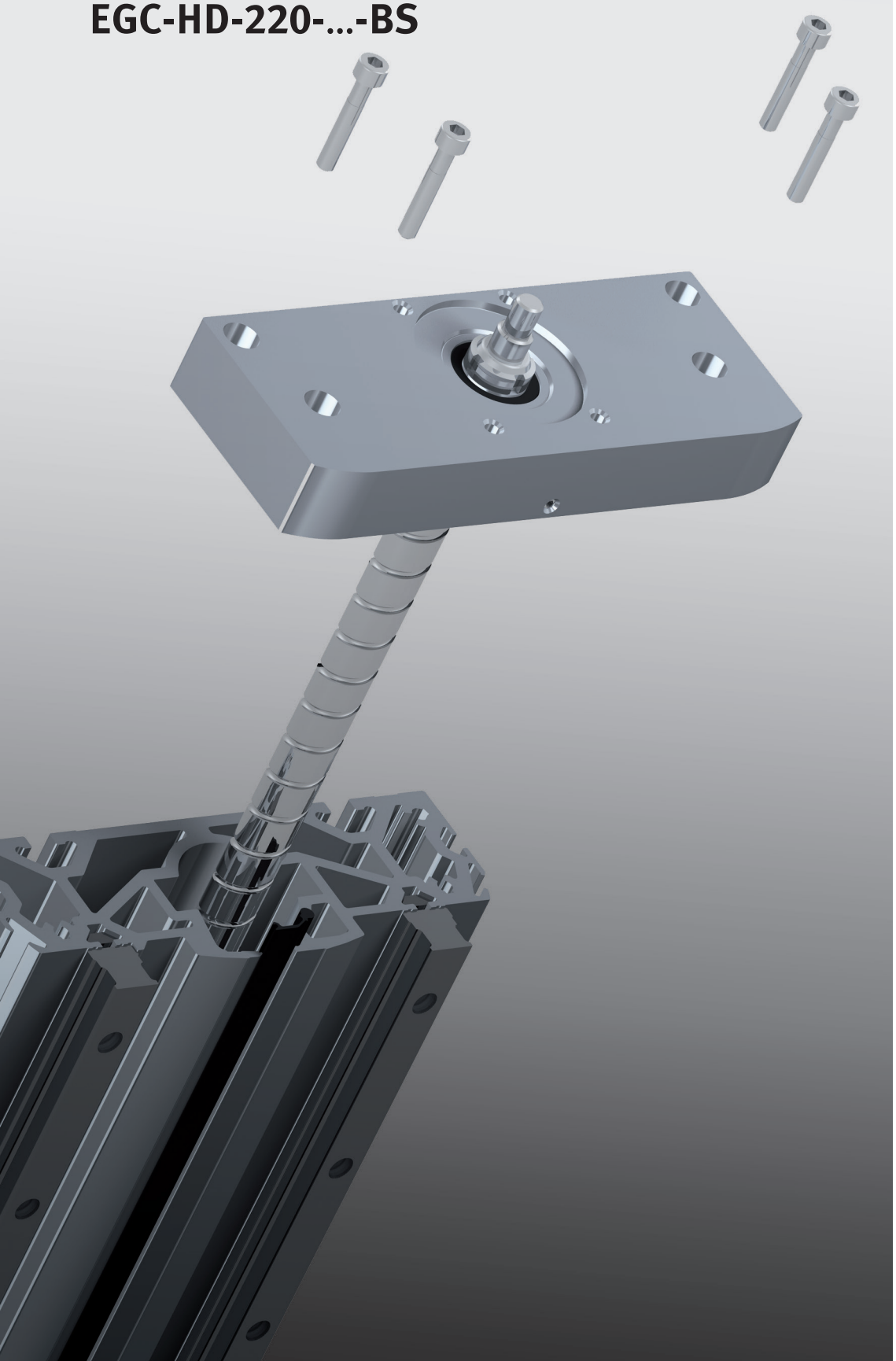
Spindle axis with heavy-duty guide

EGC-HD-125-...-BS

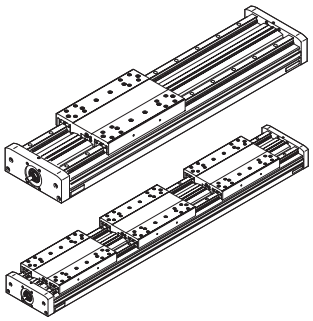
EGC-HD-160-...-BS

EGC-HD-220-...-BS



FESTO

Repair instructions (en)



7EGC_HD_BSb_en

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Foreword

These repair instructions are valid for the spindle axes listed on the title page to the exclusion of any liability claims.

Differences compared to the descriptions in these repair instructions may arise depending on the design and/or modification status of the spindle axis. The user must check this prior to carrying out the repair and take the deviations into consideration if necessary.

These repair instructions have been prepared with care.

Festo SE & Co. KG does not, however, accept liability for any errors in these repair instructions or their consequences. Likewise, no liability is accepted for direct or consequential damage resulting from incorrect use of the products.

Further information is given in Chapter 9 on page 31.

The relevant regulations on occupational safety, safety engineering, and interference suppression as well as the stipulations contained in these repair instructions must be observed when working on the products.

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Table of Contents

1 Important information

1.1 About these repair instructions

This document contains important information about professional repair of the spindle axis type EGC-HD-BS.

However, the costs of carrying out a repair must be considered in the case of larger defects.

Before carrying out a repair, the relevant chapter in these instructions must be read in full and followed consistently.

For reasons of clarity, these repair instructions do not contain all detailed information. The following documents should therefore also be available when repairing the spindle axis:

- **Spindle axis EGC-HD-BS operating instructions**

  Contains information on the product's peripherals as well as its function, structure, application, installation, commissioning, maintenance and care, etc. (➔ www.festo.com).
- **Spare parts documentation**

  Contains an overview of the spare and wearing parts as well as information on their installation. This can be found in the online spare parts catalogue on the Festo website (➔ www.festo.com/spareparts).
- **"Tools and repair accessories" information brochure**

  Contains an overview of available assembly aids (e.g. lubricants, locking agent), special tools, schematic diagrams, fixtures, measuring devices, etc. The information can be found in the online spare parts catalogue on the Festo website (➔ Tools and Repair Accessories.pdf).

1.2 Symbols used in these repair instructions

Danger categories

The following symbols identify text passages which draw attention to specific hazards.

Danger

Caution

Marking special information

The following symbols identify text passages which contain special information.

Note

Information

Environment

1.3 Text designations used in these repair instructions

- Activities that can be carried out in any order.

1. Activities which should be carried out in the specified order.

– General lists.

➔ Reference to further information.

Underlined, blue text indicates a cross-reference or hyperlink that you can click on in the PDF.

1.4 General safety instructions

Danger

Risk of fatal injury due to electric shock and uncontrolled movement of components.

– The spindle axis must be de-energised, depressurised and reliably secured against unauthorised switching back on again before the maintenance and repair work begins.

Caution

The spindle axis may only be repaired by authorised and trained persons in accordance with the specifications in the technical documentation and using original spare parts.

Installation and repair by unauthorised and untrained persons, repairs using non-original spare parts or without the technical documentation required for installation and/or repair are dangerous and therefore not permitted.

Repairs must only be carried out in conjunction with these repair instructions and the respective device-specific operating instructions.

Caution

Unintended switching on can trigger unexpected movements and cause bruises.

– Ensure that the unit is protected against restarting before any modification or maintenance work or inspections are carried out. Loosened parts can make unexpected movements or fall off.

– Secure parts against accidental movements or move them into a safe end position.

Note

Carrying out repair work without the respective necessary technical documentation is dangerous, and therefore not permissible. Repairs must only be carried out in conjunction with these repair instructions and the respective operating instructions for the device, as well as the documents listed in Chapter 1.1 on page 5.

In the event of damage caused by unauthorised manipulation, improper use or use of non-original spare parts, all warranty and liability claims against the manufacturer expire.

Instead of carrying out the repair yourself, your local Festo sales office offers the option of having the repair carried out by Festo.

Components and equipment replaced during repair must be disposed of in accordance with the relevant local environmental protection regulations.

1.5 Technical requirements

Note

The following instructions for safe and proper use must be observed:

- Observe the connection and ambient conditions specified in the technical data of the products and all the connected components. The product can only be operated in compliance with the relevant safety guidelines if you comply with the limit values and load limits (see enclosed documentation).
- The spindle axis gantries must be in faultless technical condition.
- The spindle axis may only be operated in its original condition and without unauthorised modifications.
- The spindle axis is designed for industrial use.

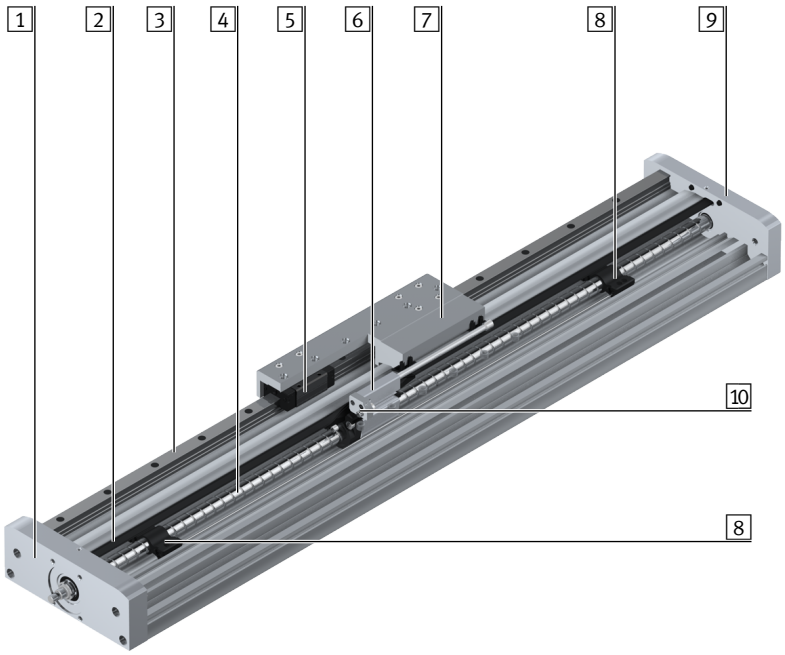
1.6 Standards and test values

Standards and test values which products comply with and fulfil can be found in the “Technical data” sections of the enclosed documentation.

2 General product description

2.1 Functional description

The EGC-HD-BS is a spindle axis, which is designed for movements with large forces and precise repetition accuracy. A rotating ball screw converts the rotational movement of a motor into linear motion. This causes the piston to move backwards and forwards. The mechanics of the spindle axis are not automatically locking. After the input torque is removed the slide module can move freely. The EGC-HD-BS is approved for slide and yoke operation.



1 Clevis foot
2 Cover band
3 Roller track
4 Ball screw
5 Bearing cartridge
6 Retainer module
7 Slide module
8 Spindle support
9 Bearing cap
10 Adapter module

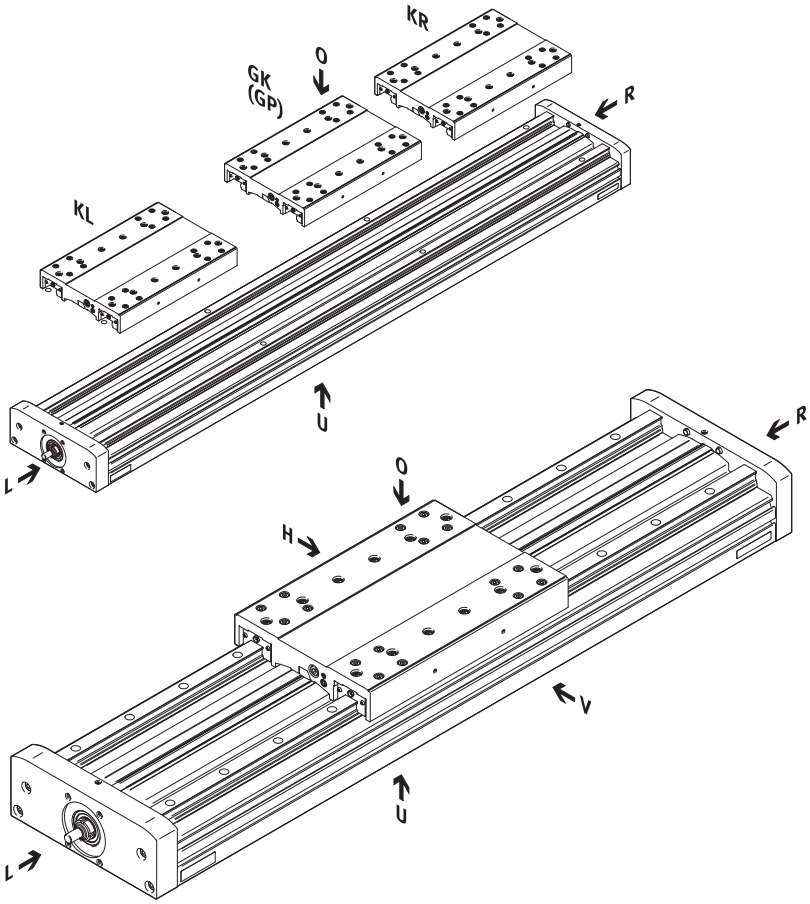
2.2 Types and part numbers

Type	Part number
EGC-HD-125-...-BS	556819
EGC-HD-160-...-BS	556820
EGC-HD-220-...-BS	556821

The complete overview of features, accessories, type codes, technical data and dimensions of the EGC-HD-BS spindle axes can be found in the product catalogue or on the Festo website (➔ www.festo.com).

2.3 Slide variants and orientation definition

This illustration provides an overview of the orientation designations and slide variants of the spindle axis.



Versions:

GK = Standard slide

GP = Protected standard slide

KL = Additional slide, standard, left

KR = Additional slide, standard, right

Orientation:

O = top

U = bottom

R = right

L = left

V = front

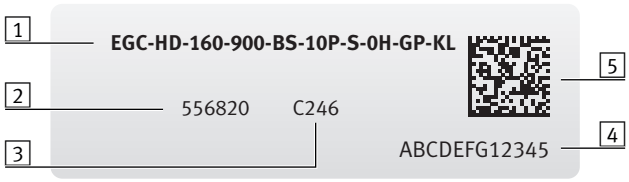
H = rear

2.4 Type code

The features of a spindle axis can be determined with the help of the product labelling on the spindle axis. The order code describes the features of the spindle axis, separated by a hyphen “-”.

A list and description of all possible equipment features of the spindle axis can be found on the data sheet. It is available on the Festo website (➔ www.festo.com).

Example



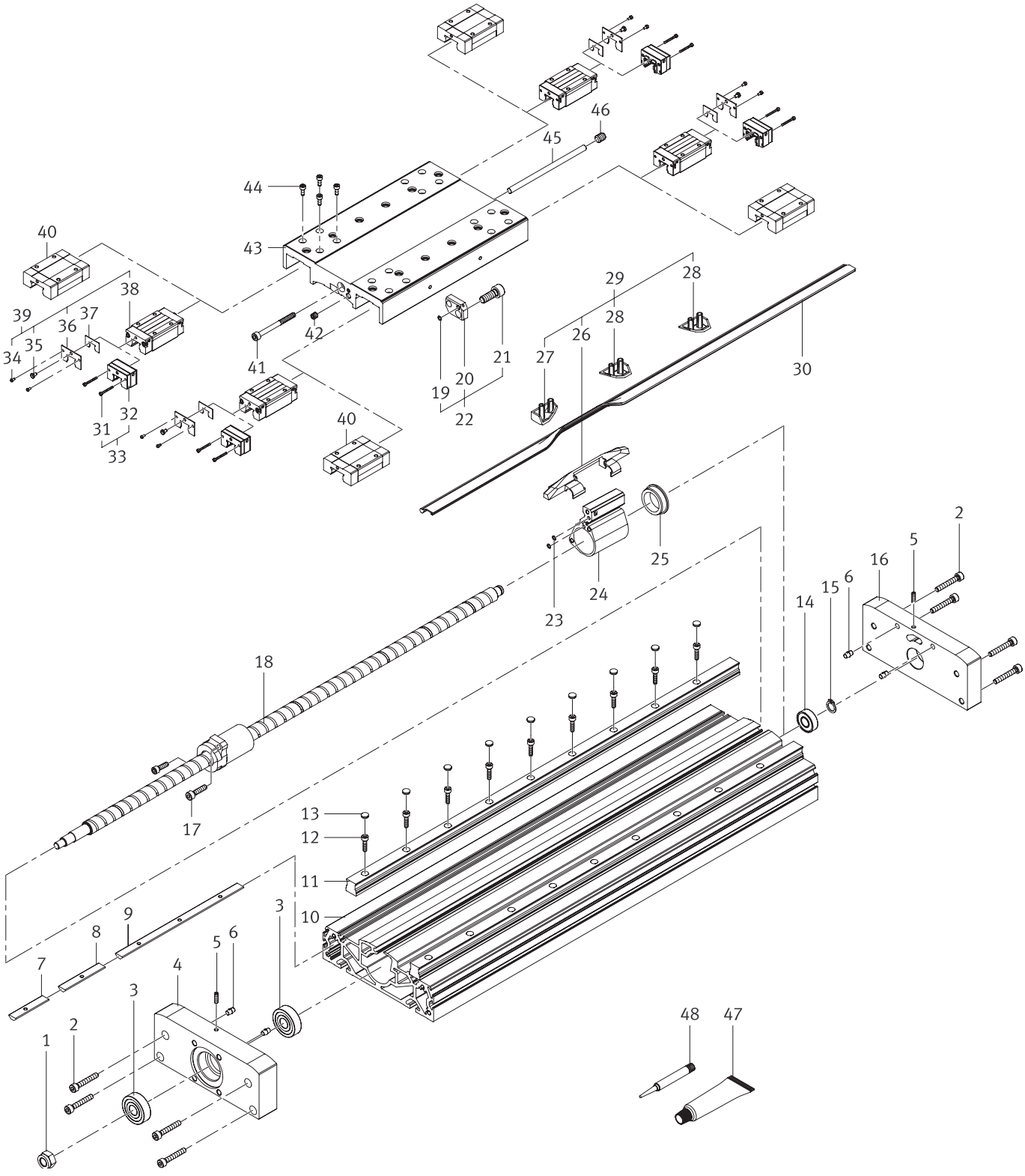
1 Order code
2 Part number
3 Serial number
4 Product key
5 Product Key Code
Data Matrix Barcode
(http://pk.festo.com/ + Product Key)

The order code on the product labelling provides the following information:

EGC	Electric linear axis
HD	Heavy-duty guide
160	Size, axis width
900	900 mm stroke
BS	Spindle drive
10P	Spindle pitch, 10mm / spindle rotation
S	With spindle support
0H	Stroke reserve, 0 mm
GP	Standard slide module, protected
KL	Additional slide module, left

3 Components list

3.1 EGC-HD-125 / 160 / 220-...-BS



This diagram is intended only to provide an overview of the individual components. To order spare and wearing parts, please use the online spare parts catalogue on the Festo website (➔ www.festo.com/spareparts).

Spindle axis		EGC-HD-125-...-BS	EGC-HD-160-...-BS	EGC-HD-220-...-BS
Item	Designation	Type	Type	Type
1	Hex nut	DIN 985-M8×1-8	**Not present**	**Not present**
1	Slotted nut	**Not present**	GUK M10×0,75	GUA M16×1
2	Socket head screw	ISO 4762-M4X25-8.8	ISO 4762-M5X30-8.8	ISO 4762-M6X40-10.9
3	Deep-groove ball bearing	DIN 625-629-2RS	**Not present**	**Not present**
3	Angular ball bearing	**Not present**	DIN 628-7200-B-2RS	DIN 628-7203-B-2RS
4	Clevis foot			
5	Grub screw	ISO 4026-M3X10-45H	ISO 4026-M4X10-45H	ISO 4026-M5X16-45H
6	Buffer			
7	Slot nut			**Not present**
8	Slot nut			
9	Slot nut			
10	Cylinder barrel module			
11	Roller track			
12	Socket head screw	ISO 4762-M3X12-12.9	ISO 4762-M4X14-12.9	ISO 4762-M6X20-12.9
13	Cover cap			
14	Deep-groove ball bearing	D616-698-2RS	D616-698-2RS	XF+DIN 625-6200-2RS
15	Retaining ring	DIN 471-8×0,8	DIN 471-8×0,8	DIN 471-10×1
16	Bearing cap			
17	Socket head screw	ISO 4762-M4X16-8.8	ISO 4762-M5X25-10.9	ISO 4762-M6X20-10.9
18	Ball screw			
19	O-ring	B-2×1-N-NBR70	B-2×1-N-NBR70	3×1-N-NBR70
20	Lubricating head module			
21	Socket head screw	ISO 4762-M6X16-10.9	ISO 4762-M6X12-10.9	ISO 4762-M6X20-10.9
22	Adapter module			
23	O-ring	B-2×1-N-NBR70	B-2×1-N-NBR70	3×1-N-NBR70
24	Retainer module			
25	Sleeve	**Not present**	**Not present**	
26	Belt reversal			
27	Belt reversal			
28	Belt reversal			
29	Belt reversal			
30	Cover band			
31		**Not present**		
32		**Not present**		
33	Lubrication adapter	**Not present**		
34		**Not present**		
35	Lubrication nipple	**Not present**	M3-S16	AM 6 DIN 3405
36		**Not present**		
37		**Not present**		
38		**Not present**		
39	Bearing cartridge, GP variant	**Not present**		
40	Bearing cartridge, GK variant			
41	Socket head screw	ISO 4762-M4X45-8.8	ISO 4762-M5X55-10.9	ISO 4762-M6X85-10.9
42	Grub screw	ISO 4026-M6X6-45H	ISO 4026-M6X6-45H	ISO 4026-M6X6-45H
43	Slide module			
44	Socket head screw	ISO 4762-M3X8-12.9	ISO 4762-M4X10-10.9	ISO 4762-M6X12-10.9
45	Rod			
46	Grub screw	ISO 4026-M6X10-45H	ISO 4026-M8X10-45H	ISO 4026-M10X10-45H
47	Lubricating grease	LUB-KC1, silicone-free	LUB-KC1, silicone-free	LUB-KC1, silicone-free
48	Adhesive			

4 Repair steps

Where possible, it is advisable to dismantle the spindle axis from the system entirely before carrying out the repair.

Before starting the repair, dismantle any attachment components in accordance with the instructions in the corresponding operating instructions.

Keep your working environment clean and tidy.

Before dismantling the spindle axis the cause of the failure must be investigated to prevent repeated and premature failure. A spindle axis that has been used as intended will not normally show any signs of premature failure.

This investigation is not necessary in the case of non-premature failure (fatigue time). However, the condition of the spindle axis (general condition, etc.) must always be checked.

In case of uncertainty, we recommend replacing all the components mentioned to rule out reciprocal effects during later operation.

In the event of premature failure of the spindle axis the operating conditions should be examined more closely.

The following possibilities should be considered, among other things:

– **Overloading**
  - In case of overloading, the application parameters (load, speed) should be adjusted accordingly.

– **Ambient conditions/material resistance**
  - Check whether the ambient temperature is within the permissible range.
  - Check the chemical and physical ambient conditions for harmful substances, such as dust, abrasive particles, cooling lubricants, solvents, ozone, radiation, water-soluble substances, greases and oils, etc.

Note

The repair should preferably be carried out on a stable and flat work surface with storage for small parts.

To prevent damage to the roller track and other components, do not use pointed or sharp-edged assembly tools.

4.1 Preparatory steps

Danger

Risk of fatal injury from electric shock.

– The control of the drive motors is still charged after the voltage has been switched off (capacitor voltage). As such, you must wait approx. 3 minutes after switching off the voltage before the motor cables can be removed. The capacitors discharge their voltage during this time.

1. Disconnect the spindle axis from the power supply and secure it from being switched on again accidentally.
2. Remove the motor and encoder cables.
3. Dismantle the motor, axial kit or parallel kit.

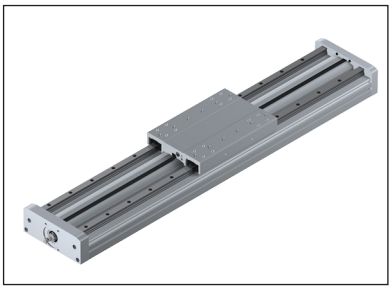
4.2 Visual inspection

- Check the spindle axis for visible damage that can impair its function, such as large dents in the guide roller track.

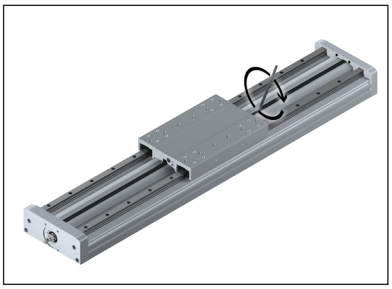
The complete spindle axis must be replaced if significant damage exists.

4.3 Dismantling the spindle axis

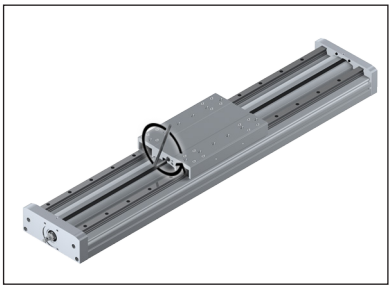
1. Place the spindle axis on the work surface with the slide module facing upwards.



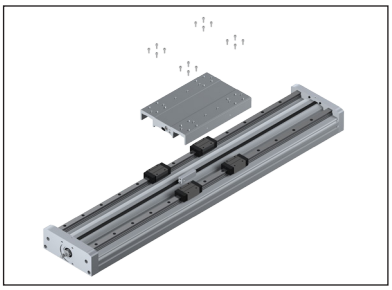
2. Unscrew the grub screw on the right-hand side of the slide module.
3. Remove the rod from the slide module.



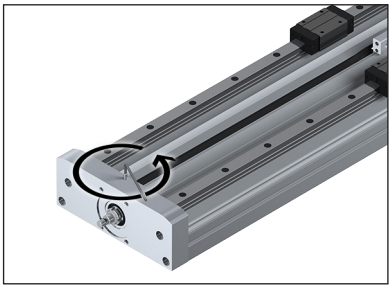
4. Completely unscrew the socket head screw on the left-hand side of the slide module.



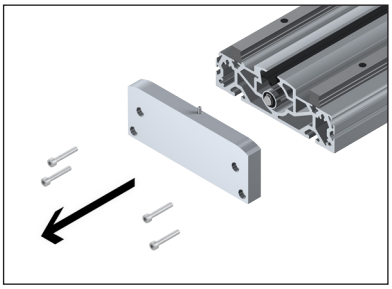
5. Completely unscrew the socket head screws for fixing the slide on the bearing cartridge.
6. Remove the slide module from the bearing cartridge from above.



7. Unscrew the grub screws of the cover band clamp so that they are flush with the clevis foot / bearing cap.



8. Unscrew the socket head screws from the bearing cap.



Note

When the bearing cap is pulled off the cylinder barrel module, the bearing seat of the roller bearing is also pulled off the ball screw. After pulling off the bearing cap the ball screw must be supported so that torque / tilting moments do not damage the roller bearing on the opposite side of the ball screw.

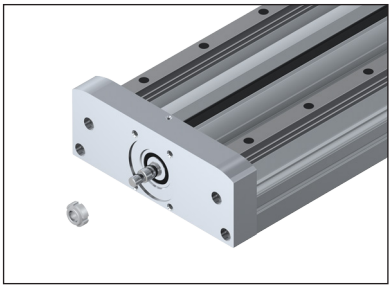
9. Carefully pull the bearing cap off the cylinder barrel.

EGC-HD-125-...-BS

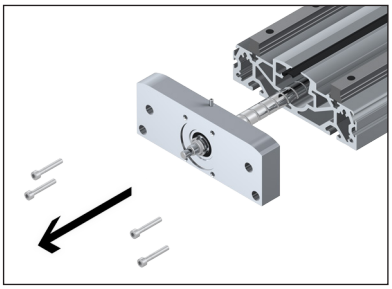
10. Unscrew the hex nut from the ball screw.

EGC-HD-160 / 220-...-BS

11. Unscrew the slotted nut from the ball screw.

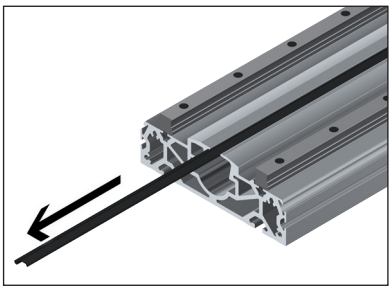


12. Unscrew the socket head screws from the clevis foot.
13. Pull the clevis foot together with the ball screw carefully out of the cylinder barrel.
14. Carefully pull the clevis foot off the ball screw.



The roller bearings are pressed onto the ball screw. A certain amount of force is required to pull it off.

15. Carefully pull the cover band out of the cylinder barrel.
16. Check the cover band for damage and renew if necessary.



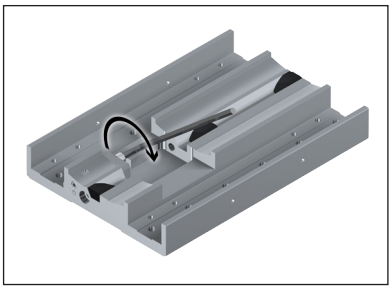
4.3.1 Replacing the adapter module in the slide module

Requirement

The slide module is dismantled (➔ Chapter 4.3 on page 13).

Dismantling the adapter module

1. Unscrew the socket head screw of the adapter module completely out of the slide.

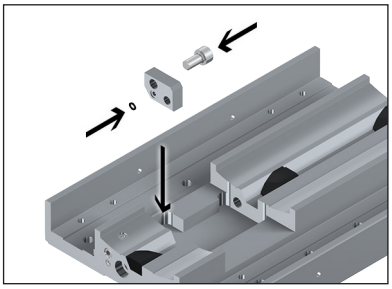


On removing the lubricating head module, ensure that the O-ring does not become lost.

2. Remove the lubricating head module.

Assembling the adapter module

1. Check the lubricating head module and O-ring for damage and replace if necessary.
2. Insert the O-ring in the lubricating head.
3. Clean the socket head screw to remove the thread locking agent.



Note

Note the mounting position.

Insert the lubricating head module in the slide as shown in the Figure to the side.

4. Position the lubricating head module in the slide.
5. Wet the socket head screw with thread locking agent.
6. Screw the socket head screw through the lubricating head module in the left-hand short middle web of the slide module and tighten with the appropriate tightening torque.

Type	Tightening torque
EGC-HD-125-...-BS	3.5 Nm
EGC-HD-160-...-BS	3.5 Nm
EGC-HD-220-...-BS	3.5 Nm

7. Mount the slide module on the bearing cartridges (➔ Chapter 4.4.2 on page 22).

4.3.2 Replacing the bearing cartridges

Festo recommends, as a basic principle, that you always replace the entire drive if a defect occurs in the linear recirculating ball bearing guide system.

Users replace the bearing cartridges at their own risk.

Before replacing the bearing cartridges, check the roller tracks for wear and damage. Defective or worn roller tracks **cannot** be replaced. It is the responsibility of the user to evaluate the wear and damaged condition of the roller tracks.

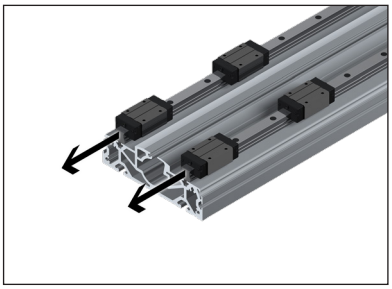
Requirement

– The slide module is dismantled (➔ Chapter 4.3 on page 13),
– The bearing cap or clevis foot is dismantled (➔ Chapter 4.3 on page 13).

Dismantling the bearing cartridges

Note

The recirculating ball bearing guide system is pretensioned. Individual balls can therefore easily slip out and become lost when the bearing cartridges are pushed off the roller tracks. Only separate the bearing cartridges from the roller track to replace them.



1. Push the bearing cartridges off the roller tracks.
2. Clean the cylinder barrel and roller tracks with compressed air and a cloth.

Assembling the bearing cartridges

The new bearing cartridges are delivered on an assembly aid.

Note

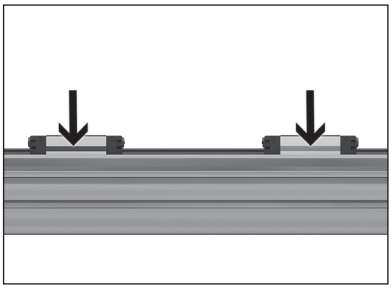
The recirculating ball bearing guide system is pretensioned. Individual balls can therefore easily slip out and become lost when the bearing cartridges are pushed off the assembly aid.

The bearing cartridges must remain on the assembly aids and are pushed off the assembly aids and directly onto the roller tracks.

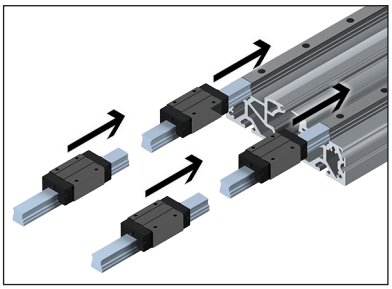
Note

Pay attention to the installation position when positioning the new bearing cartridges. The ground sides (stop side) of the bearing cartridges faces the opposite bearing cartridge, i.e. the stops sides always face the cover strip.

By contrast, the grooved side of the bearing cartridge faces the outside.



1. Position the assembly aid with the new bearing cartridge at the front side of the roller track.



Note

When pushing the bearing cartridges from the assembly aid and onto the roller track, ensure that

– the sealing lips of the bearing cartridges are not damaged and
– no balls slip out of the bearing cartridges.

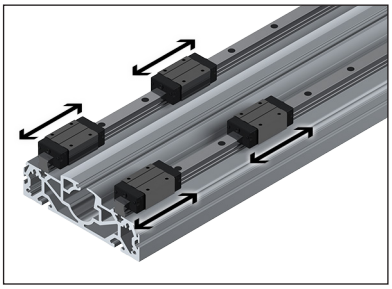
Only bearing cartridges with the full number of balls may be installed.

2. Push the new bearing cartridges carefully onto the roller track.

Note

Before commissioning the spindle axis, the new bearing cartridges must be relubricated (➔ Chapter 7.3 on page 28). Non-compliance can lead to unlubricated operation, and thus failure of the spindle axis before the next specified relubrication.

3. Check the guide backlash and the displacement resistance by moving the bearing cartridges several times.
4. The bearing cartridges must move along the roller tracks smoothly and without jerking.
   There must be **no** guide backlash.



The backlash of the bearing cartridges is not adjustable. If the operating behaviour is not correct, check the roller track and replace the entire spindle axis if necessary.

- Mount the slide module on the bearing cartridges (➔ Chapter 4.4.2 on page 22).
- Mount the bearing cap or clevis foot (➔ Chapter 4.4.2 on page 22).

Relubricating the recirculating ball bearing guide

The recirculating ball bearing guides must be lubricated using a grease gun before commissioning and at certain intervals as described in Chapter 7.3 on page 28.

Festo offers a one-hand high-pressure grease gun with a suitable pinpoint nozzle for greasing the lubricating holes (➔ Chapter 8.2 on page 30).

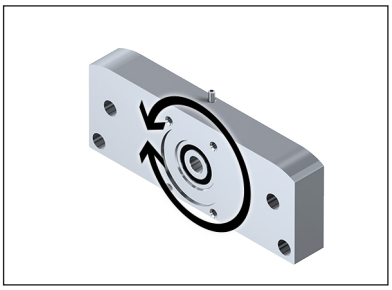
4.3.3 Checking and replacing the deep-groove ball bearing or angular ball bearing with seat in the clevis foot

In the spindle axes EGC-HD-125 / 160 / 220-...-BS, the bearing of the ball screw in the **clevis foot** differs depending on the size:

– two **deep-groove ball bearings** are installed in the spindle axis EGC-HD-125-...-BS,
– two **angular ball bearings** are installed in each of the spindle axes EGC-HD-160-...-BS and EGC-HD-220-...-BS.

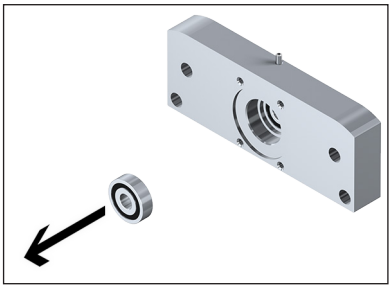
The rolling behaviour of the deep-groove ball bearing or angular ball bearing in the clevis foot and the deep-groove ball bearing or angular ball bearing on the ball screw must be checked with each repair. If the rolling behaviour of one of the two roller bearings is no longer perfect, e.g. due to increased scratching noises, both roller bearings must always be replaced.

1. Check the rolling behaviour of the roller bearing in the clevis foot and the deep-groove ball bearing or angular ball bearing on the ball screw.



Replacing the roller bearing

Note
When driving out the roller bearing, ensure that the bearing seat in the clevis foot is not damaged.

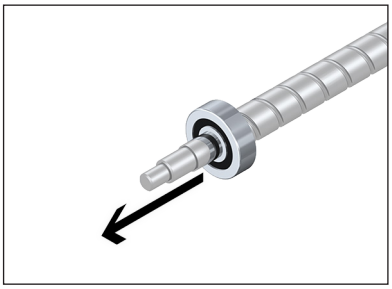


2. Drive the roller bearing out of the clevis foot.

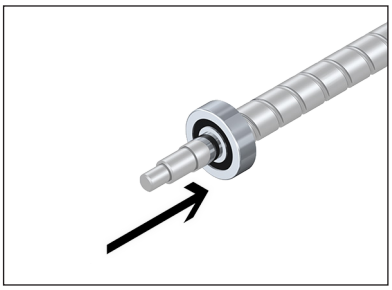
Note

Ensure that the seat of the roller bearing is not damaged when it is pulled off the ball screw.

3. Pull roller bearing off the spindle.



4. Apply a thin film of grease to the inner raceway of the new roller bearing.



Note

When pressing on the roller bearing, ensure that it does not tilt and become damaged.

EGC-HD-125-...-BS

5. Press the deep-groove ball bearing over the inner raceway onto the spindle.

EGC-HD-160 / 220-...-BS

Note

When installing the angular ball bearing (size EGC-HD-160 / 220-...-BS), ensure that the **wider** outer raceway face is **always** pointed towards the clevis foot.

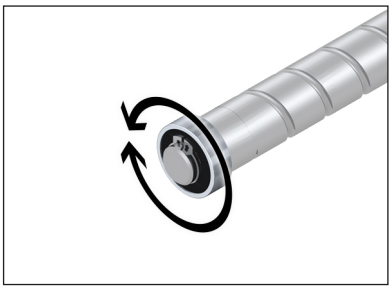
6. Press the angular ball bearing over the inner raceway onto the spindle.

4.3.4 Checking and replacing the deep-groove ball bearing with seat in the bearing cap

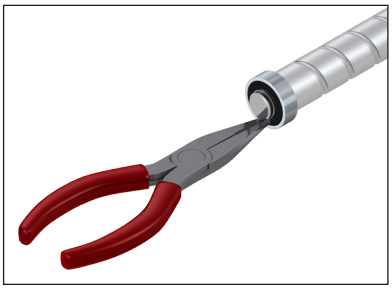
In the spindle axes EGC-HD-125 / 160 / 220-...-BS, the ball screw is supported in the **clevis foot** by means of a deep-groove ball bearing.

The rolling behaviour of the deep-groove ball bearing on the ball screw must be checked with each repair. If the rolling behaviour is no longer perfect, e.g. due to increased scratching noises, the deep-groove ball bearing on the ball screw must be replaced.

1. Check the rolling behaviour of the deep-groove ball bearing on the ball screw.



Replacing the deep-groove ball bearing

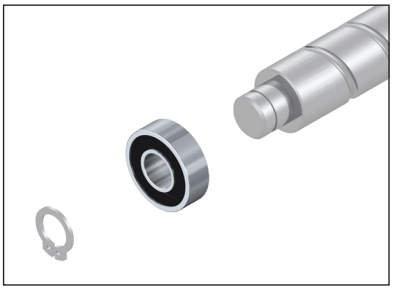


Note

Ensure that the seat of the deep-groove ball bearing is not damaged when the deep-groove ball bearing is pulled off the ball screw.

2. Use pliers to remove the retaining ring from the ball screw.
3. Pull the deep-groove ball bearing off the ball screw.

4. Apply a thin film of grease on the inner raceway of the deep-groove ball bearing.
5. Press the deep-groove ball bearing over the inner raceway onto the spindle.
6. Use pliers to insert the retaining ring in the ball screw.



4.3.5 Checking and replacing the ball screw

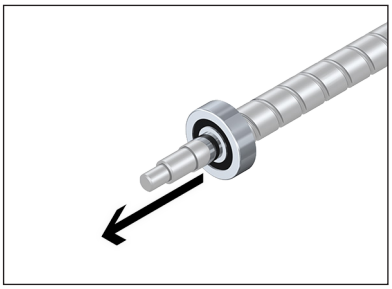
The ball screw converts the rotational movement of the motor into a linear movement. The backlash free bearing enables very high repetition accuracy to be achieved.

If the rolling behaviour is no longer faultless, the ball screw must be replaced.

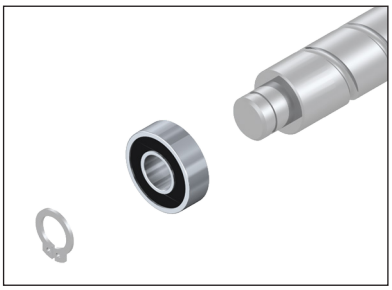
Note

Ensure that the seat of the roller bearing is not damaged when the deep-groove ball bearing or angular ball bearing is pulled off the ball screw.

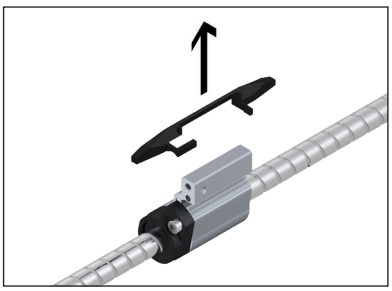
1. Pull the deep-groove ball bearing or angular ball bearing off the spindle.



2. Dismantle the deep-groove ball bearing as described in Chapter 4.3.4 on page 18.



3. Remove the belt reversal from the retainer module.

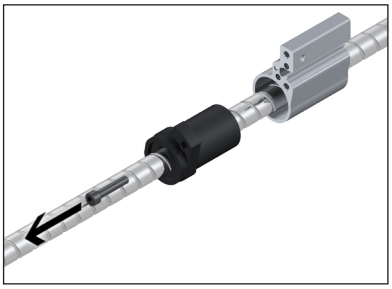


4. Unscrew the socket head screw from the retainer module.

   EGC-HD-220-...-BS

   - Unscrew both socket head screws from the retainer module.

5. Pull the retainer module off the ball screw.



The retainer module is pressed onto the ball screw. A certain amount of force is required to pull it off.

Note

When pressing it on, ensure that the retainer module does not tilt. Otherwise the seat could be damaged.

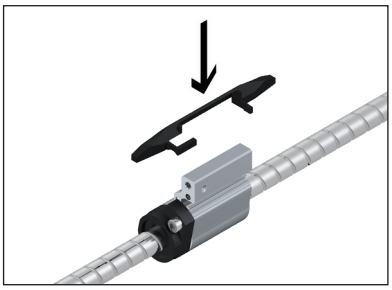
6. Carefully press on the retainer module.
7. Clean the socket head screw to remove the thread locking agent.
8. Wet the socket head screw with thread locking agent.
9. Screw in the socket head screw and tighten with the appropriate tightening torque.

EGC-HD-220-...-BS

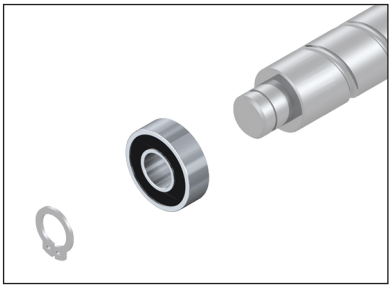
- Screw two socket head screws into the retainer module and tighten with the appropriate tightening torque.

Type	Tightening torque
EGC-HD-125-...-BS	2.5 Nm
EGC-HD-160-...-BS	5 Nm
EGC-HD-220-...-BS	3.5 Nm

10. Place the belt reversals on the retainer module.

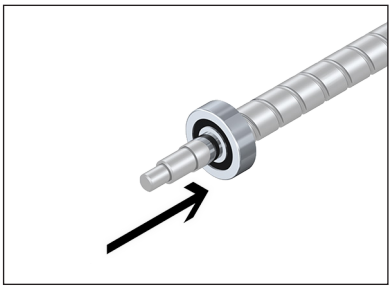


11. Mount the deep-groove ball bearing as described in Chapter 4.3.4 on page 18.



Note

When installing the angular ball bearing (size EGC-HD-160 / 220-...-BS), ensure that the **wider** outer raceway face is **always** pointed towards the clevis foot.



12. Apply a thin film of grease on the inner raceway of the roller bearing.

Note

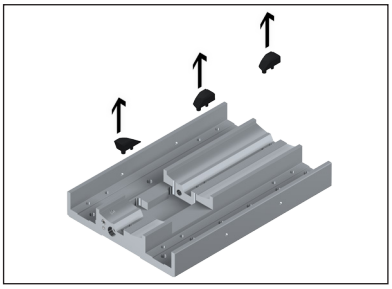
When pressing on the roller bearing, ensure that it does not tilt and become damaged.

13. Press the roller bearing over the inner raceway onto the spindle.

4.3.6 Replacing the belt reversal

Slide module belt reversal

1. Lever three belt reversals out of the slide module.
2. Check the three belt reversals for damage and replace if necessary.



Note

Two right-hand belt reversals and one left-hand belt reversal are installed in the slide module.

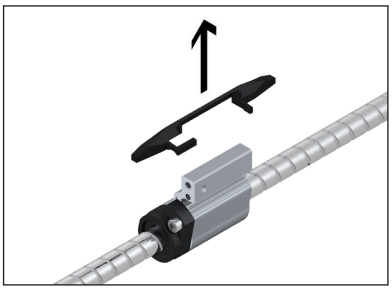
The left-hand belt reversal, with slanted edge pointing right, is inserted into the left-hand, short middle web of the slide module.

The two right-hand belt reversals, with slanted edge of each pointing to the left, are inserted into the right-hand, long middle web of the slide module.

3. Insert three belt reversals.

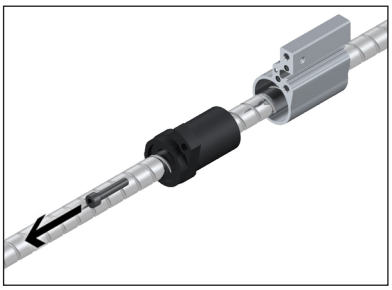
Retainer module belt reversal

1. Remove the belt reversal from the retainer module.
2. Check the belt reversal for damage and replace if necessary.
3. Place the belt reversals on the retainer module.



4.3.7 Replacing the retainer module

1. Unscrew the socket head screw from the retainer module.



EGC-HD-220-...-BS

- Unscrew both socket head screws from the retainer module.

2. Pull the retainer module off the ball screw.
3. Clean the socket head screw to remove the thread locking agent.
4. Wet the socket head screw with thread locking agent.

5. Push the retainer module onto the ball screw.
6. Screw in the socket head screw and tighten with the appropriate tightening torque.

EGC-HD-220-...-BS

- Screw two socket head screws into the retainer module and tighten with the appropriate tightening torque.

Type	Tightening torque
EGC-HD-125-...-BS	2.5 Nm
EGC-HD-160-...-BS	5 Nm
EGC-HD-220-...-BS	3.5 Nm

4.4 Mounting the spindle axis

4.4.1 Greasing whilst assembling

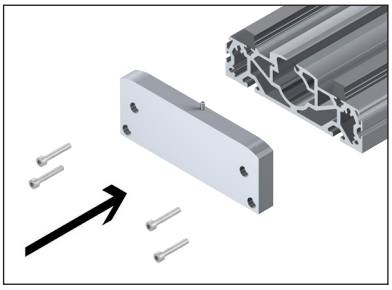
- Grease the following parts as described.

Component	Lubricant	Greasing instructions
Cylinder barrel	Festo LUB-KC1[1)]	Apply a layer of grease to the slot.
Cover band	Festo LUB-KC1[1)]	Apply a layer of grease all around and along the entire length.
Ball screw	Festo LUB-KC1[1)]	Grease all round.
Belt reversal on slide module	Festo LUB-KC1[1)]	Grease in the deflection area.
Belt reversal on retainer module	Festo LUB-KC1[1)]	Grease in the deflection area.
Bearing cartridges	Festo LUB-KC1[1)]	➔ Chapter 7.3 on page 28

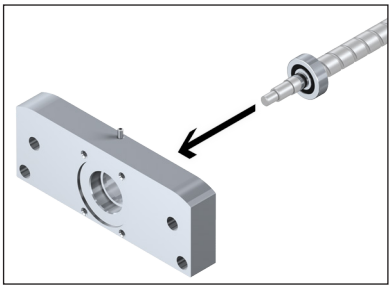
[1)] For further information, refer to the information brochure: **“Tools and repair accessories”**. The brochure can be found in the online spare parts catalogue on the Festo website (➔ Tools and Repair Accessories.pdf).

4.4.2 Assembling the spindle axis

1. Clean the socket head screws of the bearing cap to remove thread locking agent.
2. Wet the socket head screws with thread locking agent.
3. Screw in the socket head screws loosely.



4. Apply a thin film of grease on the outer raceway of the deep-groove ball bearing or angular ball bearing on the ball screw.

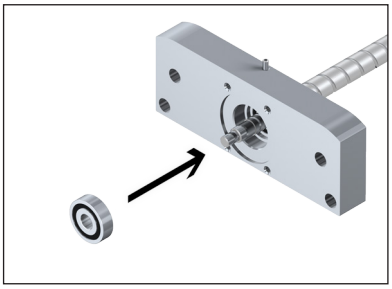


Note

After the ball screw has been driven into the deep-groove ball bearing or angular ball bearing in the clevis foot, the ball screw must be supported. The self-weight and resulting torque / tilting moments can damage the roller bearings.

5. Drive the ball screw carefully into the clevis foot.
6. Support the ball screw.

7. Apply a thin film of grease to the outer and inner raceway of the deep-groove ball bearing or angular ball bearing.

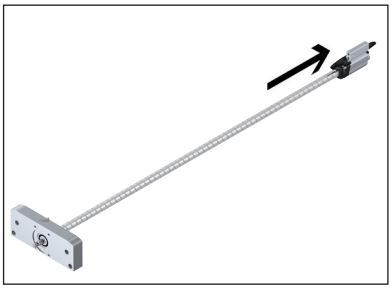


Note

When installing the angular ball bearing (size EGC-HD-160 / 220-...-BS), ensure that the **wider** outer raceway face is **always** pointed towards the clevis foot.

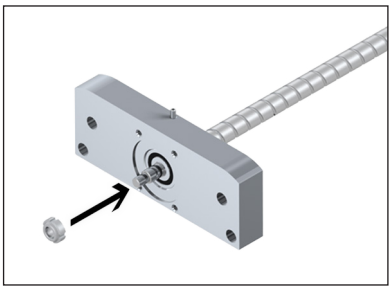
8. Drive the deep-groove ball bearing or angular ball bearing carefully into the clevis foot above the outer and inner raceway.

9. Push the retainer module onto the ball screw in the direction of the preassembled deep-groove ball bearing until it stops.



Note

The axial backlash of the roller bearing is adjusted by tightening the hex nut of the EGC-HD-125-...-BS or the slotted nut of the EGC-HD-160-...-BS and EGC-HD-220-...-BS. Overtightening reduces the life of the roller bearing. The correct tightening torque is chosen at the discretion of the qualified personnel.



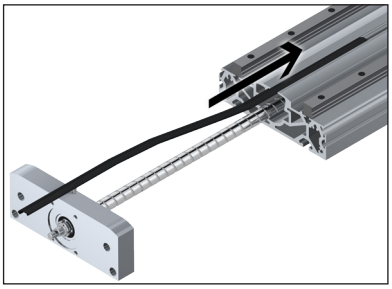
EGC-HD-125-...-BS

10. Screw the hex nut onto the spindle and adjust the deep-groove ball bearing axially so that it free from backlash.

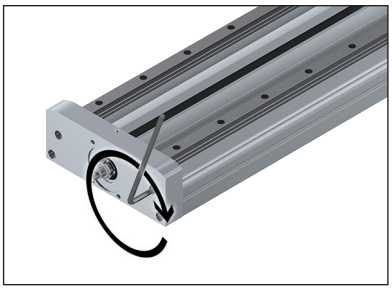
EGC-HD-160 / 220-...-BS

11. Screw the slotted nut onto the spindle and adjust the angular ball bearing axially so that it is free from backlash.

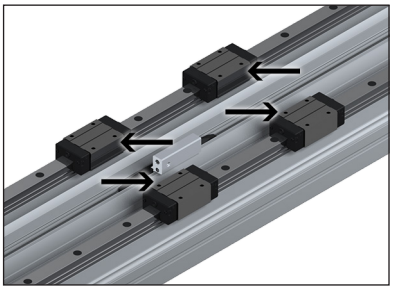
12. Insert the ball screw into the cylinder barrel module until the retainer module is roughly in the middle of the cylinder barrel module.
13. Push the cover band into the slot in the cylinder barrel from the clevis foot side and guide it over the belt reversal into the bearing cap until it stops.
14. Insert the preassembled deep-groove ball bearing onto the ball screw in the bearing cap.



15. Knock the clevis foot onto the cylinder barrel module.
16. Clean the socket head screws to remove the thread locking agent.
17. Wet the socket head screws with thread locking agent.
18. Screw in the socket head screws loosely.



The bearing cartridges have a ground surface on one side as a stop face for the slide module. This stop face must not have any surface defects such as burrs, chips, dents, etc. and no thread locking agent residue.



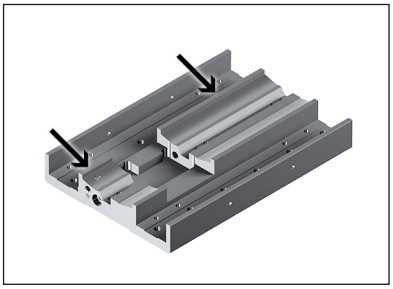
Note

Pay attention to the installation position when positioning the new bearing cartridges. The ground sides (stop side) of the bearing cartridges faces the opposite bearing cartridge, i.e. the stops sides always face the cover strip.

By contrast, the grooved side of the bearing cartridge faces the outside.

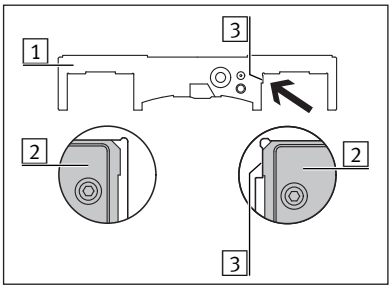
19. Clean the stop faces of the bearing cartridges.

The milled stop face and mounting surfaces of the slide module for the bearing cartridges must not have any surface defects such as burrs, chips, dents, etc. and no thread locking agent residues.

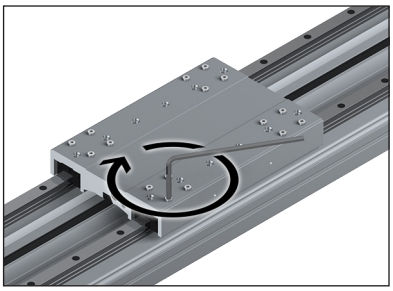


20. Clean the stop face and mounting surfaces of the slide module.

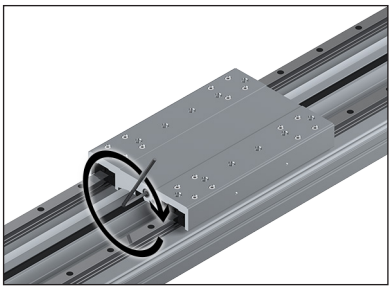
1 Slide module
2 Bearing cartridges
3 Stop face on the slide module



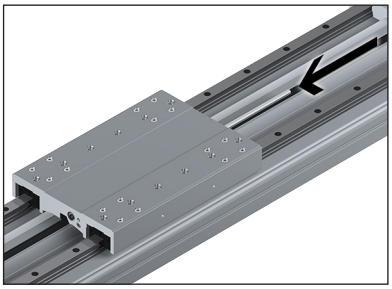
21. Position the slide module on the bearing cartridges so that the lubrication opening in the front face of the slide module faces the clevis foot and the retainer module is located between the middle webs of the slide module. Clean the socket head screws to remove the thread locking agent.
22. Wet the socket head screws with thread locking agent.
23. Align the bearing cartridges.
24. Screw the socket head screws loosely into the four bearing cartridges.



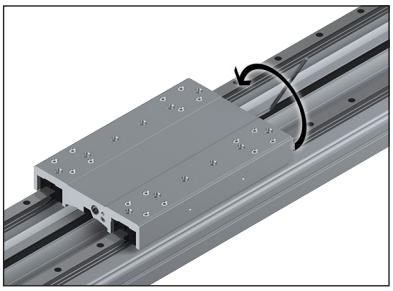
25. Clean the socket head screw for connecting the slide module to the retainer group to remove thread locking agent.
26. Wet the socket head screw with thread locking agent.
27. Insert the socket head screw into the slide module.
28. Screw in the socket head screw loosely.



29. Insert the rod into the slide module.

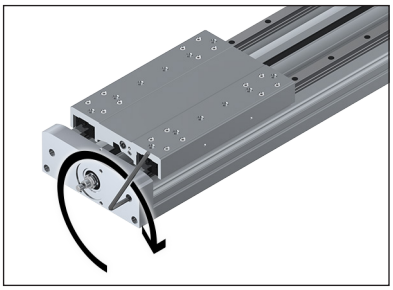


30. Clean the grub screw to remove thread locking agent.
31. Wet the grub screw with thread locking agent.
32. Screw the grub screw loosely into the slide module.



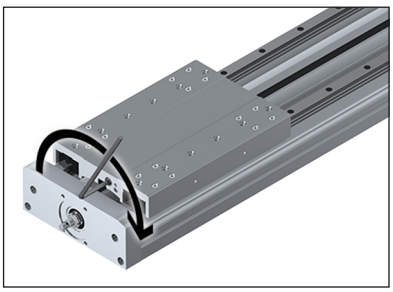
33. Move the slide in the direction of the clevis foot until it stops.
34. Tighten the socket head screws using the appropriate torque.

Type	Tightening torque
EGC-HD-125-...-BS	2.5 Nm
EGC-HD-160-...-BS	5 Nm
EGC-HD-220-...-BS	12 Nm



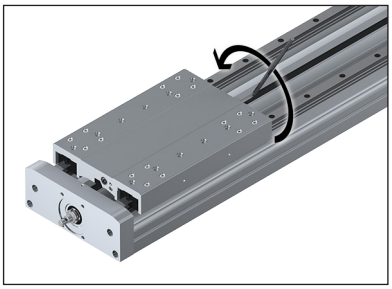
35. Push the slide towards the front against the ground surface of the bearing cartridges and tighten the socket head screws with the appropriate tightening torque.

Type	Tightening torque
EGC-HD-125-...-BS	2.5 Nm
EGC-HD-160-...-BS	8.5 Nm
EGC-HD-220-...-BS	14 Nm



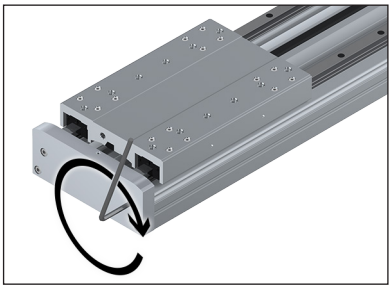
36. Push the slide towards the front against the ground surface of the bearing cartridges and tighten the grub screw with the appropriate tightening torque.

Type	Tightening torque
EGC-HD-125-...-BS	1 Nm
EGC-HD-160-...-BS	2.5 Nm
EGC-HD-220-...-BS	3.5 Nm



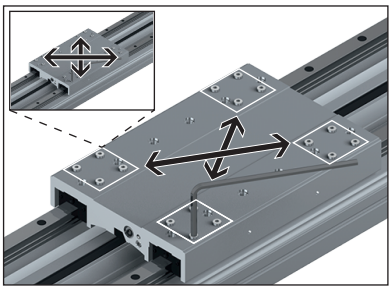
37. Push the slide in the direction of the bearing cap until it stops.
38. Tighten the socket head screws using the appropriate torque.

Type	Tightening torque
EGC-HD-125-...-BS	2.5 Nm
EGC-HD-160-...-BS	5 Nm
EGC-HD-220-...-BS	12 Nm



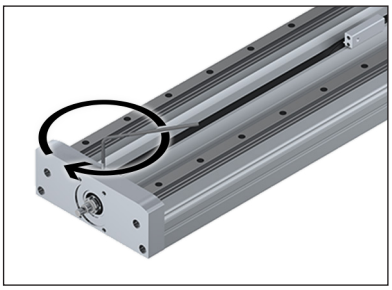
39. Push the slide forwards against the ground surface of the bearing cartridge and tighten the socket head screws, loosely screwed into the bearing cartridges, cross-wise and also cross-wise in the system with the appropriate tightening torque.

Type	Tightening torque
EGC-HD-125-...-BS	2.5 Nm
EGC-HD-160-...-BS	5.0 Nm
EGC-HD-220-...-BS	18 Nm



40. Completely unscrew the grub screws for clamping the cover band.
41. Clean the grub screws to remove thread locking agent.
42. Wet the grub screws with thread locking agent.
43. Tighten the grub screws to the appropriate torque.

Type	Tightening torque
EGC-HD-125-...-BS	0.1 Nm
EGC-HD-160-...-BS	0.3 Nm
EGC-HD-220-...-BS	0.5 Nm



5 Functional test

After completing the assembly work on the spindle axis, check that it functions faultlessly.

5.1 No-load torque

It must be possible to move the idling slide module, with no attached drive or coupled load, without much resistance or jerking.

This check is based on the technician's instinct and experience. It is not possible to specify precise test values.

5.2 Start-up

Commission the repaired spindle axis as per the operating instructions (enclosed with the spindle axis or available on the Festo website (➔ www.festo.com)).

6 Cleaning

Note

If other cleaning products are used, ensure that they do not corrode the non-metal parts of the spindle axis.
If in doubt, check the resistance of the non-metal parts with the help of the information on the Festo website (➔ www.festo.com).

- Use a soft cloth and a gentle cleaning product to clean the spindle axis as and when necessary.
- Use a mild cleaning product to clean the cover strip and the roller track as and when necessary.

7 Maintenance

7.1 Check the reversing backlash

Note

The reversing backlash (reversing clearance) must be checked with each maintenance. Increased reversing backlash results in increased noise in the long term and ultimately to blocking of the lead screw or fracturing of the spindle nut.

	EGC-HD-125-...-BS	EGC-HD-160-...-BS	EGC-HD-220-...-BS
Max. allowable reversing backlash	0.1 mm	0.1 mm	0.2 mm

- Check the reversing backlash of the slide.

7.2 Relubricating the belt system and roller track

Grease the belt system and roller track with Festo LUB-KC1 as and when required, see **"Tools and repair accesories"** information brochure. It can be found in the online spare parts catalogue on the Festo website (➔ Tools and Repair Accessories.pdf).

7.3 Relubricating the recirculating ball bearing guide and ball screw

The bearing cartridges and the ball screw should be relubricated after a load-dependent lubrication interval S_{int}. To determine the lubrication interval S_{int}, the load comparison factor f_v must be calculated using the formula for combined loads, see operating instructions **"Spindle axis EGC-BS-KF, -EGC-HD-BS"** (➔ www.festo.com).

Note

The lubrication interval S_{int} depends on the load acting on the product.

Load factors:

- Dusty and contaminated environment
- Nominal stroke > 2000 mm
- Speed > 2 m/s
- Travel profile ≙ triangular operation (frequent acceleration and braking)
- Ambient temperature > 40 °C
- Product's time in operation > 3 years

- If **one** of these factors applies, halve the lubrication interval S_{int}.
- If **several** factors apply at the same time, divide the lubrication interval by four.
- We recommend that you lubricate the ball screw and the bearing cartridges at the same time. In this case lubrication should take place according to the shorter lubrication interval.

Note

During the relubrication the slide on the roller track must be moved backwards and forwards along the entire travel distance, to distribute the grease uniformly inside.

For notes and information on lubricating, refer to the **"Spindle axis EGC-BS-KF, EGC-HD-BS"** operating instructions (➔ www.festo.com).

There are two different versions of the bearing cartridges.

The **GK** slide variant has lubrication holes on both end faces of the slide. The lubricant must be inserted in both holes, as the bearing cartridges do not have lubricant connections between them.

The **GP** slide variant has an integrated lubricating system that ensures a continuous supply of lubricating oil for the raceways. This version cannot be regreased.

Lubricant quantity for bearing cartridges with GK slide variant

Always insert the lubricant in **both** lubrication nipples on the two end faces of the slide, as there is no lubricant connection between the bearing cartridges. Half the quantity of grease (see table) is to be inserted in each lubrication nipple, in different slide positions, whose distance apart is equal to twice the slide length.

	EGC-HD-125-...-BS	EGC-HD-160-...-BS	EGC-220-HD-...-BS
Grease quantity	1 g	0.6 g	1.5 g

Festo offers a one-hand, high-pressure grease gun with a suitable pointed nozzle for greasing the lubrication holes. See Special tools Chapter 8.2 on page 30.

Lubricant quantity for ball screw

The spindle nut is lubricated via a lubrication nipple or optionally via a central lubrication hole (each on the left-hand side of the slide).

	EGC-HD-125-...-BS Spindle pitch: 10 mm/rev.	EGC-HD-160-...-BS Spindle pitch: 10 mm/rev.	EGC-HD-160-...-BS Spindle pitch: 20 mm/rev.	EGC-HD-220-...-BS Spindle pitch: 10 mm/rev.	EGC-HD-220-...-BS Spindle pitch: 25 mm/rev.
Grease quantity	0.5 g	1.0 g	1.2 g	2.4 g	2.89 g

Festo offers a one-hand, high-pressure grease gun with suitable pointed nozzle or lubrication adapter (female thread M10x1) for greasing the lubrication holes. See Special tools Chapter 8.2 on page 30.

8 Tools

This chapter provides an overview of the tools and aids required to repair and maintain the spindle axis.

8.1 Standard tools

The following standard tools are required for repair and maintenance of the spindle axis:

- Plastic hammer
- Pliers for retaining rings (inner retainer for bore)
- Ruler
- Allen key
- Torque wrench
- Torque screwdriver
- Flat pliers
- Sturdy general purpose scissors or metal shears
- Open-end wrench (only EGC-HD-125-BS)
- Slotted nut wrench

8.2 Special tools

The following special tools are required for repair and maintenance of the spindle axis:

Designation	Additional information	Festo order no.	Figure
One-hand grease gun LUB-1	Pinpoint nozzle for miniature, funnel-shaped lubrication nipples and lubricating holes	647958	
Lubrication adapter LUB-1-KU	Lubrication adapter (Female thread M10x1)	744166	
Lubrication adapter LUB-1-TR-I	Lubrication adapter (nozzle pipe Ø 6x200 axial)	647959	
Lubrication adapter LUB-1-TR-L	Lubrication adapter (nozzle pipe Ø 6x200 lateral)	647960	
Lubrication adapter LUB-1-TR-W	Lubrication adapter (nozzle pipe Ø 6x200 lateral, 45° angled)	8073388	

Further information on the special tools is included in the information brochure **“Tools and repair accessories”**. The brochure can be found in the online spare parts catalogue on the Festo website (➔ Tools and Repair Accessories.pdf).

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