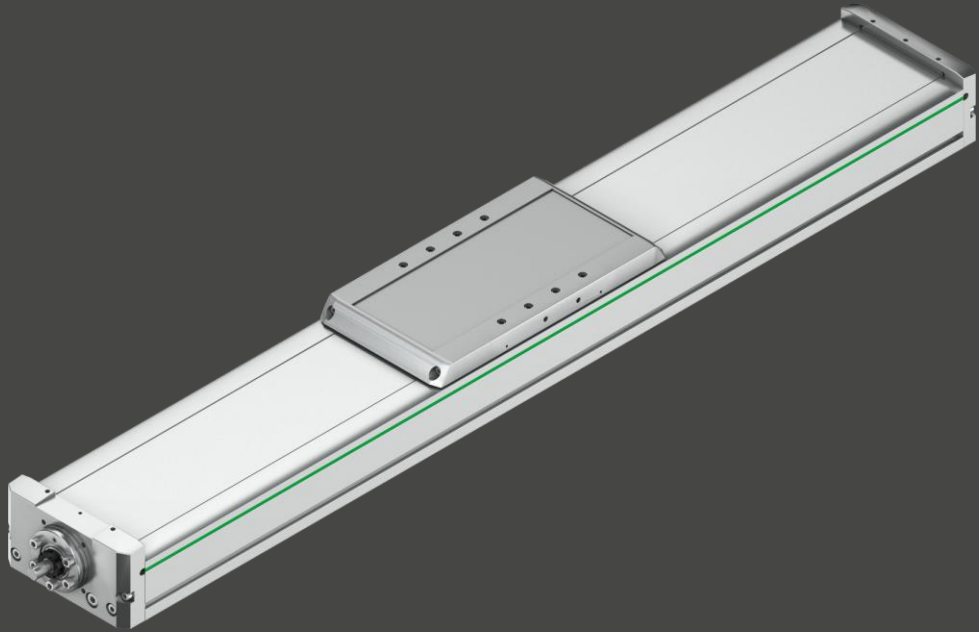


HIWIN®



ASSEMBLY INSTRUCTIONS

Shaft Axes HM-S, HT-S

HMS-HTS-03-0-EN-2610-MA

Legal information

HIWIN GmbH

Brücklesbünd 1

77654 Offenburg

Germany

Tel +49 781 93278-0

info@hiwin.de

HIWIN.de

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1 General

1.1 About these assembly instructions

These assembly instructions are intended for planners, developers and operators of systems who are planning to incorporate and install the products mentioned as machine components. They are also intended for those carrying out the following work in connection with the axes mentioned:

- Transport
- Assembly
- Electrical connection, including connection to the higher-level control system
- Integration into a safety system
- Retrofitting or upgrading
- Set-up
- commissioning
- Operation
- Cleaning
- Maintenance
- Troubleshooting and fault rectification
- Decommissioning, dismantling and disposal

1.1.1 Prerequisites

We assume that

- operating personnel have been trained in the safe operation of the products mentioned and have read and understood these assembly instructions in full,
- maintenance staff must maintain and repair the products in such a way that they do not pose a risk to people, the environment or property.

1.1.2 Availability

These assembly instructions must always be available to all persons working with or on the products mentioned. The assembly instructions are also available at [HIWIN.de](https://www.hiwin.de).

1.2 Illustrations used in these assembly instructions

1.2.1 Instructions

Instructions are labelled with triangles in the order in which they are to be carried out. The results of the actions carried out are labelled with tick marks.

Example:

- Step 1
- Step 2
- ✓ Result.

1.2.2 Lists

Lists are labelled with bullet points.

Example:

The products must not be operated:

- outdoors
- in potentially explosive ranges
- ...

1.2.3 Presentation of safety notices

Safety notices are always labelled with a signal word and, in some cases, with a hazard-specific symbol (see section [1.2.4 Symbols used](#)).

The following signal words and hazard levels are used:

 **Danger!** Immediate danger!

Non-compliance with the safety notices may result in serious injury or death!

 **Warning!** Potentially dangerous situation!

Non-compliance with the safety notices may result in serious injury or death!

 **Caution!** Potentially dangerous situation!

Non-compliance with the safety notices may result in moderate to minor injuries!

 **Attention!** Potentially dangerous situation!

Non-compliance with the safety notices may result in damage to property or environmental pollution!

1.2.4 Symbols used

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

Warning and prohibition symbols			
	Warning: dangerous electrical voltage!		Warning: risk of hearing damage!
	Warning: risk of cuts!		Warning: risk of crushing!
	Substance hazardous to the environment!		Warning: danger from suspended loads!

mandatory signs			
	Wear protective gloves!		Wear ear protection!
	Wear safety goggles!		Disconnect the power supply before starting work!

1.2.5 Notes

Note:

Notes describe general information and recommendations.

1.3 Warranty and liability

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

1.4 Manufacturer's details

Address	HIWIN GmbH Brücklesbünd 1 77654 Offenburg
Telephone	+49 (0) 781 / 9 32 78 - 0
Technical Support	+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
Email	support@hiwin.de
Website	HIWIN.de

1.5 Product monitoring

Please inform HIWIN GmbH, the manufacturer of the mentioned products, of:

- Accidents
- Potential hazards associated with the products
- Any ambiguities in these assembly instructions

2 Basic safety notices

Warning!

This section is intended to ensure the safety of everyone who works with, assembles, installs, operates, maintains or dismantles the products mentioned. Failure to observe the following instructions may result in danger.

2.1 Intended use

The linear axes combine one guide and drive into a compact unit. They are used for the precise positioning, in terms of both time and location, of permanently mounted loads within an automated system.

HM-S and HT-S linear axes must be used exclusively for the specified purpose:

- Performance limits are specified for each size of the products mentioned (see the 'HX Linear Axes and Axis Systems' catalogue). These performance limits must not be exceeded during operation.
- The products must not be used in potentially explosive atmospheres.
- The products must not be operated in a vacuum.
- The products must only be used and operated indoors.
- In the case of vertical installation, a suitable clamping or braking device must be provided to prevent the load from dropping unintentionally.
- The products are used as part of an overall system; therefore, personal safety must be ensured through the design of the overall system.
- Compliance with the assembly instructions and adherence to the maintenance and repair regulations are prerequisites for the intended use of the products.
- Any other use of the products is considered improper.

The HM-S and HT-S linear axes are supplied as a system (one guide, drive). You should therefore refer to the full documentation for the system. The accompanying documentation may vary depending on the type of linear axis.

Environmental requirements

Operating environmental conditions:	+5 to +40 °C
Relative humidity during operation:	in accordance with IEC 60721-3-3, Class 3K22, non-condensing
Climatic environmental conditions for transport and storage:	Ambient temperature: –20 to +50 °C, non-condensing
Environmental conditions for long-term storage:	Ambient temperature: +20 °C, non-condensing

Note:

Prevent condensation to avoid corrosion of the axis.

2.2 Reasonably foreseeable misuse

The products mentioned must not be operated:

- outdoors
- in potentially explosive ranges

2.3 Modifications or alterations

Modifications or alterations to the products mentioned are not permitted! If you have any special requirements, please contact HIWIN GmbH.

2.4 Residual hazards

The products listed do not pose any residual hazards during normal operation, as they are used as part of the overall system and the operator is responsible for ensuring personal safety through the overall system. Warnings regarding hazards that may arise during maintenance and servicing are provided in the relevant sections.

2.5 Requirements for personnel

Only authorised and competent personnel may carry out work on the products! They must be familiar with the safety devices and regulations before commencing work (see table below).

Task	Qualification
Normal operation	Trained staff
Cleaning	Trained staff
Maintenance	Trained specialist staff from the operator or manufacturer
Maintenance	Trained specialist staff from the operator or manufacturer
Transport	Trained staff
Assembly	Trained specialist staff
Dismantling	Trained specialist staff

2.6 Safety devices

Table2.1: Personal protective equipment

Operating phase	Personal protective equipment
Normal operation	It is not permitted to remain in the vicinity of the products mentioned during normal operation. If you are in the vicinity of the products, the following personal protective equipment is required, depending on the travel speed: – Safety footwear – Hearing protection, if necessary
All other operating phases (cleaning, maintenance, servicing, changeover, troubleshooting, repair)	The following personal protective equipment is required during all other operational phases of the products mentioned: – Safety footwear – Protective gloves and safety goggles where necessary – Hearing protection, where necessary – Where applicable, a hairnet

2.7 Labelling on the product

You will find the labelling shown below on the products.

Fig.2 .1 : Example of a type plate

		Type: HM060S010C0755L000ANNN	
HIWIN GmbH Brücklesbünd 1 77654 Offenburg www.hiwin.de		S/N:	HSN000001508
		Art. No:	25.12082
		Year built:	2021
		Mass of stage:	5 kg

3 Description of the linear axes

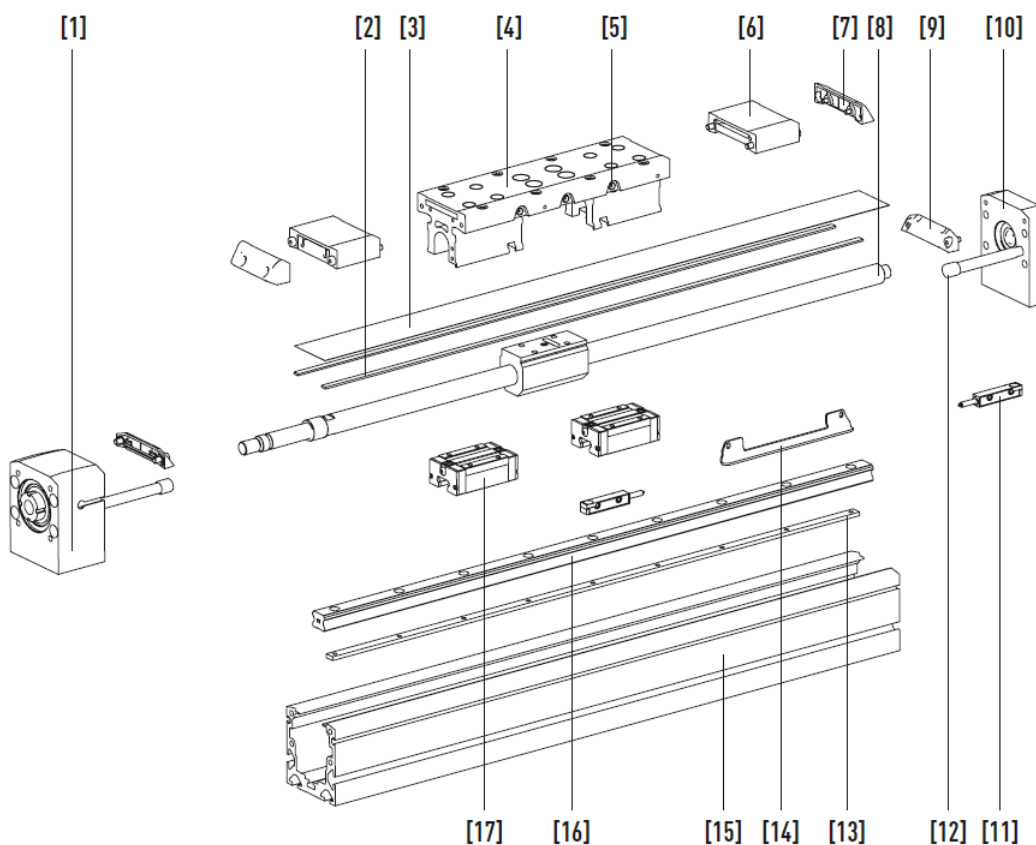
3.1 HM-S linear module

3.1.1 Applications

The HM-S linear modules with ballscrews are compact, flexible positioning modules and are particularly suitable for applications requiring high precision and high feed forces.

3.1.2 Main components

Fig.3 .1 : Main components of the HM-S linear axis

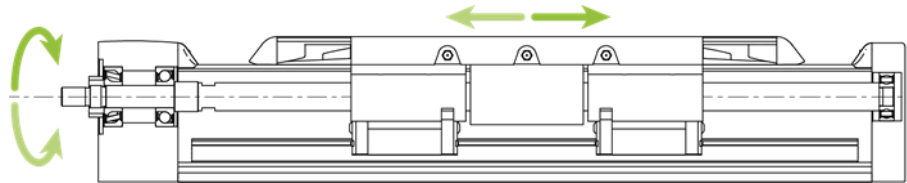


1	drive block	10	end plate
2	magnetic strip	11	limit switch
3	Steel cover strip	12	stop buffer
4	slide	13	threaded strip
5	Grease nipples, 3 on each side	14	damping element
6	belt deflection	15	Aluminium axle body
7	slide end piece	16	profile rail
8	ballscrew	17	block
9	Clamp housing for cover strip		

3.1.3 function description

In linear axes with ballscrews, the drive and guide are combined in a compact unit. The forces and torques from the load to be moved are transmitted via the slides to the linear guideway. With two blocks per slide, this also ensures precise guidance of the linear movement. The movement itself is achieved via a ballscrew, the shaft of which is driven by an electric motor. The ballscrew converts the rotational movement of the motor into linear movement of the nut, which is rigidly connected to the slide.

Fig.3 .2 : Operating principle of HM-S linear modules



3.1.4 Order code for HM-S linear modules

Number	1	2	3	4	5	6	7	8	
order code	HM	060	S	010	C	0755	L	000	Chapter
1	HM	series: HM: Module axis							3.1
2	060	size: 040: Profile width 40 mm 060: Profile width 60 mm 080: Profile width 80 mm 120: Profile width 120 mm							
3	S	Drive type: S: ballscrew							3.1.3
4	010	Lead: 005/010: 5 mm/10 mm 005/010/016: 5 mm/10 mm/16 mm 005/010/020: 5 mm/10 mm/20 mm 010/020/032: 10 mm/20 mm/32 mm							
5	C	cover strip: N: None C: With							
6	0755	Stroke length [mm]							4.1
7	L	Carriage length: S: Short L: Long							4.3
8	000	Sled spacing [mm]: 000: Single slide							

Number	9	10	11	12	13	
Continued order code	A	N	N	R	B002	Chapter
9	A	limit switch: N: Without A: 2x n/c contacts, connection cable with connector B: 2x n/o contacts, connection cable with connector C: 2x n/c contacts, 5m cable D: 2x n/o contacts, 5m cable				4.4
10	N	spindle supports: N: None 1: 1x SA max. speed: x rpm 2: 2x SA max. speed: x rpm 3: 3x SA max. speed: x rpm 4: 4x SA maximum speed: x rpm				4.8
11	N	distance measuring system: N: Without A: Magic analogue 1Vss sin/cos D: Magic digital TTL 5V F: APM absolute BissC				4.5
12	R	Drive interface: N: Without drive S: Straight drive L: Left-hand with belt drive R: Right-hand drive with belt drive A: Top with belt drive B: Bottom-mounted belt drive				4.6
13	B002	Flange type				

3.2 HT-S linear table

3.2.1 Applications

HIWIN HT-S linear tables with ballscrews are particularly suitable for applications where heavy loads need to be moved with high precision. The integrated HIWIN ballscrews ensure precise positioning thanks to their high pitch accuracy and rigidity. Various lead options are available for each size to optimally meet requirements for feed force and dynamic response. With up to four travelling spindle supports on each side, movement at full speed is possible even with long strokes.

3.2.2 Main components

Fig.3 .3 : Main components of the HT-S linear tables

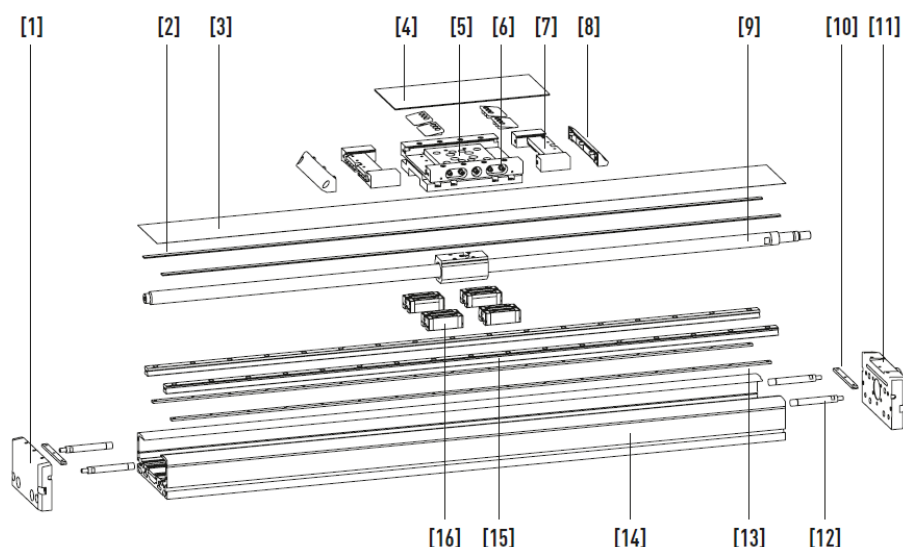


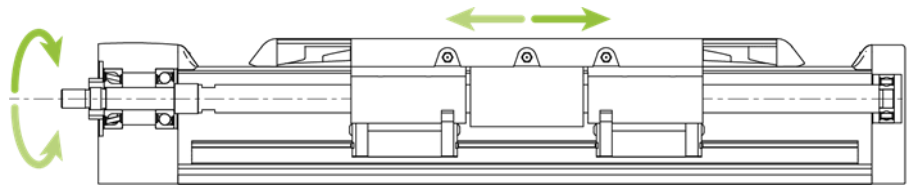
Table3.1: Description of the main components of the HT-S linear tables

1	end plate	9	ballscrew
2	Magnetic strips	10	Clamping sheet for cover strip
3	Steel cover strip	11	drive block
4	slide cover	12	stop buffer
5	slide	13	Threaded strips
6	grease nipple	14	Aluminium axle body
7	belt deflection	15	Profile rails
8	slide end piece	16	block

3.2.3 function description

In linear tables with ballscrew drives, the drive and guide are combined in a single compact unit. The forces and torques from the load to be moved are transmitted via the slides to the linear guideways. These also ensure precise guidance of the linear movement with four blocks per slide. The movement itself is achieved via a ballscrew, the shaft of which is driven by an electric motor. The ballscrew converts the rotational movement of the motor into linear movement of the nut, which is rigidly connected to the slide.

Fig.3 .4 : Operating principle of the HT-S linear table



3.2.4 Order code for HT-S linear table

Number	1	2	3	4	5	6	7	
order code	HT	150	S	010	C	1234	S	Chapter
1	HT	series: HT: Table axis						3.2
2	150	size: 100: Profile width 100 mm 150: Profile width 150 mm 200: Profile width 200 mm 250: Profile width 250 mm						
3	S	Drive type: S: ballscrew						3.2.3
4	010	Lead: 005/010/016: 5 mm/10 mm/16 mm 005/010/020: 5 mm/10 mm/20 mm 005/010/025: 5 mm/10 mm/25 mm 010/020/032: 10 mm/20 mm/32 mm						
5	C	cover strip: N: None C: With						Fehler! Verweisquelle konnte nicht gefunden werden.
6	1234	Stroke length [mm]						4.1
7	S	Carriage length: S: Short						4.3

Number	8	9	10	11	12	
Continued order code	A	N	N	S	BR04	Chapter
8	A	limit switch: N: Without A: 2x n/c contacts, connection cable with connector B: 2x n/o contacts, connection cable with connector C: 2x n/c contacts, 5m cable D: 2x n/o contacts, 5m cable				4.4
9	N	spindle supports: N: None 1: 1x SA max. speed: x rpm 2: 2x SA max. speed: x rpm 3: 3x SA max. speed: x rpm 4: 4x SA max. speed: x rpm				4.8
10	N	distance measuring system: N: Without A: Magic analogue 1Vss sin/cos D: Magic Digital TTL 5V F: APM Absolute BissC				4.5
11	S	Drive interface: N: Without drive, without energy chain S: Straight drive, without energy chain L: Left-hand, belt drive, without energy chain R: Right-hand, belt drive, without energy chain A: Top with belt drive, without energy chain B: Bottom with belt drive, without energy chain C: Without drive, energy chain on the right D: Straight drive, energy chain on the right E: Left-hand belt drive, energy chain on the right G: Top with belt drive, energy chain on the right H: Bottom with belt drive, energy chain on the right				4.6
12	BR04	Flange type				

4 Options for the HT-L and HB-L linear axes

4.1 Stroke length

The stroke lengths of the linear axes can be selected in millimetre steps.

The maximum stroke length, depending on the series and size, is listed in the 'Linear Axes & Linear Axis Systems' catalogue, in the 'Product Selection' chapter. Longer stroke lengths are available on request.

Please note that the selection of certain options may result in further restrictions on the maximum stroke length.

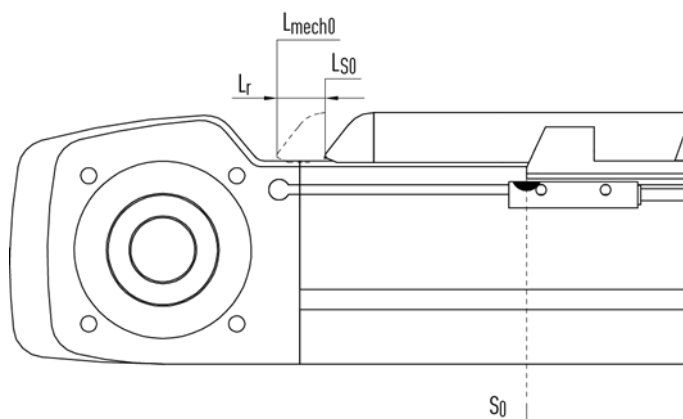
4.1.1 Reserve stroke

Warning! Risk of damage to the linear axis!

- The mechanical end position must not be reached during operation.

The reserve stroke L_r corresponds to the distance that can be travelled on both sides of the end positions (stroke 0, max. stroke) in addition to the stroke, before the slide reaches the mechanical end position (mechanical 0) at the fitted stop buffers. The reserve stroke for each axis size can be found in the 'HX Linear Axes and Axis Systems' catalogue.

Fig.4 .1 : Illustration of reserve stroke



L_{mech0}	Carriage position at mechanical 0 (rubber buffer stop)
L_{S0}	Carriage position at stroke 0 (sensor switching point)
S_0	Position of the drive block at stroke 0 (sensor switching point)

4.2 Cover strip

A steel cover strip is available as an option for all sizes of the HM-S and HT-S linear axes. The cover strip is held in place by magnetic strips to protect the interior of the axis from contamination. Please note that the carriage length is increased on axes with a cover strip due to the required belt deflection.

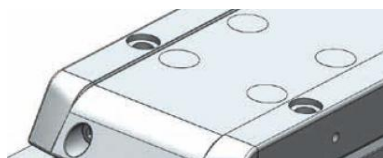
Note:

The 'cover strip' option cannot be retrofitted at a later date.

4.3 Slide

Two slide types are available for the HM-S linear modules (slide types S and L). Slide type S is fitted as standard on the HT-S linear tables. The slides feature mounting threads for attaching the payload. These have additional counter bores to allow the insertion of centring sleeves.

Fig.4 .2 : Slide with mounting threads



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

Short slide (S)

- For single axes

Long slide (L)

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

4.4 Limit switch

On the linear axes, two inductive limit switches indicate the end positions of the travel distance. The limit switch cables can either be routed directly to the interface or laid alongside the mounting groove. The limit switches are available as n/c contacts or normally open contacts and, optionally, with open cable ends or with connectors.

Note:

Additional reference switches are available on request.

4.4.1 Limit switch dimensions

Fig.4 .3 : Dimensions of the limit switch

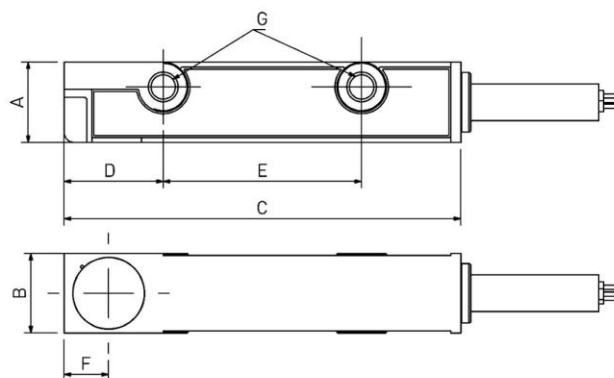


Table4.1: Dimensions of the limit switch

	HM-S, HT-S
A	8.1 mm
B	8 mm
C	40 mm
D	10 mm
E	20 mm
F	4.5 mm
G	3.2 mm

4.4.2 Limit Switch Specifications

Table 4.2: General characteristics of limit switches

order code	A	B	C	D
article number				
HM040S, HT100S	80168980	80168994	80169033	80169036
HM060-120S, HT150-250S	80169076	80169099	80169202	80169231
Output function	n/c contact	n/o contact	n/c contact	n/o contact
Connection type	100 mm cable with M8 connector		5 m ^{cable2)}	
Connection	3-pin		3-wire	
Design	Rectangular			
Dimensions (W × H × D)	8 × 8 × 40 mm			
Max. switching distance	2 mm			
Guaranteed switching distance	1.62 mm			
Adjustable switching distance	1 mm			
Switching sequence	2,000 Hz			
Switching output	PNP			
Electrical type	DC 3-wire			
protection class	IP67, IP68 ¹⁾			

¹⁾ In accordance with EN 60529

²⁾ Not suitable for use with energy chains

Table 4.3: Mechanical and electrical specifications of the limit switches

order code	A	B	C	D
article number				
HM040S, HT100S	80168980	80168994	80169033	80169036
HM060-120S, HT150-250S	80169076	80169099	80169202	80169231
Type	n/c contact	n/o contact	n/c contact	n/o contact
power supply	10 to 30 VDC			
Residual ripple	$\leq 10\%$ ¹⁾			
Voltage drop	$\leq 2\text{ V}$ ²⁾			
Current consumption	$\leq 10\text{ mA}$ ³⁾			
Standby delay	$\leq 100\text{ ms}$			
Hysteresis	5 to 15 %			
Reproducibility	$\leq 2\%$ ⁴⁾			
Temperature drift	$\pm 10\%$			
EMC	In accordance with EN 60947-5-2			
Continuous current I_a	$\leq 200\text{ mA}$			
Cable material	PVC			
Short-circuit protection	Yes			
Reverse polarity protection	Yes			
Inrush current suppression	Yes			
Shock and vibration resistance	30 g, 11 ms/10 to 55 Hz, 1 mm			
Operating ambient temperature	-25 °C to $+75\text{ °C}$			
Housing material	Plastic, VISTAL®			
Material, active surface	Plastic, VISTAL®			
UL file no. (certificate)	NRKH.E348498			

¹⁾ From U_V

²⁾ At $I_a\text{ max.}$

³⁾ Without load

⁴⁾ At constant voltage and temperature

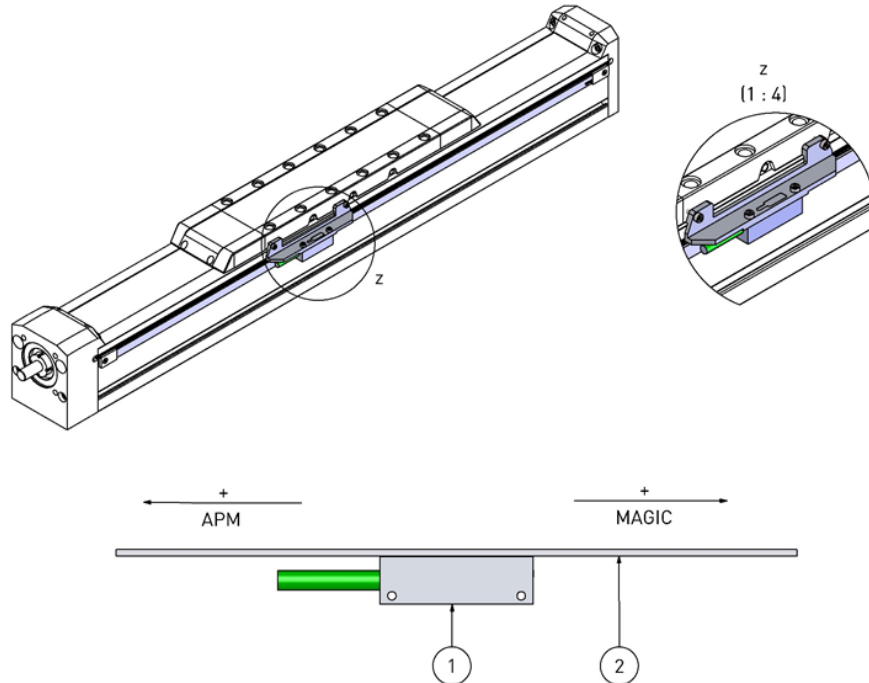
Note

Information on connection and pin configuration can be found in section 6.9.1

4.5 Distance measuring system

If the accuracy of the linear axis provided by the drive element is insufficient for a particular application, the positioning and repeatability accuracy can be improved by using a distance measuring system. The distance measuring system is located externally, on the side of the slide, and consists of an encoder (item 1) and a measurement tape (item 2).

Fig.4 .4 : Position and positive direction of travel of the distance measuring system, using the HM-S as an example



The cable outlet of the encoder is used to determine the positive direction of travel. For HIWIN MAGIC, the positive direction of travel is opposite to the cable outlet. For HIWIN APM, the positive direction of travel is in the direction of the cable outlet. When connecting the position measurement system in accordance with Table 6.29 or Table 6.30, the positive direction of travel shown in Fig. 4.4 applies.

4.5.1 HIWIN MAGIC

The HIWIN-MAGIC distance measuring system is used in linear axes for incremental distance measurement. The output is available as either an analogue or digital signal. The HIWIN-MAGIC distance measuring system consists of the encoder (Fig. 4.4) and the magnetic scale (Fig. 4.5) as the measuring medium.

The HIWIN-MAGIC distance measuring system is compatible with all standard servo drives and the HIWIN ED1 servo drive. Further information on HIWIN servo drives can be found in the 'Servo Drives' catalogue or at hiwin.de.

Fig.4 .5 : MAGIC encoder



Fig.4 .6 : MAGIC magnetic scale



Note:

The measurement tape of the magnetic position measurement systems must not be exposed to strong magnetic fields (maintain a safe distance from permanent magnets!). Severe vibrations (e.g. a blow from a hammer) can also damage the magnetisation of the measurement tape. The system is not suitable for environments containing magnetic dust (e.g. graphite dust). This can distort the measurement signal or damage the position measurement system.

Note

Further information can be found in the 'Linear Motors & Positioning Systems' catalogue, as well as in the 'HIWIN-MAGIC Positioning Systems' assembly instructions.

Note

Information on connection and pin configuration can be found in the chapter '6.9.2'.

4.5.2 HIWIN APM

The HIWIN APM distance measuring system is used in linear axes for absolute position determination without the need for a reference run. The APM is a magnetically encoded, non-contact, absolute position measuring system consisting of a sensor head and a scale. The scale features two magnetic tracks: one track with alternating magnetic north and south poles, and one track encoding the absolute position. The sensors in the sensor head measure the alternating magnetic field. As the sensor head passes over the scale body without contact, the sensors detect the magnetic poles and transmit the position data to the controller. This enables the controller to determine the absolute position and the distance travelled. The system is integrated via a BiSS-C interface.

Note

Further information can be found in the 'Linear Motors & Position Measurement Systems' catalogue, as well as in the 'HIWIN Absolute Position Measurement System' assembly instructions.

Note

Information on connection and pin configuration can be found in the chapter 6.9.2

4.6 Drive Interface

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

Possible drive interfaces:

Fig.4 .7 : Drive interfaces for the HM-S linear axes

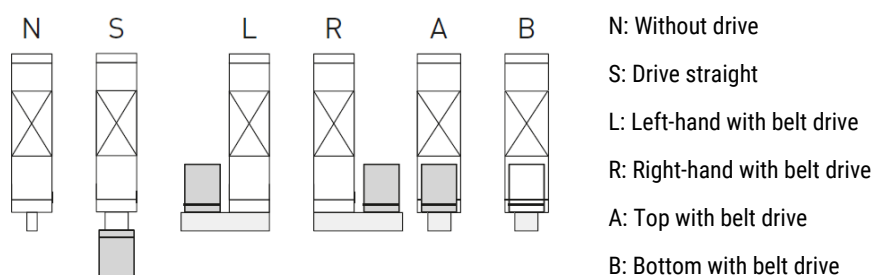
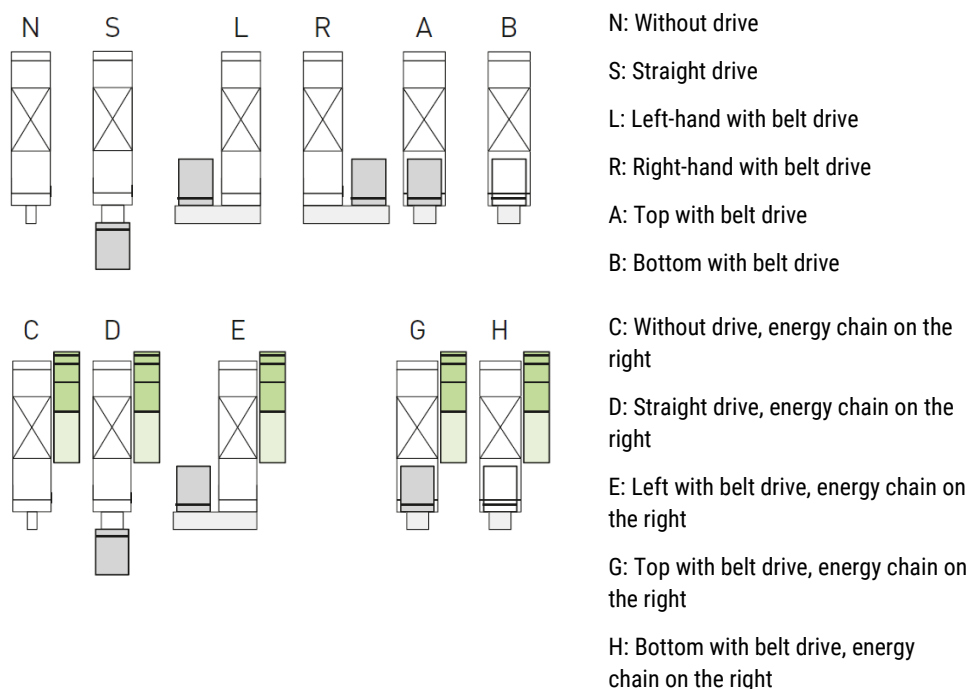


Fig.4 . 8 : Drive interfaces for the HT-S linear axes



4.7 Energy chain

To ensure the safe routing of additional cables, the HT-S linear axes can be supplied with generously dimensioned energy chains as an option. The energy chains are mounted on the axis in a particularly compact and space-saving manner. The orientation of the energy chain depends on the selected drive interface (see section 4.6). The energy chain type and specifications can be found at Table 4.4. The linear tables with energy chains are optimised for horizontal installation. Axes with energy chains for vertical use are available on request.

Table 4.4 : Specification for HT-S linear axes with energy chain

size	Manufacturer's designation (igus SE & Co. KG)	Internal cross-section W × H [mm]	Bending radius [mm]	Max. stroke [mm]
HT100S	2400.05.075.0	57 × 25	75	4000
HT150S, HT200S, HT250S	2600.07.100.0	75 × 35	100	5000

The upper strand is mounted as a self-supporting structure; an energy chain support is provided for the lower strand to allow it to unroll. To prevent cables and hoses from sliding over one another, a separating bar is provided in every second chain link. The connectors are of a rigid type. Strain relief combs for securing the cables and hoses with cable ties are provided on both sides. For the correct handling of the energy chains, as well as the routing and securing of the cables and hoses, please refer to the energy chain manufacturer's assembly instructions.

General information:

- Please refer to the motor manufacturer's operating manual for details on suitable motor and signal cables.
- Observe the minimum bending radii (industry standard $8 \times D$) for cables and hoses and the associated expected service life.
- For shielded cables, ensure that the shields are resistant to bending.
- The sheaths of cables and hoses should be low-friction and abrasion-resistant.
- To prevent them from sticking together, separate cables and hoses with different outer sheaths using spacers.
- Lay cables and hoses without any twists.

- Allow for sufficient clearance (10–20 per cent, min. 1 mm) around the cables and hoses, and take into account the transverse expansion of hoses when pressurised.
- Ensure an even/symmetrical weight distribution. Position heavy cables and hoses preferably on the outside.
- Ensure strain relief on both sides of cables and hoses so that, when fully extended, they are located in the neutral zone and can move freely within the radius of the energy chain.
- Where necessary, provide additional separator bars in the event of high accelerations or cables with significantly different diameters.
- Observe the maximum permissible additional load caused by cables and hoses, depending on the stroke, as specified in [Fig. 4.10](#).

Fig.4.9 : Maximum permissible additional load F_{Add} as a function of stroke L_T , Series 2400
(Source: igus SE & Co. KG)

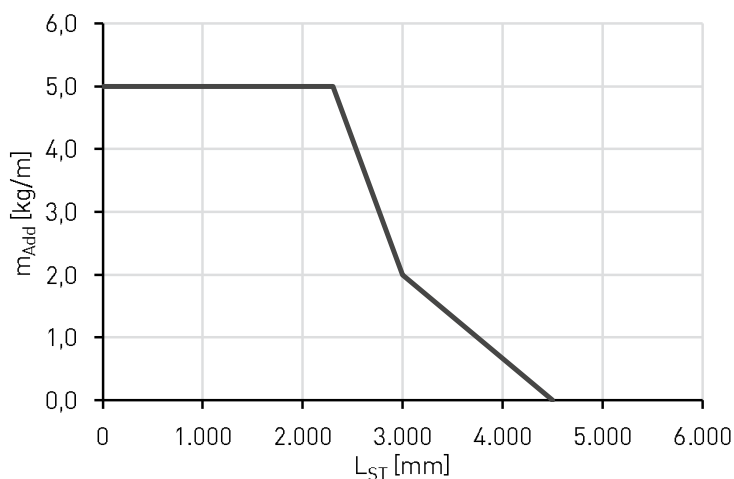
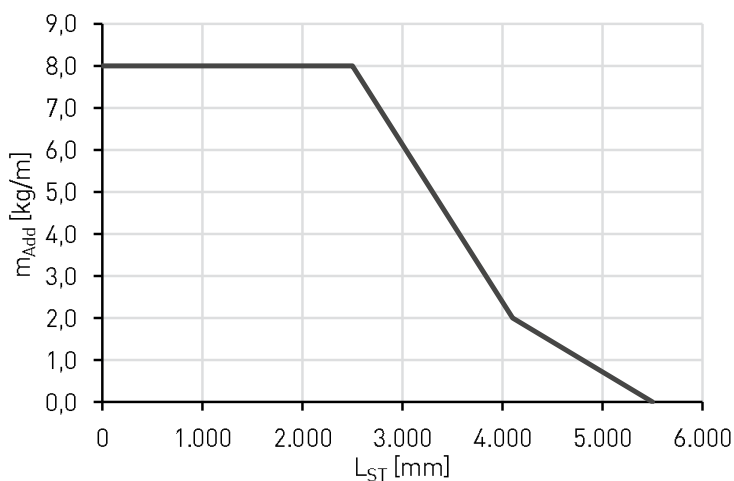


Fig.4.10 : Maximum permissible additional load F_{Add} as a function of stroke L_T , Series 2600
(Source: igus SE & Co. KG)



4.7.1 Tape for reducing noise in energy chains

Cellular rubber strip for reducing noise generated by energy chains. The single-sided self-adhesive noise-reduction strips are affixed to the energy chain support in such a way that the energy chain links rest on the strips as the energy chains slide, which significantly reduces noise emissions.

Fig.4 .11 : Dimensions of the noise-reduction tape for energy chains

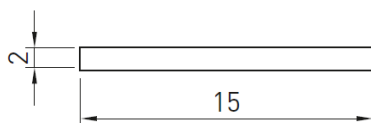


Table4.5: Article number for cellular rubber tape

Suitable for linear axis	Article number (10 m)
HT-S	25-002485

4.8 Spindle supports

In applications involving HM-S and HT-S linear axes with long strokes and high speeds, the spindle may reach its critical speed, making appropriate support necessary. For HIWIN HM-S linear modules, up to four travelling spindle supports (not available for HM040S) can be selected on each side of the slide as an option. Up to four spindle supports are also possible on HT-S linear tables. Please refer to the 'HX Linear Axes and Axis Systems' catalogue for the critical speed depending on the spindle supports.

5 Transport and installation

5.1 Delivery

5.1.1 Condition on delivery

The linear axes are supplied fully assembled and functionally tested.

5.1.2 Scope of delivery

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

5.2 Transport to the installation site

⚠ Warning! Danger from suspended loads or falling parts!

Lifting heavy loads can cause injury.

- ▶ Assembly and maintenance of the linear axes must only be carried out by qualified personnel!
- ▶ Take the mass of the parts into account during transport. Use suitable lifting equipment!
- ▶ Observe the applicable health and safety regulations for handling suspended loads!
- ▶ Only lift linear axes at the specified support points!
- ▶ Secure machines and machine parts to prevent them from tipping over!

⚠ Caution! Risk of shock and crushing!

When moving or manoeuvring the axes manually, injuries may occur due to moving and displaced axes as well as attached components (energy chains, customer-supplied attachments).

- ▶ Observe the applicable health and safety regulations!
- ▶ Transport to the installation site must only be carried out by qualified personnel!

ⓘ Warning! Potential damage to the linear axis!

The linear axis may be damaged if subjected to mechanical stress.

- ▶ Only lift linear axes at the specified support points! (see section 5.5)!
- ▶ For axes of length, ensure that the centre sections are additionally secured!
- ▶ Ensure that the linear axes do not bend, as this will permanently impair their accuracy!
- ▶ Do not transport any additional loads on the linear axis during transport!
- ▶ Provide additional support for heavy attachments!

The linear axes are precision products and must be handled with care. Shocks and knocks can damage the axes. This may result in reduced positioning accuracy and a shorter service life. Transport the product in its packaging as close as possible to the installation site. Do not remove the packaging until you reach the site.

5.3 Requirements for the installation site

5.3.1 Environmental conditions

Operating environmental conditions:	+5 to +40 °C
Relative humidity during operation:	in accordance with IEC 60721-3-3, Class 3K22, non-condensing
Climatic conditions for transport and storage:	Ambient temperature: -20 to +50 °C, non-condensing
Environmental conditions for long-term storage:	Ambient temperature: +20 °C, non-condensing

5.3.2 Safety devices to be provided by the operator

Possible safety devices/measures:

- Personal protective equipment in accordance with UVV (Accident Prevention Regulations)
- Non-contact safety devices
- Mechanical safety devices

5.4 Bearing

- Store the linear axes in their transport packaging.
- Alternatively: Choose packaging in which the linear axes are secured against slipping, damage and vibration.
- Store the linear axes only in dry, frost-free rooms.
- Clean and protect used linear axes before storing them.
- After long-term storage, the linear axes must be relubricated before commissioning.

5.5 Unpacking and installation

! Warning! Hazard to health and the environment!

Contact with lubricants may cause irritation, poisoning and allergic reactions, as well as environmental damage.

- ▶ Use only suitable media that are harmless to humans. Observe the manufacturers' safety data sheets!
- ▶ Ensure proper disposal!

Note:

The linear axes must only be installed and operated indoors.

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

Fig.5.1 : Support points A and B for lifting and transport, using a HM-S linear axis as an example

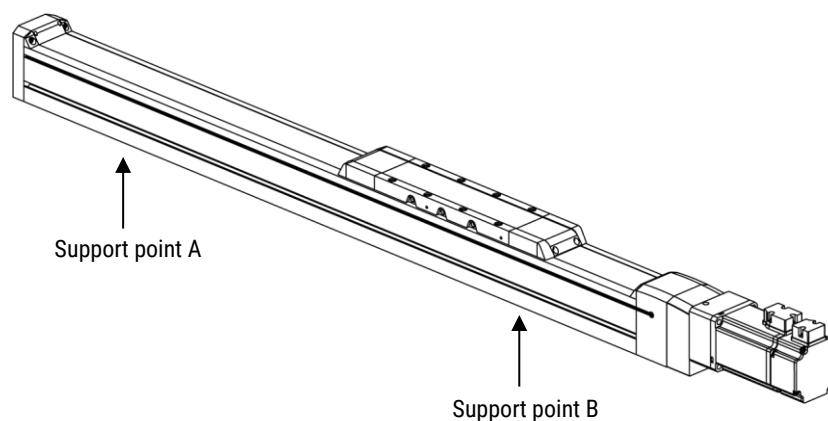


Fig.5 .2 : Correct position of the support points

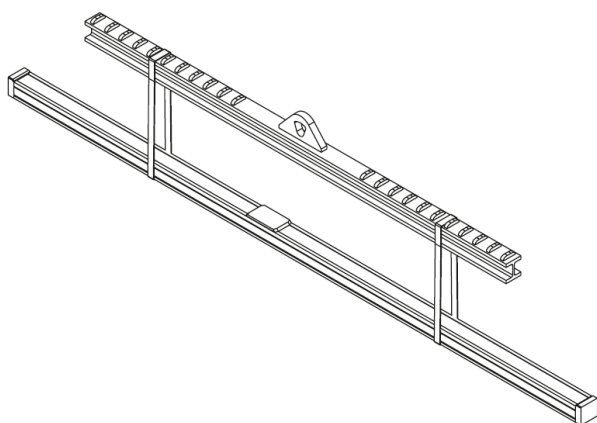
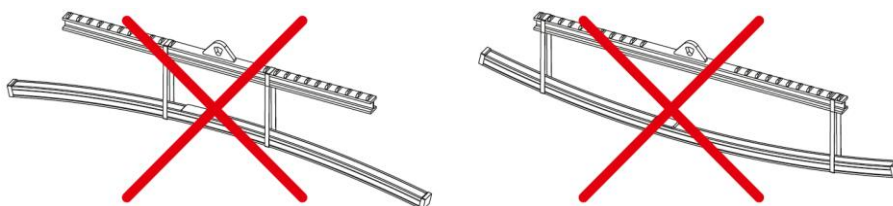


Fig.5 .3 : Incorrect position of the support points



6 Installation and connection

Warning! Risk of shock and crushing!

Injuries may occur as a result of the slide moving automatically or manually.

- ▶ A safety guard must be fitted for the operation of the linear axes!
- ▶ Commissioning, set-up, troubleshooting and fault rectification must only be carried out by qualified personnel!

Warning! Risk of cuts!

The cover strip may cause cuts during assembly or disassembly.

- ▶ Commissioning and set-up must only be carried out by qualified personnel wearing appropriate protective equipment (gloves, safety goggles)!

Warning! Risk of shock and crushing!

Injuries may occur as a result of unintended movements of the driven elements of the linear axes.

- ▶ Control system design in accordance with DIN EN 12100. No start-up after
 - application; energy may be restored!
 - Troubleshooting!
 - Stop the machine!

Caution! Risk of hearing damage!

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

- ▶ Hearing protection must be worn when linear axes are running at high speeds and producing noise levels above 70 dB(A)!
- ▶ Linear axes with an energy chain and chain support can generate noise levels of up to 94 dB(A), depending on the load and speed. A noise-reduction strip is available as an accessory to reduce noise.

Caution! Danger from suspended loads or falling parts!

- ▶ Installation and maintenance of the linear axes must only be carried out by qualified personnel!
- ▶ Take the mass of the parts into account during transport. Use suitable lifting equipment!
- ▶ Observe the applicable health and safety regulations for handling suspended loads!
- ▶ Only lift linear axes at the specified support points!
- ▶ Secure machines and machine parts to prevent them from tipping over!
- ▶ Secure the linear axes in accordance with the assembly instructions!
- ▶ If linear axes are arranged vertically, ensure the slide is secured when at a standstill!

Caution! Risk of shock and crushing due to the payload becoming detached!

Incorrect fastening or failure of the fastenings may result in injury from falling or flying parts.

- ▶ Carry out assembly in such a type that parts do not come loose, even under high acceleration or continuous vibration!
- ▶ Secure the payload in accordance with the assembly instructions!

⚠ Caution! Risk of shock and crushing!

When the axes are moved by motor, injuries may occur due to moving and driven axes as well as attached components (energy chains, customer-supplied components).

- ▶ A separating safety guard must be provided for the operation of the linear axes!
- ▶ If linear axes are arranged vertically, ensure the slide is secured when at a standstill!

⚠ Caution! Risk of electric shock or burns due to contact with live parts!

Contact with live parts may result in injury.

Cables installed by the customer may, if laid incorrectly, become frayed due to constant movement within the energy chain and expose electrical contact points.

- ▶ Control system design in accordance with DIN EN 12100. No start-up after
 - power-up, return of energy!
 - Troubleshooting!
 - Stop the machine!
- ▶ Cabling must only be installed by qualified personnel!
- ▶ Work on electrical installations must only be carried out by qualified personnel!

⚠ Warning! Hazard to health and the environment!

Contact with lubricants may cause irritation, poisoning and allergic reactions, as well as environmental damage.

- ▶ Use only suitable media that are safe for humans. Observe the manufacturers' safety data sheets!
- ▶ Ensure proper disposal!

6.1 Installation of linear axes

The linear axis can be installed in any orientation; it must be secured to the aluminium profile of the axis. For axes with a cover strip, ceiling mounting is only permitted under certain conditions. Please consult HIWIN. HT-S linear axes with an energy chain can only be installed in a horizontal orientation (see Fig. 6.1). The axes can be secured to the mounting surface using clamping profiles (side grooves) or nut blocks (bottom grooves). Please note that, depending on the installation position, the weight of the linear axis acts as an additional load and that the actual forces and torques must remain below the permissible values (see the 'HX Linear Axes and Axis Systems' catalogue).

Fig. 6.1 : Horizontal installation position



Fig. 6.2 : Horizontal upright mounting position



Fig. 6.3 : Ceiling mounting



Fig. 6.4 : Vertical installation position



Note:

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

Note:

If increased alignment accuracy is required, the axis must be aligned with and secured to a precise reference edge.

Note:

Please observe the support spacing for the respective shaft sizes (see section 6.1.1). The end blocks must not be the only parts resting on the mounting surface!

Note:

The screws must be secured against accidental loosening.

6.1.1 Maximum support spacing for linear axes

For linear axes with long stroke lengths and high payloads, depending on the mounting method, the axis body may experience an impermissibly high degree of deflection. To prevent this, the axis body should be supported at multiple points and mounted securely on a level surface. The maximum permissible support spacing L , depending on the applied force, can be determined using the diagrams below.

Fig.6 .5 : Horizontally mounted axis

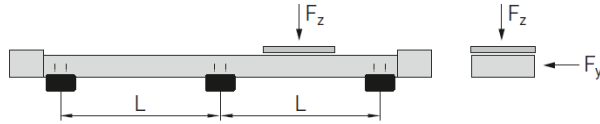


Fig.6 .6 : Horizontal, upright shaft orientation

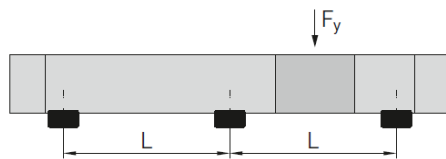


Fig.6 .7 : HM-S: Maximum support distance L_{SUP} as a function of the force F_z

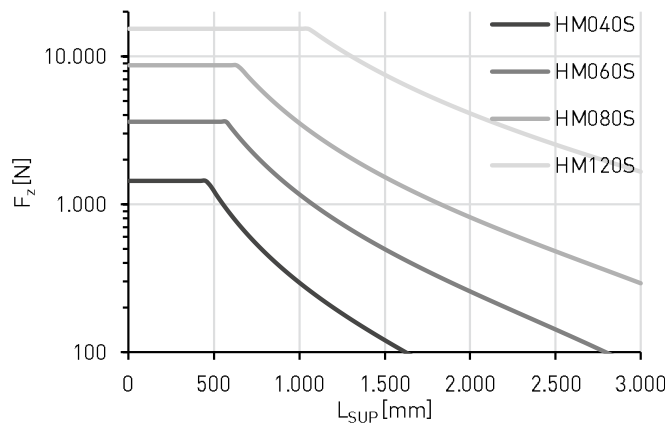


Fig.6 .8 : HM-S: Maximum support spacing (L_{SUP}) as a function of force F_y

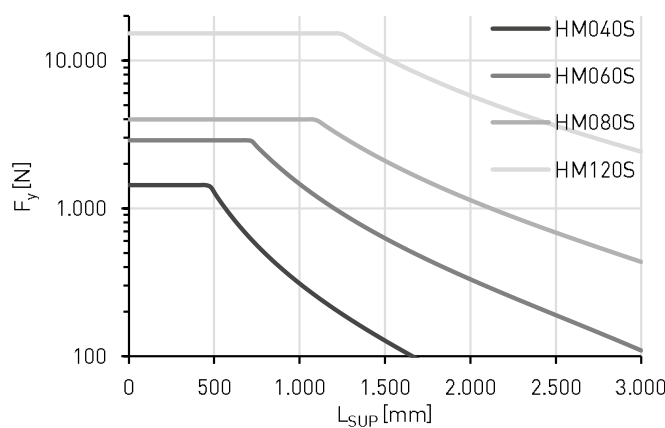


Fig.6 .9 : HT-S: Maximum support spacing L_{SUP} as a function of force F_z

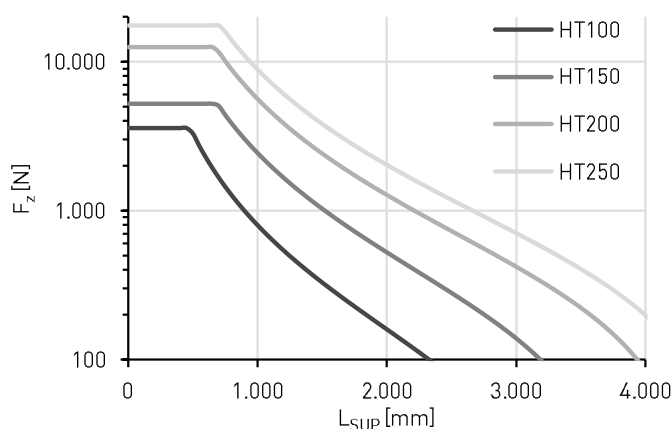
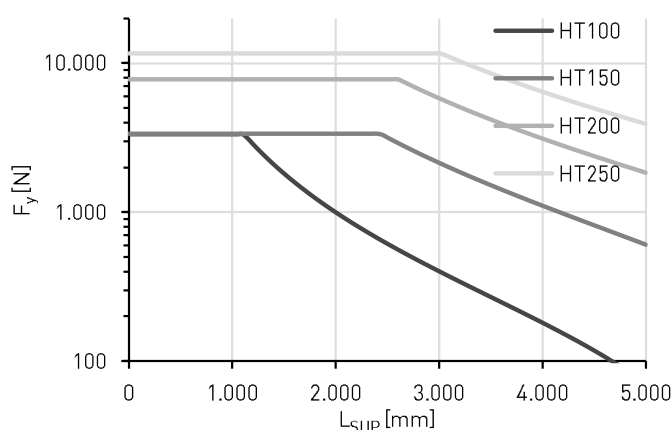


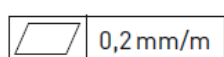
Fig.6 .10 : HT-S: Maximum support spacing L_{SUP} as a function of force F_y



6.1.2 Accuracy requirements for the mounting surface

When fixing the linear axis, ensure that the axis profile is mounted on a level surface and that the fixing points are aligned with one another in such a way that the required flatness is achieved.

Fig.6 .11 : Bore spacing for mounting linear axes from below using nuts



0,2 mm/m

Accuracy requirements for the mounting surface

6.1.3 Mounting with nuts

6.1.3.1 HM-S linear modules

The nuts to be used for each axis size can be found at [Table 6.1](#). The nuts must be arranged in accordance with [Fig. 6.11](#) and [Fig. 6.13](#) or [Fig. 6.14](#). The required number of nuts depends on the external load. To calculate the required number, the load values listed in [Table 6.1](#) (clamping force per nut; permissible axial operating force in the direction of tension per nut) must be taken into account. The minimum number of nuts specified in [Table 6.1](#) must not be undercut. The nuts must be positioned in groups around fixing points, as shown in [Fig. 6.13](#) and [Fig. 6.14](#). It must be ensured that there is at least one fixing point at each end of the shaft and that each fixing point is capable of safely transmitting the external load on its own. The number and spacing of additional fixing points must be selected according to the load conditions. The L_{NX} spacings listed in [Table 6.1](#) are for guidance only.

- Drill the mounting holes in the mounting surface (hole spacings in accordance with [Table 6.1](#)).
- Clean the mounting surface and position the linear axis on the mounting surface.
- Swivel the nut into the lower groove.

- Pre-assemble the nut using the screws with a low screw tightening torque.
 - Tighten the screws at each fixing point in a criss-cross pattern, observing the specified screw tightening torques. When doing so, follow the sequence of fixing points: tighten either from the outside in or from one side to the other to avoid stress concentrations.
- ✓ The linear axis is now fitted.

When fixing the linear axes, observe the bore hole spacings L_{NY} .

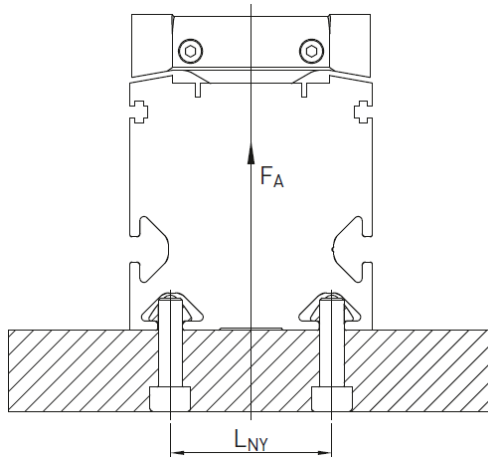


Fig.6 .12 : Permissible axial operating force in the direction of tension per nut ($F_{A_zul.}$)

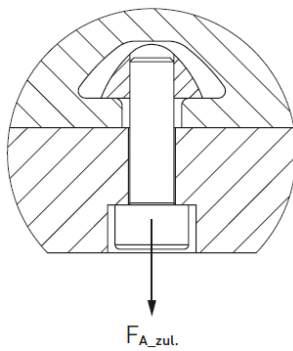


Fig.6 .13 : Mounting with nuts – HM040S, HM060S, HM080S

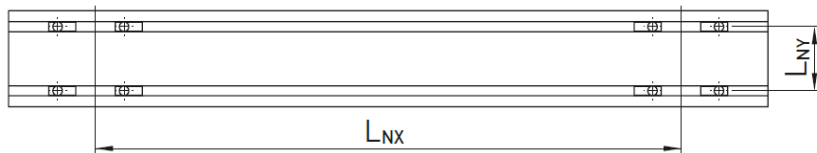


Fig.6 .14 : Fastening with nuts – HM120S

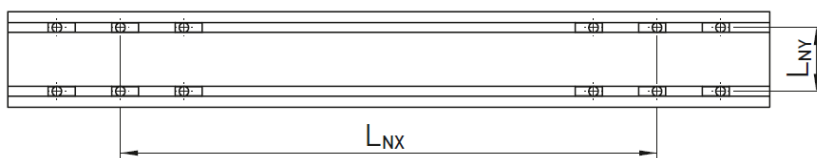


Table6.1 : Minimum number of T-nuts required to secure the axis and recommended spacing of fixing points for longer axes – HM-S linear modules

size	Minimum number of nuts	L_{NY} [mm]	Recommended spacing L_{NX} [mm]	Thread size	Screw tightening torque [Nm]	$F_{A,permissible}$ ¹⁾ [N]	Item no. nuts for t-slots (10 pcs.)
HM040S	8	20	400	M5	4.5	500	20-000529
HM060S	8	40	600	M6	10.1	1,750	20-000531
HM080S	8	40	800	M8	24.6	5,000	20-000534
HM120S	12	80	1,200	M8	24.6	5,000	20-000534

¹⁾ Permissible axial operating force in the direction of pull per nut

6.1.3.2 HT-S linear tables

The number of nut steels to be used for each shaft size can be found in Table6.2 . The nut steels must be arranged in accordance with Fig.6.15 , Fig.6.16 , Fig.6.18 , Fig.6.19 and Fig.6.20 REF. Ref84934917 \h *Charformat . The required number of nuts depends on the external load. To calculate the required number, the load values listed in Table6.2 (clamping force per nut; permissible axial force in the direction of tension per nut) must be taken into account. The minimum number of nuts specified in Table6.2 must not be undercut. The slotted nuts must be positioned in groups around fixing points, as shown in Fig.6.18 , Fig.6.19 and Fig.6.20 . It must be ensured that there is at least one fixing point at each end of the shaft and that each fixing point is capable of safely transmitting the external load on its own. The number and spacing of additional fixing points must be selected according to the load conditions. The L_{NX} spacings listed in Table6.2 are for guidance only.

- Drill the mounting holes into the mounting surface (hole spacing in accordance with Table6.2).
- Clean the mounting surface and position the linear table on the mounting surface.
- Swivel the nut into the lower groove.
- Pre-assemble the nut using the screws with a low screw tightening torque.
- Tighten the screws at each fixing point in a criss-cross pattern, observing the specified screw tightening torques. Observe the sequence of the fixing points: tighten either from the outside in or from one side to the other to avoid stress concentrations.

✓ The linear table is now installed

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

Fig.6.15 : Hole spacing for mounting the HT100S, HT150S and HT200S linear tables from below using nuts

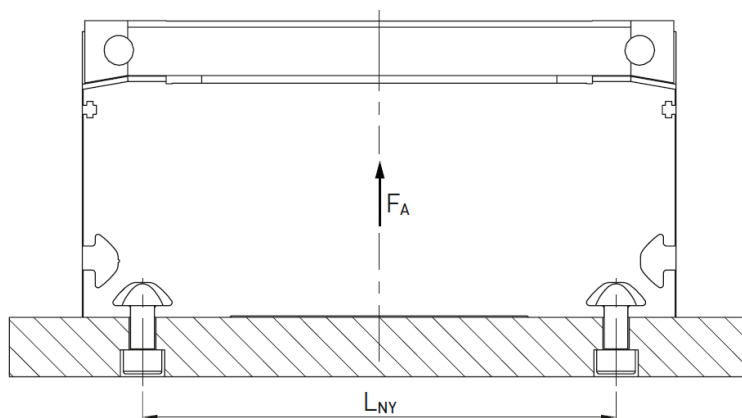


Fig.6 .16 : Hole spacing for mounting HT250S linear tables from below using t nuts

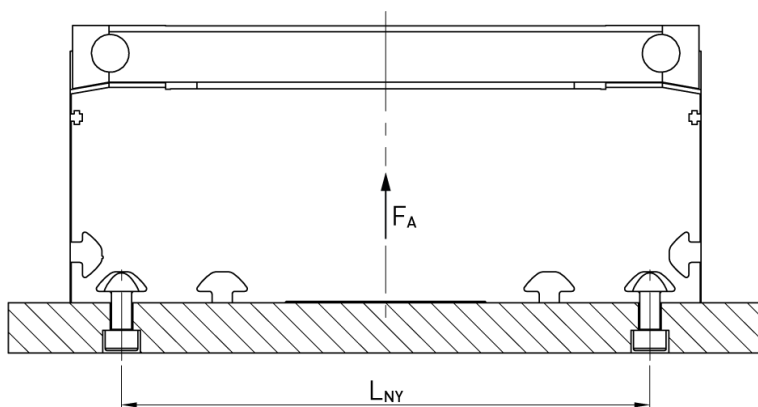


Fig.6 .17 : Permissible axial operating force in the direction of tension per t nut ($F_{A_perm.}$)

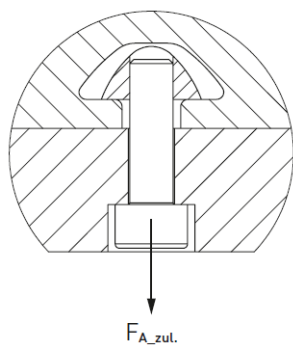


Fig.6 .18 : Mounting with nuts – HT100S, HT150S

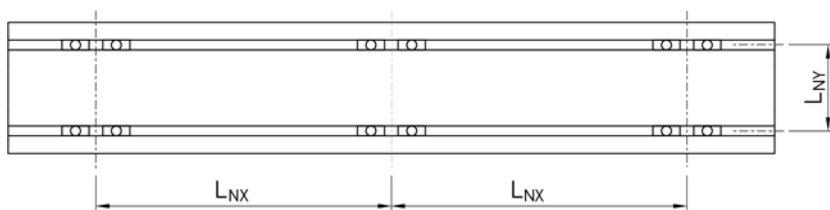


Fig.6 .19 : Fastening with nuts – HT200S

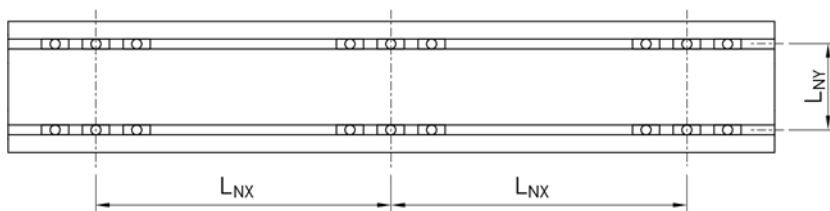


Fig.6 .20 : Fixing with nuts – HT250S

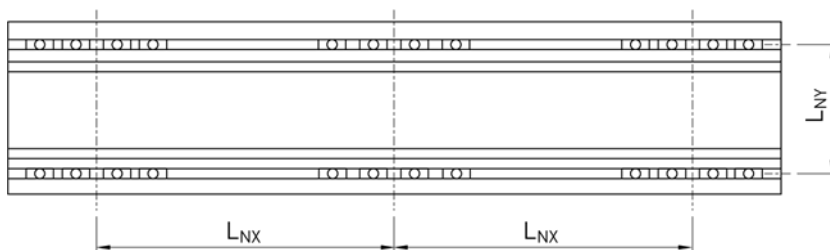


Table 6.2 : Minimum number of nuts required to secure the axis and recommended spacing of fixing points for axes of longer length – HT-S linear modules

size	Minimum number of nuts	L_{NY} [mm]	Recommended spacing L_{NX} [mm]	Thread size	Screw tightening torque [Nm]	$F_{A_permissible}$ ¹⁾ [N]	Item no. Nuts (10 pcs.)
HT100S	8	80	500	M5	4.5	500	20-000529
HT150S	8	120	600	M6	10.1	1,750	20-000531
HT200S	12	160	800	M8	24.6	5,000	20-000534
HT250S	16	210	1,000	M8	24.6	5,000	20-000534

¹⁾ Permissible axial operating force in the direction of tension per nut

6.1.4 Installation with clamping profiles

6.1.4.1 HM-S linear modules

The clamping profiles must always be fitted in pairs (to the left and right of the axis body) (see Fig. 6.22 and Fig. 6.23). The required number of clamping profiles depends on the external load. To calculate the required number, the load values listed in Table 6.3 (clamping force per clamping profile; permissible axial operating load in the direction of tension per pair of clamping profiles) must be taken into account. The minimum number of clamping profiles specified in Table 6.3 must not be undercut. It should be noted that there must be at least one fixing point at each end of the shaft and that each fixing point must be capable of safely transferring the external load on its own. The number and spacing of additional fixing points must be selected according to the load situation. The L_{SX} spacings listed in Table 6.3 are for guidance only.

- Drill the mounting holes in the mounting surface (hole spacing in accordance with Table 6.3).
- Clean the mounting surface and position the linear axis on the mounting surface.
- Swivel the clamping profile into the side groove.
- Pre-assemble the clamping profile using the screws, applying a low screw tightening torque.
- Tighten the screws at each fixing point in a criss-cross pattern, observing the specified screw tightening torques. When doing so, follow the sequence of fixing points: tighten either from the outside in or from one side to the other to avoid stress concentrations.

✓ The linear axis is now installed

When fixing the linear axes, observe the hole spacing L_{SY} (Fig. 6.21).

Fig. 6.21 : Hole spacing for lateral mounting of HM-S linear modules with clamping profiles

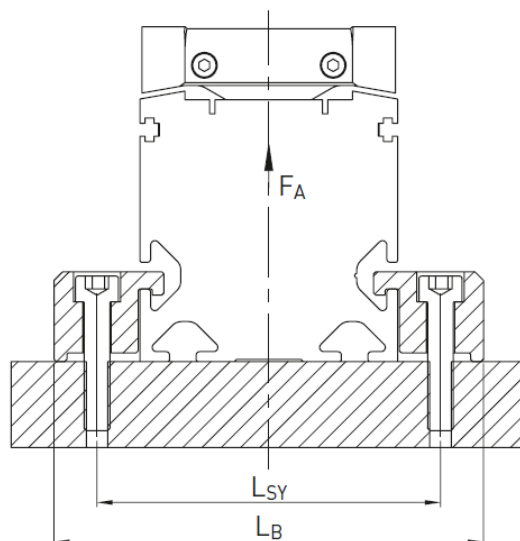


Fig.6 .22 : Mounting with clamping profiles – HM040S, HM060S, HM080S

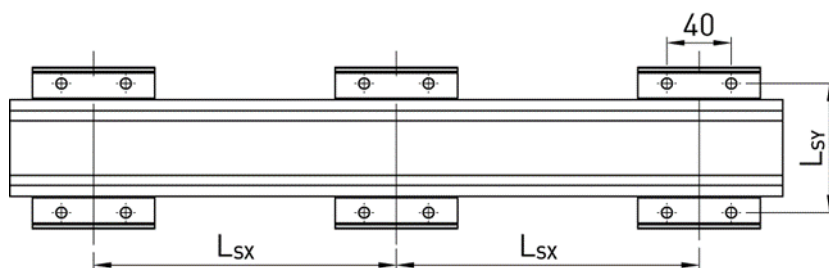


Fig.6 .23 : Mounting with clamping profiles – HM120S

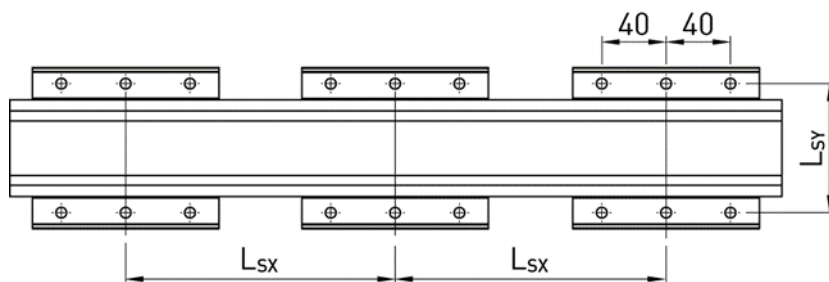


Table6.3 : Minimum number of clamping profiles required to secure the axis and recommended spacing of fixing points for axes of longer length – HM-S linear modules

size	Minimum number of clamping profiles	LSY [mm]	LB [mm]	Recommended spacing L _{SX} [mm]	Thread size	Screw tightening torque [Nm]	FA _{perm.} ¹⁾ [N]	Item no. Clamping profiles (4 pcs.)
HM040S	4	55	70	400	M5	4.9	200	25-000517
HM060S	4	80	100	600	M6	6.4	500	25-000518
HM080S	4	100	120	800	M8	18.5	1,200	25-000519
HM120S	4	140	160	1,200	M8	18.5	2,400	25-000520

¹⁾ Permissible axial operating force in the direction of tension per pair of clamping profiles

6.1.4.2 HT-S linear modules

The clamping profiles must always be fitted in pairs (to the left and right of the shaft body) (see Fig.6 .25 and Fig.6 .26). The required number of clamping profiles depends on the external load. To calculate the required number, the load values listed in Table6.4 (clamping force per clamping profile; permissible axial operating load in the direction of tension per pair of clamping profiles) must be taken into account. The minimum number of clamping profiles specified in Table6.4 must not be undercut. It should be noted that there must be at least one fixing point at each end of the shaft and that each fixing point must be capable of safely transferring the external load on its own. The number and spacing of additional fixing points must be selected according to the load situation. The L_{SX} spacings listed in Table6.4 are merely guide values.

- Drill the mounting holes into the mounting surface (hole spacing in accordance with Table6.4).
- Clean the mounting surface and position the linear table on the mounting surface.
- Swivel the clamping profile into the side groove.
- Pre-assemble the clamping profile using the screws with a low screw tightening torque.
- Tighten the screws at each fixing point in a criss-cross pattern, observing the specified screw tightening torques. Observe the sequence of the fixing points: tighten either from the outside in or from one side to the other to avoid stress concentrations.

✓ The linear table is now installed

When fixing the linear tables, observe the hole spacing L_{SY} (Fig.6.24).

Fig.6.24 : Hole spacing for lateral mounting of HT-S linear tables using clamping profiles

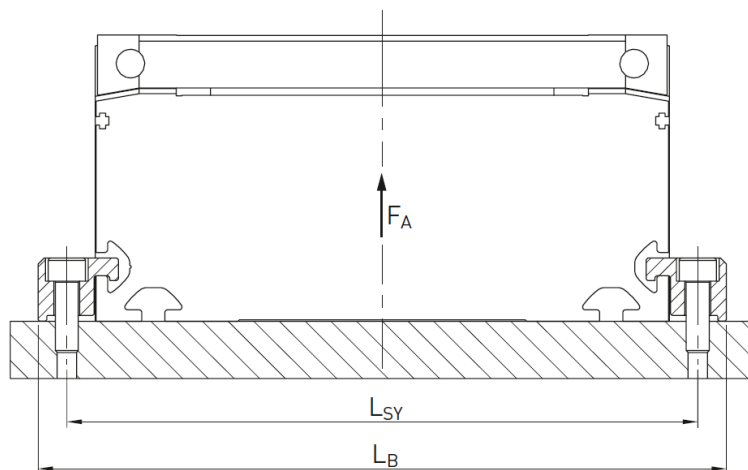


Fig.6.25 : Mounting with clamping profiles – HT100S, HT150S

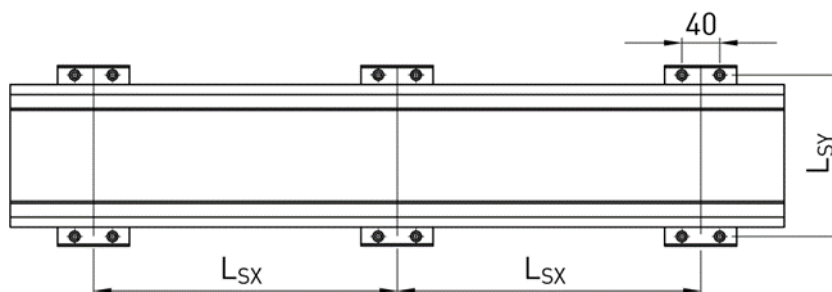


Fig.6.26 : Mounting with clamping profiles – HT200S, HT250S

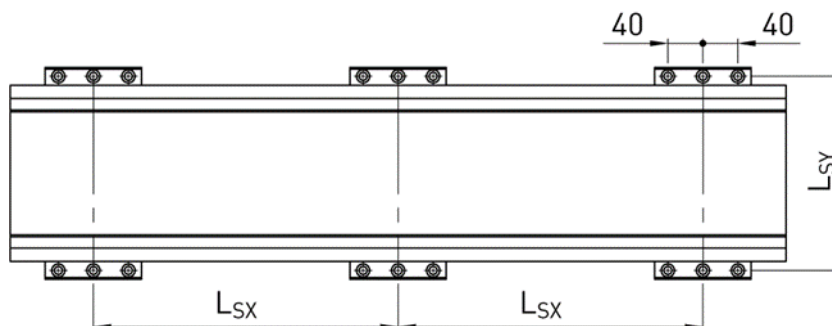


Table6.4 : Minimum number of clamping profiles required to secure the axis and recommended spacing of fixing points for longer axes – HT-S linear tables

size	Minimum number of clamping profiles	L_{SY} [mm]	L_B [mm]	Recommended spacing L_{SX} [mm]	Thread size	Screw tightening torque [Nm]	$F_{A,perm.}$ ¹⁾ [N]	Item no. Clamping profiles (4 pcs.)
HT100S	4	115	130	500	M5	4.9	800	25-000517
HT150S	4	170	190	600	M6	10.1	1,600	25-001023
HT200S	4	220	240	800	M8	18.5	3,000	25-000520
HT250S	6	270	290	1,000	M8	18.5	5,000	25-000520

¹⁾ Permissible axial operating force in the direction of tension per pair of clamping profiles

6.2 Mounting the payload

The spacing of the threaded holes for mounting the payload can be found in the 'HX Linear Axes and Axis Systems' catalogue. Additional counter bores allow for the insertion of centring sleeves. HIWIN recommends arranging two centring sleeves diagonally opposite each other. For axes with more than one slide, it is recommended that only one slide be fitted with centring sleeves in each case to avoid stress concentrations.

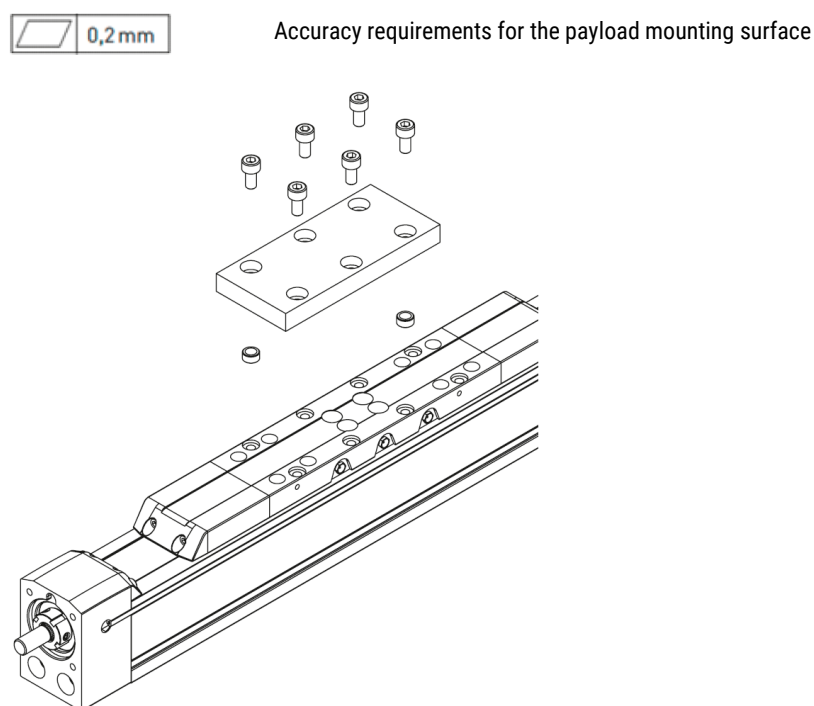
Table 6.5: Threaded holes for securing the payload

Series/Size	Thread size × depth	Counter bore depth for centring sleeve	Counter bore diameter for centring sleeve [mm]
HM040	M5 × 10	1.5	Ø8 H7
HM060	M6 × 12	1.5	Ø8 H7
HM080	M8 × 16	2.0	Ø12 H7
HM120	M10 × 22	2.0	Ø15 H7
HT100	M5 × 10	1.5	Ø8 H7
HT150	M6 × 14	1.5	Ø8 H7
HT200	M8 × 14	2.0	Ø12 H7
HT250	M10 × 20	2.0	Ø15 H7

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

✓ The payload is now fitted.

Fig. 6.27 : Mounting the load with centring sleeves, using a HM-S linear module as an example



6.3 Fitting the limit switches

The limit switches are available as either n/c contacts or normally open contacts. The limit switch can be fixed directly into the limit switch groove (T-slot) using the supplied M3 screws and square nuts. The limit switches can be fitted on either the right or left-hand side.

- If necessary, remove the green trim strip from the upper T-slot.
 - Slide two square nuts through the cut-out on the drive block into the upper T-slot.
 - Fit the limit switch using both screws (see Fig. 6.28). For sizes HM040 and HT100, the limit switch is mounted either with a spacer plate and M3x12 screws or without a spacer plate using M3x10.8 screws, depending on the type. Leave both screws loosely tightened for now.
 - Slide the limit switch into the desired position and press it gently upwards.
 - Tighten the screws. The screw tightening torque is 0.5 Nm.
- ✓ The limit switches are now fitted.

Fig. 6.28 : Fitting limit switches: HM040S, HT100S

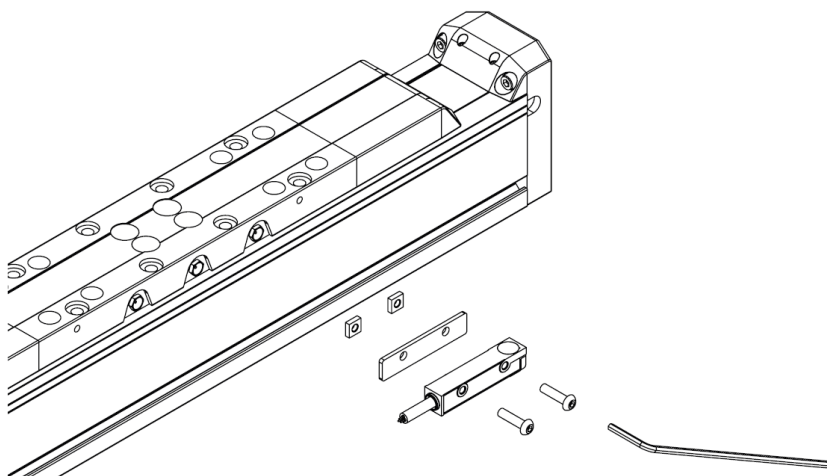
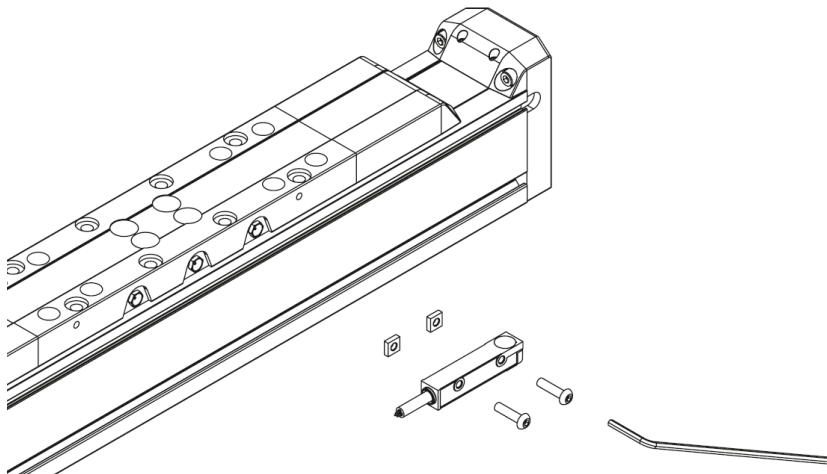


Fig. 6.29 : Fitting limit switches: HM060S, HM080S, HM120S, HT150S, HT200S, HT250S

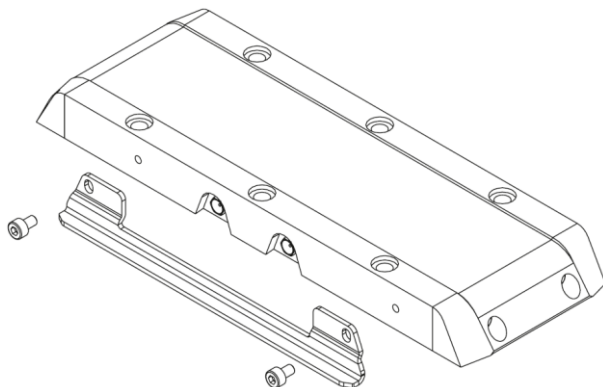


6.4 Fitting the damping element

The damping element is used to activate the limit switches in the two end positions of the slide (at stroke 0 and maximum stroke) and must be fitted on the same side as the limit switches.

- Position the damping element against the slide.
- Lightly screw the damping element to the slide using the screws provided.
- Align the damping element parallel to the lower edge of the carriage.
- ✓ The damping element is pre-assembled.

Fig.6 .30 : Fitting the damping element



6.5 Adjusting the switching distance

The limit switches operate inductively and require a defined switching distance between the limit switch and the damping element.

Table6.6: Standard without head

Switching distance	1 mm
Screw tightening torque	1 Nm

- Move the slide until the damping element is positioned above a limit switch. Use a feeler gauge to align the damping element so that the switching distance of 1 mm is maintained. Ensure that the damping element remains aligned parallel to the lower edge of the slide.
- Tighten the screws on the damping element to the specified screw tightening torque.
- If a second limit switch is fitted: Move the slide until the damping element is positioned above the second limit switch and use a feeler gauge to check that the switching clearance is maintained. Adjust as necessary until the switching clearance is maintained at both limit switches.
- Route the limit switch cable through the lower groove. There, the cable can be protected by the groove cover. The groove cover is available separately; see the section12 .
- ✓ The switching distance has been set.
- Check that the limit switch is functioning correctly before commissioning, either using a limit switch test box or by moving the system to the end positions in a controlled manner.

Fig.6 .31 : Adjusting the switching distance using a feeler gauge and tightening the screws

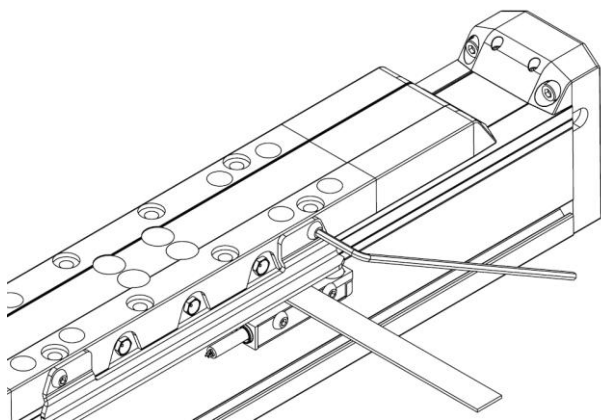
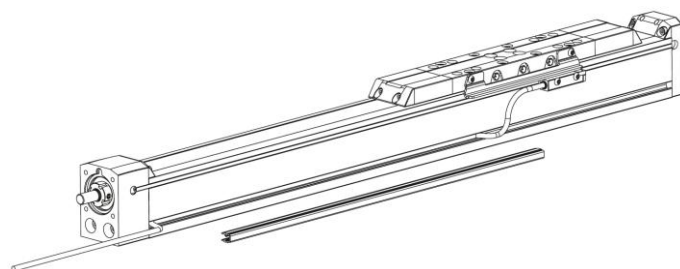


Fig.6 .32 : Limit switch installation: Routing the cables



6.6 Installation of the drive adapter for the HM-S linear axis

6.6.1 Fitting the coupling assembly

A suitable coupling assembly is required for mounting the motor. You will find this in [Chapter11 Drive adaptation](#) .

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

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

There are two designs of clamping hub:

- Variant 1 with one clamping bolt – see [Fig.6 .33](#)
- Variant 2 with two clamping bolts – see [Fig.6 .34](#)

Fig.6 .33 : Coupling assembly, variant 1: clamping hubs with one clamping bolt

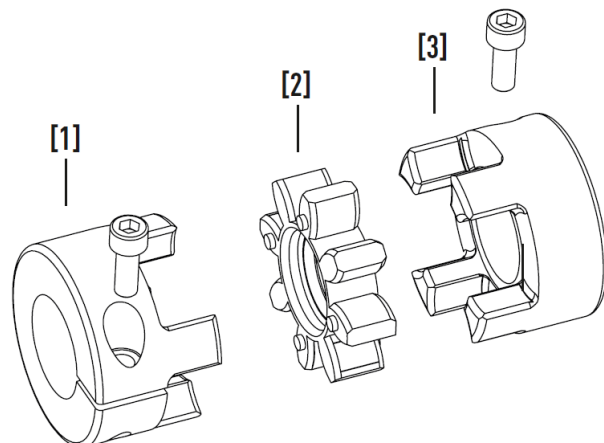
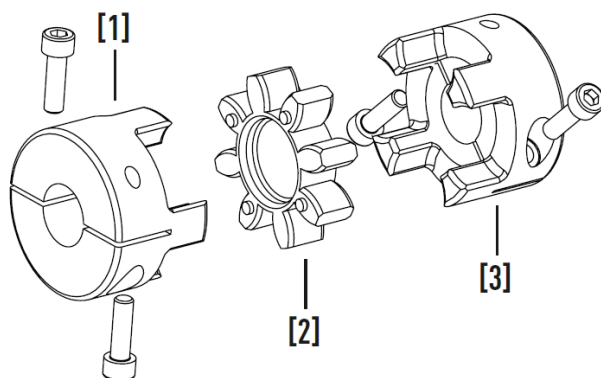


Fig.6 .34 : Coupling assembly, variant 2: clamping hubs with two clamping bolts



Please ensure before assembly that

- no parts are damaged
- all parts are free from dirt and grease

The screw tightening torques listed in [Table6.7](#) and [Table6.8](#) apply to the assembly of the coupling assembly:

Table6.7 : Screw tightening torques for the clamping hub

size	Screw tightening torque for clamping hub, variant 1 [Nm]	Screw tightening torque for clamping hub, variant 2 [Nm]
HM040S	1.9	2.1
HM060S	5.0	5.0 ²⁾
HM080S	14.0 ¹⁾	14.0 ³⁾
HM120S	14.0	15.0

¹⁾ Special version with clamping diameter 24 mm: 10 Nm

²⁾ Special version with clamping diameter 16 mm: 4.0 Nm

³⁾ Special version with clamping diameters of 22 and 24 mm: 10 Nm

Table6.8 : Screw tightening torques for the coupling housing

size	Screw strength class	Thread size	Screw tightening torque [Nm]
HM040S	8.8	M4	3.0
HM060S	8.8	M5	6.0
HM080S	8.8	M6	10.0
HM120S	8.8	M8	25.0

Fitting the clutch assembly:

- Carefully press the clamping hub onto the journal of the shaft until dimension L_1 (see [Table6.9](#)) is achieved.

Fig.6 .35 : Fitting the clamping hub onto the drive journal of the HM-S linear axis

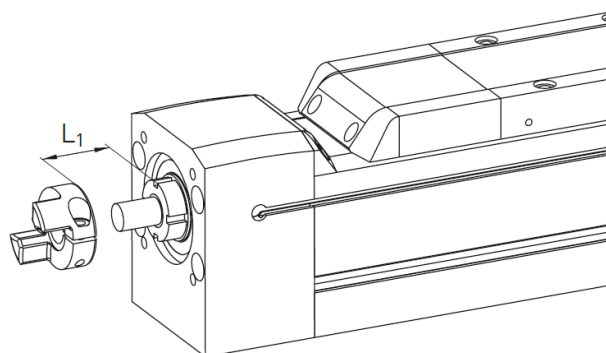


Table 6.9 : Setting the distance between the clamping hub and the lock nut using dimension L_1

size	L_1 variant 1 [mm]	L_1 variant 2 [mm]
HM040S	5.5 ¹⁾	5.5
HM060S	7.5 ²⁾	7.5
HM080S	3.5 ³⁾	3.5
HM120S	4.5 ⁴⁾	6.5

¹⁾ Up to serial number HSN 0000000669: $L_1 = 3$ mm

²⁾ Up to serial number HSN 0000002990: $L_1 = 5$ mm

³⁾ Up to serial number HSN 0000004905: $L_1 = 0$ mm

⁴⁾ Up to serial number HSN 0000002990: $L_1 = 0$ mm

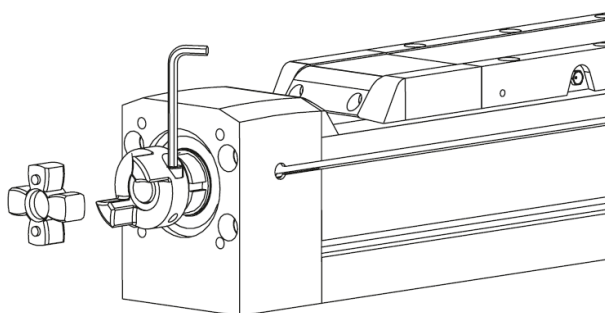
Variant 1:

- Tighten the screw on the clamping hub. For the screw tightening torque, see [Table 6.7](#).

Option 2:

- First, position the screw on the first side of the clamping hub, then tighten the screw on the second side and finally on the first side to the screw tightening torque specified in [Table 6.7](#).
- Press the elastomer insert into the clamping hub.

Fig. 6.36 : Tightening the clamping hub and fitting the elastomer insert



Note:

The elastomer insert must be slightly preloaded and should have no backlash. If it fits too loosely, it must be replaced. Lightly greasing the elastomer insert with a PU-compatible lubricant can make installation easier.

- Fit the KB coupling housing using 4 screws so that it lies flat. For screw tightening torques, see [Table 6.8](#).
- Slide the clamping hub onto the elastomer insert until the dimension L_2 (see [Table 6.10](#)) is achieved.

Fig. 6.37 : Fitting the clamping hub and the KB coupling housing to the HM-S linear axis

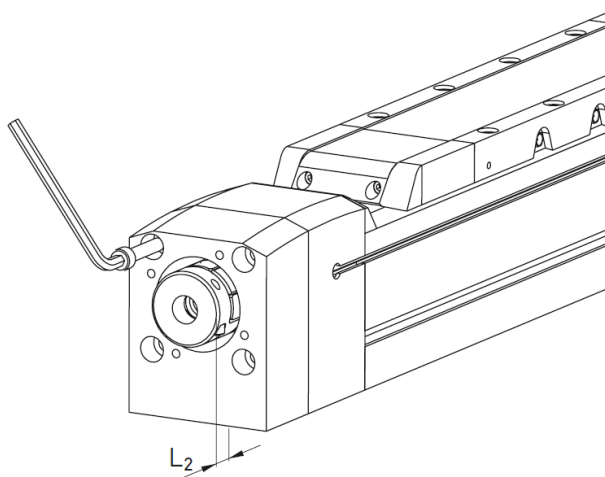
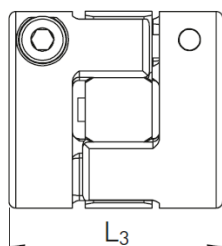


Table6.10 : Adjustment of the coupling distance via dimension L_2

size	Coupling size	L_2 variant 1 [mm]	L_2 variant 2 [mm]
HM040S	12	8.5	8.5
HM060S	14	10.0	10.0
HM080S	19	14.0	14.0
HM120S	24	16.5	14.5

Fig.6 .38 : Overall length of the HM-S coupling assembly


Note:

When installing without a coupling housing, the coupling distance L_3 must be set in accordance with [Fig.6 .38](#) and [Table6.11](#) .

 Table6.11 : Setting the coupling distance via dimension L_3 for installation without a 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 Fitting the motor

- Fit the motor adapter plate AM flush, taking care to ensure the correct position of the hole for the clamping bolt on the clamping hub.
- Tighten the 4 screws. For screw tightening torques, see [Table6.12](#) .

Fig.6 .39 : Fitting the AM motor adapter plate

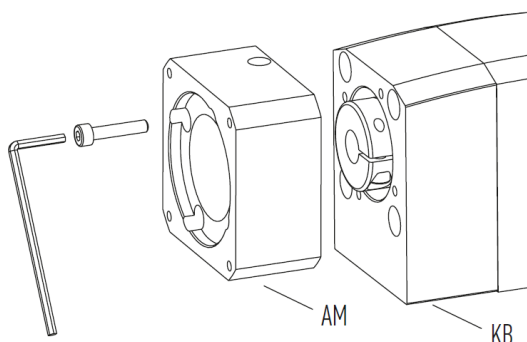
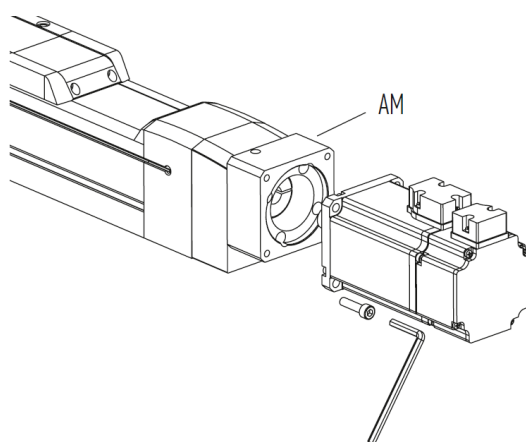


Table 6.12 : Screw tightening torques for the motor adapter plate AM

size	Strength class of screw	Thread size	Screw tightening torque [Nm]
HM040S	8.8	M4	3.0
HM060S	8.8	M5	6.0
HM080S	8.8	M6	10.0
HM120S	8.8	M8	25.0

- Secure the motor to prevent it from falling.
- Place the motor flat on the AM motor adapter plate.
- Secure the motor in accordance with the manufacturer's instructions.

Fig.6 .40 : Securing the motor with screws



Note:

Ensure that the motor is slid on straight so that the previously set dimension L remains unchanged.

- Remove the side locking elements from the motor adapter plate AM.
- Move the slide to position the clamping hub so that the screw(s) of the clamping hub align with the borehole.

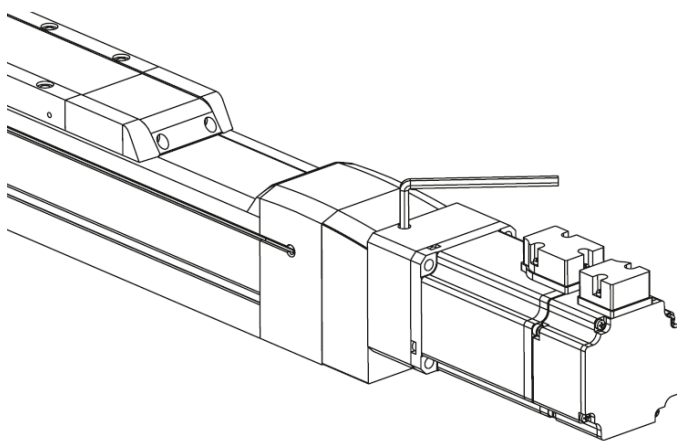
Option 1:

- Tighten the clamping hub screw through the bore to the screw tightening torque specified in [Table 6.7](#).

Option 2:

- Tighten both screws of the clamping hub one after the other through the bore. First apply the screw on the first side, then tighten the screw on the second side and finally on the first side to the screw tightening torque specified in [Table 6.7](#).
- Fit the locking elements into the motor adapter plate AM until they reach the stop.
- ✓ The motor is now fitted.

Fig.6 .41 : Tightening the clamping hub on the motor shaft



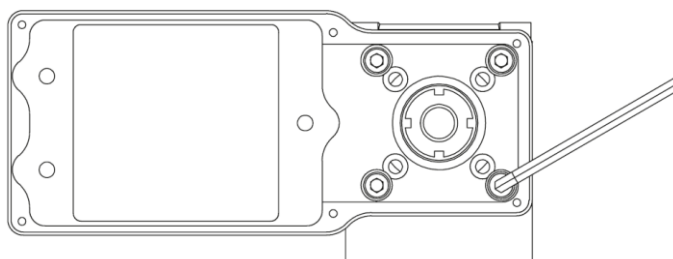
6.6.3 Fitting the belt drive

- Align the belt drive housing in the desired direction and place it flat on the drive block of the axis.
- Tighten the 4 screws. For screw tightening torques, see [Table6.13](#) . Secure the screws.

Table6.13 : Mounting bolts for belt drive housing

size	Strength class of screw	Thread size × length	Screw tightening torque [Nm]
HM040S	8.8	M4 × 12	3.0
HM060S	8.8	M5 × 12	6.0
HM080S	8.8	M6 × 16	10.0
HM120S	8.8	M8 × 20	25.0

Fig.6 .42 : Fitting the belt drive housing

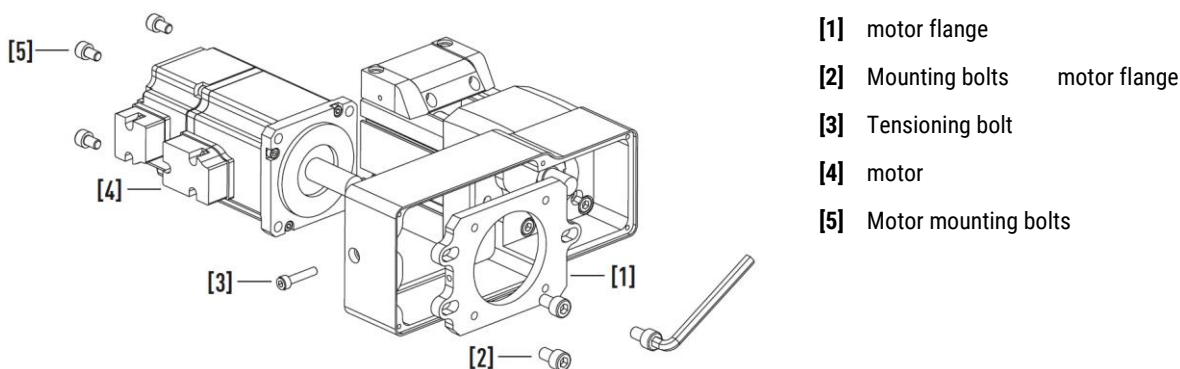


- Insert the motor flange **[1]** into the designated opening in the housing.
- Lightly tighten the mounting bolts **[2]** for the motor flange.
- Push the motor flange until it reaches the stop in the direction of the linear axis.
- Screw the clamping screw **[3]** into the motor flange through the front bore of the housing until the screw head lies flush.
- Fit the motor **[4]** via the rear of the housing, as shown in [Fig.6 .43](#) . The length of the motor-specific mounting bolts **[5]** must be selected so that they protrude by a maximum of 0.5 mm towards the inside of the housing.

Table6.14 : Motor flange mounting bolts and clamping screw

size	Motor flange mounting bolt				Clamping screw	
	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

Fig.6 .43 : Assembly of motor flange, clamping screw and motor



- Slide the clamping assembly [7] for the toothed washer [6] onto the shaft end until it reaches the stop. Slide the pre-assembled unit (clamping assembly and toothed washer) onto the shaft end of the shaft axis [8]. Whilst doing so, use a feeler gauge to ensure that the safety clearance between the toothed washer and the housing is maintained in accordance with Fig.6 .45 .
- Slide the clamping assembly [9] for the toothed washer [10] onto the motor side until it reaches the stop. Fit the pre-assembled unit (clamping assembly and toothed washer) onto the motor shaft [11].
- Use a feeler gauge to ensure that a safety clearance, as shown in Fig.6 .45 , is maintained between the flange of the toothed washer and the motor flange.
- Tighten the clamping screws of the clamping sets in a crosswise pattern in 3 stages to the screw tightening torque specified in Table6.15 and Table6.16 .
- Then retighten the tensioning bolts of the tensioning sets in sequence to the screw tightening torques specified in Table6.15 and Table6.16 .
- First place the toothed belt over the motor-side toothed washer, then over the axle-side toothed washer.

Fig.6 .44 : Fitting the toothed washers and toothed belts

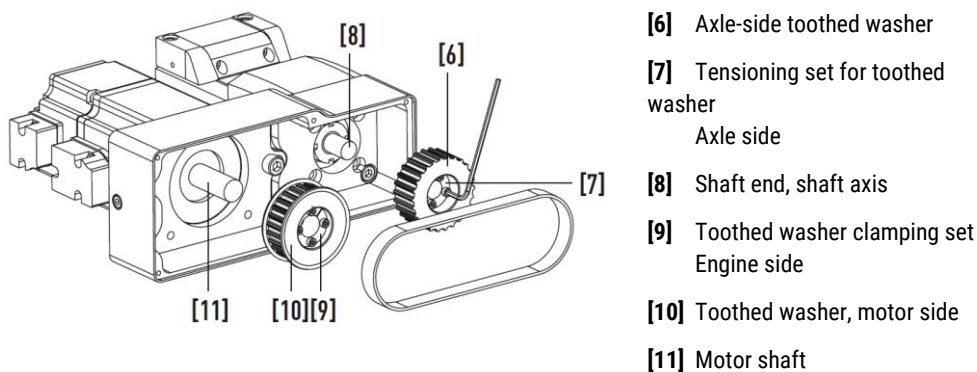


Fig.6 .45 : Safety clearances between the flange of the toothed washer (motor side) and the motor flange, and between the toothed washer (shaft side) and the housing

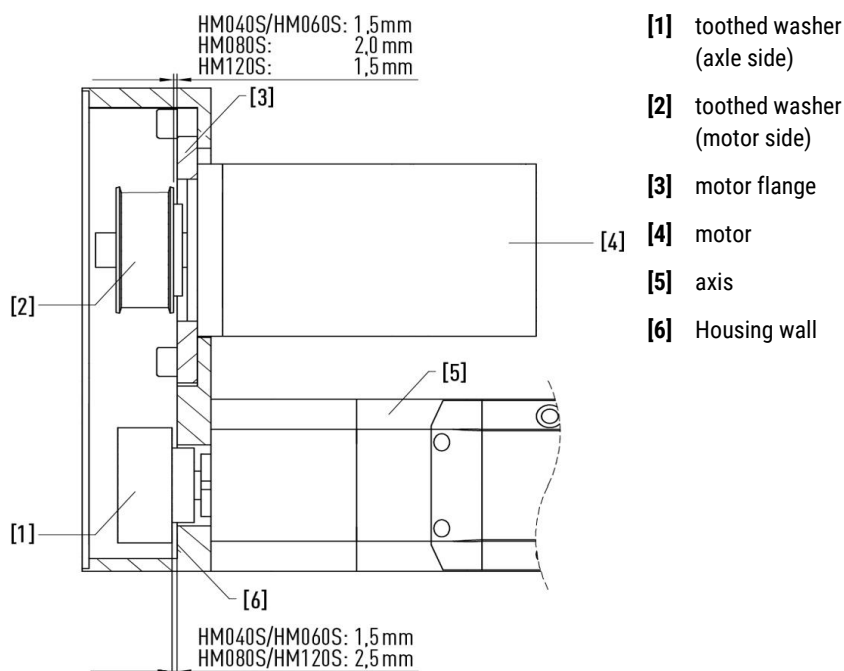


Table6.15 : Tightening torques for clamping screws, clamping set, shaft side

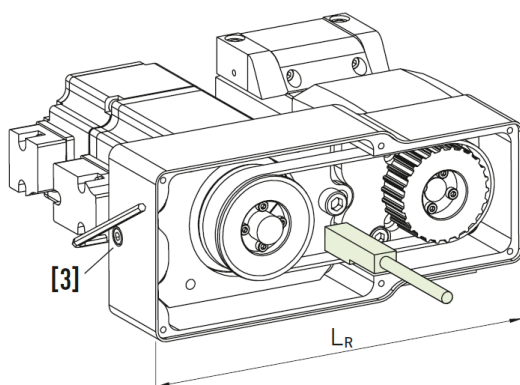
Linear axis [mm]	Screw tightening torque for clamping screw [Nm]
HM040S, HM060S, HM080S	1.2
HM120S	9.7

Table6.16 : Tightening torques for clamping screws, motor-side clamping set

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

- Ensure that the axis is unloaded and that the motor is not energised.
- Carefully tighten the clamping screw [3] on the front of the housing until the belt frequency, calculated using the formula [F6.1](#), is set to within $\pm 10\%$. This must be determined via the inside of the belt using a belt tension gauge, as shown in [Fig.6 .46](#). If the frequency is within the specified range, the mounting bolts [2] of the motor flange can be tightened in accordance with [Table6.14](#). Secure the screws.
- Check the preload again, as tightening the screws may cause a slight change.

Fig.6 .46 : Setting the belt frequency



Determining the belt frequency

F6.1

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

$f_{\min}$ Minimum belt frequency [Hz] (see [Table6.17](#))

f Belt frequency [Hz]

M Application-dependent motor drive torque [Nm]

X Factor for determining the belt frequency [Nm/Hz^2] (see [Table6.17](#))

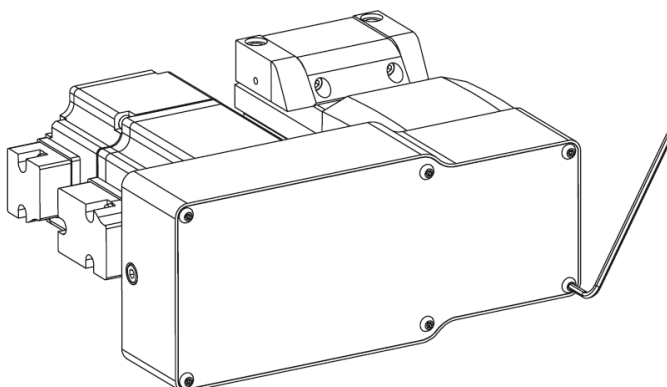
Table6.17 : Factor for determining the belt frequency

size	Belt drive variant ¹⁾	Up to serial no. HSN 0000003845		CS: From serial no. HSN 0000003846		$f_{\min}$ [Hz]
		X [Nm/Hz^2]	L_R [mm]	X [Nm/Hz^2]	L_R [mm]	
HM040S	V1	64	168.5	35	168.5	168
HM060S	V1	64	168.5	35	168.5	168
	V2	59	198.5	52	201.5	138
HM080S	V1	193	236.0	181	236.0	136
	V2	244	265.0	229	265.0	121
HM120S	V1	1,405	303.5	696	303.5	114
	V2	1,193	343.0	887	343.0	101

¹⁾ Belt drive variant depending on the selected motor; see [Table11.1](#) from page81 .

- Cover the belt drive with the cover plate.
- Tighten the supplied M3 × 6 pan-head screws to a torque of 1.0 Nm.
- ✓ The belt drive is now fitted.

Fig.6 .47 : Fitting the cover plate for the belt drive



6.7 Assembly of the drive unit for the HT-S linear table

6.7.1 Fitting the coupling assembly

A suitable coupling assembly is required for mounting the motor. You will find this in [section 11.2.4](#) on [page 86](#)).

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

- Clamping hub for the axis side **[1]**
- Elastomer insert **[2]**
- Clamping hub for drive side **[3]**

There are two designs of clamping hub:

- Variant 1 with one clamping bolt – see [Fig.6 .48](#)
- Variant 2 with two clamping bolts – see [Fig.6 .49](#)

Fig.6 .48 : Clutch assembly, variant 1, with clamping hubs featuring a single clamping bolt

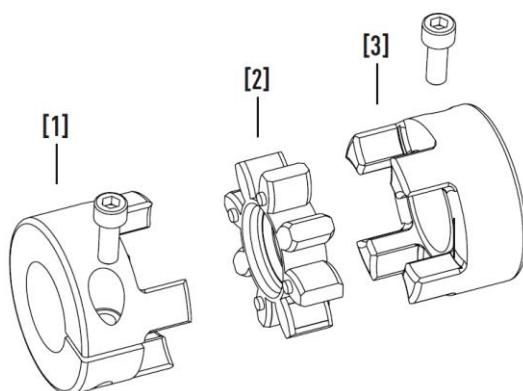
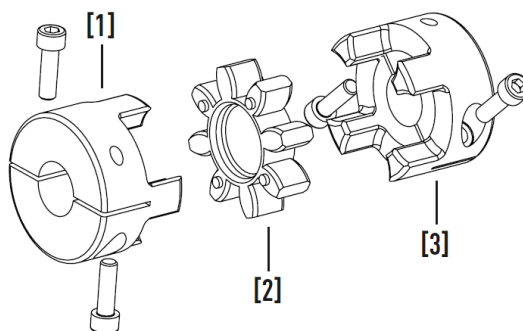


Fig.6 .49 : Coupling assembly, variant 2, with clamping hubs with two clamping bolts



Please ensure before assembly that

- no parts are damaged
- all parts are free from dirt and grease

The screw tightening torques listed in [Table 6.18](#) and [Table 6.19](#) apply to the assembly of the coupling assembly.

Table6.18 : Screw tightening torques for the clamping hub

size	Screw tightening torque for clamping hub, variant 1 [Nm]	Screw tightening torque for clamping hub, variant 2 [Nm]
HT100S	5.0	5.0 ²⁾
HT150S	14.0 ¹⁾	14.0 ³⁾
HT200S	14.0 ¹⁾	14.0 ³⁾
HT250S	14.0	15.0

¹⁾ Special version with a clamping diameter of 24 mm: 10 Nm

²⁾ Special version with a clamping diameter of 20 mm: 4.0 Nm

³⁾ Special version with clamping diameters of 22 and 24 mm: 10 Nm

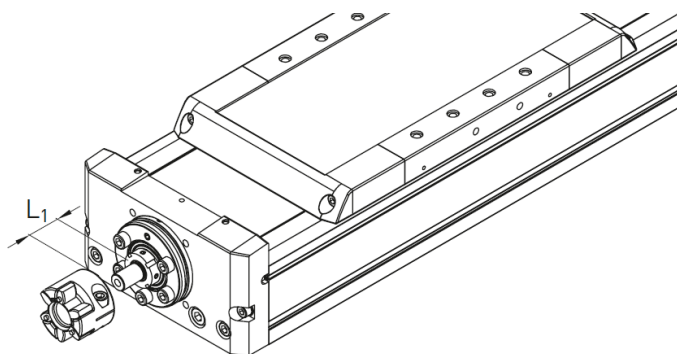
Table6.19 : Screw tightening torques for the coupling housing

size	Screw strength class	Thread size	Screw tightening torque [Nm]
HT100S	8.8	M5	6.0
HT150S	8.8	M6	10.0
HT200S	8.8	M6	10.0
HT250S	8.8	M8	25.0

Fitting the clutch assembly:

- Carefully press the clamping hub onto the journal of the shaft until dimension L_1 (see [Table6.20](#)) is achieved.

Fig.6 .50 : Fitting the clamping hub onto the drive journal of the HT-S linear table


 Table6.20 : Adjusting the distance from the clamping hub to the lock nut using dimension L_1

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

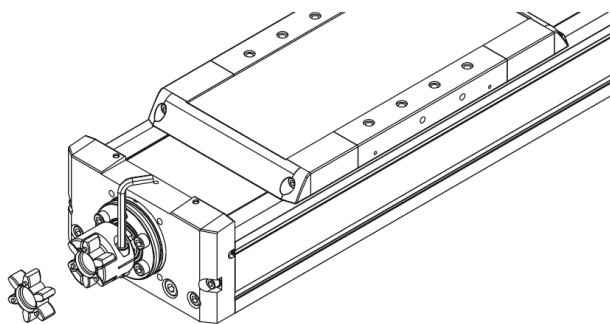
Option 1:

- Tighten the screw on the clamping hub. For the screw tightening torque, see [Table6.18](#) .

Method 2:

- First, position the screw on the first side of the clamping hub, then tighten the screw on the second side and finally on the first side to the screw tightening torque specified in [Table6.18](#) .
- Press the elastomer insert into the clamping hub.

Fig.6 .51 : Tightening the clamping hub and fitting the elastomer insert (HT150S, HT200S)



Note:

The elastomer insert must be slightly preloaded and should not have any backlash. If it fits too loosely, it must be replaced. Lightly greasing the elastomer insert with a PU-compatible lubricant can make installation easier.

- Fit the KB coupling housing using 4 screws so that it sits flush. For screw tightening torques, see [Table6.19](#) .
- Slide the clamping hub onto the elastomer insert until the dimension L_2 (see [Table6.21](#)) is achieved.

Fig.6 .52 : Fitting the clamping hub and the KB coupling housing to the HT-S linear tables

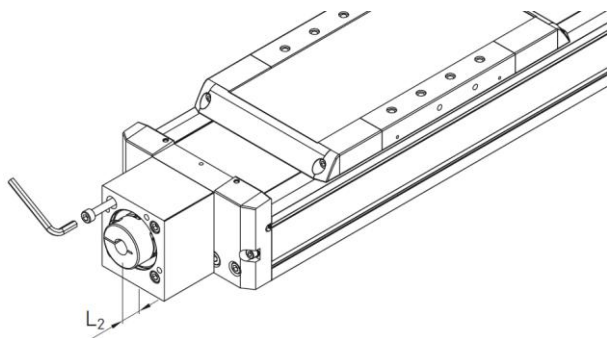
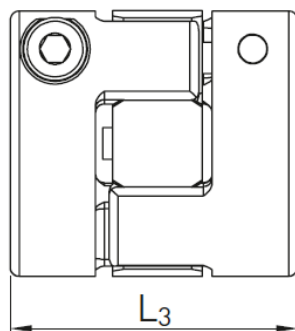


Table6.21 : Adjustment of the coupling distance via dimension L_2

size	Coupling size	L_2 variant 1 [mm]	L_2 variant 2 [mm]
HT100S	14	10.0	10.0
HT150S	19	14.0	14.0
HT200S	19	14.0	14.0
HT250S	24	16.5	14.5

Fig.6 .53 : Overall length of the coupling assembly (HT-S)



Note:

When installing without a coupling housing, the coupling distance L_3 must be set in accordance with [Fig.6 .53](#) and [Table6.22](#) .

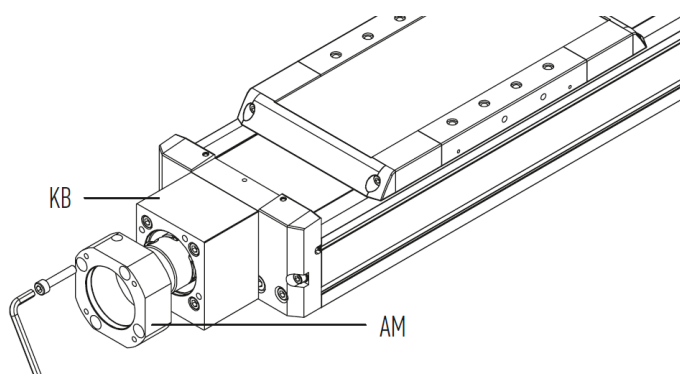
Table6.22 : Setting the coupling distance via dimension L_3 for installation without a coupling housing

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

6.7.2 Fitting the motor

- Fit the motor adapter plate AM flush, taking care to ensure the correct position of the hole for the clamping bolt on the clamping hub.
- Tighten the 4 screws. For screw tightening torques, see [Table6.23](#) .

Fig.6 .54 : Fitting the motor adapter plate AM



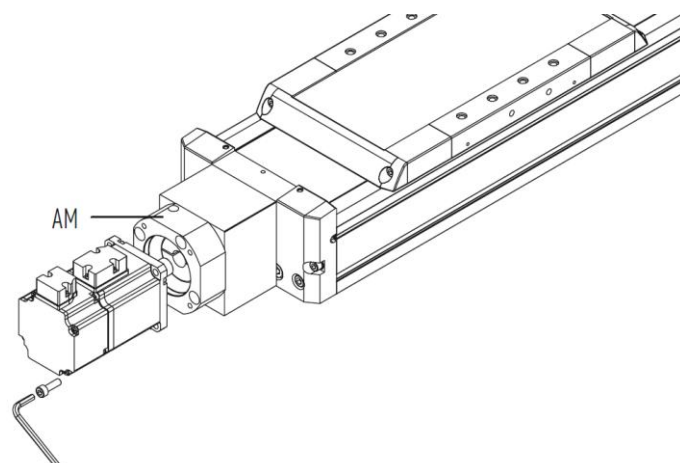
KB coupling housing

Table6.23 : Screw tightening torques for the motor adapter plate AM

size	Strength class of screw	Thread size	Screw tightening torque [Nm]
HT100S	8.8	M5	6.0
HT150S	8.8	M6	10.0
HT200S	8.8	M6	10.0
HT250S	8.8	M8	25.0

- Secure the motor to prevent it from falling.
- Place the motor flat on the motor adapter plate AM.
- Secure the motor in accordance with the manufacturer's instructions.

Fig.6 .55 : Securing the motor to the HT-S linear table



Note:

Ensure that the motor is slid on straight so that the previously set dimension L remains unchanged.

- Remove the side locking elements from the motor adapter plate AM.
- Move the slide to position the clamping hub so that the screw(s) of the clamping hub align with the hole.

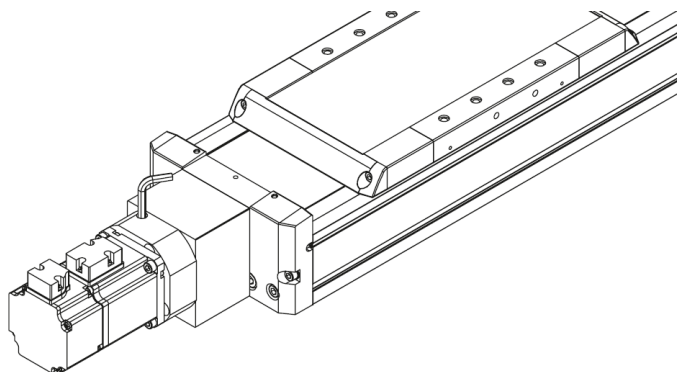
Option 1:

- Tighten the clamping hub screw through the bore to the screw tightening torque specified in [Table 6.18](#).

Option 2:

- Tighten both screws of the clamping hub one after the other through the bore. First apply the screw on the first side, then tighten the screw on the second side and finally on the first side to the screw tightening torque specified in [Table 6.18](#).
- Fit the locking elements into the motor adapter plate AM until they reach the stop.
- ✓ The motor is now fitted.

Fig.6 .56 : Tightening the clamping hub on the motor shaft



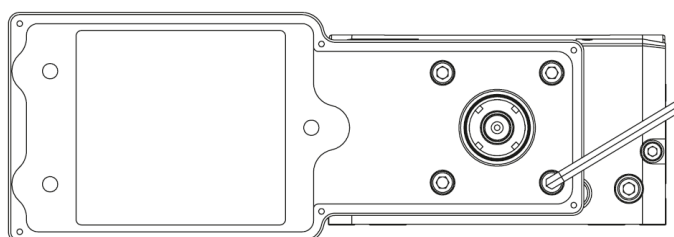
6.7.3 Fitting the belt drive

- Align the belt drive housing in the desired direction and place it flat on the drive block of the axis.
- Tighten the 4 screws. For screw tightening torques, see [Table 6.24](#). Secure the screws.

Table 6.24 : Mounting bolts for belt drive housing

size	Strength class of screw	Thread size × length	Screw tightening torque [Nm]
HT100S	8.8	M5 × 16	6.0
HT150S	8.8	M6 × 25	10.0
HT200S	8.8	M6 × 25	10.0
HT250S	8.8	M8 × 30	25.0

Fig.6 .57 : Fitting the belt drive housing

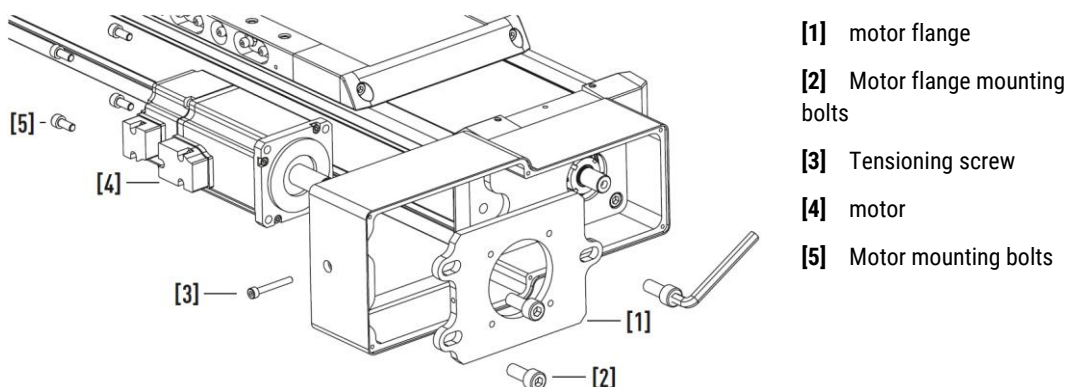


- Insert the motor flange **[1]** into the designated opening in the housing.
- Lightly tighten the mounting bolts **[2]** for the motor flange.
- Push the motor flange until it reaches the stop in the direction of the linear axis.
- Screw the clamping screw **[3]** into the motor flange through the front bore of the housing until the screw head lies flush.
- Fit the motor **[4]** via the rear of the housing, as shown in [Fig.6 .58](#) . The length of the motor-specific mounting bolts **[5]** must be selected so that they protrude by a maximum of 0.5 mm towards the inside of the housing.

Table6.25 : Motor flange mounting bolts and clamping screw

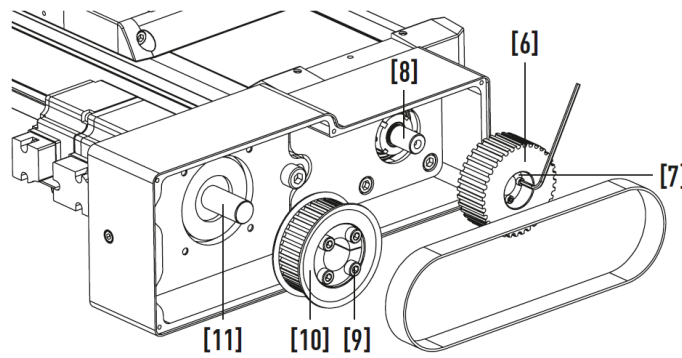
Size	Motor flange mounting bolt				Clamping screw	
	Strength class	Thread size × length	Number [pcs.]	Screw tightening torque [Nm]	Strength class	Thread size × length
HT100S	8.8	M6 × 12	3	10	8.8	M4 × 20
HT150S	8.8	M8 × 20	3	25	8.8	M4 × 30
HT200S	8.8	M8 × 20	3	25	8.8	M4 × 30
HT250S	8.8	M8 × 25	4	25	8.8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

Fig.6 .58 : Assembly of motor flange, clamping screw and motor



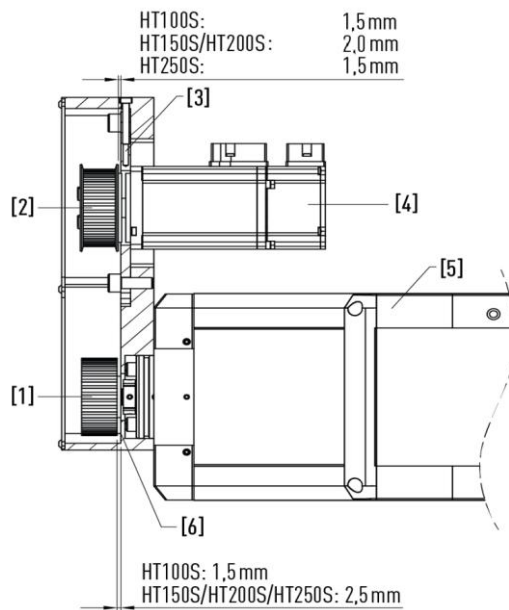
- Slide the clamping assembly **[7]** for the toothed washer **[6]** onto the shaft end until it reaches the stop. Slide the pre-assembled unit (clamping assembly and toothed washer) onto the shaft end of the shaft axis **[8]**. Whilst doing so, use a feeler gauge to ensure that the safety clearance between the toothed washer and the housing is maintained in accordance with [Fig.6 .60](#) .
- Slide the clamping assembly **[9]** for the toothed washer **[10]** onto the motor side until it reaches the stop. Fit the pre-assembled unit (clamping assembly and toothed washer) onto the motor shaft **[11]**.
- Use a feeler gauge to ensure that a safety clearance, as shown in [Fig.6 .60](#) , is maintained between the flange of the toothed washer and the motor flange.
- Tighten the clamping screws of the clamping sets in a crosswise pattern in 3 stages to the screw tightening torque specified in [Table6.26](#) and [Table6.27](#) .
- Then retighten the tensioning bolts of the tensioning sets in sequence to the screw tightening torques specified in [Table6.26](#) and [Table6.27](#) .
- First place the toothed belt over the motor-side toothed washer, then over the axle-side toothed washer.

Fig.6 .59 : Fitting toothed washers and toothed belts



- [6] Toothed washer, axle side
- [7] Tensioning set for toothed washer
Axle side
- [8] Shaft end, shaft axis
- [9] Clamping set for toothed washer
Motor side
- [10] Toothed washer, motor side
- [11] Motor shaft

Fig.6 .60 : Safety clearances between the flange of the toothed washer (motor side) and the motor flange, and between the toothed washer (shaft side) and the housing



- [1] Toothed washer (axle side)
- [2] Toothed washer (motor side)
- [3] motor flange
- [4] motor
- [5] axis
- [6] Housing wall

Table6.26 : Tightening torques for clamping screws, clamping set, shaft side

size	Screw tightening torque for clamping screw [Nm]
HT100S, HT150S	1.2
HT200S	4.9
HT250S	9.7

Table6.27 : Tightening torques for clamping screws, motor-side clamping set

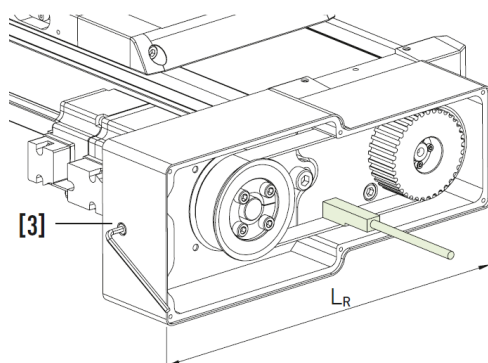
size	Screw tightening torque for clamping screw [Nm]
6 – 12	1.2
14 – 15	2.1
16 – 19	4.9
20	9.7
22–32	17.0

- Ensure that the axis is unloaded and that the motor is not energised.
- Carefully tighten the clamping screw [3] on the front of the housing until the belt frequency, calculated using the formula $F_{6.2}$, is achieved within ± 10 per cent. This must be determined by measuring the inside of the belt using a belt speed meter, as shown in Fig.6 .61 . If the

frequency is within the specified range, the mounting bolts [2] of the motor flange can be tightened in accordance with Table 6.25. Secure the screws.

- Check the preload again, as tightening the screws may cause a slight change.

Fig.6 .61 : Setting the belt frequency



Determining the belt frequency

F6.2

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

$f_{\min}$ Minimum belt frequency [Hz] (see Table 6.17)

f Belt frequency [Hz]

M Application-dependent motor drive torque [Nm]

X Factor for determining the belt frequency [Nm/Hz^2] (see Table 6.28)

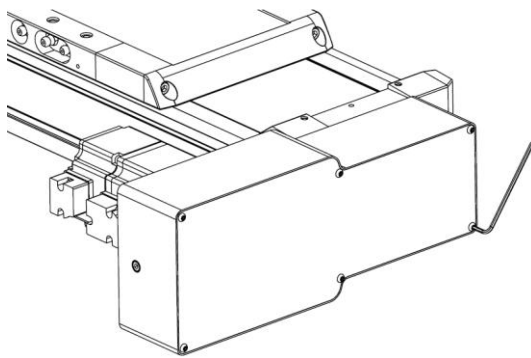
Table 6.28 : Factor for determining the belt frequency

size	Belt drive variant ¹⁾	X [Nm/Hz^2]	L_R [mm]	$f_{\min}$ [Hz]
HT100S	V1	53	186.5	137
	V2	80	225.5	111
HT150S	V1	243	255.5	117
	V2	317	289.5	103
HT200S	V1	317	279.5	103
	V2	390	311.0	92
HT250S	V1	1,196	348.7	87
	V2	1,600	400.2	75

¹⁾ Belt drive variant depending on the selected motor; see Table 11.1.

- Cover the belt drive with the cover plate.
- Tighten the supplied M3 × 6 pan-head screws to a torque of 1.0 Nm.
- ✓ The belt drive is now fitted.

Fig.6 .62 : Fitting the cover plate for the belt drive



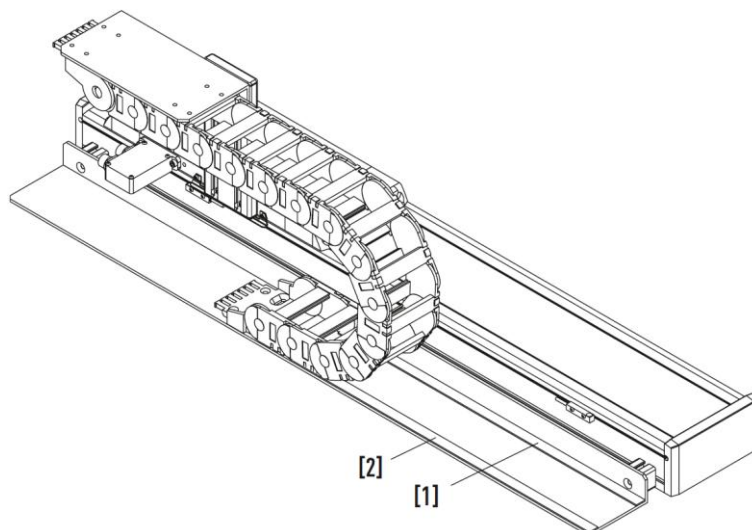
6.8 Fitting the noise-reduction strip for energy chains

The strip serves to reduce the noise emitted by the energy chain.

- Manually push the slide to its mechanical end position so that the energy chain rests as far as possible on the energy chain support.
- Cut the noise-reduction strip to a length corresponding to the maximum contact length of the energy chain. Two strips of equal length are required per energy chain.
- Push the slide by hand to the other end position so that the lower part of the energy chain is lifted as far as possible off the energy chain support.
- Clean the energy chain support so that it is free of dirt, dust and grease.
- Stick the first strip **[1]** flush with the corner of the energy chain support (see Fig.6 .63).
- Stick the second strip **[2]** flush with the outer edge of the support bracket.
- Move the slide and ensure that the energy chain rolls along the tapes over the entire travel distance.

✓ The noise-reduction tape is now fitted.

Fig.6 .63 : Linear axis with noise-reduction tape fitted



6.9 Electrical connection

⚠ Danger! Risk of electric shock!

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

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

⚠ Danger! Risk from electrical voltage!

Electric currents can still flow even when the motor is not moving.

- ▶ Ensure that the linear axes are de-energised before disconnecting the motors' electrical connections!
- ▶ After disconnecting the servo drive from the power supply, wait at least 5 minutes before touching live parts or disconnecting any connections!
- ▶ For safety's sake, measure the voltage in the servo drive's DC link. Wait until it has dropped below 40 V!
- ▶ Work on electrical installations must only be carried out by qualified personnel!

6.9.1 Limit switch connection

The pin assignment for the limit switch plug for variants A and B can be found at [Fig.6 .65](#) . For variants C and D with exposed wire ends, the wires must be connected in accordance with [Fig.6 .64](#) .

Fig.6 .64 : Wiring diagram

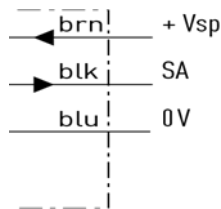
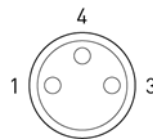


Fig.6 .65 : Pin assignment: limit switch plug



Pin configuration:

- 1: Brown (+ Vsp)
- 3: Blue (0 V)
- 4: Black (switch output)

Note:

As the sensor operates at a low voltage, it does not normally pose a risk of injury or danger to life on its own.

Note:

Do not operate the sensor at a voltage other than that specified, as this may damage it!

6.9.2 Connection of external distance measuring system

⚠ Warning! Risk of injury!

Incorrect connection of the position measurement system can lead to uncontrolled movement of the slide and, under certain circumstances, to damage to the axis.

The position-measuring system must only be connected by qualified personnel!

When connecting the position measuring system in accordance with Table 6.29 or Table 6.30, the positive direction of travel shown in Fig. 4.4 applies. The cable length is 5 m with an open cable end.

Table 6.29 : Cable and connector pin assignments for HIWIN MAGIC

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

If a positive counting direction in the opposite direction is required, 'A' must be swapped with 'B' and ' $\bar{A}$ ' with ' $\bar{B}$ ' when connecting to the evaluation electronics.

Table 6.30 : Cable and connector pin assignments HIWIN APM

Colour of encoder cable	Signal
Brown	Power supply 4.5 – 28 V
Green	Power supply 4.5 – 28 V
Grey	Power supply 4.5 – 28 V
White	GND / 0 V
Yellow	GND / 0 V
Pink	GND / 0 V
Dotted cable Yellow and brown	SIN+
Dotted cable, yellow and white	SIN-
Dotted cable: green and brown	COS+
Dotted cable: green and white	COS-
Blue	MA+ / Clock+
Red	MA- / Clock-
Violet	SLO+ / Data+
Black	SLO- / Data-
Inner shield	Inner shield
Outer shield	Outer shield

6.9.3 Motor connection

Note:

For information on the motor's connection options, please refer to the instruction manual for the motor in use!

6.9.4 Servo drive connection

Note:

For information on the servo drive's connection options, please refer to the instruction manual for the servo drive in use!

7 Maintenance and cleaning

Warning! Risk of shock and crushing!

Injuries may occur if the slide is moved or starts moving unintentionally.

- ▶ When linear axes are arranged vertically, ensure the slide is secured when at a standstill!
- ▶ Control system design in accordance with DIN EN 12100: No start-up following:
 - Application, return of energy!
 - Troubleshooting!
 - Stopping the machine!

Warning! Risk of injury and damage to property!

Unauthorised work on the system poses a risk of injury and may invalidate the warranty.

- ▶ Installation and maintenance of the system must only be carried out by qualified personnel!

Warning! Risk of cuts!

The cover strip may cause cuts during assembly and disassembly.

- ▶ Commissioning and set-up must only be carried out by qualified personnel wearing appropriate protective equipment (gloves, safety goggles)!

Caution! Risk of crushing due to the axes tipping over!

- ▶ Secure the machine and its components to prevent them from tipping over!

Caution! Risk of shock and crushing due to the axis falling or the payload becoming detached! Risk from heavy loads!

- ▶ Use suitable lifting equipment!
- ▶ Secure the linear axes in accordance with the assembly instructions (see section [6.1](#))!
- ▶ Secure the payload in accordance with the assembly instructions (see section [6.1](#))!

Caution! Risk of shock and crushing!

When moving or manoeuvring the axes manually, injuries may occur due to moving and displaced axes as well as attached components (energy chains, customer-supplied components).

- ▶ Observe the applicable health and safety regulations!
- ▶ Transport to the installation site must only be carried out by qualified personnel!

Caution! Risk of electric shock or burns due to contact with live parts!

Contact with live parts may result in injury. Cables installed by the customer may become frayed due to constant movement within the energy chain if not laid correctly, thereby exposing electrical contact points.

- ▶ Control system design in accordance with DIN EN 12100. No start-up after
 - power-up, return of energy!
 - Troubleshooting!
 - Stop the machine!
- ▶ Cabling must only be installed by qualified personnel!
- ▶ Work on electrical installations must only be carried out by qualified personnel!

⚠ Caution! Danger to health and the environment!

Contact with lubricants may cause irritation, poisoning and allergic reactions, and may also result in environmental damage.

- ▶ Use only suitable media that are safe for humans. Observe the manufacturers' safety data sheets!
- ▶ Ensure proper disposal!

⚠ Caution! Hazard to health and the environment!

Contact with lubricants may cause irritation, poisoning and allergic reactions, as well as environmental damage.

- ▶ Use only suitable media that are harmless to humans. Observe the manufacturers' safety data sheets!
- ▶ Ensure proper disposal!

! Warning! Damage caused by using the wrong lubricant!

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

- ▶ Use the correct type of lubricant (grease, oil) as specified in these assembly instructions!

During maintenance work:

- Secure the linear axis/linear axis systems to prevent unauthorised activation.
- De-energise the linear axis/linear axis systems.
- Secure the linear axis/linear axis systems to prevent unauthorised reactivation.



Note:

It is essential to adhere to the maintenance intervals for cleaning and lubrication.

- ▶ Include the maintenance intervals in your maintenance schedule.

7.1 Lubrication

The operation of the linear axis results in the continuous consumption of lubricant. The product must be relubricated regularly. Please note that small quantities of lubricant may leak from the lubrication system.

The following factors influence the lubrication intervals:

- Dust and dirt
- Operating temperatures
- Loads
- Vibration loads
- Constantly short positioning strokes
- Rotational speeds

Note:

Inadequate lubrication or the use of the wrong lubricant increases wear and reduces service life!

7.1.1 Lubrication of the HM-S linear axes

The HM-S linear axes comprise a profiled linear guideway with two blocks and a ballscrew, which are factory-lubricated with an initial lubricant. The initial lubrication is sufficient for the first lubrication interval. For relubrication, there are three grease nipples on each side of the slide. The outer grease nipples are used to lubricate the blocks, whilst the middle one is used for the ballscrew. The amount of grease required for relubrication can be found at Table 7.1) and Table 7.2).

The lubrication interval depends on the load, speed, cycle time and ambient conditions. The guideline values for the lubrication interval are given in Fig. 7.1 and Fig. 7.2 , as well as in Table 7.2 .

Table 7.1 : Relubrication quantity per block for HM-S linear axes

size	Optional profile rail	block	lubricant	Relubrication volume [cm ³]
HM040S	–	MGN15C	G04	0.04
HM060S	–	QEH15CA	G04	0.3
HM060S	O: Mx+ (CG)	CGL15CA	G04	0.3
HM080S	–	QHH20CA	G04	0.5
HM080S	O: Mx+ (CG)	CGH20CA	G04	0.5
HM120S	–	QHW30CC	G04	1.3
HM120S	O: Mx+ (CG)	CGW30CC	G04	1.3

Fig.7.1 : Load-dependent relubrication interval for HM-S linear axes

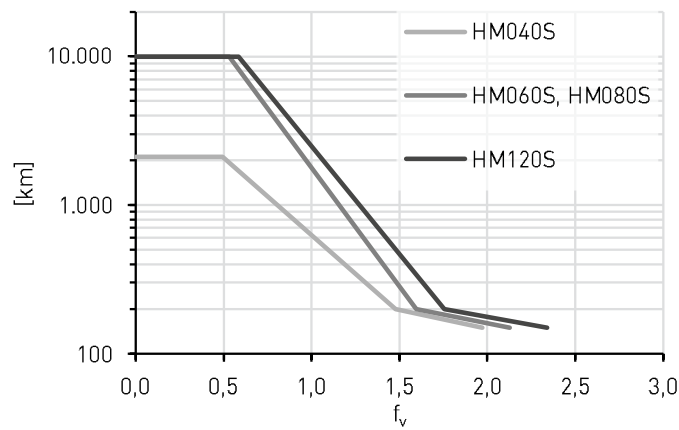
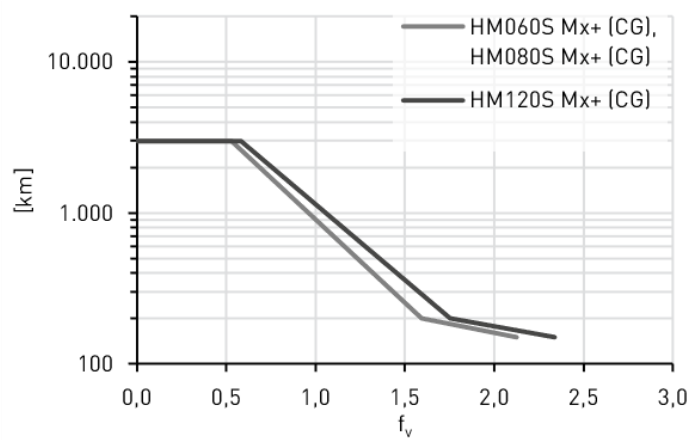


Fig.7.2 : Load-dependent relubrication interval for HM-S linear axes with optional Mx+ (CG) profile rail



f_v = load comparison factor as per the 'Linear Axes & Linear Axis Systems' catalogue, chapter 'Calculation Principles'

Table7.2 : Relubrication quantity and relubrication interval for the ballscrew of HM-S linear axes

size	Shaft Ø [mm]	Lead [mm]	lubricant	Relubrication quantity [cm ³]	Relubrication interval [km]
HM040S	12	5	G04	0.12	100
		10		0.28	200
HM060S	16	5	G04	0.65	100
		10		0.59	200
		16		0.87	320
HM080S	20	5	G04	0.43	100
		10		0.78	200
		20		0.71	400
HM120S	32	10	G04	2.21	200
		20		5.89	400
		32		5.81	640

7.1.2 Lubrication of the HT-S linear axes

The HT-S linear axes comprise two linear guideways, each with two blocks, and a ballscrew, all of which are factory-lubricated. Five grease nipples are located on one side of the slide for

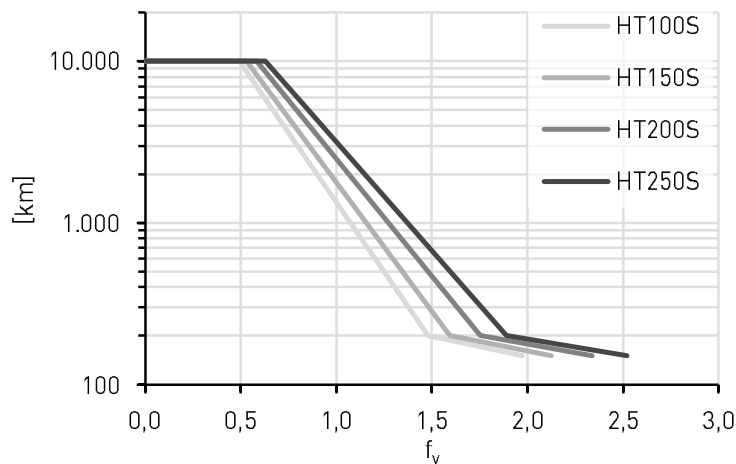
relubrication. The outer grease nipples () are used to lubricate the blocks, whilst the central one is used for the ballscrew. The relubrication quantities can be found at Table 7.3) and Table 7.4).

The lubrication interval depends on the load, speed, cycle time and ambient conditions. The guide values from Fig. 7.3 , and the table at Table 7.4 , apply to the lubrication interval.

Table 7.3 : Relubrication quantity per block for HT-S linear axes

size	block	lubricant	Relubrication quantity [cm ³]
HT100S	QEH15SA	G04	0.2
HT150S	QEH15CA	G04	0.3
HT200S	QHH20CA	G04	0.5
HT250S	QHH25CA	G04	0.8

Fig. 7.3 : Load-dependent relubrication interval for HT-S linear axes



f_v = load comparison factor as per the 'Linear Axes & Linear Axis Systems' catalogue, chapter 'Calculation Principles'

Table 7.4 : Relubrication quantity and relubrication interval for the ballscrew of the HT-S linear axes

size	Shaft Ø [mm]	Lead [mm]	lubricant	Relubrication quantity [cm ³]	Relubrication interval [km]
HT100S	16	5	G04	0.65	100
		10		0.59	200
		16		0.87	320
HT150S	20	5	G04	0.43	100
		10		0.78	200
		20		0.71	400
HT200S	25	5	G04	0.60	100
		10		0.97	200
		25		1.14	500
HT250S	32	10	G04	2.21	200
		20		5.89	400
		32		5.81	640

Table 7.5: Lubricant for linear guideway and ballscrew

Designation / Type	Application range	Unit of measurement	article number
G04	HX Standard / high speed	400g cartridge	20-000345

7.1.3 Lubrication process

Note:

Use only lubricants in accordance with DIN 51825, KP2K, NLGI consistency class 2!

Note:

Ensure that only lubricants without solid lubricant content (e.g. graphite or MoS_2) are used!

Note:

If the linear axes are installed vertically, horizontally or ceiling-mounted, the relubrication quantities must be increased by approx. 50 per cent.

Note:

Under special operating conditions (contamination, short stroke, mounting type), the lubrication intervals must be adapted to the specific application.

Note:

On HM-S linear modules, each lubrication point has two grease nipples, positioned on the left and right of the slide. This allows relubrication to be carried out from both the left and right sides of the slide.

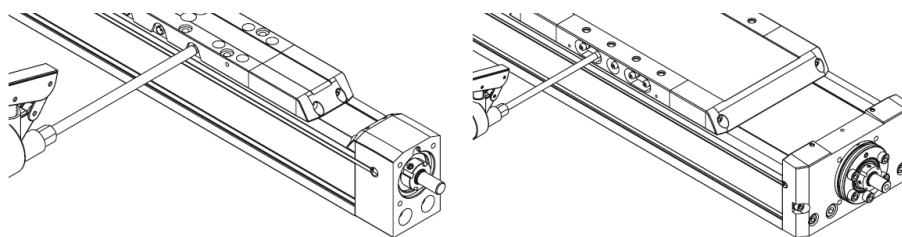
Note:

On HT-S linear tables, there are five grease nipples on the right-hand side of the carriage, which are used to lubricate all four blocks and the ballscrew.

Lubrication using the linear guideway as an example:

- Move the slide to any position.
- Position the nozzle at a right angle to a lubrication point on the side.
- Press the nozzle against the grease nipple using manual force.
- Operate the grease gun until the required lubrication quantities (see [Table 7.1](#), [Table 7.2](#), [Table 7.3](#) and [Table 7.4](#)) have been reached.
- Repeat the procedure for all lubrication points on the selected carriage side.
- ✓ The linear guideway is now lubricated.

Fig. 7.4 : Lubrication on an HM-S linear module (left) and an HT-S linear table (right)



7.2 Cleaning the linear axis

The linear axes must be checked regularly and cleaned from the outside. Please note the following points when cleaning:

- Do not use compressed air.
- The surface is anodized and only has limited resistance to alkaline cleaning agents. Only neutral cleaning agents must be used for cleaning.
- Remove coarse particles from the surface regularly. A damp, soft, lint-free cleaning cloth is ideal.
- The cover strip is subject to abrasion due to operational friction. Remove the abrasion regularly.

7.3 Replacing the cover strip

7.3.1 Replacing the cover strip for HM-S linear modules

The cover strip must be replaced when it begins to ripple and when it is no longer held in position by the magnetic strips. In this case, an adequate sealing effect can no longer be guaranteed.

- Loosen the clamping bolt on the cover tape clamp on both sides of the axis as shown in [Fig.7.11](#).
 - Loosen the screws on the slide end piece and remove it on both sides for all slides (see [Fig.7.9](#)).
 - Loosen the screws on the belt deflection unit and remove it from both sides of all slides (see [Fig.7.7](#)).
 - Now remove the cover strip and the tribo-tape by pulling both out of the carriage profile.
 - Remove any dirt from the cover strip clamp, slide end piece, belt deflection unit and tribo-tape using a damp, soft, lint-free cloth.
 - Cut the new cover strip to the same length as the removed cover strip.
 - Feed the cover strip through the upper opening of the carriage profile as shown in [Fig.7.5](#).
 - Thread the belt deflection on both sides of the slide onto the cover strip. Ensure the belt deflection is correctly oriented as shown in [Fig.7.6](#).
 - Tighten the belt deflection screws by hand.
 - Slide the tribo-tape through the upper opening of the belt deflection as shown in [Fig.7.8](#) and align it lengthways.
 - Fit the slide end pieces onto the belt deflection as shown in [Fig.7.9](#) and tighten the mounting bolts by hand.
 - Slide the ends of the cover strip on both sides under the cover strip clamp. Ensure that the cover strip is aligned with the axis profile and rests on the magnetic strips along its entire length. Tighten the clamping bolts of the cover strip clamp (see [Fig.7.10](#) and [Fig.7.11](#)) by hand.
 - Move the slide to both end positions and check the alignment of the cover strip. If necessary, loosen the screws on the cover strip clamp again, align the cover strip and retighten the screws.
- ✓ The new cover strip is now fitted

Fig.7 .5 : Fitting the cover strip on the slide

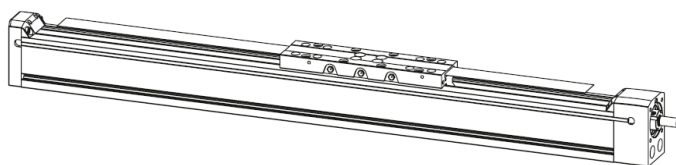


Fig.7 .6 : Orientation of the belt deflection

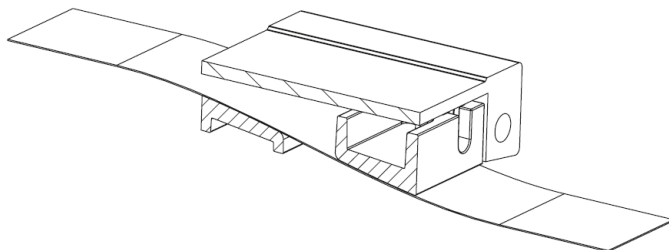


Fig.7 .7 : Removal/fitting of the belt deflection

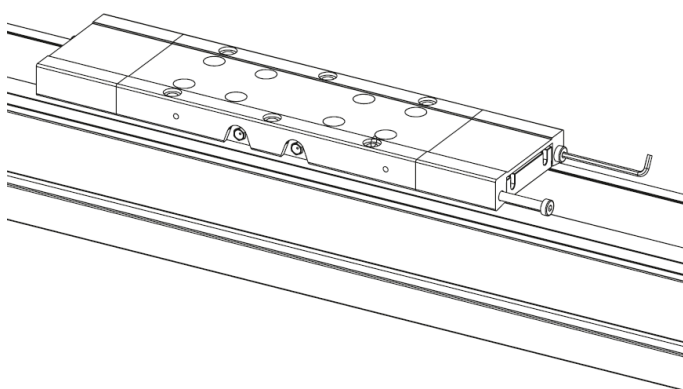


Fig.7 .8 : Fitting the tribo-tape

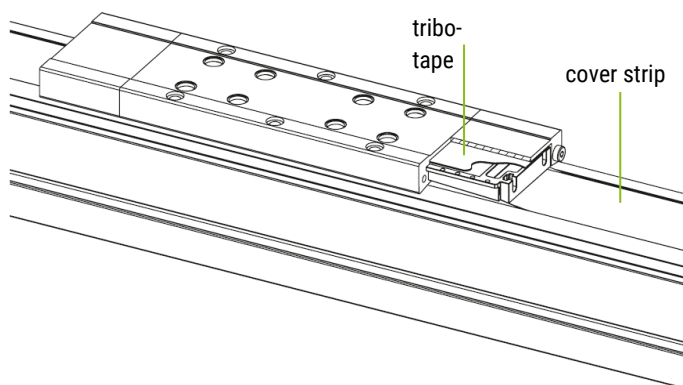


Fig.7 .9 : Removal/installation of the slide end piece

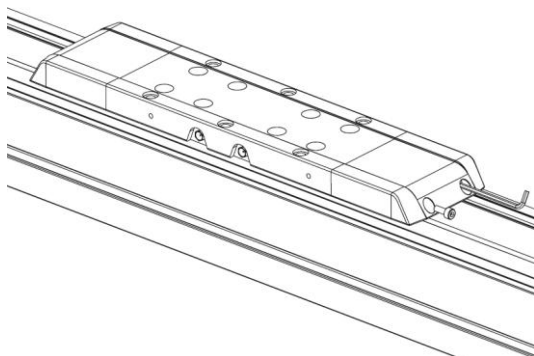


Fig.7 .10 : Fitting the cover strip into the cover strip clamp on HM-S linear modules

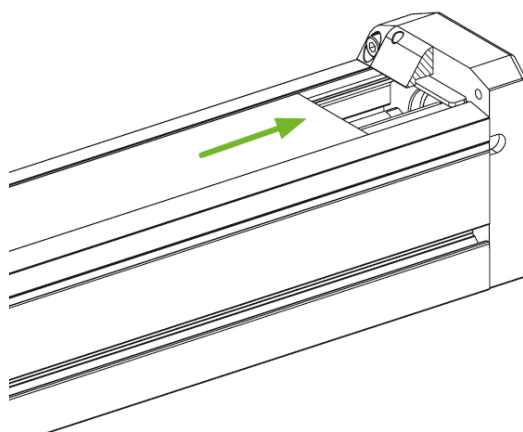
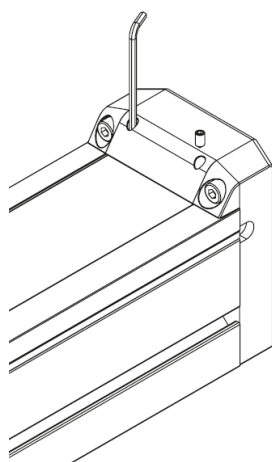


Fig.7 .11 : Removal/installation of the cover clamp on HM-S linear modules



7.3.2 Replacing the cover strip for HT-S linear tables

The cover strip must be replaced if it begins to ripple and if it is no longer held in position by the magnetic strips. In this case, an adequate sealing effect can no longer be guaranteed.

- Loosen the clamping bolt on the cover strip clamp on both sides of the axis as shown in [Fig.7 .18](#) .
- Loosen the screws on the slide end piece and remove it from both sides on all slides (see [Fig.7 .16](#)) .
- Remove the slide cover by sliding it out of the carriage profile (see [Fig.7 .12](#)) .
- Loosen the mounting bolts for the belt deflection and remove them on both sides of all slides (see [Fig.7 .13](#)) .
- Now remove the cover strip by lifting it off the carriage profile.
- Remove any dirt from the cover strip clamp, slide end piece, belt deflection unit, strip guide and slide cover using a damp, soft, lint-free cloth (with ethanol if necessary).
- If necessary, replace the strip guides on the top of the carriage profile and the bottom side of the belt deflection (see [Fig.7 .14](#)) .
- Cut the new cover strip to the same length as the cover strip you have removed.
- Place the cover strip on the magnetic strip of the base profile and guide it over the carriage profile (see [Fig.7 .15](#)) .
- Align the cover strip.
- Fit the belt deflection on both sides of the slide as shown in [Fig.7 .13](#) .
- Align the belt deflection unit.
- Tighten the belt deflection unit screws by hand.
- Fit the slide cover by sliding it into the groove in the carriage profile and the belt deflection unit (see [Fig.7 .12](#))

- Fit the slide end pieces onto the belt deflection as shown in Fig. 7.16 and tighten the mounting bolts by hand.
 - Slide the ends of the cover strip on both sides under the cover strip clamp. Ensure that the cover strip is aligned with the axis profile and rests on the magnetic strips along its entire length. Tighten the clamping bolts of the cover strip clamp by hand (see Fig. 7.17 and Fig. 7.18).
 - Move the slide to both end positions and check the alignment of the cover strip. If necessary, loosen the screws on the cover strip clamp again, align the cover strip and retighten the screws.
- ✓ The new cover strip is fitted

Fig. 7.12 : Removal/installation of slide cover

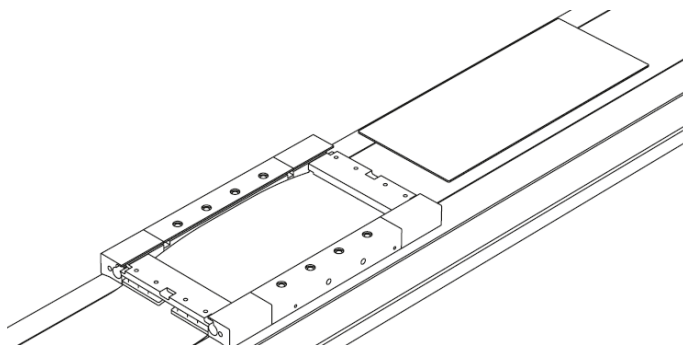


Fig. 7.13 : Removal/installation of the belt deflection unit

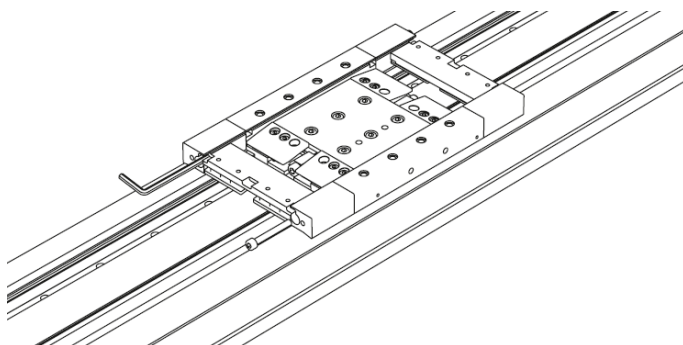


Fig. 7.14 : Removal/installation of the strip guide

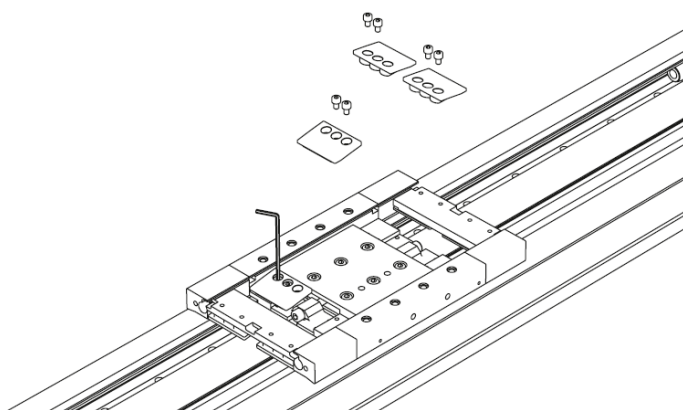


Fig. 7.15 : Cover strip guide

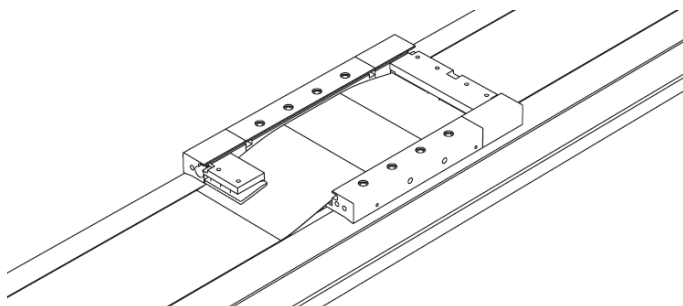


Fig.7 .16 : Removal/installation of slide end piece

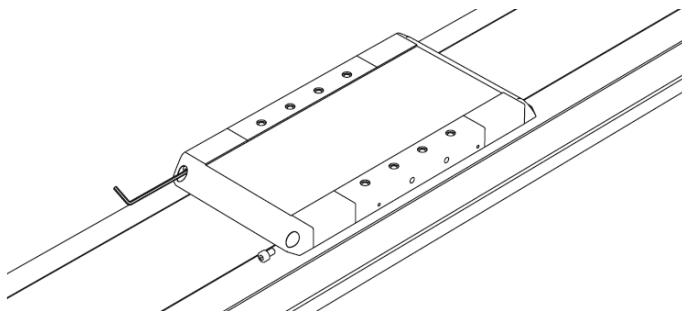


Fig.7 .17 : Fitting the cover strip into the cover strip clamp

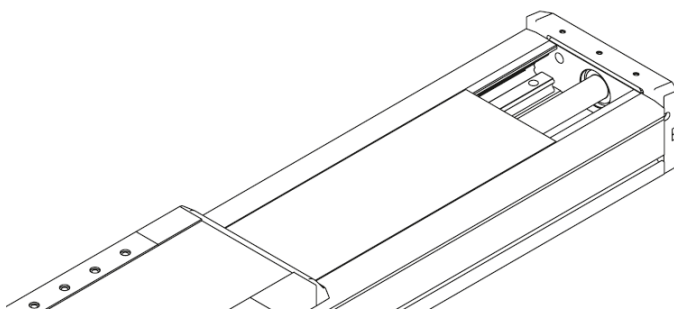
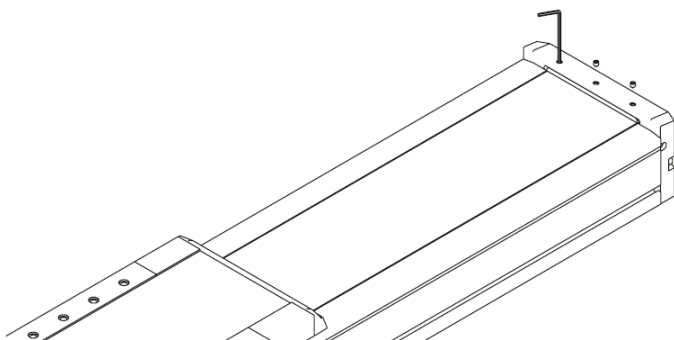


Fig.7 .18 : Removal/installation of the cover strip clamp



8 Faults

Possible faults affecting the linear axis and their remedies are listed in Table 8.1.

In the event of faults affecting the motor or servo drive, refer to the motor or servo drive instruction manual for the nature of the fault and instructions on how to rectify it

8.1 Faults on the linear axes

 **Caution!** Risk of shock and crushing!

When the axes are being moved by the motor, injuries may occur due to moving and driven axes as well as attached components (energy chains, customer-supplied components).

- ▶ A protective barrier must be provided for the operation of the linear axes!
- ▶ Where linear axes are arranged vertically, ensure the slide is secured when at a standstill!

 **Caution!** Risk of electric shock or burns due to contact with live parts!

Contact with live parts may result in injury.

Cables installed by the customer may, if laid incorrectly, become frayed due to constant movement within the energy chain and expose electrical contact points.

- ▶ Control system design in accordance with DIN EN 12100. No start-up after:
 - Power-up, return of energy!
 - Troubleshooting!
 - Stopping the machine!
- ▶ Cabling must only be installed by qualified personnel!
- ▶ Work on electrical installations must only be carried out by qualified personnel!

Table 8.1: Fault table

Fault	Possible cause	Remedy
The slide or axis block does not move	Load too high	Reduce the payload or the drive's acceleration
	Coupling is slipping	Check that the clutch assembly has been correctly assembled. Check the tightening torques of the clamping bolts and adjust them correctly. Check the maximum drive torque applied and reduce it if necessary
	The ballscrew is seized or no longer rotates	Send the linear axis to HIWIN GmbH for repair
Limit switch not functioning	Switching distance too large	Readjust the switching distance and set it correctly
	Limit switch defective or cable break	Replace the limit switch
	Signal not reaching the control unit	Check the cable to the control unit
Noise and vibrations at high speed	Tension in the system	Install the linear axis without any tension; check the flatness of the support surface and the mounted payload
	Incorrect settings on the drive controller	Fine-tune and adjust the controller settings to suit the application conditions
	Excessive speed or supercritical speed on shaft axes	Reduce the speed
Noise from the linear guideways	Lack of lubricant	Re-lubricate and, if necessary, reduce relubrication intervals
	Damage to the linear guideways, for example due to extreme impact loads on the slide or extreme contamination	Send the linear axis to HIWIN GmbH for repair
Motor load increases; the control system switches off due to overload	Tension in the system	Install the linear axis free of stress; check the flatness of the support surface and the mounted payload.
	Lack of lubricant	Re-lubricate and, if necessary, reduce relubrication intervals
	Heavy contamination of the linear axis and the internal linear guideways	Clean the linear axis; ensure that the guides and drive elements move freely
The slide or axis body has backlash and positions inaccurately	Backlash in the linear guideway or the drive element following a collision or due to extreme external influences (shocks, load peaks, etc.)	Send the linear axis to HIWIN GmbH for repair
Programmed absolute position changes	Coupling is slipping	Check that the clutch assembly has been correctly assembled. Check the tightening torques of the clamping bolts and adjust them correctly. Check the maximum drive torque applied and reduce it if necessary

9 Dismantling

Danger! Danger due to electrical voltage!

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

- ▶ Work must only be carried out by a qualified electrician when the system is de-energised!
- ▶ Before carrying out any work, disconnect the linear axes from the power supply and secure them against being switched on again!

Warning! Risk of shock and crushing!

Injuries may occur if the slide is moved or starts moving unintentionally.

- ▶ When linear axes are arranged vertically, secure the slide when it is at a standstill!
- ▶ Control system design in accordance with DIN EN 12100: No start-up following:
 - Application, return of energy!
 - Troubleshooting!
 - Stopping the machine!

Warning! Risk of crushing by the travel carriage!

Risk of injury due to crushing and damage to the linear axes caused by the movement of the slide carriage under the influence of gravity, as the axes are not fitted with brakes as standard.

- ▶ Ensure that the slide is secured against unintentional movement when at a standstill!

Warning! Risk of cuts!

The cover strip may cause cuts during assembly or disassembly.

- ▶ Commissioning and set-up must only be carried out by qualified personnel wearing appropriate protective equipment (gloves, safety goggles)!

Warning! Danger from suspended loads or falling parts!

Lifting heavy loads can cause injury.

- ▶ Assembly and maintenance of the linear axes must only be carried out by qualified personnel!
- ▶ Take the mass of the parts into account during transport. Use suitable lifting equipment!
- ▶ Observe the applicable health and safety regulations for handling suspended loads!
- ▶ Only lift linear axes at the specified support points!
- ▶ Secure machines and machine parts to prevent them from tipping over!

Caution! Risk of shock and crushing!

When moving or manoeuvring the axes manually, injuries may occur due to moving and displaced axes as well as attached components (energy chains, customer-supplied attachments).

- ▶ Observe the applicable health and safety regulations!
- ▶ Transport to the installation site must only be carried out by qualified personnel!

⚠ Caution! Risk of electric shock or burns from contact with live parts!

Contact with live parts may result in injury.
Cables installed by the customer may become frayed due to constant movement within the energy chain if laid incorrectly, thereby exposing electrical contact points.

- ▶ Control system design in accordance with DIN EN 12100. No start-up after:
 - Power-up, return of energy!
 - Troubleshooting!
 - Stopping the machine!
- ▶ Cabling must only be installed by qualified personnel!
- ▶ Work on electrical installations must only be carried out by qualified personnel!

⚠ Caution! Risk of crushing due to the axes tipping over!

- ▶ Secure the machine and its components to prevent them from tipping over!

! Warning! Danger to health and the environment!

Contact with lubricants may cause irritation, poisoning and allergic reactions, as well as environmental damage.

- ▶ Use only suitable media that are harmless to humans. Observe the manufacturers' safety data sheets!
- ▶ Ensure proper disposal!

Dismantling steps:

- Disconnect the linear axis from the electrical system.
 - Screw the moving load off.
 - Secure the moving parts (e.g. the slide) to prevent unintended movement.
 - Unscrew the linear axis.
- ✓ The linear axis has been removed.

10 Disposal

⚠ Warning! Hazard to health and the environment!

Contact with lubricants may cause irritation, poisoning and allergic reactions, as well as environmental damage.

- ▶ Use only suitable media that are safe for humans. Follow the manufacturers' safety data sheets!
- ▶ Ensure proper disposal!

Table 10.1: Disposal

Liquids	
Lubricants	Dispose of as hazardous waste in an environmentally sound manner
Soiled cleaning cloths	Dispose of as hazardous waste in an environmentally sound manner
linear axis	
Cabling, electrical components	Dispose of as electronic waste
Plastic components (e.g. energy chain)	Dispose of by material type
Steel components (e.g. profile rail)	Dispose of by material type
Aluminium components (e.g. profile, synchronous shaft)	Dispose of by material type

11 Drive adaptation

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

11.1 Drive adaptation for HM-S linear modules and HT-S linear tables

The drive adaptation for HM-S linear modules and HT-S linear tables has a two-part type to ensure easy flange mounting of all standard motors.

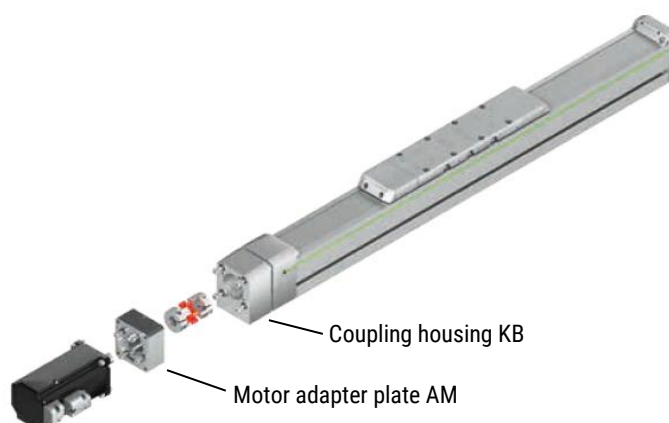
The flange type set comprises the following components:

- KB coupling housing
- Coupling assembly
- Motor adapter plate AM or belt drive bd

The dimensions of the coupling housing, motor adapter plate and belt drive for HIWIN motors can be found in section 11.2. Adaptations for motors from other manufacturers can be found in the configurator at hiwin.de.

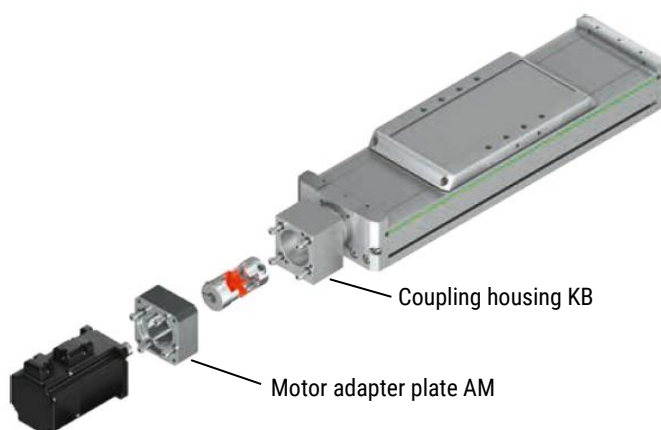
Motor adaptation for the linear axis without belt drive

Fig.11 .1 : Motor adaptation for HM-S linear modules without belt drive



Motor adapter plate AM: Adapter from axis to motor

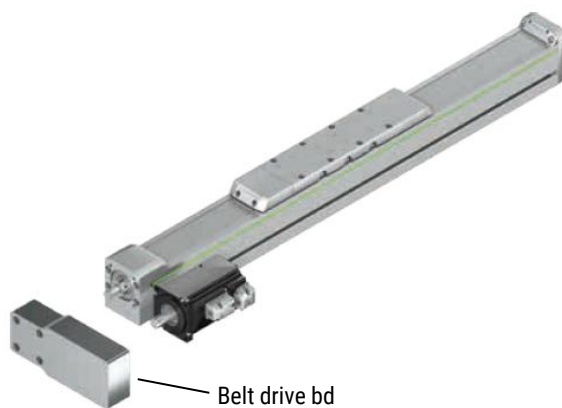
Fig.11 .2 : Motor adaptation for HT-S linear tables without belt drive



Motor adapter plate AM: Adapter from axis to motor

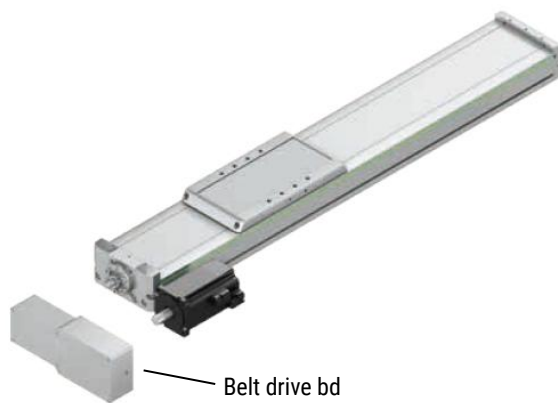
Motor adaptation of the linear axis with belt drive

Fig.11 .3 : Motor adaptation for HM-S linear modules with belt drive



BD belt drive: For recirculation of the drive by 180°

Fig.11 .4 : Motorised HT-S linear tables with belt drive



bd belt drive: For recirculation of the drive by 180°

Table11.1 : Order code for position, flange type³⁾ – HM-S linear modules and HT-S linear tables

Drive Manufacturer/Type		Linear module HM-S				HT-S linear table			
		HM040S	HM060S	HM080S	HM120S	HT100S	HT150S	HT200S	HT250S
		Motor only							
HIWIN	EM1-C-M-20-2	HW21 ¹⁾	HW03 ¹⁾	HW05 ¹⁾		HW03 ¹⁾	HW05 ¹⁾		
	EM1-C-M-40-2		HW03 ¹⁾	HW05 ¹⁾		HW03 ¹⁾	HW05 ¹⁾	HW05 ¹⁾	
	EM1-C-M-05-2	HW22 ¹⁾	HW16 ¹⁾						
	EM1-C-M-10-2	HW22 ¹⁾	HW16 ¹⁾			HW16 ¹⁾			
	EM1-C-M-75-2			HW06 ¹⁾	HW08 ¹⁾		HW06 ¹⁾	HW06 ¹⁾	HW08 ¹⁾
	EM1-A-M-1K-2				HW13 ²⁾			HW25	HW13 ²⁾
	EM1-D-M-1A-2				HW13 ²⁾				HW13 ²⁾
	EM1-D-M-2K-2				HW13 ²⁾				HW13 ²⁾

¹⁾ Possible belt drive v_1

²⁾ Possible belt drive v_2

³⁾ See [Order code for HM-S linear modules Page11](#) and [Order code for HT-S linear table Page 14](#)

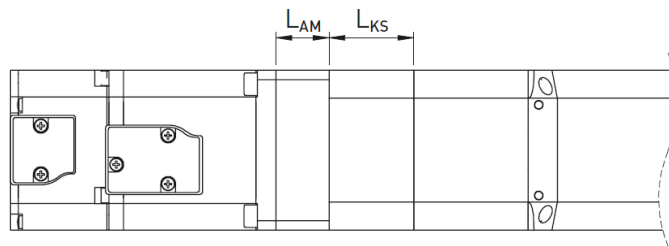
11.2 Dimensions of the drive adaptor for the HM-S linear modules and the HT-S linear tables

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

- Adaptor components (KS coupling housing, AM motor adapter plate)
- Belt drive bd
- motor

Linear axis without belt drive

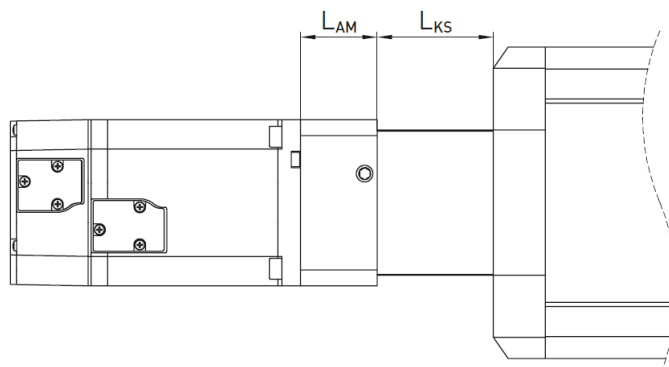
Fig.11 .5 : Motor connection for HM-S linear modules without belt drive



LKS Length of coupling housing, see [Table11.2](#) .

LAM Length of motor adapter plate, see [Table11.3](#) .

Fig.11 .6 : Motor connection for HT-S linear tables without belt drive

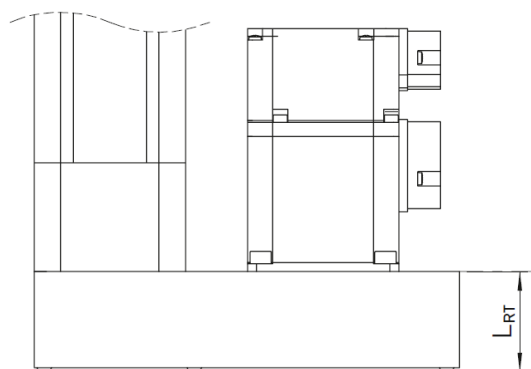


LKS Length of coupling housing, see [Table11.2](#) .

LAM Length of motor adapter plate, see [Table11.3](#) .

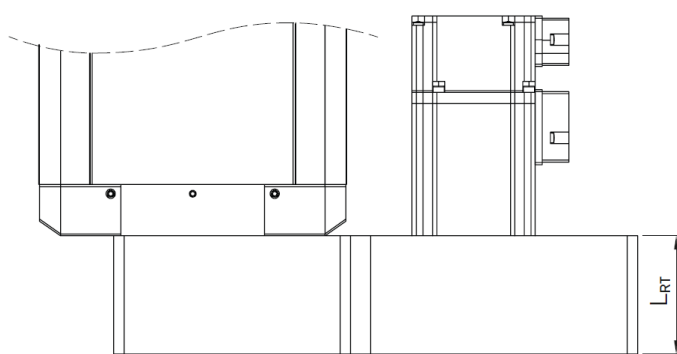
Linear axis with belt drive

Fig.11 .7 : Motor connection for HM-S linear modules with belt drive



L_{RT} Belt drive length, see [Table 11.4](#).

Fig.11 .8 : Motor connection for HT-S linear tables with belt drive



L_{RT} Belt drive length, see [Table 11.4](#).

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

Fig.11 .9 : Coupling housing for HM-S linear modules

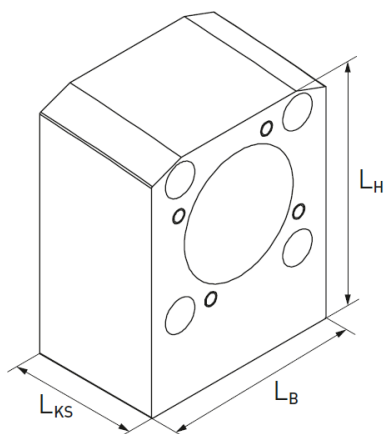


Fig.11 .10 : Coupling housing for HT-S linear tables

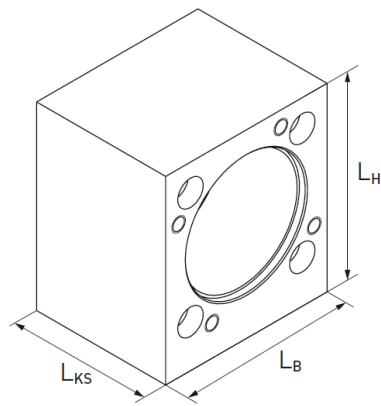


Table11.2 : Dimensions of KS coupling housing for HM-S linear axes and HT-S linear tables

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 HM-S linear modules and HT-S linear tables

Fig.11 .11 : AM motor adapter plate for HM-S linear modules and HT-S linear tables

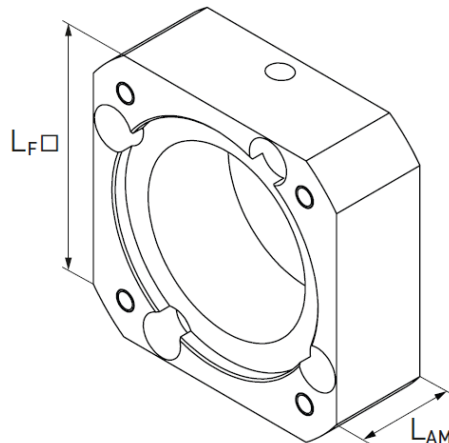


Table11.3 : AM motor adapter plate for HM-S and HT-S linear modules

linear axis	Manufacturer	Motors	L _F [mm]	L _{AM} [mm]	article number
HM040S	HIWIN	EM1-C-M-05-2, EM1-C-M-10-2	42	22.5	25-002721
		EM1-C-M-20-2	60	27.5	25-002871
HM060S	HIWIN	EM1-C-M-05-2, EM1-C-M-10-2	50	25.5	25-002736
		EM1-C-M-20-2, EM1-C-M-40-2	60	30.5	25-000404
HM080S	HIWIN	EM1-C-M-20-2, EM1-C-M-40-2	72	27	25-000414
		EM1-C-M-75-2	80	37	25-000421

linear axis	Manufacturer	Motors	L _F [mm]	L _{AM} [mm]	article number
HM120S	HIWIN	EM1-C-M-75-2	80	36.5	25-000438
		EM1-A-M-1K-2, EM1-D-M-1A-2, EM1-D-M-2K-2	130	51.5	25-000450
HT100S	HIWIN	EM1-C-M-10-2	50	25.5	25-002736
		EM1-C-M-20-2, EM1-C-M-40-2	60	30.5	25-000404
HT150S	HIWIN	EM1-C-M-20-2	72	27	25-000414
HT200S	HIWIN	EM1-A-M-1K-2	130	52	25-001791
HT250S	HIWIN	EM1-C-M-75-2	80	36.5	25-000438
		EM1-A-M-1K-2, EM1-D-M-1A-2, EM1-D-M-2K-2	130	51.5	25-000450

11.2.3 BD for HM-S linear modules and HT-S linear tables

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

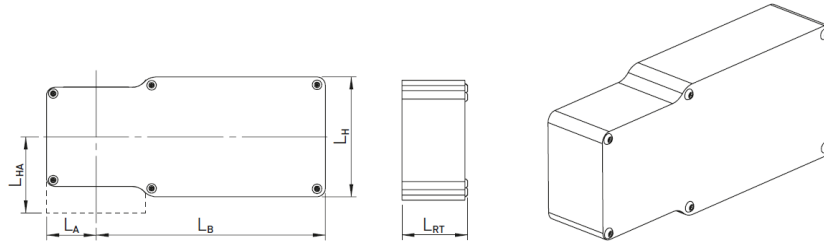


Table11.4 : Belt drive specifications

linear axis	Type ¹⁾	LH	LB	LRT	LA	LHA	ratio
HM040S	V1	72	138.5	40	30.0	36.25	1
HM060S	V1	72	138.5	40	30.0	45.80	1
	V2	102	171.5	40	30.0	45.80	1
HM080S	V1	102	197.0	51	39.0	61.40	1
	V2	131	226.0	61	39.0	61.40	1
HM120S	V1	135	248.5	63	55.0	89.00	1
	V2	175	288.0	73	55.0	89.00	1
HT100S	V1	74	157.0	43	29.5	31.00	1
	V2	102	196.0	43	29.5	31.00	1
HT150S	V1	102	217.0	60	38.5	43.00	1
	V2	131	251.0	70	38.5	43.00	1
HT200S	V1	100	237.0	61	42.5	51.00	1
	V2	131	268.5	71	42.5	51.00	1
HT250S	V1	135	298.0	73	50.7	52.00	1
	V2	175	349.5	83	50.7	52.00	1

¹⁾ You can find the required type in [Table11.1](#) .

Note:

Please note that the belt drive protrudes beyond the lower edge of the shaft if the following applies:

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

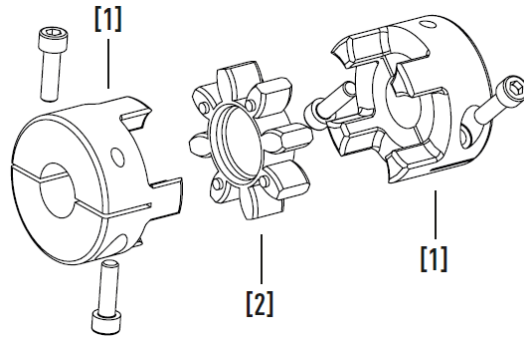
Note:

Please note that the belt drive may protrude sideways beyond the axis if the following applies:

$$L_A > \frac{\text{Profilbreite (Achse)}}{2}$$

11.2.4 Coupling assembly

Fig.11 .13 : Coupling assembly for HM-S linear modules and HT-S linear tables



- | | |
|---|---|
| 1 | Clamping hubs (1 for the axis side, 1 for the motor side) |
| 2 | elastomer insert |

11.2.4.1 clamping hub

Coupling element on motor and axle sides.

Fig.11 .14 : Clamping hub for HM-S linear modules and HT-S linear tables

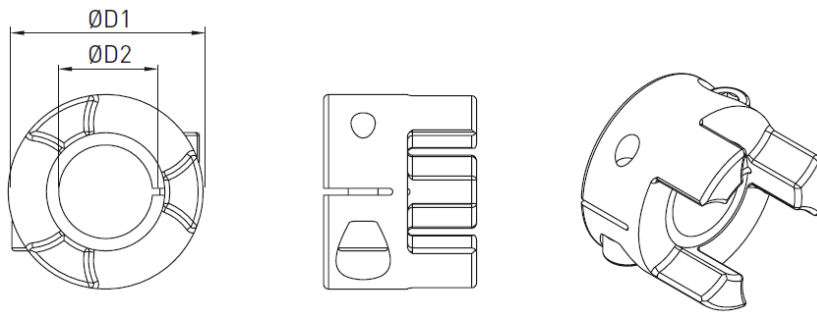


Table11.5: Article numbers and specifications for clamping hubs

axis type/ size	Type	Ø D1 [mm]	Ø D2 [mm]	Thread size × length	Screw tightening torque [Nm]	Moment of inertia [Nm]	Frictional torque [Nm]	article number
HM040S	Size 12	24.5	5	M3 × 12	2.1	1.46	5.2	25-002382
			6	M3 × 12	2.1	1.46	6.1	25-002384
			6.35	M3 × 12	2.1	1.46	6.4	25-002385
			8	M3 × 12	2.1	1.45	8.1	25-002386
			9	M3 × 12	2.1	1.45	9.1	25-002387
			10	M3 × 12	2.1	1.44	10.1	25-002388
			11	M3 × 12	2.1	1.43	11.1	25-002389
			12	M3 × 12	2.1	1.41	12.1	25-002390
			14	M3 × 12	2.1	1.41	14.1	25-002391
HM060S, HT100S	Size 14	29.5	5	M4 × 12	5.0	2.70	10.1	25-002392
			6	M4 × 12	5.0	2.69	12.2	25-002393
			6.35	M4 × 12	5.0	2.69	13.2	25-002394
			8	M4 × 12	5.0	2.68	16.5	25-002395
			9	M4 × 12	5.0	2.68	18.6	25-002396

axis type/ size	Type	Ø D1 [mm]	Ø D2 [mm]	Thread size x length	Screw tightening torque [Nm]	Moment of inertia [Nm]	Frictional torque [Nm]	article number
HM060S, HT100S	Size 14	29.5	10	M4 × 12	5.0	2.67	20.8	25-002397
			11	M4 × 12	5.0	2.66	23.0	25-002398
			12	M4 × 12	5.0	2.65	25.1	25-002399
			13	M4 × 12	5.0	2.63	27.2	25-002400
			14	M4 × 12	5.0	2.61	29.4	25-002401
			16	M4 × 12	4.0	6.11	28.0	25-002610
HM080S, HT150S, HT200S	Size 19	39.5	6.35	M6 × 16	14	15.26	25.8	25-002403
			8	M6 × 16	14	15.25	32.5	25-002404
			9	M6 × 16	14	15.24	36.5	25-002405
			10	M6 × 16	14	15.23	40.6	25-002406
			11	M6 × 16	14	15.21	44.6	25-002407
			12	M6 × 16	14	15.18	48.7	25-002408
			14	M6 × 16	14	15.11	56.8	25-002409
			16	M6 × 16	14	14.99	64.9	25-002410
			18	M6 × 16	14	14.82	73.1	25-002411
			19	M6 × 16	14	14.71	77.1	25-002412
			20	M6 × 16	14	14.58	81.2	25-002413
			22	M5 × 16	10	13.95	71.5	25-002414
			24	M5 × 16	10	13.52	75.6	25-002415
HM120S, HT250S	Size 24	54.5	11	M6 × 20	15	53.30	46.0	25-002456
			14	M6 × 20	15	53.20	58.0	25-002416
			16	M6 × 20	15	53.10	66.0	25-002417
			19	M6 × 20	15	52.80	78.0	25-002418
			20	M6 × 20	15	52.70	82.0	25-002419
			22	M6 × 20	15	52.30	90.0	25-002420
			24	M6 × 20	15	51.90	98.0	25-002422
			25	M6 × 20	15	51.60	102.0	25-002423
			28	M6 × 20	15	50.50	114.0	25-002424
			32	M6 × 20	15	48.50	130.0	25-002425

11.2.4.2 elastomer insert

Fig.11 .15 : Elastomer insert for HM-S linear modules and HT-S linear tables

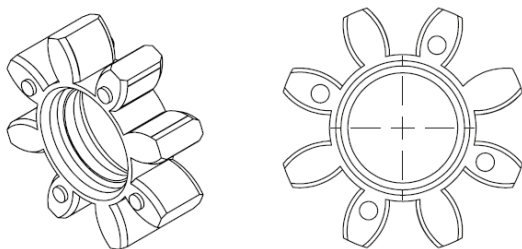


Table11.6: Elastomer insert article number

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 Accessory

You can find information on accessories and replacement parts on our website at hiwin.de

13 Declaration of Incorporation for partly completed machinery

in accordance with the Machinery Directive 2006/42/EC, Annex II, Part 1 B,

and the Machinery Regulation (EU) 2023/1230, Annex V, Part B

The manufacturer: HIWIN GmbH, Brücklesbünd 1, 77654 Offenburg

Documentation Department: HIWIN GmbH, Brücklesbünd 1, 77654 Offenburg

Description and identification of the partly completed machinery:

Product/article: HM-S linear modules and HT-S linear tables

Type: HM040S, HM060S, HM080S, HM120S

HT100S, HT150S, HT200S, HT250S

Year of manufacture: from 2019

It is hereby declared that the essential health and safety requirements relevant to this product, as set out in the Machinery Directive 2006/42/EC (Annex I) and the Machinery Regulation (EU) 2023/1230 (Annex III), are met.

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

It is further declared that the technical documentation for this partly completed machinery has been drawn up in accordance with the requirements of the Machinery Directive 2006/42/EC and the Machinery Regulation (EU) 2023/1230.

It is hereby declared that the partly completed machinery complies with the relevant requirements of the following European legislation.

2006/42/EC	Machinery Directive
(EU) 2023/1230	Machinery Regulation
2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	RoHS Directive on the Restriction of Hazardous Substances

The following harmonised standards, in particular, have been applied to meet the essential health and safety requirements.

EN ISO 13732-1:2008	Ergonomics of the thermal environment – Evaluation methods for human responses to contact with surfaces – Part 1: Hot surfaces
EN ISO 12100:2010	Safety of machinery – General principles for design – Risk assessment and risk reduction
EN 60204-1:2018	Safety of machinery – Electrical equipment of machinery – Part 1: General requirements

The manufacturer or their authorised representative undertakes to provide the competent authorities with the relevant technical documentation for the partly completed machinery upon reasoned request.

This does not affect industrial property rights!

Important note! The partly completed machinery may only be put into service once it has been established that the complete machinery into which the partly completed machinery is to be incorporated complies with the requirements of the Machinery Directive 2006/42/EC or, from 20 January 2027, the Machinery Regulation (EU) 2023/1230.

Offenburg, October 2026

Werner Mäurer, Management

WE LIVE MOTION

Germany

HIWIN GmbH
Brücklesbünd 1
77654 Offenburg
Deutschland
Fon +49 781 93278-0
info@hiwin.de
hiwin.de

Taiwan

Headquarters
HIWIN Technologies Corp.
No. 7, Jingke Road
Precision Machinery Park
Taichung 40852
Táiwān
Fon +886 4 2359-4510
business@hiwin.tw
hiwin.tw

Taiwan

Headquarters
HIWIN Mikrosystem Corp.
No. 6, Jingke Central Road
Precision Machinery Park
Taichung 40852
Táiwān
Fon +886 4 2355-0110
business@hiwinmikro.tw
hiwinmikro.tw

France

HIWIN SAS
Le Méléze
17 Rue des Cigognes
67960 Entzheim
France
Fon +33 3 882884-80
contact@hiwin.fr
hiwin.fr

Poland

HIWIN GmbH Biuro Warszawa
ul. Putawska 405a
02-801 Warszawa
Polska
Fon +48 22 46280-00
info@hiwin.pl
hiwin.pl

Denmark

HIWIN GmbH
info@hiwin.dk
hiwin.dk

Netherlands

HIWIN GmbH
info@hiwin.nl
hiwin.nl

Austria

HIWIN GmbH
info@hiwin.at
hiwin.at

Hungary

HIWIN GmbH
info@hiwin.hu
hiwin.hu

Czech Republic

HIWIN s.r.o.
Medkova 888/11
62700 Brno
Česká republika
Fon +42 05 48528-238
info@hiwin.cz
hiwin.cz

Bulgaria

HIWIN Bulgaria
Christopher Columbus No. 4
1582 Sofia
Bulgaria
Fon +35 92 999 52 45
info@hiwin.bg
hiwin.bg

Slovakia

HIWIN s.r.o., o.z.z.o.
Mládežnícka 2101
01701 Považská Bystrica
Slovensko
Fon +421 424 4347-77
info@hiwin.sk
hiwin.sk

Switzerland

HIWIN (Schweiz) GmbH
Eichwiesstrasse 20
8645 Jona
Schweiz
Fon +41 55 22500-25
sales@hiwin.ch
hiwin.ch

Italy

HIWIN Srl
Via Pitagora 4
20861 Brugherio (MB)
Italia
Fon +39 039 28761-68
info@hiwin.it
hiwin.it

Romania

HIWIN Srl
info@hiwin.ro
hiwin.ro

Slovenia

HIWIN Srl
info@hiwin.si
hiwin.si

China

HIWIN Corp.
hiwin.cn

Japan

HIWIN Corp.
info@hiwin.co.jp
hiwin.co.jp

USA

HIWIN Corp.
info@hiwin.com
hiwin.us

Korea

HIWIN Corp.
hiwin.kr

Singapore

HIWIN Corp.
hiwin.sg