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TH series

TH series description

Fig. 1

TH linear actuators are rigid and compact, ball screw driven linear units, that enable high positioning accuracy and repeatability in all process phases. With optimal performance assured, TH actuators have a repeatability within 5 µm.

Thrust force transmission is achieved by means of super high efficient ball screws, which are available in several precision classes and a variety of leads. Linear motion is based on two or four preloaded re-circulating ball bearing blocks, with ball retainer technology, mounted on two precision aligned parallel rails. The TH series is available in single carriage or double carriage versions to meet different load requirements.

The TH linear units also feature safe rail and screw lubrication through a dedicated channel for each component. The incredibly compact structure of the TH actuator makes it the ideal solution for applications where space is limited.

- Extremely compact dimensions
- High positioning accuracy
- High load capacity and stiffness
- Preloaded ball screw
- Block with ball retainer
- Internal protected rails and ball screw
- Safe lubrication through dedicated channels for each component (block and ball screw)

The components

Aluminum base unit and carriage

The anodized extrusions used for the profile and carriages of the Rollon TH-series linear units were designed and manufactured in cooperation with industry experts to achieve high-level accuracy and to maximize mechanical properties. The anodized aluminum alloy 6060 used and was extruded with dimensional tolerances complying with UNI 3879 standards.

Linear motion system

Precision ball bearing guides with ground rails and preloaded blocks are used on Rollon TH series linear units. Use of this technology makes it possible to obtain the following features:

- **High accuracy running parallelism**
- **High positioning accuracy**
- **High level of rigidity**
- **Reduced wear**
- **Low resistance to movement**

Drive system

Rollon TH-series linear units use precision ball screws with either preloaded or non-preloaded ball screw nuts. The standard precision class of the ball screws used is ISO 7, however ISO 5 precision class is also available upon request. The ballscrew on the TH unit is available in different diameters and leads (see specifications tables). Use of this type of technology makes it possible to obtain the following features:

- **High speed (for long pitch screws)**
- **High load capacity and accurate thrust forces**
- **Superior mechanical performance**
- **Reduced wear**
- **Low resistance to movement**

Protection

Rollon TH series linear units are equipped with sealing strips in order to protect the mechanical components inside the linear unit against contaminants. In addition, the ball bearing guides and ball screws have their own protection system, including scrapers and lip seals to remove contaminates from the raceways of the ball bearings.

General data about aluminum used: AL 6060

Chemical composition [%]

Al	Mg	Si	Fe	Mn	Zn	Cu	Impurites
Remaining	0.35-0.60	0.30-0.60	0.30	0.10	0.10	0.10	0.05-0.15

Tab. 1

Physical characteristics

Density	Coeff. of elasticity	Coeff. of thermal expansion (20°-100°C)	Thermal conductivity (20°C)	Specific heat (0°-100°C)	Resistivity	Melting point
$\frac{kg}{dm^3}$	$\frac{kN}{mm^2}$	$\frac{10^{-6}}{K}$	$\frac{W}{m \cdot K}$	$\frac{J}{kg \cdot K}$	$\Omega \cdot m \cdot 10^{-9}$	°C
2.7	69	23	200	880-900	33	600-655

Tab. 2

Mechanical characteristics

Rm	Rp (02)	A	HB
$\frac{N}{mm^2}$	$\frac{N}{mm^2}$	%	—
205	165	10	60-80

Tab. 3

TH 70 SP2

TH 70 SP2 Dimensions (single carriage)

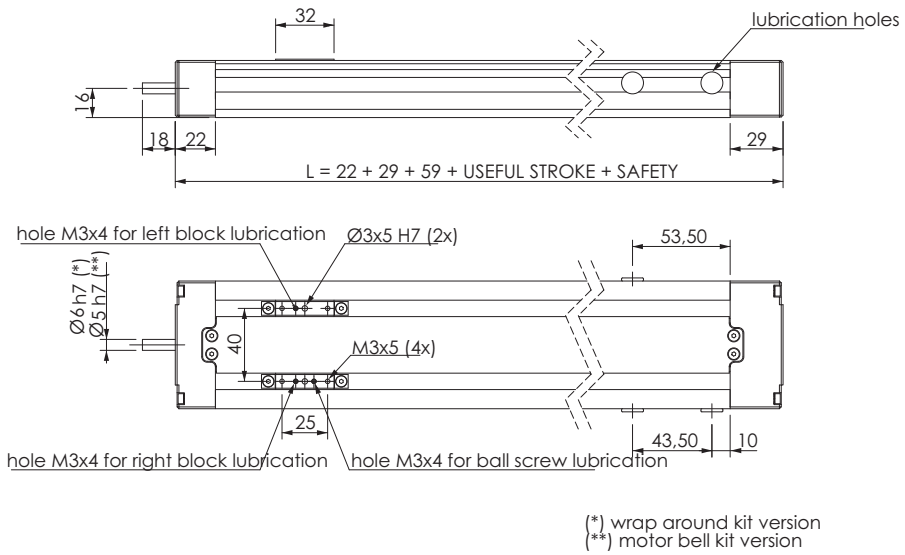


Fig. 2

Technical data

	Type
	TH 70 SP2
Useful stroke length [mm]	290 *1
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	0.152
Zero travel weight [kg]	0.58
Weight for 100 mm useful stroke [kg]	0.26
Rail size [mm]	9 mini

*1 Max stroke 591mm. For more information please contact Rollon.

Tab. 4

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 70 SP2	0.0054	0.0367	0.042

Tab. 6

Ball screw precision

Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5*	ISO 7	ISO 5*	ISO 7
TH 70 / 8-2.5	0.023	0.05	0.01	0.02

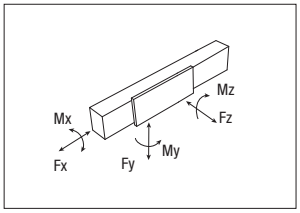
* ISO5 available only for max stroke 370mm. For more information please contact Rollon.

Tab. 5

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TH 70 SP2	8-2.5	2220	1470

Tab. 7



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TH 70 SP2	4990	3140	4990	99.8	12.8	12.8

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 8

TH 70 SP4

TH 70 SP4 Dimensions (dual carriage)

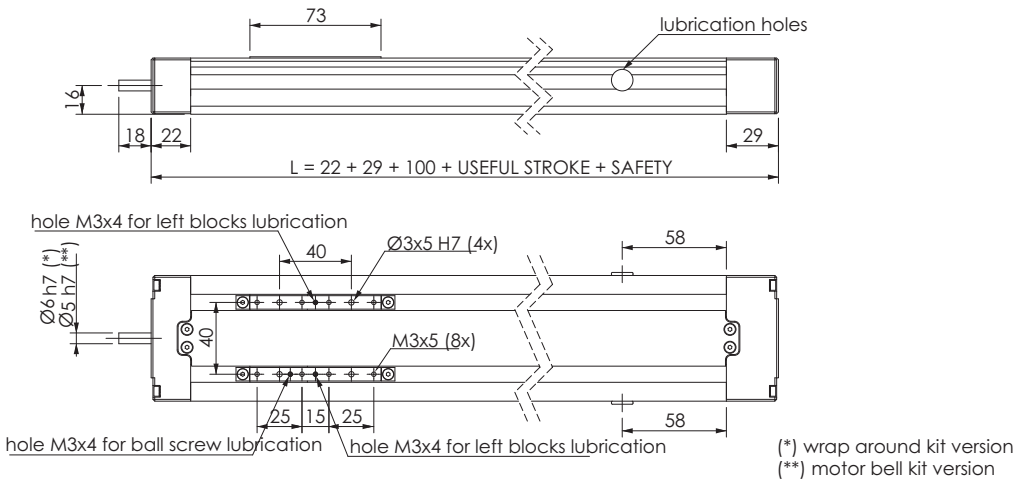


Fig. 3

Technical data

	Type
	TH 70 SP4
Useful stroke length [mm]	249 *1
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	0.268
Zero travel weight [kg]	0.8
Weight for 100 mm useful stroke [kg]	0.26
Rail size [mm]	9 mini

*1 Max stroke 550mm. For more information please contact Rollon.

Tab. 9

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 70 SP4	0.0054	0.0367	0.042

Tab. 11

Ball screw precision

Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5*	ISO 7	ISO 5*	ISO 7
TH 70 / 8-2.5	0.023	0.05	0.01	0.02

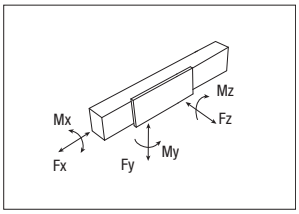
* ISO5 available only for max stroke 330mm. For more information please contact Rollon.

Tab. 10

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn
TH 70 SP4	8-2.5	2220	1470

Tab. 12



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn	Stat.	Stat.	Stat.	Stat.
TH 70 SP4	9980	6280	9980	200	319	319

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 13

Note: for SP4 model the load capacities are valid only when the sliders are fixed together

TH 90 SP2

TH 90 SP2 Dimensions (single carriage)

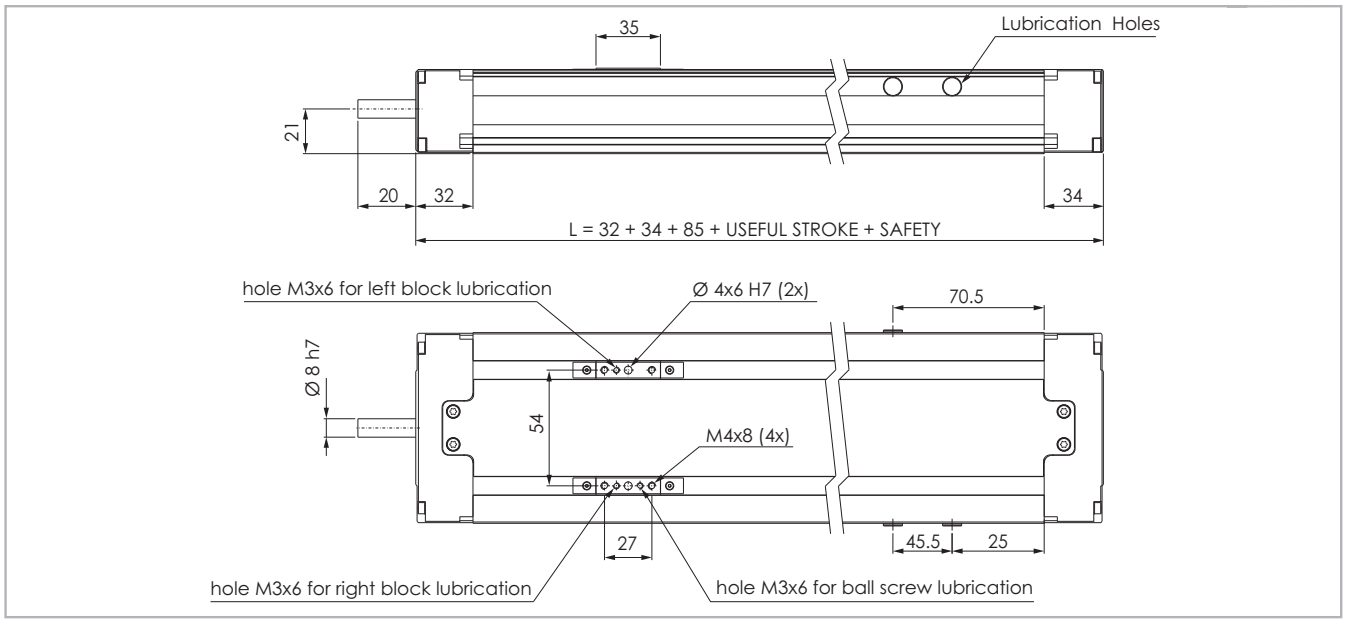


Fig. 4

Technical data

	Type
	TH 90 SP2
Max. useful stroke length [mm]	665
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	0.65
Zero travel weight [kg]	1.41
Weight for 100 mm useful stroke [kg]	0.6
Rail size [mm]	12 mini

Tab. 14

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 90 SP2	0.0130	0.0968	0.1098

Tab. 16

Starting torque

Type	Ball Screw	[Nm]
TH 90 SP2	12-05	0.07
	12-10	0.08

Tab. 17

Ball screw precision

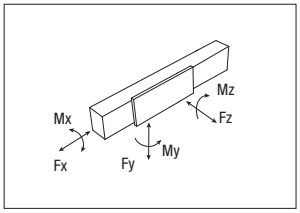
Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TH 90 / 12-05	0.023	0.05	0.01	0.02
TH 90 / 12-10	0.023	0.05	0.01	0.02

Tab. 15

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TH 90 SP2	12-05	9000	4300
	12-10	6600	3600

Tab. 18



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TH 90 SP2	7060	6350	7060	192	24	24

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 19

TH 90 SP4

TH 90 SP4 Dimensions (dual carriage)

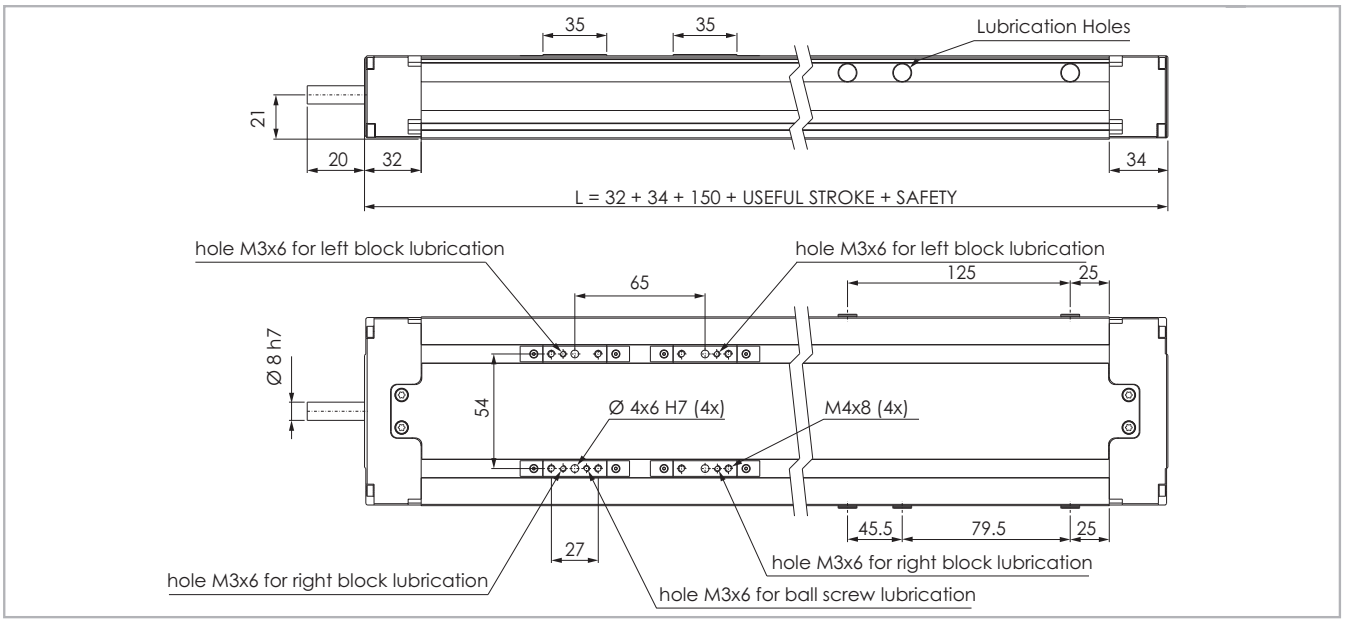


Fig. 5

Technical data

	Type
	TH 90 SP4
Max. useful stroke length [mm]	600
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	0.90
Zero travel weight [kg]	2.04
Weight for 100 mm useful stroke [kg]	0.6
Rail size [mm]	12 mini

Tab. 20

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 90 SP4	0.0130	0.0968	0.1098

Tab. 22

Starting torque

Type	Ball Screw	[Nm]
TH 90 SP4	12-05	0.07
	12-10	0.08

Tab. 23

Ball screw precision

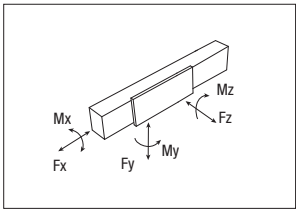
Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TH 90 / 12-05	0.023	0.05	0.01	0.02
TH 90 / 12-10	0.023	0.05	0.01	0.02

Tab. 21

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn
TH 90 SP4	12-05	9000	4300
	12-10	6600	3600

Tab. 24



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn	Stat.	Stat.	Stat.	Stat.
TH 90 SP4	14120	12699	14120	384	459	459

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 25

Note: for SP4 model the load capacities are valid only when the sliders are fixed together

TH 110 SP2

TH 110 SP2 Dimensions (single carriage)

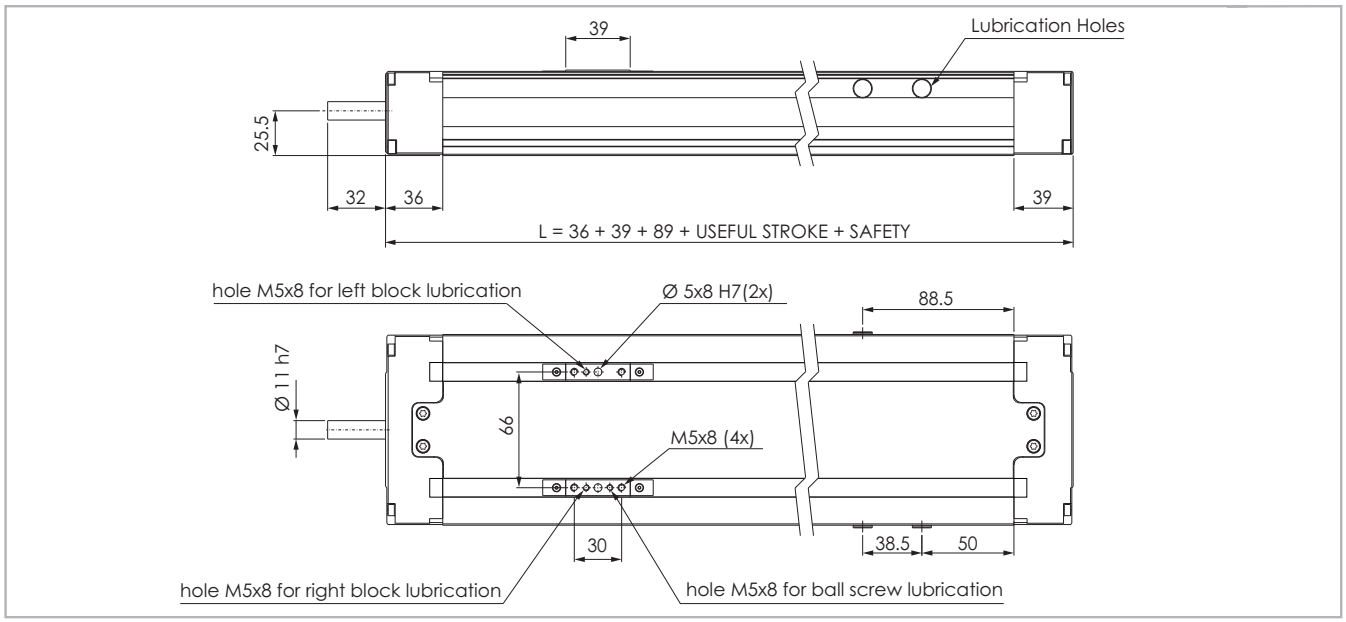


Fig. 6

Technical data

	Type
	TH 110 SP2
Max. useful stroke length [mm]	1411
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	0.76
Zero travel weight [kg]	2.65
Weight for 100 mm useful stroke [kg]	0.83
Rail size [mm]	15

Tab. 26

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 110 SP2	0.0287	0.2040	0.2327

Tab. 28

Starting torque

Type	Ball Screw	[Nm]
TH 110 SP2	16-05	0.16
	16-10	0.23
	16-16	0.27

Tab. 29

Ball screw precision

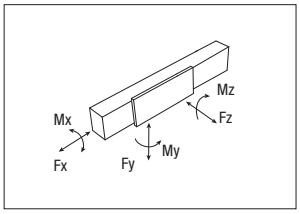
Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TH 110 / 16-05	0.023	0.05	0.005	0.045
TH 110 / 16-10	0.023	0.05	0.005	0.045
TH 110 / 16-16	0.023	0.05	0.005	0.045

Tab. 27

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TH 110 SP2	16-05	17400	11800
	16-10	18300	10500
	16-16	18800	10300

Tab. 30



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TH 110 SP2	48400	22541	48400	1549	350	350

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 31

TH 110 SP4

TH 110 SP4 Dimensions (Dual carriage)

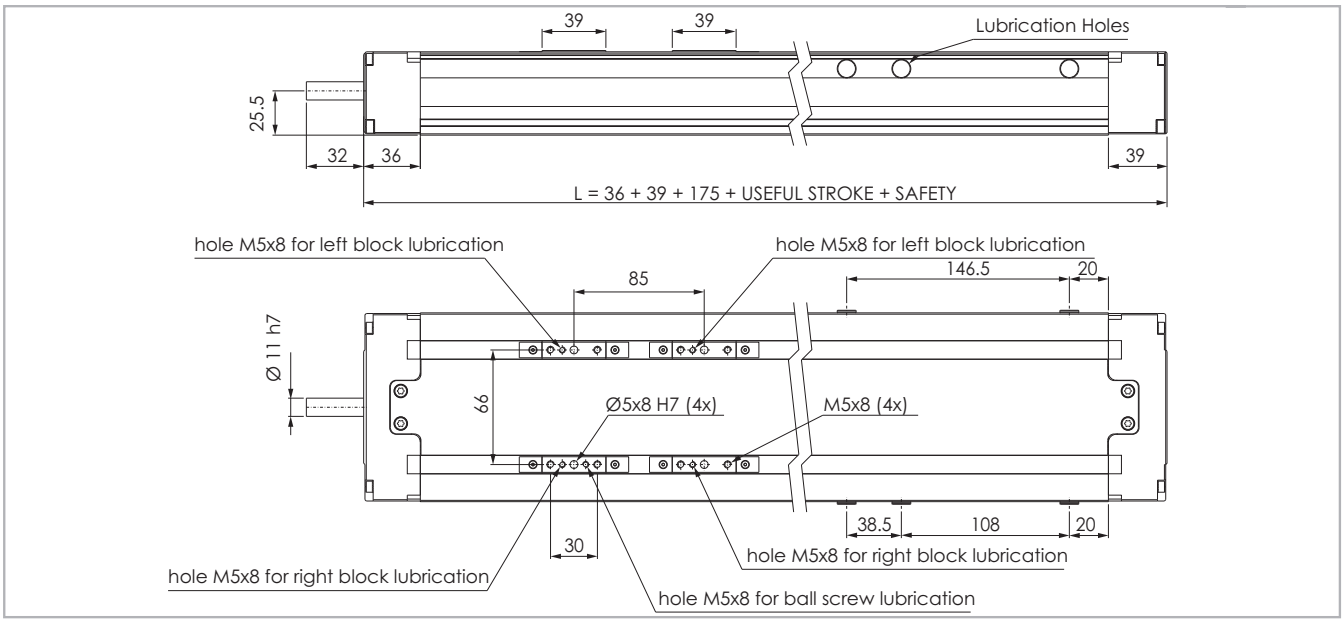


Fig. 7

Technical data

	Type
	TH 110 SP4
Max. useful stroke length [mm]	1325
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	1.26
Zero travel weight [kg]	4.00
Weight for 100 mm useful stroke [kg]	0.83
Rail size [mm]	15

Tab. 32

Ball screw precision

Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TH 110 / 16-05	0.023	0.05	0.005	0.045
TH 110 / 16-10	0.023	0.05	0.005	0.045
TH 110 / 16-16	0.023	0.05	0.005	0.045

Tab. 33

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 110 SP4	0.0287	0.2040	0.2327

Tab. 34

Starting torque

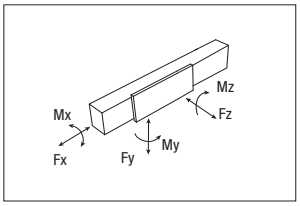
Type	Ball Screw	[Nm]
TH 110 SP4	16-05	0.16
	16-10	0.23
	16-16	0.27

Tab. 35

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn
TH 110 SP4	16-05	17400	11800
	16-10	18300	10500
	16-16	18800	10300

Tab. 36



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn	Stat.	Stat.	Stat.	Stat.
TH 110 SP4	96800	45082	96800	3098	2606	2606

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 37

Note: for SP4 model the load capacities are valid only when the sliders are fixed together

TH 145 SP2

TH 145 SP2 Dimensions (single carriage)

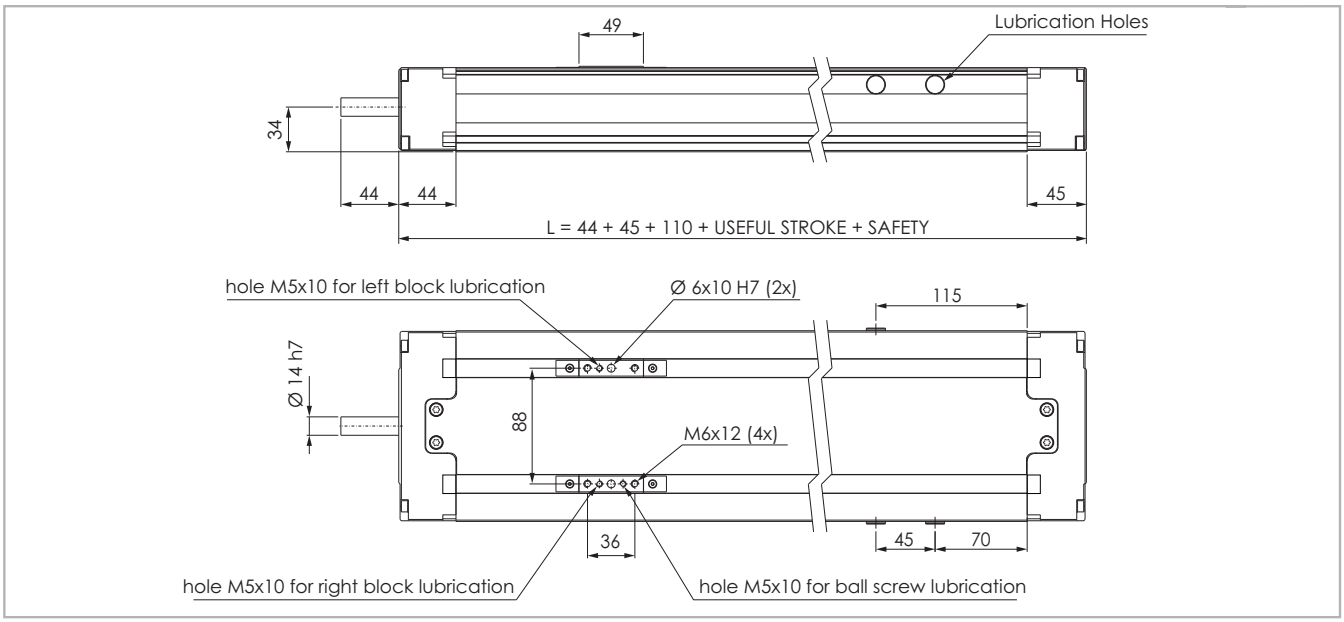


Fig. 8

Technical data

	Type
	TH 145 SP2
Max. useful stroke length [mm]	1690
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	1.45
Zero travel weight [kg]	5.9
Weight for 100 mm useful stroke [kg]	1.6
Rail size [mm]	20

Tab. 38

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 145 SP2	0.090	0.659	0.749

Tab. 40

Starting torque

Type	Ball Screw	[Nm]
TH 145 SP2	20-05	0.22
	20-20	0.35
	25-10	0.29

Tab. 41

Ball screw precision

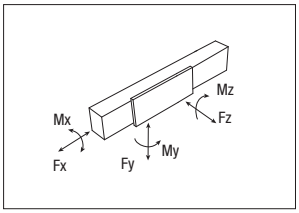
Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TH 145 / 20-05	0.023	0.05	0.005	0.045
TH 145 / 20-20	0.023	0.05	0.005	0.045
TH 145 / 25-10	0.023	0.05	0.005	0.045

Tab. 39

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TH 145 SP2	20-05	25900	14600
	20-20	23900	13400
	25-10	32600	16000

Tab. 42



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TH 145 SP2	76800	35399	76800	3341	668	668

Tab. 43

See verification under static load and lifetime on page SL-2 and SL-3

TH 145 SP4

TH 145 SP4 Dimensions (dual carriage)

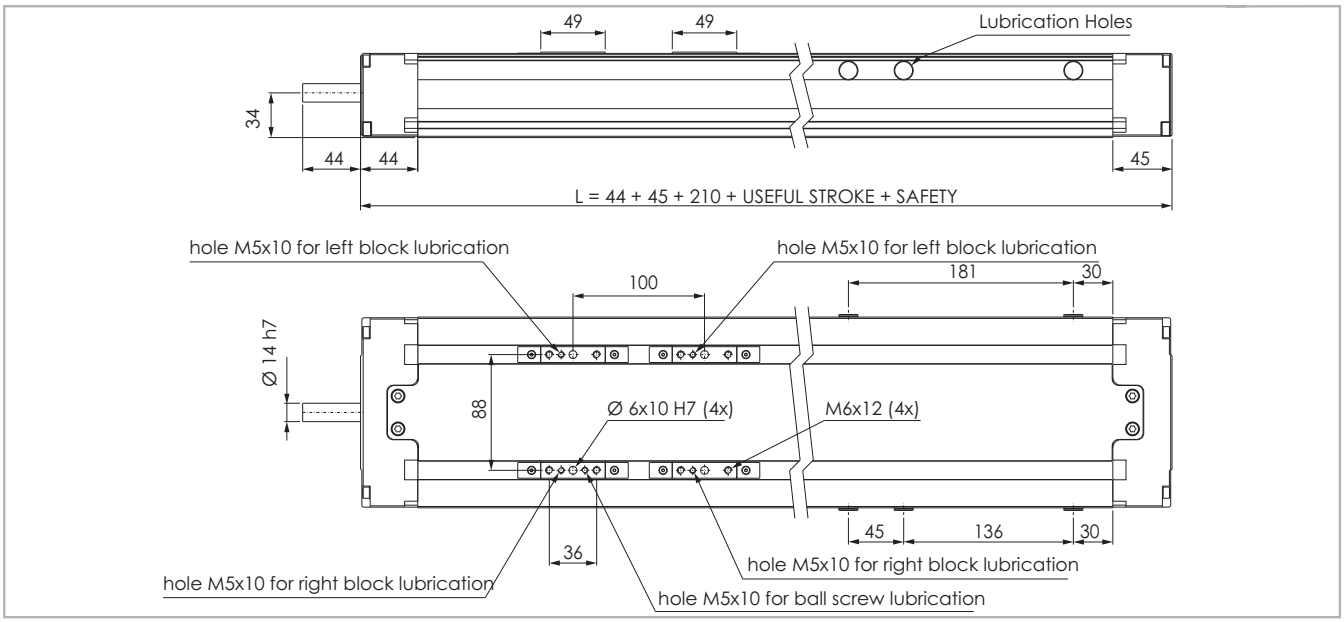


Fig. 9

Technical data

	Type
	TH 145 SP4
Max. useful stroke length [mm]	1590
Max. speed [m/s]	See page PS-14
Carriage weight [kg]	2.42
Zero travel weight [kg]	8.3
Weight for 100 mm useful stroke [kg]	1.6
Rail size [mm]	20

Tab. 44

Ball screw precision

Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TH 145 / 20-05	0.023	0.05	0.005	0.045
TH 145 / 20-20	0.023	0.05	0.005	0.045
TH 145 / 25-10	0.023	0.05	0.005	0.045

Tab. 45

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TH 145 SP4	0.090	0.659	0.749

Tab. 46

Starting torque

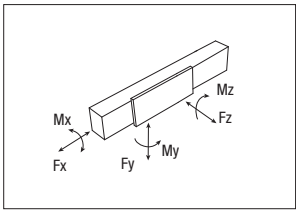
Type	Ball Screw	[Nm]
TH 145 SP4	20-05	0.22
	20-20	0.35
	25-10	0.29

Tab. 47

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TH 145 SP4	20-05	25900	14600
	20-20	23900	13400
	25-10	32600	16000

Tab. 48



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TH 145 SP4	153600	70798	153600	6682	5053	5053

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 49

Note: for SP4 model the load capacities are valid only when the sliders are fixed together

Motor connections

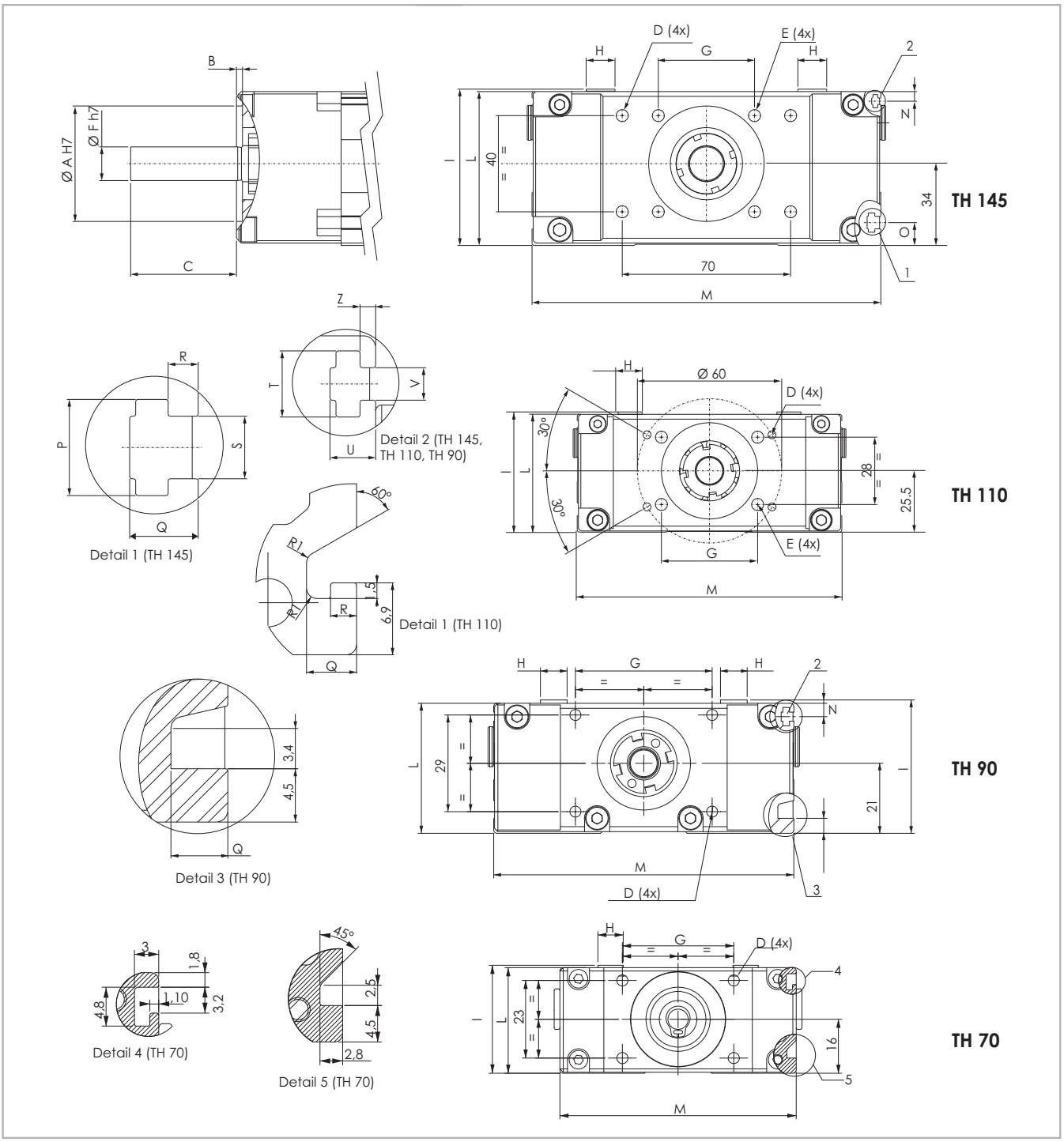


Fig. 10

Units [mm]

Type	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T	U	V	Z
TH 70	28	2.5	18	M4x8	-	5 or 6	33	7.5	32	31.3	70	-	-	-	-	-	-	-	-	-	-
TH 90	28	2.5	20	M4x8	-	8	41	8	40	39	90	4	4.5	-	4.8	-	-	5.5	3.8	2.7	1.3
TH 110	40	2.5	32	M4x8	M6x10	11	40	10	50	49	110	4	-	-	4.8	2.5	-	5.5	3.8	2.7	1.3
TH 145	48	2.5	44	M6x10	M6x12	14	40	12	65	64	145	4	9.5	8	5.7	2.5	5.2	5.5	3.8	2.7	1.3

Tab. 50

Lubrication

TH linear units with ball bearing guides

TH Linear units are equipped with self lubricating linear ball guides. The ball bearing carriages are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

This system guarantees a long interval between maintenances: every 2000 Km or 1 year of use, based on the value reached first. If a longer service life is required or in case of high dynamic or high loaded applications please contact our offices for further verification.

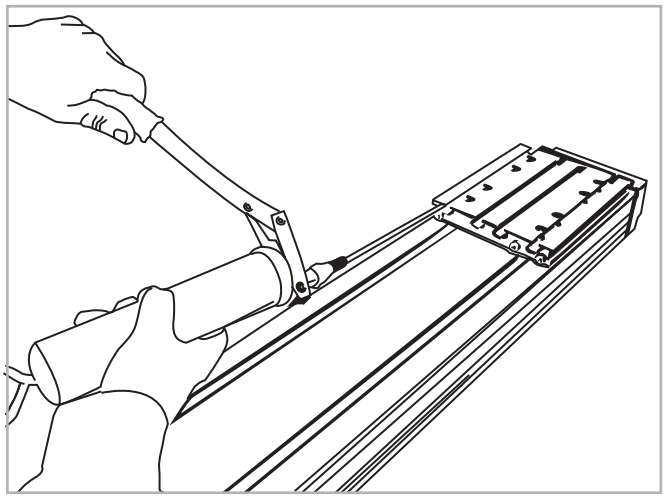


Fig. 11

Ball screws

The ball screw nuts for the Rollon TH series linear slides should be re-lubricated every 100 km.

Type	Quantity [cm³] for grease nipple
08-2.5	0.1
12-05	0.2
12-10	0.2
16-05	0.41
16-10	0.78
16-16	0.6
20-05	0.79
20-20	1.0
25-10	1.2

Tab. 51

Amount of lubricant needed to lubricate carriages:

Type	Quantity [cm³]
TH 70	0.23
TH 90	0.5
TH 110	0.7
TH 145	1.4

Tab. 52

- Insert grease gun into the specific grease nipples.
- Type of lubrificant: Lithium soap grease of class NLGI 2.
- For specially stressed applications or difficult enviromental conditions, lubrication should be carried out more frequently. Refer to Rollon for further advice.

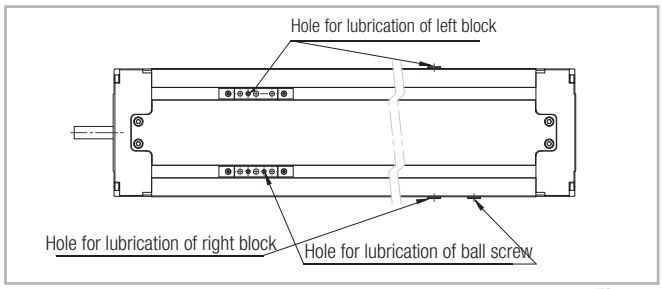
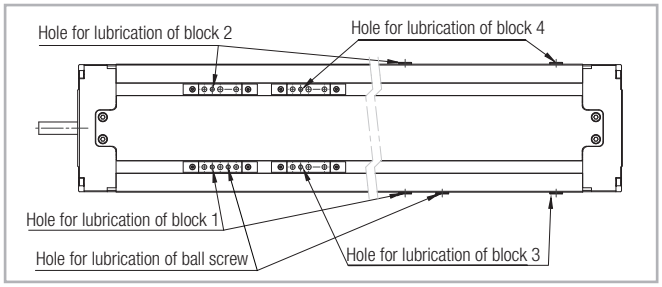


Fig. 12



Please refer to page PS-5 for the position of the holes for lubrication for TH 90 SP 4.

Fig. 13

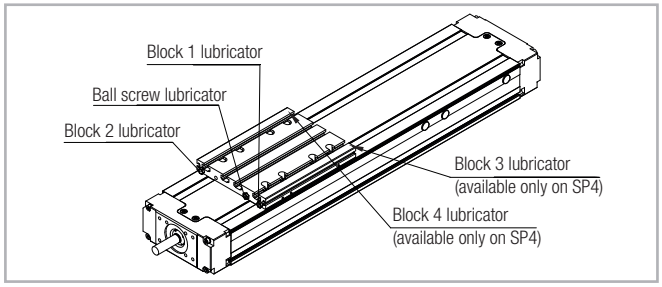


Fig. 14

Critical speed

The maximum linear speed of Rollon TH series linear units depends on the critical speed of the screw (based on its diameter and length) and on the max. permissible speed of the ball screw nut used.

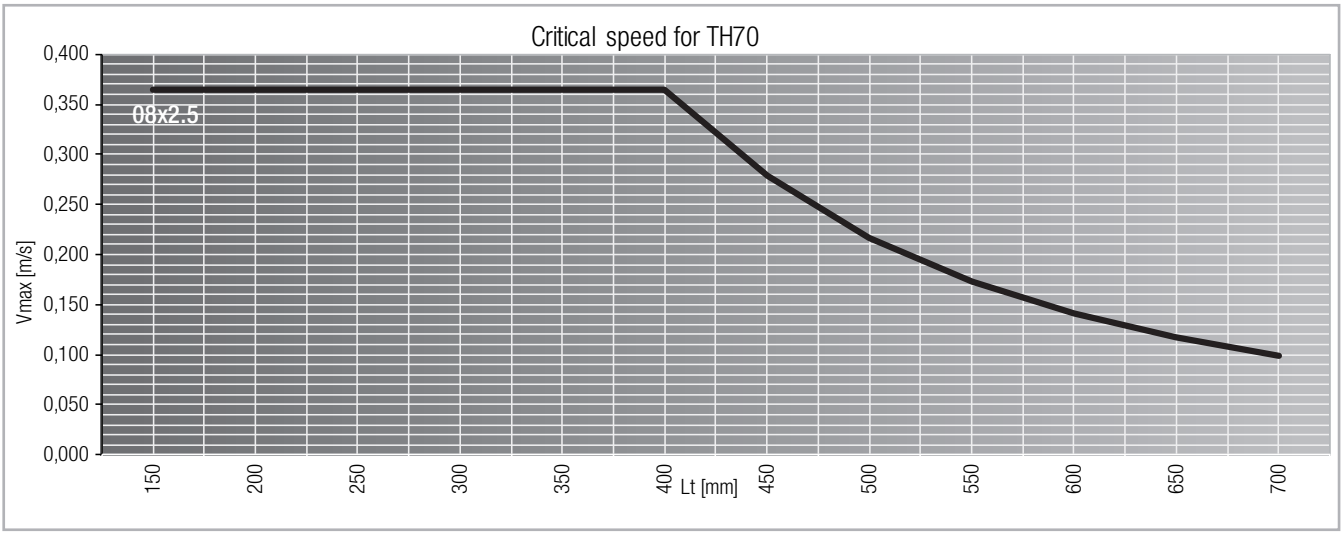


Fig. 15

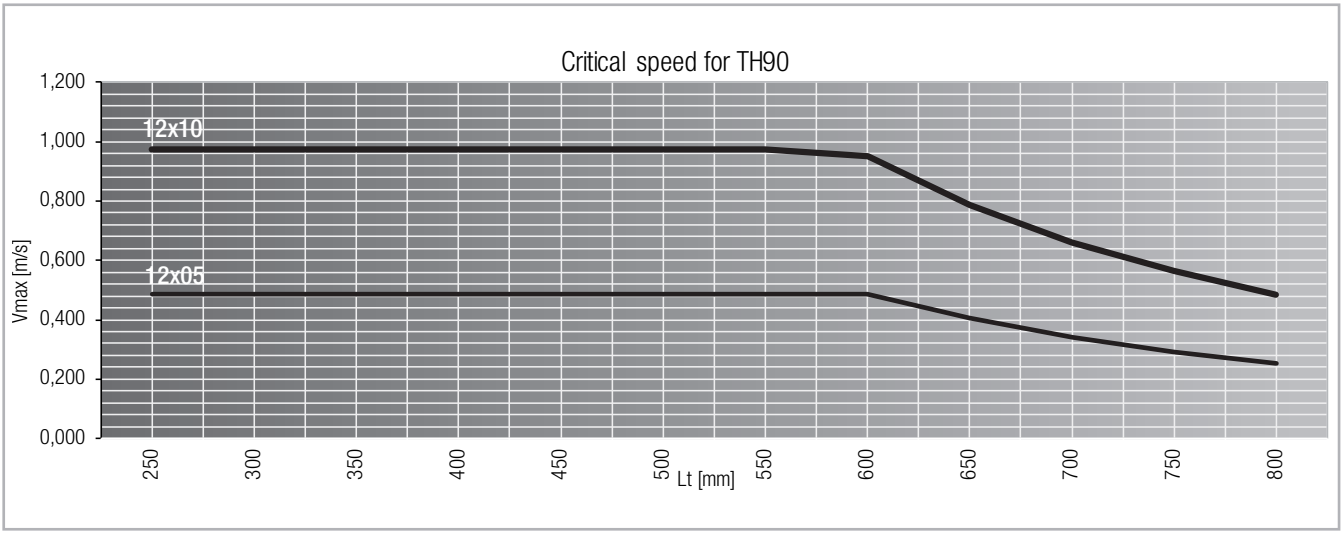


Fig. 16

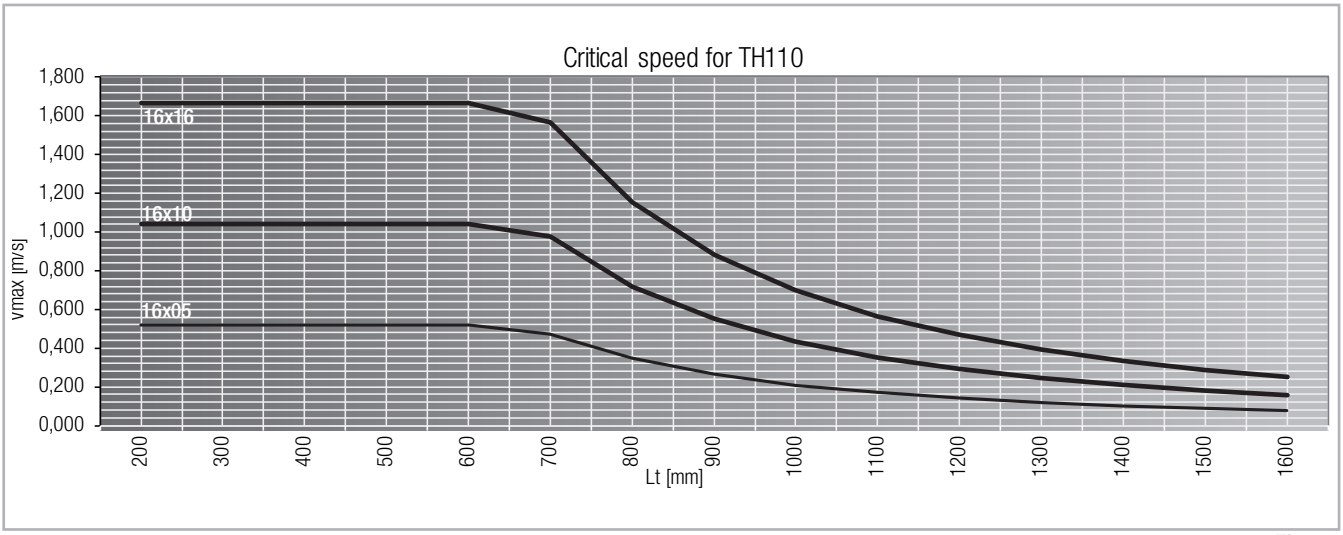


Fig. 17

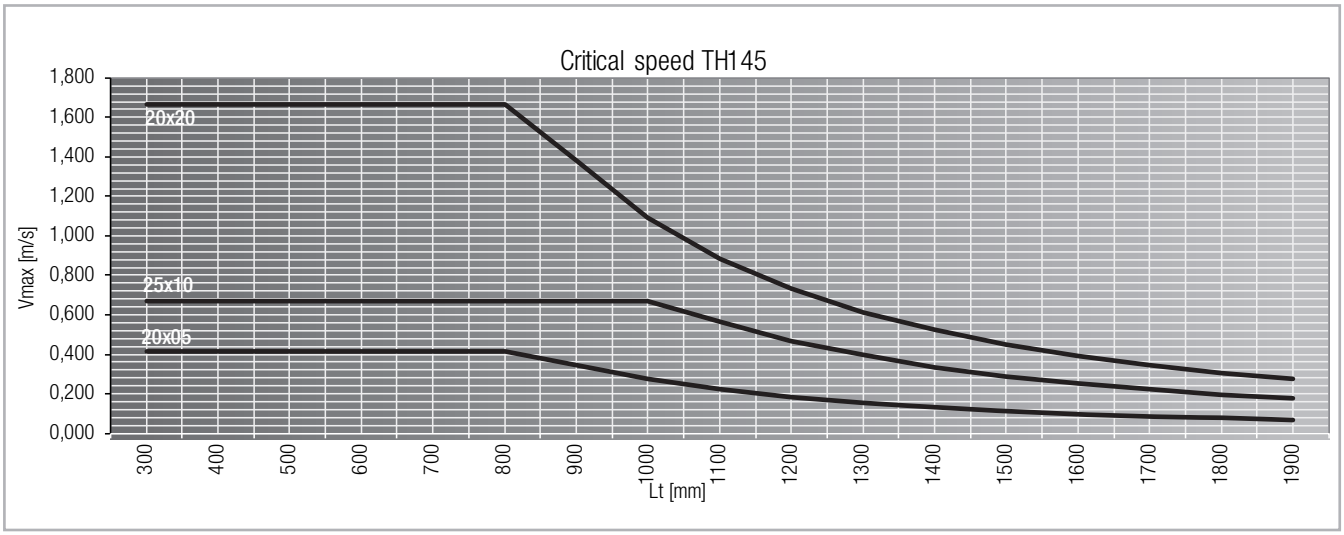


Fig. 18

Accessories

Fixing by brackets

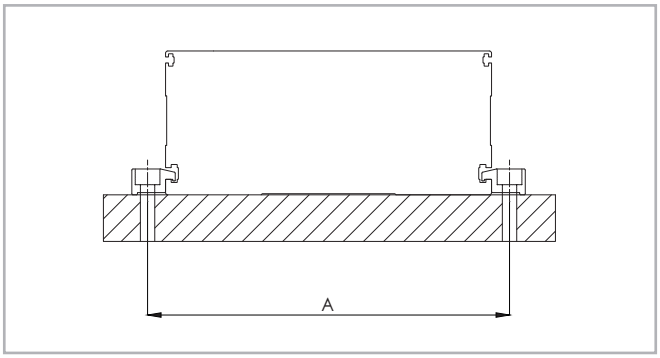


Fig. 19

Units (mm)

Type	A Unit mm
TH 70	82
TH 90	102
TH 110	126
TH 145	161

Tab. 53

Fixing brackets

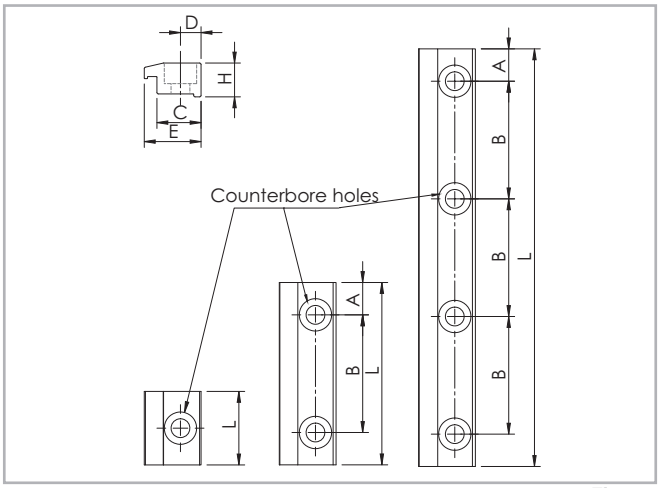


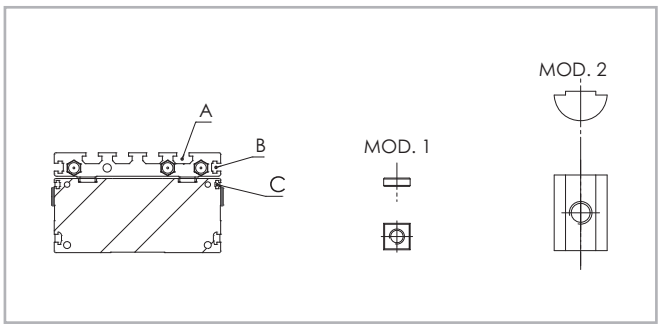
Fig. 20

Dimensions (mm)

Type	N° holes	Counterbore for screw	A	B	C	D	E	H	L	Code Rollon
TH 70	1	M4	-	-	12.5	6.5	15	9	22	1005198
TH 90	2	M4	11	40	10.5	4.5	14.5	9.1	62	1003385
	4	M4	8.5	30	10.5	4.5	14.5	9.1	107	1003509
	4	M4	8.5	20	10.5	4.5	14.5	9.1	77	1003510
	1	M4	-	-	10.5	4.5	14.5	9.1	25	1003612
TH 110 TH 145	4	M5	8.5	30	15	7	19.3	11.5	107	1002805
	4	M6	11	40	15	7	19.3	11.5	142	1002864
	1	M6	-	-	15	7	19	11.5	25	1002970
	2	M6	11	40	15	7	19	11.5	62	1002971
	4	M5	20	20	15	7	19	11.5	100	1003311

Tab. 54

T nuts



21

Units (mm)

Type	A	B	C
TH 70	Mod. 1 M4 - 963.0407.81	Mod. 1 M4 - 963.0407.81	-
TH 90	Mod. 2 M5 - 6000436	-	Mod. 1 M2.5 - 6001361
TH 110	Mod. 2 M5 - 6000436	Mod. 1 M4 - 963.0407.81	Mod. 1 M2.5 - 6001361
TH 145	Mod. 2 M6 - 6000437	Mod. 1 M4 - 963.0407.81	Mod. 1 M2.5 - 6001361

Tab. 55

Proximity

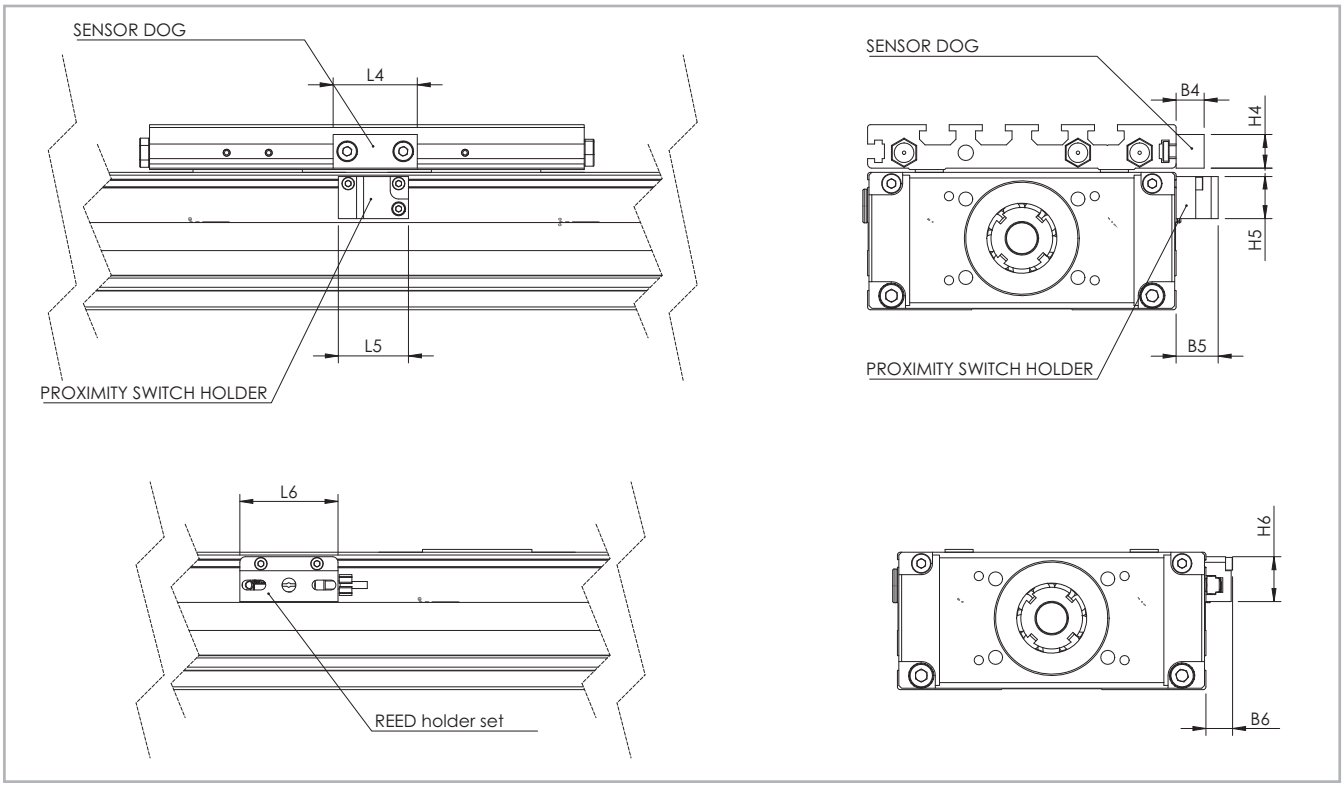


Fig. 22

Units (mm)

	B4	B5	B6	L4	L5	L6	H4	H5	H6	Sensor	Proximity holder set	Sensor dog	REED holder set
TH 70	8	10	8	30	25	35	10	18	18	Ø 6.5	G001975	G001976	G001974
TH 90	10	15	9.5	12	25	35	6	15	16	Ø 8	G001193	G001203	G001204
TH 110	10	15	9.5	30	25	35	12	15	16	Ø 8	G001193	G001198	G001204
TH 145	10	15	9.5	30	25	35	12	15	16	Ø 8	G001193	G001198	G001204

Tab. 56

External carriage

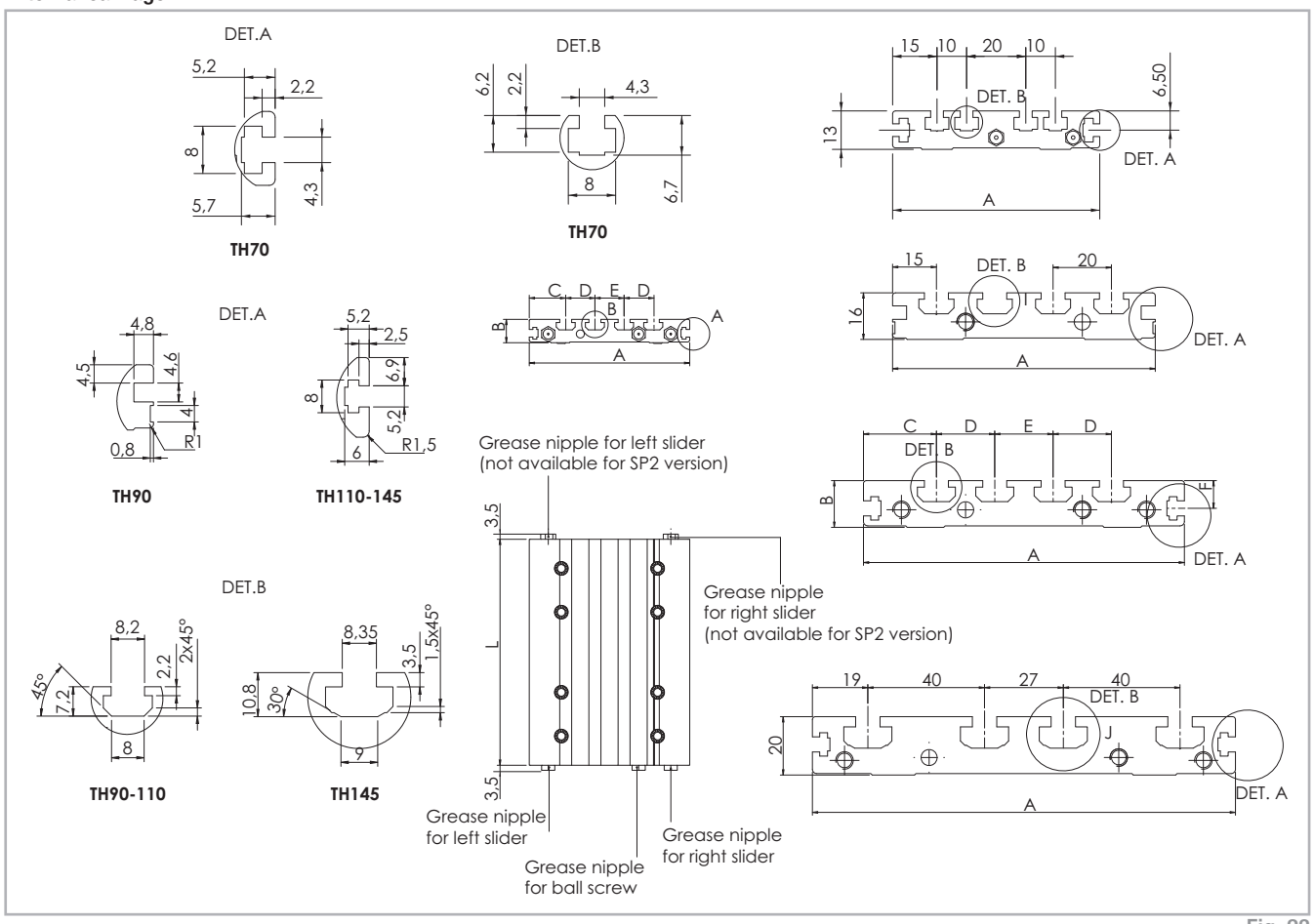
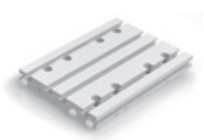


Fig. 23

External carriage for SP2	Type	A	B	C	D	E	F	L	Code
	TH 70	70	13	15	10	20	6,5	60	G001957
	TH 90	90	16	15	20	20	6.8	60	G001195
	TH 110	110	16	25	20	20	9.5	60	G001059
	TH 145	145	20	19	40	27	9.5	80	G001062

Tab. 57

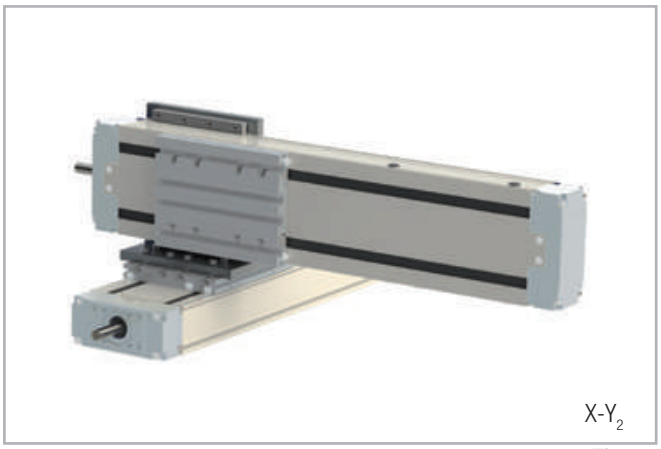
External carriage for SP4	Type	A	B	C	D	E	F	L	Code
	TH 70	70	13	15	10	20	6,5	95	G001958
	TH 90	90	16	15	20	20	6.8	125	G001194
	TH 110	110	16	25	20	20	9.5	155	G001060
	TH 145	145	20	19	40	27	9.5	190	G001061

Tab. 58

Coupling	Motor bell Kit
	

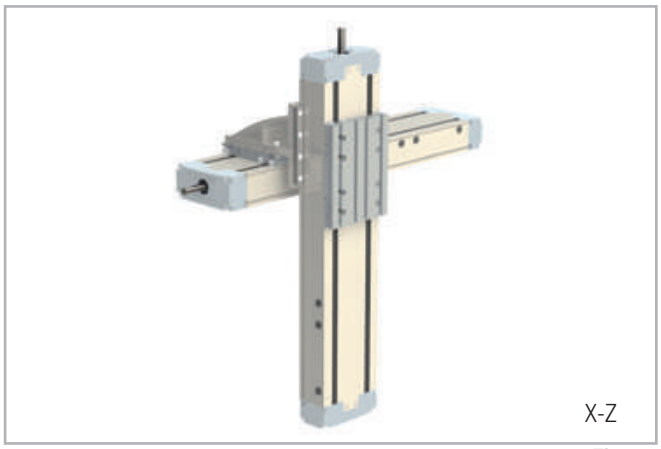
Tab. 59

Assembly kits



X-Y_2

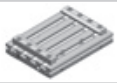
Fig. 24



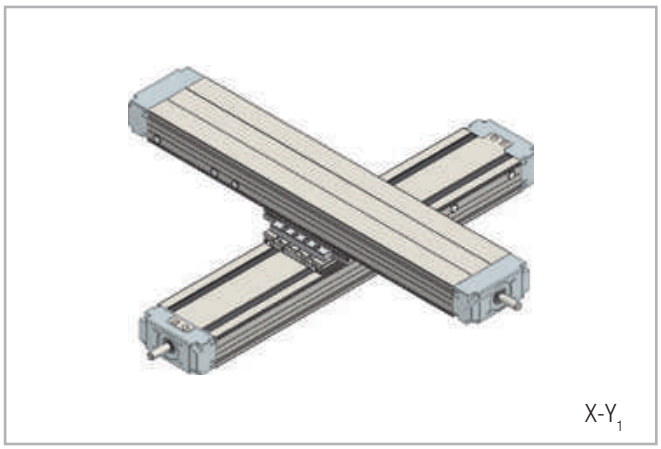
X-Z

Fig. 25

For the direct assembly of TH linear units on multiple axis system Rollon offers dedicated assembly kits. The table below shows the allowed combinations as well as the assembly kit codes.

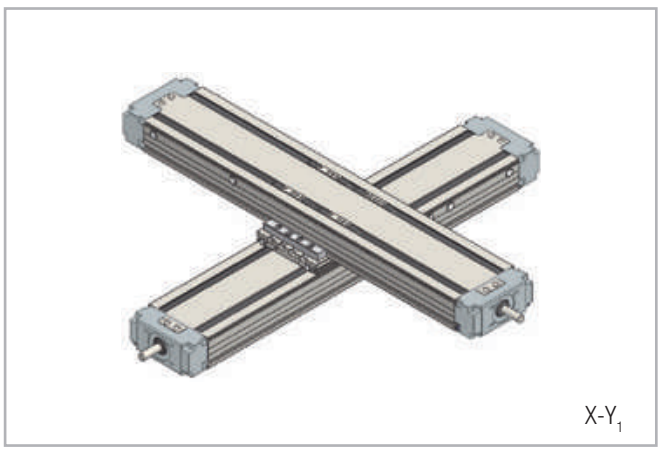
Kit		Code
	**TH 90 - TH 90 XY_2**	G001199
	**TH 90 - TH 110 XY_2**	G001199
	**TH 90 - TH 110 XZ**	G001205
	**TH 110 - TH 110 XY_2**	G001080
	**TH 110 - TH 110 XZ**	G001083
	**TH 110 - TH 145 XY_2**	G001079
	**TH 110 - TH 145 XZ**	G001084
	**TH 145 - TH 145 XY_2**	G001081
	**TH 145 - TH 145 XZ**	G001085
	**TH 90 - TH 90 XY_1**	G001483
	**TH 90 - TH 90 XY_3**	G001483 + G001194
	**TH 110 - TH 110 XY_1**	G001173
	**TH 110 - TH 110 XY_2**	G001173 + G001060
	**TH 145 - TH 145 XY_1**	G001362
	**TH 145 - TH 145 XY_2**	G001362 + G001061

Tab. 60



X-Y_1

Fig. 26



X-Y_1

Fig. 27

Wrap around kit

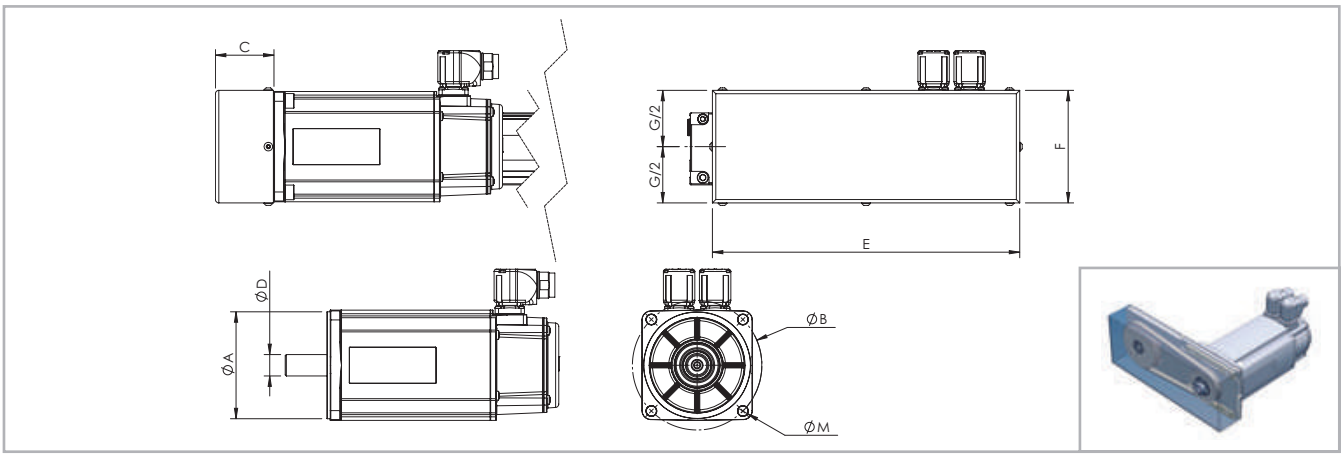


Fig. 28

Unit	Ratio	A	B	C	D	E	F	M	Code
TH 90	1 : 1	Ø 40	Ø 63	30	Ø 9	168	63	M4	G001592
TH 110	1 : 1	Ø 40	Ø 63	40.5	Ø 9	233	88	M4	G001011
TH 110	1 : 1	Ø 50	Ø 70	40.5	Ø 14	233	88	M4	G001055
TH 110	1 : 1	Ø 60	Ø 75	40.5	Ø 14	233	88	M6	G001013
TH 145	1 : 1	Ø 80	Ø 100	52	Ø 14	273	100	M6	G000984
TH 145	1 : 1	Ø 95	Ø 115	52	Ø 19	273	100	M8	G000988

For further information please contact Rollon Technical Dept.

Tab. 61

Mounting of the motor

Rollon TH Series linear units can be supplied with different types of motor mounts, adapter flanges, and with torsionally stiff couplings for screw and motor connections that enable fast, hassle-free assembly of the motors.

The types of bells available for the related units are shown in the table motor mounts:

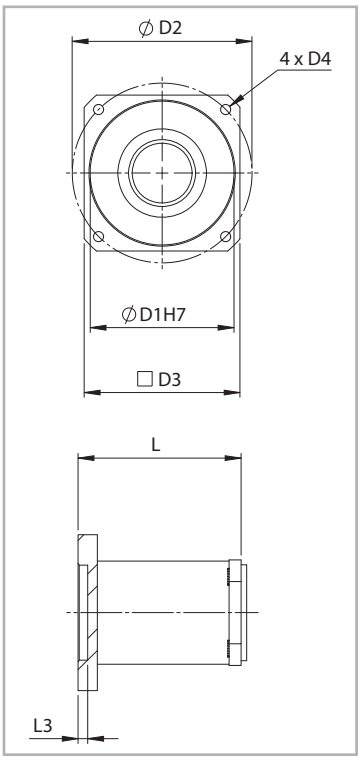


Fig. 29

Unit	D1	D2	D3	D4	L	L3	Code
TH70	Ø 30	Ø 45	38	M3	52	4	G002000
TH70	Ø 40	Ø 63	54	M4	49	3.5	G002001
TH70	Ø 50	Ø 70	60	M4	59	4	G002002
TH90	Ø 40	Ø 63	56	M5	50	3	G001192
TH110	Ø 60	Ø 75	65	M6	68	4	G001051
TH110	Ø 73,1	Ø 98,4	86	M5	76.7	2	G001074
TH110	Ø 60	Ø 75	65	M5	68	4	G001119
TH110	Ø 50	Ø 70	65	Ø 5.4	75	11	G001200
TH145	Ø 50	Ø 70	80x60	M4	92	21	G000979
TH145	Ø 70	Ø 85	80x85	M6	92	4	G001066
TH145	Ø 70	Ø 90	80x85	M5	92	5	G001067
TH145	Ø 80	Ø 100	90	M6	92	4	G001068
TH145	Ø 50	Ø 65	80x85	M5	92	21	G001069
TH145	Ø 60	Ø 75	80x85	M6	92	4	G001070
TH145	Ø 50	Ø 70	80x85	M5	92	21	G001071
TH145	Ø 73	Ø 98,4	85	M5	92	4	G001072
TH145	Ø 55	68X40	85x60	Ø6,4	82	11	G001073

Tab. 62

Ordering key

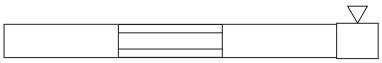
Identification code for the TH linear units

H	09 07=70 09=90 11=110 14=145	1205 08-2.5 12-05 12-10 16-05 16-10 16-16 20-05 20-20 25-10	5P 5P=ISO 5 7N=ISO 7	0800	1A 1A=SP2 set for motor bell kit 2A=SP4 set for motor bell kit 3A=SP2 set for wrap around kit 4A=SP4 set for wrap around kit	
					Head configuration code	
				L=total length of th unit		
			Type *see from pg. PS-4 to pg. PS-11, tab. 5, 10, 15, 21, 27, 33*			
		B/S diameter and lead				
	Size *see from pg. PS-4 to pg. PS-11*					
Linear unit serie TH *see pg. PS-2*						

In order to create identification codes for Actuator Line, you can visit: **http://configureactuator.rollon.com**

Configure Actuator

Left / right orientation



TT series

TT series description

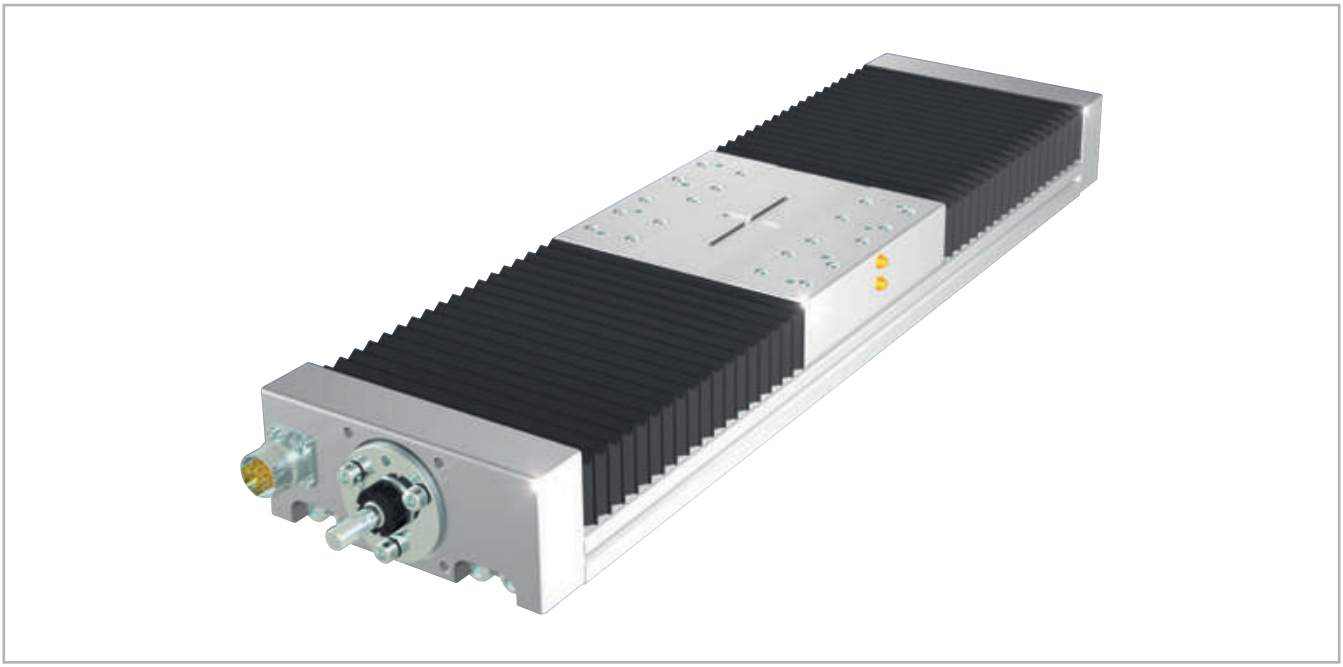


Fig. 30

TT

The TT is a linear actuator series mainly used for high accuracy positioning within a 10 µm range and precision repeatability within 5 µm. Manufactured using a very rigid extruded anodized aluminum base structure, this actuator series is designed for high loads and precise movements that are typically required in machine tools and other exacting machine design applications.

All mounting surfaces and reference datums have been produced to significantly reduce the deviations of pitch, yaw and roll along the entire stroke. The heavy duty carriage is driven by a C5 or C7 preloaded ball screw drive and the payload is supported by a system of four runner blocks mounted on two parallel linear guides. High speeds can be accomplished by specifying available super lead ball screw drivers.

The TT series contains all the necessary features and hardware to make multi-axis configurations and assembly easy. All TT units are 100% inspected and supplied with certificates of accuracy.

The components

Aluminum base unit and carriage

The base and carriages of the Rollon TT series linear units were designed and manufactured in co-operation with industry experts to obtain the high-level of accuracy and maximize mechanical properties. Anodized aluminum alloy 6060 was used with dimensional tolerances complying with UNI 3879 standards. To guarantee highly precise movement, the bodies are precision machined on all outer surfaces and in the areas where the mechanical components are fitted, such as ball bearing guides and ball screw supports.

Linear motion system

Precision ball bearing guides with ground rails and preloaded blocks are used on Rollon TT series linear units. Use of this technology makes it possible to obtain the following features:

- **High accuracy running parallelism**
- **High positioning accuracy**
- **High level of rigidity**
- **Reduced wear**
- **Low resistance to movement**

Drive system

Rollon TT-series linear units use precision ball screws with either preloaded or non-preloaded ball screw nuts. The standard precision class of the ball screws used is ISO 5, however ISO 7 precision class is also available upon request. The ballscrew on the TH unit is available in different diameters and leads (see specifications tables). Use of this type of technology makes it possible to obtain the following features:

- **High speed (for long pitch screws)**
- **High load capacity and accurate thrust forces**
- **Superior mechanical performance**
- **Reduced wear**
- **Low resistance to movement**

Protection

Rollon TT-series linear units are equipped with bellows in order to protect the mechanical and electrical components inside the linear unit against contaminants. In addition to the bellows system, the ball bearing guides and ball screws have their own protection including scrapers and lip seals to remove contaminates from the raceways of the ball bearings.

General data about aluminum used: AL 6060

Chemical composition [%]

Al	Mg	Si	Fe	Mn	Zn	Cu	Impurites
Remaining	0.35-0.60	0.30-0.60	0.30	0.10	0.10	0.10	0.05-0.15

Tab. 63

Physical characteristics

Density	Coeff. of elasticity	Coeff. of thermal expansion (20°-100°C)	Thermal conductivity (20°C)	Specific heat (0°-100°C)	Resistivity	Melting point
$\frac{kg}{dm^3}$	$\frac{kN}{mm^2}$	$\frac{10^{-6}}{K}$	$\frac{W}{m \cdot K}$	$\frac{J}{kg \cdot K}$	$\Omega \cdot m \cdot 10^{-9}$	°C
2.7	69	23	200	880-900	33	600-655

Tab. 64

Mechanical characteristics

Rm	Rp (02)	A	HB
$\frac{N}{mm^2}$	$\frac{N}{mm^2}$	%	—
205	165	10	60-80

Tab. 65

TT 100

TT 100 Dimensions

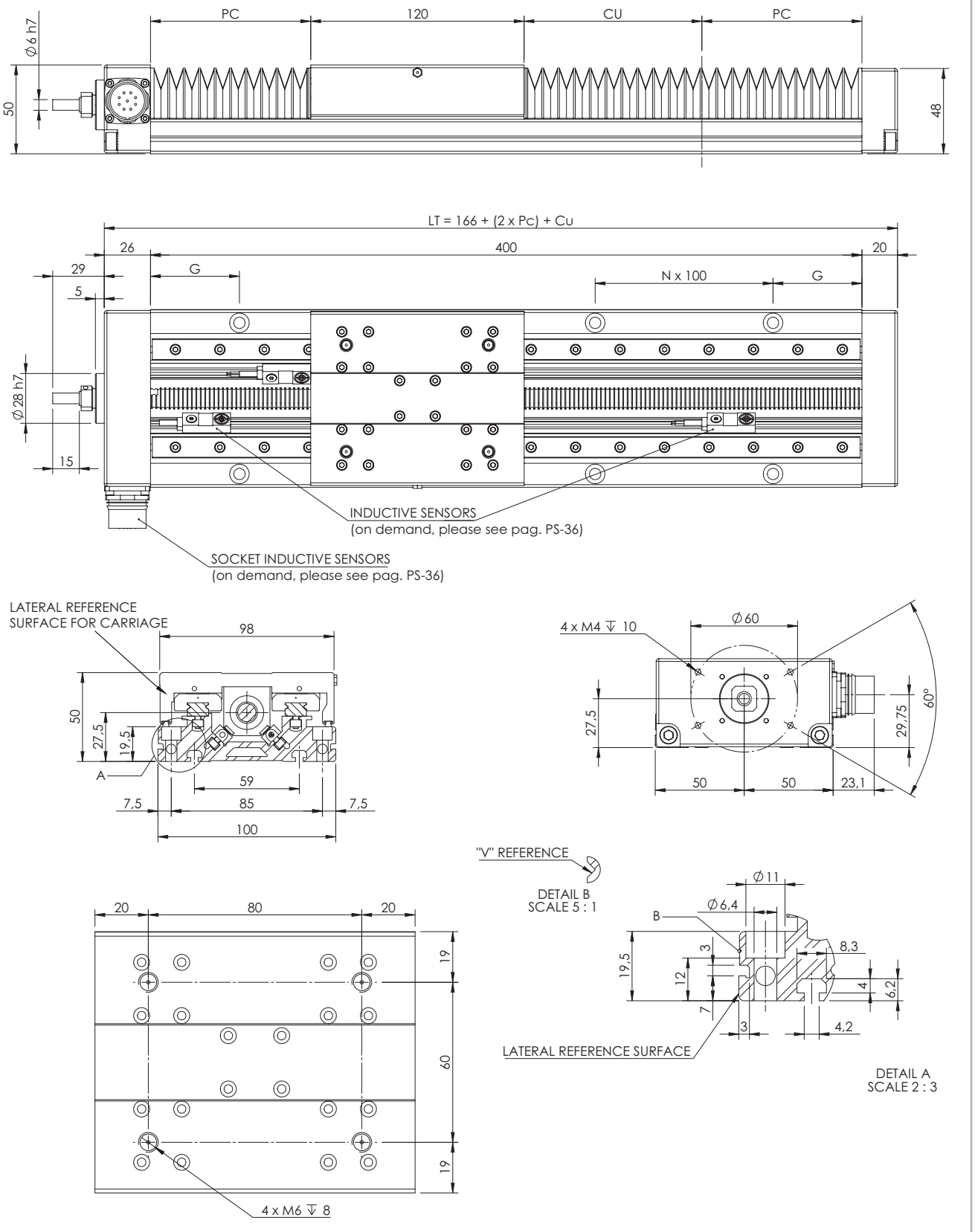


Fig. 31

Technical data

Useful stroke CU [mm]	Total length LT [mm]	G Dimension [mm]	Weight [Kg]
46	246	50	2.5
114	346	50	3
182	446	50	4
252	546	50	5
320	646	50	6
390	746	50	7
458	846	50	7
526	946	50	8
596	1046	50	9
664	1146	50	10
734	1246	50	11
802	1346	50	11
940	1546	50	13

Note: for the ballscrew 12/10 the max. useful stroke is 664 mm.

Tab. 66

Technical data

	Type
	TT 100
Max. speed [m/s]	See page PS-35
Carriage weight [kg]	0.93
Rail size [mm]	12 mini

Tab. 68

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TT 100	0.006	0.144	0.150

Tab. 69

Ball screw precision

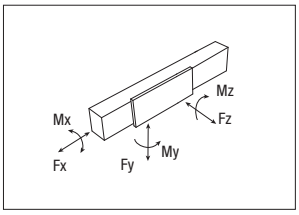
Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TT 100 / 12-05	0.023	0.05	0.01	0.02
TT 100 / 12-10	0.023	0.05	0.01	0.02

Tab. 67

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TT 100	12-05	9000	4300

Tab. 70



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TT 100	9980	6280	9980	274	349	349

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 71

TT 155

TT 155 Dimensions

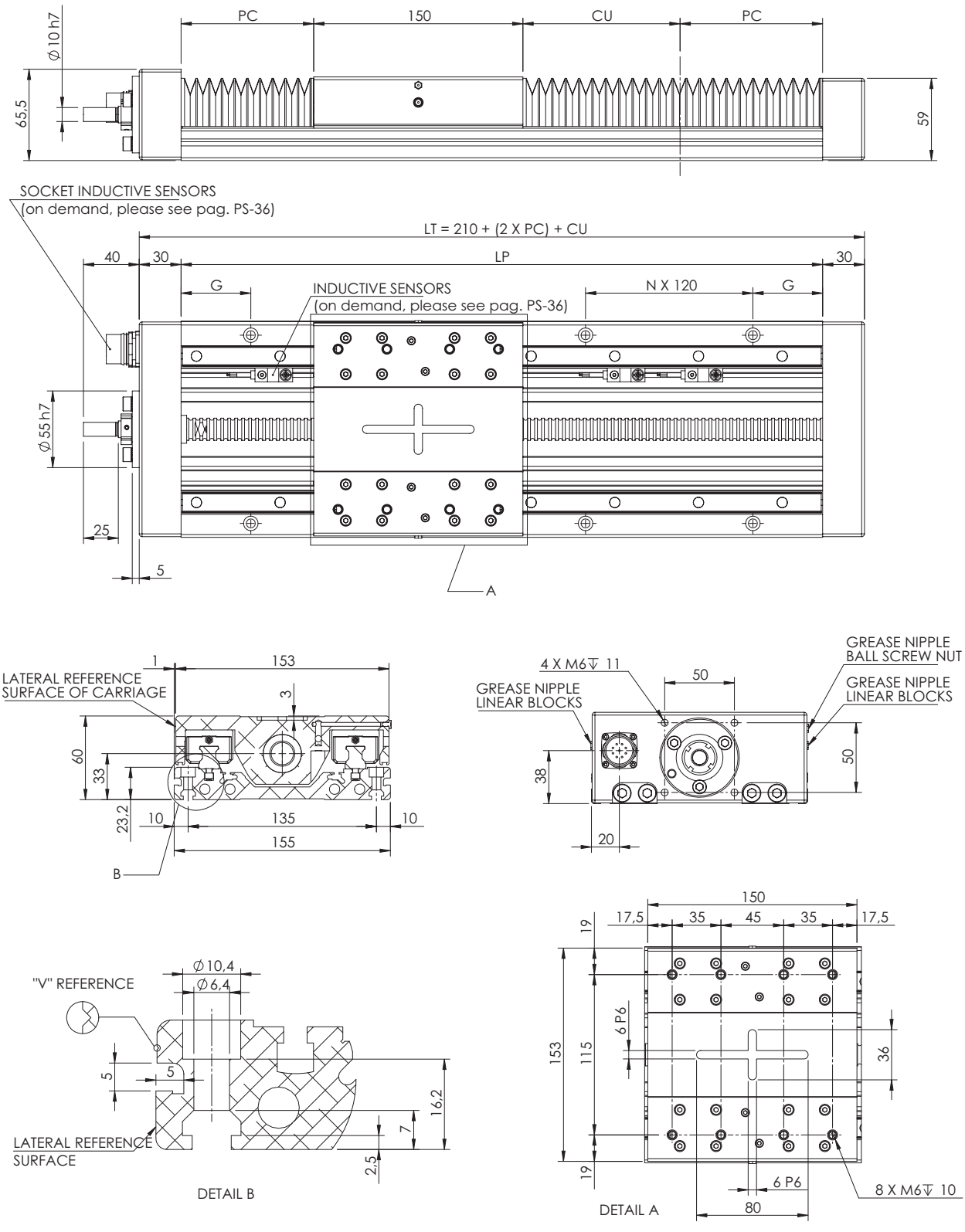


Fig. 32

Technical data

Useful stroke CU [mm]	Total length LT [mm]	G Dimension [mm]	Weight [Kg]
92	340	20	7.5
140	400	50	8.5
188	460	20	9
236	520	50	10
282	580	20	11
330	640	50	12
378	700	20	13
424	760	50	13
520	880	50	15
614	1000	50	17
710	1120	50	18
806	1240	50	20
900	1360	50	21
994	1480	50	23
1090	1600	50	25
1184	1720	50	26
1280	1840	50	28
1376	1960	50	30
1470	2080	50	31

Note: for the ballscrew Ø16 the max. useful stroke is 994 mm.

Tab. 72

Technical data

	Type
	TT 155
Max. speed [m/s]	See page PS-35
Carriage weight [kg]	2.93
Rail size [mm]	15

Tab. 74

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TT 155	0.009	0.531	0.54

Tab. 75

Ball screw precision

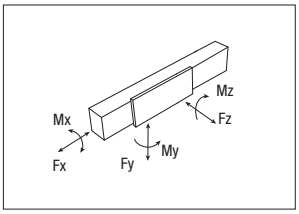
Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TT 155 / 16-05	0.023	0.05	0.005	0.045
TT 155 / 16-10	0.023	0.05	0.005	0.045
TT 155 / 20-05	0.023	0.05	0.005	0.045
TT 155 / 20-20	0.023	0.05	0.005	0.045

Tab. 73

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TT 155	16-05	17400	11800
	16-10	18300	10500
	20-05	25900	14600
	20-20	23900	13400

Tab. 76



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TT 155	96800	45082	96800	5082	2972	2972

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 77

TT 225

TT 225 Dimensions

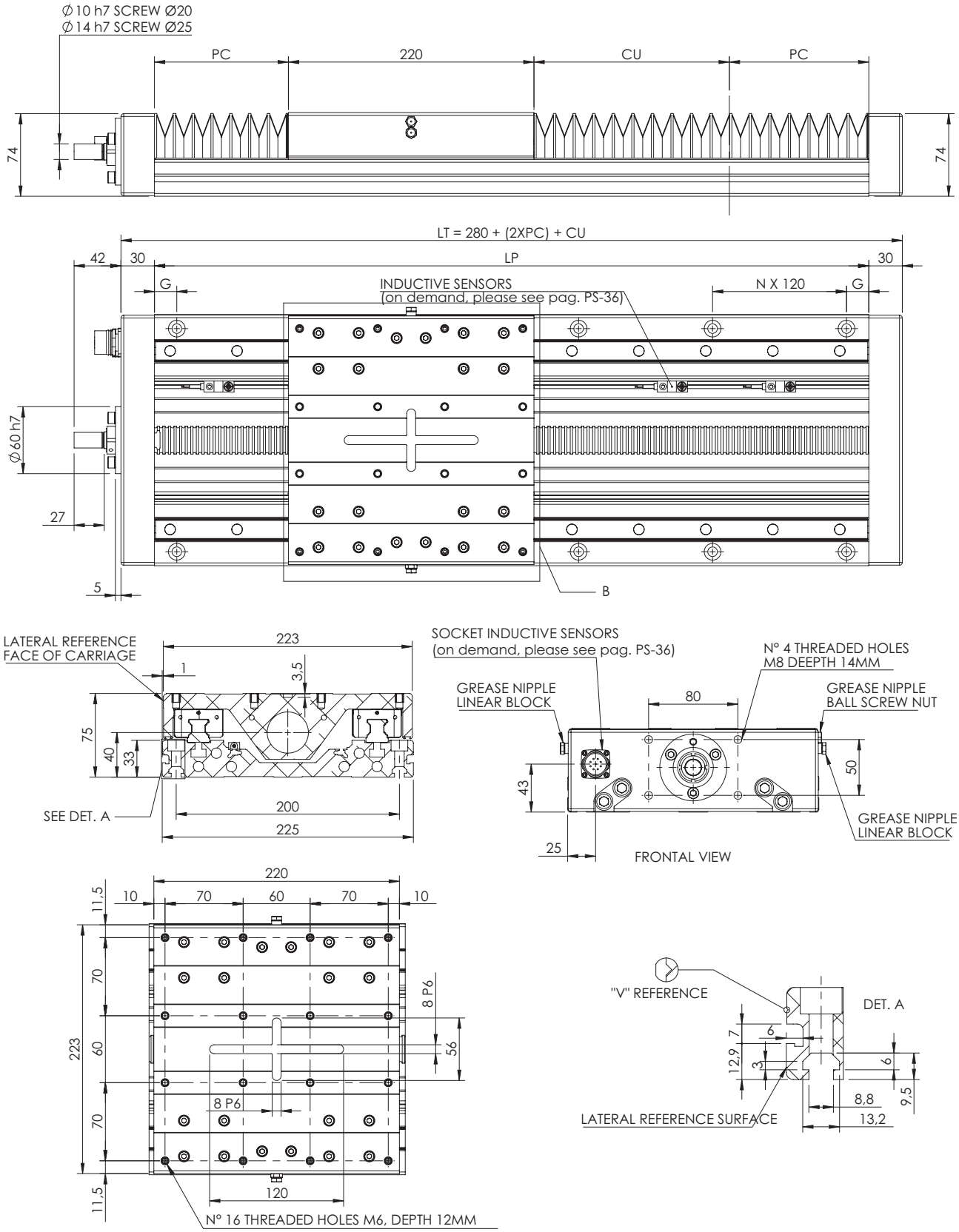


Fig. 33

Technical data

Useful stroke CU [mm]	Total length LT [mm]	G Dimension [mm]	Weight [Kg]
92	400	50	15
144	460	20	16
196	520	50	17
248	580	20	19
300	640	50	20
352	700	20	21
404	760	50	23
508	880	50	25
612	1000	50	28
714	1120	50	31
818	1240	50	33
922	1360	50	36
1026	1480	50	39
1234	1720	50	44
1440	1960	50	49
1648*	2200	50	54
1856*	2440	50	60
2062*	2680	50	65
2270*	2920	50	70

Note: for the ballscrew Ø20 the max. useful stroke is 1440 mm.
* For the indicated lengths Rollon does not guarantee the tolerance values shown on pag. PS-33

Tab. 78

Technical data

	Type
	TT 225
Max. speed [m/s]	See page PS-35
Carriage weight [kg]	5.4
Rail size [mm]	20

Tab. 80

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TT 225	0.038	2.289	2.327

Tab. 81

Ball screw precision

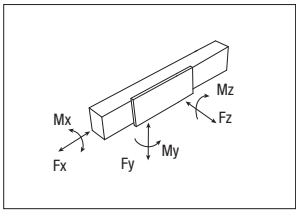
Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TT 225 / 20-05	0.023	0.05	0.005	0.045
TT 225 / 20-20	0.023	0.05	0.005	0.045
TT 225 / 25-05	0.023	0.05	0.005	0.045
TT 225 / 25-10	0.023	0.05	0.005	0.045
TT 225 / 25-25	0.023	0.05	0.005	0.045

Tab. 79

Load capacity F_x

Type	F_x [N]		
	Screw	Stat.	Dyn.
TT 225	20-05	25900	14600
	20-20	23900	13400
	25-05	41200	19800
	25-10	32600	16000
	25-25	30500	15100

Tab. 82



Load capacity

Type	F_y [N]		F_z [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Stat.	Stat.	Stat.
TT 225	153600	70798	153600	12288	9984	9984

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 83

TT 310

TT 310 Dimensions

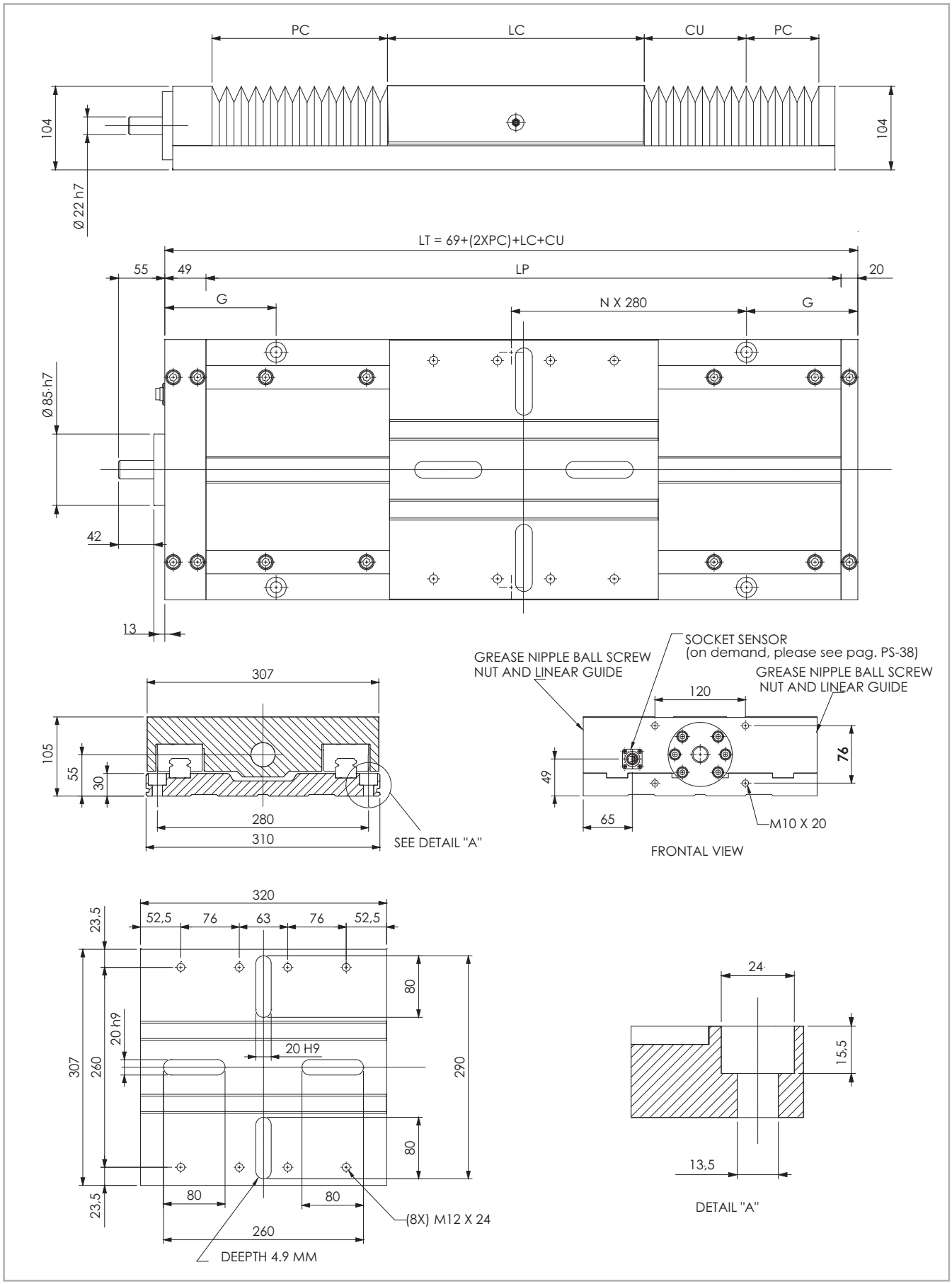


Fig. 34

Technical data

Useful stroke CU [mm]	Total length LT [mm]	G Dimension [mm]	Weight [Kg]
100	560	140	47
150	625	172.5	50
200	690	65	53
250	760	100	56
300	825	132.5	59
350	895	167.5	62
400	965	62.5	65
450	1030	95	68
500	1100	130	71
600*	1235	197.5	77
800*	1505	192.5	89
1000*	1750	175	100
1200*	2000	160	111
1600*	2495	127.5	133
2000*	2990	235	156
2400*	3485	202.5	178
3000*	4225	292.5	211

* For the indicated lengths Rollon does not guarantee the tolerance values shown on pag. PS-33

Tab. 84

Technical data

	Type
	TT 310
Max. speed [m/s]	See page PS-36
Carriage weight [kg]	16.6
Rail size [mm]	30

Tab. 86

Moments of inertia of the aluminum body

Type	I_x [10^7 mm^4]	I_y [10^7 mm^4]	I_p [10^7 mm^4]
TT 310	0.1251	8.56	8.008

Tab. 87

Ball screw precision

Type	Max. positioning precision [mm/300mm]		Max. repeatability precision [mm]	
	ISO 5	ISO 7	ISO 5	ISO 7
TT 310 / 32-05	0.023	0.05	0.008	0.045
TT 310 / 32-10	0.023	0.05	0.008	0.045
TT 310 / 32-32	0.023	0.05	0.008	0.045

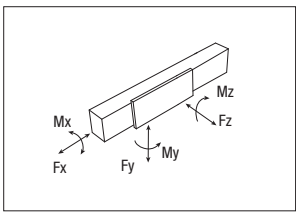
Tab. 85

Load capacity F_x

Type	F_x *1 [N]		
	Screw	Stat.	Dyn.
TT 310	32-05	11538	8947
	32-10	11538	8947
	32-32	11538	8947

*1 Referred to the Max axial load on the bearings not the Ball Screw

Tab. 88



Load capacity

Type	F_y [N]		F_z [N]		M_x [Nm]	M_y [Nm]	M_z [Nm]
	Stat.	Dyn.	Stat.	Dyn.	Stat.	Stat.	Stat.
TT 310	230500	128492	274500	146031	30195	26625	22365

See verification under static load and lifetime on page SL-2 and SL-3

Tab. 89

Lubrication

TT linear units with ball bearing guides

TT Linear units are equipped with self lubricating linear ball guides. The ball bearing carriages are also fitted with a retention cage that eliminates "steel-steel" contact between adjacent revolving parts and prevents misalignment of these in the circuits.

This system guarantees a long interval between maintenances: every 2000 Km or 1 year of use, based on the value reached first. If a longer service life is required or in case of high dynamic or high loaded applications please contact our offices for further verification.

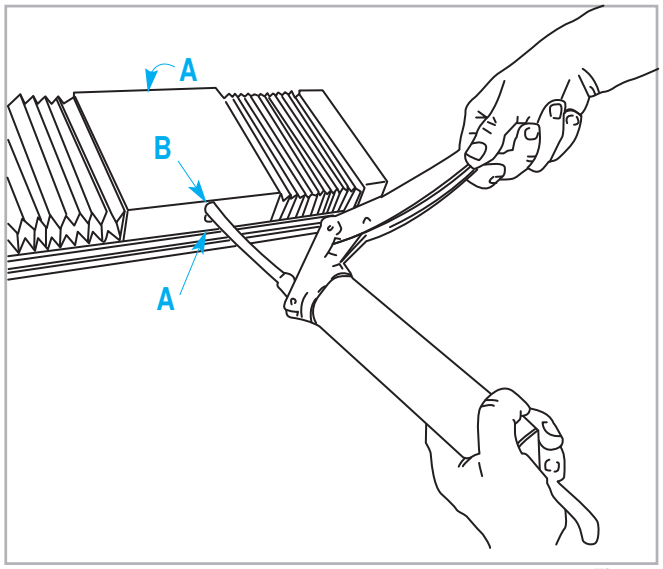


Fig. 35

- Insert the tip in the specific grease nipples:

A - Linear block - **B** - Ball screw nut

- Type of lubricant: Lithium soap grease of class NLGI 2.
- For specially stressed applications or difficult enviromental conditions, lubrication should be carried out more frequently. Refer to Rollon for further advice.

Quantity of lubricant necessary for block re-lubrication at each point:

Type	Quantity [cm^3] for grease nipple
TT 100	1.4
TT 155	1.4
TT 225	2.8
TT 310	5.6

Tab. 90

Ball screws

The ball screw nuts of Rollon TT series linear units must be relubricated every 100 km.

Standard lubrication

Lubrication of the ball bearing blocks and the ball screw nut is facilitated by grease nipples located on the sides of the carriage of the Rollon TT series actuators. The linear units are lubricated with class NLGI2 lithium soap grease.

Amount of lubricant recommended for ball screw nut re-lubrication

Type	Quantity [cm^3] for grease nipple
12-05	0.3
12-10	0.3
16-05	0.41
16-10	0.78
20-05	0.79
20-20	1
25-05	1.2
25-10	1.2
25-25	1.58
32-05	1.8
32-10	2.0
32-32	3.0

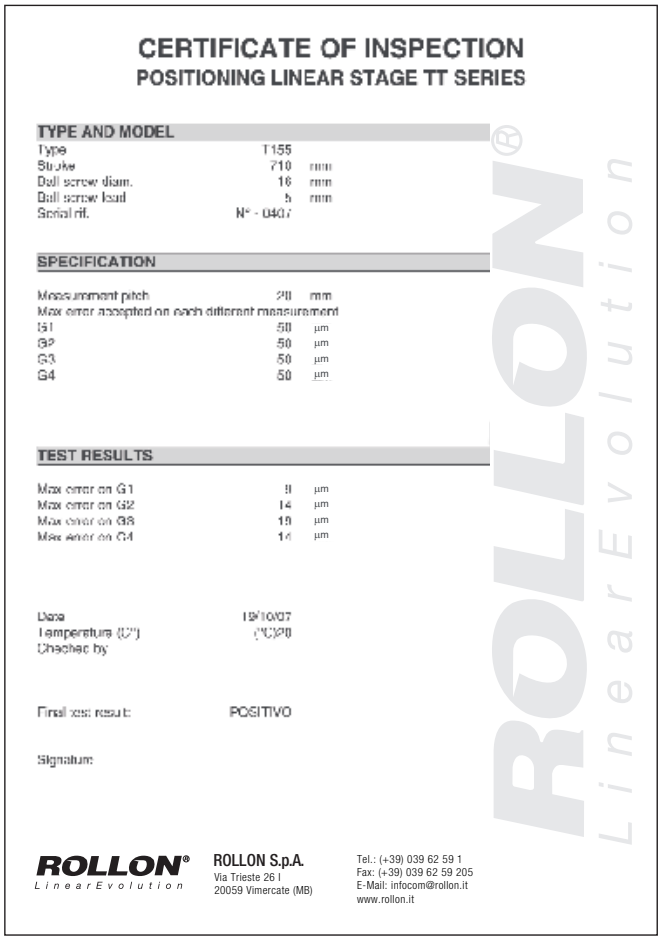
Tab. 91

Accuracy certificate

The Rollon TT series linear units are high accurate products. The base and the carriages are made of aluminum extrusions that are manufactured by means of high precision machining of all external faces and all mounting surfaces of mechanical components (linear guides, ball screw supports, etc.). This results in excellent repeatability, positioning accuracy and running parallelism. Rollon TT series linear units are 100% tested and will be delivered with a certificate of accuracy.

The certificate shows all parallel tolerances during the movement of the carriage on the base unit. The figures can be used for eventual electronic compensations during the movement of the linear units.
The maximum deviations are shown as follows:

G1 - rolling 50 µm
G2 - pitching 50 µm
G3 - yawing 50 µm
G4 - parallelism carriage/base unit 50µm



CERTIFICATE OF INSPECTION
POSITIONING LINEAR STAGE TT SERIES

TYPE AND MODEL

Type	TT55	
Stroke	710	mm
Ball screw diam.	16	mm
Ball screw lead	5	mm
Serial nr.	N° - 0407	

SPECIFICATION

Measurement pitch	20	mm
Max error accepted on each different measurement		
G1	50	µm
G2	50	µm
G3	50	µm
G4	50	µm

TEST RESULTS

Max error on G1	8	µm
Max error on G2	14	µm
Max error on G3	19	µm
Max error on G4	14	µm

Date 19/10/07
Temperature (C°) (°C)20
Checked by

Final test result: POSITIVO

Signature:

ROLLON® LinearEvolution

ROLLON S.p.A.
Via Trieste 26 I
20059 Vimercate (MB)

Tel.: (+39) 039 62 59 1
Fax: (+39) 039 62 59 205
E-Mail: infocom@rollon.it
www.rollon.it

Type	Screw	Fixing torques screws 12.9	
		On aluminum	On steel
TT 100	M6	10 Nm	14 Nm
TT 155	M6	10 Nm	14 Nm
TT 225	M8	15 Nm	30 Nm
TT 310	M12	60 Nm	120 Nm

Tab. 92

Note :Values for base unit length (Lt) <_ 2000 mm
These values are measured while linear unit is fixed with brackets on a reference table with parallelism error < 2 µm.
The fixing torques of the bolt must follow the indicated values in the table.

ATTENTION: The mentioned accuracy grades are valid only if the linear unit is fixed on a continuous mounting surface with the same length. The errors of the mounting surface may negatively influence the accuracy of the Rollon linear unit. Rollon does not guarantee the above mentioned parallelism tolerances for applications when the linear unit is mounted without support or as a cantilever.

The graphs below show an example of measurement of accuracy along the stroke the deviation is given.
Each actuator delivered is provided with the graphs.

Precision G1

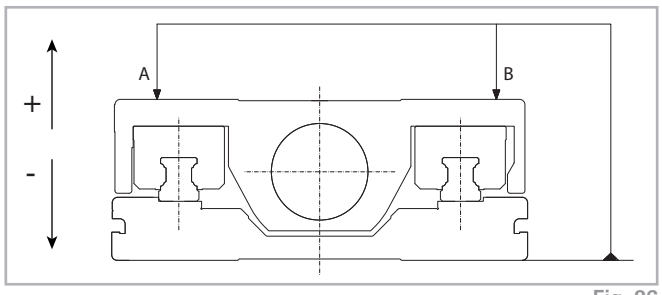
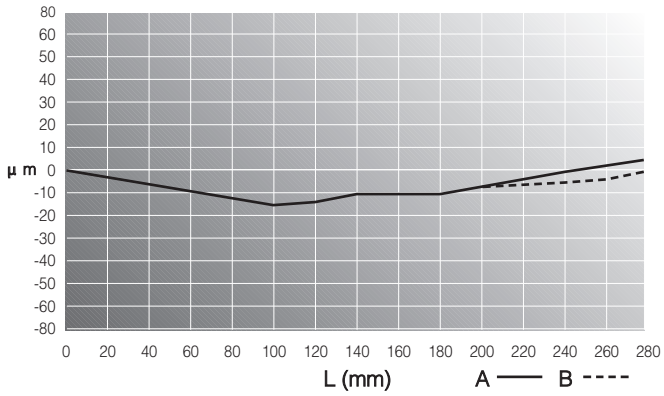


Fig. 36



Precision G2

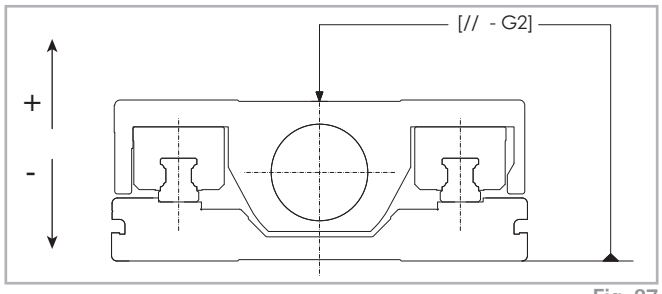
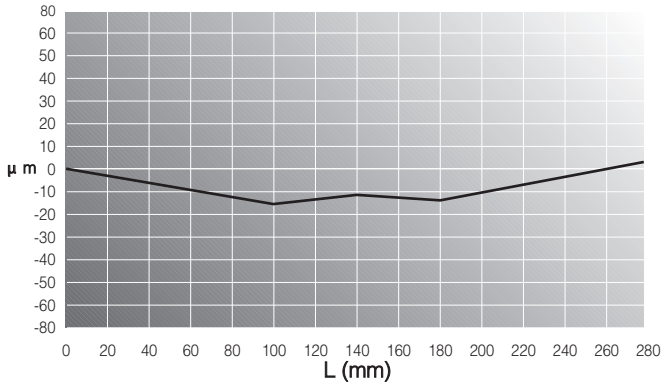


Fig. 37



Precision G3

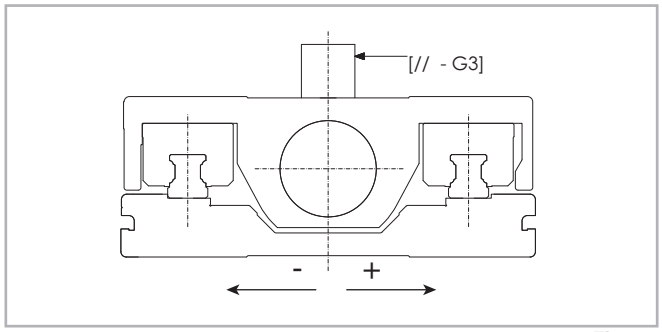
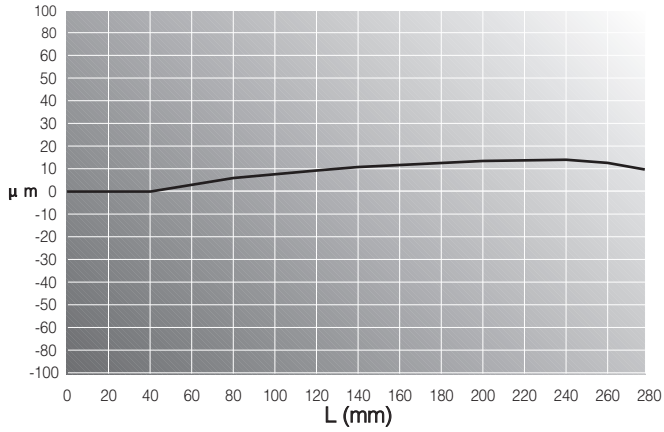


Fig. 38



Precision G4

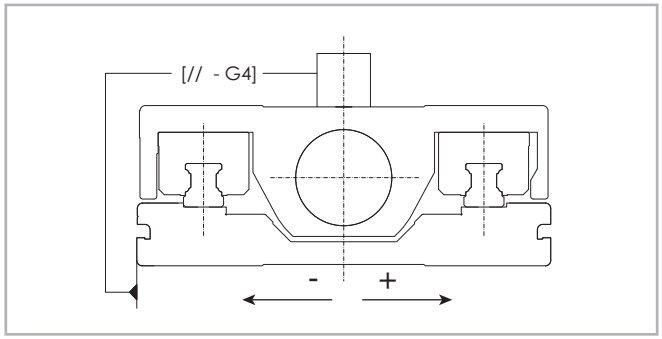
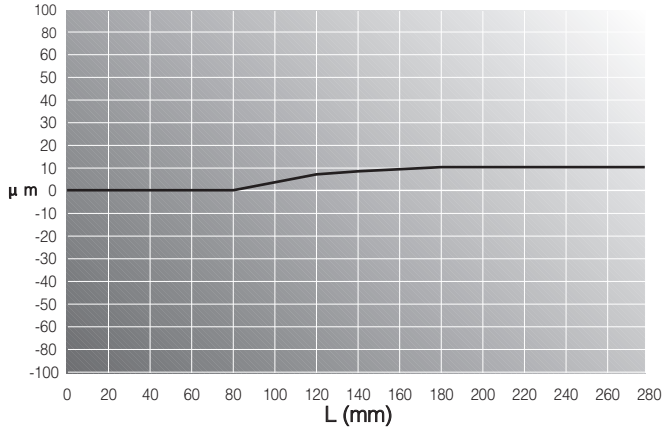


Fig. 39



Critical speed

The maximum linear speed of Rollon TT series linear units depends on the critical speed of the screw (based on its diameter and length) and on the max. permissible speed of the ball screw nut used.

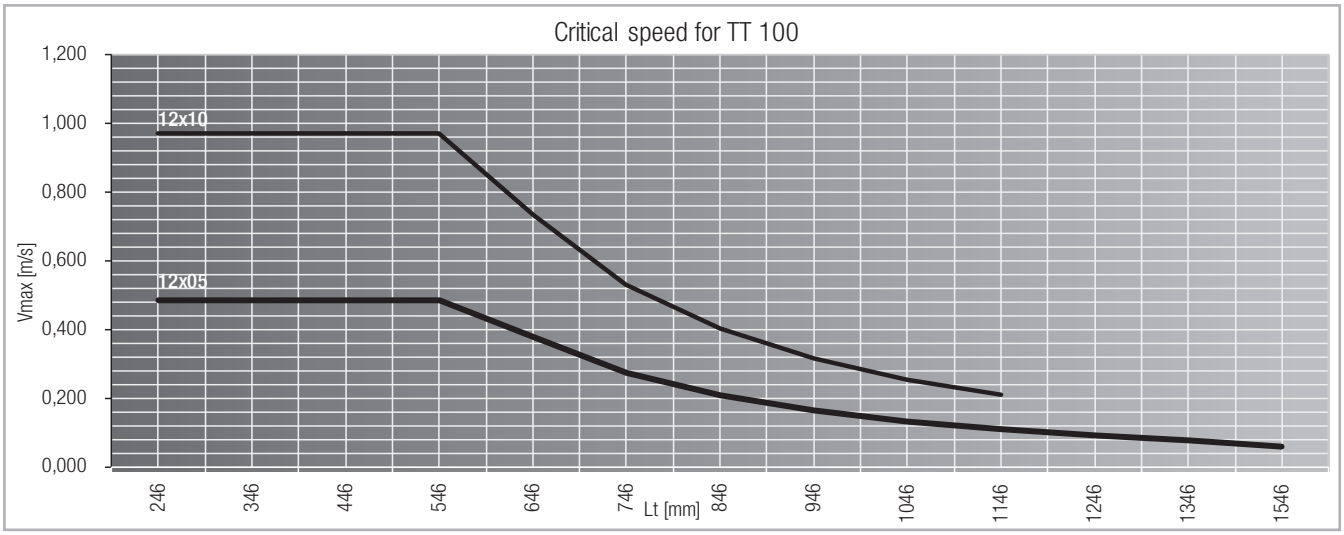


Fig. 40

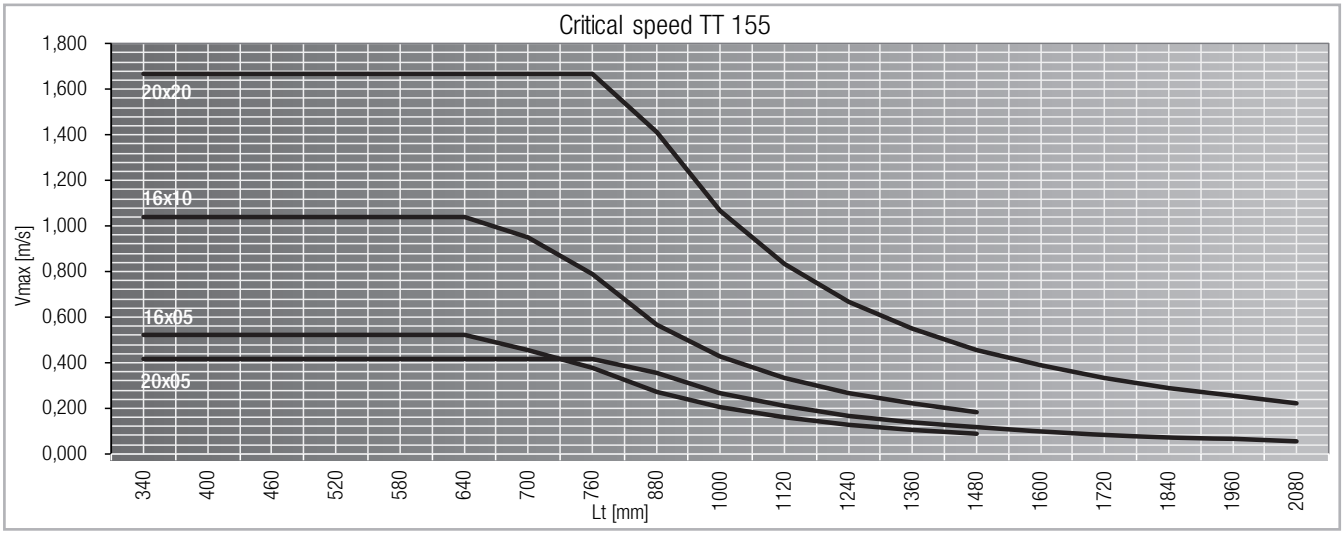


Fig. 41

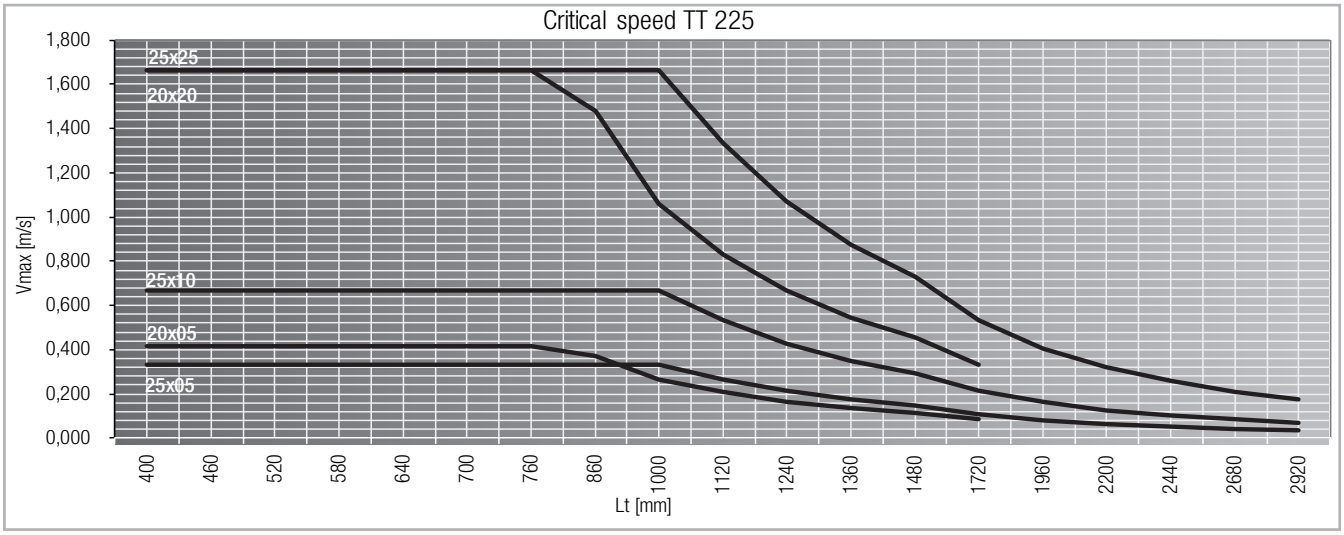


Fig. 42

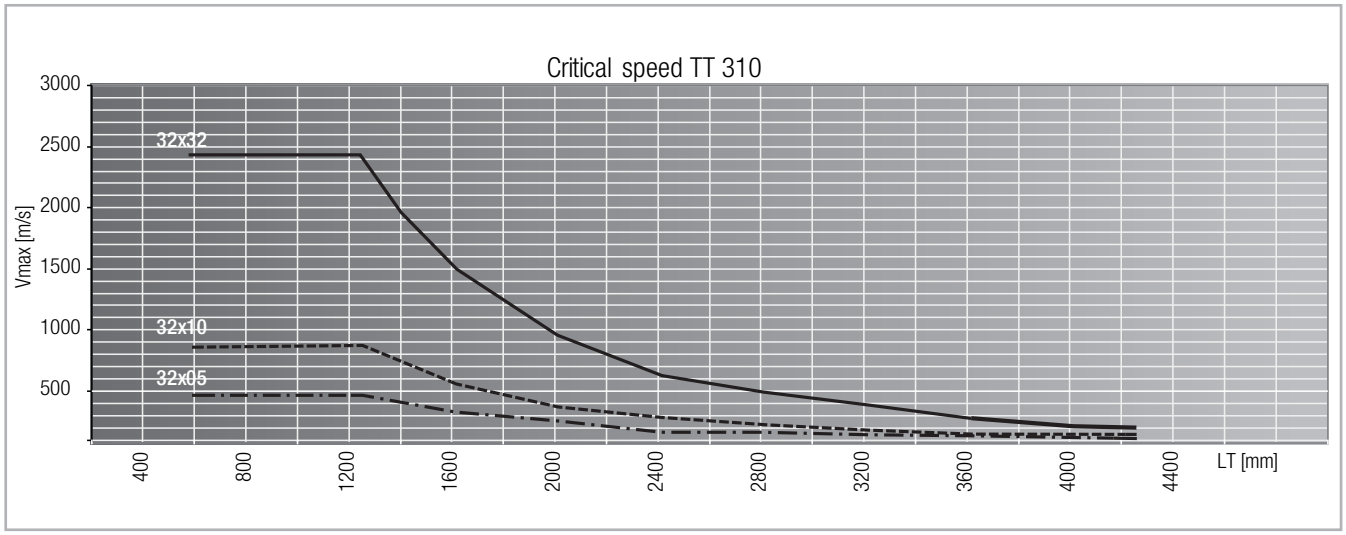


Fig. 43

Accessories

Mounting of the motor

Rollon TT Series linear units can be supplied with different types of motor mounts, adapter flanges, and with torsionally stiff couplings for screw and motor connections that enable fast, hassle-free assembly of the motors.

The types of bells available for the related units are shown in the table motor mounts:

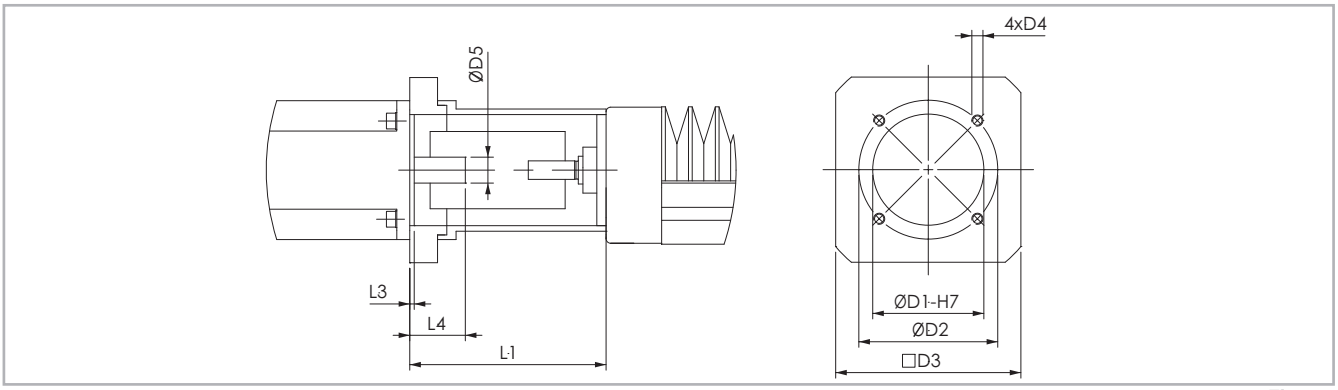


Fig. 44

Units [mm]

Type of unit	Ø D1	Ø D2	Ø D3	D4	Ø D5		L1	L3	L4		Kit code
					min.	max.			min.	max.	
TT 100	60	75	65	M6	5	16	68	4	25	27	G000321
	73.1	98.4	86	M5	5	16	76.7	2	33.7	35.7	G000322
	40	64.5	65	M5	5	16	68	4	25	27	G000336
	50	70	65	M5	5	16	77.5	3.5	34.5	36.5	G000433
TT 155	70	85	80	M6	10	20	90	4	20	34	G000311
	70	90	80	M5	10	20	90	5	20	34	G000312
	80	100	90	M6	10	20	90	4	20	34	G000313
	50	65	80	M5	10	20	90	5	20	34	G000314
	60	75	80	M6	10	20	90	4	20	34	G000315
	50	70	80	M5	10	20	90	5	20	34	G000316
	73	98.4	85	M5	10	20	90	4	20	34	G000317
	55.5	125.7	105	M6	10	20	100	5	30	44	G000318
	60	99	85	M6	10	20	98	4	28	42	G000319
TT 225	80	100	100	M6	10	28	106	5	30	48	G000302
	95	115	100	M8	10	28	106	5	30	48	G000303
	110	130	115	M8	10	28	106	5	30	48	G000304
	60	75	100	M6	10	28	106	5	30	48	G000305
	70	85	100	M6	10	28	106	5	30	48	G000306
	70	90	100	M5	10	28	106	5	30	48	G000307
	50	70	96x75	M4	10	28	101	4	30	48	G000308
	55.5	125.7	105	M6	10	28	106	5	30	48	G000309
	73.1	98.4	96	M5	10	28	101	3	30	48	G000310
	130	165	150	M10	10	28	106	5	30	48	G000363
TT 310	Option										

Tab. 93

Fixing by brackets

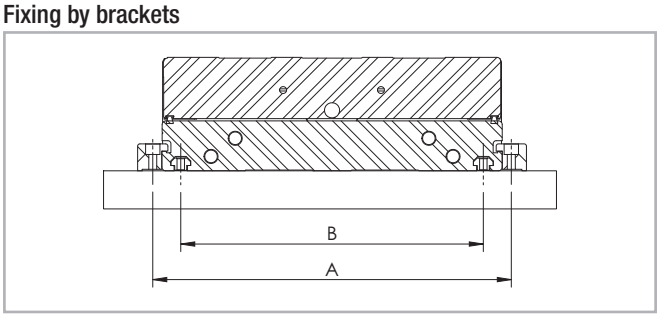


Fig. 45

Type	A Unit mm	B Unit mm
TT 100	112	59
TT 155	167	135
TT 225	237	200

Tab. 94

Fixing brackets

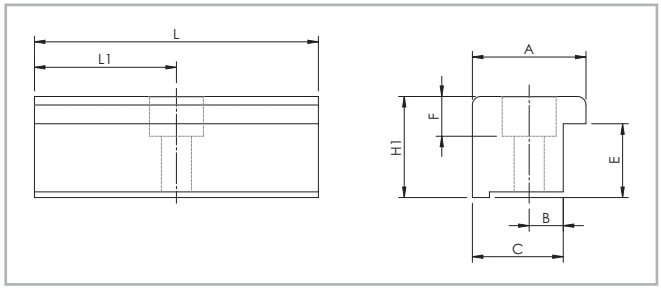


Fig. 46

Type	A	B	C	E	F	D1	D2	H1	L	L1	Code Rollon
TT 100	18.5	6	16	7	4.5	9.5	5.3	9.8	50	25	1002353
TT 155	20	6	16	11	7	9.5	5.3	15.8	50	25	1002167
TT 225	20	6	16	13	7	9.5	5.3	17.8	50	25	1002354

Tab. 98

T nuts

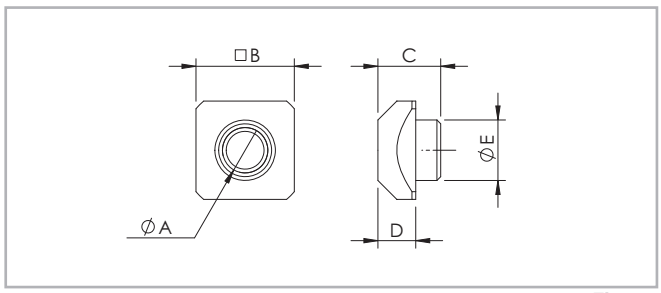


Fig. 47

Type	Ø A	□B	C	D	Ø E	Code Rollon
TT 100	M4	8	-	3.4	-	1001046
TT 155	M5	10	6.5	4.2	6.7	1000627
TT 225	M6	13	8.3	5	8	1000043

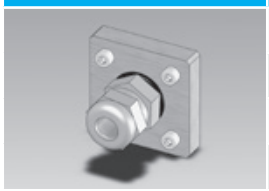
Tab. 99

Proximity	Type	PNP-NO	PNP-NC
	TT 100	G001981	G001980
	TT 155	G001981	G001980
	TT 225	G001981	G001980
	TT 310	/	/

Tab. 95

End cap	Type	Code
	TT 100	G000245
	TT 155	G000244
	TT 225	G000244
	TT 310	/

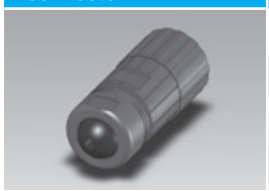
Tab. 100

Cable Strain Relief	Type	Code
	TT 100	G000249
	TT 155	G000248
	TT 225	G000248
	TT 310	/

Tab. 96

9 Pin Fixed Connector	Type	Code
	TT 100	G000191
	TT 155	G000191
	TT 225	G000191
	TT 310	/

Tab. 101

9 Pin Back-Shell Connector	Type	To crimp	To solder
	TT 100	6000516	6000589
	TT 155	6000516	6000589
	TT 225	6000516	6000589
	TT 310	/	/

Tab. 97

Assembly kits

The Rollon TT series linear units must be mounted to the application's surface in an appropriate way in order to achieve maximum accuracy of the system. The evenness of the mounting surface determines the final result of the movement of the system.The aluminum base and the carriage of the Rollon TT linear units have a lateral reference surface, indicated by a groove (except on the TT 310). On the carriage's surface are two reference slots at 90° angles, useful for accurate mounting of X-Y-systems. The Rollon TT series linear units can be fixed to the mounting surface from above the base unit by screws (fig. 48), through T-slots (fig. 49), or through appropriate mounting brackets (fig. 50), depending on the application. For high accuracy applications, Rollon recommends bolting the unit down from above. For mounting dimensions please refer to the dimensional drawings of the units.

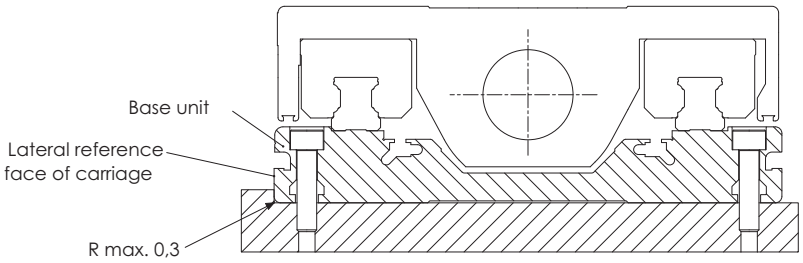


Fig. 48

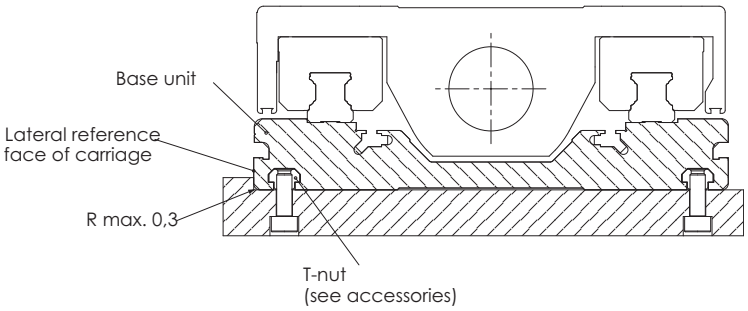


Fig. 49

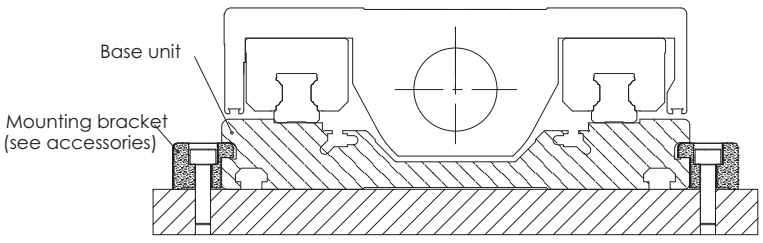


Fig. 50

Ordering key

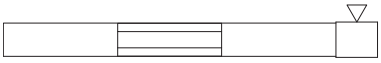
Identification code for the TT linear units

T	10	1205	5P	0880	1A	
	10=100	12-05	5P=ISO 5			
	15=155	12-10	7N=ISO 7			
	22=225	16-05				
	31=310	16-10				
		20-05				
		20-20				
		25-05				
		25-10				
		25-25				
		32-05			Head configuration code	
		32-10		L=total length of th unit		
		32-32	Type *see from pg. PS-24 to pg. PS-30*			
		B/S diameter and lead *see from pg. PS-24 to pg. PS-30*				
	Size *see from pg. PS-24 to pg. PS-30*					
Linear unit series TT *see pg. PS-22*						

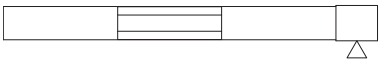
In order to create identification codes for Actuator Line, you can visit: **http://configureactuator.rollon.com**

Configure Actuator

Left / right orientation



Right



Left