

5.1 Technical Data

SIZE		SA 0 PD		SA 1 PD		SA 2 PD			SA 3 PD		
Profile ISO 15552	[mm]	□ 45		□ 52		□ 65			□ 75		
Rod diameter	[mm]	Ø 20		Ø 22		Ø 25			Ø 30		
Front attachment thread	[mm]	M10 × 1.25 depth 15 mm		M12 × 1.25 depth 20 mm		M12 × 1.25 depth 20 mm			M16 × 1.5 depth 24 mm		
Ball screw BS		BS1	BS2	BS1	BS2	BS1	BS2	BS3	BS1	BS2	BS3
Diameter × Lead ($d_o \times P_h$)	[mm]	12 × 5	12 × 10	14 × 5	14 × 10	16 × 5	16 × 10	16 × 16	20 × 5	20 × 10	20 × 20
Ball (D_w)	[mm]	Ø 2.381		Ø 3.175		Ø 3.175			Ø 3.175		
Accuracy grade (°)		IT 7		IT 7		IT 7			IT 7		
N° of circuits		3	2	3	2	4	3	2	4	3	2
N° of starts		1	2	1	1	1	1	2	1	1	2
Dynamic load (C_a)	[N]	5300	6600	7800	5300	11100	8900	10500	12800	10200	12100
Static load (C_{da})	[N]	8000	9500	11100	6900	18100	14400	15700	24400	18900	20900
Brushless servomotor		BM 45 L - 30		BM 45 L - 30		BM 63 S - 30			BM 63 L - 30		
Peak torque T_p (°)	[Nm]	1.05		1.05		2.1			4.2		
Stall torque $T_{0,100K}$	[Nm]	0.35		0.35		0.7			1.4		
Rated torque $T_{nom,100K}$	[Nm]	0.32		0.32		0.6			1.3		
Nominal speed n_{nom}	[rpm]	3000		3000		3000			3000		
Ratio (u) RV		1 : 1 (16 : 16)		1 : 1 (21 : 21)		1 : 1 (26 : 26)			1 : 1.06 (32 : 34)		
Linear travel for 1 motor shaft revolution	[mm]	5	10	5	10	5	10	16	4.706	9.412	18.824
Peak load F_p (°)	[N]	1080	550	1075	545	2140	1095	690	4490	2315	1175
Continuous load at zero-speed F_o	[N]	360	180	355	175	710	365	230	1495	770	390
Continuous load at no-zero-speed F_{nom}	[N]	330	165	325	160	610	310	195	1390	715	360
Max. linear speed v_{max}	[mm/s]	250	500	250	500	250	500	800	235	470	940
Total actuator efficiency (η)		0.82	0.83	0.81	0.83	0.81	0.83	0.84	0.79	0.82	0.84
Ratio (u) RN		–		–		–			1 : 1.27 (30 : 38)		
Linear travel for 1 motor shaft revolution	[mm]	–		–		–			3.947	7.895	15.789
Peak load F_p (°)	[N]	–		–		–			5360	2760	1400
Continuous load at zero-speed F_o	[N]	–		–		–			1790	920	465
Continuous load at no-zero-speed F_{nom}	[N]	–		–		–			1660	855	430
Max. linear speed v_{max}	[mm/s]	–		–		–			195	390	780
Total actuator efficiency (η)		–		–		–			0.80	0.83	0.84
Mass in linear motion (m) and moment of inertia (J) of the actuator reduced to motor shaft											
m_o ref. to 0 mm stroke		[kg]	0.32	0.32	0.47	0.48	0.61	0.62	0.61	1.00	1.00
m_{100} ref. to each 100 mm extra-stroke		[kg]	0.13		0.14		0.19			0.20	
J_o ref. to 0 mm stroke actuator	RV	without brake [kg×m ²]	1.4×10 ⁻⁵	1.5×10 ⁻⁵	1.7×10 ⁻⁵	1.8×10 ⁻⁵	3.6×10 ⁻⁵	3.7×10 ⁻⁵	4.0×10 ⁻⁵	7.2×10 ⁻⁵	7.4×10 ⁻⁵
		with brake [kg×m ²]	1.4×10 ⁻⁵	1.5×10 ⁻⁵	1.7×10 ⁻⁵	1.8×10 ⁻⁵	3.8×10 ⁻⁵	3.9×10 ⁻⁵	4.2×10 ⁻⁵	7.4×10 ⁻⁵	7.6×10 ⁻⁵
	RN	without brake [kg×m ²]	–		–		–			6.1×10 ⁻⁵	6.2×10 ⁻⁵
		with brake [kg×m ²]	–		–		–			6.3×10 ⁻⁵	6.4×10 ⁻⁵
J_{100} for each 100 mm extra-stroke	RV	[kg×m ²]	1.9×10 ⁻⁶	2.1×10 ⁻⁶	2.7×10 ⁻⁶	3.0×10 ⁻⁶	4.7×10 ⁻⁶	5.1×10 ⁻⁶	6.0×10 ⁻⁶	1.0×10 ⁻⁵	1.1×10 ⁻⁵
	RN	[kg×m ²]	–		–		–			7.3×10 ⁻⁶	7.6×10 ⁻⁶
Weight of 100 mm stroke actuator (°)		[kg]	3.0 (3.3)		3.5 (3.8)		5.2 (5.9)			7.4 (8.1)	
Weight for each 100 mm extra-stroke		[kg]	0.44		0.51		0.67			0.79	
Operating temperature		[°C]	10 ... 40								

(°) - ball screws with accuracy grade IT 3 or IT 5 available on request

(°) - valid only in case of intermittent working

(°) - weight of actuator without accessories

5.1 Technical Data

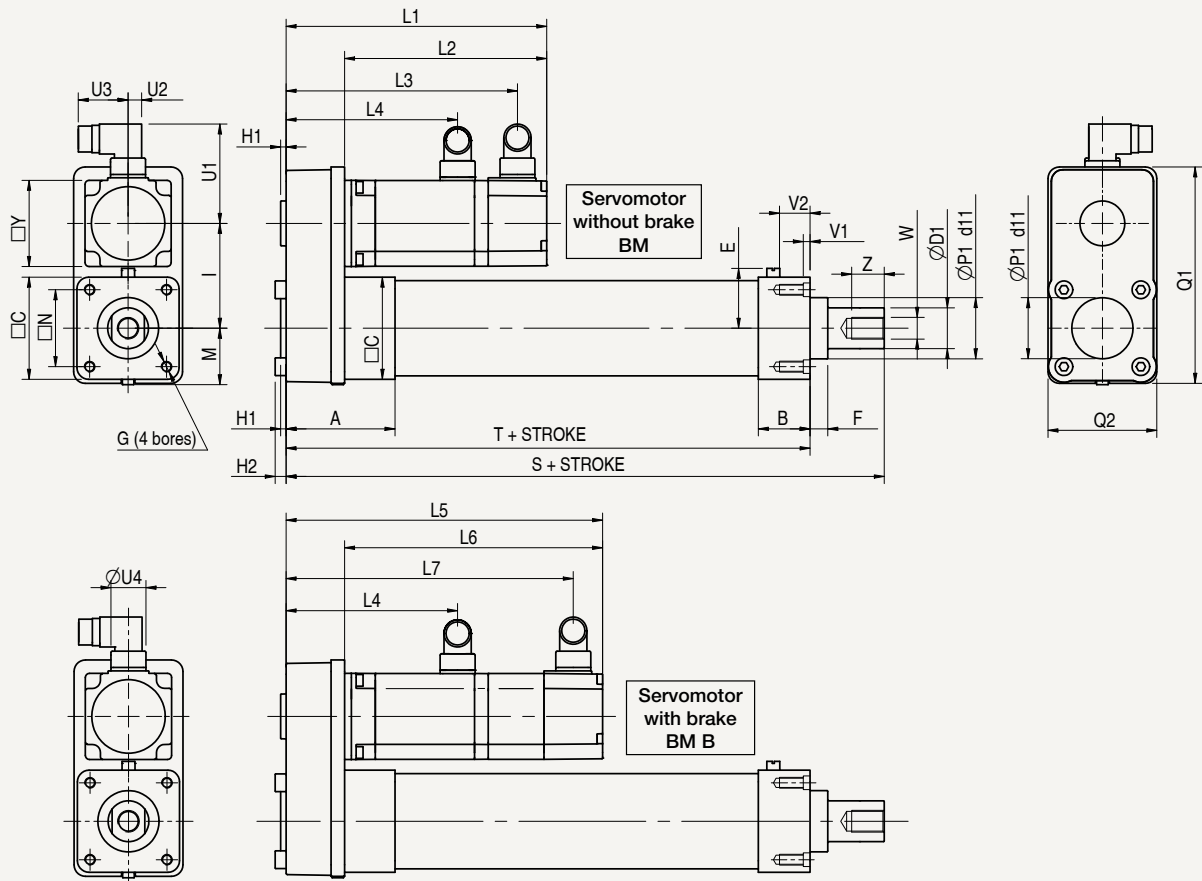
SA 4 PD			SA 5 PD				SA 6 PD				SIZE	
□ 95			□ 115				□ 140				[mm]	Profile ISO 15552
Ø 35			Ø 50				Ø 60				[mm]	Rod diameter
M20 × 1.5 depth 30 mm			M20 × 1.5 depth 40 mm				M27 × 2 depth 54 mm				[mm]	Front attachment thread
BS1	BS2	BS3	BS1	BS2	BS3	BS4	BS1	BS2	BS3	BS4	Ball screw BS	
25 × 5	25 × 10	25 × 25	32 × 5	32 × 10	32 × 20	32 × 32	40 × 5	40 × 10	40 × 20	40 × 40	[mm]	Diameter × Lead ($d_p \times P_h$)
Ø 3.175	Ø 3.969	Ø 3.175	Ø 3.175	Ø 6.350	Ø 6.350	Ø 6.350	Ø 3.175	Ø 6.350	Ø 6.350	Ø 6.350	[mm]	Ball (D_w)
IT 7			IT 7				IT 7				Accuracy grade (1)	
4	3	2	6	4	3	2	6	4	3	2	N° of circuits	
1	1	2	1	1	1	2	1	1	1	2	N° of starts	
14500	14800	13600	23000	37000	29800	35000	25300	42800	34300	40300	[N]	Dynamic load C_a
31500	28000	27300	60200	66800	53200	58100	76900	88900	70000	77100	[N]	Static load C_{0a}
BM 82 L - 30			BM 102 S - 30				BM 102 L6 - 30 BM 102 L8 - 30				Brushless servomotor	
9			15				22 30				[Nm]	Peak torque T_p (2)
3			5.2				7.3 9				[Nm]	Stall torque $T_{0,100K}$
2.5			4.1				6.4 6.7				[Nm]	Rated torque $T_{nom,100K}$
3000			3000				3000				[rpm]	Nominal speed n_{nom}
1 : 1.09 (44 : 48)			1 : 1 (36 : 36)				1 : 1 (40 : 40)				Ratio (u) RV	
4,583	9.167	22.917	5	10	20	32	5	10	20	40	[mm]	Linear travel for 1 motor shaft revolution
9740	5050	2070	14580	7650	3920	2470	20885 28480	11085 15115	5715 7795	2900 3955	[N]	Peak load F_p (2)
3240	1680	690	5050	2650	1360	860	6930 8545	3680 4535	1895 2340	960 1185	[N]	Continuous load at zero-speed F_0
2700	1400	575	4055	2130	1090	690	6290 6905	3335 3665	1720 1890	875 960	[N]	Continuous load at no-zero-speed F_{nom}
230	450	1140	230	460	930	1490	185	375	750	1500	[mm/s]	Max. linear speed v_{max}
0.78	0.82	0.84	0.76	0.81	0.83	0.84	0.74	0.79	0.82	0.84	Total actuator efficiency (η)	
1 : 1.33 (36 : 48)			1 : 1.47 (30 : 44)				1 : 1.5 (32 : 48)				Ratio (u) RN	
3.75	7.5	18.75	3.409	6.818	13.636	21.818	3.334	6.667	13.334	26.667	[mm]	Linear travel for 1 motor shaft revolution
11900	6190	2530	21380	11220	5750	3625	31324 42715	16625 22670	8575 11690	4355 5935	[N]	Peak load F_p (2)
3970	2060	845	7410	3890	1995	1255	10395 12815	5515 6800	2845 3505	1445 1780	[N]	Continuous load at zero-speed F_0
3300	1720	700	5845	3070	1570	990	9130 9540	4840 5060	2495 2611	1265 1325	[N]	Continuous load at no-zero-speed F_{nom}
190	375	935	170	340	680	1090	167	333	667	1333	[mm/s]	Max. linear speed v_{max}
0.79	0.82	0.84	0.77	0.81	0.83	0.84	0.76	0.80	0.83	0.84	Total actuator efficiency (η)	
Mass in linear motion (m) and moment of inertia (J) of the actuator reduced to motor shaft												
1.45	1.44	1.46	3.37	3.22	3.26	3.19	4.90	4.90	4.90	4.90	[kg]	m_0 ref. to 0 mm stroke
0.24			0.49				0.62				[kg]	m_{100} ref. to each 100 mm extra-stroke
2.3×10 ⁻⁴	2.4×10 ⁻⁴	2.5×10 ⁻⁴	7.8×10 ⁻⁴	7.9×10 ⁻⁴	8.1×10 ⁻⁴	8.7×10 ⁻⁴	1.7×10 ⁻³	1.7×10 ⁻³	1.7×10 ⁻³	1.9×10 ⁻³	[kg×m²]	without brake
2.5×10 ⁻⁴	2.5×10 ⁻⁴	2.7×10 ⁻⁴	8.2×10 ⁻⁴	8.3×10 ⁻⁴	8.6×10 ⁻⁴	9.2×10 ⁻⁴	1.7×10 ⁻³	1.7×10 ⁻³	1.8×10 ⁻³	2.0×10 ⁻³	[kg×m²]	with brake
1.9×10 ⁻⁴	1.9×10 ⁻⁴	2.0×10 ⁻⁴	5.3×10 ⁻⁴	5.4×10 ⁻⁴	5.5×10 ⁻⁴	5.8×10 ⁻⁴	1.0×10 ⁻³	1.0×10 ⁻³	1.1×10 ⁻³	1.1×10 ⁻³	[kg×m²]	without brake
2.0×10 ⁻⁴	2.0×10 ⁻⁴	2.1×10 ⁻⁴	5.8×10 ⁻⁴	5.8×10 ⁻⁴	6.0×10 ⁻⁴	6.2×10 ⁻⁴	1.1×10 ⁻³	1.1×10 ⁻³	1.1×10 ⁻³	1.2×10 ⁻³	[kg×m²]	with brake
2.4×10 ⁻⁵	2.4×10 ⁻⁵	2.8×10 ⁻⁵	7.3×10 ⁻⁵	7.4×10 ⁻⁵	7.9×10 ⁻⁵	8.8×10 ⁻⁵	1.9×10 ⁻⁴	1.9×10 ⁻⁴	1.9×10 ⁻⁴	2.2×10 ⁻⁴	[kg×m²]	RV J_{100} for each
1.6×10 ⁻⁵	1.6×10 ⁻⁵	1.8×10 ⁻⁵	3.4×10 ⁻⁵	3.4×10 ⁻⁵	3.7×10 ⁻⁵	4.1×10 ⁻⁵	8.3×10 ⁻⁵	8.4×10 ⁻⁵	8.7×10 ⁻⁵	9.6×10 ⁻⁵	[kg×m²]	RN 100 mm extra-stroke
13 (15)			24 (26)				39 (41)				[kg]	Weight of 100 mm stroke actuator (3)
1.1			1.9				2.7				[kg]	Weight for each 100 mm extra-stroke
10 ... 40											[°C]	Operating temperature

(1) - ball screws with accuracy grade IT 3 or IT 5 available on request

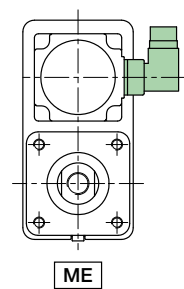
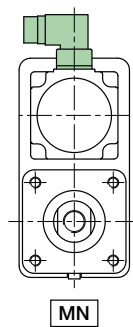
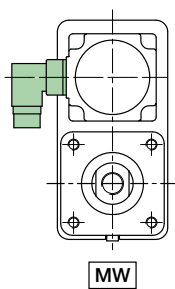
(2) - valid only in case of intermittent working

(3) - weight of actuator without accessories

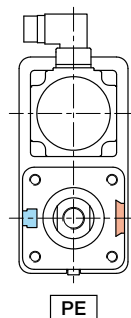
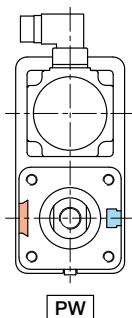
5.2 Dimensions



Servomotor mounting positions



Stroke end switch slot positions



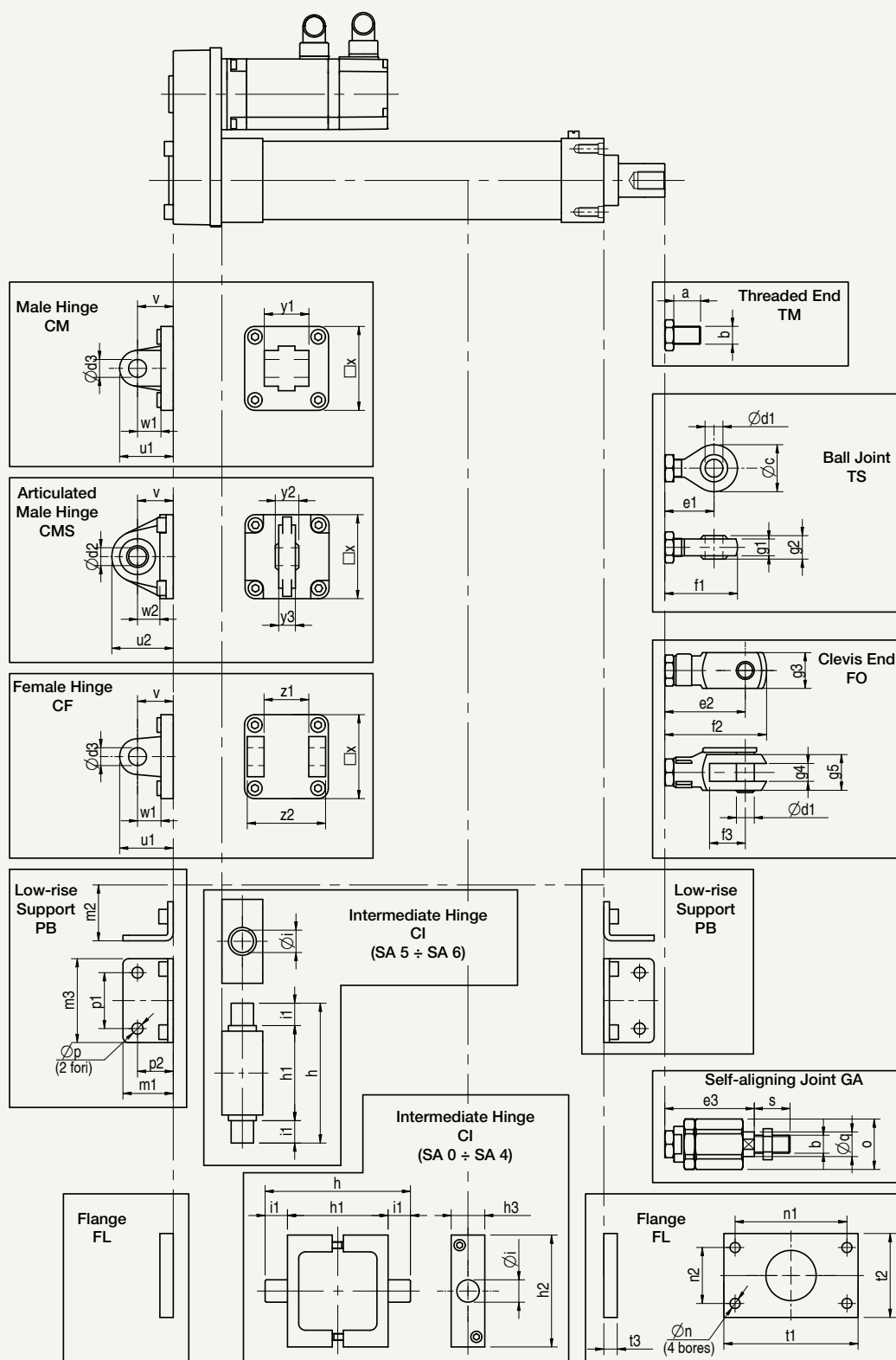
5.2 Dimensions

SIZE	SA 0 PD	SA 1 PD	SA 2 PD	SA 3 PD	SA 4 PD	SA 5 PD	SA 6 PD
A	65	65	80	80	104	165	207
B	40	34	40	38	51.5	82	108
□ C	46	52	65	75	95	112	138
Ø D1	20	22	25	30	35	50	60
E	30	32	39	44	54	-	-
F	21.5	10	13	13	5	8	8
G	M6	M6	M8	M8	M10	M10	M12
H1	4	4	4	4	4	4	5
H2	6	6	8	8	10	10	12
I	52	56	71	79	102	123.5	132.5
L1	159	159	167	192	216	245.5	317.5
L2	123	123	124	149	160	177	227
L3	137.5	137.5	144.5	170	194	223	295
L4	92.5	92.5	100.5	125	150	173.5	245.5
L5	196	196	212	237	278	299.5	371.5
L6	156	156	165	190	218	231	281
L7	171	171	185.5	211	252	277	349
M	27	30	37	43.5	52.5	65.5	79.5
□ N	32.5	38	46.5	56.5	72	89	110
Ø P1	30	35	40	45	45	70	80
Q1	101	108	138	160	199	239	261
Q2	50	60	70	80	100	120	150
S	264	281	307	339.5	388.5	522	629
T	237.5	240.5	260.5	285	340.5	464	564
U1	66	66	73	73	85	94.5	94.5
U2	10	10	10	10	14	14	14
U3	36.5	36.5	36.5	36.5	41	41	41
Ø U4	26	26	26	26	28	28	28
V1	4.5	4.5	5.5	5.5	5.5	25	30
V2	17.5	17.5	22.5	22.5	27.5	-	-
W	M10 × 1.25	M12 × 1.25	M12 × 1.25	M16 × 1.5	M20 × 1.5	M20 × 1.5	M27 × 2
□ Y	45	45	63	63	82	102	102
Z	15	20	20	24	30	40	54

Standard stroke lengths:

Stroke [mm]	100	200	300	400	500	600	700	800	900	1000
SA 0 PD	C100	C200	C300	-	-	-	-	-	-	-
SA 1 PD	C100	C200	C300	C400	-	-	-	-	-	-
SA 2 PD	C100	C200	C300	C400	C500	C600	-	-	-	-
SA 3 PD	C100	C200	C300	C400	C500	C600	C700	C800	-	-
SA 4 PD	C100	C200	C300	C400	C500	C600	C700	C800	-	-
SA 5 PD	C100	C200	C300	C400	C500	C600	C700	C800	C900	C1000
SA 6 PD	C100	C200	C300	C400	C500	C600	C700	C800	C900	C1000

5.3 Accessories Dimensions

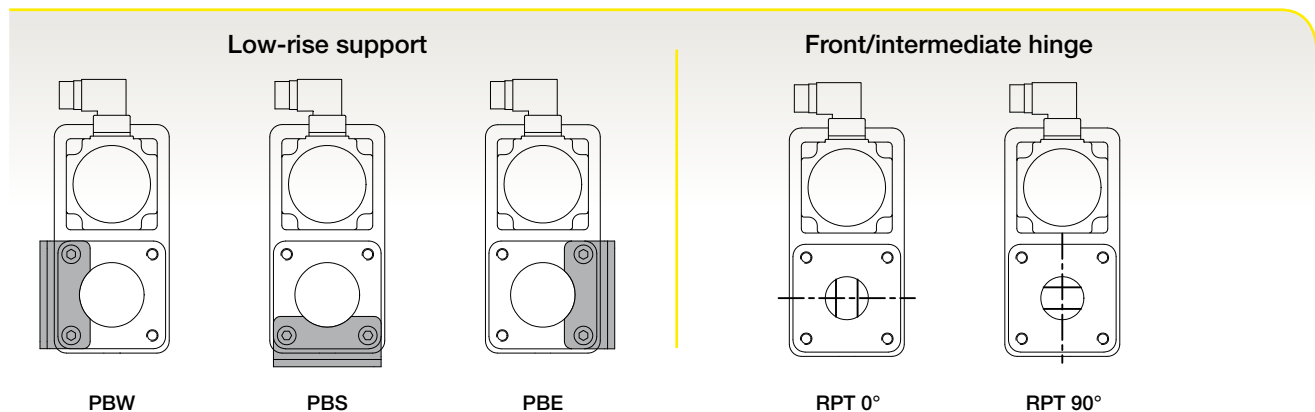


NOTE: Front attachments TS and FO must be aligned during assembling with the rear hinge axis; avoid any torsional load on the shaft to prevent damages on the anti-rotation device.

5.3 Accessories Dimensions

SIZE	SA 0 PD	SA 1 PD	SA 2 PD	SA 3 PD	SA 4 PD	SA 5 PD	SA 6 PD
a	15	20	20	24	30	40	54
b	M10 × 1.25	M12 × 1.25	M12 × 1.25	M16 × 1.5	M20 × 1.5	M20 × 1.5	M27 × 2
Ø c	28	32	32	42	50	50	70
Ø d1	10	12	12	16	20	20	30
Ø d2	10	12	16	16	20	20	30
Ø d3	10	12	12	16	16	20	25
e1	35	36	36	44	50	50	125
e2	46	55	55	72	89	89	122
e3	57.5	58.5	58.5	80	88	88	105
f1	49	52	52	65	75	75	160
f2	58	69	69	91	114	114	160
f3	20	24	24	32	40	40	54
g1	10.5	12	12	15	18	18	25
g2	14	16	16	21	25	25	37
g3	20	24	24	32	40	40	55
g4	10	12	12	16	20	20	30
g5	20	24	24	32	40	40	55
h	74	95	105	130	148	182	210
h1	50	63	73	90	108	132	160
h2	74	80	90	100	130	-	-
h3	25	25	25	30	30	-	-
Ø i	12	16	16	20	20	25	25
i1	12	16	16	20	20	25	25
m1	35	36	47	45	55	57	70
m2	32	36	45	50	63	71	90
m3	45	52	65	75	95	115	140
Ø n	7	9	9	9	12	14	16
n1	64	72	90	100	126	150	180
n2	32	36	45	50	63	75	90
o	32	32	32	45	45	45	70
Ø p	7	7	9	9	11	11	14
p1	32	36	45	50	63	75	90
p2	24	28	32	32	41	41	45
Ø q	14	14	14	22	22	22	32
s	20	24	24	32	40	40	54
t1	80	90	110	120	150	170	205
t2	45	52	65	75	95	115	140
t3	10	10	12	12	16	16	20
u1	32	37	39	48	52	61	75
u2	38	43	48	55	64	71	90
v	22	25	27	32	36	41	50
w1	13	16	16	21	22	27	30
w2	12	15	15	20	20	25	30
□ x	45	52	65	75	95	115	140
y1	26	28	32	40	50	60	70
y2	14	16	21	21	25	25	37
y3	10.5	12	15	15	18	18	25
z1	26	28	32	40	50	60	70
z2	45	52	60	70	90	110	130

Accessories mounting position



5.4 Performances

Following diagrams show the performances of the standard **actuator + motor** combinations. Values in each diagram refer to a max. ambient temperature of 40°C and a max. altitude of 1000 m ASL.

Three zones can be determined:

Zone 1: performances with continuous working cycle

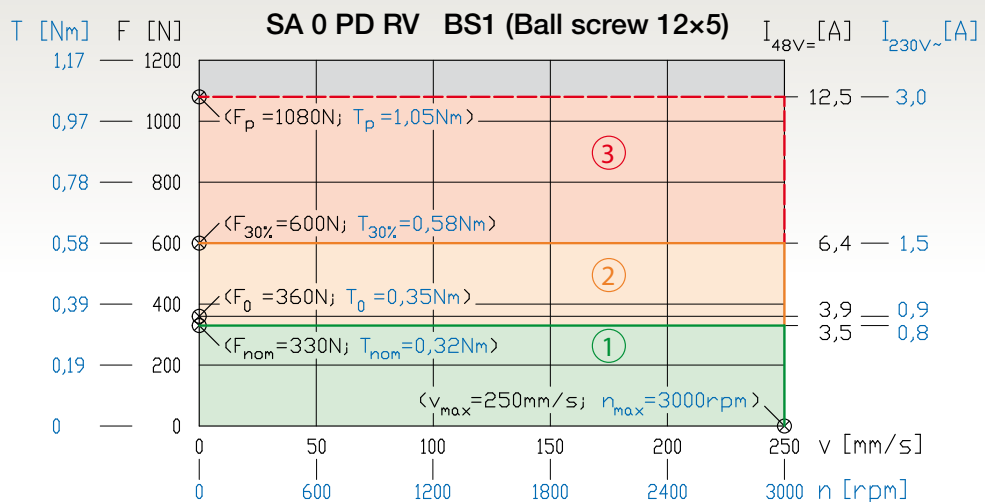
Zone 2: performances with working cycle S3 30 % over a 10 min period of time

Zone 3: performances that can be reached instantly or during a short period of time

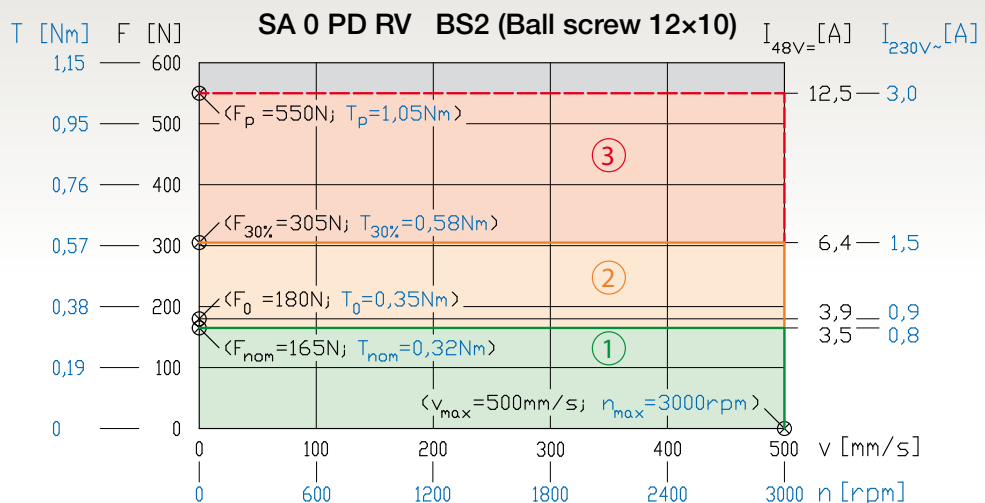
Please refer to tables on pages 20-21 or to Appendix A on page 110 for a correct symbols interpretation. When the working cycle of the actuator requires performances within zone 3 or zone 2 but out of the S3 30 % 10 min limits, you have to verify the suitable motor, as explained in Chapter 6.2 on page 60.

WARNING: the following performance diagrams refer to the max motor torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.

5.4.1 SA 0 PD

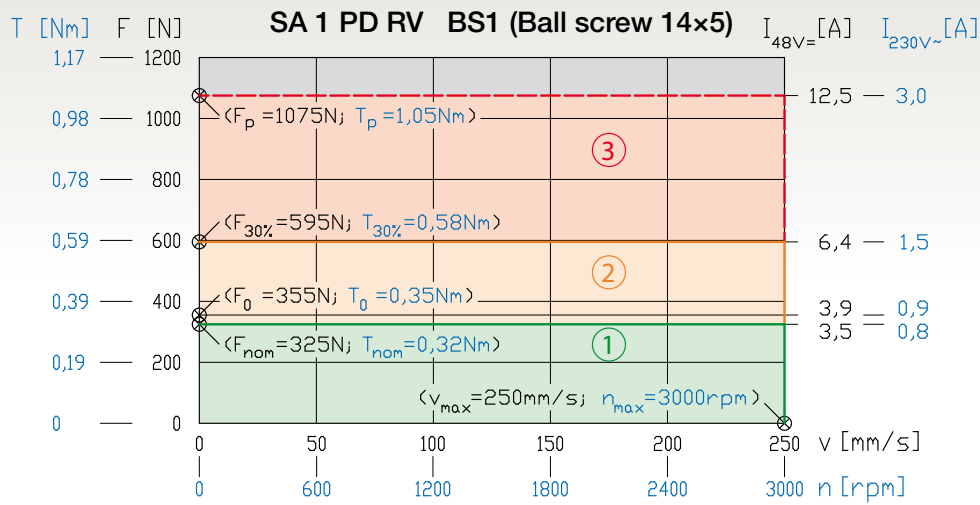


5.4.1 SA 0 PD

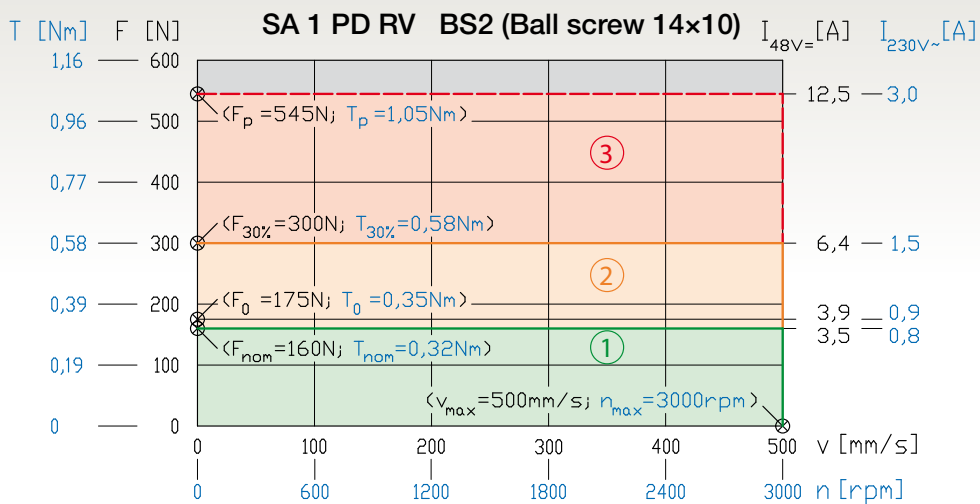


5.4 Performances

5.4.2 SA 1 PD

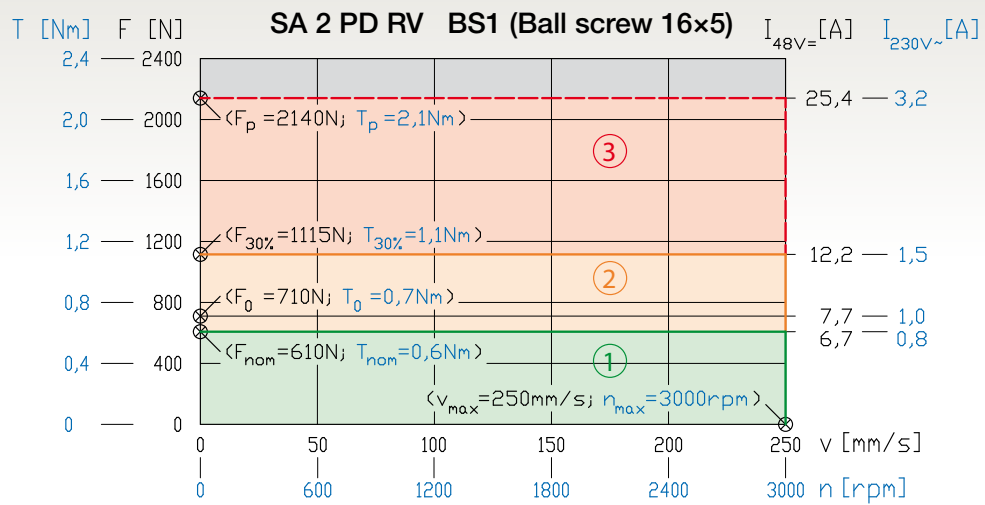


5.4.2 SA 1 PD

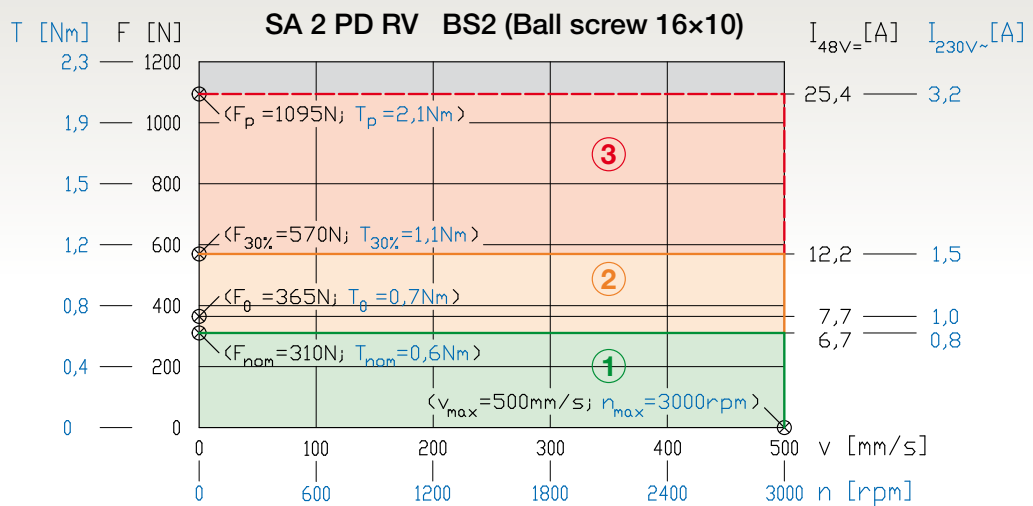


5.4 Performances

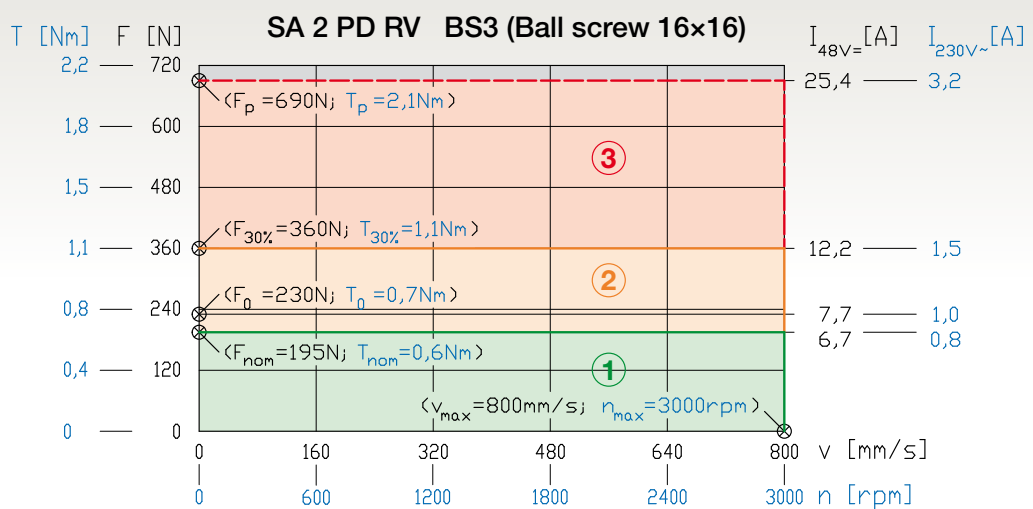
5.4.3 SA 2 PD



5.4.3 SA 2 PD



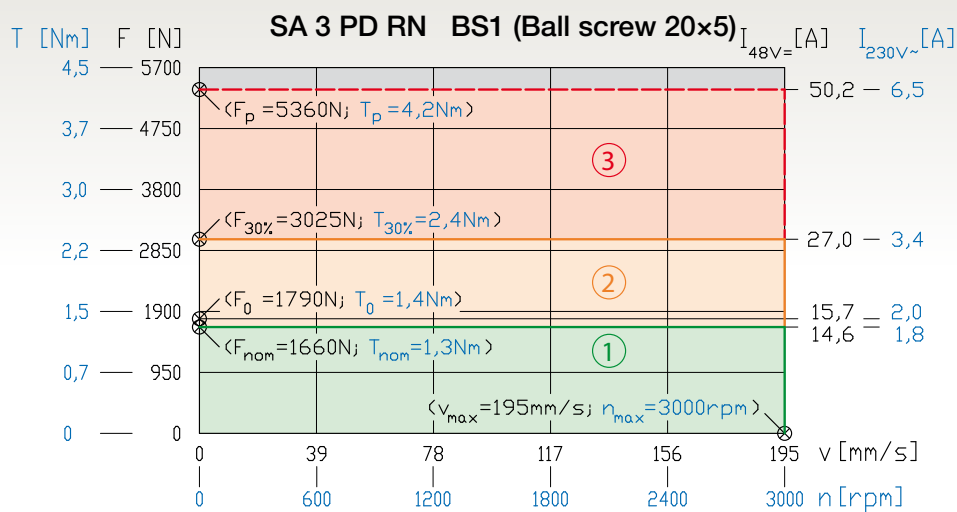
5.4.3 SA 2 PD



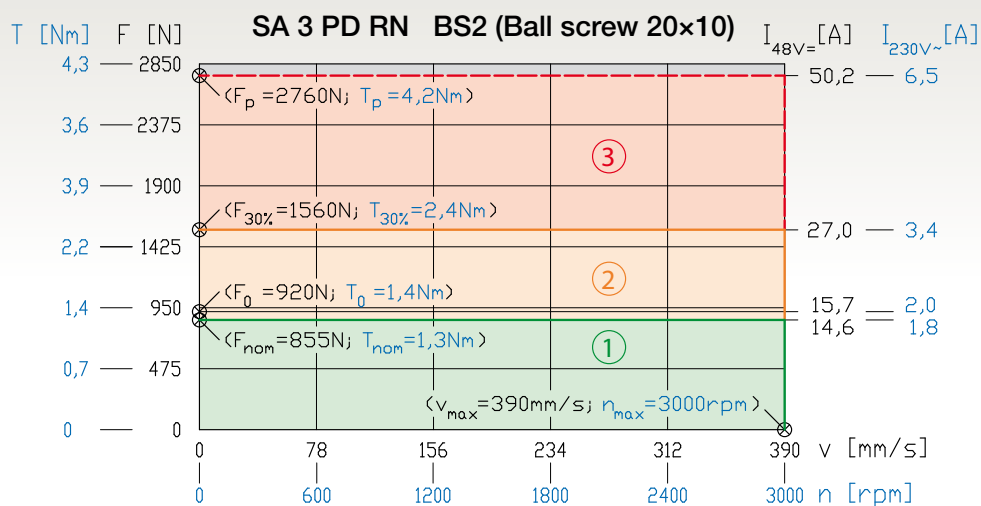
5. SA PD Series Servoactuators



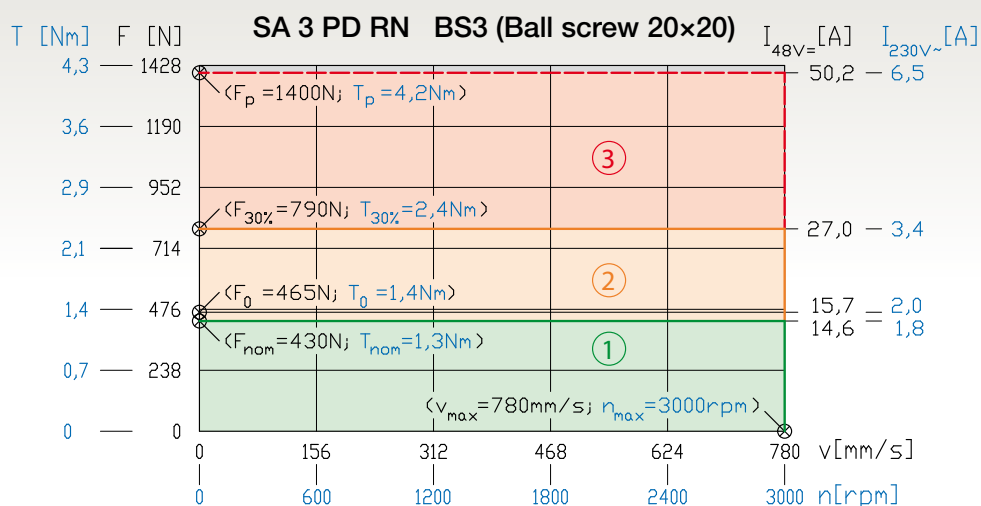
WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.



5.4.4 SA 3 PD



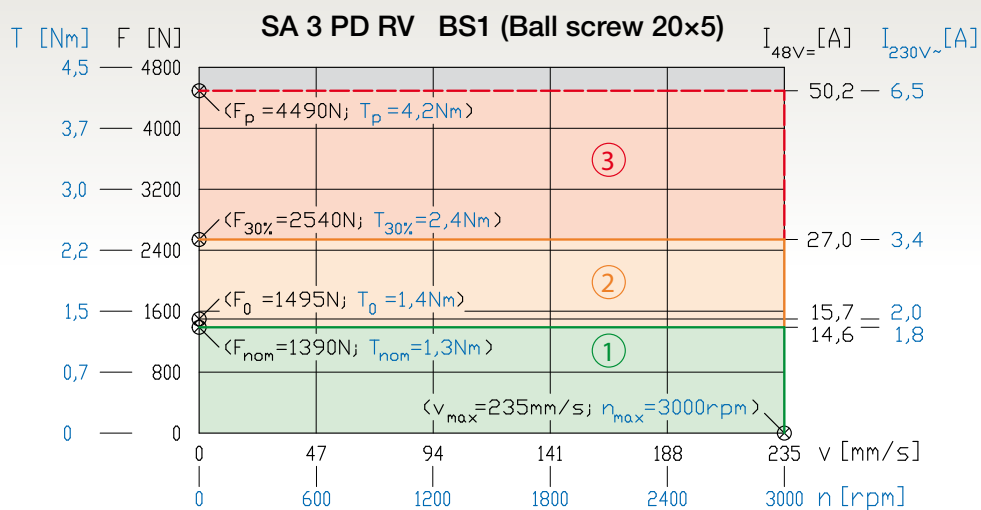
5.4.4 SA 3 PD



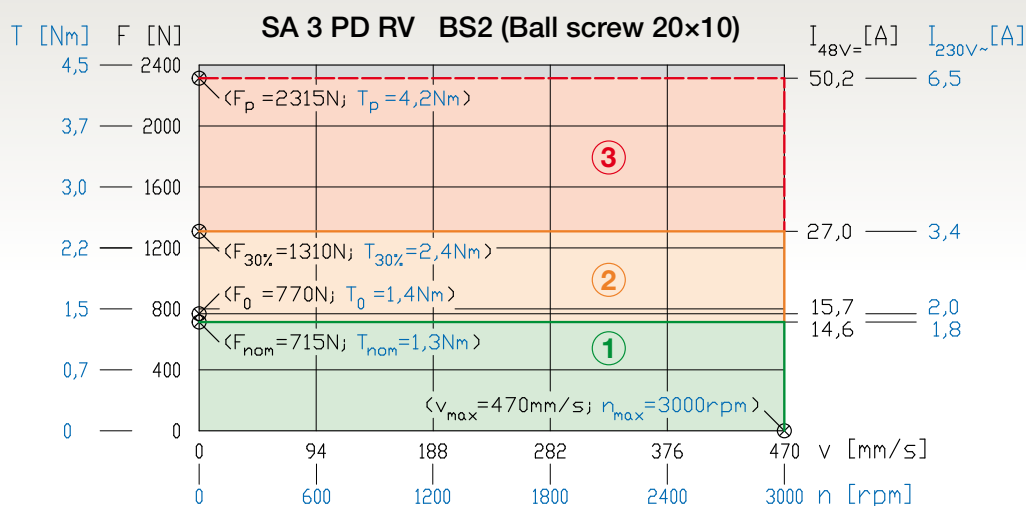
5.4.4 SA 3 PD

5.4 Performances

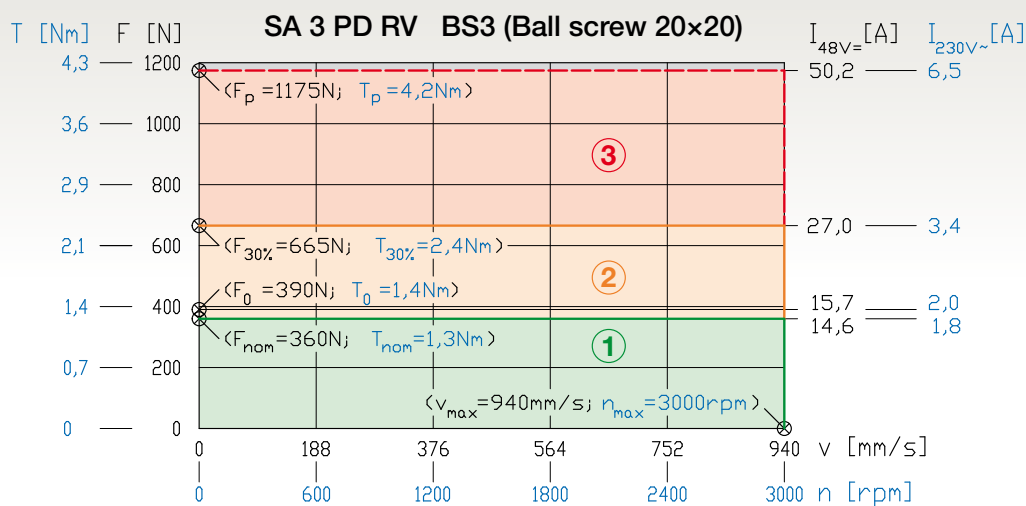
5.4.4 SA 3 PD



5.4.4 SA 3 PD



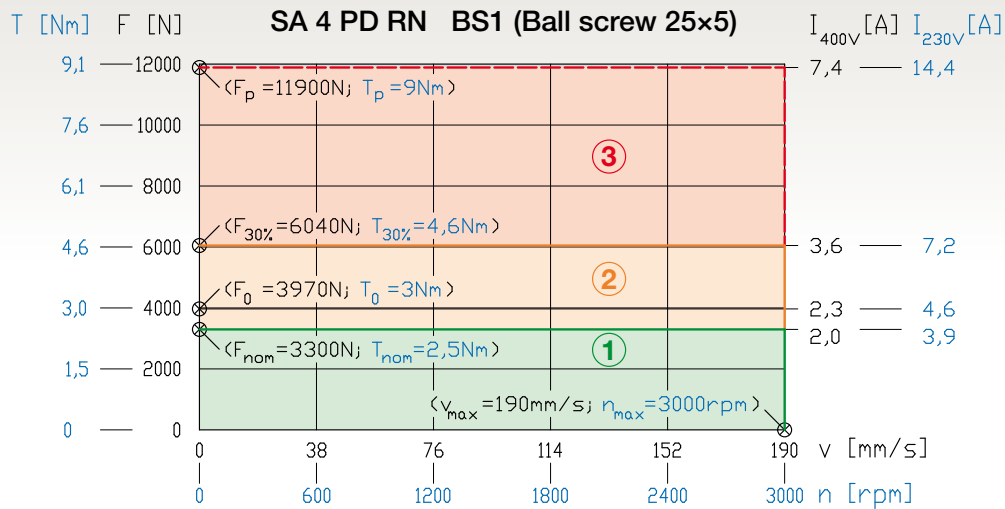
5.4.4 SA 3 PD



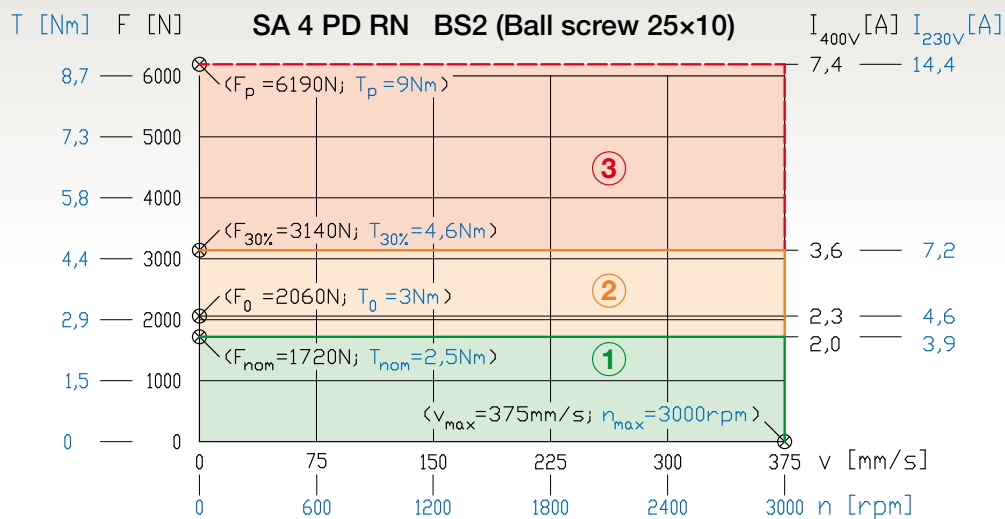
5. SA PD Series Servoactuators



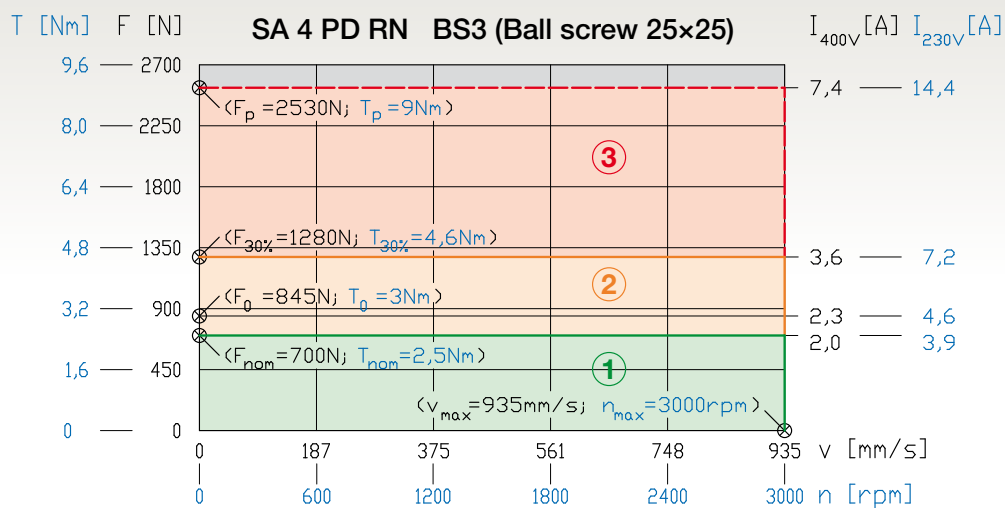
WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.



5.4.5 SA 4 PD



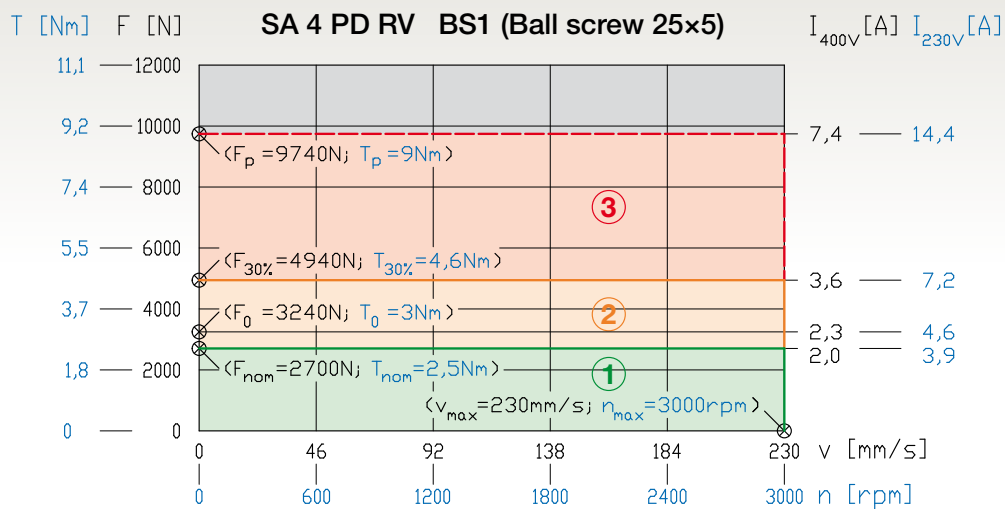
5.4.5 SA 4 PD



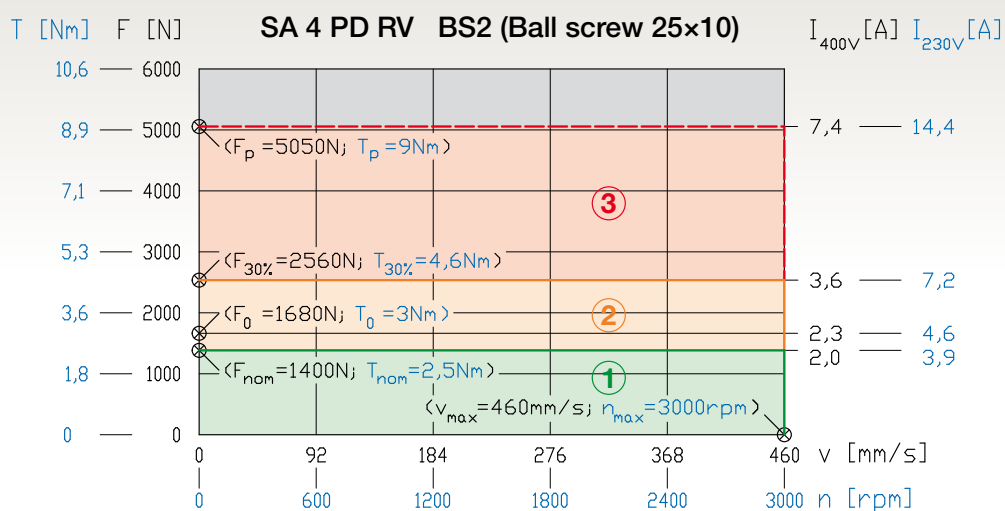
5.4.5 SA 4 PD

5.4 Performances

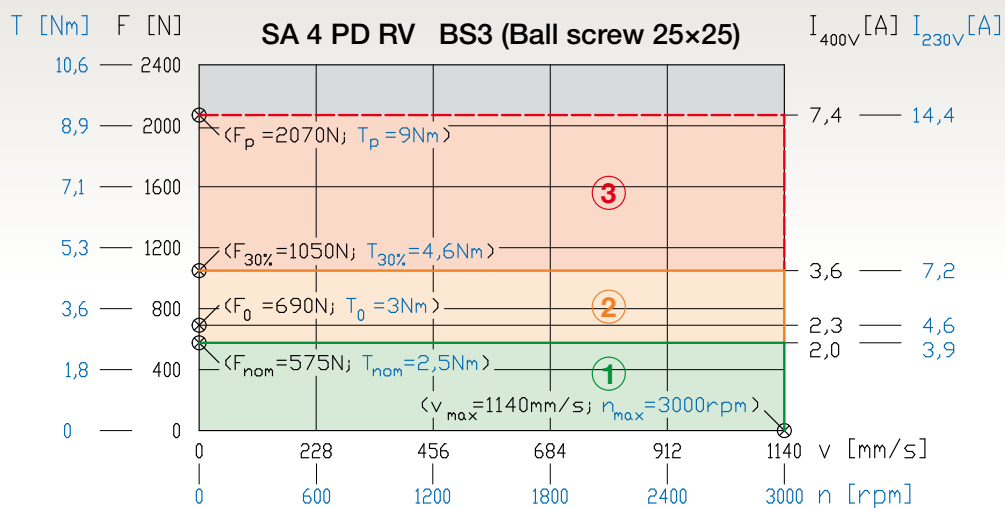
5.4.5 SA 4 PD



5.4.5 SA 4 PD



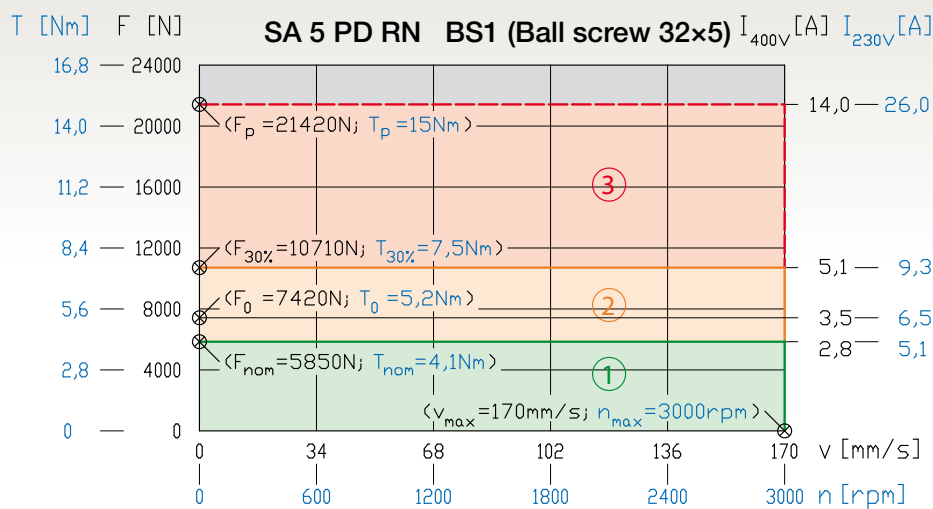
5.4.5 SA 4 PD



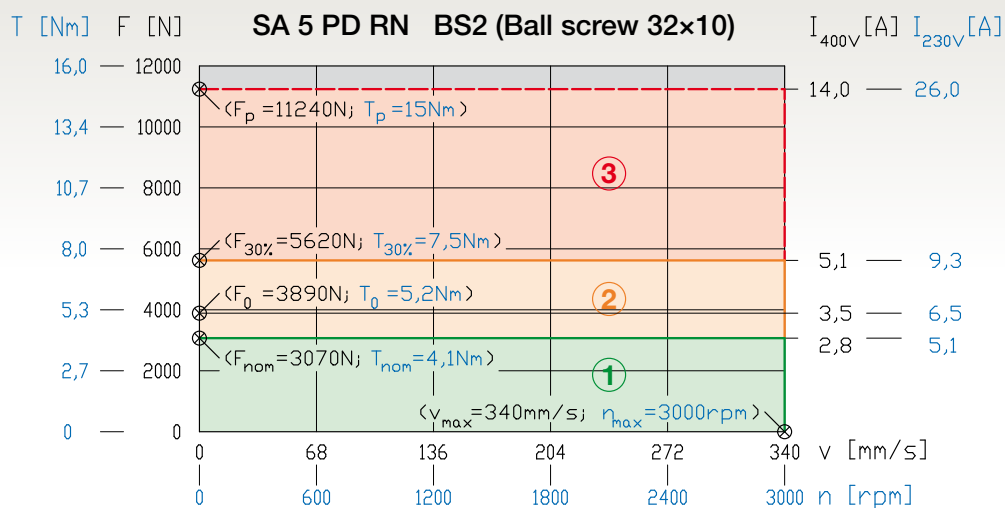
5. SA PD Series Servoactuators



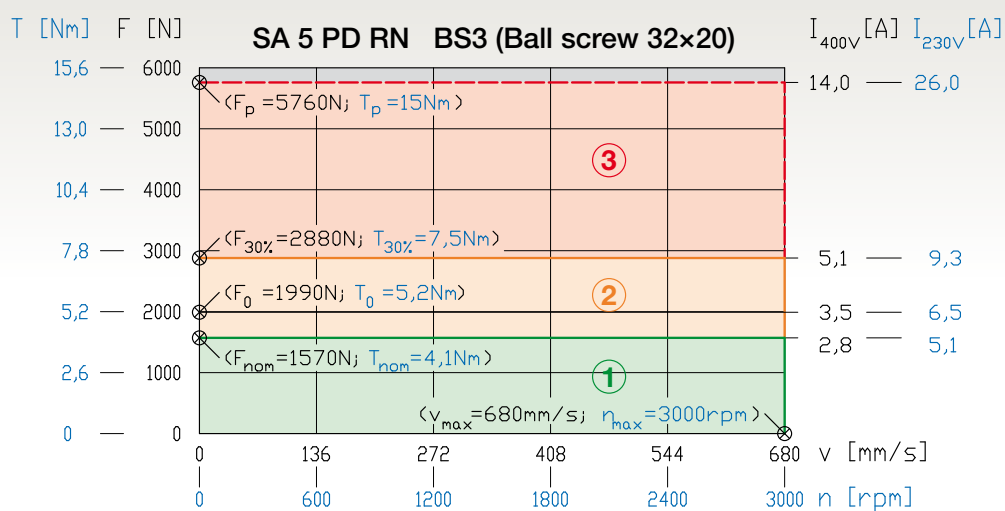
WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.



5.4.6 SA 5 PD



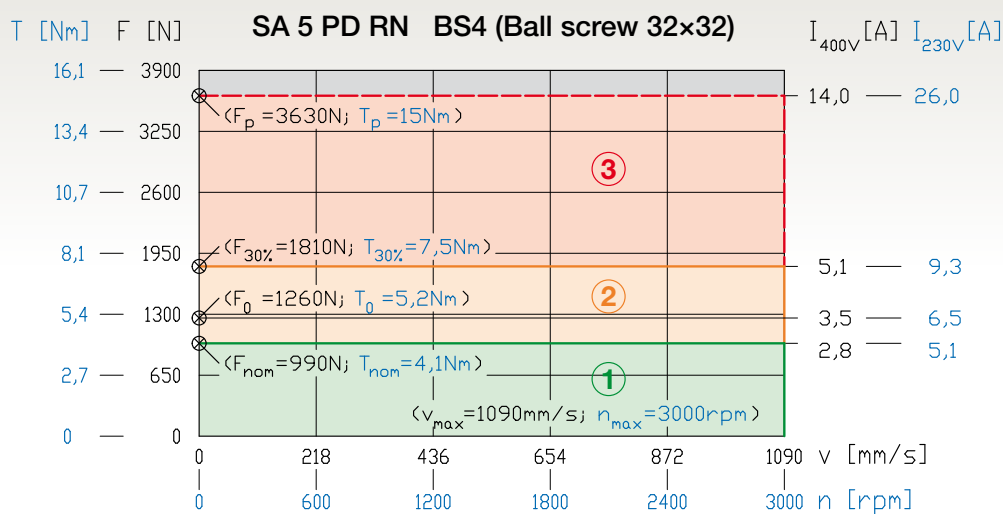
5.4.6 SA 5 PD



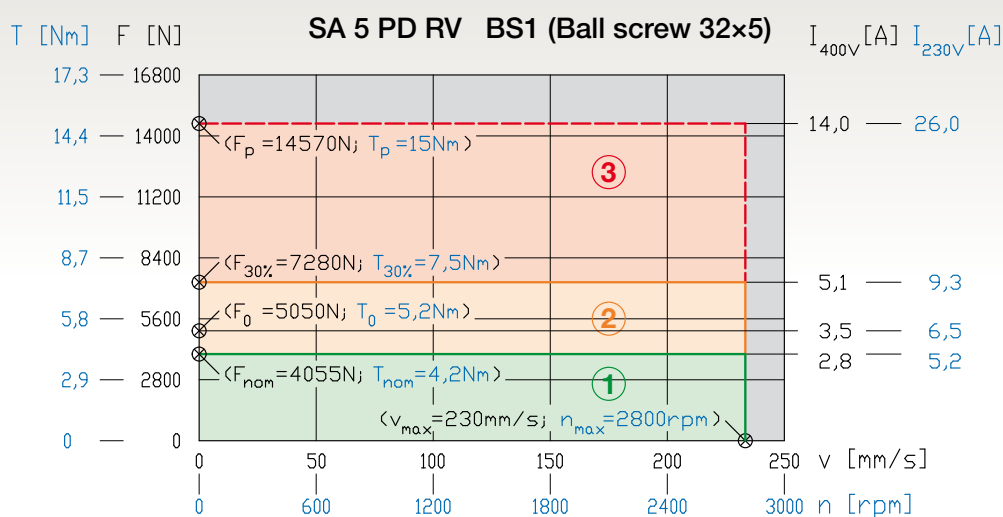
5.4.6 SA 5 PD

5.4 Performances

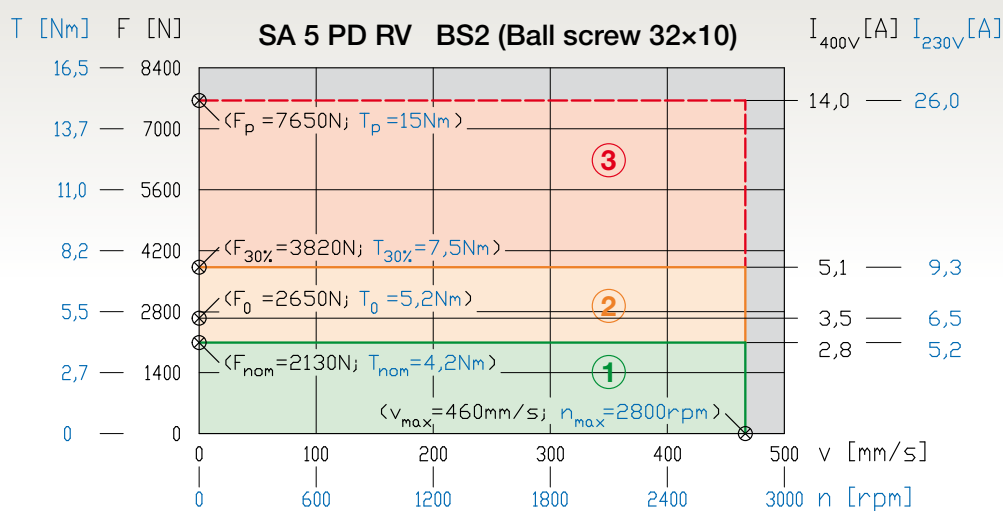
5.4.6 SA 5 PD



5.4.6 SA 5 PD



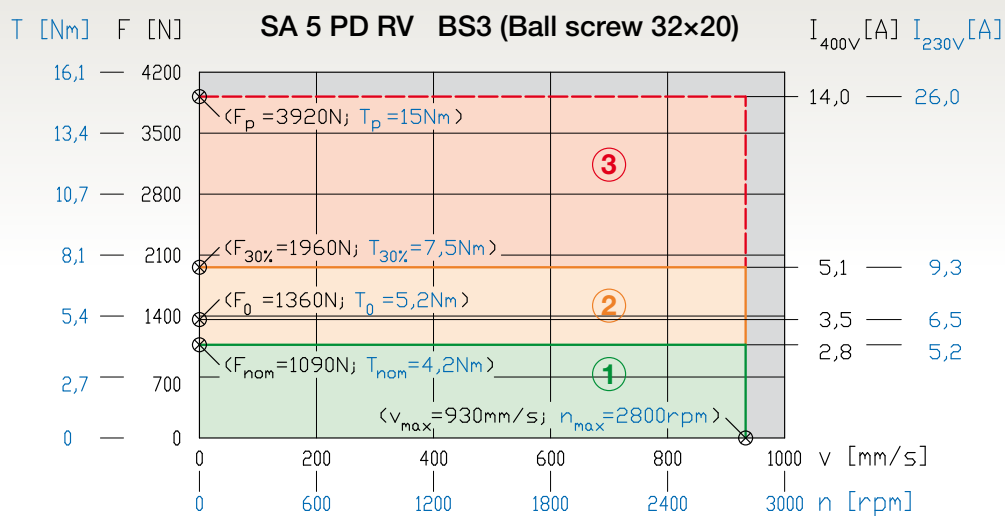
5.4.6 SA 5 PD



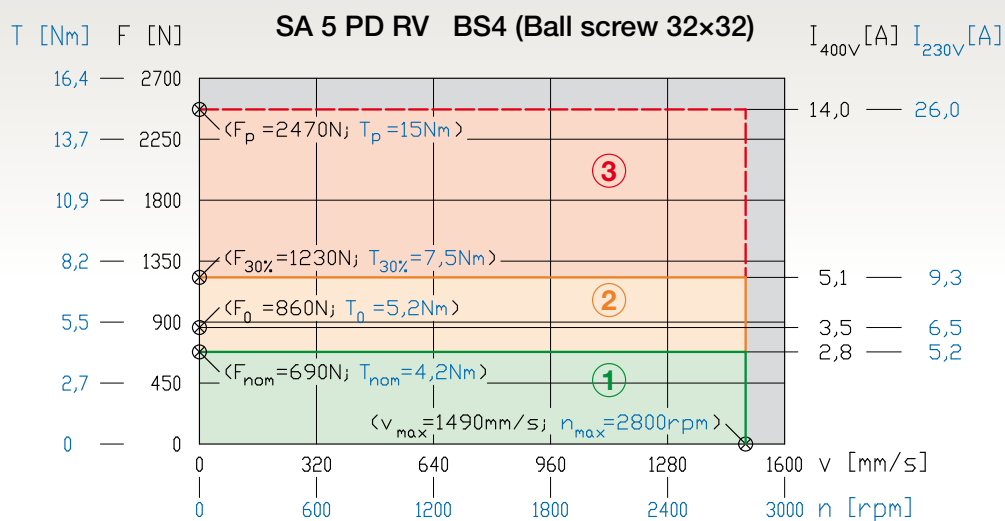
5. SA PD Series Servoactuators



WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.



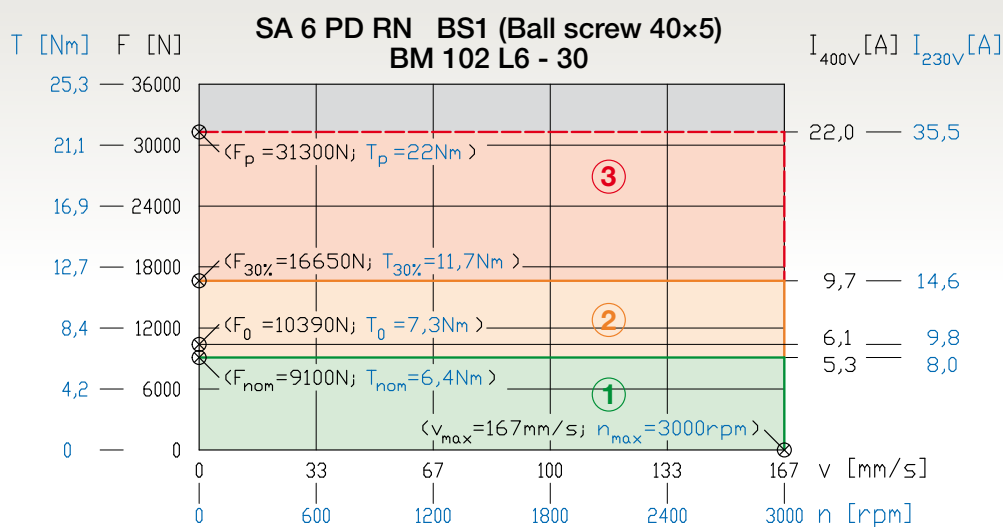
5.4.6 SA 5 PD



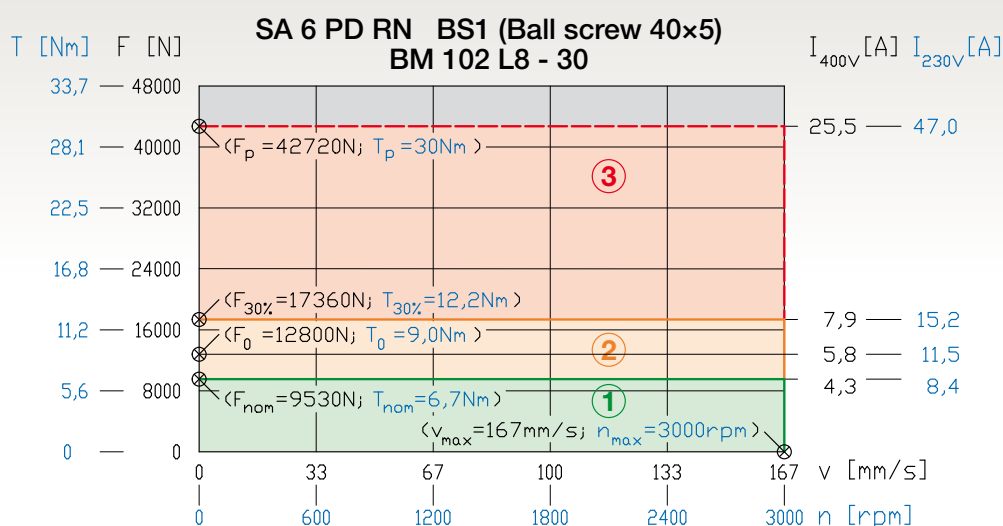
5.4.6 SA 5 PD

5.4 Performances

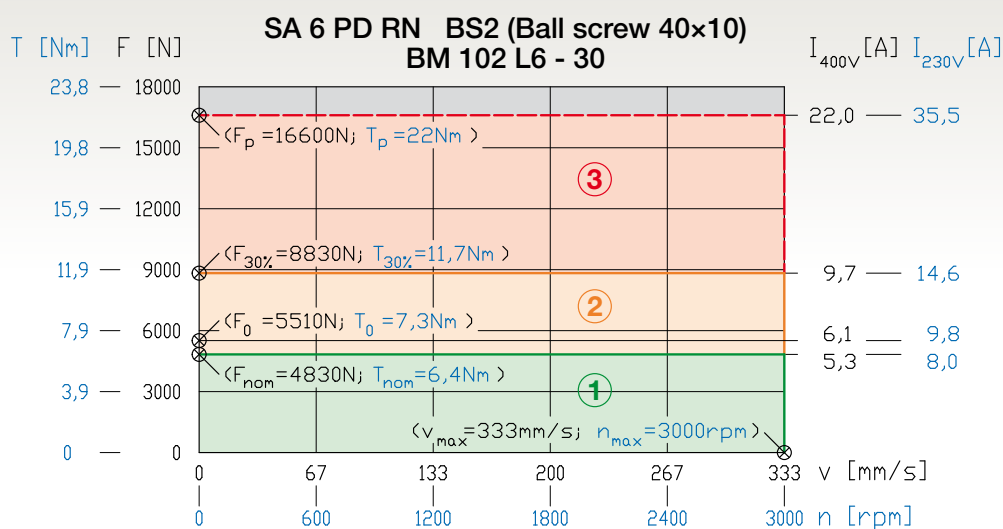
5.4.7 SA 6 PD



5.4.7 SA 6 PD



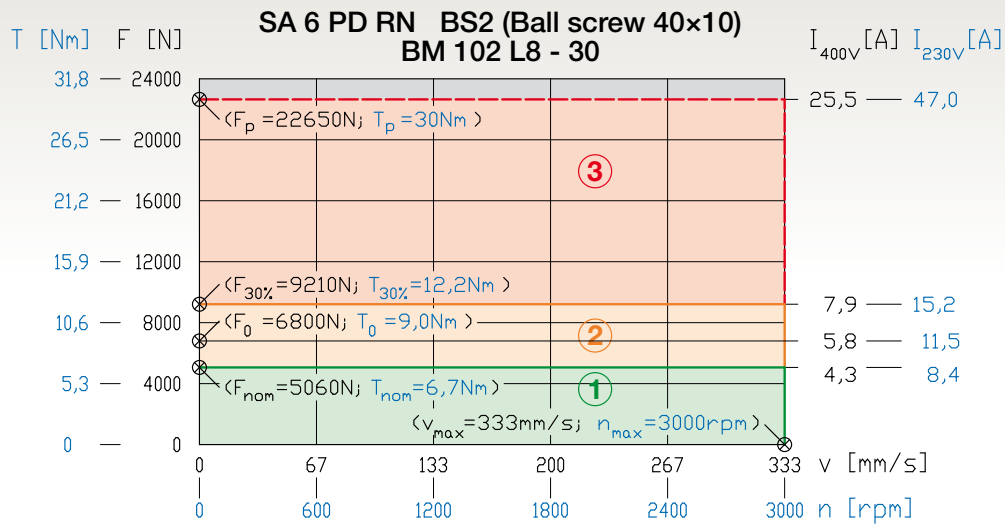
5.4.7 SA 6 PD



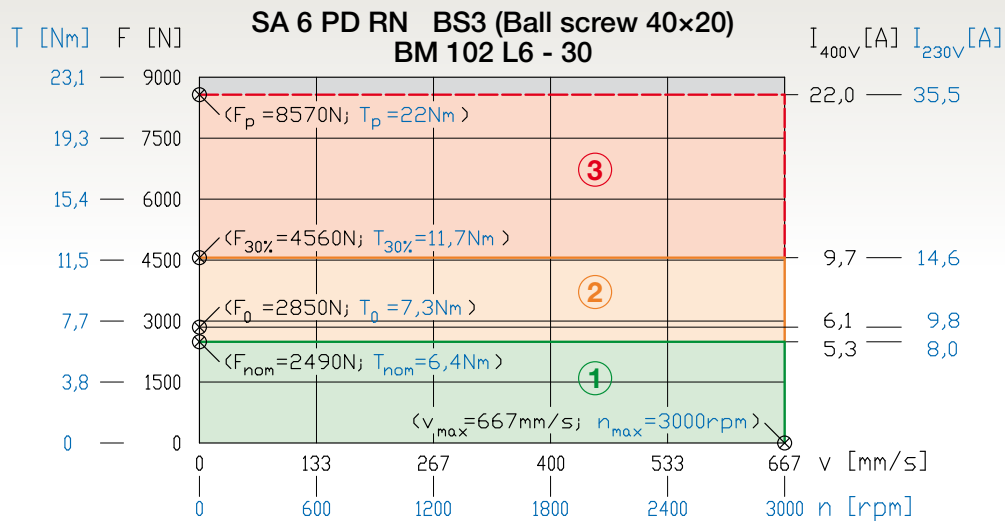
5. SA PD Series Servoactuators



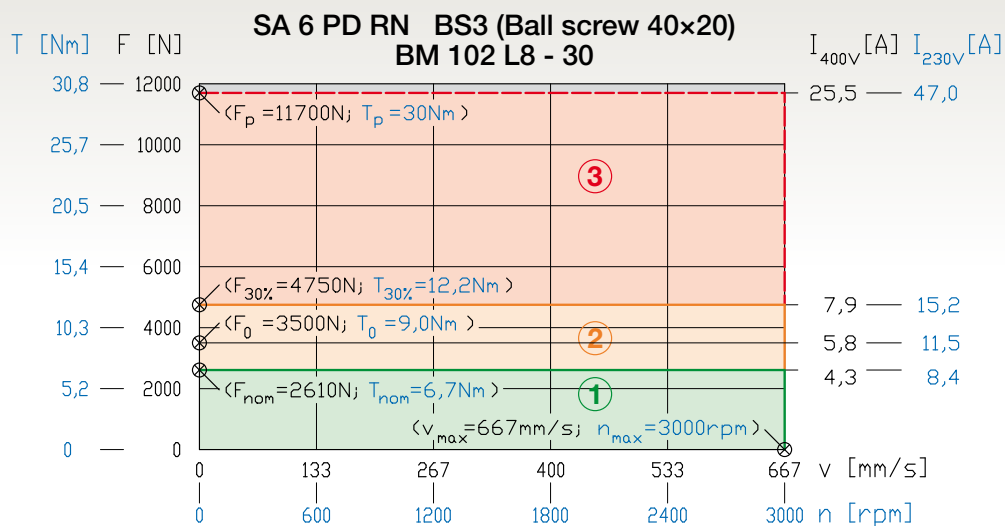
WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.



5.4.7 SA 6 PD



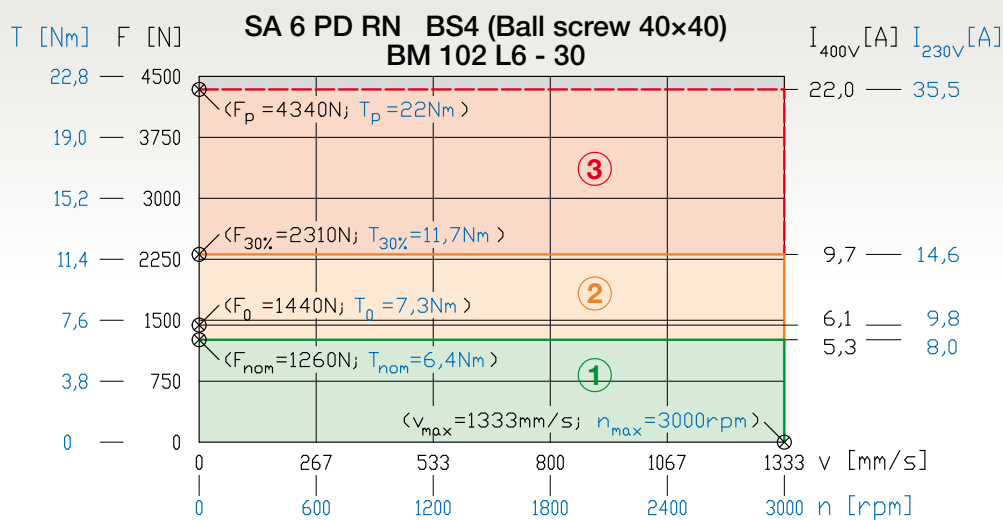
5.4.7 SA 6 PD



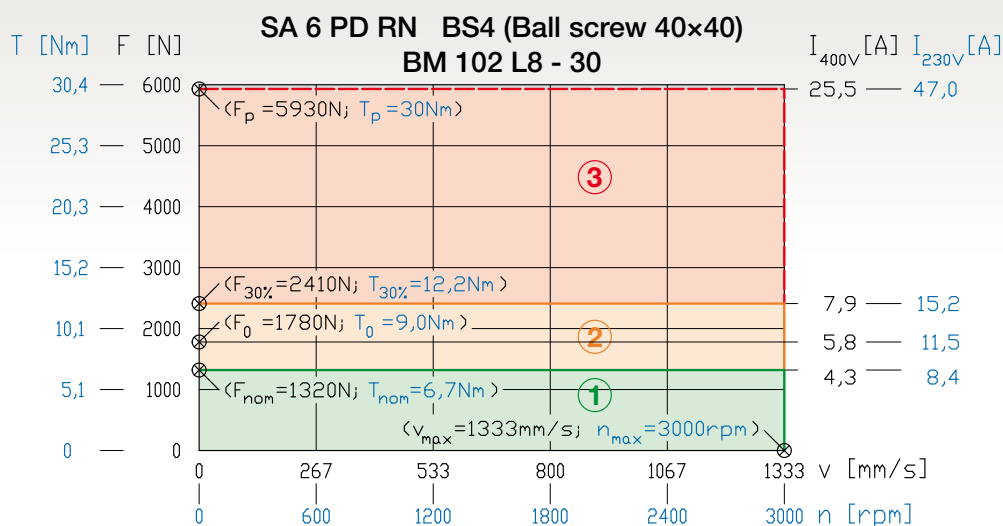
5.4.7 SA 6 PD

5.4 Performances

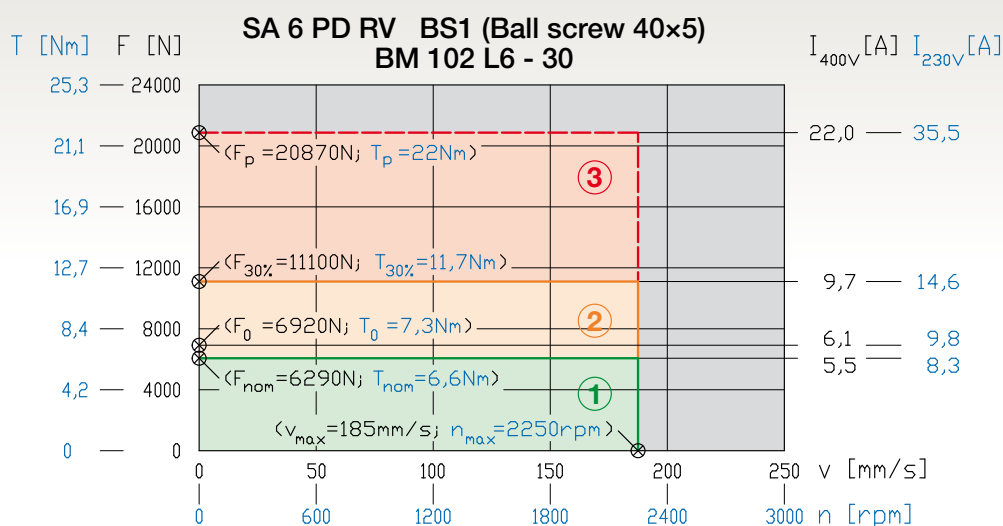
5.4.7 SA 6 PD



5.4.7 SA 6 PD



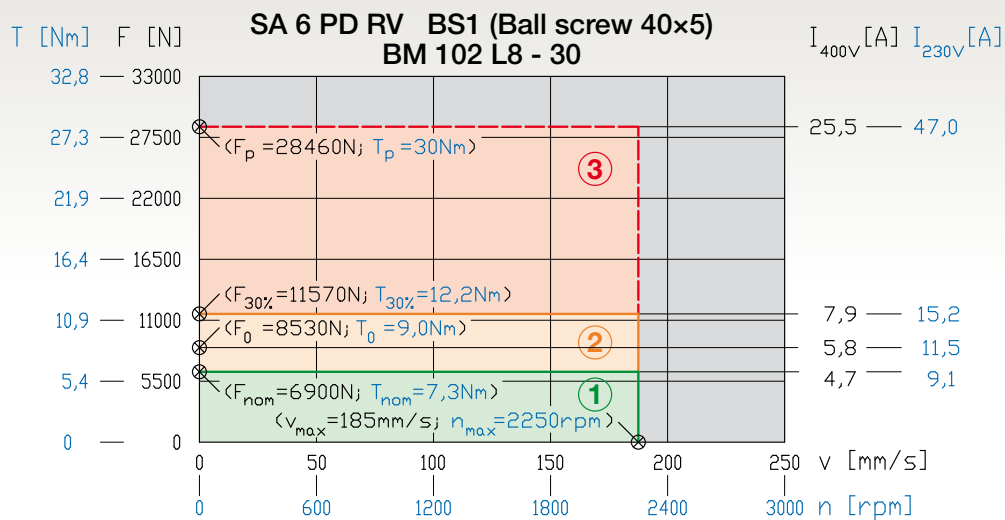
5.4.7 SA 6 PD



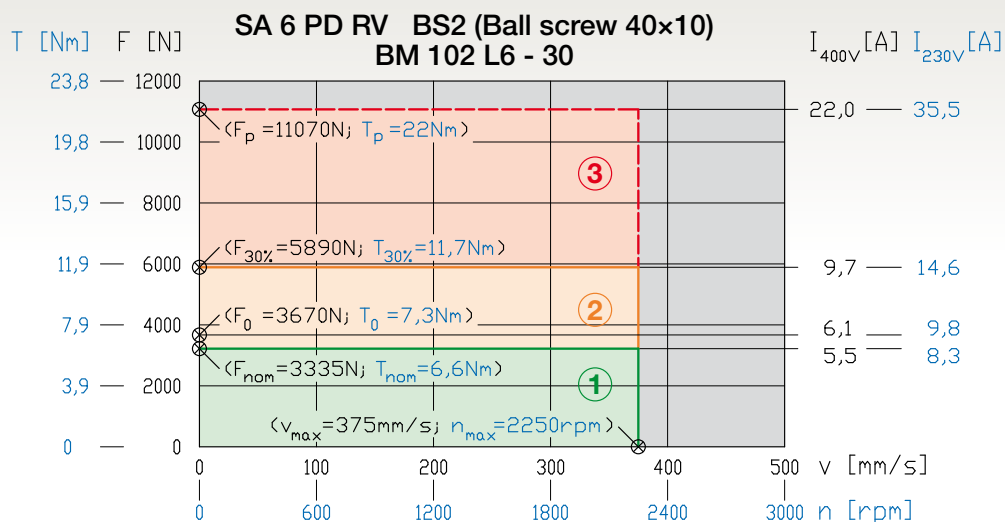
5. SA PD Series Servoactuators



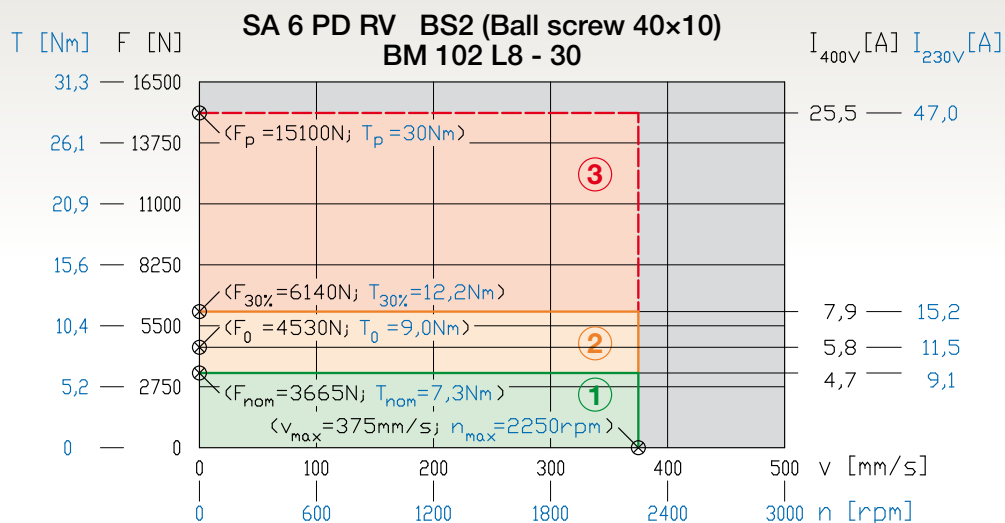
WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.



5.4.7 SA 6 PD



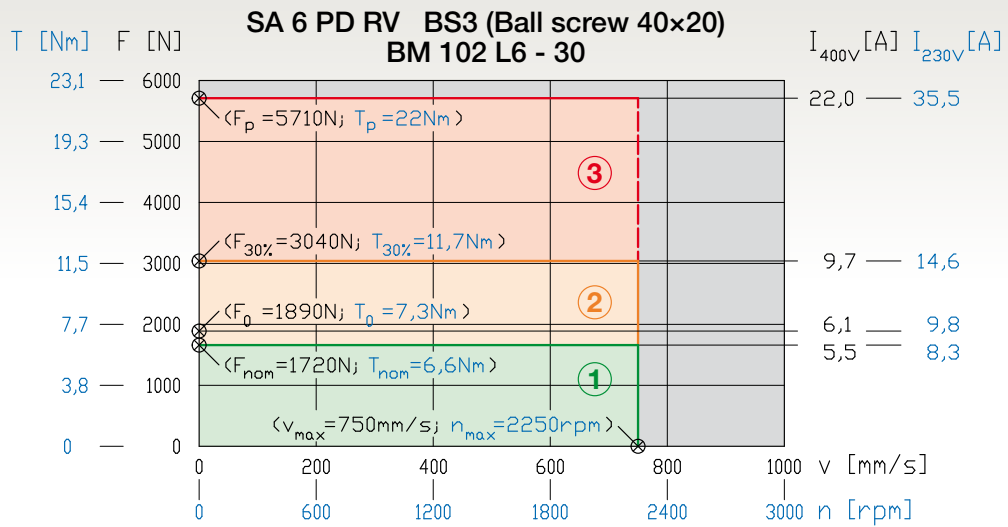
5.4.7 SA 6 PD



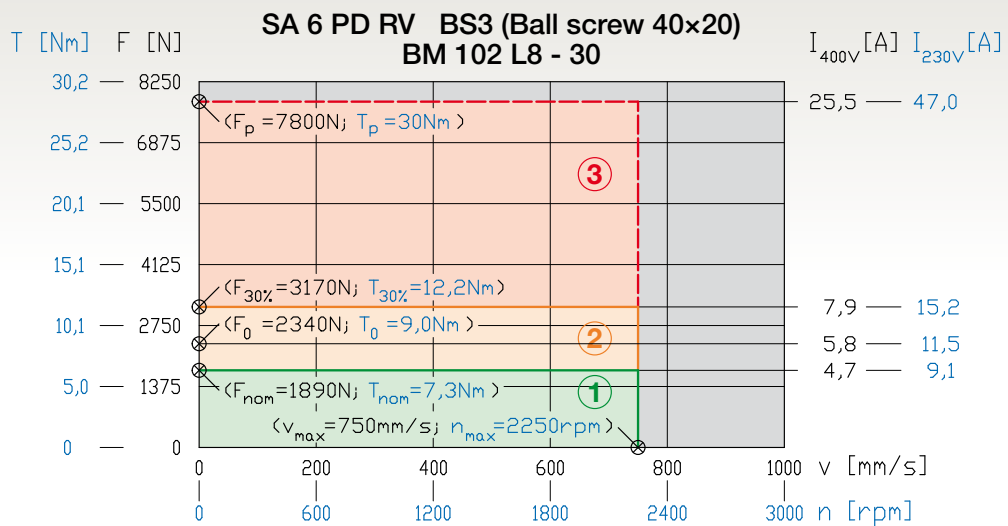
5.4.7 SA 6 PD

5.4 Performances

5.4.7 SA 6 PD



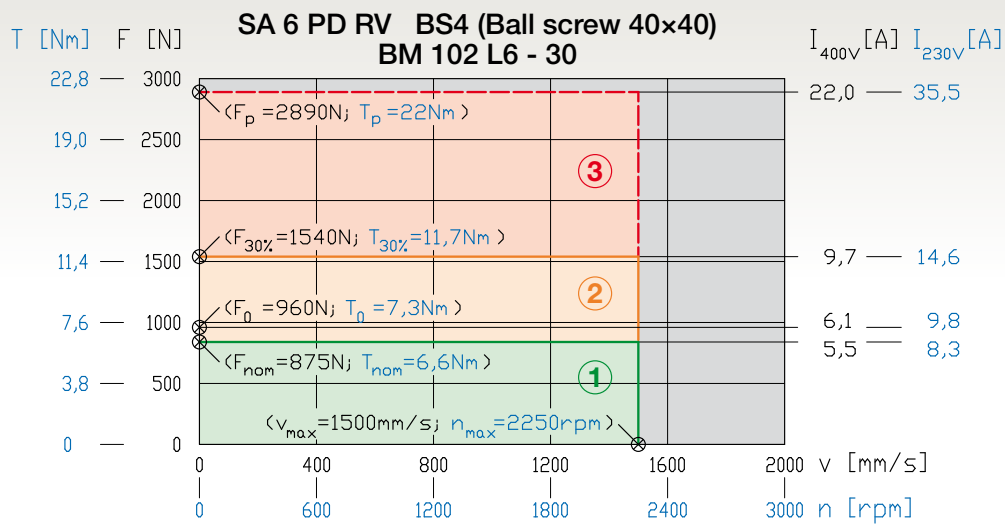
5.4.7 SA 6 PD



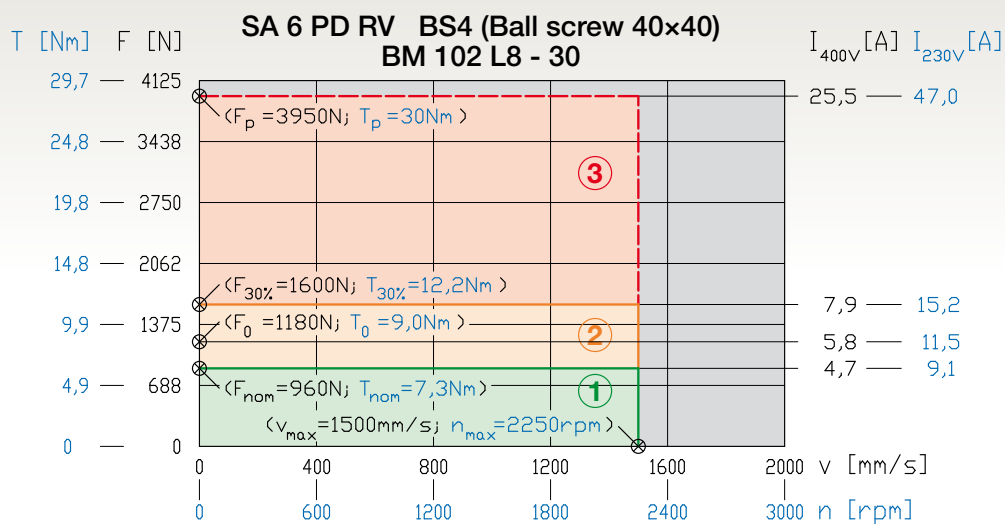
5. SAPD Series Servoactuators



WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.



5.4.7 SA 6 PD



5.4.7 SA 6 PD