Linear Tables

MOVITEC electromechanical Linear Tables are manufactured in the following configurations:

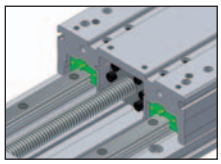
– **TVP** type in size 100, 150, 200, 250, 300 and 400 with screw drive and linear rail guides (standard)
– **TVL** type in size 100, 150, 200, 250, 300 and 400 with screw drive and long carriage linear rail guides
– **TVH** type in size 200, 250, 300 and 400 with screw drive and heavy load linear rail guides
– **TVR** type in size 150, 200, 250, 300 and 400 with screw drive and linear roller guides
– **TVB** type in size 100 and 150 with screw drive and ball bushings.

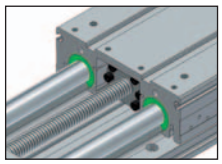
Drives

A wide range of drives is available:
– rolled ball screws
– ground ball screws
– “Speedy” high-helix lead screws
– “Rondo” round thread lead screws
– satellite roller screws
– trapezoidal screws (rolled).

Guiding system

The following guiding systems are available for the TV type:
– **TVP** with linear rail guides (standard)
– **TVL** with long carriage linear rail guides
– **TVH** with heavy load linear rail guides
– **TVR** with linear roller guides
– **TVB** with ball bushings.



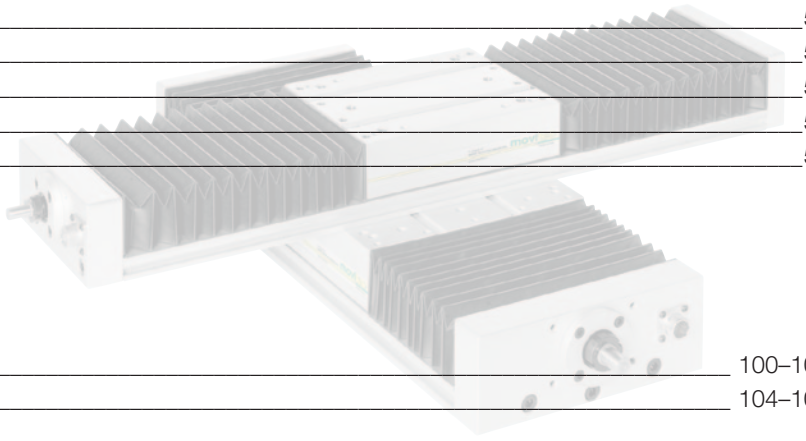


Application

MOVITEC Linear Tables are suited for precise handling applications and tooling machines. They can be easily combined together or with any other MOVITEC linear system to build multi axis systems.

Product	Linear Tables TV type	TVP	TVL	TVH	TVR	TVB
Drive	**V** – Rolled ball screws	•	•	•	•	•
	V – Ground ball screws	•	•	•	•	•
	V – „Speedy“ high-helix lead screws	•	•	•	•	•
	V – „Rondo“ round thread lead screws	•	•	•	•	•
	V – Satellite roller screws	•	•	•	•	•
	V – Trapezoidal screws	•	•	•	•	•
Guide	**P** – Linear rail guides (standard)	•	–	–	–	–
	L – Long carriage linear rail guides	–	•	–	–	–
	H – Heavy load linear rail guides	–	–	•	–	–
	R – Linear roller guides	–	–	–	•	–
	B – Ball bushings	–	–	–	–	•
Size	100	•	•	–	–	•
	150	•	•	–	•	•
	200	•	•	•	•	–
	250	•	•	•	•	–
	300	•	•	•	•	–
	400	•	•	•	•	–
Material	**A** – Aluminium	•	•	•	•	•
	C – Steel	•	•	•	•	•
Stroke	[mm]	50–2600				
Protection	**S** – Expansion bellows	•	•	•	•	•
	M – Metal cover	•	•	•	•	•
Options	Extra drillings	•	•	•	•	•
	Lubrication	•	•	•	•	•
	Limit switches	•	•	•	•	•
	Fixing systems	•	•	•	•	•
	Direct motor mount with coupling	•	•	•	•	•
	Lateral motor mount with belt gear	•	•	•	•	•
	Safety systems	•	•	•	•	•
	Measuring systems	•	•	•	•	•
Motors	BLDC brushless servomotors	•	•	•	•	•
	AC/DC servomotors	•	•	•	•	•
	Stepper motors	•	•	•	•	•
Controls	Linear controls	•	•	•	•	•
	Path controls for 2, 3 and more axes	•	•	•	•	•

Content TV type



Order code TV type

Example T V P 100 A 0750 S

Product
T = Linear Table

Drive
V = screw drive

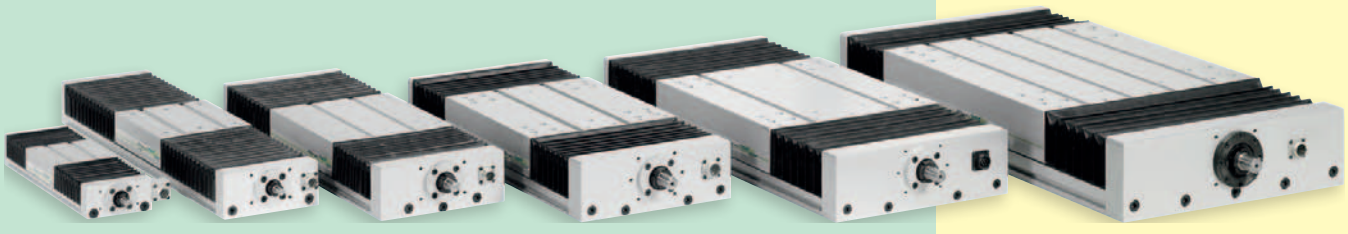
Guiding system
P = linear rail guides (standard)
L = long carriage linear rail guides
H = heavy load linear rail guides
R = linear roller guides
B = ball bushings

Size
100 = profile width 100 mm
150 = profile width 150 mm
200 = profile width 200 mm
250 = profile width 250 mm
300 = profile width 300 mm
400 = profile width 400 mm

Material
A = aluminium (standard)
C = steel

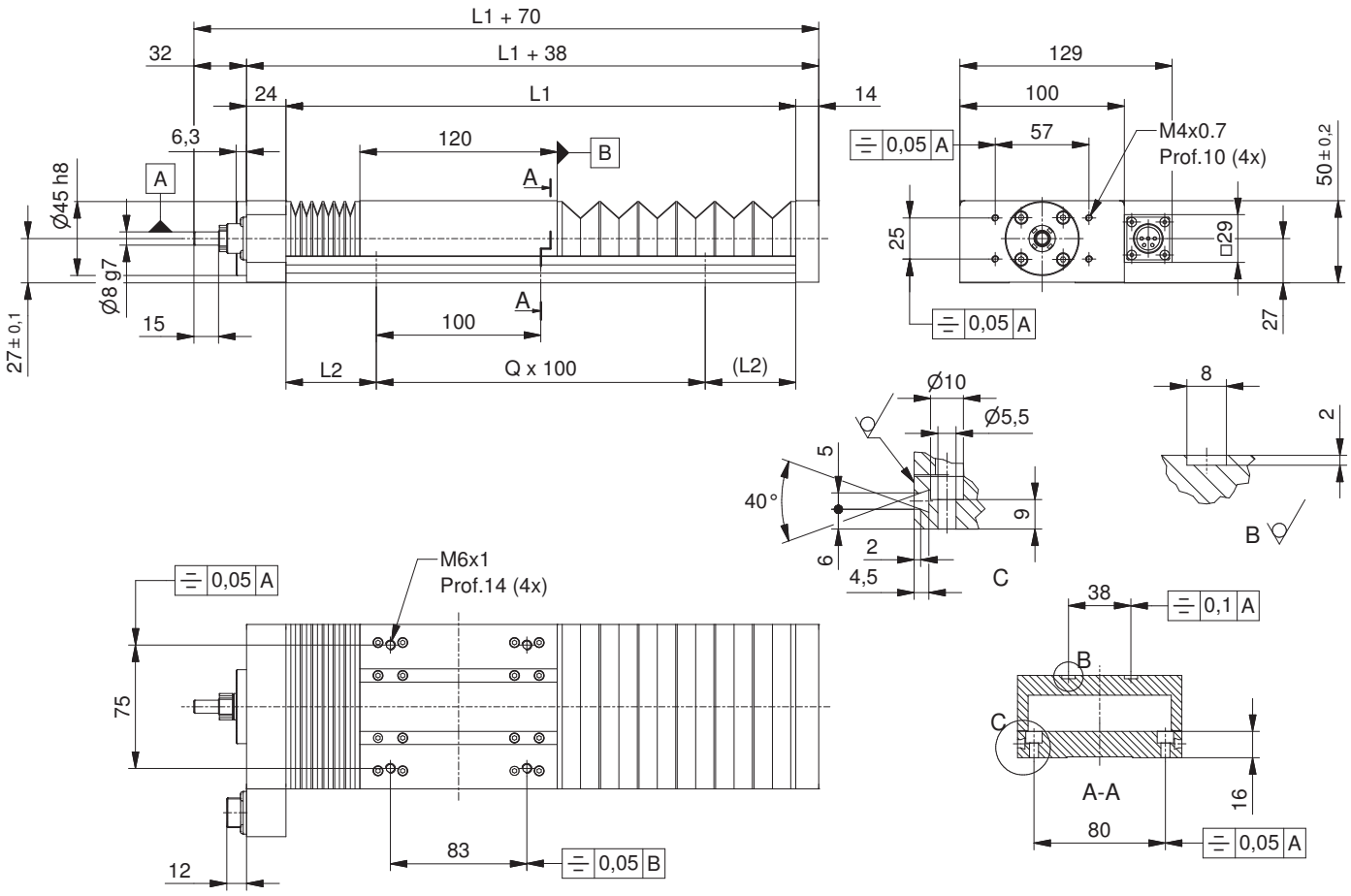
Stroke [mm]; 0050–2600 (other strokes on request)

Protection
S = expansion bellows (standard; on request equipped with slats in stainless steel)
M = metal cover



TV 100 A S · Dimensions / Technical Data

Linear Tables with screw drive (TV), size 100, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)	
Stroke s [mm]	L_1 [mm]	L_2 [mm]	Q [-]	Weight m_t [kg]	Gravity center z_G [mm]	Weight m_c [kg]	Gravity center z_G [mm]	Weight m_b [kg]	Gravity center z_G [mm]
50	240	70	1	3.2	23			2.1	18
100	310	55	2	3.6	22			2.5	17
150	370	35	3	4.0	21			2.9	17
200	440	70	3	4.4	21			3.3	17
250	500	50	4	4.6	20			3.7	16
300	570	35	5	5.2	20			4.1	16
350	640	70	5	5.6	19			4.5	16
400	700	50	6	6.0	19	1.1	16	4.9	16
450	770	35	7	6.4	19			5.3	16
500	840	70	7	6.8	19			5.7	16
550	910	55	8	7.2	18			6.1	16
600	970	35	9	7.6	18			6.5	16
650	1030	65	9	8.0	18			6.9	16
700	1100	50	10	8.4	18			7.3	16
800	1240	70	11	9.2	17			8.1	15
				$m_t = 0.008 \cdot s + 2.8$		$m_c = 1.1$ kg		$m_b = m_t - m_c$	

* on request also available in steel (C) and with metal cover (M)

For the TV 100 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d_0 [mm]	Pitch [mm]	d_2 [mm]	v_{max} carriage [1] [m/min]	ISO	Lead accuracy [µm/300 mm]	Repeat-ability [µm]	Backlash [2] [mm]	Effi-ciency h [-]	Operating temperature [°C]	Load rates dyn. C [N]	stat. C_0 [N]
Rolled ball screws	12	2	10.6	2.0…6.0	7	52	±15	0.06	≥ 0.9	–20° / +80°	1380	2500
		4	9.8	3.8…12.0				0.07			5500	11000
		5	9.5	4.6…15.0				0.07			6600	12000
		10	9.9	8.9…30.0				0.04			2800	3100
Ground ball screws	12	2	10.2	3.9…12.0	5	23	±10	≤ 0.01	≥ 0.9	–20° / +80°	2670	3650
		4	10.2	3.9…12.0				0.07			4485	8387
		5	10.2	4.9…15.0				0.07			4481	8364
		10	9.7	9.4…30.0				0.06			3730	3550
Speedy high-helix lead screws, rolled	11	60	9.1	52.6…180.0	9	100	±50	0.05…0.1	0.5 to 0.75	–40° / +60°	$F_{per.}$	1500
	12	15	9.2	13.3…45.0							$F_{per.}$	1400
	12	25	8.0	19.3…75.0						*–40° / +200° (bronze nut)*	$F_{per.}$	1500
	13	20	8.8	17.0…60.0							$F_{per.}$	1300
	13	70	10.9	73.5…210.0							$F_{per.}$	1750
Rondo, rolled	10	3	7.8	2.2…9.0	9	100	±50	0.05…0.1	0.4 to 0.5	–40° / +60°	$F_{per.}$	1200
	12	4	9.8	3.8…12.0							$F_{per.}$	2500
Trapezoidal screws	12	3	8.2	2.4…9.0	7	52	±15	0.02…0.16	0.3	–40° / +120°	***	***
		6	8.2	4.8…9.0				0.02…0.16	0.5		***	***

[1] Calculations based on a max. rotational speed of 6000 min^{-1} for rolled ball screws and 4000 min^{-1} for ground ball screws.

[2] IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
Reduced backlash up to ≤ 0,01 mm (ISO 7) available
Zero backlash available with preloaded nuts. Preload = 3% of C_0 (ISO 5)

Permissible maximum load F_{per} based on circumferencial speed:

F_{per} = $C_0 \cdot f_C$ [N]

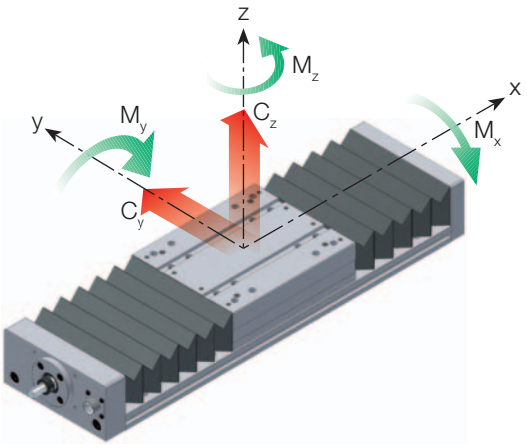
C_0 = static load [N]

f_L = load factor [–] for POM-C nuts

circumferential speed v_C [m/min]	load factor f_L [–]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

*** calculations available on request

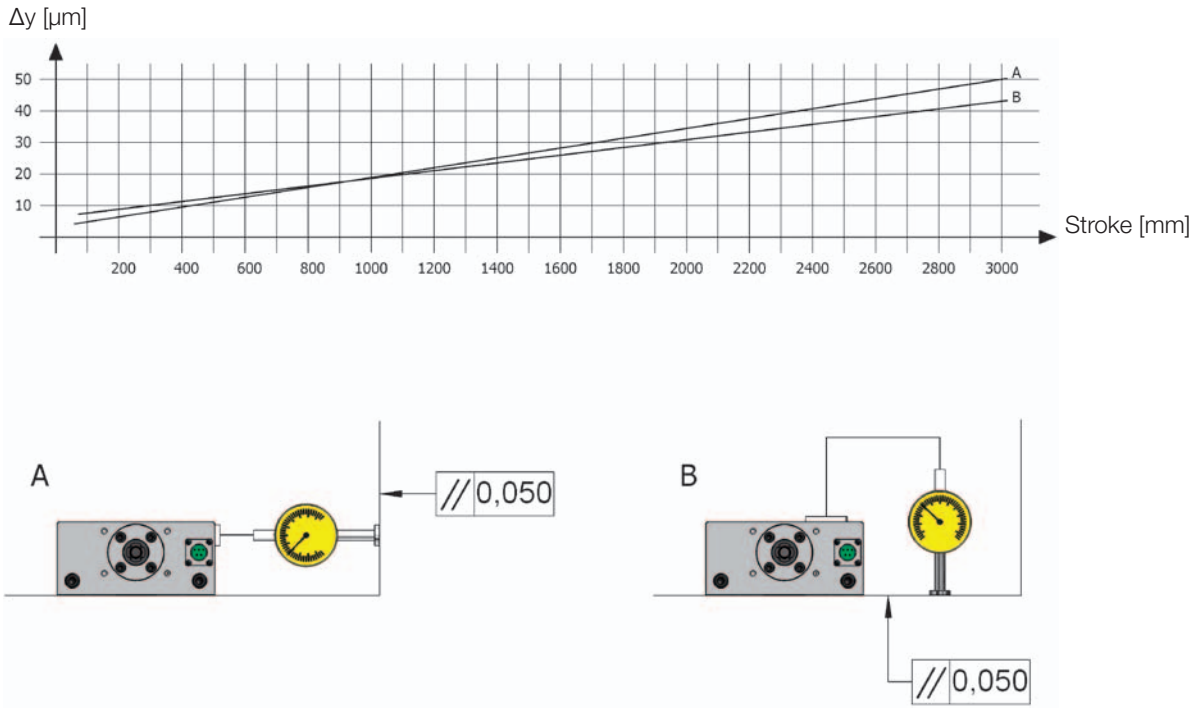
Load Rates and Torque



Guiding System	Safety factor s	Load rates [N] C_y dyn.	C_y stat.	C_z- dyn.	C_z- stat.	C_z+ dyn.	C_z+ stat.	Torque [Nm] M_x dyn.	M_x stat.	M_y dyn.	M_y stat.	M_z dyn.	M_z stat.
TV**P** – linear rail guides	10	833	1073	1332	1716	1332	1716	39	50	52	67	39	51
	5	1665	2145	2664	3432	2664	3432	78	100	104	134	78	101
TV**L** – long carriage linear rail guides	10	1078	1550	1724	2480	1724	2480	50	72	63	91	48	68
	5	2155	3100	3448	4960	3448	4960	100	144	126	182	95	136
TV**R** – linear roller guides	10	1473	2600	2356	4160	2356	4160	69	121	92	163	69	122
	5	2945	5200	4712	8320	4712	8320	137	242	184	325	138	244
TV**B** – ball bushings	10	188	135	300	220	210	154	10	8	17	14	26	21
	5	376	270	600	440	420	308	20	16	34	28	52	42

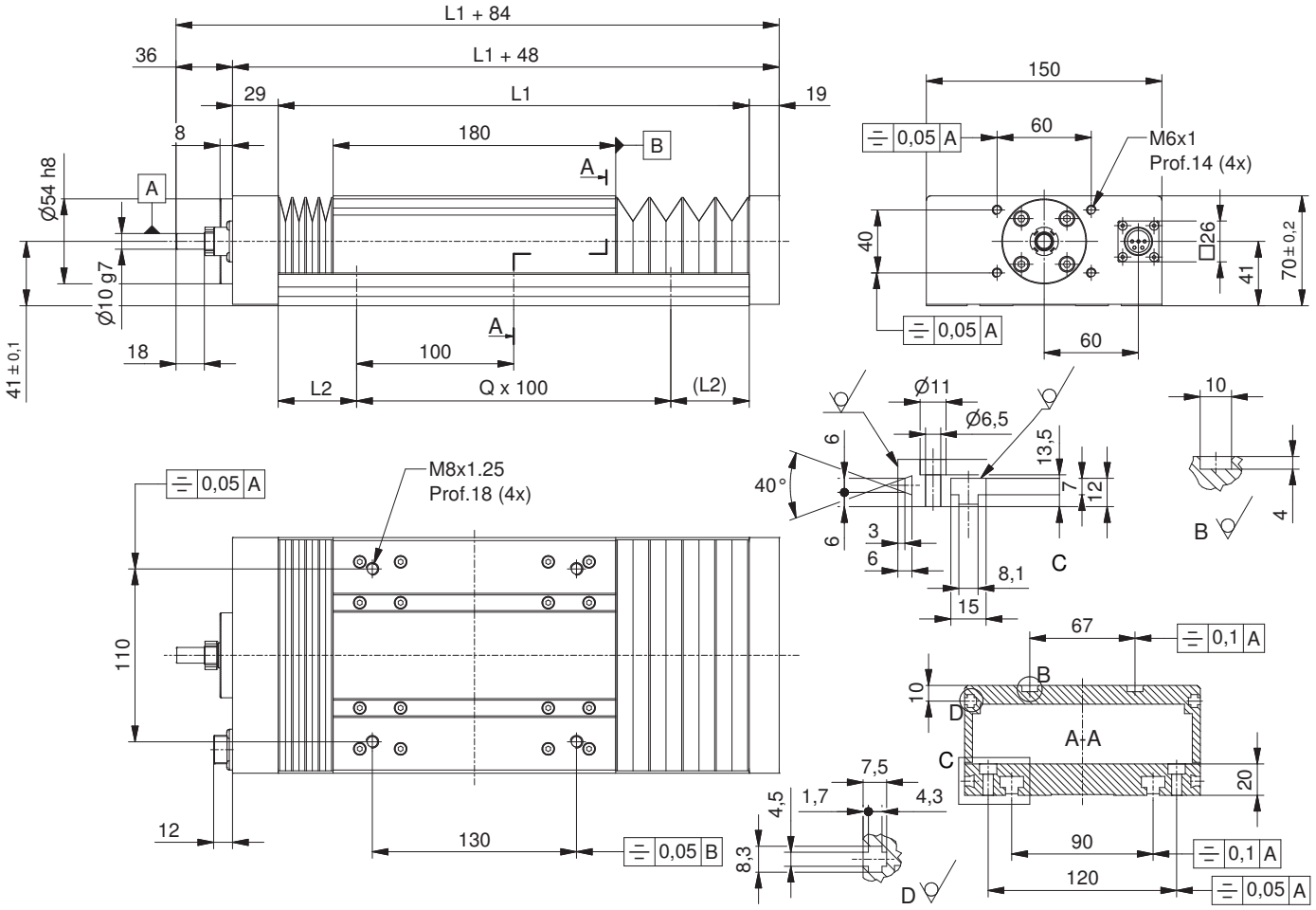
values valid for standard carriage length = 120 mm

Accuracy



TV 150 A S · Dimensions / Technical Data

Linear Tables with screw drive (TV), size 150, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)	
Stroke s [mm]	L_1 [mm]	L_2 [mm]	Q [-]	Weight m_t [kg]	Gravity center z_G [mm]	Weight m_c [kg]	Gravity center z_G [mm]	Weight m_b [kg]	Gravity center z_G [mm]
50	300	50	2	7.5	34			4.7	25
100	360	30	3	8.2	33			5.4	25
150	420	60	3	8.9	32			6.1	24
200	480	40	4	9.6	31			6.8	24
250	540	70	4	10.2	30			7.4	24
300	600	50	5	10.9	30			8.1	24
350	660	30	6	11.6	29			8.8	23
400	720	60	6	12.3	29	2.8	23	9.5	23
500	850	75	7	13.6	28			10.8	23
600	980	40	9	15.0	27			12.2	23
700	1110	55	10	16.4	27			13.6	22
800	1230	65	11	17.7	26			14.9	22
900	1350	75	12	19.1	26			16.3	22
1000	1490	45	14	20.4	25			17.6	22
1200	1740	70	16	23.2	25			20.4	22
				$m_t = 0.0136 \cdot s + 6.8414$		$m_c = 2.8$ kg		$m_b = m_t - m_c$	

* on request also available in steel (C) and with metal cover (M)

For the TV 150 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d_0 [mm]	Pitch [mm]	d_2 [mm]	v_{max} carriage [1] [m/min]	ISO	Lead accuracy [µm/300 mm]	Repeat-ability [µm]	Backlash [2] [mm]	Effi-ciency h [-]	Operating temperature [°C]	Load rates dyn. C [N]	stat. C_0 [N]
Rolled ball screws	16	2	14.5	1.4…6.0	7	52	±15	0.06	≥ 0.9	–20° / +80°	2500	5500
		5	13.0	3.1…15.0				0.07			9700	22000
		10	13.0	6.1…30.0				0.08			15400	26500
		16	13.2	9.9…48.0				0.07			13700	7000
		20	12.0	11.2…60.0				0.03			6600	6300
		50	11.0	25.8…150.0				0.07			4500	10000
Ground ball screws	16	5	13.5	3.1…15.0	5	23	±10	0.07	≥ 0.9	–20° / +80°	9069	18135
		10	13.5	6.1…30.0				0.07			9030	17903
Sat. roller screws, r.	12	4	11.65	2.2…12.0	7	52	±15	0.04	0.89	–20° / +100°	7000	12500
		5	11.56	2.7…15.0				0.04			7300	12700
Satellite roller screws, ground	12	1	11.89	0.6…3.0	5	23	±10	0.03	0.79	–20° / +100°	19000	17200
		2	11.81	1.1…6.0				0.03	0.85		12800	18000
		4	11.65	2.2…12.0				0.03	0.89		10000	17800
		5	11.56	2.7…15.0				0.03	0.89		10500	18100
		8	11.1	4.2…24.0				0.03	0.90		8300	15700
Speedy high-helix lead screws, rolled	14	18	11.4	9.6…54.0	9	100	±50	0.05…0.1	0.5 to 0.75	–40° / +60°	$F_{per.}$	1600
	14	30	10.1	14.2…90.0							$F_{per.}$	1750
	15	20	12.5	11.7…60.0							$F_{per.}$	1600
	15	80	12.6	47.2…240.0						–40° / +200° (bronze nut)	$F_{per.}$	2000
	16	35	12.1	19.8…105.0							$F_{per.}$	2000
	16	90	14.3	60.3…270.0							$F_{per.}$	2250
	18	40	14.1	26.4…120.0							$F_{per.}$	2250
	18	100	16.2	75.9…300.0							$F_{per.}$	2500
Rondo, rolled	14	4	11.5	1.5…12.0	9	100	±50	0.05…0.1	0.4 to 0.5	–40° / +60°	$F_{per.}$	3200
	16	5	13.0	2.3…15.0							$F_{per.}$	5000
Trapezoidal screws	16	4	11.1	1.3…12.0	7	52	±15	0.03…0.2	0.3	–40° / +120°	***	***
		8	11.1	4.2…24.0				0.03…0.2	0.5		***	***

[1] Calculations based on a max. rotational speed of 6000 min^{-1} for rolled ball screws and 4000 min^{-1} for ground ball screws.

[2] IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
Reduced backlash up to ≤ 0,01 mm (ISO 7) available
Zero backlash available with preloaded nuts.
Preload = 3% of C_0 (ISO 5)

*** Calculations available on request

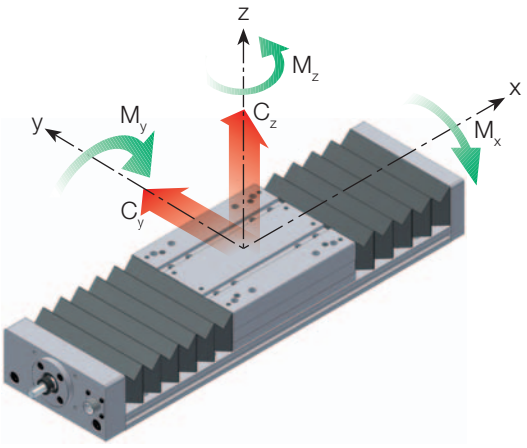
Permissible maximum load F_{per} based on circumferencial speed:

$F_{per} = C_0 \cdot f_C$ [N]

C_0 = static load [N] / f_L = load factor [–] for POM-C nuts

circumferential speed v_C [m/min]	load factor f_L [–]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

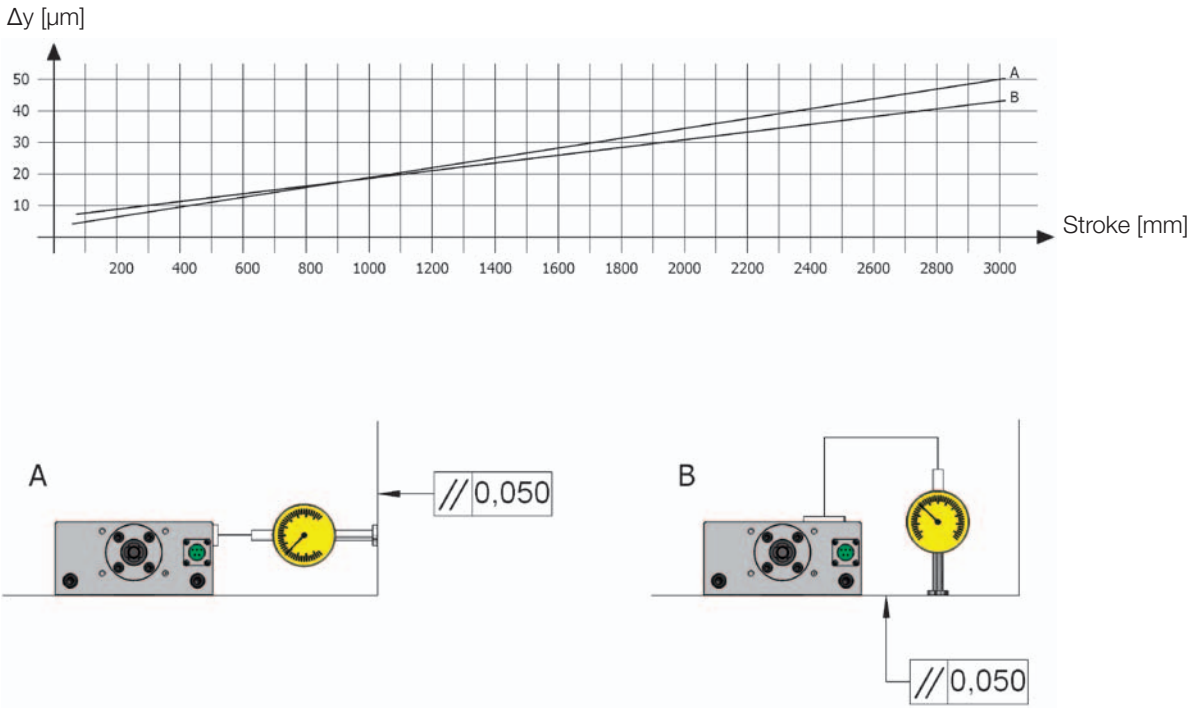
Load Rates and Torque



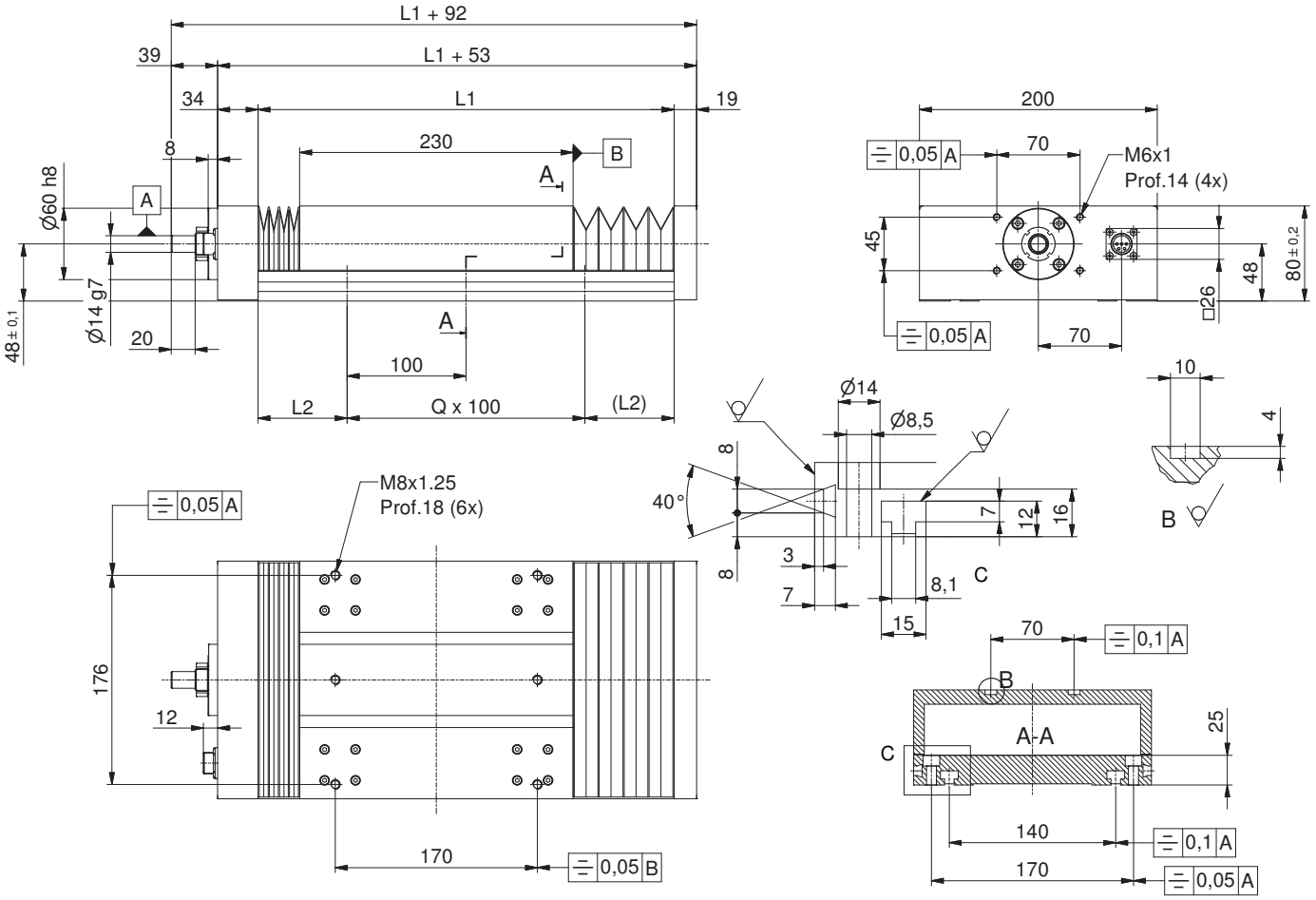
Guiding System	Safety factor s	Load rates [N] C_y dyn.	C_y stat.	C_z- dyn.	C_z- stat.	C_z+ dyn.	C_z+ stat.	Torque [Nm] M_x dyn.	M_x stat.	M_y dyn.	M_y stat.	M_z dyn.	M_z stat.
TV**P** – linear rail guides	10	1910	2348	3056	3756	3056	3756	143	175	184	226	138	170
	5	3820	4695	6112	7512	6112	7512	285	350	367	451	276	339
TV**L** – long carriage linear rail guides	10	2335	3125	3736	5000	3736	5000	174	233	191	255	143	192
	5	4670	6250	7472	10000	7472	10000	348	465	382	510	286	383
TV**R** – linear roller guides	10	2875	5000	4600	8000	4600	8000	214	372	276	480	207	360
	5	5750	10000	9200	16000	9200	16000	428	744	552	960	414	720
TV**B** – ball bushings	10	500	313	800	500	560	350	35	25	45	30	80	55
	5	1000	626	1600	1000	1120	700	70	50	90	60	160	110

values valid for standard carriage length = 180 mm

Accuracy



Linear Tables with screw drive (TV), size 200, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)	
Stroke s [mm]	L_1 [mm]	L_2 [mm]	Q [-]	Weight m_t [kg]	Gravity center z_G [mm]	Weight m_c [kg]	Gravity center z_G [mm]	Weight m_b [kg]	Gravity center z_G [mm]
50	350	75	2	14.0	39			8.1	28
100	410	55	3	15.1	38			9.2	28
150	470	35	4	16.1	37			10.2	28
200	530	65	4	17.2	37			11.3	27
250	590	45	5	18.2	36			12.3	27
300	650	75	5	19.2	35			13.3	27
400	770	35	7	21.3	34			15.4	27
500	890	45	8	23.4	33	5.9	25	17.5	26
600	1010	55	9	25.5	33			19.6	26
700	1130	65	10	27.6	32			21.7	26
800	1260	80	11	29.7	31			23.8	26
1000	1530	65	14	33.9	30			28.0	25
1200	1770	35	17	38.1	30			32.2	25
1400	2010	55	19	42.2	29			36.3	25
1600	2290	45	22	46.4	29			40.5	25
				$m_t = 0.0209 \cdot s + 12.975$		$m_c = 5.9$ kg		$m_b = m_t - m_c$	

* on request also available in steel (C) and with metal cover (M)

For the TV 200 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d_0 [mm]	Pitch [mm]	d_2 [mm]	v_{max} carriage [1] [m/min]	ISO	Lead accuracy [µm/300 mm]	Repeat-ability [µm]	Backlash [2] [mm]	Effi-ciency h [-]	Operating temperature [°C]	Load rates dyn. C [N]	Load rates stat. C_0 [N]
Rolled ball screws	20	5	16.5	2.2…15.0	7	52	±15	0.07	≥ 0.9	–20° / +80°	10800	25000
		10	16.5	4.4…30.0				0.07			21000	51000
		20	16.9	9.0…60.0				0.08			11600	18400
		50	16.5	22.2…150.0				0.015			13000	24600
Ground ball screws	20	5	17.5	2.4…15.0	5	23	±10	0.07	≥ 0.9	–20° / +80°	10359	23116
		10	17.5	4.7…30.0				0.07			10816	24557
		20**	17.5	9.4…60.0				0.07			8206	17959
Sat. roller screws, r.	15	4	14.7	1.6…12.0	7	52	±15	0.04	0.89	–20° / +100°	11200	19300
		5	14.6	2.0…15.0				0.04			10500	19500
Satellite roller screws, ground	15	2	14.8	0.8…6.0	5	23	±10	0.03	0.84	–20° / +100°	19300	26300
		4	14.7	1.6…12.0				0.03	0.88		15900	27600
		5	14.6	2.0…15.0				0.03	0.89		15000	27800
		8	14.2	3.2…24.0				0.03	0.9		13900	25300
Trapezoidal screws	20	4	15.1	1.6…12.0	7	52	±15	0.03…0.2	0.3	–40° / +120°	***	***
		8	15.1	3.2…24.0				0.03…0.2	0.5		***	***

[1] Calculations based on a max. rotational speed of 6000 min^{-1} for rolled ball screws and 4000 min^{-1} for ground ball screws.

[2] IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
Reduced backlash up to ≤ 0,01 mm (ISO 7) available
Zero backlash available with preloaded nuts. Preload = 3% of C_0 (ISO 5)

Permissible maximum load F_{per} based on circumferencial speed:

F_{per} = $C_0 \cdot f_C$ [N]

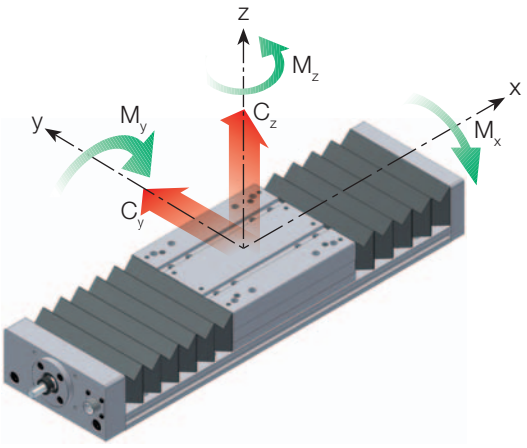
C_0 = static load [N]

f_L = load factor [–] for POM-C nuts

circumferential speed v_C [m/min]	load factor f_L [–]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

*** calculation available on request

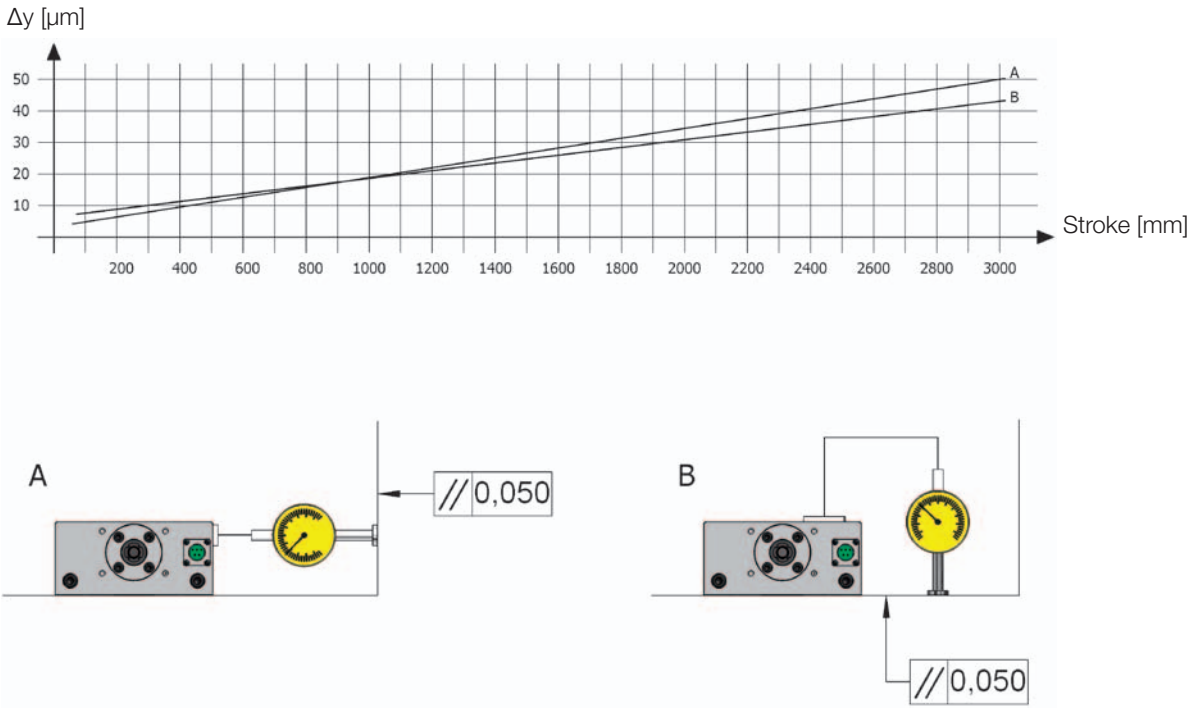
Load Rates and Torque



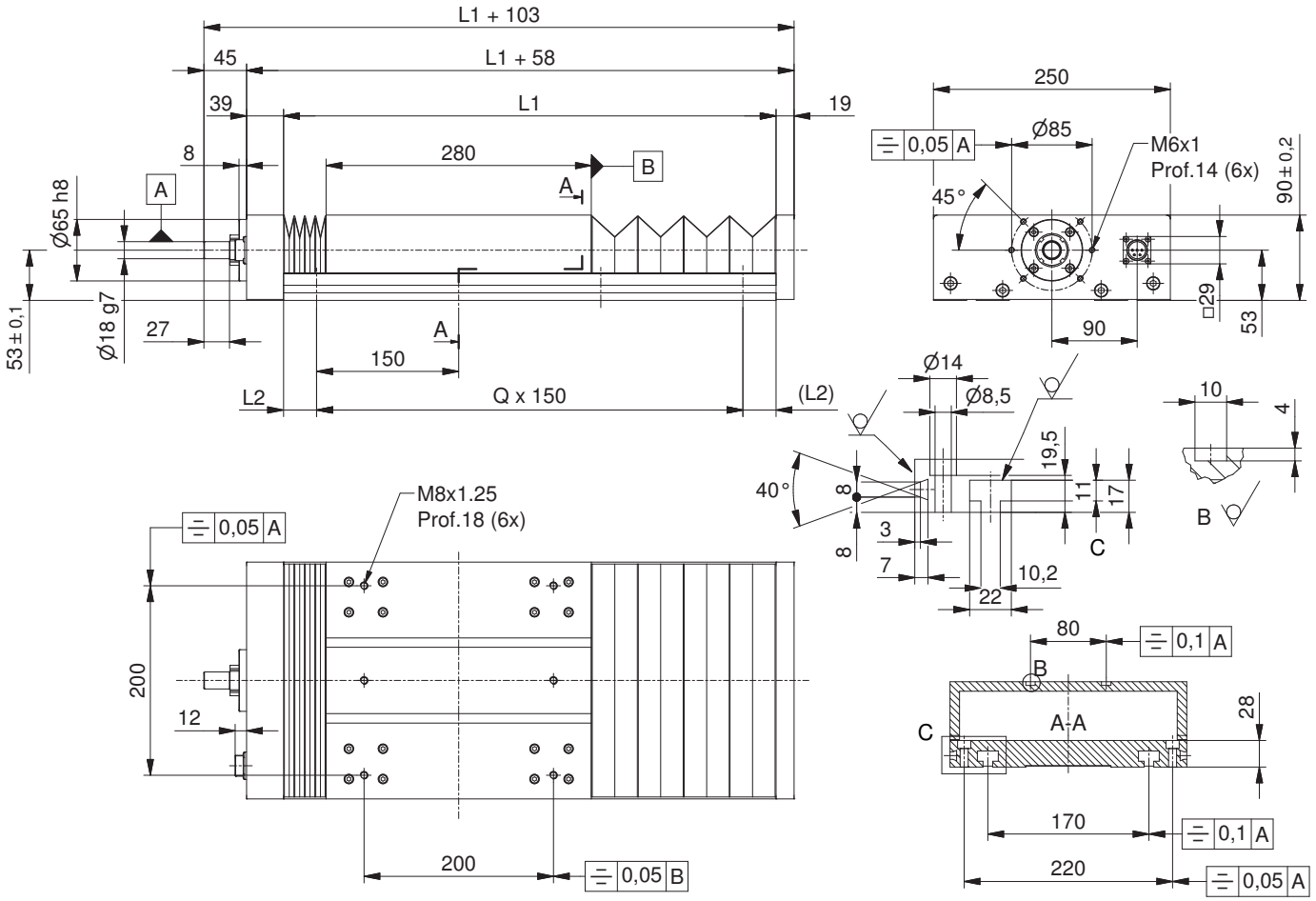
Guiding System	Safety factor s	Load rates [N] C_y dyn.	C_y stat.	C_z- dyn.	C_z- stat.	C_z+ dyn.	C_z+ stat.	Torque [Nm] M_x dyn.	M_x stat.	M_y dyn.	M_y stat.	M_z dyn.	M_z stat.
TV**P** – linear rail guides	10	2900	3350	4640	5360	4640	5360	332	383	376	434	282	326
	5	5800	6700	9280	10720	9280	10720	664	766	752	868	564	652
TV**L** – long carriage linear rail guides	10	2335	3125	3736	5000	3736	5000	268	358	273	365	205	274
	5	4670	6250	7472	10000	7472	10000	535	715	546	730	410	548
TV**H** – heavy load linear rail guides	10	4525	5275	7240	8440	7240	8440	486	566	551	642	413	482
	5	9050	10550	14480	16880	14480	16880	971	1131	1101	1283	826	963
TV**R** – linear roller guides	10	2875	5000	4600	8000	4600	8000	329	572	373	648	280	486
	5	5750	10000	9200	16000	9200	16000	658	1144	746	1296	559	972

values valid for standard carriage length = 230 mm

Accuracy



Linear Tables with screw drive (TV), size 250, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)	
Stroke s [mm]	L_1 [mm]	L_2 [mm]	Q [-]	Weight m_t [kg]	Gravity center z_G [mm]	Weight m_c [kg]	Gravity center z_G [mm]	Weight m_b [kg]	Gravity center z_G [mm]
150	520	35	3	23.8	43			14.2	30
200	580	65	3	25.0	42			15.4	30
250	640	95	3	26.3	42			16.7	30
300	700	50	4	27.6	41			18.0	29
350	760	80	4	28.9	40			19.3	29
400	820	35	5	30.1	40			20.5	29
500	950	100	5	32.7	39			23.1	29
600	1070	85	6	35.2	38	9.6	27	25.6	29
800	1310	55	8	40.3	36			30.7	28
1000	1570	35	10	45.4	35			35.8	28
1200	1810	80	11	50.4	34			40.8	27
1400	2050	50	13	55.5	33			45.9	27
1600	2330	40	15	50.6	33			51.0	27
1800	2570	85	16	65.7	32			56.1	27
2000	2810	55	18	70.8	32			61.2	27
				$m_t = 0.0254 \cdot s + 19.968$		$m_c = 9.6$ kg		$m_b = m_t - m_c$	

* on request also available in steel (C) and with metal cover (M)

For the TV 250 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d_0 [mm]	Pitch [mm]	d_2 [mm]	v_{max} carriage [1] [m/min]	ISO	Lead accuracy [µm/300 mm]	Repeat-ability [µm]	Backlash [2] [mm]	Effi-ciency h [-]	Operating temperature [°C]	Load rates dyn. C [N]	Load rates stat. C_0 [N]
Rolled ball screws	25	5	21.5	1.9…15.0	7	52	±15	0.07	≥ 0.9	–20° / +80°	11700	30000
		10	21.9	3.9…30.0				0.07			13200	25300
		20	22.0	7.8…60.0				0.07			13000	23300
		25	22.0	9.5…75.0				0.08			16700	32200
		50	21.5	19.0…150.0				0.08			15400	31700
Ground ball screws	25	5	21.5	1.9…15.0	5	23	±10	0.07	≥ 0.9	–20° / +80°	12205	31402
		10	21.9	3.8…30.0				0.08			17313	39532
		20	22.0	7.6…60.0				0.08			13337	35383
		25**	22.0	9.5…75.0				0.08			9362	23222
Sat. roller screws, r.	20	5	19.02	1.7…15.0	7	52	±15	0.04	0.89	–20° / +100°	11200	19300
Satellite roller screws, ground	20	2	19.32	0.7…6.0	5	23	±10	0.04	0.82	–20° / +100°	47800	59700
		4	19.15	1.4…12.0				0.04	0.87		40200	64300
		5	19.02	1.7…15.0				0.04	0.88		37100	64000
		8	18.69	2.6…24.0				0.04	0.89		38200	64000
		10	18.62	3.3…30.0				0.04	0.9		42900	61900
Trapezoidal screws	25	5	19.1	1.7…15.0	7	52	±15	0.03…0.2	0.3	–40° / +120°	***	***
		10	19.1	3.4…30.0				0.03…0.2	0.5		***	***

[1] Calculations based on a max. rotational speed of 6000 min^{-1} for rolled ball screws and 4000 min^{-1} for ground ball screws.

[2] IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
Reduced backlash up to ≤ 0,01 mm (ISO 7) available
Zero backlash available with preloaded nuts. Preload = 3% of C_0 (ISO 5)

Permissible maximum load F_{per} based on circumferencial speed:

$F_{per} = C_0 \cdot f_c$ [N]

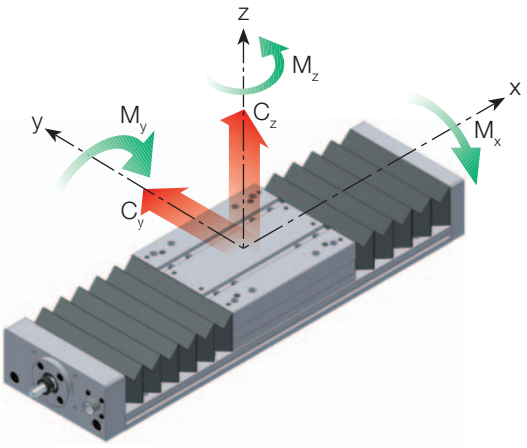
C_0 = static load [N]

f_L = load factor [–] for POM-C nuts

circumferential speed v_C [m/min]	load factor f_L [–]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

*** calculations available on request

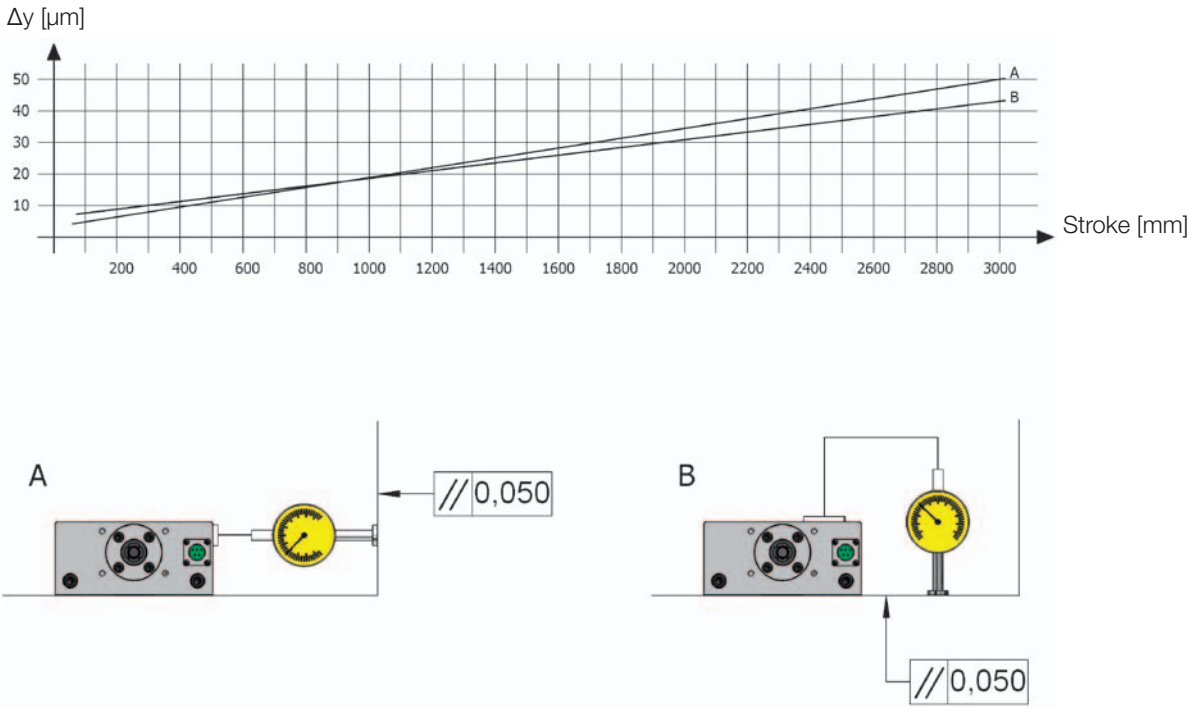
Load Rates and Torque



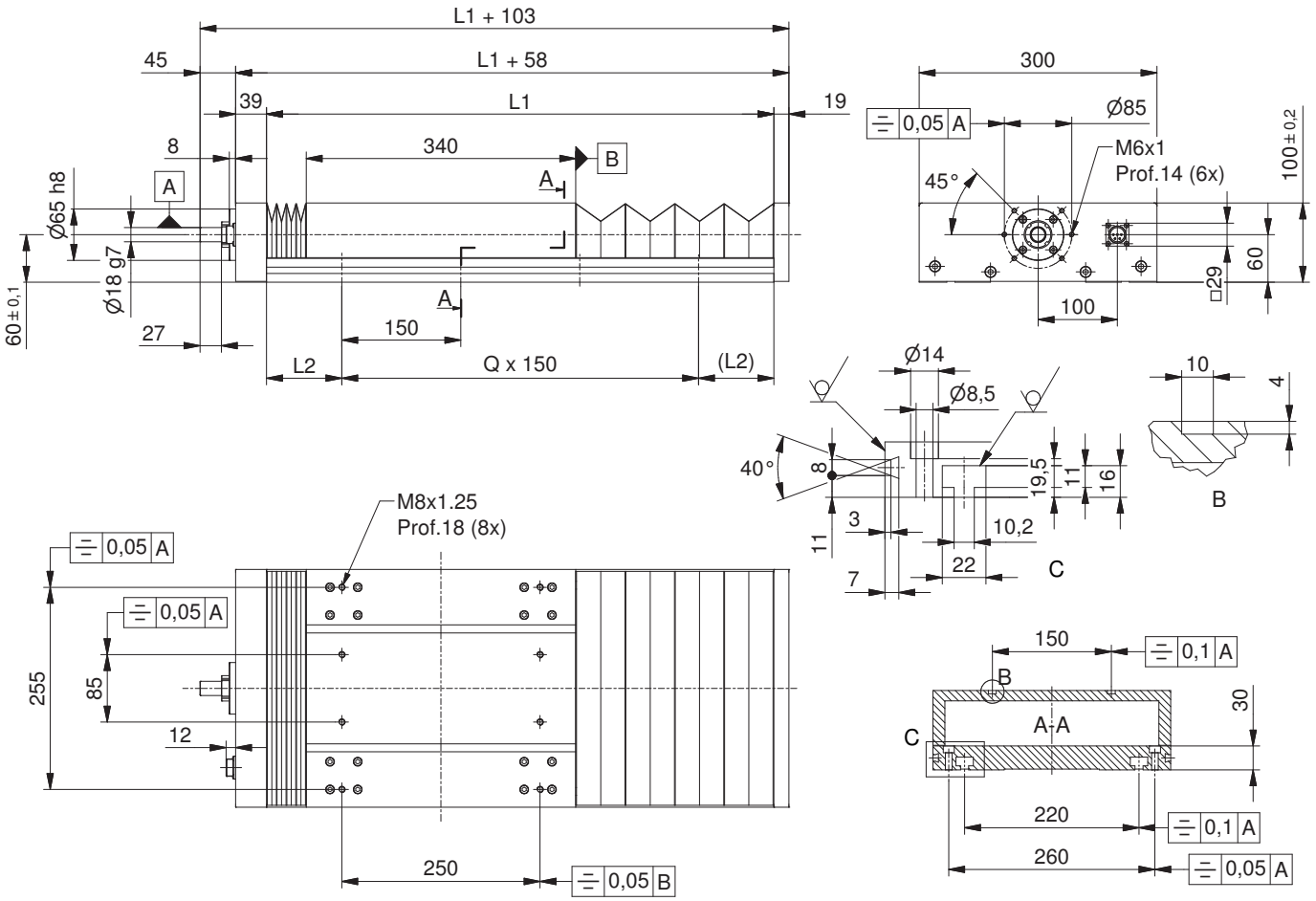
Guiding System	Safety factor s	Load rates [N] C_y dyn.	C_y stat.	C_z- dyn.	C_z- stat.	C_z+ dyn.	C_z+ stat.	Torque [Nm] M_x dyn.	M_x stat.	M_y dyn.	M_y stat.	M_z dyn.	M_z stat.
TV**P** – linear rail guides	10	4525	5275	7240	8440	7240	8440	637	743	710	827	532	620
	5	9050	10550	14480	16880	14480	16880	1274	1486	1420	1654	1064	1240
TV**L** – long carriage linear rail guides	10	6026	7925	9640	12680	9640	12680	849	1116	801	1053	601	790
	5	12052	15850	19280	25360	19280	25360	1698	2232	1602	2106	1202	1580
TV**H** – heavy load linear rail guides	10	6300	7200	10080	11520	10080	11520	872	997	913	1043	685	782
	5	12600	14400	20160	23040	20160	23040	1744	1994	1826	2086	1370	1564
TV**R** – linear roller guides	10	5850	10675	9360	17080	9360	17080	824	1504	918	1674	688	1256
	5	11700	21350	18720	34160	18720	34160	1648	3008	1836	3348	1376	2512

values valid for standard carriage length = 280 mm

Accuracy



Linear Tables with screw drive (TV), size 300, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)	
Stroke s [mm]	L_1 [mm]	L_2 [mm]	Q [-]	Weight m_t [kg]	Gravity center z_G [mm]	Weight m_c [kg]	Gravity center z_G [mm]	Weight m_b [kg]	Gravity center z_G [mm]
200	640	95	3	39.8	47			23.5	33
300	750	75	4	43.5	46			27.2	32
400	870	60	5	47.2	45			30.9	32
500	980	40	6	50.9	44			34.6	32
600	1090	95	6	54.6	43			38.3	32
700	1200	75	7	58.3	42			42.0	31
800	1310	55	8	62.0	41			45.7	31
1000	1560	105	9	69.4	40	16.3	31	53.1	31
1200	1800	75	11	76.8	39			60.5	31
1400	2020	35	13	84.2	38			67.9	31
1600	2300	100	14	91.6	37			75.3	30
1800	2540	70	16	99.0	37			82.7	30
2000	2800	50	18	106.4	36			90.1	30
2200	3040	95	19	113.8	36			97.5	30
2400	3280	65	21	121.2	35			104.9	30
				$m_t = 0.0370 \cdot s + 32.429$		$m_c = 1.1$ kg		$m_b = m_t - m_c$	

* on request also available in steel (C) and with metal cover (M)

For the TV 300 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d_0 [mm]	Pitch [mm]	d_2 [mm]	v_{max} carriage [1] [m/min]	ISO	Lead accuracy [µm/300 mm]	Repeat-ability [µm]	Back-lash [2] [mm]	Effi-ciency h [-]	Operating temperature [°C]	Load rates dyn. C [N]	Load rates stat. C_0 [N]
Rolled ball screws	25	5	21.5	1.9…15.0	7	52	±15	0.07	≥ 0.9	–20° / +80°	11700	30000
		10	21.9	3.9…30.0				0.07			13200	25300
		20	22.0	7.8…60.0				0.07			13000	23300
		25	22.0	9.5…75.0				0.08			16700	32200
		50	21.5	19.0…150.0				0.08			15400	31700
Ground ball screws	25	5	21.5	1.9…15.0	5	23	±10	0.07	≥ 0.9	–20° / +80°	12205	31402
		10	21.9	3.8…30.0				0.08			17313	39532
		20	22.0	7.6…60.0				0.08			13337	35383
		25**	22.0	9.5…75.0				0.08			9362	23222
Sat. roller screws, r.	23	4	22.15	1.1…12.0	7	52	±15	0.04	0.86	–20° / +100°	32300	51500
		5	22.06	1.4…15.0				0.04	0.87		29900	51500
		10	21.62	2.8…24.0				0.04	0.89		23500	50700
Satellite roller screws, ground	25	2	23.82	0.6…6.0	5	23	±10	0.03	0.80	–20° / +100°	78000	93200
		4	23.63	1.2…12.0				0.03	0.85		66500	102600
		5	23.53	1.5…15.0				0.03	0.87		62500	104200
		8	23.21	2.4…24.0				0.03	0.89		75300	104800
		10	23.0	2.9…30.0				0.03	0.89		84100	103600
Trapezoidal screws	25	5	19.1	1.2…15.0	7	52	±15	0.03…0.2	0.3	–40° / +120°	***	***
		10	19.1	2.4…30.0				0.03…0.2	0.5		***	***

1) Calculations based on a max. rotational speed of 6000 min^{-1} for rolled ball screws and 4000 min^{-1} for ground ball screws.

2) IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
Reduced backlash up to ≤ 0,01 mm (ISO 7) available
Zero backlash available with preloaded nuts. Preload = 3% of C_0 (ISO 5)

Permissible maximum load F_{per} based on circumferencial speed:

F_{per} = $C_0 \cdot f_c$ [N]

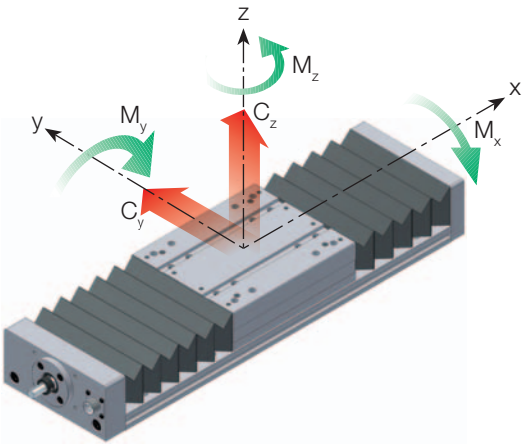
C_0 = static load [N]

f_L = load factor [–] for POM-C nuts

circumferential speed v_C [m/min]	load factor f_L [–]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

*** calculations available on request

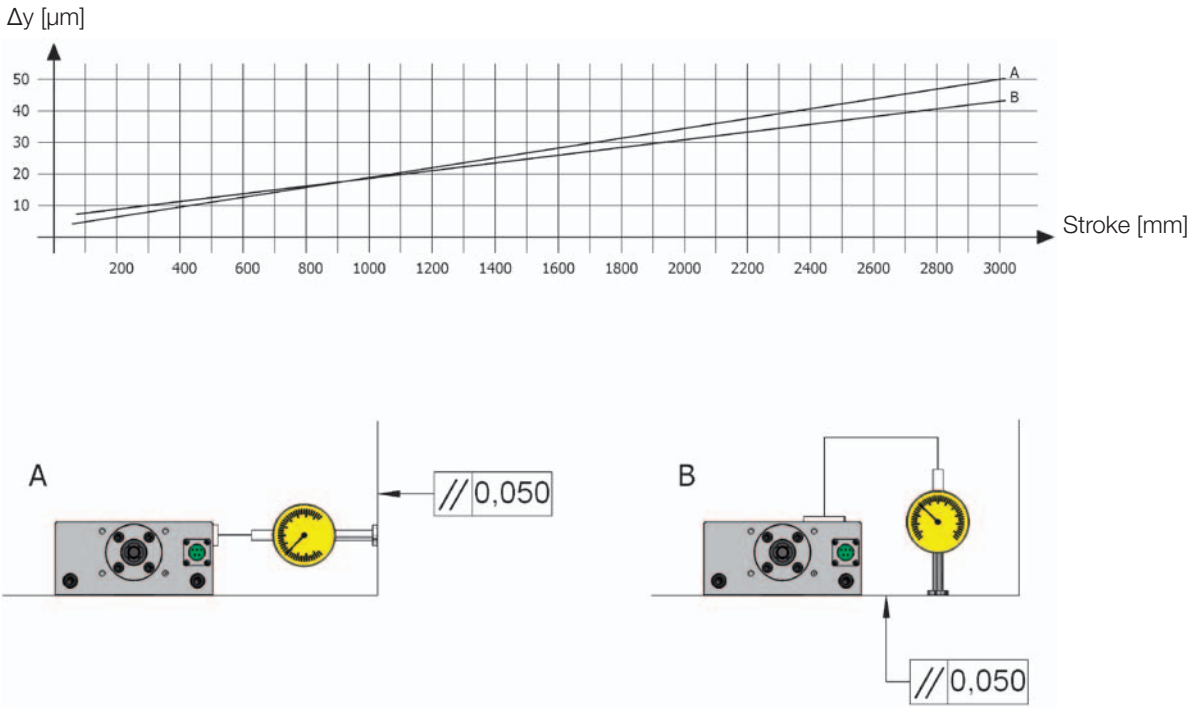
Load Rates and Torque



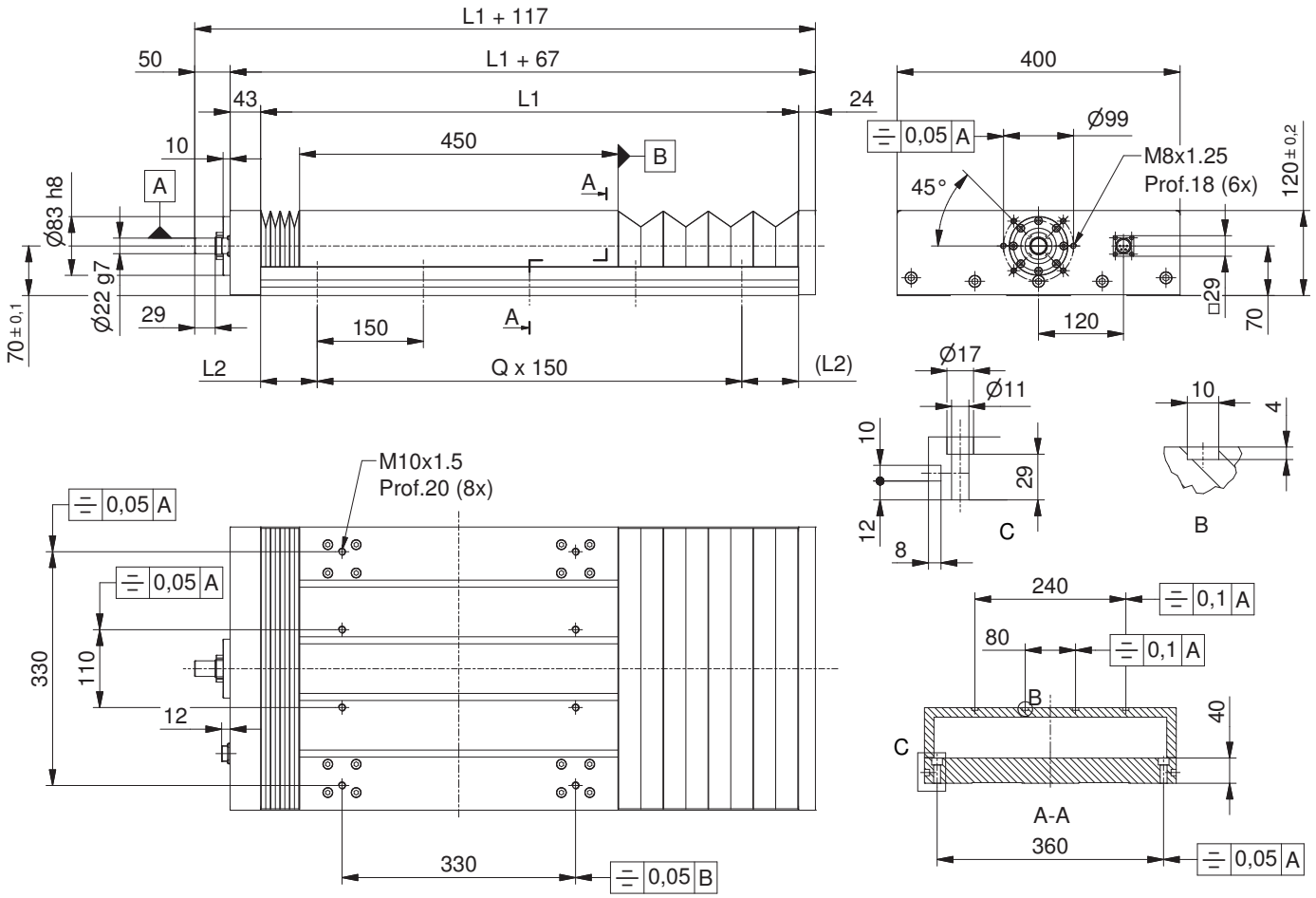
Guiding System	Safety factor s	Load rates [N] C_y dyn.	C_y stat.	C_z- dyn.	C_z- stat.	C_z+ dyn.	C_z+ stat.	Torque [Nm] M_x dyn.	M_x stat.	M_y dyn.	M_y stat.	M_z dyn.	M_z stat.
TV**P** – linear rail guides	10	6300	7200	10080	11520	10080	11520	1109	1267	1235	1411	926	1058
	5	12600	14400	20160	23040	20160	23040	2218	2534	2470	2822	1852	2116
TV**L** – long carriage linear rail guides	10	7700	9575	12320	15320	12320	15320	1356	1686	1356	1686	1017	1264
	5	15400	19150	24640	30640	24640	30640	2712	3372	2712	3372	2034	2528
TV**H** – heavy load linear rail guides	10	8850	10175	14160	16280	14160	16280	1523	1751	1601	1840	1201	1380
	5	17700	20350	28320	32560	28320	32560	3046	3502	3202	3680	2402	2760
TV**R** – linear roller guides	10	8025	14075	12840	22520	12840	22520	1413	2478	1573	2759	1180	2070
	5	16050	28150	25680	45040	25680	45040	2826	4956	3146	5518	2360	4140

values valid for standard carriage length = 340 mm

Accuracy



Linear Tables with screw drive (TV), size 400, made of aluminium (A)* and with expansion bellows (S)



Dimensions				Entire product		Carriage (fixed base plate)		Base plate (fixed carriage)	
Stroke s [mm]	L_1 [mm]	L_2 [mm]	Q [-]	Weight m_t [kg]	Gravity center z_G [mm]	Weight m_c [kg]	Gravity center z_G [mm]	Weight m_b [kg]	Gravity center z_G [mm]
200	760	80	4	88.2	59			55.2	40
300	880	65	5	95.4	57			62.4	39
400	1010	55	6	102.5	56			69.5	39
500	1130	40	7	109.6	54			76.6	38
600	1260	105	7	116.7	53			83.7	38
800	1500	75	9	130.9	51			97.9	38
1000	1720	110	10	145.1	50			112.1	37
1200	1980	90	12	159.3	48	33.0	35	126.3	37
1400	2220	60	14	173.6	47			140.6	37
1600	2440	95	15	187.8	46			154.8	37
1800	2640	105	16	202.0	46			169.0	37
2000	2880	35	19	216.2	45			183.2	36
2200	3100	45	21	230.3	44			197.3	36
2400	3320	35	23	244.6	44			211.6	36
2600	3540	110	24	258.8	43			225.8	36
				$m_t = 1.1 \cdot (0.0646 \cdot s + 67.31)$		$m_c = 33.0$ kg		$m_b = m_t - m_c$	

* on request also available in steel (C) and with metal cover (M)

For the TV 400 the following screw drives are available. Please contact us for drive optimization.

Screw drive	d_0 [mm]	Pitch [mm]	d_2 [mm]	v_{max} carriage [1] [m/min]	ISO	Lead accuracy [µm/300 mm]	Repeat-ability [µm]	Back-lash [2] [mm]	Effi-ciency h [-]	Operating temperature [°C]	Load rates dyn. C [N]	Load rates stat. C_0 [N]
Rolled ball screws	32	5	26.6	1.4…15.0	7	52	±15	0.07	≥ 0.9	–20° / +80°	19000	54000
		10	27.3	2.8…30.0				0.08			44000	54500
		20	27.9	5.7…60.0				0.08			42500	59800
		32**	29.3	9.5…75.0				0.1			8715	23756
Ground ball screws	32	5	29.5	1.9…15.0	5	23	±10	0.09	≥ 0.9	–20° / +80°	13892	41348
		10	27.75	3.8…30.0				0.1			27753	65122
		20	29.3	7.6…60.0				0.1			17645	51590
		32**	29.3	9.5…75.0				0.1			12450	33937
Sat. roller screws, rolled	23	4	22.15	1.1…12.0	7	52	±15	0.04	0.86	–20° / +100°	32300	51500
		5	22.06	1.4…15.0				0.04	0.87		29900	51500
		10	21.62	2.8…24.0				0.04	0.89		23500	50700
Satellite roller screws, ground	25	2	23.82	0.6…6.0	5	23	±10	0.03	0.80	–20° / +100°	78000	93200
		4	23.63	1.2…12.0				0.03	0.85		66500	102600
		5	23.53	1.5…15.0				0.03	0.87		62500	104200
		8	23.21	2.4…24.0				0.03	0.89		75300	104800
		10	23.0	2.9…30.0				0.03	0.89		84100	103600
Trapezoidal screws	30	6	22.5	1.4…18.0	7	52	±15	0.03…0.2	0.3	–40° / +120°	***	***
		12	22.5	2.8…36.0				0.03…0.2	0.5		***	***

1) Calculations based on a max. rotational speed of 6000 min^{-1} for rolled ball screws and 4000 min^{-1} for ground ball screws.

2) IMPEX standard backlash for ball screws = 0,03 mm (ISO 7)
Reduced backlash up to ≤ 0,01 mm (ISO 7) available
Zero backlash available with preloaded nuts. Preload = 3% of C_0 (ISO 5)

Permissible maximum load F_{per} based on circumferencial speed:

F_{per} = $C_0 \cdot f_c$ [N]

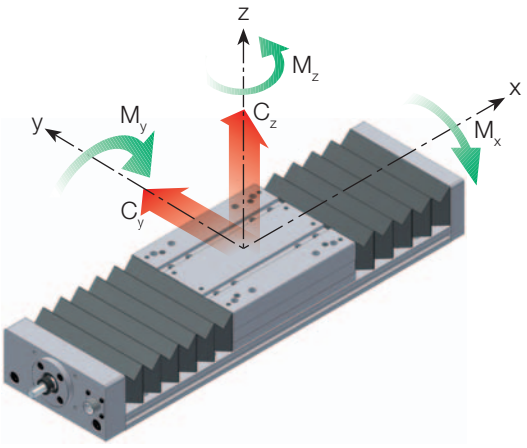
C_0 = static load [N]

f_L = load factor [–] for POM-C nuts

circumferential speed v_C [m/min]	load factor f_L [–]
5	0.95
10	0.75
20	0.45
30	0.37
40	0.12
50	0.08

*** calculations available on request

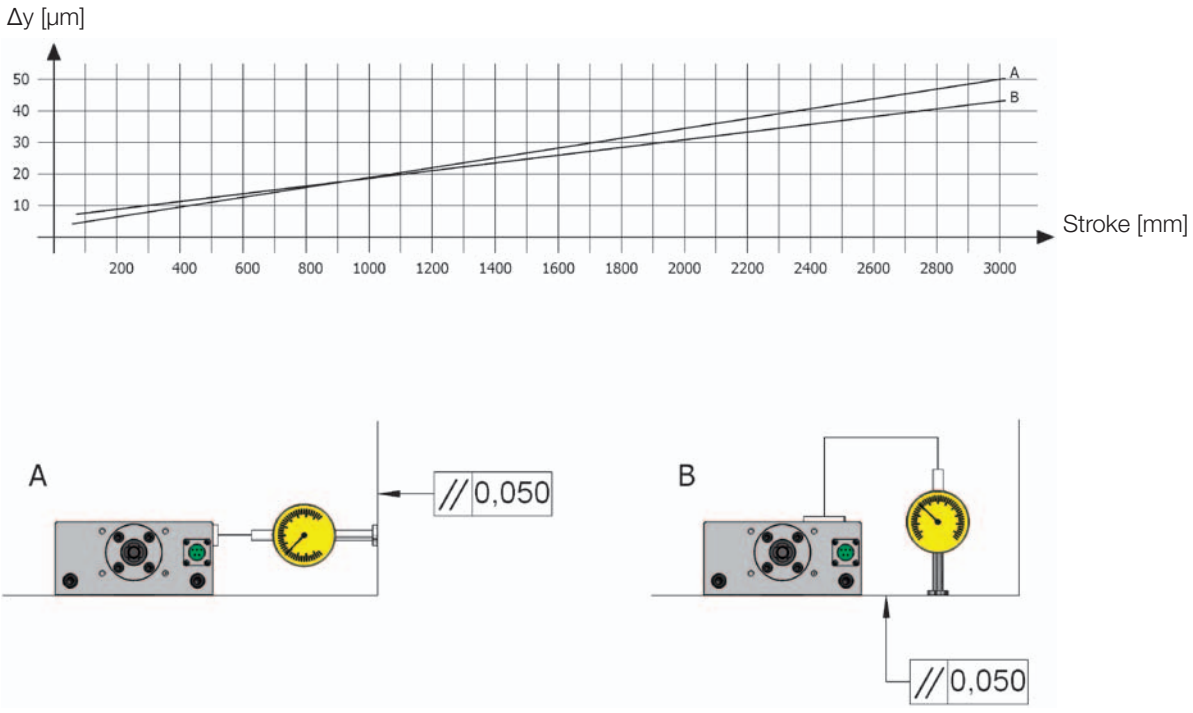
Load Rates and Torque



Guiding System	Safety factor s	Load rates [N] C_y dyn.	C_y stat.	C_z- dyn.	C_z- stat.	C_z+ dyn.	C_z+ stat.	Torque [Nm] M_x dyn.	M_x stat.	M_y dyn.	M_y stat.	M_z dyn.	M_z stat.
TV**P** – linear rail guides	10	8850	10175	14160	16280	14160	16280	2195	2523	2336	2686	1752	2015
	5	17700	20350	28320	32560	28320	32560	4390	5046	4672	5372	3504	4030
TV**L** – long carriage linear rail guides	10	10675	13300	17080	21280	17080	21280	2648	3299	2648	3299	1986	2474
	5	21350	26600	34160	42560	34160	42560	5296	6598	5296	6598	3972	4948
TV**H** – heavy load linear rail guides	10	12175	13425	19480	21480	19480	21480	2971	3276	3117	3437	2338	2578
	5	24350	26850	38960	42960	38960	42960	5942	6552	6234	6874	4676	5156
TV**R** – linear roller guides	10	10850	18600	17360	29760	17360	29760	2691	4613	2865	4911	2149	3683
	5	21700	37200	34720	59520	34720	59520	5382	9226	5730	9822	4298	7366

values valid for standard carriage length = 450 mm

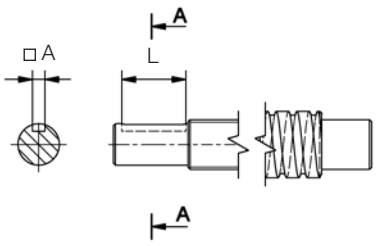
Accuracy



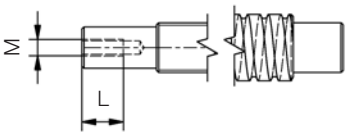
Machining of screw drive shafts

In standard execution the screw drive shafts are without machining.
Optional a keyway (VC1) or a tapping hole (FIL) are available.

TV size	Keyway (VC1) A x A x L [mm]
100	3 x 3 x 12
150	3 x 3 x 15
200	5 x 5 x 16
250	6 x 6 x 25
300	6 x 6 x 25
400	6 x 6 x 25



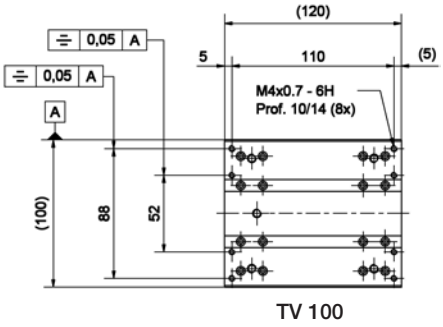
TV size	Tapping hole (FIL) M x L [mm]
100	M4 x 10
150	M4 x 10
200	M5 x 12
250	M6 x 12
300	M6 x 12
400	M8 x 12



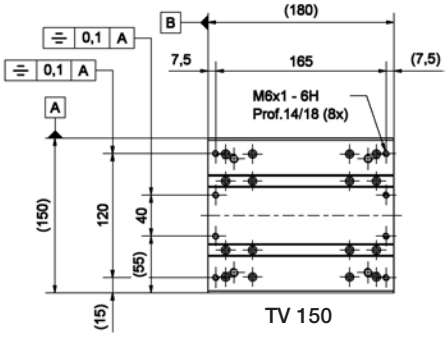
Extra holes on carriage

Carriages of the TV type can be delivered with additional tapping holes on top for X-Y mounting or fixing of other accessories.
For special executions please contact our technical department.

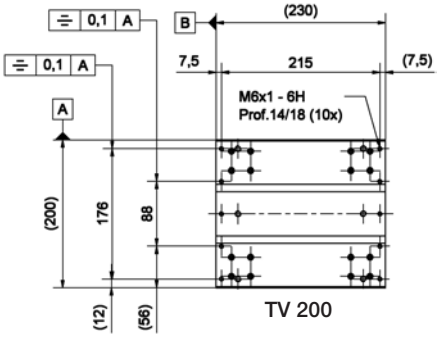
TV size	Tapping hole M x L [mm]
100	M4 x 10
150	M6 x 14
200	M6 x 14
250	M6 x 14
300	M8 x 18
400	M10 x 22



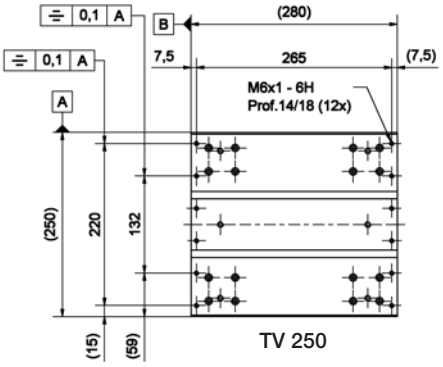
TV 100



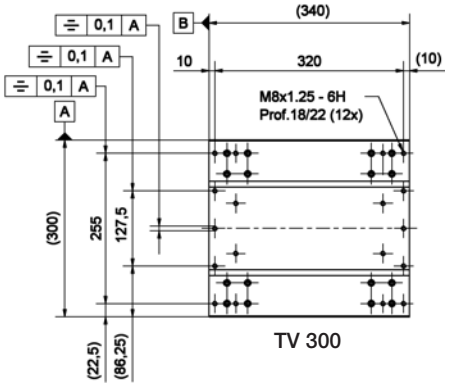
TV 150



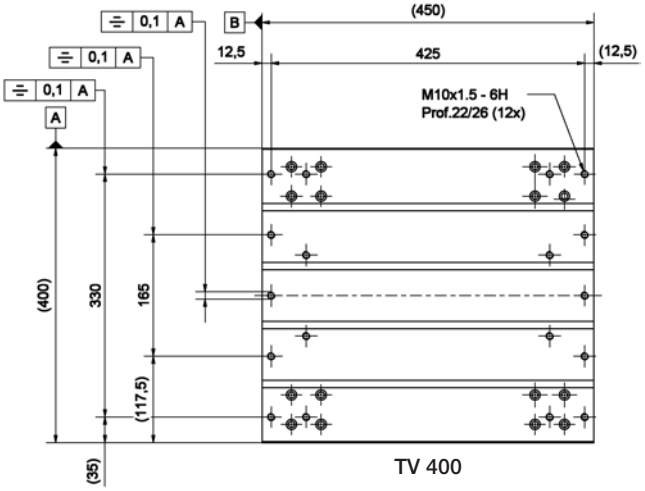
TV 200



TV 250



TV 300

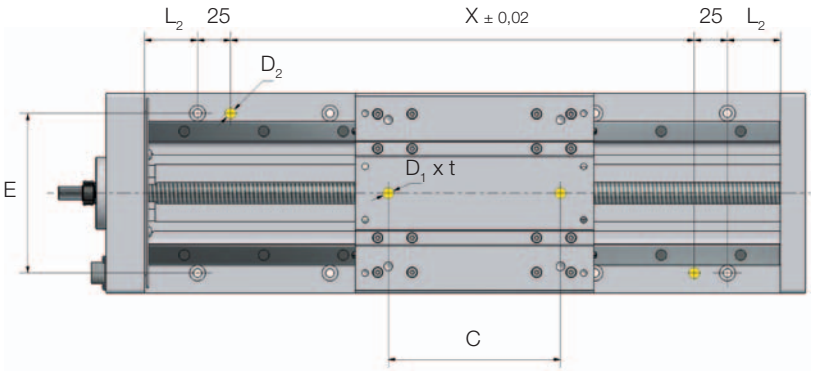


TV 400

Positioning holes

For accurate X-Y mounting or the fixing of accessories the TV Linear Tables are available with additional drill holes on the top of the carriage and on the base plate.

TV size	Carriage		Base plate	
	D_1 x t [mm]	C ± 0,02 [mm]	D_2 [mm]	E ± 0,02 [mm]
100	6 h7 x 8	98	6 h7	80
150	8 h7 x 15	130	8 h7	120
200	8 h7 x 15	120	8 h7	170
250	8 h7 x 15	150	8 h7	220
300	8 h7 x 15	250	8 h7	260
400	8 h7 x 15	280	8 h7	360



L_2 : see dimensins of corresponding TV size

Lubrication

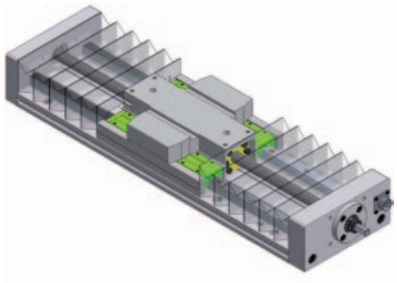
Lubrication holes are provided standard on the left hand side of the carriage. On request it is possible to have them on the right hand side.

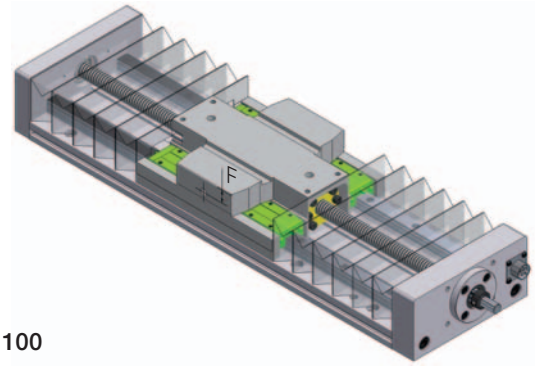
TV size	F [mm]	Lubrication hole Ø	Lubrication hole Quantity
100	12	M6 *	1x
150	15	1/8”	5x
200	15	1/8”	5x
250	15	1/8”	5x
300	15	1/8”	5x
400	20	1/8”	5x

* only one hole for the lubrication of the screw drive; linear rail guides with “self-lubricating” carriages

F : distance between the surface of the carriage and the center of the holes
Z : distance between centers of lubrication holes 15 mm

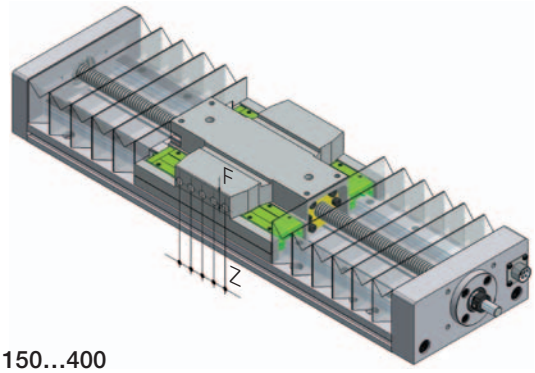
TV configuration with screw drives lubricated “for life” and linear rail guides with 4 “self lubricating” carriages (KK0).





– lubrication holes for **TV 100**

Ord. code	Description
LKD	1 lub. hole for screw drive **right** + 4 self-lub. carriages
LKS	1 lub. hole for screw drive **left** + 4 self-lub. carriages



– lubrication holes for **TV 150…400**

Ord. code	Description
L5D	5 lub. holes **right** hand side (for screw drive + rail guides)
L5S	5 lub. holes **left** hand side (for screw drive + rail guides)
5KD	5 lub. holes **right** hand side + self-lubricating rail guides
5KS	5 lub. holes **left** hand side + self-lubricating rail guides

Limit switches

The pin connector is supplied standard on the right hand side (left hand side on request).

– pin connector for **TV 100**

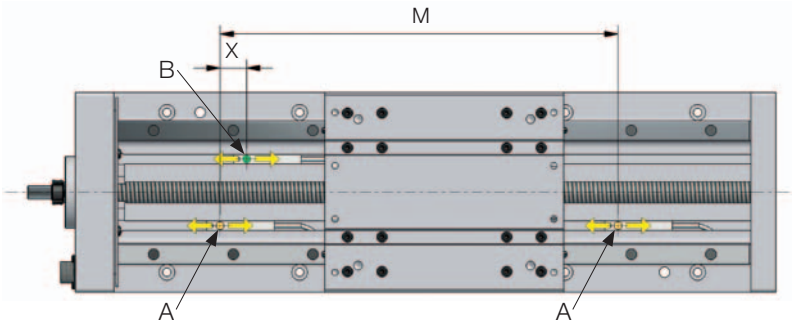
standard optional

– pin connector for **TV 150…400**

standard optional

– Inductive limit switches:

A : Inductive limit switches **PNP-NC**
B : Inductive limit switch **PNP-NO**
M : Nominal stroke
X : 10 mm (standard)
⇦ ⇨ : Adjustable limit switch ± 10 mm



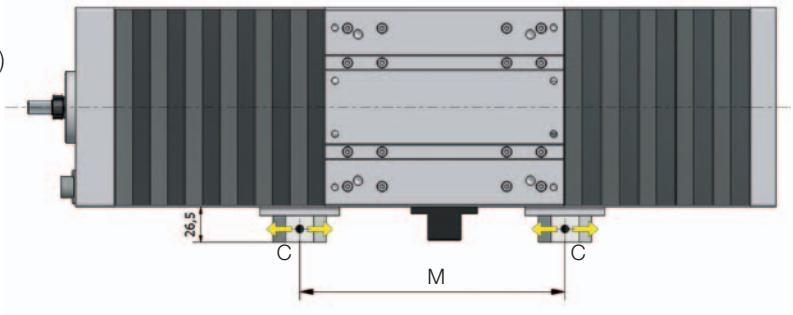
Config. with pin connector		Config. without pin connector*		Inductive limit switches
Order code for limit switch on the right side (DX)	left side (SX)	Order code for limit switch on the right side (DX)	left side (SX)	
FA1	FA3	FA2	FA4	2x PNP-NC (emergency) 1x PNP-NO (reference limit switch, motor side)
FB1	FB3	FB2	FB4	2x PNP-NC (emergency) 1x PNP-NO (reference limit switch, opposite motor side)
FC1	FC3	FC2	FC4	2x PNP-NC (emergency)
FD1	FD3	FD2	FD4	1x PNP-NO (reference limit switch)

Pin connectors correspond to the IP54 standard (IP67 on request).
*On request cable gland PG 11 or 13

– Mechanical limit switches:

C : Mechanical limit switches (Balluf or Euchner type)
M : Nominal stroke
⇦ ⇨: Adjustable limit switch ± 10 mm

Mechanical limit switches are only available for TV size 150 to 400.

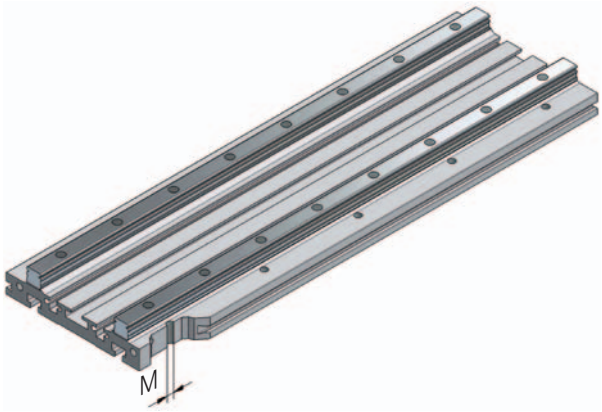


Fixing systems

– Base plates with tapping holes

In standard configuration spot-faced holes are drilled on the base plate. On request tapping holes are available:

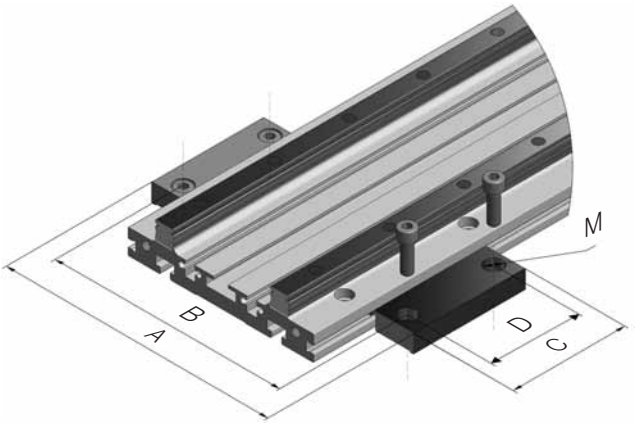
TV size	M [mm]
100	M6
150	M8
200	M10
250	M10
300	M10
400	M12



– Steel brackets

The profile can be fixed with steel brackets, supplied in pairs.

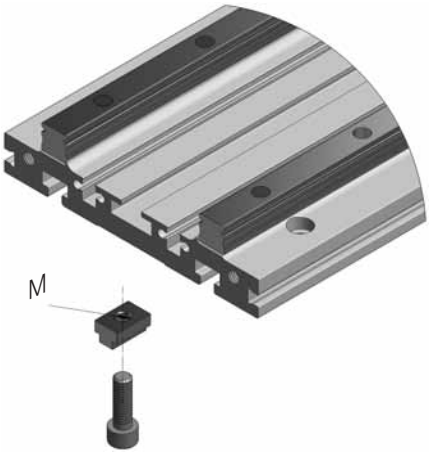
TV size	Order code	A [mm]	B [mm]	C [mm]	D [mm]	M [mm]
100	ST 100-01	140	112	60	40	M5
150	ST 150-01	198	165	60	40	M6
200	ST 200-01	256	220	80	60	M8
250	ST 200-01	306	270	80	60	M8
300	ST 300-01	366	320	80	60	M8
400	ST 400-01	484	425	100	80	M10



– "Lower" T-nuts

Steel T-nuts are available to match the groove width on the lower surface of each TV size base plate.

TV size	Order code	M [mm]
150	I 200-01	M6
200	I 200-01	M6
250	I 250-01	M8
300	I 250-01	M8

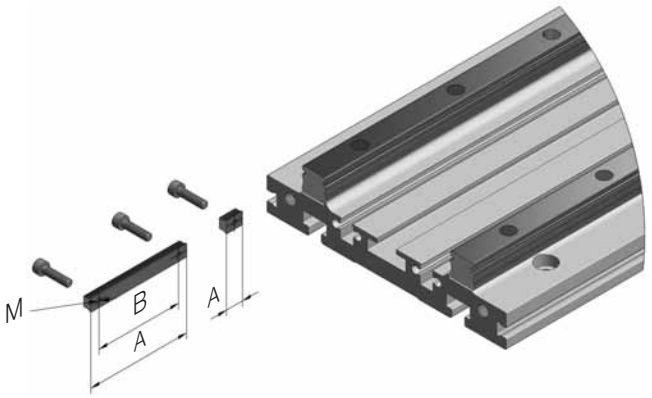


Fixing systems (continuation)

– "Lateral" T-nuts

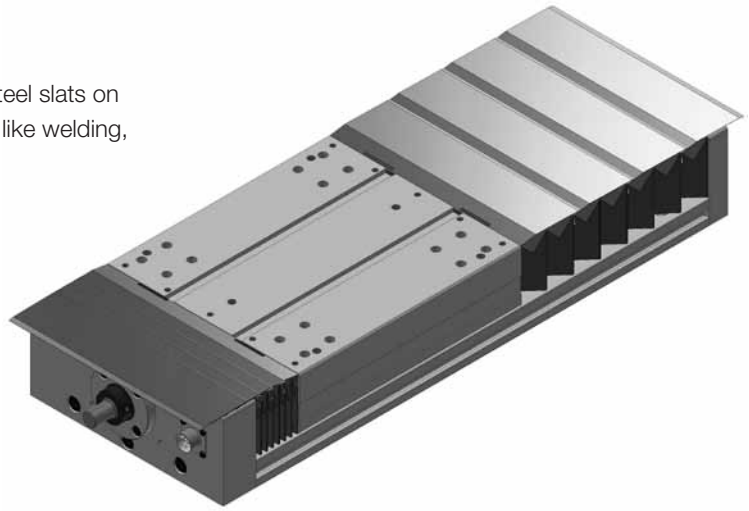
For the mounting of external components like trailing cables, limit switches or measuring systems there are steel T-nuts available. They match the width of the lateral grooves in the base plate of each TV size and are suitable in short or long version.

TV size	Order code	A [mm]	M [mm]	B [mm]
150	IL 150-01	10	M4	—
150	IL 150-02	60	M4	50
200	IL 200-01	10	M4	—
200	IL 200-02	60	M4	50
250	IL 200-01	10	M4	—
250	IL 200-02	60	M4	50
300	IL 200-01	10	M4	—
300	IL 200-02	60	M4	50



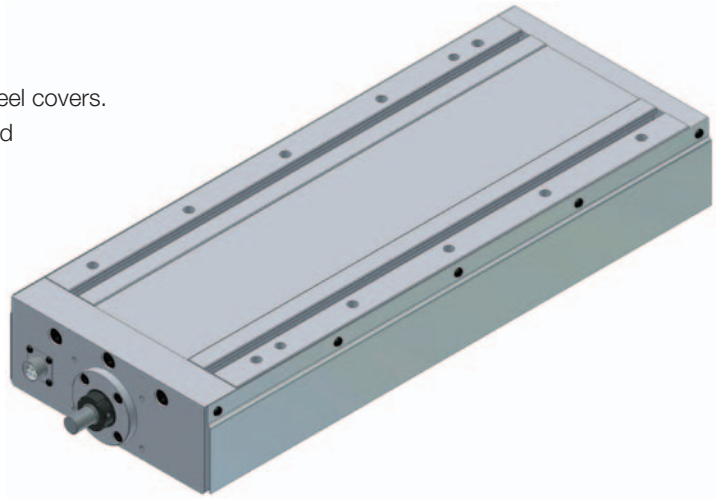
Expansion bellows with stainless steel slats

On all TV Linear Tables it is possible to fit protective stainless steel slats on the standard expansion bellows for special working conditions like welding, grounding, machine tooling, etc.



Lateral steel covers

All Linear Tables TV can be protected on both sides with lateral steel covers. These are recommended with strong dirt conditions and "overhead mounting".

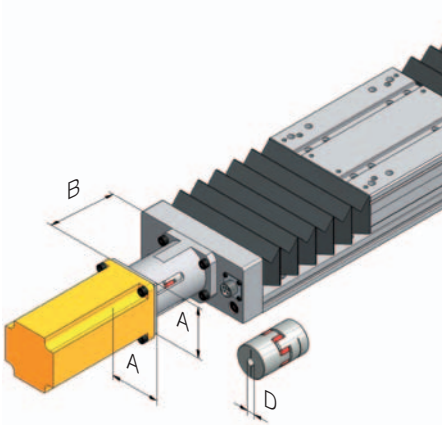


Motor mount

– Direct motor mount with coupling

Aluminium support and coupling with collet clamp.

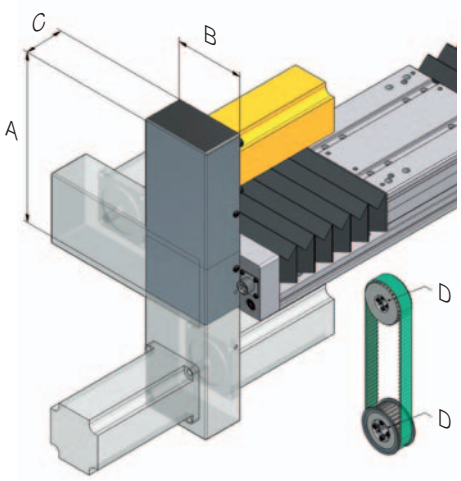
TV size	□ A [mm]	B [mm]	Clamp size	max. Torque [Nm]	ø D min/max [mm]	Tightening torque of locking screw [Nm]
100	50–70	57	14	12.5	6/14	1.34
150	60–86	95	19/24	17	10/24	10.5
200	70–90	95	19/24	17	10/24	10.5
250	90–120	95–100	24/28	60	19/30	10.5
300	90–120	95–100	24/28	60	19/30	10.5
400	110–135	105–125	24/28	60	19/30	10.5



– Lateral motor mount with belt gear

Aluminium support with belt, pulley and locking set.

TV size	A [mm]	B [mm]	C [mm]	Belt type	ø D min/max [mm]	Speed ratio [–]
100	50–70	70–90	35–50	10/AT5	6/14	1:1 (standard) 1:2 2:1
150	60–86	80–100	40–50	16/AT5	10/24	
200	70–90	80–100	40–60	16/AT5 20/AT5	10/24	
250	90–120	90–120	40–60	16/AT10 20/AT10	19/30	
300	90–120	100–150	45–60	20/AT10 25/AT10	19/30	
400	110–135	100–150	45–60	20/AT10 25/AT10	19/30	

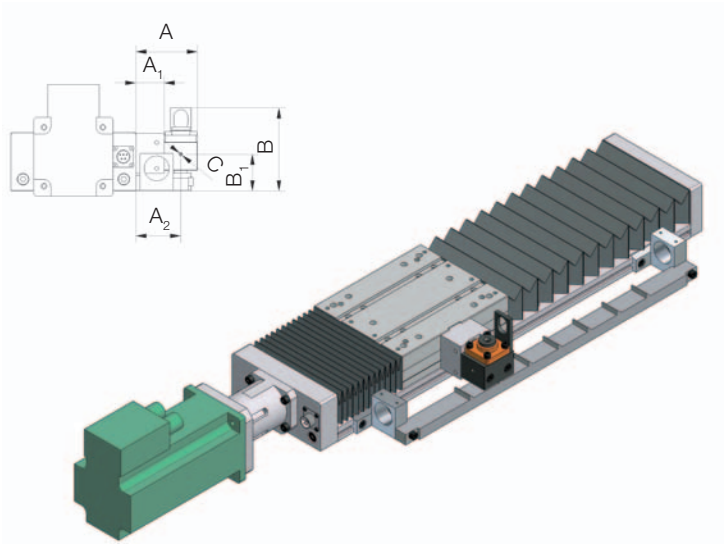


Safety systemes

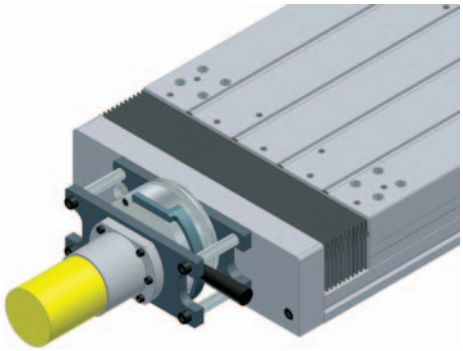
Vertically mounted Linear Tables may be equipped with two different types of safety systems:

– Electropneumatic safety stop, laterally mounted

TV size	A [mm]	A_1 [mm]	A_2 [mm]	B_1 [mm]	B_2 [mm]	C [mm]
100	–	–	–	–	–	–
150	74	34	54	99.5	44	M5
200	74	34	54	104	48.5	M5
250	85	34	58	117.5	58	M5
300	85	34	58	116	48	M5
400	92	38	64	140	63	M5



– Electromechanical safety stop



Measuring systems

For all TV Linear Tables linear measuring systems with resolutions of 0.1, 0.01, 0.005 or 0.001 mm are available. Outputs: RC transistor NPN (standard), OC open collector, LTD 26LS31 or sinusoidal SIN 1VPP.

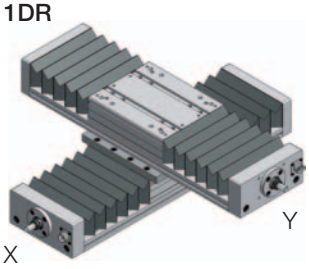
Magnetic measuring system

Besides linear measuring systems, it is possible to supply internal linear magnetic strips. They have same characteristics of resolution and output like the optical systems.

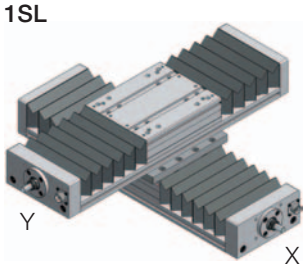
Assembly examples

TV Linear Tables can be combined to multi axes systems, but also easily assembled with any other MOVITEC products.
Examples:

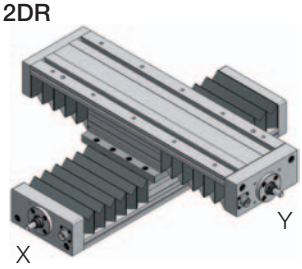
1DR



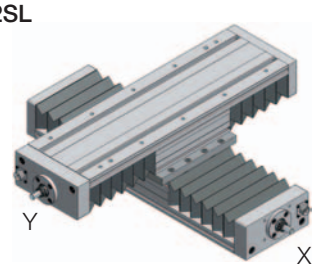
1SL



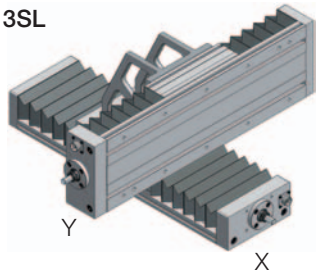
2DR



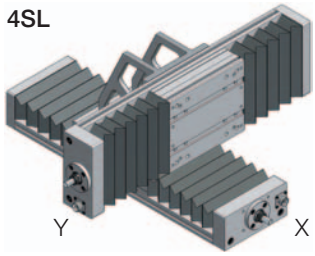
2SL



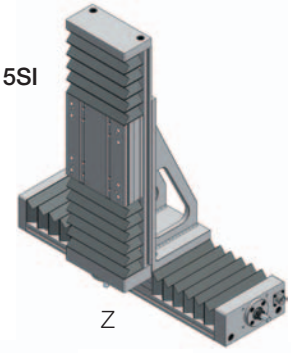
3SL



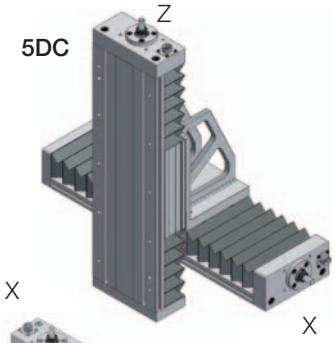
4SL



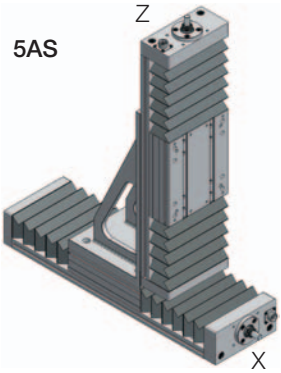
5SI



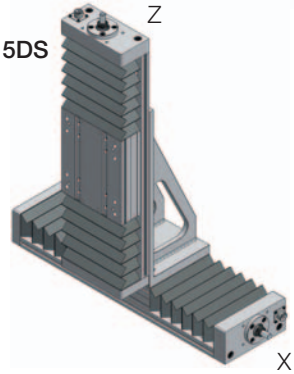
5DC



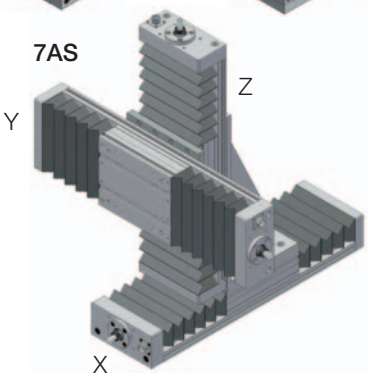
5AS



5DS



7AS



Complete, customer specific solutions

MOVITEC linear systems are the ideal components for customer-specific solutions. Thanks to their modular construction, very economic, application-oriented linear systems can be implemented in the shortest time.