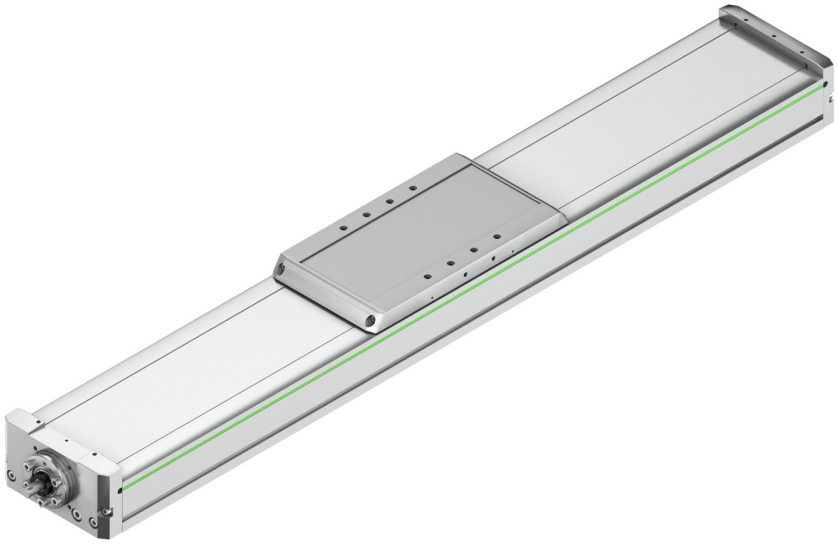
HIWIN®



Valid from serial no. HSN 000 000 000 1

Assembly instructions

Linear axes HM-S, linear tables HT-S

HMS_HTS-01-4-EN-2212-MA

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Legal information

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Contents

1 General

1.1 About these assembly instructions

These assembly instructions are intended for planners, developers and operators of systems who plan and install the named products as machine elements. It is also addressed to the persons who carry out the following work in connection with the named axes:

- Transport
- Assembly
- Electrical connection including connection to the higher-level control system
- Integration into a safety system
- Retrofitting or upgrading
- Setup
- Commissioning
- Operation
- Cleaning
- Maintenance
- Troubleshooting
- Decommissioning, disassembly and disposal

1.1.1 Requirements

We assume that

- The operating personnel have been instructed in the safe operation of the named products and have read and understood these assembly instructions in full
- Maintenance personnel maintain and repair the products in such a way that they present no danger to persons, the environment or property

1.1.2 Availability

These assembly instructions must always be available to all persons working with or on the named products. The assembly instructions are also available at www.hiwin.de.

1.2 Presentation and layout conventions used in these assembly instructions

1.2.1 Instructions for actions

Instructions for actions are provided in sequential order and identified with a triangle symbol.

The results of the actions are accompanied by a tick symbol.

Example:

- ▶ Instruction 1
- ▶ Instruction 2
- ✓ Result

1.2.2 Lists

Lists are identified through the use of bullet points.

Example:

The products must not be operated:

- Outdoors
- In areas where there is a risk of explosion
- …

1.2.3 Presentation of safety information

Safety notices are always indicated by a signal word and sometimes with a hazard-specific symbol (see section 1.2.4 Symbols used).

The following signal words/hazard levels are used:

⚠ **Danger!** Immediate danger!

Failure to follow this safety instruction will result in severe or fatal injury!

⚠ **Warning**! Potentially dangerous situation!

Failure to follow this safety instruction could result in severe or fatal injury!

⚠ **Attention!** Potentially dangerous situation!

Failure to follow this safety instruction could result in moderately severe or minor injury!

Caution! Potentially dangerous situation!

Failure to follow this safety instruction could result in damage to property or the environment!

1.2.4 Symbols used

The following symbols are used in these assembly instructions and on the products:

Warning and prohibition signs			
	Warning of dangerous electrical voltage!		Warning of risk of hearing damage!
	Warning of cutting injuries!		Warning of crushing risk!
	Environmentally hazardous substance!		Warning of danger from suspended loads!

Mandatory signs			
	Wear safety gloves!		Wear hearing protection!
	Wear protective goggles!		Release prior to work!

1.2.5 Information

Note:
Notes describe general advice and recommendations.

1.3 Warranty and liability

The manufacturer's "General Terms and Conditions of Sale and Delivery" apply.

1.4 Manufacturer information

Address	HIWIN GmbH Brücklesbünd 1 77654 Offenburg, Germany
Telephone	+49 (0) 781 / 9 32 78 - 0
Technical customer service team	+49 (0) 781 / 9 32 78 - 77
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Technical customer service team fax	+49 (0) 781 / 9 32 78 - 97
E-mail	support@hiwin.de
Internet	www.hiwin.de

1.5 Product monitoring

Please inform HIWIN GmbH, as manufacturer of the named products, about:

- Accidents
- Possible sources of danger on the products
- Any unclear information in these assembly instructions

2 Basic safety information

⚠ **Warning**!

> This chapter is for the safety of everyone who works with, assembles, installs, operates, maintains or disassembles the named products. Failure to comply with the following information could be dangerous!

2.1 Proper use

Linear axes HM-S and HT-S combine guide and drive into one compact unit. They are used for the exact positioning in time and place of fixed loads within an automated system. They are ideal in particular for applications requiring high precision.

In the event of vertical mounting, a suitable clamping or braking device must be provided to be able to prevent unintentional lowering of the load.

All linear axes HM-S and HT-S may only be used as described for the intended purpose.

- Performance limits are given for each size of the named products (see “Linear axes and axis systems HX” catalogue). These performance limits must not be exceeded during operation.
- The products must not be used in potentially explosive atmospheres.
- The products may only be used and operated indoors.
- The products are used as part of an overall system, therefore personal safety must be ensured via the concept of the overall system.
- The assembly instructions and the maintenance and servicing instructions must be complied to ensure the intended use of the products.
- Any other use of the products is considered improper use.

Linear axes HM-S and HT-S are supplied as a system (guide, drive). That is why the entire documentation of the system must be observed. Depending on the linear axis type, the accompanying documentation may vary.

Requirements for ambient conditions

Ambient conditions during operation:	+5 to +40 °C
Relative humidity during operation:	according to IEC 60721-3-3, class 3K22, non-condensing
Climatic ambient conditions for transport and storage:	Ambient temperature: -20 to +50 °C, non-condensing
Vacuum:	Operation in a vacuum is not permissible

Note:

Prevent condensation from forming to avoid corrosion of the axis.

2.2 Reasonably foreseeable misuse

The named products must not be operated:

- Outdoors
- In areas where there is a risk of explosion

2.3 Conversions or modifications

Conversions or modifications to the named products are not permitted! For special requirements, please contact HIWIN GmbH.

2.4 Residual risks

No residual hazards emanate from the named products during normal operation, as they are used as part of the overall system and personal safety is to be ensured by the operator via the overall system. Dangers that may arise during maintenance and servicing are specified in the respective chapters.

2.5 Requirements for personnel

Only authorised persons may carry out work on the products! They must be familiar with the safety equipment and regulations before they start work (see following table).

Activity	Qualifications
Normal operation	Instructed personnel
Cleaning	Instructed personnel
Maintenance	Qualified personnel of the operator or manufacturer
Servicing	Qualified personnel of the operator or manufacturer
Transport	Instructed personnel
Assembly	Instructed qualified personnel
Disassembly	Instructed qualified personnel

2.6 Safety equipment

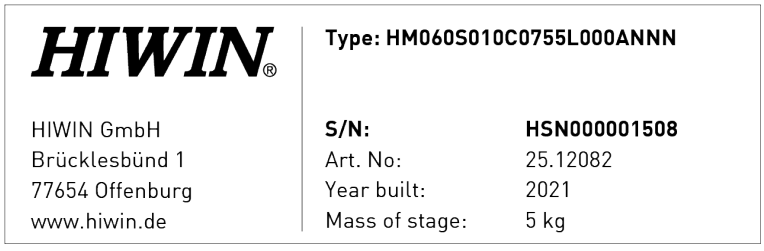
Table 2.1: Personal protective equipment

Operating phase	Personal protective equipment
Normal operation	Staying around the named products is not permitted during normal operation. When staying in the vicinity of the products, the following personal protective equipment is necessary, depending on the travel speed: ○ Safety shoes ○ Hearing protection if necessary
All other operating phases (Cleaning, maintenance, servicing, retrofitting, troubleshooting, repair)	The following personal protective equipment is required for all other phases of operation of the named products: ○ Safety shoes ○ If necessary, protective gloves and goggles ○ Hearing protection if necessary

2.7 Labelling on the products

The labels shown below can be found on the products.

Fig. 2.1: Example of a type plate



3 Description of linear modules HM-S and linear tables HT-S

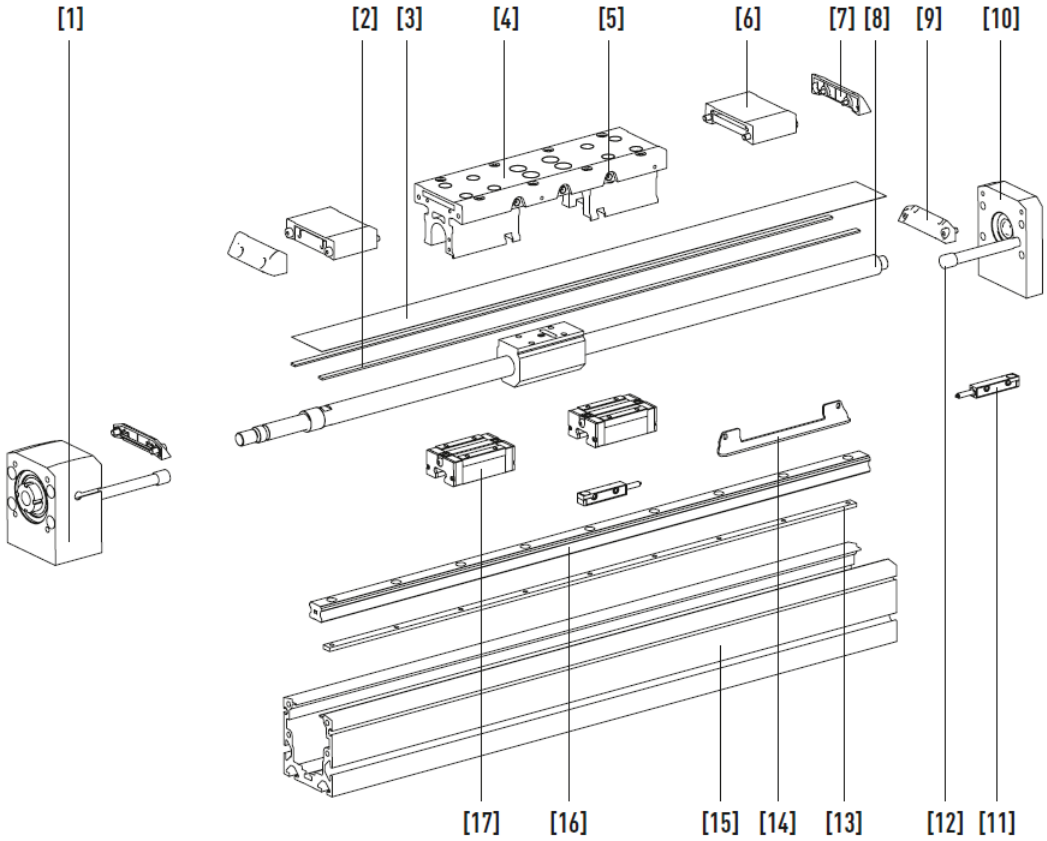
3.1 Linear modules HM-S

3.1.1 Application

Linear modules HM-S with ballscrew are compact, flexible positioning modules and are particularly suitable for applications where high precision and high feed forces are required.

3.1.2 Main components

Fig. 3.1: Main components of linear axis HM-S

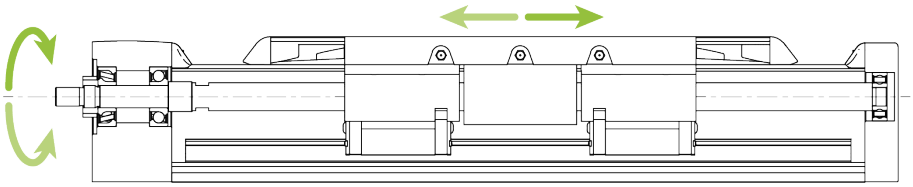


1	Drive block	10	End plate
2	Magnetic strip	11	Limit switch
3	Steel cover strip	12	Stop buffer
4	Carriage	13	Threaded strip
5	Grease nipple, 3 grease nipples per side	14	Damping element
6	Cover strip deflection	15	Aluminium axis beam
7	Carriage end piece	16	Profile rail
8	Ballscrew	17	Block
9	Clamp housing for cover strip		

3.1.3 Functional description

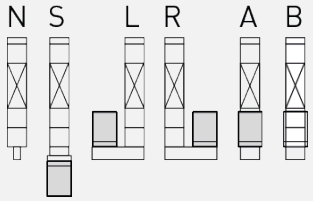
Linear axes with ballscrew combine drive and guide in one compact unit. The forces and torques from the load to be moved are transmitted into the linear guideway via the carriages. This also ensures precise guidance of the linear movement with two blocks per carriage. The movement itself takes place via a ballscrew whose spindle is driven by an electric motor. The ballscrew converts the rotary movement of the motor into a linear movement of the nut, which is firmly connected to the carriage.

Fig. 3.2: Functional principle of linear modules HM-S



3.1.4 Order code for linear modules HM-S

Number		1	2	3	4	5	6	7	8
Order code		HM	060	S	010	C	0755	L	000
1	HM	HIWIN linear module							
2	060	Size (profile width): 040: 40 mm 060: 60 mm 080: 80 mm 120: 120 mm							
3	S	Drive type: S: Ballscrew							
4	010	Spindle pitch [mm] 005/010: HM040S 005/010/016: HM060S 005/010/020: HM080S 005/020/032: HM120S							
5	C	Cover strip: C: With steel cover strip N: Without cover strip							
6	0755	Stroke length [mm]							
7	L	Carriage length: S: Short L: Long							
8	000	Clearance between two carriages [mm]: (000: Only one carriage)							

Number		9	10	11	12	13
Continued Order code		A	N	N	R	BO02
9	A	Axis limit switch [4]: N: Without limit switch A: 2 × NC contact, 100 mm cable, plug B: 2 × NO contact, 100 mm cable, plug C: 2 × NC contact, 4 m open cable end D: 2 × NO contact, 5 m open cable end				
10	N	Spindle support: N: Without spindle support 1: One spindle support per side (HM060/080/120) 2: Two spindle supports per side (HM060/080/120) 3: Three spindle supports per side (HM060/080/120)				
11	N	Distance measuring system option [1]: N: Without distance measuring system A: Distance measuring system with analogue signal, 5 m open cable end D: Distance measuring system with digital signal, 5 m open cable end				
12	R	Drive interface [2]: N: Without S: Straight L: Left R: Right A: Top B: Bottom				
13	BO02	Flange type of motor [3]				

[1] Detailed information on request or in the “HIWIN MAGIC distance measuring systems” assembly instructions.

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

[3] All flange types can be found in section 11.1 from page 76. If no flange type is selected, the order code ends after this digit.

[4] Additional reference switches on request.

3.2 Linear tables HT-S

3.2.1 Application

HIWIN linear tables HT-S with ballscrew are particularly suitable for applications in which large loads are moved with high precision. The integrated HIWIN ballscrews ensure exact positioning thanks to their high pitch accuracy and rigidity. Different spindle pitches are available for each size in order to optimally meet the requirements for feed force and dynamics. With up to four travelling spindle supports per side, traversing at full speed is possible even with large strokes.

3.2.2 Main components

Fig. 3.3: Main components of linear tables HT-S

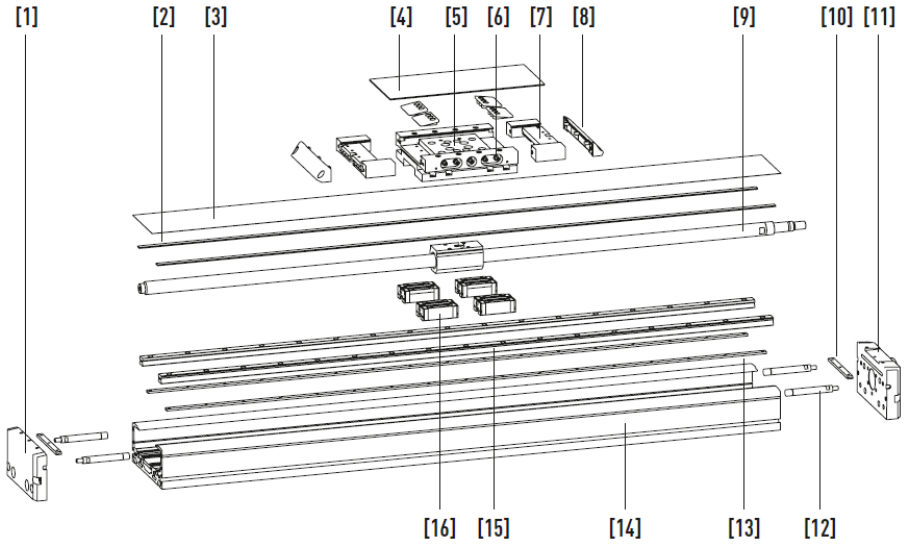


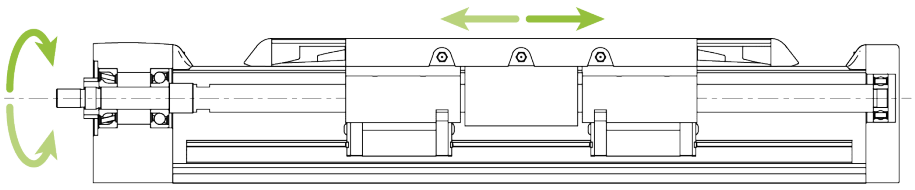
Table 3.1: Description of the main components of linear tables HT-S

1	End plate	9	Ballscrew
2	Magnetic strips	10	Clamping plate for cover strip
3	Steel cover strip	11	Drive block
4	Carriage cover	12	Stop buffer
5	Carriage	13	Threaded strips
6	Grease nipple	14	Aluminium axis beam
7	Cover strip deflection	15	Profile rails
8	Carriage end piece	16	Block

3.2.3 Functional description

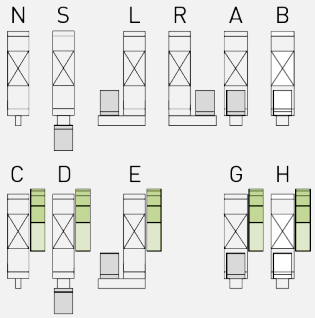
Linear tables with ballscrew combine drive and guide in one compact unit. The forces and torques from the load to be moved are transmitted into the linear guideways via the carriages. They also ensure precise guidance of the linear movement with four blocks per carriage. The movement itself takes place via a ballscrew whose spindle is driven by an electric motor. The ballscrew converts the rotary movement of the motor into a linear movement of the nut, which is firmly connected to the carriage.

Fig. 3.4: Principle of operation of linear table HT-S



3.2.4 Order code for linear table HT-S

Number		1	2	3	4	5	6	7
Order code		HT	150	S	010	C	1234	S
1	HT	HIWIN linear table						
2	150	Size (profile width): 100: 100 mm 150: 150 mm 200: 200 mm 250: 250 mm						
3	S	Drive type: S: Ballscrew						
4	010	Spindle pitch [mm]: 005/010/016: HT100S 005/010/020: HT150S 005/010/025: HT200S 005/020/032: HT250S						
5	C	Cover strip: C: With steel cover strip N: Without cover strip						
6	1234	Stroke length [mm]						
7	S	Carriage length: S: Short						

Number		8	9	10	11	12
Continued Order code		A	N	N	S	BR04
8	A	Axis limit switch [4]: N: Without limit switch A: 2 × NC contact, 100 mm cable, plug B: 2 × NO contact, 100 mm cable, plug C: 2 × NC contact, 4 m open cable end D: 2 × NO contact, 5 m open cable end				
9	N	Spindle support: N: Without spindle support 1: One spindle support per side 2: Two spindle supports per side 3: Three spindle supports per side 4: Four spindle supports per side				
10	N	Distance measuring system option [1]: N: Without distance measuring system A: Distance measuring system with analogue signal, 5 m open cable end D: Distance measuring system with digital signal, 5 m open cable end				
11	S	Drive interface [2]: N: Without S: Straight L: Left R: Right A: Top B: Bottom C: Without, energy chain right D: Straight, energy chain right E: Left, energy chain right G: Top, energy chain right H: Bottom, energy chain right				
12	BR04	Flange type of motor [3]				

[1] Detailed information in section 4.5 or in the “HIWIN MAGIC distance measuring systems” assembly instructions.

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

[3] All flange types can be found in section 11.1 from page 76. If no flange type is selected, the order code ends after this digit.

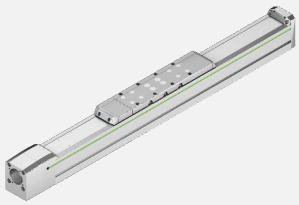
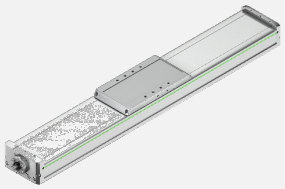
[4] Additional reference switches on request.

4 Options of linear modules HM-S and linear tables HT-S

4.1 Stroke length

The stroke lengths of the linear axes can be selected in millimetre increments. The maximum stroke length depending on the series and size is listed in Table 4.1.

Table 4.1: Maximum stroke length

Column title	Column title	Column title
Linear module 	**HM040S**	1.200
	HM060S	2.500
	HM080S	2.500
	HM120S	3.800
Linear table 	**HT100S**	2.600
	HT150S	3.000
	HT200S	3.500
	HT250S	3.800

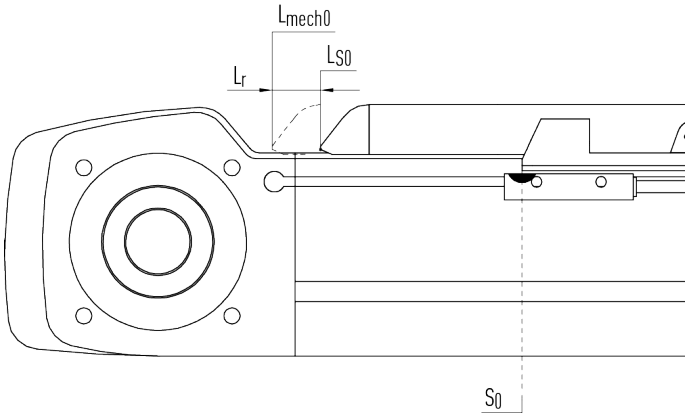
Please note that the maximum possible stroke is reduced with the following options:

- Longer carriages (HM-S: Carriage type L)
- Second carriage (HM-S)
- Design with cover strip (due to the required cover strip deflections)
- Spindle support if necessary

4.1.1 Reserve stroke

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 (mechanical 0) at the built-in stop buffers. The reserve stroke for each axis size can be found in the “Linear axes and axis systems HX” catalogue.

Fig. 4.1: Illustration of reserve stroke using the example of a linear axis



L_{mech0} Carriage position at mechanical 0 (rubber buffer stop)

L_{S0} Carriage position at stroke 0 (sensor switching point)

S_0 Position of drive block at stroke 0 (sensor switching point)

Caution! Possible damage to the linear axis!

▶ The mechanical end position must not be approached during operation!

4.2 Cover

A steel cover strip is optionally available for all sizes of linear axis and double axis. The cover strip is held down with magnetic strips to protect the inside of the axis from dirt. Note that the carriage length increases for axes with cover strip due to the required cover strip deflection.

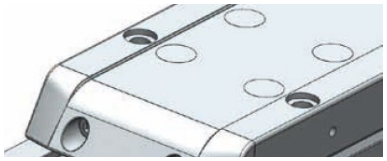
Note:

The “cover strip” option cannot be retrofitted.

4.3 Carriage

Two carriage types are available for linear modules HM-S (carriage type S and L). For linear tables HT-S, carriage type S is provided as standard. The carriages have fastening threads for mounting the payload. These have additional counter bores to allow for insertion of centring sleeves.

Fig. 4.2: Carriage with fastening threads



Typical applications for the respective carriage lengths of linear modules HM-S are:

Short carriage (S)

- For single axes

Long carriage (L)

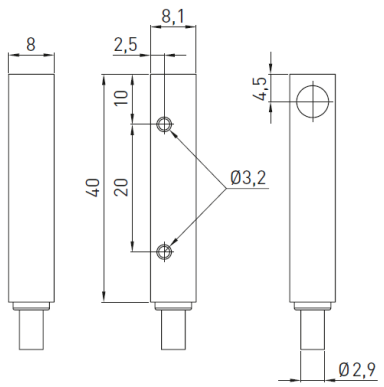
- For very high torque load (M_y, M_z)
- For use in gantry systems (mainly for X-axis)

4.4 Limit switch

On the linear axes, two inductive PNP switches, also called proximity switches, indicate the end positions of the travel distance. The limit switch cables can either be routed directly to the interface or laid laterally in the mounting groove. The limit switches are available as NC or NO contacts and optionally with open cable end or with plug.

4.4.1 Limit switch dimensions

Fig. 4.3: Limit switch dimensions



4.4.2 Limit switch specifications

Table 4.2: General features of the limit switches

Features	NC contact (25-000786)	NO contact (25-002766)	NC contact (25-000787)	NO contact (25-000788)
Type	Cuboid			
Dimensions (W × H × D)	8 × 8 × 40 mm			
Max. switching distance	2 mm			
Secured switching distance	1,62 mm			
Switching distance to be set	1 mm			
Switching sequence	2.000 Hz			
Connection type	Cable with plug M8, 3-pin, 100 mm	Cable with plug M8, 3-pin, 100 mm	Cable, 3-wire, 4 m[2)]	Cable, 3-wire, 5 m[2)]
Switching output	PNP			
Electrical type	DC 3-wire			
Protection class	IP67, IP68 [1)]			

[1)] According to EN 60529
[2)] Not suitable for energy chains

Table 4.3: Mechanics/Electrics of the limit switches

Mechanics/Electrics	NC contact (25-000786)	NO contact (25-002766)	NC contact (25-000787)	NO contact (25-000788)
Power supply	10 to 30 VDC			
Residual ripple	≤ 10% [1)]			
Voltage drop	≤ 2 V [2)]			
Current consumption	≤ 10 mA [3)]			
Ready delay	≤ 100 ms			
Hysteresis	5 to 15%			
Reproducibility	≤ 2 % [4)]			
Temperature drift	±10%			
EMC	According to EN 60947-5-2			
Continuous current I_a	≤ 200 mA			
Cable material	PVC			
Short-circuit protection	Yes			
Reverse polarity protection	Yes			
Switch-on pulse suppression	Yes			
Shock and vibration resistance	30 g, 11 ms/10 to 55 Hz, 1 mm			
Ambient temperature during operation	-25 °C to +75 °C			
Housing material	Plastic, VISTAL®			
Material, active surface	Plastic, VISTAL®			
UL file no. (certificate)	NRKH.E348498			

[1)] From U_v
[2)] At I_a max.
[3)] Without load
[4)] At constant voltage and temperature

4.5 Distance measuring system

If the precision of the linear axis given by the drive element and the encoder signals of the servo drive is not sufficient for an application, the positioning and repeat accuracy can be increased by using a distance measuring system. The distance measuring system is located externally, on the side of the carriage, and enables a repeat accuracy of ±0,01 mm for spindle axes. The housing of the encoder is electrically shielded, the output is either an analogue or digital signal.

The HIWIN MAGIC distance measuring system consists of the encoder (Fig. 4.4) and the magnetic tape (Fig. 4.5) as the measuring standard. Assembly is done at the factory.

Fig. 4.4: MAGIC encoder

Fig. 4.5: MAGIC magnetic tape

Note:

The measuring tape of the magnetic distance measuring systems must not be exposed to strong magnetic fields (keep a distance to permanent magnets!). Strong vibrations (e.g. a blow with a hammer) can also damage the magnetisation of the measuring tape. The system is not suitable for environments with magnetic dust (e.g. graphite dust). These can falsify the measuring signal or damage the distance measuring system.

4.5.1 Technical data of MAGIC distance measuring system

Table 4.4: Electrical and mechanical properties of the MAGIC encoder

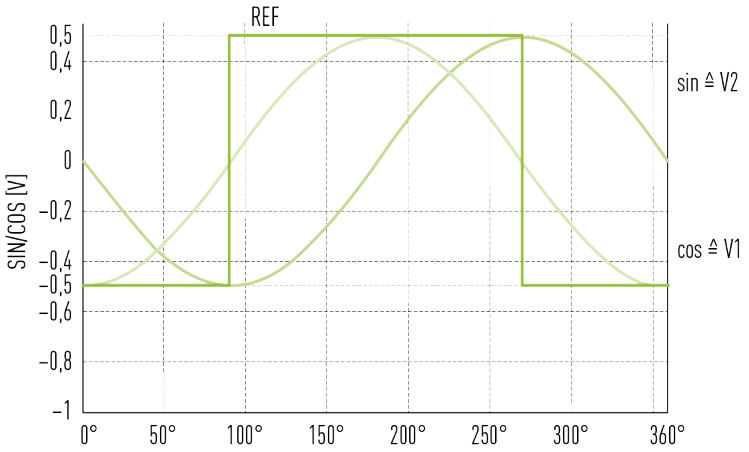
Model	1 V_{SS} (analogue)	TTL (digital)
Electrical properties		
Output signal specification	sin/cos, 1 V_{SS} (0,85 V_{SS} – 1,2 V_{SS})	Quadrature signals acc. to RS422
Resolution	Infinite, signal period 1 mm	1 µm
Repeatability bidirectional	0,003 mm	0,002 mm
Absolute accuracy	±20 µm/m	
Reference signal [1)]	Periodic index impulse at a distance of 1 mm	
Phase angle	90° ±0,1° el	90°
DC component	2.5 V ±0,3 V	–
Distortion factor	Typ. < 0,1%	–
Operating voltage	5 V ± 5%	
Power consumption	Typ. 35 mA, max. 70 mA	Typ. 70 mA, max. 120 mA
Max. measurement speed	10 m/s	5 m/s
EMC class	3, according to IEC 801	
Mechanical properties		
Housing material	Aluminium alloy, stainless steel sensor base	
Dimensions of MAGIC encoder	L × W × H: 45 mm × 12 mm × 14 mm	
Standard cable length	5,000 mm	
Min. bending radius cable	40 mm	
Protection class	IP67	
Operating temperature	0 °C to +50 °C	
Weight of MAGIC encoder	80 g	

[1)] Can be used e.g. with reference switch

4.5.2 Formats and outputs for MAGIC measuring system (analogue)

Signal format sine/cosine 1 V_{SS} output: The electrical signals after the differential input of the downstream electronic components. The HIWIN MAGIC-PG interface sine/cosine 1 V_{SS} is strictly based on the Siemens specification. The period length of the sine output signal is 1 mm. The period length of the reference signal is 1 mm.

Fig. 4.6: Electrical signals after the difference input of the subsequent electronics (analogue version)

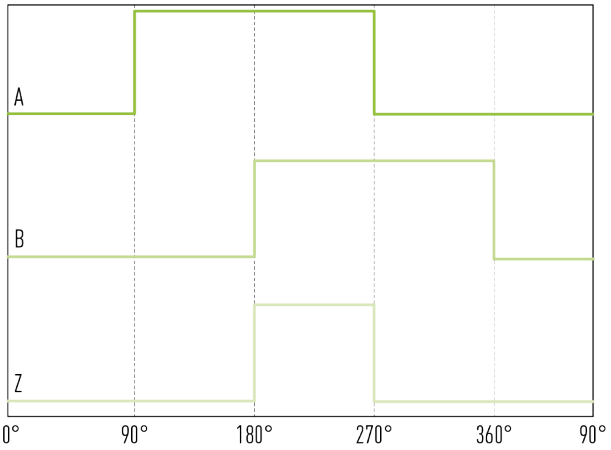


Output signals within one scale period (1.000 µm) in degrees (360°=1.000µm)

4.5.3 Formats and outputs for MAGIC measuring system (digital)

Digital TTL output: The signals to the A and B channels are phase-shifted by 90° (according to the RS-422 specifications conforming to DIN 66259). Output signals: A, $\bar{A}$, B, $\bar{B}$ and Z, $\bar{Z}$.

Fig. 4.7: Signals of the MAGIC encoder (TTL version)



A A signal

B B signal

Z Z signal (reference switch)

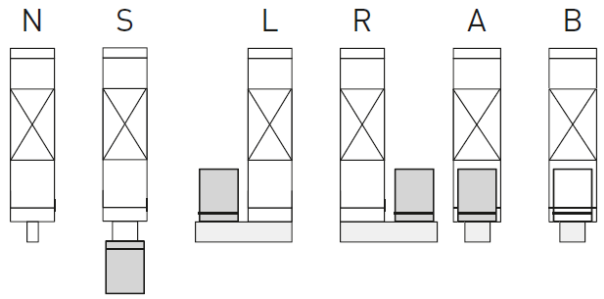
For more information, see the “HIWIN MAGIC distance measuring system” assembly instructions.

4.6 Drive interfaces

With linear axes HM-S and HT-S, the drive is mounted as an extension of the spindle. Depending on the motor, the scope of delivery includes a coupling housing, a matching coupling and an adapter plate for the motor. Optionally, the motor position can be rotated 180° with a belt drive to reduce the overall length of linear axes HM-S and HT-S.

Possible drive interfaces:

Fig. 4.8: Drive interfaces of linear axes HM-S



N: Without

S: Straight

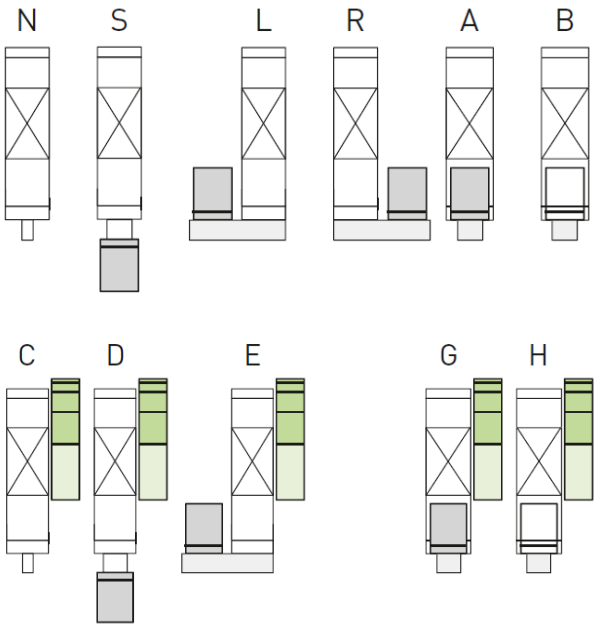
L: Left

R: Right

A: Top

B: Bottom

Fig. 4.9: Drive interfaces of linear axes HT-S



N: Without
S: Straight
L: Left
R: Right
A: Top
B: Bottom

C: Without, energy chain right
D: Straight, energy chain right
E: Left, energy chain right
G: Top, energy chain right
H: Bottom, energy chain right

4.7 Energy chain

For safe carrying of additional cables, linear axes HT-S can optionally be supplied with generously dimensioned energy chains. They are extremely compact and save space when attached to the axis. The alignment of the energy chain depends on the selected drive interface (see section 4.6). The energy chain type and specification can be found in Table 4.5. The linear tables with energy chain are optimised for horizontal installation. Axes with energy chain for vertical use on request.

Table 4.5: Specification of energy chain

Axis type	Manufacturer's reference [1)]	Cross-section interior W × H [mm]	Bending radius [mm]
HT100S	2400.05.075.0	57 × 25	75
HT150S, HT200S, HT250S	2600.07.100.0	75 × 35	100

[1)] Manufacturer: igus GmbH

The upper run is self-supporting but there is a surface for the lower run that supports the energy chain as it unrolls. To prevent the cables and hoses from riding over each other, there is a partition in every second link. The connecting pieces are of a rigid design. Strain relief combs are fitted at both ends so that the cables and hoses can be secured with cable ties. To ensure that the energy chains are handled correctly, and that the cables and hoses are installed and secured properly, please observe the assembly instructions from the energy chain manufacturer.

General information:

- For details of suitable motor and signal cables, please refer to the operating manual from the motor manufacturer.
- Observe the minimum bending radii (industrial standard 8 × D) specified for the cables and hoses, and the associated service life that is to be anticipated.
- In the case of shielded cables, make sure the shields are resistant to bending.
- Low-friction and abrasion-resistant cable/hose sheaths should be used.
- To prevent cables and hoses with different outer sheaths from bonding, separate them with partitions.
- Ensure twist-free installation of cables and hoses.

- Leave enough spare room (10 to 20%, at least 1 mm) all the way around the cables and hoses, and allow for the lateral expansion that occurs when hoses are pressurised.
- Make sure that the weight is distributed evenly/symmetrically. Ideally, heavy cables and hoses should be positioned at the outer edges.
- Provide strain relief for cables and hoses at both ends so that they are located in the neutral zone when the energy chain is in the extended position and can move freely within its radius.
- In the case of high acceleration values or if the cables have a wide variety of diameters, use additional partitions where applicable.
- Observe the maximum additional load from cables and hoses that is permitted based on the stroke according to Fig. 4.11.

Fig. 4.10: Maximum permissible additional load F_{Add} depending on stroke L_T, series 2400 (source: igus)

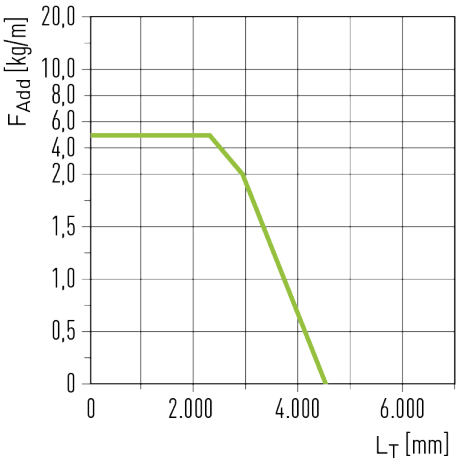
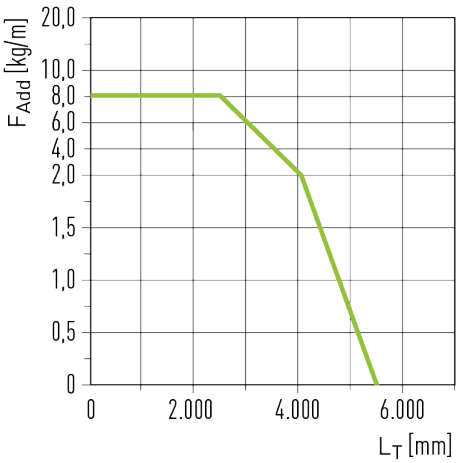


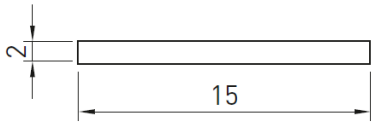
Fig. 4.11: Maximum permissible additional load F_{Add} depending on stroke L_T, series 2600 (source: igus)



4.7.1 Tape for reduction of noise emissions from the energy chain [1)]

Cellular rubber tape for the reduction of noise emissions from energy chains. The noise reduction tapes, which are self-adhesive on one side, are attached to the energy chain support in such a way that the links of the energy chain are deposited on the tapes when the carriage moves, significantly reducing noise emissions. The noise reduction tape is available in rolls of 10 m (Article number: 25-002485).

Fig. 4.12: Dimensions of tape for reduction of noise emissions from the energy chain



[1)] Suitable for all linear motor axes HT-S with energy chain

4.8 Spindle support

In applications of linear axes HM-S and HT-S with long stroke and high speed, the critical speed of the spindle can be reached, meaning that appropriate support is required. For HIWIN linear modules HM-S, up to three travelling spindle supports (not available for HM040S) can be optionally selected on each side of the carriage. Up to four spindle supports are possible with linear tables HT-S. The critical speed depending on the spindle support can be found in the “Linear axes and axis systems HX” catalogue.

5 Transport and setup

5.1 Delivery

5.1.1 Delivery condition

The linear axes are delivered fully assembled and functionally tested.

5.1.2 Scope of delivery

The scope of delivery varies depending on the model, accessories and options ordered.

5.2 Transport to the installation location

⚠ **Warning**! Danger from suspended loads or falling parts!

Lifting heavy loads can cause damage to health.

- Assembly and maintenance of the linear axes only by qualified personnel!
- Take the mass of the parts into account during transport. Use suitable lifting gear!
- Comply with the applicable industrial safety regulations for handling suspended loads.
- Lift linear axes only at specified support points!
- Secure machines and machine parts against tipping over!

⚠ **Attention!** Risk of impact and crushing!

If the axes are moved/driven manually, injuries can be caused by moving axes and attachments (energy chains, attachments installed by customer).

- Observe applicable industrial safety regulations!
- Transport to the installation site only by qualified personnel!

Caution! Possible damage to the linear axis!

The linear axis can be damaged by mechanical stress.

- Lift linear axes only at specified support points! (See section 5.5)!
- For longer linear axes, ensure the centre sections have additional protection!
- Ensure that the linear axes do not bend, as this will permanently affect the precision!
- Do not transport any additional loads on the linear axis during transport!
- Provide additional support for heavy attachments!

The linear axes are precision products and must be handled with care. Shocks and impacts can damage the axes. Reduced running accuracy and a reduced service life could be the result. Transport the product packed as close as possible to the installation site. Only remove the packaging once there.

5.3 Installation location requirements

5.3.1 Environmental conditions

Ambient conditions during operation:	+5 to +40 °C
Relative humidity during operation:	according to IEC 60721-3-3, class 3K22, non-condensing
Climatic ambient conditions for transport and storage:	Ambient temperature: -20 to +50 °C, non-condensing
Vacuum:	Operation in a vacuum is not permissible

5.3.2 Safety equipment to be provided by the operator

Possible safety equipment/measures:

- Personal protective equipment according to UVV (accident prevention regulation)
- Electrosensitive protective equipment
- Mechanical safety equipment

5.4 Storage

- Store the linear axes in the transport packaging.
- Alternative: Select packaging in which the linear axes are secured against slipping, damage and vibration.
- Store the linear axes only in dry, frost-free rooms.
- Clean and protect used linear axes before storage.

5.5 Unpacking and setup

Caution! Danger to health and the environment!

Contact with lubricants can cause irritation, poisoning and allergic reactions as well as damage to the environment.

- Only use suitable media that are not dangerous for humans. Observe the manufacturer's safety data sheets.
- Dispose of substances appropriately.

Note:

The linear axes may only be set up and operated indoors.

5.5.1 Unpacking and setting up linear axes HM-S/HT-S

- Remove the packaging.
- Lift the linear axis for transport at specified support points A and B (see Fig. 5.1, Fig. 5.2 and Fig. 5.3). The distance of points A and B from the end of the axis should be one quarter of the total length of the axis.
- Do not lift the linear axis by attachments. During transport, provide additional support for heavy attachments such as the drive.
- Dispose of the packaging in an environmentally friendly manner.

Fig. 5.1: Support points A and B for lifting and transporting, using the example of linear axis HM-S

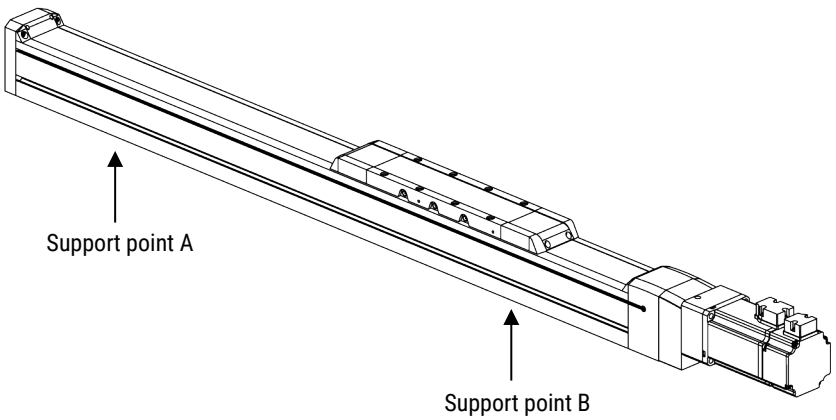


Fig. 5.2: Correct position of the support points

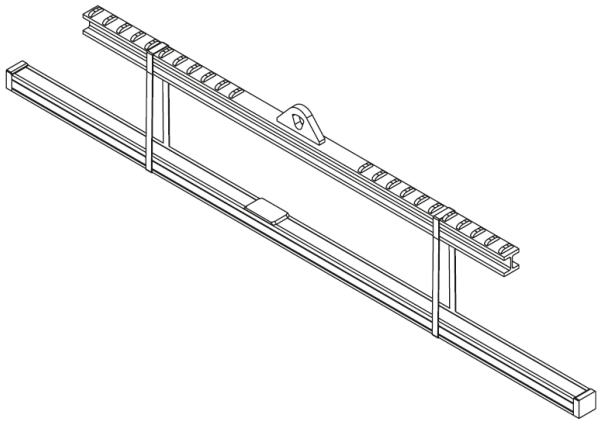
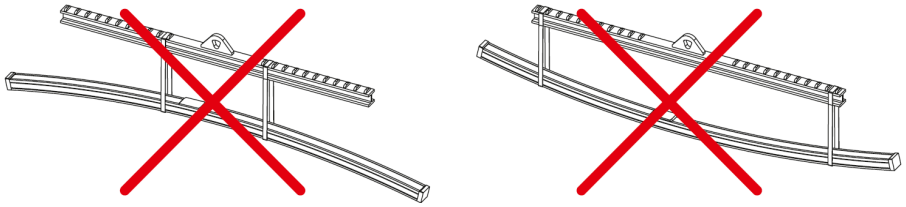


Fig. 5.3: Incorrect position of the support points



6 Assembly and connection

⚠ **Warning**! Risk of impact and crushing!

Injuries may occur due to automatic or manual movement of the carriage.

- A safety guard must be provided for the operation of the linear axes!
- Commissioning, set-up and troubleshooting only by qualified personnel!

⚠ **Warning**! Danger of cutting!

The cover strip can cause cuts during assembly or disassembly.

- Commissioning and set-up only by qualified personnel with appropriate protective equipment (gloves, goggles)!

⚠ **Warning**! Risk of impact and crushing!

Unintentional movements of the driven elements of the linear axes can cause injuries.

- Construction of the control system according to DIN EN 12100. No start-up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!

⚠ **Attention!** Danger of hearing damage!

The linear axes can generate noise above 70 dB(A) at high speeds.

- For fast running linear axes with a noise level above 70 dB(A), ear protection must be worn!
- Linear axes with energy chain and chain support can generate noise up to 94db(A) depending on load and speed. Noise reduction tape is available as an accessory.

⚠ **Attention!** Danger from suspended loads or falling parts!

- Assembly and maintenance of the linear axes only by qualified personnel!
- Take the mass of the parts into account during transport. Use suitable lifting gear!
- Comply with the applicable industrial safety regulations for handling suspended loads.
- Lift linear axes only at specified support points!
- Secure machines and machine parts against tipping over!
- Attach the linear axes according to the assembly instructions!
- When linear axes are arranged vertically, secure the carriage when stationary!

⚠ **Attention!** Danger of impacts and crushing due to imposed load becoming detached!

If the fastener is fastened incorrectly or fails, injuries can be caused by falling or flying parts.

- Carry out assembly in such a way that parts do not come loose even in the event of strong acceleration or continuous vibrations!
- Attach the payload in accordance with the assembly instructions!

⚠ **Attention!** Risk of impact and crushing!

If the axes are moved by the motor, injuries can be caused by moving axes and attachments (energy chains, attachments installed by customer).

- A safety guard must be provided for the operation of the linear axes!
- When linear axes are arranged vertically, secure the carriage when stationary!

⚠ **Attention!** Danger of electric shock or burns from contact with live parts!

Contact with live parts can cause injuries.

If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Construction of the control system according to DIN EN 12100. No start-up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!
- Only qualified personnel may install cabling!
- Work on electrical installations only by qualified personnel!

Caution! Danger to health and the environment!

Contact with lubricants can cause irritation, poisoning and allergic reactions as well as damage to the environment.

- Only use suitable media that are not dangerous for humans. Observe the manufacturer's safety data sheets.
- Dispose of substances appropriately.

6.1 Mounting the linear axes

The linear axis can be installed in any position, the attachment is to be made to the aluminium profile of the axis. The axes can be fastened to the mounting surface with clamping profiles (lateral grooves) or with T nuts (bottom grooves). Please note that depending on the installation position, the weight of the linear axis acts as an additional load and that the actually acting forces and torques must be below the permissible values (see "Linear axes and axis systems HX" catalogue).

Note:

The aluminium profile of the axis is manufactured using the extrusion process in accordance with EN 12020-2.

Note:

If increased running accuracy is required, the axis must be aligned and fastened to an accurate reference edge.

Note:

Please observe the support spacing of the respective axis sizes (see section 6.1.1 Maximum support distance of linear axes HM-S and HT-S with self-supporting application). Not only the end blocks must rest on the mounting surface!

Note:

The screws must be secured against unintentional loosening.

6.1.1 Maximum support distance of linear axes HM-S and HT-S with self-supporting application

In the case of linear axes with long stroke lengths and high payloads, an impermissibly high deflection of the axis beam can occur depending on the mounting. To avoid this, the axis beam should be supported several times and mounted stably on a flat surface. The maximum permissible support distance L as a function of the acting force can be determined from the following diagrams.

Fig. 6.1: Horizontal lying axis position

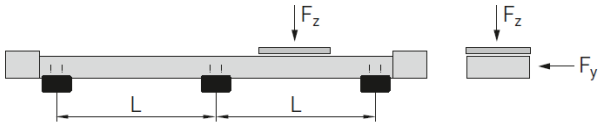


Fig. 6.2: Horizontal standing axis position

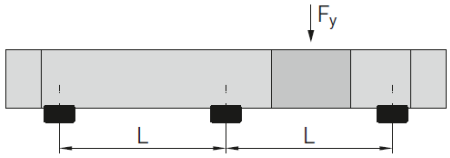


Fig. 6.3: HM-S: Maximum support distance L as a function of force F_z

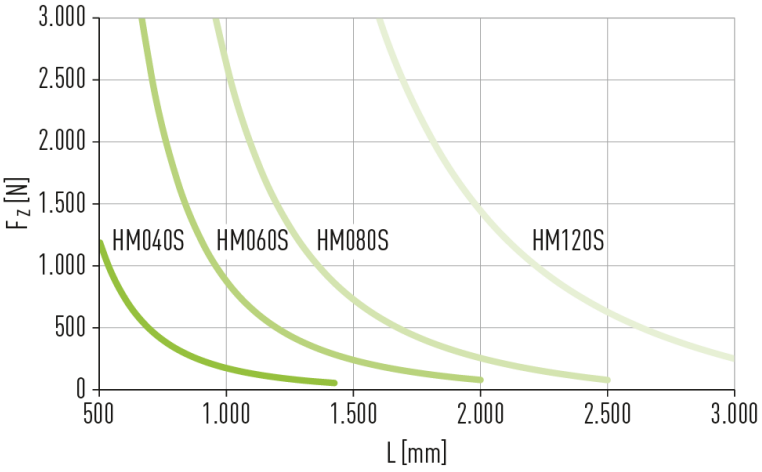


Fig. 6.4: HM-S: Maximum support distance as a function of force F_y

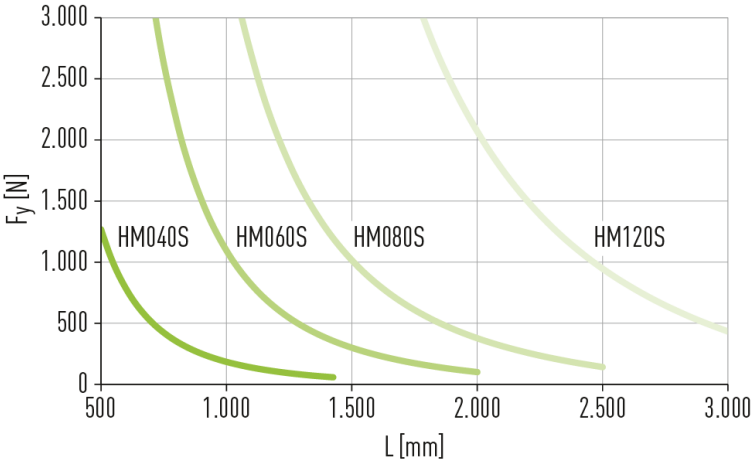


Fig. 6.5: HT-S: Maximum support distance as a function of force F_z

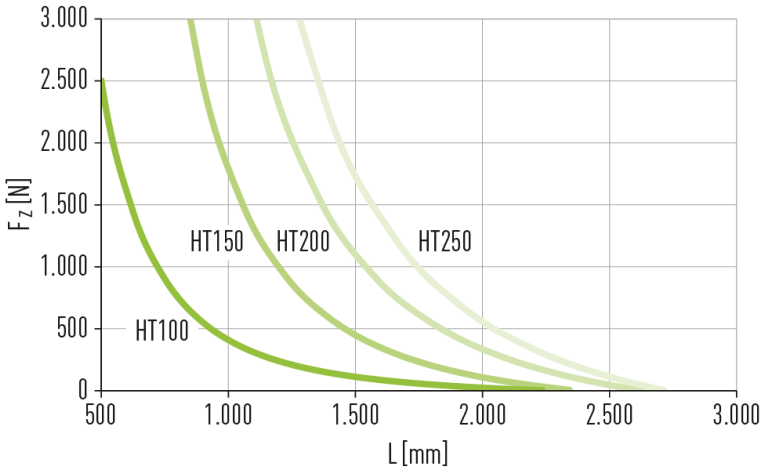
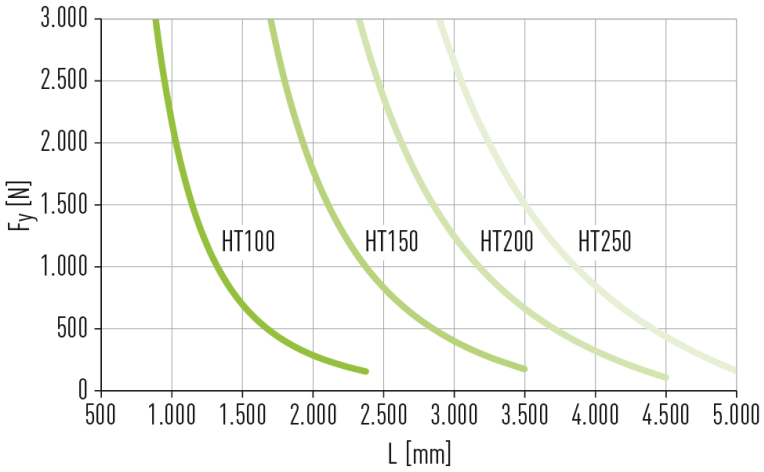


Fig. 6.6: HT-S: Maximum support distance as a function of force F_y



6.1.2 Reference surface accuracy requirements

When securing the linear axes, mount the axis on a flat surface and make sure that the mounting points are aligned with each other so that the necessary flatness of 0,2 mm/m is achieved.

6.1.3 Mounting with T nuts – linear modules HM-S

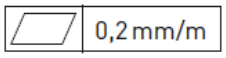
The T nut to be used for each axis size can be found in Table 6.1. The T nuts are to be arranged according to Fig. 6.7 and Fig. 6.9 or Fig. 6.10. The required number of T nuts depends on the external load. To calculate the required number, the load values listed in Table 6.1 (clamping force per T nut; permissible axial operating force in tensile direction per T nut) must be taken into account. The minimum number of T nuts specified in Table 6.1 must not be undercut. The T nuts are to be positioned grouped into mounting points as shown in Fig. 6.9 and Fig. 6.10. It is important to ensure that there is at least one mounting point at each end of the axis and each mounting point is capable of safely transmitting the external load. The number and spacing of the additional mounting points should be chosen according to the load situation. Distances L_{NX} listed in Table 6.1 are only reference values.

- Drill the mounting holes in the mounting surface (hole spacing according to Table 6.1).
- Clean the mounting surface and position the linear axis on the mounting surface.
- Swing the T nut into the lower groove.
- Pre-assemble the T nut with the screws with low screw tightening torque.
- Tighten the screws crosswise, taking into account the screw tightening torques.

✓ The linear axis is mounted.

When mounting the linear axes, observe hole spacing L_{NY}.

Fig. 6.7: Hole spacing for fastening the linear axes from below with T nuts



Level of accuracy required for all reference surfaces in order to secure the axis profile.

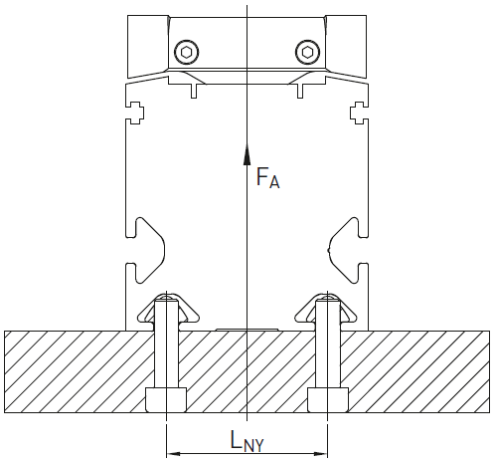


Fig. 6.8: Permissible axial operating force in tensile direction per T nut ($F_{A\_per.}$)

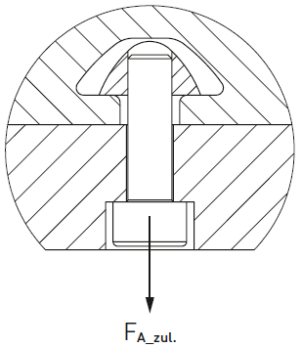


Fig. 6.9: Mounting with T nuts – HM040S, HM060S, HM080S

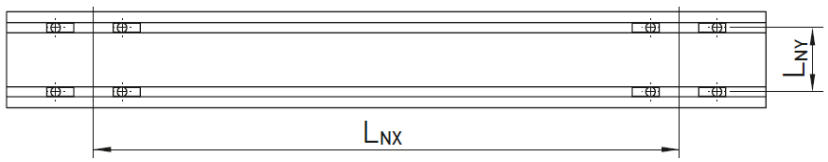


Fig. 6.10: Mounting with T nuts – HM120S

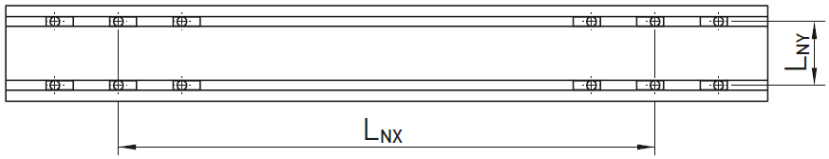


Table 6.1: Minimum number of T nuts for fastening the axis and recommended spacing of the mounting points for longer axes – linear modules HM-S

Size	Minimum number of T blocks	L_{NY} [mm]	Recommended distance L_{NX} [mm]	Thread size	Screw tightening torque [Nm]	Clamping force per T nut [N]	$F_{A\_per.}$ [1] [N]	Art. no. T nuts (10 pcs.)
HM040S	8	20	400	M5	4,5	5.400	500	20-000529
HM060S	8	40	600	M6	10,1	10.200	1.750	20-000531
HM080S	8	40	800	M8	24,6	18.600	5.000	20-000534
HM120S	12	80	1.200	M8	24,6	18.600	5.000	20-000534

[1] Permissible axial operating force in tensile direction per T nut.

6.1.4 Mounting with T nuts – linear tables HT-S

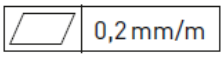
The T nut to be used for each axis size can be found in Table 6.2. The T nuts are to be arranged according to Fig. 6.11, Fig. 6.12, Fig. 6.14, Fig. 6.15 or Fig. 6.16. The required number of T nuts depends on the external load. To calculate the required number, the load values listed in Table 6.2 (clamping force per T nut; permissible axial force in tensile direction per T nut) must be taken into account. The minimum number of T nuts specified in Table 6.2 must not be undercut. The T nuts are to be positioned grouped into mounting points as shown in Fig. 6.14, Fig. 6.15 and Fig. 6.16. It is important to ensure that there is at least one mounting point at each end of the axis and each mounting point is capable of safely transmitting the external load. The number and spacing of the additional mounting points should be chosen according to the load situation. Distances L_{NX} listed in Table 6.2 are only reference values.

- Drill the mounting holes in the mounting surface (hole spacing according to Table 6.2).
- Clean the mounting surface and position the linear table on the mounting surface.
- Swing the T nut into the lower groove.
- Pre-assemble the T nut with the screws with low screw tightening torque.
- Tighten the screws crosswise, taking into account the screw tightening torques.

✓ The linear table is mounted.

When mounting the linear tables, observe hole spacing L_{NY}.

Fig. 6.11: Hole spacing for fastening linear tables HT100S, HT150S, HT200S from below with T nuts



Level of accuracy required for all reference surfaces in order to secure the axis profile.

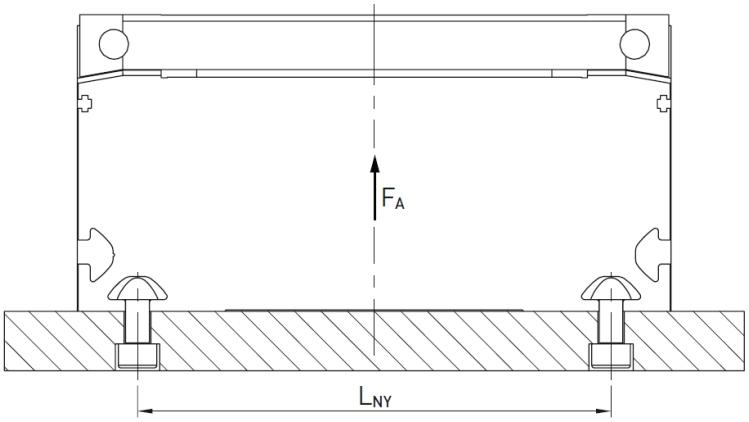


Fig. 6.12: Hole spacing for fastening linear tables HT250S from below with T nuts

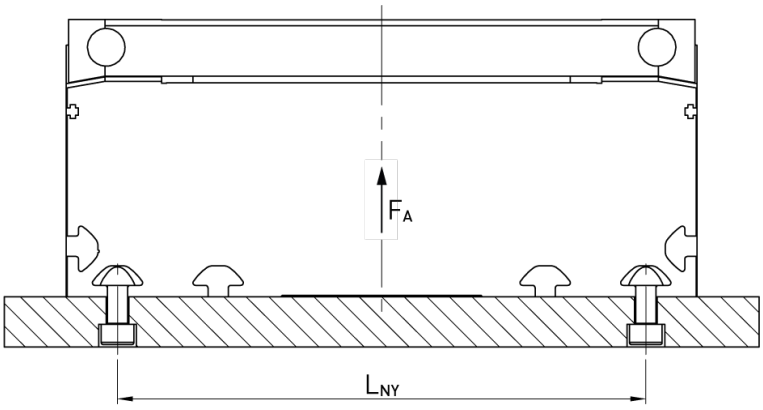


Fig. 6.13: Permissible axial operating force in tensile direction per T nut ($F_{A\_per.}$)

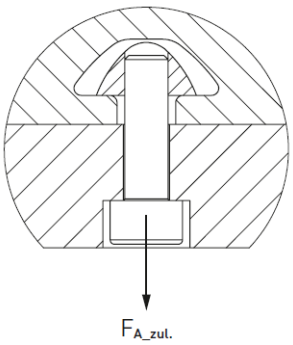


Fig. 6.14: Mounting with T nuts – HT100S, HT150S

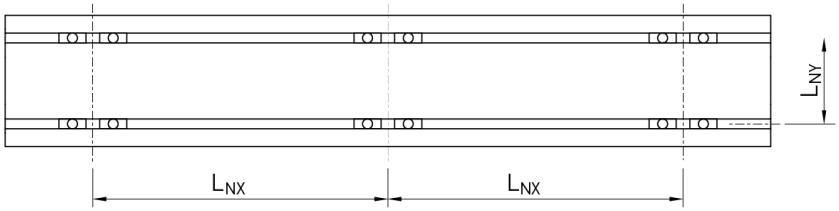


Fig. 6.15: Mounting with T nuts – HT200S

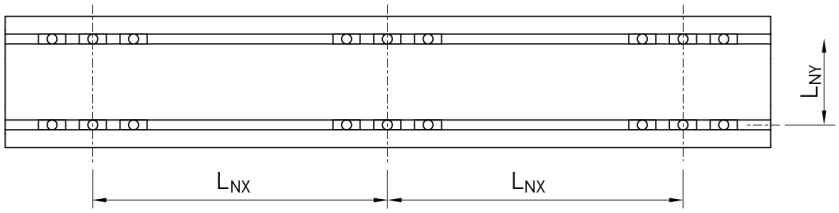


Fig. 6.16: Mounting with T nuts – HT250S

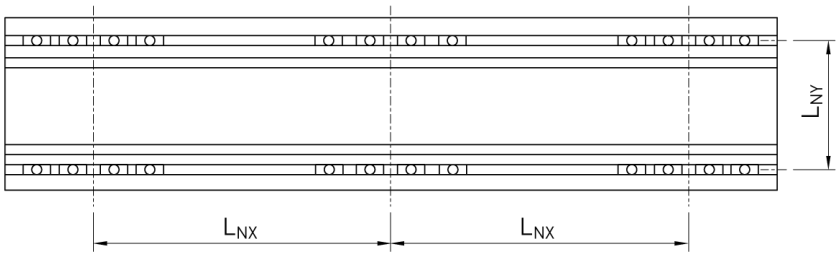


Table 6.2: Minimum number of T nuts for fastening the axis and recommended spacing of the mounting points for longer axes – linear modules HT-S

Size	Minimum number of T nuts	L_{NY} [mm]	Recommended distance L_{NX} [mm]	Thread size	Screw tightening torque [Nm]	Clamping force per T nut [N]	$F_{A\_per.}$ [1] [N]	Art. no. T nuts (10 pcs.)
HT100S	8	80	500	M5	4,5	5.400	500	20-000529
HT150S	8	120	600	M6	10,1	10.200	1.750	20-000531
HT200S	12	160	800	M8	24,6	18.600	5.000	20-000534
HT250S	16	210	1.000	M8	24,6	18.600	5.000	20-000534

[1] Permissible axial operating force in tensile direction per T nut.

6.1.5 Mounting with clamping profiles – linear modules HM-S

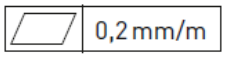
The clamping profiles must always be mounted in pairs (left and right of the axis beam) (see Fig. 6.18 and Fig. 6.19). The required number of clamping profiles depends on the external load. To calculate the required number, the load values listed in Table 6.3 (clamping force per clamping profile; permissible axial operating load in tensile direction per pair of clamping profiles) must be taken into account. The minimum number of clamping profiles specified in Table 6.3 must not be undercut. It is important to ensure that there is at least one mounting point at each end of the axis and each mounting point is capable of safely transmitting the external load. The number and spacing of the additional mounting points should be chosen according to the load situation. Distances L_{SX} listed in Table 6.3 are only reference values.

- Drill the mounting holes in the mounting surface (hole spacing according to Table 6.3).
- Clean the mounting surface and position the linear axis on the mounting surface.
- Swivel the clamping profile into the lateral groove.
- Pre-assemble the clamping profile with the screws with low screw tightening torque.
- Tighten the screws crosswise, taking into account the screw tightening torques.

✓ The linear axis is mounted.

When mounting the linear axes, observe hole spacing L_{SY} (Fig. 6.17).

Fig. 6.17: Hole spacing for lateral mounting of linear modules HM-S with clamping profiles



Level of accuracy required for all reference surfaces in order to secure the axis profile.

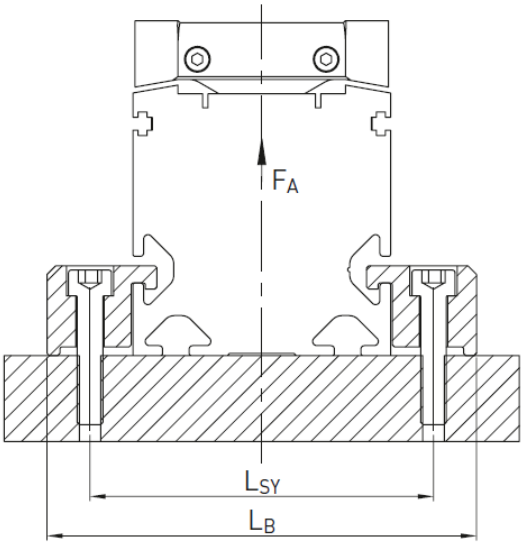


Fig. 6.18: Mounting with clamping profiles – HM040S, HM060S, HM080S

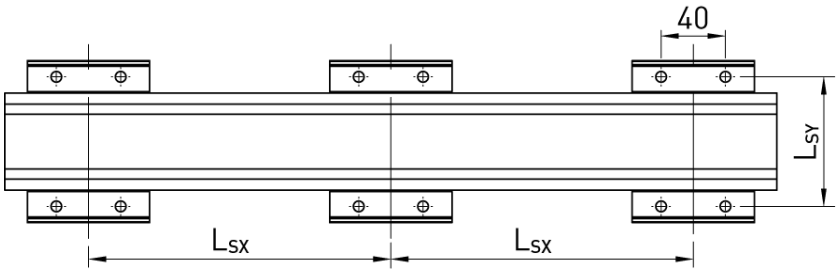


Fig. 6.19: Mounting with clamping profiles – HM120S

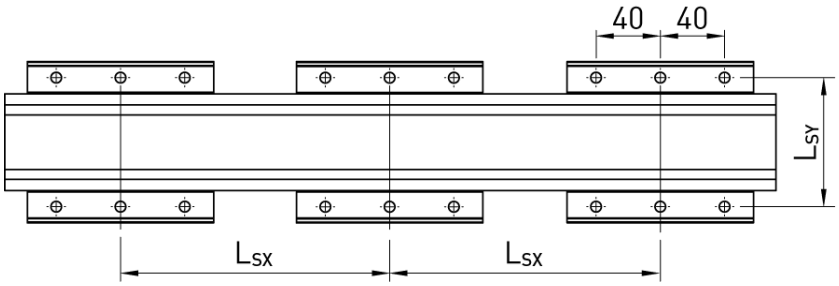


Table 6.3: Minimum number of clamping profiles for fastening the axis and recommended spacing of the mounting points for longer axes – linear modules HM-S

Size	Minimum number of clamping profiles	L_{SY} [mm]	L_B [mm]	Recommended distance L_{SX} [mm]	Thread size	Screw tightening torque [Nm]	Clamping force per clamping profile [N]	$F_{A\_per.}$ [1] [N]	Article no. clamping profiles (4 pcs.)
HM040S	4	55	70	400	M5	4,9	4.700	200	25-000517
HM060S	4	80	100	600	M6	6,4	5.500	500	25-000518
HM080S	4	100	120	800	M8	18,5	11.400	1.200	25-000519
HM120S	4	140	160	1.200	M8	18,5	17.000	2.400	25-000520

[1] Permissible axial operating force in tensile direction per pair of clamping profiles

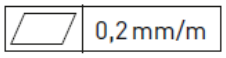
6.1.6 Mounting with clamping profiles – linear tables HT-S

The clamping profiles must always be mounted in pairs (left and right of the axis beam) (see Fig. 6.21 and Fig. 6.22). The required number of clamping profiles depends on the external load. To calculate the required number, the load values listed in Table 6.4 (clamping force per clamping profile; permissible axial operating load in tensile direction per pair of clamping profiles) must be taken into account. The minimum number of clamping profiles specified in Table 6.4 must not be undercut. It is important to ensure that there is at least one mounting point at each end of the axis and each mounting point is capable of safely transmitting the external load. The number and spacing of the additional mounting points should be chosen according to the load situation. Distances L_{SX} listed in Table 6.4 are only reference values.

- ▶ Drill the mounting holes in the mounting surface (hole spacing according to Table 6.4).
- ▶ Clean the mounting surface and position the linear table on the mounting surface.
- ▶ Swivel the clamping profile into the lateral groove.
- ▶ Pre-assemble the clamping profile with the screws with low screw tightening torque.
- ▶ Tighten the screws crosswise, taking into account the screw tightening torques.
- ✓ The linear table is mounted.

When mounting the linear tables, observe hole spacing L_{SY} (Fig. 6.20).

Fig. 6.20: Hole spacing for lateral mounting of linear tables HT-S with clamping profiles



Level of accuracy required for all reference surfaces in order to secure the axis profile.

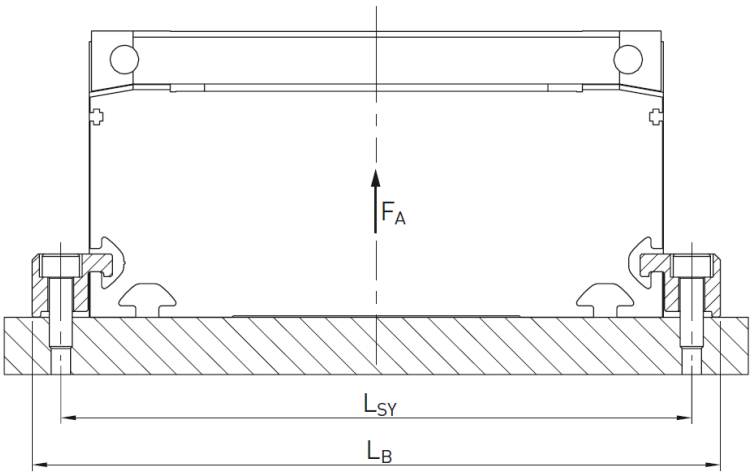


Fig. 6.21: Mounting with clamping profiles – HT100S, HT150S

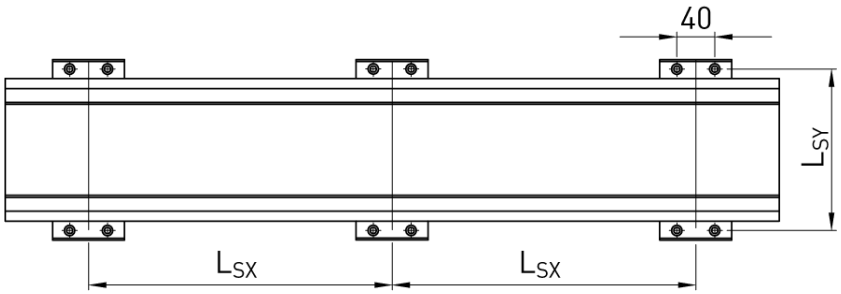


Fig. 6.22: Mounting with clamping profiles – HT200S, HT250S

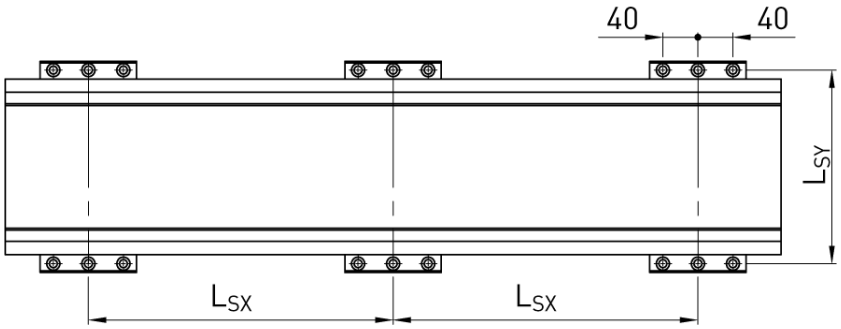


Table 6.4: Minimum number of clamping profiles for fastening the axis and recommended spacing of the mounting points for longer axes – linear tables HT-S

Size	Minimum number of clamping profiles	L_{SY} [mm]	L_B [mm]	Recommended distance L_{SX} [mm]	Thread size	Screw tightening torque [Nm]	Clamping force per clamping profile [N]	$F_{A\_per.}$ [1)] [N]	Article no. clamping profiles (4 pcs.)
HT100S	4	115	130	500	M5	4,9	4.700	800	25-000517
HT150S	4	170	190	600	M6	10,1	8.600	1.600	25-001023
HT200S	4	220	240	800	M8	18,5	17.000	3.000	25-000520
HT250S	6	270	290	1.000	M8	18,5	17.000	5.000	25-000520

[1)] Permissible axial operating force in tensile direction per pair of clamping profiles

6.2 Mounting the payload

The distances of the threaded holes for mounting the payload can be found in the “Linear axes and axis systems HX” catalogue. Additional counter bores allow for insertion of centring rings. HIWIN recommends arranging two centring rings diagonally opposite each other. For axes with more than one carriage, only equipping one carriage at a time with centring sleeves is recommended to avoid stress.

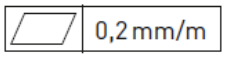
Table 6.5: Threaded holes for fastening the payload

Axis type/size	Thread size × depth	Counter bore depth for centring sleeve	Counter bore diameter for centring sleeve [mm]
HM040S	M5 × 10	1,5	Ø8 H7
HM060S	M6 × 12	1,5	Ø8 H7
HM080S	M8 × 16	2,0	Ø12 H7
HM120S	M10 × 22	2,0	Ø15 H7
HT100S	M5 × 10	1,5	Ø8 H7
HT150S	M6 × 14	1,5	Ø8 H7
HT200S	M8 × 14	2,0	Ø12 H7
HT250S	M10 × 20	2,0	Ø15 H7

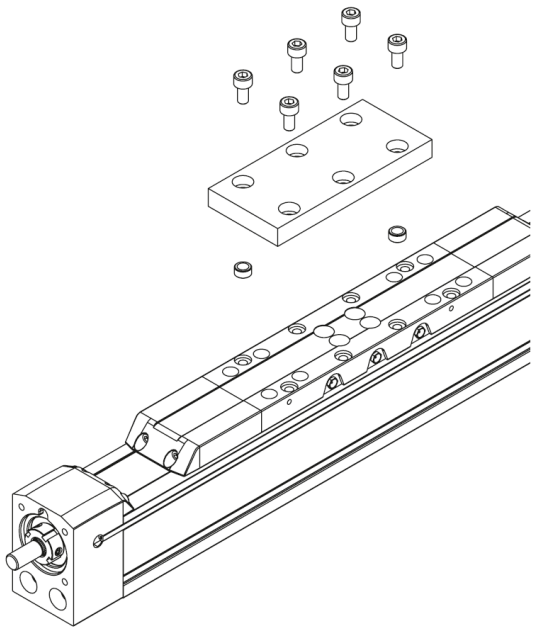
- Clean the mounting surfaces on the carriage.
- Clean the mounting surface of the load.
- Use centring sleeves if necessary.
- Position the load on the carriage of the linear axis.
- Tighten the mounting bolts crosswise.
- Check if the load moves freely throughout the entire stroke.
- Secure the screws.

✓ The payload is mounted.

Fig. 6.23: Mounting the load with centring sleeves with the example of a linear module HM-S



Level of accuracy required for all reference surfaces in order to secure the axis profile.



6.3 Mounting the limit switches

The limit switches are optionally available as NC or NO contacts. The limit switch can be fixed directly in the limit switch groove (T groove) with the enclosed M3 screws and square nuts. The limit switches can be mounted either on the right or on the left.

- Where applicable, remove the green trim from the upper T groove.
- Slide two square nuts into the upper T groove through each recess on the drive block.
- Fit the limit switch with both screws (for sizes HM040S/HT100S, the spacer plate must also be fitted between the limit switch and the axis, see Fig. 6.24). Leave the two screws unfastened for the time being.
- Slide the limit switch to the desired position and push it slightly upwards.
- Tighten the screws. The screw tightening torque is 0,5 Nm.
- ✓ The limit switches have been mounted.

Fig. 6.24: Mounting of limit switch: HM040S, HT100S

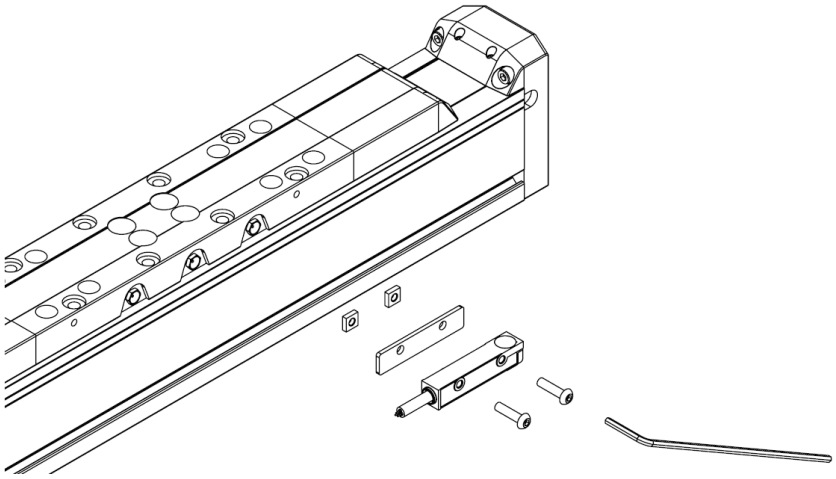
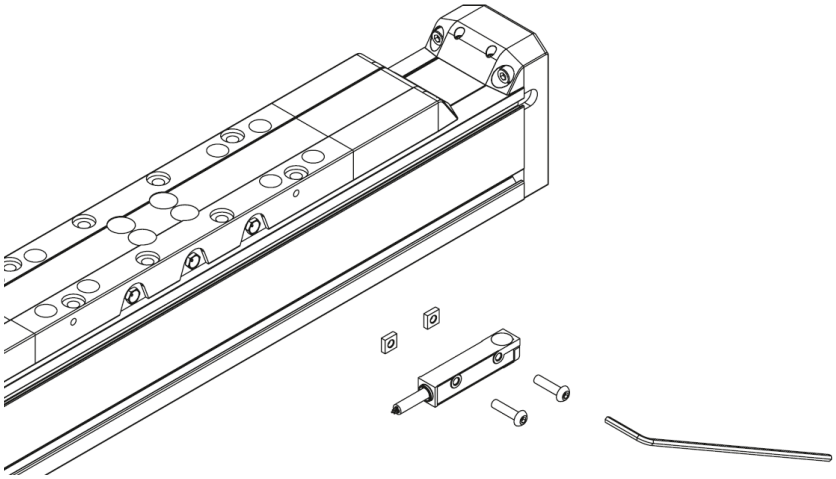


Fig. 6.25: Mounting of limit switch: HM060S, HM080S, HM120S, HT150S, HT200S, HT250S



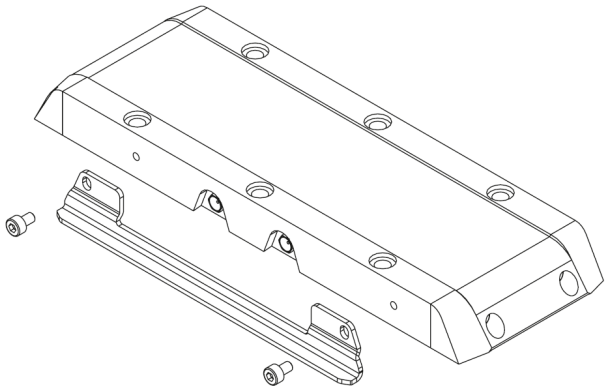
6.4 Mounting the damping element

The damping element actuates the limit switches at the two end positions of the carriage (at stroke 0 and max. stroke) and must be mounted on the same side as the limit switches.

- Place the damping element on the carriage.
- Screw the damping element lightly to the carriage with the enclosed M3 screws.
- Align the damping element parallel to the lower edge of the carriage.

✓ The damping element is pre-assembled.

Fig. 6.26: Mounting damping element



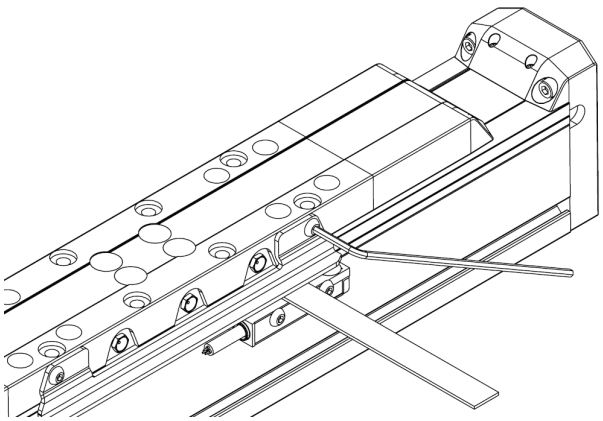
6.5 Setting the switching distance

The limit switches are inductive units and require a defined switching distance between limit switch and damping element of 1 mm.

- Move the carriage until the damping element is above a limit switch. Align the damping element using a feeler gauge so that the switching distance of 1 mm is maintained. Make sure that the damping element remains aligned parallel to the lower edge of the carriage.
- Tighten the bolts of the damping element. The screw tightening torque is 1 Nm.
- If a second limit switch is installed: Move the carriage until the damping element is above the second limit switch and check with a feeler gauge whether the switching distance of 1 mm is maintained. Correct if necessary until the switching distance is maintained for both limit switches.
- Lay the limit switch cable in the lower groove. The cable can be protected by the groove cover there. The groove cover is available separately, see section 12.4.

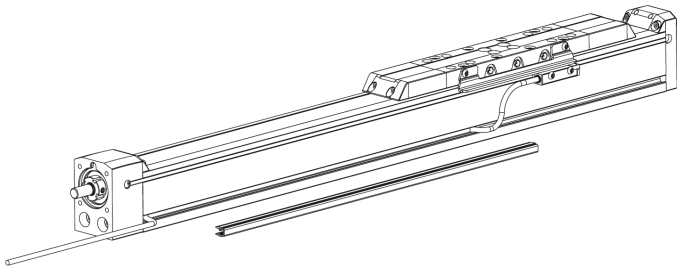
✓ The switching distance has been set.

Fig. 6.27: Setting the switching distance with a feeler gauge and tightening the bolts



- Check that the limit switch is functioning correctly before commissioning with a limit switch test box or by controlled travel to the end positions.

Fig. 6.28: Mounting of limit switch: Laying the cables



6.6 Mounting the drive unit of linear axis HM-S

6.6.1 Assembly of coupling assembly HM-S

A suitable coupling assembly is required for attaching the motor. These can be found in chapter 11 Appendix 1: Drive adaptation.

The coupling assembly for linear axis HM-S consists of:

- 1 clamping hub for the axis side **[1]**
- 1 sprocket **[2]**
- 1 clamping hub for the drive side **[3]**

The clamping hubs come in two versions:

- Variant 1 with a clamping bolt, see Fig. 6.29
- Variant 2 with two clamping bolts, see Fig. 6.30

Fig. 6.29: Coupling assembly variant 1: Clamping hubs with one clamping bolt

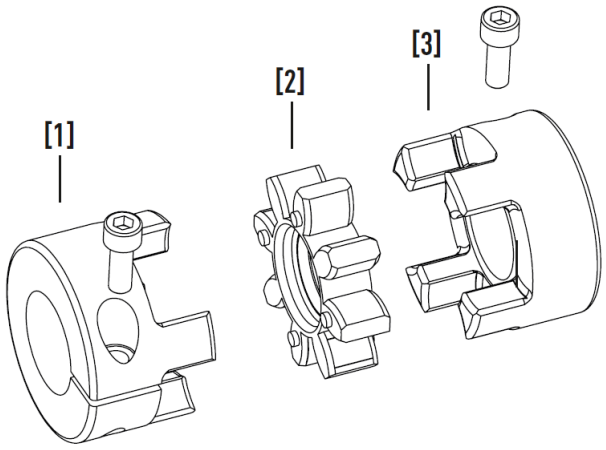
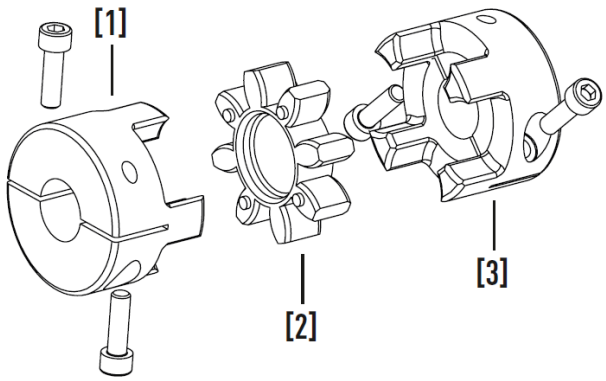


Fig. 6.30: Coupling assembly variant 2: Clamping hubs with two clamping bolts



Before mounting, please ensure that

- No parts are damaged
- All parts are free of dirt and grease

For assembly of the coupling assembly, the screw tightening torques listed in Table 6.6 and Table 6.7 apply:

Table 6.6: Screw tightening torques for the clamping hub

Size	Screw tightening torque for clamping hub, variant 1 [Nm]	Screw tightening torque for clamping hub, variant 2 [Nm]
HM040S	1,9	2,1
HM060S	5,0	5,0 [2)]
HM080S	14,0 [1)]	14,0 [3)]
HM120S	14,0	15,0

[1)] Special version with clamping diameter 24 mm: 10 Nm
[2)] Special version with clamping diameter 16 mm: 3,8 Nm
[3)] Special version with clamping diameter 22 and 24 mm: 10 Nm

Table 6.7: Screw tightening torques for the clutch housing

Size	Bolt strength class	Thread size	Screw tightening torque [Nm]
HM040S	8.8	M4	3,0
HM060S	8.8	M5	5,9
HM080S	8.8	M6	10,1
HM120S	8.8	M8	24,6

Attachment of the coupling assembly:

- Carefully press the clamping hub onto the journal of the spindle until dimension L_1 (see Table 6.8) is set.

Fig. 6.31: Placing clamping hub on drive journal of linear axis HM-S

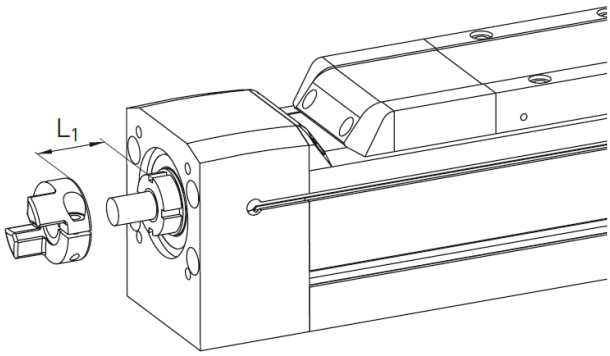


Table 6.8: Adjustment of the distance from clamping hub to locknut nut via dimension L_1

Size	L_1 variant 1 [mm]	L_1 variant 2 [mm]
HM040S	5,5 [1)]	5,5
HM060S	7,5 [2)]	7,5
HM080S	3,5 [3)]	3,5
HM120S	4,5 [4)]	6,5

[1)] Up to serial number HSN 0000000669: L_1 = 3 mm
[2)] Up to serial number HSN 0000002990: L_1 = 5 mm
[3)] Up to serial number HSN 0000004905: L_1 = 0 mm
[4)] Up to serial number HSN 0000002990: L_1 = 0 mm

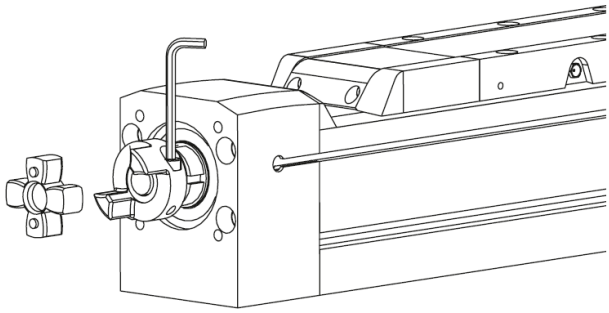
Variant 1:

- Tighten the screw on the clamping hub. For screw tightening torque, see Table 6.6.

Variant 2:

- First, position the screw on the 1st side to the clamping hub, then tighten the screw on the 2nd side, followed by the screw on the 1st side, to the screw tightening torque shown in Table 6.6.
- Press the sprocket into the clamping hub.

Fig. 6.32: Tightening the clamping hub and fitting the sprocket



Note:

The sprocket must be slightly pre-tensioned and should not exhibit any backlash. If it is too easy to attach, it has to be exchanged. Lightly greasing the sprocket with PU-compatible lubricants can make installation easier.

- Mount coupling housing KB with 4 screws so that it lies flat. For screw tightening torques, see Table 6.7.
- Push the clamping hub onto the sprocket until dimension L_2 is achieved (see Table 6.9).

Fig. 6.33: Mounting of clamping hub and coupling housing KB on linear axis HM-S

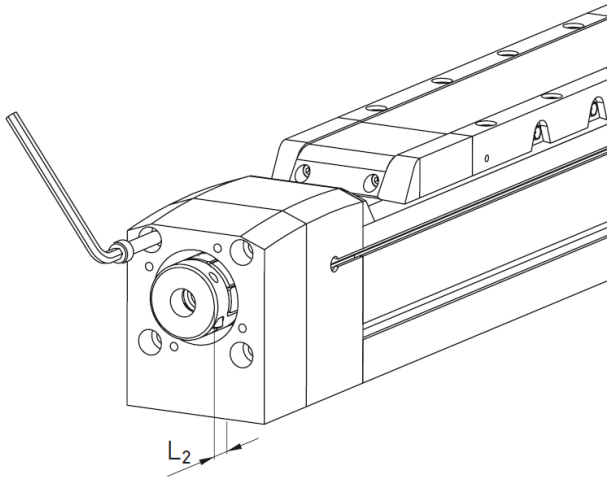
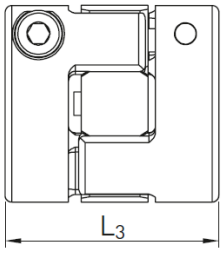


Table 6.9: Adjusting the coupling distance via dimension L_2

Size	Coupling size	L_2 variant 1 [mm]	L_2 variant 2 [mm]
HM040S	12	8,5	8,5
HM060S	14	10,0	10,0
HM080S	19	14,0	14,0
HM120S	24	16,5	14,5

Fig. 6.34: Total length of HM-S coupling assembly



Note:
When mounting without coupling housing, coupling distance L_3 must be set according to Fig. 6.34 and Table 6.10.

Table 6.10: Adjusting the coupling distance via dimension L_3 when there is no coupling housing

Size	L_3 variant 1 [mm]	L_3 variant 2 [mm]
HM040S	34	34
HM060S	32	32
HM080S	50	50
HM120S	58	54

6.6.2 Mounting the motor

- Push motor adapter plate AM on flat, taking note of the position of the hole for the clamping bolt of the clamping hub.
- Tighten the 4 screws. For screw tightening torques, see Table 6.11.

Fig. 6.35: Mounting motor adapter plate AM

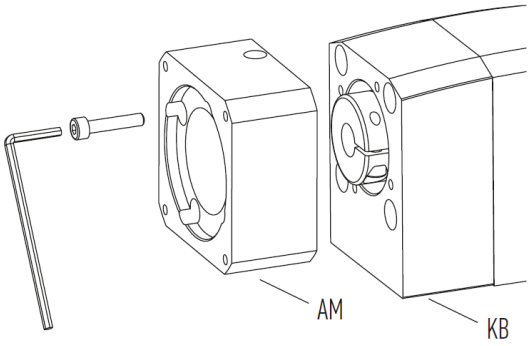
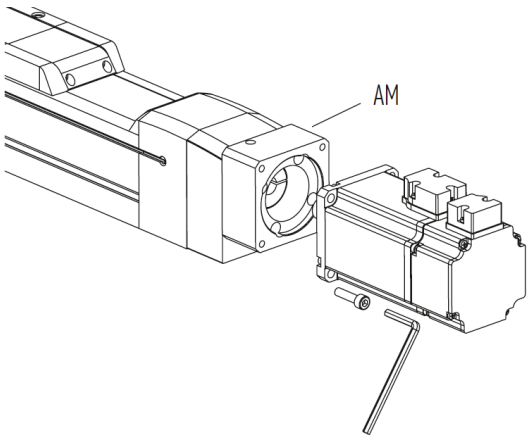


Table 6.11: Screw tightening torques for motor adapter plate AM

Size	Bolt strength class	Thread size	Screw tightening torque [Nm]
HM040S	8.8	M4	3,0
HM060S	8.8	M5	5,9
HM080S	8.8	M6	10,1
HM120S	8.8	M8	24,6

- Secure the motor to make sure it cannot fall.
- Place the motor flat on motor adapter plate AM.
- Mount the motor according to the manufacturer's instructions.

Fig. 6.36: Screwing the motor to linear axis HM-S



Note:

Take care to slide the motor on straight so that the preset L measurement does not change.

- Remove the sealing plug from the side hole of motor adapter plate AM.
- Move the clamping hub by moving the carriage to the position where the screw/s of the clamping hub is/are reached through the hole.

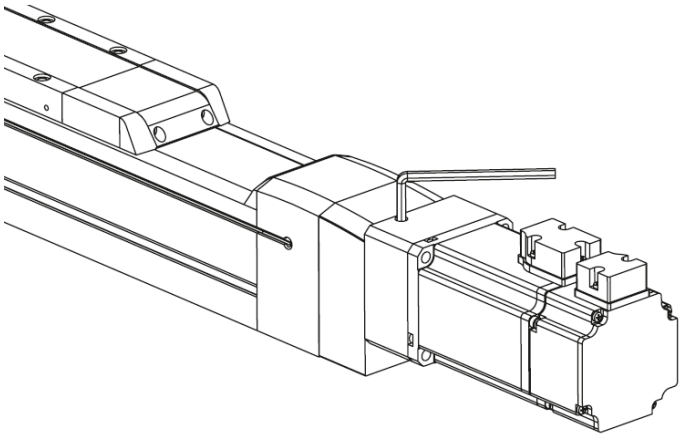
Variant 1:

- Tighten the screw of the clamping hub through the bore hole to the screw tightening torque as shown in Table 6.6.

Variant 2:

- Tighten the two screws of the clamping hub one after the other, through the bore hole. First, position the screw on the 1st side, then tighten the screw on the 2nd side, followed by the screw on the 1st side, to the screw tightening torque shown in Table 6.6.
- Close the hole with the sealing plug.
- ✓ The motor is mounted.

Fig. 6.37: Tightening the clamping hub on the motor shaft



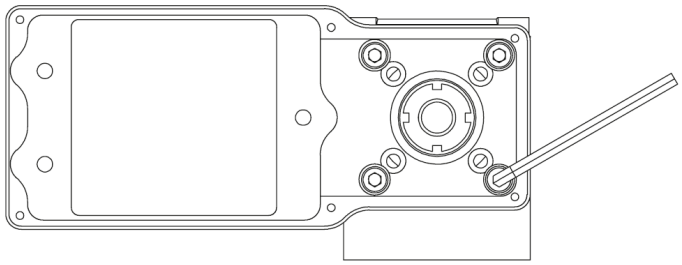
6.6.3 Mounting belt drive

- Align the belt drive housing in the desired direction and place it flat on the drive block of the axis.
- Tighten the 4 screws. For screw tightening torques, see Table 6.12. Secure the screws.

Table 6.12: Mounting bolts of belt drive housing

Size	Bolt strength class	Thread size × length	Screw tightening torque [Nm]
HM040S	8.8	M4 × 12	3
HM060S	8.8	M5 × 12	6
HM080S	8.8	M6 × 16	10
HM120S	8.8	M8 × 20	25

Fig. 6.38: Assembly of belt drive housing

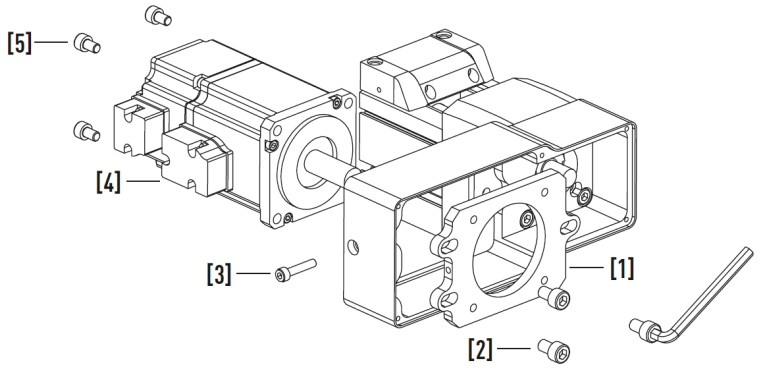


- Insert the motor flange **[1]** into the window provided in the housing.
- Lightly tighten the mounting bolts **[2]** for the motor flange.
- Push the motor flange towards the linear axis as far as it will go.
- Screw the clamping screw **[3]** into the motor flange via the frontal hole of the housing until the screw head lies flat.
- Mount the motor **[4]** over the back of the housing as shown in Fig. 6.39. The length of the motor-specific mounting bolts **[5]** must be selected so that they protrude max. 0.5 mm towards the inside of the housing.

Table 6.13: Mounting bolts for motor flange and clamping screw

Size	Motor flange mounting bolt				Clamping screw	
	Strength class	Thread size × length	Quantity [pcs.]	Screw tightening torque [Nm]	Strength class	Thread size × length
HM040S/HM060S	8.8	M6 × 10	3	4	8.8	M4 × 20
HM080S	8.8	M8 × 12	3	8	8.8	M4 × 30
HM120S	8.8	M8 × 16	4	10	8.8	M6 × 25

Fig. 6.39: Mounting of motor flange, clamping screw and motor



[1] Motor flange

[2] Motor flange mounting bolts

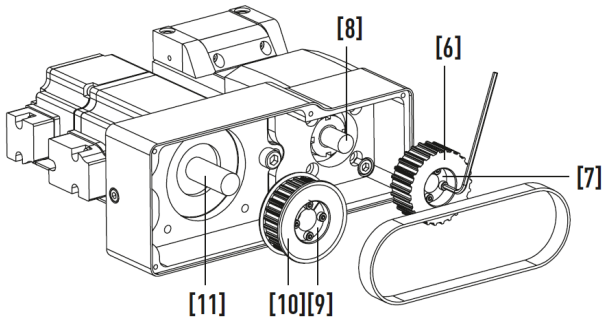
[3] Clamping screw

[4] Motor

[5] Motor mounting bolts

- Push the clamping set **[7]** for the toothed lock washer **[6]** on the axis side into it as far as it will go. Slide the pre-assembled unit (clamping set and toothed lock washer) onto the shaft end of the spindle axis **[8]**. Use a feeler gauge to ensure that the safety distance between the toothed lock washer and the housing is maintained according to Fig. 6.41.
- Push the clamping set **[9]** for the toothed lock washer **[10]** on the motor side into it as far as it will go. Put the pre-assembled unit (clamping set and toothed lock washer) onto the motor shaft **[11]**.
- Using a feeler gauge, ensure that a safety distance as shown in Fig. 6.41 is maintained between the flanged wheel of the toothed lock washer and the motor flange.
- Working in a criss-cross fashion and in 3 steps, tighten the clamping screws of the clamping sets to the screw tightening torque specified in Table 6.14 and Table 6.15.
- Then repeat the process of tightening the clamping set clamping screws one after the other as per the screw tightening torques specified in Table 6.14 and Table 6.15.
- First place the toothed belt over the motor-side toothed lock washer, then over the axis-side toothed lock washer.

Fig. 6.40: Mounting of toothed lock washers and toothed belt



[6] Toothed lock washer axis side

[7] Clamping set toothed lock washer axis side

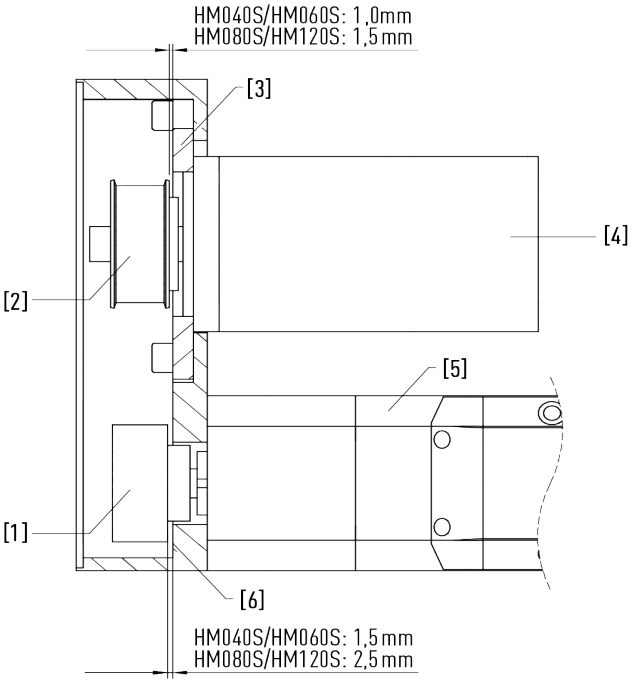
[8] Shaft end spindle axis

[9] Clamping set toothed lock washer motor side

[10] Toothed lock washer motor side

[11] Motor shaft

Fig. 6.41: Safety distances between the flanged wheel of the toothed lock washer (motor side) and motor flange as well as between the toothed lock washer (axis side) and housing



[1] Toothed lock washer (axis side)

[2] Toothed lock washer (motor side)

[3] Motor flange

[4] Motor

[5] Axis

[6] Housing wall

Table 6.14: Tightening torques for clamping screw, axis side

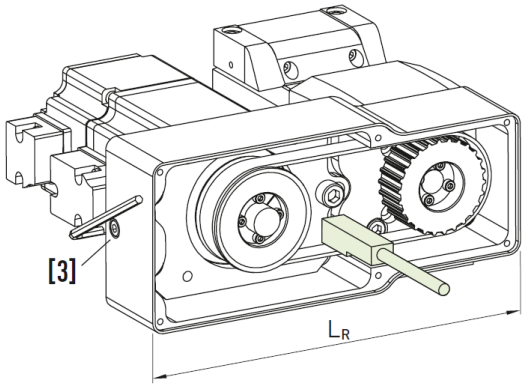
Linear axis [mm]	Screw tightening torque of clamping screw [Nm]
HM040S, HM060S, HM080S	1,2
HM120S	9,7

Table 6.15: Tightening torques for clamping screw, motor side

Shaft diameter of motor [mm]	Screw tightening torque of clamping screw [Nm]
6 – 12	1,2
14 – 15	2,1
16 – 19	4,9
20	9,7
22 – 32	17,0

- Make sure that the axis is in load-free condition and that the motor is not energised.
- Carefully tighten the clamping screw **[3]** at the front of the housing until the belt frequency ±10% determined according to formula F 6.1 is set. This can be determined with the help of a trummeter, as shown in Fig. 6.42, using the inside of the belt. If the frequency is within the specified range, the mounting bolts **[2]** of the motor flange can be tightened according to Table 6.13. Secure the screws.
- Check the preload again, as there may be a slight change due to the tightening of the screws.

Fig. 6.42: Setting the belt frequency



Determining the belt frequency

F 6.1

$$f = \sqrt{\frac{10^6 \times M}{X}} \geq f_{min}$$

f_{min} Minimum value belt frequency [Hz] (see Table 6.16)

f Belt frequency [Hz]

M Application-dependent drive torque of motor [Nm]

X Factor for determining the belt frequency [Nm/Hz^2] (see Table 6.16)

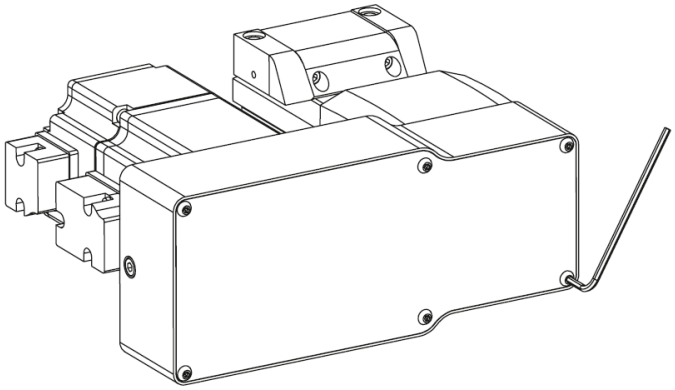
Table 6.16: Factor for determining the belt frequency

Size	Belt drive variant [1)]	Up to serial no. HSN 0000003845		From serial no. HSN 0000003846		f_{min} [Hz]
		X [Nm/Hz²]	L_R [mm]	X [Nm/Hz²]	L_R [mm]	
HM040S	V1	64	168,5	35	168,5	168
HM060S	V1	64	168,5	35	168,5	168
	V2	59	198,5	52	201,5	138
HM080S	V1	193	236,0	181	236,0	136
	V2	244	265,0	229	265,0	121
HM120S	V1	1.405	303,5	696	303,5	114
	V2	1.193	343,0	887	343,0	101

[1)] Belt drive variant depending on the selected motor, see Table 11.1 from page 78.

- ▶ Close the belt drive with the cover strip.
- ▶ Tighten the enclosed M3 × 6 pan-head screws to a torque of 1,0 Nm.
- ✓ The belt drive is mounted.

Fig. 6.43: Mounting the belt drive cover strip



6.7 Mounting the drive unit of linear table HT-S

6.7.1 Assembly of coupling assembly (HT-S)

A suitable coupling assembly is required for attaching the motor. These can be found in section 11.2.4 on page 89.

The coupling assembly for linear table HT-S consists of:

- 1 clamping hub for the axis side **[1]**
- 1 sprocket **[2]**
- 1 clamping hub for the drive side **[3]**

The clamping hubs come in two versions:

- Variant 1 with a clamping bolt, see Fig. 6.44
- Variant 2 with two clamping bolts, see Fig. 6.45

Fig. 6.44: Coupling components - Variant 1 with clamping hubs with one clamping bolt

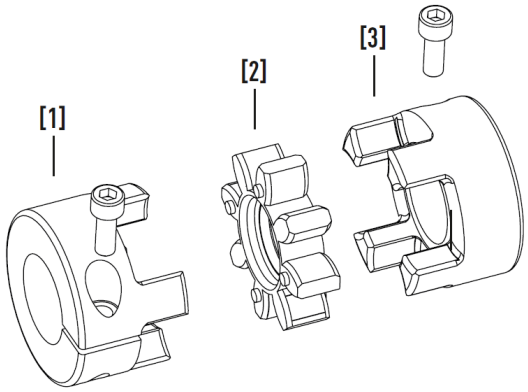
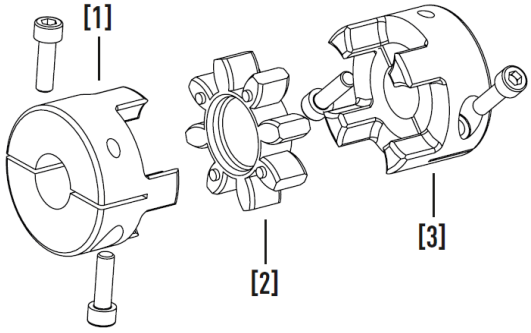


Fig. 6.45: Coupling components - Variant 2 with clamping hubs with two clamping bolts



Before mounting, please ensure that

- No parts are damaged
- All parts are free of dirt and grease

For assembly of the coupling assembly, the screw tightening torques listed in Table 6.17 and Table 6.18 apply:

Table 6.17: Screw tightening torques for the clamping hub

Size	Screw tightening torque for clamping hub, variant 1 [Nm]	Screw tightening torque for clamping hub, variant 2 [Nm]
HT100S	5,0	5,0 [2)]
HT150S	14,0 [1)]	14,0 [3)]
HT200S	14,0 [1)]	14,0 [3)]
HT250S	14,0	15,0

[1)] Special version with clamping diameter 24 mm: 10 Nm
[2)] Special version with clamping diameter 20 mm: 3,8 Nm
[3)] Special version with clamping diameter 22 and 24 mm: 10 Nm

Table 6.18: Screw tightening torques for the clutch housing

Size	Bolt strength class	Thread size	Screw tightening torque [Nm]
HT100S	8.8	M5	5,9
HT150S	8.8	M6	10,1
HT200S	8.8	M6	10,1
HT250S	8.8	M8	24,6

Attachment of the coupling assembly:

- Carefully press the clamping hub onto the journal of the spindle until dimension L_1 (see Table 6.19) is set.

Fig. 6.46: Placing clamping hub on drive journal of linear table HT-S

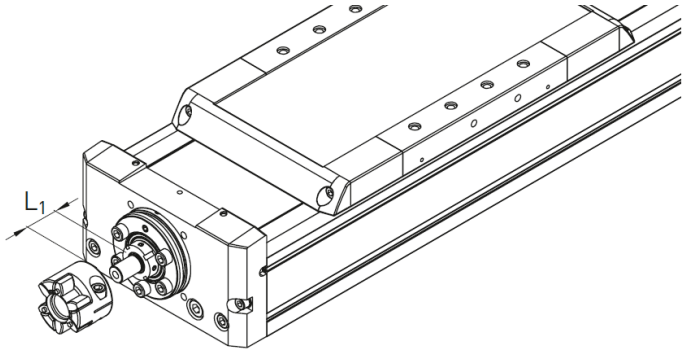


Table 6.19: Adjustment of the distance from clamping hub to locknut nut via dimension L_1

Size	L_1 variant 1 [mm]	L_1 variant 2 [mm]
HT100S	6	6
HT150S	1	1
HT200S	1	1
HT250S	2	4

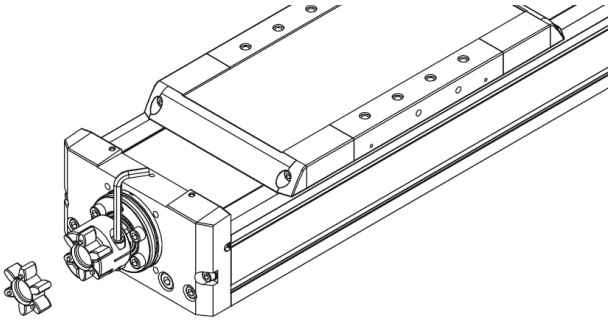
Variant 1:

- Tighten the screw on the clamping hub. For screw tightening torque, see Table 6.17.

Variant 2:

- First, position the screw on the 1st side to the clamping hub, then tighten the screw on the 2nd side, followed by the screw on the 1st side, to the screw tightening torque shown in Table 6.17.
- Press the sprocket into the clamping hub.

Fig. 6.47: Tightening the clamping hub and fitting the sprocket (HT150S, HT200S)



Note:

The sprocket must be slightly pre-tensioned and should not exhibit any backlash. If it is too easy to attach, it must be replaced. Lightly greasing the sprocket with PU-compatible lubricants can make installation easier.

- Mount coupling housing KB with 4 screws so that it lies flat. For screw tightening torques, see Table 6.18.
- Push the clamping hub onto the sprocket until dimension L_2 is achieved (see Table 6.20).

Fig. 6.48: Mounting of clamping hub and coupling housing KB on linear tables HT-S

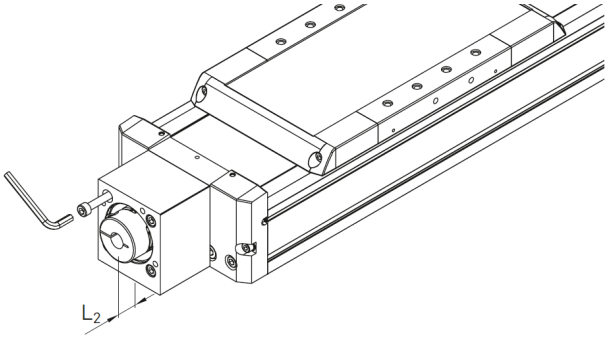
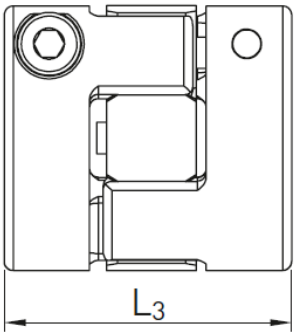


Table 6.20: Adjusting the coupling distance via dimension L_2

Size	Coupling size	L_2 variant 1 [mm]	L_2 variant 2 [mm]
HT100S	14	10,0	10,0
HT150S	19	14,0	14,0
HT200S	19	14,0	14,0
HT250S	24	16,5	14,5

Fig. 6.49: Total length of coupling assembly (HT-S)



Note:
When mounting without coupling housing, coupling distance L_3 must be set according to Fig. 6.49 and Table 6.21.

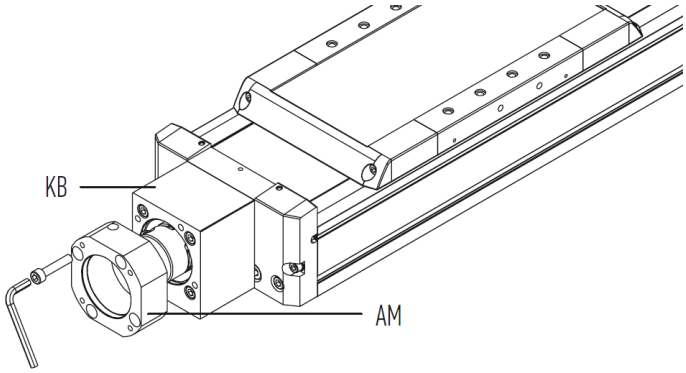
Table 6.21: Adjusting the coupling distance via dimension L_3 when there is no coupling housing

Size	L_3 variant 1 [mm]	L_3 variant 2 [mm]
HT100S	34	32
HT150S	32	50
HT200S	50	50
HT250S	58	54

6.7.2 Mounting the motor

- Push motor adapter plate AM on flat, taking note of the position of the hole for the clamping bolt of the clamping hub.
- Tighten the 4 screws. For screw tightening torques, see Table 6.22.

Fig. 6.50: Mounting motor adapter plate AM



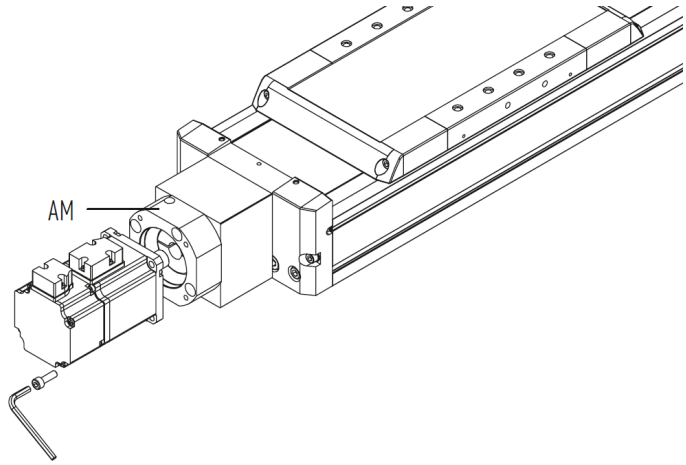
KB Coupling housing

Table 6.22: Screw tightening torques for motor adapter plate AM

Size	Bolt strength class	Thread size	Screw tightening torque [Nm]
HT100S	8.8	M5	5,9
HT150S	8.8	M6	10,1
HT200S	8.8	M6	10,1
HT250S	8.8	M8	24,6

- Secure the motor to make sure it cannot fall.
- Place the motor flat on motor adapter plate AM.
- Mount the motor according to the manufacturer's instructions.

Fig. 6.51: Screwing the motor to linear table HT-S



Note:

Take care to slide the motor on straight so that preset dimension L does not change

.

- Remove the sealing plug from the side hole of motor adapter plate AM.
- Move the clamping hub by moving the carriage to the position where the screw/s of the clamping hub is/are reached through the hole.

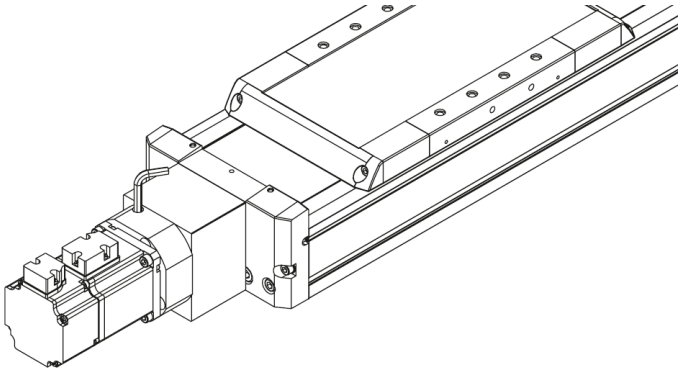
Variant 1:

- Tighten the screw of the clamping hub through the bore hole to the screw tightening torque as shown in Table 6.17.

Variant 2:

- Tighten the two screws of the clamping hub one after the other, through the bore hole. First, position the screw on the 1st side, then tighten the screw on the 2nd side, followed by the screw on the 1st side, to the screw tightening torque shown in Table 6.17.
- Close the hole with the sealing plug.
- ✓ The motor is mounted.

Fig. 6.52: Tightening the clamping hub on the motor shaft



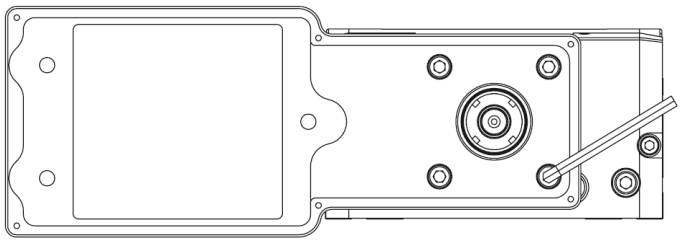
6.7.3 Mounting belt drive

- Align the belt drive housing in the desired direction and place it flat on the drive block of the axis.
- Tighten the 4 screws. For screw tightening torques, see Table 6.23. Secure the screws.

Table 6.23: Mounting bolts of belt drive housing

Size	Bolt strength class	Thread size × length	Screw tightening torque [Nm]
HT100S	8.8	M5 × 16	6
HT150S	8.8	M6 × 25	10
HT200S	8.8	M6 × 25	10
HT250S	8.8	M8 × 30	25

Fig. 6.53: Assembly of belt drive housing

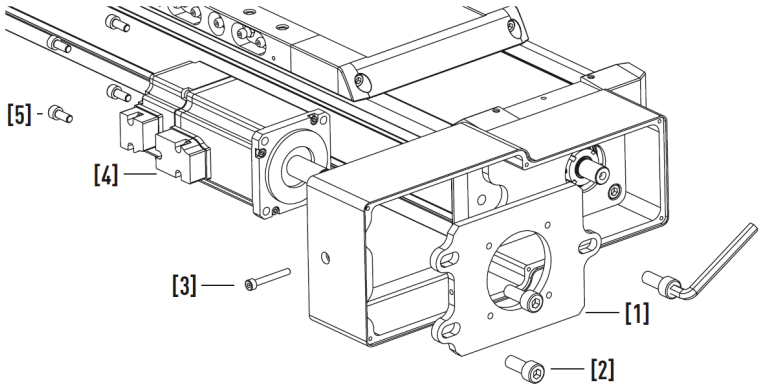


- Insert the motor flange **[1]** into the window provided in the housing.
- Lightly tighten the mounting bolts **[2]** for the motor flange.
- Push the motor flange towards the linear axis as far as it will go.
- Screw the clamping screw **[3]** into the motor flange via the frontal hole of the housing until the screw head lies flat.
- Mount the motor **[4]** over the back of the housing as shown in Fig. 6.54. The length of the motor-specific mounting bolts **[5]** must be selected so that they protrude max. 0,5 mm towards the inside of the housing.

Table 6.24: Mounting bolts for motor flange and clamping screw

Size	Motor flange mounting bolt				Clamping screw	
	Strength class	Thread size × length	Quantity [pcs.]	Screw tightening torque [Nm]	Strength class	Thread size × length
HT100S	8.8	M6 × 12	3	10	8.8	M4 × 20
HT150S	8.8	M8 × 20	3	25	8.8	M4 × 30
HT200S	8.8	M8 × 20	3	25	8.8	M4 × 30
HT250S	8.8	M8 × 25	4	25	8.8	M6 × 25

Fig. 6.54: Mounting of motor flange, clamping screw and motor



[1] Motor flange

[2] Motor flange mounting bolts

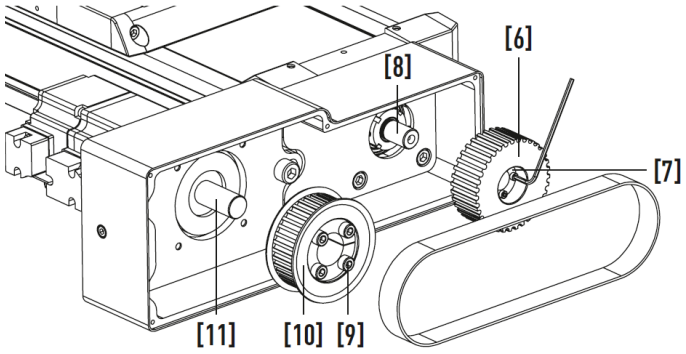
[3] Clamping screw

[4] Motor

[5] Motor mounting bolts

- Push the clamping set **[7]** for the toothed lock washer **[6]** on the axis side into it as far as it will go. Slide the pre-assembled unit (clamping set and toothed lock washer) onto the shaft end of the spindle axis **[8]**. Use a feeler gauge to ensure that the safety distance between the toothed lock washer and the housing is maintained according to Fig. 6.56.
- Push the clamping set **[9]** for the toothed lock washer **[10]** on the motor side into it as far as it will go. Put the pre-assembled unit (clamping set and toothed lock washer) onto the motor shaft **[11]**.
- Using a feeler gauge, ensure that a safety distance as shown in Fig. 6.56 is maintained between the flanged wheel of the toothed lock washer and the motor flange.
- Working in a criss-cross fashion and in 3 steps, tighten the clamping screws of the clamping sets to the screw tightening torque specified in Table 6.25 and Table 6.26.
- Then repeat the process of tightening the clamping set clamping screws one after the other as per the screw tightening torques specified in Table 6.25 and Table 6.26.
- First place the toothed belt over the motor-side toothed lock washer, then over the axis-side toothed lock washer.

Fig. 6.55: Mounting of toothed lock washers and toothed belt



[6] Toothed lock washer axis side

[7] Clamping set toothed lock washer axis side

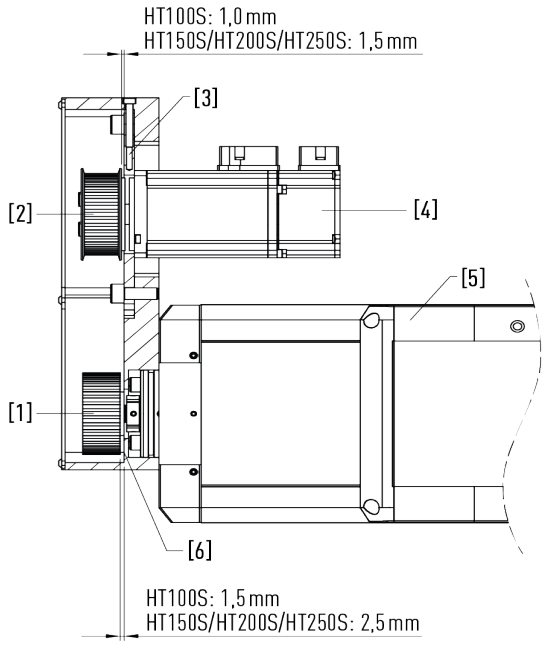
[8] Shaft end spindle axis

[9] Clamping set tooth lock washer motor side

[10] Toothed washer motor side

[11] Motor shaft

Fig. 6.56: Safety distances between the flanged wheel of the toothed lock washer (motor side) and motor flange as well as between the toothed lock washer (axis side) and housing



[1] Toothed lock washer (axis side)

[2] Toothed lock washer (motor side)

[3] Motor flange

[4] Motor

[5] Axis

[6] Housing wall

Table 6.25: Tightening torques for clamping screw, axis side

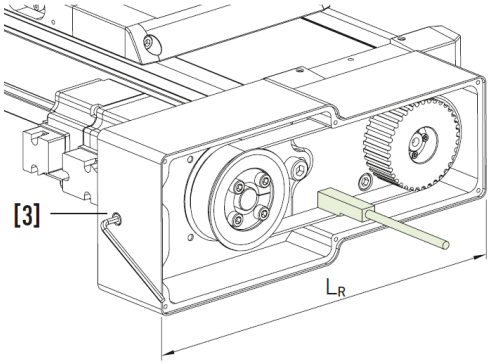
Size	Screw tightening torque of clamping screw [Nm]
HT100S, HT150S	1,2
HT200S	4,9
HT250S	9,7

Table 6.26: Tightening torques for clamping screw, motor side

Size	Screw tightening torque of clamping screw [Nm]
6 – 12	1,2
14 – 15	2,1
16 – 19	4,9
20	9,7
22 – 32	17,0

- Make sure that the axis is in load-free condition and that the motor is not energised.
- Carefully tighten the clamping screw **[3]** at the front of the housing until the belt frequency ±10% determined according to formula F 6.2 is set. This can be determined with the help of a trummeter, as shown in Fig. 6.57, using the inside of the belt. If the frequency is within the specified range, the mounting bolts **[2]** of the motor flange can be tightened according to Table 6.24. Secure the screws.
- Check the preload again, as there may be a slight change due to the tightening of the screws.

Fig. 6.57: Setting the belt frequency



Determining the belt frequency

F 6.2

$$f = \sqrt{\frac{10^6 \times M}{X}} \geq f_{min}$$

f_{min} Minimum value belt frequency [Hz] (see Table 6.16)

f Belt frequency [Hz]

M Application-dependent drive torque of motor [Nm]

X Factor for determining the belt frequency [Nm/Hz^2] (see Table 6.27)

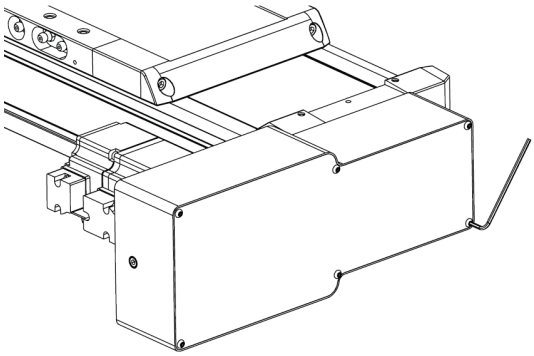
Table 6.27: Factor for determining the belt frequency

Size	Belt drive variant [1)]	X [Nm/Hz^2]	L_R [mm]	f_{min} [Hz]
HT100S	V1	53	186,5	137
	V2	80	225,5	111
HT150S	V1	243	255,5	117
	V2	317	289,5	103
HT200S	V1	317	279,5	103
	V2	390	311,0	92
HT250S	V1	1.196	348,7	87
	V2	1.600	400,2	75

[1)] Belt drive variant depending on the selected motor, see Table 11.1.

- ▶ Close the belt drive with the cover strip.
- ▶ Tighten the enclosed M3 × 6 pan-head screws to a torque of 1,0 Nm.
- ✓ The belt drive is mounted.

Fig. 6.58: Mounting the belt drive cover strip



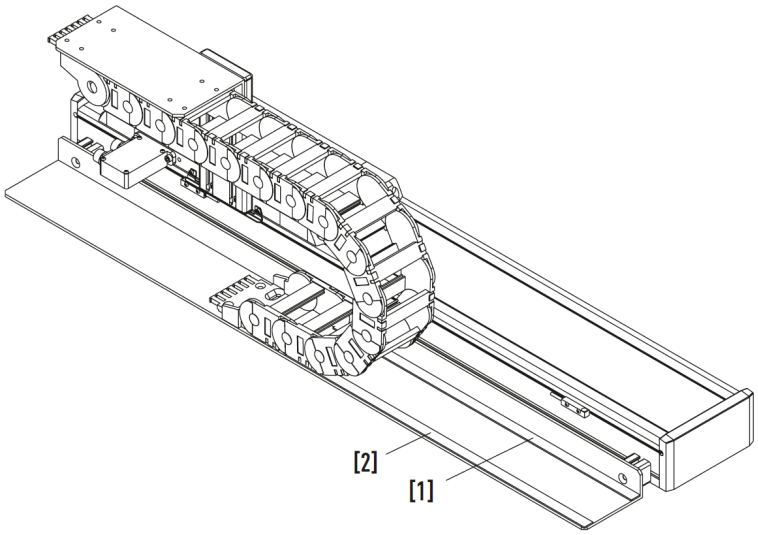
6.8 Mounting the tape for reduction of noise emissions from the energy chain

The tape reduces the noise emission of the energy chain.

- Slide the carriage by hand to the mechanical end position so that the energy chain rests on the energy chain support to the maximum extent.
- Shorten the noise reduction tape until it corresponds to the maximum support length of the energy chain. Two tapes of the same length are required for each energy chain.
- Slide the carriage by hand to the other end position so that the lower section of the energy chain is lifted as far as possible from the energy chain support.
- Clean the energy chain support so that it is free of dirt, dust and grease.
- Attach the 1st Tape **[1]** flush with the corner of the energy chain support (see Fig. 6.59).
- Attach the 2nd tape **[2]** flush with the outer edge of the support bracket.
- Move the carriage and make sure that the energy chain runs on the tapes over its entire travel distance.

✓ The noise reduction tape has been mounted.

Fig. 6.59: Linear axis with mounted noise reduction tape



6.9 Electrical connection

⚠ **Danger!** Danger due to electrical voltage!

If the motor is not properly earthed, there is a risk of electric shock.

- Make sure that the linear axes are properly earthed via the PE rail in the switch cabinet before connecting the electrical power supply!

⚠ **Danger!** Danger due to electrical voltage!

Electrical currents can also flow when the motor is not moving.

- Make sure that the linear axes are disconnected from the power supply before disconnecting the electrical connections of the motors!
- After disconnecting the servo drive from the power supply, wait at least 5 minutes before touching live parts or loosening connections!
- To be on the safe side, measure the voltage in the intermediate circuit of the servo drive. Wait until it has dropped below 40 V!
- Work on electrical installations only by qualified personnel!

6.9.1 Limit switch connection

The pin assignment of the limit switch plug for variant A can be found in Fig. 6.61: For variant C and D (see order codes: Linear modules HM-S page 12, linear tables HT-S page 15) with open cable ends, the wires must be connected according to Fig. 6.60.

Fig. 6.60: Wiring diagram

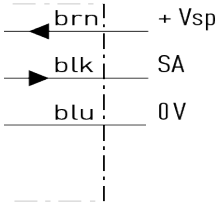
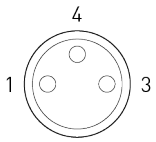


Fig. 6.61: Pin assignment: Limit switch plug



Pin assignment:
1: Brown (+ Vsp)
3: Blue (0 V)
4: Black (switching output)

Note:

Since the sensor is operated with a low voltage, it alone does not normally pose a risk of injury or death.

Note:

Do not operate the sensor with a voltage other than the specified voltage, otherwise it may be destroyed!

6.9.2 Connection of external distance measuring system for HM-B and HT-S

The HIWIN MAGIC distance measuring system is factory-mounted on the side of the carriage of the axis. The cable length is 5 m with open cable end.

If the encoder is connected according to table 6.28, the counting direction (with the encoder in motion) results according to the definitions in Fig. 6.62 and Fig. 6.63.

If you wish to have a positive counting direction in the opposite direction, when connecting to the electronic evaluation system, you must switch “A” with “B and “$\bar{A}$” with “$\bar{B}$”.

Fig. 6.62: MAGIC distance measuring system – linear axes HM-S and HT-S

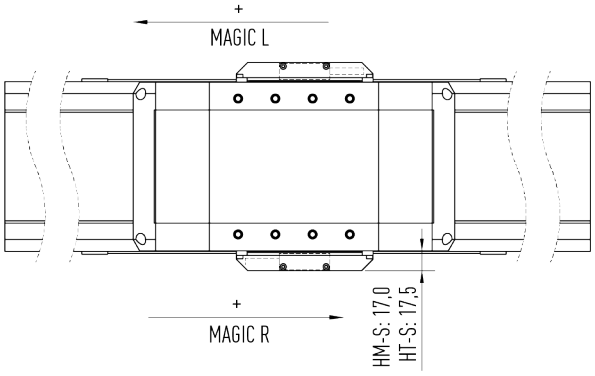


Fig. 6.63: Detail view, positive direction of travel of MAGIC encoder

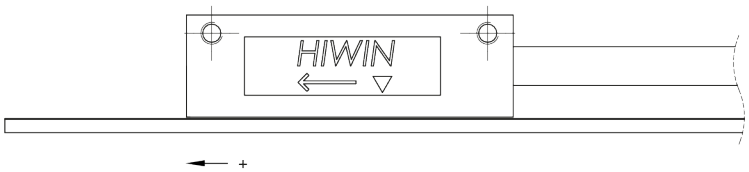


Table 6.28: Line and plug assignments

Colour of encoder cable	Signal
Brown	Power supply 5 V
White	GND / 0 V
Green	V1+ / A
Yellow	V1- / $\bar{A}$
Blue	V2+ / B
Red	V2- / $\bar{B}$
Purple	Ref+ / Z
Grey	Ref- / $\bar{Z}$
	Shielding

For more information, see the “HIWIN MAGIC distance measuring system” assembly instructions.

6.9.3 Motor connection

Note:

Information on the connection options of the motor can be found in the operating instructions of the motor used!

6.9.4 Servo drive connection

Note:

Information on the connection options of the servo drive can be found in the operating instructions of the servo drive used!

7 Maintenance and cleaning

⚠ **Warning**! Risk of impact and crushing!

Injuries can occur if the carriage is moved or accidentally started up.

- When linear axes are arranged vertically, secure the carriage when stationary!
- Construction of the control system according to DIN EN 12100: No start up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!

⚠ **Warning**! Danger of injury and damage to property!

Unauthorised work on the unit may cause injury and invalidate the warranty.

- Assembly and maintenance of the system only by qualified personnel!

⚠ **Attention!** Danger of crushing due to tilting of the axes!

- Secure machine and machine parts against tipping over!

⚠ **Attention!** Danger of impacts and crushing due to the axis falling down or the payload coming loose! Danger due to high loads!

- Use suitable lifting gear!
- Attach the linear axis according to the assembly instructions (see section 6.1)!
- Attach the payload according to the assembly instructions (see section 6.1)!

⚠ **Attention!** Risk of impact and crushing!

If the axes are moved/driven manually, injuries can be caused by moving axes and attachments (energy chains, attachments installed by customer).

- Observe applicable industrial safety regulations!
- Transport to the installation site only by qualified personnel!

⚠ **Attention!** Danger of electric shock or burns from contact with live parts!

Contact with live parts can cause injuries. If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Construction of the control system according to DIN EN 12100. No start-up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!
- Only qualified personnel may install cabling!
- Work on electrical installations only by qualified personnel!

⚠ **Attention!** Danger to health and the environment!

Contact with lubricants can cause irritation, poisoning and allergic reactions as well as damage to the environment.

- Only use suitable media that are not dangerous for humans. Observe the manufacturer's safety data sheets.
- Dispose of substances appropriately.

Caution! Damage due to incorrect lubricant!

Using the wrong lubricant can cause damage to property or environmental pollution.

- Use the correct type of lubricant (grease, oil) according to the specifications in these assembly instructions!

For maintenance work:

- Secure the linear axis/linear axis systems against unauthorised switching on.
- Disconnect the linear axis/linear axis systems from the power supply.
- Secure the linear axis/linear axis systems against unauthorised restart.

Note:

Compliance with the maintenance intervals for cleaning and lubrication is essential.

- Include the maintenance intervals in your maintenance schedule.

7.1 Lubrication

Operation of the linear axis continuously consumes lubricant. The product must be relubricated regularly. Note that the lubricant may leak out of the lubrication system in small quantities.

The following factors influence the lubrication intervals:

- Dust and dirt
- Operating temperatures
- Loads
- Vibration stress
- Permanently short positioning paths
- Speeds

Note:

Insufficient lubrication or the wrong lubricant increase wear and reduce the service life!

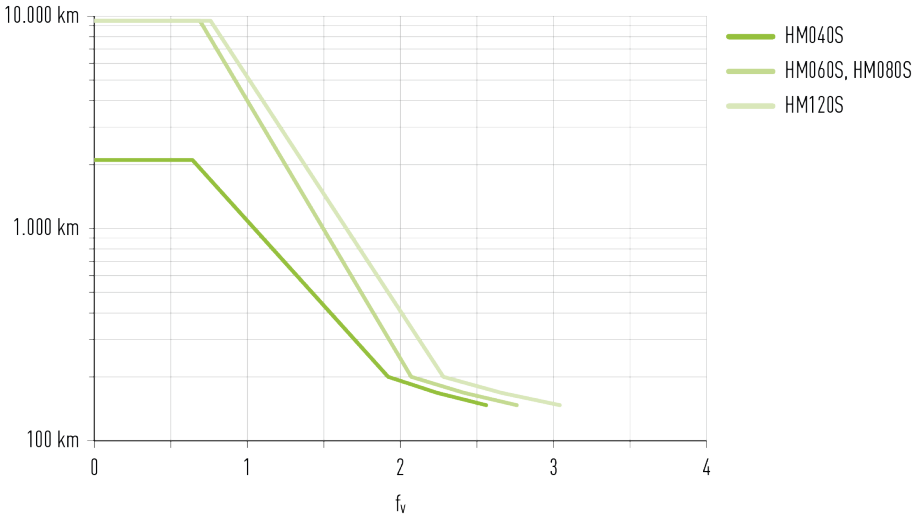
7.1.1 Lubrication of linear axis HM-S

Part of linear axis HM-S is a linear guideway with two blocks as well as a ballscrew, which are provided with initial lubrication at the factory. For relubrication, there are three grease nipples on each side of the carriage. The blocks are lubricated via the outer grease nipples, the ballscrew via the centre one.

Table 7.1: Lubricant quantities of the linear guideway of linear axes HM-S

Size	Guide carriage	Lubricant	Relubrication quantity [cm³]
HM040S	MGN15	G04	0,50
HM060S	QE15	G04	0,55
HM080S	QH20	G04	0,70
HM120S	QH30	G04	0,75

Fig. 7.1: Load-dependent relubrication intervals [km] of the linear guideway of linear axes HM-S



fv Load comparison factor according to F 7.1 on page 65.

Table 7.2: Lubrication interval of the ballscrew

Size	Ø spindle [mm]	Spindle pitch [mm]	Lubricant	Relubrication quantity [cm³]	Mileage [km]
HM040S	12	5	G04	0,19	100
		10		0,31	
HM060S	16	5	G04	1,15	100
		10		0,91	
		16		1,66	
HM080S	20	5	G04	1,02	100
		10		1,10	
		20		2,49	
HM120S	32	10	G04	3,29	100
		20		4,52	
		32		4,64	

Under the following conditions, the relubrication intervals may be shorter. Please consult HIWIN in these cases:

v > 3 m/s, a > 30 m/s^2, media impact, temperatures < 20 °C or > 30 °C, dirty environment.

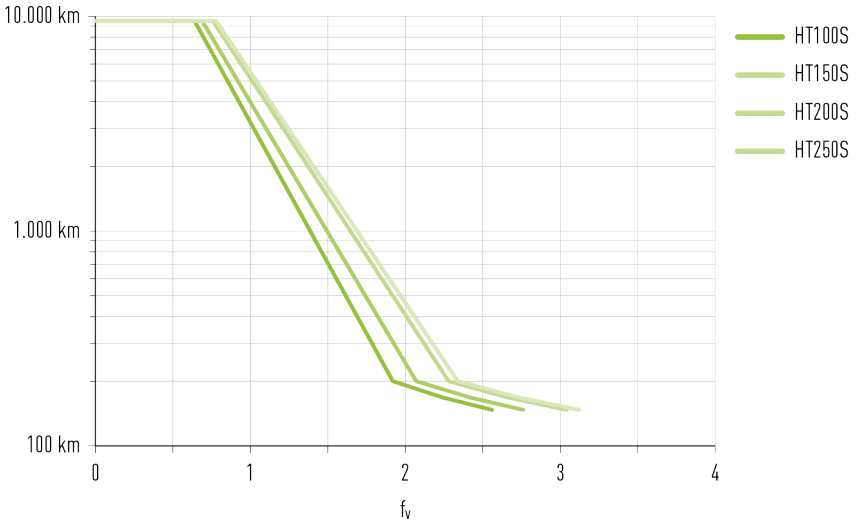
7.1.2 Lubrication linear table HT-S

Part of linear table HT-S are two linear guideways with two blocks each as well as a ballscrew, which are provided with initial lubrication at the factory. For relubrication, there are five grease nipples on the side of the block. The blocks are lubricated via the outer grease nipples, the ballscrew via the centre one.

Table 7.3: Lubricant quantities of the linear guideway of linear tables HT-S

Size	Guide carriage	Lubricant	Relubrication quantity [cm³]
HT100S	QE15	G04	0,55
HT150S	QE15	G04	0,55
HT200S	QH20	G04	0,70
HT250S	QH25	G04	0,75

Fig. 7.2: Load-dependent relubrication intervals [km] of the linear guideway of linear tables HT-S



f_v Load comparison factor according to F 7.1.

Table 7.4: Lubrication interval of the ballscrew

Size	Ø spindle [mm]	Spindle pitch [mm]	Lubricant	Relubrication quantity [cm³]	Mileage [km]
HT100S	12	5	G04	1,15	100
		10		1,20	
		16		1,66	
HT150S	16	5	G04	1,20	100
		10		1,40	
		20		2,50	
HT200S	20	5	G04	1,55	100
		10		1,80	
		25		2,10	
HT250S	32	10	G04	3,30	100
		20		4,50	
		32		4,65	

Under the following conditions, the relubrication intervals may be shorter. Please consult HIWIN in these cases:

v > 3 m/s, a > 30 m/s², media impact, temperatures < 20 °C or > 30 °C, dirty environment.

7.1.3 Determination of load comparison factor fv

In case of combined load from several forces and torques, load comparison factor f_v is calculated according to formula F 7.1.

F 7.1

$$f_v = \frac{|F_y|}{F_{ydynmax}} + \frac{|F_z|}{F_{zdynmax}} + \frac{|M_x|}{M_{xdynmax}} + \frac{|M_y|}{M_{ydynmax}} + \frac{|M_z|}{M_{zdynmax}}$$

f_v	Load comparison factor	$F_{ydynmax}$	Maximum dynamic force in Y-direction [N]
F_y	Effective force in Z-direction [N]	$F_{zdynmax}$	Maximum dynamic force in Z-direction [N]
F_z	Effective force in Z-direction [N]	$M_{xdynmax}$	Maximum dynamic moment around the X-axis [Nm]
M_x	Effective torque around the X-axis [Nm]	$M_{ydynmax}$	Maximum dynamic moment around the Y-axis [Nm]
M_y	Effective torque around the Y-axis [Nm]	$M_{zdynmax}$	Maximum dynamic moment around the Z-axis [Nm]
M_z	Effective torque around the Z-axis [Nm]		

7.1.4 Lubrication process

Note:
Only use lubricants according to DIN 51825, KP2K, consistency class NGLI2!

Note:
Make sure that only lubricants without solid lubricant content (e.g. graphite or MoS_2) are used!

Note:
With vertical installation, the relubrication quantity increases by approx. 50%.

Note:
In case of special operating conditions (contamination, short stroke, type of installation), the lubrication intervals must be adapted to the application.

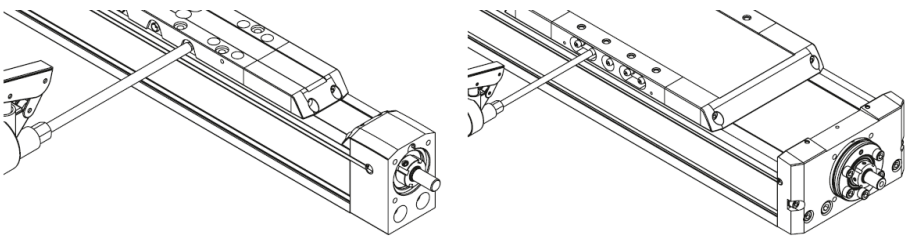
Note:
With linear modules HM-S, each lubrication point has two grease nipples arranged on the left and right of the carriage. This means that relubrication can be carried out from both the left and the right side of the carriage.

Note:
With linear tables HT-S, five grease nipples are provided on the right-hand side of the carriage, via which all four blocks and the ballscrew are lubricated.

Lubrication using the example of the linear guideway:

- ▶ Move the carriage to any position.
- ▶ Place the nozzle at a right angle to a lateral lubrication point.
- ▶ Press the nozzle against the grease nipple with manual force.
- ▶ Operate the lubrication gun until the required relubrication quantities (see Table 7.1, Table 7.2, Table 7.3 and Table 7.4) are reached.
- ▶ Repeat the procedure for all lubrication points on the selected carriage side.
- ✓ The linear guideway is lubricated.

Fig. 7.3: Lubrication on a linear module HM-S (left) and a linear table HT-S (right)



7.1.5 HIWIN lubricants

Grease type G04 is recommended for lubricating the linear axis. HIWIN also offers you a suitable grease gun with a suitable mouthpiece (see section 12.17).

7.2 Cleaning the linear axis

⚠ **Warning**! Danger of cutting!

The cover strip can cause cuts during assembly and disassembly.

- Commissioning and set-up only by qualified personnel with appropriate protective equipment (gloves, goggles)!

⚠ **Attention!** Danger to health and the environment!

Contact with lubricants can cause irritation, poisoning and allergic reactions as well as damage to the environment.

- Only use suitable media that are not dangerous for humans. Observe the manufacturer's safety data sheets.
- Dispose of substances appropriately.

Linear axes are insensitive to the penetration of dirt and foreign bodies due to their constructive design and the optionally selectable cover strips. Nevertheless, the linear axis must be checked regularly and cleaned from the outside.

Observe the following points when cleaning:

- Do not use compressed air.
- The surface is anodised and only resistant to alkaline cleaning agents under certain conditions. Only neutral cleaning agents may be used for cleaning.
- Remove coarse particles from the surface regularly. A moistened, soft and lint-free cleaning cloth is ideal for this purpose.
- The cover strip is subject to abrasion due to friction caused by its function. Remove the abrasion regularly.

7.3 Changing the cover strip

7.3.1 Changing the cover strip for linear modules HM-S

The cover strip must be changed as soon as there are any signs of rippling and it can no longer be held in position by the magnetic strips. In this case, a sufficient seal is no longer guaranteed.

- Undo the clamping bolt of the cover strip clamp at both ends of the axis as shown in Fig. 7.10.
- Undo the carriage end piece screws. Remove the end piece from both ends of all carriages (see Fig. 7.8).
- Undo the screws. Remove the cover strip deflection from both ends of all carriages (see Fig. 7.6).
- Now remove the cover strip and the slide film by pulling them both out of the carriage profile.
- Use a soft, damp, lint-free cloth to remove any dirt from the cover strip clamp, carriage end piece, cover strip deflection and slide film.
- Cut the new cover strip to the same length as the one that you have removed.
- Insert the cover strip through the upper opening in the carriage profile as shown in Fig. 7.4.
- Thread the cover strip deflection onto the cover strip at both ends of the carriage. Make sure that the cover strip deflection is correctly oriented as shown in Fig. 7.5.
- Hand-tighten the cover strip deflection screws.
- Push the slide film through the upper opening in the cover strip deflection as shown in Fig. 7.7 and align it centrally in the longitudinal direction.

- Place the carriage end pieces on the cover strip deflection as shown in Fig. 7.8 and hand-tighten the mounting bolts.
- Push the ends of the cover strip under the cover strip clamp on both sides. Make sure that the cover strip is aligned centrally with the axis profile and that it is in contact with the magnetic strips across the entire length. Hand-tighten the clamping bolts of the cover strip (see Fig. 7.9 and Fig. 7.10).
- Move the carriages to both end positions and check that the cover strip is aligned correctly. If necessary, loosen the cover strip clamp screws again, realign the cover strip and then retighten the screws.

✓ The new cover strip is mounted

Fig. 7.4: Installing the cover strip in the carriage

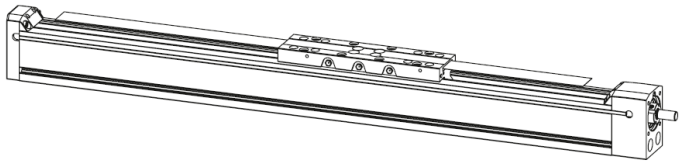


Fig. 7.5: Cover strip deflection orientation

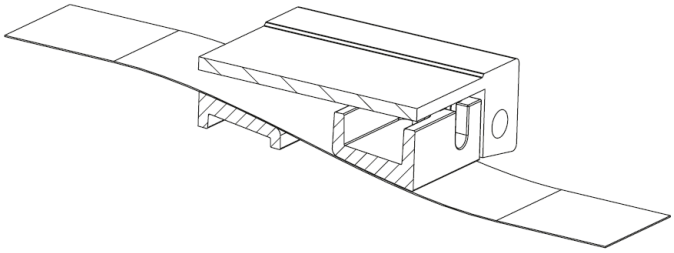


Fig. 7.6: Removing/mounting the cover strip deflection

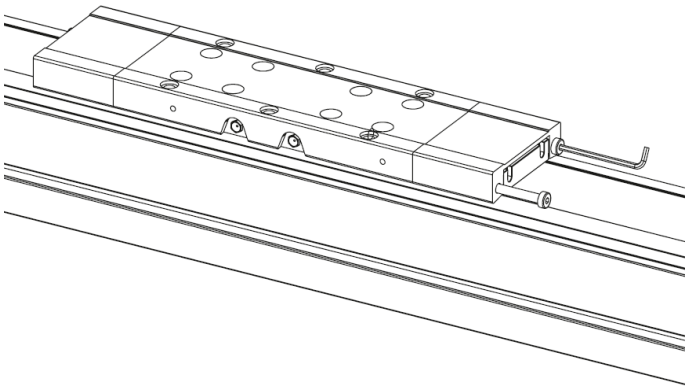


Fig. 7.7: Mounting the slide film

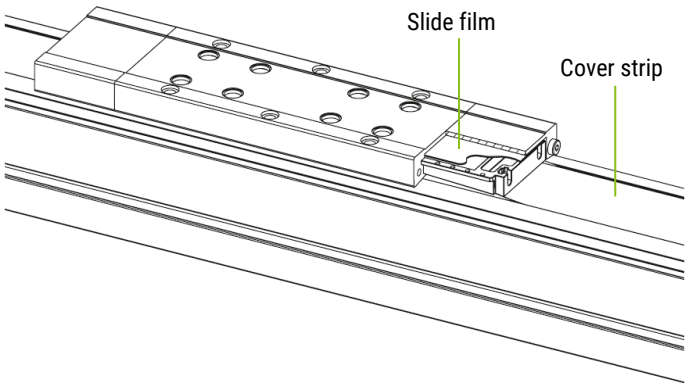


Fig. 7.8: Removing/mounting the carriage end piece

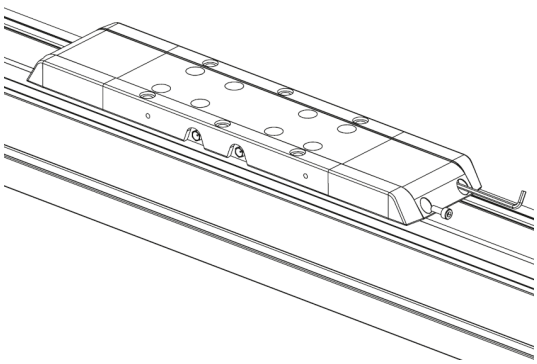


Fig. 7.9: Installing the cover strip in the cover strip clamp for linear modules HM-S

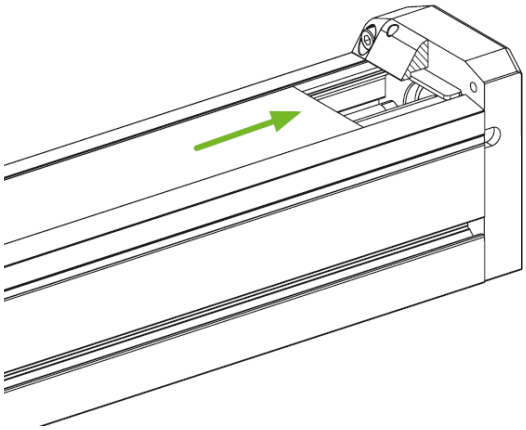


Fig. 7.10: Installing/Removing the cover strip clamp on/from linear modules HM-S

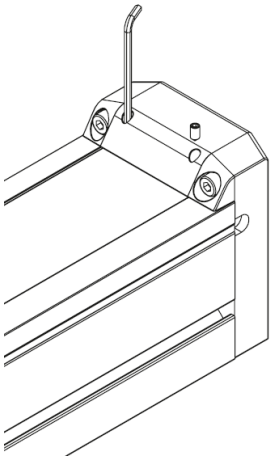


Table 7.5: Screws for cover strip deflection

Size	Bolt strength class	Thread size
HM040S	8.8	M4
HM060S	8.8	M4
HM080S	8.8	M5
HM120S	8.8	M5

Table 7.6: Screws for carriage end piece

Size	Bolt strength class	Thread size
HM040S	8.8	M3
HM060S	8.8	M3
HM080S	8.8	M3
HM120S	8.8	M4

7.3.2 Changing the cover strip for linear tables HT-S

The cover strip must be changed as soon as there are any signs of rippling and it can no longer be held in position by the magnetic strips. In this case, a sufficient seal is no longer guaranteed.

- Undo the clamping bolt of the cover strip clamp at both ends of the axis as shown in Fig. 7.17.
- Undo the carriage end piece screws. Remove the end piece from both ends of all carriages (see Fig. 7.15).
- Remove the carriage cover by sliding it out of the carriage profile (see Fig. 7.11).
- Undo the mounting bolts. Remove the cover strip deflection from both ends of all carriages (see Fig. 7.12).
- Now remove the cover strip by lifting it off the carriage profile.
- Use a soft, damp, lint-free cloth (with ethanol if necessary) to remove any dirt from the cover strip clamp, carriage end piece, cover strip deflection, strip guide and carriage cover.
- If necessary, replace the strip guides on the top of the carriage profile and the underside of the cover strip deflection (see Fig. 7.13).
- Cut the new cover strip to the same length as the one that you have removed.
- Place the cover strip on the magnetic strip of the axis base profile and guide it over the carriage profile (see Fig. 7.14).
- Centre the cover strip.
- Mount the cover strip deflection on both sides of the carriage according to Fig. 7.12.
- Align the cover strip deflection centrally.
- Hand-tighten the cover strip deflection screws.
- Fit the carriage cover by sliding it into the groove of the carriage profile and the cover strip deflection (see Fig. 7.11).
- Place the carriage end pieces on the cover strip deflection as shown in Fig. 7.15 and hand-tighten the mounting bolts.
- Push the ends of the cover strip under the cover strip clamp on both sides. Make sure that the cover strip is aligned centrally with the axis profile and that it is in contact with the magnetic strips across the entire length. Hand-tighten the cover strip clamping bolts (see Fig. 7.16 and Fig. 7.17).
- Move the carriages to both end positions and check that the cover strip is aligned correctly. If necessary, loosen the cover strip clamp screws again, realign the cover strip and then retighten the screws.

✓ The new cover strip is mounted

Fig. 7.11: Disassembly/Assembly of carriage cover

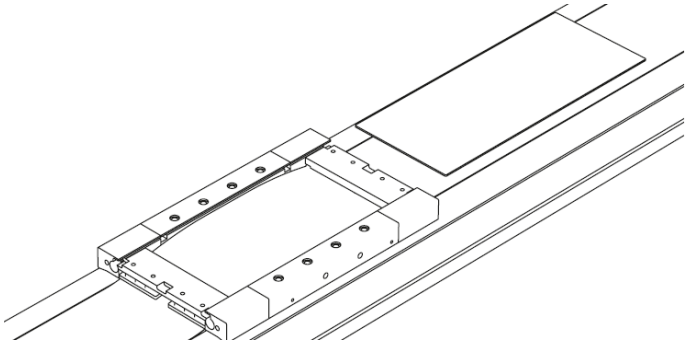


Fig. 7.12: Disassembly/Assembly of cover strip deflection

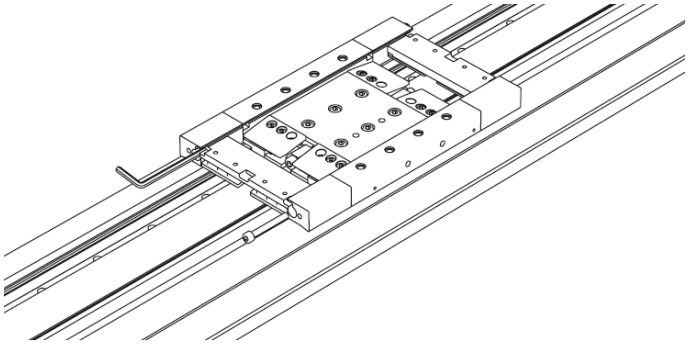


Fig. 7.13: Disassembly/Assembly of strip guide

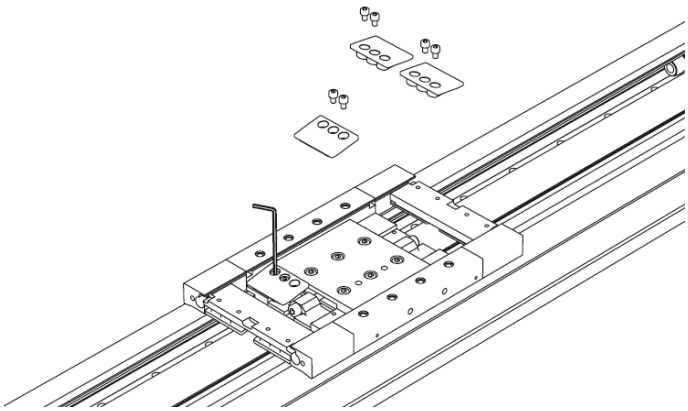


Fig. 7.14: Cover strip guide

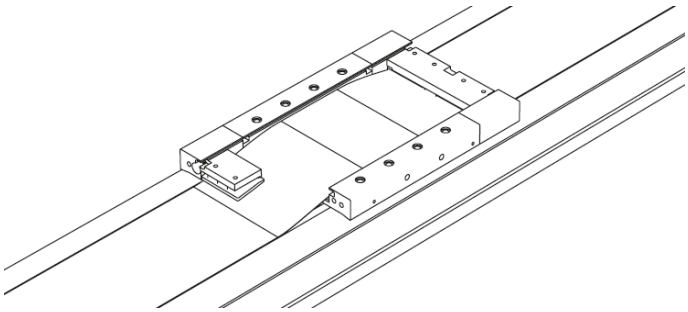


Fig. 7.15: Disassembly/Assembly of carriage end piece

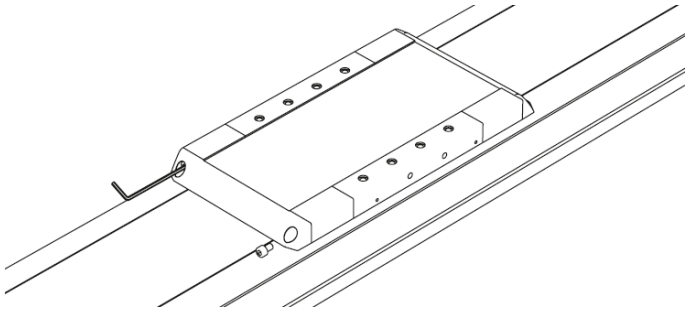


Fig. 7.16: Mounting of cover strip in the cover strip clamp

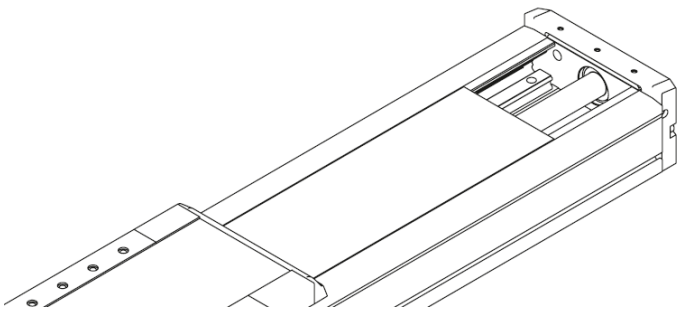
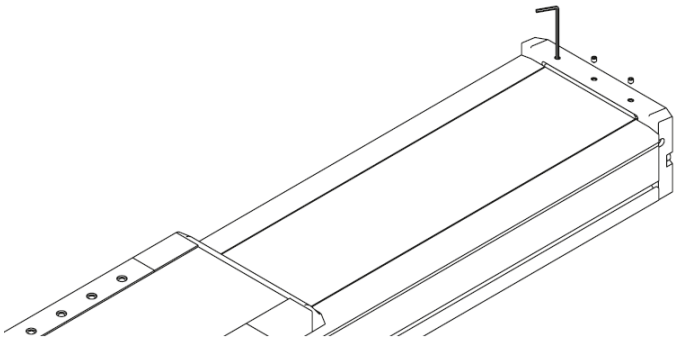


Fig. 7.17: Disassembly/Assembly of the cover strip clamp



7.4 Visual inspection of electrical components

⚠ **Attention!** Danger of electric shock or burns from contact with live parts!

Contact with live parts can cause injuries.

If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Construction of the control system according to DIN EN 12100. No start up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!
- Only qualified personnel may install cabling!
- Work on electrical installations only by qualified personnel!

8 Faults

8.1 Faults on the linear axes

⚠ **Attention!** Risk of impact and crushing!

If the axes are moved by the motor, injuries can be caused by moving axes and attachments (energy chains, attachments installed by customer).

- A safety guard must be provided for the operation of the linear axes!
- When linear axes are arranged vertically, secure the carriage when stationary!

⚠ **Attention!** Danger of electric shock or burns from contact with live parts!

Contact with live parts can cause injuries.

If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Construction of the control system according to DIN EN 12100. No start up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!
- Only qualified personnel may install cabling!
- Work on electrical installations only by qualified personnel!

Table 8.1: Fault table of linear modules HM-S and linear tables HT-S

Fault	Possible cause	Remedy
Carriage does not move	Coupling spins	Check the coupling assembly for correct assembly, check the tightening torques of the clamping bolts and set them correctly
	Ballscrew jams or no longer rotates	Send axis to HIWIN GmbH for repair
	Load too high	Reduce load or acceleration of the drive if necessary
Carriage exhibits backlash and positions inaccurately	Backlash in the guides or drive elements after a collision or due to extreme external influences (impacts, load peaks etc.)	Send axis to HIWIN GmbH for repair
Programmed absolute position changes	Coupling slips	Check the torques of the clamping bolts on the coupling elements and adjust if necessary, check the maximum drive torque applied and reduce if necessary
No limit switch function	Switching distance too large	Readjust the switching distance and set correctly
	Limit switch defective or cable break	Replace limit switch
	Signal does not arrive at the control system	Check the supply line to the control system
Noise and vibrations at high speed	Speed too high or supercritical speed on spindle axes	Reduce speed
	Tension in the system	Install the axis so it is free of tension, check the evenness of the supporting surface and the attached load
	Incorrect settings on the drive controller	Re-tune and adapt controller settings to the application conditions

Fault	Possible cause	Remedy
Noise generation of the guides	Lack of lubricant	Relubrication
	Damage to the guides, for example due to extreme impact loads on the carriage or extreme contamination	Send axis to HIWIN GmbH for repair
Motor load increases, control system switches off due to overload	Tension in the system or lack of lubricant	Install the axis so it is free of tension, check the evenness of the supporting surface and the attached load. Relubricate axis
	Heavy contamination of the axis and the internal guides	Clean axis, ensure free movement of guide and drive elements

8.2 Motor faults

You will find explanations of the faults that occur and information on how to resolve them in the operating instructions for the motor.

8.3 Operating faults with a servo drive

You will find explanations of the faults that occur and information on how to resolve them in the operating instructions for the servo drive.

9 Disassembly

⚠ **Danger!** Danger due to electrical voltage!

Dangerous currents may flow before and during assembly, disassembly and repair work.

- Work may only be carried out by qualified electricians when the device is de-energised!
- Before working, disconnect the linear axes from the power supply and secure them against being switched on again!

⚠ **Warning**! Risk of impact and crushing!

Injuries can occur if the carriage is moved or accidentally started up.

- When linear axes are arranged vertically, secure the carriage when stationary!
- Construction of the control system according to DIN EN 12100: No start up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!

⚠ **Warning**! Danger of crushing due to traversing carriage!

Risk of injury due to crushing and damage to the linear axes due to movement of the traversing carriage due to gravity, as the axes do not have a brake by default.

- Ensure that the carriage is secured against unintentional movement when stationary!

⚠ **Warning**! Danger of cutting!

The cover strip can cause cuts during assembly or disassembly.

- Commissioning and set-up only by qualified personnel with appropriate protective equipment (gloves, goggles)!

⚠ **Warning**! Danger from suspended loads or falling parts!

Lifting heavy loads can cause damage to health.

- Assembly and maintenance of the linear axes only by qualified personnel!
- Take the mass of the parts into account during transport. Use suitable lifting gear!
- Comply with the applicable industrial safety regulations for handling suspended loads.
- Lift linear axes only at specified support points!
- Secure machines and machine parts against tipping over!

⚠ **Attention!** Risk of impact and crushing!

If the axes are moved/driven manually, injuries can be caused by moving axes and attachments (energy chains, attachments installed by customer).

- Observe applicable industrial safety regulations!
- Transport to the installation site only by qualified personnel!

⚠ **Attention!** Danger of electric shock or burns from contact with live parts!

Contact with live parts can cause injuries.
If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Construction of the control system according to DIN EN 12100. No start up after:
  - Application, return of energy!
  - Correction of a fault!
  - Machine stop!
- Only qualified personnel may install cabling!
- Work on electrical installations only by qualified personnel!

⚠ **Attention!** Danger of crushing due to tilting of the axes!

- Secure machine and machine parts against tipping over!

Caution! Danger to health and the environment!

Contact with lubricants can cause irritation, poisoning and allergic reactions as well as damage to the environment.

- Only use suitable media that are not dangerous for humans. Observe the manufacturer's safety data sheets.
- Dispose of substances appropriately.

Disassembly steps:

- Disconnect the linear axis from the electric system.
- Unscrew the moving load.
- Protect the moving parts (e.g. carriage) from unintentional movement.
- Unscrew the linear axis.

✓ The linear axis is disassembled.

10 Disposal

⚠ **Attention!** Danger to health and the environment!

Contact with lubricants can cause irritation, poisoning and allergic reactions as well as damage to the environment.

- Only use suitable media that are not dangerous for humans. Observe the manufacturer's safety data sheets.
- Dispose of substances appropriately.

Table 10.1: Disposal

Liquids	
Lubricants	Dispose of as hazardous waste in an environmentally-safe manner
Soiled cleaning cloths	Dispose of as hazardous waste in an environmentally-safe manner
Linear axis	
Cabling, electrical components	Dispose of as electrical waste
Plastic components (e.g. energy chain)	Sort by type before disposal
Components made of steel (e.g. profile rail)	Sort by type before disposal
Aluminium components (e.g. profile, synchronous shaft)	Sort by type before disposal

11 Appendix 1: Drive adaptation

Our products are always subject to technical changes and improvements. To avoid incorrect deliveries of spare parts and accessories or to order parts without part numbers, please always quote the serial number of the linear axes when ordering. You will find this on the type plate of the axis.

11.1 Motor adaptation of linear modules HM-S and linear tables HT-S

The drive adaptation of linear modules HM-S and linear tables HT-S is designed in two parts to ensure easy flange-mounting of all common motors.

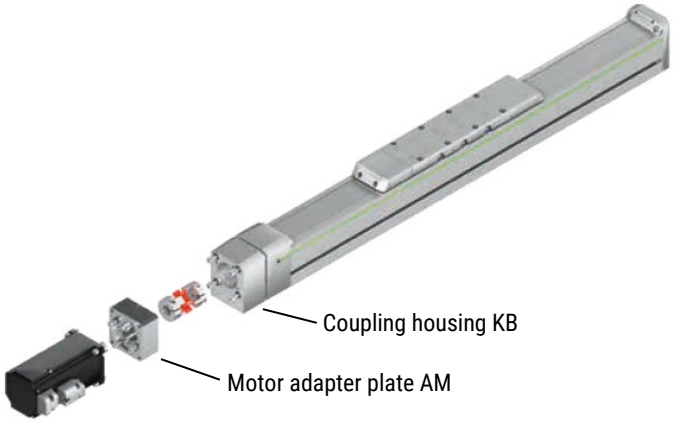
The flange type set comprises the following components:

- Coupling housing KB
- Coupling components
- Motor adapter plate AM or belt drive RT

The dimensions of the coupling housing, motor adapter plate and belt drive can be found in section 11.2.

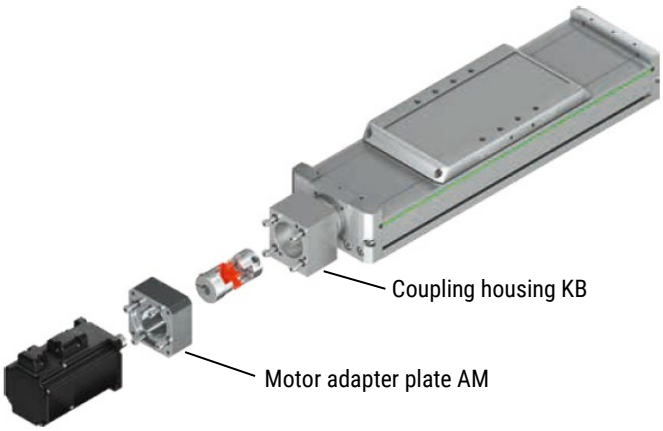
Motor adaptation of linear axis without belt drive

Fig. 11.1: Motor adaptation of linear modules HM-S without belt drive



Motor adapter plate AM: Adapter from axis to motor

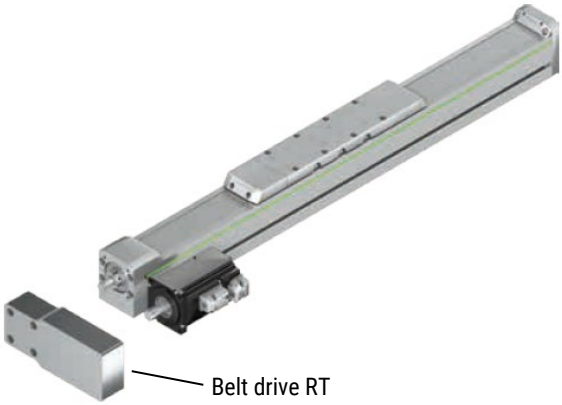
Fig. 11.2: Motor adaptation of linear tables HT-S without belt drive



Motor adapter plate AM: Adapter from axis to motor

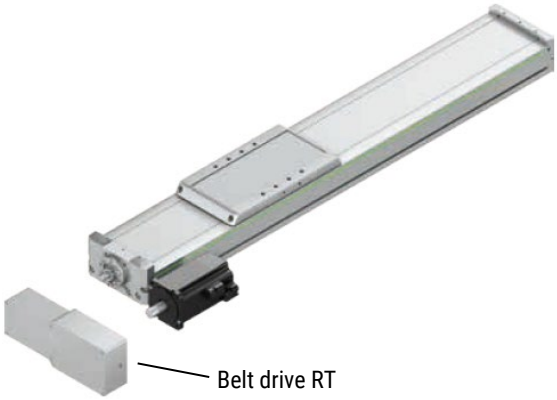
Motor adaptation of linear axis with belt drive

Fig. 11.3: Motor adaptation of linear modules HM-S with belt drive



Belt drive RT: For deflecting the drive by 180°

Fig. 11.4: Motor adaptation of linear tables HT-S with belt drive



Belt drive RT: For deflecting the drive by 180°

Table 11.1: Order code for position flange type [3] – linear modules HM-S and linear tables HT-S

Drive manufacturer/type		Linear module HM-S				Linear table HT-S			
		HM040S	HM060S	HM080S	HM120S	HT100S	HT150S	HT200S	HT250S
		Motor only							
HIWIN	EM1-C-M-05-2	HW22 [1]	HW19 [1]						
	EM1-C-M-10-2	HW22 [1]	HW19 [1]			HW19 [1]			
	EM1-C-M-20-2	HW21 [1]	HW03 [1]	HW05 [1]		HW03 [1]	HW05 [1]		
	EM1-C-M-40-2		HW03 [1]	HW05 [1]		HW03 [1]	HW05 [1]	HW05 [1]	
	EM1-C-M-75-2			HW06 [1]	HW08 [1]		HW06 [1]	HW06 [1]	HW08 [1]
	EM1-A-M-1K-2				HW13 [2]				HW13 [2]
B&R	8LSA24	BR01 [1]	BR02 [1]			BR02 [1]			
	8LSA25	BR01 [1]	BR02 [1]			BR02 [1]			
	8LSA33		BR03 [2]	BR04 [2]		BR03 [2]	BR04 [2]	BR04 [2]	
	8LSA34		BR03 [2]	BR04 [2]		BR03 [2]	BR04 [2]	BR04 [2]	
	8LSA35		BR03 [2]	BR04 [2]			BR04 [2]	BR04 [2]	
	8LSA43			BR05 [2]	BR10 [1]			BR05 [2]	BR10 [1]
	8LSA44				BR10 [1]				BR10 [1]
	8LSA45				BR10 [1]				BR10 [1]
	8LSA46				BR10 [1]				
	8LSA53				BR12 [2]				BR12 [2]
	8LSA54				BR12 [2]				BR12 [2]
	8LSA55				BR12 [2]				
	8LSN43				BR11 [2]				BR11 [2]
	8LSN44				BR11 [2]				BR11 [2]
	8LSN45				BR11 [2]				
	8LSN46				BR11 [2]				
	8LSN54				BR12 [2]				BR11 [2]
	8LSN55				BR12 [2]				
Beckhoff	AM8022		BE01 [1]	BE04 [1]		BE01 [1]	BE04 [1]		
	AM8023		BE01 [1]	BE04 [1]		BE01 [1]	BE04 [1]	BE04 [1]	
	AM8031		BE02 [2]	BE05 [1]		BE02 2)	BE05 [1]	BE05 [1]	
	AM8032			BE05 [1]	BE09 [1]			BE05 [1]	BE09 [1]
	AM8033			BE05 [1]	BE09 [1]				BE09 [1]
	AM8531		BE02 [2]	BE05 [1]	BE09 [1]	BE02 [2]	BE05 [1]	BE05 [1]	BE09 [1]
	AM8532			BE05 [1]	BE09 [1]			BE05 [1]	BE09 [1]
	AM8533			BE05 [1]	BE09 [1]				BE09 [1]
	AM8041			BE06 [2]	BE10 [1]		BE06 [2]	BE06 [2]	BE10 [1]
	AM8042			BE06 [2]	BE10 [1]				BE10 [1]
	AM8043				BE10 [1]				BE10 [1]
	AM8541			BE06 [2]	BE10 [1]		BE06 [2]	BE06 [2]	BE10 [1]
	AM8542			BE06 [2]	BE10 [1]				BE10 [1]

Drive manufacturer/type		Linear module HM-S				Linear table HT-S			
		HM040S	HM060S	HM080S	HM120S	HT100S	HT150S	HT200S	HT250S
		Motor only							
Beckhoff	AM8543				BE10 [1]				BE10 [1]
	AM8051			BE07 [2]	BE11 [1]				BE11 [1]
	AM8052				BE11 [1]				
	AM8551			BE07 [2]	BE11 [1]				BE11 [1]
	AM8552				BE11 [1]				
	AM8061				BE12 [2]				
	AM8561				BE12 [2]				
Bosch	MSK030B	BO01 [1]	BO02 [1]			BO02 [1]			
	MSK030C		BO02 [1]			BO02 [1]			
	MSK040B		BO03 [2]	BO05 [1]	BO10 [1]	BO03 [2]	BO05 [1]	BO05 [1]	BO10 [1]
	MSK040C		BO03 [2]	BO05 [1]	BO10 [1]	BO03 [2]	BO05 [1]	BO05 [1]	BO10 [1]
	MSK043C			BO05 [1]	BO10 [1]			BO05 [1]	BO10 [1]
	MSK050B			BO06 [2]	BO11 [1]		BO06 [2]	BO06 [2]	BO11 [1]
	MSK050C			BO06 [2]	BO11 [1]			BO06 [2]	BO11 [1]
	MSK060B			BO08 [2]	BO13 [2]			BO08 [2]	BO13 [2]
	MSK060C				BO13 [2]				BO13 [2]
	MSK061B			BO07 [2]	BO12 [2]			BO07 [2]	BO12 [2]
	MSK061C				BO12 [2]				
	MSK070C				BO15 [2]				
	MSK071C				BO15 [2]				
	MSK075C				BO15 [2]				
	MSK076C				BO14 [2]				
Lenze	MCS06F		LE01 [2]	LE04 [1]		LE01 [2]	LE04 [1]		
	MCS06I		LE01 [2]	LE04 [1]		LE01 [2]	LE04 [1]	LE04 [1]	
	MCS09D		LE02 [2]	LE05 [2]	LE08 [1]		LE05 [2]	LE05 [2]	LE08 [1]
	MCS09F			LE05 [2]	LE08 [1]			LE05 [2]	LE08 [1]
	MCS09H				LE08 [1]				LE08 [1]
	MCS09L				LE08 [1]				
	MCS12D			LE06 [2]	LE09 [2]				LE09 [2]
	MCS12H				LE09 [2]				LE09 [2]
	MCS14D				LE10 [2]				LE10 [2]
Schneider	BSH0551	SE01 [1]	SE02 [1]			SE02 [1]			
	BSH0552	SE01 [1]	SE02 [1]			SE02 [1]			
	BSH0701		SE03 [2]	SE07 [1]		SE03 [2]	SE07 [1]		
	BSH0702		SE03 [2]	SE07 [1]		SE03 [2]	SE07 [1]	SE07 [1]	
	BSH0703			SE08 [1]			SE08 [1]	SE08 [1]	
	BSH1001			SE09 [2]	SE13 [1]		SE09 [2]	SE09 [2]	SE13 [1]
	BSH1002				SE13 [1]				SE13 [1]

Drive manufacturer/type		Linear module HM-S				Linear table HT-S			
		HM040S	HM060S	HM080S	HM120S	HT100S	HT150S	HT200S	HT250S
		Motor only							
Schneider	BSH1003				SE13 [1]				SE13 [1]
	BSH1401				SE15 [2]				SE15 [2]
	BMH0701		SE03 [2]	SE07 [1]		SE03 [2]	SE07 [1]	SE07 [1]	
	BMH0702		SE03 [2]	SE07 [1]		SE03 [2]	SE07 [1]	SE07 [1]	
	BMH0703			SE08 [1]	SE12 [1]		SE08 [1]	SE08 [1]	SE12 [1]
	BMH1001			SE09 [2]	SE13 [1]		SE09 [2]	SE09 [2]	SE13 [1]
	BMH1002			SE09 [2]	SE13 [1]				SE13 [1]
	BMH1003				SE13 [1]				SE13 [1]
	BMH1401				SE15 [2]				
SEW	CMP40S	SW01 [1]	SW02 [1]			SW02 [1]			
	CMP40M		SW02 [1]	SW06 [1]		SW02 [1]	SW06 [1]		
	CMP50S		SW03 [2]	SW07 [1]		SW03 [2]	SW07 [1]	SW07 [1]	
	CMP50M			SW07 [1]			SW07 [1]	SW07 [1]	
	CMP50L			SW07 [1]	SW11 [1]			SW07 [1]	SW11 [1]
	CMP63S			SW08 [2]	SW12 [1]		SW08 [2]	SW08 [2]	SW12 [1]
	CMP63M				SW12 [1]				SW12 [1]
	CMP63L				SW12 [1]				SW12 [1]
	CMP71S				SW13 [2]				SW13 [2]
	CMP71M				SW13 [2]				SW13 [2]
	CMP71L				SW13 [2]				
	CMP80S				SW14 [2]				
	CMPZ71S				SW13 [2]				SW13 [2]
	CMPZ71M				SW13 [2]				SW13 [2]
	CMPZ71L				SW13 [2]				
	CMPZ80S				SW14 [2]				
Siemens	1FK7022	SM01 [1]	SM02 [1]			SM02 [1]			
	1FK7032		SM03 [2]	SM04 [1]		SM03 [2]	SM04 [1]	SM04 [1]	
	1FK7034		SM03 [2]	SM04 [1]		SM03 [2]	SM04 [1]	SM04 [1]	
	1FK7040			SM05 [2]	SM08 [1]		SM05 [2]	SM05 [2]	SM08 [1]
	1FK7042			SM05 [2]	SM08 [1]		SM05 [2]	SM05 [2]	SM08 [1]
	1FK7060			SM06	SM09 [2]				SM09 [2]
	1FK7062				SM09 [2]				SM09 [2]

Drive manufacturer/type		Linear module HM-S				Linear table HT-S			
		HM040S	HM060S	HM080S	HM120S	HT100S	HT150S	HT200S	HT250S
		Motor only							
Siemens	1FK7063				SM09 [2]				
	1FK7080				SM10 [2]				SM10 [2]
	1FK7081				SM10 [2]				
	1FK7083				SM10 [2]				

[1] Possible belt drive V_1

[2] Possible belt drive V_2

[3] See Order code for linear modules HM-S page 11 and Order code for linear table HT-S page 14

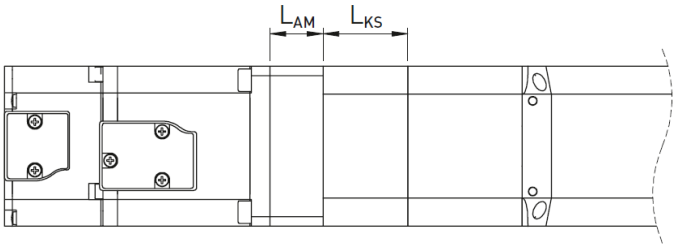
11.2 Dimensions of the motor adaptation of linear modules HM-S and linear tables HT-S

The total length of the spindle axis depends on the following factors:

- Adaptation material (coupling housing KB, motor adapter plate AM)
- Belt drive RT
- Motor

Linear axis without belt drive

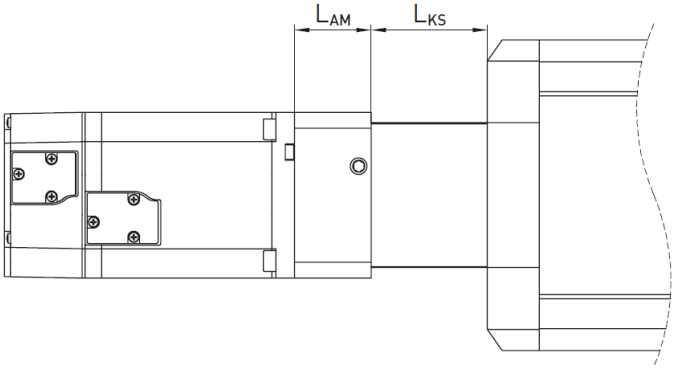
Fig. 11.5: Motor connection of linear modules HM-S without belt drive



L_{KS} Length of coupling housing, see Table 11.2.

L_{AM} Length of motor adapter plate, see Table 11.3

Fig. 11.6: Motor connection of linear tables HT-S without belt drive

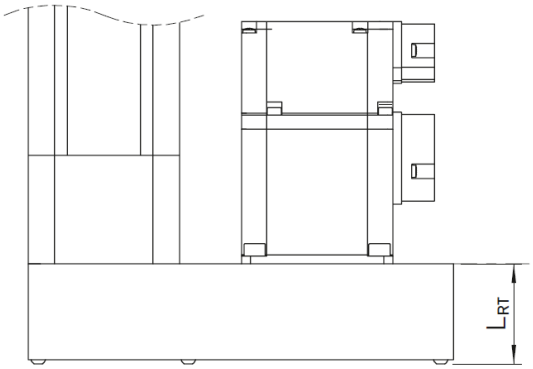


L_{KS} Length of coupling housing, see Table 11.2.

L_{AM} Length of motor adapter plate, see Table 11.3

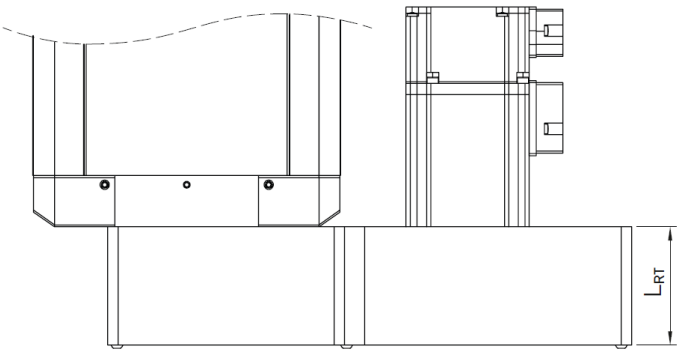
Linear axis with belt drive

Fig. 11.7: Motor connection of linear modules HM-S with belt drive



L_{RT} Length of belt drive, see Table 11.5.

Fig. 11.8: Motor connection of linear tables HT-S with belt drive



L_{RT} Length of belt drive, see Table 11.5.

11.2.1 Coupling housing KS for linear modules HM-S and linear tables HT-S

Fig. 11.9: Coupling housing for linear modules HM-S

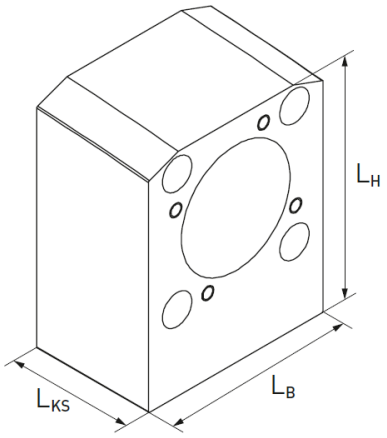


Fig. 11.10: Coupling housing for linear tables HT-S

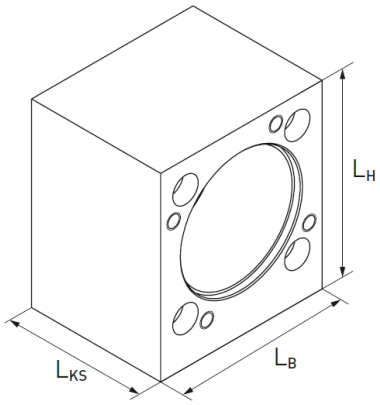


Table 11.2: Dimensions of coupling housing KS for linear axis HM-S and linear tables HT-S

Coupling housing for	L_B [mm]	L_H [mm]	L_{KS} [mm]	Article number
HM040S	39,6	57,6	34	25-000305
HM060S	59,6	75,0	32	25-000306
HM080S	79,6	95,5	41	25-000307
HM120S	119,6	141,9	50	25-000308
HT100S	55,0	58,2	39	25-000952
HT150S	70,0	78,5	56	25-000951
HT200S	75,0	90,0	59	25-000950
HT250S	90,0	99,5	68	25-000949

11.2.2 Motor adapter plate AM for linear modules HM-S and linear tables HT-S

Fig. 11.11: Motor adapter plate AM for linear modules HM-S and linear tables HT-S

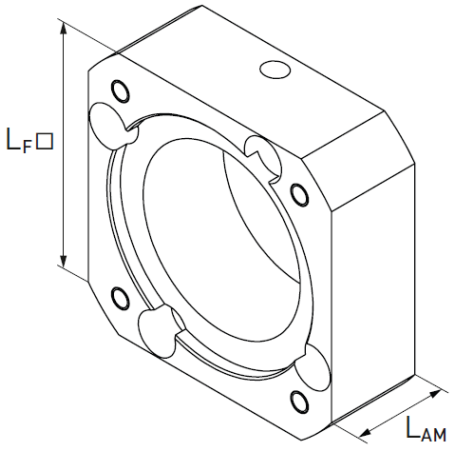


Table 11.3: Motor adapter plate AM for linear modules HM-S

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HM040S	HIWIN	EM1-C-M-05-2, EM1-C-M-10-2	42	23	25-002721
		EM1-C-M-20-2	60	27,5	25-002871
	B&R	8LSA24, 8LSA25	58	24,5	25-000397
	Bosch	MSK030B	54	20,5	25-000395
	Schneider	BSH0551, BSH0552	55	20,5	25-000396
	SEW	CMP40S	54	20,5	25-000395
	Siemens	1FK7022	55	20,5	25-000396
HM060S	HIWIN	EM1-C-M-05-2, EM1-C-M-10-2	50	25,5	25-002736
		EM1-C-M-20-2, EM1-C-M-40-2	60	31	25-000404
	B&R	8LSA24, 8LSA25	58	25	25-000403
		8LSA33, 8LSA34, 8LSA35	82	31	25-000411
	Beckhoff	AM8022D, AM8022E, AM8023E, AM8023F	55	22	25-000402
		AM8031D, AM8031F, AM8531D, AM8531F	70	31	25-000407
	Bosch	MSK030B, MSK030C	54	22	25-000401
		MSK040B, MSK040C	82	31	25-000405
	Lenze	MCS06F41, MCS06F60, MCS06I41, MCS06I60	62	25	25-000406
		MCS09D41, MCS09D60	82	31	25-000411
	Schneider	BSH0551, BSH0552	55	22	25-000402
		BSH0701, BSH0702, BMH0701, BMH0702	62	25	25-000406
	SEW	CMP40S, CMP40M	54	22	25-000401
		CMP50S	62	25	25-000406
	Siemens	1FK7022	55	22	25-000402
		1FK7032, 1FK7034	72	31	25-000408
HM080S	HIWIN	EM1-C-M-20-2, EM1-C-M-40-2	72	27	25-000414
		EM1-C-M-75-2	80	37	25-000421
	B&R	8LSA33, 8LSA34, 8LSA35	86	27	25-000423
		8LSA43	100	37	25-000426
	Beckhoff	AM8022D, AM8022E, AM8023E, AM8023F	72	21	25-000413
		AM8031D, AM8031F, AM8032D, AM8032E, AM8032H, AM8033E, AM8033F, AM8033J, AM8531D, AM8531F, AM8532D, AM8532E, AM8532H, AM8533E, AM8533F, AM8533J	70	27	25-000418
		AM8041D, AM8041E, AM8041H, AM8042E, AM8042F, AM8042J, AM8541D, AM8541E, AM8541H, AM8542E, AM8542F, AM8542J	87	37	25-000424
		AM8051E, AM8051G, AM8051K, AM8551E, AM8551G, AM8551K	104	47	25-000427
	Bosch	MSK040B, MSK040C, MSK043C	82	27	25-000415
		MSK050B, MSK050C	98	37	25-000425
		MSK061B	116	37	25-000428
		MSK060B	116	47	25-000429
	Lenze	MCS06F41, MCS06F60, MCS06I41, MCS06I60	72	21	25-000417
		MCS09D41, MCS09D60, MCS09F38, MCS09F60	86	27	25-000423
		MCS12D20, MCS12D41	116	37	25-000430

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HM080S	Schneider	BSH0701, BSH0702, BMH0701, BMH0702	72	21	25-000417
		BSH0703, BMH0703	70	27	25-000418
		BSH1001, BMH1001, BMH1002	98	37	25-000425
	SEW	CMP40M	72	21	25-000412
		CMP63S	86	27	25-000423
		CMP50S, CMP50M, CMP50L	72	21	25-000417
	Siemens	1FK7032, 1FK7034	72	27	25-000419
		1KF7040, 1FK7042	87	37	25-000424
		1FK7060	116	47	25-000431
HM120S	HIWIN	EM1-C-M-75-2	80	37	25-000438
		EM1-A-M-1K-2	130	51	25-000450
	B&R	8LSA43, 8LSA44, 8LSA45, 8LSA46	100	37	25-000443
		8LSN43, 8LSN44, 8LSN45, 8LNS46	116	37	25-000447
		8LSA53, 8LSA54, 8LSA55, 8LSN54, 8LSN55	142	51	25-000454
	Beckhoff	AM8032D, AM8032E, AM8032H, AM8033E, AM8033F, AM8033J, AM8531D, AM8531F, AM8532D, AM8532E, AM8532H, AM8533E, AM8533F, AM8533J	73	27	25-000436
		AM8041D, AM8041E, AM8041H, AM8042E, AM8042F, AM8042J, AM8043E, AM8043H, AM8043K, AM8541D, AM8541E, AM8541H, AM8542E, AM8542F, AM8542J, AM8543E, AM8543H, AM8543K	87	37	25-000441
		AM8051E, AM8051G, AM8051K, AM8052F, AM8052J, AM8052L, AM8551E, AM8551G, AM8551K, AM8552F, AM8552J, AM8552L	100	51	25-000444
		AM8061G, AM8061J, AM8061M, AM8561G, AM8561J, AM8561M	138	56	25-000453
	Bosch	MSK040B, MSK040C, MSK043C	82	27	25-000433
		MSK050B, MSK050C	98	37	25-000442
		MSK061B, MSK061C	116	37	25-000445
		MSK060B, MSK060C	116	51	25-000446
		MSK70C, MSK71C, MSK75C	138	56	25-000453
		MSK076C	139	51	25-000451
	Lenze	MCS09D41, MCS09D60, MCS09F38, MCS09F60, MCS09H41, MCS09H60, MCS09L41, MCS09L51	86	27	25-000440
		MCS12D20, MCS12D41, MCS12H15, MCS12H35	116	37	25-000447
		MCS14D15, MCS14D36	139	51	25-000452
	Schneider	BMH0703	73	27	25-000436
		BSH1001, BSH1002, BSH1003, BMH1001, BMH1002, BMH1003	98	37	25-000442
		BSH1401, BMH1401	139	51	25-000452
	SEW	CMP50L	73	20	25-000435
		CMP63S, CMP63M, CMP63L	86	27	25-000440
		CMP71S, CMP71M, CMP71L, CMPZ71S, CMPZ71M, CMPZ71L	116	51	25-000448
		CMP80S, CMPZ80S	138	56	25-000453
	Siemens	1FK7040, 1FK7042	87	37	25-000441
		1FK7060, 1FK7062, 1FK7063	116	51	25-000448
		1FK7080, 1FK7081, 1FK7083	138	56	25-000453

Table 11.4: Motor adapter plate AM for linear tables HT-S

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HT100S	HIWIN	EM1-C-M-10-2	50	25,5	25-002736
		EM1-C-M-20-2, EM1-C-M-40-2	60	31	25-000404
	B&R	8LSA24, 8LSA25	58	25	25-000403
		8LSA33, 8LSA34	82	31	25-000411
	Beckhoff	AM8022D, AM8022E, AM8023E, AM8023F	55	22	25-000402
		AM8031D, AM8031F, AM8531D, AM8531F	70	31	25-000407
	Bosch	MSK030B, MSK030C	54	22	25-000401
		MSK040B, MSK040C	82	31	25-000405
	Lenze	MCS06F41, MCS06F60, MCS06I41, MCS06I60	62	25	25-000406
	Schneider	BSH0551, BSH0552	55	22	25-000402
		BSH0701, BSH0702, BMH0701, BMH0702	62	25	25-000406
	SEW	CMP40S, CMP40M	54	22	25-000401
		CMP50S	62	25	25-000406
	Siemens	1FK7022	55	22	25-000402
		1FK7032, 1FK7034	72	31	25-000408
HT150S	HIWIN	EM1-C-M-20-2, EM1-C-M-40-2	72	27	25-000414
		EM1-C-M-75-2	80	37	25-000421
	B&R	8LSA33, 8LSA34, 8LSA35	86	27	25-000423
	Beckhoff	AM8022D, AM8022E, AM8023E, AM8023F	72	21	25-000413
		AM8031D, AM8031F, AM8531D, AM8531F	70	27	25-000418
		AM8041D, AM8041E, AM8041H, AM8541D, AM8541E, AM8541H	87	37	25-000424
	Bosch	MSK040B, MSK040C	82	27	25-000415
		MSK050B	98	37	25-000425
	Lenze	MCS06F41, MCS06F60, MCS06I41, MCS06I60	72	21	25-000417
		MCS09D41, MCS09D60	86	27	25-000423
	Schneider	BSH0701, BSH0702, BMH0701, BMH0702	72	21	25-000417
		BSH0703, BMH0703	70	27	25-000418
		BSH1001, BMH1001	98	37	25-000425
	SEW	CMP40M	72	21	25-000412
		CMP63S	86	27	25-000423
		CMP50S, CMP50M	72	21	25-000417
	Siemens	1FK7032, 1FK7034	72	27	25-000419
		1KF7040, 1FK7042	87	37	25-000424
HT200S	HIWIN	EM1-C-M-40-2	72	27	25-000414
		EM1-C-M-75-2	80	37	25-000421
	B&R	8LSA33, 8LSA34, 8LSA35	86	27	25-000423
		8LSA43	100	37	25-000426
	Beckhoff	AM8023E, AM8023F	72	21	25-000413
		AM8031D, AM8031F, AM8032D, AM8032E, AM8032H, AM8531D, AM8531F, AM8532D, AM8532E, AM8532H	70	27	25-000418
		AM8041D, AM8041E, AM8041H, AM8541D, AM8541E, AM8541H	87	37	25-000424

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HT200S	Bosch	MSK040B, MSK040C, MSK043C	82	27	25-000415
		MSK050B, MSK050C	98	37	25-000425
		MSK061B	116	37	25-000428
		MSK060B	116	47	25-000429
	Lenze	MCS06I41, MCS06I60	72	21	25-000417
		MCS09D41, MCS09D60, MCS09F38, MCS09F60	86	27	25-000423
	Schneider	BSH0702, BMH0701, BMH0702	72	21	25-000417
		BSH0703, BMH0703	70	27	25-000418
		BSH1001, BMH1001	98	37	25-000425
	SEW	CMP63S	86	27	25-000423
		CMP50S, CMP50M, CMP50L	72	21	25-000417
	Siemens	1FK7032, 1FK7034	72	27	25-000419
		1KF7040, 1FK7042	87	37	25-000424
HT250S	HIWIN	EM1-C-M-75-2	80	37	25-000438
		EM1-A-M-1K-2	130	51	25-000450
	B&R	8LSA43, 8LSA44, 8LSA45	100	37	25-000443
		8LSN43, 8LSN44	116	37	25-000447
		8LSA53, 8LSA54, 8LSN54	142	51	25-000454
	Beckhoff	AM8032D, AM8032E, AM8032H, AM8033E, AM8033F, AM8033J, AM8531D, AM8531F, AM8532D, AM8532E, AM8532H, AM8533E, AM8533F, AM8533J	73	27	25-000436
		AM8041D, AM8041E, AM8041H, AM8042E, AM8042F, AM8042J, AM8043E, AM8043H, AM8043K, AM8541D, AM8541E, AM8541H, AM8542E, AM8542F, AM8542J, AM8543E, AM8543H, AM8543K	87	37	25-000441
		AM8051E, AM8051G, AM8051K, AM8551E, AM8551G, AM8551K	100	51	25-000444
	Bosch	MSK040B, MSK040C, MSK043C	82	27	25-000433
		MSK050B, MSK050C	98	37	25-000442
		MSK060B, MSK060C	116	51	25-000446
	Lenze	MCS09D41, MCS09D60, MCS09F38, MCS09F60, MCS09H41, MCS09H60	86	27	25-000440
		MCS12D20, MCS12D41, MCS12H15, MCS12H35	116	37	25-000447
		MCS14D15, MCS14D36	139	51	25-000452
	Schneider	BMH0703	73	27	25-000436
		BSH1001, BSH1002, BSH1003, BMH1001, BMH1002, BMH1003	98	37	25-000442
		BSH1401	139	51	25-000452
	SEW	CMP50L	73	20	25-000435
		CMP63S, CMP63M, CMP63L	86	27	25-000440
		CMP71S, CMP71M, CMPZ71S, CMPZ71M	116	51	25-000448
	Siemens	1FK7040, 1FK7042	87	37	25-000441
		1FK7060, 1FK7062	116	51	25-000448
		1FK7080	138	56	25-000453

11.2.3 Belt drive RT for linear modules HM-S and linear tables HT-S

Fig. 11.12: Belt drive for linear axis HM-S and linear tables HT-S

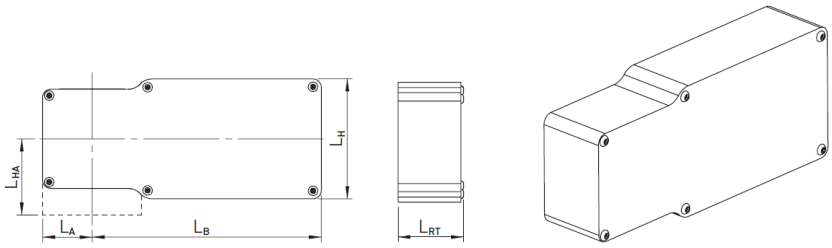


Table 11.5: Specifications of belt drive

Linear axis	Type [1]	L_H	L_B	L_{RT}	L_A	L_{HA}	Translation
HM040S	V1	72	138,5	40	30,0	36,25	1
HM060S	V1	72	138,5	40	30,0	45,80	1
	V2	102	171,5	40	30,0	45,80	1
HM080S	V1	102	197,0	51	39,0	61,40	1
	V2	131	226,0	61	39,0	61,40	1
HM120S	V1	135	248,5	63	55,0	89,00	1
	V2	175	288,0	73	55,0	89,00	1
HT100S	V1	74	157,0	43	29,5	31,00	1
	V2	102	196,0	43	29,5	31,00	1
HT150S	V1	102	217,0	60	38,5	43,00	1
	V2	131	251,0	70	38,5	43,00	1
HT200S	V1	100	237,0	61	42,5	51,00	1
	V2	131	268,5	71	42,5	51,00	1
HT250S	V1	135	298,0	73	50,7	52,00	1
	V2	175	349,5	83	50,7	52,00	1

[1] The required type can be found in Table 11.1.

Note:

Please note that the belt drive protrudes over the lower edge of the axis if the following applies:

$$\frac{L_H}{2} > L_{HA}$$

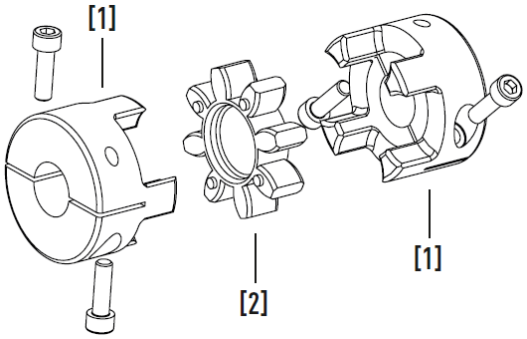
Note:

Please note that the belt drive may protrude laterally over the axis if the following applies:

$$L_A > \frac{\text{Profile width (axis)}}{2}$$

11.2.4 Coupling assembly for linear modules HM-S and linear tables HT-S

Fig. 11.13: Coupling assembly for linear modules HM-S and linear tables HT-S



1	Clamping hubs (1 for axis side, 1 for motor side)
2	Sprocket

11.2.4.1 Clamping hub

Coupling element on motor and axis side.

Fig. 11.14: Clamping hub for linear modules HM-S and linear tables HT-S

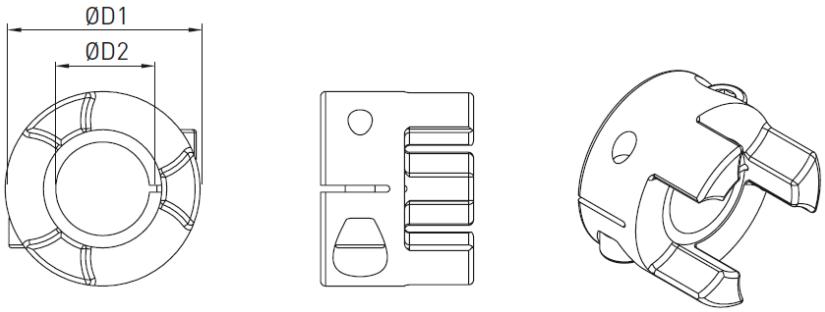


Table 11.6: Article numbers and specifications of clamping hub

Axis type/ size	Model	Ø D1 [mm]	Ø D2 [mm]	Thread size × length	Screw tightening torque [Nm]	Moment of inertia [Nm]	Frictional torque [Nm]	Article number
HM040S	Size 12	24.5	5	M3 × 12	2,1	1,46	5,2	25-002382
			6	M3 × 12	2,1	1,46	6,1	25-002384
			6,35	M3 × 12	2,1	1,46	6,4	25-002385
			8	M3 × 12	2,1	1,45	8,1	25-002386
			9	M3 × 12	2,1	1,45	9,1	25-002387
			10	M3 × 12	2,1	1,44	10,1	25-002388
			11	M3 × 12	2,1	1,43	11,1	25-002389
			12	M3 × 12	2,1	1,41	12,1	25-002390
			14	M3 × 12	2,1	1,41	14,1	25-002391
HM060S, HT100S	Size 14	29.5	5	M4 × 12	5,0	2,70	10,1	25-002392
			6	M4 × 12	5,0	2,69	12,2	25-002393
			6,35	M4 × 12	5,0	2,69	13,2	25-002394
			8	M4 × 12	5,0	2,68	16,5	25-002395
			9	M4 × 12	5,0	2,68	18,6	25-002396

Axis type/ size	Model	Ø D1 [mm]	Ø D2 [mm]	Thread size × length	Screw tightening torque [Nm]	Moment of inertia [Nm]	Frictional torque [Nm]	Article number
HM060S, HT100S	Size 14	29.5	10	M4 × 12	5,0	2,67	20,8	25-002397
			11	M4 × 12	5,0	2,66	23,0	25-002398
			12	M4 × 12	5,0	2,65	25,1	25-002399
			13	M4 × 12	5,0	2,63	27,2	25-002400
			14	M4 × 12	5,0	2,61	29,4	25-002401
			16	M4 × 12	4,0	6,11	28,0	25-002610
HM080S, HT150S, HT200S	Size 19	39.5	6.35	M6 × 16	14	15,26	25,8	25-002403
			8	M6 × 16	14	15,25	32,5	25-002404
			9	M6 × 16	14	15,24	36,5	25-002405
			10	M6 × 16	14	15,23	40,6	25-002406
			11	M6 × 16	14	15,21	44,6	25-002407
			12	M6 × 16	14	15,18	48,7	25-002408
			14	M6 × 16	14	15,11	56,8	25-002409
			16	M6 × 16	14	14,99	64,9	25-002410
			18	M6 × 16	14	14,82	73,1	25-002411
			19	M6 × 16	14	14,71	77,1	25-002412
			20	M6 × 16	14	14,58	81,2	25-002413
			22	M5 × 16	10	13,95	71,5	25-002414
			24	M5 × 16	10	13,52	75,6	25-002415
HM120S, HT250S	Size 24	54.5	11	M6 × 20	15	53,30	46,0	25-002456
			14	M6 × 20	15	53,20	58,0	25-002416
			16	M6 × 20	15	53,10	66,0	25-002417
			19	M6 × 20	15	52,80	78,0	25-002418
			20	M6 × 20	15	52,70	82,0	25-002419
			22	M6 × 20	15	52,30	90,0	25-002420
			24	M6 × 20	15	51,90	98,0	25-002422
			25	M6 × 20	15	51,60	102,0	25-002423
			28	M6 × 20	15	50,50	114,0	25-002424
			32	M6 × 20	15	48,50	130,0	25-002425

11.2.4.2 Sprocket

Fig. 11.15: Sprocket for linear modules HM-S and linear tables HT-S

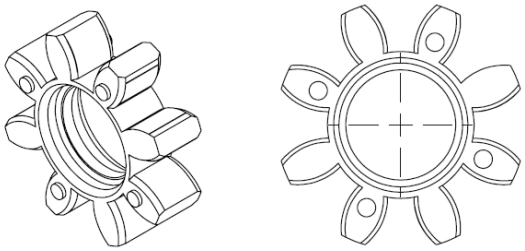


Table 11.7: Article number for sprocket

Linear axis	Model	Article number
HM040S	Size 12	25-000202
HM060S, HT100S	Size 14	25-000203
HM080S, HT150S, HT200S	Size 19	25-000204
HM120S, HT250S	Size 24	25-000205

12 Appendix 2: Accessories

Our products are always subject to technical changes and improvements. To avoid incorrect deliveries of spare parts and accessories or to order parts without part numbers, please always quote the serial number of the linear axes when ordering. You will find this on the type plate of the axis.

12.1 Clamping profiles

With the help of clamping profiles, the linear axis is attached to the machine frame from above. The clamping profiles can be swivelled laterally into the profile groove of the axis. The required number of clamping profiles depends on the axis length and the load and can be found in sections 6.1.5 (HM-S) and 6.1.6 (HT-S). Sets containing 4 clamping profiles are available.

Fig. 12.1: Clamping profiles short and long

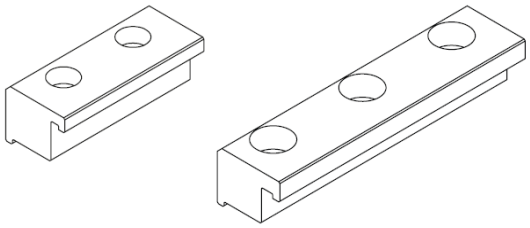


Fig. 12.2: Dimensioned drawing of clamping profile short

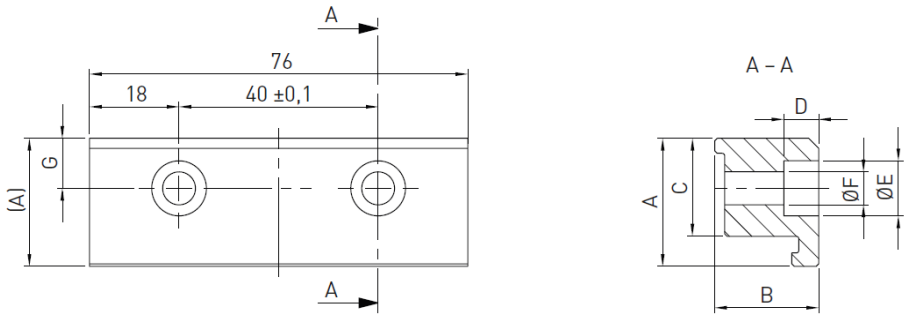


Table 12.1: Article numbers and dimensions of clamping profiles short

Suitable for linear axis	Model	A	B	C	D	Ø E	Ø F	G	Matching screw	Article number, 4 pieces
HM040S, HT100S	Size 5	18,0	10,5	14,1	6,0	10	5,5	6,85	DIN 912 M5	25-000517
HM060S	Size 6	25,6	20,9	19,6	9,5	11	6,6	10,00	DIN 912 M6	25-000518
HT150S	Size 6	26,1	15,9	19,6	8,5	11	6,6	10,00	DIN 912 M6	25-001023
HM080S [1], HM120S, HT200S, HT250S	Size 8	28,0	22,0	19,5	8,0	15	9,0	10,00	DIN 912 M8	25-000519

[1] Preferred type for axis mounting
Unit: mm

Fig. 12.3: Dimensioned drawing of clamping profile long

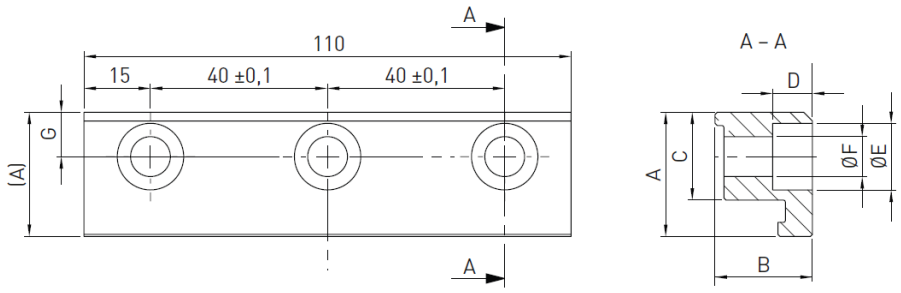


Table 12.2: Article numbers and dimensions of clamping profiles long

Suitable for linear axis	Model	A	B	C	D	Ø E	Ø F	G	Matching screw	Article number, 4 pieces
HM080S, HM120S [1], HT200S [1], HT250S [1]	Size 8	28,0	22,0	19,5	8,0	15,0	9,0	10,0	DIN 912 M8	25-000520

[1] Preferred type for axis mounting
Unit: mm

12.2 T nut

T nut for force-fit mounting of the linear axis. Flexible fastening option via the grooves on the side and underside of the axis profile. The required number of T nuts depends on the axis length and the load and can be found in sections 6.1.3 (HM-S) and 6.1.4 (HT-S). Sets containing 10 T nuts are available.

Fig. 12.4: Dimensioned drawing of T nut

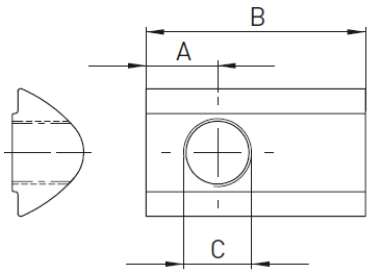


Table 12.3: Article numbers and dimensions of T groove

Suitable for linear axis	Model	A	B	C	Article number, 10 pieces
HM040S, HT100S	Size 5 M4	3,5	12,0	M4	20-000528
HM040S, HT100S [1]	Size 5 M4	3,5	12,0	M5	20-000529
HM060S, HT150S	Size 6 M5	4,5	17,0	M5	20-000530
HM060S, HT150S [1]	Size 6 M6	5,5	17,0	M6	20-000531
HM080S, HM120S, HT200S, HT250S	Size 8 M5	7,5	23,0	M5	20-000532
HM080S, HM120S, HT200S, HT250S	Size 8 M6	6,5	23,0	M6	20-000533
HM080S, HM120S, HT200S, HT250S [1]	Size 8 M8	7,5	23,0	M8	20-000534

[1] Preferred type for axis mounting
Unit: mm

12.3 Centring sleeve

Centring sleeves for insertion into the mounting holes of the carriage for exact and reproducible load pick-up. Sets containing 10 centring sleeves are available.

Fig. 12.5: Dimensioned drawing of centring sleeve

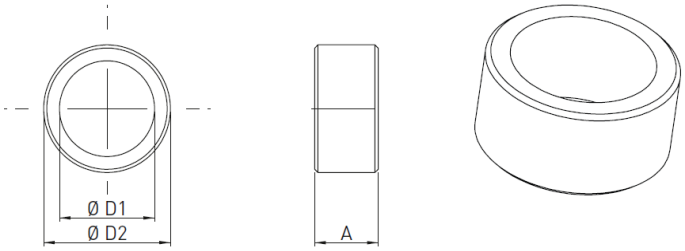


Table 12.4: Article numbers and dimensions of centring sleeve

Suitable for linear axis	A	Ø D1	Ø D2	Article number, 10 pieces
HM040S, HT100S, HM060S, HT150S	4	6,5	8 h6	25-000511
HM080S, HT200S	4	9,0	12 h6	25-000512
HM120S, HT250S	4	11,0	15 h6	25-000513

Unit: mm

12.4 Groove cover

Groove cover for covering mounting groove. Length: 2 m. Sets of 5 groove covers are available.

Fig. 12.6: Groove cover for linear modules HM-S and linear tables HT-S

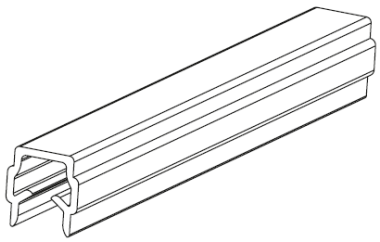


Table 12.5: Article number for groove covers

Suitable for linear axis	Model	Article number, 5 pieces
HM040S, HT100S	Size 5	25-000514
HM060S, HT150S	Size 6	25-000515
HM080S, HM120S, HT200S, HT250S	Size 8	25-000516

12.5 Limit switch

Inductive proximity switch, available in either a normally closed or a normally open version. By default, the limit switch is available with connector or open cable end. Set including mounting material.

Fig. 12.7: Limit switch for linear modules HM-S and linear tables HT-S

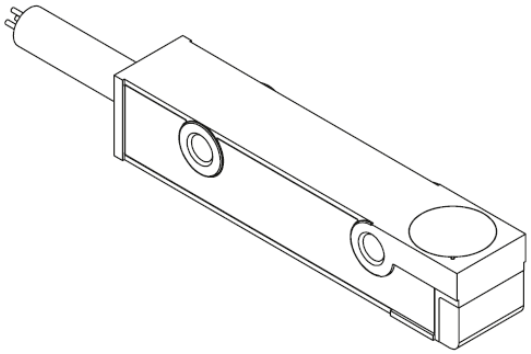


Table 12.6: Limit switch option

Option	Article number
Limit switch with 100 mm cable, plug (NC contact)	25-000786
Limit switch with 100 mm cable, plug (NO contact)	25-002766
Limit switch with 4 m cable (NC contact)	25-000787
Limit switch with 5 m cable (NO contact)	25-000788

Note:

For more information, see section 4.4 on page 17.

12.6 Extension cable for limit switch

Cable with 3-pin M8 round plug on the limit switch side and open wires at the other end of the cable.

Fig. 12.8: Extension cable for limit switch

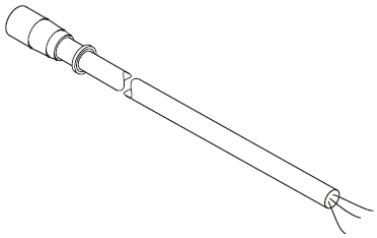


Table 12.7: Extension cable for limit switch

Length [m]	Max. cable diameter d [mm]	Min. static bending radius [mm]	Min. dynamic bending radius [mm]	Article number
3	4,5	13,5	18	8-10-0275
5	4,5	13,5	18	8-10-0276
7	4,5	13,5	18	8-10-0277
10	4,5	13,5	18	8-10-0278
15	4,5	13,5	18	8-10-0279

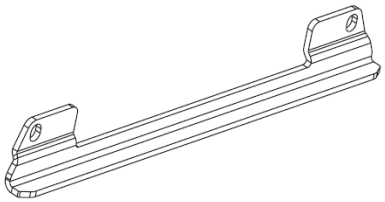
12.7 Damping element

The damping element is used to switch the limit switch in the two carriage end positions (at stroke 0 and stroke max.). It can be mounted on the left or right of the carriage. Set including mounting material.

Article number for linear modules HM-S: 25-000785

Article number for linear tables HT-S: 25-001031

Fig. 12.9: Damping element for linear modules HM-S and linear tables HT-S



12.8 HIWIN MAGIC distance measuring system

Magnetic distance measuring system consisting of encoder (with 5,000 mm cable length and open cable end).

Fig. 12.10: HIWIN MAGIC encoder

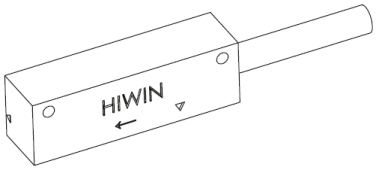


Table 12.8: MAGIC encoder

Encoder	Order code	Article number
MAGIC encoder analogue	MAGIC-T-AM5000L	8-08-0120
MAGIC encoder digital	MAGIC-T-DM5000L	8-08-0122

For more information, see section 4.5 on page 19.

Fig. 12.11: HIWIN MAGIC magnetic tape

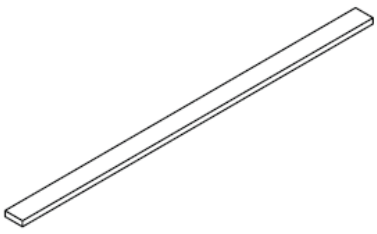


Table 12.9: MAGIC magnetic tape

Magnetic scale	Order code
MAGIC magnetic tape	MAGIC-PS-B-XXXX [1)]

[1)] XXXX = Length [mm]

12.9 Cover strip

The steel cover strip is available in lengths of 3 m and 6 m. Individual lengths on request.

Fig. 12.12: Cover strip

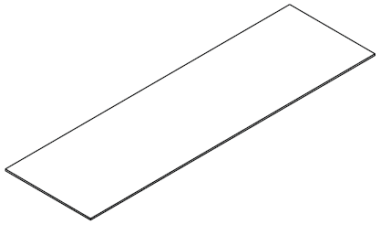


Table 12.10: Cover strip article numbers

Suitable for linear axis	Article number (3 m)	Article number (6 m)
HM040S	25-000535	25-000536
HM060S	25-000537	25-000538
HM080S	25-000539	25-000540
HM120S	25-000541	25-000542
HT100S	25-001187	25-001191
HT150S	25-001188	25-001192
HT200S	25-001189	25-001193
HT250S	25-001190	25-001194

12.10 Magnetic strip

The magnetic strip is used to hold down the cover strip and is available in a length of 7,5 m.

Fig. 12.13: Magnetic strip

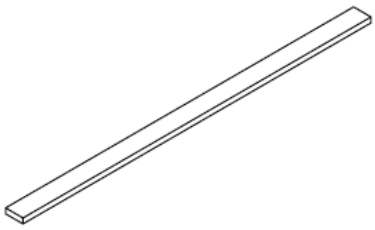


Table 12.11: Magnetic strip article numbers

Suitable for linear axis	Article number (7.5 m)
HM040S	25-001841
HM060S, HM080S, HM120S, HT100S	25-000543
HT150S, HT200S	25-001195
HT250S	25-001196

12.11 Partitions for energy chain

Partitions for separating cables in the energy chain By default, the energy chain is equipped with a partition in every second chain link. Additional partitions are available in a set of 20. Article number (VPE 20 pcs.): 8-05-0337

Fig. 12.14: Partition for energy chains

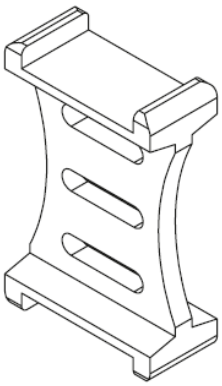


Table 12.12: Article numbers for partition

Suitable for linear table	Article number, 20 pcs.
HT100S	8-05-0336
HT150S, HT200S, HT250S	8-05-0337

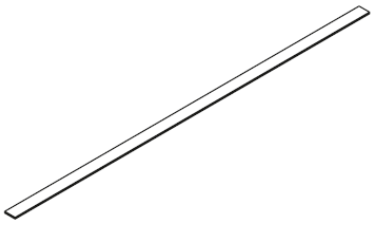
12.12 Tape for reduction of noise emissions from the energy chain

Cellular rubber tape, self-adhesive on one side, for attachment to the contact surface of the energy chain in order to reduce noise emissions. Suitable for all linear axes HT-S with energy chain

Roll of 10 m

Article number: 25-002485

Fig. 12.15: Tape for reduction of noise emissions from the energy chain



12.13 Cover strip deflection for linear modules HM-S

The cover strip deflection set includes the following parts:

- 2 cover strip deflections with
- 2 × deflector housing
- 2 × strip guide
- 4 × cylinder head screw
- 4 × square nut (not applicable for HM040)

Fig. 12.16: Cover strip deflection – HM-S

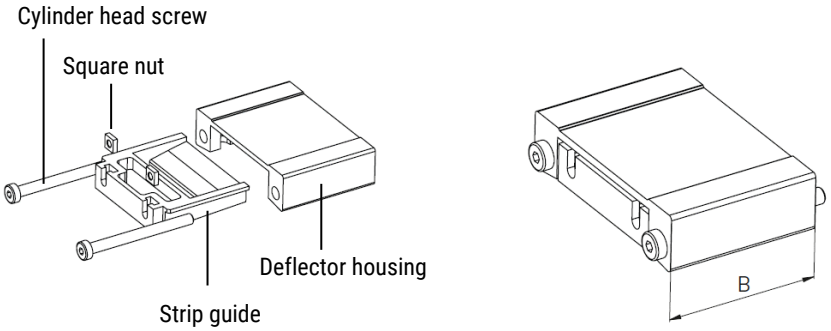


Table 12.13: Article numbers cover strip deflection set

Suitable for linear module	B [mm]	Cylinder head screw	Square nut	Article number
HM040S	40	DIN 7984 M4 × 30	–	25-000618
HM060S	40	DIN 7984 M4 × 45	DIN 562 M3	25-000619
HM080S	45	DIN 7984 M5 × 45	DIN 562 M3	25-000620
HM120S	60	DIN 912 M5 × 45	DIN 562 M4	25-000621

12.14 Cover strip deflection for linear tables HT-S

The cover strip deflection set includes the following parts:

- 8 × strip guide
- 16 × cylinder head screw

One cover strip deflection set is required per carriage.

Fig. 12.17: Cover strip deflection – HT-S

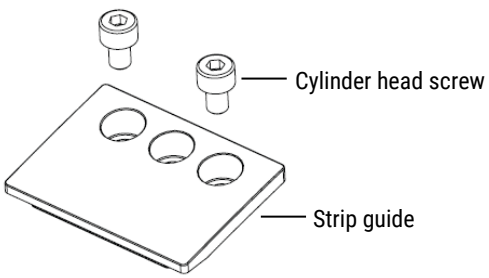


Table 12.14: Article numbers cover strip deflection set

Suitable for linear module	Cylinder head screw	Article number
HT100S	DIN 7984 M3 × 5	25-001203
HT150S	DIN 912 M4 × 6	25-001204
HT200S	DIN 912 M4 × 6	25-001205
HT250S	DIN 6912 M5 × 8	25-001206

12.15 Stop buffer

The stop buffer serves as a mechanical limit.

Fig. 12.18: Stop buffer

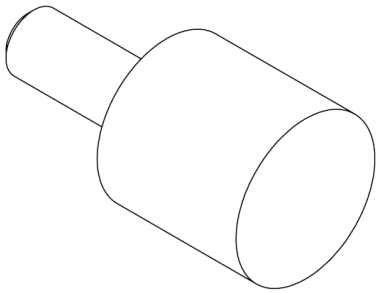


Table 12.15: Article numbers for stop buffers

Suitable for linear axis	Article number
HM040S	25-000055
HM060S, HT100S, HT150S	25-000056
HM080S	25-000057
HM120S	25-000058
HT200S	8-13-0007
HT250S	8-13-0008

12.16 Toothed belt for belt drive RT

Fig. 12.19: Toothed belt for belt drive RT

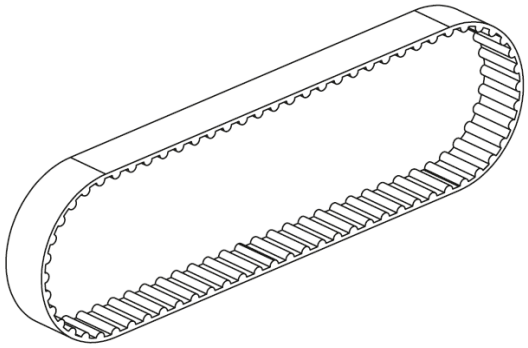


Table 12.16: Article numbers for toothed belts

Suitable for linear axis	Model	Article number
HM040S, HM060S	V1	25-001438
HM060S	V2	25-001439
HM080S	V1	25-001440
HM080S	V2	25-001441
HM120S	V1	25-001442
HM120S	V2	25-001446
HT100S	V1	25-001439
HT100S	V2	25-001450
HT150S	V1	25-001455
HT150S	V2	25-001456
HT200S	V1	25-001456
HT200S	V2	25-001459
HT250S	V1	25-001460
HT250S	V2	25-001463

[1)] You will find the required type in Table 11.1

12.17 HIWIN lubricants

Table 12.17: Recommended HIWIN grease

Grease type	Area of application	Unit of measure	Article number
G04	Heavy velocity	Cartridge 400 g	20-000345

Table 12.18: Recommended HIWIN grease gun

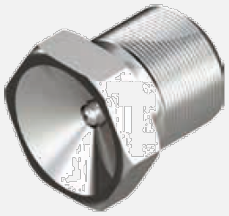
Article number	Description	Scope of delivery	Comment
20-000333	Grease gun type GN-400C including set of lubrication adapters and nozzles (see Fig. 12.20)	Grease gun type GN-400-C consisting of: ○ Grease gun ○ Hydraulic gripping coupling A1 suitable for conical grease nipples according to DIN 71412, outer diameter 15 mm ○ Hollow mouthpiece A2 for conical and ball grease nipples to DIN 71412/DIN 3402, outer diameter 10 mm ○ Set of lubrication adapters and nozzles	Suitable for 400 g cartridge or direct filling

Fig. 12.20: Grease gun GN-400C

12.18 HIWIN grease nipple

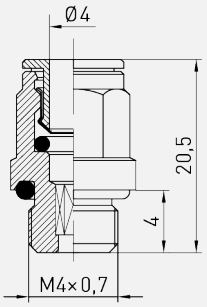
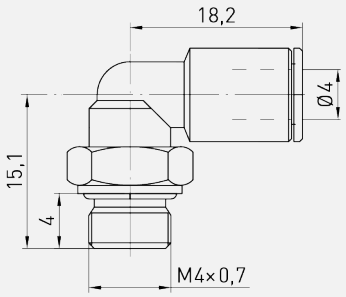
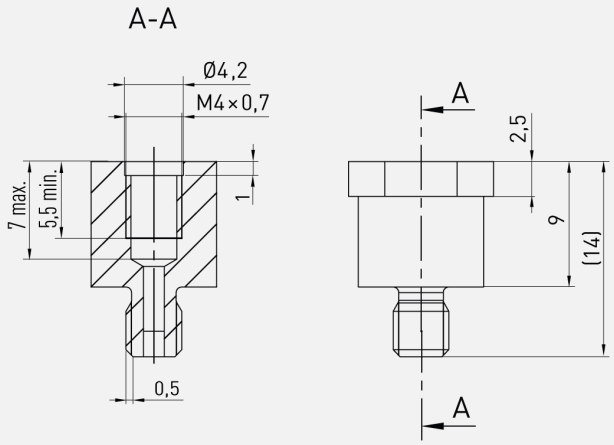
Grease nipple M4 × 0.7 suitable for linear modules HM-S and linear tables HT-S (all sizes).

Table 12.19: Grease nipple M4 × 0.7

Article number	Linear axes HM	Linear axes HT	Figure
20-000325	Standard	Standard: HT100S	
20-000538	Option	Option: HT150S, HT200S, HT250S	
20-000272	Option	Standard: HT150S, HT200S, HT250S	

12.19 Lubrication connectors and push-in fittings

Table 12.20: Lubrication connectors and push-in fittings

Article number	Model	Figure
8-12-0186	Push-in fitting, straight Ø 4	
20-002116	Push-in fitting, angled Ø 4	
20-002108	Lubrication adapter M4/M4 for extending the push-in fittings to avoid collisions (e.g. damping element)	

13 Installation certificate

In terms of EC Machinery Directive 2006/42/EC, Appendix II 1. B for incomplete machines

The manufacturer: HIWIN GmbH, Brücklesbünd 1, 77654 Offenburg, Germany

Documentation department: HIWIN GmbH, Brücklesbünd 1, 77654 Offenburg, Germany

Description and identification of the incomplete machine:

Product:	Linear modules HM-S and linear tables HT-S
Type:	HM040S, HM060S, HM080S, HM120S HT100S, HT150S, HT200S, HT250S
Year of manufacture:	from 2019

We hereby declare that the machine satisfies the following fundamental provisions of the Machinery Directive 2006/42/EC:

1.1.3, 1.1.5, 1.3.3, 1.3.4, 1.3.7, 1.3.9, 1.5.1, 1.5.8, 1.5.9, 1.6.2, 1.5.5, 1.1.2, 1.3.2, 1.5.4

We also declare that the specialist technical documents have been produced in accordance with appendix VII, part B.

We expressly declare that the incomplete machine satisfies all of the applicable provisions of the following EC directives.

2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility (EMC)
2011/65/EU	RoHS Directive on the restriction of hazardous substances

Reference of the harmonised standards applied in accordance with Article 7(2)

EN ISO 13732-1:2008	Ergonomics of the thermal environment – Evaluation methods for human responses to contact with surfaces - Part 1: Hot surfaces
EN ISO 12100:2010	Safety of machinery – General principles for design – Risk assessment and risk reduction
EN 60204-1:2006/AC:2010	Safety of machinery – Electrical equipment of machines – Part 1: General requirements

The manufacturer or its agents undertake to provide the specialist documents on the incomplete machine to authorised organisations in the individual member states upon request.

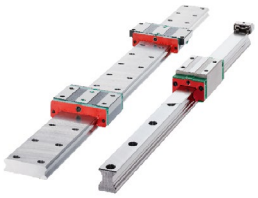
Commercial copyrights remain unaffected.

Important note! The incomplete machinery may not be put into operation until it has been ascertained that the machinery into which this incomplete machinery is to be incorporated is in conformity with this Directive.

Offenburg, 01/03/2019

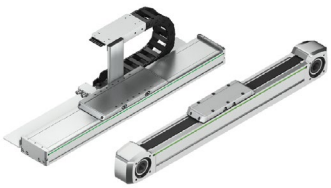
Werner Mäurer, Management

We live motion.

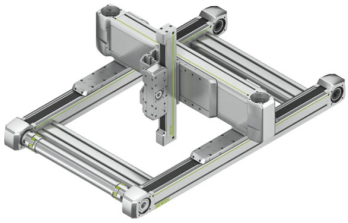


Linear guideways

Ballscrews



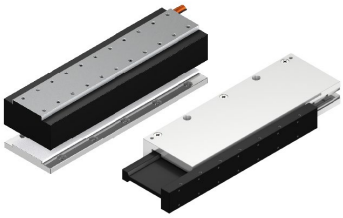
Linear axes



Linear axis systems

Torque motors

Robot



Linear motors

Rotary tables

Servo drives and servo motors

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