

Linear axes & linear axis systems

Cantilever axes HC-B

13. Cantilever axes HC-B

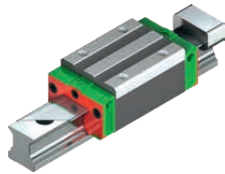
13.1 Properties of cantilever axes HC-B with toothed belt drive

The HIWIN cantilever axes with toothed belt drive are flexible linear units in which the drive block is stationary while the light cantilever moves. They are especially suitable for vertical applications where high dynamics and high speeds are required.



Linear guideway

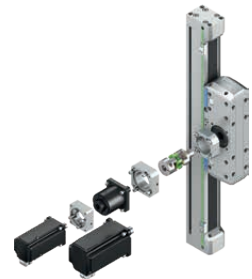
High-quality HIWIN linear guideways with two blocks safely transfer forces and torques from the cantilever to the drive block. The CG guide with O-arrangement of the ball track also ensures increased rigidity and high torque load capacity in the HC060B, HC080B and HC100B sizes.



Drive connection

Thanks to the symmetrical design, the HIWIN cantilever axis allows motors and gearboxes to be mounted on both sides of the drive block.

Additional journals, which are available as accessories (see [Page 199](#)), can be used to mount additional drives and outputs.



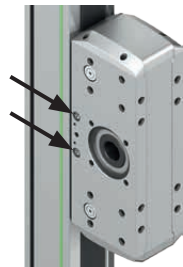
Toothed belt

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



Lubrication

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



Mounting

The drive block as well as the interfaces for attaching the load capacity on both sides of the cantilever have additional bore holes on each mounting hole. This ensures ideal, reproducible alignment of the adjacent construction. You will find the matching centring sleeves in the accessories on [Page 192](#).

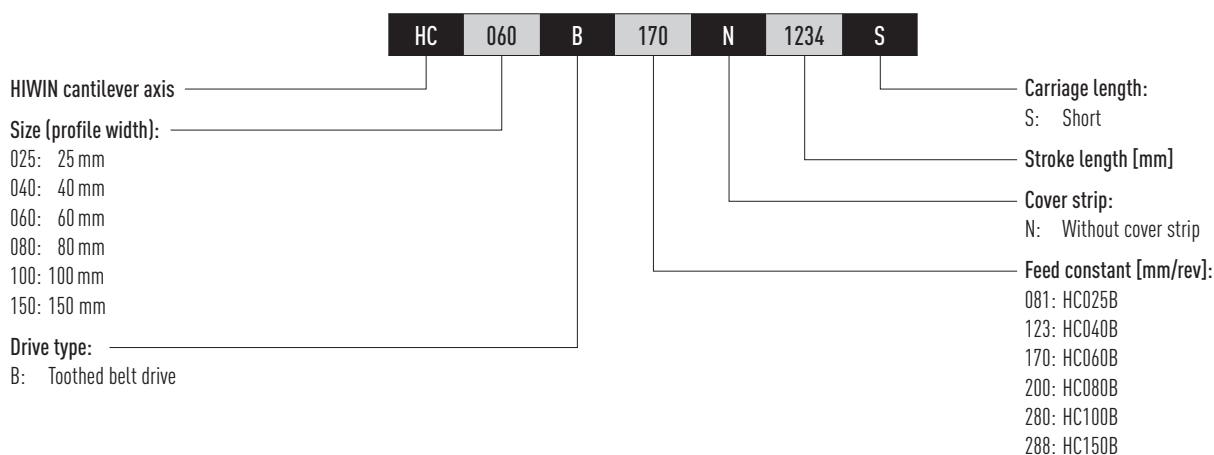


Clamping and braking element

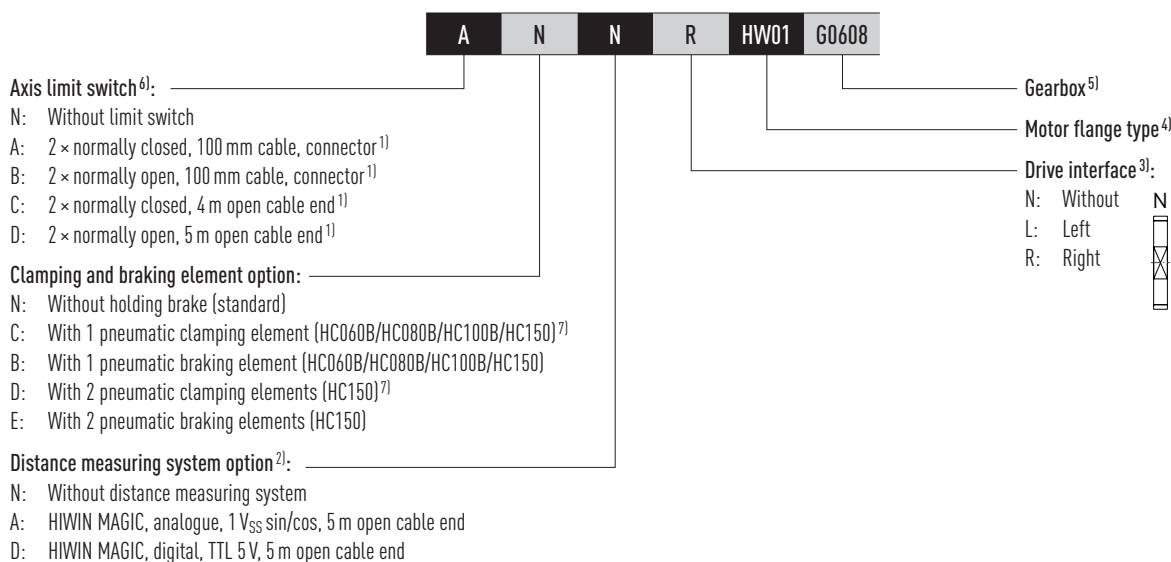
The clamping or braking element can be controlled via a pneumatic connection on the drive block. Clamping onto the profile rail is fail-safe as soon as there is no more compressed air at the connection. Particularly in vertical applications, clamping may be necessary to securely fix the axis at standstill.



13.2 Order code for cantilever axes HC-B



Continuation, order code for cantilever axes HC-B



¹⁾ HC025B: A: 2 × normally closed, 200 mm cable, connector, C: 2 × normally closed, 2 m open cable end; B and D: not available.

²⁾ More detailed information in chapter 21 from page 156 or in the "HIWIN MAGIC Distance Measuring Systems" assembly instructions".

³⁾ If no drive interface is selected, the order code ends after this digit.

⁴⁾ 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.

⁵⁾ You can find the right gearbox for the HIWIN axes in section 22.1.5.5 from page 170.

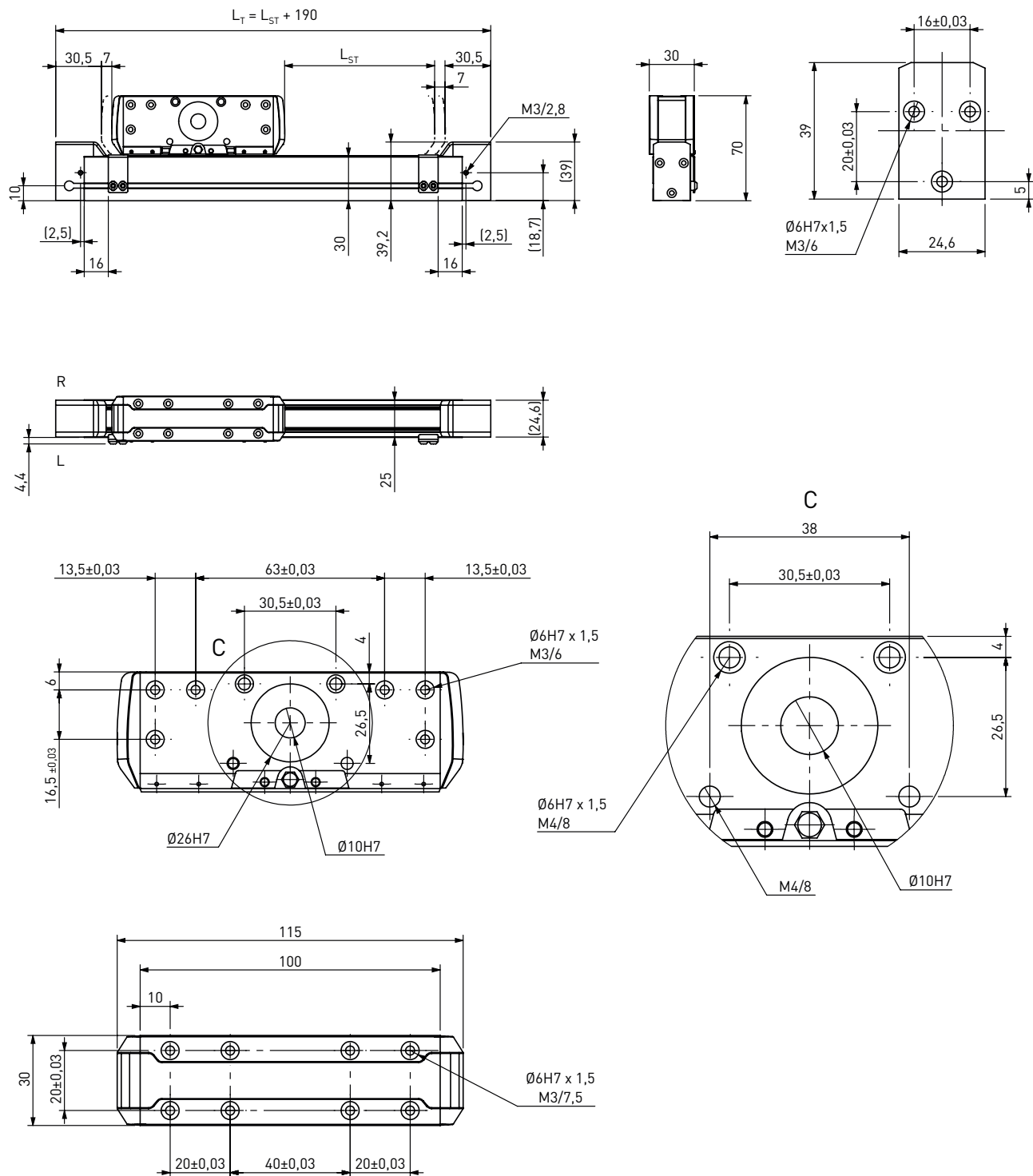
⁶⁾ Additional reference switches on request.

⁷⁾ The clamping element may only be used when the axis is stationary and not as a brake.

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13.3 Dimensions and specifications of HC025B



L_{ST} Stroke
 L_T Total length
 L Left
 R Right

Table 13.1 Load data

	Permissible load data	Theoretical load data
Lifetime reference value	5,000 km	100 km
$F_{y\text{dynmax}}^{1)}$ [N]	616	2,953
$F_{z\text{dynmax}}^{1)}$ [N]	616	2,953
$M_{x\text{dynmax}}$ [Nm]	2.8	14
$M_{y\text{dynmax}}$ [Nm]	21	99
$M_{z\text{dynmax}}$ [Nm]	21	99

¹⁾ Force must only act free of torque

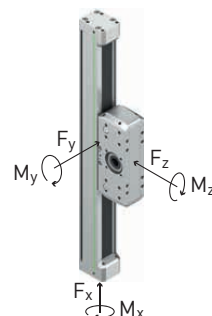


Table 13.2 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x\text{max}}$ [N]	241
Max. speed [m/s]	5
Max. acceleration [m/s ²]	30
Max. drive torque $M_{A\text{max}}$ [Nm]	3.1
Typical load capacity [kg]	2
Maximum vertical stroke length [mm]	300
Maximum horizontal stroke length [mm]	200
Area moment of inertia of profile cross section I_x [mm ⁴]	18,706
Area moment of inertia of profile cross section I_y [mm ⁴]	19,299

Table 13.3 Guide

Type of carriage	MGN09C × 2
Static load rating C_0 [N]	2,550 × 2
Dynamic load rating C_{dyn} 50 km [N]	1,860 × 2

Table 13.4 Drive

Drive element	B12HTD3
Feed constant [mm/U]	81
Toothed belt effective diameter [mm]	25.78

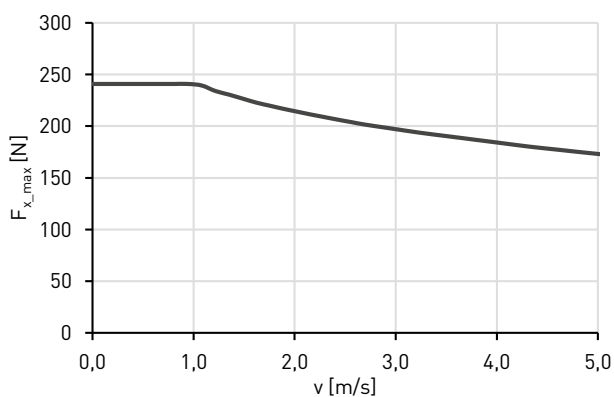


Fig. 13.1 Max. feed force $F_{x\text{max}}$ depending on axis speed v

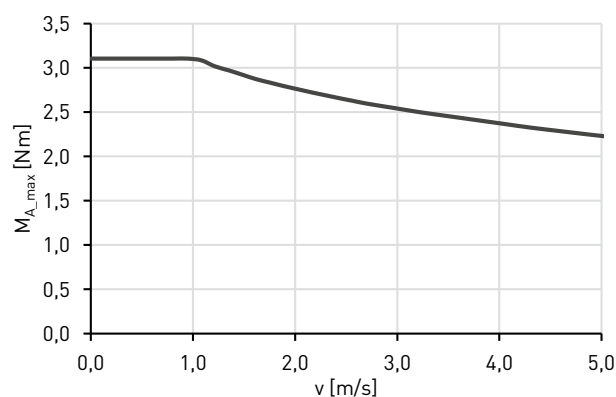


Fig. 13.2 Max. drive force $M_{A\text{max}}$ depending on axis speed v

Table 13.5 Mechanical properties

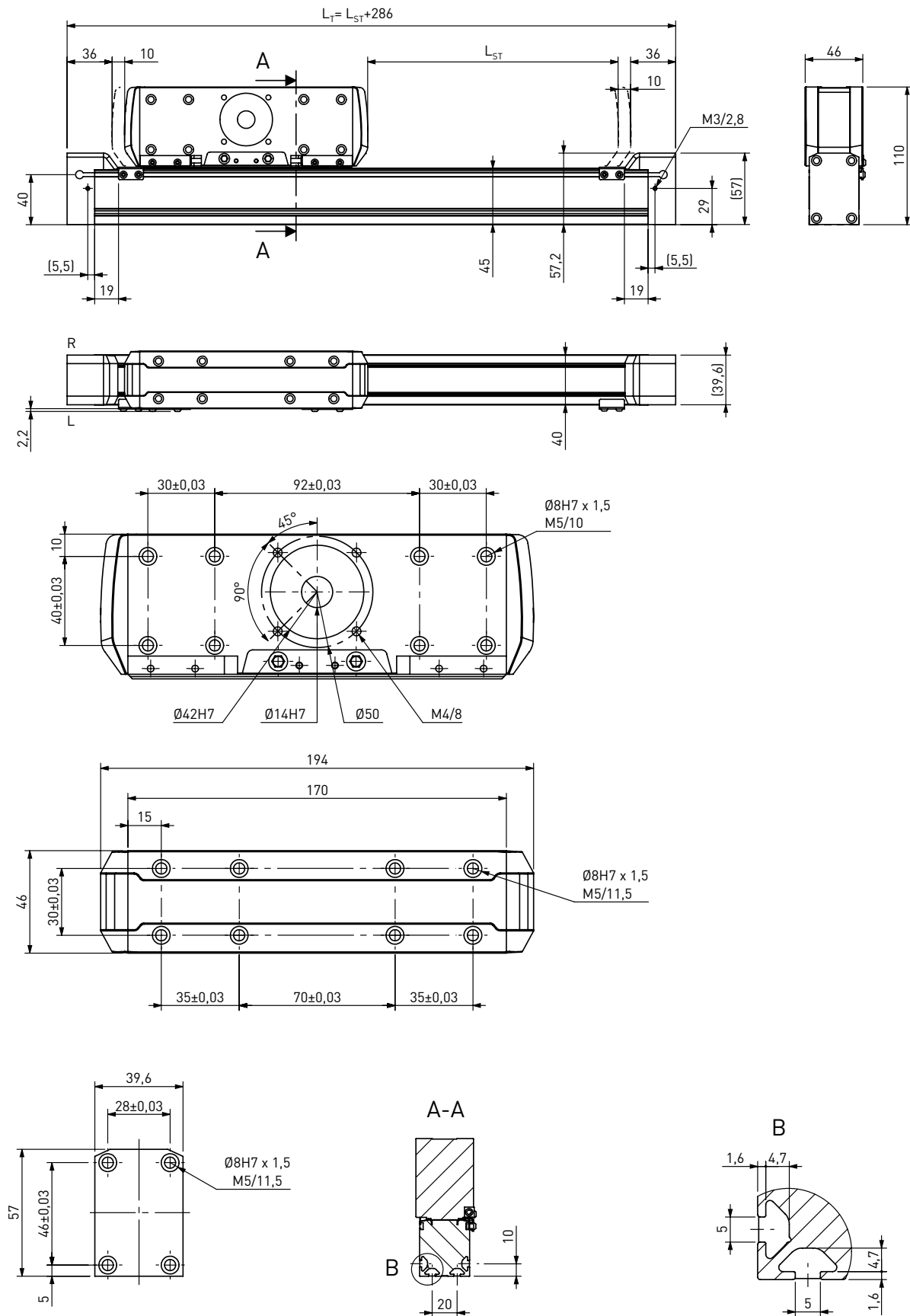
Mass at 0-stroke [kg]	0.72
Mass per 100 mm stroke [kg/100 mm]	0.13
Mass of cantilever at 0-stroke [kg]	0.30
Mass of cantilever per 100 mm stroke [kg/100 mm]	0.13
$J_{\text{rot.}}^{1)}$ [kgcm ²]	0.16
Idle torque at 0-stroke [Nm]	0.15

¹⁾ Rotational moment of inertia

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13.4 Dimensions and specifications of HC040B



L_{ST}

Stroke

L_T

Total length

L

Left

R

Right

Table 13.6 Load data

	Permissible load data	Theoretical load data
Lifetime reference value	10,000 km	100 km
$F_{y\text{dynmax}}^{1)}$ [N]	1,213	7,318
$F_{z\text{dynmax}}^{1)}$ [N]	1,213	7,318
$M_{x\text{dynmax}}$ [Nm]	9.8	59
$M_{y\text{dynmax}}$ [Nm]	78	468
$M_{z\text{dynmax}}$ [Nm]	78	468

¹⁾ Force must only act free of torque

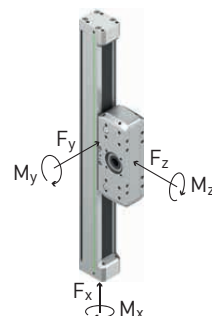


Table 13.7 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x\text{max}}$ [N]	404
Max. speed [m/s]	5
Max. acceleration [m/s ²]	30
Max. drive torque $M_{A\text{max}}$ [Nm]	7.9
Typical load capacity [kg]	8
Maximum vertical stroke length [mm]	500
Maximum horizontal stroke length [mm]	400
Area moment of inertia of profile cross section I_x [mm ⁴]	94,400
Area moment of inertia of profile cross section I_y [mm ⁴]	102,030

Table 13.8 Guide

Type of carriage	MGN15C × 2
Static load rating C_0 [N]	5,590 × 2
Dynamic load rating $C_{\text{dyn } 50 \text{ km}}$ [N]	4,610 × 2

Table 13.9 Drive

Drive element	B20HTD3
Feed constant [mm/U]	123
Toothed belt effective diameter [mm]	39.15

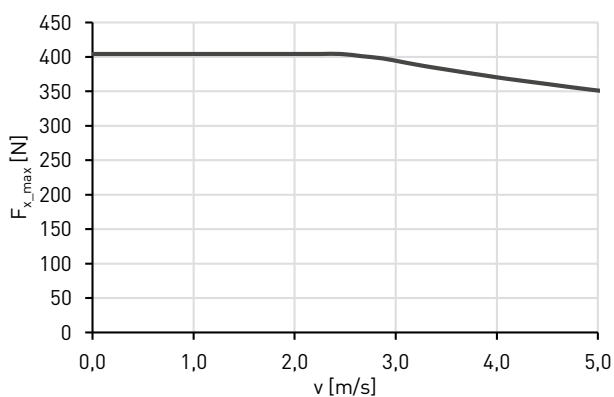
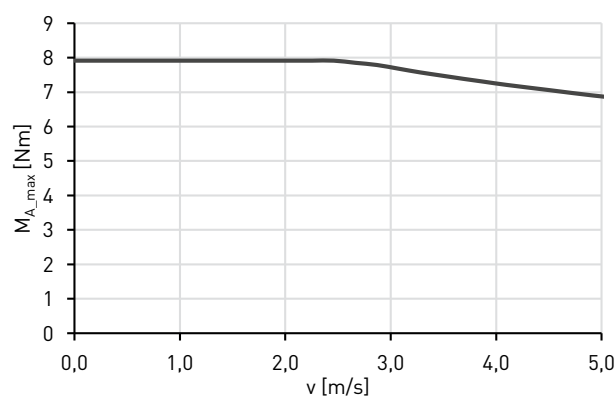

 Fig. 13.3 Max. feed force $F_{x\text{max}}$ depending on axis speed v

 Fig. 13.4 Max. drive force $M_{A\text{max}}$ depending on axis speed v

Table 13.10 Mechanical properties

Mass at 0-stroke [kg]	2.33
Mass per 100 mm stroke [kg/100 mm]	0.28
Mass of cantilever at 0-stroke [kg]	0.91
Mass of cantilever per 100 mm stroke [kg/100 mm]	0.28
$J_{\text{rot.}}^{1)}$ [kgcm ²]	0.44
Idle torque at 0-stroke [Nm]	0.20

¹⁾ Rotational moment of inertia

Cantilever axes HC-B

[illegible]

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Table 13.11 Load data

	Permissible load data	Theoretical load data
Lifetime reference value	15,000 km	100 km
$F_{y\text{dynmax}}^{1)}$ [N]	2,152	23,335
$F_{z\text{dynmax}}^{1)}$ [N]	3,378	23,335
$M_{x\text{dynmax}}$ [Nm]	27	189
$M_{y\text{dynmax}}$ [Nm]	243	1,680
$M_{z\text{dynmax}}$ [Nm]	155	1,680

¹⁾ Force must only act free of torque

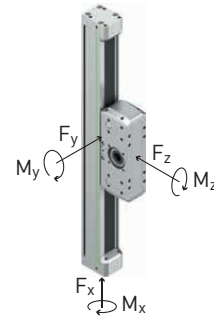


Table 13.12 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x\text{max}}$ [N]	997
Max. speed [m/s]	5
Max. acceleration [m/s ²]	30
Max. drive torque $M_{A\text{max}}$ [Nm]	27
Typical load capacity [kg]	16
Maximum vertical stroke length [mm]	800
Maximum horizontal stroke length [mm]	600
Area moment of inertia of profile cross section I_x [mm ⁴]	431,271
Area moment of inertia of profile cross section I_y [mm ⁴]	536,119

Table 13.13 Guide

Type of carriage	CGL15CA × 2
Static load rating C_0 [N]	23,470 × 2
Dynamic load rating $C_{\text{dyn } 50 \text{ km}}$ [N]	14,700 × 2

Table 13.14 Drive

Drive element	B30HTD5
Feed constant [mm/U]	170
Toothed belt effective diameter [mm]	54.11

Table 13.15 Clamping/Braking element¹⁾

Holding force [N]	400
Operating pressure [bar]	5.5–6.5

¹⁾ The clamping element may only be used when the axis is stationary and not as a brake.

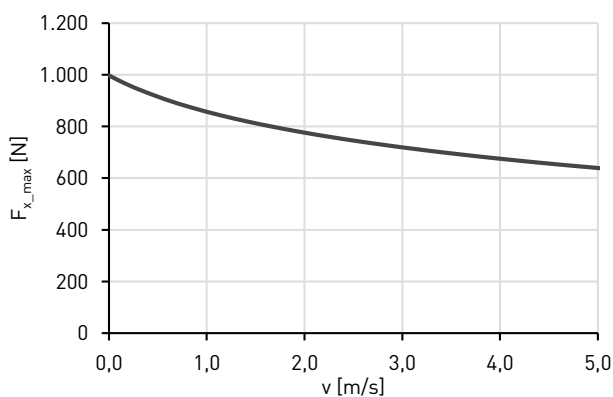


Fig. 13.5 Max. feed force $F_{x\text{max}}$ depending on axis speed v

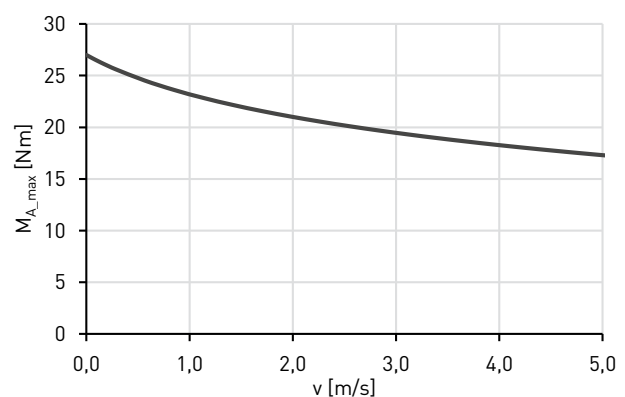


Fig. 13.6 Max. drive force $M_{A\text{max}}$ depending on axis speed v

Table 13.16 Mechanical properties

Mass at 0-stroke [kg]	5.44
Mass per 100 mm stroke [kg/100 mm]	0.52
Mass of cantilever at 0-stroke [kg]	2.23
Mass of cantilever per 100 mm stroke [kg/100 mm]	0.52
$J_{\text{rot.}}^{1)}$ [kgcm ²]	2.41
Idle torque at 0-stroke [Nm]	0.60

¹⁾ Rotational moment of inertia

Cantilever axes HC-B

Technical drawing of the M5 clamping/braking element, showing multiple views and dimensions.

Top View: Dimensions include 48, 20, 144,5, 42, 84, 102,2, 20, 48, 94,3, 71, 102, 84, 190. The total length is defined as $L_T = L_{ST} + 426$.

Side View (R/L): Dimensions include 79,6, 80, 1,15, 25,8, 16,3.

Front View (A-A): Dimensions include 45 ± 0,03, 108 ± 0,03, 45 ± 0,03, 10, 71 ± 0,03, 45 ± 0,03, 138 ± 0,03, 45 ± 0,03, 290, 250, 12,5, 84, 62 ± 0,03, 45 ± 0,03, 135 ± 0,03, 45 ± 0,03. It also shows a 45° angle and a 90° angle.

Bottom View: Dimensions include 79,6, 60 ± 0,03, 102, 60 ± 0,03, 32, 6,2, 7, 3, 7, 6,2, 15, 50.

Legend:

- L_{ST} Stroke
- L_T Total length
- L Left
- R Right
- 1d Compressed air connection for clamping/braking element M5

Table 13.17 Load data		
	Permissible load data	Theoretical load data
Lifetime reference value	15,000 km	100 km
$F_{y\text{dynmax}}^{1)}$ [N]	3,855	43,019
$F_{z\text{dynmax}}^{1)}$ [N]	6,228	43,019
$M_{x\text{dynmax}}$ [Nm]	63	434
$M_{y\text{dynmax}}$ [Nm]	508	3,506
$M_{z\text{dynmax}}$ [Nm]	314	3,506

¹⁾ Force must only act free of torque

Table 13.18 General technical data	
Repeatability [mm]	± 0.05
Max. feed force F_{x_max} [N]	1,330
Max. speed [m/s]	5
Max. acceleration [m/s ²]	30
Max. drive torque M_{A_max} [Nm]	42.3
Typical load capacity [kg]	30
Maximum vertical stroke length [mm]	1,200
Maximum horizontal stroke length [mm]	800
Area moment of inertia of profile cross section I_x [mm ⁴]	1,394,922
Area moment of inertia of profile cross section I_y [mm ⁴]	1,758,779

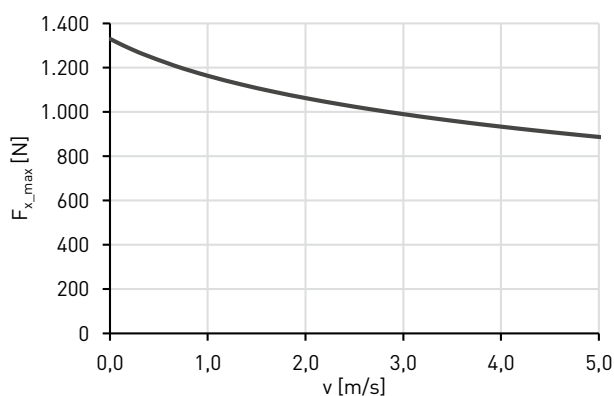


Fig. 13.7 Max. feed force F_{x_max} as a function of axis speed v

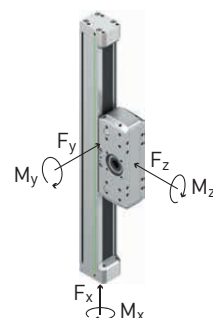


Table 13.19 Guide	
Type of carriage	CGH20CA × 2
Static load rating C_0 [N]	36,680 × 2
Dynamic load rating C_{dyn} 50 km [N]	27,100 × 2

Table 13.20 Drive	
Drive element	B40HTD5
Feed constant [mm/U]	200
Toothed belt effective diameter [mm]	63.66

Table 13.21 Clamping/Braking element ¹⁾	
Holding force [N]	650
Operating pressure [bar]	5.5–6.5

¹⁾ The clamping element may only be used when the axis is stationary and not as a brake.

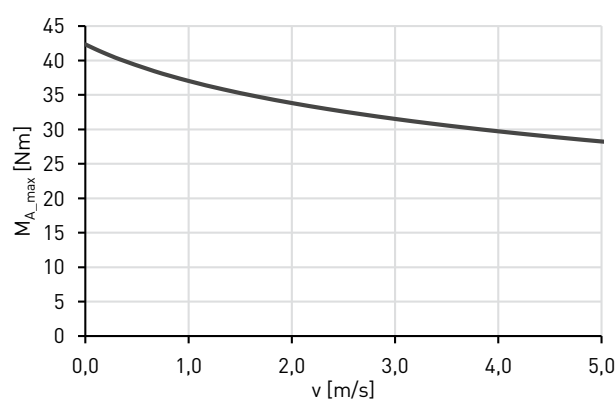


Fig. 13.8 Max. drive force M_{A_max} as a function of axis speed v

Table 13.22 Mechanical properties	
Mass at 0-stroke [kg]	10.15
Mass per 100 mm stroke [kg/100 mm]	0.90
Mass of cantilever at 0-stroke [kg]	4.35
Mass of cantilever per 100 mm stroke [kg/100 mm]	0.90
$J_{rot.}^{1)}$ [kgcm ²]	5.49
Idle torque at 0-stroke [Nm]	1.40

¹⁾ Rotational moment of inertia

Linear axes & linear axis systems

Cantilever axes HC-B

13.7 Dimensions and specifications of HC100B

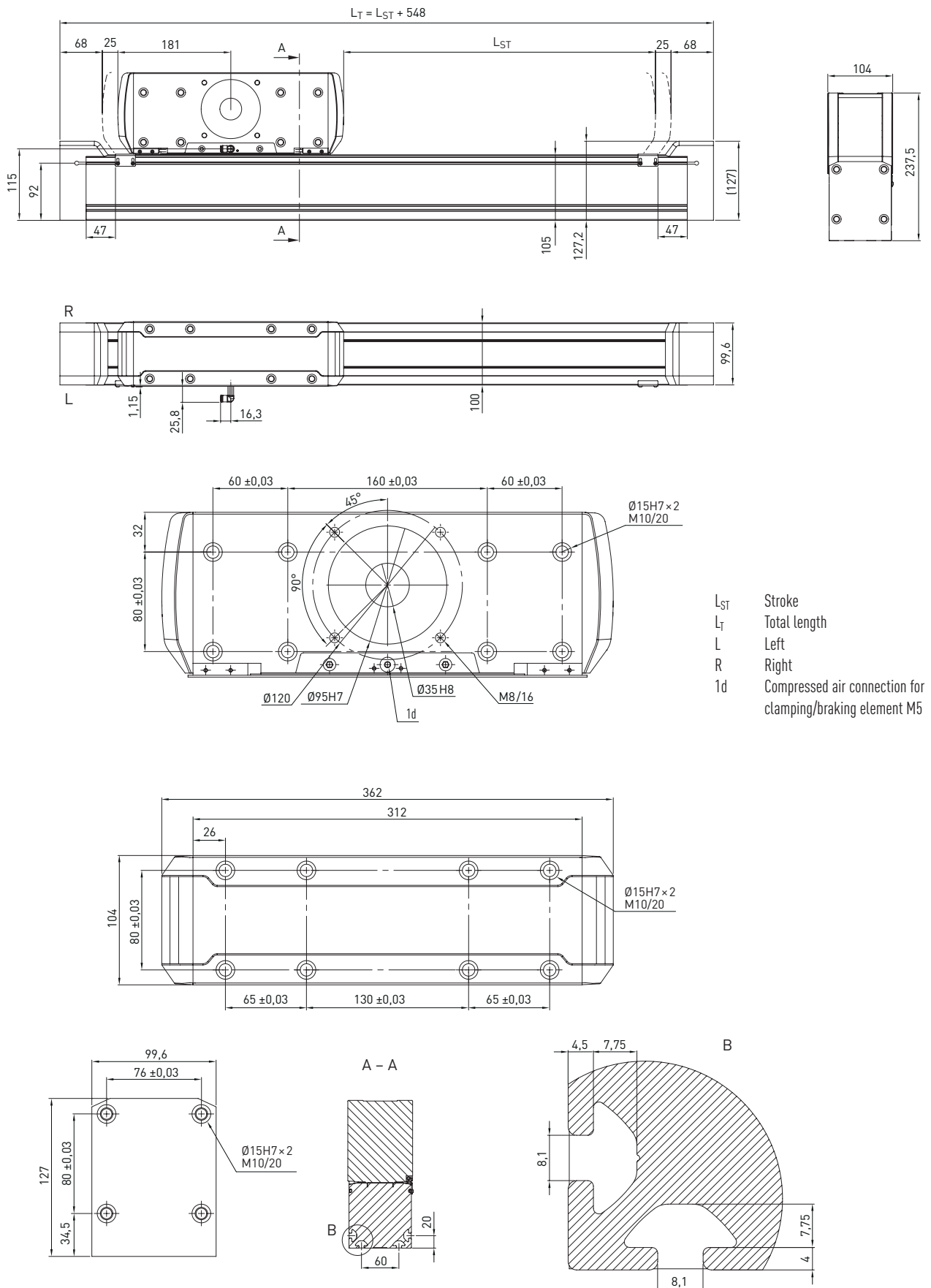


Table 13.23 Load data

	Permissible load data	Theoretical load data
Lifetime reference value	15,000 km	100 km
$F_{y_{dynmax}}^{1)}$ [N]	6,979	55,400
$F_{z_{dynmax}}^{1)}$ [N]	8,021	55,400
$M_{x_{dynmax}}$ [Nm]	91	629
$M_{y_{dynmax}}$ [Nm]	842	5,817
$M_{z_{dynmax}}$ [Nm]	733	5,817

¹⁾ Force must only act free of torque

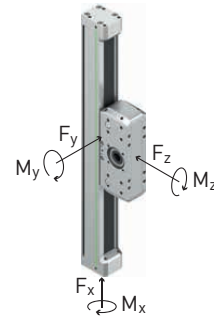


Table 13.24 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x_{max}}$ [N]	2,667
Max. speed [m/s]	5
Max. acceleration [m/s ²]	30
Max. drive torque $M_{A_{max}}$ [Nm]	118.8
Typical load capacity [kg]	60
Maximum vertical stroke length [mm]	1,800
Maximum horizontal stroke length [mm]	1,200
Area moment of inertia of profile cross section I_x [mm ⁴]	3,290,845
Area moment of inertia of profile cross section I_y [mm ⁴]	4,100,279

Table 13.25 Guide

Type of carriage	CGL25CA × 2
Static load rating C_0 [N]	52,820 × 2
Dynamic load rating C_{dyn} 50 km [N]	34,900 × 2

Table 13.26 Drive

Drive element	B40HTD8
Feed constant [mm/U]	280
Toothed belt effective diameter [mm]	89.13

Table 13.27 Clamping/Braking element¹⁾

Holding force [N]	750
Operating pressure [bar]	5.5–6.5

¹⁾ The clamping element may only be used when the axis is stationary and not as a brake.

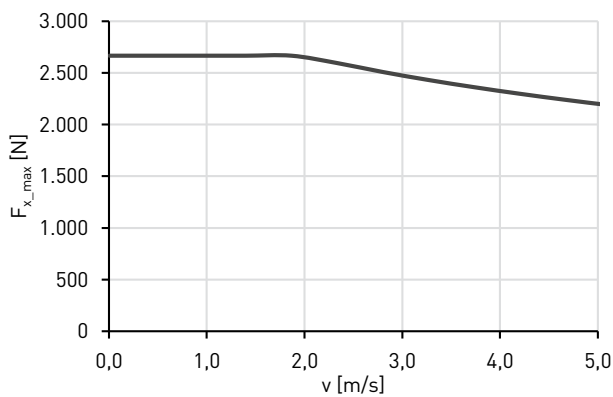


Fig. 13.9 Max. feed force $F_{x_{max}}$ depending on axis speed v

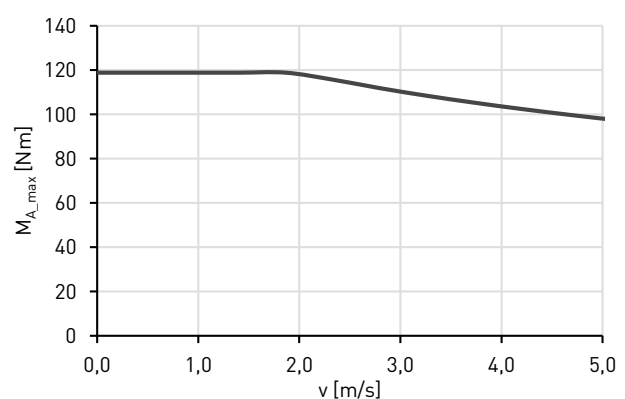


Fig. 13.10 Max. drive force $M_{A_{max}}$ depending on axis speed v

Table 13.28 Mechanical properties

Mass at 0-stroke [kg]	20.12
Mass per 100 mm stroke [kg/100 mm]	1.32
Mass of cantilever at 0-stroke [kg]	8.40
Mass of cantilever per 100 mm stroke [kg/100 mm]	1.32
$J_{rot.}^{1)}$ [kgcm ²]	28.99
Idle torque at 0-stroke [Nm]	3.00

¹⁾ Rotational moment of inertia

Cantilever axes HC-B

Technical drawing of a mechanical assembly, showing multiple views and dimensions.

Top View: Overall dimensions include a total length of $L_T = L_{ST} + 622$. Key dimensions shown are 89, 30, 192, 171, 163.1, 90, 131, 30, and 89. Section lines A-A are indicated.

Front View: Shows the main body with a width of 384 and a height of 150. A central rectangular feature has a width of 14.4. The total length is L . A detail view '1a' is shown on the right.

Top View (Detailed): Shows the top surface with a central circular feature. Dimensions include 75±0.03, 182±0.03, 75±0.03, 25, 75±0.03, 60°, 60°, Ø15H7 × 2 M10 / 20, M8 / 16, Ø100.5H7, Ø111, 1d, and Ø35H8.

Bottom View: Shows the bottom surface with dimensions 72, 40±0.03, 40±0.03, 80±0.03, 40±0.03, 40±0.03, 170, 140±0.03, and Ø15H7 × 2 M10 / 20.

Side View (Right): Shows the right side with dimensions 149.6, 107±0.03, 70±0.03, 42, and Ø15H7 × 2 M10 / 20.

Section A-A: A cross-section view showing the internal structure. Dimensions include 170, 300, 20, 65, 100, 150, and 25.

Section B: A cross-section view showing the internal structure. Dimensions include 4.5, 7.75, 8.1, 7.75, 8.1, 4.5, and 7.75.

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Table 13.29 Load data

	Permissible load data	Theoretical load data
Lifetime reference value	15,000 km	100 km
$F_{y\text{dynmax}}^{1)}$ [N]	9,485	95,244
$F_{z\text{dynmax}}^{1)}$ [N]	13,789	95,244
$M_{x\text{dynmax}}$ [Nm]	446	5,524
$M_{y\text{dynmax}}$ [Nm]	1,755	12,125
$M_{z\text{dynmax}}$ [Nm]	1,207	12,125

¹⁾ Force must only act free of torque

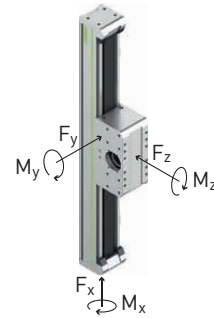


Table 13.30 General technical data

Repeatability [mm]	± 0.05
Max. feed force $F_{x\text{max}}$ [N]	4,000
Max. speed [m/s]	5
Max. acceleration [m/s ²]	30
Max. drive torque $M_{A\text{max}}$ [Nm]	183.3
Typical load capacity [kg]	80
Maximum vertical stroke length [mm]	2,000
Maximum horizontal stroke length [mm]	1,400
Area moment of inertia of profile cross section I_x [mm ⁴]	7,556,719
Area moment of inertia of profile cross section I_y [mm ⁴]	13,470,080

Table 13.31 Guide

Type of carriage	QHH20CA × 4
Static load rating C_0 [N]	33,860 × 4
Dynamic load rating $C_{\text{dyn } 50 \text{ km}}$ [N]	30,000 × 4

Table 13.32 Drive

Drive element	b60HTD8
Feed constant [mm/U]	288
Toothed belt effective diameter [mm]	91.67

 Table 13.33 Clamping/Braking element¹⁾

Holding force [N]	650 / Element
Operating pressure [bar]	5.5–6.5

¹⁾ The clamping element may only be used when the axis is stationary and not as a brake.

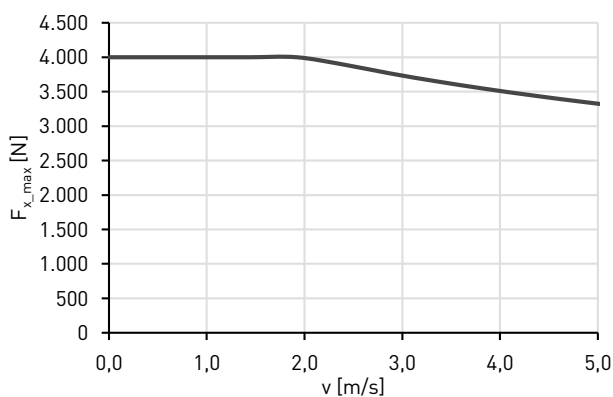
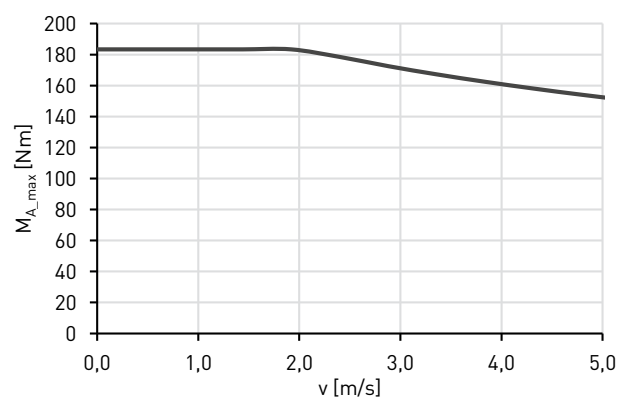

 Fig. 13.11 Max. feed force $F_{x\text{max}}$ depending on axis speed v

 Fig. 13.12 Max. drive force $M_{A\text{max}}$ depending on axis speed v

Table 13.34 Mechanical properties

Mass at 0-stroke [kg]	36.69
Mass per 100 mm stroke [kg/100 mm]	1.83
Mass of cantilever at 0-stroke [kg]	13.88
Mass of cantilever per 100 mm stroke [kg/100 mm]	1.83
$J_{\text{rot.}}^{1)}$ [kgcm ²]	48.37
Idle torque at 0-stroke [Nm]	5.50

¹⁾ Rotational moment of inertia