HIWIN®

Motion Control & Systems

Valid from serial no. HSN 000 000 000 1

Assembly Instructions

Linear Axes HM-S
Linear Tables HT-S

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1. General information

1.1 About these assembly instructions

These assembly instructions are intended for planners, developers and operators of systems who plan for and install linear axes HM-S and HT-S as machine elements. They are also intended for persons who perform the following tasks in connection with the above mentioned axes:

- Transportation
- Assembly
- Electrical connection including connection to the higher-level control system
- Integration into a security system
- Retrofitting or upgrading
- Setup
- Commissioning
- Operation
- Maintenance
- Cleaning
- Troubleshooting and error elimination
- Shutdown, disassembly and disposal

1.1.1 Version management

Table 1.1 **Version management**

Version	Date	Notes
01-1	November 2020	Update couplings
01-0	May 2019	Initial creation of this document

1.1.2 Requirements

We assume that

- ➔ operating personnel are trained in the safe operation practices for linear axes HM-S and HT-S and have read and understood these assembly instructions in full;
- ➔ maintenance personnel maintain and repair the linear axes HM-S and HT-S in such a way that they pose no danger to people, property or the environment.

1.1.3 Availability

These assembly instructions must remain constantly available to all persons who work with or on the linear axes HM-S and HT-S.

1.2 Depictions used in these assembly instructions

1.2.1 Instructions

Instructions are indicated by triangular bullet points in the order in which they are to be carried out.
Results of the actions carried out are indicated by ticks.

Example:

- ▶ Produce appropriate mounting holes on the mounting surface if not already present.
- ▶ Clean mounting surface and position linear axis on it
- ▶ With the help of T nuts and clamping profiles fix the linear axis.

✓ Linear axis is mounted.

1.2.2 Lists

Lists are indicated by bullet points.

Example:
Linear axes must not be operated:

- ○ Outdoors
- ○ In potentially explosive atmospheres
- ○ ...

1.2.3 Depiction of safety notices

Safety notices are always indicated using a signal word and sometimes also a symbol for the specific risk (see Section 1.2.4, "Symbols used").
The following signal words and risk levels are used:

⚠ DANGER!

Imminent danger!
Noncompliance with the safety notices will result in serious injury or death!

⚠ WARNING!

Potentially dangerous situation!
Noncompliance with the safety notices runs the risk of serious injury or death!

⚠ CAUTION!

Potentially dangerous situation!
Noncompliance with the safety notices runs the risk of slight to moderate injury!

ATTENTION!

Potentially dangerous situation!
Noncompliance with the safety notices runs the risk of damage to property or environmental pollution!

1.2.4 Symbols used

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

Table 1.2 **Warning signs**

	Warning of dangerous electrical voltage!		Warning of risk of hearing damage!
	Warning of cutting injuries!		Warning of crushing!
	Substance hazardous to the environment!		Warning of danger from suspended loads!

Table 1.3 **Mandatory signs**

	Wear protective gloves!		Wear hearing protection!
	Wear safety goggles!		Isolate before work!

1.2.5 Information

NOTE Describes general information and recommendations.

1.3 Warranty and liability

The manufacturer's "General conditions of sale and delivery" apply.

1.4 Manufacturer's details

Table 1.4 **Manufacturer's details**

Address	HIWIN GmbH Brücklesbünd 1 D-77654 Offenburg
Phone	+49 (0) 781 / 9 32 78 - 0
Technical customer service	+49 (0) 781 / 9 32 78 - 77
Fax	+49 (0) 781 / 9 32 78 - 90
Technical customer service fax	+49 (0) 781 / 9 32 78 - 97
E-mail	support@hiwin.de
Website	www.hiwin.de

1.5 Copyright

1.6 Product monitoring

Please inform HIWIN, the manufacturer of the linear axes HM-S and HT-S of:

- Accidents
- Potential sources of danger in the linear axes
- Anything in these assembly instructions which is difficult to understand

2. Basic safety notices

⚠ WARNING!

This chapter serves to ensure the safety of everyone working with linear axes HM-S and HT-S and those who assemble, install, operate, maintain or disassemble them. Non-compliance with the following information results in dangerous working conditions.

2.1 Intended use

The linear axes HM-S and HT-S combine guiding and drive functions in the one compact unit. They are designed for the precise positioning in terms of time and location of fixed mounted loads within an automated system. It is specifically ideal for applications requiring high precision.
In the case of vertical assembly, a suitable clamping or braking device must be provided in order to prevent unintended lowering of the load.
All linear axes HM-S and HT-S may only be used for the intended purpose as described.

- All linear axis HM-S and HT-S sizes are subject to performance limits (see catalogue „Linear Axes and Axis Systems HX"). These performance limits may not be exceeded during operations.
- Linear axes HM-S and HT-S must not be operated in potentially explosive atmospheres.
- Linear axes HM-S and HT-S may only be used and operated indoors.
- Linear axes HM-S and HT-S form part of a complete system. Personal safety must therefore be safeguarded beyond the concept for this complete system.
- Proper use of the linear axes HM-S and HT-S includes observing the assembly instructions and following the maintenance and repair specifications.
- Use of the linear axes HM-S and HT-S for any other purpose shall be considered improper use.

The linear axes HM-S and HT-S are delivered as a system (guiding/drive). Therefore observe the whole documentation for this system. The provided documentation may vary depending on the linear axis type.

2.2 Reasonably foreseeable misuse

Linear axes HM-S and HT-S must not be operated:

- outdoors
- in potentially explosive atmospheres

2.3 Conversions and modifications

Conversions or modifications to the linear axes HM-S and HT-S are not permitted!

2.4 Residual risks

During normal operation, there are no residual risks associated with the linear axes HM-S and HT-S because they form part of the complete system and the operator must safeguard personal safety beyond the concept for this complete system. Warnings about risks that may arise during maintenance and repair work are provided in the relevant sections.

2.5 Personnel requirements

Only authorised and competent persons may carry out work on the linear axes HM-S and HT-S! They must be familiar with the safety equipment and regulations before starting work (see Table 2.1).

Table 2.1 **Personnel requirements**

Activity	Qualification
Normal operation	Trained personnel
Cleaning	Trained personnel
Maintenance	Trained specialist personnel of the operator or manufacturer
Repair	Trained specialist personnel of the operator or manufacturer
Transportation	Trained personnel
Assembly	Trained specialist personnel
Disassembly	Trained specialist personnel

2.6 Protective equipment

2.6.1 Personal protective equipment

Table 2.2 **Personal protective equipment**

Operating phase	Personal protective equipment
Normal operation	No persons may remain at the linear axes HM-S and HT-S during normal operations. Persons near the linear axes HM-S and HT-S must wear the following personal protective equipment depending on the travel speed: – Safety shoes – If necessary, hearing protection
All other operating phases (cleaning, maintenance, resetting, troubleshooting, repair)	The following personal protective equipment is needed for all other operating phases of the linear axes HM-S and HT-S: – Safety shoes – If necessary, safety gloves and safety goggles – If necessary, hearing protection

2.7 Labels on the linear axis

The linear axes HM-S and HT-S bear the labels depicted in the following.

2.7.1 Type plate

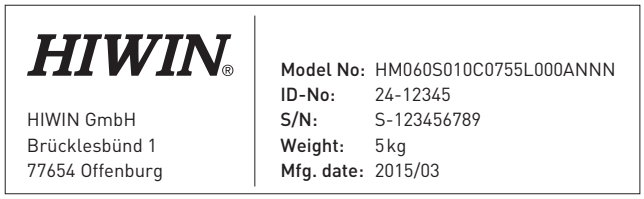


Fig. 2.1 **Type plate (example only)**

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

3.1 Linear module HM-S

3.1.1 Field of application

HIWIN linear modules HM-S with ballscrew are compact, flexible positioning modules. They are specifically ideal for applications requiring high precision and high feed forces.

3.1.2 Ambient conditions

Ambient conditions during operation:	+5 to +40 °C
Relative air humidity during operation:	complying with IEC 60721-3-3, Class 3K3, non-condensing
Climatic ambient conditions for transport and storage:	ambient temperature: –20 to +50 °C, non-condensing
Vacuum:	it may not be operated in vacuum

NOTE

Prevent condensation to avoid corrosion of the axis.

3.1.3 Main components

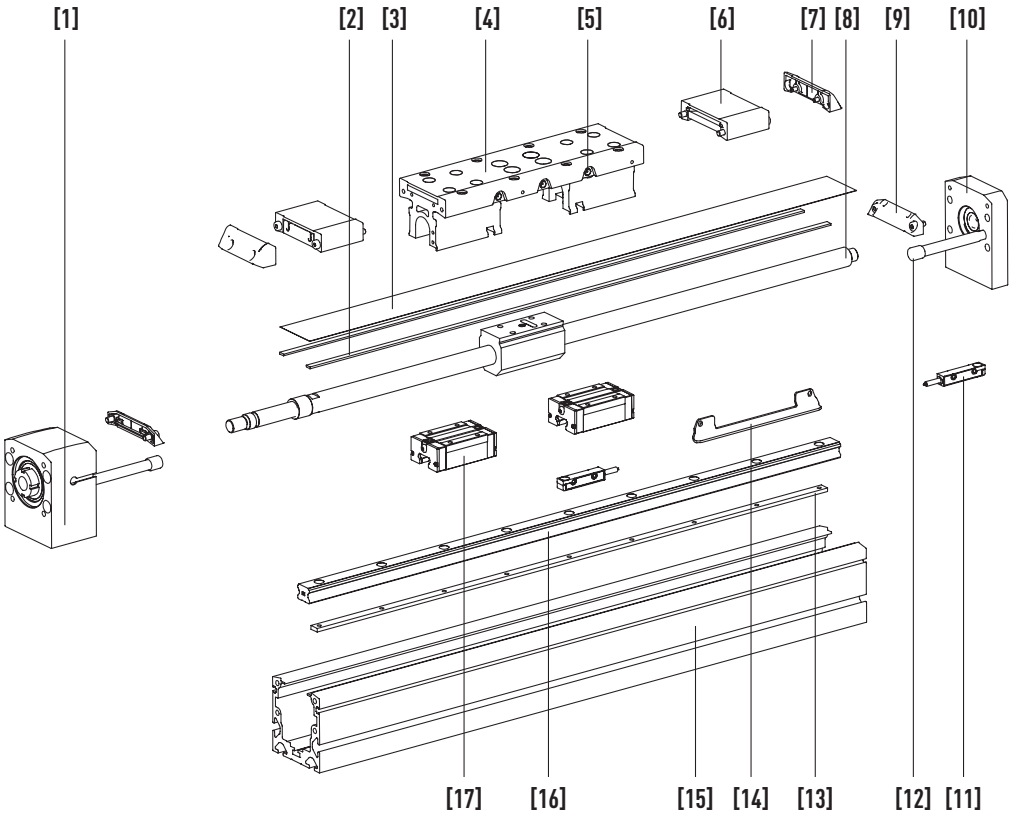


Fig. 3.1 **Main components of the linear module HM-S**

Table 3.1 **Description of the main components of the linear module HM-S**

Pos.	Description	Pos.	Description
1	Drive block	**10**	End plate
2	Magnetic strip	**11**	Limit switch
3	Steel cover strip	**12**	Stopping buffer
4	Carriage	**13**	Threaded bar
5	Grease nipple, 3 grease nipples on each side	**14**	Clamping element
6	Cover strip deflection	**15**	Axis body of aluminium
7	Carriage end piece	**16**	Profile rail
8	Ballscrew	**17**	Block
9	Clamp housing for cover strip		

3.1.4 Functional description

Ballscrew linear axes combine guiding and drive functions in the one compact unit. The forces and torques generated by the moving load are transferred through the carriages into the linear guideway. The linear guideway also executes precise linear movements with two blocks per carriage. The movements themselves are executed over a ballscrew whose spindle is driven by an electric motor. The ballscrew converts the motor's rotations into linear motion of the nut secured firmly to the carriage.

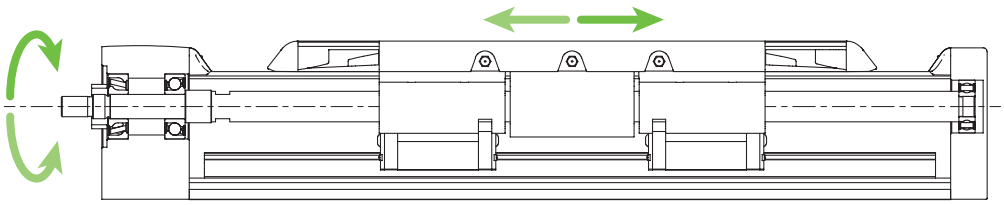
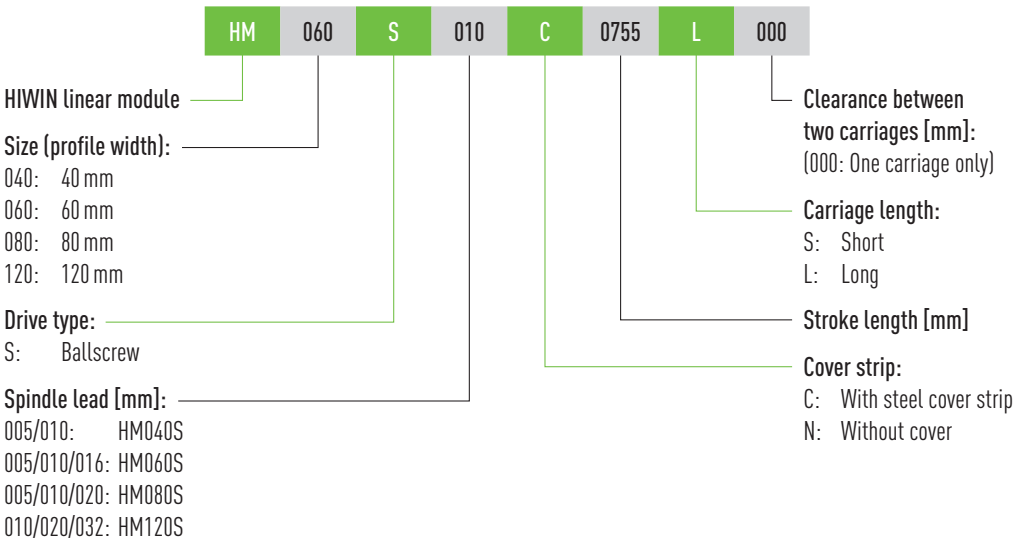
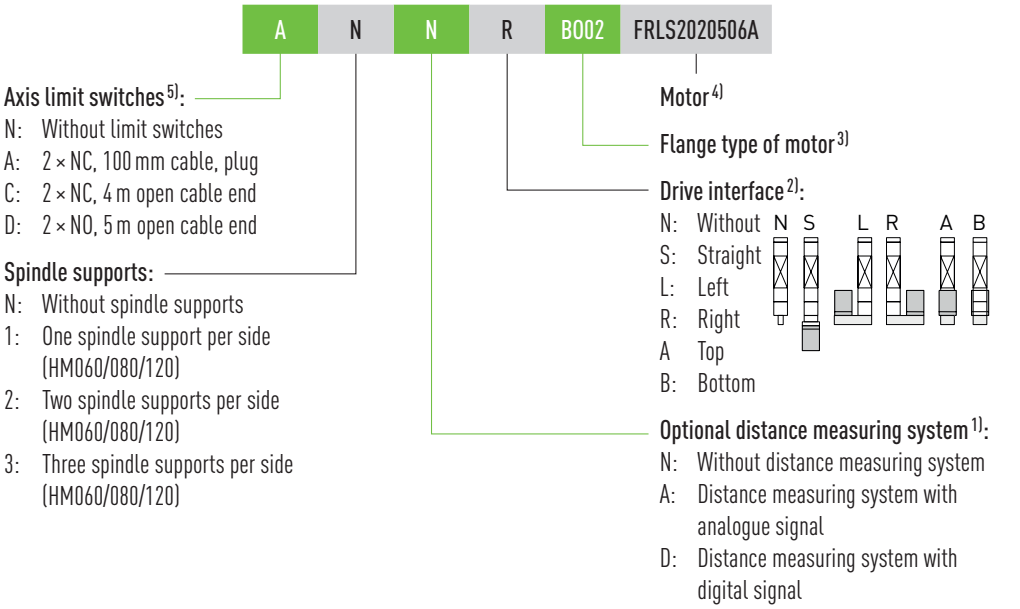


Fig. 3.2 **Functional principle of the linear module HM-S**

3.1.5 Order code for linear modules HM-S



Order code for linear modules HM-S (continuation)



[1] Detailed information upon request or in the assembly instructions "HIWIN MAGIC Distance Measuring Systems"
[2] If no drive interface is selected, the order code ends at this position
[3] All flange types can be found in Section 11.1 on Page 75 ff.
If no flange type is selected, the order code ends at this position
[4] Suitable HIWIN motors can be found in the catalogue "Drives and Servo Motors"
[5] Further reference switches on request

3.2 Linear table HT-S

3.2.1 Field of application

HIWIN linear tables HT-S with ballscrew drive are particularly suitable for applications in which large loads need to be moved with high precision. The integrated HIWIN ballscrews exhibit high lead accuracy and rigidity for precise positioning. Each size comes with various spindle leads for the optimal solution to feed force and dynamic response requirements. Thanks to up to four moving spindle supports per side, the method can be realised at full speed, even over long strokes.

3.2.2 Ambient conditions

Ambient conditions during operation:	+5 to +40 °C
Relative air humidity during operation:	complying with IEC60721-3-3, Class 3k3, non-condensing
Climatic environmental conditions for transport and storage:	ambient temperature: –20 to +50 °C, non-condensing
Vacuum:	it may not be operated in vacuum

Prevent forming of condensation to prevent corrosion of the axis.

NOTE

3.2.3 Main components

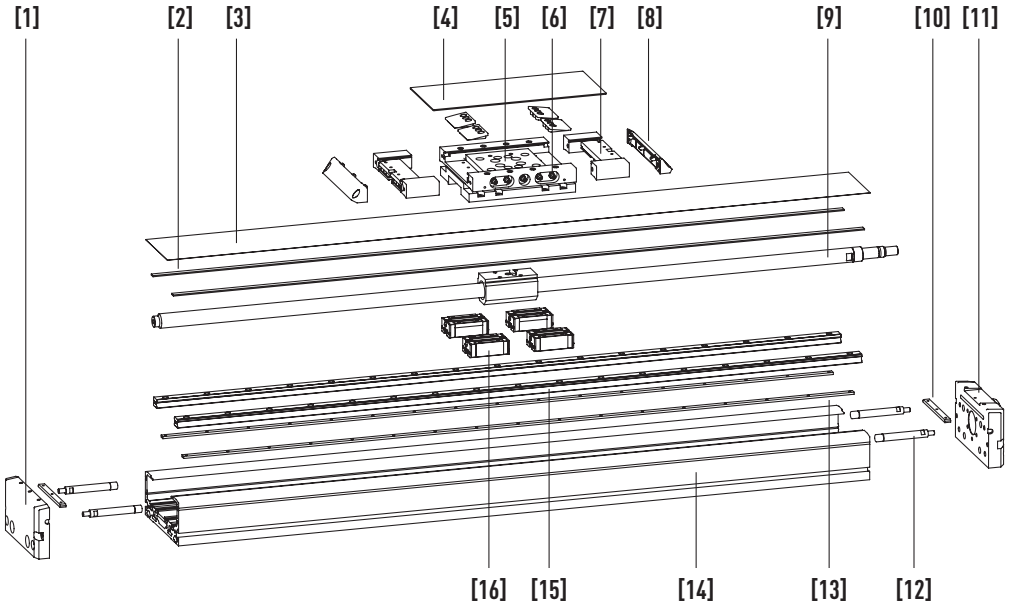


Fig. 3.3 **Main components of the linear tables HT-S**

Table 3.2 **Description of the main components of the linear tables HT-S**

Pos.	Description	Pos.	Description
1	End plate	9	Ballscrew
2	Magnetic strips	10	Clamp housing for cover strip
3	Steel cover strip	11	Drive block
4	Carriage cover	12	Stopping buffer
5	Carriage	13	Threaded bars
6	Grease nipple	14	Axis body of aluminium
7	Cover strip deflection	15	Profile rails
8	Carriage end piece	16	Block

3.2.4 Functional description

Linear tables with ballscrew drive combine guiding and drive functions in the one compact unit. The forces and torques generated by the moving load are transferred through the carriages into the linear guideway. The linear guideways also execute precise linear movements with four blocks per carriage. The movements themselves are executed over a ballscrew whose spindle is driven by an electric motor. The ballscrew converts the motor's rotations into linear motion of the nut secured firmly to the carriage.

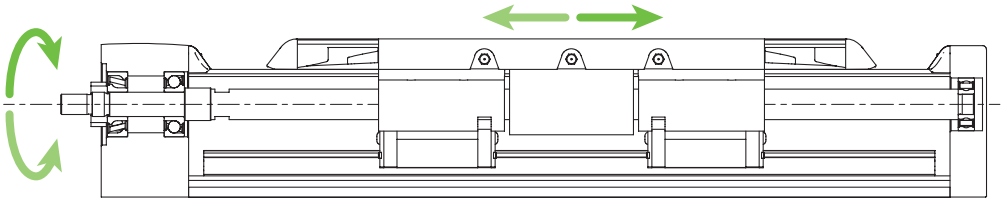


Fig. 3.4 **Functional principle of the linear tables HT-S**

3.2.5 Order code for linear tables HT-S

HT	150	S	010	C	1234	S

HIWIN linear table

Size (profile width):
100: 100 mm
150: 150 mm
200: 200 mm
250: 250 mm

Drive type:
S: Ballscrew

Carriage length:
S: Short

Stroke length [mm]

Cover strip:
C: With steel cover strip
N: Without cover strip

Spindle lead [mm]:
005/010/016: HT100S
005/010/020: HT150S
005/010/025: HT200S
010/020/032: HT250S

Order code for linear tables HT-S (continuation)

A	N	N	S	BR04

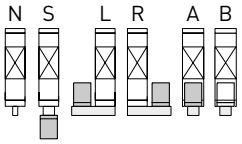
Axis limit switches[4]**:**
N: Without limit switches
A: 2 × NC, 100 mm cable, plug
C: 2 × NC, 4 m open cable end
D: 2 × NO, 5 m open cable end

Spindle support:
N: Without spindle supports
1: One spindle support per side
2: Two spindle supports per side
3: Three spindle supports per side
4: Four spindle supports per side

Optional distance measuring system[1]**:**
N: Without distance measuring system
A: Distance measuring system with analogue signal
D: Distance measuring system with digital signal

Flange type of motor[3]

Drive interface[2]**:**
N: None
S: Straight
L: Left
R: Right
A: Top
B: Bottom



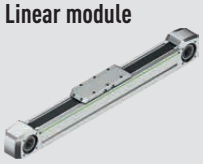
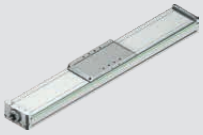
[1] Detailed information in Section 4.5 or in the assembly instructions "HIWIN MAGIC Distance Measuring Systems"
[2] If no drive interface is selected, the order code ends at this position
[3] All flange types can be found in Section 11.1 on Page 75 ff.
If no flange type is selected, the order code ends at this position
[4] Further reference switches on request

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

4.1 Stroke length

The stroke lengths for the linear axes can be set to the millimetre.
The maximum stroke lengths depending on the series and size are listed in Table 4.1.

Table 4.1 **Maximum stroke**

Model	Axis	Maximum stroke [mm]
Linear module 	**HM040B**	3,000
	HM060B	5,500
	HM080B	5,500
	HM120B	5,500
Linear table 	**HT100S**	2,600
	HT150S	3,000
	HT200S	3,500
	HT250S	3,800

Please bear in mind that the maximum possible stroke is shorter with the following options:

- Longer carriages (HM-S: carriage type L)
- Second carriage (HM-S)
- Type with cover strip (owing to required cover strip deflections)
- If necessary, spindle supports

4.1.1 Reserve stroke

The reserve stroke L_r equals 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 installed buffer stops. The reserve stroke for each axis size can be found in the catalogue„Linear Axes and Axis Systems HX".

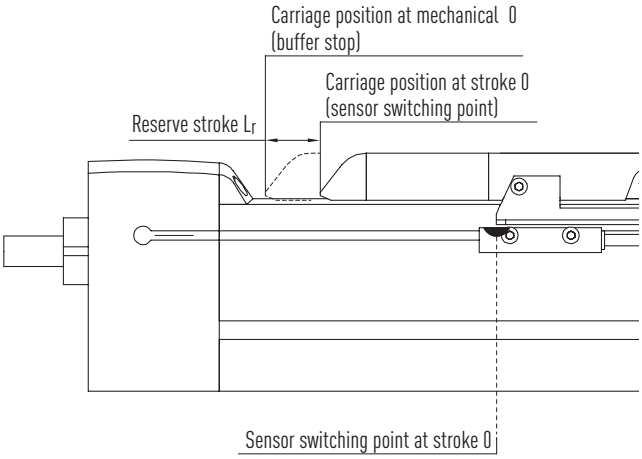


Fig. 4.1 **Example reserve stroke on a linear axis**

ATTENTION!

Damage to the linear axis!

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

4.2 Cover

An optional steel cover strip is available for all linear axis and double axis sizes. This cover strip is held in place with magnetic strips to prevent contaminants from entering the axis's interior. Bear in mind that the carriage is longer on axes with cover strip because of the required cover strip deflection.

The optional cover strip cannot be retrofitted. **NOTE**

4.3 Carriage

There are two carriage types available for the linear modules HM-S(carriage type S and L). The linear tables HT-S are equipped with the carriage type S as standard. The carriages are equipped with mounting threads for mounting the imposed load. These have additional counterbores that can take centring sleeves.

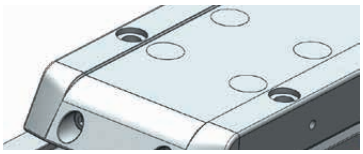


Fig. 4.2 **Carriage with mounting threads**

The typical applications for each of the linear modules' carriage lengths are:

Short carriage (S)
- For individual axes

Long carriage (L)
- For very high torques (M_y, M_z)
- For use in gantry systems (primarily for X-axis)

4.4 Limit switches

The linear axes feature two inductive PNP or proximity switches that signal the end positions of the travel distance. The limit switch cables can be routed either directly to the interface or into the mounting groove. The limit switches are available as N/C or N/O contacts, with or without plug.

4.4.1 Limit switch dimensions

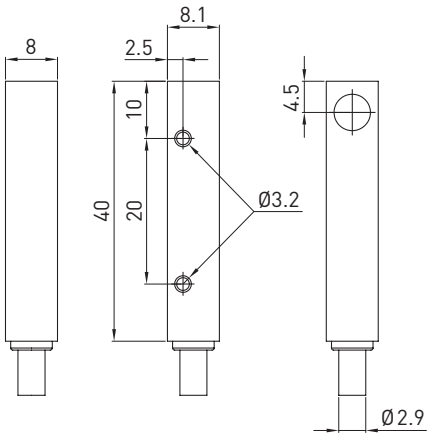


Fig. 4.3 **Limit switch dimensions**

4.4.2 Limit switch specifications

Table 4.2 **General features of the limit switches**

Properties	N/C contact (25-000786)	N/C contact (25-000787)	N/O contact (25-000788)
Housing	Rectangular		
Dimensions (W × H × D)	8 × 8 × 40 mm		
Max. sensing range	2 mm		
Switching frequency	2,000 Hz		
Connection type	Cable with M8, 3-pin plug, 100 mm	Cable, 3-wire, 4 m	Cable, 3-wire, 5 m
Output type	PNP		
Electrical wiring	DC 3-wire		
Protection class	IP67, IP68 [1]		

[1] According to EN 60529

Table 4.3 **Mechanics/electronics of the limit switches**

Mechanics/electronics	N/C contact (25-000786)	N/C contact (25-000787)	N/O contact (25-000788)
Supply voltage	10 to 30 VDC		
Ripple	≤ 10 % [1]		
Voltage drop	≤ 2 V [2]		
Current consumption	≤ 10 mA [3]		
Time delay before availability	≤ 100 ms		
Hysteresis	5 to 15 %		
Repeatability	≤ 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		
Power-up pulse protection	Yes		
Shock and vibration resistance	30 g, 11 ms/10 to 55 Hz, 1 mm		
Ambient operating temperature	–25 °C to +75 °C		
Housing material	Plastic, VISTAL®		
Sensing face material	Plastic, VISTAL®		
UL-File-No. (certificate)	NRKH.E348498		

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

4.5 Distance measuring system

If the accuracy of the linear axis, delivered through the drive element and the encoder signal of the servo drive, is not sufficient for the application, a direct distance measuring system can be used to increase positioning accuracy and repeatability. The distance measuring system is an external component located on the side of the carriage and enables a repeatability of ±0.01 mm for spindle axes. The encoder housing is electrically shielded. The output signals can be either analogue or digital. The HIWIN-MAGIC distance measuring system consists of the encoder (Fig. 4.4) and the magnetic scale (Fig. 4.5) as the measurement standard. It is assembled prior to delivery.

Fig. 4.4 **MAGIC encoder**

Fig. 4.5 **MAGIC magnetic scale**

NOTE

The measuring scale of the magnetic measuring systems may not be subjected to any strong magnetic fields (keep it well away from permanent magnets!). Strong shocks (e.g. hammer blows) can also damage the magnetization of the measuring scale. The system is not suitable for environments where there is magnetic dust (e.g. graphite dust). These things can falsify the encoder signal or damage the distance measuring system.

4.5.1 Technical data of the MAGIC distance measuring system

Table 4.4 **Electrical and mechanical properties of the MAGIC encoder**

Type	1 V_{PP} (analogue)	TTL (digital)
Electrical properties		
Output signal	sin/cos, 1 V_{PP} (0.85 V_{PP} – 1.2 V_{PP})	Quadrature signal, 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. measuring speed	10 m/s	5 m/s
EMC class	3, according to IEC 801	
Mechanical properties		
Housing material	High-quality aluminium alloy, encoder bottom made of stainless steel	
MAGIC encoder dimensions	L × W × B: 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 of the MAGIC measuring system (analogue)

Electrical signals after the differential input of the downstream electronic components. The sinus/cosinus interface of HIWIN MAGIC is strictly based on the Siemens specifications. The period length of the sinus output signal is 1 mm. The period length of the reference signal is 1 mm.

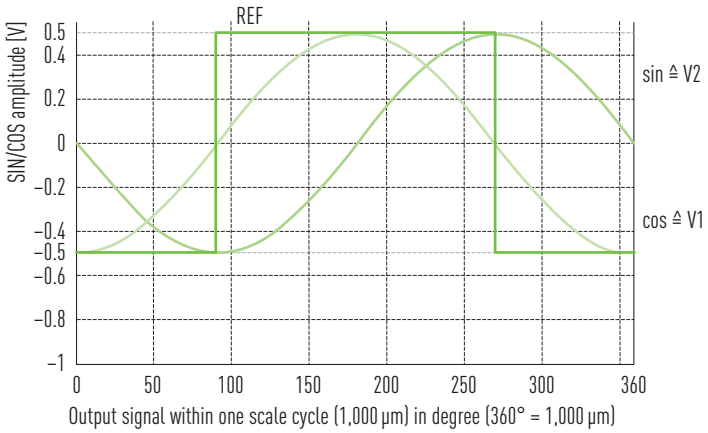


Fig. 4.6 **Electrical signals after the differential input of the downstream electronic components (analogue version)**

4.5.3 Formats and outputs of the MAGIC measuring system (digital)

Digital TTL output: 90° phase shifted square signal in compliance with RS422 specification (according to DIN 66259). Differential output signal: A, $\bar{A}$, B, $\bar{B}$ and Z, $\bar{Z}$.

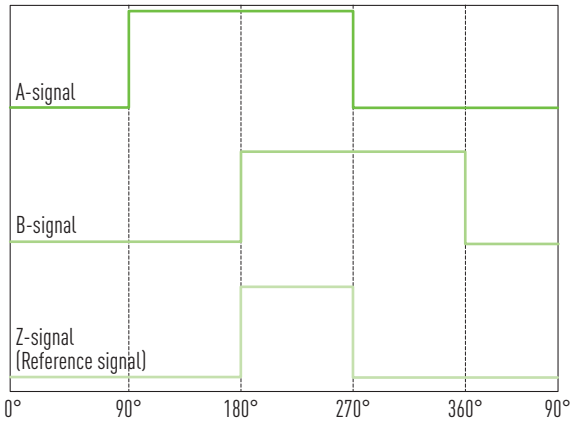
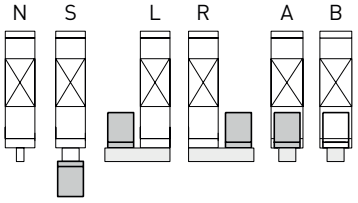


Fig. 4.7 **Signals of the MAGIC encoder (TTL version)**

For more information, please refer to the assembly instructions "HIWIN MAGIC Distance Measuring Systems".

4.6 Drive interfaces

On the linear axes HM-S and HT-S, the drive is mounted in the spindle extension. Depending on the motor, delivery includes a coupling housing, a matching coupling, and an adapter plate for the motor. If fitted with a belt drive, the motor may also be swivelled through 180°, reducing effectively the overall length of the linear axes HM-S and HT-S.
Possible drive interfaces:



N: None
S: Straight
L: Left
R: Right
A: Top
B: Bottom

Fig. 4.8 **Drive interfaces of the linear axes HM-S and HT-S**

4.7 Spindle support

With long strokes at high speeds, the linear axes HM-S and HT-S can reach the critical spindle speed. These must then be supported accordingly. HIWIN linear modules HM-S (with the exception of the HM040S) allow up to three optional spindle supports to be fitted on each side of the carriage. Up to four spindle supports are possible with the linear tables HT-S. The critical speeds for spindle support can be taken from the catalogue "Linear Axes and Axis Systems HX".

5. Transport and installation

5.1 Delivery

5.1.1 Delivery state

The linear axes HM-S and HT-S are supplied fully assembled and function tested.

5.1.2 Scope of delivery

The contents of delivery vary depending on the ordered model, accessories, and options.

5.2 Transport to the installation site

⚠ WARNING!

Danger from suspended loads or falling parts!

Lifting heavy loads may damage your health!

- Only qualified personnel may assemble, install, and service the linear axes!
- Note the mass when transporting the parts. Use suitable hoisting gear!
- Observe the applicable occupational health and safety regulations when handling suspended loads!
- Hoist the linear axes only at the designated points!
- Secure machinery and machine parts against tilting!

⚠ CAUTION!

Danger of impacts 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 the applicable occupational health and safety regulations!
- Transport to the installation site only by qualified personnel!

ATTENTION!

Damage to the linear axes!

The linear axis may be damaged by mechanical loading.

- Hoist the linear axes only at the designated points (see Section 5.5)!
- For longer linear axes, provide additional protection of the centre section!
- Ensure that the linear axes do not bend as this could permanently damage accuracy!
- During transport, do not transport any additional loads on the linear axis!
- Provide heavy attachments with additional supports!

The linear axes are precision products and must be treated with care. Impacts of any kind may damage the axis. The result may be compromised running precision and service life. Transport the packaged product as close as possible to its installation site. Remove the packaging at this site only.

5.3 Requirements at the installation site

5.3.1 Ambient conditions

Ambient conditions during operation:	+5 to +40 °C
Relative air humidity during operation:	complying with IEC60721-3-3, Class 3k3, non-condensing
Climatic environmental conditions for transport and storage:	ambient temperature: –20 to +50 °C, non-condensing
Vacuum:	it may not be operated in vacuum

5.3.2 Safety equipment to be provided by the operator

Possible safety equipment/measures:

- Personal protective equipment in accordance with UVV (German accident prevention regulations)
- Zero-contact protective equipment
- Mechanical protective equipment

5.4 Storage

- Store the linear axes in their transport packaging.
- Alternatively: Use packaging that secures the linear axes against slipping, damage, and vibrations.
- Store the linear axes in dry, frost free rooms only.
- Clean and protect used linear axes before storage.

5.5 Unpacking and installing

ATTENTION!

Warning! Health and environmental hazards!

Contact with lubricants may cause irritation, poisoning, allergic reactions, and damage to the environment.

- Use only suitable, non-hazardous agents. Note the manufacturer's safety data sheets!
- Ensure proper disposal!

The linear axes HM-S and HT-S may only be installed and operated indoors.

NOTE

5.5.1 Unpacking and installing the linear axes HM-S/HT-S

- Remove packaging.
- To transport the linear axis, hoist it at the points designated A and B (see Fig. 5.1, Fig. 5.2 and Fig. 5.3). The points A and B should be a quarter of the axis' overall length from each of its ends.
- Do not hoist the linear axis by its attachments. During transport, provide additional support for heavy attachments such as the drive.
- Dispose of packaging in an environmentally friendly way.

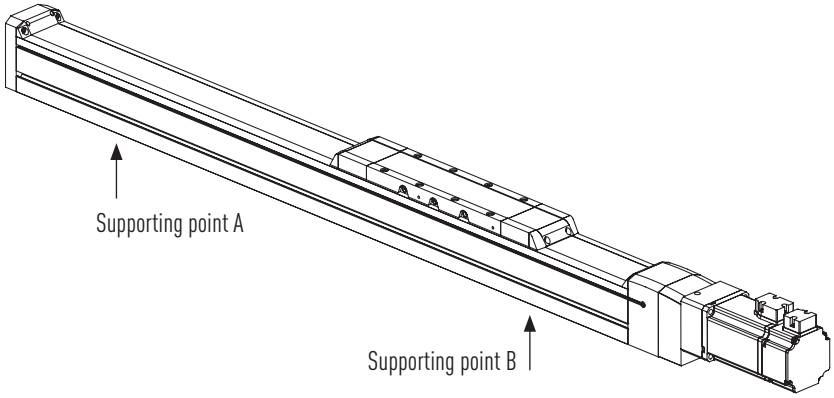


Fig. 5.1 **Supporting points A and B for hoisting and transporting, here on a linear axis HM-S**

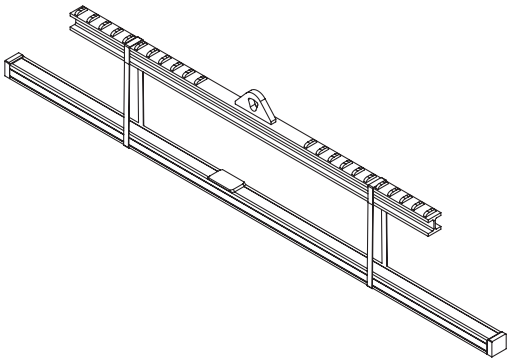


Fig. 5.2 **Correct position of the supporting points**

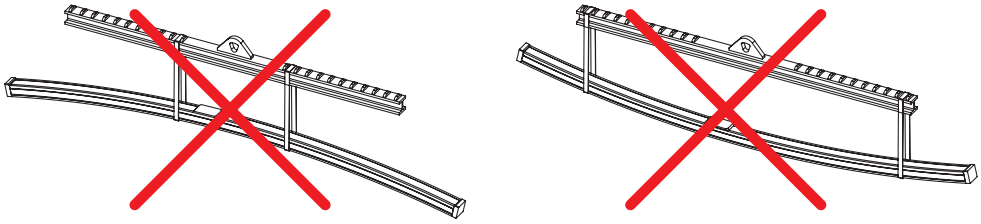


Fig. 5.3 **Correct position of the supporting points**

6. Assembly and connection

⚠ WARNING!

Danger of impacts and crushing!
Uncontrolled or manual carriage movements may cause injury.
- Isolating protective equipment must be provided for linear axis operations!
- Only qualified personnel may be assigned to commissioning, setup, and troubleshooting!

⚠ WARNING!

Danger of cutting injuries!
Installing or removing the cover strip may cause cutting injuries.
- Only qualified personnel wearing appropriate protective equipment (gloves, goggles) may be assigned to commissioning and setup!

⚠ WARNING!

Danger of impacts and crushing!
Uncontrolled movements by the powered elements of the linear axis may cause injury.
- Controller design complying with DIN EN 12100. No start after
  – power connected, reinstated!
  – troubleshooting!
  – machine stop!

⚠ CAUTION!

Warning! Damage to hearing!
The linear axes can generate noise in excess of 70 dB(A) at high speeds.
- Hearing protection must be worn when high speed linear axes generate noise greater than 70 dB(A)!

⚠ CAUTION!

Danger from suspended loads or falling parts!
- Only qualified personnel may assemble, install, and service the linear axes!
- Note the mass when transporting the parts. Use suitable hoisting gear!
- Observe the applicable occupational health and safety regulations when handling suspended loads!
- Hoist the linear axes only at the designated points!
- Secure machinery and machine parts against tilting!
- Secure the linear axes as described in the assembly instructions!
- When installing a vertical linear axis, provide support for the carriage during downtimes!

⚠ CAUTION!

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.
- Your assembly must ensure that parts cannot detach even under high accelerations or constant vibrations!
- Secure the imposed load as described in the assembly instructions!

⚠ CAUTION!

Danger of impacts 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).
- Isolating protective equipment must be provided for linear axis operations!
- When installing a vertical linear axis, provide support for the carriage during downtimes!

⚠ CAUTION!

Warning! Electric shock or burns by contact with live parts!
Contact with live parts can result in injuries.
If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Controller design complying with DIN EN 12100. No start after
  - power connected, reinstated!
  - troubleshooting!
  - machine stop!
- Only qualified personnel may install cabling!
- Only qualified personnel may work on electrical installations!

ATTENTION!

Warning! Health and environmental hazards!
Contact with lubricants may cause irritation, poisoning, allergic reactions, and damage to the environment.

- Use only suitable, non-hazardous agents. Note the manufacturer's safety data sheets!
- Ensure proper disposal!

6.1 Assembling the linear axes

The linear axes HM-S/HT-S can be installed in any position. Fasteners must be applied to the axis' aluminium profile. The HS axis systems cannot just be installed in any position.
The axes can be secured to the mounting surface by means of clamping profiles (side grooves) or T nuts (grooves at bottom). Bear in mind that, depending on the installation position, the linear axis weight acts as an additional load and that the actually induced forces and torques must remain within the permitted range (see catalogue "Linear Axes and Axis Systems HX").

NOTE **The axis' aluminium profile has been extruded in compliance with EN 12020-2.**

NOTE **If higher running precision is required, the axis must be aligned and secured to a precision reference edge.**

NOTE **Please note the support spacing for each of the axis sizes (see Section 6.1.1, "Maximum support spacing for linear axes HM-S and HT-S in self-supporting applications").**
Not only the end blocks may lie on the mounting surface.

NOTE **The bolts must be secured to prevent them coming loose.**

6.1.1 Maximum support spacing for linear axes HM-S and HT-S in self-supporting applications

Depending on how the linear axis HM-S/HT-S is fixed, the body may undergo excessive bending, especially with large stroke lengths and high load capacities. This can be prevented when the axis body is mounted on multiple supports on a stable sub construction. The maximum support spacing L is a function of the acting force and can be determined from the following diagrams. In the case of multi-axis systems, the masses of the moving axes must also be taken into account.

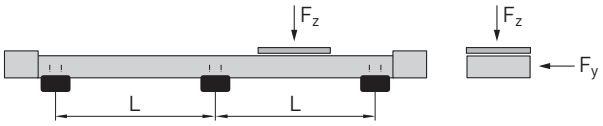


Fig. 6.1 **Horizontal axis position**

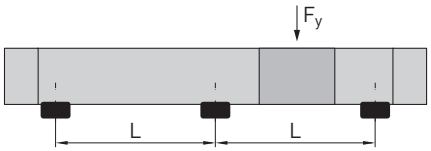


Fig. 6.2 **Vertical axis position**

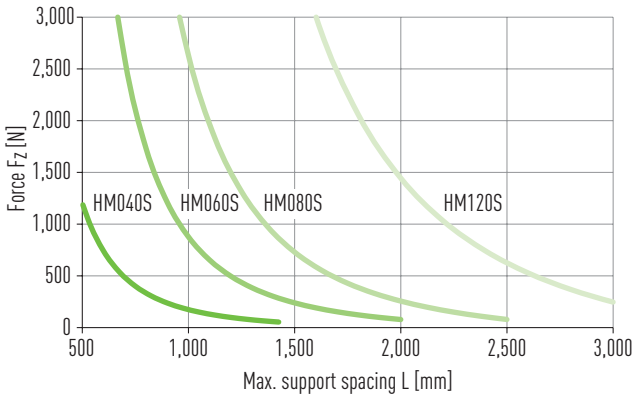


Fig. 6.3 **HM-S: Maximum support spacing as a function of the force F_z**

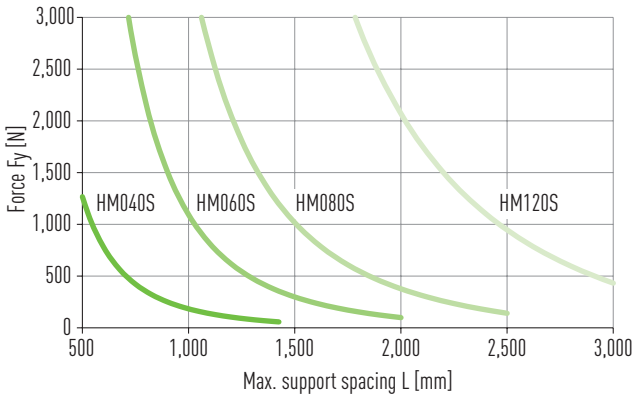


Fig. 6.4 **HM-S: Maximum support spacing as a function of the force F_y**

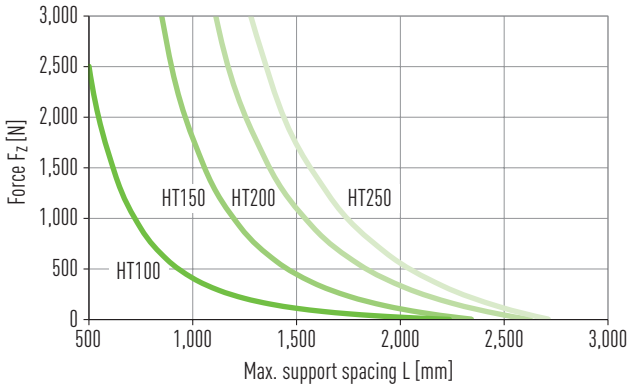


Fig. 6.5 **HT-S: Maximum support spacing as a function of the force F_z**

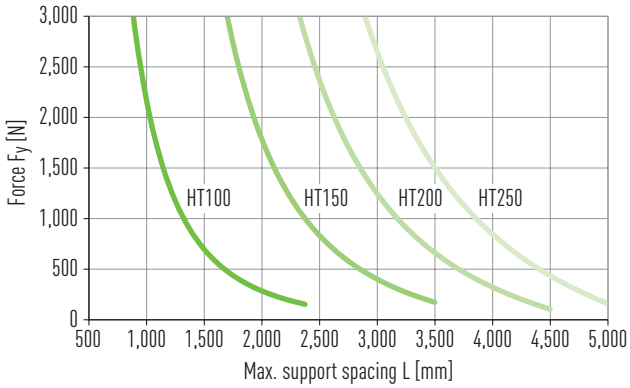


Fig. 6.6 **HT-S: Maximum support spacing as a function of the force F_y**

6.1.2 Reference surface accuracy requirements

When securing the linear axis HM-S/HT-S, 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 Assembly with T nuts linear modules HM-S

The T nuts to be used for each axis size are given in Table 6.1. The T nuts must be arranged as per Fig. 6.7 and Fig. 6.9 or Fig. 6.10. Four T nuts (six for HM120 and HD4) must be used at each mounting point. 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 tension direction per T nut) must be taken into account. Don't drop below the minimum number of T nuts specified in Table 6.1. The T nuts are to be positioned grouped in the form of mounting points as shown in Fig. 6.9 and Fig. 6.10. Make sure that each mounting point for itself transmits the external load safely. The distances between the mounting points are to be selected depending on the load situation. The recommended distances L_{NX} listed in Table 6.1 are only reference values.

- ▶ Drill mounting holes in the mounting surface (hole spacing listed in Table 6.1).
- ▶ Clean mounting surface and position linear axis on it.
- ▶ Swivel the T nut into the bottom groove.
- ▶ Secure the T nut with a small tightening torque on the bolts.
- ▶ Now tighten the bolts with the full tightening torques, proceeding in a crosswise manner.

✓ The linear axis has now been installed.

Note the hole spacing L_{NY} when securing the linear axes.

0.2 mm/m Precision requirements for all reference surfaces for securing the axis profile.

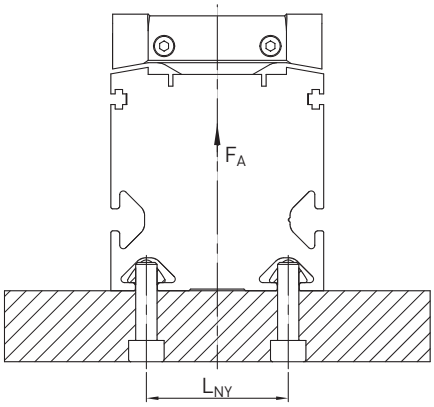


Fig. 6.7 **Hole spacing for securing the linear axes with a T nut from below**

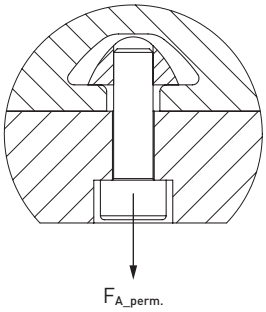


Fig. 6.8 **Permissible axial operating force in tension direction per slot nut ($F_{A_}$perm.)**

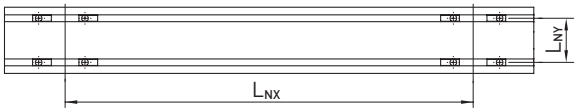


Fig. 6.9 **Securing with T nuts – HM040S, HM060S, HM080S**

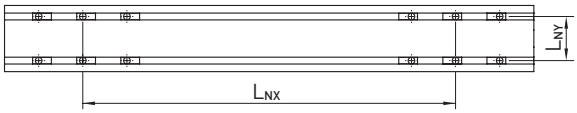


Fig. 6.10 **Securing with T nuts – HM120S**

Table 6.1 **Minimum number of T nuts for securing the axis, and recommended spacing of mounting points on long axes – linear modules HM-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]	$F_{A\_perm.}$ [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 tension direction per T nut

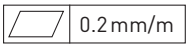
6.1.4 Assembly with T nuts – linear tables HT-S

The T nuts to be used for each axis size are given in Table 6.2. The T nuts must be arranged as per 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 operating force in tension direction per T nut) must be taken into account. Don't drop below the minimum number of T nuts specified in Table 6.2. The T nuts are to be positioned grouped in the form of mounting points as shown in Fig. 6.14, Fig. 6.15 and Fig. 6.16. Make sure that each mounting point for itself transmits the external load safely. The distances between the mounting points are to be selected depending on the load situation. The recommended distances L_{NX} listed in Table 6.2 are only reference values.

- Drill mounting holes in the mounting surface (hole spacing listed in Table 6.2).
- Clean mounting surface and position linear table on it.
- Swivel the T nut into the bottom groove.
- Secure the T nut with a small tightening torque on the bolts.
- Now tighten the bolts with the full tightening torques, proceeding in a crosswise manner.

✓ The linear table has now been installed.

Note the hole spacing L_{NY} when securing the linear tables.



Precision requirements for all reference surfaces for securing the axis profile.

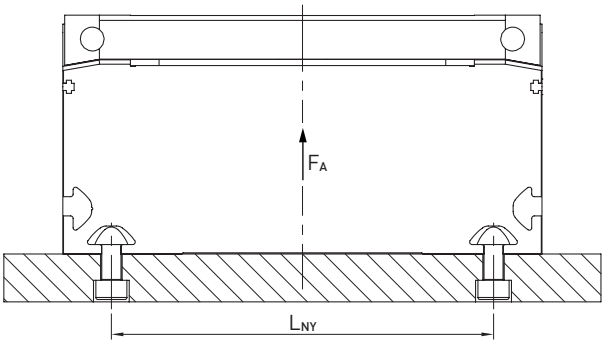


Fig. 6.11 **Hole spacing for securing the linear tables HT100S, HT150S, HT200S with a T nut from below**

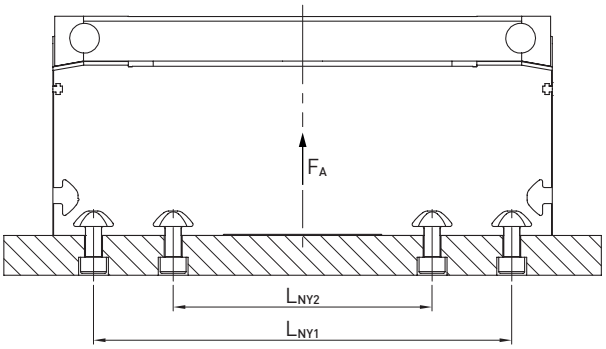


Fig. 6.12 **Hole spacing for securing the linear tables HT250S with a T nut from below**

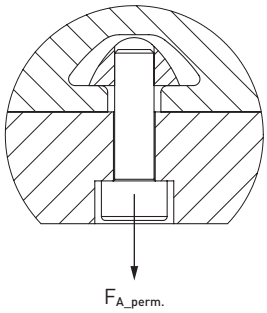


Fig. 6.13 **Permissible axial operating force in tension direction per slot nut (F_{A}_perm.)**

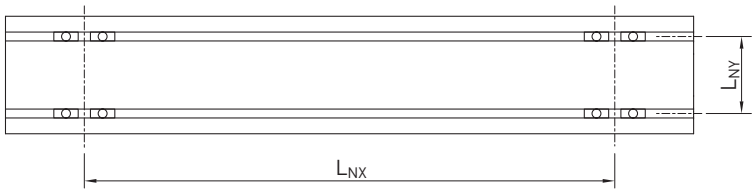


Fig. 6.14 **Securing with T nuts – HT100S, HT150S**

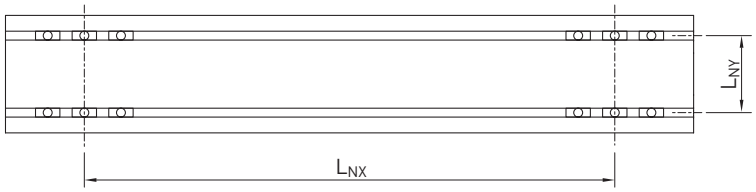


Fig. 6.15 **Securing with T nuts – HT200S**

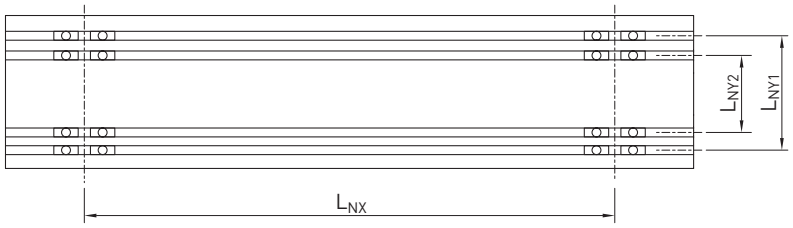


Fig. 6.16 **Securing with T nuts – HT250S**

Table 6.2 **Minimum number of T nuts for securing the axis, and recommended spacing of mounting points on long axes – linear tables HT-S**

Size	Minimum number of T nuts	L_{NY}/L_{NY1} [mm]	L_{NY2} [mm]	Recommended distance L_{NX} [mm]	Thread size	Screw tightening torque [Nm]	Clamping force per T nut [N]	$F_{A\_perm.}$ [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	130	1,000	M8	24.6	18,600	5,000	20-000534

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

6.1.5 Mounting with clamping profiles – linear modules HM-S

The clamping profiles must always be attached in pairs to the left and right of the axis body (see Fig. 6.18 and Fig. 6.19). The required minimum number must be taken from Table 6.3. 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 force in tension direction per clamping profile) must be taken into account. Don't drop below the minimum number of clamping profiles specified in Table 6.3. The distances between the mounting points are to be selected depending on the load situation. The recommended distances L_{SX} listed in Table 6.3 are only reference values.

- Drill mounting holes in the mounting surface (hole spacing listed in Table 6.3).
- Clean mounting surface and position linear axis on it.
- Swivel the clamping profile into the side groove.
- Secure the clamping profile with a small tightening torque on the bolts.
- Now tighten the bolts with the full tightening torques, proceeding in a crosswise manner.

✓ The linear axis has now been installed.

Observe the L_{SY} hole spacing (Fig. 6.17) when securing linear axes.

Precision requirements for all reference surfaces for securing the axis profile.

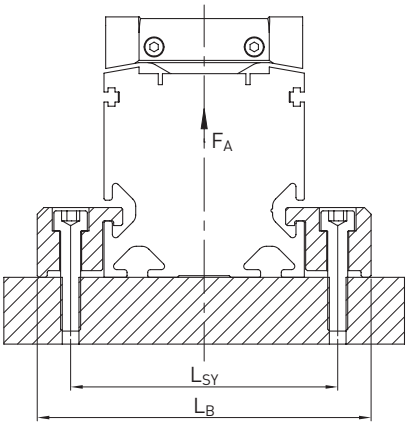


Fig. 6.17 **Hole spacing for the lateral securing of linear modules HM-S with clamping profiles**

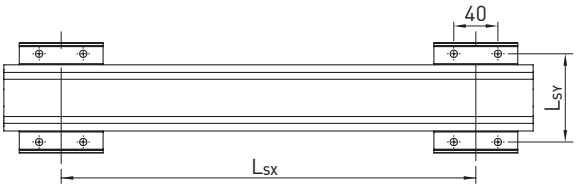


Fig. 6.18 **Securing with clamping profiles – HM040S, HM060S, HM080S**

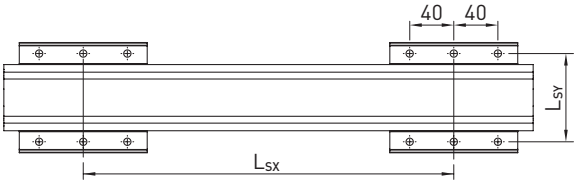


Fig. 6.19 **Securing with clamping profiles – HM120S**

Table 6.3 **Minimum number of clamping profiles for securing the axis, and recommended spacing of mounting points on long axes – linear modules HM-S**

Size	Min. 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]	$F_{A\_perm.}$ [1] [N]	Art. 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 tension direction per pair of clamping profiles

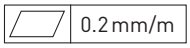
6.1.6 Mounting with clamping profiles – linear tables HT-S

The clamping profiles must always be attached in pairs to the left and right of the axis body (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 force in tension direction per clamping profile) must be taken into account. Don't drop below the minimum number of clamping profiles specified in Table 6.4. The distances between the mounting points are to be selected depending on the load situation. The recommended distances L_{SX} listed in Table 6.4 are only reference values.

- Drill mounting holes in the mounting surface (hole spacing listed in Table 6.4).
- Clean mounting surface and position linear table on it.
- Swivel the clamping profile into the side groove.
- Secure the clamping profile with a small tightening torque on the bolts.
- Now tighten the bolts with the full tightening torques, proceeding in a crosswise manner.

✓ The linear table has now been installed.

Observe the L_{SY} hole spacing (Fig. 6.20) when securing the linear tables.



Precision requirements for all reference surfaces for securing the axis profile.

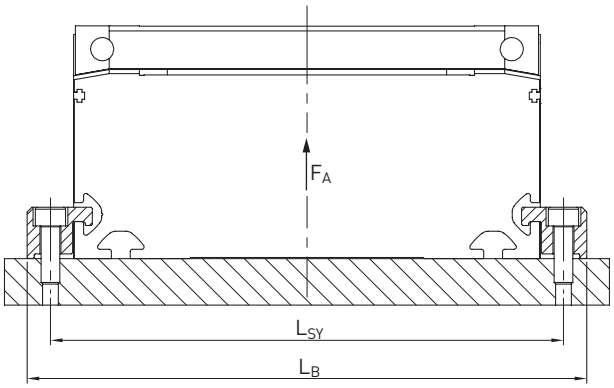


Fig. 6.20 **Hole spacing for the lateral securing of linear tables HT-S with clamping profiles**

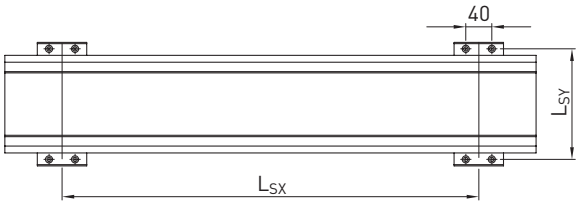


Fig. 6.21 **Securing with clamping profiles – HT100S, HT150S**

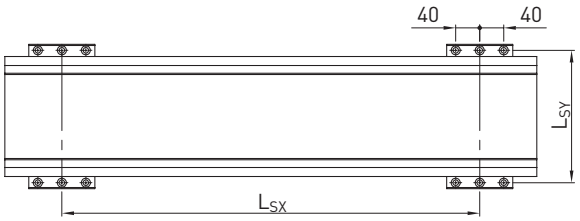


Fig. 6.22 **Securing with clamping profiles – HT200S, HT250S**

Table 6.4 **Minimum number of clamping profiles for securing the axis, and recommended spacing of mounting points on long axes**

Size	Min. 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]	$F_{A\_perm.}$ [1] [N]	Art. 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 tension direction per pair of clamping profiles

6.2 Mounting the imposed load

The spacings of the threaded holes for mounting the imposed load can be found in the catalogue "Linear Axes and Axis Systems HX". Additional counterbores can take centring rings. HIWIN recommends to position two centring rings diagonally opposite each other. For axes with more than one carriage, it is recommended to equip only one carriage each with centring sleeves to avoid distortion.

Table 6.5 **Threaded holes for securing the imposed load**

Size	Thread size × depth	Counterbore depth for centring sleeve [mm]	Counterbore 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 mounting surfaces at the carriage.
- Clean the mounting surface of the load.
- If necessary, use centring sleeves.
- Position the load on the carriage of the linear axis.
- Tighten the mounting bolts crosswise.
- Check the free movement of the load over the entire stroke.
- Lock the bolts.

✓ The imposed load has now been installed.

Precision requirements for the imposed load's mounting surface.

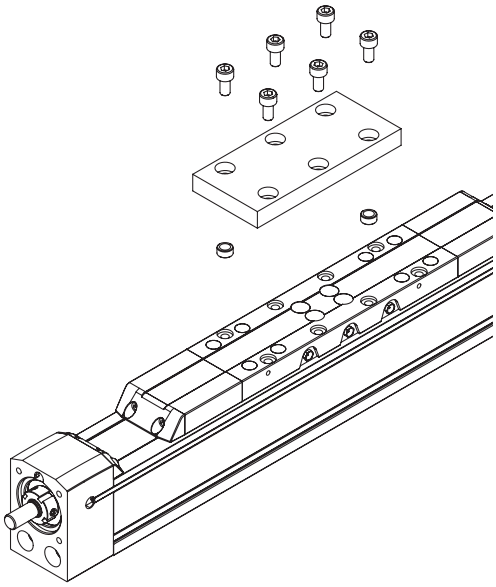


Fig. 6.23 **Securing the load with centring sleeves (linear module HM-S as an example)**

6.3 Mounting the limit switches

The limit switches are available as an N/C or N/O contact. The limit switch can be secured directly in the limit switch groove (T groove) with the provided M3 bolts and nuts. The limit switches can be mounted on the left or right.

- If necessary, remove the green decorative strip from the upper T groove.
- Push two nuts into the upper T groove through the notch at the drive block.
- Attach the limit switch with two bolts (in the case of the axis sizes HM040S/HT100S, the spacer plate must also be installed between the limit switch and axis, see Fig. 6.24). First leave the two bolts untightened.
- Push the limit switch to the required position, and press it up slightly.
- Tighten the bolts. The tightening torque is 0.5 Nm.

✓ The limit switches have now been installed.

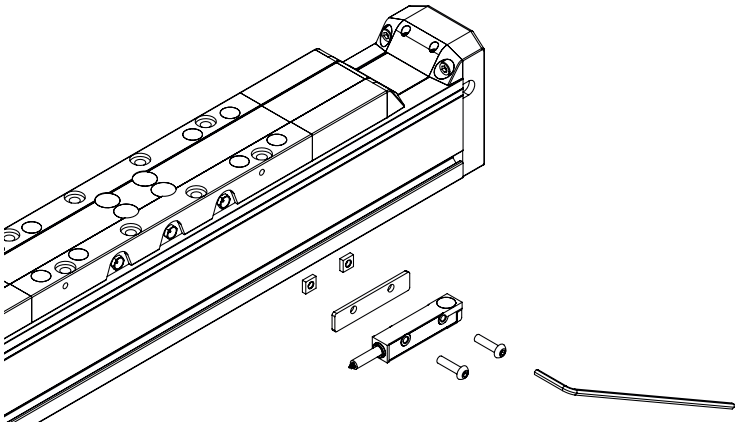


Fig. 6.24 **Mounting the limit switch: HM040S, HT100S**

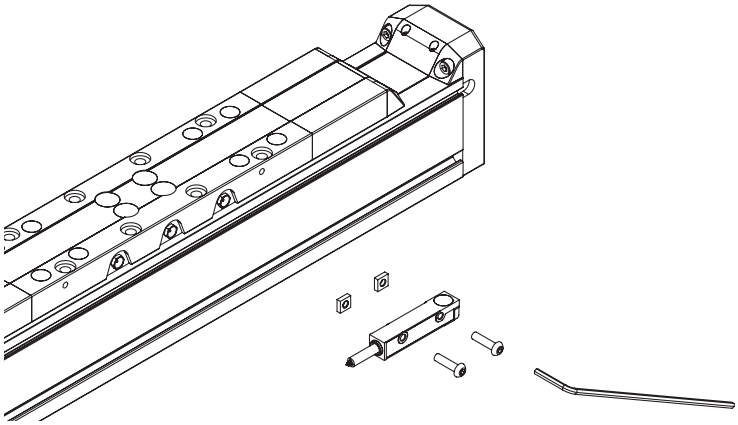


Fig. 6.25 **Mounting the limit switch: HM060S, HM080S, HM120S, HT150S, HT200S, HT250S**

6.4 Mounting the damping element

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

- ▶ Place the damping element at the carriage.
- ▶ Using the enclosed M3 bolts, secure the damping element loosely on the carriage.
- ▶ Align the damping element parallel to the carriage's lower edge.

✓ The damping element has now been pre-installed.

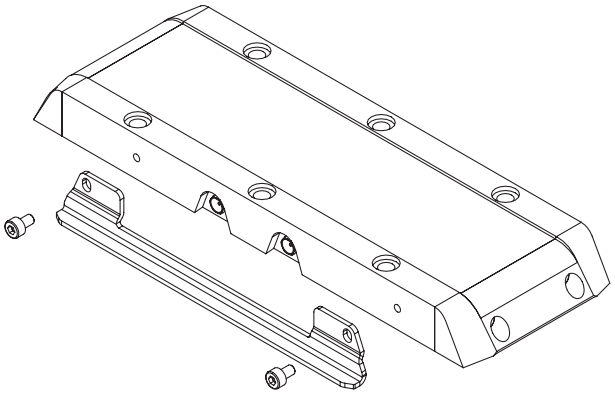


Fig. 6.26 **Mounting the damping element**

6.5 Setting the switching distance

The limit switches are inductive units and need a defined switching distance of 0.8 mm (±0.2 mm) to the damping element.

- Move the carriage until the damping element is above a limit switch. Using a feeler gauge, align the damping element for a switching distance of 0.8 mm (±0.2 mm). Make sure in doing so that the damping element remains parallel to the carriage's lower edge.
- Tighten the bolts for the damping element. The tightening torque is 1 Nm.
- If a second limit switch has been installed: Move the carriage until the damping element is above the second limit switch, and check with a feeler gauge that the switching distance is 0.8 mm (±0.2 mm). Correct where necessary until the switching distance is reached for both limit switches.
- Route the limit switch cable into the lower groove. There the cable is protected under the groove cover. The groove cover is available separately, see Section 12.4.

✓ The switching distance has now been set.

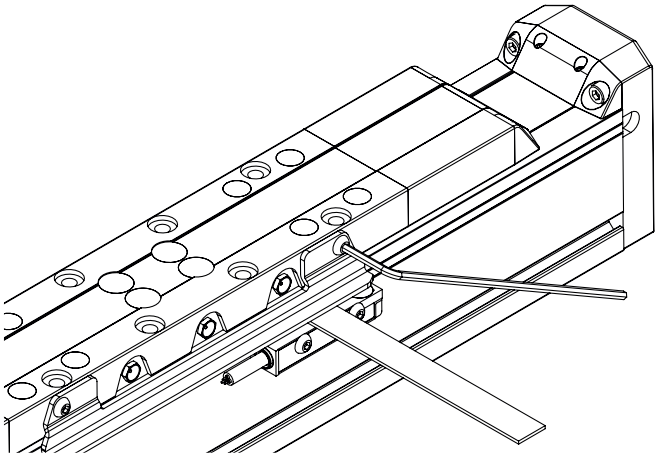


Fig. 6.27 **Setting the switching distance with a feeler gauge, and tightening the bolts**

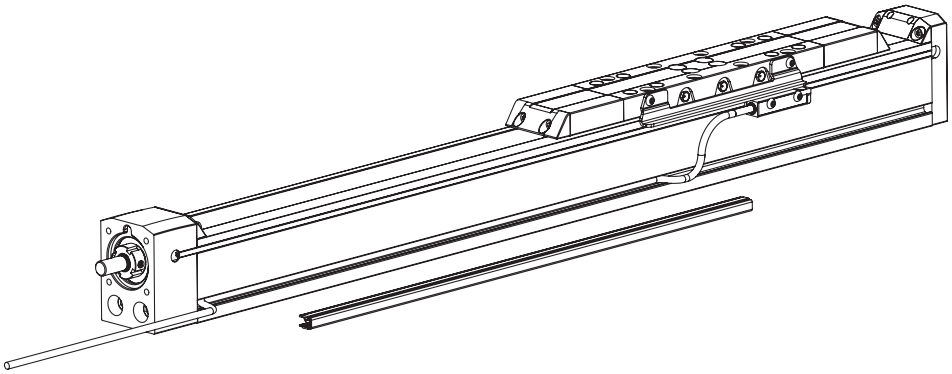


Fig. 6.28 **Mounting the limit switch: Routing the cables**

6.6 Mounting the drive unit on the linear axis HM-S

6.6.1 Assembly of the HM-S coupling components

A suitable coupling assembly is needed for the motor attachment. These can be found in Chapter 11, "Appendix 1: Drive adapter".

The coupling components for the linear axis HM-S consist of:

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

There are two types of clamping hubs:

- Variant 1 with one clamping screw, see Fig. 6.29
- Variant 2 with two clamping screws, see Fig. 6.30

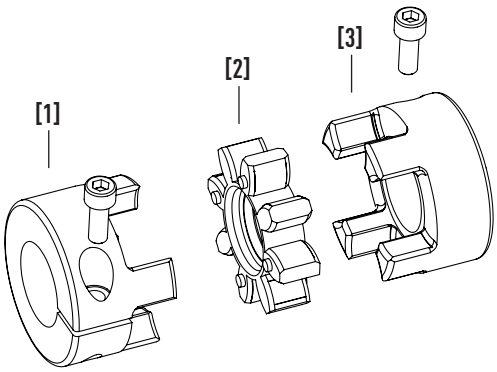


Fig. 6.29 **Coupling assembly variant 1: clamping hubs with one clamping screw**

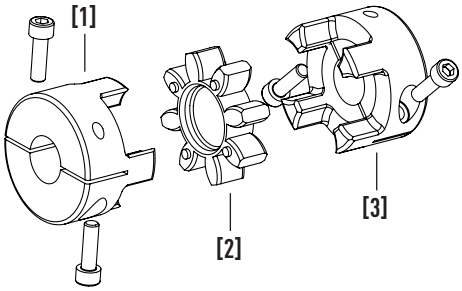


Fig. 6.30 **Coupling assembly variant 2: clamping hubs with two clamping screws**

Please make sure before mounting that

- ➔ no parts are damaged
- ➔ all parts are free of dirt and grease

The tightening torques in Table 6.6 and Table 6.7 must be used for mounting the coupling components:

Table 6.6 **Screw tightening torque 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	2.0 [2)]
HM080S	14.0 [1)]	14.0 [3)]
HM120S	14.0	15.0

[1)] Special version with 24 mm clamping diameter: 10 Nm
[2)] Special version with 16 mm clamping diameter: 3.8 Nm
[2)] Special version with 22 and 24 mm clamping diameter: 10 Nm

Table 6.7 **Screw tightening torque for the coupling housing**

Size	Screw 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

Attaching the coupling assembly:

- Carefully depress the clamping hub on the spindle's journal. The clamping hub must have the following distances (measurement d) from the locknut:

Press carefully the clamping hub on the shaft journal of the spindle until measurement L_1 (see Table 6.8) has been achieved.

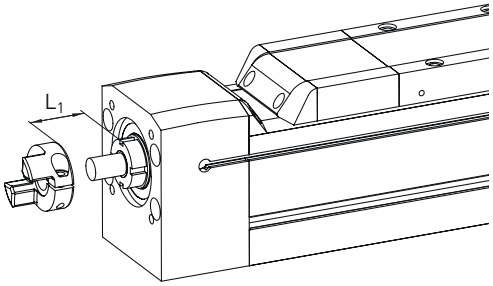


Fig. 6.31 **Attaching the clamping hub to the linear axis HM-S drive journal**

Table 6.8 **Adjusting the distance between clamping hub and locknut based on measurement 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)] Until serial no. HSN 0000000669: L_1 = 3 mm
[2)] Until serial no. HSN 0000002990: L_1 = 5 mm
[3)] Until serial no. HSN 0000004905: L_1 = 0 mm
[4)] Until serial no. HSN 0000002990: L_1 = 0 mm

Variant 1:

- Tighten the bolt on the clamping hub. See Table 6.6 for the tightening torque.

Variant 2:

- First, place the screw on the 1st side on the clamping hub, then tighten the screw on the 2nd side and after that on the 1st side with the tightening torque shown in Table 6.6.

- Depress the elastomer insert into the clamping hub.

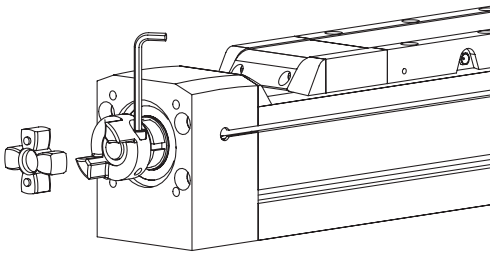


Fig. 6.32 **Tightening the clamping hub and depressing the elastomer insert**

NOTE

The elastomer insert must be lightly preloaded and should have no backlash. A small quantity of PU compatible grease can be applied to the elastomer insert for easier installation.

- Using four bolts, mount the coupling housing KB so that it lies flat. See Table 6.7 for the tightening torques.
- Push the clamping hub onto the elastomer insert until measurement L_2 (see Table 6.9) has been achieved.

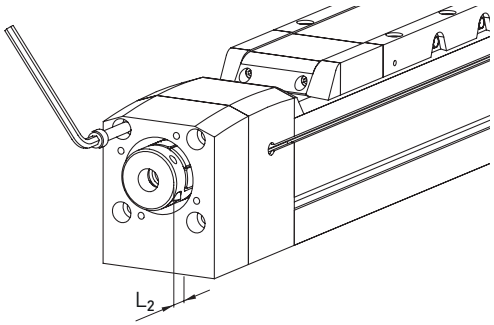


Fig. 6.33 **Mounting the clamping hub and the coupling housing KB on the linear axis HM-S**

Table 6.9 **Adjusting the coupling distance based on measurement 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

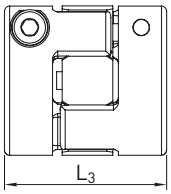


Fig. 6.34 **Total length of HM-S coupling assembly**

NOTE

If the coupling is mounted without a coupling housing, the coupling distance L_3 must be set in accordance with Fig. 6.34 and Table 6.10.

Table 6.10 **Adjusting the coupling distance based on measurement L_2 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

- Attach the motor adapter plate AM so that it lies flat. In doing so, note the position of the hole for the clamping hub's clamping bolt.
- Tighten the four bolts. See Table 6.11 for the tightening torques.

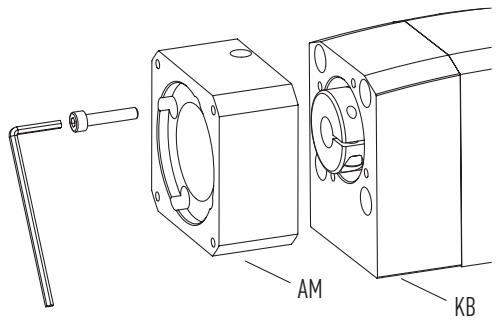


Fig. 6.35 **Mounting the motor adapter plate AM**

Table 6.11 **Tightening torques for the motor adapter plate AM**

Size	Screw 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 against falling.
- Place the motor flat on the motor adapter plate AM.
- Fasten the motor in accordance with the manufacturer's specifications.

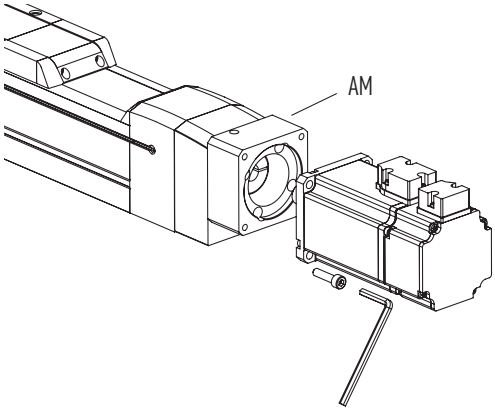


Fig. 6.36 **Bolting the motor to the linear axis HM-S**

NOTE

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

- Remove the seal plug from the hole on the side of the motor adapter plate AM.
- By moving the carriage, shift the clamping hub to the position in which the screw(s) of the clamping hub can be reached through the bore.

Variant 1:

- Tighten the clamping hub's bolt through the bore with the tightening torque shown in Table 6.6.

Variant 2:

- Tighten both screws of the clamping hub one after the other through the bore. First, position the screw on the 1st side, then tighten the screw on the 2nd side and then on the 1st side with the tightening torque shown in Table 6.6.

- Insert the seal plug back in the hole.

✓ The motor has now been installed.

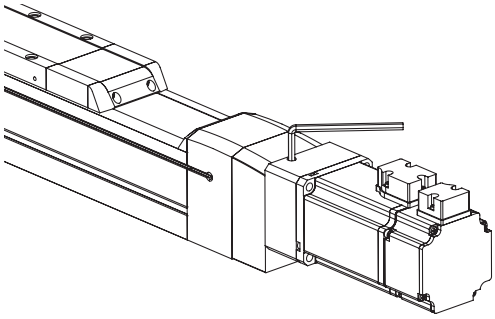


Fig. 6.37 **Tightening the clamping hub on the motor shaft**

6.6.3 Mounting the belt drive

- Align the belt drive housing in the direction you want, and place it flat on the axis drive block.
- Tighten the four bolts. See Table 6.12. for the tightening torques. Secure the bolts.

Table 6.12 **Belt drive housing mounting bolts**

Size	Screw 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

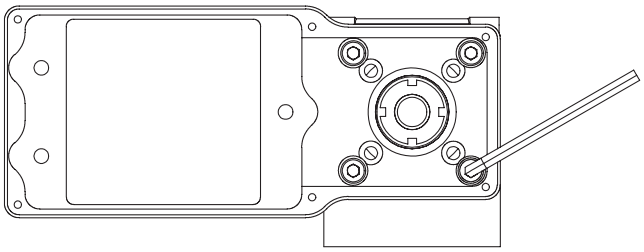
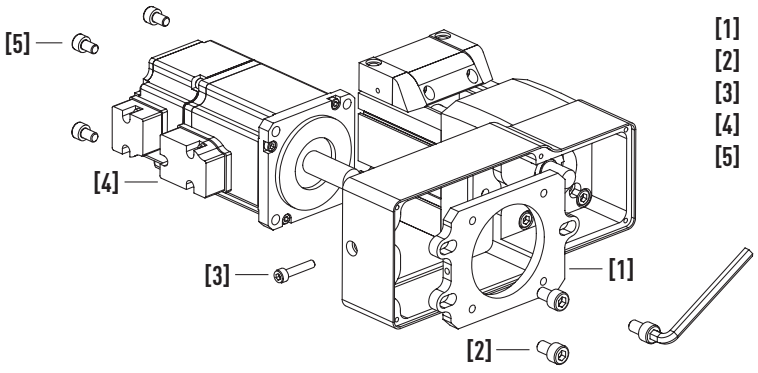


Fig. 6.38 **Mounting the belt drive housing**

- Insert the motor flange **[1]** in the window provided in the housing.
- Tighten loosely the mounting bolts **[2]** for the motor flange.
- Push the motor flange towards the linear axis to the stop.
- Through the hole on the housing's face side, turn the clamping screw **[3]** into the motor flange until the bolt's head lies flat.
- Mount the motor **[4]** through the back of the housing as depicted in Fig. 6.39. The length of the mounting bolts **[5]** for the specific motor must not project by more than 0.5 mm into the housing.

Table 6.13 **Motor flange mounting bolts and clamping bolt**

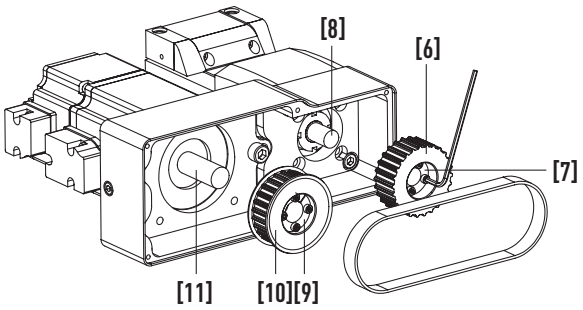
Size	Motor flange mounting bolts				Clamping bolt	
	Strength class	**Thread size × length**	**Number [Pcs.]**	**Screw tightening torque [Nm]**	**Strength class**	**Thread size × length**
HM040S/HM060S	8.8	M6 × 10	3	4	8.8	M4 × 20
HM080S	8.8	M8 × 12	3	8	8.8	M4 × 30
HM120S	8.8	M8 × 16	4	10	8.8	M6 × 25



[1] Motor flange
[2] Motor flange mounting bolts
[3] Clamping bolt
[4] Motor
[5] Motor mounting bolts

Fig. 6.39 **Mounting the motor flange, clamping bolt, and motor**

- Push the clamping set **[7]** for the pulley **[6]** to the stop on the axis side. Push the preassembled unit (clamping set and pulley) on the spindle axis' **[8]** shaft end. Use a feeler gauge to confirm an adequate safety distance (according to Fig. 6.41) between the pulley and the housing.
- Push the clamping set **[9]** for the pulley **[10]** to the stop on the motor side. Attach the preassembled unit (clamping set and pulley) to the motor shaft **[11]**.
- Use the feeler gauge to confirm an adequate safety distance between the pulley's flanged wheel and the motor flange as depicted in Fig. 6.41).
- Working in a criss-cross fashion and in 3 steps, tighten the clamping screws of the clamping sets to the 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 tightening torques specified in Table 6.14 and Table 6.15.
- First place the toothed belt over the motor-side pulley, then over the axis-side pulley.



[6] Axis-side pulley
[7] Axis-side pulley clamping set
[8] Spindle axis shaft end
[9] Motor-side pulley clamping set
[10] Motor-side pulley
[11] Motor shaft

Fig. 6.40 **Mounting the pulleys and toothed belt**

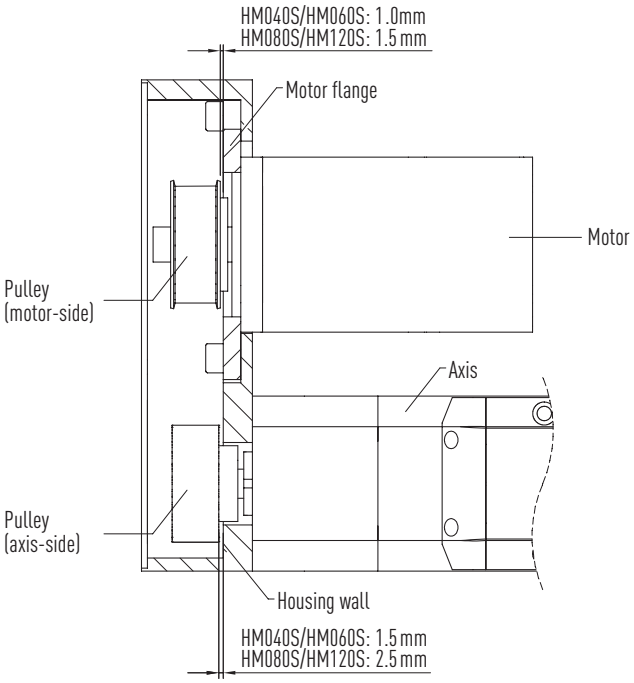


Fig. 6.41 **Safety distances between the pulley's flanged wheel (motor-side) and motor flange and between pulley (motor-side) and housing**

Table 6.14 **Clamping bolt tightening torques for axis side**

Linear axis [mm]	Clamping bolt tightening torque [Nm]
HM040S, HM060S, HM080S	1.2
HM120S	9.7

Table 6.15 **Clamping bolt tightening torques for motor side**

Motor shaft diameter [mm]	Clamping bolt tightening torque [Nm]
6 – 12	1.2
14 – 15	2.1
16 – 19	4.9
20	9.7
22 – 32	17.0

- Make sure that the axes are not under load and the motor is disconnected from the power supply.
- Carefully tighten the clamping bolt **[3]** on the housing's face side until the belt frequency ±10 % calculated with formula F 6.1. This can be measured with a so called Trummeter, or belt tension meter, applied to the inside of the belt as shown in Fig. 6.42. Once the frequency is within the specified range, the mounting bolts **[2]** can be tightened on the motor flange (see Table 6.13). Secure the bolts.
- Again check the preload. Tightening the bolts may change this slightly.

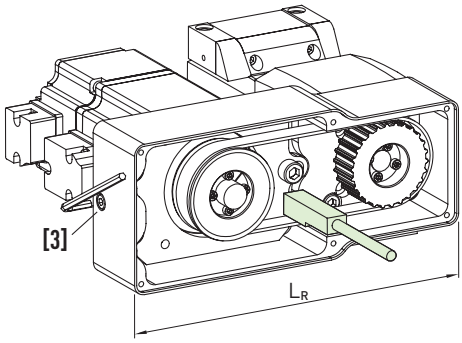


Fig. 6.42 **Setting the belt frequency**

Calculating the belt frequency

F 6.1

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

f Belt frequency [Hz]
M Application-based motor drive torque [Nm]
X Factor for calculating the belt frequency [Nm/Hz^2] (see Table 6.16)

Table 6.16 **Factor for calculating the belt frequency**

Size	Belt drive type [1]	Up to serial no HSN 0000003845		From serial no HSN 0000003846	
		X [Nm/Hz²]	L_R [mm]	X [Nm/Hz²]	L_R [mm]
HM040S	V_1	64	168.5	35	168.5
HM060S	V_1	64	168.5	35	168.5
	V_2	59	198.5	52	201.5
HM080S	V_1	193	236.0	181	236.0
	V_2	244	265.0	229	265.0
HM120S	V_1	1,405	303.5	696	303.5
	V_2	1,193	343.0	887	343.0

[1] The belt drive type depends on the selected motor, see Table 11.1 on Page 75 ff.

- Place the cover plate over the belt drive.
- Apply a tightening torque of 1.0 Nm to the provided M3 × 6 rounded head screws.

✓ The belt drive has now been installed.

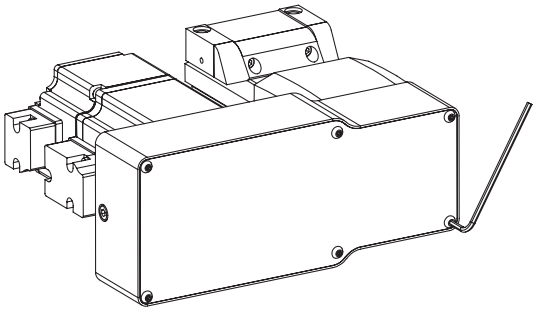


Fig. 6.43 **Mounting the belt drive cover plate**

6.7 Mounting the drive unit on the linear table HT-S

6.7.1 Assembly of the coupling components (HT-S)

A suitable coupling assembly is needed for the motor attachment. These can be found in Section 11.2.4 on Page 86.

The coupling components for the linear table HT-S consist of:

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

There are two types of clamping hubs:

- Variant 1 with one clamping screw, see Fig. 6.44
- Variant 2 with two clamping screws, see Fig. 6.45

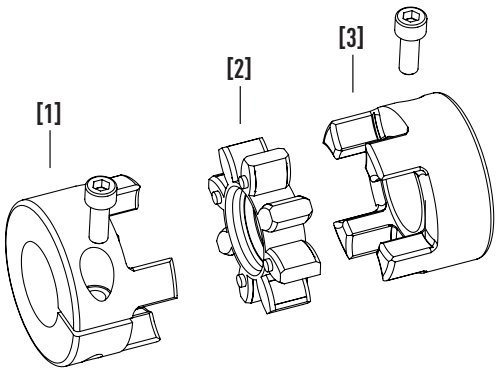


Fig. 6.44 **Coupling assembly variant 1: clamping hubs with one clamping screw**

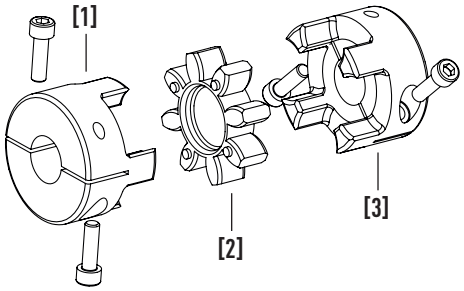


Fig. 6.45 **Coupling assembly variant 2: clamping hubs with two clamping screws**

Please make sure before mounting that

- ➔ no parts are damaged
- ➔ all parts are free of dirt and grease

The tightening torques in Table 6.17 and Table 6.18 must be used for mounting the coupling assembly.

Table 6.17 **Screw tightening torque 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	14.0

[1)] Special version with 24 mm clamping diameter: 10 Nm
[2)] Special version with 20 mm clamping diameter: 3.8 Nm
[3)] Special version with 22 and 24 mm clamping diameter: 10 Nm

Table 6.18 **Screw tightening torque for the coupling housing**

Size	Screw 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

Attaching the coupling assembly:

- Carefully depress the clamping hub on the spindle's journal until measurement L_1 (see Table 6.19) has been achieved.

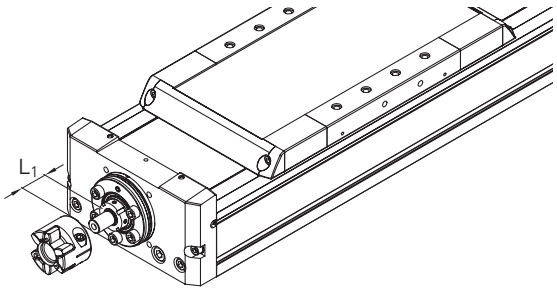


Fig. 6.46 **Attaching the clamping hub to the linear table HT-S drive journal**

Table 6.19 **Adjusting the distance between clamping hub and locknut based on measurement 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 bolt on the clamping hub. See Table 6.17 for the tightening torque.

Variant 2:

- First, place the screw on the 1st side on the clamping hub, then tighten the screw on the 2nd side and after that on the 1st side with the tightening torque shown in Table 6.17.

- Depress the elastomer insert into the clamping hub.

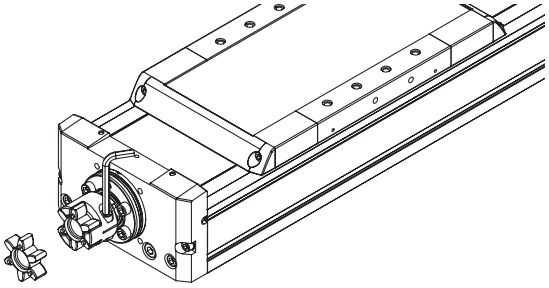


Fig. 6.47 **Tightening the clamping hub and depressing the elastomer insert (HT150S, HT200S)**

The elastomer insert must be lightly preloaded and should have no backlash. A small quantity of PU compatible grease can be applied to the elastomer insert for easier installation.

NOTE

- Using four bolts, mount the coupling housing KB so that it lies flat. See Table 6.18 for the tightening torques.
- Push the clamping hub onto the elastomer insert until measurement L_2 (see Table 6.20) has been achieved.

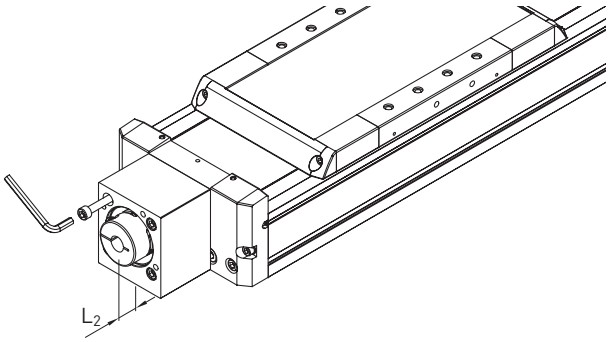


Fig. 6.48 **Mounting the clamping hub and the coupling housing KB on the linear table HT-S**

Table 6.20 **Adjusting the coupling distance based on measurement 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

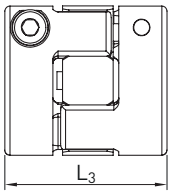


Fig. 6.49 **Total length of coupling assembly (HT-S)**

NOTE

If the coupling is mounted without a coupling housing, the coupling distance L_2 must be set in accordance with Fig. 6.49 and Table 6.21.

Table 6.21 **Adjusting the coupling distance based on measurement L_2 when there is no coupling housing**

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

6.7.2 Mounting the motor

- Attach the motor adapter plate AM so that it lies flat. In doing so, note the position of the hole for the clamping hub's clamping bolt.
- Tighten the four bolts. See Table 6.22 for the tightening torques.

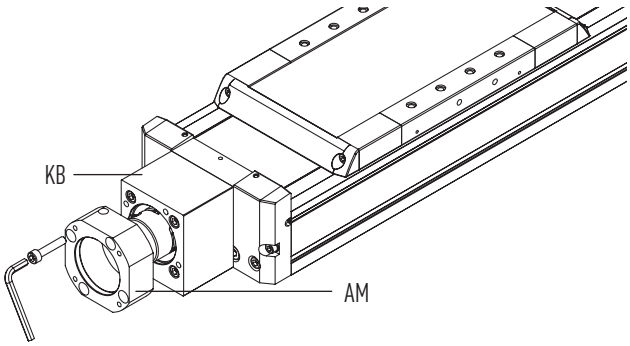


Fig. 6.50 **Mounting the motor adapter plate AM**

Table 6.22 **Tightening torques for the motor adapter plate AM**

Size	Screw 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 against falling.
- Place the motor flat on the motor adapter plate AM.
- Fasten the motor in accordance with the manufacturer's specifications.

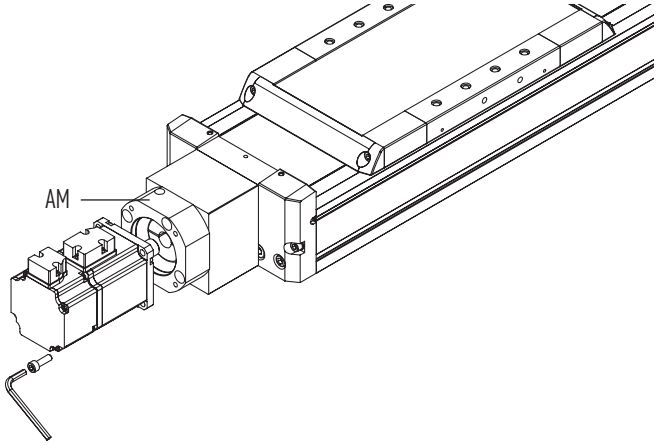


Fig. 6.51 **Bolting the motor to the linear table HT-S**

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

- Remove the seal plug from the hole on the side of the motor adapter plate AM.
- By moving the carriage, shift the clamping hub to the position in which the screw(s) of the clamping hub can be reached through the bore.

Variant 1:

- Tighten the clamping hub's bolt through the bore with the tightening torque shown in Table 6.17.

Variant 2:

- Tighten both screws of the clamping hub one after the other through the bore. First, position the screw on the 1st side, then tighten the screw on the 2nd side and then on the 1st side with the tightening torque shown in Table 6.17.

- Insert the seal plug back in the hole.

✓ The motor has now been installed.

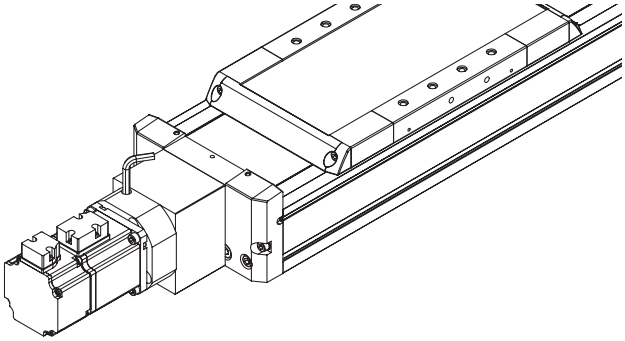


Fig. 6.52 **Tightening the clamping hub on the motor shaft**

6.7.3 Mounting the belt drive

- Align the belt drive housing in the direction you want, and place it flat on the axis drive block.
- Tighten the four bolts. See Table 6.23 for the tightening torques. Secure the bolts.

Table 6.23 **Belt drive housing mounting bolts**

Size	Screw 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

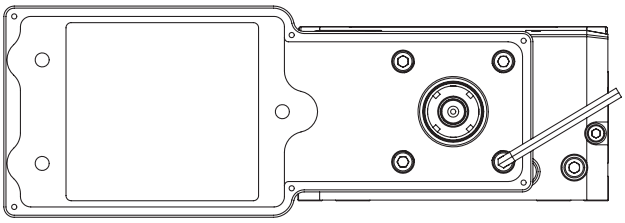
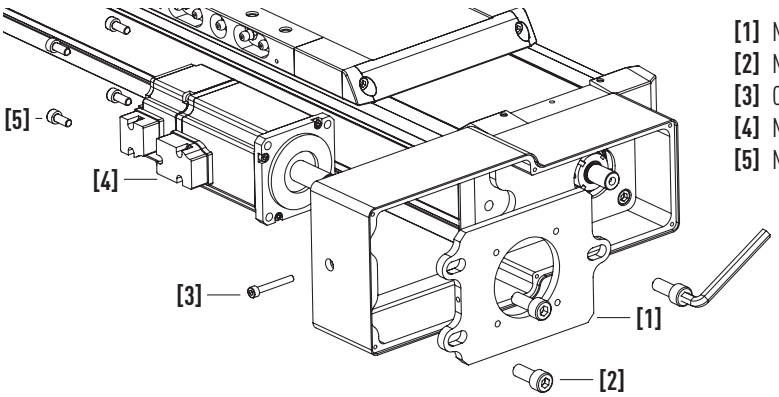


Fig. 6.53 **Mounting the belt drive housing**

- Insert the motor flange **[1]** in the window provided in the housing.
- Tighten loosely the mounting bolts **[2]** for the motor flange.
- Push the motor flange towards the linear axis to the stop.
- Through the hole on the housing's face side, turn the clamping screw **[3]** into the motor flange until the bolt's head lies flat.
- Mount the motor **[4]** through the back of the housing as depicted in Fig. 6.54. The length of the mounting bolts **[5]** for the specific motor must not project by more than 0.5 mm into the housing.

Table 6.24 **Motor flange mounting bolts and clamping bolt**

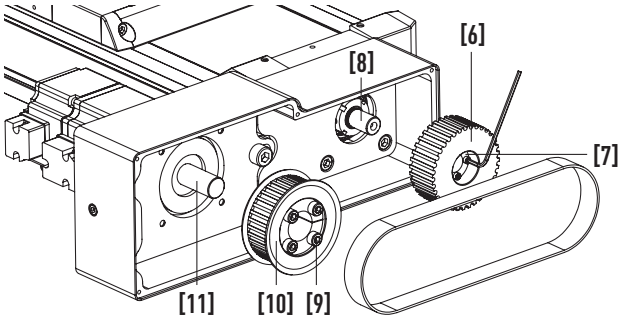
Size	Motor flange mounting bolts				Clamping bolt	
	Strength class	**Thread size × length**	**Number [Pcs.]**	**Screw tightening torque [Nm]**	**Strength class**	**Thread size × length**
HT100S	8.8	M6 × 12	3	10	8.8	M4 × 20
HT150S	8.8	M8 × 20	3	24	8.8	M4 × 30
HT200S	8.8	M8 × 20	3	24	8.8	M4 × 30
HT250S	8.8	M8 × 25	4	24	8.8	M6 × 25



[1] Motor flange
[2] Motor flange mounting bolts
[3] Clamping bolt
[4] Motor
[5] Motor mounting bolts

Fig. 6.54 **Mounting the motor flange, clamping bolt, and motor**

- Push the clamping set **[7]** for the pulley **[6]** to the stop on the axis side. Push the preassembled unit (clamping set and pulley) on the spindle axis' **[8]** shaft end. Use a feeler gauge to confirm an adequate safety distance (according to Fig. 6.56) between the pulley and the housing.
- Push the clamping set **[9]** for the pulley **[10]** to the stop on the motor side. Attach the preassembled unit (clamping set and pulley) to the motor shaft **[11]**.
- Use the feeler gauge to confirm an adequate safety distance between the pulley's flanged wheel and the motor flange as depicted in Fig. 6.56.
- Working in a criss-cross fashion and in 3 steps, tighten the clamping screws of the clamping sets to the 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 tightening torques specified in Table 6.25 and Table 6.26.
- First place the toothed belt over the motor-side pulley, then over the axis-side pulley.



[6] Axis-side pulley
[7] Axis-side pulley clamping set
[8] Spindle axis shaft end
[9] Motor-side pulley clamping set
[10] Motor-side pulley
[11] Motor shaft

Fig. 6.55 **Mounting the pulleys and toothed belt**

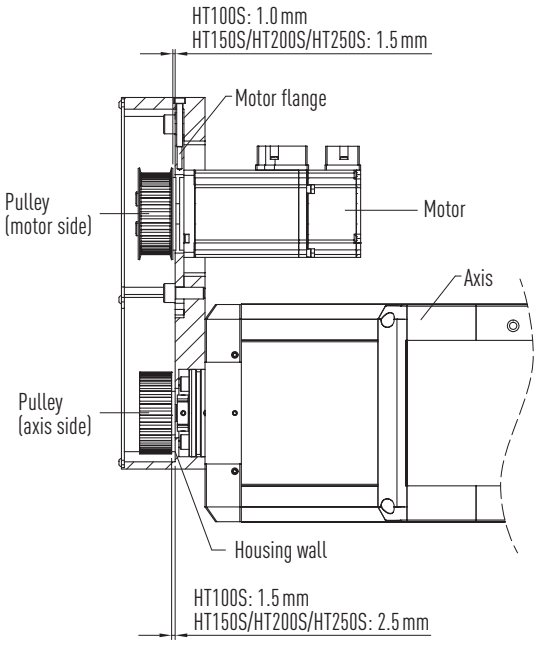


Fig. 6.56 **Safety distances between the pulley's flanged wheel (motor-side) and motor flange and between pulley (motor-side) and housing**

Table 6.25 **Clamping bolt tightening torques for axis side**

Size	Clamping bolt tightening torque [Nm]
HT100S, HT150S	1.2
HT200S	4.9
HT250S	9.7

Table 6.26 **Clamping bolt tightening torques for motor side**

Motor shaft diameter [mm]	Clamping bolt tightening torque [Nm]
6 – 12	1.2
14 – 15	2.1
16 – 19	4.9
20	9.7
22 – 32	17.0

- Make sure that the axes are not under load and the motor is disconnected from the power supply.
- Carefully tighten the clamping bolt **[3]** on the housing's face side until the belt frequency ±10 % calculated with formula F 6.2. This can be measured with a so called Trummeter, or belt tension meter, applied to the inside of the belt as shown in Fig. 6.57. Once the frequency is within the specified range, the mounting bolts **[2]** can be tightened on the motor flange (see Table 6.24). Secure the bolts.
- Again check the preload. Tightening the bolts may change this slightly.

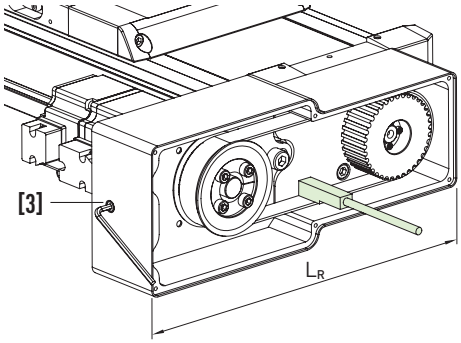


Fig. 6.57 **Setting the belt frequency**

Calculating the belt frequency

F 6.2

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

f Belt frequency [Hz]
M Application-based motor drive torque [Nm]
X Factor for calculating the belt frequency [Nm/Hz²] (see Table 6.27)

Table 6.27 **Factor for calculating the belt frequency**

Size	Belt drive type [1]	X [Nm/Hz²]	L_R [mm]
HT100S	V_1	53	186.5
	V_2	80	225.5
HT150S	V_1	243	255.5
	V_2	317	289.5
HT200S	V_1	317	279.5
	V_2	390	311.0
HT250S	V_1	1,196	348.7
	V_2	1,600	400.2

[1] The belt drive type depends on the selected motor, see Table 11.1 on Page 75 ff.

- Place the cover plate over the belt drive.
- Apply a tightening torque of 1.0 Nm to the provided M3 × 6 rounded head screws.

✓ The belt drive has now been installed.

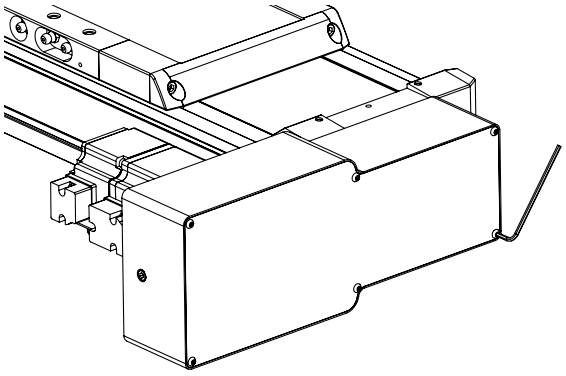


Fig. 6.58 **Mounting the belt drive cover plate**

6.8 Electrical connection

⚠ DANGER!

Danger from electrical voltage!
If motors are incorrectly earthed, there is a danger of electric shock.
- Before connecting the electrical power supply, ensure that the linear axis is correctly earthed via the PE rail in the switch cabinet!

⚠ DANGER!

Danger from electrical voltage!
Electrical currents may flow even if the motor is not moving.
- Ensure that the linear axis is disconnected from the power supply before the electrical connections are detached from the motors!
- After disconnecting the drive amplifier from the power supply, wait at least 5 minutes before touching live parts or breaking connections!
- For safety reasons, measure the voltage in the intermediate circuit and wait until it has fallen below 40 V!
- Only qualified personnel may work on electrical installations!

6.8.1 Connecting the limit switches

The pin assignment of the limit switch connector for variant A is shown in Fig. 6.60. For variants C and D (order codes: linear modules HM-S on Page 12, linear tables HT-S on Page 15) with open cable ends, the wires must be connected according to Fig. 6.59.

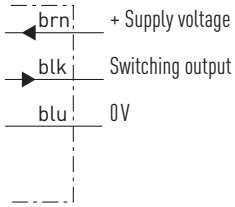
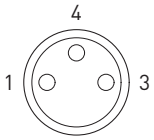


Fig. 6.59 **Connection diagram**



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

Fig. 6.60 **Pin assignment of limit switch plug**

The sensor is operated at a low voltage, so there is not normally any risk of injuries or fatalities from this alone. **NOTE**

Do not operate the sensor with a voltage other than the one specified. This can destroy it. **NOTE**

6.8.2 Connection external distance measuring system for HM-S and HT-S

The distance measuring system HIWIN MAGIC is located on the side of the carriage. 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 moving) is given according to the definitions in Fig. 6.61 and Fig. 6.62.

If a positive counting direction in the opposite direction is desired, "A" must be exchanged with "B" and "Ā" with "B̄" when connecting to the electronic evaluation system.

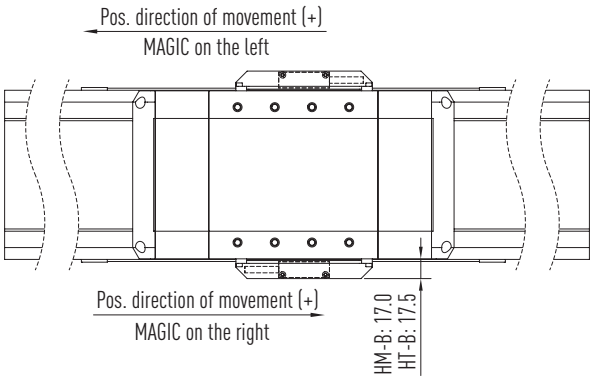


Fig. 6.61 **Distance measuring system MAGIC – linear axes HM-S and HT-S**

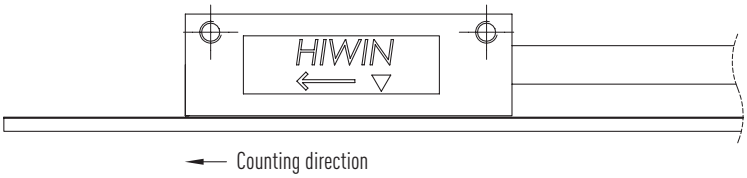


Fig. 6.62 **Detailed view of positive direction of movement of the MAGIC encoder**

Table 6.28 **Cable and connector assignments**

Colour of the encoder cable	Signal
Brown	5 V power supply
White	GND / 0 V
Green	V1+ / A
Yellow	V1– / Ā
Blue	V2+ / B
Red	V2– / B̄
Purple	Ref+ / Z
Grey	Ref– / Z̄
	Shielding

Further information can be found in the assembly instructions "HIWIN MAGIC Distance Measuring Systems"

6.8.3 Connecting the motor

NOTE

Details on the motor's connections can be found in its operating instructions!

6.8.4 Connecting the drive amplifier

NOTE

Details on the drive amplifier's connections can be found in its operating instructions!

7. Maintenance and cleaning

⚠ WARNING!

Danger of impacts and crushing!
If the carriage is moved or started unintentionally, injuries may result!
- When installing a vertical linear axis, provide support for the carriage during downtimes!
- Controller design complying with DIN EN 12100. No start after:
  – power connected, reinstated!
  – troubleshooting!
  – machine stop!

⚠ WARNING!

Risk of injury and material damage!
Unauthorised work on the system creates the risk of injuries and may invalidate the warranty.
- Only qualified personnel may assemble, install, and service the system!

⚠ CAUTION!

Tilting linear axes can cause crushing injuries!
- Secure machinery and machine parts against tilting!

⚠ CAUTION!

Falling axis or detached imposed load can cause impact and crushing injuries!
Danger from high loads!
- Use suitable hoisting gear!
- Secure the linear axis as described in the assembly instructions (see Section 6.1)!
- Secure the imposed load as described in the assembly instructions (see Section 6.2)!

⚠ CAUTION!

Danger of impacts 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 the applicable occupational health and safety regulations!
- Transport to the installation site only by qualified personnel!

⚠ CAUTION!

Warning! Electric shock or burns by contact with live parts!
Contact with live parts can result in injuries.
If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.
- Controller design complying with DIN EN 12100. No start after:
  – power connected, reinstated!
  – troubleshooting!
  – machine stop!
- Only qualified personnel may install cabling!
- Only qualified personnel may work on electrical installations!

ATTENTION!

Warning! Health and environmental hazards!
Contact with lubricants may cause irritation, poisoning, allergic reactions, and damage to the environment.
- Use only suitable, non-hazardous agents. Note the manufacturer's safety data sheets!
- Ensure proper disposal!

ATTENTION!

Damage from wrong lubricant!
Using a wrong lubricant can cause damage to property and pollute the environment.
- Use the correct lubricant type (grease, oil) as specified in these assembly instructions!

During maintenance:
- Secure the linear axis against being switched on without authorisation.
- Disconnect the power supply of the linear axis.
- Secure the linear axis against being switched back on without authorisation.

NOTE

The cleaning and lubrication intervals must be observed without fail.
- **Include these maintenance intervals in your maintenance schedule.**

7.1 Lubrication

Linear axis operations consume lubricant on a continuous basis. The product must be relubricated at regular intervals. Bear in mind that small quantities of lubricant can exit the lubrication system.

The following factors affect the lubrication intervals:
- Dust and dirt
- Operating temperatures
- Loads
- Vibration stress
- Permanently short positioning distances
- Rotary speeds

NOTE

Inadequate lubrication or the wrong lubricant increases wear and reduces the service life.

7.1.1 Linear axis HM-S lubrication

The linear axis HM-S includes a linear guideway with two blocks and a ballscrew that are initially lubricated prior to delivery. Relubrication is introduced through three grease nipples each on both sides of the carriage. The outer grease nipples are used to lubricate the blocks, the middle one the ballscrew.

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

Size	Block	Lubricant	Relubrication quantity [cm³]
HM040S	MGN15	Klüber ISOFLEX TOPAS AK 50	0.50
HM060S	QE15	G04	0.55
HM080S	QH20	G04	0.70
HM120S	QH30	G04	0.75

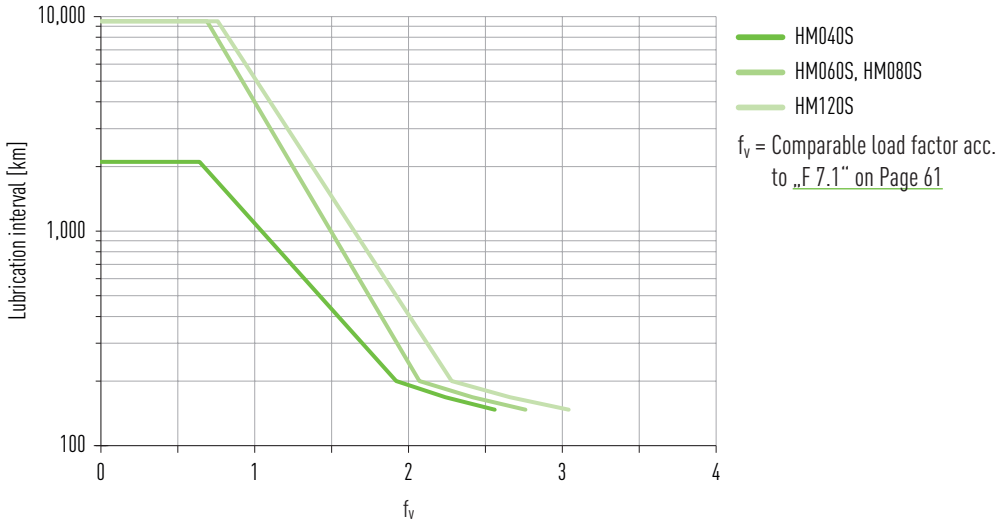


Fig. 7.1 **Load-dependent relubrication intervals for linear guideways of the linear axes HM-S**

Table 7.2 **Lubrication interval for the ballscrew**

Size	Spindle diameter [mm]	Spindle lead [mm]	Lubricant	Relubrication quantity [cm³]	Running performance [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	

The relubrication intervals can possibly be shortened under the following conditions. In such cases, please consult HIWIN: v > 3 m/s, a > 30 m/s², contact with media, temperatures < 20 °C or > 30 °C, soiled ambient conditions.

7.1.2 Linear table HT-S lubrication

The linear table HT-S includes two linear guideways with two blocks each and a ballscrew that are initially lubricated prior to delivery. Relubrication is introduced through five grease nipples on the side of the carriage. The outer grease nipples are used to lubricate the blocks, the middle one the ballscrew.

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

Size	Block	Lubricant	Relubrication quantity [cm³]
HT100S	QE15	G04	0.55
HT150S	QE15	G04	0.55
HT200S	QH20	G04	0.70
HT250S	QH25	G04	0.75

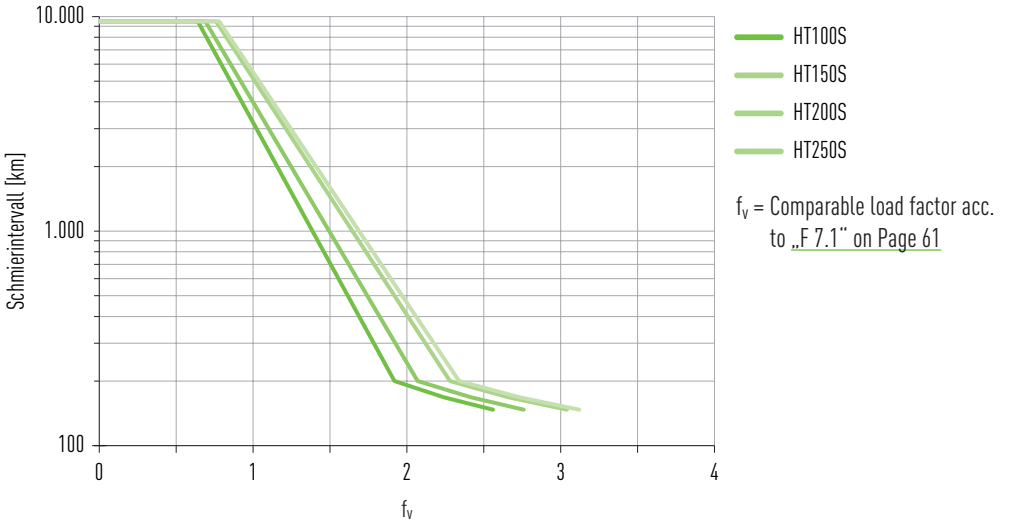


Fig. 7.2 **Load-dependent relubrication intervals for linear guideways of the linear tables HT-S**

Table 7.4 **Lubrication interval for the ballscrew**

Size	Spindle diameter [mm]	Spindle lead [mm]	Lubricant	Relubrication quantity [cm³]	Running performance [km]
HT100S	16	5	G04	1.15	100
		10		1.20	
		16		1.66	
HT150S	20	5	G04	1.20	100
		10		1.40	
		20		2.50	
HT200S	25	5	G04	1.55	100
		10		1.80	
		25		2.10	
HT250S	32	10	G04	3.30	100
		20		4.50	
		32		4.65	

The relubrication intervals can possibly be shortened under the following conditions. In such cases, please consult HIWIN: v > 3 m/s, a > 30 m/s², contact with media, temperatures < 20 °C or > 30 °C, soiled ambient conditions.

7.1.3 Calculating the comparable load factor f_v

In the case of combined loads from multiple forces and torques, the comparable load factor f_v is calculated with the 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	Comparable load factor
F_y	Force acting along the Y axis [N]
F_z	Force acting along the Z axis [N]
M_x	Torque acting around the X axis [Nm]
M_y	Torque acting around the Y axis [Nm]
M_z	Torque acting around the Z axis [Nm]
$F_{ydynmax}$	Maximum dynamic force along the Y axis [N]
$F_{zdynmax}$	Maximum dynamic force along the Z axis [N]
$M_{xdynmax}$	Maximum dynamic torque acting around the X axis [Nm]
$M_{ydynmax}$	Maximum dynamic torque acting around the Y axis [Nm]
$M_{zdynmax}$	Maximum dynamic torque acting around the Z axis [Nm]

7.1.4 Lubrication procedure

NOTE **Use only lubricants that are in accordance with DIN 51825, KP2K of the consistency class NGLI2!**

NOTE **Ensure that only lubricants without solid lubricant particles (e.g. graphite or MoS2) are used!**

NOTE **For vertical installation, the relubricant quantity is increased by approx. 50 %.**

NOTE **Under special operating conditions (soiling, short stroke, installation type), the lubrication intervals must be adjusted from case to case.**

NOTE **In the linear modules HM-S each lube point features two grease nipples, one each on the left and right of the carriage. Relubrication can then be introduced on the left or right side of the carriage.**

NOTE **The linear tables HT-S have five grease nipples on the right side of the carriage, which are used to lubricate all four carriages and the ballscrew.**

Example lubrication of the linear guideway:

- Move the carriage to an arbitrary position.
- Apply the nozzle at right angles to a lube point on the side.
- Press the nozzle manually against the grease nipple.
- Discharge the required quantities of lubricant from the grease gun (see Table 7.1, Table 7.2, Table 7.3 and Table 7.4).
- Repeat the process for all lube points on this carriage side.

✓ The linear guideway has been lubricated.

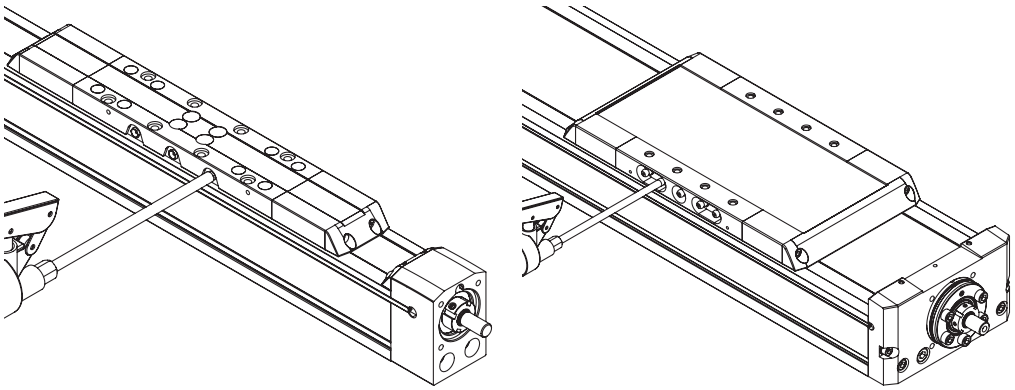


Fig. 7.3 **Example lubrication of a linear module HM-S (left) and a linear table HT-S (right)**

7.1.5 HIWIN lubricants

The grease type G04 is recommended for the linear axis. HIWIN can also offer you a suitable grease gun with matching adapter (see Section 12.15).

7.2 Cleaning the linear axis

⚠ WARNING!

Danger of cutting injuries!
Installing or removing the cover strip may cause cutting injuries.
- Only qualified personnel wearing appropriate protective equipment (gloves, goggles) may be assigned to commissioning and setup!

ATTENTION!

Warning! Health and environmental hazards!
Contact with lubricants may cause irritation, poisoning, allergic reactions, and damage to the environment.
- Use only suitable, non-hazardous agents. Note the manufacturer's safety data sheets!
- Ensure proper disposal!

Thanks to their layout and optional cover strips, linear axes HM-S/HT-S are insensitive to penetration by contaminants and foreign particles. Nevertheless, the linear axis must be examined and its outside cleaned at regular intervals.

Note the following points when cleaning:
- ➔ Do not use compressed air.
- ➔ The surface is anodised and therefore only partially resistant to alkaline cleaning agents. Only neutral cleaning agents may be used for cleaning.
- ➔ Regularly remove coarse particles from the surface. Ideal is a moistened, soft, and lint free cleaning cloth.
- ➔ The cover strip is exposed to friction and therefore abrasion. Remove the abrasion particles regularly.

7.3 Replacing the cover strip

7.3.1 Replacing 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 sealing is no longer guaranteed.
- Undo the clamping screw 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 pieces from both ends of all carriages (see Fig. 7.8).
- Undo the cover strip deflection 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 screws.
- 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 screws of the cover strip clamp (see Fig. 7.9 and Fig. 7.10).
- Move the carriages to both end positions and check that the cover strip is seated correctly. If necessary, loosen the cover strip clamp screws again, realign the cover strip and then retighten the screws.

✓ The new cover strip has been mounted.

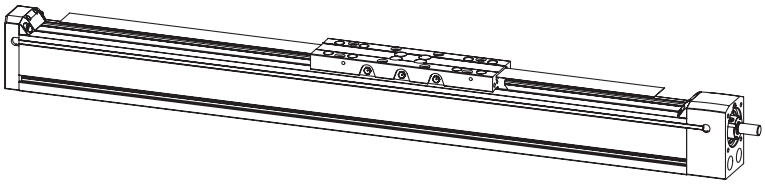


Fig. 7.4 **Installing the cover strip in the carriage**

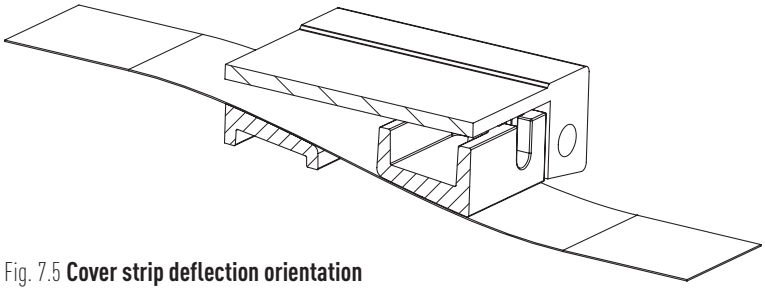


Fig. 7.5 **Cover strip deflection orientation**

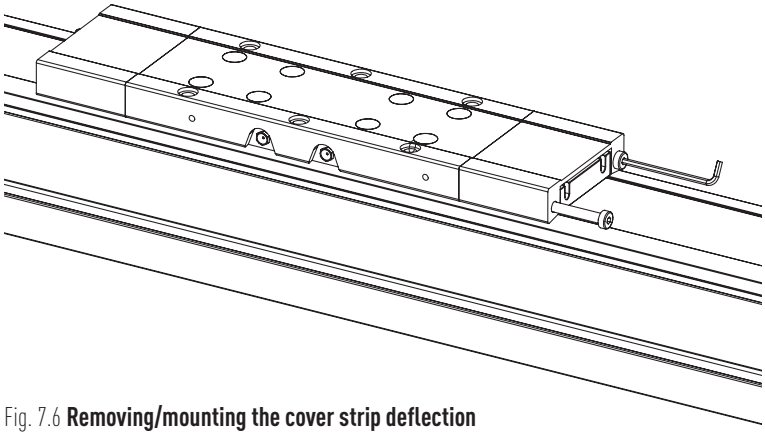


Fig. 7.6 **Removing/mounting the cover strip deflection**

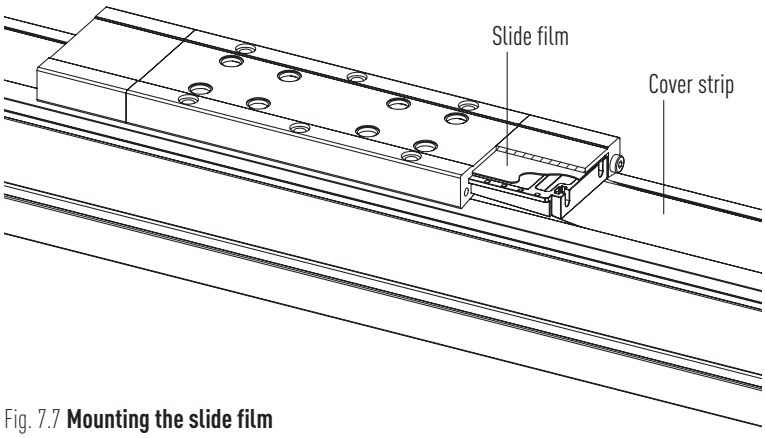


Fig. 7.7 **Mounting the slide film**

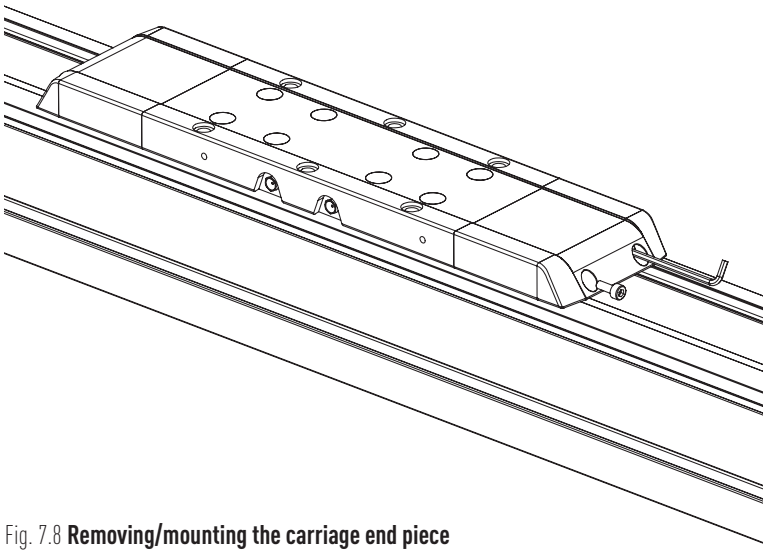


Fig. 7.8 **Removing/mounting the carriage end piece**

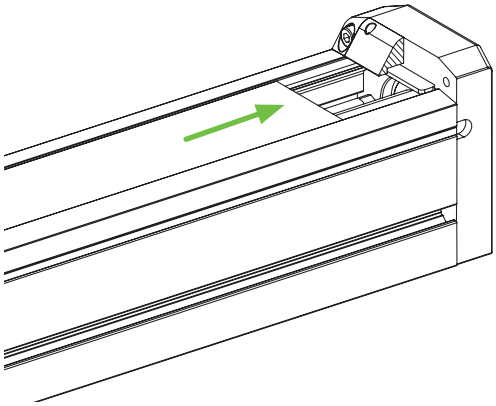


Fig. 7.9 **Installing the cover strip in the cover strip clamp on the and linear module HM-S**

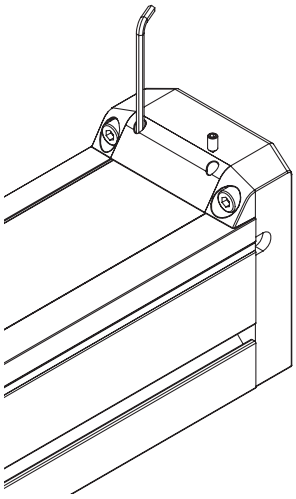


Fig. 7.10 **Installing/removing the cover strip clamp on/from the linear module HM-S**

Table 7.5 **Screws for the cover strip deflection**

Size	Screw 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 the carriage end piece**

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

7.3.2 Replacing 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 sealing is no longer guaranteed.

- Undo the clamping screw 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 pieces from both ends of all carriages (see Fig. 7.15).
- Remove the carriage cover by pushing it out of the carriage profile (see Fig. 7.11).
- Undo the cover strip deflection mounting screws. 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 to remove any dirt from the cover strip clamp, carriage end piece, cover strip deflection, cover strip guide and carriage cover (e.g. with ethanol).
- If necessary, replace the cover strip guides on the top of the carriage profile and the bottom 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.
- Lay the cover strip on the magnetic strip of the axis base profile and guide it over the carriage profile (see Fig. 7.14).
- Center the cover strip.
- Mount the cover strip deflection on both sides of the carriage as shown in Fig. 7.12.
- Center the cover strip deflection.
- Hand-tighten the cover strip deflection screws.
- Mount the carriage cover by inserting 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 screws.
- 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 screws of the cover strip clamp (see Fig. 7.16 and Fig. 7.17).
- Move the carriages to both end positions and check that the cover strip is seated correctly. If necessary, loosen the cover strip clamp screws again, realign the cover strip and then retighten the screws.

✓ The new cover strip has been mounted.

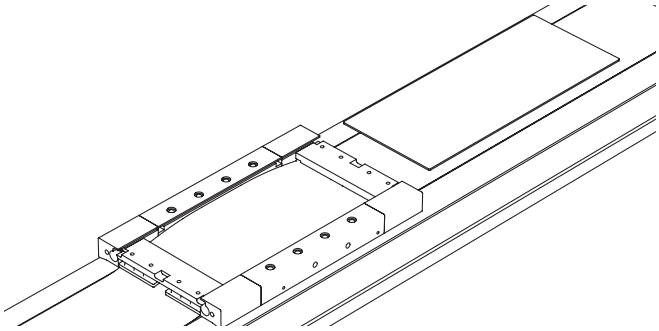


Fig. 7.11 **Removing/mounting the carriage cover**

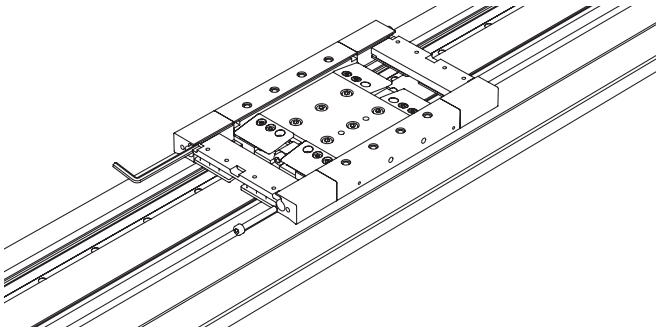


Fig. 7.12 **Removing/mounting the cover strip deflection**

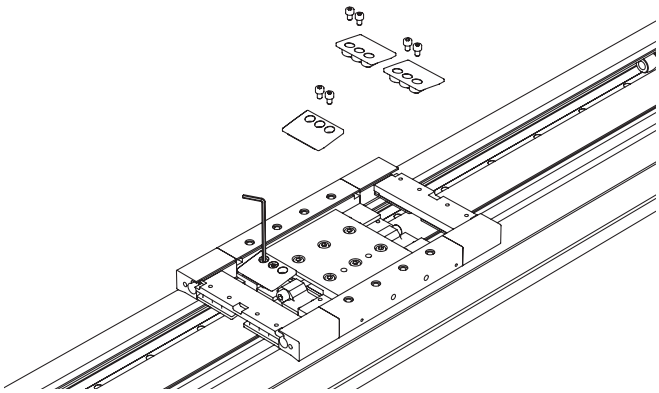


Fig. 7.13 **Removing/mounting the cover strip guide**

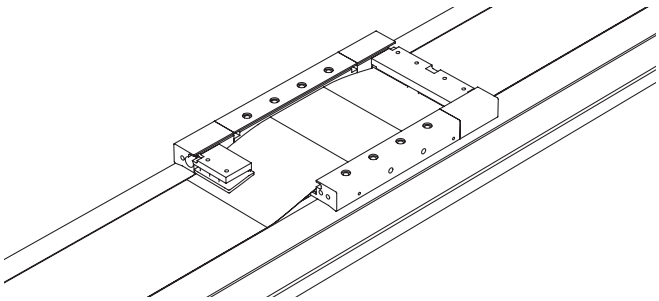


Fig. 7.14 **Guiding the cover strip**

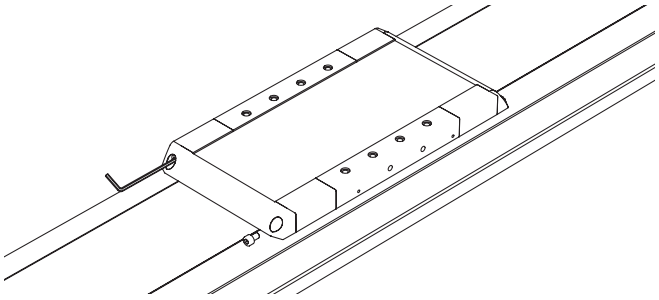


Fig. 7.15 **Removing/mounting the carriage end piece**

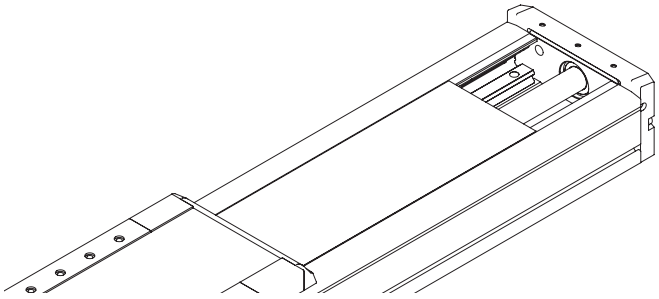


Fig. 7.16 **Mounting the cover strip under the cover strip clamp**

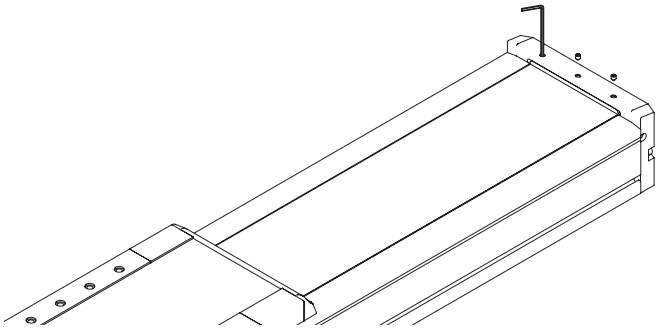


Fig. 7.17 **Removing/mounting the cover strip clamp**

7.4 Visual examination of electrical componentry

⚠ CAUTION!

Warning! Electric shock or burns by contact with live parts!
Contact with live parts can result in injuries.
If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Controller design complying with DIN EN 12100. No start after:
  - power connected, reinstated!
  - troubleshooting!
  - machine stop!
- Only qualified personnel may install cabling!
- Only qualified personnel may work on electrical installations!

8. Faults

8.1 Linear axis malfunctions

⚠ CAUTION!

Danger of impacts 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).

- Isolating protective equipment must be provided for linear axis operations!
- When installing a vertical linear axis, provide support for the carriage during downtimes!

⚠ CAUTION!

Warning! Electric shock or burns by contact with live parts!
Contact with live parts can result in injuries.
If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.

- Controller design complying with DIN EN 12100. No start after:
  - power connected, reinstated!
  - troubleshooting!
  - machine stop!
- Only qualified personnel may install cabling!
- Only qualified personnel may work on electrical installations!

Table 8.1 **Table of linear module HM-S and linear table HT-S malfunctions**

Fault	Possible cause	Remedy
Carriage not moving	Coupling slipping	Check that coupling assembled correctly; check and if necessary correct tightening torques on clamping bolts
	Ballscrew catching or seizing	Send axis to HIWIN for repair
	Load too high	Reduce load or drive acceleration
Carriage backlash and inaccurate positioning	Guiding or drive element backlash after a collision or from extreme effects (impacts, peak loads, etc.) from outside	Send axis to HIWIN for repair
Programmed absolute position changing	Coupling slipping	Check and if necessary correct clamping bolt torques on coupling elements; check and if necessary reduce maximum transferred drive torque
Limit switch not working	Switching distance too large	Adjust switching distance to correct value
	Limit switch defect or cable break	Replace limit switch
	Signal not arriving at controller	Check input line to controller
Noise and vibrations at high speeds	Speed too high, or overcritical spindle axis speed	Reduce speed
	Tensions in the system	Install axis free of tension; check flatness of bearing surface and attached load
	Wrong drive controller settings	Retune, and adjust controller settings to the application conditions
Noise generated by guiding mechanisms	Lack of lubricant	Relubricate
	Damage to guiding mechanisms, e.g. as a result of extreme impact on the carriage or extreme contamination	Send axis to HIWIN for repair

Table 8.1 **Table of linear module HM-S and linear table HT-S malfunctions (continuation)**

Fault	Possible cause	Remedy
Motor load rising, controller shutting down owing to overload	Tensions in the system or lack of lubrication	Install axis free of tension; check flatness of bearing surface and attached load. Relubricate axis
	Heavy contamination on the axis and internal guiding mechanisms	Clean axis, reinstate free movement of guiding and drive elements

8.2 Motor malfunctions

For interpretation of faults and information on how to remedy them, see the motor's operating instructions.

8.3 Faults during operation with drive amplifier

For interpretation of faults and information on how to remedy them, see the drive's operating instructions.

9. Disassembly

⚠ DANGER!

Danger from electrical voltage!
Before and during assembly, disassembly and repair work, dangerous currents may flow.
- Work may only be carried out by a qualified electrician and with the power supply disconnected!
- Before carrying out work on the linear axes, disconnect the power supply and protect it from being switched back on!

⚠ WARNING!

Danger of impacts and crushing!
If the carriage is moved or started unintentionally, injuries may result!
- When installing a vertical linear axis, provide support for the carriage during downtimes!
- Controller design complying with DIN EN 12100. No start after:
  – power connected, reinstated!
  – troubleshooting!
  – machine stop!

⚠ WARNING!

Risk of crushing from carriages!
Danger of injury from crushing and damage to the linear axes caused by movement of the carriage due to gravity, as the axes do not feature brakes in their standard version.
- Make sure that the carriage is secured against uncontrolled movement during downtimes!

⚠ WARNING!

Danger of cutting injuries!
Installing or removing the cover strip may cause cutting injuries.
- Only qualified personnel wearing appropriate protective equipment (gloves, goggles) may be assigned to commissioning and setup!

⚠ WARNING!

Danger from suspended loads or falling parts!
Lifting heavy loads may damage your health!
- Only qualified personnel may assemble, install, and service the linear axes!
- Note the mass when transporting the parts. Use suitable hoisting gear!
- Observe the applicable occupational health and safety regulations when handling suspended loads!
- Hoist the linear axes only at the designated points!
- Secure machinery and machine parts against tilting!

⚠ CAUTION!

Danger of impacts 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 the applicable occupational health and safety regulations!
- Transport to the installation site only by qualified personnel!

⚠ CAUTION!

Warning! Electric shock or burns by contact with live parts!
Contact with live parts can result in injuries.
If the customer installs cables incorrectly, the constant motion inside the energy chain can cause chafing and expose the electrical contact points.
- Controller design complying with DIN EN 12100. No start after:
  – power connected, reinstated!
  – troubleshooting!
  – machine stop!
- Only qualified personnel may install cabling!
- Only qualified personnel may work on electrical installations!

⚠ CAUTION!

Tilting linear axes can cause crushing injuries!

- Secure machinery and machine parts against tilting!

ATTENTION!

Warning! Health and environmental hazards!

Contact with lubricants may cause irritation, poisoning, allergic reactions, and damage to the environment.

- Use only suitable, non-hazardous agents. Note the manufacturer's safety data sheets!
- Ensure proper disposal!

Disassembly steps:

- Disconnect the linear axis from its power supply.
- Unscrew and remove the moved loads.
- Secure moving parts (e.g. carriage) against uncontrolled movements.
- Unscrew and remove the linear axis.

✓ The linear axis has now been disassembled.

10. Disposal

ATTENTION!

Warning! Health and environmental hazards!
Contact with lubricants may cause irritation, poisoning, allergic reactions, and damage to the environment.
- Use only suitable, non-hazardous agents. Note the manufacturer's safety data sheets!
- Ensure proper disposal!

Table 10.1 **Disposal**

Fluids	
Lubricants	Dispose of as hazardous waste in an environmentally friendly way
Soiled cleaning cloths	Dispose of as hazardous waste in an environmentally friendly way
Linear axis	
Cabling, electrical components	Dispose of as electrical waste
PP components (e.g. energy chain)	Dispose of separately
Steel components (e.g. profile rail)	Dispose of separately
Aluminium components (e.g. profile, synchronous shaft)	Dispose of separately

11. Appendix 1: Drive adapter

Our products are constantly subjected to technical changes and improvements. Please always quote the serial numbers of your linear axes when ordering replacement parts, accessories, and parts without article numbers. This will ensure that you receive the correct parts. The serial number can be found on the axis' type plate.

11.1 Motor adapter of the linear modules HM-S and the linear tables HT-S

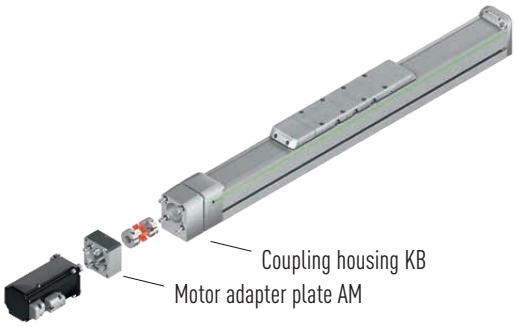
The drive adapter on the linear modules HM-S and the linear tables HT-S is a two-part structure that simplifies the process of flange-mounting any standard motor.

The flange type set consists of the following components:

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

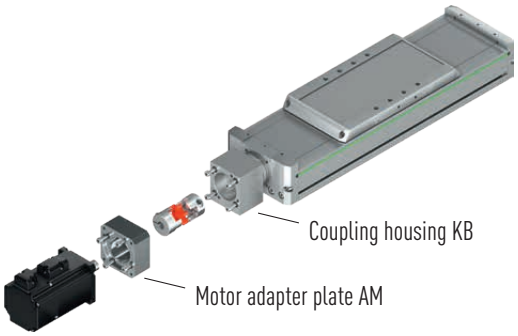
Section 11.2 lists the dimensions for the coupling housing, motor adapter plate, and belt drive.

Motor adapter of the linear axes HM-S/HT-S without belt drive



Motor adapter plate AM: Axis–motor adapter

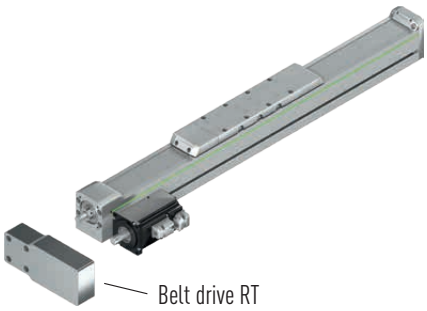
Fig. 11.1 **Motor adapter of the linear modules HM-S without belt drive**



Motor adapter plate AM: Axis–motor adapter

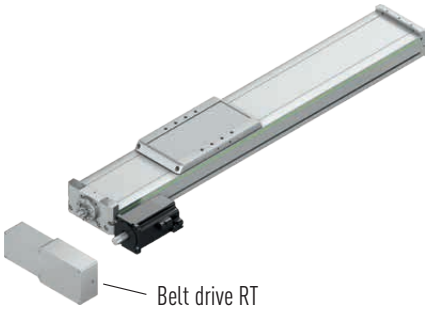
Fig. 11.2 **Motor adapter of the linear tables HT-S without belt drive**

Motor adapter of the linear axes HM-S/HT-S with belt drive



Belt drive RT: For deflecting the drive through 180°

Fig. 11.3 **Motor adapter of the linear modules HM-S with belt drive**



Belt drive RT: For deflecting the drive through 180°

Fig. 11.4 **Motor adapter of the linear tables HT-S with belt drive**

Table 11.1 **Order code for 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							
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]				BR12 [2]
	8LSN55				BR12 [2]				

[1] Possible belt drive V_1
[2] Possible belt drive V_2
[3] See order codes on Page 12 for linear modules HM-S and on Page 15 for linear tables HT-S

Table 11.1 **Order code for flange type[3] – linear modules HM-S and linear tables HT-S (continuation)**

Drive Manufacturer/type		Linear module HM-S				Linear table HT-S			
		HM040S	HM060S	HM080S	HM120S	HT100S	HT150S	HT200S	HT250S
		Motor only							
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]
	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]

[1] Possible belt drive V_1
[2] Possible belt drive V_2
[3] See order codes on Page 12 for linear modules HM-S and on Page 15 for linear tables HT-S

Table 11.1 **Order code for flange type[3] – linear modules HM-S and linear tables HT-S (continuation)**

Drive Manufacturer/type		Linear module HM-S				Linear table HT-S			
		HM040S	HM060S	HM080S	HM120S	HT100S	HT150S	HT200S	HT250S
		Motor only							
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]
	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]
	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 codes on Page 12 for linear modules HM-S and on Page 15 for linear tables HT-S

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

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

- Adapter materials (coupling housing KS, motor adapter plate AM)
- Belt drive RT
- Motor

Linear axis without belt drive

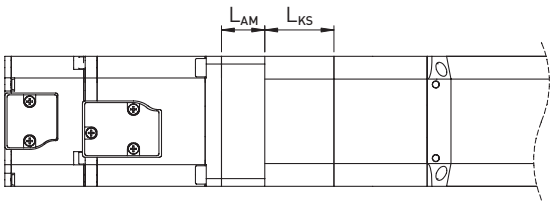


Fig. 11.5 **Motor connection of linear modules HM-S without belt drive**

L_{KS} Length of coupling housing, see Table 11.2
L_{AM} Motor adapter plate length, see Table 11.3

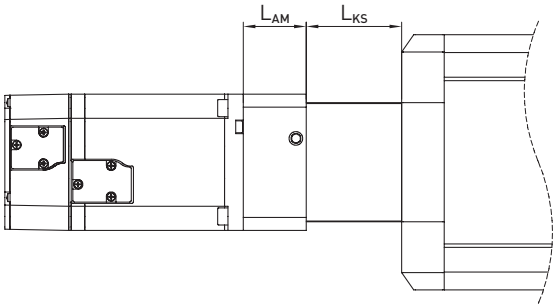


Fig. 11.6 **Motor connection of linear tables HT-S without belt drive**

L_{KS} Length of coupling housing, see Table 11.2
L_{AM} Motor adapter plate length, see Table 11.4

Linear axis with belt drive

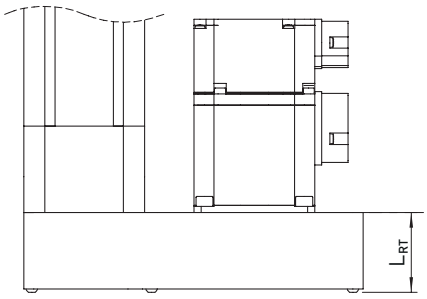


Fig. 11.7 **Motor connection of linear modules HM-S with belt drive**

L_{RT} Belt drive length, see Table 11.5

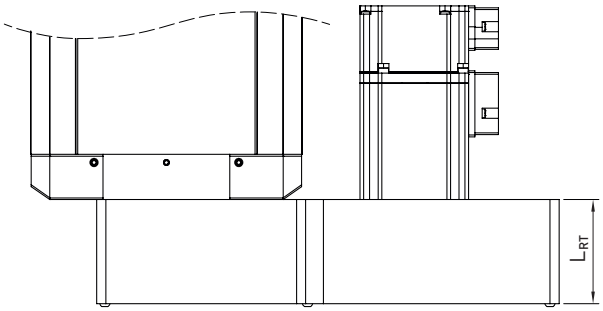


Fig. 11.8 **Motor connection of linear tables HT-S with belt drive**

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

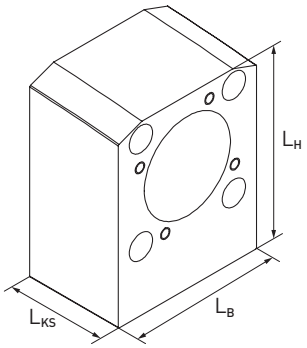


Fig. 11.9 **Coupling housing KS for linear modules HM-S**

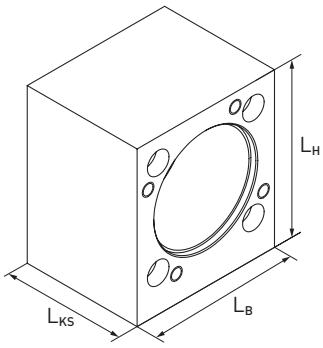


Fig. 11.10 **Coupling housing KS for linear tables HT-S**

Table 11.2 **Dimensions of coupling housing KS for linear modules 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

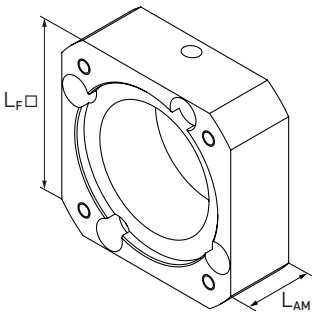


Fig. 11.11 **Motor adapter plate AM for linear modules HM-S and linear tables HT-S**

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	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	B&R	8LSA24, 8LSA25	58	25.0	25-000403
		8LSA33, 8LSA34, 8LSA35	82	31.0	25-000411
	Beckhoff	AM8022D, AM8022E, AM8023E, AM8023F	55	22.0	25-000402
		AM8031D, AM8031F, AM8531D, AM8531F	70	31.0	25-000407
	Bosch	MSK030B, MSK030C	54	22.0	25-000401
		MSK040B, MSK040C	82	31.0	25-000405
	Lenze	MCS06F41, MCS06F60, MCS06I41, MCS06I60	62	25.0	25-000406
		MCS09D41, MCS09D60	82	31.0	25-000411
	Schneider	BSH0551, BSH0552	55	22.0	25-000402
		BSH0701, BSH0702, BMH0701, BMH0702	62	25.0	25-000406
	SEW	CMP40S, CMP40M	54	22.0	25-000401
		CMP50S	62	25.0	25-000406
	Siemens	1FK7022	55	22.0	25-000402
		1FK7032, 1FK7034	72	31.0	25-000408

Table 11.3 **Motor adapter plate AM for linear modules HM-S (continuation)**

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HM080S	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
	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	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

Table 11.3 **Motor adapter plate AM for linear modules HM-S (continuation)**

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HM120S	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	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	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

Table 11.4 **Motor adapter plate AM for linear tables HT-S (continuation)**

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HT150S	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	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
	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	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

Table 11.4 **Motor adapter plate AM for linear tables HT-S (continuation)**

Linear axis	Manufacturer	Motors	L_F [mm]	L_{AM} [mm]	Article number
HT250S	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

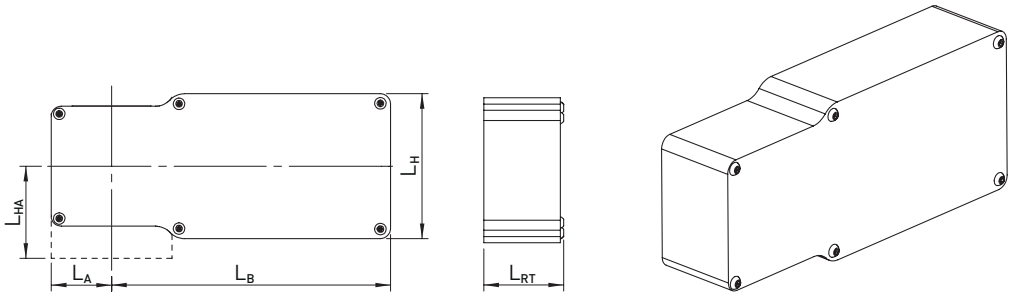


Fig. 11.12 **Belt drive for linear modules HM-S and linear tables HT-S**

Table 11.5 **Belt drive specifications**

Linear axis	Type [1]	L_H	L_B	L_{RT}	L_A	L_{HA}	Ratio
HM040S	V_1	72	138.5	40	30.0	36.25	1
HM060S	V_1	72	138.5	40	30.0	45.80	1
	V_2	102	171.5	40	30.0	45.80	1
HM080S	V_1	102	197.0	51	39.0	61.40	1
	V_2	131	226.0	61	39.0	61.40	1
HM120S	V_1	175	248.5	63	55.0	89.00	1
	V_2	175	288.0	73	55.0	89.00	1
HT100S	V_1	74	157.0	43	29.5	31.00	1
	V_2	102	196.0	43	29.5	31.00	1
HT150S	V_1	102	217.0	60	38.5	43.00	1
	V_2	131	251.0	70	38.5	43.00	1
HT200S	V_1	100	237.0	61	42.5	51.00	1
	V_2	131	268.5	71	42.5	51.00	1
HT250S	V_1	135	298.0	73	50.7	52.00	1
	V_2	175	349.5	83	50.7	52.00	1

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

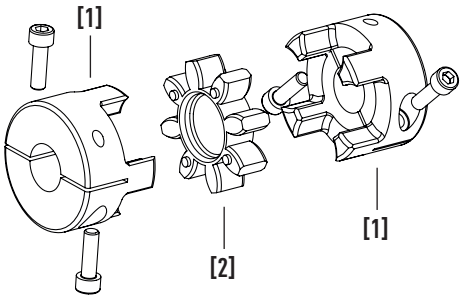
Please bear in mind that the belt drive projects over the lower axis edge when: **NOTE**

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

Please bear in mind that the belt drive may project over the side of the axis when: **NOTE**

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

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



[1] Clamping hub (one for axis side, one for motor side)
[2] Elastomer insert

Fig. 11.13 **Coupling components for linear modules HM-S and linear tables HT-S**

Clamping hub
Motor- and axis-side coupling element.

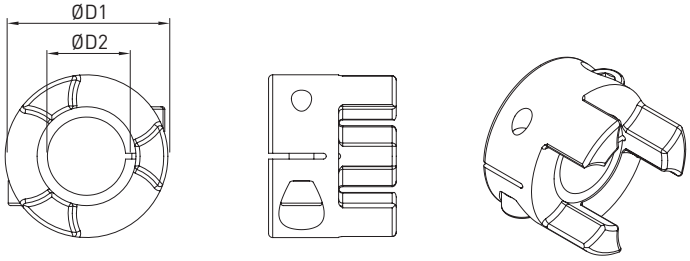


Fig. 11.14 **Clamping hub for linear modules HM-S and linear tables HT-S**

Table 11.6 **Article numbers and specifications for clamping hub**

Size	Type	Ø D1 [mm]	Ø D2 [mm]	Thread size and length	Screw tightening torque [Nm]	Inertia torque [Nm]	Friction grip 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
			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	3.8	2.55	25.6	25-002402

Table 11.6 **Article numbers and specifications for clamping hub (continuation)**

Size	Type	Ø D1 [mm]	Ø D2 [mm]	Thread size and length	Screw tightening torque [Nm]	Inertia torque [Nm]	Friction grip torque [Nm]	Article number
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

Elastomer insert

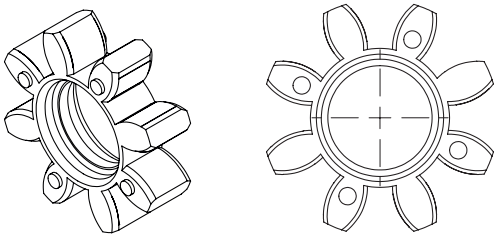


Fig. 11.15 **Elastomer insert for linear modules HM-S and linear tables HT-S**

Table 11.7 **Article number for elastomer insert**

Linear axis	Type	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 constantly subjected to technical changes and improvements. Please always quote the serial numbers of your linear axes when ordering replacement parts, accessories, and parts without article numbers. This will ensure that you receive the correct parts. The serial number can be found on the axis' type plate.

12.1 Clamping profiles

Clamping profiles are devices for installing the linear axis to the machine frame from above. The clamping profiles can be swivelled into the sides of the axis' profile groove. The required number of clamping profiles depends on the axis length and the load. It can be found in Sections 6.1.5 (HM-S) and 6.1.6 (HT-S). Sets are available with four clamping profiles.

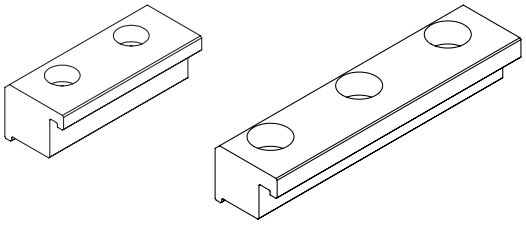


Fig. 12.1 **Short and long clamping profiles**

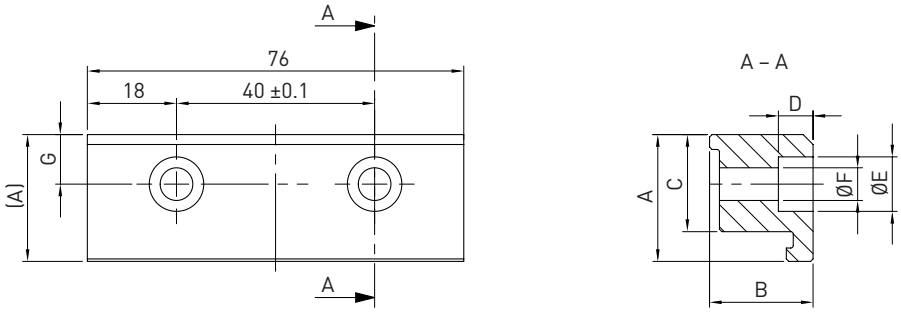


Fig. 12.2 **Dimensional drawing of short clamping profile**

Table 12.1 **Article numbers and dimensions for short clamping profiles**

Suitable for linear axis	Type	A	B	C	D	Ø E	Ø F	G	Suitable screw	Article number, 4 pcs.
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

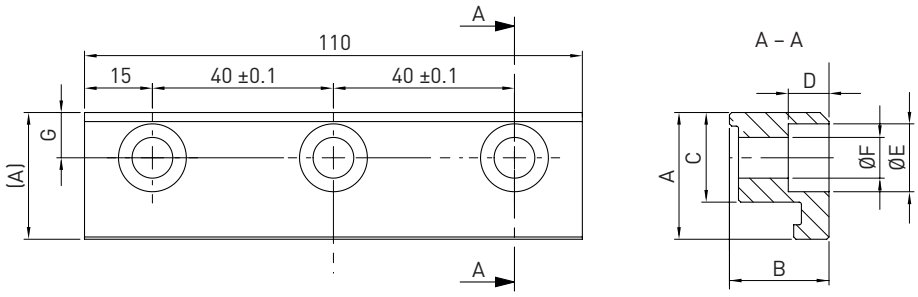


Fig. 12.3 **Dimensional drawing of long clamping profile**

Table 12.2 **Article numbers and dimensions for long clamping profiles**

Suitable for linear axis	Type	A	B	C	D	Ø E	Ø F	G	Suitable screw	Article number, 4 pcs.
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 the frictional connection of the linear axis. Flexible fastening options through the grooves on the side and on the bottom of the axis profile. The required number of T nuts depends on the axis length and the load. It can be found in Sections 6.1.3 (HM-S) and 6.1.4 (HT-S). Sets are available with ten T nuts.

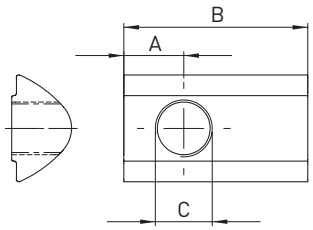


Fig. 12.4 **Dimensional drawing of T nut**

Table 12.3 **Article numbers and dimensions for T nuts**

Suitable for linear axis	Type	A	B	C	Article number, 10 pcs.
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 that are inserted in the carriage's mounting holes for precise, repeatable load bearing. Sets are available with ten centring sleeves.

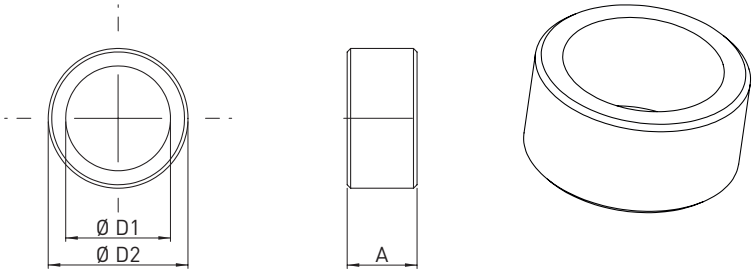


Fig. 12.5 **Dimensional drawing of centring sleeve**

Table 12.4 **Article numbers and dimensions for centring sleeves**

Suitable for linear axis	A	Ø D1	Ø D2	Article number, 10 pcs.
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

Cover for the fastening groove. Length: 2 m. Sets are available with five groove covers.

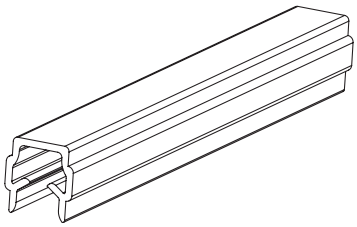


Fig. 12.6 **Groove cover for linear modules HM-S and linear tables HT-S**

Table 12.5 **Article numbers for groove covers**

Suitable for linear axis	Type	Article number, 5 pcs.
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 limit switch as NC or NO contact. A screw (M3 × 12) and nut (DIN EN ISO 4035) is necessary to fix the sensor to the axis profile. The limit switch is supplied as standard with plug or open cable end. Set including mounting material.

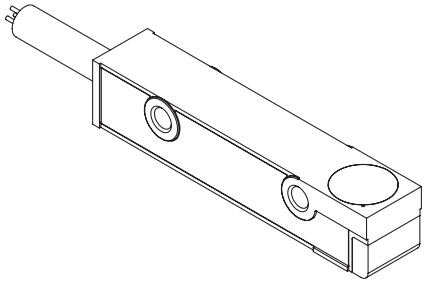


Fig. 12.7 **Limit switch for linear modules HM-S and linear tables HT-S**

Table 12.6 **Limit switch options**

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

For more information see Section 4.4 on Page 17.

NOTE

12.6 Extension cable for limit switch

Cable with 3-pin M8 round connector on the limit switch side and exposed wires on the other cable end.

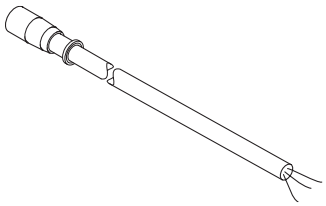


Fig. 12.8 **Extension cable for limit switch**

Table 12.7 **Extension cable for limit switch**

Length [m]	Max. cable diameter d [mm]	Min. bending radius static [mm]	Min. bending radius dynamic [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 needed to switch the limit switches at both of the carriage's end positions (at stroke 0 and stroke max). It can be attached on the left and right of the carriage. Set incl. fasteners.

Article number linear modules HM-S: 25-000785
Article number linear tables HT-S: 25-001031

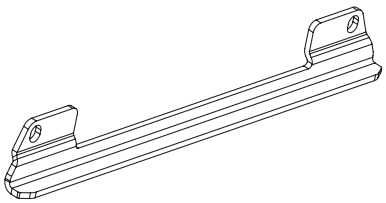


Fig. 12.9 **Damping element for linear modules HM-S and linear tables HT-S**

12.8 Distance measuring system HIWIN MAGIC

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

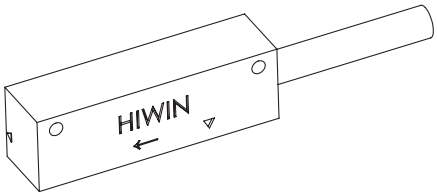


Fig. 12.10 **HIWIN MAGIC encoder**

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 18

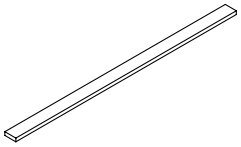


Fig. 12.11 **HIWIN MAGIC magnetic scale**

Table 12.9 **MAGIC magnetic scale**

Magnetic scale	Order code
MAGIC magnetic scale	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.

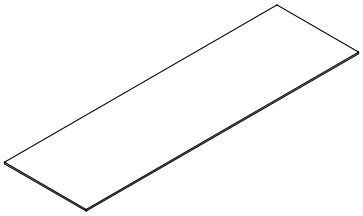


Fig. 12.12 **Cover strip**

Table 12.10 **Article numbers for cover strip**

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 holds down the cover strip and is available in a length of 7.5 m.

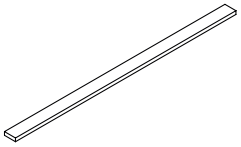


Fig. 12.13 **Magnetic strip**

Table 12.11 **Article numbers for magnetic strip**

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 Cover strip deflection for linear modules HM-S

The cover strip deflection set consists of the following parts:
2 cover strip deflections, each with
2 × deflector housing
2 × cover strip guide
4 × cylinder-head screw
4 × square nut (not applicable to HM040S)

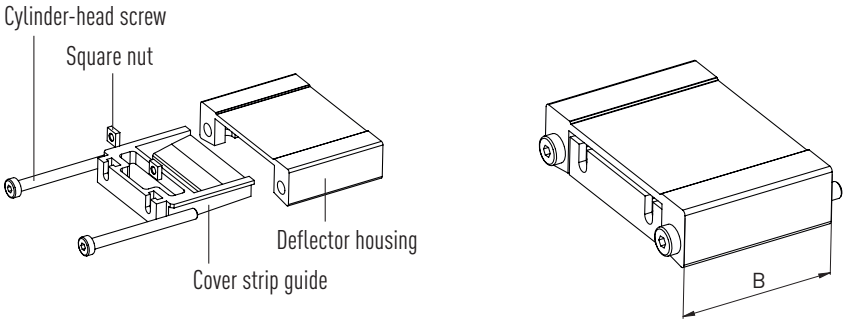


Fig. 12.14 **Cover strip deflection dimensions**

Table 12.12 **Cover strip deflection set article numbers**

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

12.12 Cover strip deflection for linear tables HT-S

The cover strip deflection set consists of the following parts:
8 × cover strip guide
16 × cylinder-head screw

Each carriage requires one cover strip deflection set.

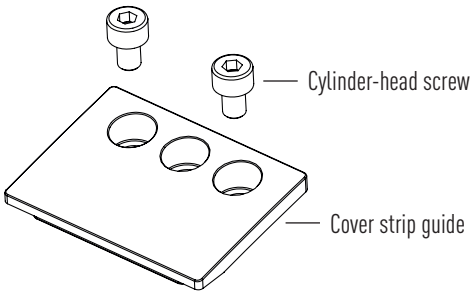


Fig. 12.15 **Cover strip deflection for linear tables HT-S**

Table 12.13 **Cover strip deflection set article numbers**

Suitable for linear table	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

12.13 Buffer stop

The buffer stop serves as a mechanical limit.

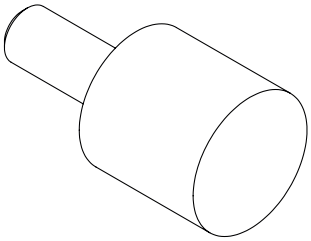


Fig. 12.16 **Buffer stop**

Table 12.14 **Article numbers for buffer stop**

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

12.14 Toothed belt for belt drive RT

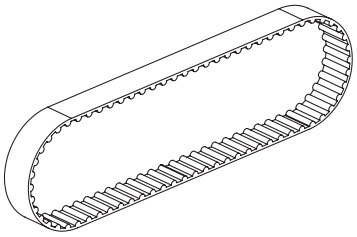


Fig. 12.17 **Toothed belt for belt drive RT**

Table 12.15 **Article numbers for toothed belt**

Suitable for linear axis	Type [1)]	Article number
HM040S, HM060S	V_1	25-001438
HM060S	V_2	25-001439
HM080S	V_1	25-001440
HM080S	V_2	25-001441
HM120S	V_1	25-001442
HM120S	V_2	25-001446
HT100S	V_1	25-001439
HT100S	V_2	25-001450
HT150S	V_1	25-001455
HT150S	V_2	25-001456
HT200S	V_1	25-001456
HT200S	V_2	25-001459
HT250S	V_1	25-001460
HT250S	V_2	25-001463

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

12.15 HIWIN lubricants

Table 12.16 **Recommended HIWIN grease**

Grease type	Application	Quantity unit	
G04	High speed	**Cartridge 400 g**	**Can 1 kg**
			
		Article number: 20-000345	Article number: 20-000346

Table 12.17 **Recommended HIWIN grease gun**

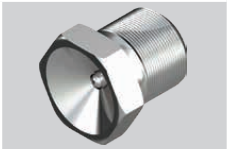
Article no.	Description	Scope of delivery	Comment
20-000333	Grease gun GN-400C incl. set of lubrication adapter and nozzles (see Fig. 12.18)	Grease gun GN-400-C consisting of: – Grease gun – Hydraulic coupling A1 suitable for conical grease nipples acc. to DIN 71412, outer diameter 15 mm – Hollow mouthpiece A2 suitable for conical or ball grease nipples acc. to DIN 71412/DIN 3402, outer diameter 10 mm – Set of lubrication adapter and nozzles	Suitable for 400 g cartridge or direct filling

Fig. 12.18 **Grease gun GN-400C**

12.16 HIWIN grease nipples

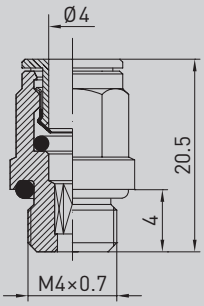
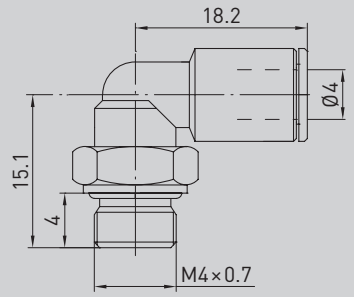
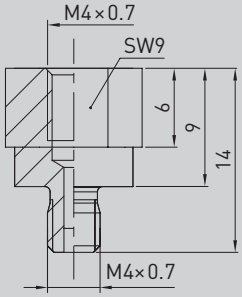
Grease nipples M4 × 0.7 suitable for linear modules HM-S and linear tables HT-S (all sizes).

Table 12.18 **Grease nipples M4 × 0.7**

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

12.17 Lubrication fittings and push-in fittings

Table 12.19 **Lubrication fittings and push-in fittings**

Article number	Type	Picture
8-12-0186	Straight push-in fitting Ø 4	
20-002116	90° angled push-in fitting Ø 4	
20-002108	Lubrication adapter M4/M4 for extending the push-in fittings to avoid collisions (e.g. damping element)	

13. Appendix 3: Declaration of Incorporation

in the sense of the EC Machinery Directive 2006/42/EC, Annex II 1. B for partly completed machinery

The manufacturer:	HIWIN GmbH, Brücklesbünd 1, D-77654 Offenburg
Documentation department:	HIWIN GmbH, Brücklesbünd 1, D-77654 Offenburg

Description and identification of the partly completed 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

It is hereby declared that the following essential requirements of the Machinery Directive 2006/42/EC have been fulfilled.
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

Moreover, it is declared that the relevant technical documentation specified under Annex VII Part B has been compiled.
It is hereby explicitly declared that the partly completed machine complies with all of the pertinent conditions in the following EC Directives.

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

A reference to the harmonised standards used, as referred to in Article 7(2)

EN ISO 13732-1:2008	Ergonomics of the thermal environment – Methods for the assessment of 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 the authorised person undertakes to transmit, in response to a reasoned request by the national authorities, the relevant documentation on the partly completed machinery.

This is without prejudice to the intellectual property rights of the manufacturer!

Important note! The partly completed machinery may not be commissioned until it has been ascertained that the machinery into which this partly completed machinery is to be incorporated is compliant with the provisions of this Directive.

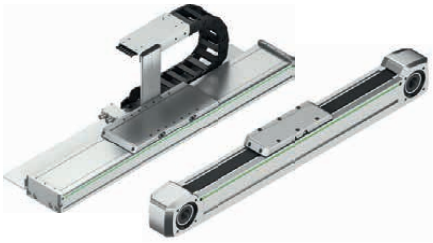
Offenburg, 01.03.2019

Werner Mäurer,
Managing Director

We live motion.

Linear Guideways

Ballscrews



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Robots

Linear Motor Components

Rotary Tables

Drives & Servo Motors

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