

# Linear axes and axis systems HX

## Double axes HD

### 11. Double axes HD

#### 11.1 Properties of double axes HD with toothed belt drive

The HIWIN double axes HD are linear modules for flexible use and consist of two belt axes HM-B, which are connected to each other via a synchronous shaft. They are preferably used in applications where a single axis is not sufficient due to high torque loads or the dimensions of the loads to be transported. HIWIN double axes HD are also ideally suited as a basis for multi-axis systems.



#### Synchronous shaft

The synchronous shaft ensures safe and rigid power transmission for parallel movement of both axes. Due to the generously dimensioned diameter, the synchronous shaft is very torsionally stiff, meaning no additional bearing is required, even at higher speeds and longer axis distances.



#### Critical speed of the synchronous shaft

The critical speed depends on the length and diameter of the synchronous shaft and must not be exceeded during operation. The resulting maximum centre distance depending on the size and the axis speed of the HIWIN double axes can be calculated using the diagram in Fig. 11.1.

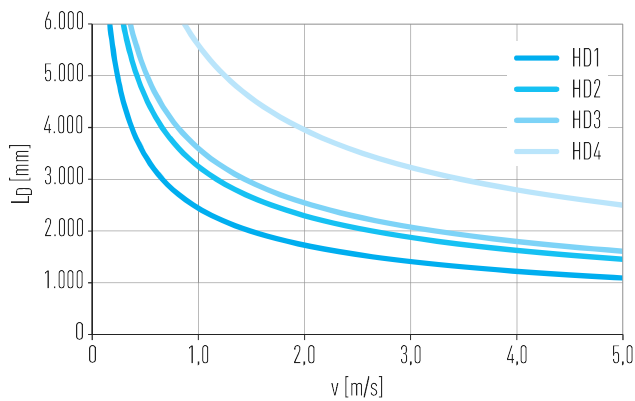
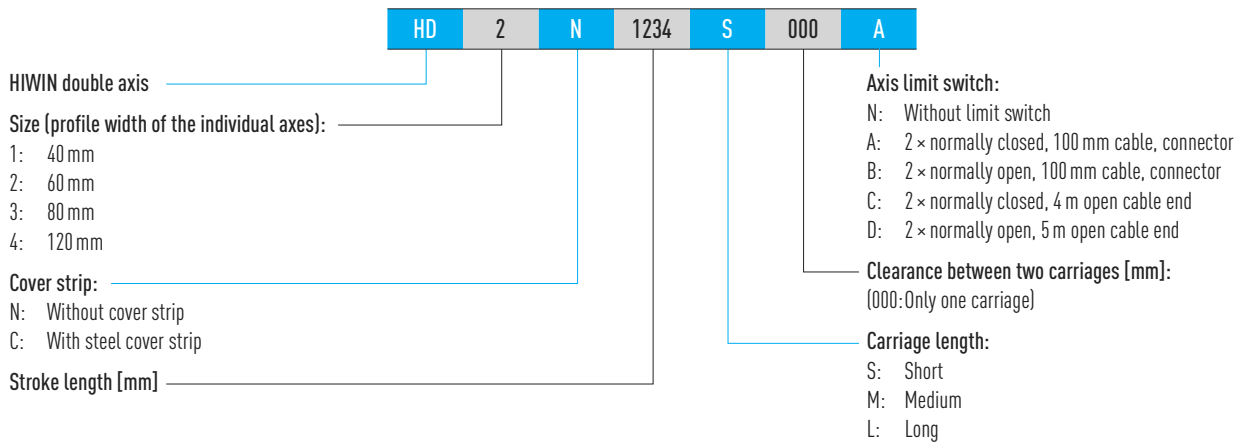
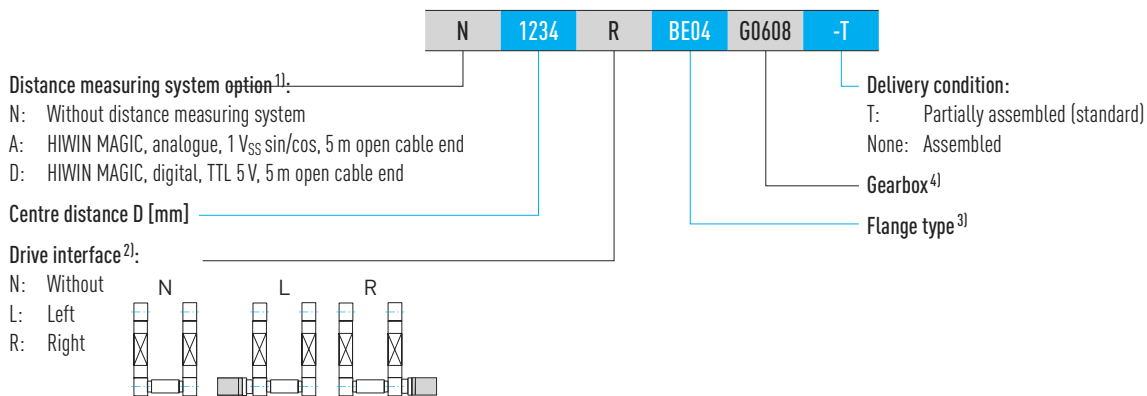


Fig. 11.1 Maximum centre distance  $L_D$  as a function of axis speed  $v$

## 11.2 Order code for double axes HD



Continuation, order code for double axes HD



<sup>1)</sup> More detailed information in chapter 17 from page 134 or in the "HIWIN MAGIC Distance Measuring Systems" assembly instructions".

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

<sup>3)</sup> You can find all flange types in Table 18.1 from page 138. If no gearbox is selected, the order code ends after this digit.

<sup>4)</sup> You can find matching gearboxes in section 18.1.4.5 from page 158.

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### 11.3 Dimensions and specifications of HD1

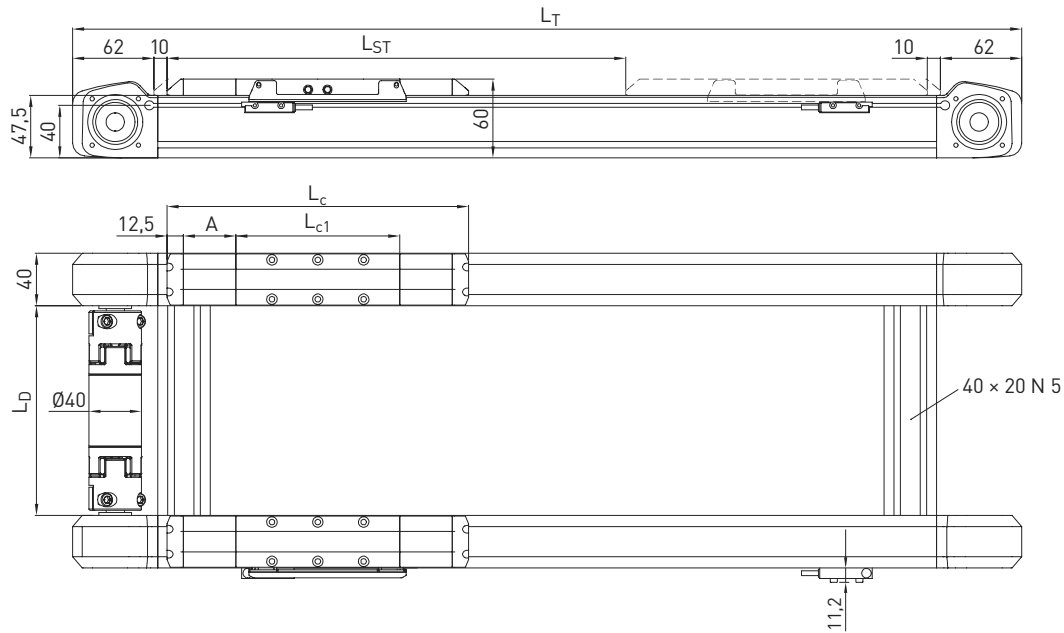


Table 11.1 HD1 dimensions

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Carriage profile length $L_c$ [mm]	125	160	230	125	160	230
Total carriage length $L_c$ [mm]	150	185	255	230	265	335
Cover strip deflection $A$ [mm]	—	—	—	40	40	40
Max. stroke length $L_{ST}$ [mm]	3,000	3,000	3,000	3,000	3,000	3,000
Total length $L_T$ [mm]	$L_T = L_{ST} + 294$	$L_T = L_{ST} + 329$	$L_T = L_{ST} + 399$	$L_T = L_{ST} + 374$	$L_T = L_{ST} + 409$	$L_T = L_{ST} + 479$
Centre distance $L_D$ min. [mm]	160	160	160	160	160	160
Centre distance $L_D$ max. [mm]	1,500	1,500	1,500	1,500	1,500	1,500

Table 11.2 General technical data

Max. feed force $F_{x\_max}$ [N]	450
Max. speed [m/s]	5
Max. drive torque $M_{A\_max}$ [Nm]	8
Typical load capacity <sup>1)</sup> [kg]	25
Single axis	HMD40B

<sup>1)</sup> With equal load distribution on both axes

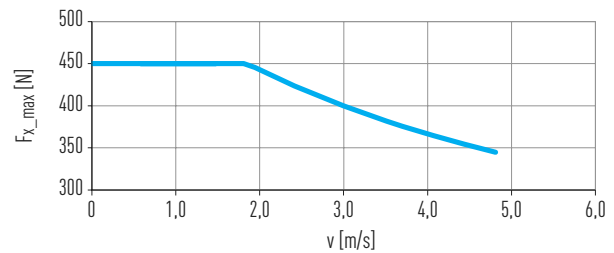


Fig. 11.2 Max. feed force  $F_{x\_max}$  as a function of axis speed  $v$

Table 11.3 Mechanical properties

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Mass of the carriage [kg]	0.66	0.77	1.00	0.74	0.86	1.09
Mass at 0-stroke and centre distance $L_D = 0$ <sup>2)</sup> [kg]	3.33	3.65	4.32	3.93	4.26	4.92
Mass per 1 m stroke [kg/m]	6.04			6.09		
Mass per 1 m centre distance $L_D$ [kg/m]	2.74			2.74		
$J_{rot.}$ <sup>1)</sup> at 0-stroke and centre distance $L_D = 0$ [kgcm <sup>2</sup> ]	1.40			1.40		
$J_{rot.}$ <sup>1)</sup> per 1 m stroke centre distance [kgcm <sup>2</sup> /m]	3.24			3.24		
Idle torque at 0-stroke [Nm]	0.35			0.50		

<sup>1)</sup> Rotational moment of inertia

<sup>2)</sup> 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))

Note: For further dimensions and data, see belt axis HMD40B on Page 22.

## 11.4 Dimensions and specifications of HD2

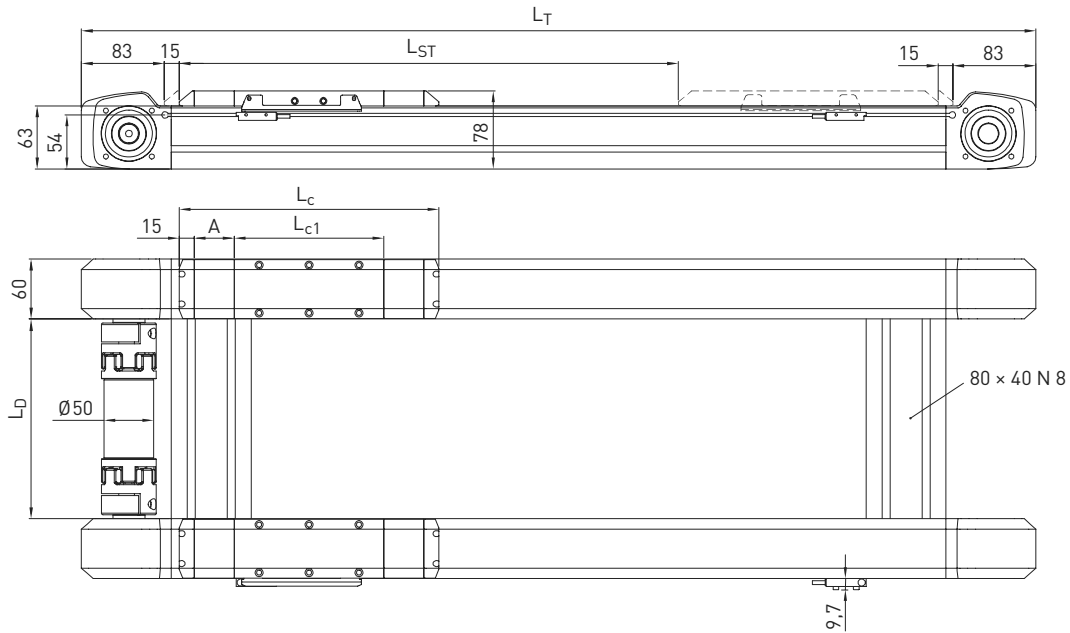


Table 11.4 HD2 dimensions

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Carriage profile length $L_C$ [mm]	150	200	300	150	200	300
Total carriage length $L_{C1}$ [mm]	180	230	330	260	310	410
Cover strip deflection $A$ [mm]	—	—	—	40	40	40
Max. stroke length $L_{ST}$ [mm]	5,704	5,654	5,554	5,624	5,574	5,474
Total length $L_T$ [mm]	$L_T = L_{ST} + 376$	$L_T = L_{ST} + 426$	$L_T = L_{ST} + 526$	$L_T = L_{ST} + 456$	$L_T = L_{ST} + 506$	$L_T = L_{ST} + 606$
Centre distance $L_D$ min. [mm]	186	186	186	186	186	186
Centre distance $L_D$ max. [mm]	2,000	2,000	2,000	2,000	2,000	2,000

Table 11.5 General technical data

Max. feed force $F_{x\_max}$ [N]	1,323
Max. speed [m/s]	5
Max. drive torque $M_{a\_max}$ [Nm]	33
Typical load capacity <sup>1)</sup> [kg]	63
Single axis	HM060B

<sup>1)</sup> With equal load distribution on both axes

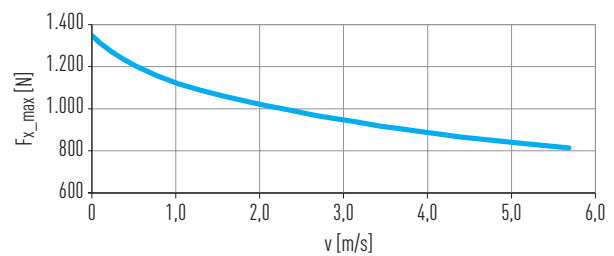


Fig. 11.3 Max. feed force  $F_{x\_max}$  as a function of axis speed  $v$

Table 11.6 Mechanical properties

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Mass of the carriage [kg]	1.62	1.91	2.49	1.78	2.07	2.65
Mass at 0-stroke and centre distance $L_D = 0$ <sup>2)</sup> [kg]	8.19	9.04	10.73	9.29	10.14	11.84
Mass per 1 m stroke [kg/m]	10.93			11.02		
Mass per 1 m centre distance $L_D$ [kg/m]	10.26			10.26		
$J_{rot.}$ <sup>1)</sup> at 0-stroke and centre distance $L_D = 0$ [kgcm <sup>2</sup> ]	6.53			6.53		
$J_{rot.}$ <sup>1)</sup> Per 1 m stroke centre distance [kgcm <sup>2</sup> /m]	6.63			6.63		
Idle torque at 0-stroke [Nm]	0.94			2.00		

<sup>1)</sup> Rotational moment of inertia

<sup>2)</sup> 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))

Note: For further dimensions and data, see belt axis HM060B on Page 24.

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### 11.5 Dimensions and specifications of HD3

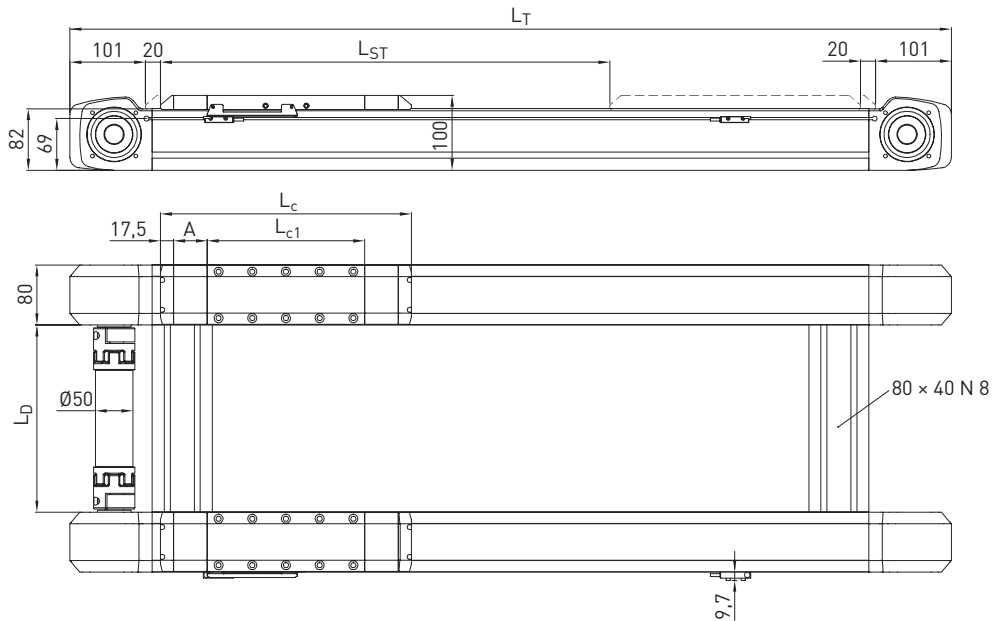


Table 11.7 HD3 dimensions

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Carriage profile length $L_c$ [mm]	210	300	390	210	300	390
Total carriage length $L_{c1}$ [mm]	245	335	425	335	425	515
Cover strip deflection A [mm]	—	—	—	45	45	45
Max. stroke length $L_{ST}$ [mm]	5,633	5,543	5,453	5,543	5,453	5,363
Total length $L_T$ [mm]	$L_T = L_{ST} + 487$	$L_T = L_{ST} + 577$	$L_T = L_{ST} + 667$	$L_T = L_{ST} + 577$	$L_T = L_{ST} + 667$	$L_T = L_{ST} + 757$
Centre distance $L_D$ min. [mm]	200	200	200	200	200	200
Centre distance $L_D$ max. [mm]	2,400	2,400	2,400	2,400	2,400	2,400

Table 11.8 General technical data

Max. feed force $F_{x,max}$ [N]	1,852
Max. speed [m/s]	5
Max. drive torque $M_{a,max}$ [Nm]	56
Typical load capacity [kg] <sup>1)</sup>	150
Single axis	HM080B

<sup>1)</sup> With equal load distribution on both axes

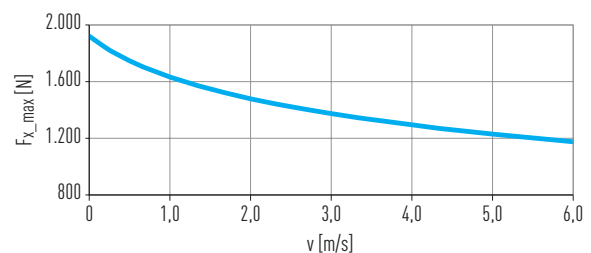


Fig. 11.4 Max. feed force  $F_{x,max}$  as a function of axis speed v

Table 11.9 Mechanical properties

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Mass of the carriage [kg]	3.10	3.94	4.77	3.40	4.24	5.07
Mass at 0-stroke and centre distance $L_D = 0$ <sup>2)</sup> [kg]	16.09	18.73	21.36	18.28	20.93	23.57
Mass per 1 m stroke [kg/m]	19.73			19.84		
Mass per 1 m centre distance $L_D$ [kg/m]	10.26			10.26		
$J_{rot.}$ <sup>1)</sup> at 0-stroke and centre distance $L_D = 0$ [kgcm <sup>2</sup> ]	15.00			15.00		
$J_{rot.}$ <sup>1)</sup> Per 1 m stroke centre distance [kgcm <sup>2</sup> /m]	6.63			6.63		
Idle torque at 0-stroke [Nm]	2.40			2.60		

<sup>1)</sup> Rotational moment of inertia

<sup>2)</sup> 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))

Note: For further dimensions and data, see belt axis HM080B on Page 26.

## 11.6 Dimensions and specifications of HD4

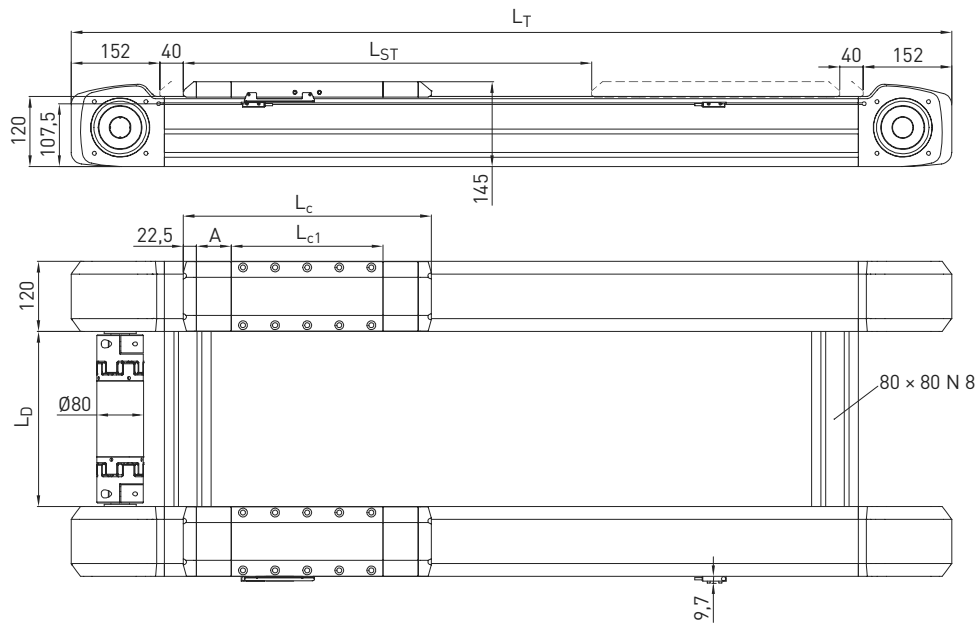


Table 11.10 HD4 dimensions

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Carriage profile length $L_c$ [mm]	260	370	535	260	370	535
Total carriage length $L_c$ [mm]	305	415	580	425	535	700
Cover strip deflection A [mm]	—	—	—	60	60	60
Max. stroke length $L_{ST}$ [mm]	5,531	5,421	5,256	5,411	5,301	5,136
Total length $L_T$ [mm]	$L_T = L_{ST} + 689$	$L_T = L_{ST} + 799$	$L_T = L_{ST} + 964$	$L_T = L_{ST} + 809$	$L_T = L_{ST} + 919$	$L_T = L_{ST} + 1,084$
Centre distance $L_D$ min. [mm]	256	256	256	256	256	256
Centre distance $L_D$ max. [mm]	3,000	3,000	3,000	3,000	3,000	3,000

Table 11.11 General technical data

Max. feed force $F_{x,max}$ [N]	4,385
Max. speed [m/s]	5
Max. drive torque $M_{a,max}$ [Nm]	201
Typical load capacity [kg] <sup>1)</sup>	300
Single axis	HM120B

<sup>1)</sup> With equal load distribution on both axes

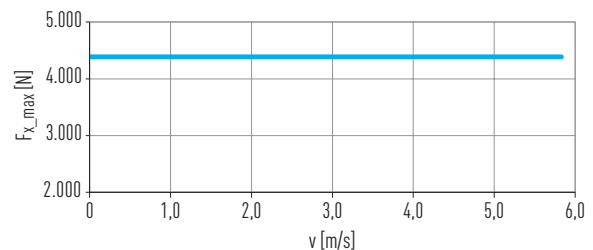


Fig. 11.5 Max. feed force  $F_{x,max}$  as a function of axis speed  $v$

Table 11.12 Mechanical properties

	Variant without cover			Variant with cover		
	Carriage type S	Carriage type M	Carriage type L	Carriage type S	Carriage type M	Carriage type L
Mass of the carriage [kg]	10.59	12.15	15.58	11.61	13.18	16.60
Mass at 0-stroke and centre distance $L_D = 0$ <sup>2)</sup> [kg]	50.31	56.68	66.93	56.63	63.02	73.30
Mass per 1 m stroke [kg/m]	41.54			41.72		
Mass per 1 m centre distance $L_D$ [kg/m]	18.42			18.42		
$J_{rot.}$ <sup>1)</sup> at 0-stroke and centre distance $L_D = 0$ [kgcm <sup>2</sup> ]	104.30			104.30		
$J_{rot.}$ <sup>1)</sup> Per 1 m stroke centre distance [kgcm <sup>2</sup> /m]	44.90			44.90		
Idle torque at 0-stroke [Nm]	6.20			9.00		

<sup>1)</sup> Rotational moment of inertia

<sup>2)</sup> 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))

Note: For further dimensions and data, see belt axis HM120B on Page 28.