm]	130 + j280	110+j140
Output impedance	[Ohm]	425 + j755	130+j240
System accuracy	[']	± 10'	
Rotor inertia	[kg cm2]	0.03	0.1



BRAKE FEATURES

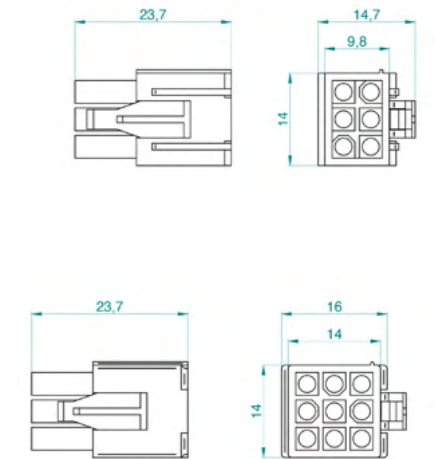
MOTOR SIZE		40	60	80	100
Operating motor temperature	[°C]	-20 ÷ 120			
External ambient temperature	[°C]	-20 ÷ 40			
Standard brake duty	-	Stationary			
Minimum dry static torque (-20 ÷ 120 °C)	[Nm]	0.32	1.3	2.5	6.5
Nominal operating voltage (± 10 %)	[Vdc]	24			
Power consumption at 20 °C (± 7 %)	[W]	4.35	11.2	10.2	10.4
Release time	[ms]	22	58	46	49
Brake release time (pull-in)	[ms]	77	25	58	30
Maximum backlash	[deg]	1.2			

WIRING MOTOR CONNECTION

Connectors with D0 connection (9 pins, only for size 40)

Power connector		Feedback connector			
Pin	Function	Pin	A1	N1	R1
1	Phase U	1	data +	data +	sin
2	Phase V	2	+ sin	-	/sin
3	Phase W	3	Refsin	-	cos
4	PE	4	data -	data -	/cos
5	brake + (#)	5	+ cos	-	ref
6	brake - (#)	6	Refcos	-	/ref
		7	8V / us	+ 5V	-
		8	0V	0V	-
		9	shield	shield	shield

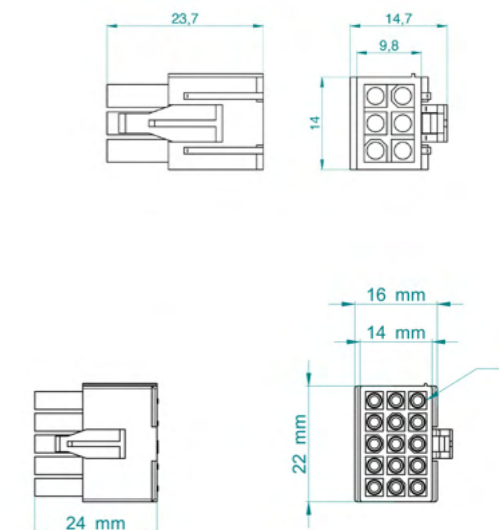
(#) Optional



Connectors with D2 connection (15 pins, only for size 40)

Power connector		Feedback connector	
Pin	Function	Pin	M1
1	Phase U	1	Ch A
2	Phase V	2	Ch/A
3	Phase W	3	Ch B
4	PE	4	Ch/B
5	brake + (#)	5	Ch Z
6	brake - (#)	6	Ch/Z
		7	Hall U
		8	Hall/U
		9	Hall V
		10	Hall/V
		11	Hall W
		12	Hall/W
		13	5 Vdc
		14	0 Vdc
		15	Shield

(#) Optional



SEE IT BEFORE IT HAPPENS



**Motor Power
Company s.r.l.**

Reggio Emilia (Italy)
T. +39 0522 682710
info@motorpowerco.it

**Motor Power
Company (Taicang)
Motion Co. Ltd.**

Taicang, P.R.China
T. + 86 512 33337978
infoasia@motorpowerco.com



motorpowerco.com