

### 4.1 Technical Data

SIZE		SA 0 IL		SA 1 IL		SA 2 IL			SA 3 IL		
Profile ISO 15552	[mm]	□ 45		□ 52		□ 65			□ 75		
Rod diameter	[mm]	∅ 20		∅ 22		∅ 25			∅ 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]	∅ 2.381		∅ 3.175		∅ 3.175			∅ 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 ( $C_{0a}$ )	[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 ( $u$ )		1 : 1		1 : 1		1 : 1			1 : 1		
Linear travel for 1 motor shaft revolution	[mm]	5	10	5	10	5	10	16	5	10	20
Peak load $F_p$ (°)	[N]	1140	580	1135	575	2255	1155	730	4450	2300	1165
Continuous load at zero-speed $F_0$	[N]	380	190	375	185	750	385	240	1485	765	390
Continuous load at no-zero-speed $F_{nom}$	[N]	345	175	340	170	645	330	210	1380	710	360
Max. linear speed $v_{max}$	[mm/s]	250	500	250	500	250	500	800	250	500	1000
Total actuator efficiency ( $\eta$ )		0.86	0.88	0.85	0.88	0.85	0.87	0.88	0.84	0.87	0.88
Mass in linear motion ( $m$ ) and moment of inertia ( $J$ ) of the actuator reduced to motor shaft											
$m_0$ ref. to 0 mm stroke	[kg]	0.32	0.32	0.47	0.48	0.61	0.62	0.61	1.00	1.01	1.00
$m_{100}$ for each 100 mm extra-stroke	[kg]	0.13		0.14		0.19			0.20		
$J_0$ ref. to 0 mm stroke actuator	without brake [kg×m <sup>2</sup> ]	1.7×10 <sup>-5</sup>	1.7×10 <sup>-5</sup>	1.8×10 <sup>-5</sup>	1.9×10 <sup>-5</sup>	4.3×10 <sup>-5</sup>	4.4×10 <sup>-5</sup>	4.7×10 <sup>-5</sup>	7.7×10 <sup>-5</sup>	7.9×10 <sup>-5</sup>	8.7×10 <sup>-5</sup>
	with brake [kg×m <sup>2</sup> ]	1.7×10 <sup>-5</sup>	1.7×10 <sup>-5</sup>	1.8×10 <sup>-5</sup>	1.9×10 <sup>-5</sup>	4.5×10 <sup>-5</sup>	4.6×10 <sup>-5</sup>	4.9×10 <sup>-5</sup>	7.9×10 <sup>-5</sup>	8.1×10 <sup>-5</sup>	8.9×10 <sup>-5</sup>
$J_{100}$ for each 100 mm extra-stroke	[kg×m <sup>2</sup> ]	1.8×10 <sup>-6</sup>	2.0×10 <sup>-6</sup>	2.6×10 <sup>-6</sup>	2.9×10 <sup>-6</sup>	4.5×10 <sup>-6</sup>	4.9×10 <sup>-6</sup>	5.7×10 <sup>-6</sup>	1.1×10 <sup>-5</sup>	1.2×10 <sup>-5</sup>	1.3×10 <sup>-5</sup>
Weight of 100 mm stroke actuator (°)	[kg]	3.0 (3.3)		3.5 (3.8)		5.3 (6.0)			7.4 (8.1)		
Extra-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

## 4.1 Technical Data

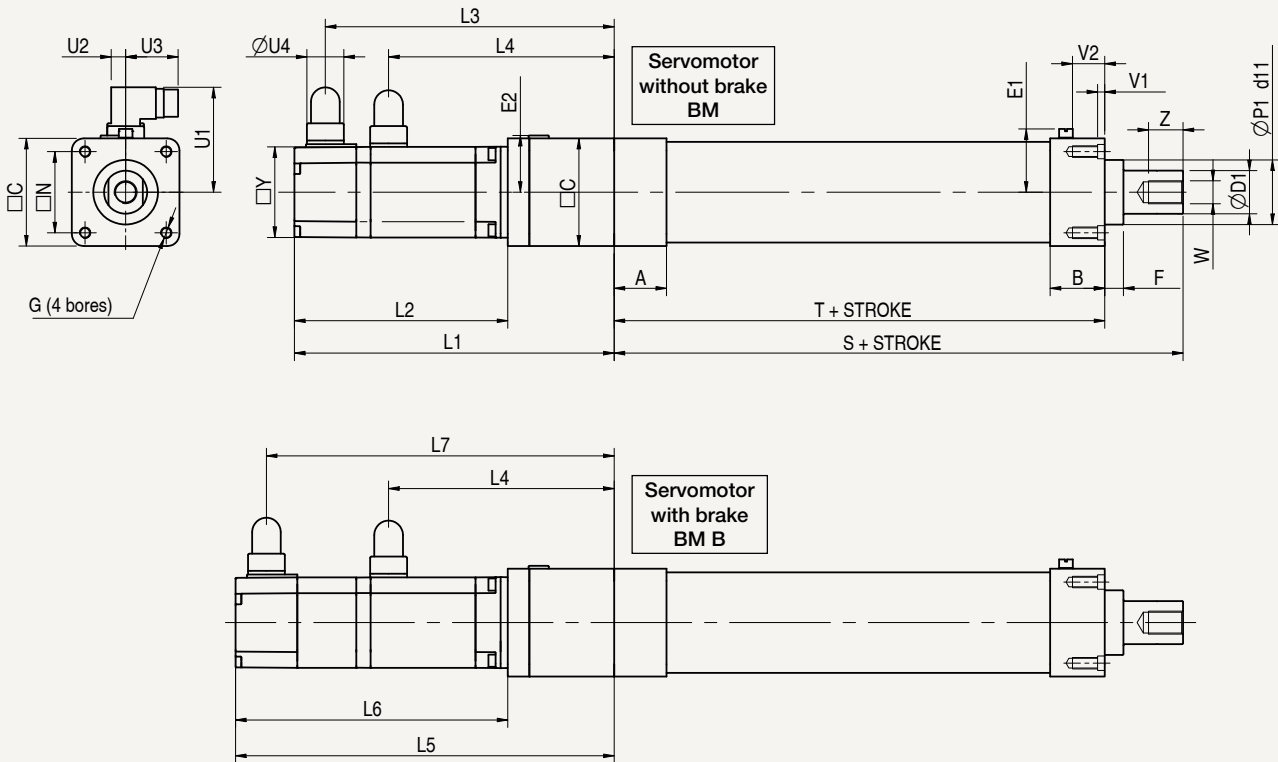
SA 4 IL			SA 5 IL				SA 6 IL				SIZE	
□ 95			□ 115				□ 140				[mm] Profile ISO 15552	
∅ 35			∅ 50				∅ 60				[mm] Rod diameter	
M20 × 1.5 depth 30 mm			M20 × 1.5 depth 40 mm				M27 × 2 depth 54 mm				[mm] Front attachment thread	
BS1	BS2	BS3	BS1	BS2	BS3	BS4	BS1	BS2	BS3	BS4	Ball screw BS	
25 × 5	25 × 10	25 × 25	32 × 5	32 × 10	32 × 20	32 × 32	40 × 5	40 × 10	40 × 20	40 × 40	[mm] Diameter × Lead ( $d_o \times P_h$ )	
∅ 3.175	∅ 3.969	∅ 3.175	∅ 3.175	∅ 6.350	∅ 6.350	∅ 6.350	∅ 3.175	∅ 6.350	∅ 6.350	∅ 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 $C_u$	
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		Peak torque $T_p$ (2)	
3			5.2				7.3		9		Stall torque $T_{0,100K}$	
2.5			4.1				6.4		6.7		Rated torque $T_{nom,100K}$	
3000			3000				3000		3000		Nominal speed $n_{nom}$	
1 : 1			1 : 1				1 : 1		1 : 1		Ratio ( $u$ )	
5	10	25	5	10	20	32	5	10	20	40	[mm] Linear travel for 1 motor shaft revolution	
9400	4885	2000	15345	8055	4130	2605	21985 29975	11665 15910	6015 8205	3055 4165	[N] Peak load $F_p$ (2)	
3135	1630	670	5320	2790	1430	900	7295 8995	3870 4775	1995 2460	1015 1250	[N] Continuous load at zero speed $F_0$	
2610	1360	555	4270	2240	1150	725	6620 7270	3515 3860	1810 1990	920 1010	[N] Continuous load at no-zero-speed $F_{nom}$	
250	500	1250	230	460	930	1490	185	375	750	1500	[mm/s] Max. linear speed $v_{max}$	
0.82	0.86	0.88	0.80	0.85	0.87	0.88	0.78	0.84	0.87	0.88	Total actuator efficiency ( $\eta$ )	
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
$2.2 \times 10^{-4}$	$2.3 \times 10^{-4}$	$2.5 \times 10^{-4}$	$7.9 \times 10^{-4}$	$8.0 \times 10^{-4}$	$8.3 \times 10^{-4}$	$8.8 \times 10^{-4}$	$1.7 \times 10^{-3}$	$1.7 \times 10^{-3}$	$1.8 \times 10^{-3}$	$1.9 \times 10^{-3}$	[kg·m <sup>2</sup> ] without brake $J_0$ ref. to 0 mm stroke actuator	
$2.4 \times 10^{-4}$	$2.4 \times 10^{-4}$	$2.6 \times 10^{-4}$	$8.4 \times 10^{-4}$	$8.5 \times 10^{-4}$	$8.7 \times 10^{-4}$	$9.3 \times 10^{-4}$	$1.7 \times 10^{-3}$	$1.8 \times 10^{-3}$	$1.8 \times 10^{-3}$	$2.0 \times 10^{-3}$	[kg·m <sup>2</sup> ] with brake	
$2.7 \times 10^{-5}$	$2.8 \times 10^{-5}$	$3.1 \times 10^{-5}$	$6.9 \times 10^{-5}$	$7.1 \times 10^{-5}$	$7.5 \times 10^{-5}$	$8.4 \times 10^{-5}$	$1.8 \times 10^{-4}$	$1.8 \times 10^{-4}$	$1.8 \times 10^{-4}$	$2.1 \times 10^{-4}$	[kg·m <sup>2</sup> ] $J_{100}$ for each 100 mm extra-stroke	
13 (15)			25 (26)				39 (41)					[kg] Weight of 100 mm stroke actuator (3)
1.1			1.9				2.7					[kg] Extra-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

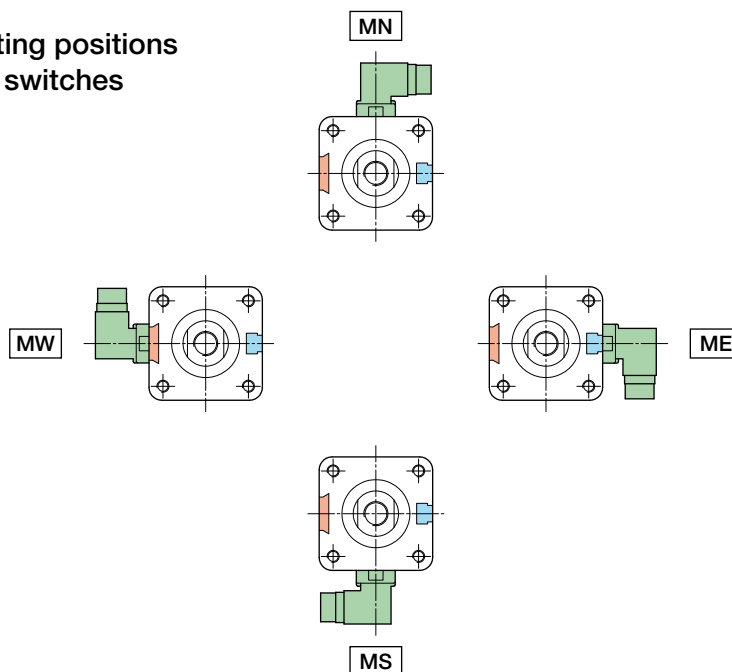
(2) - valid only in case of intermittent working

(3) - weight of actuator without accessories

## 4.2 Dimensions



Servomotor mounting positions related to the limit switches



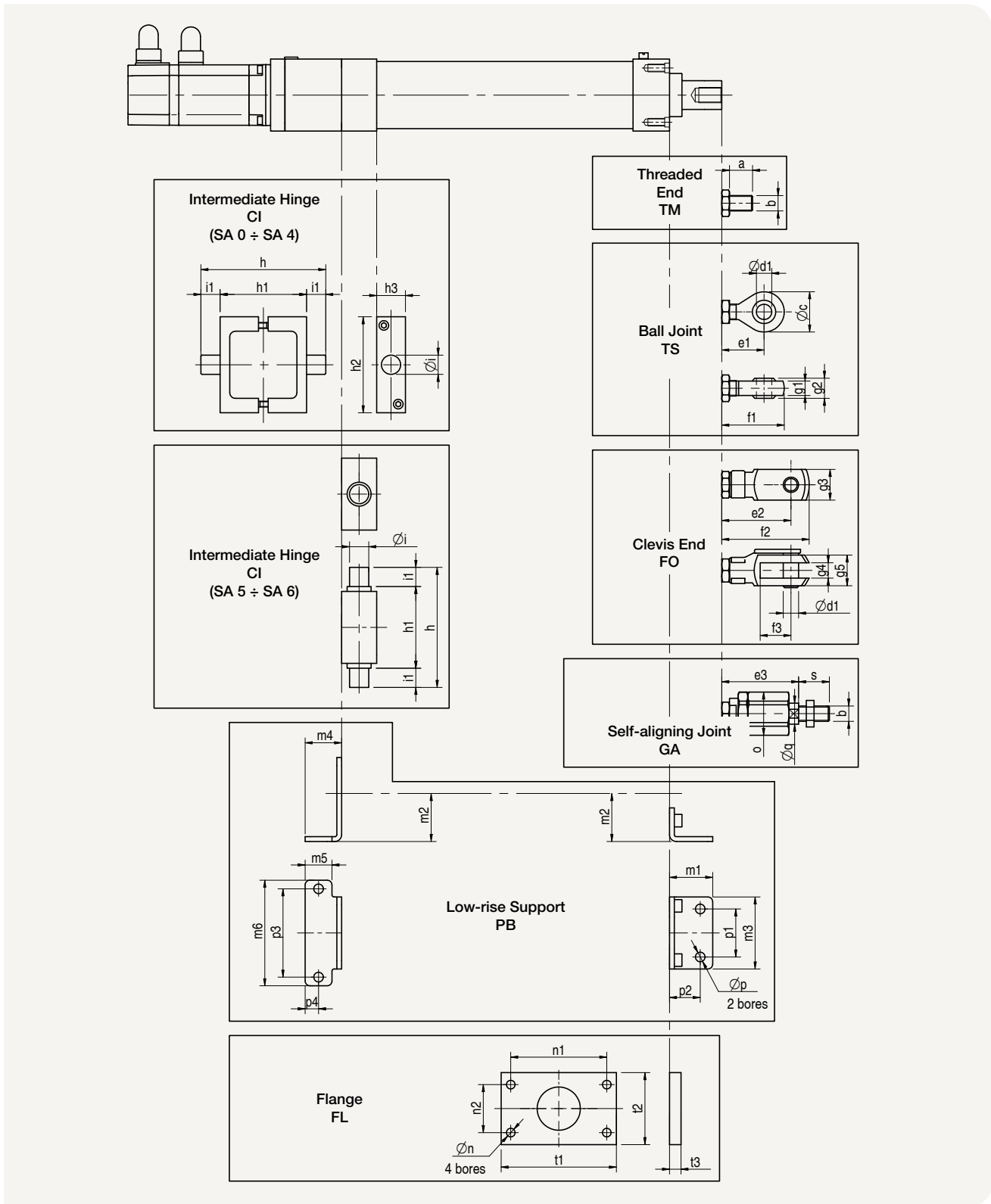
### 4.2 Dimensions

SIZE	SA 0 IL	SA 1 IL	SA 2 IL	SA 3 IL	SA 4 IL	SA 5 IL	SA 6 IL
A	30	30	37	37	48	96	116
B	40	34	40	38	51.5	82	108
□ C	46	52	65	75	95	112	138
∅ D1	20	22	25	30	35	50	60
E1	30	32	39	44	54	-	-
E2	24.5	28	34.5	39.5	49.5	60	73.5
F	21.5	10	13	13	5	8	8
G	M6	M6	M8	M8	M10	M10	M12
L1	184	183	198	223	251	305	355
L2	123	123	124	149	160	177	227
L3	164	163	176	201	229	283	335
L4	119	118	132	157	185	233	283
L5	217	216	239	264	309	359	409
L6	156	156	165	190	218	231	281
L7	152.5	151.5	173	198	287	337	389
□ N	32.5	38	46.5	56.5	72	89	110
∅ P1	30	35	40	45	45	70	80
S	229	246	264	296	330	453	538
T	203	205	217	241	284	396	474
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
∅ 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
<b>SA 0 IL</b>	C100	C200	C300	-	-	-	-	-	-	-
<b>SA 1 IL</b>	C100	C200	C300	C400	-	-	-	-	-	-
<b>SA 2 IL</b>	C100	C200	C300	C400	C500	C600	-	-	-	-
<b>SA 3 IL</b>	C100	C200	C300	C400	C500	C600	C700	C800	-	-
<b>SA 4 IL</b>	C100	C200	C300	C400	C500	C600	C700	C800	-	-
<b>SA 5 IL</b>	C100	C200	C300	C400	C500	C600	C700	C800	C900	C1000
<b>SA 6 IL</b>	C100	C200	C300	C400	C500	C600	C700	C800	C900	C1000

## 4.3 Accessories Dimensions

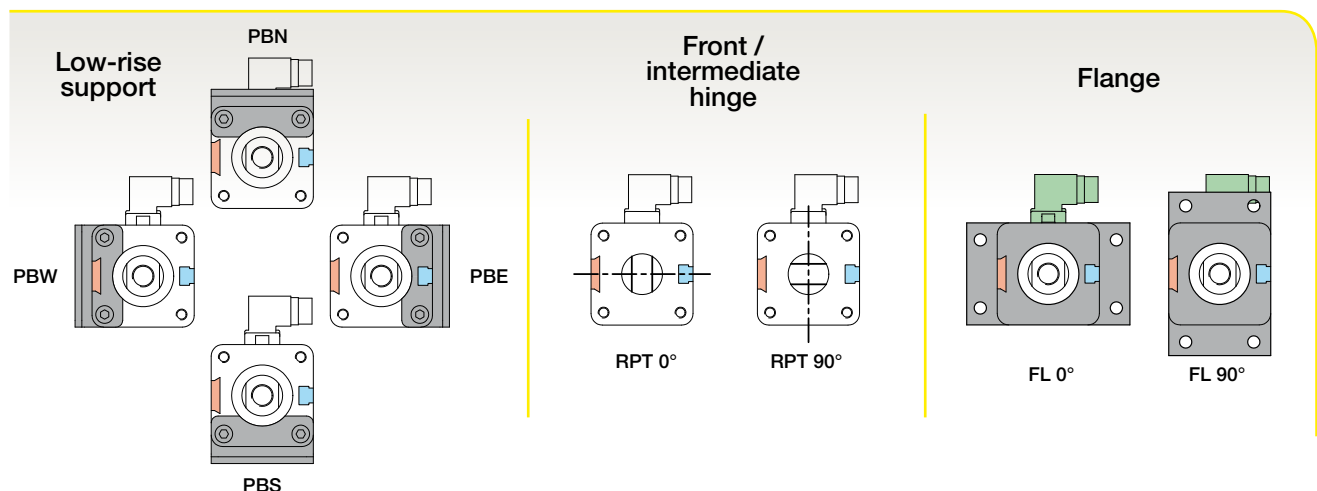


NOTE: Front attachments TS and FO must be aligned during assembling with the rear hinge axis; avoid any torsional load on the shaft to prevent damages on the anti-rotation device.

## 4.3 Accessories Dimensions

SIZE	SA 0 IL	SA 1 IL	SA 2 IL	SA 3 IL	SA 4 IL	SA 5 IL	SA 6 IL
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
∅ c	28	32	32	42	50	50	70
∅ d1	10	12	12	16	20	20	30
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	-	-
∅ 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
m4	31	34	38	38	44	44	66
m5	22	25	28	28	32	32	50
m6	75	82	100	110	147	172	210
∅ 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
∅ p	7	7	9	9	11	11	14
p1	32	36	45	50	63	75	90
p2	24	28	32	32	41	41	45
p3	58	65	82	92	115	132	160
p4	11	12.5	14	14	14	16	25
∅ 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

### Accessories mounting position related to the limit switches



## 4.4 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.

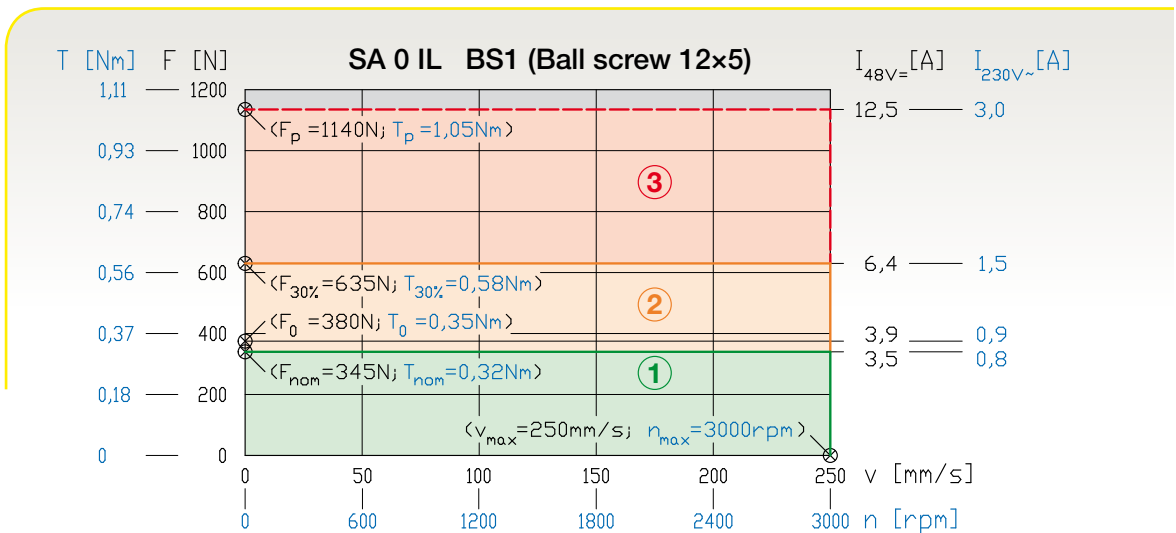
Three zones can be determined:

- 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

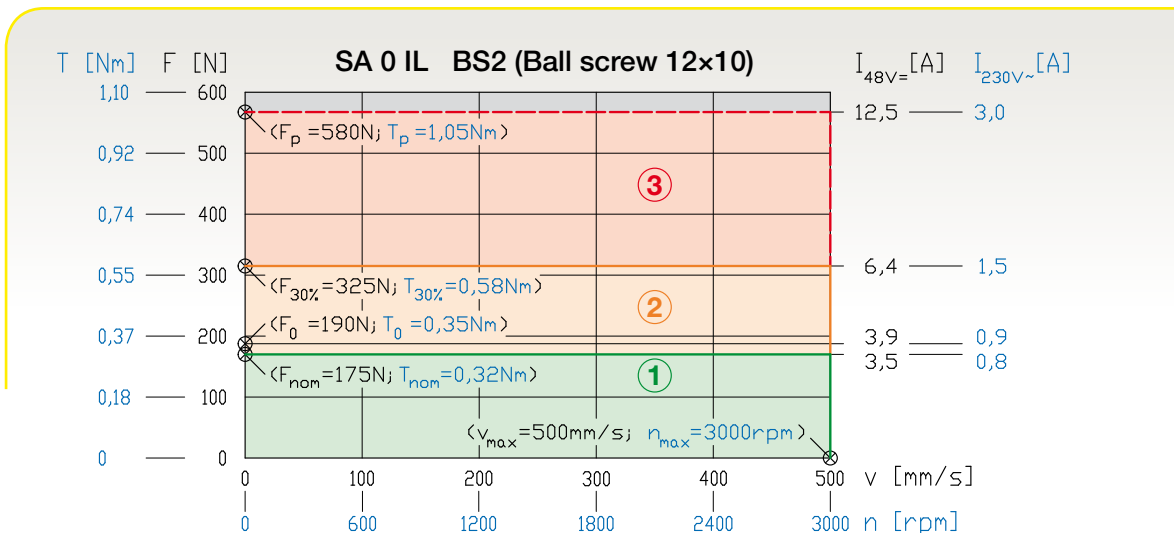
Please refer to tables on pages 20-21 or to Appendix A on page 110 for a correct symbols interpretation. When the working cycle of the actuator requires performances within zone 3 or zone 2 but out of the S3 30 % 10 min limits, you have to verify the suitable motor, as explained in Chapter 6.2 on page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

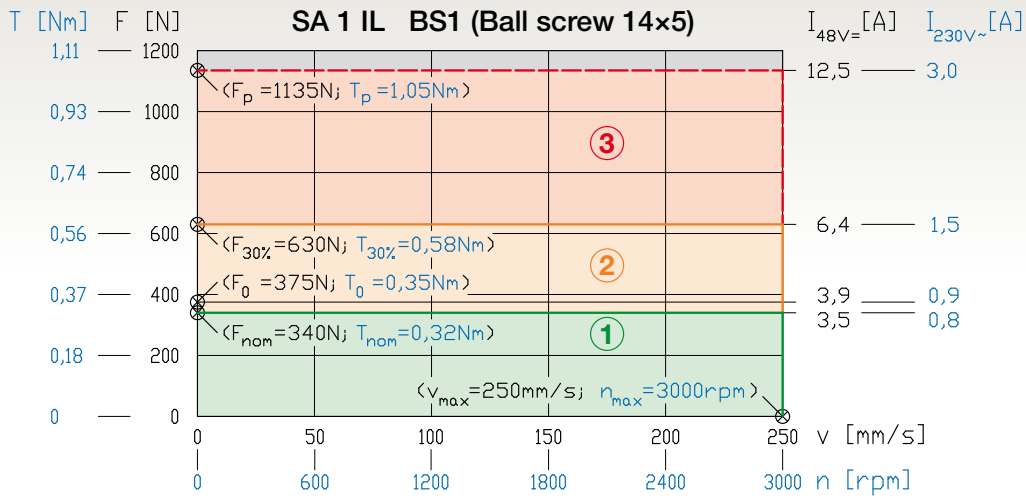
### 4.4.1 SA 0 IL



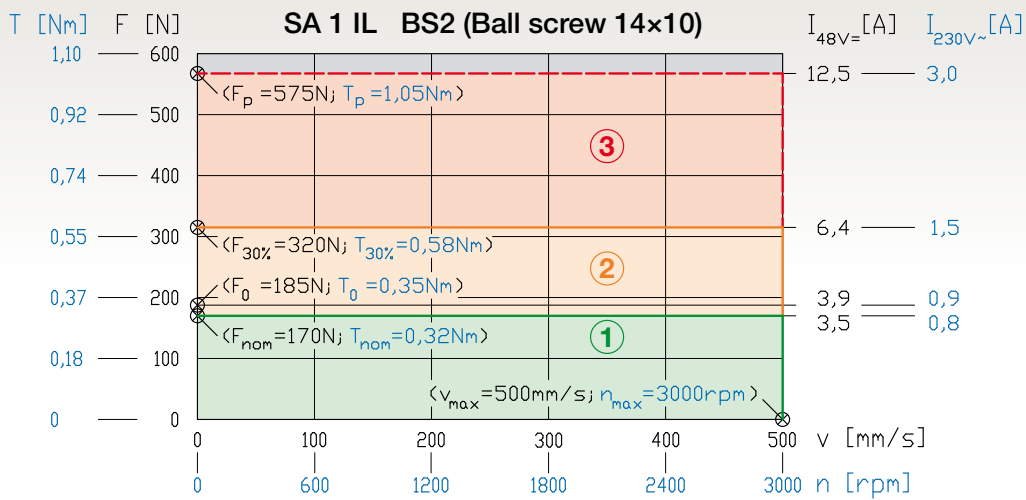
### 4.4.1 SA 0 IL



## 4.4 Performances



4.4.2 SA 1 IL

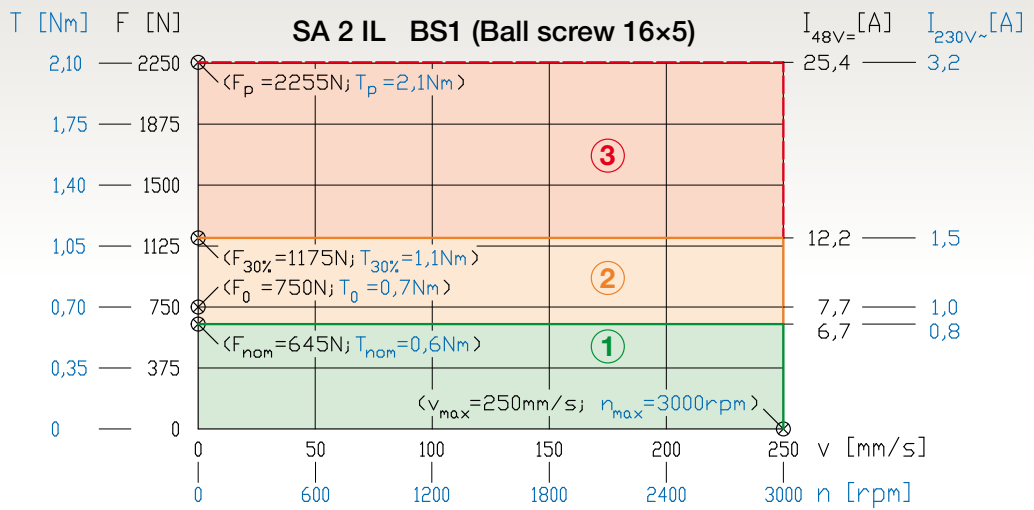


4.4.2 SA 1 IL

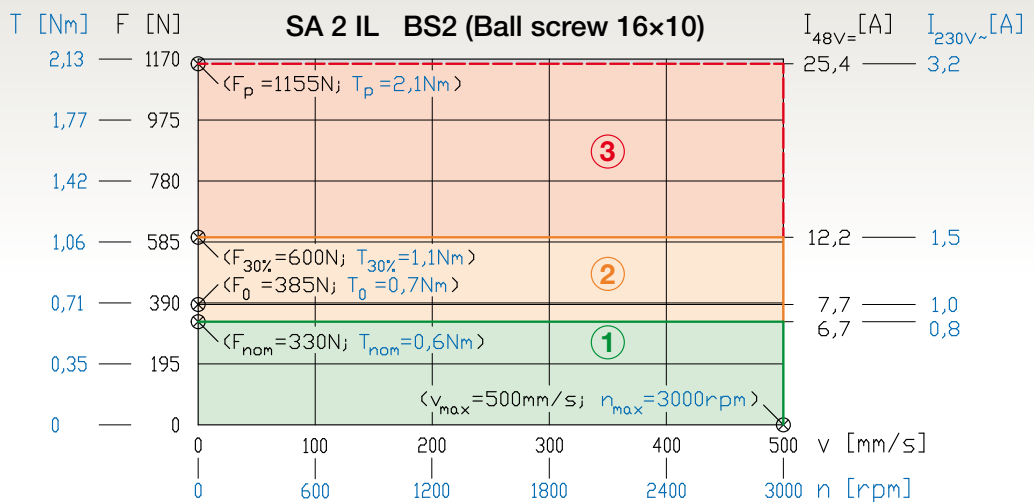


## 4.4 Performances

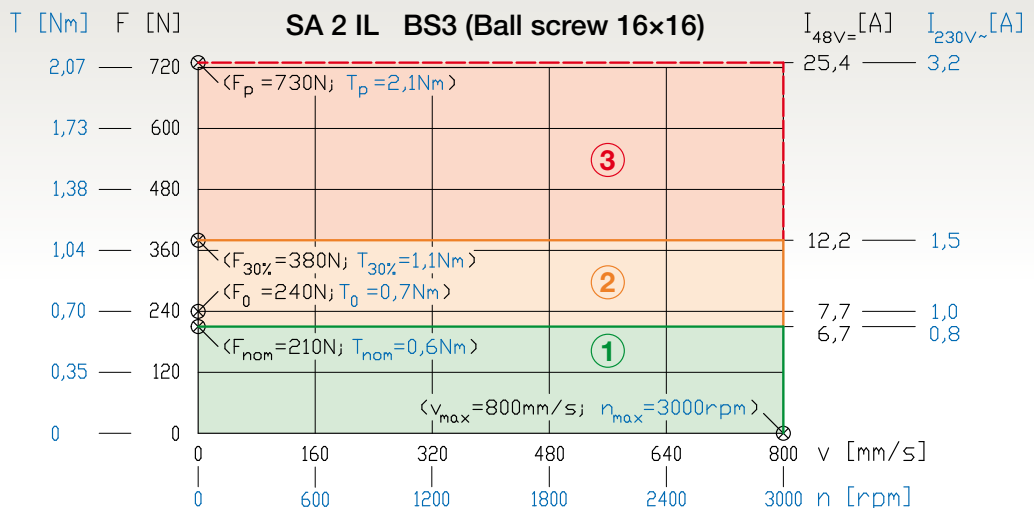
### 4.4.3 SA 2 IL



### 4.4.3 SA 2 IL



### 4.4.3 SA 2 IL

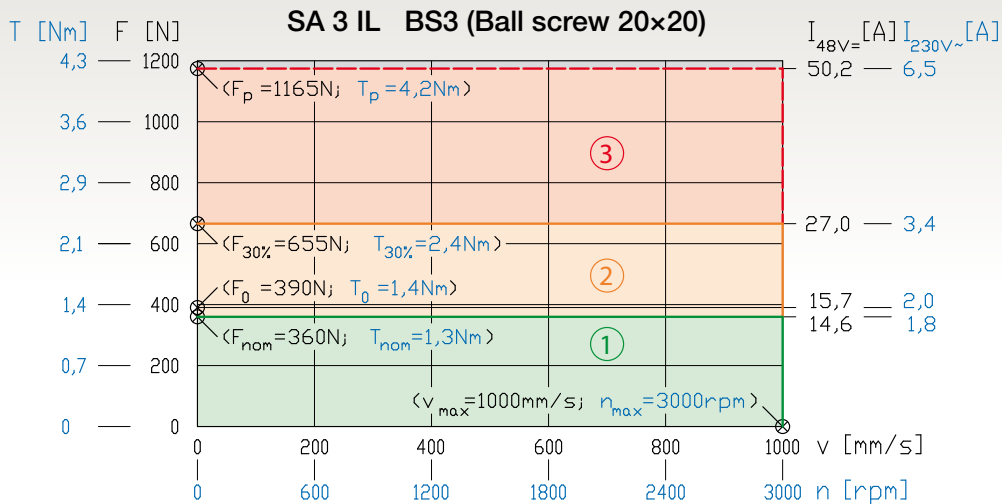
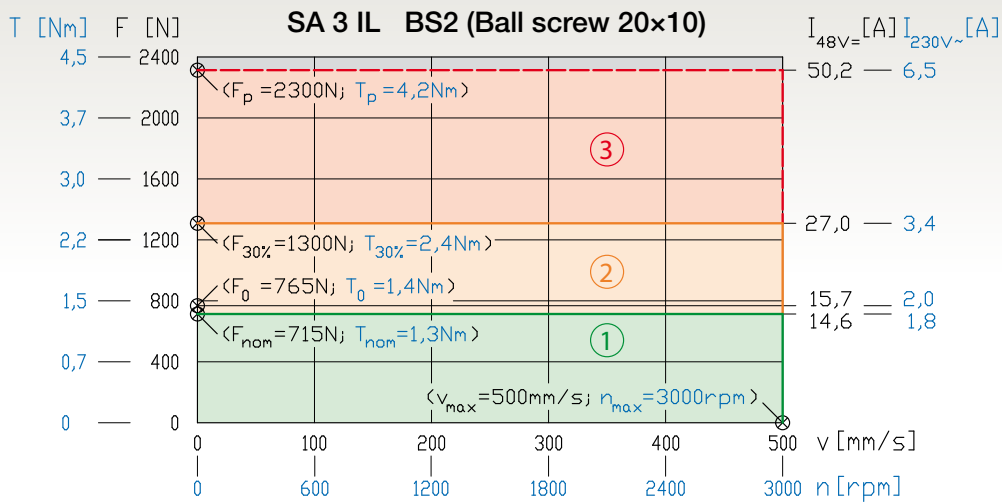
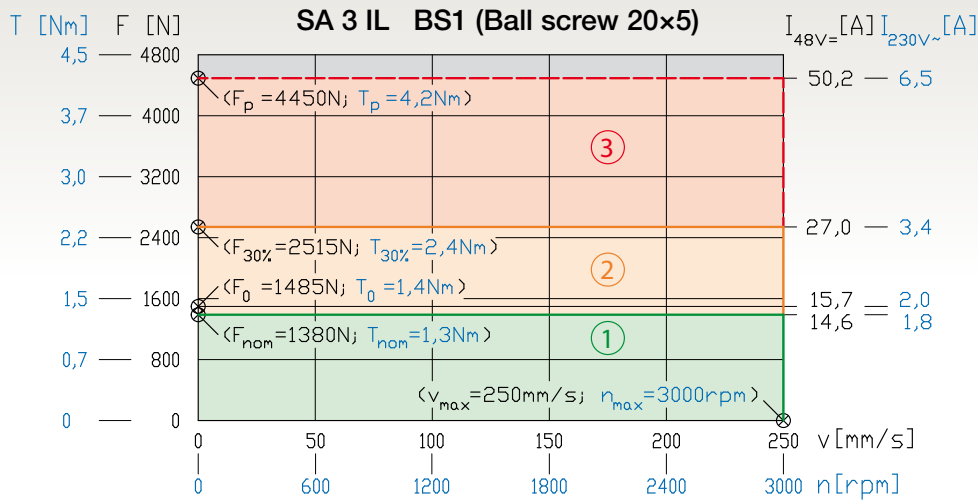


# 4. SA IL Series Servoactuators



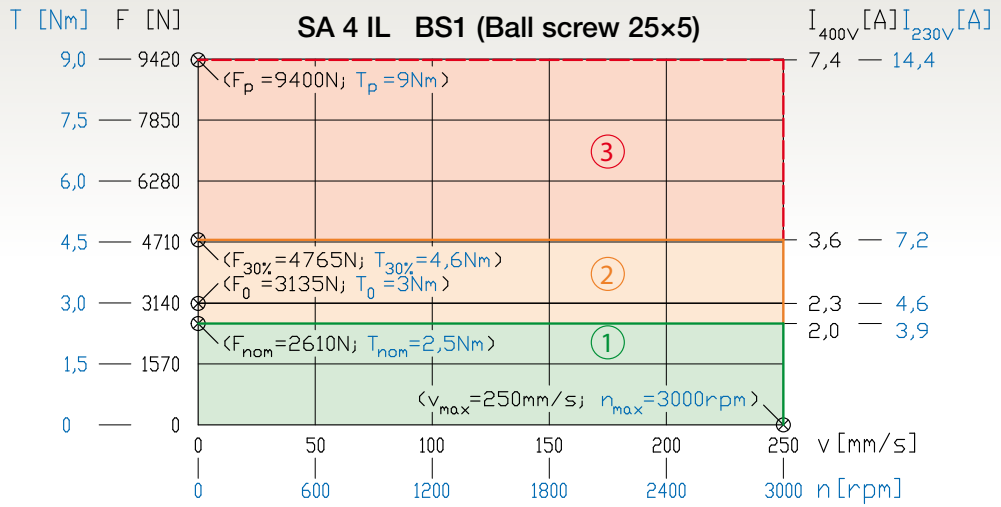
WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.

## 4.4.4 SA 3 IL

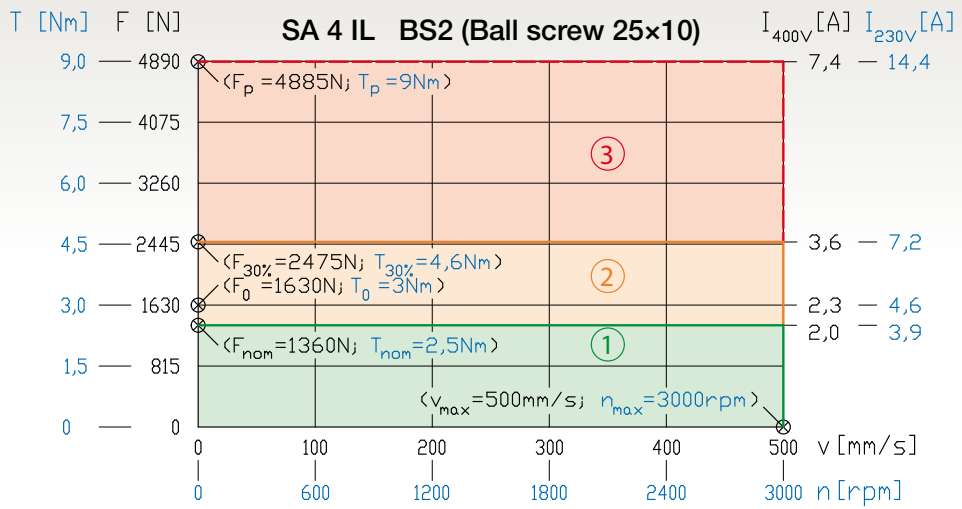


## 4.4 Performances

### 4.4.5 SA 4 IL



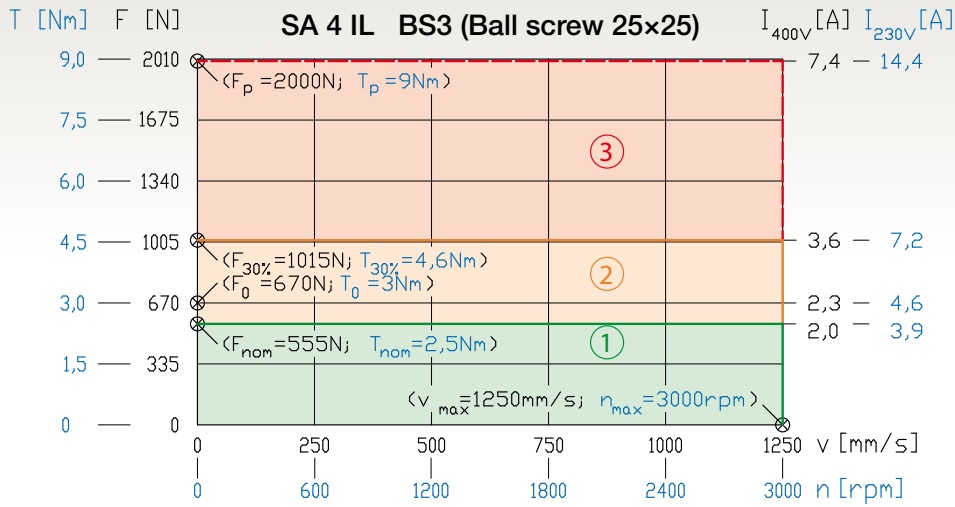
### 4.4.5 SA 4 IL



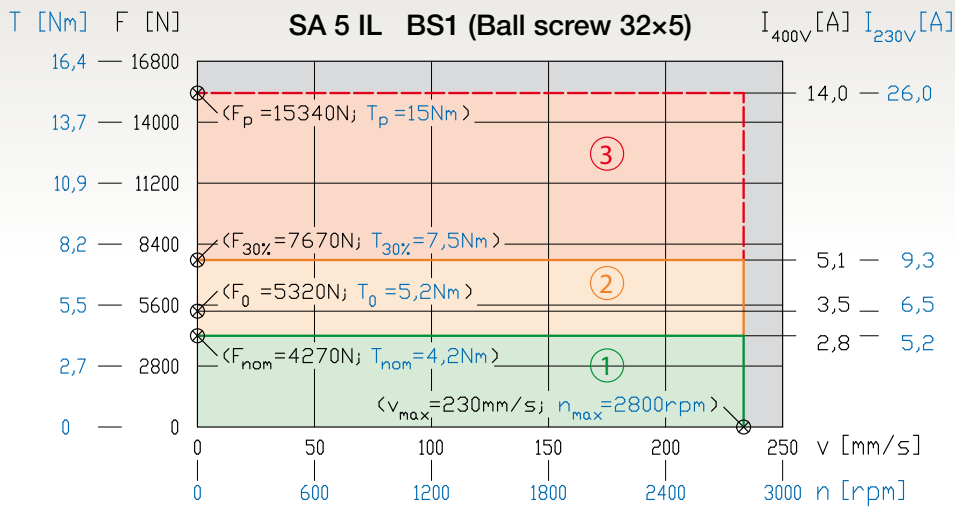
# 4. SA IL Series Servoactuators



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.



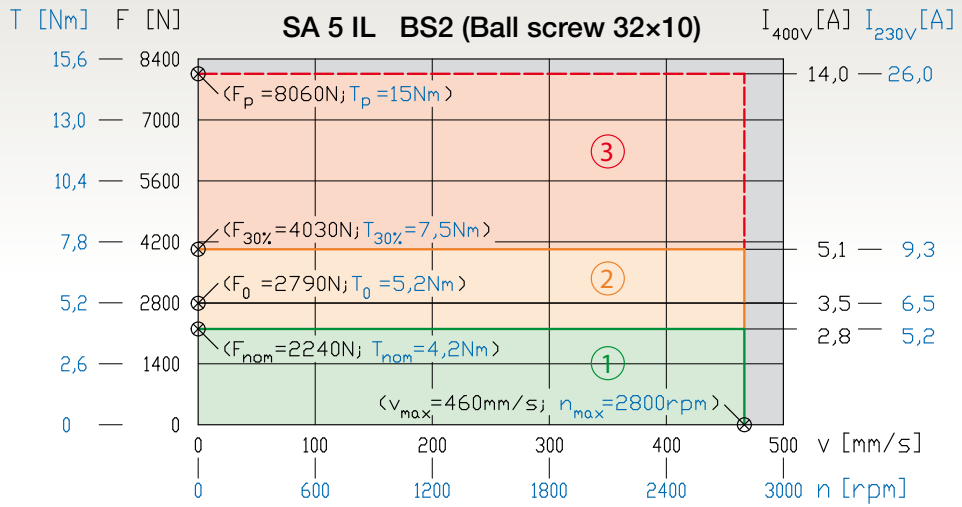
4.4.5 SA 4 IL



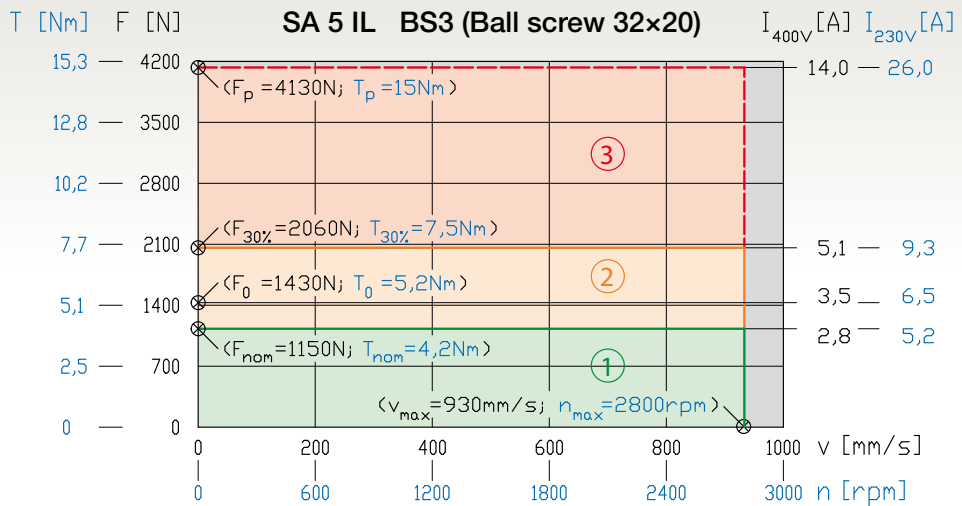
4.4.6 SA 5 IL

## 4.4 Performances

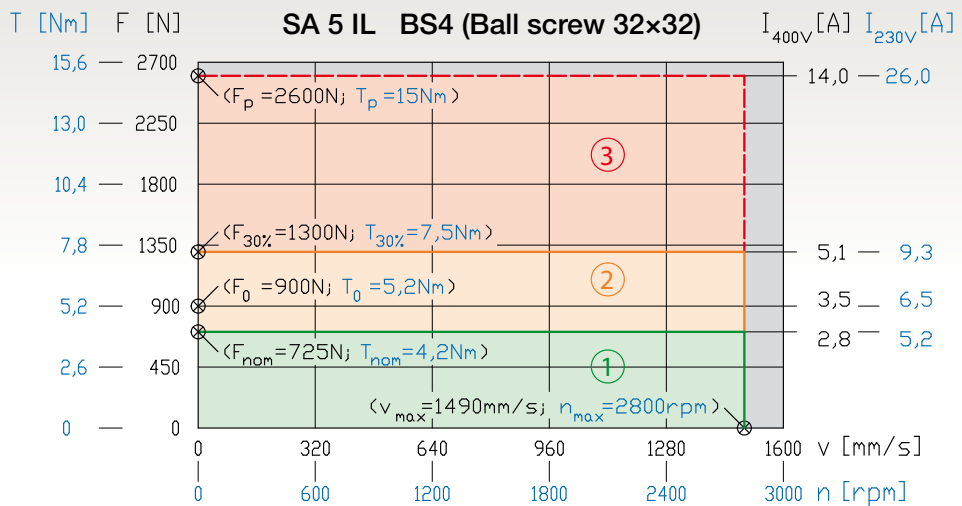
### 4.4.6 SA 5 IL



### 4.4.6 SA 5 IL



### 4.4.6 SA 5 IL

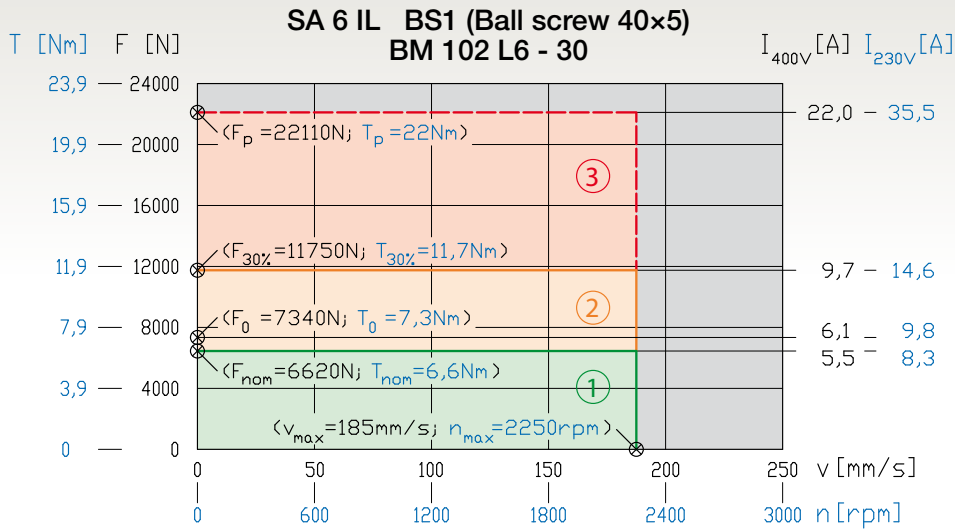


# 4. SA IL Series Servoactuators

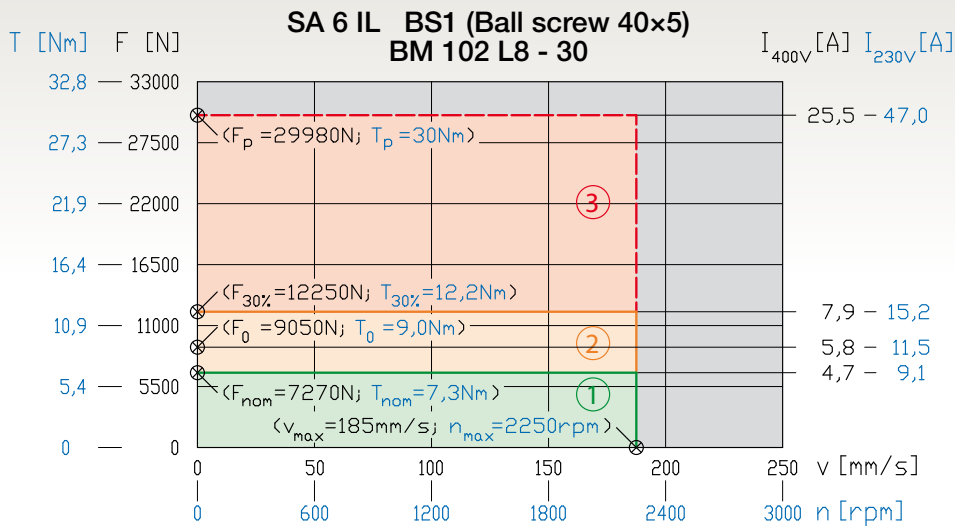


WARNING: the following performance diagrams refer to the motor maximum torque. A possible performance degrading shall occur depending on drive model type, as specified in Chapter 12.8 on pages 102-103.

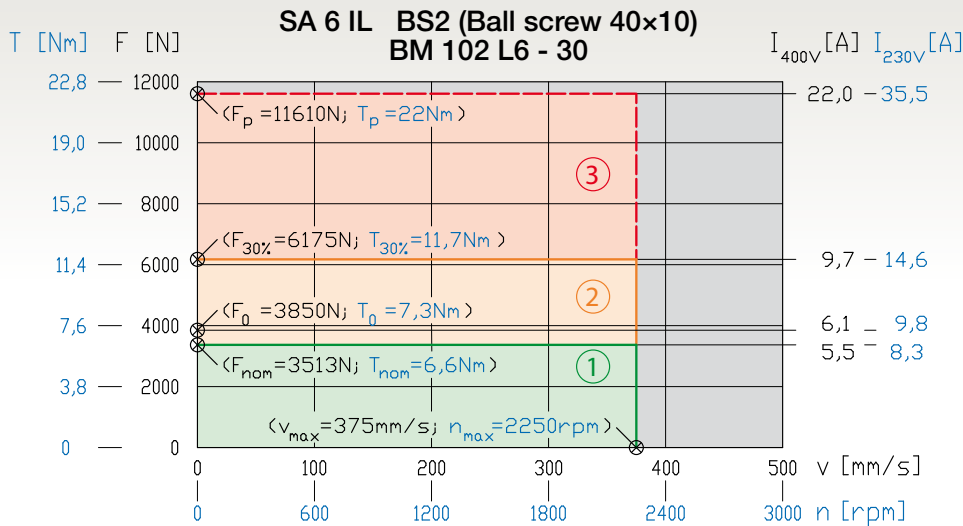
## 4.4.7 SA 6 IL



## 4.4.7 SA 6 IL

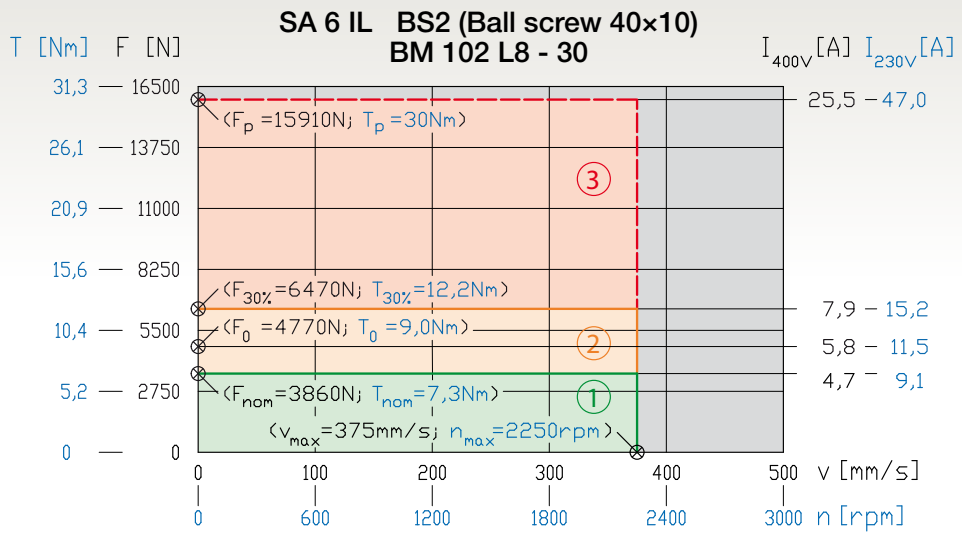


## 4.4.7 SA 6 IL

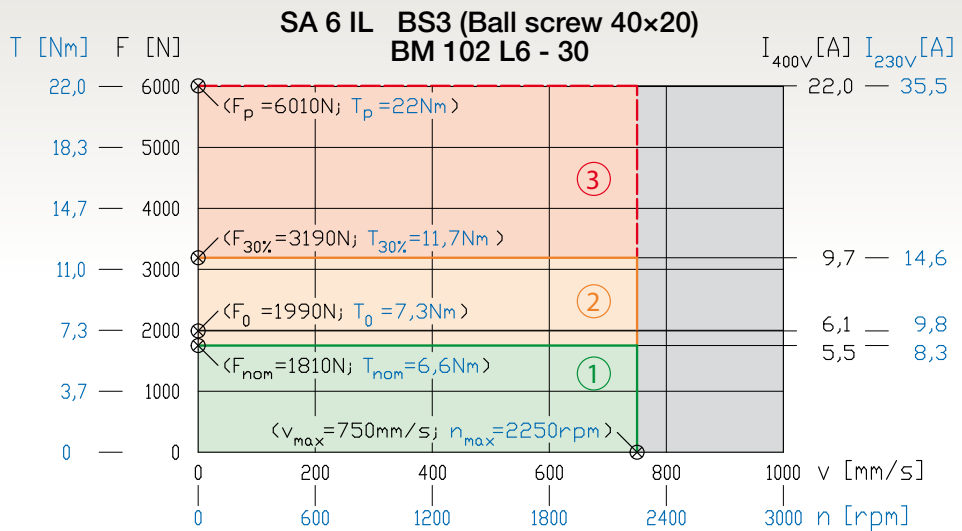


## 4.4 Performances

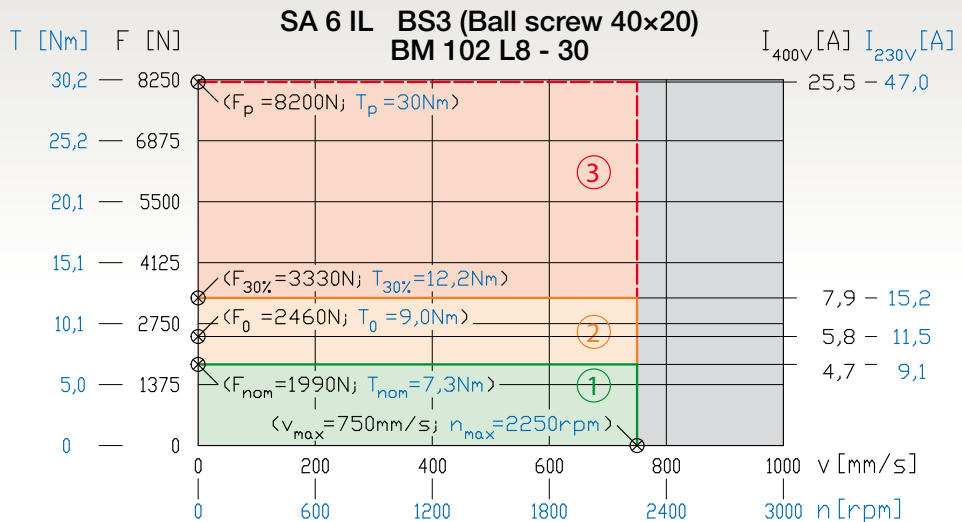
### 4.4.7 SA 6 IL



### 4.4.7 SA 6 IL



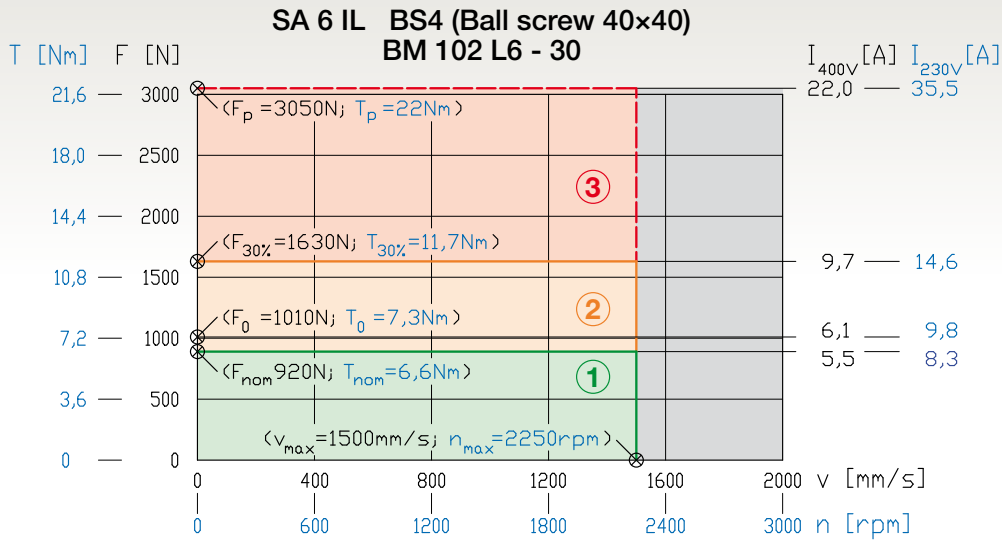
### 4.4.7 SA 6 IL



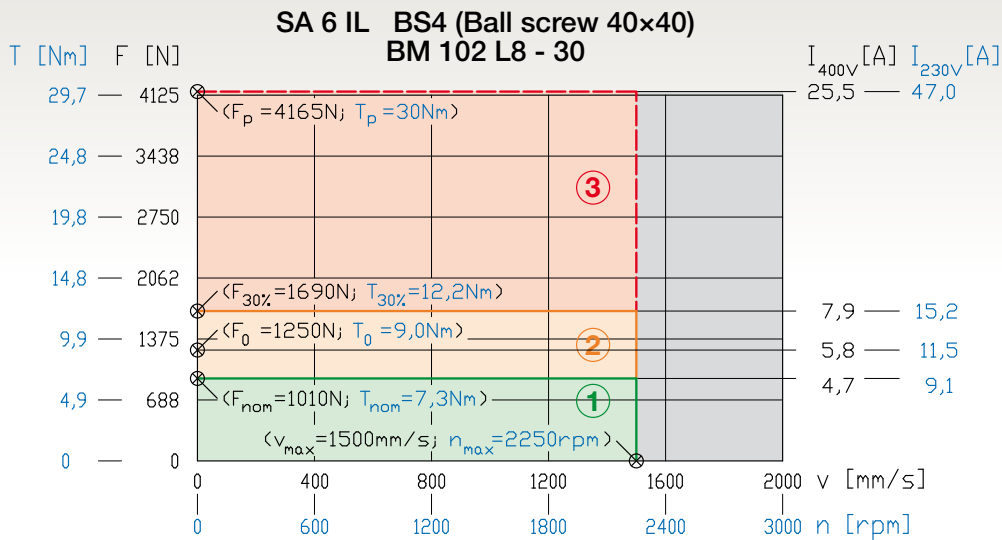
# 4. SA IL Series Servoactuators



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.



4.4.7 SA 6 IL



4.4.7 SA 6 IL