

Linear axes and axis systems HX

Linear modules HM-B

5. Linear modules HM-B

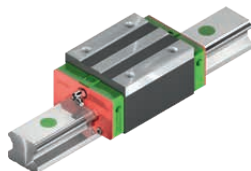
5.1 Properties of linear modules HM-B with toothed belt drive

The HIWIN linear axes with toothed belt drive are compact positioning modules that can be used flexibly. They are ideal in particular for applications requiring high dynamic responses and high speeds. In addition, large travel distances can be realised with these linear axes.



Linear guideway

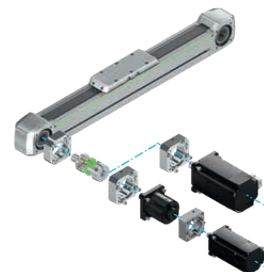
High-quality HIWIN linear guideways safely transfer forces and torques from the carriage to the axis profile. Two blocks are used per carriage, which are guided on a high-precision profile rail. The SynchMotion™ technology with ball chain also ensures good synchronisation and smooth running in the HM060B, HM080B and HM120B sizes.



Drive connection

Thanks to its symmetrical design, the HIWIN toothed belt axis allows motors and gears to be mounted on all four sides of the drive blocks.

Additional journals, which are available as accessories (see Page 238), can be used to mount additional drives and outputs at any point.



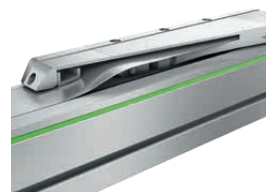
Toothed belt

The toothed belt with modern high performance profiles (HTD shape) and reinforced steel tension members enables high power transmission while offering high skip resistance.



Cover strip

The steel cover strip prevents dirt and dust from entering the axis interior. In addition, the cover strip allows the axes to be used in areas with coarse, sharp-edged or hot foreign bodies. The magnetic strips integrated in the axis profile hold the belt securely in position and increase the sealing effect.



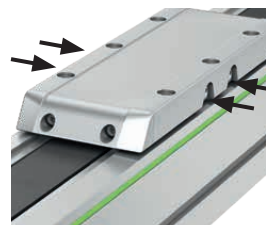
Carriage

HIWIN toothed belt modules are available with three different carriage lengths depending on the size and dimensions of the load to be transported. In order to ensure ideal, reproducible alignment of the adjacent structure, each threaded hole has an additional bore hole via which the load capacity can be fixed with centring sleeves. You will find the matching centring sleeves in the accessories on Page 231.

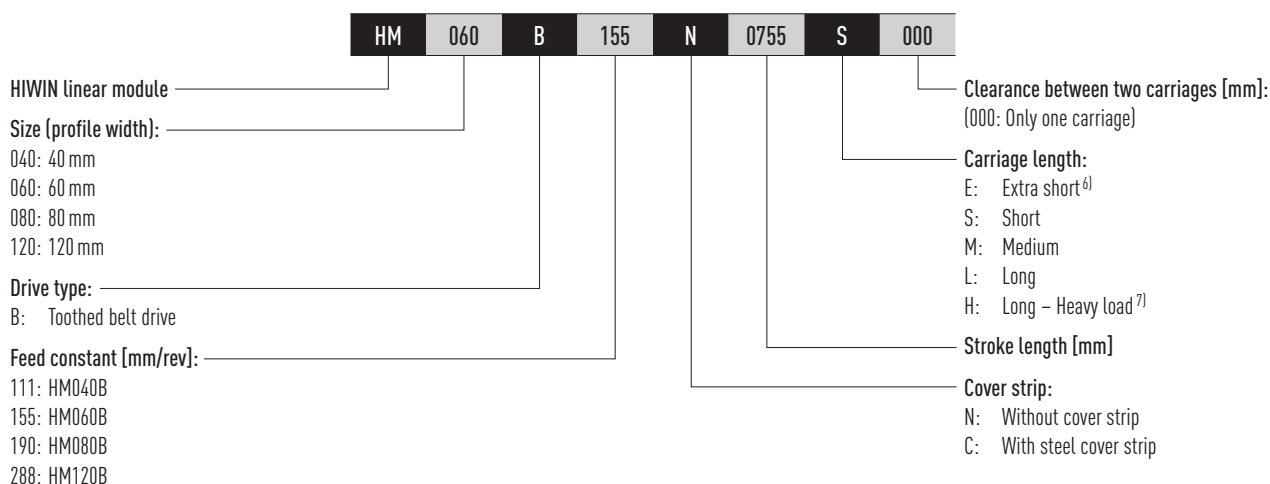


Lubrication

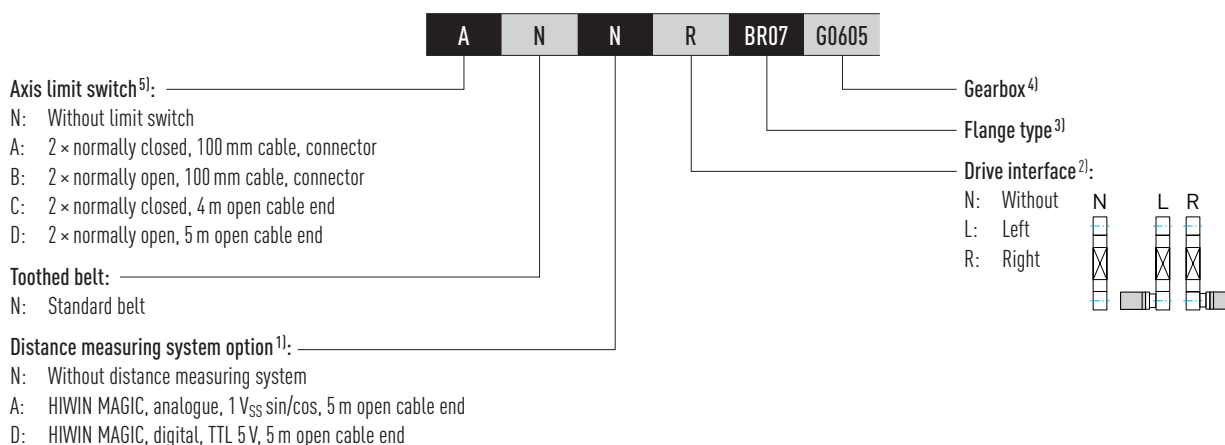
For convenient maintenance of the linear axis, a separate grease nipple is fitted to the left and right of the carriage for each lubrication point. This ensures optimum accessibility for relubrication, even under difficult installation conditions.



5.2 Order code for linear modules HM-B



Continuation, order code for linear modules HM-B



¹⁾ More detailed information in chapter 21 from page 156 or in the "HIWIN MAGIC Distance Measuring Systems" assembly instructions".

²⁾ If no drive interface is selected, the order code ends after this digit.

³⁾ You can find all flange types in Table 22.1 from page 160. If no gearbox is selected, the order code ends after this digit.

⁴⁾ You can find the right gearbox for the HIWIN axes in section 22.1.5.5 from page 195.

⁵⁾ Additional reference switches on request.

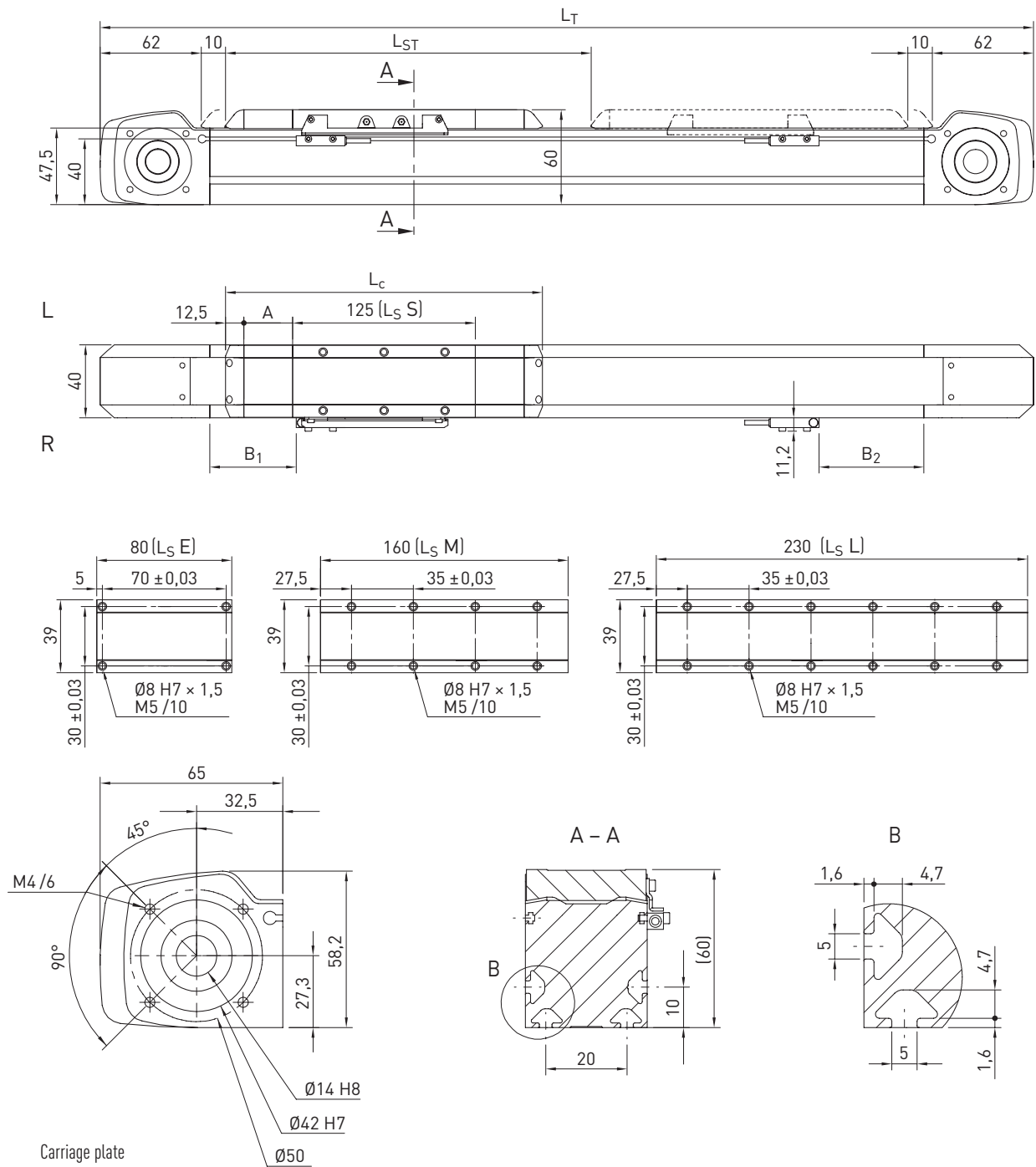
⁶⁾ Only available for HM040B.

⁷⁾ Only available for HM120B.

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5.3 Dimensions and specifications of HM040B



L_S Carriage plate
 L Left
 R Right

Table 5.1 HM040B dimensions

	Variant without cover				Variant with cover		
Type of carriage	E	S	M	L	S	M	L
Total carriage length L_C [mm]	105	150	185	255	230	265	335
Cover strip deflection A [mm]	—	—	—	—	40	40	40
Switch distance B_1 [mm]	23	24	24	24	64	64	64
Switch distance B_2 [mm]	23	9	44	114	49	84	154
Max. stroke length L_{ST} [mm]	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Total length L_T [mm]	$L_T = L_{ST} + 249$	$L_T = L_{ST} + 294$	$L_T = L_{ST} + 329$	$L_T = L_{ST} + 399$	$L_T = L_{ST} + 374$	$L_T = L_{ST} + 409$	$L_T = L_{ST} + 479$

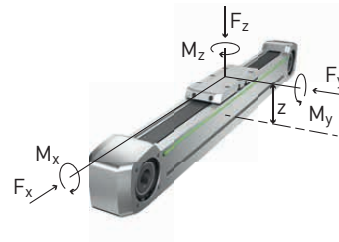
Table 5.2 Load data

Type of carriage	E	S	M	L
$F_{y\text{dynmax}}^{1)}$ [N]	665	963		
$F_{z\text{dynmax}}^{1)}$ [N]	665	963		
$M_{x\text{dynmax}}$ [Nm]	5	8		
$M_{y\text{dynmax}}$ [Nm]	4	35	52	85
$M_{z\text{dynmax}}$ [Nm]	4	35	52	85
$z^{2)}$ [mm]	34.1			

¹⁾ Force must only act free of torque

²⁾ Carriage upper edge – centre guide

See section 3.3.2 on page 17 (lifetime reference value)


Table 5.3 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x\text{max}}$ [N]	300
Max. speed [m/s]	5
Max. acceleration [m/s²]	30
Max. drive torque $M_{A\text{max}}$ [Nm]	5
Typical load capacity [kg]	10 ¹⁾
Maximum total length [mm]	3,479
Area moment of inertia of profile cross section I_x [mm⁴]	117,795
Area moment of inertia of profile cross section I_y [mm⁴]	122,922

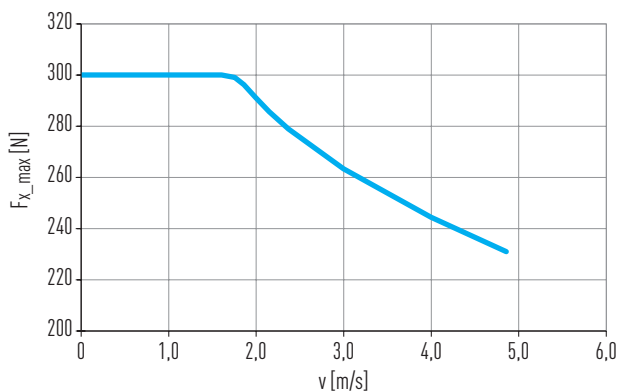
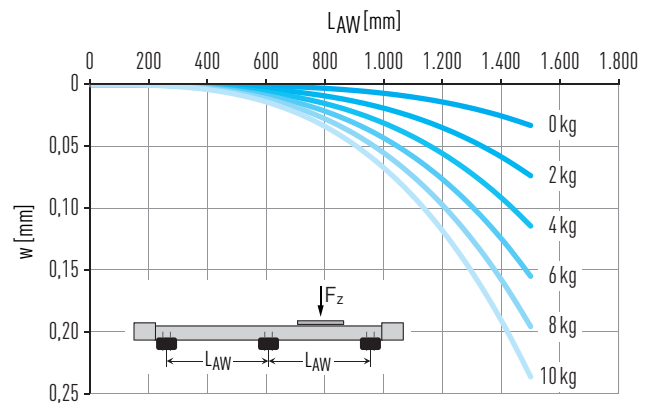
¹⁾ Carriage type E: 4 kg

Table 5.4 Guide

Type of carriage	E	S/M/L
Guide type	MGN15H	MGN15C
Static load rating C_0 [N]	9,110	5,590
Dynamic load rating C_{dyn} [N]	6,370	4,610

Table 5.5 Drive

Drive element	B15HTD3
Feed constant [mm/U]	111
Toothed belt effective diameter [mm]	35.33


Fig. 5.1 Max. feed force $F_{x\text{max}}$ as a function of axis speed v

Fig. 5.2 Deflection w over unsupported axis length L_{AW} under load capacity F_z
Table 5.6 Mechanical properties

Type of carriage	Variant without cover				Variant with cover		
	E	S	M	L	S	M	L
Mass of the carriage [kg]	0.23	0.33	0.38	0.50	0.37	0.43	0.54
Mass at 0-stroke ²⁾ [kg]	1.18	1.42	1.58	1.91	1.72	1.89	2.22
Mass per 1 m stroke [kg/m]	3.02				3.04		
$J_{\text{rot.}}^{1)}$ [kgcm²]	0.34				0.34		
Idle torque at 0-stroke [Nm]	0.15	0.18			0.25		

¹⁾ Rotational moment of inertia

²⁾ The values apply to axes with one carriage. For axes with 2 carriages, add the following: Mass of carriage + mass per 1 m stroke x (Clearance between the carriages (in m) + carriage length L_c (in m))

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Technical drawing of the SPS 1000 system, showing side, front, and detail views with dimensions and labels.

Side View (Top): Shows the overall length L_T and the distance between the end flanges L_{ST} . The end flanges have a width of 83 mm and a height of 63 mm. The main body has a height of 54 mm. The distance from the end flange to the first mounting point is 15 mm. The mounting points are spaced at intervals of 78 mm. A section line A-A is indicated.

Front View (Middle): Shows the overall length L_C and the distance between the end flanges L_S . The end flanges have a width of 15 mm. The main body has a height of 60 mm. The mounting points are spaced at intervals of 150 mm. A section line A-A is indicated. The distance from the end flange to the first mounting point is B_1 and the distance from the last mounting point to the end flange is B_2 . The distance between the end flanges is 9,7 mm.

Detail Views (Bottom):

- 200 (L_S M):** Shows the mounting points on the main body. The distance between the mounting points is 50 ± 0,03 mm. The mounting points are Ø8 H7 × 1,5 M6/12. The distance from the end flange to the first mounting point is 25 mm. The distance from the last mounting point to the end flange is 48 ± 0,03 mm. The distance between the end flanges is 59 mm.
- 300 (L_S L):** Shows the mounting points on the main body. The distance between the mounting points is 50 ± 0,03 mm. The mounting points are Ø8 H7 × 1,5 M6/12. The distance from the end flange to the first mounting point is 25 mm. The distance from the last mounting point to the end flange is 48 ± 0,03 mm. The distance between the end flanges is 59 mm.
- Carriage plate:** Shows the mounting points on the carriage plate. The distance between the mounting points is 90 mm. The distance from the end flange to the first mounting point is 42,5 mm. The distance from the last mounting point to the end flange is 77,1 mm. The distance between the end flanges is 35,4 mm. The mounting points are Ø20 H8, Ø55 H7, and Ø65.
- A - A:** Shows the cross-section of the main body. The distance between the mounting points is 40 mm. The distance from the end flange to the first mounting point is 20 mm. The distance from the last mounting point to the end flange is 78 mm.
- B:** Shows the cross-section of the end flange. The distance between the mounting points is 2,5 mm. The distance from the end flange to the first mounting point is 7 mm. The distance from the last mounting point to the end flange is 7 mm. The distance between the end flanges is 6,2 mm. The distance from the end flange to the first mounting point is 2,3 mm.

L _S	Carriage plate
L	Left
R	Right

	Variant without cover			Variant with cover		
Type of carriage	S	M	L	S	M	L
Total carriage length L_c [mm]	180	230	330	260	310	410
Cover strip deflection A [mm]	—	—	—	40	40	40
Switch distance B_1 [mm]	25	25	25	65	65	65
Switch distance B_2 [mm]	40	90	190	80	130	230
Max. stroke length L_{ST} [mm]	5,704	5,654	5,554	5,624	5,574	5,474
Total length L_T [mm]	$L_T = L_{ST} + 376$	$L_T = L_{ST} + 426$	$L_T = L_{ST} + 526$	$L_T = L_{ST} + 456$	$L_T = L_{ST} + 506$	$L_T = L_{ST} + 606$

Table 5.8 Load data

Type of carriage	S	M	L
$F_{y\text{dynmax}}^{1)}$ [N]	2,152		
$F_{z\text{dynmax}}^{1)}$ [N]	2,616		
$M_{x\text{dynmax}}$ [Nm]	21		
$M_{y\text{dynmax}}$ [Nm]	98	164	294
$M_{z\text{dynmax}}$ [Nm]	81	135	242
$z^{2)}$ [mm]	45.6		

¹⁾ Force must only act free of torque

²⁾ Carriage upper edge – centre guide

See section 3.3.2 on page 17 (lifetime reference value)

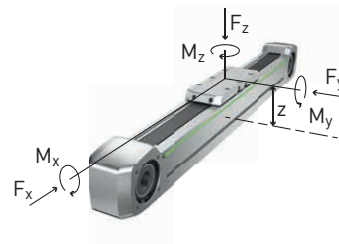


Table 5.9 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x\text{max}}$ [N]	895
Max. speed [m/s]	5
Max. acceleration [m/s²]	30
Max. drive torque $M_{A\text{max}}$ [Nm]	22
Typical load capacity [kg]	25
Maximum total length ¹⁾ [mm]	6,080
Area moment of inertia of profile cross section I_x [mm⁴]	507,521
Area moment of inertia of profile cross section I_y [mm⁴]	625,920

¹⁾ Long axes on request

Table 5.10 Guide

Guide type	QE15CA
Static load rating C_0 [N]	15,280
Dynamic load rating C_{dyn} [N]	12,530

Table 5.11 Drive

Drive element	B25HTD5
Feed constant [mm/U]	155
Toothed belt effective diameter [mm]	49.34

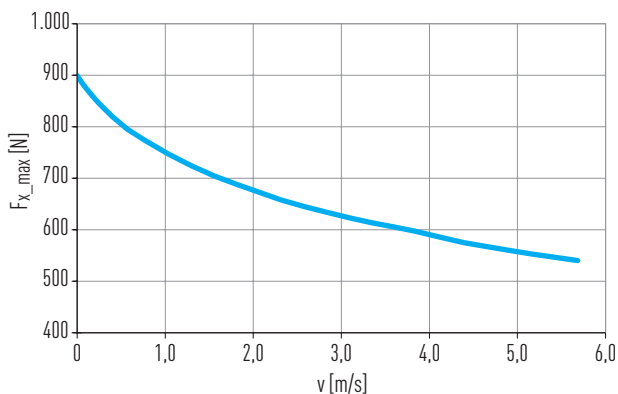
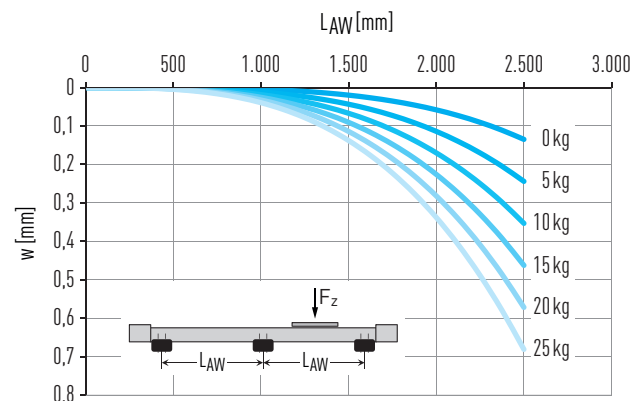

 Fig. 5.3 Max. feed force $F_{x\text{max}}$ as a function of axis speed v

 Fig. 5.4 Deflection w over unsupported axis length L_{AW} under load capacity F_z

Table 5.12 Mechanical properties

Type of carriage	Variant without cover			Variant with cover		
	S	M	L	S	M	L
Mass of the carriage [kg]	0.81	0.96	1.25	0.89	1.03	1.32
Mass at 0-stroke ²⁾ [kg]	3.50	3.92	4.77	4.05	4.47	5.32
Mass per 1 m stroke [kg/m]	5.47			5.51		
$J_{\text{rot.}}^{1)}$ [kgcm²]	1.92			1.92		
Idle torque at 0-stroke [Nm]	0.47			0.80		

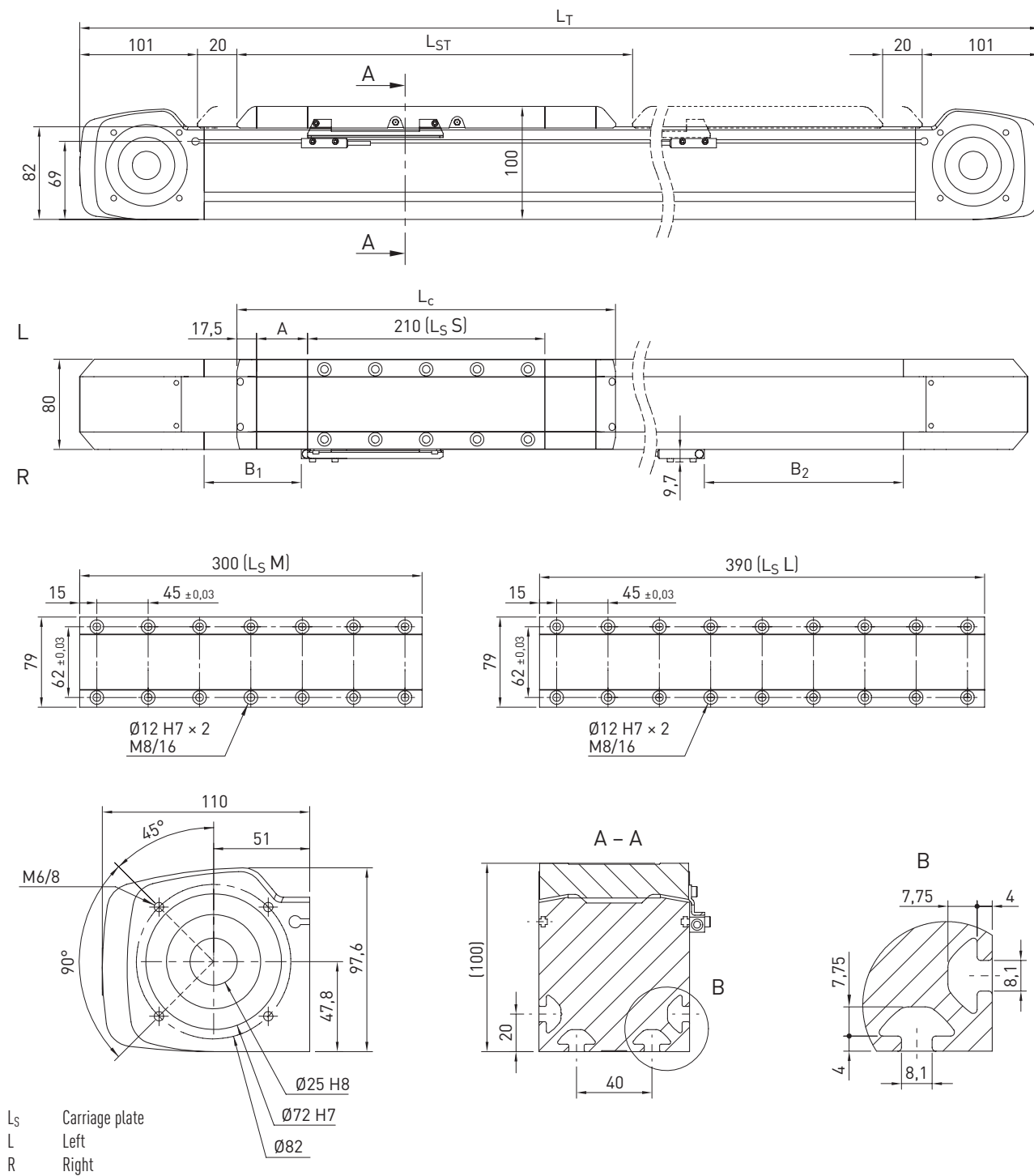
¹⁾ Rotational moment of inertia

²⁾ The values apply to axes with one carriage. For axes with 2 carriages, add the following: Mass of carriage + mass per 1 m stroke x (Clearance between the carriages (in m) + carriage length L_C (in m))

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5.5 Dimensions and specifications of HM080B



	Variant without cover			Variant with cover		
Type of carriage	S	M	L	S	M	L
Total carriage length L_c [mm]	245	335	425	335	425	515
Cover strip deflection A [mm]	—	—	—	45	45	45
Switch distance B_1 [mm]	23	23	23	68	68	68
Switch distance B_2 [mm]	113	203	293	158	248	338
Max. stroke length L_{ST} [mm]	5,633	5,543	5,453	5,543	5,453	5,363
Total length L_T [mm]	$L_T = L_{ST} + 487$	$L_T = L_{ST} + 577$	$L_T = L_{ST} + 667$	$L_T = L_{ST} + 577$	$L_T = L_{ST} + 667$	$L_T = L_{ST} + 757$

Table 5.14 Load data

Type of carriage	S	M	L
$F_{y\text{dynmax}}^{1)}$ [N]	3,855		
$F_{z\text{dynmax}}^{1)}$ [N]	6,264		
$M_{x\text{dynmax}}$ [Nm]	48		
$M_{y\text{dynmax}}$ [Nm]	357	639	921
$M_{z\text{dynmax}}$ [Nm]	220	393	567
$z^{2)}$ [mm]	53.4		

¹⁾ Force must only act free of torque

²⁾ Carriage upper edge – centre guide

See section 3.3.2 on page 17 (lifetime reference value)

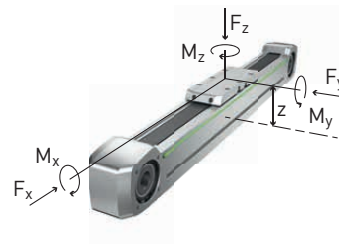


Table 5.15 General technical data

Repeatability [mm]	± 0.05
Max. feed force F_{x_max} [N]	1,253
Max. speed [m/s]	5
Max. acceleration [m/s²]	30
Max. drive torque M_{A_max} [Nm]	38
Typical load capacity [kg]	60
Maximum total length ¹⁾ [mm]	6,120
Area moment of inertia of profile cross section I_x [mm⁴]	1,522,057
Area moment of inertia of profile cross section I_y [mm⁴]	2,081,321

¹⁾ Long axes on request

Table 5.16 Guide

Guide type	QHH20CA
Static load rating C_0 [N]	33,860
Dynamic load rating C_{dyn} [N]	30,000

Table 5.17 Drive

Drive element	B35HTD5
Feed constant [mm/U]	190
Toothed belt effective diameter [mm]	60.48

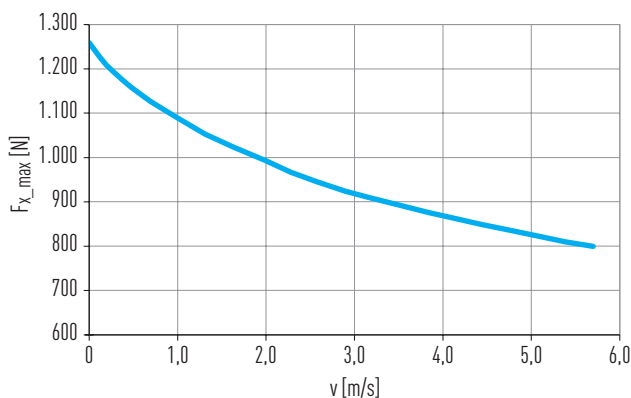


Fig. 5.5 Max. feed force F_{x_max} as a function of axis speed v

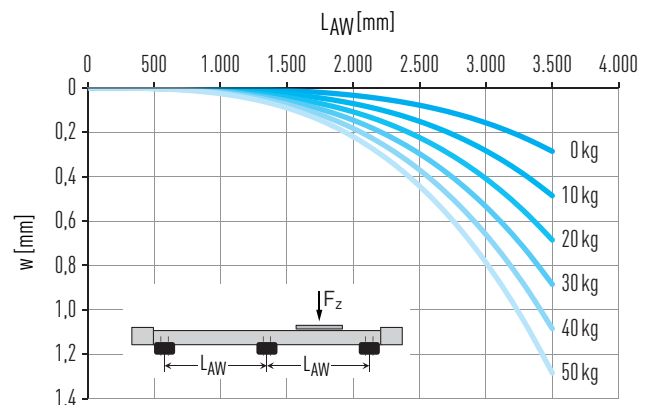


Fig. 5.6 Deflection w over unsupported axis length L_{AW} under load capacity F_z

Table 5.18 Mechanical properties

Type of carriage	Variant without cover			Variant with cover		
	S	M	L	S	M	L
Mass of the carriage [kg]	1.55	1.97	2.38	1.70	2.12	2.54
Mass at 0-stroke ²⁾ [kg]	7.38	8.70	10.02	8.48	9.80	11.12
Mass per 1 m stroke [kg/m]	9.86			9.92		
$J_{rot.}^{1)}$ [kgcm²]	6.03			6.03		
Idle torque at 0-stroke [Nm]	1.20			1.30		

¹⁾ Rotational moment of inertia

²⁾ The values apply to axes with one carriage. For axes with 2 carriages, add the following: Mass of carriage + mass per 1 m stroke x (Clearance between the carriages (in m) + carriage length L_C (in m))

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5.6 Dimensions and specifications of HM120B

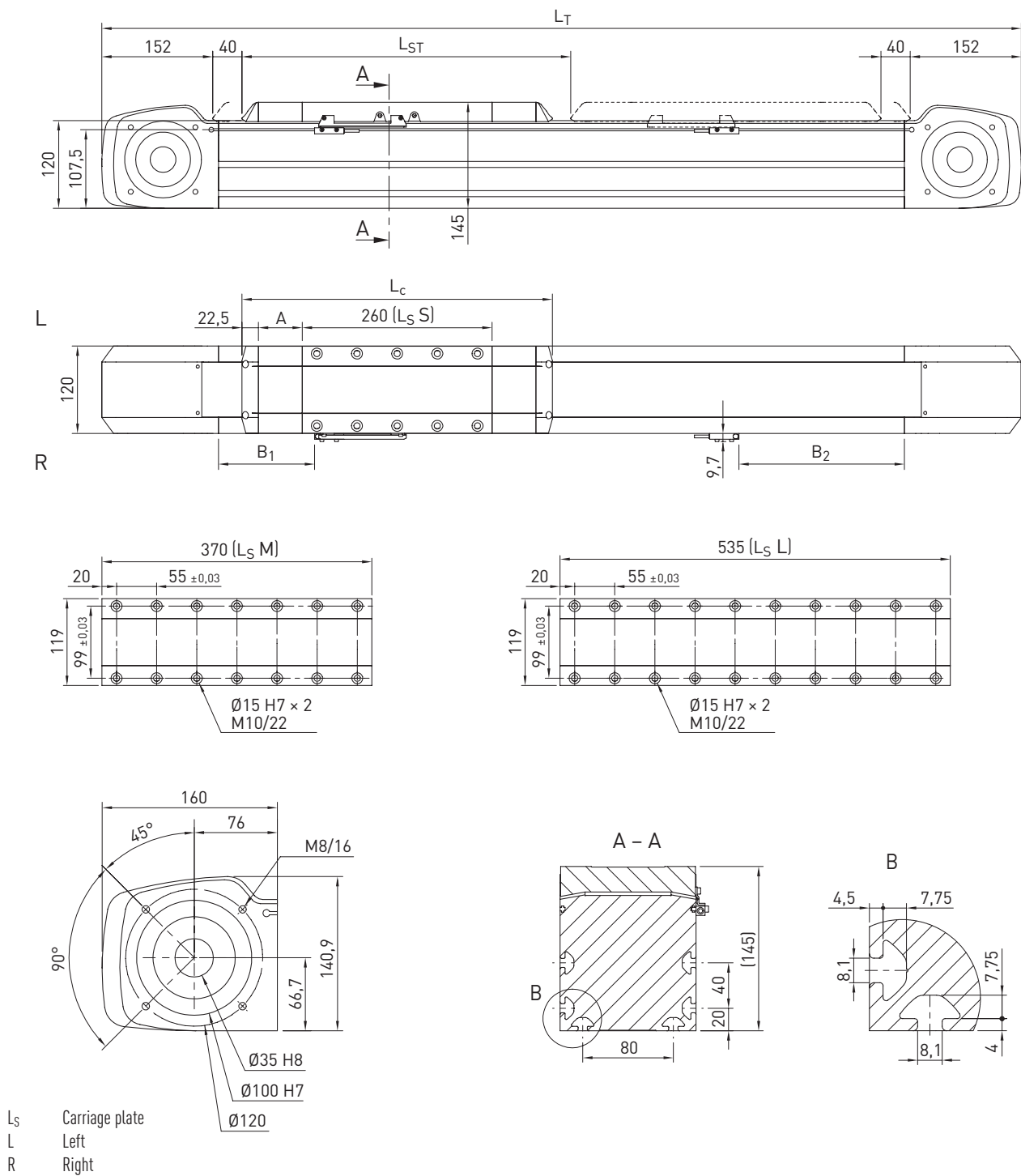


Table 5.19 HM120B dimensions

Type of carriage	Variant without cover			Variant with cover		
	S	M	L/H	S	M	L/H
Total carriage length L_c [mm]	305	415	580	425	535	700
Cover strip deflection A [mm]	—	—	—	60	60	60
Switch distance B_1 [mm]	71.5	71.5	71.5	131.5	131.5	131.5
Switch distance B_2 [mm]	166.5	276.5	441.5	226.5	336.5	501.5
Max. stroke length L_{ST} [mm]	5,531	5,421	5,256	5,411	5,301	5,136
Total length L_T [mm]	$L_T = L_{ST} + 689$	$L_T = L_{ST} + 799$	$L_T = L_{ST} + 964$	$L_T = L_{ST} + 809$	$L_T = L_{ST} + 919$	$L_T = L_{ST} + 1,084$

Table 5.20 Load data

Type of carriage	S	M	L	H
$F_{y\text{dynmax}}^{1)} \text{ [N]}$	12,165			
$F_{z\text{dynmax}}^{1)} \text{ [N]}$	12,165			14,683
$M_{x\text{dynmax}} \text{ [Nm]}$	110			138
$M_{y\text{dynmax}} \text{ [Nm]}$	900	1,569	2,573	2,937
$M_{z\text{dynmax}} \text{ [Nm]}$	900	1,569	2,573	2,433
$z^{2)} \text{ [mm]}$	77.0			

¹⁾ Force must only act free of torque

²⁾ Carriage upper edge – centre guide

See section 3.3.2 on page 17 (lifetime reference value)

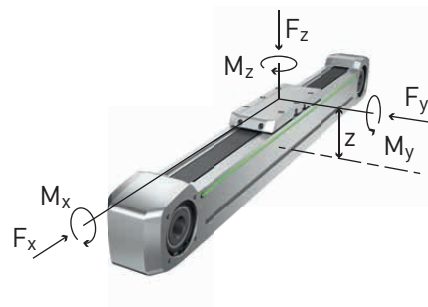


Table 5.21 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x_max} \text{ [N]}$	4,000
Max. speed [m/s]	5
Max. acceleration [m/s²]	30
Max. drive torque $M_{A_max} \text{ [Nm]}$	183
Typical load capacity [kg]	120
Maximum total length ¹⁾ [mm]	6,220
Area moment of inertia of profile cross section $I_x \text{ [mm}^4\text{]}$	6,791,541
Area moment of inertia of profile cross section $I_y \text{ [mm}^4\text{]}$	9,553,626

¹⁾ Long axes on request

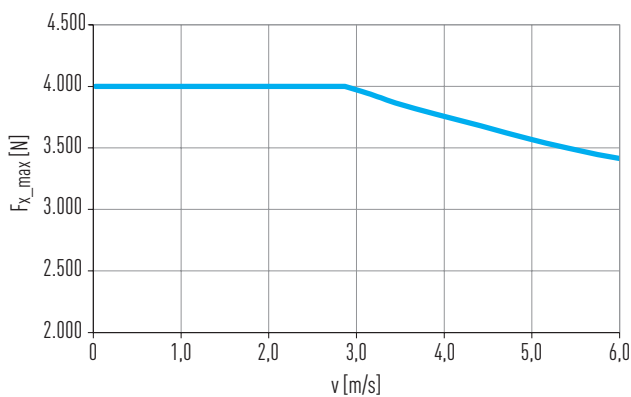


Fig. 5.7 Max. feed force F_{x_max} as a function of axis speed v

Table 5.22 Guide

Type of carriage	S/M/L	H
Guide type	QHW30CC	QHW30HC
Static load rating $C_0 \text{ [N]}$	66,340	88,450
Dynamic load rating $C_{dyn} \text{ [N]}$	58,260	70,320

Table 5.23 Drive

Drive element	B60HTD8
Feed constant [mm/U]	288
Toothed belt effective diameter [mm]	91.67

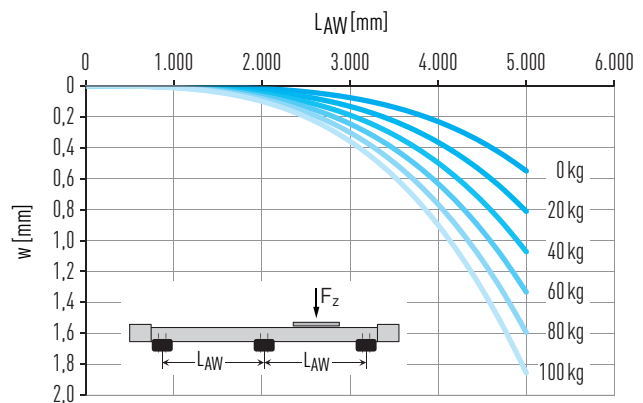


Fig. 5.8 Deflection w over unsupported axis length L_{AW} under load capacity F_z

Table 5.24 Mechanical properties

	Variant without cover				Variant with cover			
Type of carriage	S	M	L	H	S	M	L	H
Mass of the carriage [kg]	5.29	6.08	7.79	8.72	5.81	6.59	8.30	9.2
Mass at 0-stroke ²⁾ [kg]	23.44	26.63	31.75	31.22	26.60	29.80	34.94	34.5
Mass per 1 m stroke [kg/m]	20.77			21.03	20.86			21.21
$J_{rot.}^{1)} \text{ [kgcm}^2\text{]}$	42.42				42.42			
Idle torque at 0-stroke [Nm]	3.10				3.50			

¹⁾ Rotational moment of inertia

²⁾ The values apply to axes with one carriage. For axes with 2 carriages, add the following: Mass of carriage + mass per 1 m stroke x (Clearance between the carriages (in m) + carriage length L_C (in m))