

Linear axes and axis systems HX

Linear tables HT-L

9. Linear tables HT-L

9.1 Properties of linear tables HT-S with linear motor

HIWIN linear tables with linear motor are flexible positioning modules with integrated HIWIN double guide. They are specifically ideal for precise positioning at high speed and with high dynamics.



Linear guideway

A high quality HIWIN double guide transfers forces and torques reliably from the carriage into the axis profile. Each carriage comes with four blocks that are guided over two parallel high precision rails. The SynchMotion™ technology with ball chain also ensures a high level of synchronism and quiet running for all sizes.



Electrical interface

The self-locking quick fasteners provide a fast and easy way of connecting motor and encoder cables at the side of the carriage – without the need for tools. There are two different options for the connector configuration to suit the installation conditions and how the cables need to be routed.



Linear motor

The integrated HIWIN linear motors ensure dynamic and precise positioning. Two motor sizes are available for each size, in order to optimally meet the requirements for the required feed force.



Energy chain

Generously dimensioned energy chains provide space for the reliable carrying of supply cables. At the same time, the energy chains are attached to the axis in a particularly compact and space-saving way. Details on the orientation of the energy chain can be found in Section [17.4 on Page 163 ff.](#)



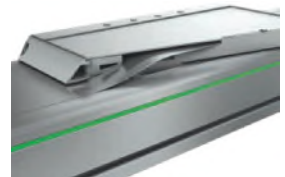
Carriages

Around each threaded hole the carriages have an additional locating hole that can be used with centring sleeves to secure the load capacity. This allows an ideal, reproducible attachment of the connecting structure. The matching centring sleeves can be found in the accessories on [Page 166](#). Grease nipples are situated at each lube point on the carriage, making it easier to perform maintenance on the linear axis.



Cover strip

The steel strip protects the inside of the axis against dust and dirt. Also, when fitted with the cover strip, the axes can be used in areas with coarse, sharp edged, or hot foreign bodies. The magnetic strips integrated in the axis profile keep the strip securely in place and increase the sealing effects.

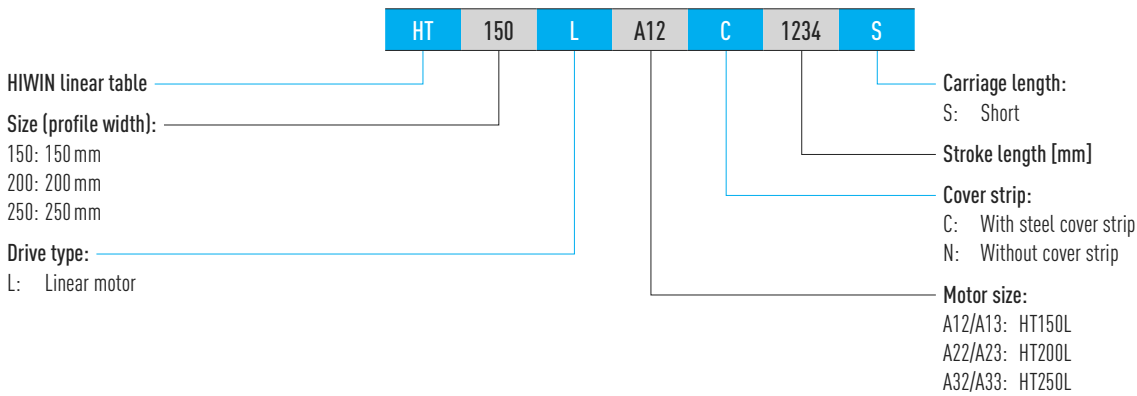


Distance measuring systems

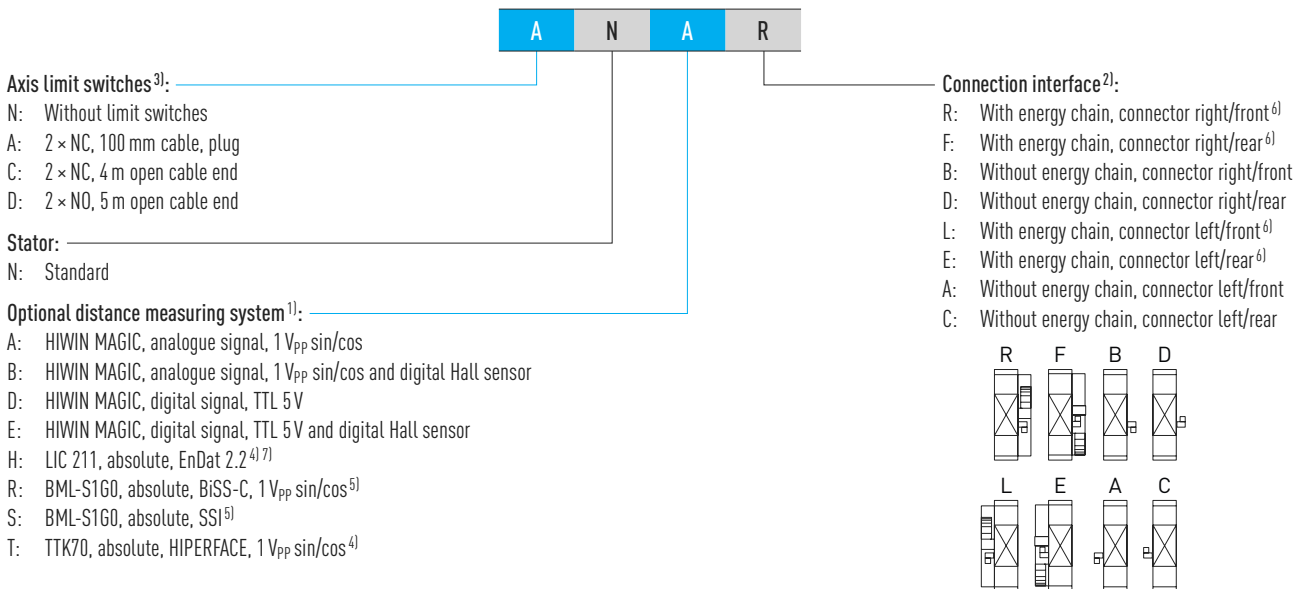
The distance measuring system, that is integrated into the interior of the axis in order to save space, determines the repeatability. Various measuring systems are available, depending on the requirements for measuring method, interface and resolution. See [Page 121](#) for more information.



9.2 Order code for linear tables HT-L



Order code for linear tables HT-L (continuation)



¹⁾ Detailed information in Chapter 16 on Page 121 ff. or in the assembly instructions "HIWIN MAGIC Distance Measuring Systems"

²⁾ For details of the connector configuration and the position of the energy chain, refer to Section 17.4 on Page 163 ff.

³⁾ Further reference switches on request

⁴⁾ Maximum stroke may be restricted; see Table 16.1 on Page 121

⁵⁾ The distance measuring system has a safety-related, analogue, incremental real-time signal

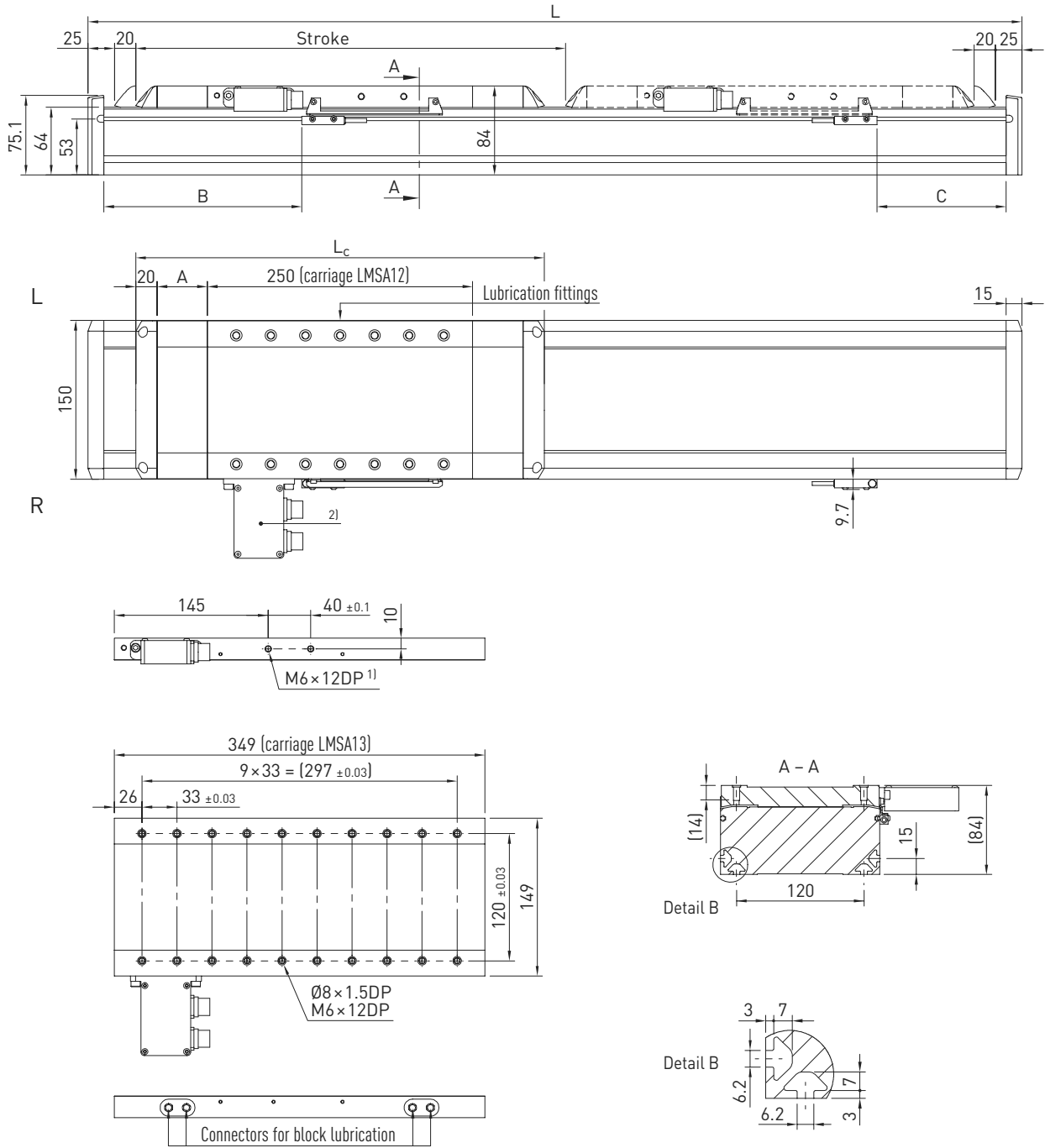
⁶⁾ Maximum possible stroke: 5,000 mm

⁷⁾ In horizontal mounting position, the axis must be installed so that the distance measuring system is at the top

Linear axes and axis systems HX

Linear tables HT-L

9.3 Dimensions and specifications of HT150L



¹⁾ Does not apply to version with energy chain ²⁾ Drive interface shown: "D" option; for other versions, see Section 17.4 on Page 163 ff.

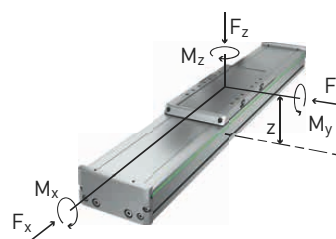
	Variant without cover		Variant with cover	
	A12	A13	A12	A13
Motor size	A12	A13	A12	A13
Total carriage length L_c [mm]	290	389	385	484
Length of cover strip deflection A [mm]	—	—	47.5	47.5
Switch position B [mm]	138	138	185.5	185.5
Switch position C [mm]	73	172	120.5	219.5
Total length L [mm]	$L = \text{stroke} + 380$	$L = \text{stroke} + 479$	$L = \text{stroke} + 475$	$L = \text{stroke} + 574$

	Motor size A12	Motor size A13
$F_{y\text{dynmax}}^{1)}$ [N]	3,350	3,350
$F_{z\text{dynmax}}^{1)}$ [N]	4,270	3,789
$M_{x\text{dynmax}}$ [Nm]	201	178
$M_{y\text{dynmax}}$ [Nm]	414	555
$M_{z\text{dynmax}}$ [Nm]	325	491
$z^{2)}$ [mm]	51.5	51.5

¹⁾ Force may act only without torque

²⁾ Upper carriage edge to guiding centre

See Section 3.3.3 on Page 14 (reference service life)



Repeatability [mm] ²⁾	± 0.005
Max speed [m/s]	5
Max acceleration [m/s ²]	50
Typical load capacity [kg]	80
Max total length [mm] ²⁾³⁾	5,930
Flatness (mm/300 mm) ¹⁾	± 0.03
Straightness (mm/300 mm) ¹⁾	± 0.03
Area moment of inertia of profile cross-section I_x [mm ⁴]	907,754
Area moment of inertia of profile cross-section I_y [mm ⁴]	7,417,610

¹⁾ Values apply to bolting surfaces or mounting plates with appropriate specifications

²⁾ Depending on distance measuring system (Chapter 16) and energy chain (Section 17.4)

³⁾ Longer axes lengths on request

Guiding type	QEH15CA
Static load rating C_0 [N]	15,280
Dynamic load rating C_{dyn} [N]	12,530

	Motor size A12	Motor size A13
Motor type	LMSA12	LMSA13
Continuous force [N]	205	308
Peak force [N]	579	868

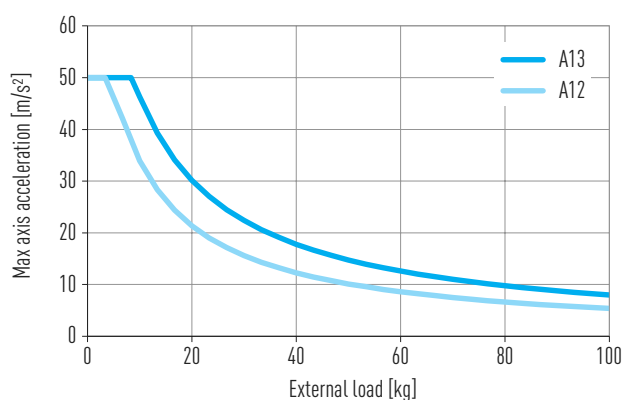


Fig. 9.1 Max acceleration as a function of load capacity

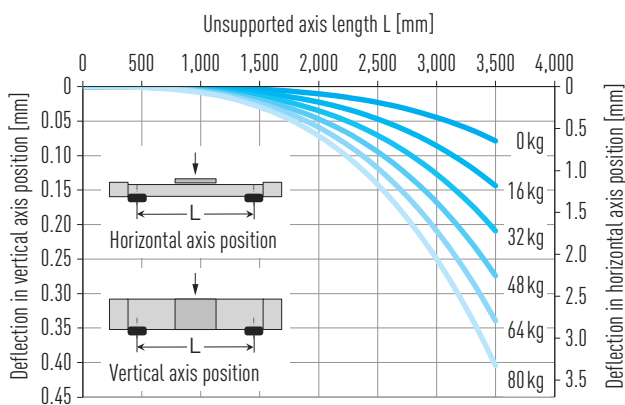


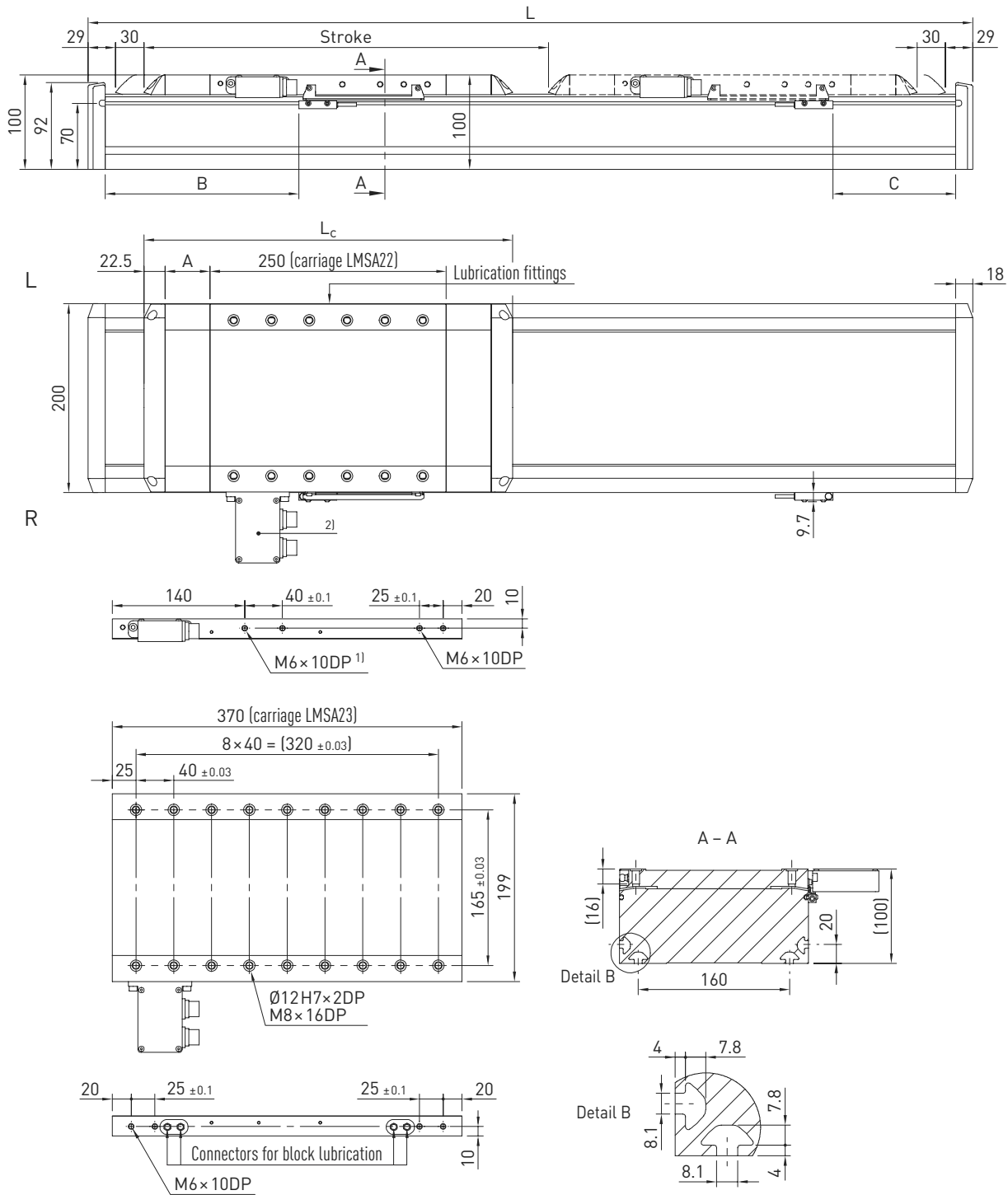
Fig. 9.2 Deflection under load capacity

	Variant without cover		Variant with cover	
	Motor size A12	Motor size A13	Motor size A12	Motor size A13
Carriage mass [kg]	4.33	5.97	4.80	6.45
Mass at 0 stroke [kg]	9.80	12.77	11.56	14.57
Mass per 1 m stroke [kg/m]	13.31		13.59	
Displacement force carriage F_l [N]	1.2		1.7	

Linear axes and axis systems HX

Linear tables HT-L

9.4 Dimensions and specifications of HT200L



¹⁾ Does not apply to version with energy chain ²⁾ Drive interface shown: "D" option; for other versions, see Section 17.4 on Page 163 ff.

	Variant without cover		Variant with cover	
	A22	A23	A22	A23
Motor size	A22	A23	A22	A23
Total carriage length L_c [mm]	295	415	390	510
Length of cover strip deflection A [mm]	—	—	47.5	47.5
Switch position B [mm]	156.5	156.5	204	204
Switch position C [mm]	81.5	201.5	129	249
Total length L [mm]	$L = \text{stroke} + 413$	$L = \text{stroke} + 533$	$L = \text{stroke} + 508$	$L = \text{stroke} + 628$

Table 9.8 Load data		
	Motor size A22	Motor size A23
$F_{y\text{dynmax}}^{1)}$ [N]	7,712	6,750
$F_{z\text{dynmax}}^{1)}$ [N]	7,712	6,750
$M_{x\text{dynmax}}$ [Nm]	524	459
$M_{y\text{dynmax}}$ [Nm]	733	1,046
$M_{z\text{dynmax}}$ [Nm]	733	1,046
$z^{2)}$ [mm]	58.48	58.48

¹⁾ Force may act only without torque

²⁾ Upper carriage edge to guiding centre

See Section 3.3.3 on Page 14 (reference service life)

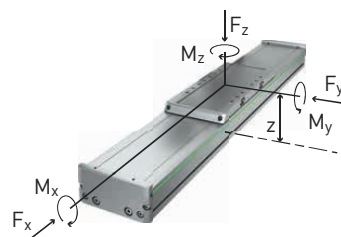


Table 9.9 General technical data	
Repeatability [mm] ²⁾	± 0.005
Max speed [m/s]	5
Max acceleration [m/s ²]	50
Typical load capacity [kg]	150
Max total length [mm] ^{2) 3)}	5,936
Flatness (mm/300 mm) ¹⁾	± 0.03
Straightness (mm/300 mm) ¹⁾	± 0.03
Area moment of inertia of profile cross-section I_x [mm ⁴]	2,071,928
Area moment of inertia of profile cross-section I_y [mm ⁴]	19,658,810

¹⁾ Values apply to bolting surfaces or mounting plates with appropriate specifications

²⁾ Depending on distance measuring system (Chapter 16) and energy chain (Section 17.4)

³⁾ Longer axes lengths on request

Table 9.10 Guiding	
Guiding type	QHH20CA
Static load rating C_0 [N]	25,630
Dynamic load rating C_{dyn} [N]	23,080

Table 9.11 Drive		
	Motor size A22	Motor size A23
Motor type	LMSA22	LMSA23
Continuous force [N]	362	544
Peak force [N]	1,023	1,535

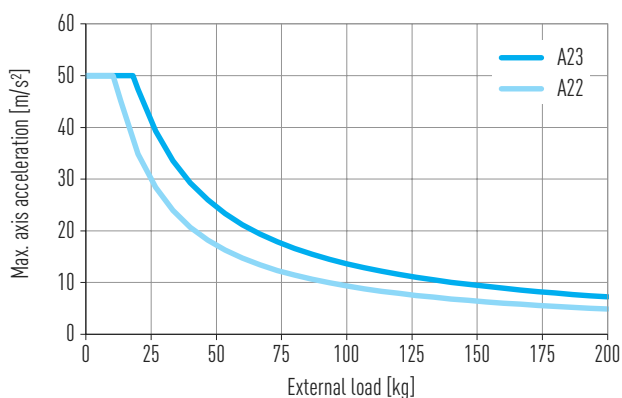


Fig. 9.3 Max acceleration as a function of load capacity

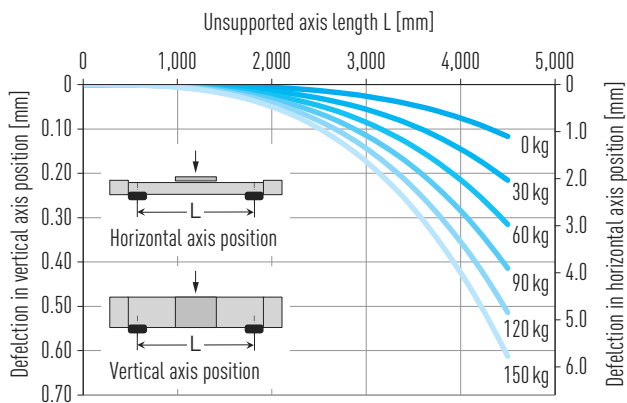


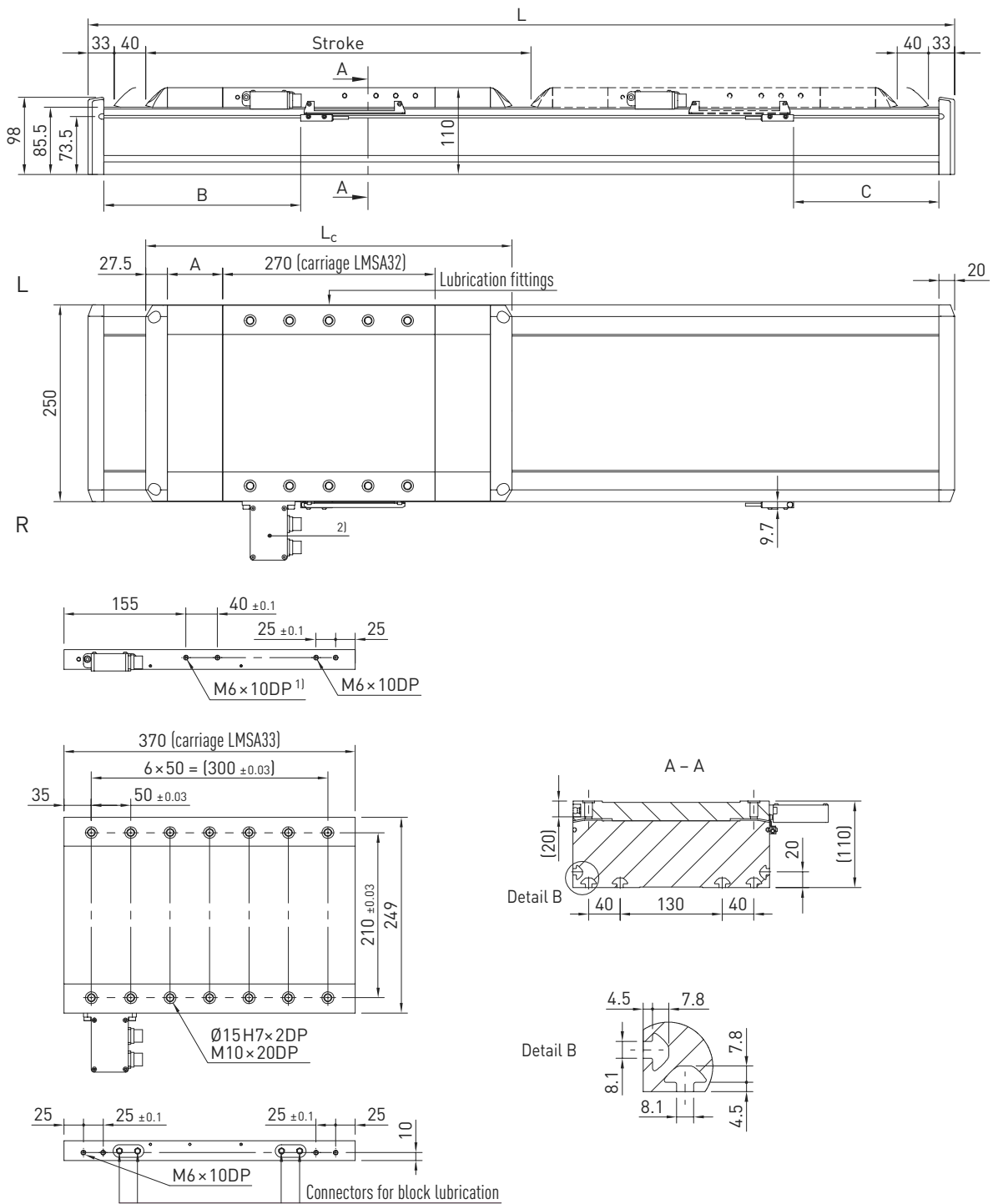
Fig. 9.4 Deflection under load capacity

Table 9.12 Mechanical properties				
	Variant without cover		Variant with cover	
	Motor size A22	Motor size A23	Motor size A22	Motor size A23
Carriage mass [kg]	6.80	9.64	7.39	10.24
Mass at 0 stroke [kg]	16.33	21.71	18.85	24.28
Mass per 1 m stroke [kg/m]	21.49		21.81	
Displacement force carriage F_1 [N]	2.0		2.5	

Linear axes and axis systems HX

Linear tables HT-L

9.5 Dimensions and specifications of HT250L



¹⁾ Does not apply to version with energy chain ²⁾ Drive interface shown: "D" option; for other versions, see Section 17.4 on Page 163 ff.

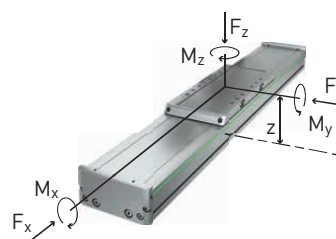
	Variant without cover		Variant with cover	
	A32	A33	A32	A33
Motor size	A32	A33	A32	A33
Total carriage length L_c [mm]	325	425	465	565
Length of cover strip deflection A [mm]	—	—	70	70
Switch position B [mm]	178.5	178.5	248.5	248.5
Switch position C [mm]	113.5	213.5	183.5	283.5
Total length L [mm]	$L = \text{stroke} + 471$	$L = \text{stroke} + 571$	$L = \text{stroke} + 611$	$L = \text{stroke} + 711$

	Motor size A32	Motor size A33
$F_{y\text{dynmax}}^{1)}$ [N]	10,383	8,938
$F_{z\text{dynmax}}^{1)}$ [N]	10,383	8,938
$M_{x\text{dynmax}}$ [Nm]	888	764
$M_{y\text{dynmax}}$ [Nm]	1,012	1,318
$M_{z\text{dynmax}}$ [Nm]	1,012	1,318
$z^2)$ [mm]	68.07	68.07

¹⁾ Force may act only without torque

²⁾ Upper carriage edge to guiding centre

See Section 3.3.3 on Page 14 (reference service life)



Repeatability [mm] ²⁾	± 0.005
Max speed [m/s]	5
Max acceleration [m/s ²]	50
Typical load capacity [kg]	250
Max total length [mm] ^{2) 3)}	5,940
Flatness (mm/300 mm) ¹⁾	± 0.03
Straightness (mm/300 mm) ¹⁾	± 0.03
Area moment of inertia of profile cross-section I_x [mm ⁴]	3,265,771
Area moment of inertia of profile cross-section I_y [mm ⁴]	39,262,043

¹⁾ Values apply to bolting surfaces or mounting plates with appropriate specifications

²⁾ Depending on distance measuring system (Chapter 16) and energy chain (Section 17.4)

³⁾ Longer axes lengths on request

Guiding type	QHH25CA
Static load rating C_0 [N]	33,680
Dynamic load rating C_{dyn} [N]	31,780

	Motor size A32	Motor size A33
Motor type	LMSA32	LMSA33
Continuous force [N]	583	875
Peak force [N]	1,646	2,469

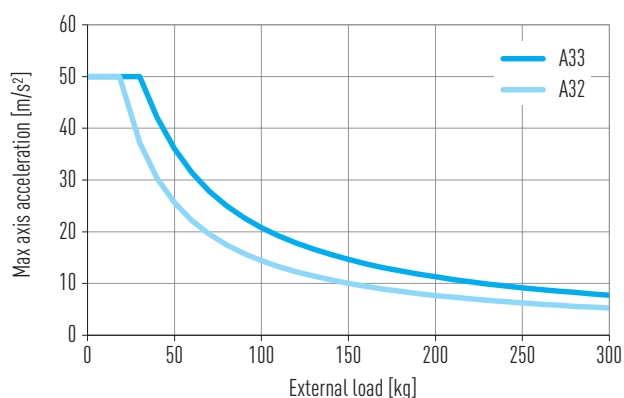


Fig. 9.5 Max acceleration as a function of load capacity

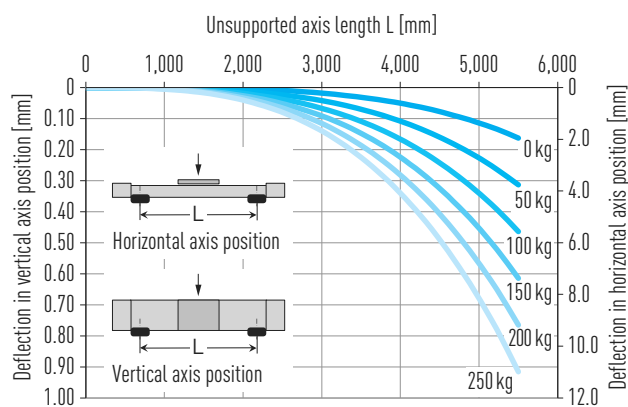


Fig. 9.6 Deflection under load capacity

	Variant without cover		Variant with cover	
	Motor size A32	Motor size A33	Motor size A32	Motor size A33
Carriage mass [kg]	11.58	15.77	12.98	17.17
Mass at 0 stroke [kg]	26.35	33.57	31.58	38.85
Mass per 1 m stroke [kg/m]	30.15		30.54	
Displacement force carriage F_1 [N]	3.0		3.5	

17.4 Connection interface and energy supply for linear motor axes HT-L

Linear motor axes HT-L are equipped with an interface for motor and encoder cables. This is located on the side of the carriage. The self-locking quick fasteners it features provide a fast and easy way of connecting the cables – without the need for tools. There are two different options for the connector configuration to suit the installation conditions and how the cables need to be routed: see [Fig. 17.38](#) and [Fig. 17.39](#). To ensure that the supply cables are carried safely, linear motor axes HT-L up to a maximum stroke of 5,000 mm are available with the option of generously dimensioned energy chains. They are extremely compact and save space when used with the axis. The configuration of the energy chain depends on the chosen connector orientation. The linear tables HT-L with energy chain are optimised for horizontal installation. Axes with energy chain for vertical use on request.

The dimensions of the energy chain and the electrical interface can be found in [Fig. 17.38](#), [Fig. 17.39](#) and [Table 17.22](#).

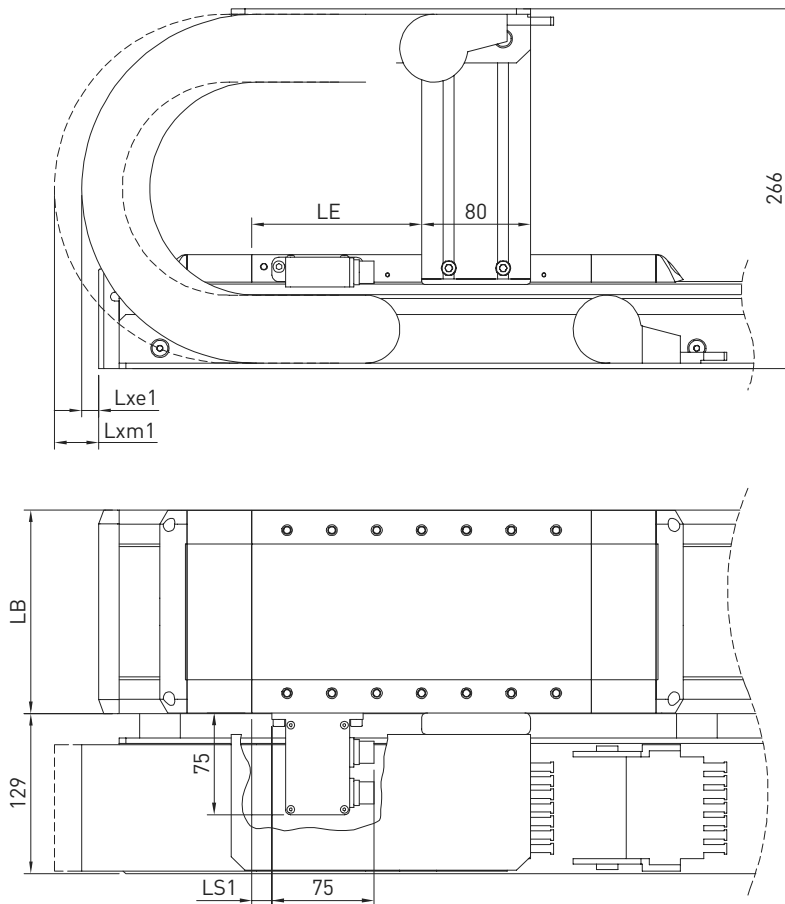


Fig. 17.38 Linear motor axes HT-L: “D” and “F” options – connector right/front, mirrored also applies to “C” and “E” options – connector left/front

18. Accessories

18.1 Clamping profiles

Clamping profiles are devices for installing the linear axis to the machine frame from above. The clamping profiles can be swivelled into the sides of the axis' profile groove.

The required number of clamping profiles depends on the axis length and the load. It can be found in the Assembly Instructions. Sets are available with four clamping profiles.

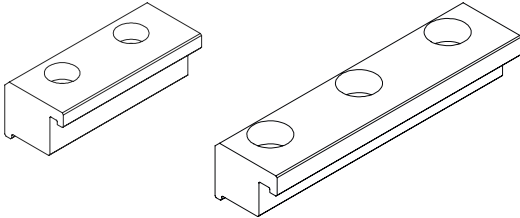


Fig. 18.1 Short and long clamping profiles

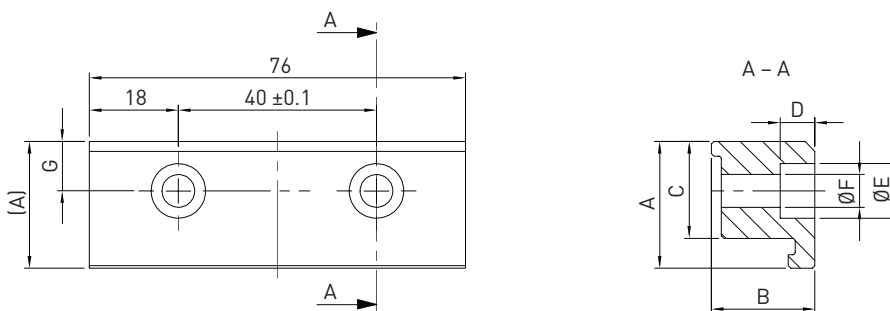


Fig. 18.2 Dimensional drawing of short clamping profile

Table 18.1 Article numbers and dimensions for short clamping profiles

Suitable for linear axis	Type	A	B	C	D	ØE	ØF	G	Suitable screw	Article number, 4 pcs.
HM040/HT100	Size 5	18.0	10.5	14.1	6.0	10	5.5	6.85	DIN 912 M5	25-000517
HM060	Size 6	25.6	20.9	19.6	9.5	11	6.6	10.00	DIN 912 M6	25-000518
HT150	Size 6	26.1	15.9	19.6	8.5	11	6.6	10.00	DIN 912 M6	25-001023
HM080 ¹⁾ /HM120/ HT200/HT250	Size 8	28.0	22.0	19.5	8.0	15	9.0	10.00	DIN 912 M8	25-000519

¹⁾ Standard
Unit: mm

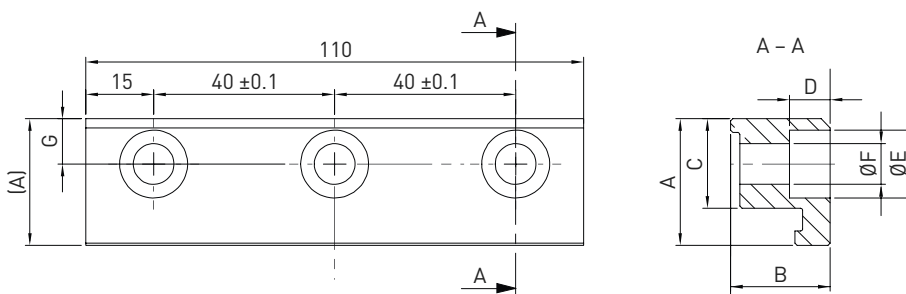


Fig. 18.3 Dimensional drawing of long clamping profile

Table 18.2 Article numbers and dimensions for long clamping profiles

Suitable for linear axis	Type	A	B	C	D	ØE	ØF	G	Suitable screw	Article number, 4 pcs.
HM080/HM120 ¹⁾ / HT200 ¹⁾ /HT250 ¹⁾	Size 8	28.0	22.0	19.5	8.0	15.0	9.0	10.0	DIN 912 M8	25-000520

¹⁾ Standard
Unit: mm

Linear axes and axis systems HX

Accessories

18.2 T nut

T nut for the frictional connection of the linear axis. Flexible fastening options through the grooves on the side and on the bottom of the axis profile. The required number of T nuts depends on the axis length and the load. It can be found in the Assembly Instructions. Sets are available with ten T nuts.

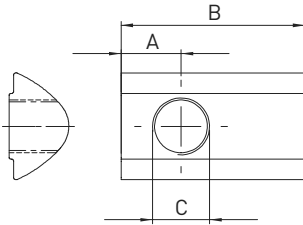


Fig. 18.4 Dimensional drawing of T nut

Table 18.3 Article numbers and dimensions for T nuts

Suitable for linear axis	Type	A	B	C	Article number, 10 pcs.
HM040, HT100	Size 5 M4	3.5	12.0	M4	20-000528
HM040, HT100 ¹⁾	Size 5 M5	3.5	12.0	M5	20-000529
HM060, HT150	Size 6 M5	4.5	17.0	M5	20-000530
HM060, HT150 ¹⁾	Size 6 M6	5.5	17.0	M6	20-000531
HM080, HM120, HT200, HT250	Size 8 M5	7.5	23.0	M5	20-000532
HM080, HM120, HT200, HT250	Size 8 M6	6.5	23.0	M6	20-000533
HM080, HM120, HT200, HT250 ¹⁾	Size 8 M8	7.5	23.0	M8	20-000534

¹⁾ Preferred type for axis mounting

Unit: mm

18.3 Centring sleeve

Centring sleeves that are inserted in the carriage's mounting holes for precise, repeatable load bearing. Sets are available with ten centring sleeves.

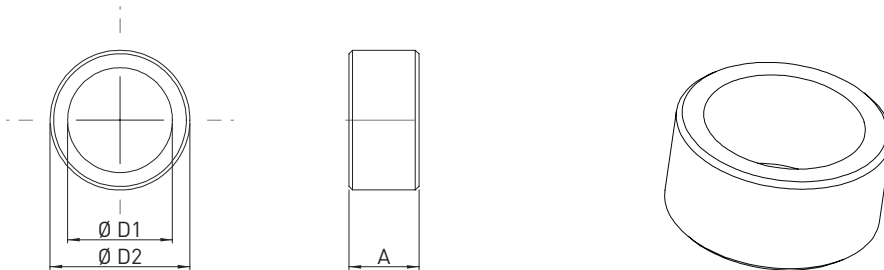


Fig. 18.5 Dimensional drawing of centring sleeve

Table 18.4 Article numbers and dimensions for centring sleeves

Suitable for linear axis	A	Ø D1	Ø D2	Article number, 10 pcs.
HCO25	4	4.5	6 h6	25-002195
HM040, HM060, HT100, HT150, HCO40, HCO60	4	6.5	8 h6	25-000511
HM080, HT200, HCO80	4	9.0	12 h6	25-000512
HM120, HT250	4	11.0	15 h6	25-000513

Unit: mm

18.4 Groove cover

Cover for the fastening groove. Length: 2 m. Sets are available with five groove covers.

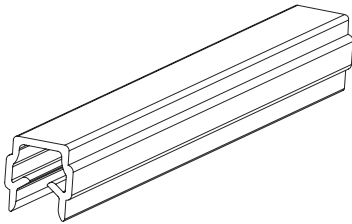


Fig. 18.6 Groove cover for linear axes HM/HT/HC

Table 18.5 Article numbers for groove covers

Suitable for linear axis	Type	Article number, 5 pcs.
HM040, HT100, HC040, HC060	Size 5	25-000514
HM060, HT150, HC080	Size 6	25-000515
HM080, HM120, HT200, HT250	Size 8	25-000516

18.5 Limit switch

Inductive limit switch as NC or NO contact. The limit switch is supplied as standard with plug or open cable end. Set including mounting material.

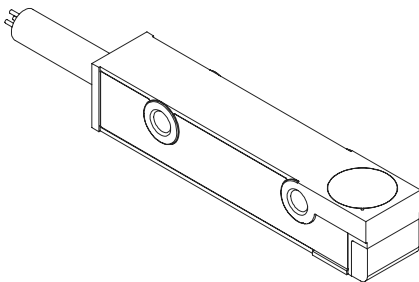


Fig. 18.7 Limit switch for linear axes HM/HT/HC

Table 18.6 Limit switch options

Suitable for linear axis	Option	Article number
HM, HT, HC040B, HC060B, HC080B	Limit switch with 100 mm cable, plug (NC)	25-000786
HM, HT, HC040B, HC060B, HC080B	Limit switch with 4 m cable (NC)	25-000787
HM, HT, HC040B, HC060B, HC080B	Limit switch with 5 m cable (NO)	25-000788
HC025B	Limit switch with 200 mm cable, plug (NC)	25-002204
HC025B	Limit switch with 2 m cable (NC)	25-002205

Linear axes and axis systems HX

Accessories

18.6 Extension cable for limit switch

Cable with 3-pin M8 round connector on the limit switch side and exposed wires on the other cable end.

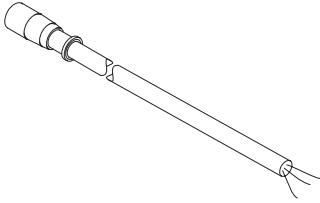


Fig. 18.8 Extension cable for limit switch

Length [m]	Max. cable diameter [mm]	Min. bending radius static [mm]	Min. bending radius dynamic [mm]	Article number
3	4.5	13.5	18.0	8-10-0275
5	4.5	13.5	18.0	8-10-0276
7	4.5	13.5	18.0	8-10-0277
10	4.5	13.5	18.0	8-10-0278
15	4.5	13.5	18.0	8-10-0279

18.7 Damping element

The damping element is needed to switch the limit switches at both of the carriage's end positions (at stroke 0 and stroke max). It can be attached on the left and right of the carriage. Set including mounting material.

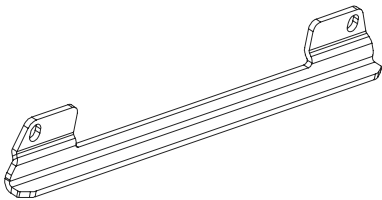


Fig. 18.9 Damping element for linear axes HM/HT

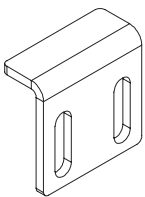


Fig. 18.10 Damping element for cantilever axes HC

Suitable for linear axis	Article number
HM, carriage type E	25-001999
HM, carriage type S, M, L	25-000785
HT	25-001031
HC025	25-002196
HC040	25-002197
HC060, HC080	25-002198

18.8 Motor cable for HT-L linear table

Motor cable suitable for linear tables HT-L. Open cable end.

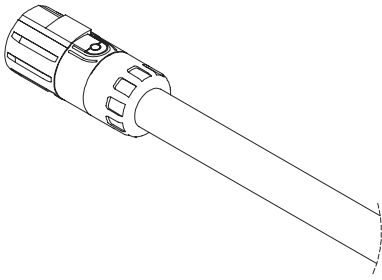


Fig. 18.11 Motor cable for HT-L linear table

Length [m]	Article number
3	8-10-1214
5	8-10-1215
10	8-10-1217

18.9 Encoder cable for incremental distance measuring system

Cable for incremental distance measuring system (option A, B, D, E) for HT-L linear table.

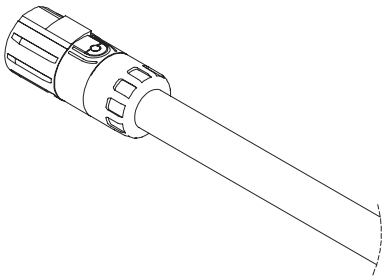


Fig. 18.12 Encoder cable for incremental distance measuring system

Length [m]	Suitable for option	Cable end	Article number
3	A, D	Open cable end: MAGIC, 1 V _{pp} , TTL, without Hall sensor	8-10-1207
5	A, D	Open cable end: MAGIC, 1 V _{pp} , TTL, without Hall sensor	8-10-1208
10	A, D	Open cable end: MAGIC, 1 V _{pp} , TTL, without Hall sensor	8-10-1210
3	B, E	Open cable end: MAGIC, 1 V _{pp} , TTL, with Hall sensor	8-10-1201
5	B, E	Open cable end: MAGIC, 1 V _{pp} , TTL, with Hall sensor	8-10-1202
10	B, E	Open cable end: MAGIC, 1 V _{pp} , TTL, with Hall sensor	8-10-1204

Linear axes and axis systems HX

Accessories

18.10 Encoder cable for absolute distance measuring system

Cable for absolute distance measuring system (option H, T, R, S) for HT-L linear tables.

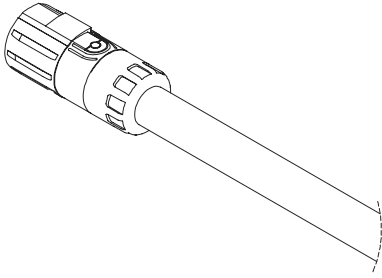


Fig. 18.13 Encoder cable for absolute distance measuring system

Length [m]	Suitable for option	Cable end	Article number
3	H, T, R, S	Open cable end	8-10-1207
5	H, T, R, S	Open cable end	8-10-1208
10	H, T, R, S	Open cable end	8-10-1210

18.11 Separators for energy chain

Separators for separating the cables within the energy chain. By default, the energy chain is equipped with a separator in each second chain link. Additional separators are available in sets of 20 pieces.

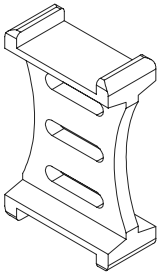


Fig. 18.14 Separator for energy chain

Suitable for linear axis				Article number, 20 pcs.
HT-L	HS (X-axis)	HS (Y-axis)	HS (Z-axis)	
—	—	—	31	8-05-0393
—	21, 31	21, 22, 23, 24, 31, 32, 33, 34	32, 33, 34	8-05-0336
150, 200, 250	22, 23, 24, 32, 33, 34	—	—	8-05-0337