

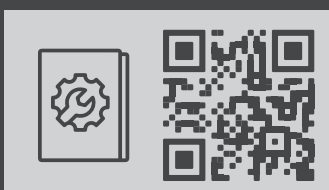
PRECISION AXES & PRECISION SYSTEMS

PRECISION AXES & PRECISION SYSTEMS

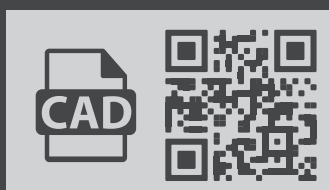
HIWIN positioning systems enable exact positioning in time and place. They are suitable for horizontal and vertical installation positions. Precision axes with ballscrew are especially well suited for applications that require high feed forces and high rigidity. Directly driven axes and systems with linear motor enable backlash-free and highly dynamic operation with low maintenance costs.

DOWNLOADS AND APPLICATIONS

Assembly instructions



CAD configurator



Precision axes and precision systems

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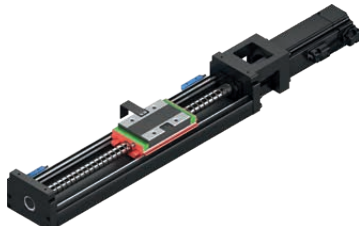
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Precision axes and precision systems

Product overview

1. Product overview



KK/KF precision axis

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- Compact design
- High rigidity thanks to steel profile
- With ballscrew
- Modular principle, available immediately
- Optionally available as cross table



LMSSA precision axis

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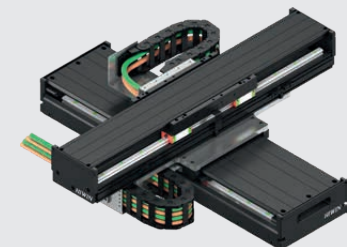
- Linear motor drive
- Modular principle with standardised options
- One or two travel carriages
- See comparison with LMSSA/LMX



LMX1A precision axis

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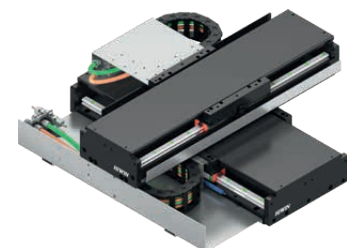
- Linear motor drive
- Tailor-made to your individual requirements
- Customised linear motor axis profile combinations possible
- See comparison with LMSSA/LMX



LMSSA2X precision cross table

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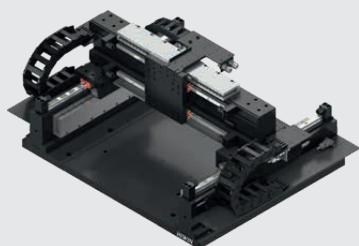
- Linear motor drive
- Modular principle with standardised options
- Two axis combinations available
- See comparison with LMSSA2X/LMX2



LMX2C precision cross table

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- Linear motor drive
- Tailor-made to your individual requirements
- Customised axis profile combinations possible
- See comparison with LMSSA2X/LMX2



LMG precision gantry

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- Linear motor drive
- Tailor-made to your individual requirements
- Wide range of linear motors available

Precision axes and precision systems

General information

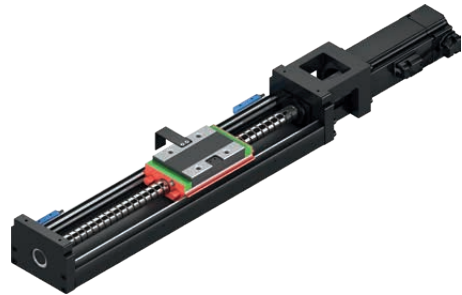
2. General information

2.1 Features and properties

2.1.1 Properties of KK/KF spindle axes

HIWIN KK/KF linear axes are compact positioning axes with high feed forces. The high precision and rigidity is achieved by a linear guideway with a ball track built directly into the steel profile. The ballscrew integrated into the block makes the axis especially compact.

The axis is available in various sizes and lengths and can be adapted to the requirements of different applications with additional options such as aluminium covers, bellows covers, limit switches and additional blocks.



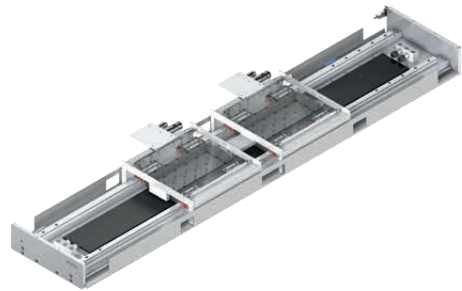
Typical properties

- Complete axis ready for installation
- For universal applications
- Compact design
- Adaptable and sturdy
- High precision and rigidity

1.1.1 Properties of the linear motor axes

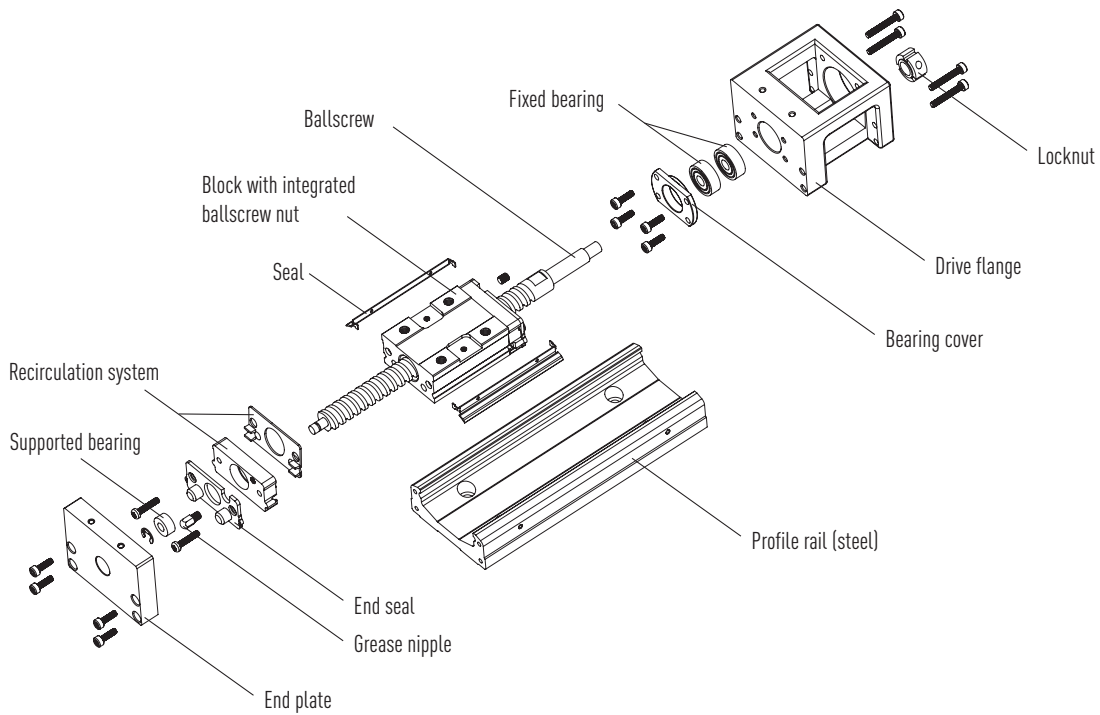
HIWIN linear motor axes are directly driven axes with linear motors, which are designed as a plug-and-play solution. Due to the direct drive, the linear axes are backlash-free, very dynamic, low maintenance and can be equipped with several travel carriages.

- Multiple travel carriages per axis
- Can be combined with additional axes
- No readjustment
- Low-maintenance
- Long service life and reliability
- Extremely precise and fast positioning
- Smooth operation
- High travel speed
- Compact design, therefore low space requirement
- Highest precision
- Designs with iron core and ironless designs



2.2 General structure

2.2.1 General structure of the spindle axes



Special feature of KK axis

- Two-row type
- Full-ball type

Special feature of KF axis

- Four-row type
- SynchMotion™ technology

Precision axes and precision systems

General information

2.2.2 General structure of the linear motor axes

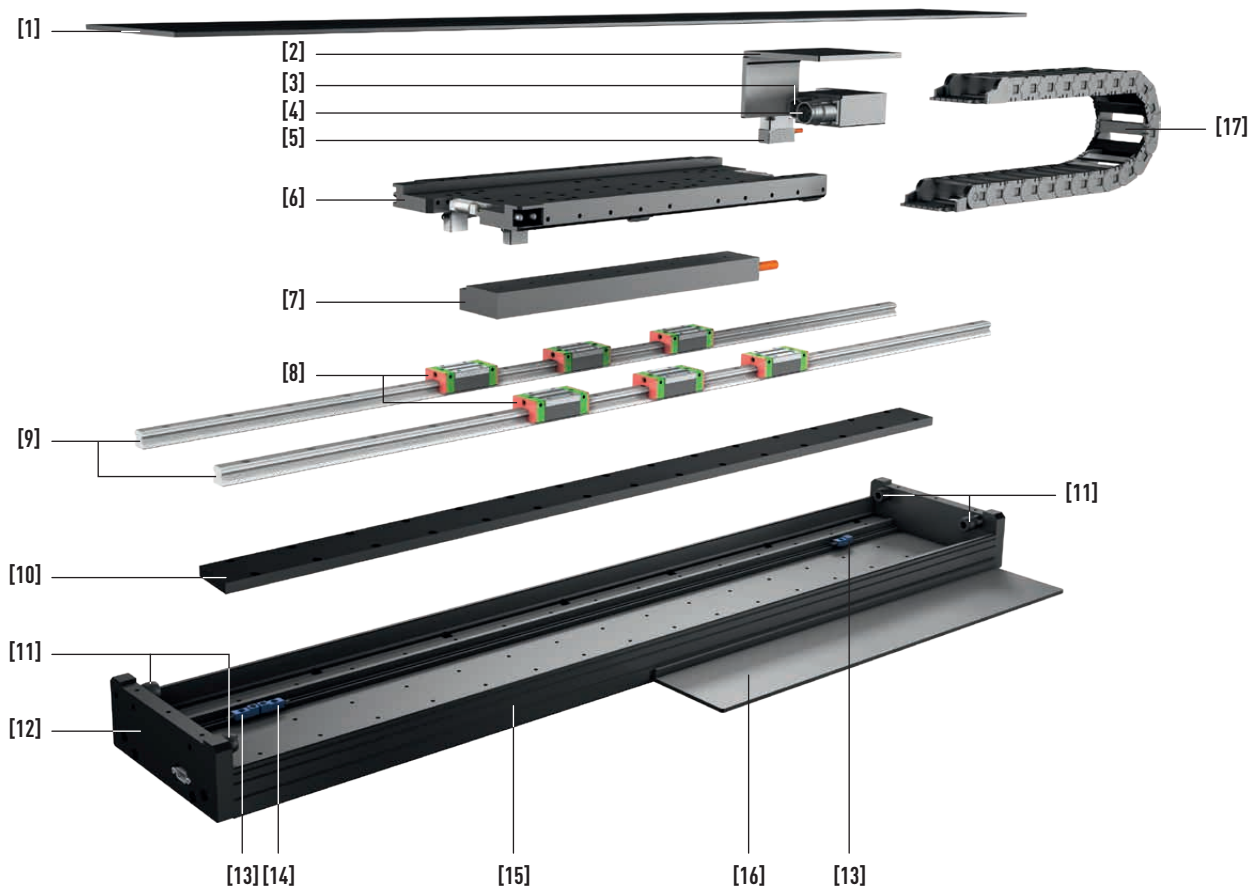


Table 2.1 Main components of the linear motor axis system			
Item	Component	Item	Component
1	Sheet metal cover	10	Stator (secondary part of the linear motor)
2	Retaining plate for energy chain	11	Stop buffer
3	Motor plug coupling	12	Profile end plate
4	Encoder plug coupling	13	Limit switch
5	Distance measuring system	14	Reference switch
6	Travel carriage (forcer carrier plate)	15	Base profile
7	Forcer (primary part of the linear motor)	16	Guide plate for energy chain
8	Profile rail block	17	Energy chain
9	Profile rail		

2.3 Installation location requirements

- Temperature range between +5 and +40 °C
- Dry
- Non-explosive

3. Calculation basis

3.1 Service life calculation for KK/KF spindle axes

3.1.1 Service life calculation

The repeated strain of the block and shaft results in signs of fatigue on the surface of the track and ultimately leads to pitting. The service life of a linear axis is defined as the total travel distance covered until pitting occurs on the surface of the track or shaft.

3.1.2 Nominal service life (L)

The service life can vary greatly even if linear axes are manufactured in the same way and used under the same movement conditions. Therefore, the nominal service life is taken as a reference value for estimating the service life of a linear axis. The nominal service life corresponds to the total travel distance achieved without failure by 90 % of a group of identical linear axes used under the same conditions.

Calculation of the nominal service life (L)

The actual load influences the nominal service life of a linear axis. Using the selected dynamic load rating and the equivalent dynamic load, the nominal service life can be calculated using the formulas F 3.1 and F 3.2.

- Nominal service life of a ballscrew

F 3.1

$$L = \left(\frac{C_{dyn}}{f_p \times F_{xm}} \right)^3 \times 10^6$$

L Nominal service life in revolutions
 C_{dyn} Dynamic load rating [N]
 F_{xm} Dynamic equivalent load (axial) [N]
 f_p Ballscrew load factor

- Nominal service life of a linear guide

F 3.2

$$L = \left(\frac{C_{dyn}}{f_w \times F_{bm}} \right)^3 \times 50 \text{ km}$$

L Nominal service life in kilometres
 C_{dyn} Dynamic load rating [N]
 F_{bm} Dynamic equivalent load [N]
 f_w Linear guide load factor

Load factor (f_p , f_w)

The loads that affect a linear axis include the weight of the block, the inertia at the beginning and end of movements and the load torques that occur due to the overhang of the load. These load factors are especially difficult to estimate if vibrations or impact loads occur as additional factors. The load should therefore be multiplied by the empirical load factor. For short-stroke applications (stroke < 2 × block length), the calculated load factor must be doubled.

Table 3.1 Ballscrew load factor

Type of load	f_p
Operation without impact	1.1 – 1.2
Operation under normal conditions	1.3 – 1.8
Operation with high impact and with vibrations	2.0 – 3.0
Short-stroke applications (< 3 × length of nut)	3.0 – 5.0

Table 3.2 Linear guide load factor

Type of load	Travel speed	f_w
No jolting or vibration	Up to 15 m/min	1.0 – 1.2
Normal load	15 m/min up to 60 m/min	1.2 – 1.5
Minor jolting	60 m/min up to 120 m/min	1.5 – 2.0
With jolting and vibration	Greater than 120 m/min	2.0 – 3.5

Precision axes and precision systems

Calculation basis

3.1.2.1 Calculation of the service life of the linear guide

Since the load on a block varies greatly, an equivalent load must be included in the calculation of the service life. The equivalent load is defined as the load that causes the same wear on the bearings as the variable load. In this way non-constant operating conditions are taken into consideration.

- Combined dynamic equivalent load

F 3.3

$$F_{bm} = F + M \times \frac{C_0}{M_0}$$

F_{bm} Dynamic equivalent load [N]
 C_0 Static load rating [N]
 M_0 Static moment [Nm]
 M Directly applied torque (around X-, Y- or Z-axis) [Nm]
 F Effective force (in Y or Z direction) [N]

This formula allows for a simplified calculation of the dynamic equivalent load. Please contact HIWIN if you need more extensive information.

Example of the calculation for the service life of the linear guide

- Service life calculation of the KK60 linear axis (with $f_w = 1$)

Specification: $M_Y = 20 \text{ Nm}$ Torque
 $M_{Y0} = 152 \text{ Nm}$ Static moment¹⁾
 $C_{dyn} = 13,230 \text{ N}$ Dynamic load rating¹⁾
 $C_0 = 21,462 \text{ N}$ Static load rating¹⁾

¹⁾ For the calculated value for load ratings and static moment see [Table 3.2](#)

$$F_{bm} = F + M \times \frac{C_0}{M_{Y0}} \rightarrow F_{bm} = 0 + 20 \text{ Nm} \times \frac{21.462 \text{ N}}{152 \text{ Nm}} \rightarrow F_{bm} = 2.823,95 \text{ N}$$

$$L = \left(\frac{C_{dyn}}{f_w \times F_{bm}} \right)^3 \times 50 \text{ km} \rightarrow L = \left(\frac{13.230 \text{ N}}{1 \times 2.823,95 \text{ N}} \right)^3 \times 50 \text{ km} \rightarrow \underline{\underline{L = 5.141 \text{ km}}}$$

With a torque of $M_Y = 20 \text{ Nm}$, the nominal service life of the block of a KK60 linear axis is 5,141 km.

Please contact HIWIN for more information.

3.1.2.2 Calculation of the service life of the ballscrew

The calculations are based on DIN 69051 and ISO 3408. Detailed information on the sizing of a ballscrew can be found in our catalogue "Ballscrews and Accessories".

a) Average speed n_m

F 3.4

$$n_m = n_1 \times \frac{t_1}{100} + n_2 \times \frac{t_2}{100} + n_3 \times \frac{t_3}{100} + \dots$$

n_m Mean total speed [rpm]
 n_n Mean total speed in phase n [rpm]
 t_n Proportion of time in phase n [%]

b) Average operating load F_{xm}

- With alternating load and constant speed:

F 3.5

$$F_{xm} = \sqrt[3]{F_{x1}^3 \times \frac{t_1}{100} \times f_{p1}^3 + F_{x2}^3 \times \frac{t_2}{100} \times f_{p2}^3 + F_{x3}^3 \times \frac{t_3}{100} \times f_{p3}^3 \dots}$$

F_{xm} Mean operating load in axial direction [N]
 F_{xn} Operating axial load in phase n [N]
 f_{pn} Operating condition factor in phase n
 f_p See [Table 3.1](#)

- With alternating load and alternating speed:

F 3.6

$$F_{xm} = \sqrt[3]{F_{x1}^3 \times \frac{n_1}{n_m} \times \frac{t_1}{100} \times f_{p1}^3 + F_{x2}^3 \times \frac{n_2}{n_m} \times \frac{t_2}{100} \times f_{p2}^3 + F_{x3}^3 \times \frac{n_3}{n_m} \times \frac{t_3}{100} \times f_{p3}^3 \dots}$$

Service life with axial load on both sides

- Service life in revolutions

F 3.7

$$L_1 = \left(\frac{C_{dyn}}{F_{xm1}} \right)^3 \times 10^6$$

$$L_2 = \left(\frac{C_{dyn}}{F_{xm2}} \right)^3 \times 10^6$$

F 3.8

$$L = \left(L_1^{-10/9} + L_2^{-10/9} \right)^{-9/10}$$

L_1 Service life in forward motion revolutions
 L_2 Service life in reverse motion revolutions
 C_{dyn} Dynamic load rating [N]
 F_{xm1} Mean forward motion operating load [N]
 F_{xm2} Mean reverse motion operating load [N]
 L Service life in revolutions

- Conversion from service life to operating hours

F 3.9

$$L_h = \frac{L}{n_m \times 60}$$

L_h Service life in operating hours
 n_m Mean speed [rpm], see formula [F 3.4](#)
 L Service life in revolutions

- Conversion from distance travelled [km] to operating hours

F 3.10

$$L_h = \left(\frac{L_{km} \times 10^6}{P} \right) \times \frac{1}{n_m \times 60}$$

L_h Service life in operating hours
 L_{km} Service life in distance travelled [km]
 P Lead [mm]
 n_m Mean speed [rpm], see formula [F 3.4](#)

Precision axes and precision systems

Product selection

4. Product selection

4.1 Overview of precision axes – single axes

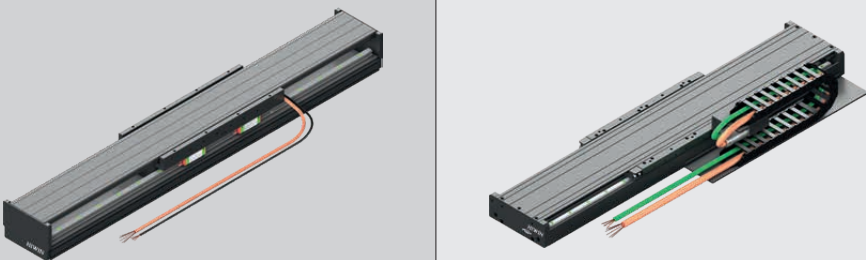
Table 4.1 General technical data for single precision axes

Description	Motor type	v_{\max} [m/s]	a_{\max} [m/s ²]	Total length L_{\max} [mm]	Repeatability ¹⁾ [μm]	Precision ¹⁾ [μm/300 mm]	Straightness [μm]	Flatness [μm]	See
KK...	—	1.48	15	1798	±3	—	±10/300 mm	±10/300 mm	Page 16
KF...	—	1.22	15	1040	±3	—	±10/300 mm	±10/300 mm	
LMSSA-S...	LMSA	5.0	50	3000	±1	±2	±8/300 mm	±8/300 mm	Page 56
LMSSA-C...	LMC	5.0	50	3000	±1	±2	±8/300 mm	±8/300 mm	
LMX1A-...	LMSA	5.0	50	4000	±0.5	±1	±5/300 mm	±5/300 mm	Page 104
LMX1E-...	LMC	5.0	50	4000	±0.5	±1	±5/300 mm	±5/300 mm	

¹⁾ Depending on the respective distance measuring system

4.2 Detailed comparison of precision axes LMSSA, LMX1

Table 4.2 Detailed comparison of precision axes LMSSA, LMX1

Figure		
Series	LMSSA	LMX1
Repeatability¹⁾	±1 μm	±0.5 μm
Absolute precision¹⁾	±2 μm	±1 μm
Straightness	±8 μm / 300 mm	±5 μm / 300 mm
Flatness	±8 μm / 300 mm	±5 μm / 300 mm
Stroke	Selectable in steps of 50/100 mm	Freely selectable in steps of 1 mm
Motor type	<ul style="list-style-type: none"> With iron core (LMSA) Ironless (LMC) 	<ul style="list-style-type: none"> With iron core (LMSA) Ironless (LMC)
Energy chain	—	Including
Cables	Motor and encoder cables are led out directly	Motor and encoder cables are led out to connector terminal on the travel carriage, extension cable freely selectable via energy chain
Distance measurement	<ul style="list-style-type: none"> Optical, analogue, 1 V_{SS} sin/cos Magnetic, analogue, 1 V_{SS} sin/cos Magnetic, digital TTL, resolution 1 μm Optical, digital TTL, resolution 1 μm Optical, digital TTL, resolution 0.1 μm Optical, absolute, BiSS-C 	<ul style="list-style-type: none"> Optical, analogue, 1 V_{SS} sin/cos Magnetic, analogue, 1 V_{SS} sin/cos Magnetic, digital TTL, resolution 1 μm Optical, digital TTL, resolution 1 μm Optical, digital TTL, resolution 0.1 μm Optical, absolute, BiSS-C, Drive-CLiQ, FANUC Additional distance measuring systems available on request
Assembly space	Compact	Ultra compact
Customised designs	—	Individually adaptable, for example energy chain, distance measuring systems, cover, profile dimensions, linear motor, precision levels.

¹⁾ Depending on the respective distance measuring system

4.3 Overview of precision axes – systems

Table 4.4 General technical data for precision linear motor systems

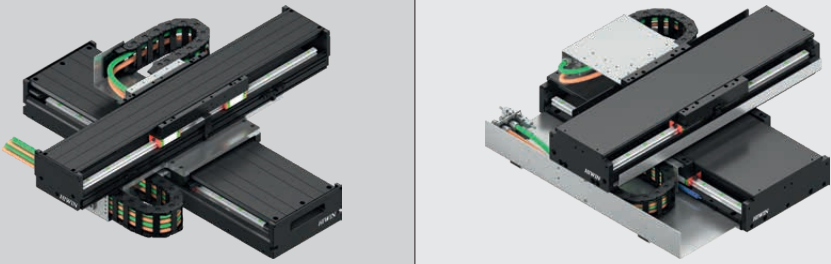
Description	Motor type	Total length L_{\max} [mm]	Repeatability ¹⁾ [μm]	Precision ¹⁾ [μm/300 mm]	Straightness [μm]	Flatness [μm]	Orthogonality [arc-sec]	See
LMSSA2X	LMSA	X: 750 Y: 850	±1	±2 μm	±8 μm / 300 mm	±8 μm / 300 mm	10 (200 × 200 mm ²)	Page 121
LMX2 ²⁾	LMC	X: 904 Y: 819	±1	±3 μm	±5 μm / 300 mm	±5 μm / 300 mm	10 (200 × 200 mm ²)	Page 127

¹⁾ Depending on the respective distance measuring system

²⁾ Customised systems available on request

4.4 Detailed comparison of precision cross tables LMSSA2X, LMX2

Table 4.3 Detailed comparison of precision cross tables LMSSA2X, LMX2

Figure		
Series	LMSSA2X	LMX2
Repeatability ¹⁾	±1 μm	±1 μm
Absolute precision ¹⁾	±2 μm	±3 μm
Straightness	±8 μm / 300 mm	±5 μm / 300 mm
Flatness	±8 μm / 300 mm	±5 μm / 300 mm
Stroke	Selectable in steps of 50 mm	Freely selectable In steps of 1mm
Motor type	With iron core (LMSA)	Ironless (LMC)
Energy chain	Including	Including
Cables	Motor and encoder cables are led out directly through the energy chains	Motor and encoder cables are led out to connector terminal, extension cable freely selectable via energy chain
Distance measurement	<ul style="list-style-type: none"> Optical, analogue, 1 V_{SS} sin/cos Magnetic, analogue, 1 V_{SS} sin/cos Magnetic, digital TTL, resolution 1 μm Optical, digital TTL, resolution 0.1 μm 	<ul style="list-style-type: none"> Optical, analogue, 1 V_{SS} sin/cos Magnetic, analogue, 1 V_{SS} sin/cos Magnetic, digital TTL, resolution 1 μm Optical, digital TTL, resolution 1 μm Optical, digital TTL, resolution 0.1 μm Optical, absolute, BiSS-C, EnDat, Drive-CLiQ, FANUC Additional distance measuring systems available on request
Assembly space	Compact	Ultra compact
Customised designs	—	Individually adaptable, for example energy chain, distance measuring systems, cover, profile dimensions, linear motor, precision levels.

¹⁾ Depending on the respective distance measuring system

Precision axes and precision systems

KK/KF precision axes

5. KK/KF precision axes

5.1 Properties of KK/KF linear axes

HIWIN KK/KF linear axes are compact positioning axes with high feed forces. The high precision and rigidity is achieved by a linear guideway with a ball track built directly into the steel profile. the ballscrew integrated into the block makes the axis especially compact.

The axis is available in various sizes and lengths and can be adapted to the requirements of different applications with additional options such as an aluminium and bellows cover, a limit switch and additional blocks.



Advantages of KK axis

- Two-row type
- Vertical mounting position possible with suitable clamping or braking device
- Application with high precision
- Compact design

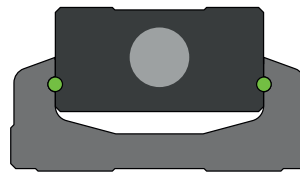


Fig. 5.1 2-row KK linear axis

Advantages of KF axis

- Four-row type
- Optimised synchronous performance
- Reduced running noise
- SynchMotion™ technology

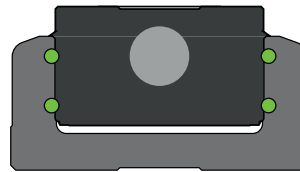


Fig. 5.2 4-row KF linear axis

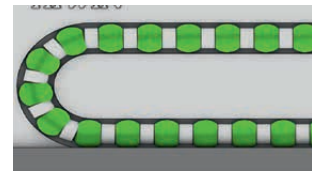


Fig. 5.3 SynchMotion™ technology

Linear guide

- Integrated into the steel profile
- High rigidity
- Prestressed ($0.01 - 0.02 \times C_{dyn}$)

Ballscrew

- Nut integrated into the block
- Rolled shaft
- Axial play:
 - Precision class P: 0.005 mm
 - Precision class C: 0.02 mm

Precision axes and precision systems

KK/KF precision axes

5.3 Technical data for KK/KF linear axes

5.3.1 Technical data

Model	Lead [mm]	L1 [mm]	v_{\max} [mm/s]	a_{\max} [m/s ²]	Max. drive torque [Nm]	Positioning precision [mm]	Repeatability precision [mm]	Guide parallelism [mm]	Starting torque [Nmm]
KK3001P0075	1	129	160	5	0.05	0.020	± 0.003	0.010	12
KK3001P0100	1	154	160	5	0.05	0.020	± 0.003	0.010	12
KK3001P0125	1	179	160	5	0.05	0.020	± 0.003	0.010	12
KK3001P0150	1	204	160	5	0.05	0.020	± 0.003	0.010	12
KK3001P0175	1	229	160	5	0.05	0.020	± 0.003	0.010	12
KK3001P0200	1	254	160	5	0.05	0.020	± 0.003	0.010	12
KK4001P0100	1	159	190	5	0.20	0.020	± 0.003	0.010	12
KK4001P0150	1	209	190	5	0.20	0.020	± 0.003	0.010	12
KK4001P0200	1	259	190	5	0.20	0.020	± 0.003	0.010	12
KK5002P0150	2	220	270	5	0.61	0.020	± 0.003	0.010	40
KK5002P0200	2	270	270	5	0.61	0.020	± 0.003	0.010	40
KK5002P0250	2	320	270	5	0.61	0.020	± 0.003	0.010	40
KK5002P0300	2	370	270	5	0.61	0.020	± 0.003	0.010	40
KK/KF6005P0150	5	220	550	15	1.26	0.020	± 0.003	0.010	150
KK/KF6005P0200	5	270	550	15	1.26	0.020	± 0.003	0.010	150
KK/KF6005P0300	5	370	550	15	1.26	0.020	± 0.003	0.010	150
KK/KF6005P0400	5	470	550	15	1.26	0.020	± 0.003	0.010	150
KK/KF6005P0500	5	570	550	15	1.26	0.025	± 0.003	0.015	150
KK/KF6005P0600	5	670	340	15	1.26	0.025	± 0.003	0.015	150
KK/KF6010P0150	10	220	1,100	15	1.26	0.020	± 0.003	0.010	150
KK/KF6010P0200	10	270	1,100	15	1.26	0.020	± 0.003	0.010	150
KK/KF6010P0300	10	370	1,100	15	1.26	0.020	± 0.003	0.010	150
KK/KF6010P0400	10	470	1,100	15	1.26	0.020	± 0.003	0.010	150
KK/KF6010P0500	10	570	1,100	15	1.26	0.025	± 0.003	0.015	150
KK/KF6010P0600	10	670	670	15	1.26	0.025	± 0.003	0.015	150
KK/KF8610P0340	10	440	740	15	2.79	0.025	± 0.003	0.015	150
KK/KF8610P0440	10	540	740	15	2.79	0.025	± 0.003	0.015	150
KK/KF8610P0540	10	640	740	15	2.79	0.025	± 0.003	0.015	150
KK/KF8610P0640	10	740	740	15	2.79	0.025	± 0.003	0.015	150
KK/KF8610P0740	10	840	740	15	2.79	0.030	± 0.003	0.020	170
KK/KF8610P0940	10	1040	610	15	2.79	0.040	± 0.003	0.030	250
KK/KF8620P0340	20	440	1,480	15	2.79	0.025	± 0.003	0.015	150
KK/KF8620P0440	20	540	1,480	15	2.79	0.025	± 0.003	0.015	150
KK/KF8620P0540	20	640	1,480	15	2.79	0.025	± 0.003	0.015	150
KK/KF8620P0640	20	740	1,480	15	2.79	0.025	± 0.003	0.015	150
KK/KF8620P0740	20	840	1,480	15	2.79	0.030	± 0.003	0.020	170
KK/KF8620P0940	20	1,040	1,220	15	2.79	0.040	± 0.003	0.030	250
KK10020P0980	20	1,089	1,120	15	8.65	0.035	± 0.005	0.025	170
KK10020P1080	20	1,189	980	15	8.65	0.035	± 0.005	0.025	170
KK10020P1180	20	1,289	750	15	8.65	0.040	± 0.005	0.030	200
KK10020P1280	20	1,389	630	15	8.65	0.045	± 0.005	0.035	230
KK10020P1380	20	1,489	530	15	8.65	0.050	± 0.005	0.040	250
KK13025P0980	25	1,098	1,120	15	18.40	0.035	± 0.005	0.025	250
KK13025P1180	25	1,298	1,120	15	18.40	0.040	± 0.005	0.030	250
KK13025P1380	25	1,498	830	15	18.40	0.040	± 0.005	0.030	250
KK13025P1680	25	1,798	550	15	18.40	0.050	± 0.007	0.040	270

5.3.2 Load ratings and torques of KK/KF linear axes

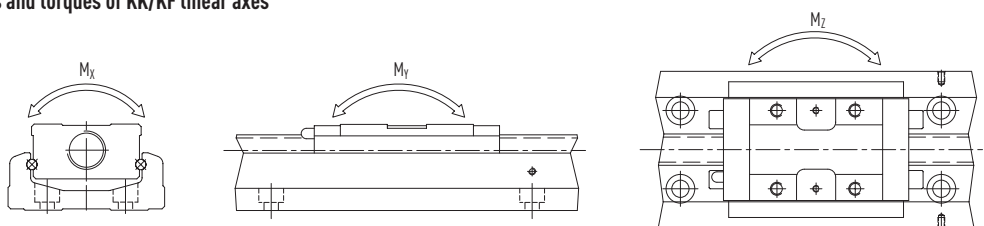


Table 5.2 Load ratings of KK/KF linear axes: Linear guideway, standard block

Model	C_{dyn} [N]	C_0 [N]	Static moment to of block A1			Static moment to of block A2		
			M_x [Nm]	M_y [Nm]	M_z [Nm]	M_x [Nm]	M_y [Nm]	M_z [Nm]
KK30	2,210	3,510	41	14	14	82	73	73
KK40	3,920	6,468	81	33	33	162	182	182
KK50	8,007	12,916	222	116	116	444	545	545
KK60	13,230	21,462	419	152	152	838	760	760
KF60	16,403	20,238	416	171	171	832	968	968
KK86	31,458	50,764	1,507	622	622	3,014	3,050	3,050
KF86	38,140	45,545	1,349	566	566	2,698	3,153	3,153
KK100	39,200	63,406	2,205	960	960	4,410	4,763	4,763
KK130	48,101	84,829	3,885	1,536	1,536	7,770	7,350	7,350

Table 5.3 Load rating of KK linear axes: Linear guideway, short block

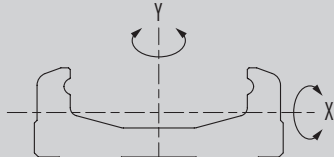
Model	C_{dyn} [N]	C_0 [N]	Static moment to of block S1			Static moment to of block S2		
			M_x [Nm]	M_y [Nm]	M_z [Nm]	M_x [Nm]	M_y [Nm]	M_z [Nm]
KK60	7,173	11,574	241	72	72	482	367	367
KK86	21,051	29,475	847	166	166	1,694	1,309	1,309

Table 5.4 Load ratings of KK/KF linear axes: Ballscrew and fixed bearing

Model	Shaft			Fixed bearing	
	\emptyset [mm]	C_{dyn} [N]	C_0 [N]	$C_{0 axial}$ [N]	$F_{max axial}$ [N]
KK3001Pxxxx	6	647	1,088	—	—
KK4001Pxxxx	8	735	1,538	1,910	750
KK5002Pxxxx	8	2,136	3,489	1,910	1,500
KK/KF6005Pxxxx	12	3,744	6,243	4,480	3,120
KK/KF6010Pxxxx	12	2,410	3,743	4,480	1,870
KK/KF8610Pxxxx	15	7,144	12,642	9,240	6,320
KK/KF8620Pxxxx	15	4,645	7,655	9,240	3,825
KK10020Pxxxx	20	7,046	12,544	10,600	6,270
KK13025Pxxxx	25	7,897	15,931	18,485	7,950

Note: The load-bearing capacity of the linear guideway and ballscrew is often restricted – not by their load-bearing strength, but by the screw connection. We therefore recommend checking the screw connection's maximum permissible load-bearing capacity in accordance with VDI 2230.

Table 5.5 Geometrical moment of inertia of the KK linear axes

Model	Geometrical moment of inertia [mm ⁴]		
	I_x	I_y	
KK30	755	12,730	 <p>I_x: Moment of inertia, calculated around the X-axis I_y: Moment of inertia, calculated around the Y-axis</p>
KK40	3,533	53,170	
KK50	9,600	134,000	
KK60	20,560	280,200	
KK86	74,450	1,134,000	
KK100	129,600	2,035,000	
KK130	254,600	5,073,000	

Precision axes and precision systems

KK/KF precision axes

5.4 KK30 linear axes

5.4.1 KK30 linear axes without cover

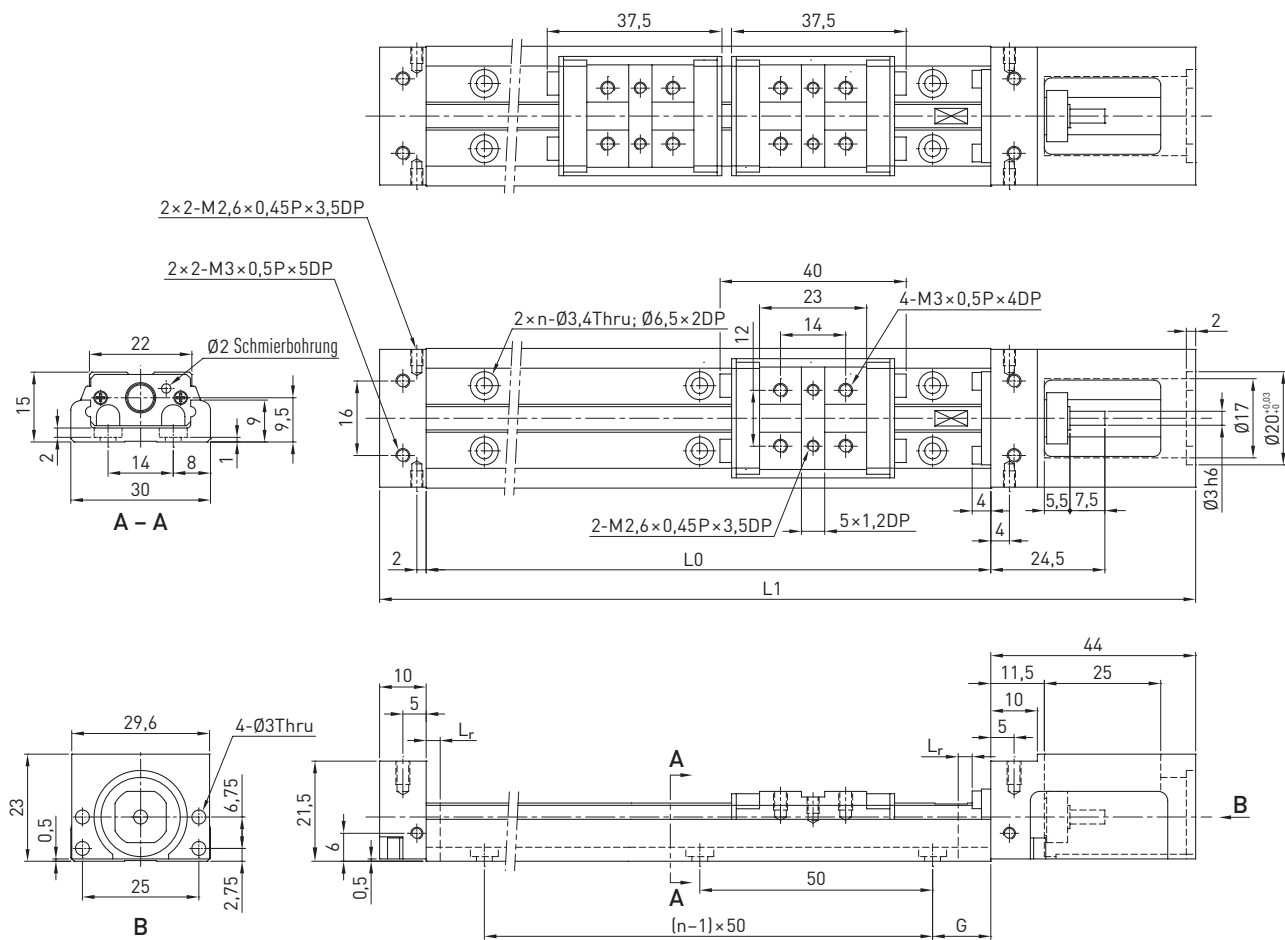


Table 5.6 Dimensions and weights of KK30 linear axes without cover

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	n	Weight [kg]	
				Block A1	Block A2				Block A1	Block A2
KK3001P0075	1	75	129	25	—	3	12.5	2	0.20	—
KK3001P0100	1	100	154	50	—	3	25.0	2	0.23	—
KK3001P0125	1	125	179	75	39	3	12.5	3	0.26	0.30
KK3001P0150	1	150	204	100	64	3	25.0	3	0.29	0.33
KK3001P0175	1	175	229	125	89	3	12.5	4	0.32	0.36
KK3001P0200	1	200	254	150	114	3	25.0	4	0.35	0.39

Reference edge

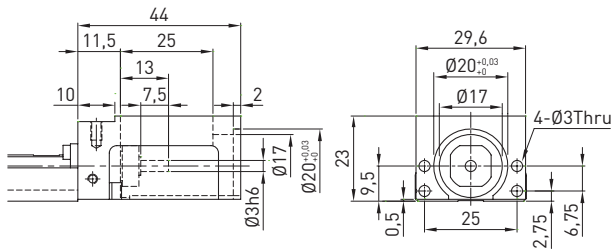
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

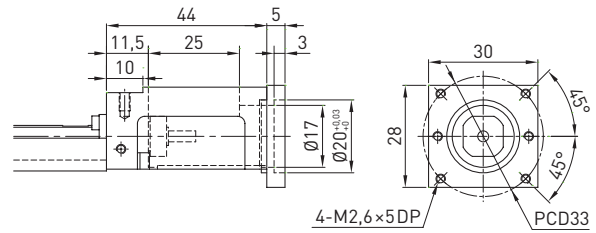
KK/KF precision axes

5.4.3 KK30 adapter flanges

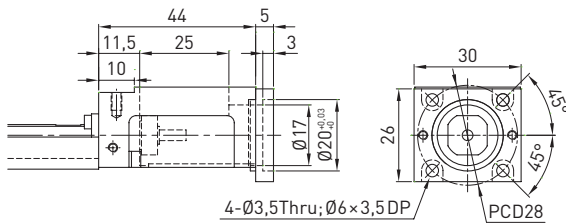
F0 motor adapter flange



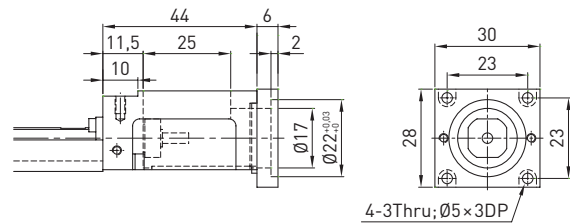
F1 motor adapter flange



F2 motor adapter flange



F3 motor adapter flange



5.5 KK40 linear axes

5.5.1 KK40 linear axes without cover

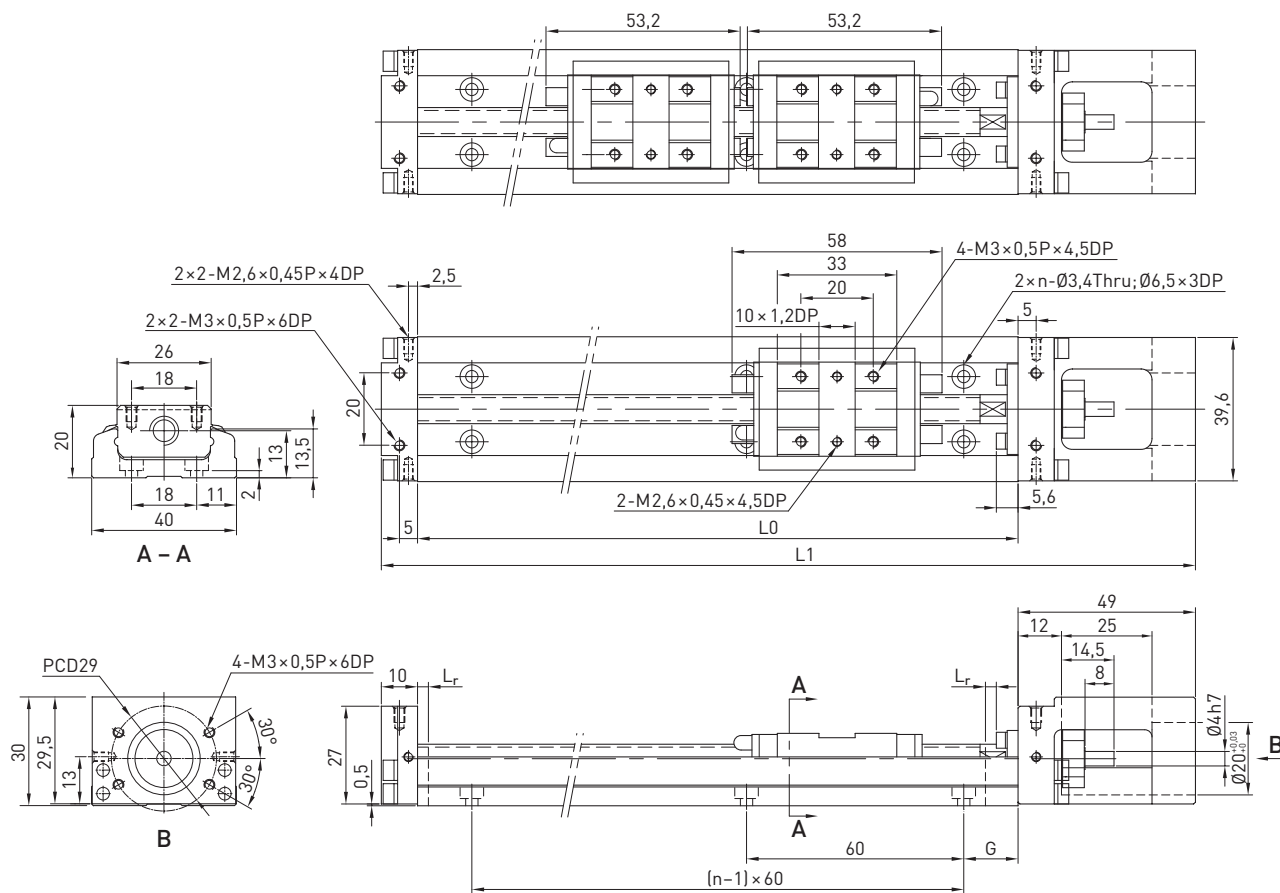


Table 5.8 Dimensions and weights of KK40 linear axes without cover

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	n	Weight [kg]	
				Block A1	Block A2				Block A1	Block A2
KK4001P0100	1	100	159	30	—	3	20	2	0.48	—
KK4001P0150	1	150	209	80	28	3	15	3	0.60	0.67
KK4001P0200	1	200	259	130	78	3	40	3	0.72	0.79

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

KK/KF precision axes

5.5.2 KK40 linear axes with aluminium cover

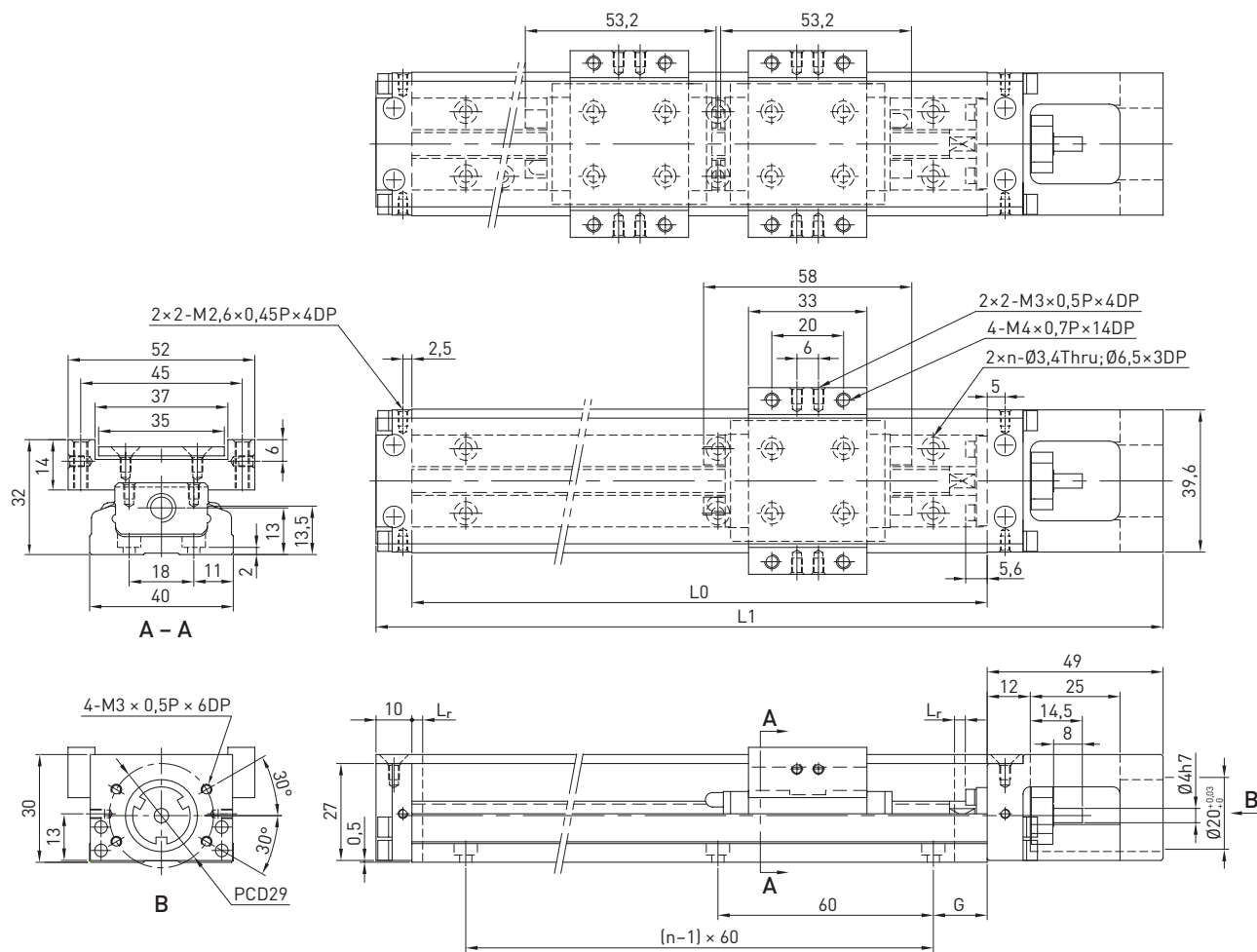


Table 5.9 Dimensions and weights of KK40 linear axes with aluminium cover

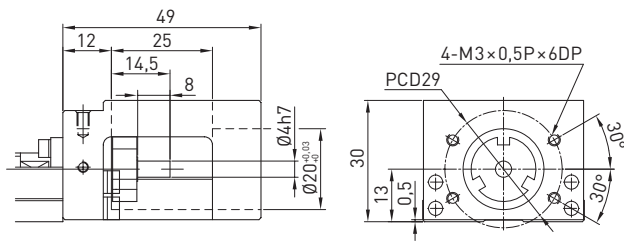
Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	n	Weight [kg]	
				Block A1	Block A2				Block A1	Block A2
KK4001P0100	1	100	159	30	—	3	20	2	0.55	—
KK4001P0150	1	150	209	80	28	3	15	3	0.68	0.76
KK4001P0200	1	200	259	130	78	3	40	3	0.82	0.89

Reference edge

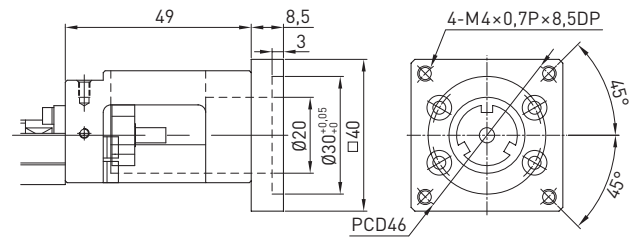
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.5.3 KK40 adapter flanges

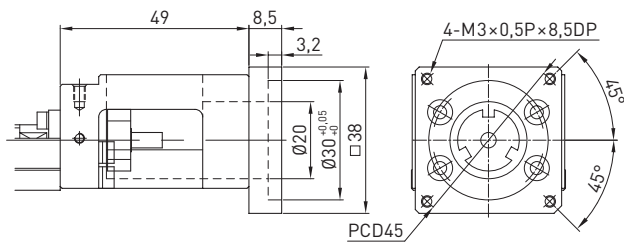
F0 motor adapter flange



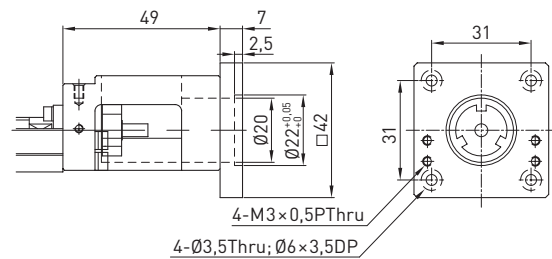
F1 motor adapter flange



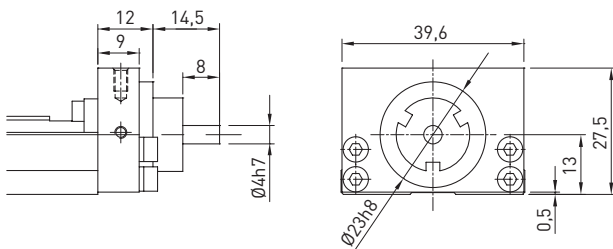
F2 motor adapter flange



F3 motor adapter flange



H0 motor adapter flange



Precision axes and precision systems

KK/KF precision axes

5.6 KK50 linear axes

5.6.1 KK50 linear axes without cover

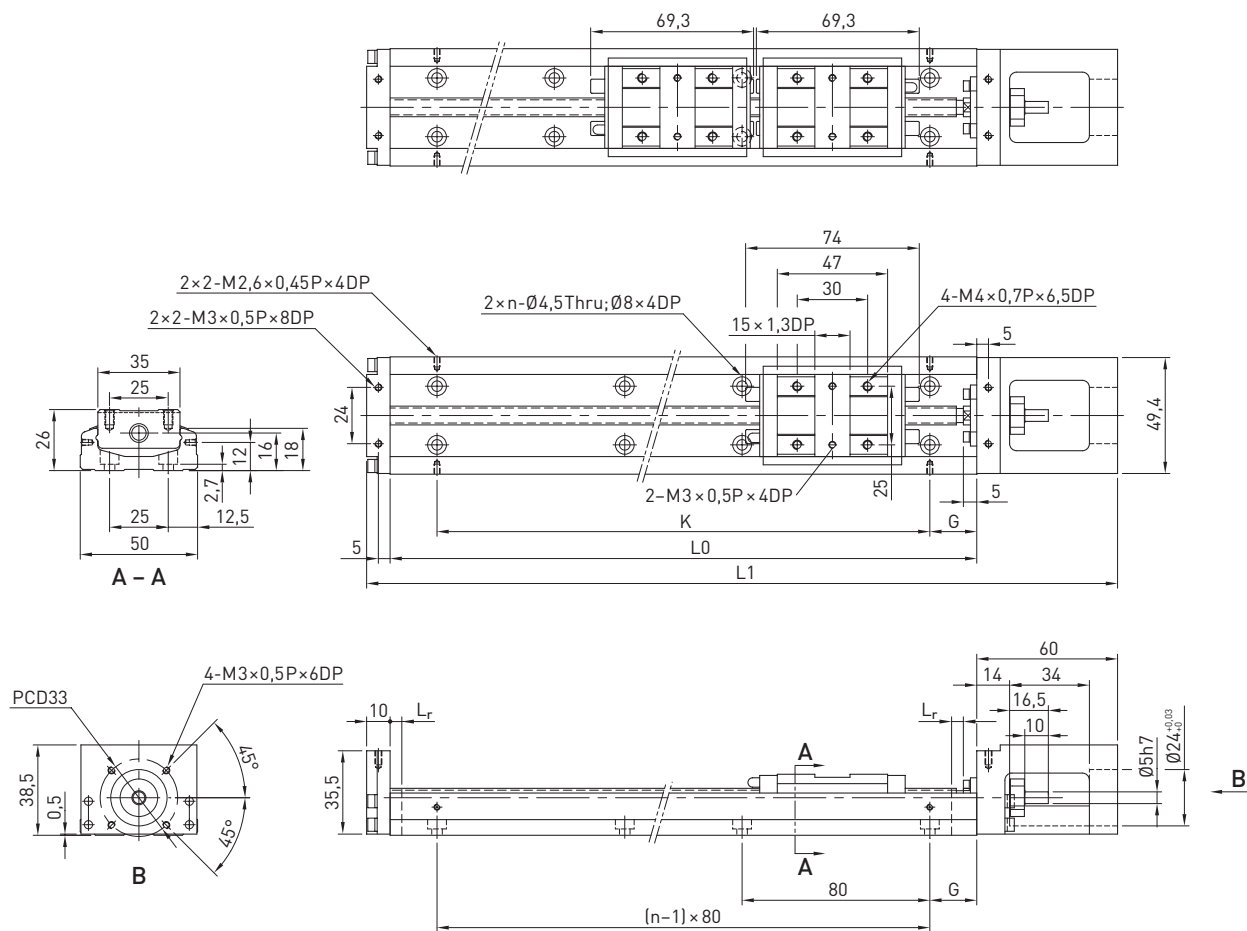


Table 5.10 Dimensions and weights of KK50 linear axes without cover

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	K [mm]	n	Weight [kg]	
				Block A1	Block A2					Block A1	Block A2
KK5002P0150	2	150	220	60	—	5	35	80	2	1.0	—
KK5002P0200	2	200	270	110	45	5	20	160	3	1.2	1.4
KK5002P0250	2	250	320	160	95	5	45	160	3	1.4	1.6
KK5002P0300	2	300	370	210	145	5	30	240	4	1.6	1.8

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.6.2 KK50 linear axes with aluminium cover

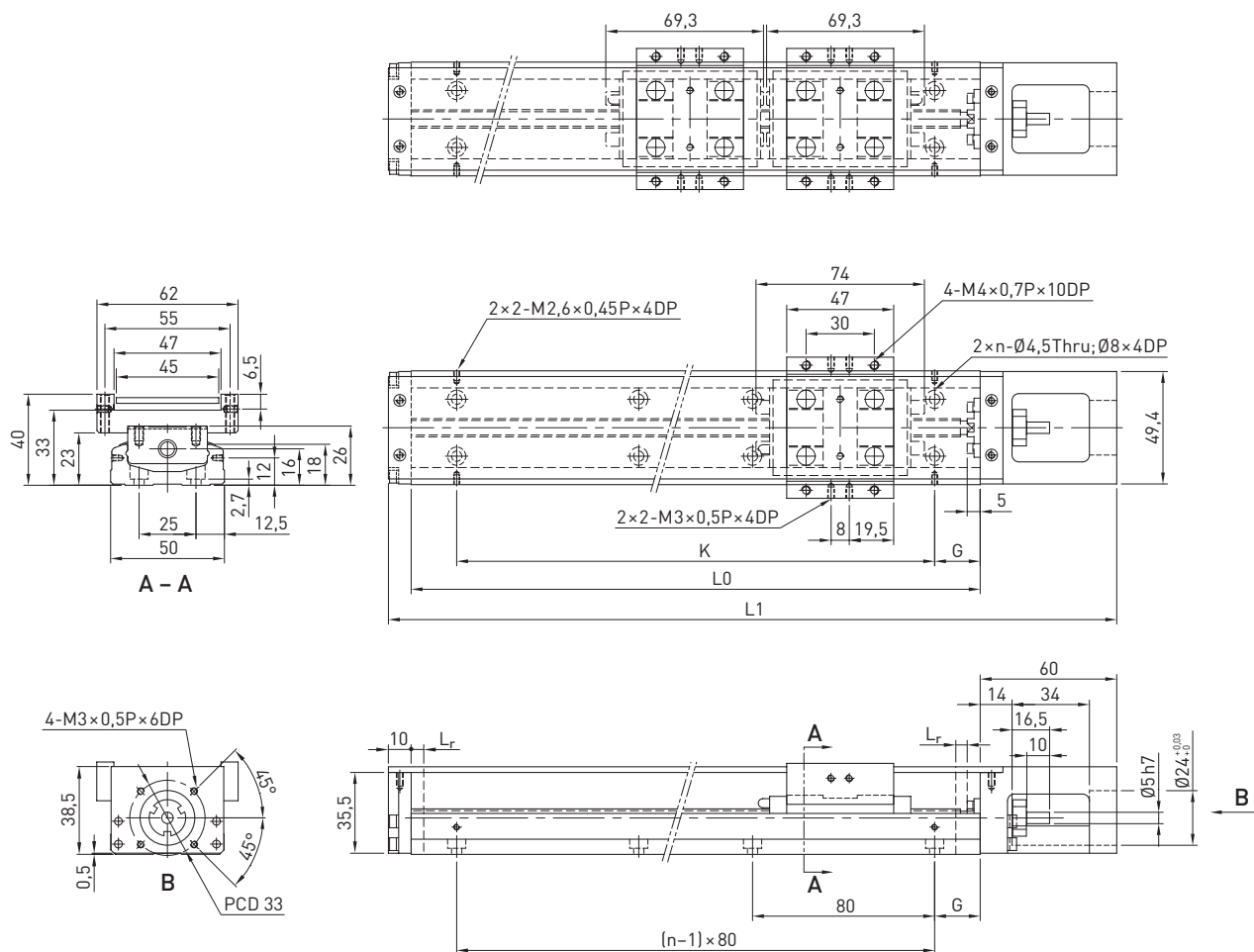


Table 5.11 Dimensions and weights of KK50 linear axes with aluminium cover

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	K [mm]	n	Weight [kg]	
				Block A1	Block A2					Block A1	Block A2
KK5002P0150	2	150	220	60	—	5	35	80	2	1.1	—
KK5002P0200	2	200	270	110	45	5	20	160	3	1.3	1.5
KK5002P0250	2	250	320	160	95	5	45	160	3	1.6	1.8
KK5002P0300	2	300	370	210	145	5	30	240	4	1.8	2.0

Reference edge

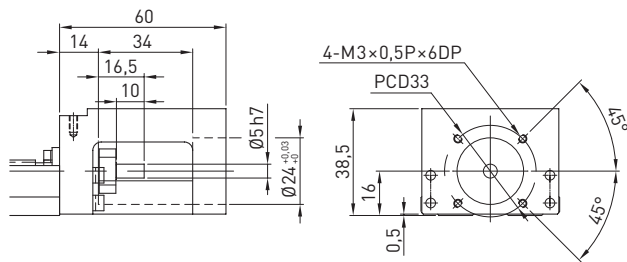
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

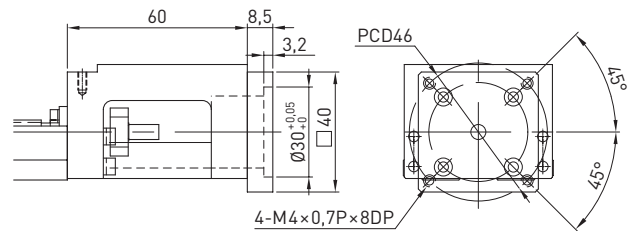
KK/KF precision axes

5.6.3 KK50 adapter flanges

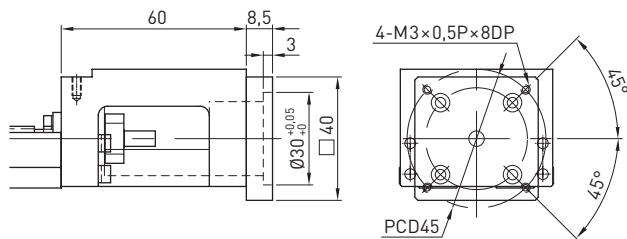
F0 motor adapter flange



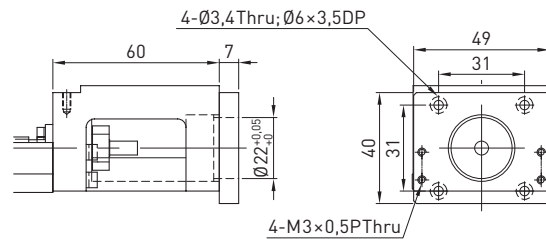
F1 motor adapter flange



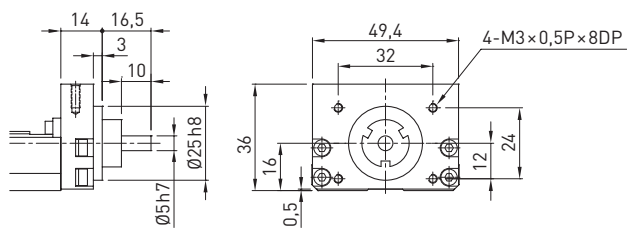
F2 motor adapter flange



F3 motor adapter flange



H0 motor adapter flange



Precision axes and precision systems

KK/KF precision axes

5.7.2 KK60 linear axes without cover, short block

(available on request)

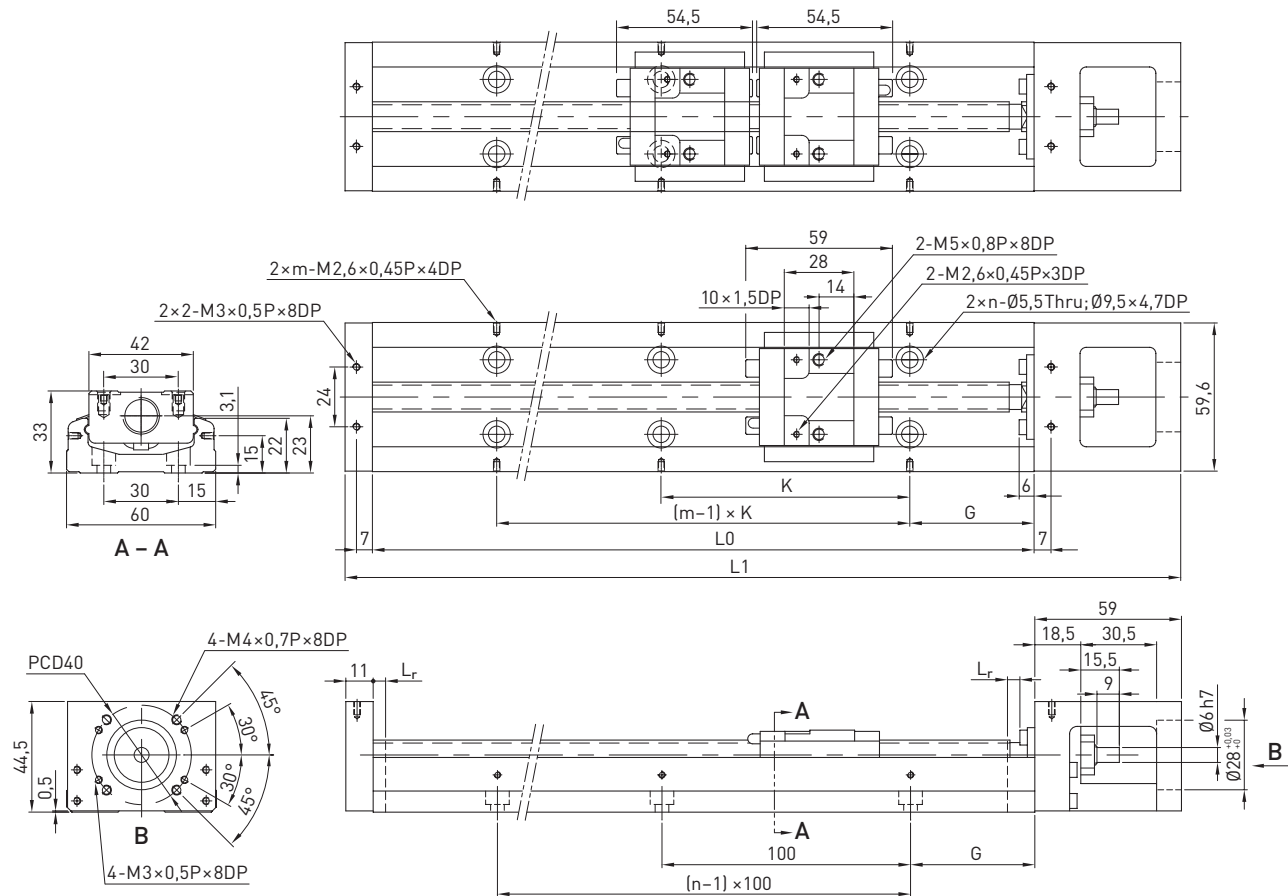


Table 5.13 Dimensions and weights of KK60 linear axes without cover, short block

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	K [mm]	n	m	Weight [kg]	
				Block S1	Block S2						Block S1	Block S2
KK6005P0150	5	150	220	75	24	5	25	100	2	2	1.4	1.6
KK6005P0200	5	200	270	125	74	5	50	100	2	2	1.7	1.9
KK6005P0300	5	300	370	225	174	5	50	200	3	2	2.3	2.5
KK6005P0400	5	400	470	325	274	5	50	100	4	4	2.9	3.1
KK6005P0500	5	500	570	425	374	5	50	200	5	3	3.5	3.7
KK6005P0600	5	600	670	525	474	5	50	100	6	6	4.1	4.3
KK6010P0150	10	150	220	75	24	5	25	100	2	2	1.4	1.6
KK6010P0200	10	200	270	125	74	5	50	100	2	2	1.7	1.9
KK6010P0300	10	300	370	225	174	5	50	200	3	2	2.3	2.5
KK6010P0400	10	400	470	325	274	5	50	100	4	4	2.9	3.1
KK6010P0500	10	500	570	425	374	5	50	200	5	3	3.5	3.7
KK6010P0600	10	600	670	525	474	5	50	100	6	6	4.1	4.3

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.7.3 KK60 linear axes with aluminium cover, standard block

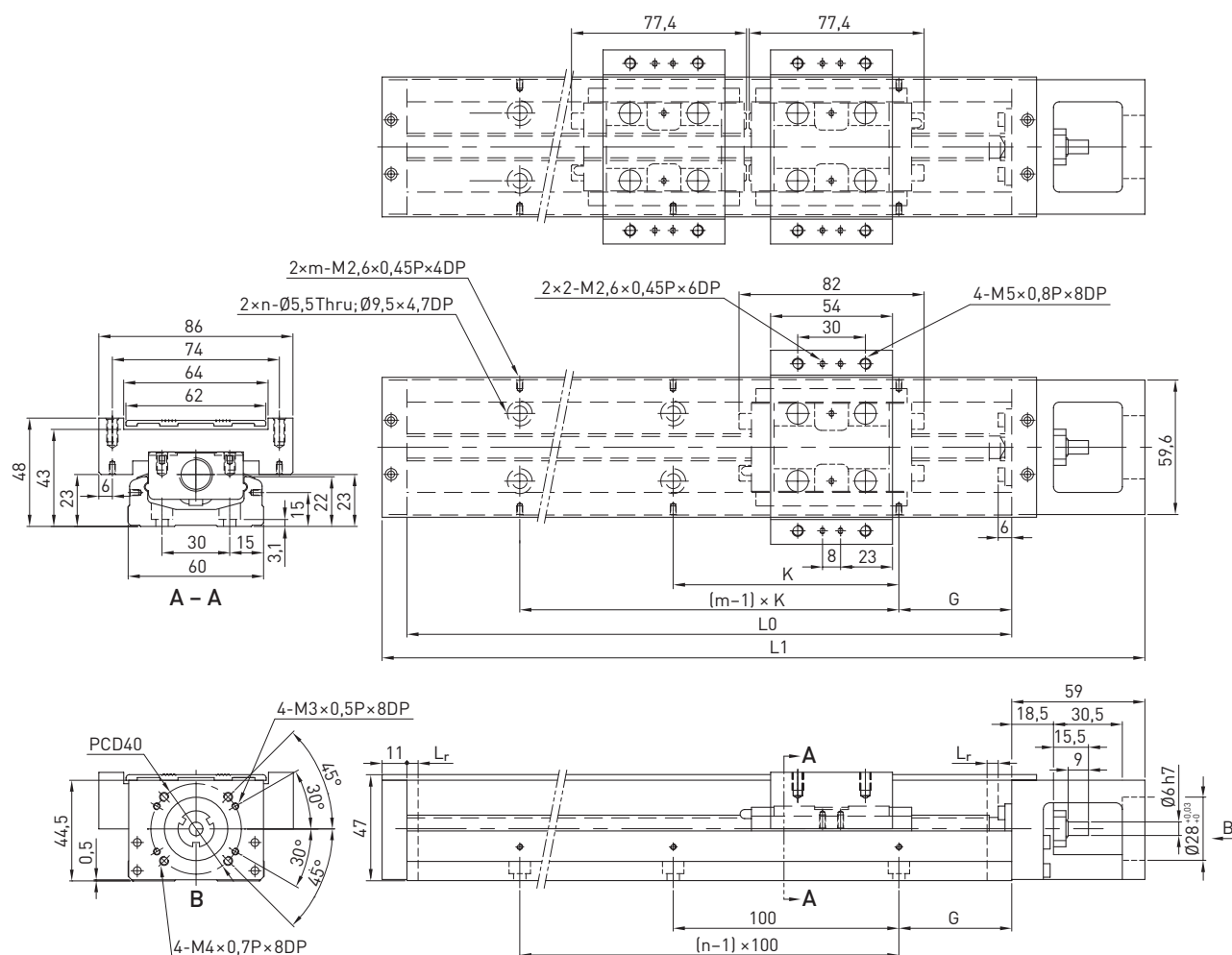


Table 5.14 Dimensions and weights of KK60 linear axes with aluminium cover, standard block

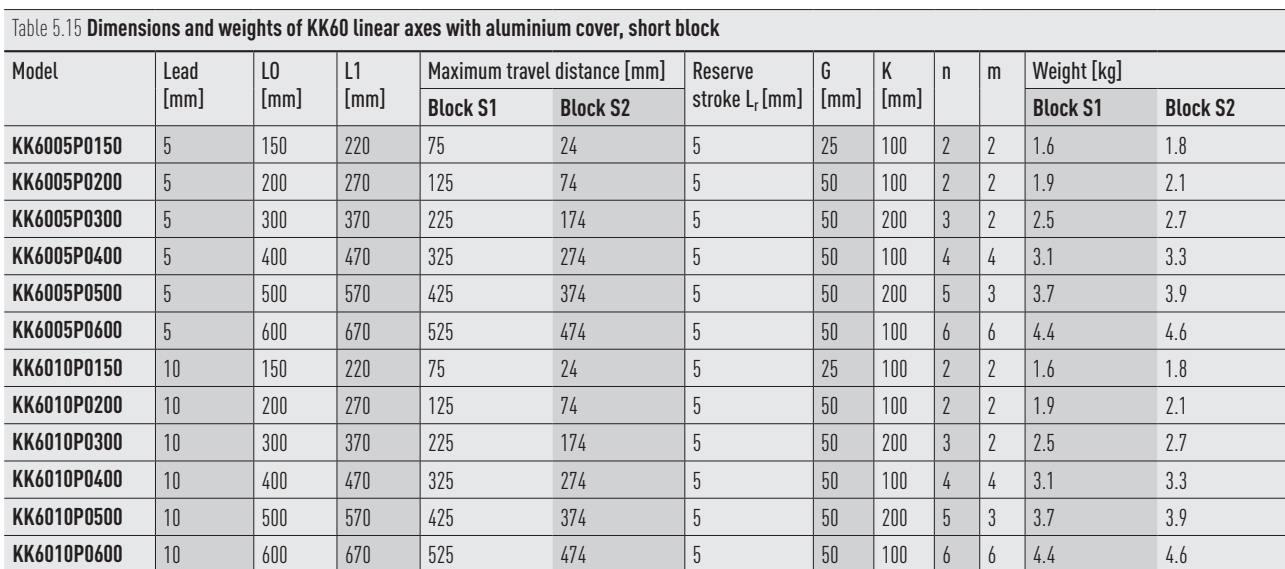
Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	K [mm]	n	m	Weight [kg]	
				Block A1	Block A2						Block A1	Block A2
KK6005P0150	5	150	220	50	—	5	25	100	2	2	1.7	—
KK6005P0200	5	200	270	100	—	5	50	100	2	2	2.1	—
KK6005P0300	5	300	370	200	125	5	50	200	3	2	2.7	3.0
KK6005P0400	5	400	470	300	225	5	50	100	4	4	3.3	3.6
KK6005P0500	5	500	570	400	325	5	50	200	5	3	3.9	4.2
KK6005P0600	5	600	670	500	425	5	50	100	6	6	4.4	5.0
KK6010P0150	10	150	220	50	—	5	25	100	2	2	1.7	—
KK6010P0200	10	200	270	100	—	5	50	100	2	2	2.1	—
KK6010P0300	10	300	370	200	125	5	50	200	3	2	2.7	3.0
KK6010P0400	10	400	470	300	225	5	50	100	4	4	3.3	3.6
KK6010P0500	10	500	570	400	325	5	50	200	5	3	3.9	4.2
KK6010P0600	10	600	670	500	425	5	50	100	6	6	4.4	5.0

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

KK/KF precision axes

(available on request)



Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.7.5 KK60 linear axes with bellows cover

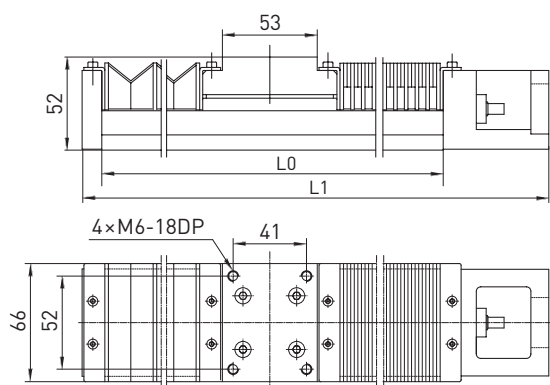


Table 5.16 Dimensions and weights of KK60 linear axes with bellows cover

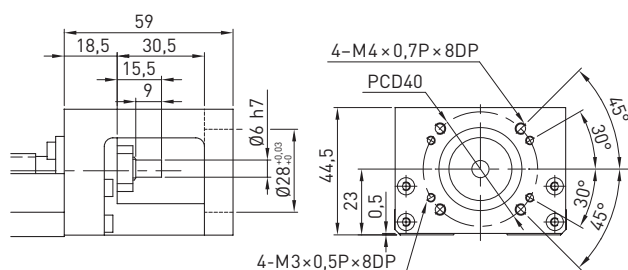
Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]	Reserve stroke L _r [mm]	Weight [kg]
KK6005P0150	5	150	220	35	5	1.7
KK6005P0200	5	200	270	67	5	2.1
KK6005P0300	5	300	370	141	5	2.7
KK6005P0400	5	400	470	220	5	3.3
KK6005P0500	5	500	570	290	5	3.9
KK6005P0600	5	600	670	366	5	4.6
KK6010P0150	10	150	220	35	5	1.7
KK6010P0200	10	200	270	67	5	2.1
KK6010P0300	10	300	370	141	5	2.7
KK6010P0400	10	400	470	220	5	3.3
KK6010P0500	10	500	570	290	5	3.9
KK6010P0600	10	600	670	366	5	4.6

Reference edge

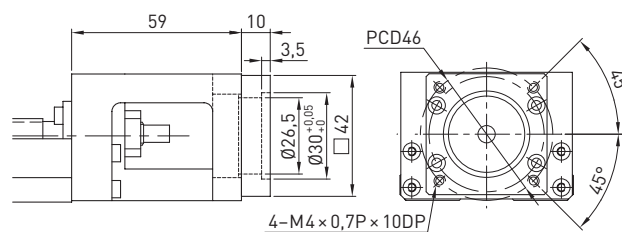
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.7.6 KK60 adapter flanges

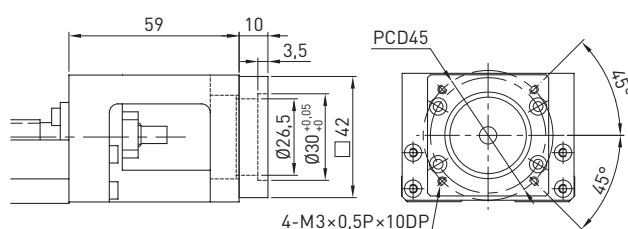
F0 motor adapter flange



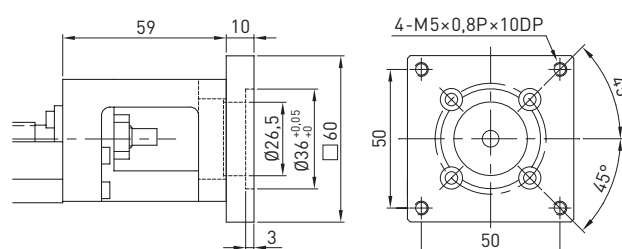
F1 motor adapter flange



F2 motor adapter flange



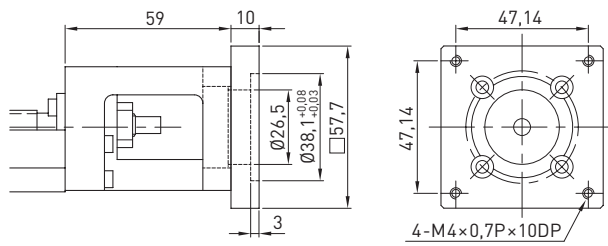
F3 motor adapter flange



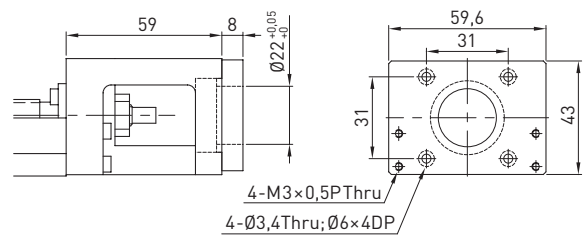
Precision axes and precision systems

KK/KF precision axes

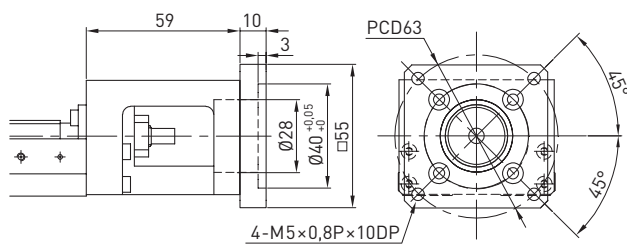
F4 motor adapter flange



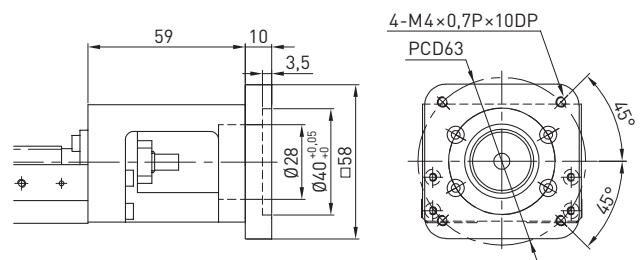
F5 motor adapter flange



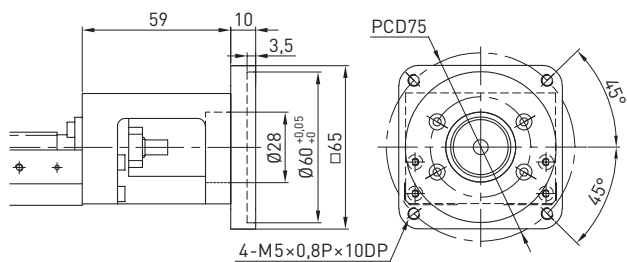
F6 motor adapter flange



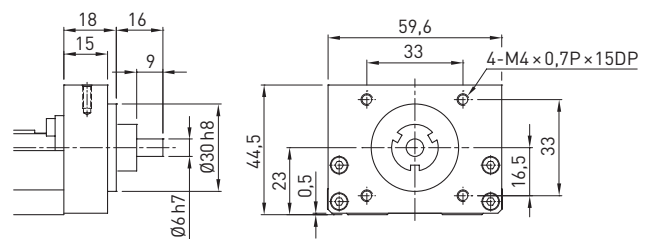
F8 motor adapter flange



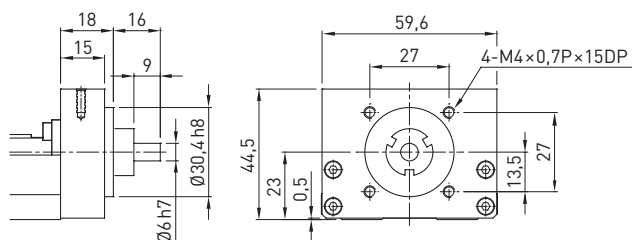
F10 motor adapter flange



H0 motor adapter flange



H1 motor adapter flange



5.8 KF60 linear axes

5.9 KF60 linear axes without cover, standard block

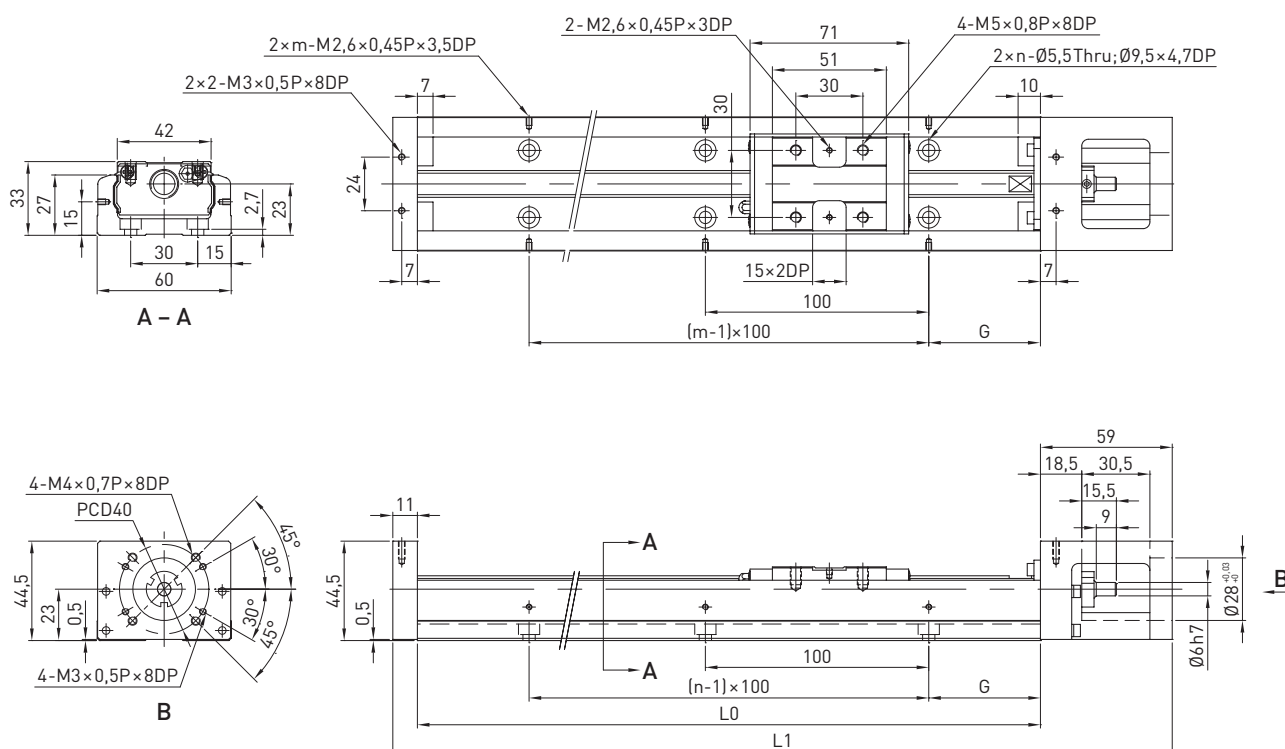


Table 5.17 Dimensions and weights of KF60 linear axes without cover, standard block

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	n	m	Weight [kg]	
				Block A1	Block A2					Block A1	Block A2
KF6005P0150	5	150	220	52	—	5	25	2	2	1.6	—
KF6005P0200	5	200	270	102	—	5	50	2	2	1.9	—
KF6005P0300	5	300	370	202	129	5	50	3	3	2.6	2.9
KF6005P0400	5	400	470	302	229	5	50	4	4	3.2	3.5
KF6005P0500	5	500	570	402	329	5	50	5	5	3.9	4.2
KF6005P0600	5	600	670	502	429	5	50	6	6	4.5	4.8
KF6010P0150	10	150	220	52	—	5	25	2	2	1.6	—
KF6010P0200	10	200	270	102	—	5	50	2	2	1.9	—
KF6010P0300	10	300	370	202	129	5	50	3	3	2.6	2.9
KF6010P0400	10	400	470	302	229	5	50	4	4	3.2	3.5
KF6010P0500	10	500	570	402	329	5	50	5	5	3.9	4.2
KF6010P0600	10	600	670	502	429	5	50	6	6	4.5	4.8

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

KK/KF precision axes

5.9.1 KF60 linear axes with aluminium cover, standard block

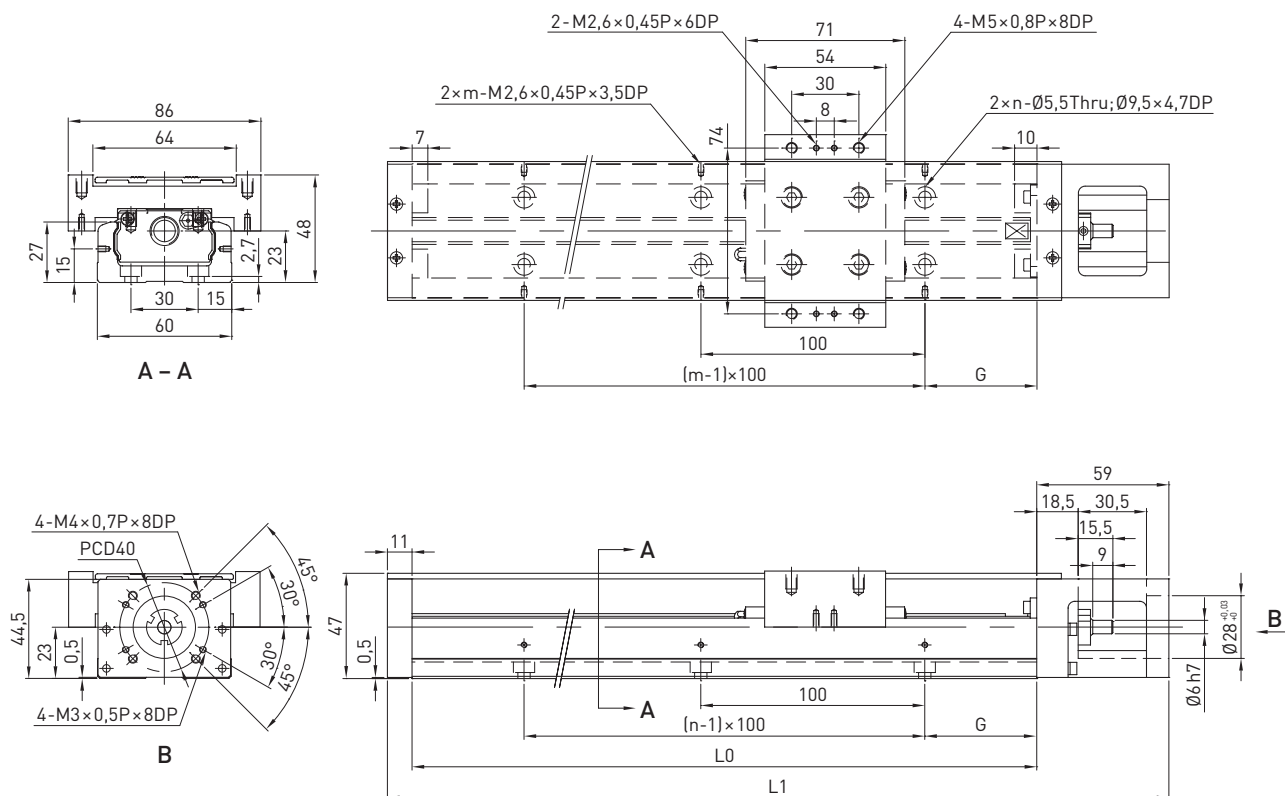


Table 5.18 Dimensions and weights of KF60 linear axes with aluminium cover, standard block

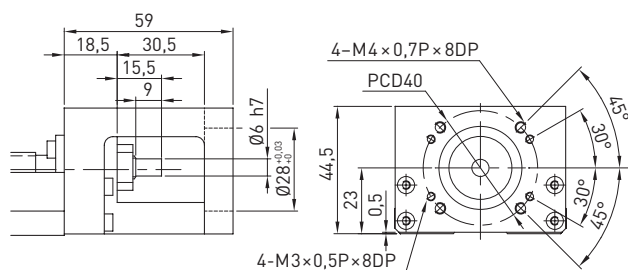
Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	n	m	Weight [kg]	
				Block A1	Block A2					Block A1	Block A2
KF6005P0150	5	150	220	52	—	5	25	2	2	1.8	—
KF6005P0200	5	200	270	102	—	5	50	2	2	2.2	—
KF6005P0300	5	300	370	202	129	5	50	3	3	2.9	3.2
KF6005P0400	5	400	470	302	229	5	50	4	4	3.5	3.8
KF6005P0500	5	500	570	402	329	5	50	5	5	4.2	4.5
KF6005P0600	5	600	670	502	429	5	50	6	6	4.9	5.2
KF6010P0150	10	150	220	52	—	5	25	2	2	1.8	—
KF6010P0200	10	200	270	102	—	5	50	2	2	2.2	—
KF6010P0300	10	300	370	202	129	5	50	3	3	2.9	3.2
KF6010P0400	10	400	470	302	229	5	50	4	4	3.5	3.8
KF6010P0500	10	500	570	402	329	5	50	5	5	4.2	4.5
KF6010P0600	10	600	670	502	429	5	50	6	6	4.9	5.2

Reference edge

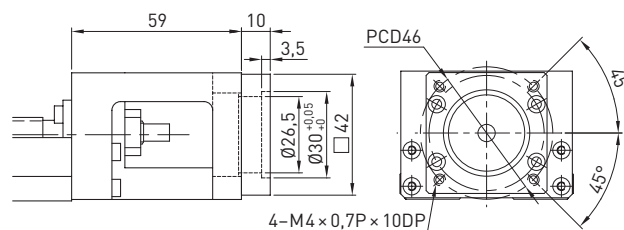
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.9.2 KF60 adapter flanges

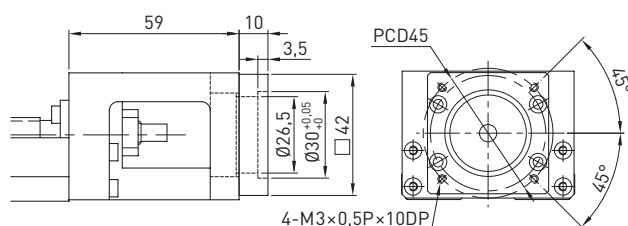
F0 motor adapter flange



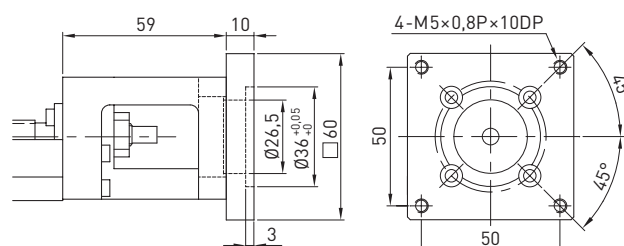
F1 motor adapter flange



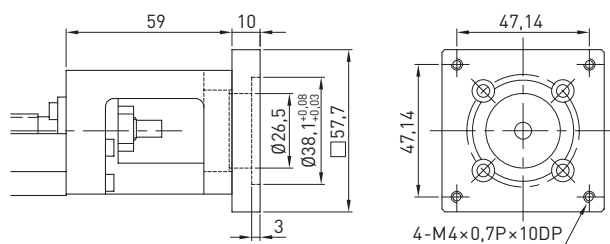
F2 motor adapter flange



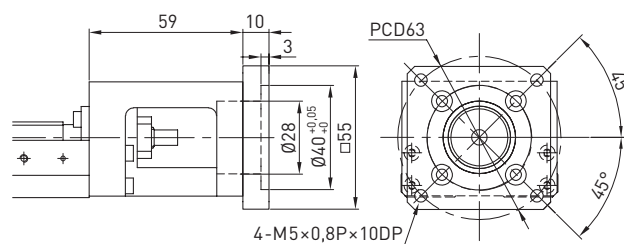
F3 motor adapter flange



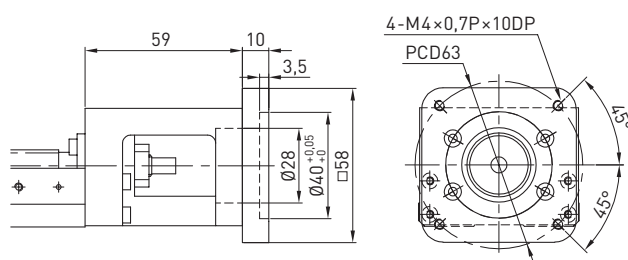
F4 motor adapter flange



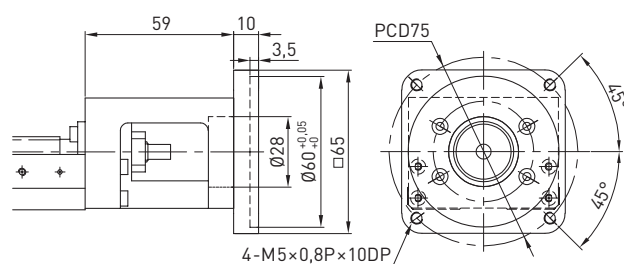
F6 motor adapter flange



F8 motor adapter flange



F10 motor adapter flange



Precision axes and precision systems

KK/KF precision axes

5.10 KK86 linear axes

5.10.1 KK86 linear axes without cover, standard block

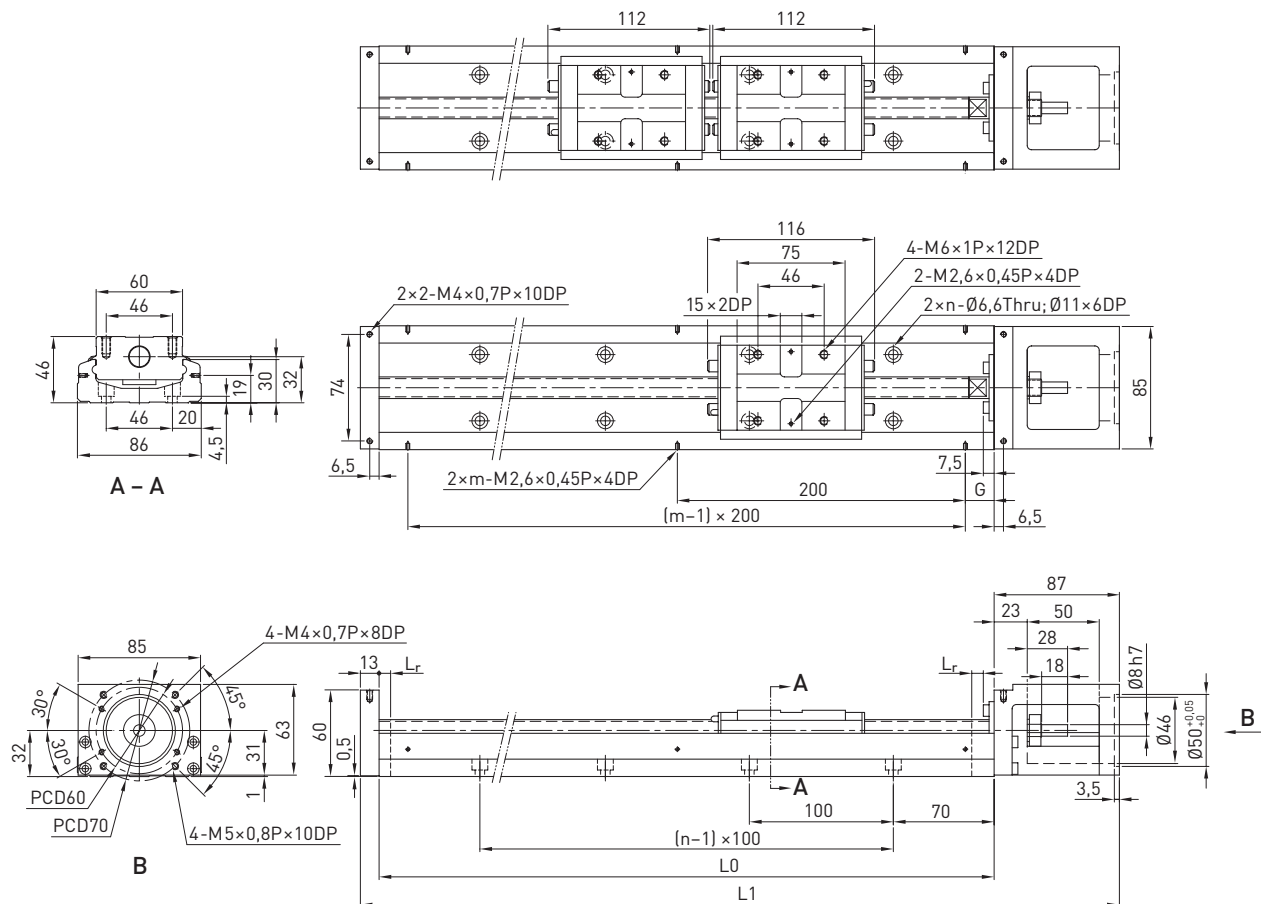


Table 5.19 Dimensions and weights of KK86 linear axes without cover, standard block

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	n	m	Weight [kg]	
				Block A1	Block A2					Block A1	Block A2
KK8610P0340	10	340	440	194	84	8	70	3	2	5.7	6.5
KK8610P0440	10	440	540	294	184	8	20	4	3	6.9	7.7
KK8610P0540	10	540	640	394	284	8	70	5	3	8.0	8.8
KK8610P0640	10	640	740	494	384	8	20	6	4	9.2	10.0
KK8610P0740	10	740	840	594	484	8	70	7	4	10.4	11.2
KK8610P0940	10	940	1,040	794	684	8	70	9	5	11.6	12.4
KK8620P0340	20	340	440	194	84	8	70	3	2	5.7	6.5
KK8620P0440	20	440	540	294	184	8	20	4	3	6.9	7.7
KK8620P0540	20	540	640	394	284	8	70	5	3	8.0	8.8
KK8620P0640	20	640	740	494	384	8	20	6	4	9.2	10.0
KK8620P0740	20	740	840	594	484	8	70	7	4	10.4	11.2
KK8620P0940	20	940	1,040	794	684	8	70	9	5	11.6	12.4

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.10.2 KK86 linear axes without cover, short block

(available on request)

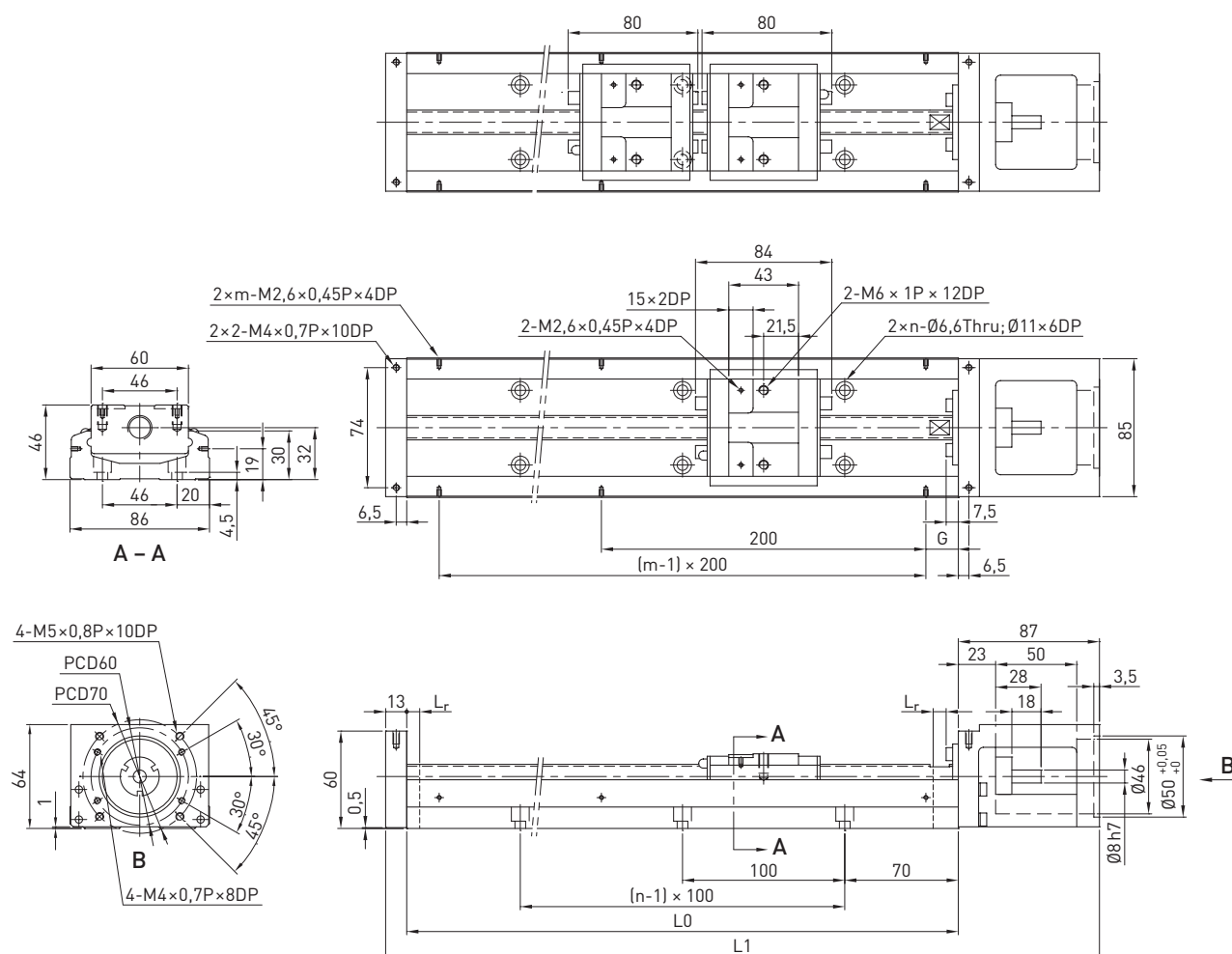


Table 5.20 Dimensions and weights of KK86 linear axes without cover, short block

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	n	m	Weight [kg]	
				Block S1	Block S2					Block S1	Block S2
KK8610P0340	10	340	440	230	154	8	70	3	2	5.4	5.9
KK8610P0440	10	440	540	330	254	8	20	4	3	6.6	7.1
KK8610P0540	10	540	640	430	354	8	70	5	3	7.7	8.2
KK8610P0640	10	640	740	530	454	8	20	6	4	8.9	9.4
KK8610P0740	10	740	840	630	554	8	70	7	4	10.1	10.6
KK8610P0940	10	940	1,040	830	754	8	70	9	5	11.3	11.8
KK8620P0340	20	340	440	230	154	8	70	3	2	5.4	5.9
KK8620P0440	20	440	540	330	254	8	20	4	3	6.6	7.1
KK8620P0540	20	540	640	430	354	8	70	5	3	7.7	8.2
KK8620P0640	20	640	740	530	454	8	20	6	4	8.9	9.4
KK8620P0740	20	740	840	630	554	8	70	7	4	10.1	10.6
KK8620P0940	20	940	1,040	830	754	8	70	9	5	11.3	11.8

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

KK/KF precision axes

[illegible]

Model	Lead [mm]	LO [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	n	m	Weight [kg]	
				Block A1	Block A2					Block A1	Block A2
KK8610P0340	10	340	440	194	84	8	70	3	2	6.5	7.3
KK8610P0440	10	440	540	294	184	8	20	4	3	7.8	8.6
KK8610P0540	10	540	640	394	284	8	70	5	3	9.0	9.8
KK8610P0640	10	640	740	494	384	8	20	6	4	10.3	11.3
KK8610P0740	10	740	840	594	484	8	70	7	4	11.6	12.4
KK8610P0940	10	940	1,040	794	684	8	70	9	5	13.0	13.8
KK8620P0340	20	340	440	194	84	8	70	3	2	6.5	7.3
KK8620P0440	20	440	540	294	184	8	20	4	3	7.8	8.6
KK8620P0540	20	540	640	394	284	8	70	5	3	9.0	9.8
KK8620P0640	20	640	740	494	384	8	20	6	4	10.3	11.3
KK8620P0740	20	740	840	594	484	8	70	7	4	11.6	12.4
KK8620P0940	20	940	1,040	794	684	8	70	9	5	13.0	13.8

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.10.4 KK86 linear axes with aluminium cover, short block (available on request)

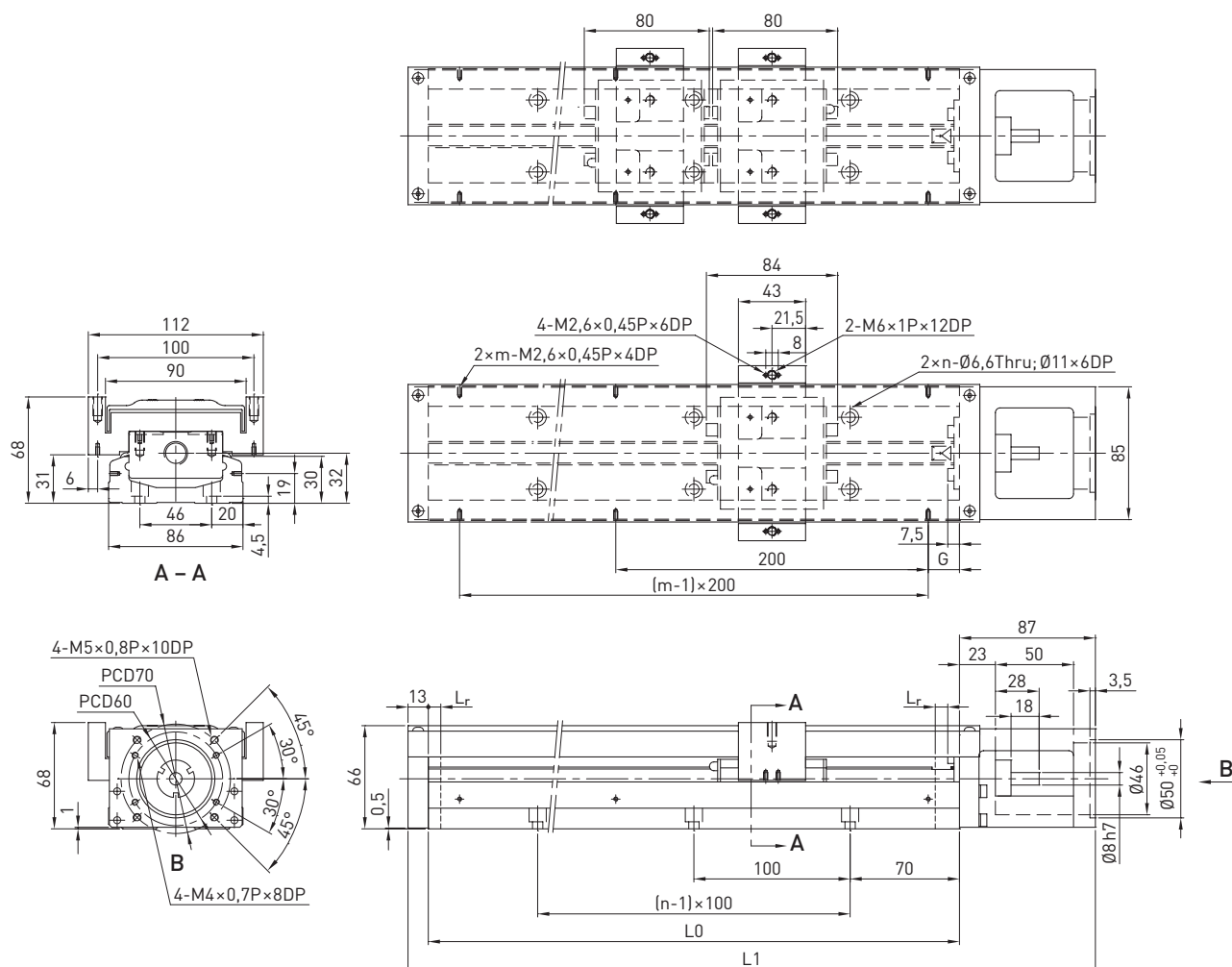


Table 5.22 Dimensions and weights of KK86 linear axes with aluminium cover, short block

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	n	m	Weight [kg]	
				Block S1	Block S2					Block S1	Block S2
KK8610P0340	10	340	440	230	154	8	70	3	2	6.3	7.1
KK8610P0440	10	440	540	330	254	8	20	4	3	7.6	8.4
KK8610P0540	10	540	640	430	354	8	70	5	3	8.8	9.6
KK 8610P0640	10	640	740	530	454	8	20	6	4	10.1	11.1
KK8610P0740	10	740	840	630	554	8	70	7	4	11.4	12.2
KK8610P0940	10	940	1,040	830	754	8	70	9	5	12.8	13.6
KK8620P0340	20	340	440	230	154	8	70	3	2	6.3	7.1
KK8620P0440	20	440	540	330	254	8	20	4	3	7.6	8.4
KK8620P0540	20	540	640	430	354	8	70	5	3	8.8	9.6
KK8620P0640	20	640	740	530	454	8	20	6	4	10.1	11.1
KK8620P0740	20	740	840	630	554	8	70	7	4	11.4	12.2
KK8620P0940	20	940	1,040	830	754	8	70	9	5	12.8	13.6

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

KK/KF precision axes

5.10.5 KK86 linear axes with bellows cover

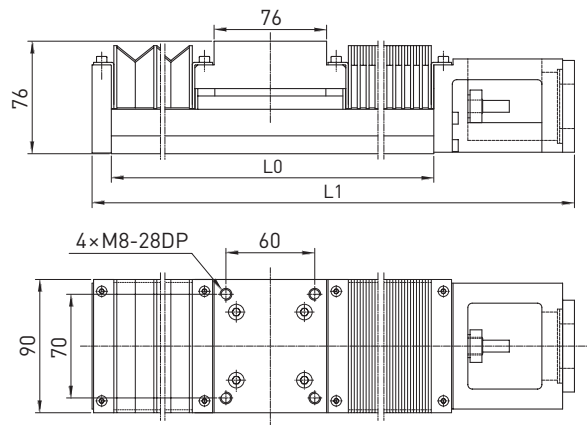


Table 5.23 Dimensions and weights of KK86 linear axes with bellows cover

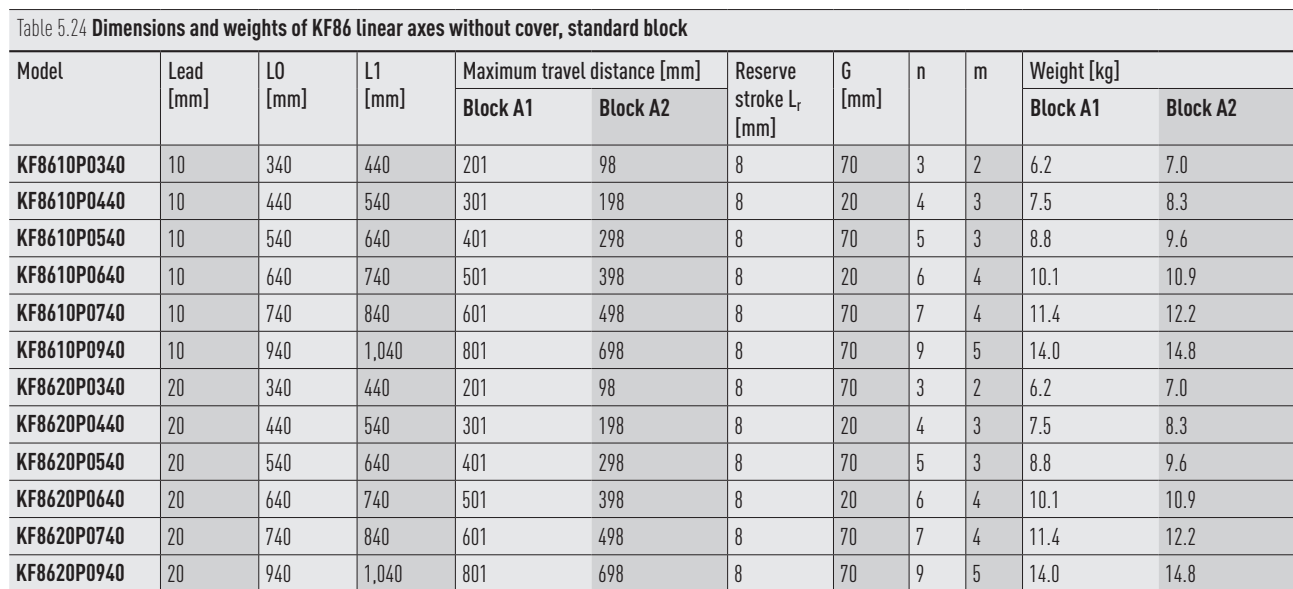
Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]	Reserve stroke L _r [mm]	Weight [kg]
KK8610P0340	10	340	440	158	8	6.3
KK8610P0440	10	440	540	232	8	7.6
KK8610P0540	10	540	640	311	8	8.8
KK8610P0640	10	640	740	394	8	10.0
KK8610P0740	10	740	840	475	8	11.3
KK8610P0940	10	940	1,040	638	8	12.7
KK8620P0340	20	340	440	158	8	6.3
KK8620P0440	20	440	540	232	8	7.6
KK8620P0540	20	540	640	311	8	8.8
KK8620P0640	20	640	740	394	8	10.0
KK8620P0740	20	740	840	475	8	11.3
KK8620P0940	20	940	1,040	638	8	12.7

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

KK/KF precision axes

5.11.1 KF86 linear axes without cover, standard block



Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.11.2 KF86 linear axes with aluminium cover, standard block

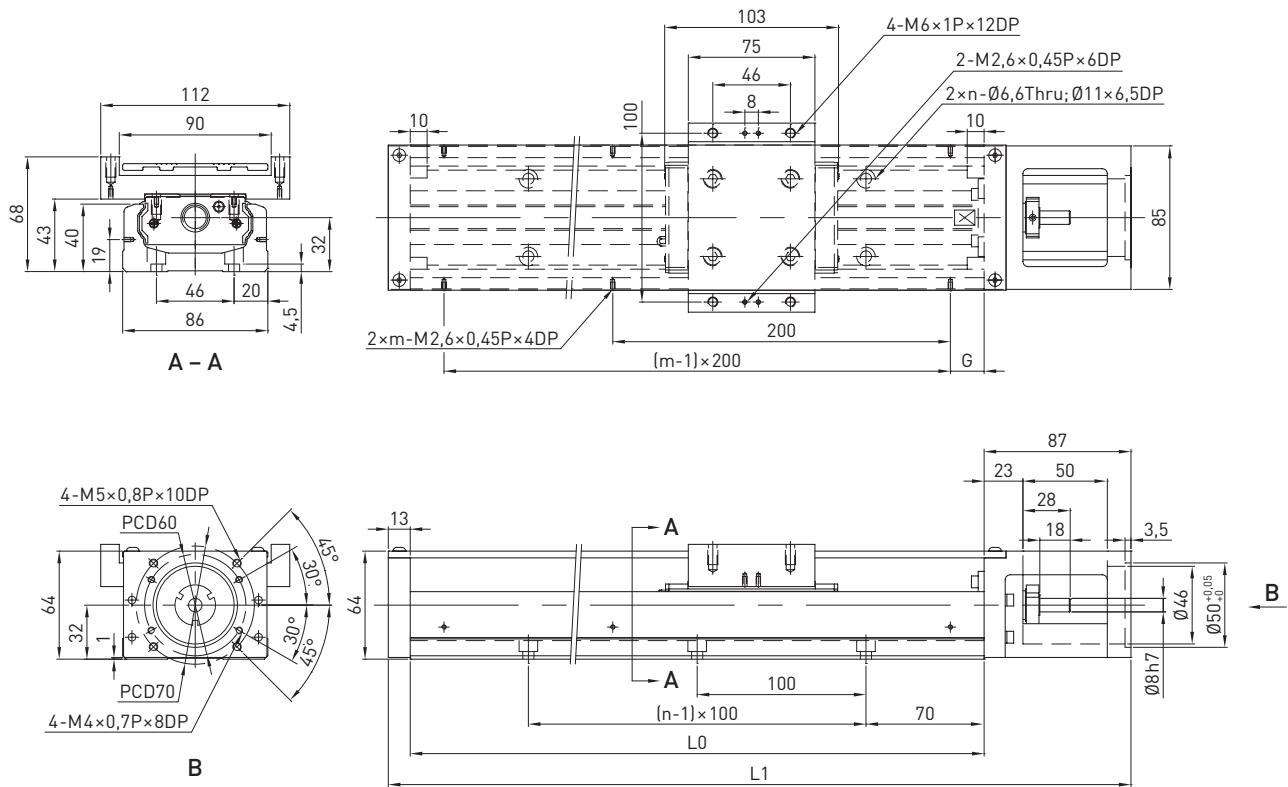


Table 5.25 Dimensions and weights of KF86 linear axes with aluminium cover, standard block

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	n	m	Weight [kg]	
				Block A1	Block A2					Block A1	Block A2
KF8610P0340	10	340	440	201	98	8	70	3	2	7.0	7.8
KF8610P0440	10	440	540	301	198	8	20	4	3	8.4	9.2
KF8610P0540	10	540	640	401	298	8	70	5	3	9.8	10.6
KF8610P0640	10	640	740	501	398	8	20	6	4	11.2	12.0
KF8610P0740	10	740	840	601	498	8	70	7	4	12.6	13.4
KF8610P0940	10	940	1,040	801	698	8	70	9	5	15.4	16.2
KF8620P0340	20	340	440	201	98	8	70	3	2	7.0	7.8
KF8620P0440	20	440	540	301	198	8	20	4	3	8.4	9.2
KF8620P0540	20	540	640	401	298	8	70	5	3	9.8	10.6
KF8620P0640	20	640	740	501	398	8	20	6	4	11.2	12.0
KF8620P0740	20	740	840	601	498	8	70	7	4	12.6	13.4
KF8620P0940	20	940	1,040	801	698	8	70	9	5	15.4	16.2

Reference edge

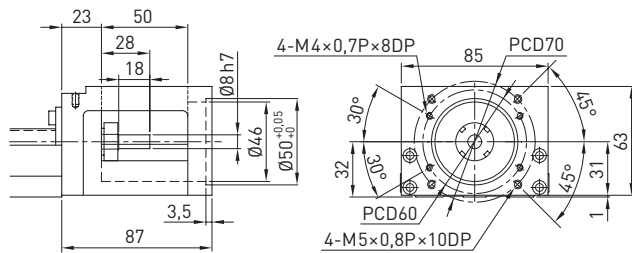
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

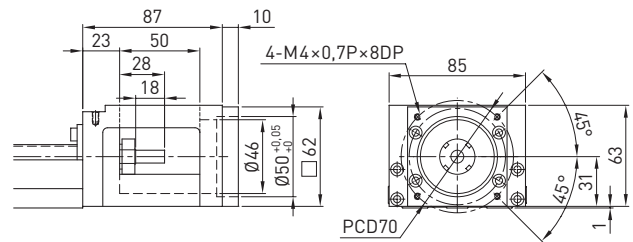
KK/KF precision axes

5.11.3 KF86 adapter flanges

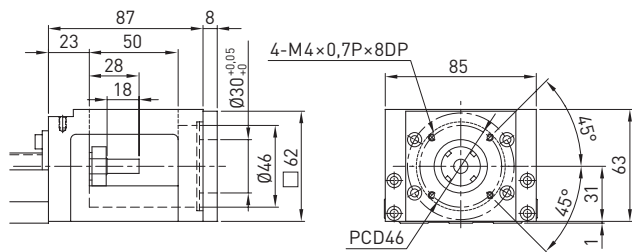
F0 motor adapter flange



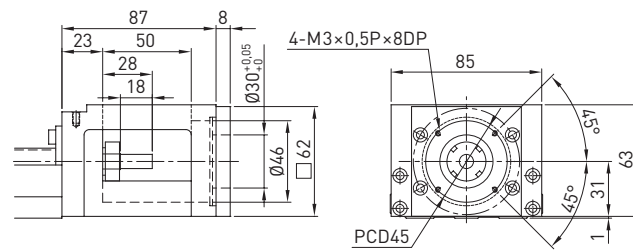
F1 motor adapter flange



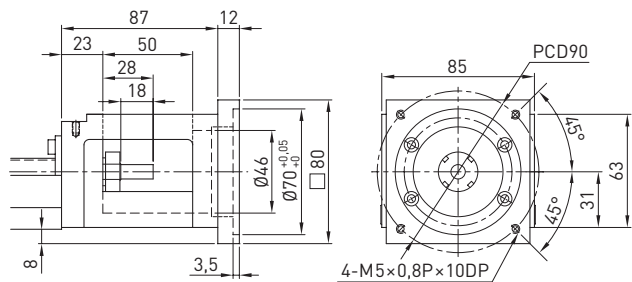
F2 motor adapter flange



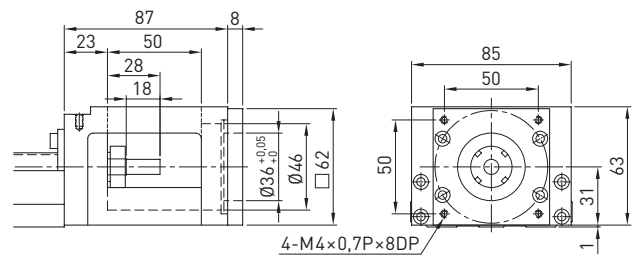
F3 motor adapter flange



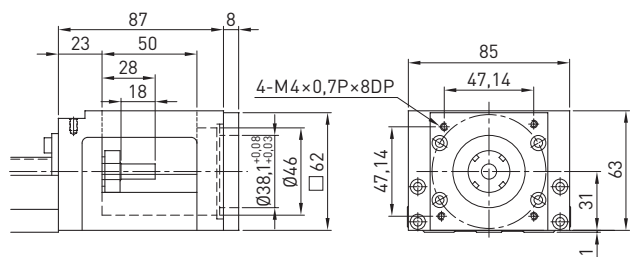
F4 motor adapter flange



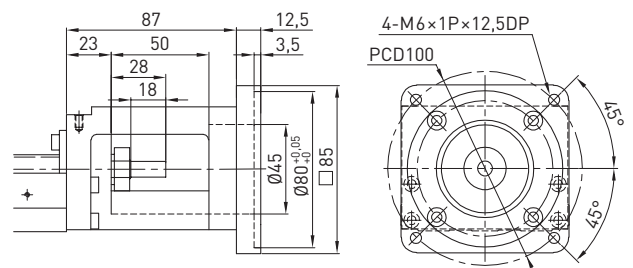
F5 motor adapter flange



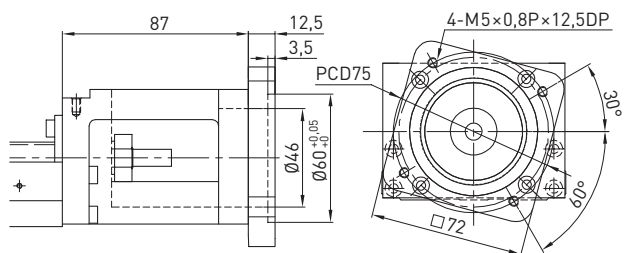
F6 motor adapter flange



F7 motor adapter flange



F8 motor adapter flange



5.12 KK100 linear axes

5.12.1 KK100 linear axes without cover

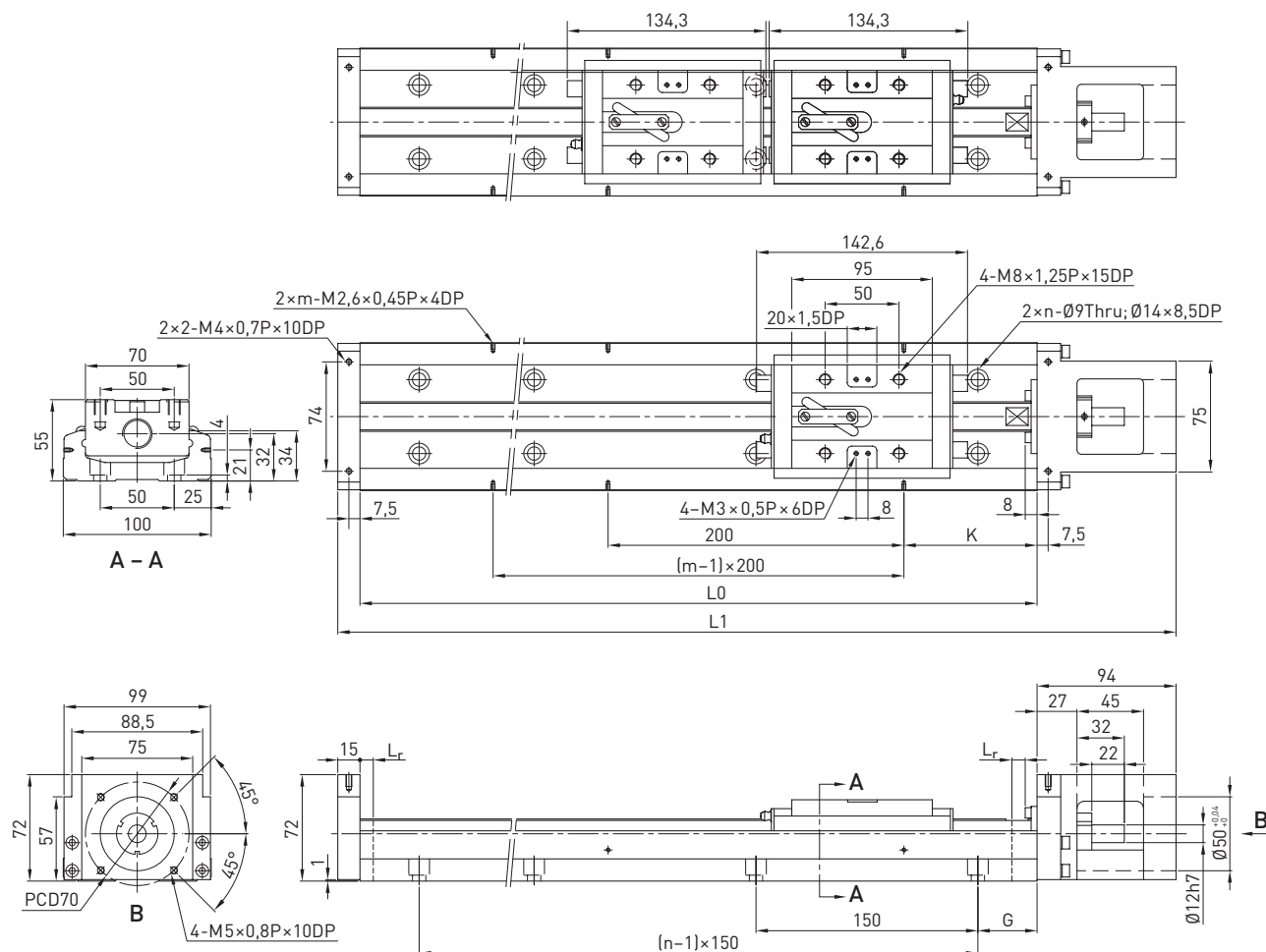


Table 5.26 Dimensions and weights of KK100 linear axes without cover

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	K [mm]	n	m	Weight [kg]	
				Block A1	Block A2						Block A1	Block A2
KK10020P0980	20	980	1,089	810	682	9	40	90	7	5	18.6	20.3
KK10020P1080	20	1,080	1,189	910	782	9	15	40	8	6	20.3	22.0
KK10020P1180	20	1,180	1,289	1,010	882	9	65	90	8	6	22.0	23.7
KK10020P1280	20	1,280	1,389	1,110	982	9	40	40	9	7	23.6	25.3
KK10020P1380	20	1,380	1,489	1,210	1,082	9	15	90	10	7	25.3	27.0

Reference edge

Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

KK/KF precision axes

5.12.2 KK100 linear axes with aluminium cover

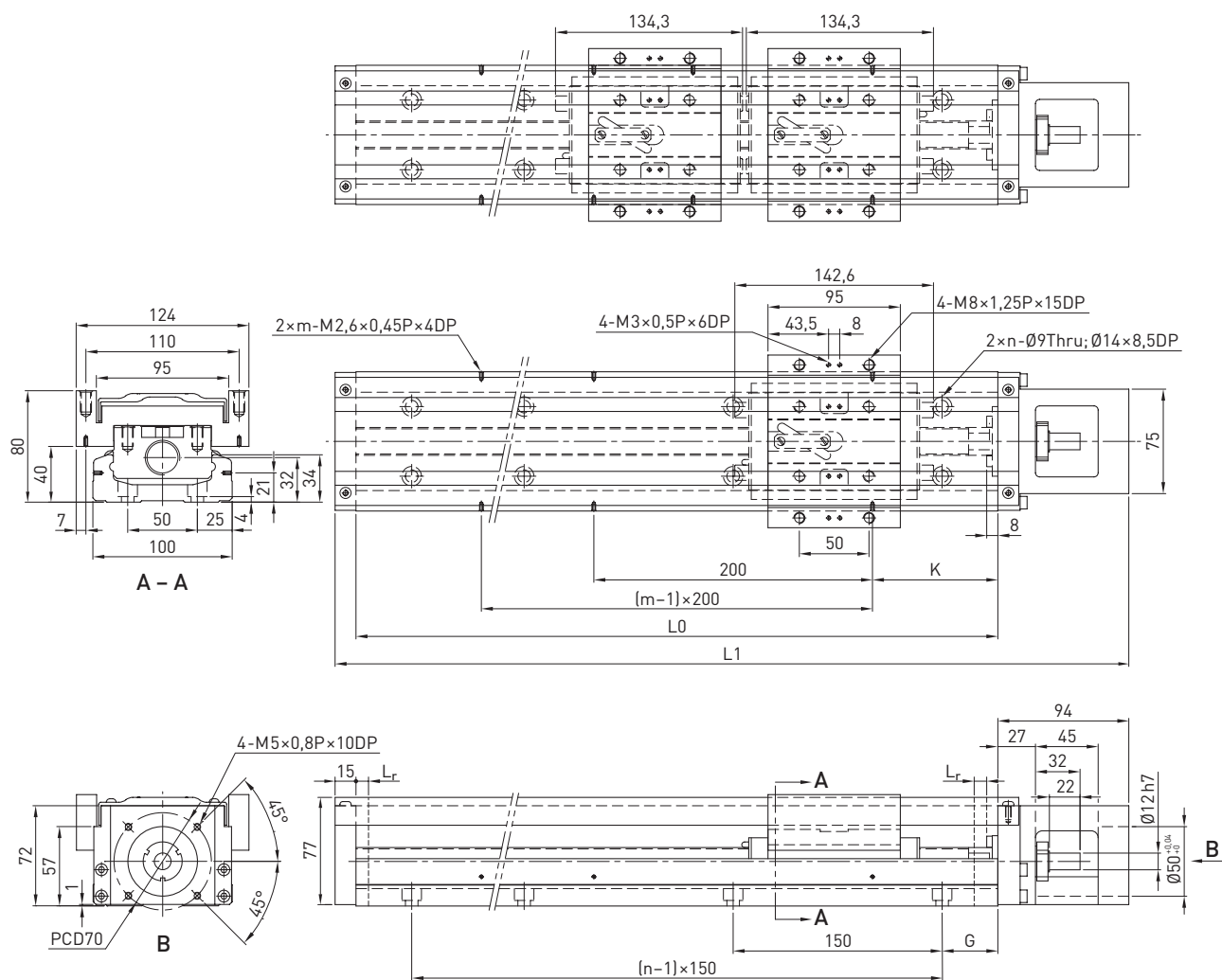


Table 5.27 Dimensions and weights of KK100 linear axes with aluminium cover

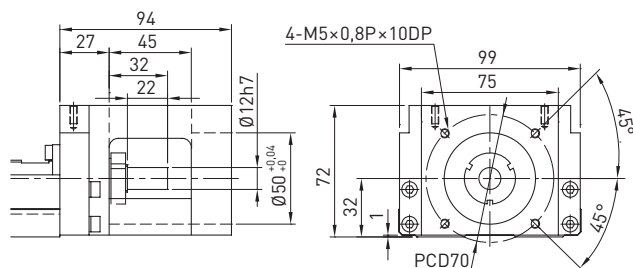
Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L_r [mm]	G [mm]	K [mm]	n	m	Weight [kg]	
				Block A1	Block A2						Block A1	Block A2
KK10020P0980	20	980	1,089	810	682	9	40	90	7	5	20.4	22.1
KK10020P1080	20	1,080	1,189	910	782	9	15	40	8	6	22.2	23.9
KK10020P1180	20	1,180	1,289	1,010	882	9	65	90	8	6	24.0	25.7
KK10020P1280	20	1,280	1,389	1,110	982	9	40	40	9	7	25.7	27.4
KK10020P1380	20	1,380	1,489	1,210	1,082	9	15	90	10	7	27.5	29.2

Reference edge

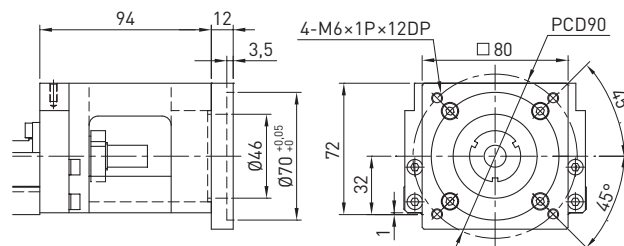
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.12.3 KK100 adapter flanges

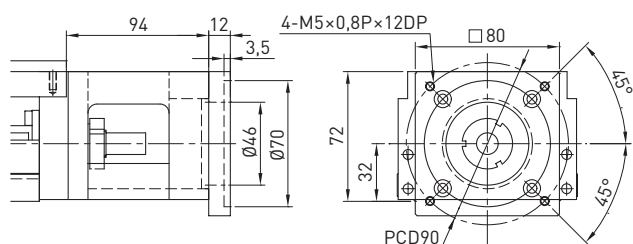
F0 motor adapter flange



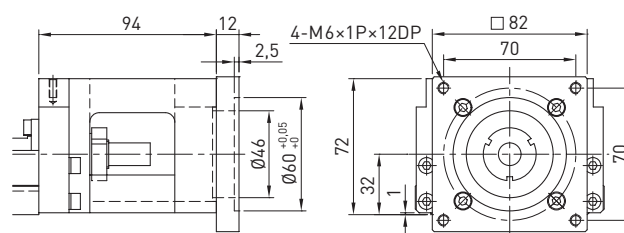
F1 motor adapter flange



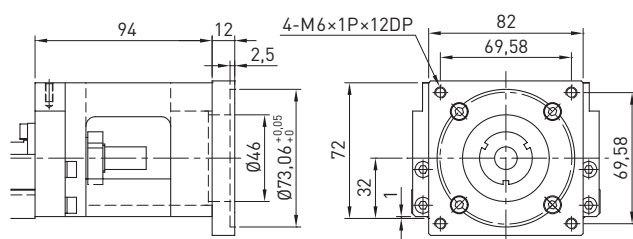
F2 motor adapter flange



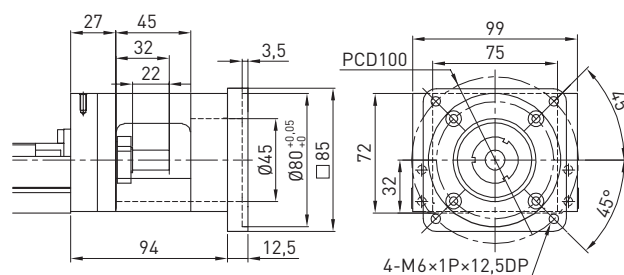
F3 motor adapter flange



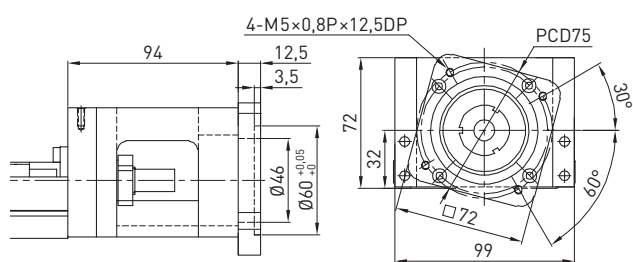
F4 motor adapter flange



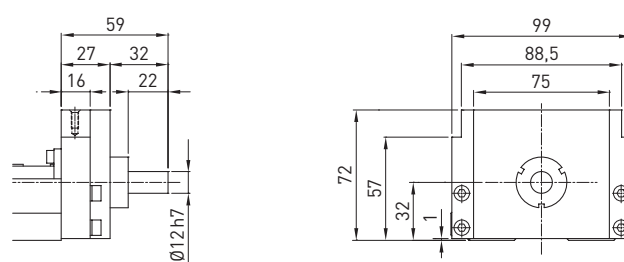
F5 motor adapter flange



F7 motor adapter flange

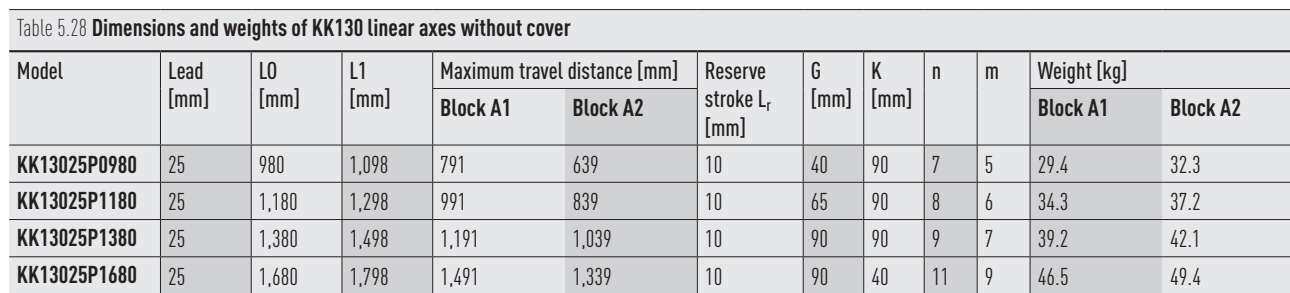


H0 motor adapter flange



KK/KF precision axes

5.13.1 KK130 linear axes without cover



Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

5.13.2 KK130 linear axes with aluminium cover

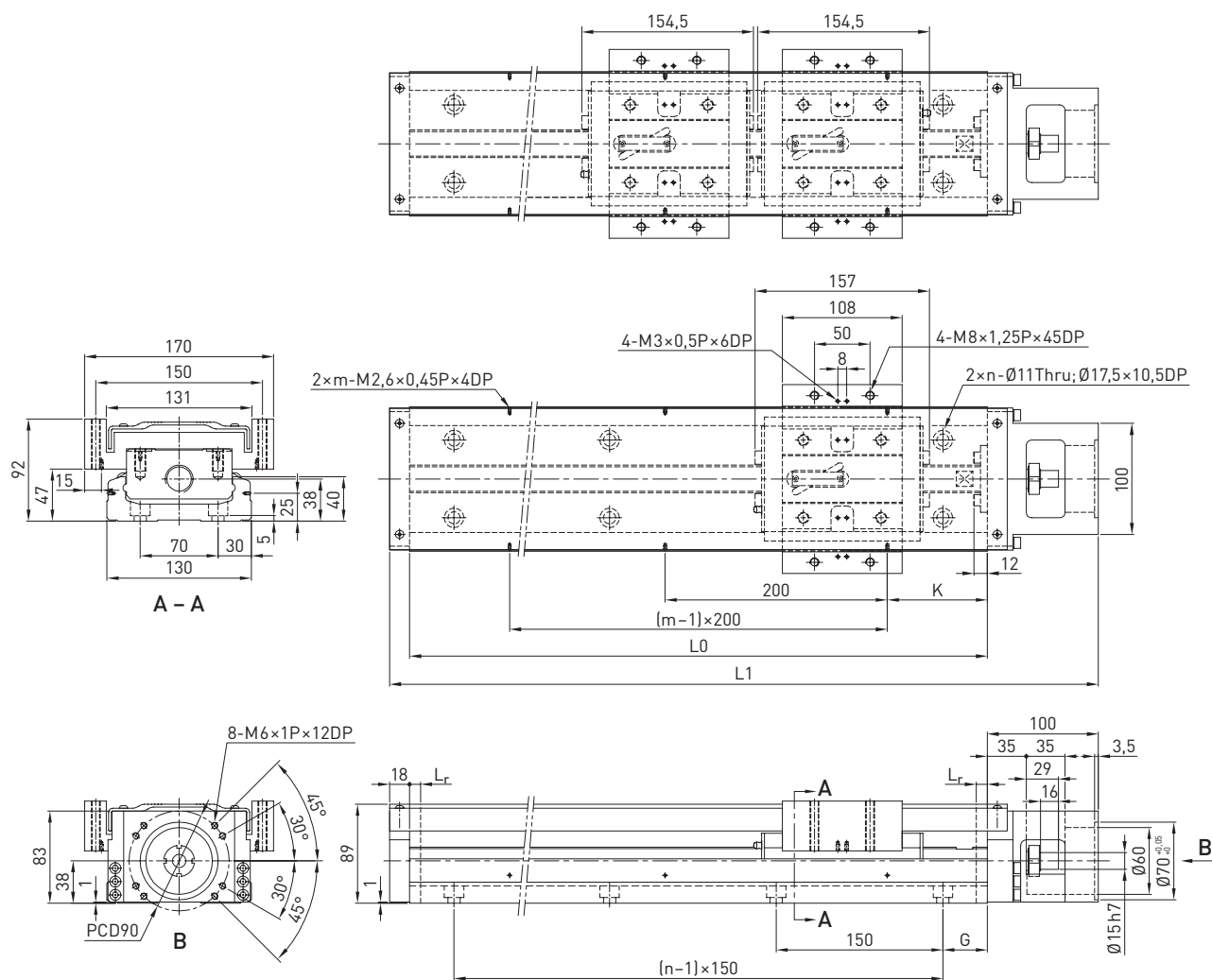


Table 5.29 Dimensions and weights of KK130 linear axes with aluminium cover

Model	Lead [mm]	L0 [mm]	L1 [mm]	Maximum travel distance [mm]		Reserve stroke L _r [mm]	G [mm]	K [mm]	n	m	Weight [kg]	
				Block A1	Block A2						Block A1	Block A2
KK13025P0980	25	980	1,098	791	639	10	40	90	7	5	31.9	35.9
KK13025P1180	25	1,180	1,298	991	839	10	65	90	8	6	37.1	41.1
KK13025P1380	25	1,380	1,498	1,191	1,039	10	90	90	9	7	42.2	46.2
KK13025P1680	25	1,680	1,798	1,491	1,339	10	90	40	11	9	49.9	53.9

Reference edge

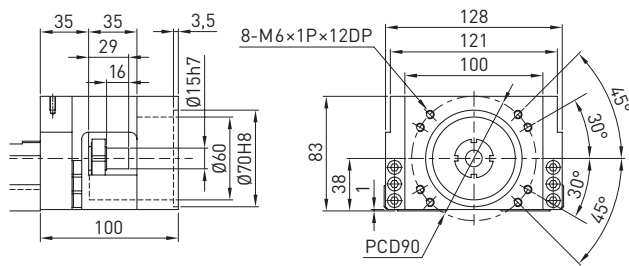
Viewed from the motor flange, the reference edge is located on the left side of the linear axis.

Precision axes and precision systems

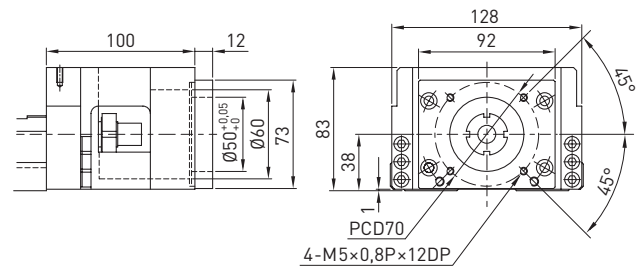
KK/KF precision axes

5.13.3 KK130 adapter flanges

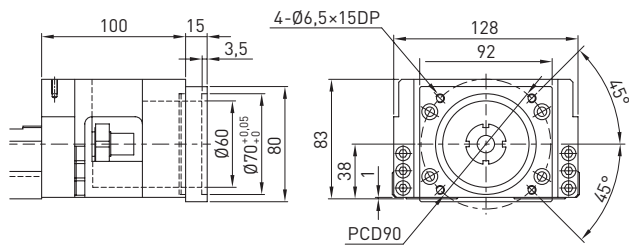
F0 motor adapter flange



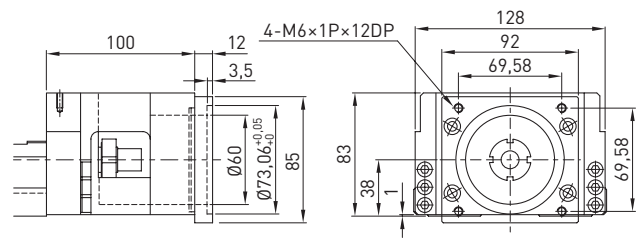
F1 motor adapter flange



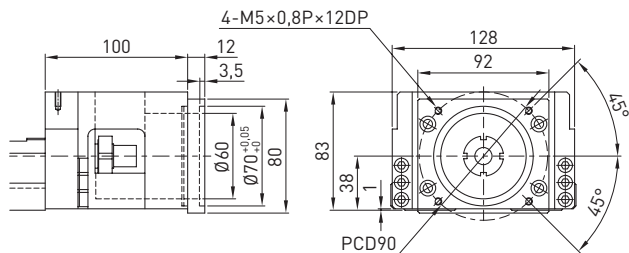
F2 motor adapter flange



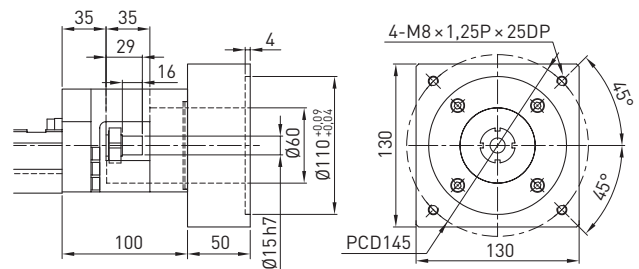
F3 motor adapter flange



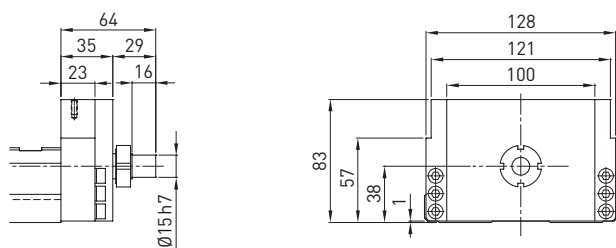
F4 motor adapter flange



F5 motor adapter flange



H0 motor adapter flange



5.14 Accessories for KK/KF precision axes

5.14.1 Sensor rail without limit switches

Linear axis KK/KF can optionally be ordered with up to three limit switches (inductive PNP proximity switches). The limit switches are mounted on the sensor rail and can be freely positioned on the rail. The limit switches are mounted on the sensor rail

that is fastened onto the linear axis, delivered with open cable tails. More detailed information about the limit switches can be found in "Assembly Instructions for KK/KF Linear Axes" at hiwin.de.

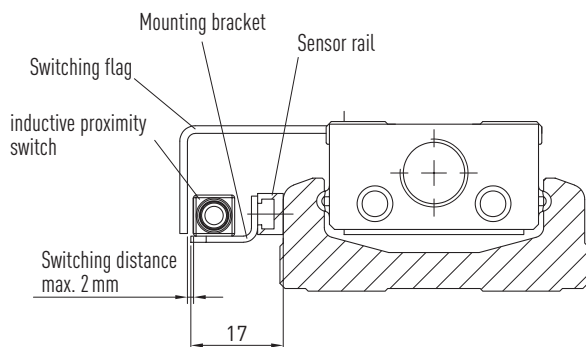


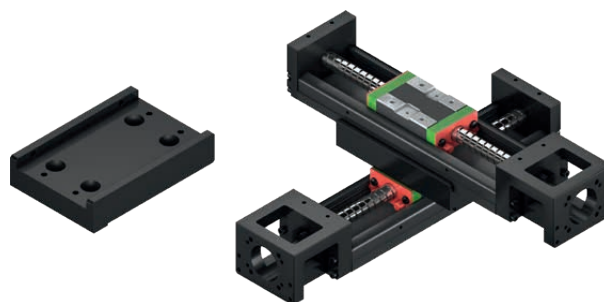
Table 5.30 Available limit switches

Article number	Function	Cable length
8-14-0040 ¹⁾	NC contact	4 m
8-14-0010	NO contact	2 m

¹⁾ Standard type

5.14.2 Cross table adapter

- Adapter for crosswise connection of two or more KK/KF linear axes to an X-Y system
- Adapter for KK/KF linear axes with and without aluminium cover
- Switching cam, adaptable for limit switches
- Surface black anodised
- Delivered in set including fastening material



5.14.3 Cross table adapter for KK linear axes without aluminium cover

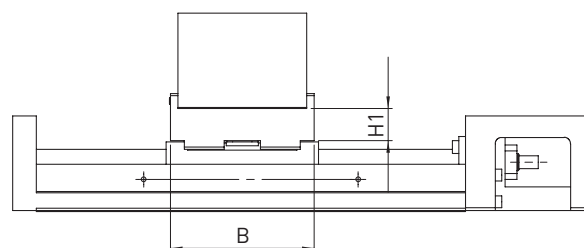
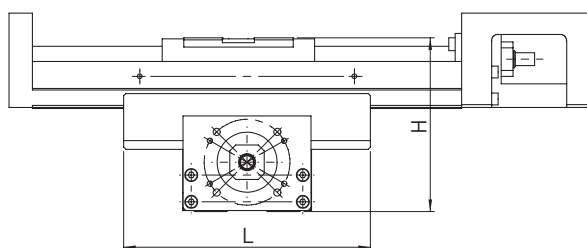


Table 5.31 Dimensions of cross table adapter for linear axes without cover

Article number	Lower axis	Upper axis	H	H1	L	B
10-000604	KK40	KK40	47	7	70	47
10-000606	KK50	KK40	56	10	70	47
10-000608	KK50	KK50	62	10	90	57
10-000610	KK/KF60	KK50	74	15	90	57
10-000612	KK/KF60	KK/KF60	81	15	115	67
10-000614	KK/KF86	KK/KF60	95	16	110	67
10-000616	KK/KF86	KK/KF86	108	16	120	97

Unit: mm

Precision axes and precision systems

KK/KF precision axes

5.14.4 Cross table adapter for KK/KF linear axes with aluminium cover

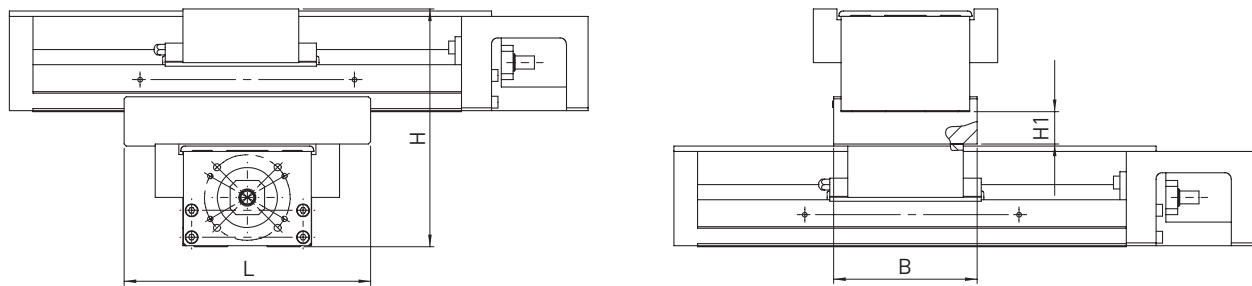


Table 5.32 Dimensions of cross table adapter for linear axes with cover

Article number	Lower axis	Upper axis	H	H1	L	B
10-000605	KK40	KK40	74	10	70	47
10-000607	KK50	KK40	82	10	70	47
10-000609	KK50	KK50	90	10	90	57
10-000611	KK/KF60	KK50	103	15	57	57
10-000613	KK/KF60	KK/KF60	111	15	115	67
10-000615	KK/KF86	KK/KF60	132	16	144	67
10-000617	KK/KF86	KK/KF86	152	16	144	97

Unit: mm

5.15 Covers

To protect the linear axes, they can be equipped with aluminium or bellows covers.

The dimensions of KK linear axes with cover can be found in the sections of the respective size.

Table 5.33 Available covers

Model	Aluminium cover	Bellows cover
KK30	●	—
KK40	●	—
KK50	●	—
KK60	●	●
KF60	●	—
KK86	●	●
KF86	●	—
KK100	●	—
KK130	●	—

5.16 Grease nipple

Table 5.34 Grease nipple for grease lubrication

Art. no.: 20-000275 – M3 × 0.5 P KK40	Art. no.: 20-000272 – M4 × 0.7 P KK50, KK/KF60, KK/KF86	Art. no.: 20-000273 – M6 × 0.75 P KK100, KK130

5.17 HIWIN servo motors

HIWIN synchronous AC servo motors are available with power ratings of 50 W, 100 W, 200 W, 400 W, 750 W and 1000 W. The motors are equipped with a 23-bit encoder and are available with or without a motor brake.



Table 5.35 Assignment of motor type – KK linear axis

Motor type	Motor power [W]	Motor torque [Nm]								
		Nominal torque	Peak torque	KK30	KK40	KK50	KK60/KF60	KK86/KF86	KK100	KK130
EM1-C-M-05	50	0.16	0.59	—	F1	F1	F1	F2	—	—
EM1-C-M-10	100	0.32	1.18	—	F1	F1	F1	F2	—	—
EM1-C-M-20	200	0.64	2.24	—	—	—	—	F0	F0	F1
EM1-C-M-40	400	1.27	4.44	—	—	—	—	F0	F0	F1
EM1-C-M-75	750	2.39	8.36	—	—	—	—	—	F1	F2
EM1-C-M-1K	1,000	4.77	14.30							F5

Precision axes and precision systems

LMSSA linear motor axis

6. LMSSA linear motor axis

6.1 Properties of the LMSSA linear motor axis

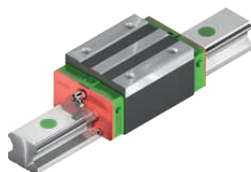
HIWIN LMSSA linear motor axes guarantee repeatability in the μ range. The precision axes feature standardisation of available options including profile width, motor type and encoder system. This reduction to the essentials means we can quickly create an offer and ensure short delivery times. All available variants can be easily put together in the HIWIN configurator for precision axes.

The modular system makes it possible to create offers quickly with short delivery times.

- Standard precision axis with linear motor drive
- Versions with iron core (high force density) and ironless versions (best synchronisation). Two motors per axis also possible.
- Profile widths from 80 mm to 206 mm
- Standard options for distance measuring systems and limit switches

Linear guideway

A high-quality HIWIN double guide safely transfers forces and torques from the carriage to the axis profile. Four blocks are used per carriage, which are guided on two parallel, high-precision profile rails. SynchMotion™ technology with ball chain also ensures good synchronisation and very smooth running in all sizes.



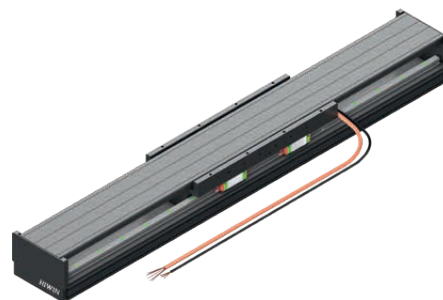
Distance measuring systems

The distance measuring system, integrated into the inside of the axis to save space, determines the repeatability. Different measuring systems are available depending on the requirements for measuring method, interface and resolution.



Linear motor

The integrated HIWIN linear motors ensure dynamic and precise positioning. LMSA motors with iron core are the first choice when high feed forces are required. Ironless motors are the first choice for applications with the highest requirements for synchronisation.



Electrical interface

To optimise costs, motor and encoder cables are led out directly at the travel carriage and delivered with open cable tails. The limit switch cables are also led out at the front of the axis with open cable tails.



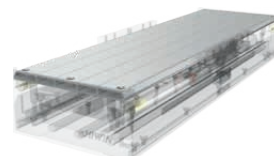
Colour

In addition to the black type, the LMSSA linear motor axis is also available in sizes 18 and 20 in a grey, anodised aluminium version.



Cover

The aluminium cover prevents dirt and dust from penetrating through the top.



6.2 Order code for LMSSA linear motor axes

	LM	SSA	18	S	100	1	800	G	5.3	A	S	S	B	
Linear motor axis														
Series														Max. voltage: A: 330 VDC ⁴⁾ B: 600 VDC ⁵⁾
Size (profile width):														Colour: S: Silver ¹⁾ B: Black
08: 80														
10: 100														
13: 135														
18: 185														
20: 206														Cover: S: Standard cover
Motor type:														Axis limit switch: A: NPN (NC contact) B: PNP (NC contact)
S: LMSA (with iron core)														
C: L MC (ironless) ¹⁾														
Nominal force [N]: ²⁾														Cable length: 5.3: Motor: 5 m/encoder: 3 m
50, 100, 200, 300, 500, 700														
Number of travel carriages:														Distance measuring system: A: Optical, analogue, 1 V _{SS} sin/cos D: Magnetic, analogue, 1 V _{SS} sin/cos E: Magnetic, digital TTL, resolution 1 µm G: Optical, digital TTL, resolution 1 µm K: Optical, digital TTL, resolution 0.1 µm P: Optical, absolute with BiSS-C interface ¹⁾
1: One travel carriage														
2: Two travel carriages														
Stroke length: ³⁾														
100 – 1300 mm (50-mm steps)														
1400 – 2700 mm (100-mm steps)														

¹⁾ Available for sizes (profile widths) 18 and 20.

²⁾ Nominal force depends on motor type.

³⁾ Max. stroke length depends on size (profile width).

⁴⁾ Max. voltage depends on motor type. LMC (ironless) with max. voltage A: 330 VDC

⁵⁾ Max. voltage depends on motor type. LMSA (with iron core) with max. voltage B: 600 VDC

Precision axes and precision systems

LMSSA linear motor axis

6.3 General dimensions and specifications for LMSSA precision axes

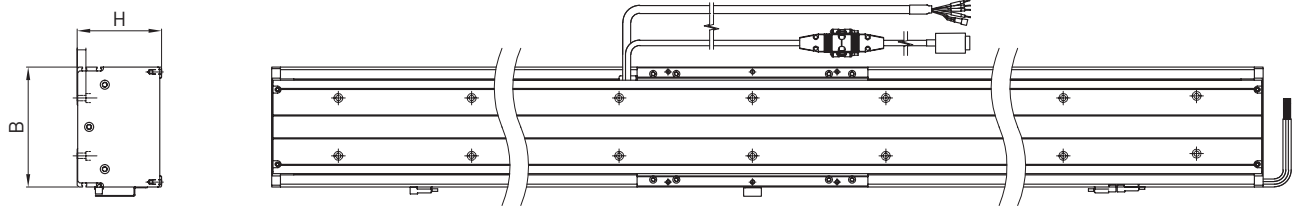


Table 6.2 General dimensions and specifications for LMSSA precision axes

	Motor type	Max stroke length ST*	Profile width W	Profile height H
LMSSA-08S	With iron core (LMSA)	1400	80	75
LMSSA-10S	With iron core (LMSA)	1400	100	76
LMSSA-13S	With iron core (LMSA)	2700	135	95
LMSSA-18S	With iron core (LMSA)	2700	185	108.7
LMSSA-18C	Ironless (LMC)	2700	185	88.7
LMSSA-20S	With iron core (LMSA)	2700	206	117.7
LMSSA-20C	Ironless (LMC)	2700	206	91.7

* Depending on the exact specification

6.4 Dimensions and specifications for LMSSA precision axes

6.2.1 Technical data for LMSSA-S (with iron core)

Table 6.1 Technical data for LMSSA-S (with iron core) – sizes 08/10/13

	Symbol	Unit	08S050	08S100	10S100	10S200	13S100	13S200	13S300
Linear motor			LMSA01	LMSA02	LMSA11	LMSA12	LMSA11	LMSA12	LMSA13
Continuous force at T_{max}	F_c	N	52	104	103	205	103	205	308
Continuous current at T_{max}	I_c	A_{eff}	2.1	4.2	2.1	4.2	2.1	4.2	6.3
Peak force (for 1 sec.)	F_p	N	112	224	289	579	289	579	868
Peak current (for 1 sec.)	I_p	A_{eff}	6.3	12.6	6.3	12.7	6.3	12.7	19.0
Maximum force (for 0.5 sec.)	F_u	N	192	384	379	759	379	759	1,138
Maximum current (for 0.5 s)	I_u	A_{eff}	10.6	21.1	10.6	21.1	10.6	21.1	31.7
Force constant	K_f	N/A_{eff}	24.5		48.6				
Electrical time constant	K_e	ms	3.0	3.7	4.4	4.5	4.4	4.5	4.4
Resistance¹⁾	R_{25}	Ω	6.2	3.1	8.4	4.1	8.4	4.1	2.8
Inductance¹⁾	L	mH	19.0	11.6	37.1	18.5	37.1	18.5	12.4
Voltage constant	K_u	$V_{eff}/(m/s)$	14.2		28.1				
Motor constant	K_m	N/\sqrt{W}	8.1	11.5	13.7	19.6	13.7	19.6	23.7
Thermal resistance	R_{th}	$^{\circ}C/W$	1.69	0.83	1.23	0.63	1.23	0.63	0.41
Thermal time constant	T_{th}	s	431	431	610	890	610	890	2,290
Thermal switch			1 × [3 PTC SNM 120 in series]						
Max. intermediate circuit voltage		V	600						
Pole pair pitch	2τ	mm	30						
Max. coil temperature	T_{max}	$^{\circ}C$	120						
Repeatability		μm	Type A/K/P: ± 1 ; type G: ± 2 ; type D/E: ± 3						
Absolute precision		μm	Type A/K/P: ± 2 ; type G: ± 4 ; type D/E: ± 6						
Horizontal straightness		μm	$\pm 8/300$ mm						
Vertical straightness		μm	$\pm 8/300$ mm						

Max. speed		m/s	5						
Max. acceleration		m/s ²	50						
Moved mass		kg	1.8	3.0	2.1	3.4	3.4	5.2	7.5
Stroke length		mm	100 – 1300 (in 50-mm steps), 1400 – 2700 (in 100-mm steps)						

¹⁾ Measured between phase-phase

All values ±10 % at 25 °C ambient temperature

Table 6.3 Technical data for LMSSA-S (with iron core) – sizes 18/20

	Symbol	Unit	18S100	18S200	18S300	20S300	20S500	20S700
Linear motor			LMSA11	LMSA12	LMSA13	LMSA22	LMSA23	LMSA24
Continuous force at T_{max}	F _c	N	103	205	308	362	544	725
Continuous current at T_{max}	I _c	A _{eff}	2.1	4.2	6.3	3.9	5.9	7.8
Peak force (for 1 sec.)	F _p	N	289	579	868	1,023	1,535	2,048
Peak current (for 1 sec.)	I _p	A _{eff}	6.3	12.7	19.0	11.8	17.6	23.5
Maximum force (for 0.5 sec.)	F _u	N	379	759	1,138	1,341	2,011	2,682
Maximum current (for 0.5 s)	I _u	A _{eff}	10.6	21.1	31.7	19.6	29.4	39.2
Force constant	K _f	N/A _{eff}	48.6			92.5		
Electrical time constant	K _e	ms	4.4	4.5	4.4	4.9	4.9	4.6
Resistance¹⁾	R ₂₅	Ω	8.4	4.1	2.8	6.8	4.6	3.5
Inductance¹⁾	L	mH	37.1	18.5	12.4	33.0	22.4	16.0
Voltage constant	K _u	V _{eff} /(m/s)	28.1			53.4		
Motor constant	K _m	N/√W	13.7	19.6	23.7	28.9	35.2	40.6
Thermal resistance	R _{th}	°C/W	1.23	0.63	0.41	0.44	0.29	0.22
Thermal time constant	T _{th}	s	610	890	2,290	2,540	2,670	3,270
Thermal switch			1 × (3 PTC SNM 120 in series)					
Max. intermediate circuit voltage		V	600					
Pole pair pitch	2τ	mm	30					
Max. coil temperature	T _{max}	°C	120					
Repeatability		μm	Type A/K: ±1; type D/E/G/P: ±3					
Absolute precision		μm	Type A/K: ±2; type D/E/G/P: ±6					
Horizontal straightness		μm	±8/300 mm					
Vertical straightness		μm	±8/300 mm					
Max. speed		m/s	5.0					
Max. acceleration		m/s ²	50					
Moved mass		kg	3.1	4.4	6.2	6.4	8.3	11.0
Stroke length		mm	200 – 1300 (in 50-mm steps), 1400 – 2700 (in 100-mm steps)					

¹⁾ Measured between phase-phase

All values ±10 % at 25 °C ambient temperature

Precision axes and precision systems

LMSSA linear motor axis

6.4.1 Technical data for LMSSA-C (ironless)

Table 6.4 Technical data for LMSSA-C (ironless)						
	Symbol	Unit	18C100	18C200	20C100	20C200
Linear motor			LMC-EFC2	LMC-EFC4	LMC-B5	LMC-B8
Continuous force at T _{max}	F _c	N	75	150	91	145
Continuous current at T _{max}	I _c	A _{eff}	3.4	3.4	2.0	2.0
Peak force (for 1 sec.)	F _p	N	300	600	364	580
Peak current (for 1 sec.)	I _p	A _{eff}	13.6	13.6	8.0	8.0
Force constant	K _f	N/A _{eff}	22.6	44.6	45.4	72.5
Electrical time constant	K _e	ms	0.7	0.7	0.4	0.3
Resistance ¹⁾	R ₂₅	Ω	3.3	6.3	9.0	14.6
Inductance ¹⁾	L	mH	2.3	4.5	3.17	4.95
Voltage constant	K _u	V _{eff} /(m/s)	12.9	25.8	24.8	40.0
Motor constant	K _m	N/√W	9.9	14.4	12.4	15.5
Thermal resistance	R _{th}	°C/W	1.26	0.66	1.11	0.68
Thermal switch			3 PTC 120 °C			3 PTC 100 °C
Max. intermediate circuit voltage		VDC	330			
Pole pair pitch	2τ	mm	60			32
Max. coil temperature	T _{max}	°C	120			100
Repeatability		μm	Type A/K: ±1; type D/E/G/P: ±3			
Absolute precision		μm	Type A/K: ±2; type D/E/G/P: ±6			
Horizontal straightness		μm	±8/300 mm			
Vertical straightness		μm	±8/300 mm			
Max. speed		m/s	5.0			
Max. acceleration		m/s ²	50			
Moved mass		kg	3.0	5.0	4.2	6.0
Stroke length		mm	200 – 1300 (50-mm steps), 1400 – 2700 (100-mm steps)			

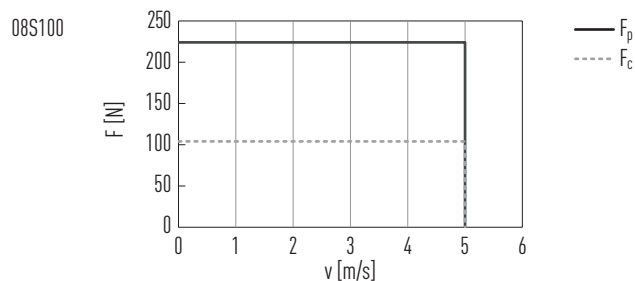
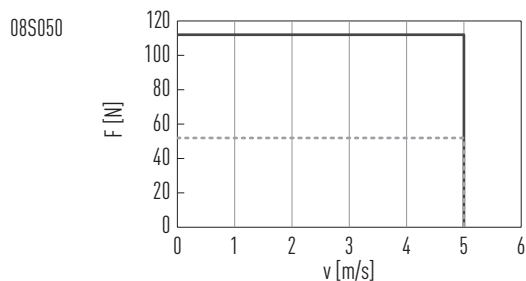
¹⁾ Measured between phase-phase

All values $\pm 10\%$ at 25 $^{\circ}C$ ambient temperature

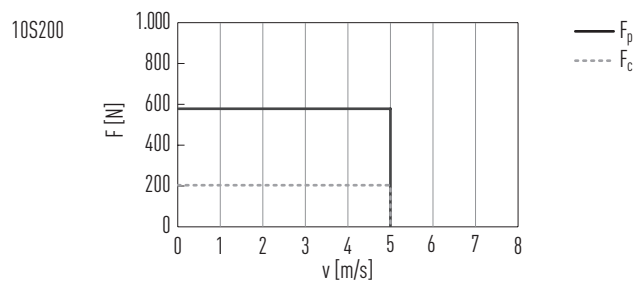
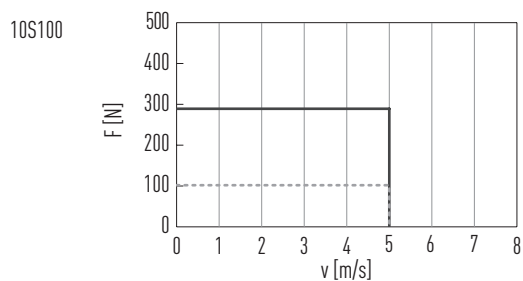
6.4.2 Characteristic curves for LMSSA-S (with iron core)

Force depending on speed (intermediate circuit voltage 600 VDC)

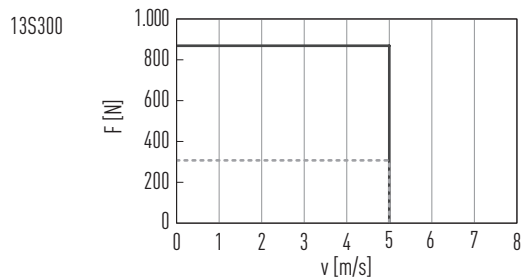
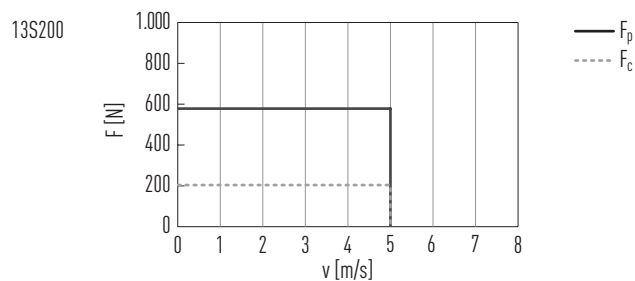
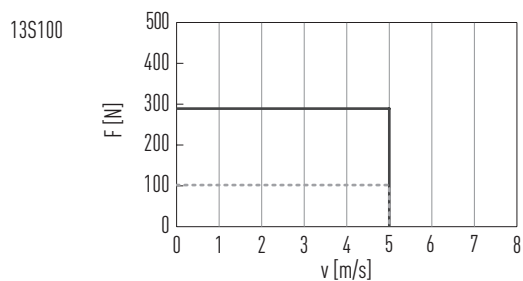
LMSSA-08



LMSSA-10



LMSSA-13

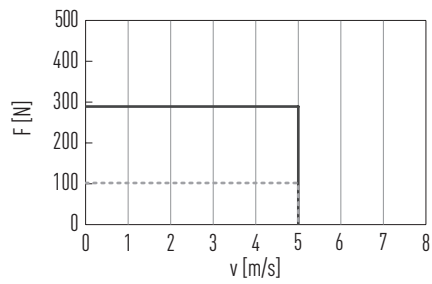


Precision axes and precision systems

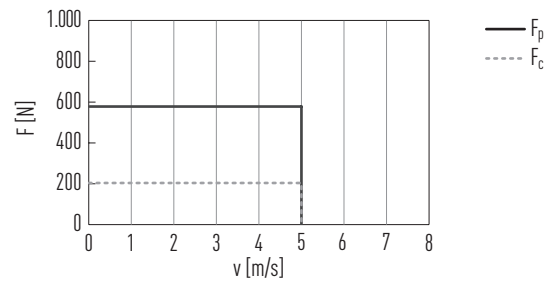
LMSSA linear motor axis

LMSSA-18

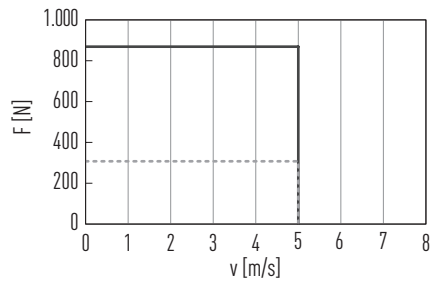
18S100



18S200

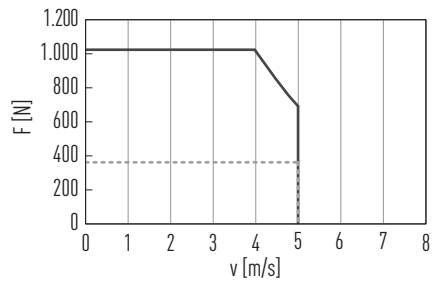


18S300

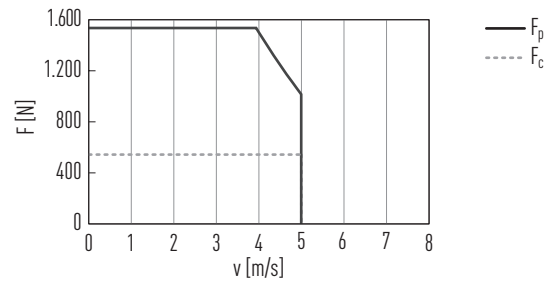


LMSSA-20

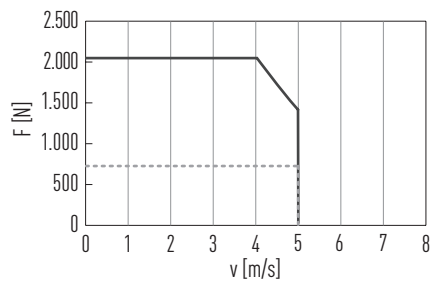
20S300



20S500



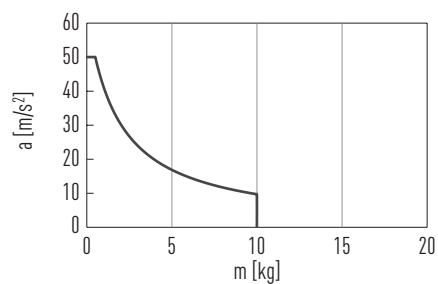
20S700



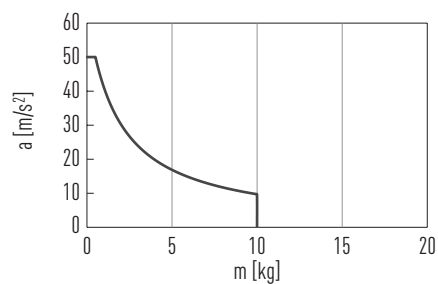
Acceleration depending on load capacity (intermediate circuit voltage 600 VDC)

LMSSA-08

08S050

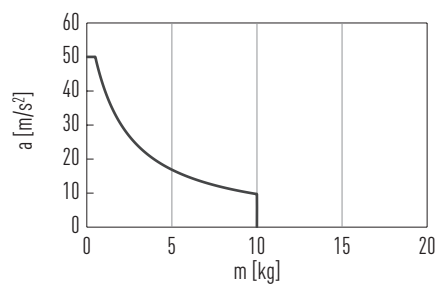


08S100

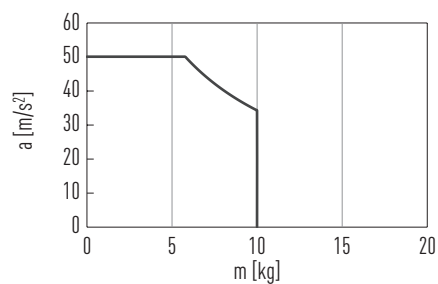


LMSSA-10

10S100

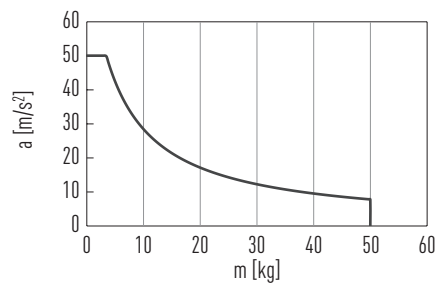


10S200

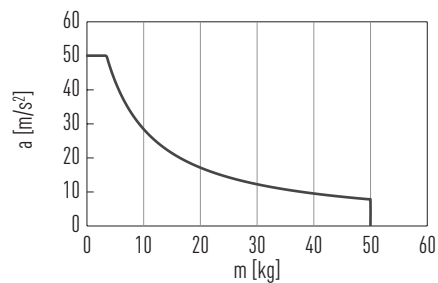


LMSSA-13

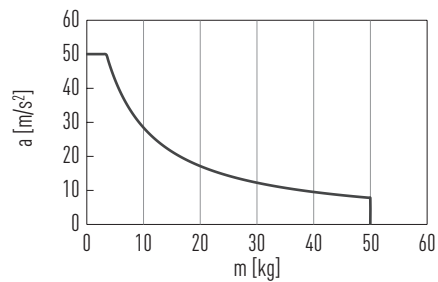
13S100



13S200



13S300

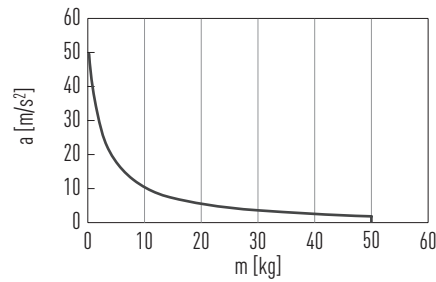


Precision axes and precision systems

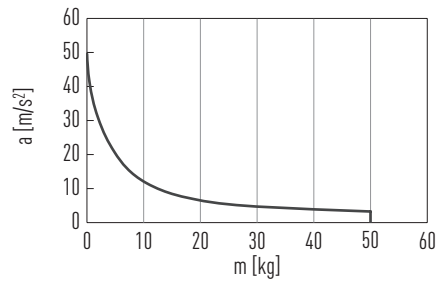
LMSSA linear motor axis

LMSSA-18

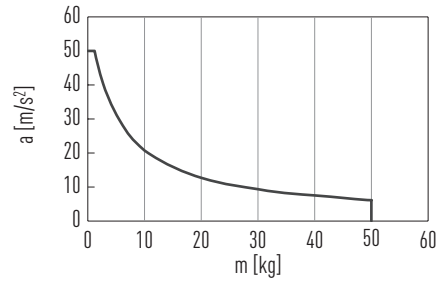
18S100



18S200

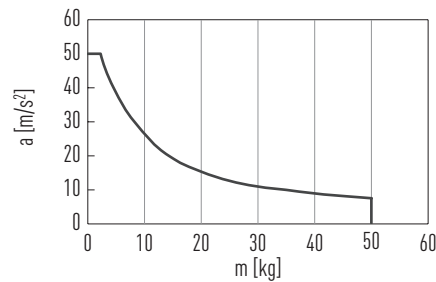


18S300

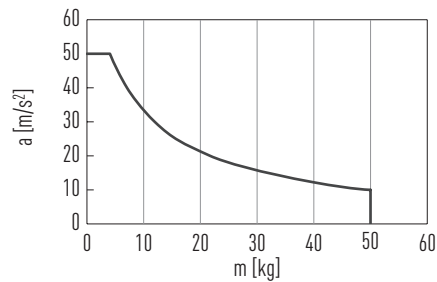


LMSSA-20

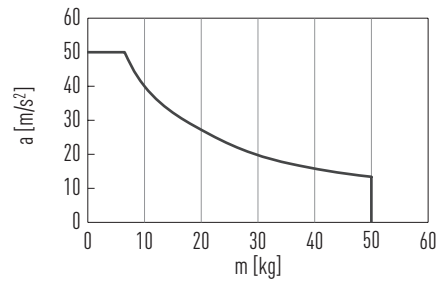
20S300



20S500

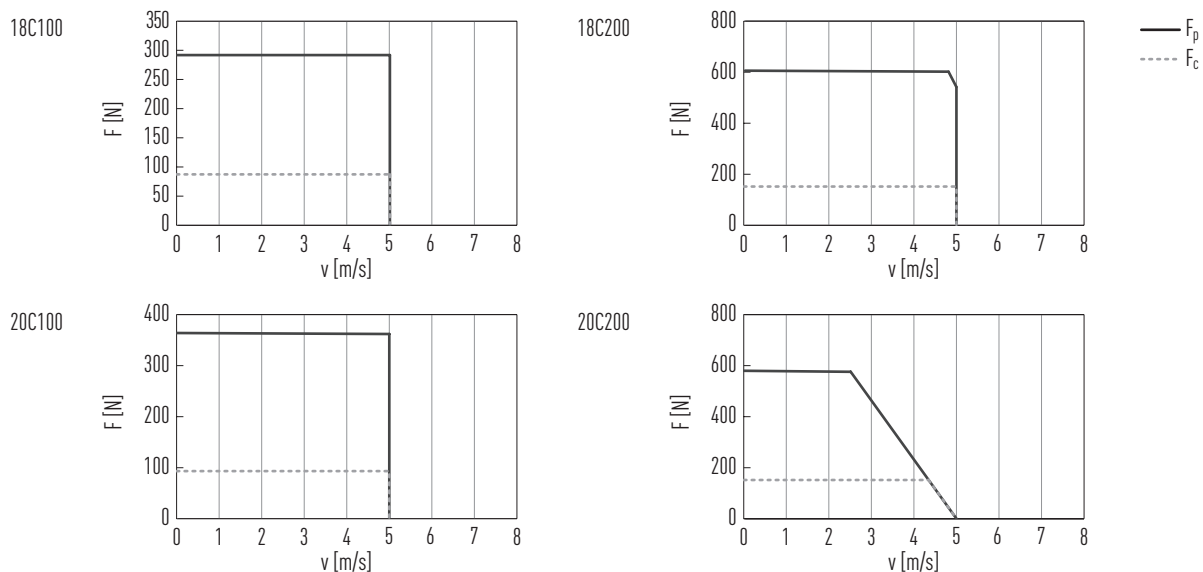


20S700

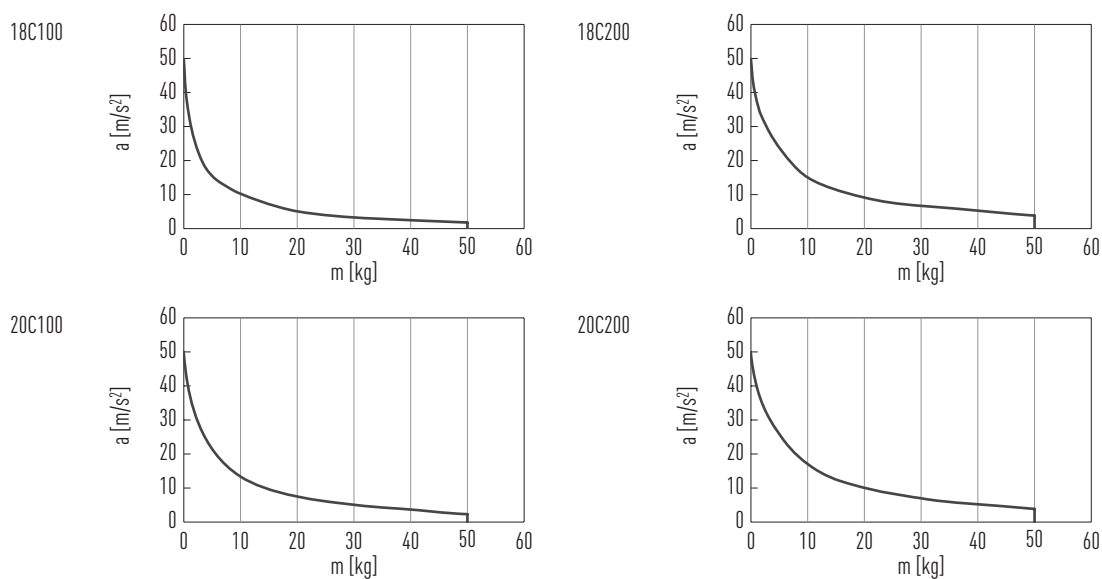


6.4.3 Characteristic curves for LMSSA-C (ironless)

Force depending on speed (intermediate circuit voltage: 325 VDC)



Acceleration depending on load capacity (intermediate circuit voltage: 325 VDC)

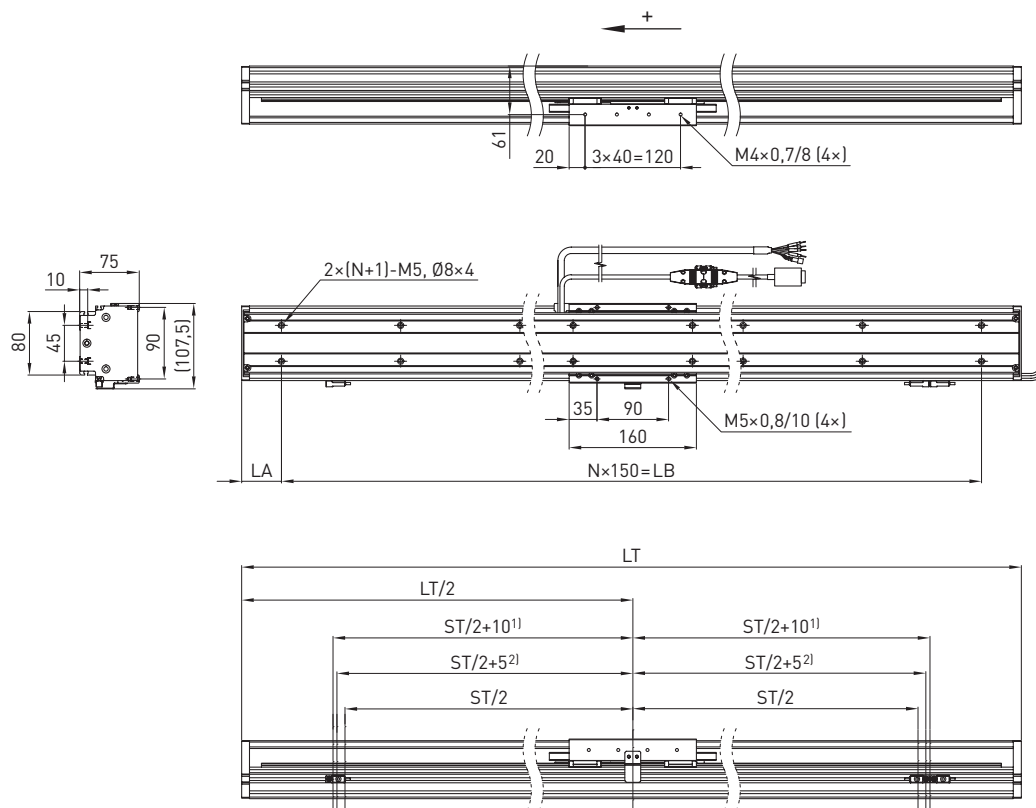


Precision axes and precision systems

LMSSA linear motor axis

6.4.4 Dimensions of LMSSA-08, 1 travel carriage

LMSSA-08S050, stroke length 100 – 1400 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.5 Dimensions of LMSSA-08S050, 1 travel carriage, stroke length 100 – 700 mm

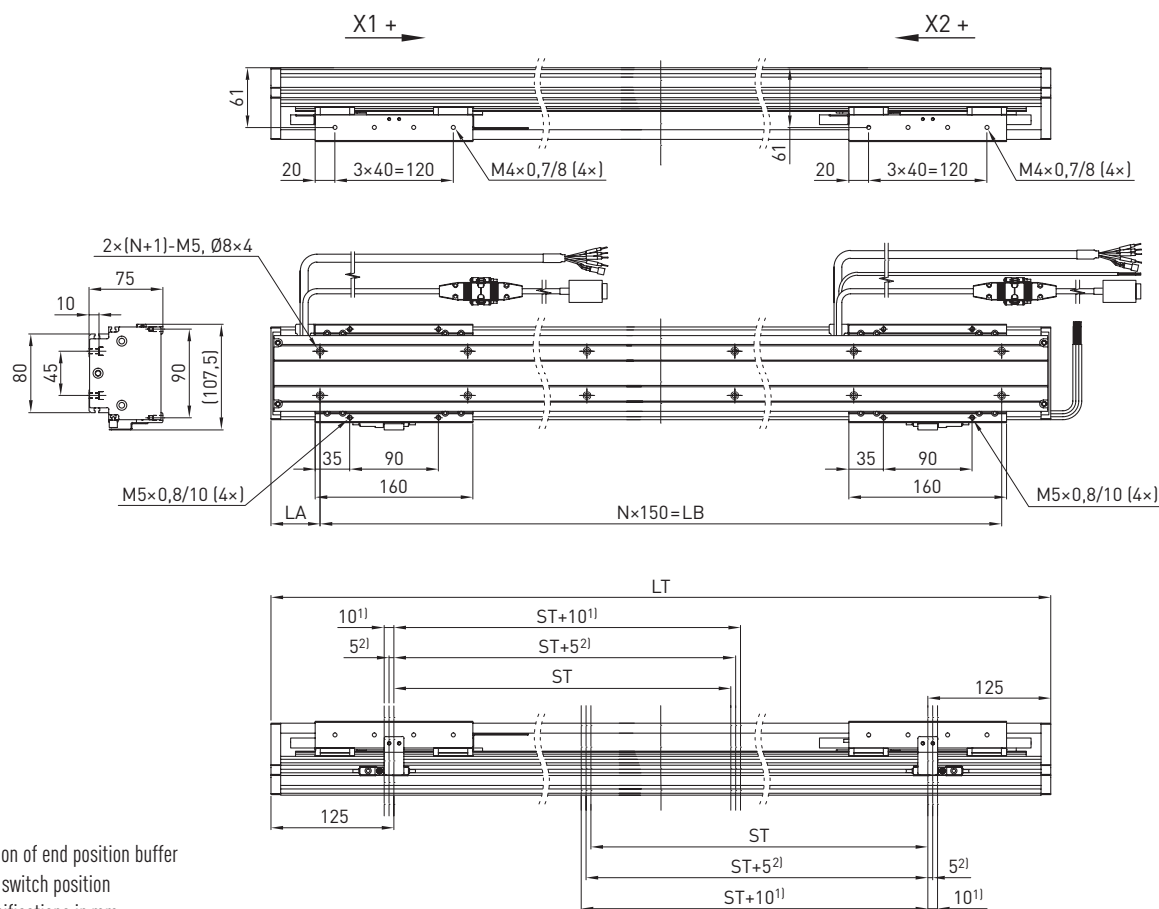
Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700
Total length LT	350	400	450	500	550	600	650	700	750	800	850	900	950
N	2	2	2	3	3	3	4	4	4	5	5	5	6
LA	25	50	75	25	50	75	25	50	75	25	50	75	25
LB	300	300	300	450	450	450	600	600	600	750	750	750	900
Weight [kg]	6.3	6.8	7.2	7.6	8.0	8.5	8.8	9.2	9.6	10.0	10.5	10.9	11.2

Table 6.6 Dimensions of LMSSA-08S050, 1 travel carriage, stroke length 750 – 1400 mm

Stroke length ST	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400
Total length LT	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,650
N	6	6	7	7	7	8	8	8	9	9	9	10	10
LA	50	75	25	50	75	25	50	75	25	50	75	25	75
LB	900	900	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500
Weight [kg]	11.6	12.1	12.5	12.9	13.3	13.6	14.1	14.5	14.9	15.3	15.8	16.1	16.9

6.4.5 Dimensions of LMSSA-08, 2 travel carriages

LMSSA-08S050, stroke length 100 – 1200 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.7 Dimensions of LMSSA-08S050, 2 travel carriages, stroke length 100 – 700 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700
Total length LT	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150
N	3	3	4	4	4	5	5	5	6	6	6	7	7
LA	50	75	25	50	75	25	50	75	25	50	75	25	50
LB	450	450	600	600	600	750	750	750	900	900	900	1,050	1,050
Weight [kg]	9.2	9.6	10.0	10.5	10.9	11.3	11.6	12.1	12.5	12.9	13.3	13.8	14.1

Table 6.8 Dimensions of LMSSA-08S050, 2 travel carriages, stroke length 750 – 1200 mm

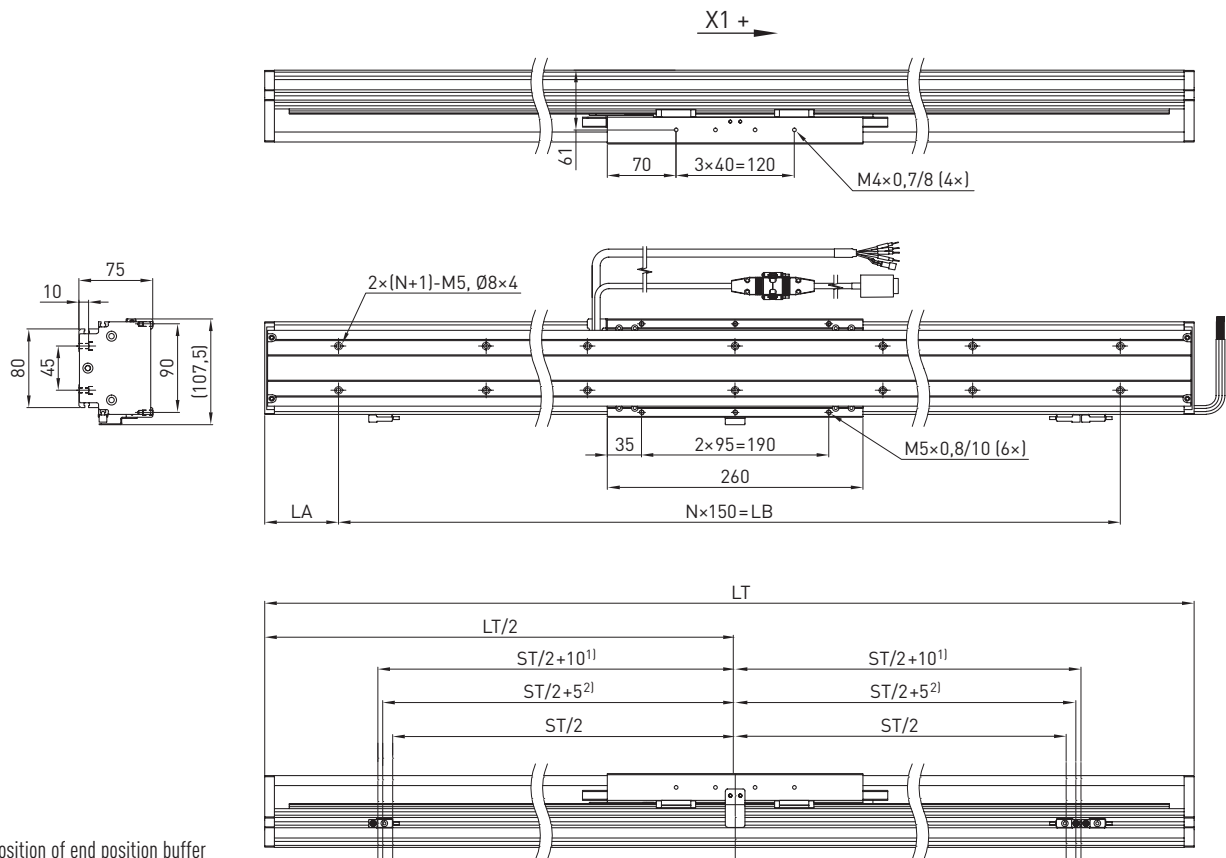
Stroke length ST	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200
Total length LT	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650
N	7	8	8	8	9	9	9	10	10	10
LA	75	25	50	75	25	50	75	25	50	75
LB	1,050	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500	1,500
Weight [kg]	14.5	14.9	15.3	15.8	16.2	16.5	16.9	17.4	17.8	18.2

Precision axes and precision systems

LMSSA linear motor axis

6.4.6 Dimensions of LMSSA-08, 1 travel carriage

LMSSA-08S100, stroke length 100 – 1300 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.9 Dimensions of LMSSA-08S100, 1 travel carriage, stroke length 100 – 700 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700
Total length LT	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050
N	2	3	3	3	4	4	4	5	5	5	6	6	6
LA	75	25	50	75	25	50	75	25	50	75	25	50	75
LB	300	450	450	450	600	600	600	750	750	750	900	900	900
Weight [kg]	8.1	8.5	8.9	9.4	9.8	10.1	10.5	10.9	11.4	11.8	12.2	12.5	13.0

Table 6.10 Dimensions of LMSSA-08S100, 1 travel carriage, stroke length 750 – 1300 mm

Stroke length ST	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300
Total length LT	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650
N	7	7	7	8	8	8	9	9	9	10	10	10
LA	25	50	75	25	50	75	25	50	75	25	50	75
LB	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500	1,500
Weight [kg]	13.4	13.8	14.2	14.7	15.0	15.4	15.8	16.2	16.7	17.1	17.4	17.8

6.4.7 Dimensions of LMSSA-08, 2 travel carriages

LMSSA-08S100, stroke length 100 – 1000 mm

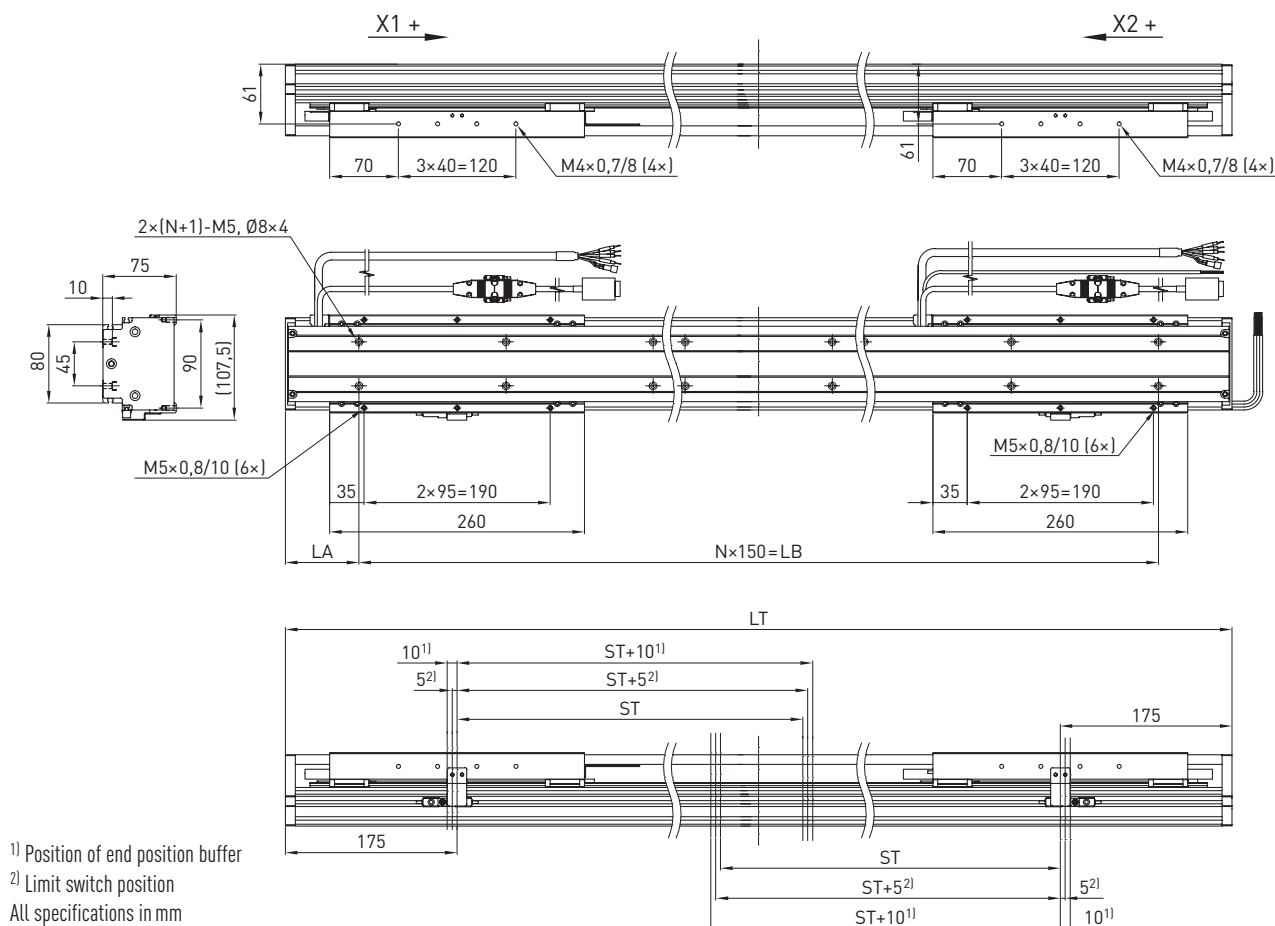


Table 6.11 Dimensions of LMSSA-08S100, 2 travel carriages, stroke length 100 – 550 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550
Total length LT	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200
N	4	5	5	5	6	6	6	7	7	7
LA	75	25	50	75	25	50	75	25	50	75
LB	600	750	750	750	900	900	900	1,050	1,050	1,050
Weight [kg]	12.5	12.9	13.3	13.7	14.0	14.5	14.9	15.3	15.8	16.2

Table 6.12 Dimensions of LMSSA-08S100, 2 travel carriages, stroke length 600 – 1000 mm

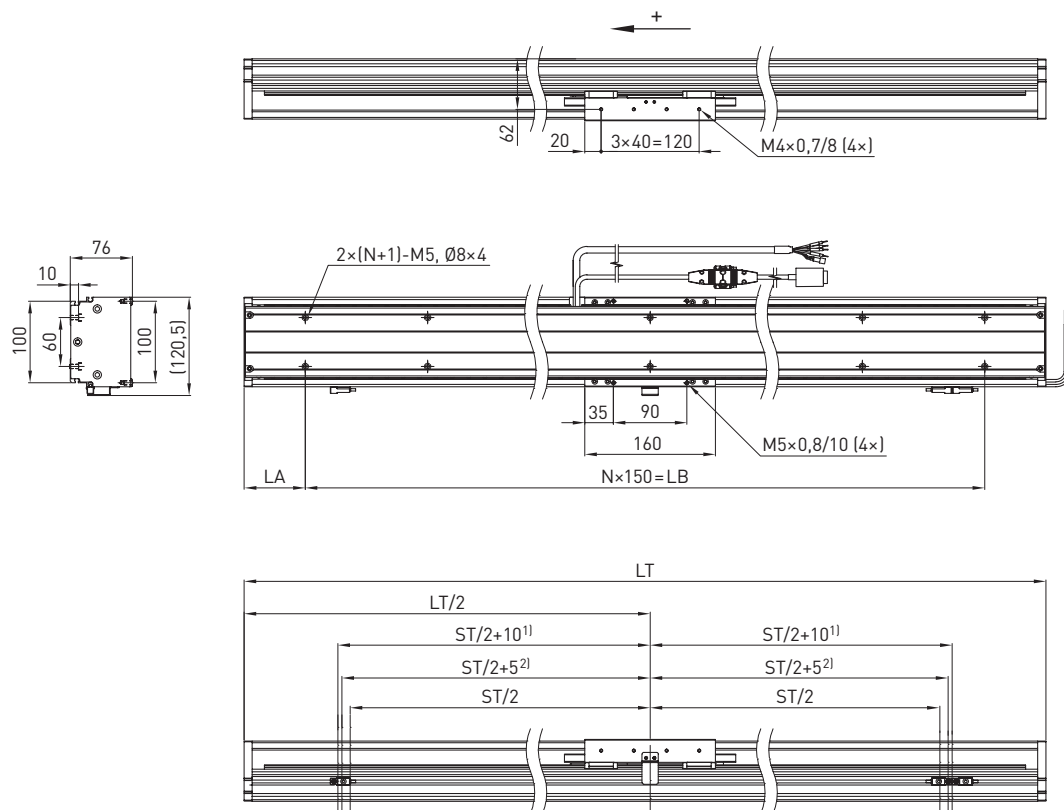
Stroke length ST	600	650	700	750	800	850	900	950	1,000
Total length LT	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650
N	8	8	8	9	9	9	10	10	10
LA	25	50	75	25	50	75	25	50	75
LB	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500	1,500
Weight [kg]	16.5	16.9	17.3	17.8	18.2	18.6	18.9	19.3	19.8

Precision axes and precision systems

LMSSA linear motor axis

6.4.8 Dimensions of LMSSA-10, 1 travel carriage

LMSSA-10S100, stroke length 100 – 1400 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.13 Dimensions of LMSSA-10S100, 1 travel carriage, stroke length 100 – 700 mm

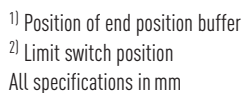
Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700
Total length LT	350	400	450	500	550	600	650	700	750	800	850	900	950
N	2	2	2	3	3	3	4	4	4	5	5	5	6
LA	25	50	75	25	50	75	25	50	75	25	50	75	25
LB	300	300	300	450	450	450	600	600	600	750	750	750	900
Weight [kg]	7.4	7.9	8.5	8.8	9.3	9.9	10.4	10.9	11.5	11.8	12.3	12.9	13.4

Table 6.14 Dimensions of LMSSA-10S100, 1 travel carriage, stroke length 750 – 1400 mm

Stroke length ST	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400
Total length LT	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,650
N	6	6	7	7	7	8	8	8	9	9	9	10	10
LA	50	75	25	50	75	25	50	75	25	50	75	25	75
LB	900	900	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500
Weight [kg]	13.9	14.5	14.8	15.3	15.9	16.4	16.9	17.5	17.8	18.3	18.9	19.4	20.5

LMSSA linear motor axis

LMSSA-10S200, stroke length 100 – 1300 mm

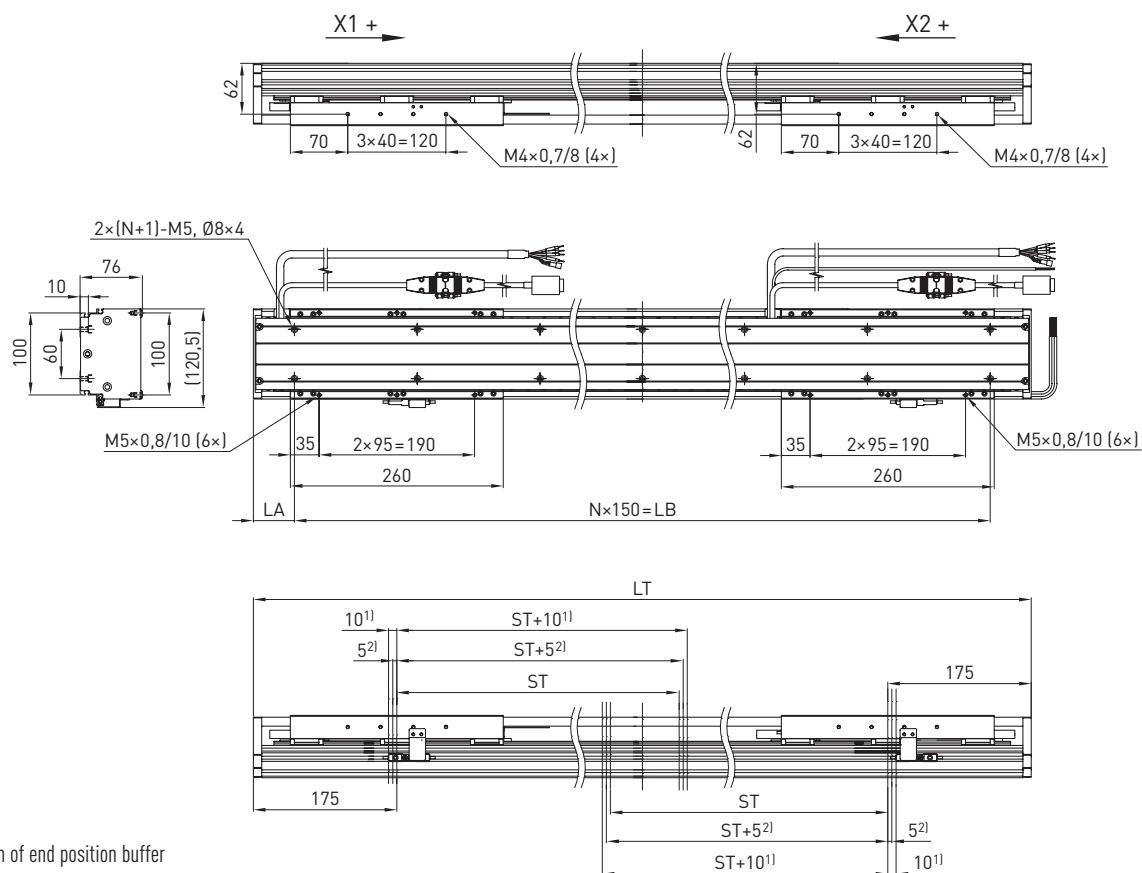


Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700
Total length LT	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050
N	2	3	3	3	4	4	4	5	5	5	6	6	6
LA	75	25	50	75	25	50	75	25	50	75	25	50	75
LB	300	450	450	450	600	600	600	750	750	750	900	900	900
Weight [kg]	9.6	10.1	10.5	11.0	11.5	12.0	12.6	13.1	13.4	14.0	14,5	15.0	15.6

Stroke length ST	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300
Total length LT	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650
N	7	7	7	8	8	8	9	9	9	10	10	10
LA	25	50	75	25	50	75	25	50	75	25	50	75
LB	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500	1,500
Weight [kg]	16.1	16.4	17.0	17.5	18.0	18.6	19.1	19.4	20.0	20.5	21.0	21.6

6.4.11 Dimensions of LMSSA-10, 2 travel carriages

LMSSA-10S200, stroke length 100 – 1000 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.19 Dimensions of LMSSA-10S200, 2 travel carriages, stroke length 100 – 550 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550
Total length LT	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200
N	4	5	5	5	6	6	6	7	7	7
LA	75	25	50	75	25	50	75	25	50	75
LB	600	750	750	750	900	900	900	1,050	1,050	1,050
Weight [kg]	14.9	15.5	16.0	16.5	17.0	17.4	17.9	18.5	19.0	19.5

Table 6.20 Dimensions of LMSSA-10S200, 2 travel carriages, stroke length 600 – 1000 mm

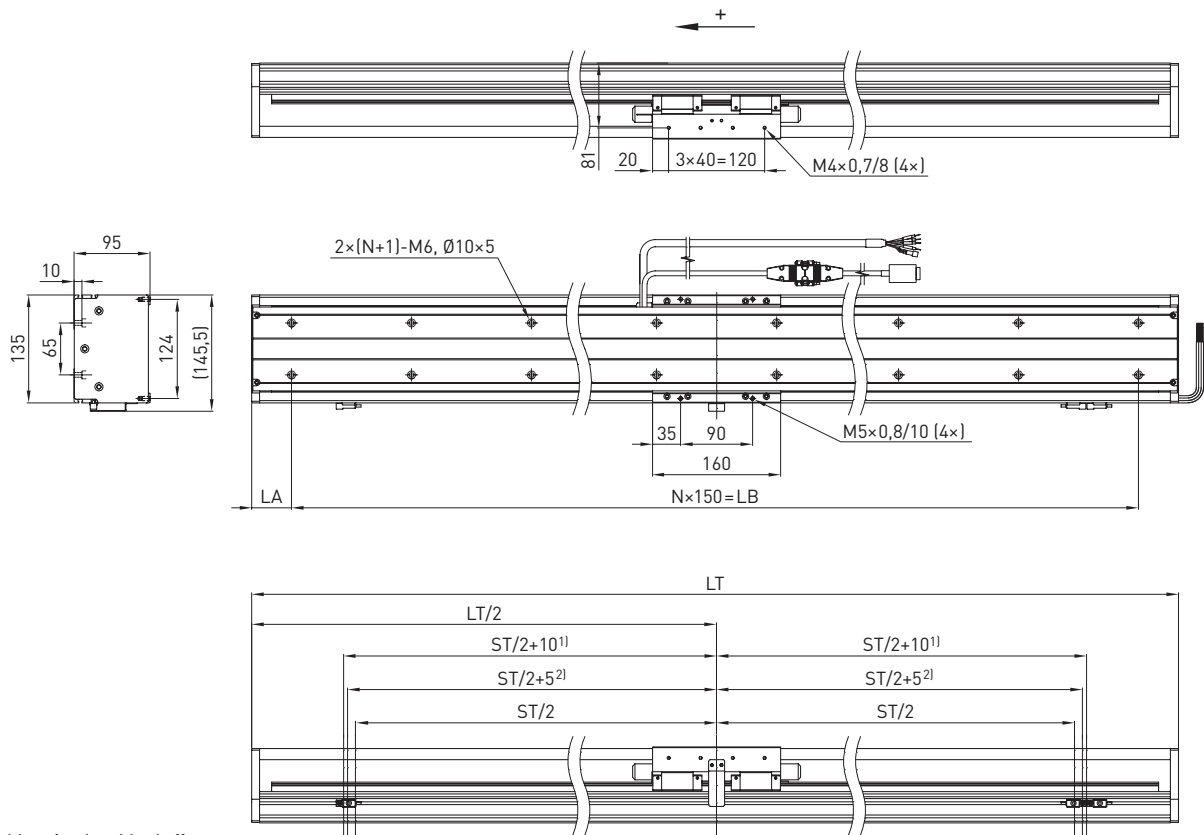
Stroke length ST	600	650	700	750	800	850	900	950	1,000
Total length LT	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650
N	8	8	8	9	9	9	10	10	10
LA	25	50	75	25	50	75	25	50	75
LB	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500	1,500
Weight [kg]	20.0	20.4	20.9	21.5	22.0	22.5	23.0	23.4	23.9

Precision axes and precision systems

LMSSA linear motor axis

6.4.12 Dimensions of LMSSA-13, 1 travel carriage

LMSSA-13S100, stroke length 100 – 2700 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.21 Dimensions of LMSSA-13S100, 1 travel carriage, stroke length 100 – 1100 mm

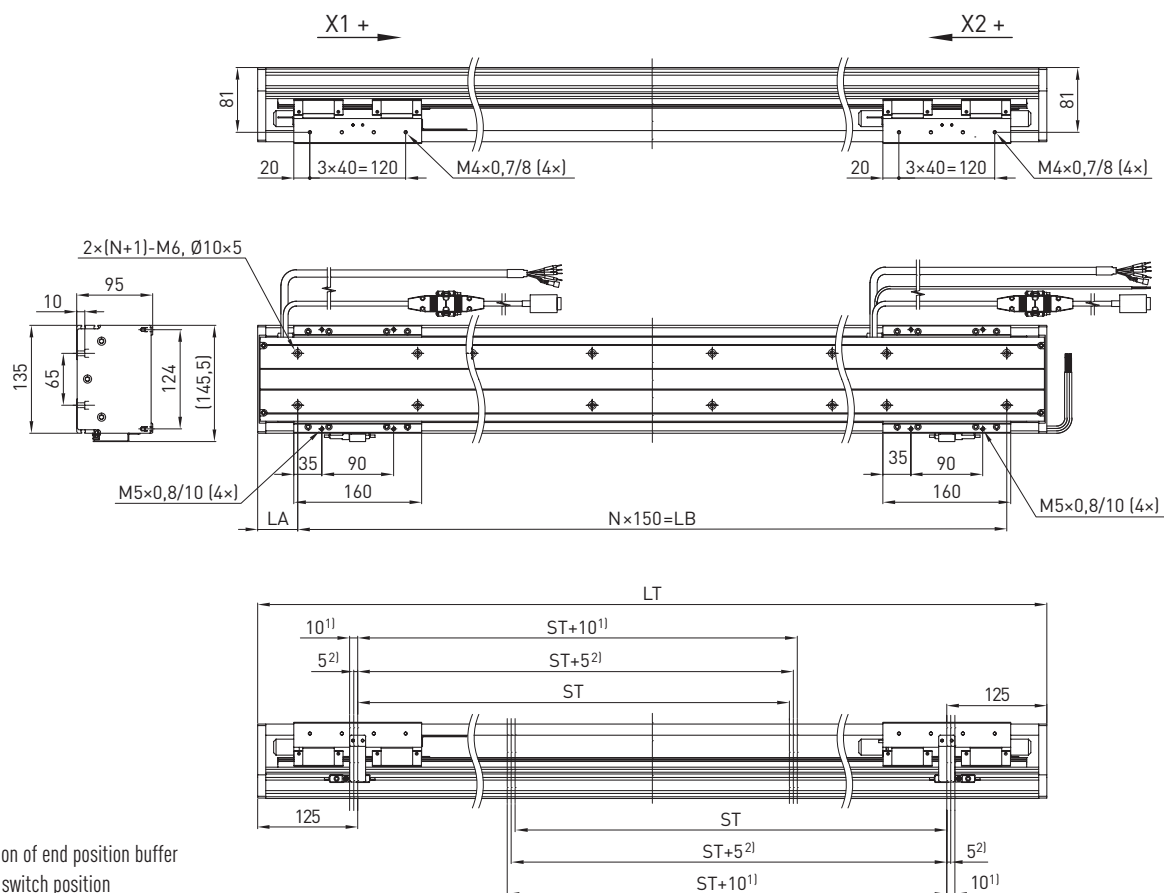
Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100
Total length LT	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350
N	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8
LA	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75
LB	300	300	300	450	450	450	600	600	600	750	750	750	900	900	900	1,050	1,050	1,050	1,200	1,200	1,200
Weight [kg]	10.6	11.4	12.2	12.9	13.7	14.5	15.3	16.1	16.9	17.6	18.4	19.2	20.0	20.9	21.7	22.3	23.1	24.0	24.8	25.6	26.4

Table 6.22 Dimensions of LMSSA-13S100, 1 travel carriage, stroke length 1150 – 2700 mm

Stroke length ST	1,150	1,200	1,250	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700
Total length LT	1,400	1,450	1,500	1,550	1,650	1,750	1,850	1,950	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N	9	9	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19
LA	25	50	75	25	50	75	25	50	75	25	75	25	75	25	50	75	25	50
LB	1,350	1,350	1,350	1,500	1,500	1,650	1,800	1,800	1,950	2,100	2,100	2,250	2,400	2,400	2,550	2,700	2,700	2,850
Weight [kg]	27.1	27.9	28.7	29.5	31.3	32.6	34.2	35.9	37.3	39.0	40.6	42.1	43.7	45.3	46.8	48.4	50.1	51.5

6.4.13 Dimensions of LMSSA-13, 2 travel carriages

LMSSA-13S100, stroke length 100 – 2500 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.23 Dimensions of LMSSA-13S100, 2 travel carriages, stroke length 100 – 1050 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050
Total length LT	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500
N	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9
LA	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75
LB	450	450	600	600	600	750	750	750	900	900	900	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350	1,350
Weight [kg]	16.1	16.9	17.8	18.4	19.2	20.0	20.9	21.7	22.5	23.1	24.0	24.8	25.6	26.4	27.2	27.9	28.7	29.5	30.3	31.1

Table 6.24 Dimensions of LMSSA-13S100, 2 travel carriages, stroke length 1100 – 2500 mm

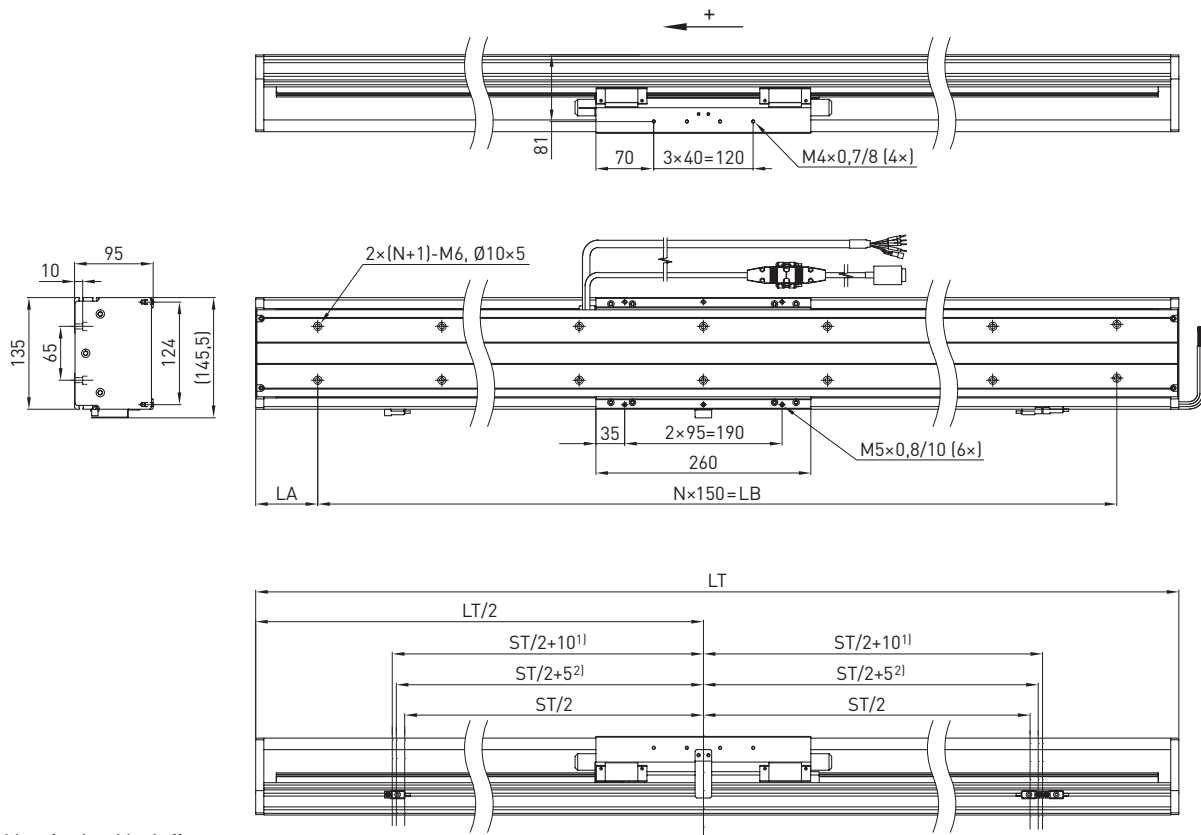
Stroke length ST	1,100	1,150	1,200	1,250	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500
Total length LT	1,550	1,600	1,650	1,700	1,750	1,850	1,950	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N	10	10	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19
LA	25	50	75	25	50	75	25	50	75	25	75	25	75	25	50	75	50
LB	1,500	1,500	1,500	1,650	1,650	1,800	1,800	1,950	2,100	2,100	2,250	2,400	2,400	2,550	2,700	2,700	2,850
Weight [kg]	32.0	32.6	33.4	34.2	35.1	36.7	38.2	39.8	41.4	42.9	44.5	46.2	47.6	49.3	50.9	52.4	54.0

Precision axes and precision systems

LMSSA linear motor axis

6.4.14 Dimensions of LMSSA-13, 1 travel carriage

LMSSA-13S200, stroke length 100 – 2600 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.25 Dimensions of LMSSA-13S200, 1 travel carriage, stroke length 100 – 1050 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050
Total length LT	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400
N	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9
LA	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25
LB	300	450	450	450	600	600	600	750	750	750	900	900	900	1,050	1,050	1,050	1,200	1,200	1,200	1,350
Weight [kg]	13.5	14.3	15.0	15.8	16.6	17.4	18.3	19.1	19.7	20.5	21.4	22.2	23.0	23.8	24.5	25.3	26.1	26.9	27.7	28.5

Table 6.26 Dimensions of LMSSA-13S200, 1 travel carriage, stroke length 1100 – 2600 mm

Stroke length ST	1,100	1,150	1,200	1,250	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600
Total length LT	1,450	1,500	1,550	1,600	1,650	1,750	1,850	1,950	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N	9	9	10	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19
LA	50	75	25	50	75	50	25	75	50	25	75	50	25	75	50	25	75	50
LB	1,350	1,350	1,500	1,500	1,500	1,650	1,800	1,800	1,950	2,100	2,100	2,250	2,400	2,400	2,550	2,700	2,700	2,850
Weight [kg]	29.2	30.0	30.8	31.6	32.4	33.9	35.5	37.2	38.6	40.3	41.9	43.4	45.0	46.6	48.1	49.7	51.4	52.8

6.4.15 Dimensions of LMSSA-13, 2 travel carriages

LMSSA-13S200, stroke length 100 – 2300 mm

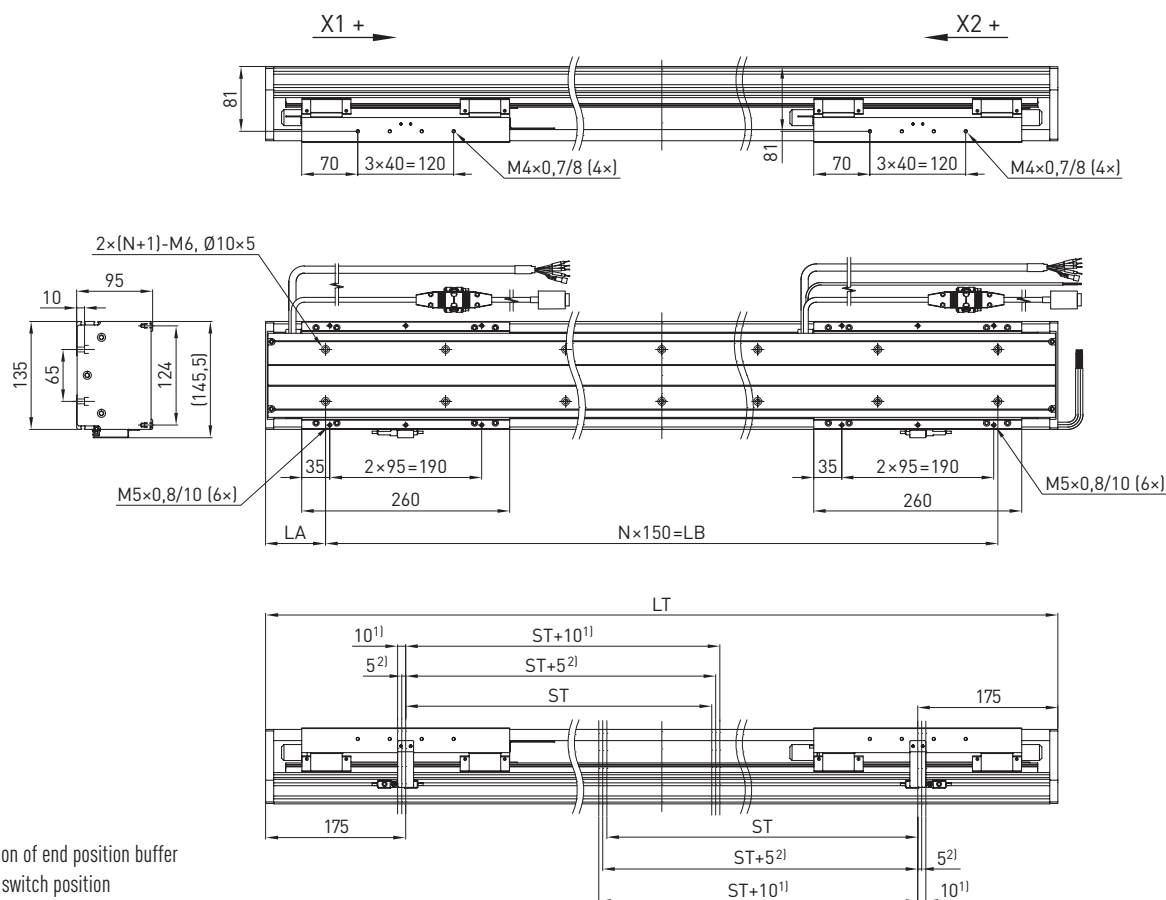


Table 6.27 Dimensions of LMSSA-13S200, 2 travel carriages, stroke length 100 – 950 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
Total length LT	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600
N	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10
LA	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50
LB	600	750	750	750	900	900	900	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500
Weight [kg]	21.8	22.6	23.5	24.3	25.1	25.7	26.6	27.4	28.2	29.0	29.8	30.5	31.3	32.1	32.9	33.7	34.6	35.2

Table 6.28 Dimensions of LMSSA-13S200, 2 travel carriages, stroke length 1000 – 2300 mm

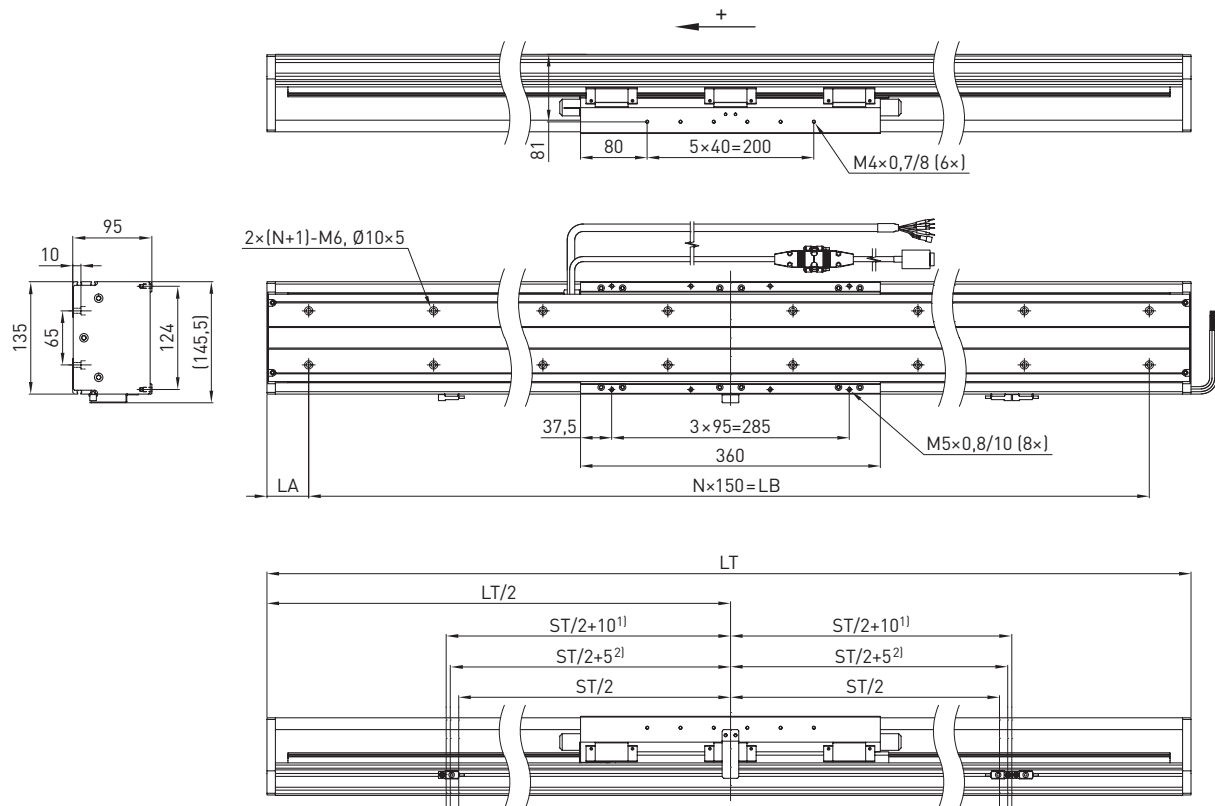
Stroke length ST	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300
Total length LT	1,650	1,700	1,750	1,800	1,850	1,900	1,950	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N	10	11	11	11	12	12	12	13	14	14	15	16	16	17	18	18	19
LA	75	25	50	75	25	50	75	50	25	75	50	25	75	50	25	75	50
LB	1,500	1,650	1,650	1,650	1,800	1,800	1,800	1,950	2,100	2,100	2,250	2,400	2,400	2,550	2,700	2,700	2,850
Weight [kg]	36.0	36.8	37.7	38.5	39.3	40.1	41.1	42.7	44.2	45.8	47.4	48.9	50.6	52.2	53.7	55.3	56.9

Precision axes and precision systems

LMSSA linear motor axis

6.4.16 Dimensions of LMSSA-13, 1 travel carriage

LMSSA-13S300, stroke length 100 – 2500 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.29 Dimensions of LMSSA-13S300, 1 travel carriage, stroke length 100 – 1000 mm

Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000
Total length LT	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450
N	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9
LA	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50
LB	450	450	600	600	600	750	750	750	900	900	900	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350
Weight [kg]	16.7	17.5	18.3	19.1	20.0	20.8	21.4	22.2	23.1	23.9	24.7	25.5	26.2	27.0	27.8	28.6	29.4	30.2	30.9

Table 6.30 Dimensions of LMSSA-13S300, 1 travel carriage, stroke length 1050 – 2500 mm

Stroke length ST	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500
Total length LT	1,500	1,550	1,600	1,650	1,700	1,750	1,850	1,950	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N	9	10	10	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19
LA	75	25	50	75	25	50	25	75	50	25	75	50	25	75	50	25	75	50
LB	1,350	1,500	1,500	1,500	1,650	1,650	1,800	1,800	1,950	2,100	2,100	2,250	2,400	2,400	2,550	2,700	2,700	2,850
Weight [kg]	31.7	32.5	33.3	34.1	35.0	35.6	37.2	38.9	40.3	42.0	43.6	45.1	46.7	48.3	49.8	51.4	53.1	54.5

6.4.17 Dimensions of LMSSA-13, 2 travel carriages

LMSSA-13S300, stroke length 100 – 2100 mm

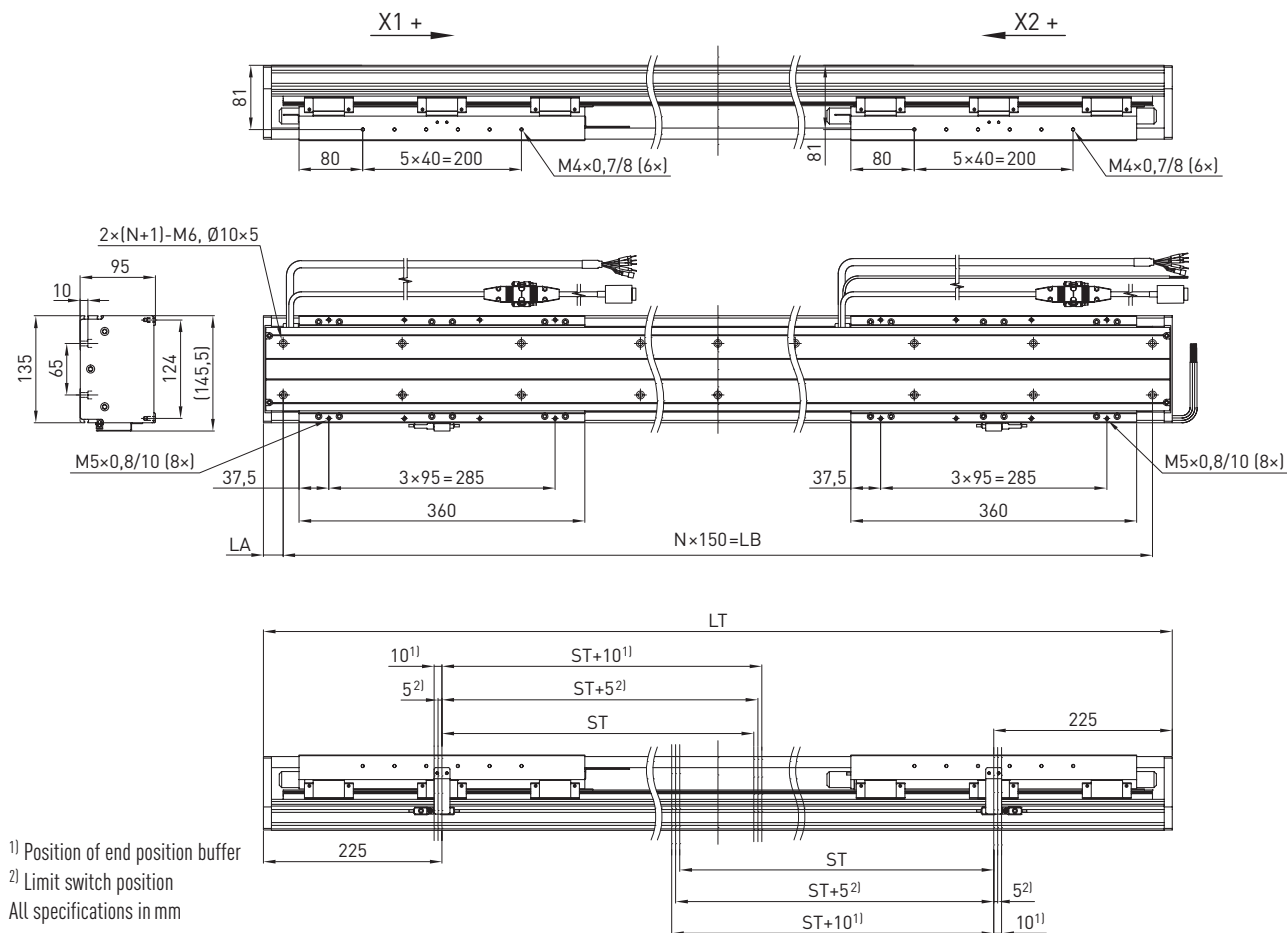


Table 6.31 Dimensions of LMSSA-13S300, 2 travel carriages, stroke length 100 – 900 mm

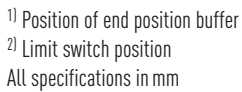
Stroke length ST	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
Total length LT	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650	1,700	1,750
N	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11
LA	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50
LB	900	900	900	1,050	1,050	1,050	1,200	1,200	1,200	1,350	1,350	1,350	1,500	1,500	1,500	1,650	1,650
Weight [kg]	31.7	32.5	33.3	34.2	35.0	35.9	36.5	37.4	38.2	39.1	39.9	40.7	41.4	42.2	43.1	43.9	44.8

Table 6.32 Dimensions of LMSSA-13S300, 2 travel carriages, stroke length 950 – 2100 mm

Stroke length ST	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100
Total length LT	1,800	1,850	1,900	1,950	2,000	2,050	2,100	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N	11	12	12	12	13	13	13	14	14	15	16	16	17	18	18	19
LA	75	25	50	75	25	50	75	25	75	50	25	75	50	25	75	50
LB	1,650	1,800	1,800	1,800	1,950	1,950	1,950	2,100	2,100	2,250	2,400	2,550	2,700	2,700	2,700	2,850
Weight [kg]	45.6	46.3	47.1	48.0	48.8	49.6	50.5	51.2	52.8	54.5	56.0	57.7	59.4	60.9	62.6	64.3

LMSSA linear motor axis

LMSSA-18S100, LMSSA-18C100, stroke length 200 – 1500 mm



Stroke length ST		200	250	300	350	400	450	500	550	600	650	700	750	800
Total length LT		490	540	590	640	690	740	790	840	890	940	990	1,040	1,090
N		5	5	7	7	7	7	7	9	9	9	9	9	11
LA		424	474	524	574	624	674	724	774	824	874	924	974	1,024
LB		125	150	55	80	105	130	155	60	85	110	135	160	65
LC		240	240	480	480	480	480	480	720	720	720	720	720	960
A		423	473	523	573	623	673	723	773	823	873	923	973	1,023
B		—	—	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	18S100	12.0	12.9	13.8	14.7	15.6	16.5	17.4	18.3	19.2	20.1	21.0	21.9	22.8
	18C100	15.9	17.0	18.1	19.2	20.3	21.4	22.5	23.7	24.8	25.9	27.0	28.1	29.2

Stroke length ST [mm]		850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500
Total length LT [mm]		1,140	1,190	1,240	1,290	1,340	1,390	1,440	1,490	1,540	1,590	1,690	1,790
N [mm]		11	11	13	13	13	13	13	13	15	15	15	17
LA [mm]		1,074	1,124	1,174	1,224	1,274	1,324	1,374	1,424	1,474	1,524	1,624	1,723
LB [mm]		90	115	20	45	70	95	120	145	50	75	125	55
LC [mm]		960	960	1,200	1,200	1,200	1,200	1,200	1,200	1,440	1,440	1,440	1,680
A [mm]		1,073	1,123	1,173	1,223	1,273	1,323	1,373	1,423	1,473	1,523	1,623	1,723
B [mm]		—	—	—	—	—	—	—	—	360	360	360	600
Weight [kg]	18S100	23.7	24.6	25.5	26.4	27.3	28.2	29.1	30.0	30.9	31.8	33.6	35.4
	18C100	30.3	31.4	32.6	33.7	34.8	35.9	37.0	38.1	39.2	40.3	42.6	44.8

Precision axes and precision systems

LMSSA linear motor axis

6.4.20 Dimensions of LMSSA-18, 2 travel carriages

LMSSA-18S100, LMSSA-18C100, stroke length 230 – 1280 mm

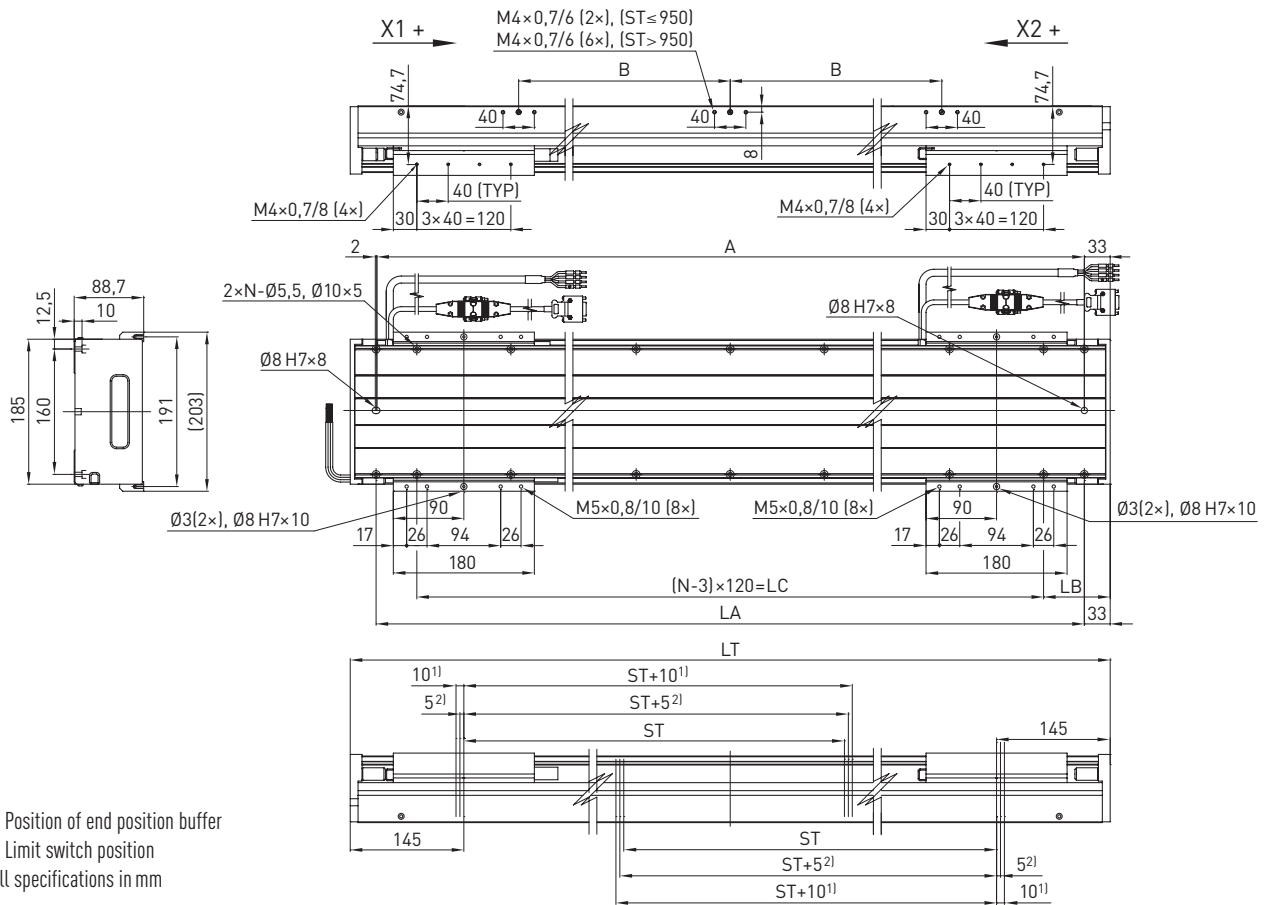


Table 6.36 Dimensions of LMSSA-18S100, -18C100, 2 travel carriages, stroke length 230 – 730 mm

Stroke length ST [mm]	230	280	330	380	430	480	530	580	630	680	730
Total length LT [mm]	740	790	840	890	940	990	1,040	1,090	1,140	1,190	1,240
N [mm]	7	7	9	9	9	9	9	11	11	11	13
LA [mm]	674	724	774	824	874	924	974	1,024	1,074	1,124	1,174
LB [mm]	130	155	60	85	110	135	160	65	90	115	20
LC [mm]	480	480	720	720	720	720	720	960	960	960	1,200
A [mm]	673	723	773	823	873	923	973	1,023	1,073	1,123	1,173
B [mm]	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	18S100	19.4	20.3	21.2	22.1	23.0	23.9	24.8	25.7	26.6	27.5
	18C100	24.1	25.2	26.3	27.5	28.6	29.7	30.8	31.9	33.0	34.1

Table 6.37 Dimensions of LMSSA-18S100, -18C100, 2 travel carriages, stroke length 780 – 1280 mm

Stroke length ST [mm]	780	830	880	930	980	1,030	1,080	1,130	1,180	1,230	1,280
Total length LT [mm]	1,290	1,340	1,390	1,440	1,490	1,540	1,590	1,640	1,690	1,740	1,790
N [mm]	13	13	13	13	13	15	15	15	15	15	17
LA [mm]	1,224	1,274	1,324	1,374	1,424	1,474	1,524	1,574	1,624	1,674	1,724
LB [mm]	45	70	95	120	145	50	75	100	125	150	55
LC [mm]	1,200	1,200	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,440	1,680
A [mm]	1,223	1,273	1,323	1,373	1,423	1,473	1,523	1,573	1,623	1,673	1,723
B [mm]	—	—	—	—	—	—	360	360	360	600	600
Weight [kg]	18S100	29.3	30.2	31.1	32.0	32.9	33.8	34.7	35.6	36.5	37.4
	18C100	36.3	37.5	38.6	39.7	40.8	41.9	43.0	44.1	45.2	46.3

6.4.21 Dimensions of LMSSA-18, 2 travel carriages

LMSSA-18S100, LMSSA-18C100, stroke length 1330 – 2430 mm

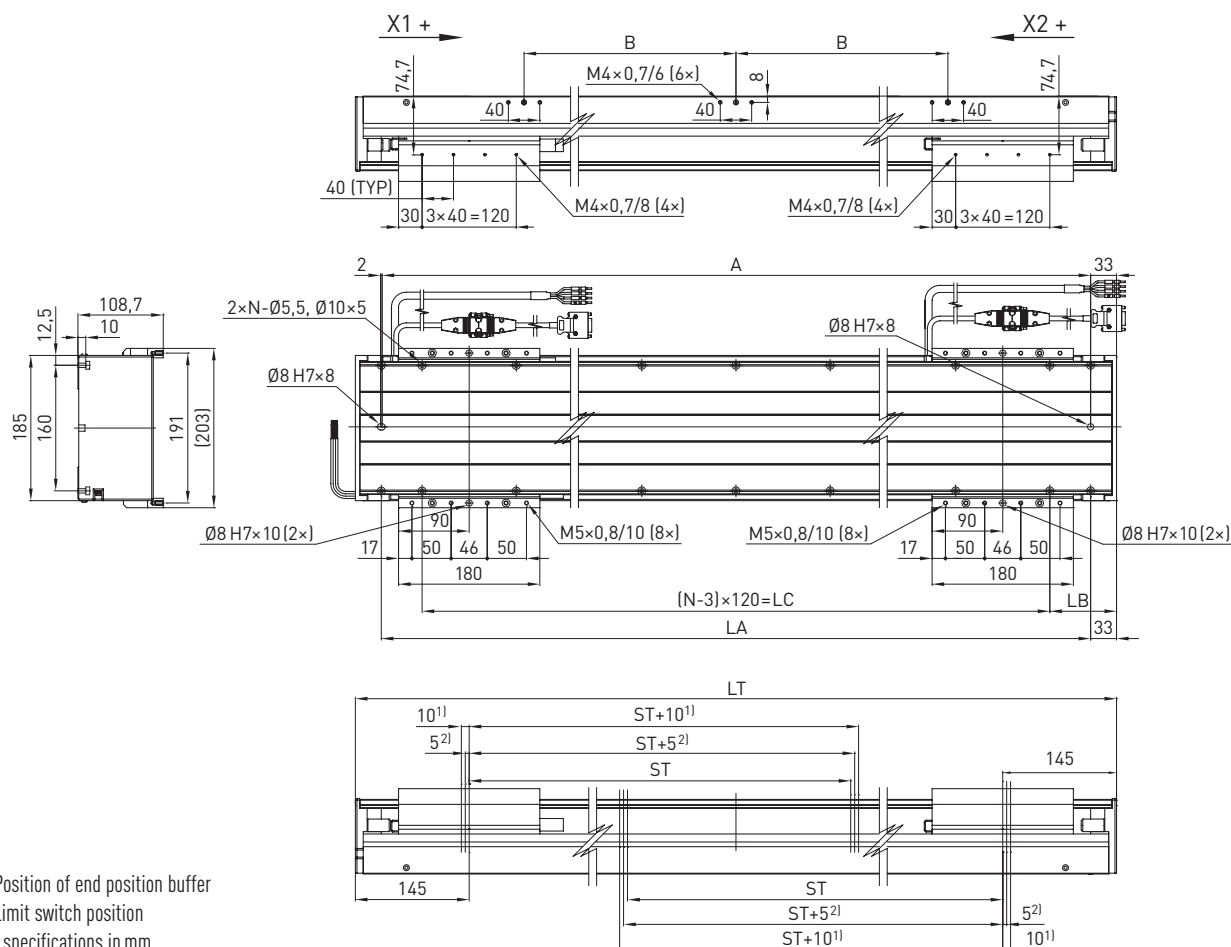


Table 6.38 Dimensions of LMSSA-18S100, -18C100, 2 travel carriages, stroke length 1330 – 2430 mm

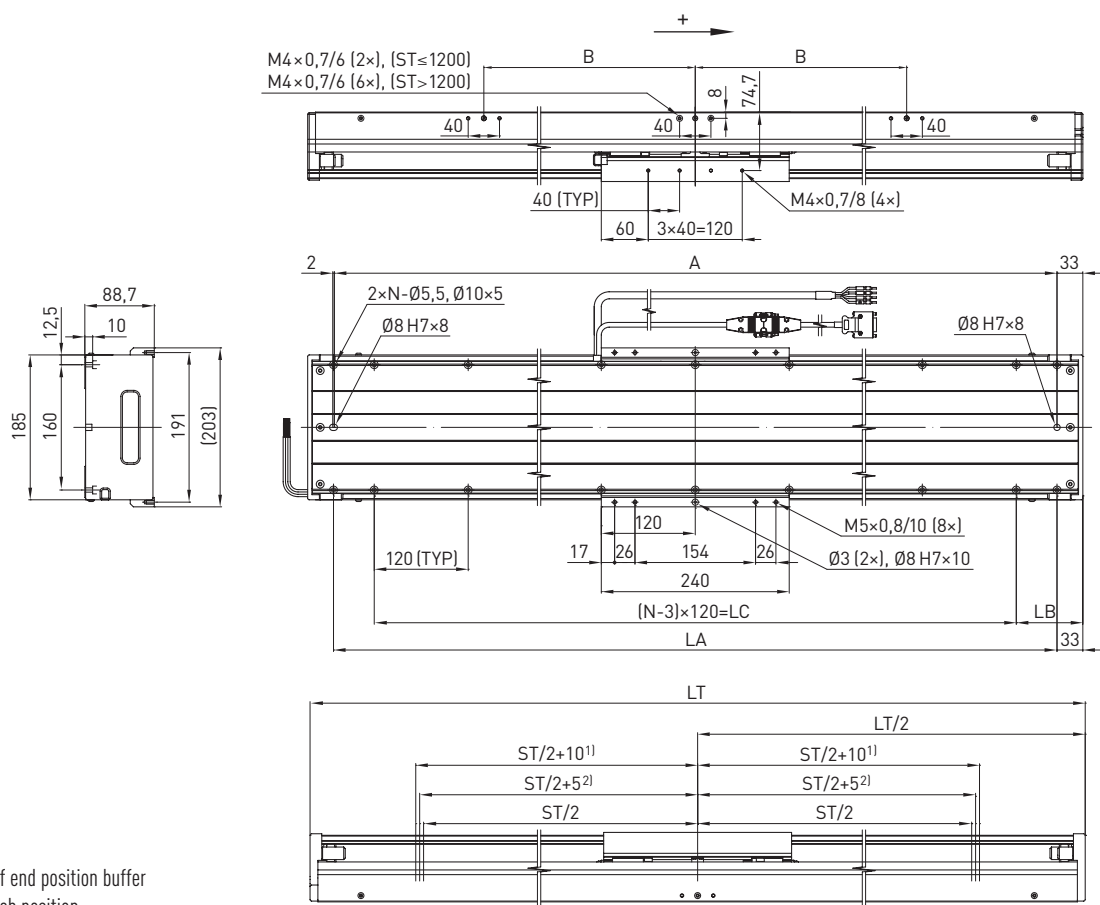
Stroke length ST [mm]	1,330	1,430	1,530	1,630	1,730	1,830	1,930	2,030	2,130	2,230	2,330	2,430
Total length LT [mm]	1,840	1,940	2,040	2,140	2,240	2,340	2,440	2,540	2,640	2,740	2,840	2,940
N [mm]	17	17	19	19	19	21	23	23	23	25	25	25
LA [mm]	1,774	1,874	1,974	2,074	2,174	2,274	2,374	2,474	2,574	2,674	2,774	2,874
LB [mm]	80	130	60	110	160	90	20	70	120	50	100	150
LC [mm]	1,680	1,680	1,920	1,920	1,920	2,160	2,400	2,400	2,400	2,640	2,640	2,640
A [mm]	1,773	1,873	1,973	2,073	2,173	2,273	2,373	2,473	2,573	2,673	2,773	2,873
B [mm]	600	600	600	600	840	840	840	840	840	1,080	1,080	1,080
Weight [kg]	18S100	41.6	43.4	45.2	47.0	48.8	50.6	52.4	54.2	55.9	57.7	59.5
	18C100	51.0	53.2	55.4	57.6	59.9	62.1	64.3	66.5	68.8	71.0	73.2

Precision axes and precision systems

LMSSA linear motor axis

6.4.22 Dimensions of LMSSA-18, 1 travel carriage

LMSSA-18S200, stroke length 200 – 1500 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.39 Dimensions of LMSSA-18S200, 1 travel carriage, stroke length 200 – 800 mm

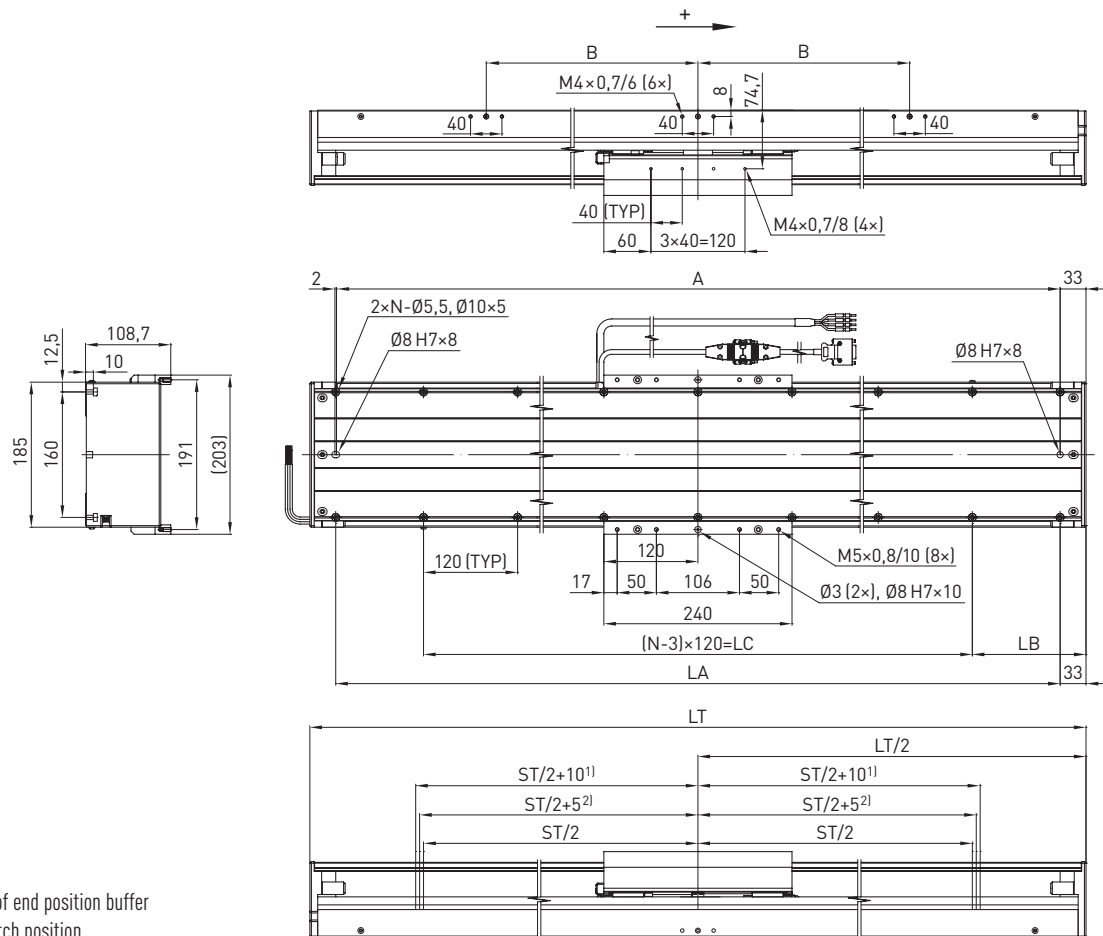
Stroke length ST [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
Total length LT [mm]	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150
N [mm]	5	7	7	7	7	7	9	9	9	11	11	11	11
LA [mm]	484	534	584	634	684	734	784	834	884	934	984	1,034	1,084
LB [mm]	155	60	85	110	135	160	65	90	115	20	45	70	95
LC [mm]	240	480	480	480	480	480	720	720	720	960	960	960	960
A [mm]	483	533	583	633	683	733	783	833	883	933	983	1,033	1,083
B [mm]	—	—	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	14.2	15.1	16.0	17.0	17.9	18.8	19.7	20.6	21.5	22.4	23.3	24.3	25.2

Table 6.40 Dimensions of LMSSA-18S200, 1 travel carriage, stroke length 850 – 1500 mm

Stroke length ST [mm]	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500
Total length LT [mm]	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650	1,750	1,850
N [mm]	11	11	13	13	13	13	13	15	15	15	15	17
LA [mm]	1,134	1,184	1,234	1,284	1,334	1,384	1,434	1,484	1,534	1,584	1,684	1,784
LB [mm]	120	145	50	75	100	125	150	55	80	105	155	85
LC [mm]	960	960	1,200	1,200	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,680
A [mm]	1,133	1,183	1,233	1,283	1,333	1,383	1,433	1,483	1,533	1,583	1,683	1,783
B [mm]	—	—	—	—	—	—	—	—	360	360	600	600
Weight [kg]	26.1	27.0	27.9	28.8	29.7	30.6	31.6	32.5	33.4	34.3	36.1	37.9

6.4.23 Dimensions of LMSSA-18, 1 travel carriage

LMSSA-18S200, stroke length 1600 – 2600 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

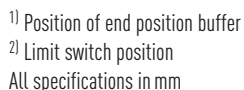
All specifications in mm

Table 6.41 Dimensions of LMSSA-18S200, 1 travel carriage, stroke length 1600 – 2600 mm

Stroke length ST [mm]	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600
Total length LT [mm]	1,950	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N [mm]	17	19	19	21	21	21	23	23	25	25	25
LA [mm]	1,884	1,984	2,084	2,184	2,284	2,384	2,484	2,584	2,684	2,784	2,884
LB [mm]	135	65	115	45	95	145	75	125	55	105	155
LC [mm]	1,680	1,920	1,920	2,160	2,160	2,160	2,400	2,400	2,640	2,640	2,640
A [mm]	1,883	1,983	2,083	2,183	2,283	2,383	2,483	2,583	2,683	2,783	2,883
B [mm]	600	600	600	840	840	840	840	840	1,080	1,080	1,080
Weight [kg]	41.8	43.6	45.4	47.2	49.1	50.9	52.7	54.5	56.4	58.2	60.0

LMSSA linear motor axis

LMSSA-18S200, stroke length 220 – 1220 mm



Stroke length ST [mm]	220	270	320	370	420	470	520	570	620	670	720
Total length LT [mm]	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350
N [mm]	9	9	9	11	11	11	11	11	11	13	13
LA [mm]	784	834	884	934	984	1,034	1,084	1,134	1,184	1,234	1,284
LB [mm]	65	90	115	20	45	70	95	120	145	50	75
LC [mm]	720	720	720	960	960	960	960	960	960	1,200	1,200
A [mm]	783	833	883	933	983	1,033	1,083	1,133	1,183	1,233	1,283
B [mm]	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	23.8	24.7	25.6	26.5	27.4	28.3	29.2	30.1	31.1	32.0	32.9

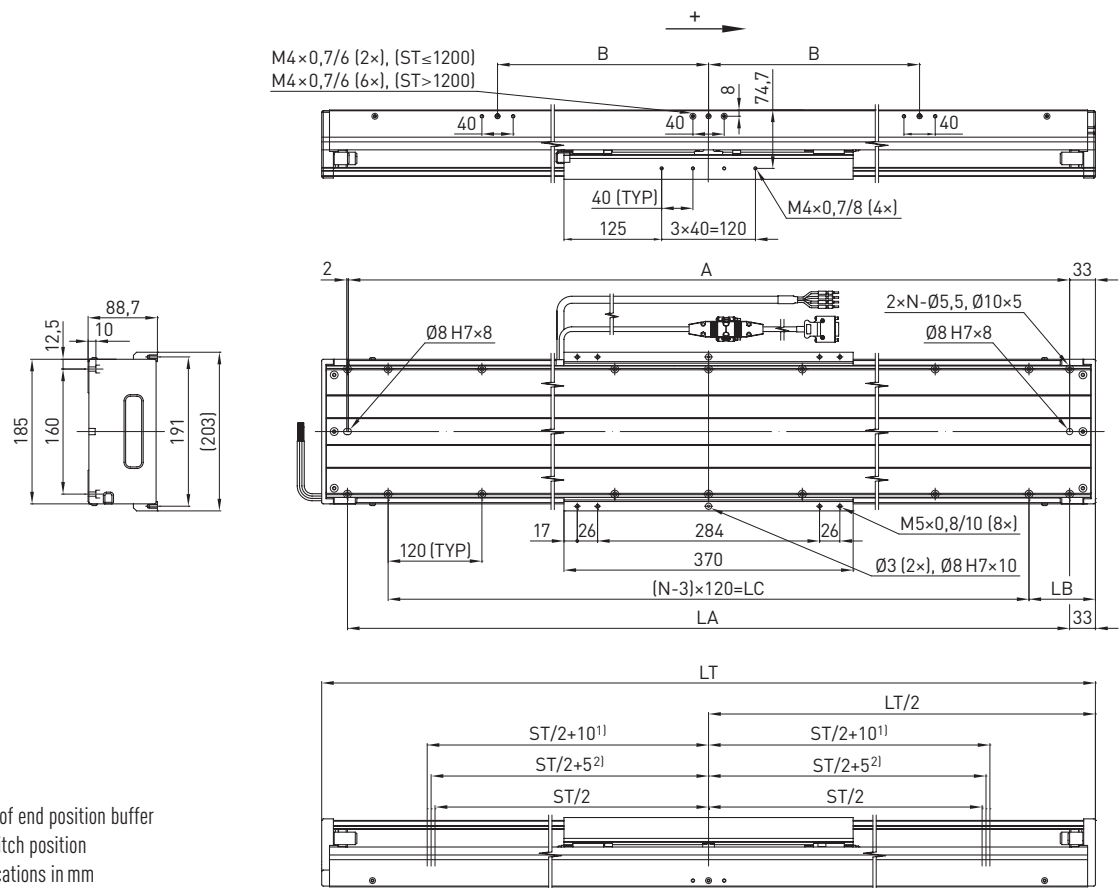
Stroke length ST [mm]	770	820	870	920	970	1,020	1,070	1,120	1,170	1,220
Total length LT [mm]	1,400	1,450	1,500	1,550	1,600	1,650	1,700	1,750	1,800	1,850
N [mm]	13	13	13	15	15	15	15	15	15	17
LA [mm]	1,334	1,384	1,434	1,484	1,534	1,584	1,634	1,684	1,734	1,784
LB [mm]	100	125	150	55	80	105	130	155	60	85
LC [mm]	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,440	1,680	1,680
A [mm]	1,333	1,383	1,433	1,483	1,533	1,583	1,633	1,683	1,733	1,783
B [mm]	—	—	—	—	360	360	600	600	600	600
Weight [kg]	33.8	34.7	35.6	36.5	37.4	38.3	39.3	40.2	41.1	42.0

Precision axes and precision systems

LMSSA linear motor axis

6.4.26 Dimensions of LMSSA-18, 1 travel carriage

LMSSA-18S300, LMSSA-18C200, stroke length 200 – 1500 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.45 Dimensions of LMSSA-18S300, -18C200, 1 travel carriage, stroke length 200 – 800 mm

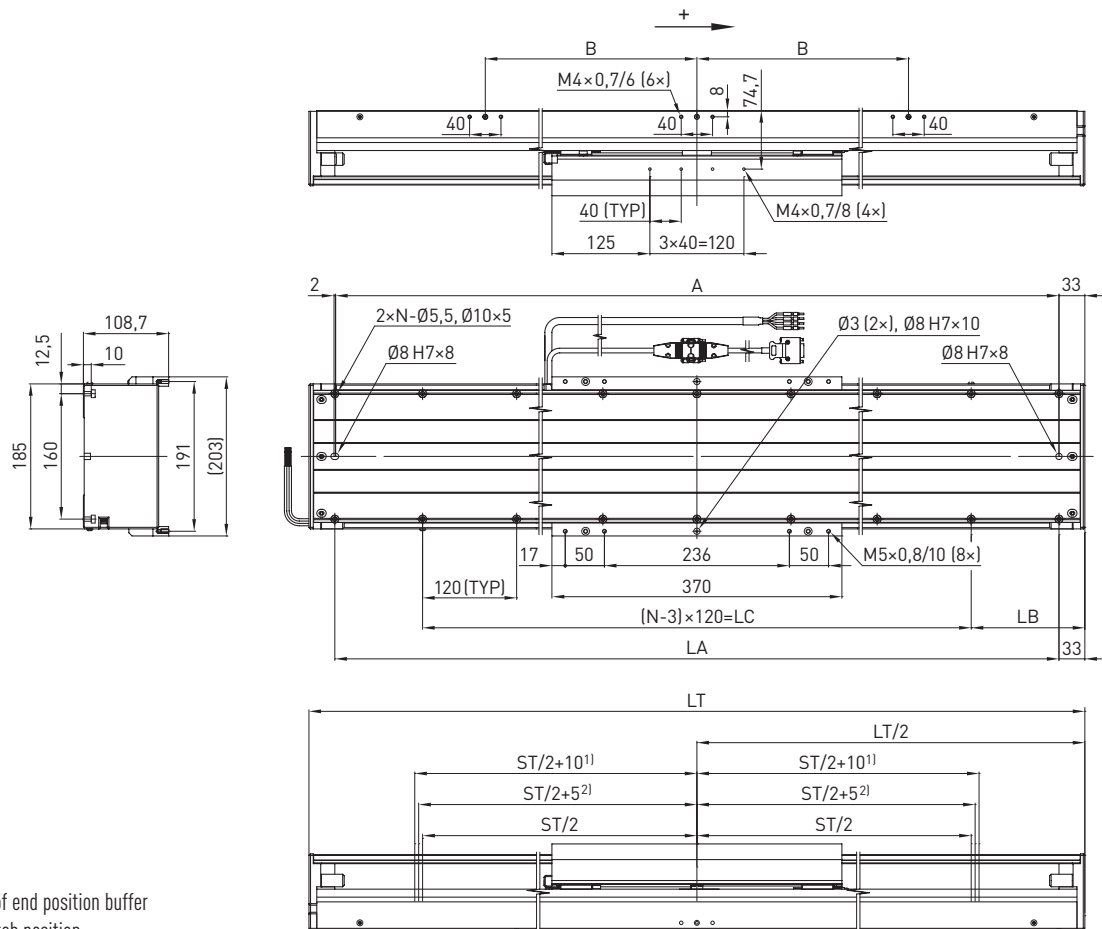
Stroke length ST [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
Total length LT [mm]	680	730	780	830	880	930	980	1,030	1,080	1,130	1,180	1,230	1,280
N [mm]	7	7	7	9	9	9	9	9	11	11	11	11	11
LA [mm]	614	664	714	764	814	864	914	964	1,014	1,064	1,114	1,164	1,214
LB [mm]	100	125	150	55	80	105	130	155	60	85	110	135	160
LC [mm]	480	480	480	720	720	720	720	720	960	960	960	960	960
A [mm]	613	663	713	763	813	863	913	963	1,013	1,063	1,113	1,163	1,213
B [mm]	—	—	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	18S300	18.4	19.5	20.7	21.8	23.0	24.2	25.3	26.5	27.6	28.8	30.0	32.3
	18C200	21.7	22.9	24.1	25.2	26.4	27.5	28.7	29.9	31.0	32.2	33.3	35.7

Table 6.46 Dimensions of LMSSA-18S300, -18C200, 1 travel carriage, stroke length 850 – 1500 mm

Stroke length ST [mm]	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500
Total length LT [mm]	1,330	1,380	1,430	1,480	1,530	1,580	1,630	1,680	1,730	1,780	1,880	1,980
N [mm]	13	13	13	15	15	15	15	15	15	17	17	17
LA [mm]	1,264	1,314	1,364	1,414	1,464	1,514	1,564	1,614	1,664	1,714	1,814	1,914
LB [mm]	65	90	115	20	45	70	95	120	145	50	100	150
LC [mm]	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,440	1,440	1,680	1,680	1,680
A [mm]	1,263	1,313	1,363	1,413	1,463	1,513	1,563	1,613	1,663	1,713	1,813	1,913
B [mm]	—	—	—	—	—	—	—	—	600	600	600	600
Weight [kg]	18S300	33.4	34.6	35.8	36.9	38.1	39.2	40.4	41.6	42.7	43.9	48.5
	18C200	36.8	38.0	39.1	40.3	41.5	42.6	43.8	44.9	46.1	47.3	51.9

6.4.27 Dimensions of LMSSA-18, 1 travel carriage

LMSSA-18S300, LMSSA-18C200, stroke length 1600 – 2500 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.47 Dimensions of LMSSA-18S300, -18C200, 1 travel carriage, stroke length 1600 – 2500 mm

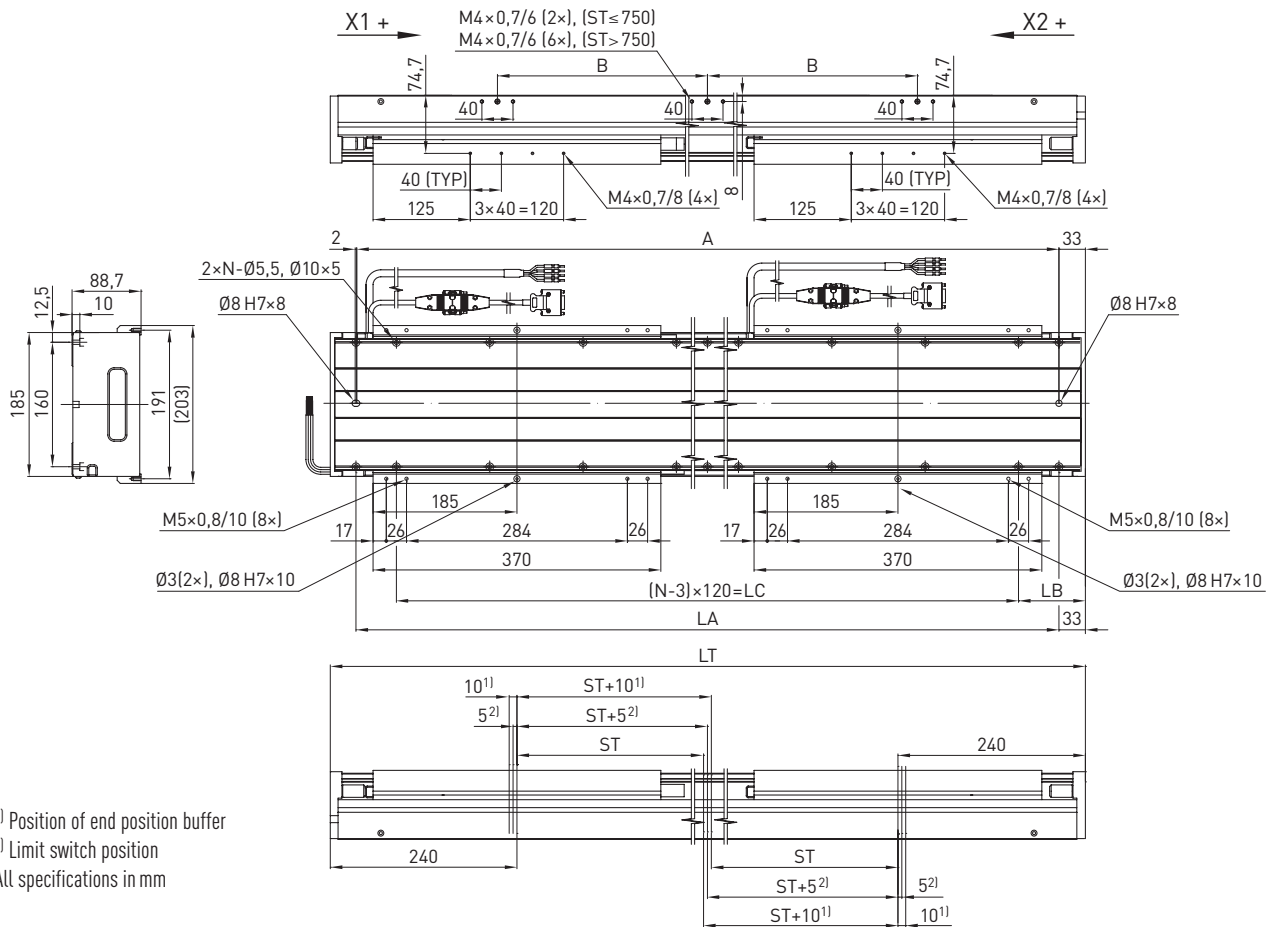
Stroke length ST [mm]	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500
Total length LT [mm]	2,080	2,180	2,280	2,380	2,480	2,580	2,680	2,780	2,880	2,980
N [mm]	19	19	21	21	21	23	25	25	25	27
LA [mm]	2,014	2,114	2,214	2,314	2,414	2,514	2,614	2,714	2,814	2,914
LB [mm]	80	130	60	110	160	90	20	70	120	50
LC [mm]	1,920	1,920	2,160	2,160	2,160	2,400	2,640	2,640	2,640	2,880
A [mm]	2,013	2,113	2,213	2,313	2,413	2,513	2,613	2,713	2,813	2,913
B [mm]	600	840	840	840	840	840	1,080	1,080	1,080	1,080
Weight [kg]	18S300	53.8	56.2	58.5	60.8	63.1	65.4	67.8	70.1	74.7
	18C200	57.2	59.5	61.9	64.2	66.5	68.8	71.1	73.5	78.1

Precision axes and precision systems

LMSSA linear motor axis

6.4.28 Dimensions of LMSSA-18, 2 travel carriages

LMSSA-18S300, LMSSA-18C200, stroke length 240 – 1090 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.49 Dimensions of LMSSA-18S300, -18C200, 2 travel carriages, stroke length 240 – 640 mm

Stroke length ST [mm]	240	290	340	390	440	490	540	590	640
Total length LT [mm]	1,130	1,180	1,230	1,280	1,330	1,380	1,430	1,480	1,530
N [mm]	11	11	11	11	13	13	13	15	15
LA [mm]	1,064	1,114	1,164	1,214	1,264	1,314	1,364	1,414	1,464
LB [mm]	85	110	135	160	65	90	115	20	45
LC [mm]	960	960	960	960	1,200	1,200	1,200	1,440	1,440
A [mm]	1,063	1,113	1,163	1,213	1,263	1,313	1,363	1,413	1,463
B [mm]	—	—	—	—	—	—	—	—	—
Weight [kg]	18S300	34.5	35.6	36.8	38.0	39.1	40.3	41.4	42.6
	18C200	36.7	37.9	39.0	40.2	41.4	42.5	43.7	44.8

Table 6.48 Dimensions of LMSSA-18S300, -18C200, 2 travel carriages, stroke length 690 – 1090 mm

Stroke length ST [mm]	690	740	790	840	890	940	990	1,040	1,090
Total length LT [mm]	1,580	1,630	1,680	1,730	1,780	1,830	1,880	1,930	1,980
N [mm]	15	15	15	15	17	17	17	17	17
LA [mm]	1,514	1,564	1,614	1,664	1,714	1,764	1,814	1,864	1,914
LB [mm]	70	95	120	145	50	75	100	125	150
LC [mm]	1,440	1,440	1,440	1,440	1,680	1,680	1,680	1,680	1,680
A [mm]	1,513	1,563	1,613	1,663	1,713	1,763	1,813	1,863	1,913
B [mm]	—	—	—	600	600	600	600	600	600
Weight [kg]	18S300	44.9	46.1	47.2	48.4	49.6	50.7	51.9	53.0
	18C200	47.2	48.3	49.5	50.6	51.8	53.0	54.1	55.3

6.4.29 Dimensions of LMSSA-18, 2 travel carriages

LMSSA-18S300, LMSSA-18C200, stroke length 1140 – 2040 mm

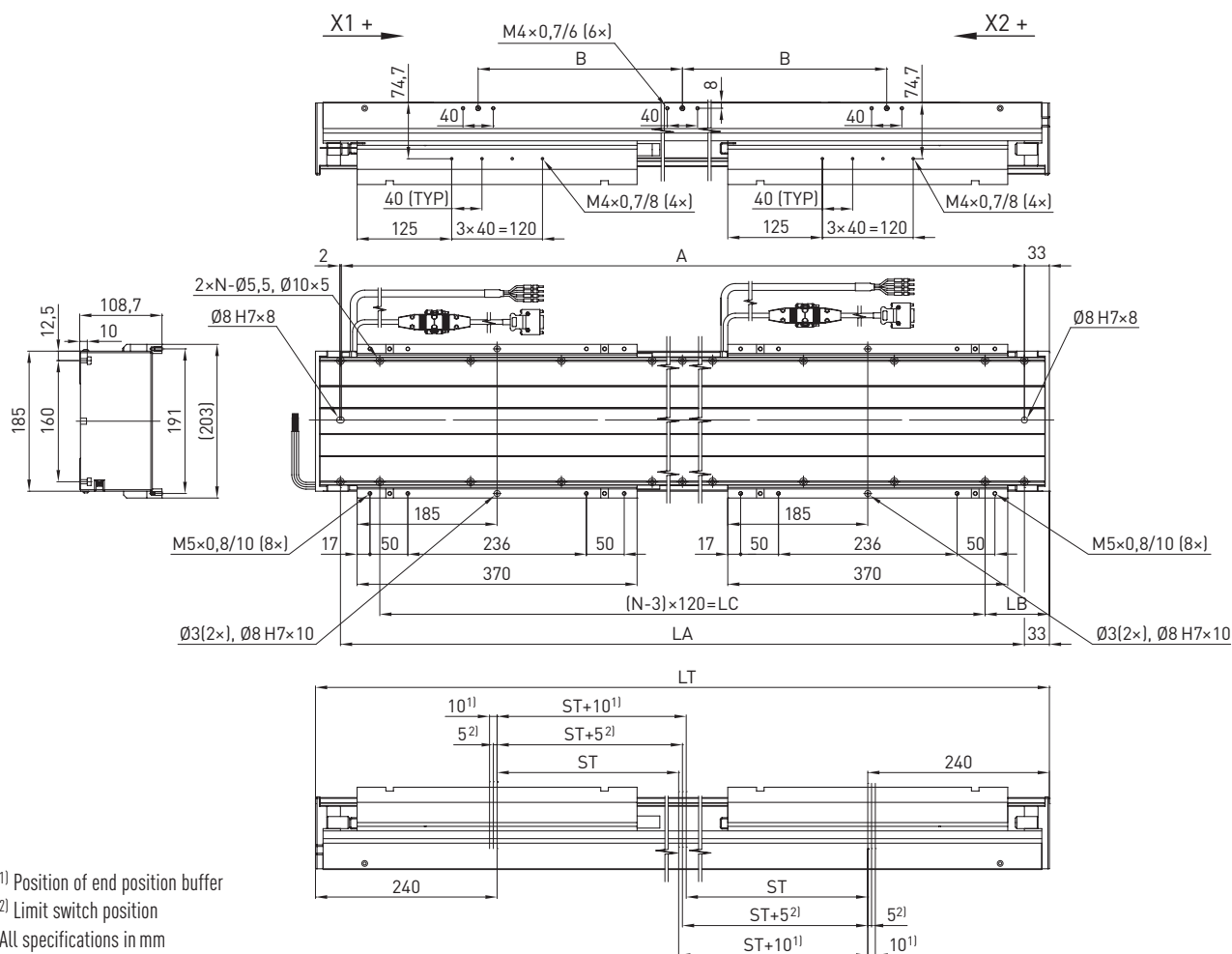


Table 6.50 Dimensions of LMSSA-18S300, -18C200, 2 travel carriages, stroke length 1140 – 2040 mm

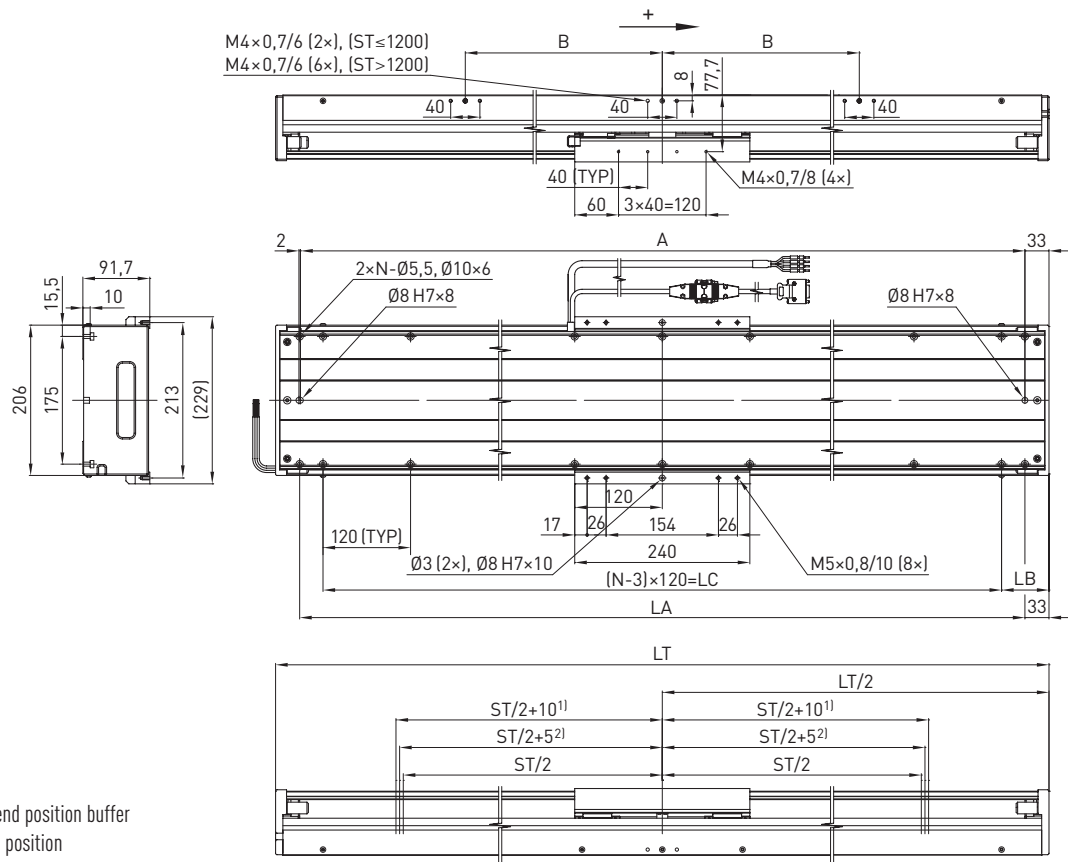
Stroke length ST [mm]	1,140	1,190	1,240	1,290	1,340	1,440	1,540	1,640	1,740	1,840	1,940	2,040
Total length LT [mm]	2,030	2,080	2,130	2,180	2,230	2,330	2,430	2,530	2,630	2,730	2,830	2,930
N [mm]	19	19	19	19	19	21	21	23	23	25	25	25
LA [mm]	1,964	2,014	2,064	2,114	2,164	2,264	2,364	2,464	2,564	2,664	2,764	2,864
LB [mm]	55	80	105	130	155	85	135	65	115	45	95	145
LC [mm]	1,920	1,920	1,920	1,920	1,920	2,160	2,160	2,400	2,400	2,640	2,640	2,640
A [mm]	1,963	2,013	2,063	2,113	2,163	2,263	2,363	2,463	2,563	2,663	2,763	2,863
B [mm]	600	600	600	840	840	840	840	840	840	1,080	1,080	1,080
Weight [kg]	18S300	61.4	62.5	63.7	64.8	66.0	68.3	70.6	73.0	75.3	77.6	79.9
	18C200	63.6	64.8	65.9	67.1	68.2	70.6	72.9	75.2	77.5	79.8	82.2

Precision axes and precision systems

LMSSA linear motor axis

6.4.30 Dimensions of LMSSA-20, 1 travel carriage

LMSSA-20S300, LMSSA-20C100, stroke length 200 – 1500 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.51 Dimensions of LMSSA-20S300, -20C100, 1 travel carriage, stroke length 200 – 800 mm

Stroke length ST [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
Total length LT [mm]	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150
N [mm]	5	7	7	7	7	7	9	9	9	11	11	11	11
LA [mm]	484	534	584	634	684	734	784	834	884	934	984	1,034	1,084
LB [mm]	155	60	85	110	135	160	65	90	115	20	45	70	95
LC [mm]	240	480	480	480	480	480	720	720	720	960	960	960	960
A [mm]	483	533	583	633	683	733	783	833	883	933	983	1,033	1,083
B [mm]	—	—	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	20S300	18.0	19.1	20.2	21.3	22.4	23.5	24.6	25.7	26.8	27.9	29.0	30.1
	20C100	19.4	20.9	22.4	23.9	25.4	26.9	28.4	29.9	31.4	32.9	34.4	36.0

Table 6.52 Dimensions of LMSSA-18S300, -18C200, 1 travel carriage, stroke length 850 – 1500 mm

Stroke length ST [mm]	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500
Total length LT [mm]	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650	1,750	1,850
N [mm]	11	11	13	13	13	13	13	15	15	15	15	17
LA [mm]	1,134	1,184	1,234	1,284	1,334	1,384	1,434	1,484	1,534	1,584	1,684	1,784
LB [mm]	120	145	50	75	100	125	150	55	80	105	155	85
LC [mm]	960	960	1,200	1,200	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,680
A [mm]	1,133	1,183	1,233	1,283	1,333	1,383	1,433	1,483	1,533	1,583	1,683	1,783
B [mm]	—	—	—	—	—	—	—	—	360	360	600	600
Weight [kg]	20S300	32.3	33.4	34.5	35.6	36.7	37.8	38.9	40.0	41.1	44.4	46.6
	20C100	39.0	40.5	42.0	43.5	45.0	46.5	48.0	49.5	51.0	55.6	58.6

Precision axes and precision systems

LMSSA linear motor axis

6.4.32 Dimensions of LMSSA-20, 2 travel carriages

LMSSA-20S300, LMSSA-20C100, stroke length 220 – 1220 mm

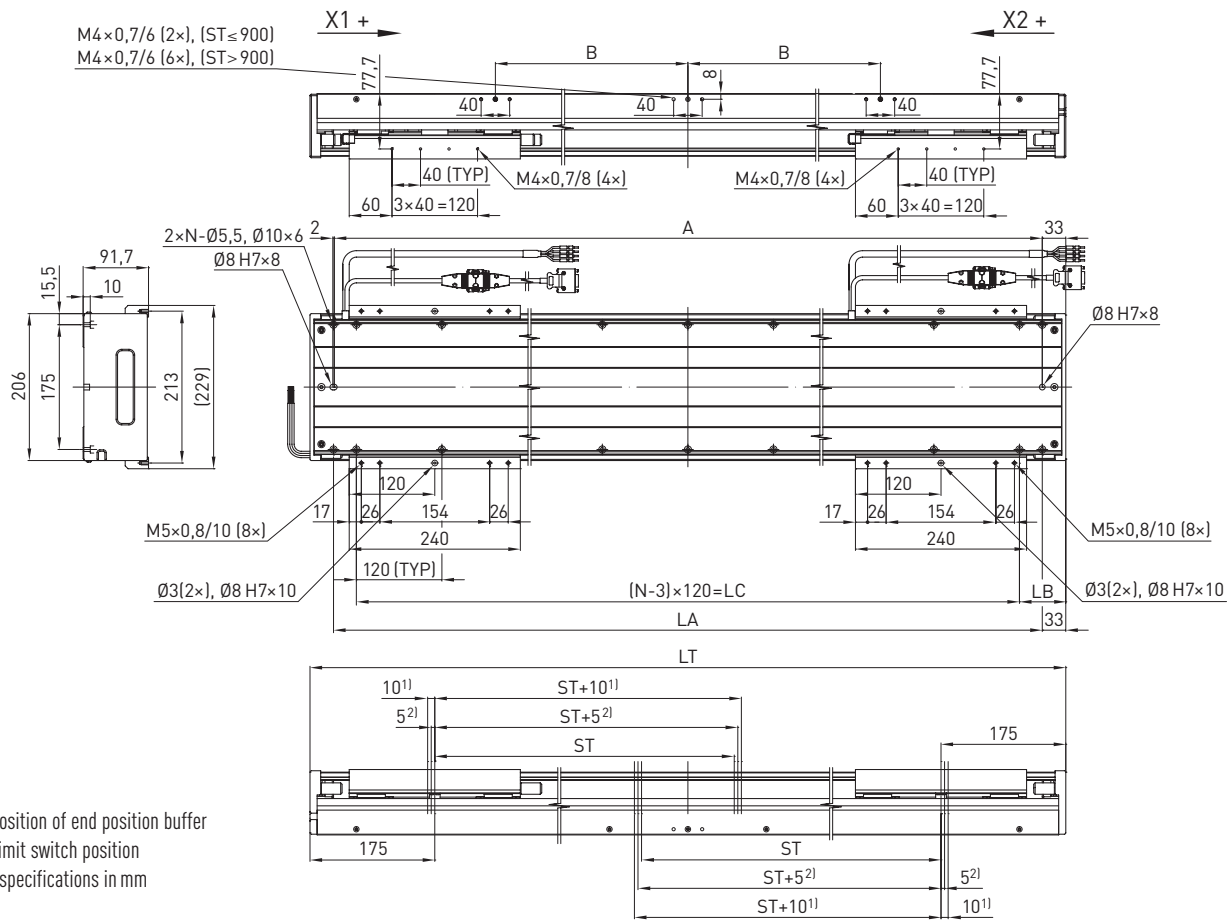


Table 6.54 Dimensions of LMSSA-20S300, -20C100, 2 travel carriages, stroke length 220 – 720 mm

Stroke length ST [mm]	220	270	320	370	420	470	520	570	620	670	720
Total length LT [mm]	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,350
N [mm]	9	9	9	11	11	11	11	11	11	13	13
LA [mm]	784	834	884	934	984	1,034	1,084	1,134	1,184	1,234	1,284
LB [mm]	65	90	115	20	45	70	95	120	145	50	75
LC [mm]	720	720	720	960	960	960	960	960	960	1,200	1,200
A [mm]	783	833	883	933	983	1,033	1,083	1,133	1,183	1,233	1,283
B [mm]	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	20S300	30.2	31.3	32.4	33.5	34.6	35.7	36.8	37.9	39.0	40.1
	20C100	32.3	33.8	35.3	36.8	38.3	39.9	41.4	42.9	44.4	45.9

Table 6.55 Dimensions of LMSSA-20S300, -20C100, 2 travel carriages, stroke length 770 – 1220 mm

Stroke length ST [mm]	770	820	870	920	970	1,020	1,070	1,120	1,170	1,220
Total length LT [mm]	1,400	1,450	1,500	1,550	1,600	1,650	1,700	1,750	1,800	1,850
N [mm]	13	13	13	15	15	15	15	15	15	17
LA [mm]	1,334	1,384	1,434	1,484	1,534	1,584	1,634	1,684	1,734	1,784
LB [mm]	100	125	150	55	80	105	130	155	60	85
LC [mm]	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,440	1,680	1,680
A [mm]	1,333	1,383	1,433	1,483	1,533	1,583	1,633	1,683	1,733	1,783
B [mm]	—	—	—	—	360	360	600	600	600	600
Weight [kg]	20S300	42.3	43.4	44.5	45.6	46.7	47.8	48.9	50.0	51.1
	20C100	48.9	50.4	51.9	53.4	54.9	56.5	58.0	59.5	61.0

6.4.33 Dimensions of LMSSA-20, 2 travel carriages

LMSSA-20S300, LMSSA-20C100, stroke length 1270 – 2320 mm

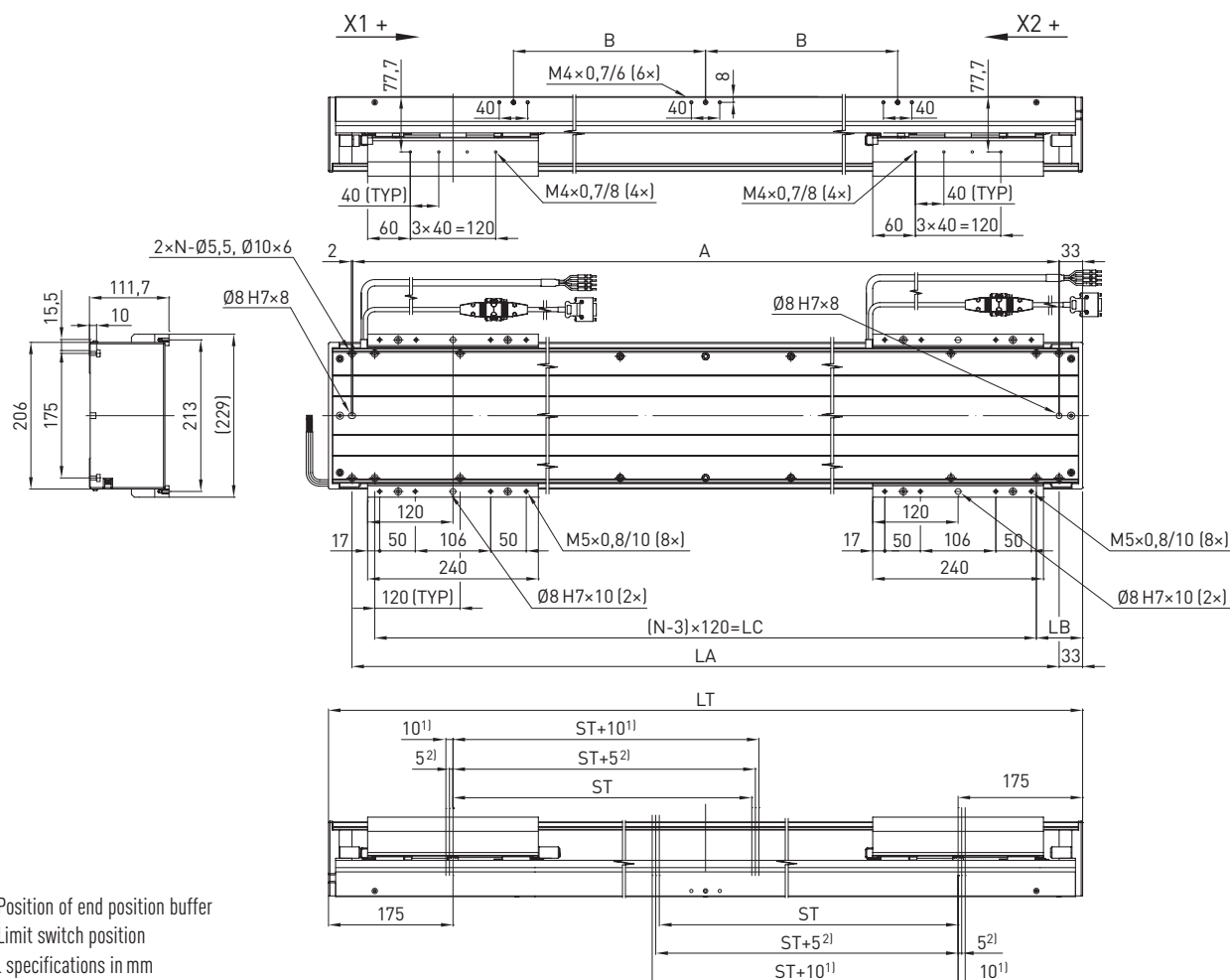


Table 6.56 Dimensions of LMSSA-20S300, -20C100, 2 travel carriages, stroke length 1270 – 2320 mm

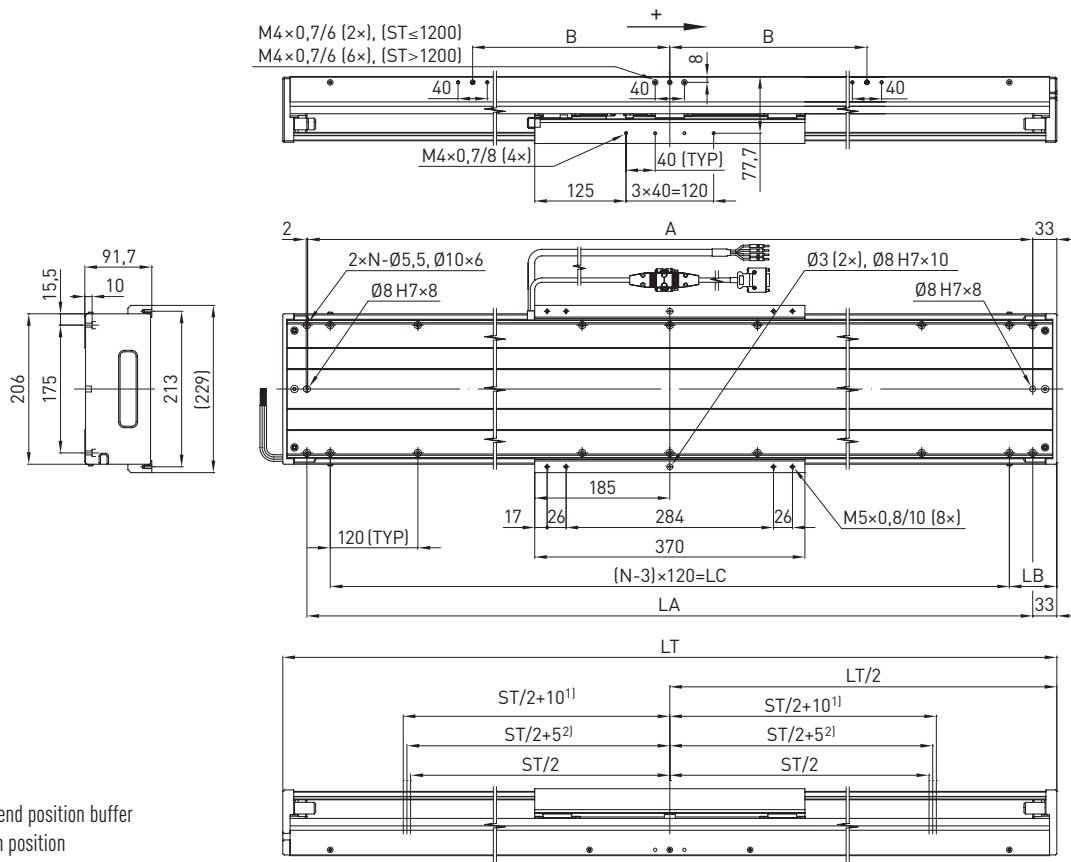
Stroke length ST [mm]	1,270	1,320	1,420	1,520	1,620	1,720	1,820	1,920	2,020	2,120	2,220	2,320
Total length LT [mm]	1,900	1,950	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950
N [mm]	17	17	19	19	21	21	21	23	23	25	25	25
LA [mm]	1,834	1,884	1,984	2,084	2,184	2,284	2,384	2,484	2,584	2,684	2,784	2,884
LB [mm]	110	135	65	115	45	95	145	75	125	55	105	155
LC [mm]	1,680	1,680	1,920	1,920	2,160	2,160	2,160	2,400	2,400	2,640	2,640	2,640
A [mm]	1,833	1,883	1,983	2,083	2,183	2,283	2,383	2,483	2,583	2,683	2,783	2,883
B [mm]	600	600	600	600	840	840	840	840	840	1,080	1,080	1,080
Weight [kg]	20S300	55.3	56.4	58.6	60.8	66.0	67.2	69.4	71.6	73.8	76.0	80.4
	20C100	68.0	69.5	72.5	75.5	78.6	81.6	84.6	87.6	90.6	93.7	99.7

Precision axes and precision systems

LMSSA linear motor axis

6.4.34 Dimensions of LMSSA-20, 1 travel carriage

LMSSA-20S500, LMSSA-20C200, stroke length 200 – 1500 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.57 Dimensions of LMSSA-20S500, -20C200, 1 travel carriage, stroke length 200 – 800 mm

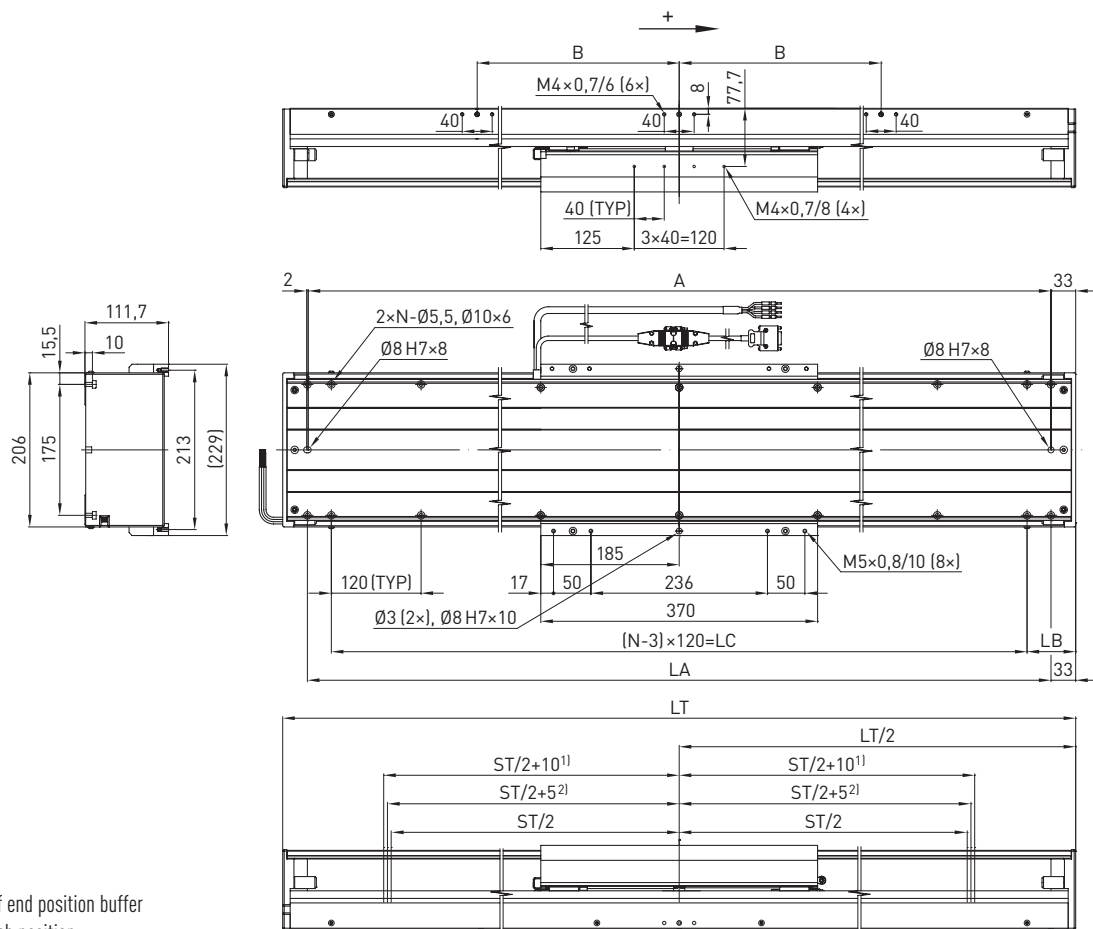
Stroke length ST [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
Total length LT [mm]	680	730	780	830	880	930	980	1,030	1,080	1,130	1,180	1,230	1,280
N [mm]	7	7	7	9	9	9	9	9	11	11	11	11	11
LA [mm]	614	664	714	764	814	864	914	964	1,014	1,064	1,114	1,164	1,214
LB [mm]	100	125	150	55	80	105	130	155	60	85	110	135	160
LC [mm]	480	480	480	720	720	720	720	720	960	960	960	960	960
A [mm]	613	663	713	763	813	863	913	963	1,013	1,063	1,113	1,163	1,213
B [mm]	—	—	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	20S500	23.1	24.2	25.4	26.5	27.7	28.8	30.0	31.1	32.3	33.4	34.6	35.7
	20C200	23.8	25.4	26.9	28.5	30.0	31.6	33.2	34.7	36.3	37.9	39.4	41.0

Table 6.58 Dimensions of LMSSA-20S500, -20C200, 1 travel carriage, stroke length 850 – 1500 mm

Stroke length ST [mm]	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500
Total length LT [mm]	1,330	1,380	1,430	1,480	1,530	1,580	1,630	1,680	1,730	1,780	1,880	1,980
N [mm]	13	13	13	15	15	15	15	15	15	17	17	17
LA [mm]	1,264	1,314	1,364	1,414	1,464	1,514	1,564	1,614	1,664	1,714	1,814	1,914
LB [mm]	65	90	115	20	45	70	95	120	145	50	100	150
LC [mm]	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,440	1,440	1,680	1,680	1,680
A [mm]	1,263	1,313	1,363	1,413	1,463	1,513	1,563	1,613	1,663	1,713	1,813	1,913
B [mm]	—	—	—	—	—	—	—	—	600	600	600	600
Weight [kg]	20S500	38.0	39.2	40.3	41.5	42.6	43.8	44.9	46.1	47.2	48.4	50.7
	20C200	44.1	45.7	47.2	48.8	50.4	51.9	53.5	55.1	56.6	58.2	61.3

6.4.35 Dimensions of LMSSA-20, 1 travel carriage

LMSSA-20S500, LMSSA-20C200, stroke length 1600 – 2500 mm

¹⁾ Position of end position buffer

2) Limit switch position

All specifications in mm

Table 6.59 Dimensions of LMSSA-20S500, -20C200, 1 travel carriage, stroke length 1600–2500 mm

Stroke length ST [mm]		1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500
Total length LT [mm]		2,080	2,180	2,280	2,380	2,480	2,580	2,680	2,780	2,880	2,980
N [mm]		19	19	21	21	21	23	25	25	25	27
LA [mm]		2,014	2,114	2,214	2,314	2,414	2,514	2,614	2,714	2,814	2,914
LB [mm]		80	130	60	110	160	90	20	70	120	50
LC [mm]		1,920	1,920	2,160	2,160	2,160	2,400	2,640	2,640	2,640	2,880
A [mm]		2,013	2,113	2,213	2,313	2,413	2,513	2,613	2,713	2,813	2,913
B [mm]		600	840	840	840	840	840	1,080	1,080	1,080	1,080
Weight [kg]	20S500	58.3	60.6	62.9	65.2	67.5	69.8	72.1	74.4	76.7	79.0
	20C200	70.6	73.7	76.8	79.9	83.1	86.2	89.3	92.4	95.6	98.7

Precision axes and precision systems

LMSSA linear motor axis

6.4.36 Dimensions of LMSSA-20, 2 travel carriages

LMSSA-20S500, LMSSA-20C200, stroke length 240 – 1090 mm

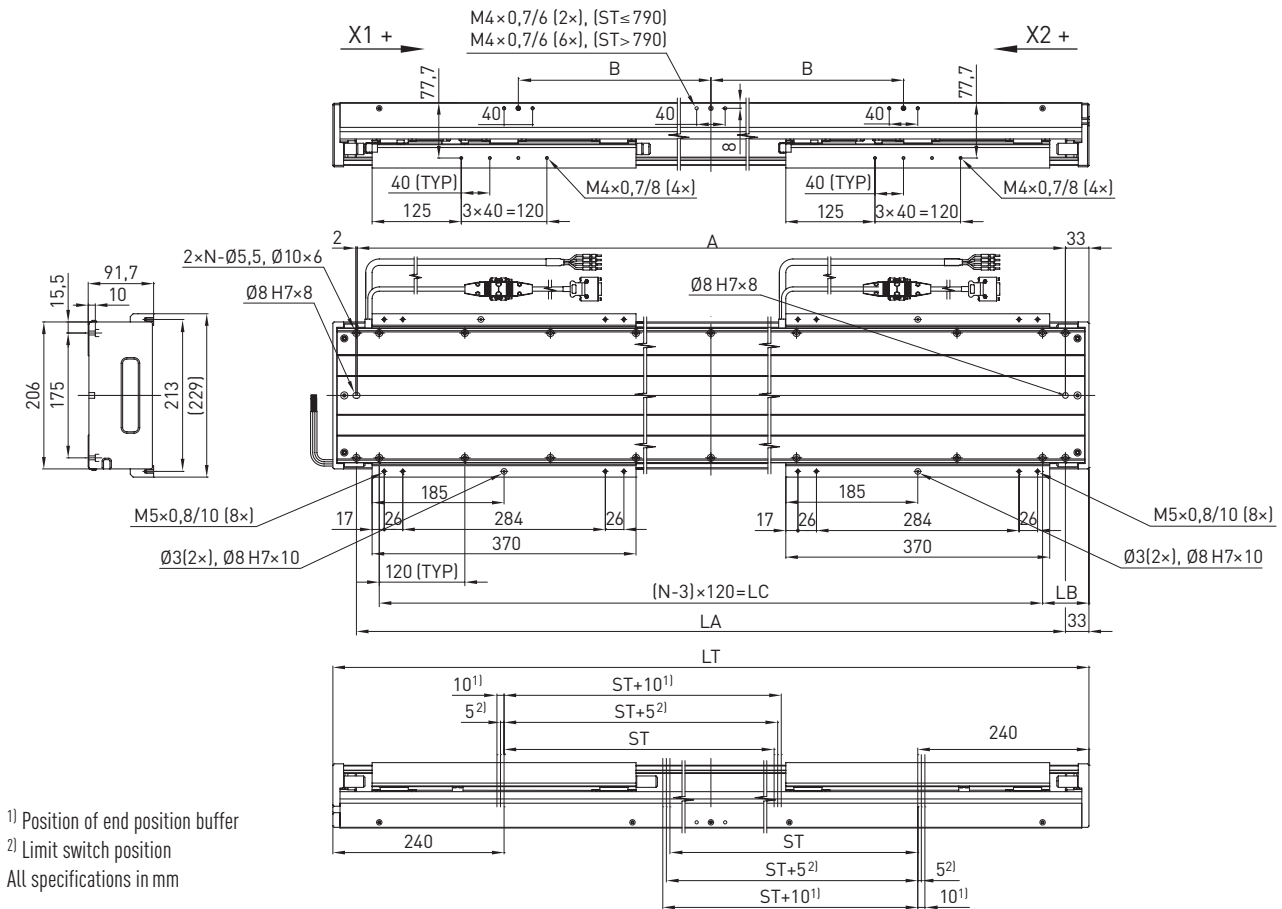


Table 6.60 Dimensions of LMSSA-20S500, -20C200, 2 travel carriages, stroke length 200 – 640 mm

Stroke length ST [mm]	240	290	340	390	440	490	540	590	640
Total length LT [mm]	1,130	1,180	1,230	1,280	1,330	1,380	1,430	1,480	1,530
N [mm]	11	11	11	11	13	13	13	15	15
LA [mm]	1,064	1,114	1,164	1,214	1,264	1,314	1,364	1,414	1,464
LB [mm]	85	110	135	160	65	90	115	20	45
LC [mm]	960	960	960	960	1,200	1,200	1,200	1,440	1,440
A [mm]	1,063	1,113	1,163	1,213	1,263	1,313	1,363	1,413	1,463
B [mm]	—	—	—	—	—	—	—	—	—
Weight [kg]	20S500	41.6	42.7	43.9	45.0	46.2	47.3	48.5	49.6
	20C200	43.4	45.0	46.5	48.1	49.7	51.2	52.8	55.9

Table 6.61 Dimensions of LMSSA-20S500, -20C200, 2 travel carriages, stroke length 690 – 1090 mm

Stroke length ST [mm]	690	740	790	840	890	940	990	1,040	1,090
Total length LT [mm]	1,580	1,630	1,680	1,730	1,780	1,830	1,880	1,930	1,980
N [mm]	15	15	15	15	17	17	17	17	17
LA [mm]	1,514	1,564	1,614	1,664	1,714	1,764	1,814	1,864	1,914
LB [mm]	70	95	120	145	50	75	100	125	150
LC [mm]	1,440	1,440	1,440	1,440	1,680	1,680	1,680	1,680	1,680
A [mm]	1,513	1,563	1,613	1,663	1,713	1,763	1,813	1,863	1,913
B [mm]	—	—	—	600	600	600	600	600	600
Weight [kg]	20S500	51.9	53.1	54.2	55.4	56.5	57.7	58.8	60.0
	20C200	57.5	59.0	60.6	62.2	63.7	65.3	66.9	70.0

6.4.37 Dimensions of LMSSA-20, 2 travel carriages

LMSSA-20S500, LMSSA-20C200, stroke length 1140 – 2040 mm

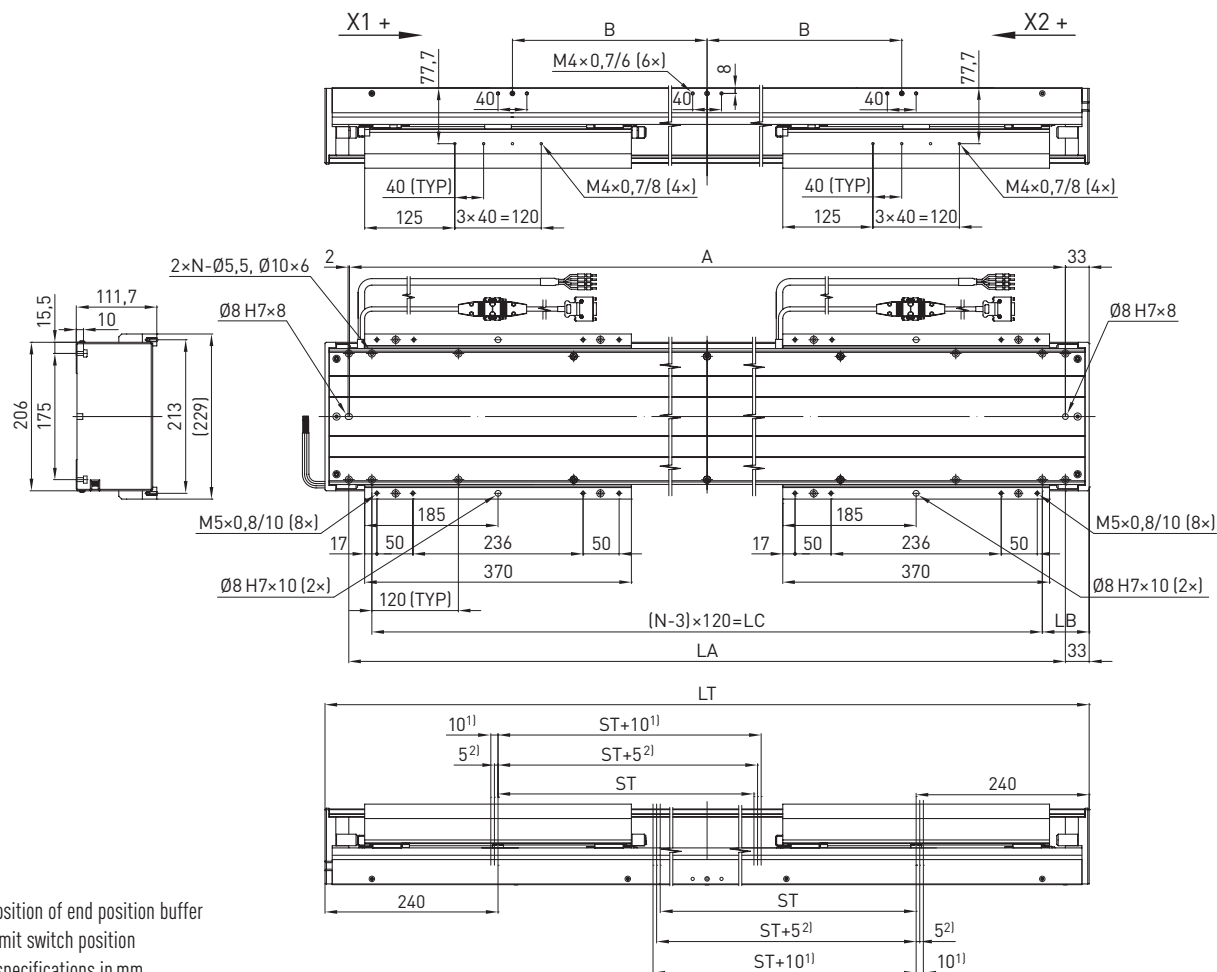
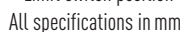


Table 6.62 Dimensions of LMSSA-20S500, -20C200, 2 travel carriages, stroke length 1140 – 2040 mm

Stroke length ST [mm]	1,140	1,190	1,240	1,290	1,340	1,440	1,540	1,640	1,740	1,840	1,940	2,040
Total length LT [mm]	2,030	2,080	2,130	2,180	2,230	2,330	2,430	2,530	2,630	2,730	2,830	2,930
N [mm]	19	19	19	19	19	21	21	23	23	25	25	25
LA [mm]	1,964	2,014	2,064	2,114	2,164	2,264	2,364	2,464	2,564	2,664	2,764	2,864
LB [mm]	55	80	105	130	155	85	135	65	115	45	95	145
LC [mm]	1,920	1,920	1,920	1,920	1,920	2,160	2,160	2,400	2,400	2,640	2,640	2,640
A [mm]	1,963	2,013	2,063	2,113	2,163	2,263	2,363	2,463	2,563	2,663	2,763	2,863
B [mm]	600	600	600	840	840	840	840	840	840	1,080	1,080	1,080
Weight [kg]	20S500	68.3	69.4	70.6	71.7	72.8	75.1	77.4	79.7	82.0	84.3	88.9
	20C200	77.5	79.1	80.7	82.2	83.8	86.9	90.1	93.2	96.3	99.4	105.7

LMSSA linear motor axis

LMSSA-20S700, stroke length 200 – 1500 mm

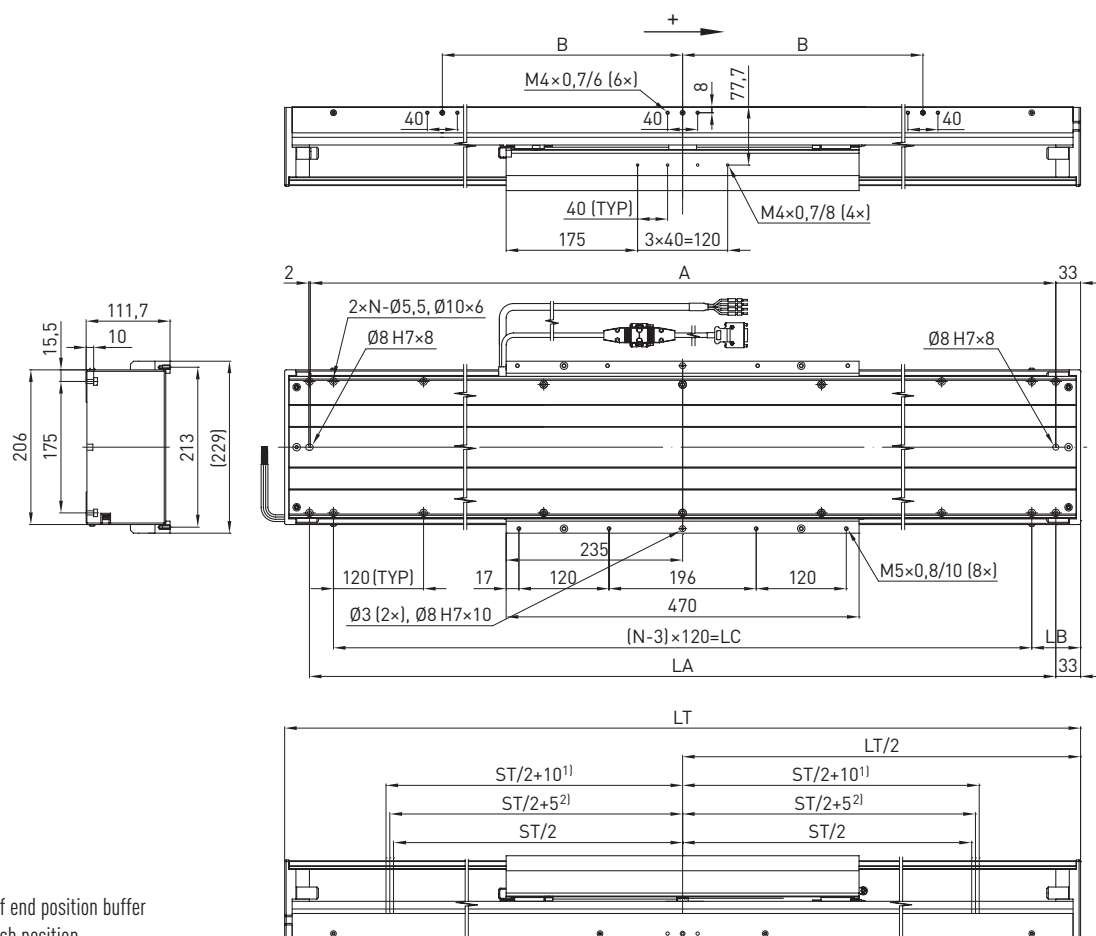


Stroke length ST [mm]	200	250	300	350	400	450	500	550	600	650	700	750	800
Total length LT [mm]	780	830	880	930	980	1,030	1,080	1,130	1,180	1,230	1,280	1,330	1,380
N [mm]	7	9	9	9	9	9	11	11	11	11	11	13	13
LA [mm]	714	764	814	864	914	964	1,014	1,064	1,114	1,164	1,214	1,264	1,314
LB [mm]	150	55	80	105	130	155	60	85	110	135	160	65	90
LC [mm]	480	720	720	720	720	720	960	960	960	960	960	1,200	1,200
A [mm]	713	763	813	863	913	963	1,013	1,063	1,113	1,163	1,213	1,263	1,313
B [mm]	—	—	—	—	—	—	—	—	—	—	—	—	—
Weight [kg]	27.4	28.5	29.7	30.8	32.0	33.1	34.3	35.4	36.6	37.7	38.9	40.0	41.2

Stroke length ST [mm]	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250	1,300	1,400	1,500
Total length LT [mm]	1,430	1,480	1,530	1,580	1,630	1,680	1,730	1,780	1,830	1,880	1,980	2,080
N [mm]	13	15	15	15	15	15	15	17	17	17	17	19
LA [mm]	1,364	1,414	1,464	1,514	1,564	1,614	1,664	1,714	1,764	1,814	1,914	2,014
LB [mm]	115	20	45	70	95	120	145	50	75	100	150	80
LC [mm]	1,200	1,440	1,440	1,440	1,440	1,440	1,440	1,680	1,680	1,680	1,680	1,920
A [mm]	1,363	1,413	1,463	1,513	1,563	1,613	1,663	1,713	1,763	1,813	1,913	2,013
B [mm]	—	—	—	—	—	—	600	600	600	600	600	600
Weight [kg]	42.3	43.5	44.6	45.8	46.9	48.1	49.2	50.4	51.5	52.7	55.0	60.3

6.4.39 Dimensions of LMSSA-20, 1 travel carriage

LMSSA-20S700, stroke length 1600 – 2400 mm



¹⁾ Position of end position buffer

²⁾ Limit switch position

All specifications in mm

Table 6.65 Dimensions of LMSSA-20S700, 1 travel carriage, stroke length 1600 – 2400 mm

Stroke length ST [mm]	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400
Total length LT [mm]	2,180	2,280	2,380	2,480	2,580	2,680	2,780	2,880	2,980
N [mm]	19	21	21	21	23	25	25	25	27
LA [mm]	2,114	2,214	2,314	2,414	2,514	2,614	2,714	2,814	2,914
LB [mm]	130	60	110	160	90	20	70	120	50
LC [mm]	1,920	2,160	2,160	2,160	2,400	2,640	2,640	2,640	2,880
A [mm]	2,113	2,213	2,313	2,413	2,513	2,613	2,713	2,813	2,913
B [mm]	840	840	840	840	840	1,080	1,080	1,080	1,080
Weight [kg]	62.6	64.9	67.2	69.5	71.8	74.1	76.4	78.7	81.0

LMSSA linear motor axis

LMSSA-20S700, stroke length 240 – 890 mm

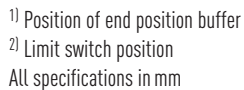


Table 6.66 **Dimensions of LMSSA-20S700, 2 travel carriages, stroke length 240 – 890 mm**

Stroke length ST [mm]	240	290	340	390	440	490	540	590	640	690	740	790	840	890
Total length LT [mm]	1,330	1,380	1,430	1,480	1,530	1,580	1,630	1,680	1,730	1,780	1,830	1,880	1,930	1,980
N [mm]	13	13	13	15	15	15	15	15	15	17	17	17	17	17
LA [mm]	1,264	1,314	1,364	1,414	1,464	1,514	1,564	1,614	1,664	1,714	1,764	1,814	1,864	1,914
LB [mm]	65	90	115	20	45	70	95	120	145	50	75	100	125	150
LC [mm]	1,200	1,200	1,200	1,440	1,440	1,440	1,440	1,440	1,440	1,680	1,680	1,680	1,680	1,680
A [mm]	1,263	1,313	1,363	1,413	1,463	1,513	1,563	1,613	1,663	1,713	1,763	1,813	1,863	1,913
B [mm]	—	—	—	—	—	—	—	—	600	600	600	600	600	600
Weight [kg]	50.5	51.7	52.8	54.0	55.1	56.3	57.4	58.6	59.7	60.9	62.0	63.2	64.3	65.5

Precision axes and precision systems

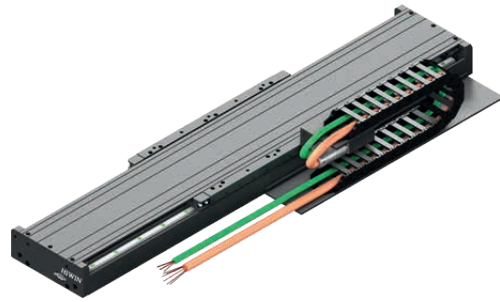
Linear motor axis LMX1A

7. Linear motor axis LMX1A

7.1 Properties of the LMX1A linear motor axis

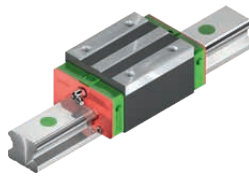
HIWIN LMX1A linear motor axes can be customised to a high degree, meaning they can be adapted to customer-specific movement tasks. They meet the highest precision requirements by integrating the guide system and linear motor into a solid ground precision strand casting profile. Thanks to high-resolution distance measuring systems, repeatability of $\pm 0.05 \mu\text{m}$ can be achieved.

Depending on the load capacity and requirement for dynamics, the motor type and size can be individually configured.



Linear guideway

A high-quality HIWIN double guide safely transfers forces and torques from the carriage to the axis profile. Four blocks are used per carriage, which are guided on two parallel, high-precision profile rails. SynchMotion™ technology with ball chain also ensures good synchronisation and very smooth running in all sizes.



Distance measuring systems

The distance measuring system is integrated into the inside of the axis to save space and determines the repeatability. Different measuring systems are available depending on the requirements for measuring method, interface and resolution.



Linear motor

The integrated HIWIN linear motors ensure dynamic and precise positioning. LMSA motors with iron core are the first choice when high feed forces are required. Ironless motors are the first choice for applications with the highest requirements for synchronisation.



Energy chain

Generously dimensioned energy chains provide space for safely carrying the supply lines. The axes are optionally available with horizontal or vertical energy supply.



7.2 Order code for LMx1A linear motor axes

	LM	X	1	A	SA21	1	0872	A	1	E	0	CL	XXX
Linear motor axis													
Axis version:													
X: Horizontal axis													
Number of axes:													
1: Single axis													
Axis profile:													
A: Motors with iron core (LMSA)													
Motor type:													
LMSAxx: Motor size													
Number of travel carriages													
Stroke length [mm]													
Distance measuring system:													
A: Optical, period 40 µm, analogue 1 V _{SS} sin/cos													
E: Magnetic, digital TTL, resolution 1 µm													
G: Optical, digital TTL, resolution 1 µm													
K: Optical, digital TTL, resolution 0.1 µm													
X: Magnetic, absolute with BiSS-C interface													
Magnetic, absolute with HIPERFACE interface													
Optical, absolute, encapsulated with EnDat interface													
Optical, absolute, encapsulated with DRIVE-CLiQ interface													
Optical, absolute, encapsulated with FANUC interface													
Limit switches:													
0: None													
1: Inductive, PNP (standard)													
2: Inductive, NPN													
	Order number of the drawing, multiple forcers, Hall sensor, weight compensation, brake, special mounting holes												
	Central lubrication:												
	0: None												
	CL: With central lubrication												
	Energy chain:												
	0: None												
	V1: Vertical, inner cross-section: 21 × 25 mm												
	V2: Vertical, inner cross-section: 21 × 38 mm												
	V3: Vertical, inner cross-section: 21 × 50 mm												
	V4: Vertical, inner cross-section: 21 × 68 mm												
	H1: Horizontal, inner cross-section: 21 × 25 mm												
	H2: Horizontal, inner cross-section: 21 × 38 mm												
	Limit switch connection:												
	E: Front Sub-D connector												
	S: Side outlet, 300 mm Sub-D connector												

Precision axes and precision systems

Linear motor axis LMX1A

7.4 General dimensions and specifications for LMX1A precision axes

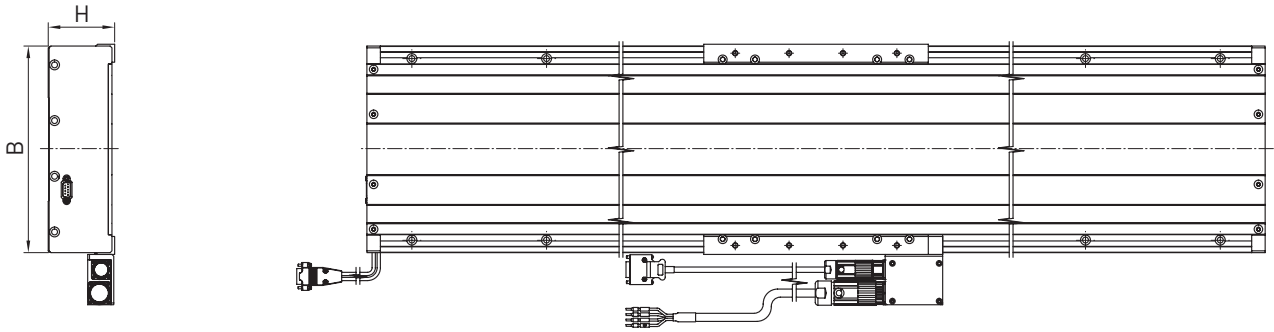


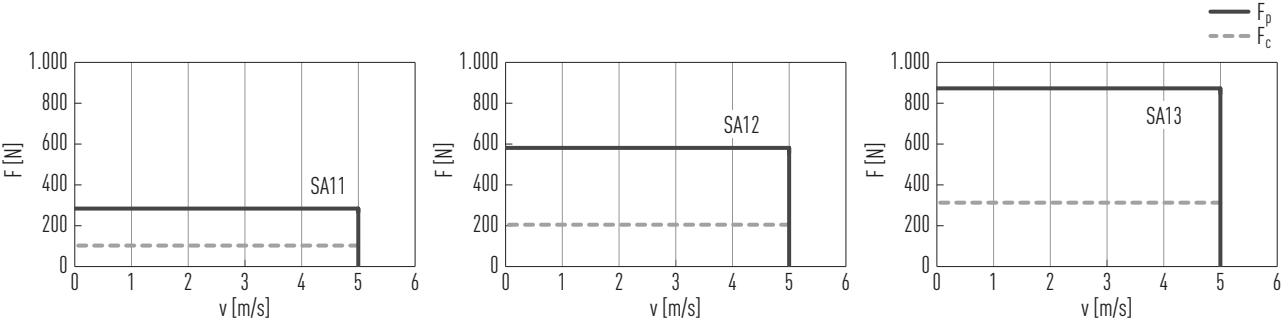
Table 7.2 General dimensions and specifications for LMX1A precision axes				
	Motor type	Max stroke length ST*	Profile width W	Profile height H
LMX1A-SA1	With iron core (LMSA)	4000	186	68
LMX1A-SA2	With iron core (LMSA)	4000	230	74
LMX1A-SA3	With iron core (LMSA)	4000	262	80

* Depending on the exact specification

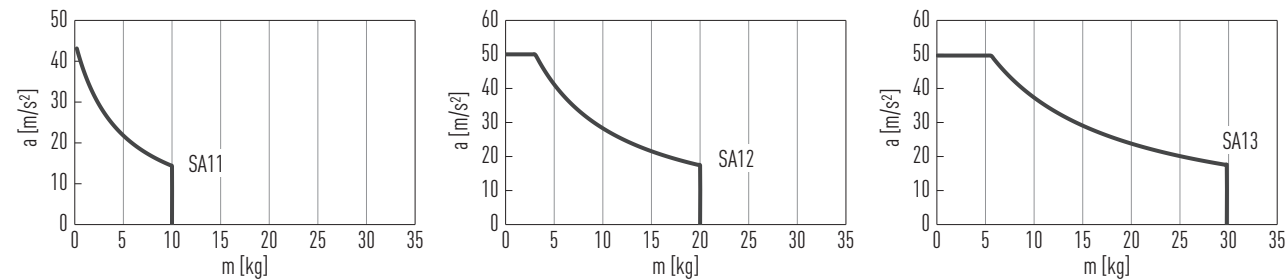
7.3 Dimensions and specifications for LMX1A precision axes

7.3.1 Characteristic curves of LMX1A-SA11/SA12/SA13

Force depending on speed (intermediate circuit voltage: 600 VDC)



Acceleration depending on load capacity (intermediate circuit voltage: 600 VDC)



7.3.2 Technical data for LMX1A -SA11/SA12/SA13

Table 7.1 Technical data for LMX1A-SA11/SA12/SA13					
	Symbol	Unit	LMX1A-SA11	LMX1A-SA12	LMX1A-SA13
Continuous force ¹⁾	F_c	N	103	205	308
Peak force ¹⁾	F_p	N	289	579	868
Stroke length		mm	100 – 4,000		

Resolution of distance measuring system			Type E/G: 1 µm; type K: 0.1 µm; type A: 1 V _{SS}		
Repeatability		µm	Type E/G: ±1; type K: ±0.5; type A: ±1		
Precision		µm	Type E/G: ±2; type K: ±1; type A: ±2		
Horizontal straightness		µm	10/500 mm		
Vertical straightness		µm	20/500 mm		
Moved mass		kg	5	6	8
Typical load capacity		kg	10	20	30

¹⁾ F_c: 100 % cyclic duration factor (CDF), with 120 °C coil temperature; F_p: 1 s

For the electrical parameters for the linear motors see catalogue "Linear Motors and Distance Measuring Systems"

7.4.1 Dimensions of LMX1A-SA11/SA12/SA13

Table 7.3 Dimensions of LMX1A-SA11 (for dimensional drawing see Page 108)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	4	5	6	6	7	8	8	9
Total length LT [mm]	400	500	600	700	800	900	1,000	1,100	1,200	1,300
LA [mm]	25	25	65	75	25	75	50	25	75	50
LB [mm]	—	—	—	—	750	750	900	1,050	1,050	1,200
LC [mm]	100	100	100	150	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	150	250	270	250	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

Table 7.4 Dimensions of LMX1A-SA12 (for dimensional drawing see Page 109)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	4	6	6	7	8	8	9	10
Total length LT [mm]	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400
LA [mm]	25	65	75	25	75	50	25	75	50	25
LB [mm]	—	—	—	750	750	900	1,050	1,050	1,200	1,350
LC [mm]	100	100	150	—	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	250	270	250	—	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

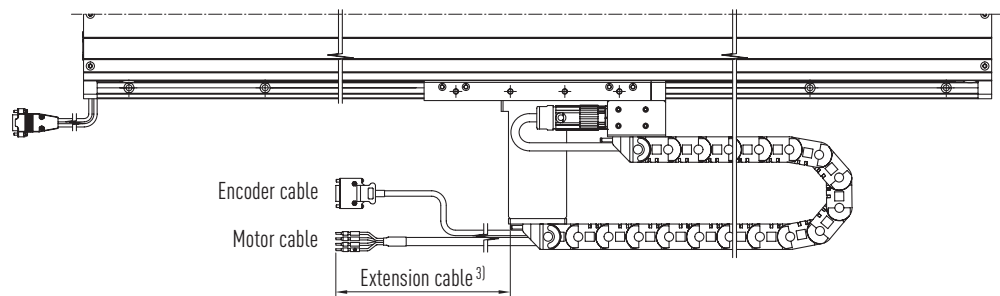
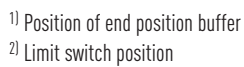
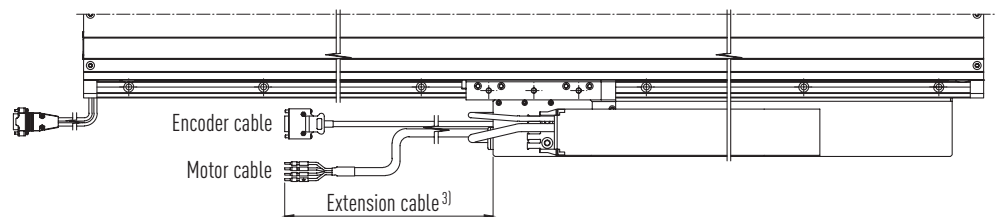
Table 7.5 Dimensions of LMX1A-SA13 (for dimensional drawing see Page 110)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	6	6	7	8	8	9	10	10
Total length LT [mm]	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
LA [mm]	65	75	25	75	50	25	75	50	25	75
LB [mm]	—	—	750	750	900	1,050	1,050	1,200	1,350	1,350
LC [mm]	100	150	—	—	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	270	250	—	—	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

Linear motor axis LMX1A

Without energy supply

[illegible]

⁴⁾ For inner width of energy chain see order code on Page 105

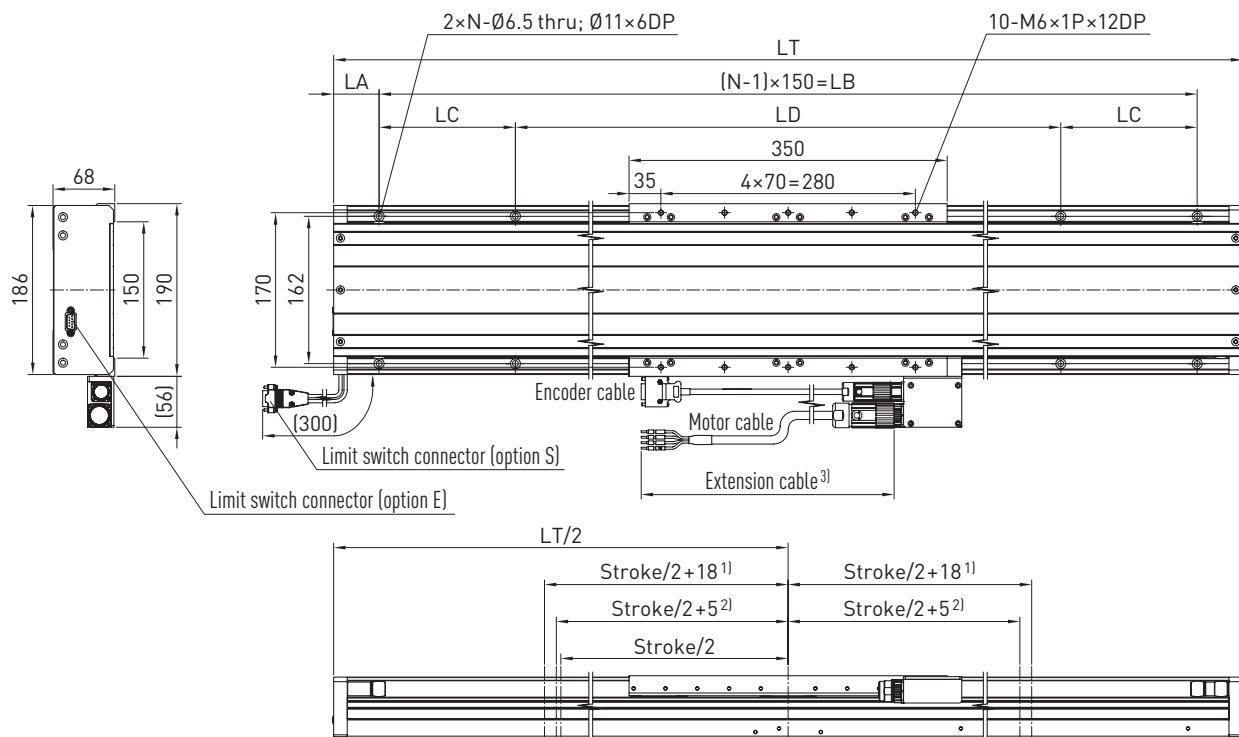
All specifications in mm

Precision axes and precision systems

Linear motor axis LMX1A

Dimensional drawing for LMX1A-SA13

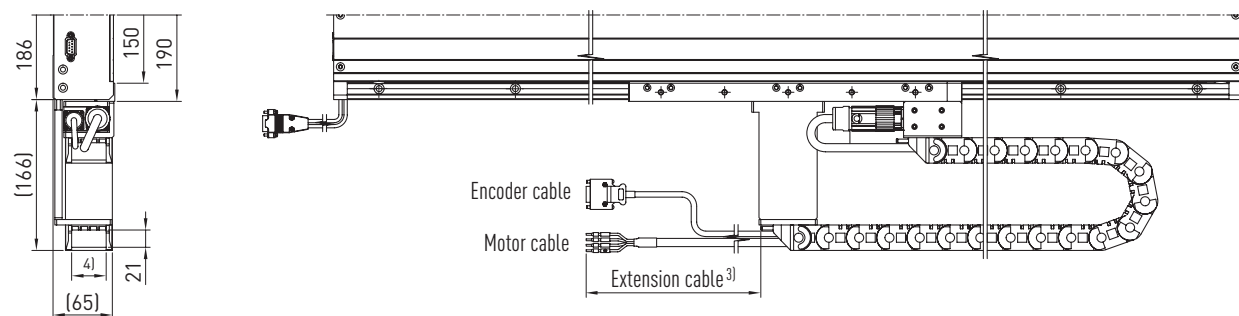
Without energy supply



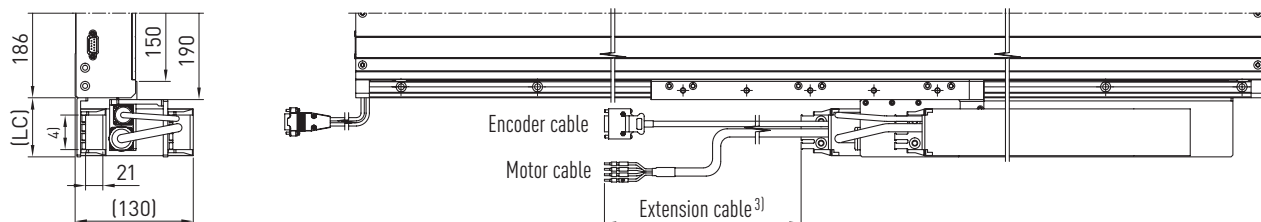
¹⁾ Position of end position buffer

²⁾ Limit switch position

Horizontal energy supply



Vertical energy supply



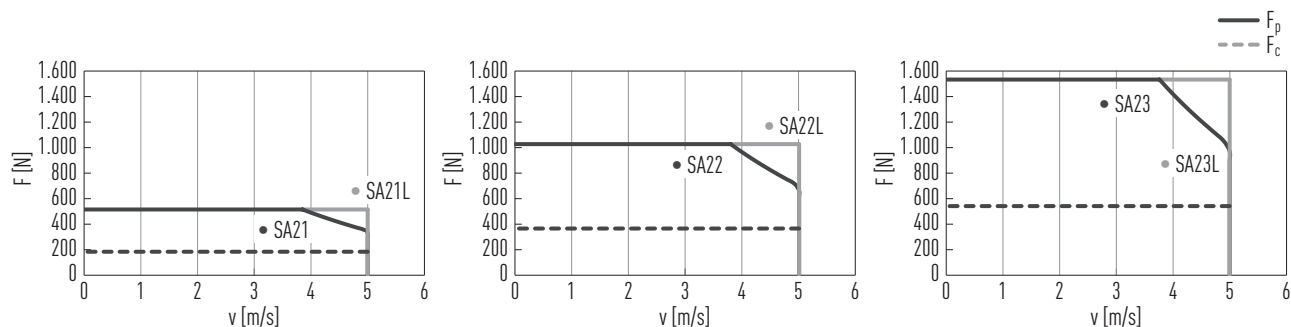
³⁾ Optional

⁴⁾ For inner width of energy chain see order code on Page 105

All specifications in mm

7.4.2 Specifications of LMX1A-SA21/SA22/SA23

Force depending on speed (intermediate circuit voltage: 600 VDC)



Acceleration depending on load capacity (intermediate circuit voltage: 600 VDC)

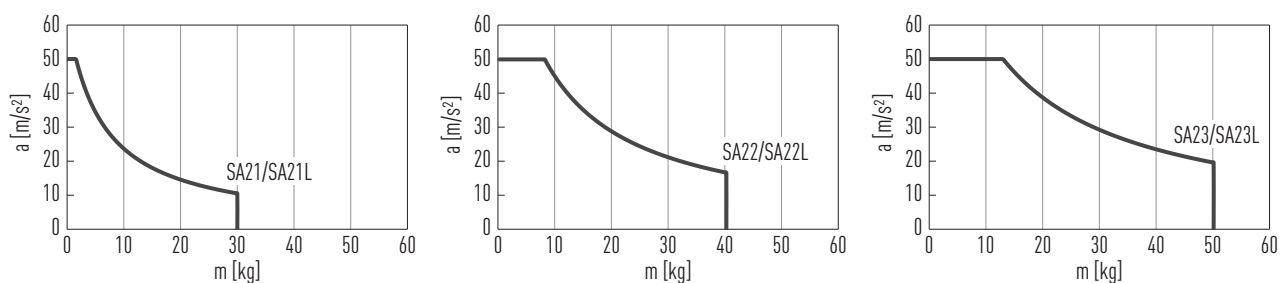


Table 7.6 Technical data for LMX1A-SA21/SA22/SA23

	Symbol	Unit	LMX1A-SA21(L)	LMX1A-SA22(L)	LMX1A-SA23(L)
Continuous force ¹⁾	F_c	N	181	362	544
Peak force ¹⁾	F_p	N	512	1,023	1,535
Stroke length		mm	100 – 4,000		
Resolution of distance measuring system			Type E/G: 1 μm ; type K: 0.1 μm ; type A: 1 V_{SS}		
Repeatability		μm	Type E/G: ± 1 ; type K: ± 0.5 ; type A: ± 1		
Precision		μm	Type E/G: ± 2 ; type K: ± 1 ; type A: ± 2		
Horizontal straightness		μm	10/500 mm		
Vertical straightness		μm	20/500 mm		
Moved mass		kg	6	8	11
Typical load capacity		kg	30	40	50

¹⁾ F_c : 100 % cyclic duration factor (CDF), with 120 °C coil temperature; F_p : 1 s

For the electrical parameters for the linear motors see catalogue "Linear Motors and Distance Measuring Systems"

Precision axes and precision systems

Linear motor axis LMX1A

7.4.3 Dimensions of LMX1A-SA21/SA22/SA23

Table 7.7 Dimensions of LMX1A-SA21 (for dimensional drawing see Page 113)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	4	5	6	6	7	8	8	9
Total length LT [mm]	400	500	600	700	800	900	1,000	1,100	1,200	1,300
LA [mm]	25	25	65	75	25	75	50	25	75	50
LB [mm]	—	—	—	—	750	750	900	1,050	1,050	1,200
LC [mm]	100	100	100	150	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	150	250	270	250	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

Table 7.8 Dimensions of LMX1A-SA22 (for dimensional drawing see Page 114)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	4	6	6	7	8	8	9	10
Total length LT [mm]	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400
LA [mm]	25	65	75	25	75	50	25	75	50	25
LB [mm]	—	—	—	750	750	900	1,050	1,050	1,200	1,350
LC [mm]	100	100	150	—	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	250	270	250	—	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

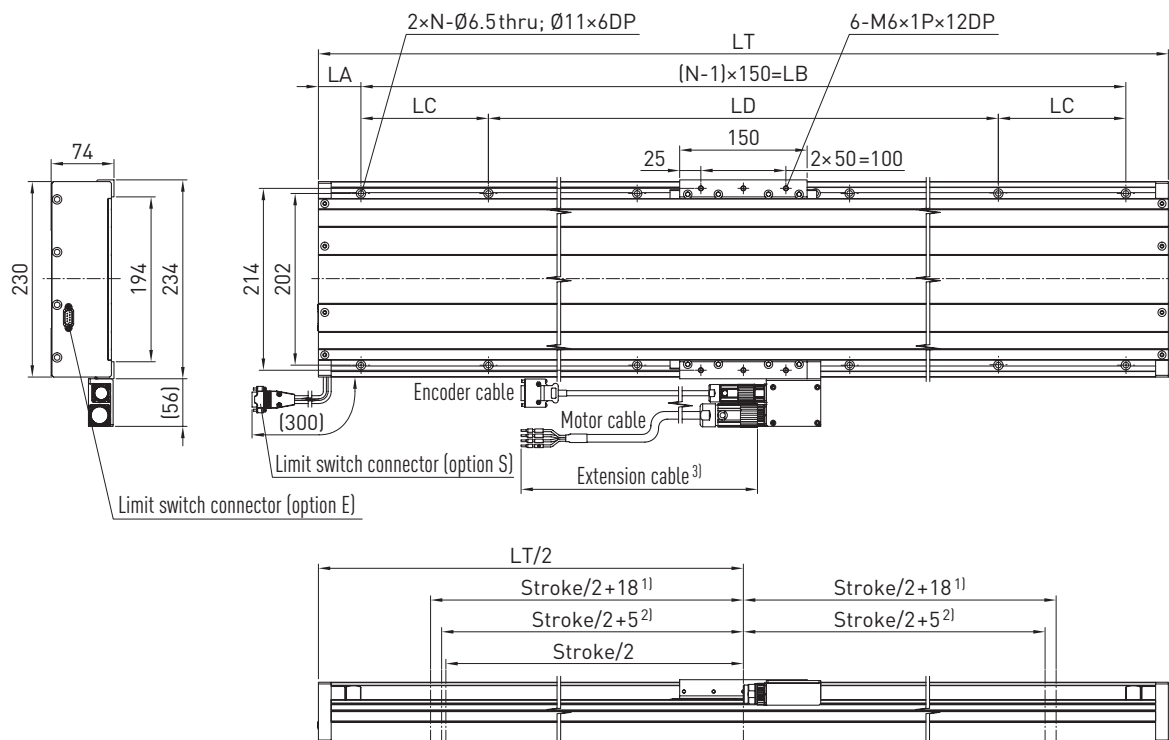
Table 7.9 Dimensions of LMX1A-SA23 (for dimensional drawing see Page 115)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	6	6	7	8	8	9	10	10
Total length LT [mm]	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
LA [mm]	65	75	25	75	50	25	75	50	25	75
LB [mm]	—	—	750	750	900	1,050	1,050	1,200	1,350	1,350
LC [mm]	100	150	—	—	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	270	250	—	—	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

Dimensional drawing for LMX1A-SA21

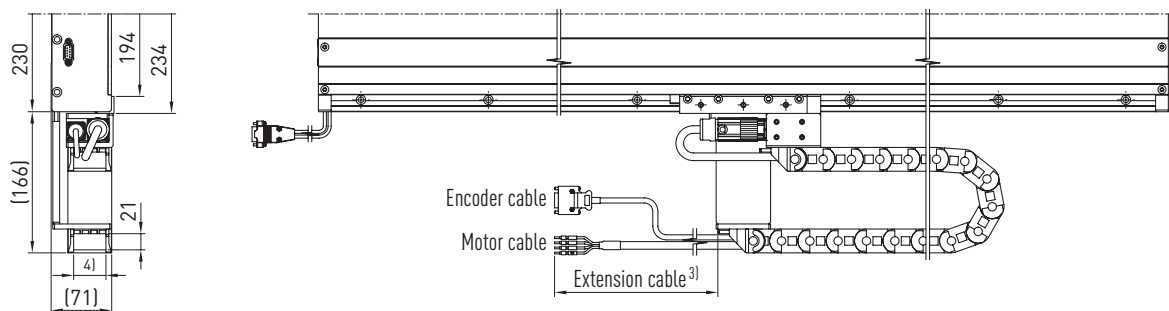
Without energy supply



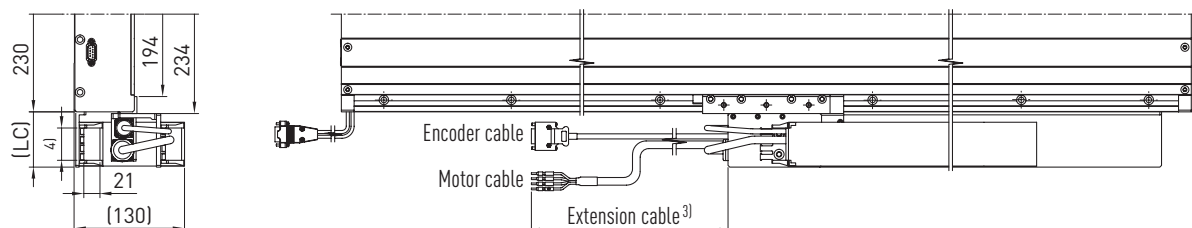
¹⁾ Position of end position buffer

²⁾ Limit switch position

Horizontal energy supply



Vertical energy supply



³⁾ Optional

⁴⁾ For inner width of energy chain see order code on Page 105

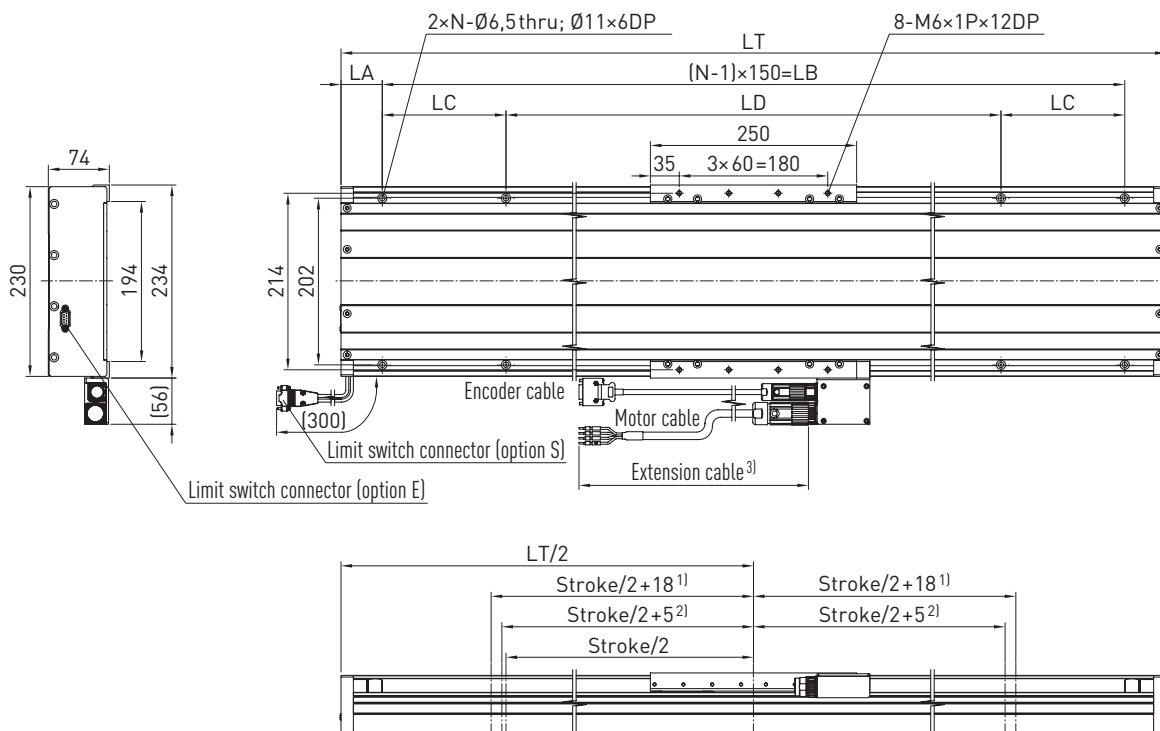
All specifications in mm

Precision axes and precision systems

Linear motor axis LMX1A

Dimensional drawing for LMX1A-SA22

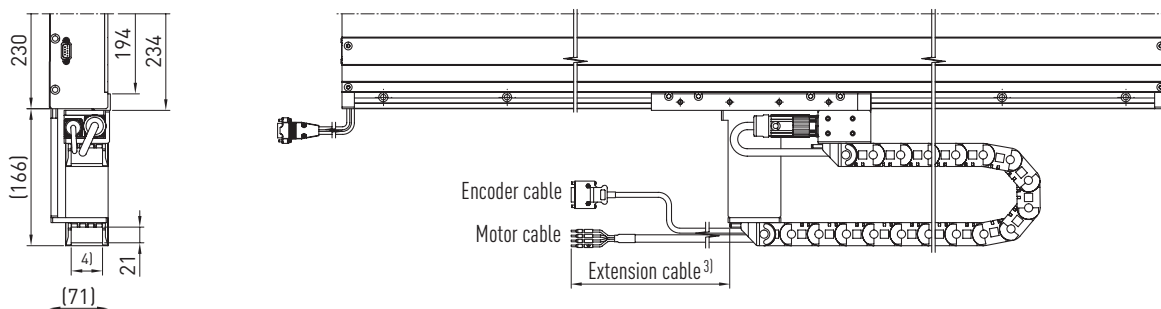
Without energy supply



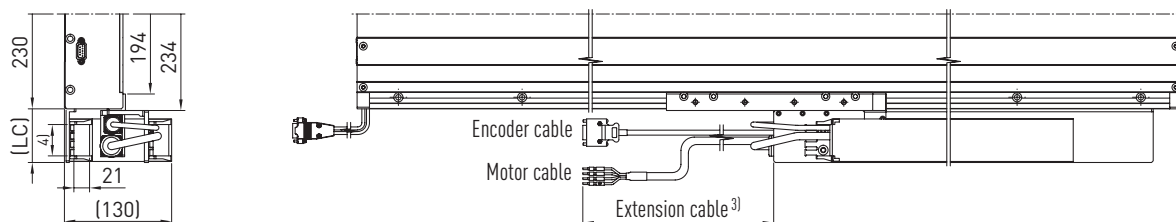
¹) Position of end position buffer

²) Limit switch position

Horizontal energy supply



Vertical energy supply



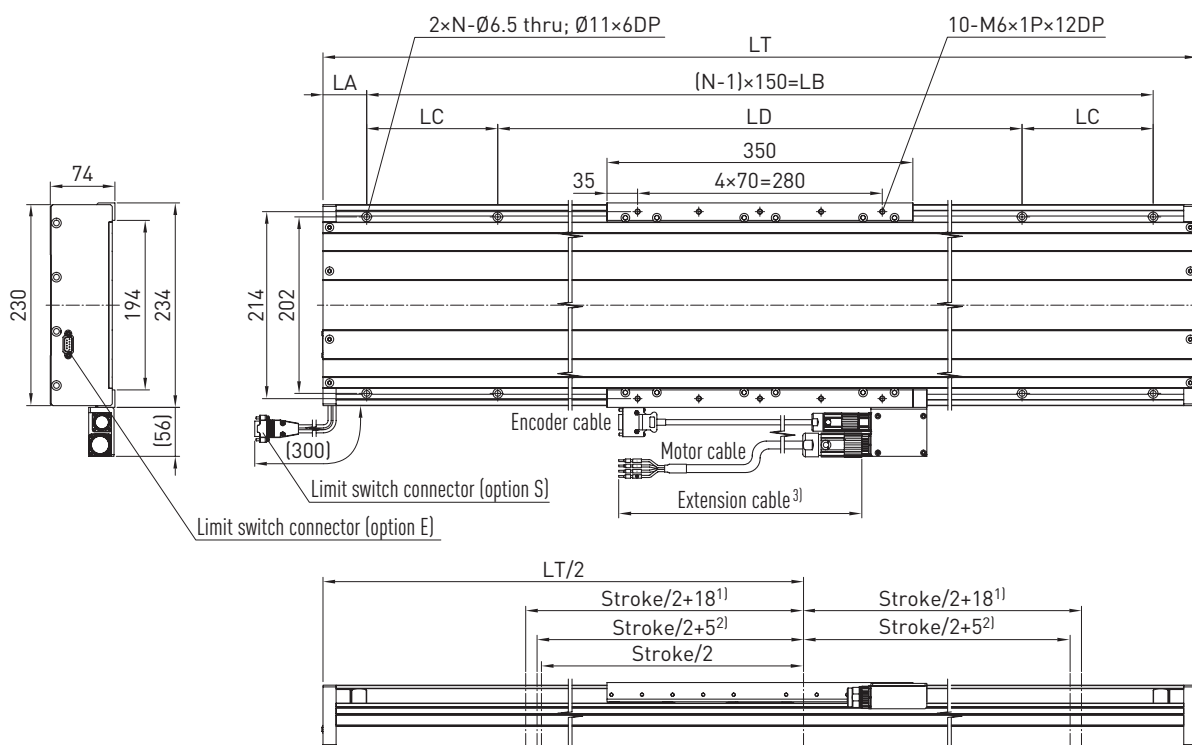
³) Optional

⁴) For inner width of energy chain see order code on Page 105

All specifications in mm

Dimensional drawing for LMX1A-SA23

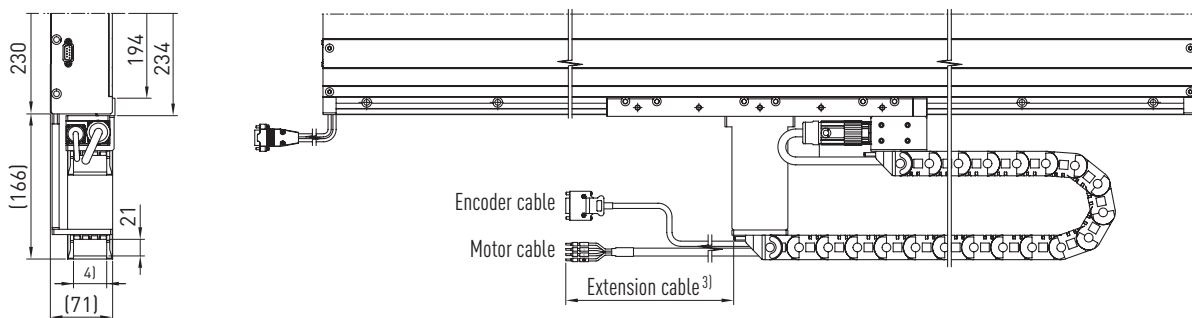
Without energy supply



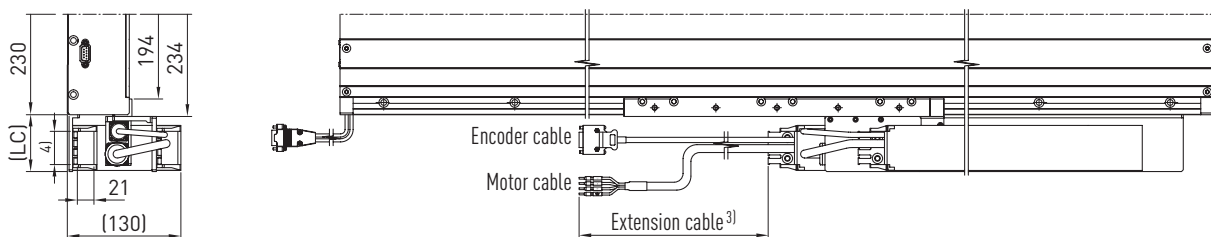
¹⁾ Position of end position buffer

²⁾ Limit switch position

Horizontal energy supply



Vertical energy supply



³⁾ Optional

⁴⁾ For inner width of energy chain see order code on Page 105

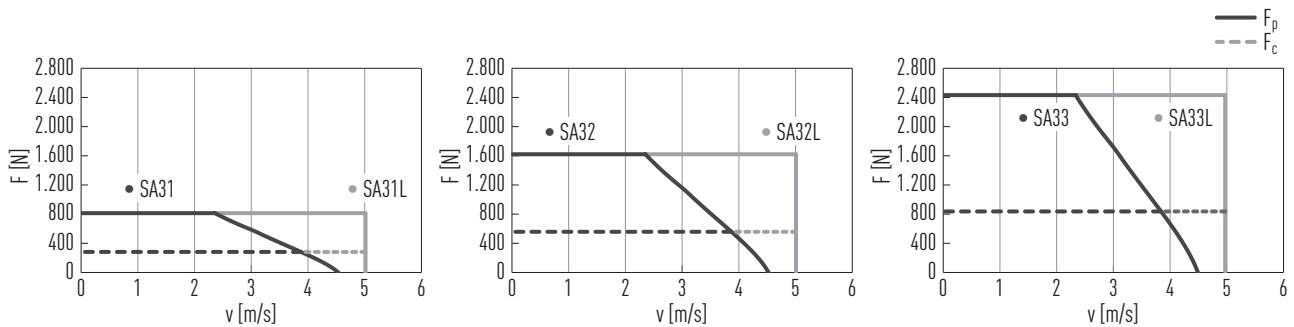
All specifications in mm

Precision axes and precision systems

Linear motor axis LMX1A

7.4.4 Specifications of LMX1A-SA31/SA32/SA33

Force depending on speed (intermediate circuit voltage: 600 VDC)



Acceleration depending on load capacity (intermediate circuit voltage: 600 VDC)

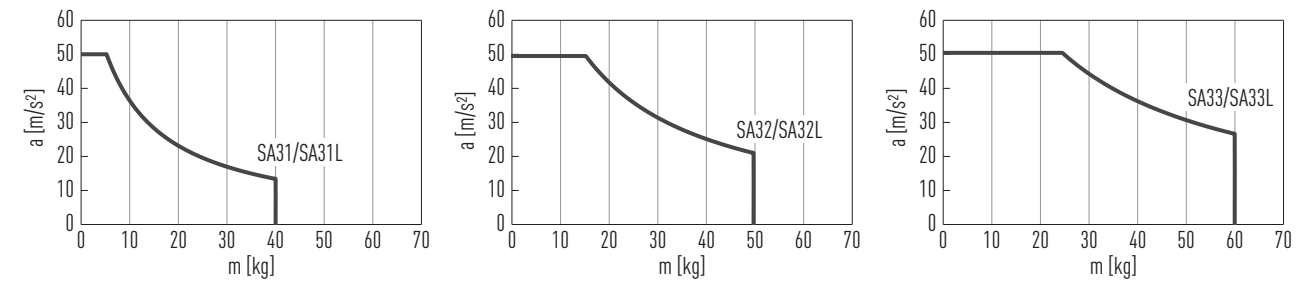


Table 7.10 Technical data for LMX1A-SA31/SA32/SA33

	Symbol	Unit	LMX1A-SA31(L)	LMX1A-SA32(L)	LMX1A-SA33(L)
Continuous force ¹⁾	F_c	N	292	583	875
Peak force ¹⁾	F_p	N	823	1,646	2,469
Stroke length		mm	100 – 4,000		
Resolution of distance measuring system			Type E/G: 1 μm ; type K: 0.1 μm ; type A: 1 V_{SS}		
Repeatability		μm	Type E/G: ± 1 ; type K: ± 0.5 ; type A: ± 1		
Precision		μm	Type E/G: ± 2 ; type K: ± 1 ; type A: ± 2		
Horizontal straightness		μm	10/500 mm		
Vertical straightness		μm	20/500 mm		
Moved mass		kg	7.5	10.5	14.5
Typical load capacity		kg	40	50	60

¹⁾ F_c : 100 % cyclic duration factor (CDF), with 120 °C coil temperature; F_p : 1 s

For the electrical parameters for the linear motors see catalogue "Linear Motors and Distance Measuring Systems"

7.4.5 Dimensions of LMX1A-SA31/SA32/SA33

Table 7.11 Dimensions of LMX1A-SA31 (for dimensional drawing see Page 118)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	4	5	6	6	7	8	8	9
Total length LT [mm]	400	500	600	700	800	900	1,000	1,100	1,200	1,300
LA [mm]	25	25	65	75	25	75	50	25	75	50
LB [mm]	—	—	—	—	750	750	900	1,050	1,050	1,200
LC [mm]	100	100	100	150	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	150	250	270	250	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

Table 7.12 Dimensions of LMX1A-SA32 (for dimensional drawing see Page 119)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	4	6	6	7	8	8	9	10
Total length LT [mm]	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400
LA [mm]	25	65	75	25	75	50	25	75	50	25
LB [mm]	—	—	—	750	750	900	1,050	1,050	1,200	1,350
LC [mm]	100	100	150	—	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	250	270	250	—	—	—	—	—	—	—

¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

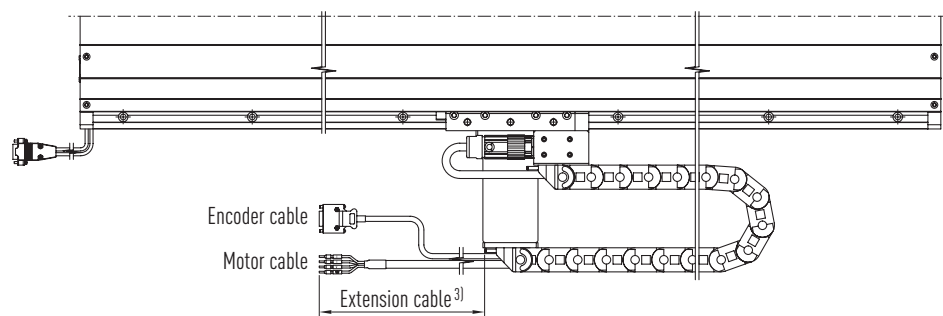
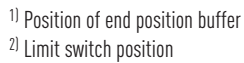
Table 7.13 Dimensions of LMX1A-SA33 (for dimensional drawing see Page 120)

Stroke length	100	200	300	400	500	600	700	800	900	1,000
N	4	4	6	6	7	8	8	9	10	10
Total length LT [mm]	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
LA [mm]	65	75	25	75	50	25	75	50	25	75
LB [mm]	—	—	750	750	900	1,050	1,050	1,200	1,350	1,350
LC [mm]	100	150	—	—	—	—	—	—	—	—
LC with energy chain V1/V2 [mm] ¹⁾	65									
LC with energy chain V3/V4 [mm] ¹⁾	95									
LD [mm]	270	250	—	—	—	—	—	—	—	—

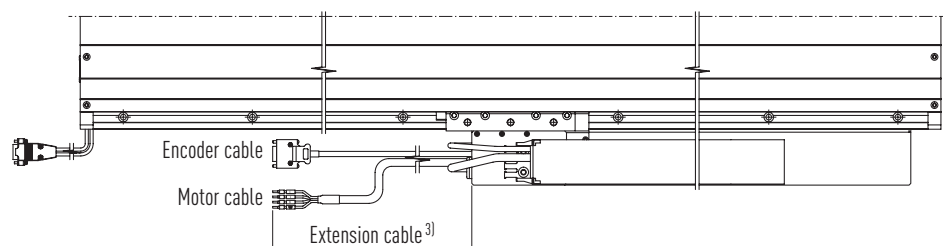
¹⁾ Dimension LC depends on the inner cross-section of the energy chain (see order code on Page 105)

Linear motor axis LMX1A

Without energy supply



Technical drawing of the rear view of the device. Dimensions include a total width of 262, a mounting hole diameter of 4, a central cutout width of 21, a distance of 226 from the top edge to the start of the cutout, and a total height of 266. The drawing also shows a central cutout and a mounting hole.

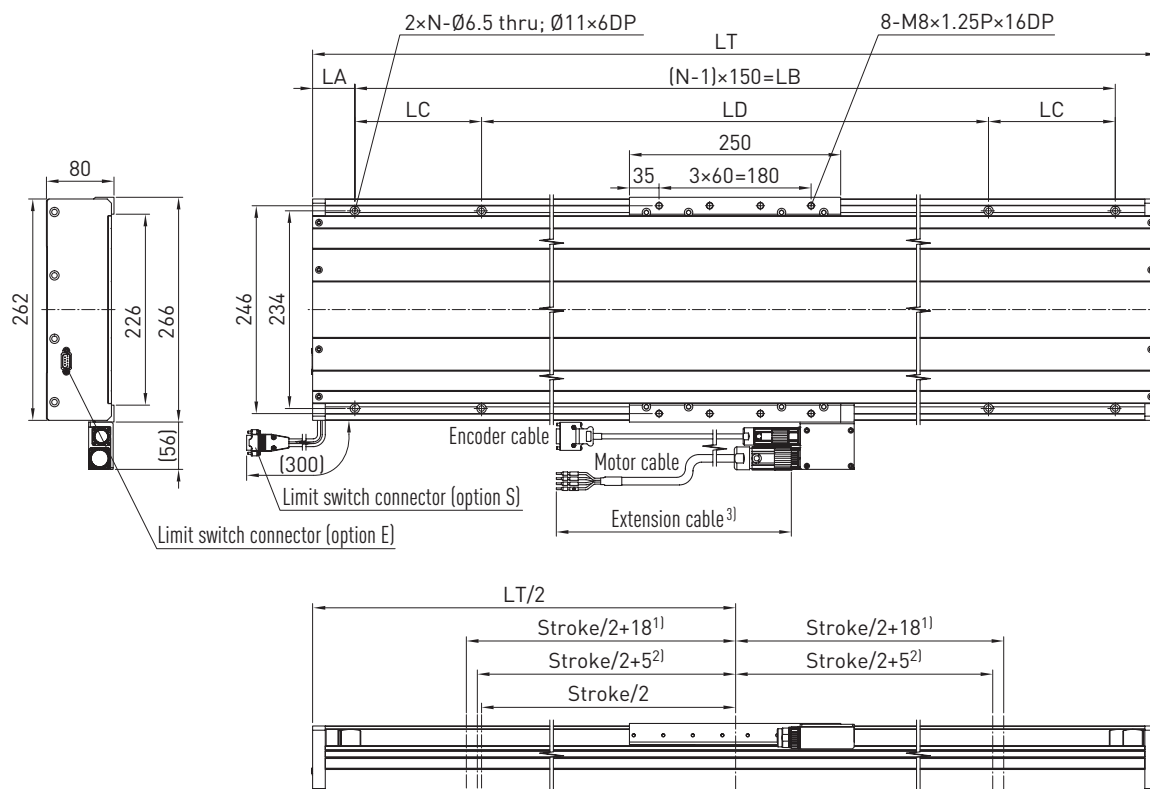


⁴⁾ For inner width of energy chain see order code on Page 105

All specifications in mm

Dimensional drawing for LMX1A-SA32

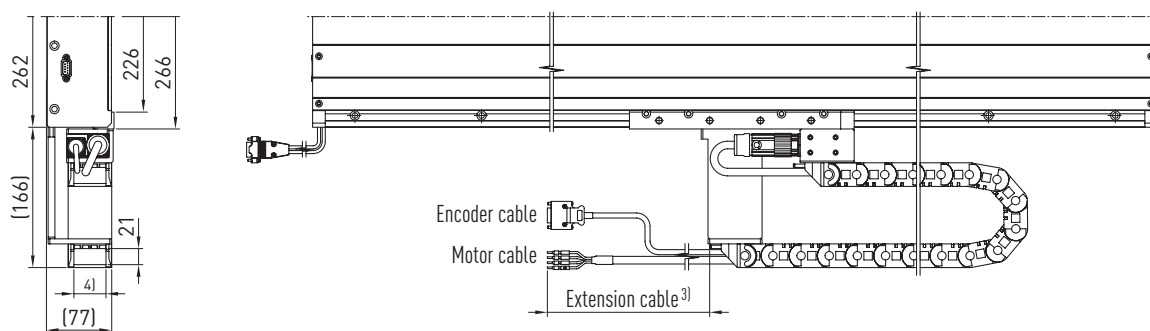
Without energy supply



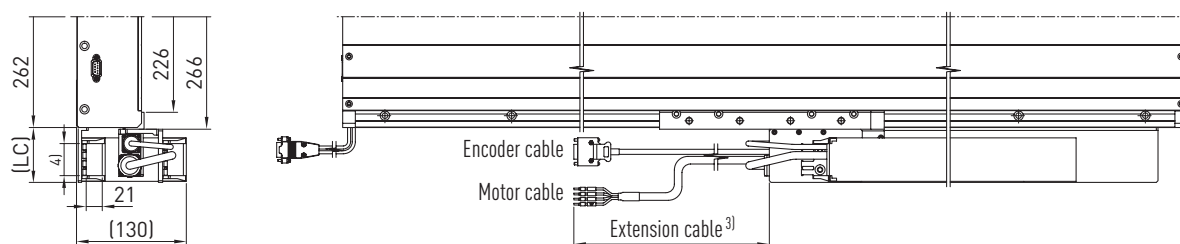
¹⁾ Position of end position buffer

²⁾ Limit switch position

Horizontal energy supply



Vertical energy supply



³⁾ Optional

⁴⁾ For inner width of energy chain see order code on [Page 105](#)

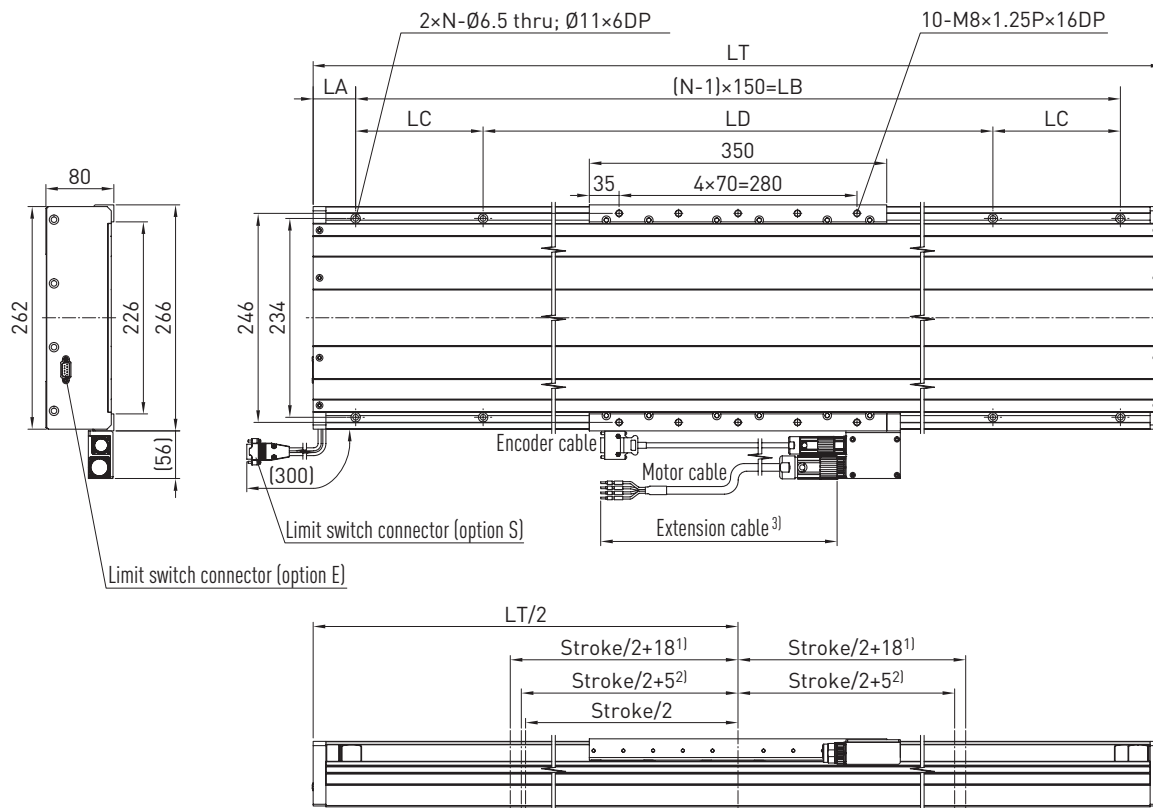
All specifications in mm

Precision axes and precision systems

Linear motor axis LMX1A

Dimensional drawing for LMX1A-SA33

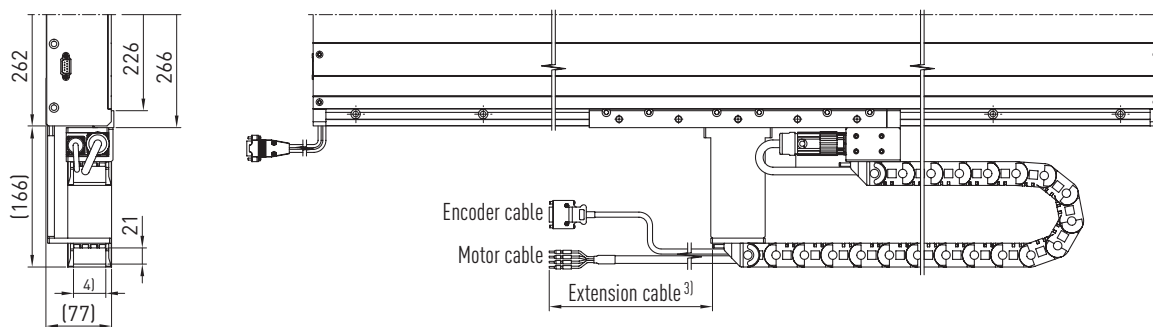
Without energy supply



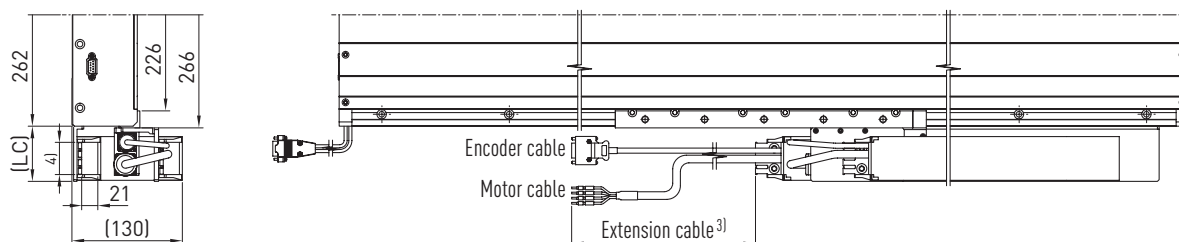
¹⁾ Position of end position buffer

²⁾ Limit switch position

Horizontal energy supply



Vertical energy supply



³⁾ Optional

⁴⁾ For inner width of energy chain see order code on [Page 105](#)

All specifications in mm

8. LMSSA2X precision cross tables

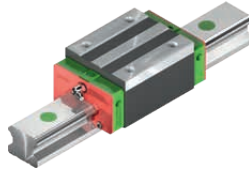
8.1 Properties of the LMSSA2X precision cross tables

HIWIN LMSSA2X precision cross tables are based on LMSSA precision axes and feature standardisation of available options including size, energy chain (cable routing) and encoder system. This reduction to the essentials means we can quickly create an offer and ensure short delivery times.



Linear guideway

A high-quality HIWIN double guide safely transfers forces and torques from the carriage to the axis profile. Four blocks are used per carriage, which are guided on two parallel, high-precision profile rails. SynchMotion™ technology with ball chain also ensures good synchronisation and very smooth running in all sizes.



Distance measuring systems

The distance measuring system is integrated into the inside of the axis to save space and determines the repeatability. Different measuring systems are available depending on the requirements for measuring method, interface and resolution.



Linear motor

The integrated HIWIN linear motors of the LMSA series ensure dynamic and precise positioning. Motors with iron core are the first choice when high feed forces are required.



Energy chain

Generously dimensioned energy chains in both axial directions provide space for safely carrying the supply lines.



LMSSA2X precision cross tables

LM	SSA	2X	10S	100	13S	200	200	200	K	A	S	0	B	0
Linear motor axis Series _____ Number of axes: _____ 2X: Two orthogonal axes Axis type of Y-axis: _____ 10S: LMSSA10 (with iron core) 13S: LMSSA13 (with iron core) Nominal force of Y-axis [N]: _____ 100, 200 Axis type of X-axis: _____ 13S: LMSSA13 (with iron core) 20S: LMSSA20 (with iron core) Nominal force of X-axis [N]: _____ 200, 300 Stroke length of Y-axis [mm]: _____ 200, 250, 300, 350, 400 Stroke length of X-axis [mm]: _____ 200, 250, 300, 350, 400, 450, 500													Type: 0: Standard Max. voltage [VDC]: B: 600 (standard) Connection interface: 0: Without energy chain 1: With horizontal energy chain (standard) Cover: S: Standard cover Axis limit switch: A: NPN (NC contact) B: PNP (NC contact) (standard) Distance measuring system: A: Optical, analogue, 1 V _{SS} sin/cos K: Optical, digital TTL, resolution 0.1 μm E: Magnetic, digital TTL, resolution 1 μm D: Magnetic, analogue, 1 V _{SS} sin/cos	

8.2.1 Technical data

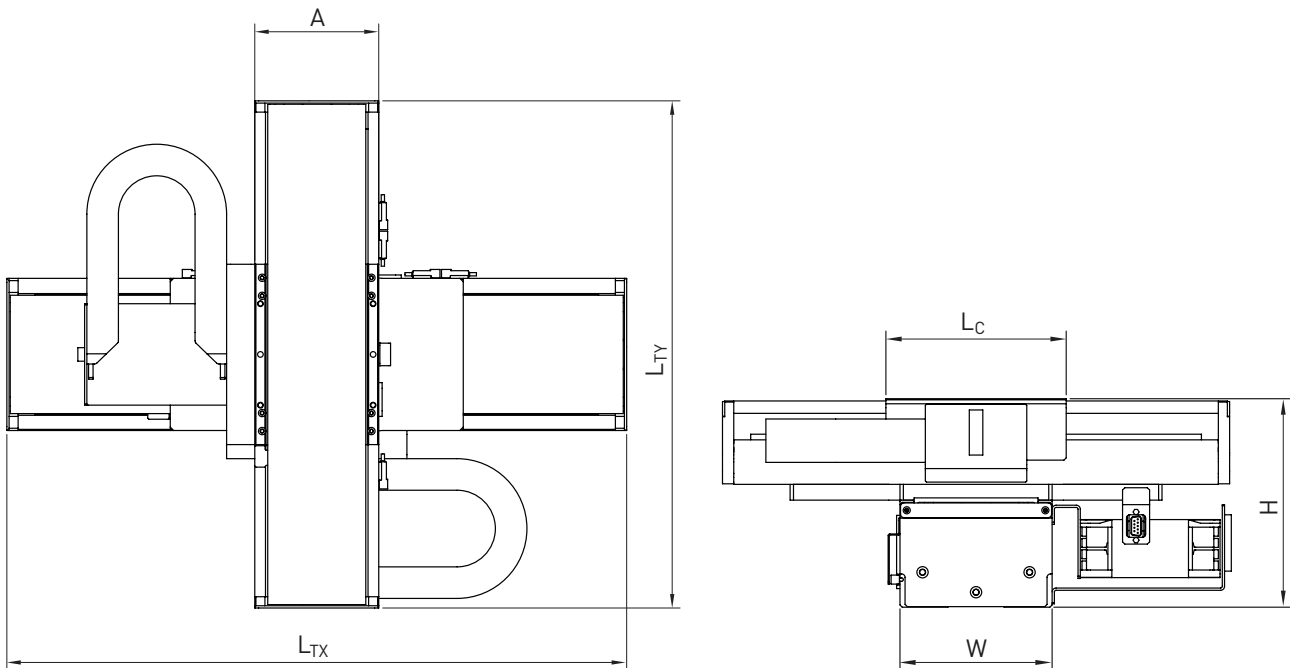


Table 8.1 Dimensions and specifications for LMSSA2X cross tables

	Symbol	Unit	10S100-13S200							13S200-20S300						
Stroke of Y-axis		mm	200	250	300	350	400	400	400	200	250	300	350	400	400	400
Stroke of X-axis		mm	200	250	300	350	400	450	500	200	250	300	350	400	450	500
Width of travel carriage	A	mm	110							135						
Length of travel carriage	L _C	mm	160							260						
Profile width of X-axis	W	mm	135							206						
Total height	H	mm	185							200						
Length of Y-axis	L _{TY}	mm	450	500	550	600	650	650	650	550	600	650	700	750	750	750
Length of X-axis	L _{TX}	mm	550	600	650	700	750	800	850	550	600	650	700	750	800	850
Continuous force of Y-axis	FC _Y	N	103							205						
Continuous force of X-axis	FC _X	N	205							362						
Peak force of Y-axis	FP _Y	N	289							579						
Peak force of X-axis	FP _X	N	579							1,023						
Max. speed ¹⁾	v _{max}	m/s	1.5													
Max. acceleration ¹⁾	a _{max}	m/s ²	20													
Max. load capacity		Kg	15							30						
Distance measuring system		—	A / K / E / D													
Repeatability		µm	±0.5 / ±1.0 / ±3.0 / ±3.0													
Absolute precision		µm	±1.0 / ±2.0 / ±6.0 / ±6.0													
Straightness		µm	±8 / 300 mm													
Flatness		µm	±8 / 300 mm													
Orthogonality		arc sec	10 (200 × 200 mm ²)													
Weight		kg	28.3	29.4	30.7	32.1	33.6	34.4	35	28.3	29.4	30.7	32.1	33.6	34.4	35
Energy chain of Y-axis		—	1400.025.075.0 (possible additional cables 2 × Ø 8mm)							1400.038.075.0 (possible additional cables 2 × Ø 8mm)						
Energy chain of X-axis		—	1400.038.075.0 (possible additional cables 2 × Ø 8mm)							1400.038.075.0 (possible additional cables 2 × Ø 8mm)						

¹⁾ Depends on stroke, load capacity, distance measuring system and other parameters

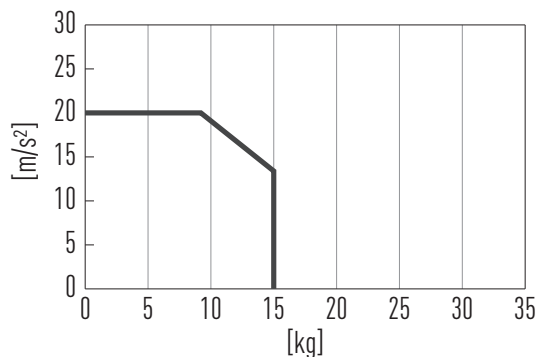
Precision axes and precision systems

LMSSA2X precision cross tables

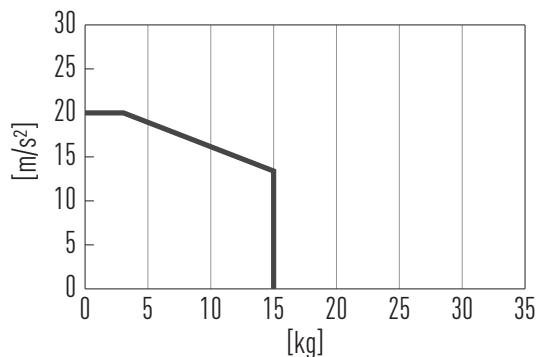
8.3 Dimensions and specifications for LMSSA2X cross tables

8.3.1 Characteristic curve for force depending on the speed and load capacity (intermediate circuit voltage 600VDC)

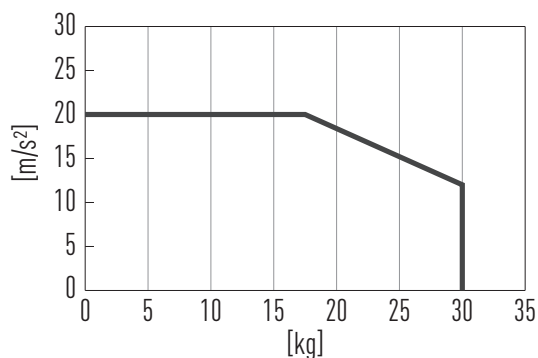
SSA-10S100



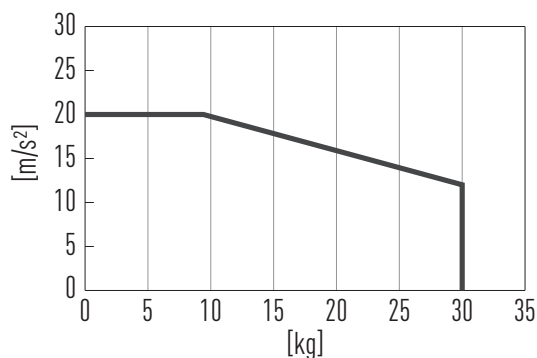
SSA-13S200



SSA-13S200



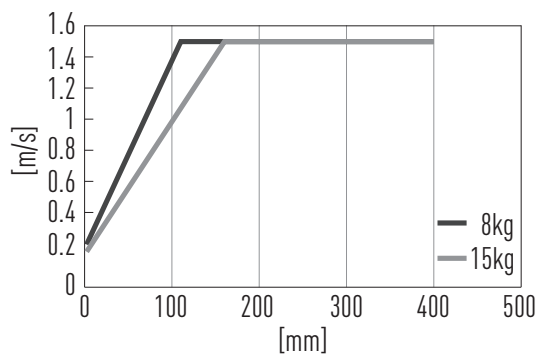
SSA-20S300



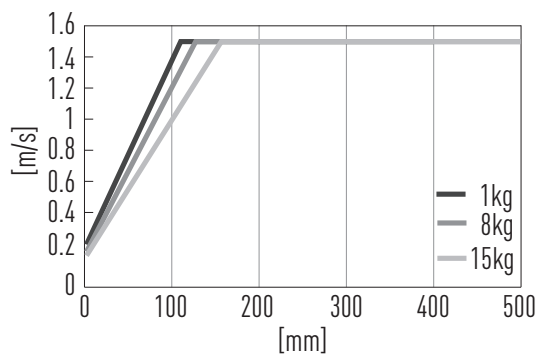
1) The characteristic curve already takes into consideration the service weight of the Y-axis

8.3.2 Characteristic curve for acceleration depending on load capacity (intermediate circuit voltage 600VDC)

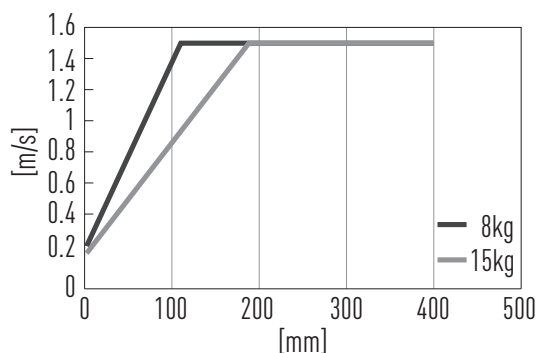
SSA-10S100



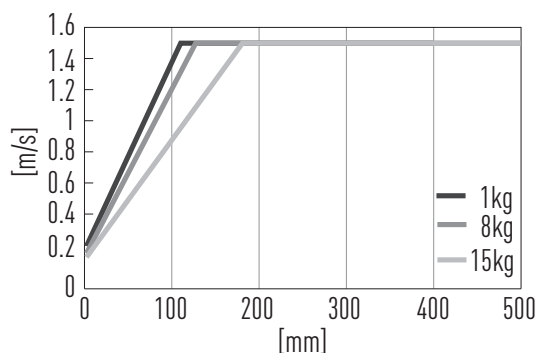
SSA-13S200



SSA-13S200



SSA-20S300



8.3.3 Dimensions of LMSSA2X-10S100-13S200

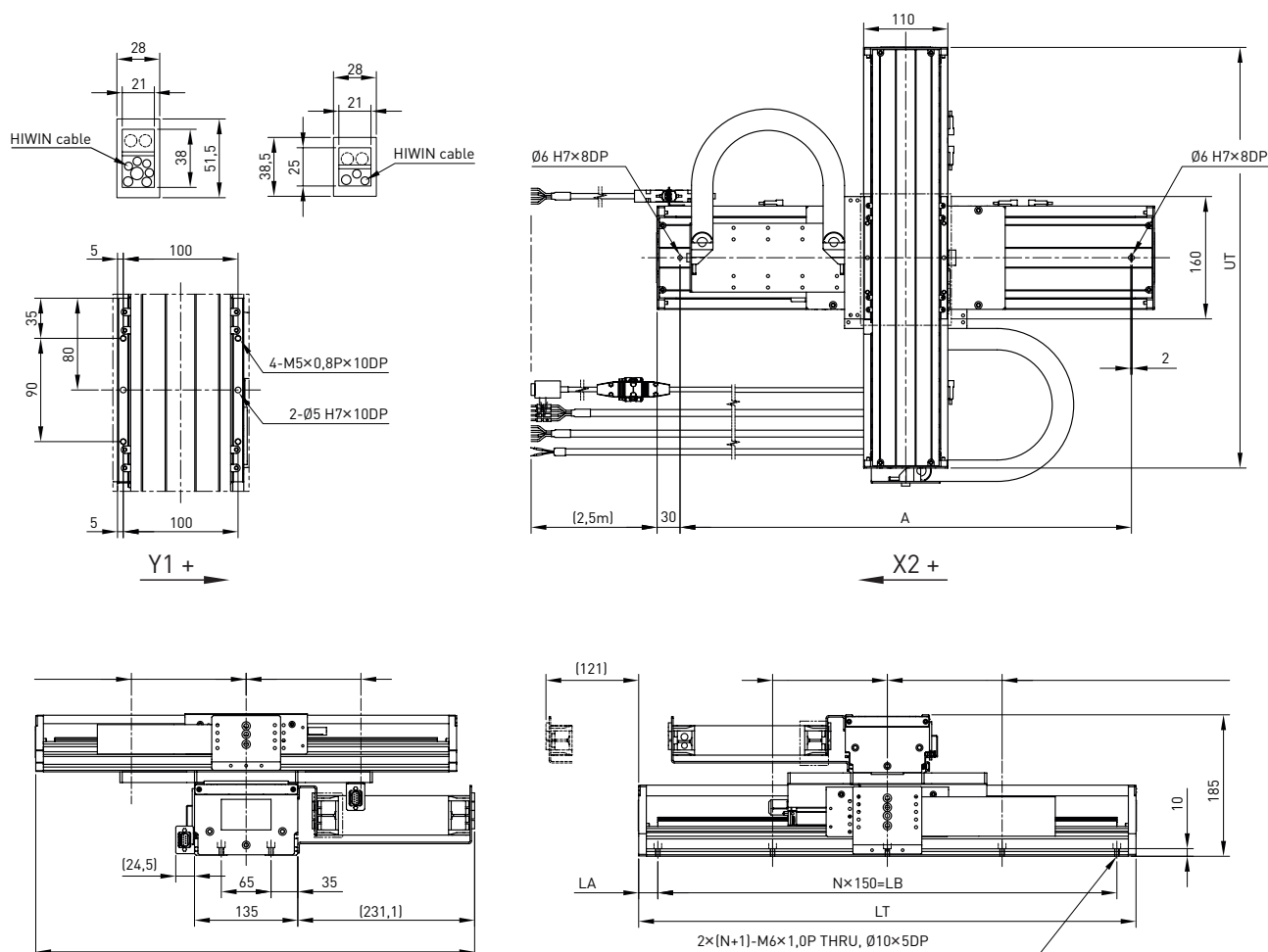


Table 8.2 Dimensions and specifications for LMSSA2X cross tables

	Unit	10S100-13S200						
Stroke of Y-axis	mm	200	250	300	350	400	400	400
Stroke of X-axis	mm	200	250	300	350	400	450	500
UT	mm	450	500	550	600	650	650	650
LT	mm	550	600	650	700	750	800	850
N	mm	3	3	4	4	4	5	5
LA	mm	50	75	25	50	75	25	50
LB	mm	450	450	600	600	600	750	750

Precision axes and precision systems

LMSSA2X precision cross tables

8.3.4 Dimensions of LMSSA2X-13S200-20S300

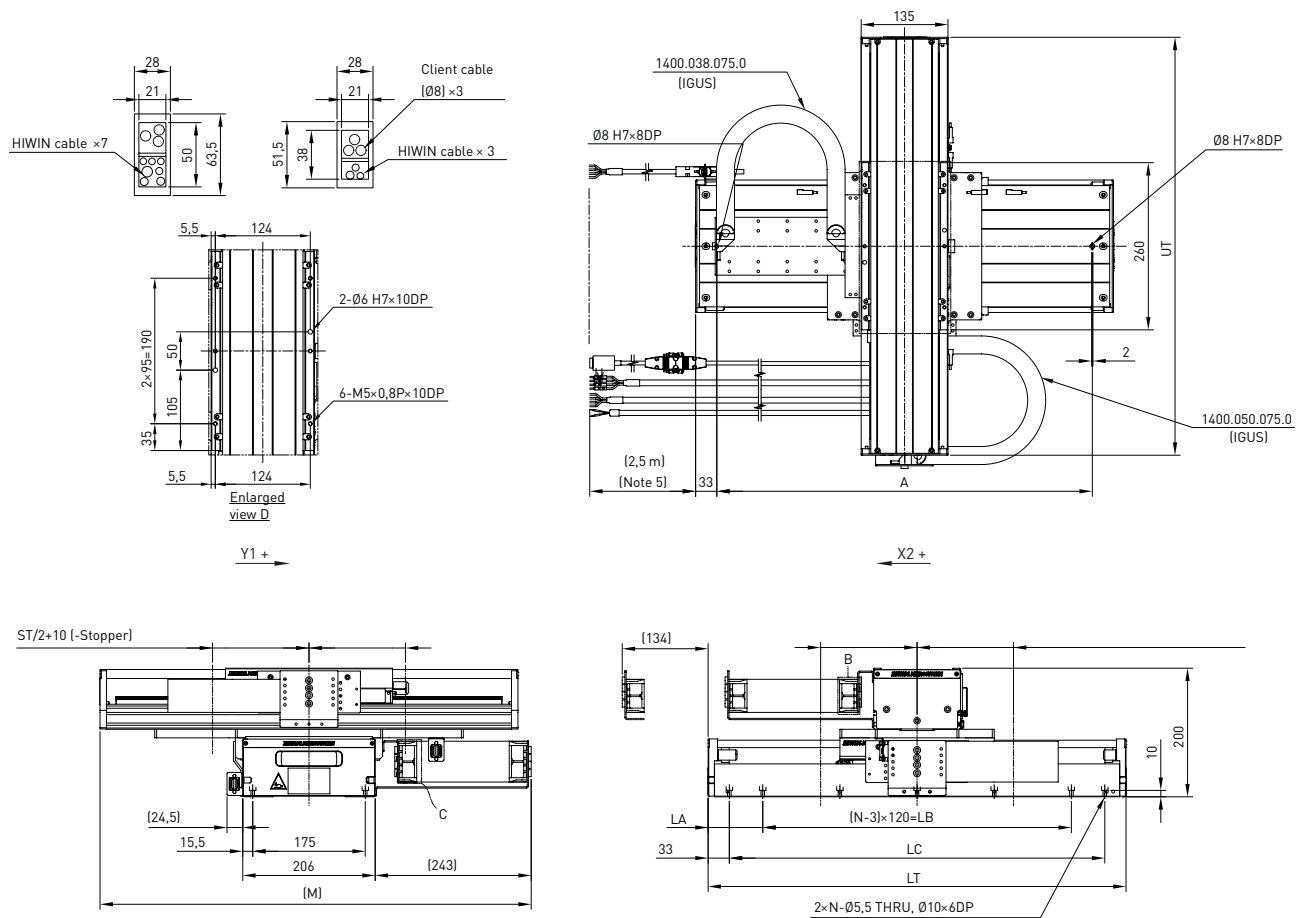


Table 8.3 Dimensions and specifications for LMSSA2X cross tables

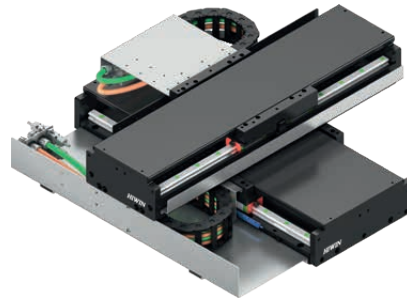
	Unit	10S100-13S200						
Stroke of Y-axis	mm	200	250	300	350	400	400	400
Stroke of X-axis	mm	200	250	300	350	400	450	500
UT	mm	550	600	650	700	750	750	750
LT	mm	550	600	650	700	750	800	850
N	mm	5	7	7	7	7	7	9
LA	mm	155	60	85	110	135	160	65
LB	mm	240	480	480	480	480	480	720
LC	mm	484	534	584	634	684	734	784

9. LMX2 precision cross tables

9.1 Properties of the LMX2C precision cross tables

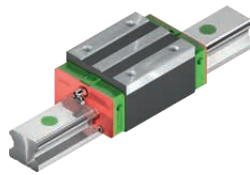
HIWIN LMX2 precision cross tables are based on LMX precision axes and can be customised to a high degree, meaning they can be adapted to customer-specific movement tasks. A wide range of options are available including encapsulation, motor type or encoder system. This means that the highest demands for precision and dynamics can be fulfilled.

- Stroke up to 500 mm in both axial directions
- Equipped with ironless linear motors
- Low inertia, high acceleration
- No cogging torque



Linear guideway

A high-quality HIWIN double guide safely transfers forces and torques from the carriage to the axis profile. Four blocks are used per carriage, which are guided on two parallel, high-precision profile rails. SynchMotion™ technology with ball chain also ensures good synchronisation and very smooth running in all sizes.



Distance measuring systems

The distance measuring system is integrated into the inside of the axis to save space and determines the repeatability. Different measuring systems are available depending on the requirements for measuring method, interface and resolution.



Linear motor

The integrated HIWIN linear motors of the ironless LMC series are the first choice for applications with the highest requirements for synchronisation.



Energy chain

Generously dimensioned energy chains in both axial directions provide space for safely carrying the supply lines.



LMX2 precision cross tables

	LM	X	2	C	CB5	CB8	400	500	K	1	AC
Linear motor axis											
Axis version:											
X: Horizontal axis											
Number of axes:											
2: Two orthogonal axes											
Axis profile:											
E: Ironless motors (LMC)											
C: Customer-specific											
Motor type of Y-axis:											
LMCxx: Motor size											
Motor type of X-axis:											
LMCxx: Motor size											
Stroke length of Y-axis [mm]											
Stroke length of X-axis [mm]											

Order number of the drawing,
multiple forcers, Hall sensor, weight
compensation, brake, special
mounting holes

Limit switches:
 0: None
 1: Inductive, PNP (standard)
 4: Inductive, NPN

Distance measuring system:
 A: Optical, analogue, 1 V_{SS} sin/cos
 K: Optical, digital TTL, resolution 0.1 μm
 C: Magnetic, analogue, 1 V_{SS} sin/cos
 D: Magnetic, analogue, 1 V_{SS} sin/cos,
integrated into guide rail
 X¹⁾: Magnetic, absolute with
 BiSS-C interface
 Magnetic, absolute with
 HIPERFACE interface
 Optical, absolute, encapsulated with
 EnDat interface
 Optical, absolute, encapsulated with
 DRIVE-CLiQ interface
 Optical, absolute, encapsulated with
 FANUC interface
 Optical, digital TTL, resolution 1 μm

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9.3 Dimensions and specifications for LMX2C precision cross tables

9.3.1 Technical data for LMX2C precision cross tables

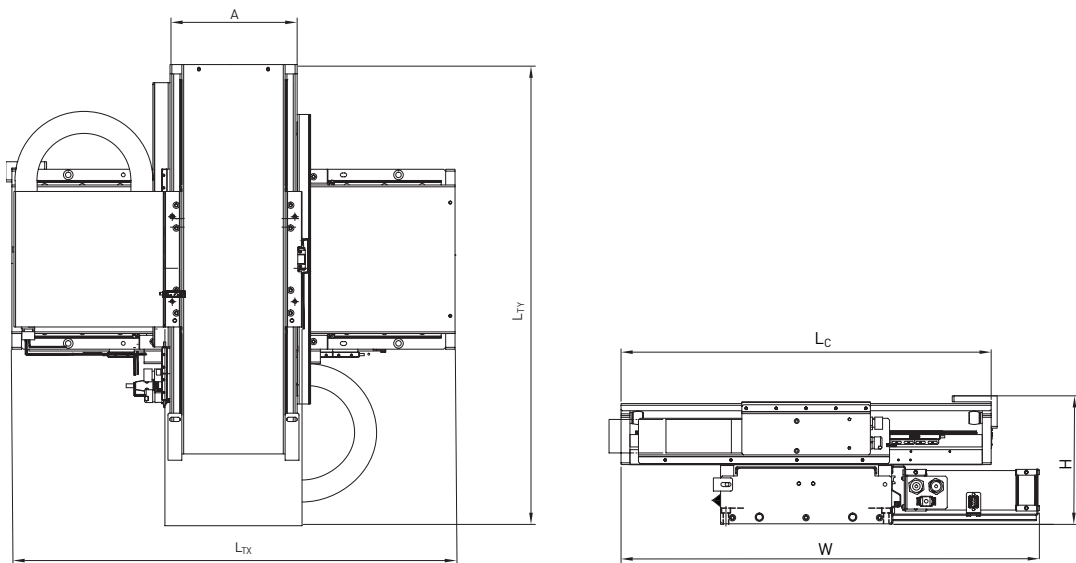


Table 9.1 Dimensions and specifications for LMX2C precision cross tables

	Symbol	Unit	LMX2C-CB5-CB8-300-300-K1AC	LMX2C-CB5-CB8-400-500-K1AC	LMX2C-CB5-CB8-500-500-K1AC
Stroke of Y-axis		mm	300	400	500
Stroke of X-axis		mm	300	500	500
Width of travel carriage	A	mm	218		
Length of travel carriage	LC	mm	215		
Profile width of X-axis	W	mm	286		
Total height	H	mm	205		
Length of Y-axis	LTY	mm	619	719	819
Length of X-axis	LTX	mm	704	904	904
Continuous force of Y-axis	FCY	N	91		
Continuous force of X-axis	FCX	N	145		
Peak force of Y-axis	FPY	N	364		
Peak force of X-axis	FPX	N	580		
Max. speed ¹⁾	v _{max}	m/s	0.3		
Max. acceleration ¹⁾	a _{max}	m/s ²	5		
Max. load capacity		Kg	5		
Distance measuring system	—		K: Optical, digital TTL, resolution 0.1 µm		
Repeatability		µm	±1		
Absolute precision		µm	±3		
Straightness		µm	±5 / 300 mm		
Flatness		µm	±5 / 300 mm		
Yaw		arc sec	±5 / 300 mm		
Pitch		arc sec	±5 / 300 mm		
Orthogonality		arc sec	10 (200 × 200 mm ²)		
Weight		kg	70	80	90
Energy chain of Y-axis	—		R6.29.040.055.0		
Energy chain of X-axis	—		R6.29.050.055.0		
Motor type of Y-axis			LMCB5		
Motor type of X-axis			LMCB8		
Article number			80088433	80089966	80090060

¹⁾ With maximum load capacity

Precision axes and precision systems

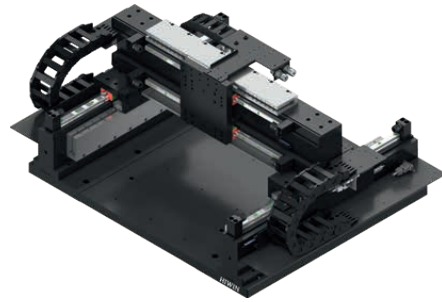
LMG precision gantry

10. LMG precision gantry

10.1 Properties of LMG precision gantry

HIWIN LMG precision gantries meet the highest requirements for precision and dynamics. Depending on the ambient conditions and the requirements, gantries that are driven on both sides or on one side are available. They are made of either aluminium or granite. The HIWIN standard offers different series with a wide variety of options. Customised solutions can also be developed with these options. Different drive options (linear motor or shaft) are also available for the Z-axis.

- Equipped with ironless linear motors
- No cogging torque
- Rigid overall system
- Seamlessly integrated into your system



Linear guideway

A high-quality HIWIN double guide safely transfers forces and torques from the carriage to the axis profile. Four blocks are used per carriage, which are guided on two parallel, high-precision profile rails. SynchMotion™ technology with ball chain also ensures good synchronisation and very smooth running in all sizes.



Distance measuring systems

The distance measuring system is integrated into the inside of the axis to save space and determines the repeatability. Different measuring systems are available depending on the requirements for measuring method, interface and resolution.



Linear motor

Integrated HIWIN linear motors of the ironless LMC series are the first choice for applications with the highest requirements for synchronisation.

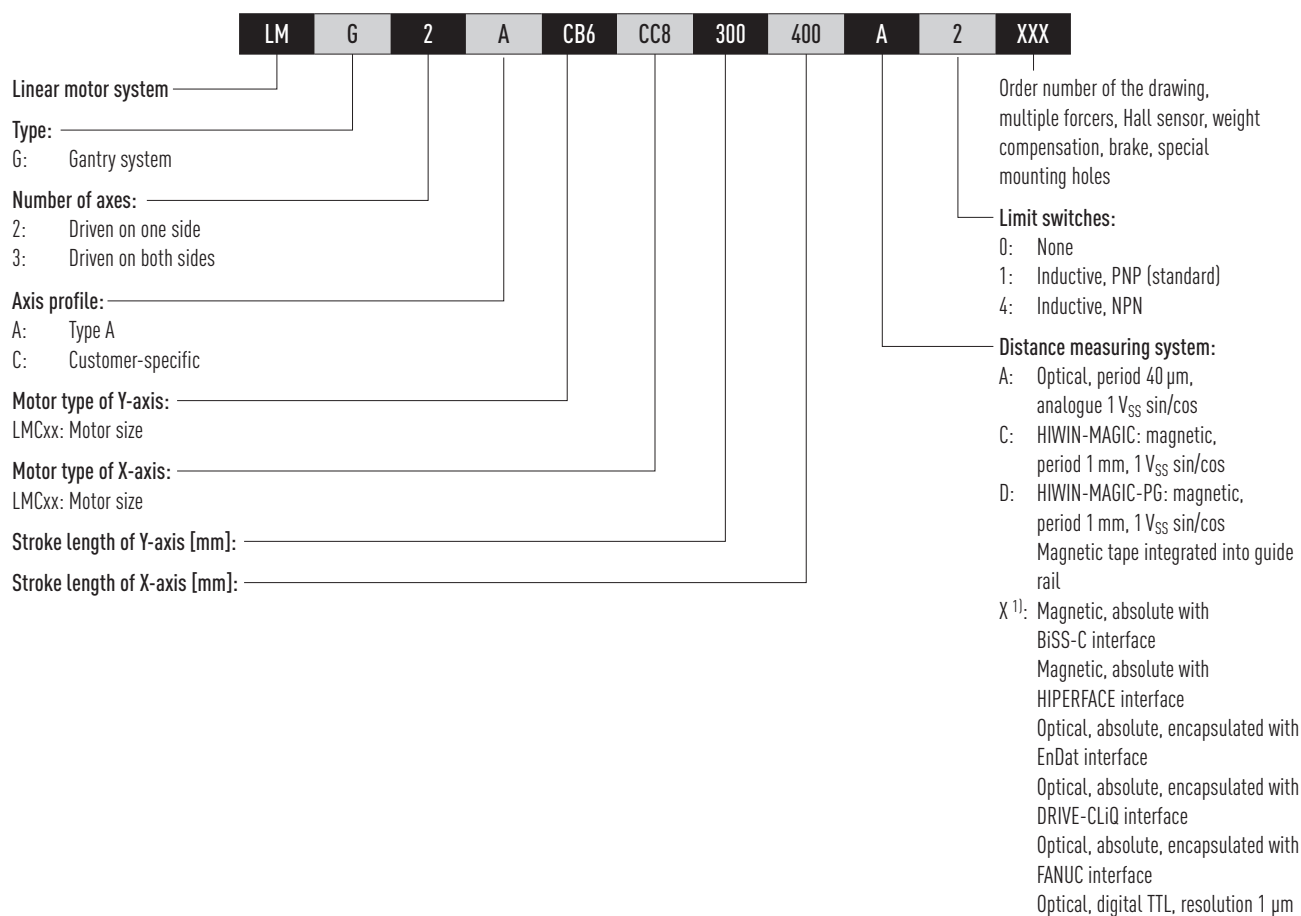


Energy chain

Generously dimensioned energy chains in both axial directions provide space for safely carrying the supply lines.



10.2 Order code of LMG precision gantry



¹⁾ Incomplete enumeration

Precision axes and precision systems

LMG precision gantry

10.3 Dimensions and specifications for LMG precision gantry

10.3.1 Technical data for LMG precision gantry

10.3.2 Dimensions for LMG precision gantry driven on one side

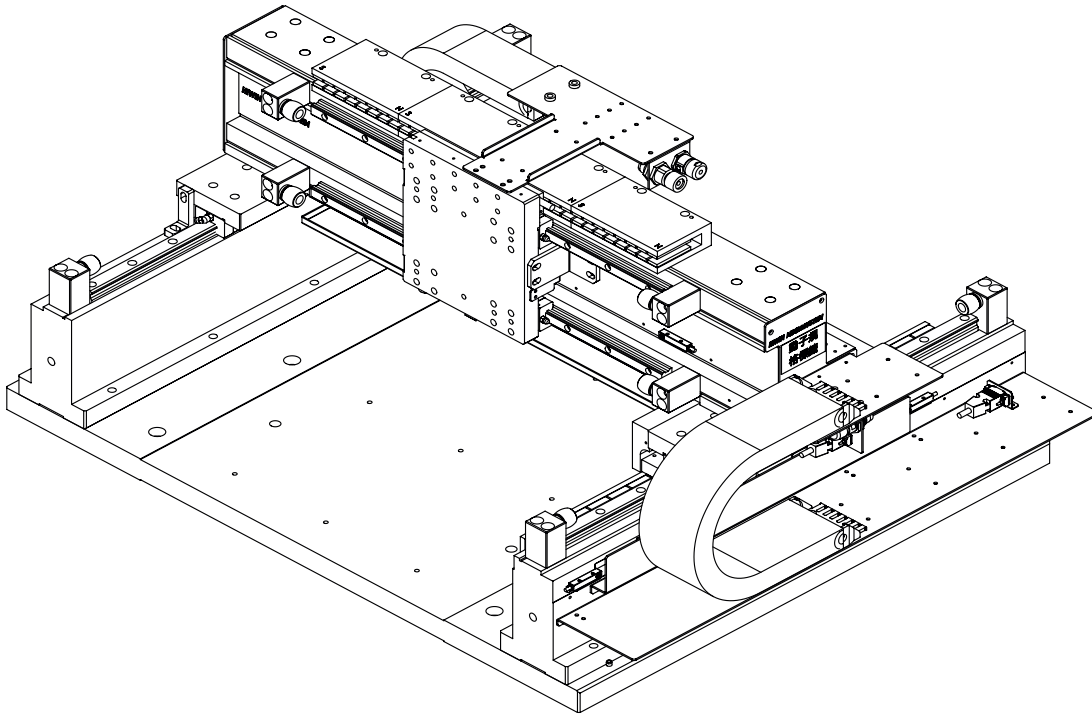


Table 10.1 Technical overview of LMG2

	Symbol	Unit	LMG2A-CB5-CEFE4-300-300-X10C	LMG2A-CB5-CEFE4-600-300-X10C	LMG2A-CB5-CEFE4-600-600-X10C
Stroke of Y-axis		mm	300	600	600
Stroke of X-axis		mm	300	300	600
Total length Y	W_y	mm	804	1,230	1,230
Total length X	W_x	mm	700	700	1,000
Total height	H	mm	427		
Motor type of Y-axis			LMCB5		
Motor type of X-axis			LMCEFE4		
Continuous force of Y-axis	F_{cy}	N	91		
Continuous force of X-axis	F_{cx}		200		
Peak force of Y-axis	F_{py}		364		
Peak force of X-axis	F_{px}		800		
Max. speed ¹⁾	v_{max}	m/s	0.5		
Max. acceleration ¹⁾	a_{max}	m/s ²	5		
Max. load capacity		Kg	10		
Distance measuring system			Absolute, BiSS-C, 26 bits		
Repeatability		μm	±2		
Absolute precision		μm	±3		
Straightness		μm	±10 / 300 mm		
Flatness		μm	±10 / 300 mm		
Orthogonality		arc sec	10 (200 × 200 mm ²)		
Yaw		arc sec	±10 / 300 mm		
Pitch		arc sec	±10 / 300 mm		
Weight		Kg	140	170	210
Energy chain of Y-axis			1400.068.075.0		
Energy chain of X-axis			1400.050.048.0		
Article number			80090091	80090092	80090093

¹⁾ With maximum load capacity

10.3.3 Dimensions for LMG precision gantry driven on both sides

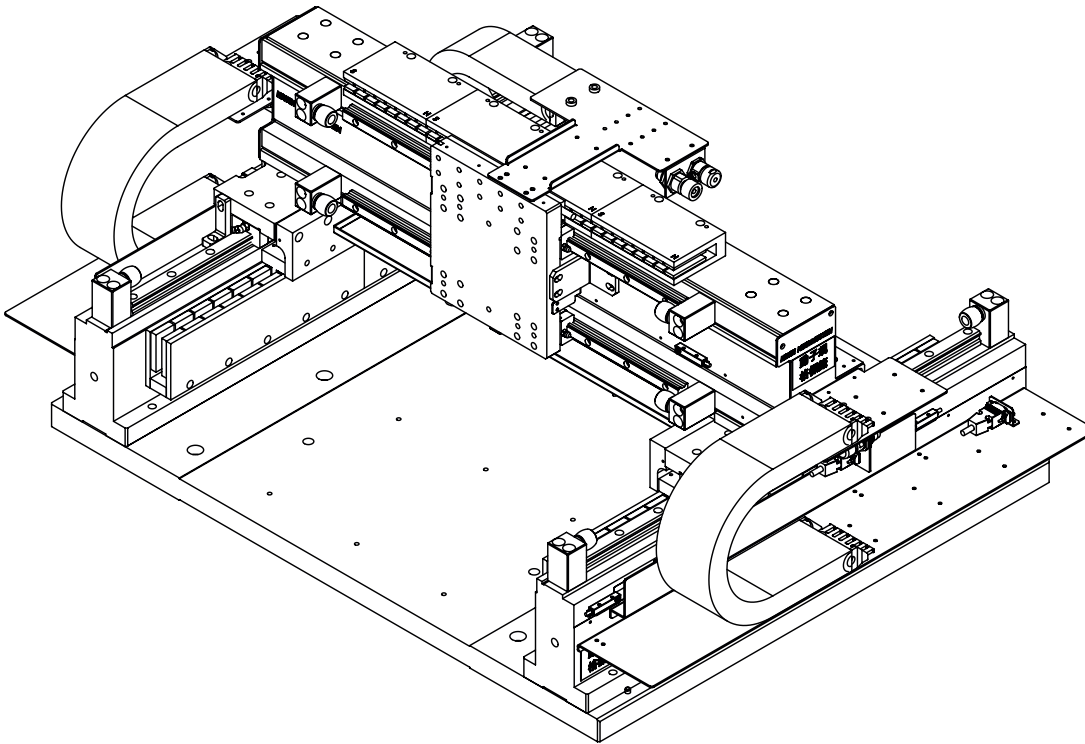


Table 10.2 Technical overview of LMG3

	Symbol	Unit	LMG3A-CB5-2CEFE4-300-300-X10C	LMG3A-CB5-2CEFE4-600-300-X10C	LMG3A-CB5-2CEFE4-600-600-X10C
Stroke of Y-axis		mm	300	600	600
Stroke of X-axis		mm	300	300	600
Total length Y	W_y	mm	1,010	1,310	1,310
Total length X	W_x	mm	700	700	1,000
Total height	H	mm	427		
Motor type of Y-axis			LMCB5		
Motor type of X-axis			2x LMCEFE4		
Continuous force of Y-axis	F_{cy}	N	91		
Continuous force of X-axis	F_{cx}		400		
Peak force of Y-axis	F_{py}		364		
Peak force of X-axis	F_{px}		1,600		
Max. speed ¹⁾	v_{max}	m/s	0.5		
Max. acceleration ¹⁾	a_{max}	m/s ²	5		
Max. load capacity		Kg	10		
Distance measuring system			Absolute, BiSS-C, 26 bits		
Repeatability		μm	±1		
Absolute precision		μm	±3		
Straightness		μm	±10 / 300 mm		
Flatness		μm	±10 / 300 mm		
Orthogonality		arc sec	10 (200 × 200 mm ²)		
Yaw		arc sec	±10 / 300 mm		
Pitch		arc sec	±10 / 300 mm		
Weight		Kg	150	180	230
Energy chain of Y-axis			1400.068.075.0		
Energy chain of X-axis			1400.050.048.0		
Article number			80090065	80090083	80090089

¹⁾ With maximum load capacity

Precision axes and precision systems

Glossary

11. Glossary

11.1 Glossary of spindle axes

Positioning precision

According to VDI/DGQ 3441, positioning precision is understood to mean the maximum deviation between the actual position and target position. Positioning precision is affected by the following factors: Shaft lead error, system play, controller parametrisation and the precision of the linear unit, transmission, motor and measuring system.

Repeatability

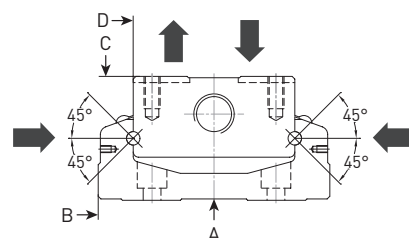
Repeatability indicates how accurately the block is stopped and positioned when approaching a position several times from any direction. The maximum deviation between the actual positions reached is indicated.

Starting torque

Starting torque is the torque required to overcome friction torque.

Guide parallelism

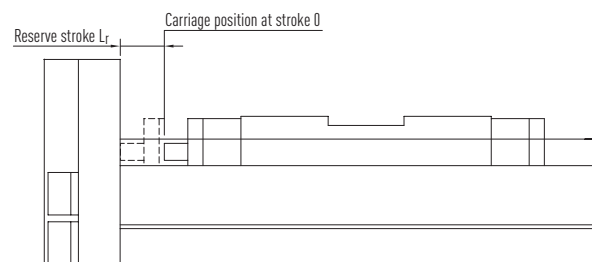
To measure the guiding parallelism, a ruler is aligned parallel to the linear axis mounted on a table. Then the parallelism of stop surfaces D and B of the carriage and profile and of the top of the carriage C to the mounting surface A of the profile is measured. This is based on the assumption of an ideal installation of the axis and ideal measurement over the centre of the carriage. The guiding parallelism is derived by subtracting the minimum value from the maximum value.



Reserve stroke

The reserve stroke L_r corresponds to the distance that can be travelled in addition to the stroke on both sides of the end positions (stroke 0, stroke max.) before the carriage reaches the mechanical end position at the built-in cushions. The reserve stroke is set at the factory for each axis size.

The reserve stroke for each axis size can be found in the dimension tables of the individual sizes.



11.2 Glossary of linear motor axes

Acceleration

The change in velocity per time unit, thus
 $\text{acceleration} = \text{velocity}/\text{time}$ or $a = v/t$.

Acceleration time

The time required by a drive to reach its final speed from a standstill.

Coil resistance R_{25}

A coil-specific dimension that indicates the coil resistance at a coil temperature of 25 °C. At a coil temperature of 80 °C, the coil resistance increases to approximately $1.2 \times R_{25}$.

Coil temperature T_{\max}

The permitted coil temperature. The actual motor temperature depends on the installation conditions, cooling conditions and operating conditions and therefore can be determined only in specific cases and calculated only to an inadequate degree.

Continuous torque, continuous force F_c

Continuous torque or nominal torque (for rotational movements) and continuous force or nominal force (for linear movements) can be delivered by the motor in continuous operation (cyclic duration factor CDF = 100 %).

Continuous current I_c

The current applied over an extended time. The maximum permitted continuous current per coil is referred to as the nominal current. The continuous current is characterised by the fact that the power loss that is produced leads to a motor warming of T_{\max} .

Counter EMF constant K_u

The ratio between the counter EMF voltage (rms) and the motor rotation speed or speed (rpm or m/s). Counter EMF is the electromagnetic force generated during the movement of the coils in the magnetic field of permanent magnets, for example in a servo motor.

Eccentricity

In rotary tables, the deviation of the centre of rotation from its position over the course of the rotation. It arises due to centring and position tolerances.

Flatness

A measure of the vertical straightness of a movement on the X-axis. A deviation from absolute flatness is a displacement on the Z-axis when moving on the X-axis.

Force constant K_f

A coil-specific dimension from which the resulting force can be calculated by multiplication with the input current as $F = I \times K_f$.

Force, torque

Force (for linear movements) or torque (for rotational movements) is specified for defined conditions, for example as continuous force or continuous torque at

- an ambient temperature of 25 °C
 - T_{\max} coil temperature
 - 100 % cyclic duration factor for linear motors and torque motors
 - 50 % cyclic duration factor for rotary tables
- or as the peak force or peak torque.

Guidance deviation

Linear deviation from the travel axis. It depends on the straightness (precision in the plane of the slide) and flatness (precision outside of the plane of the slide).

Magnetic attraction force F_a

Occurs between the primary and secondary part of iron core linear motors, thereby generating a preload of the drive system that must be absorbed by the guiding.

Motor constant K_m

The ratio between generated force and power loss, thus a measure of the efficiency of the motor.

Multi-index

An incremental track is arranged along the entire width of the measuring tape. The read head contains a sensor that emits three signal tracks: incremental tracks A and B and the Z track for the internally generated reference signal. Each time an increment is crossed, an internally generated reference signal is available (multi-index). An external reference switch is therefore required as a trigger. After this external reference switch is crossed, the reference switch is generated with the next increment.

Peak current I_p

Applied briefly when generating the peak force. For HIWIN it is defined in the following manner: Motors with iron core have as peak current I_p 3 times the permitted continuous current of the LMS series, while ironless motors have as I_p 3 times the permitted continuous current. The maximum permissible duration of the peak current is one second. The motor must then cool down to the nominal temperature before the peak current can be applied again.

Peak torque, peak force F_p

The peak torque (for rotational movements) or peak force (for linear movements) is the maximum force that a motor is able to generate for about one second. For HIWIN it lies at the end of the linear modulation range for peak current I_p and is important primarily for accelerate and braking.

Precision (absolute precision)

Actually imprecision: corresponds to the deviation between a desired target position and the actual position. Precision along an axis is defined as the difference remaining between the actual position and target position after all other deviations that can be eliminated have been excluded. Systematic and linear deviations of this type include cosine errors, angular deviations, shaft lead errors and thermal expansion, etc.

Precision is calculated for all relevant target positions of an application according to the following formula:

The maximum of all totals of systematic target/actual deviations + 2 sigma (standard deviation).

Precision must not be confused with > repeatability.

Repeatability

Not to be confused with precision. A linear axis can have low precision but very high repeatability. Unidirectional repeatability is measured by approaching a target position from a sufficiently great distance several times in the same direction. Backlash has no effect in this case. To measure bidirectional repeatability, a target position is approached from different directions of motion. Backlash does have an effect in this case.

Resolution

The smallest distance that is detected by the distance measuring system. Due to additional factors, the achievable > Step width is generally greater than the resolution.

Rigidity

Equivalent to the mechanical deformation resistance of which a component or module is capable against a static external load in a static, steady state (static rigidity) or to the elastic deformation resistance of which a component or module is capable against a dynamic force acting from outside (dynamic rigidity).

Precision axes and precision systems

Glossary

Single-index

The tape is divided into an incremental track and an index track. The index track contains one or more reference marks along the entire travel distance, depending on the requirement. The read head contains two sensors: One sensor for incremental tracks A and B and one sensor for the Z track, which generates a reference signal when the incremental reference mark (single-index) is crossed. Single-index magnetic tapes are always customer-specific.

Step width

The smallest step width is the minimum distance that can be repeatably traversed by a linear drive. It is determined by the Δ resolution of the linear drive plus the step width of the motor and all errors in the drive train (backlash, torsion, etc.).

Straightness

Measure for the horizontal straightness of a movement on the X-axis. A deviation from absolute straightness is a displacement on the Y-axis when moving on the X-axis.

Torque

A variable that causes a rotational movement and thus a vectorial quantity that can be expressed in the following cross product:

$$\vec{M} = \vec{r} \times \vec{F}_1$$

In physical terms torque is indicated in the unit $\text{Nm} = \text{kgm}^2/\text{s}^2$.

Wobble

Angular deviation of the axis of rotation of rotary tables over the course of the rotary movement, thus tipping of the surface of the rotary table. The main cause is tolerances in the bearing.

11.3 Typical dimensions

11.3.1 Coil-independent dimensions

- F_a A relatively constant attraction force between the primary and secondary parts (magnetic base) that must be absorbed by mechanical guiding.
- F_c The motor force that is available in nominal operation as continuous force and leads to warming of T_{max} .
- F_p The motor force that can be generated briefly and is achieved at the end of the linear modulation range with I_p . Without cooling it leads to significant heating.
- K_m A motor constant that expresses the ratio of generated force and power loss, and thus efficiency.
- P_v The heat output produced in the motor coil that leads to a time-dependent temperature increase depending on the mode of operation (current) and ambient conditions (cooling). In the upper modulation range (at I_p), P_v is especially high due to the quadratic dependence on current, whereas only relatively slight warming occurs in the range of the nominal current. P_v can be calculated using the motor constant K_m for a section of movement with the required force F : $P_v = F/K_m$.
- P_{vp} Peak power loss at I_p .
- P_c Power loss at I_c .
- T Permitted coil temperature that is recorded by sensors or thermal switches. The temperature of the motor surface that is reached depends on
- the specific installation conditions (size of the table)
 - heat dissipation conditions (cooling)
 - the mode of operation and thus the average power input and can only be determined if these circumstances are known.

11.3.2 Coil-dependent dimensions

- I_c The current that flows to generate the continuous force.
- I_p The peak current that flows to generate the peak force.
- K_f A coil dimension, which together with the current yields the force that is produced:
 $F = I \times K_f$.
- K_u A coil dimension which yields the armature counter voltage produced on the motor terminal in generating operation as a function of the speed: $U_g = K_u \times v$.
- R_{25} Coil resistance at 25 °C; at 80 °C this increases to approx. 1.2 times the value.

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