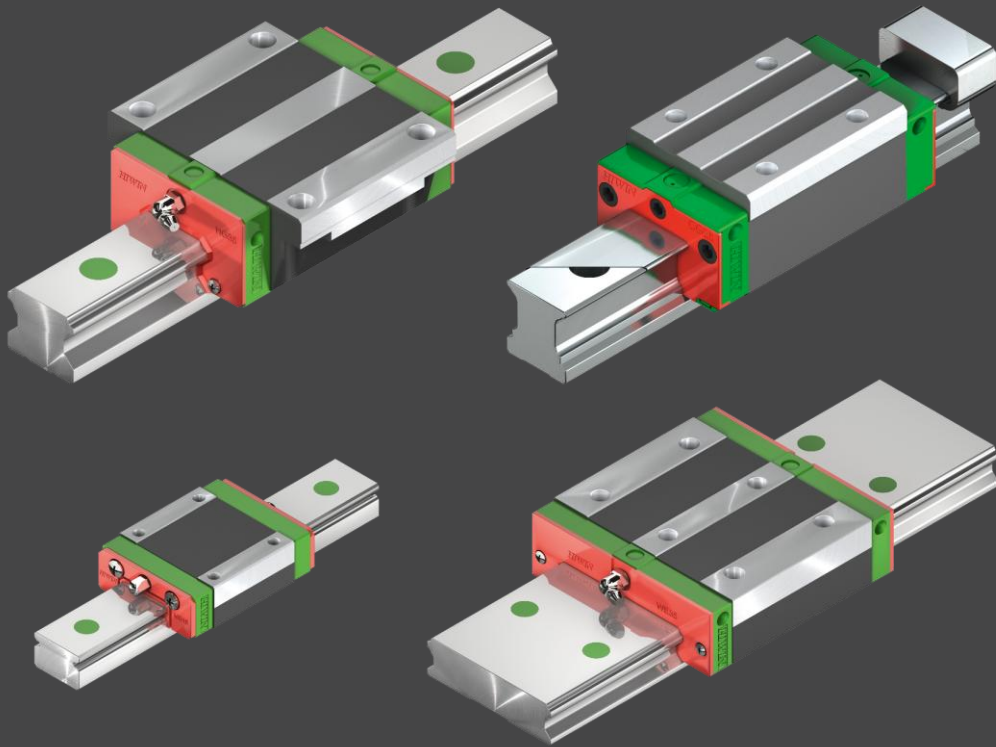




# ASSEMBLY INSTRUCTIONS

Linear guideway

GW-06-2-EN-2610-MA

## **Imprint**

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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 plan and install the named products as machine elements. It is also addressed to all persons who carry out the following work:

- Transport
- Assembly
- Retrofitting or upgrading
- Setup
- Commissioning
- Operation
- Cleaning
- Maintenance
- Troubleshooting
- Decommissioning, disassembly and disposal

### 1.1.1 Requirements

We assume that

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

### 1.1.2 Availability

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

## 1.2 Presentation and layout conventions used in these assembly instructions

### 1.2.1 Instructions for actions

Instructions for actions are provided in sequential order and identified with a triangle symbol. The results of the actions are accompanied by an arrow.

#### Example:

- Instruction 1
- Instruction 2
- ✓ Result

### 1.2.2 Lists

Lists are identified through the use of bullet points.

**Example:**

Lubricants

- Reduce wear and tear
- Protect from dirt
- ...

### 1.2.3 Presentation of safety information

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

The following signal words/hazard levels are used:

 **Danger!** Immediate danger!

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

 **Warning!** Potentially dangerous situation!

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

 **Attention!** Potentially dangerous situation!

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

 **Caution!** Potentially dangerous situation!

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

### 1.2.4 Symbols used

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

| Warning symbols                                                                     |                                         |                                                                                     |                                          |
|-------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|
|  | Warning of crushing risk!               |  | Warning of dangerous electrical voltage! |
|  | Warning of danger from suspended loads! |  | Environmentally hazardous substance!     |
|  | Warning of cuts!                        |                                                                                     |                                          |

### 1.2.5 Information

**Note:**

Provides general information and recommendations.

### 1.3 Warranty and liability

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

### 1.4 Manufacturer information

|                                            |                                                          |
|--------------------------------------------|----------------------------------------------------------|
| <b>Address</b>                             | HIWIN GmbH<br>Brücklesbünd 1<br>77654 Offenburg, Germany |
| <b>Telephone</b>                           | +49 (0) 781 / 9 32 78 - 0                                |
| <b>Technical customer service team</b>     | +49 (0) 781 / 9 32 78 - 77                               |
| <b>Fax</b>                                 | +49 (0) 781 / 9 32 78 - 90                               |
| <b>Technical customer service team fax</b> | +49 (0) 781 / 9 32 78 - 97                               |
| <b>E-mail</b>                              | support@hiwin.de                                         |
| <b>Internet</b>                            | hiwin.de                                                 |

### 1.5 Product monitoring

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

- Accidents
- Potential risks involving the torque motors
- Any unclear information in these assembly instructions

## 2 Basic safety information

 **Warning!** Failure to comply with the following notices could be dangerous!

This chapter is for the safety of everyone who works with, assembles, installs, operates, maintains or disassembles the linear guideways.

► Follow the instructions below!

### 2.1 Proper use

The linear guideway is a linear guide element that is used to guide a linear movement within a machine or an automated system.

The linear guideways are designed for installation and operation in horizontal and vertical position. In the event of vertical mounting, a suitable clamping or braking device must be provided to be able to prevent unintentional lowering of the load. The linear guideways may only be used as described for the intended purpose.

### 2.2 Exclusion of liability in the event of alteration and improper handling

No changes whatsoever may be made to the linear guideways that are not described in these assembly instructions. If a modified design is necessary, please contact the manufacturer.

The manufacturer accepts no liability in the event of modifications or improper assembly, installation, commissioning, operation, maintenance or repair.

Only original HIWIN parts are permitted as spare parts and accessories. Spare parts and accessories not supplied by HIWIN have not been tested for operation with HIWIN linear guideways and may impair operational safety. The manufacturer accepts no liability for damage caused by the use of non-approved spare parts and accessories.

### 2.3 Qualified personnel

The linear guideway may only be installed, integrated into higher-level systems, commissioned, operated and maintained by competent personnel. A qualified person is one who

- Has suitable technical training
- and**
- Has been instructed by the machine operator in operation and the valid safety guidelines and can assess the dangers to be expected
- and**
- Has read through these assembly instructions in full and understood them
- and**
- Has access to the assembly instructions at all times

### 3 Product description

#### 3.1 Order code of the linear guideways

##### 3.1.1 Order number of block (not assembled)

| Number     | 1  | 2                                                                                 | 3  | 4 | 5 | 6  | 7 | 8  | 9  |
|------------|----|-----------------------------------------------------------------------------------|----|---|---|----|---|----|----|
| Order code | HG | W                                                                                 | 25 | C | C | Z0 | H | ZZ | E2 |
| 1          | HG | Series                                                                            |    |   |   |    |   |    |    |
| 2          | W  | Type:<br>W: Flange block<br>H: High square block<br>L: Low square block           |    |   |   |    |   |    |    |
| 3          | 25 | Size                                                                              |    |   |   |    |   |    |    |
| 4          | C  | Load type:<br>S: Medium load<br>C: Heavy load<br>H: Super heavy load              |    |   |   |    |   |    |    |
| 5          | C  | Block fastening:<br>A: From above<br>C: From above or below                       |    |   |   |    |   |    |    |
| 6          | Z0 | Preload ID:<br>Z0, ZA, ZB                                                         |    |   |   |    |   |    |    |
| 7          | H  | Accuracy class:<br>C, H, P, SP, UP                                                |    |   |   |    |   |    |    |
| 8          | ZZ | Dust protection:<br>None: Standard (SS)<br>SSL, ZZ, ZZX, DD, KK, KKX, SW, ZW, ZWX |    |   |   |    |   |    |    |
| 9          | E2 | None: Standard<br>E2: Long-term lubrication unit                                  |    |   |   |    |   |    |    |

##### 3.1.2 Order number of profile rail (not assembled)

| Number     | 1     | 2                                                | 3  | 4 | 5    | 6 |
|------------|-------|--------------------------------------------------|----|---|------|---|
| Order code | HG    | R                                                | 25 | R | 1200 | H |
| 1          | HG    | Series                                           |    |   |      |   |
| 2          | R     | Profile rail                                     |    |   |      |   |
| 3          | 25    | Size                                             |    |   |      |   |
| 4          | R     | Rail mounting:<br>R: From above<br>T: From below |    |   |      |   |
| 5          | 1,200 | Length of rail [mm]                              |    |   |      |   |
| 6          | H     | Accuracy class:<br>C, H, P, SP                   |    |   |      |   |

### 3.1.3 Order code for linear guideway (assembled)

| Number     | 1  | 2                                                                       | 3  | 4 | 5 | 6 | 7 |
|------------|----|-------------------------------------------------------------------------|----|---|---|---|---|
| Order code | HG | W                                                                       | 25 | C | C | 2 | R |
| 1          | HG | Series                                                                  |    |   |   |   |   |
| 2          | W  | Type:<br>W: Flange block<br>H: High square block<br>L: Low square block |    |   |   |   |   |
| 3          | 25 | Size                                                                    |    |   |   |   |   |
| 4          | C  | Load type:<br>S: Medium load<br>C: Heavy load<br>H: Super heavy load    |    |   |   |   |   |
| 5          | C  | Block fastening:<br>A: From above<br>C: From above or below             |    |   |   |   |   |
| 6          | 2  | Number of blocks per profile rail                                       |    |   |   |   |   |
| 7          | R  | Rail mounting:<br>R: From above<br>T: From below                        |    |   |   |   |   |

### 3.1.4 Order code for linear guideway (assembled) – continued

| Number                  | 8     | 9                                                                                 | 10 | 11 | 12 | 13 |
|-------------------------|-------|-----------------------------------------------------------------------------------|----|----|----|----|
| Continuation order code | 1600  | Z0                                                                                | H  | 2  | DD | E2 |
| 8                       | 1,600 | Length of rail [mm]                                                               |    |    |    |    |
| 9                       | Z0    | Preload ID:<br>Z0, ZA, ZB                                                         |    |    |    |    |
| 10                      | H     | Accuracy class:<br>H, P, SP, UP                                                   |    |    |    |    |
| 11                      | 2     | Rails per axis <sup>1)</sup>                                                      |    |    |    |    |
| 12                      | DD    | Dust protection:<br>None: Standard (SS)<br>SSL, ZZ, ZZX, DD, KK, KKX, SW, ZW, ZWX |    |    |    |    |
| 13                      | E2    | None: Standard<br>E2: Long-term lubrication unit<br>SE: Steel end cap             |    |    |    |    |

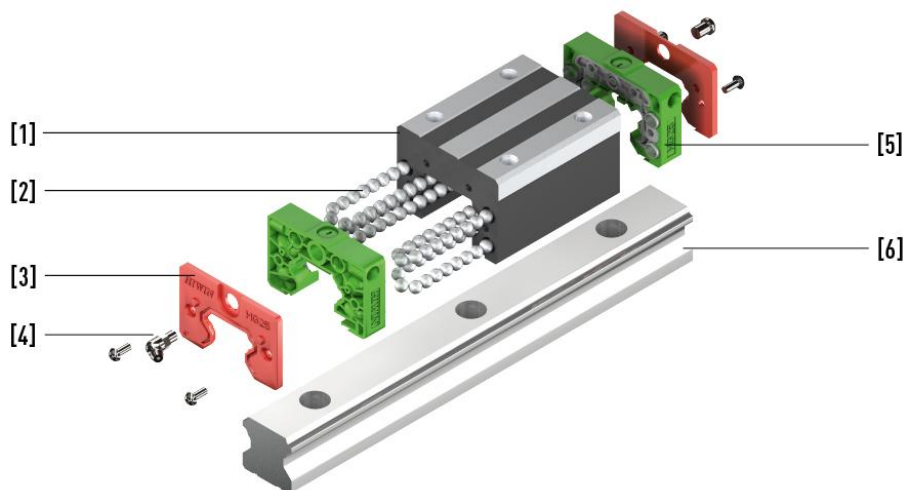
<sup>1)</sup> The number 2 is also a quantity indication, i.e. one piece of the article described above consists of one pair of rails. No number is given for single profile rails. In the case of multi-part rails, the joint is offset as standard.

### 3.2 Setup and operation of the linear guideway

A linear guideway makes it possible to move in a linear motion with rolling elements. The use of balls and rollers between the rail and block in a linear guideway makes precise linear movements possible. Compared with a standard sliding guide, the friction coefficient here is just one fiftieth. The high efficiency and zero backlash mean that the HIWIN linear guideway can be used in various ways.

The following illustration shows the structure and the installed components.

Fig. 3.1: Exploded view of the construction of a linear guideway



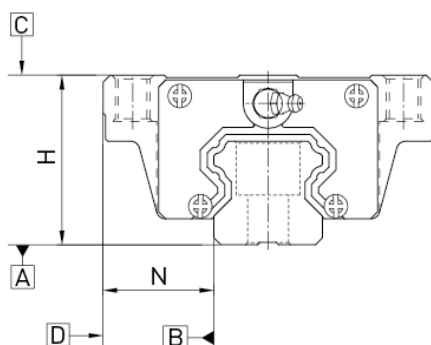
|   |                 |   |                      |
|---|-----------------|---|----------------------|
| 1 | Basic unit      | 4 | Grease nipple        |
| 2 | Rolling element | 5 | Recirculation system |
| 3 | Wiper           | 6 | Profile rail         |

### 3.3 Tolerances depending on the accuracy class

Linear guideways are available in various accuracy classes according to the parallelism between block and rail, height accuracy H and width accuracy N.

Five accuracy classes are available for the **HG, QH, EG, QE, CG, WE, QW, UR, RG, CRG** and **QR** series, and three for the **MG** series.

Fig. 3.2: Tolerances for HIWIN linear guideways



### 3.4 Parallelism

Parallelism of locating surfaces D and B of the block and rail and of top block surface C to mounting surface A of the rail. Ideal installation of the linear guideway and the measurement in the centre of the block are prerequisites.

Table 3.1: Tolerance of parallelism between block and profile rail – HG, QH, EG, QE, CG, WE, QW, UR, RG, CRG and QR series

| Rail length [mm] | Accuracy class |    |    |    |    |
|------------------|----------------|----|----|----|----|
|                  | C              | H  | P  | SP | UP |
| – 100            | 12             | 7  | 3  | 2  | 2  |
| 100 – 200        | 14             | 9  | 4  | 2  | 2  |
| 200 – 300        | 15             | 10 | 5  | 3  | 2  |
| 300 – 500        | 17             | 12 | 6  | 3  | 2  |
| 500 – 700        | 20             | 13 | 7  | 4  | 2  |
| 700 – 900        | 22             | 15 | 8  | 5  | 3  |
| 900 – 1.100      | 24             | 16 | 9  | 6  | 3  |
| 1.100 – 1.500    | 26             | 18 | 11 | 7  | 4  |
| 1.500 – 1.900    | 28             | 20 | 13 | 8  | 4  |
| 1.900 – 2.500    | 31             | 22 | 15 | 10 | 5  |
| 2.500 – 3.100    | 33             | 25 | 18 | 11 | 6  |
| 3.100 – 3.600    | 36             | 27 | 20 | 14 | 7  |
| 3.600 – 4.000    | 37             | 28 | 21 | 15 | 7  |

Unit:  $\mu\text{m}$

Table 3.2: Tolerance of parallelism between block and profile rail – MG series

| Rail length [mm] | Accuracy class |    |      |
|------------------|----------------|----|------|
|                  | C              | H  | P    |
| – 50             | 12             | 6  | 2.0  |
| 50 – 80          | 13             | 7  | 3.0  |
| 80 – 125         | 14             | 8  | 3.5  |
| 125 – 200        | 15             | 9  | 4.0  |
| 200 – 250        | 16             | 10 | 5.0  |
| 250 – 315        | 17             | 11 | 5.0  |
| 315 – 400        | 18             | 11 | 6.0  |
| 400 – 500        | 19             | 12 | 6.0  |
| 500 – 630        | 20             | 13 | 7.0  |
| 630 – 800        | 22             | 14 | 8.0  |
| 800 – 1.000      | 23             | 16 | 9.0  |
| 1.000 – 1.200    | 25             | 18 | 11.0 |
| 1.200 – 1.300    | 25             | 18 | 11.0 |
| 1.300 – 1.400    | 26             | 19 | 12.0 |

| Rail length [mm] | Accuracy class |    |      |
|------------------|----------------|----|------|
|                  | C              | H  | P    |
| 1.400 – 1.500    | 27             | 19 | 12.0 |
| 1.500 – 1.600    | 28             | 20 | 13.0 |
| 1.600 – 1.700    | 29             | 20 | 14.0 |
| 1.700 – 1.800    | 30             | 21 | 14.0 |
| 1.800 – 1.900    | 30             | 21 | 15.0 |
| 1.900 – 2.000    | 31             | 22 | 15.0 |

Unit:  $\mu\text{m}$ 

### 3.5 Accuracy – height and width

|                               |                                                                                                                                                                          |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Height tolerance of H:</b> | Permissible absolute dimension deviation of height H, measured between the centre of bolting surface C and rail underside A, with any position of the block on the rail. |
| <b>Height variance of H:</b>  | Permissible deviation of height H between several blocks on one rail, measured at the same position of the rail.                                                         |
| <b>Width tolerance of N:</b>  | Permissible absolute dimension deviation of width N, measured between the centre of bolting surfaces D and B, with any position of the block on the rail.                |
| <b>Width variance of N:</b>   | Permissible deviation of width N between several blocks on one rail, measured at the same position of the rail.                                                          |

Table 3.3: Tolerances of height and width – HG, QH, EG, QE, CG, WE, QW, UR, RG, CRG and QR series

| Size           | Accuracy class       | Height tolerance of H ( $T_H$ )    | Width tolerance of N               | Height variance of H | Width variance of N |
|----------------|----------------------|------------------------------------|------------------------------------|----------------------|---------------------|
| 15, 17, 20, 21 | C (Normal)           | $\pm 0.1$                          | $\pm 0.1$                          | 0.02                 | 0.02                |
|                | H (high)             | $\pm 0.03$                         | $\pm 0.03$                         | 0.01                 | 0.01                |
|                | P (precision)        | $0/-0.03^{1)}$<br>$\pm 0.015^{2)}$ | $0/-0.03^{1)}$<br>$\pm 0.015^{2)}$ | 0.006                | 0.006               |
|                | SP (super precision) | $0/-0.015$                         | $0/-0.015$                         | 0.004                | 0.004               |
|                | UP (ultra precision) | $0/-0.008$                         | $0/-0.008$                         | 0.003                | 0.003               |
| 25, 27, 30, 35 | C (Normal)           | $\pm 0.1$                          | $\pm 0.1$                          | 0.02                 | 0.03                |
|                | H (high)             | $\pm 0.04$                         | $\pm 0.04$                         | 0.015                | 0.015               |
|                | P (precision)        | $0/-0.04^{1)}$<br>$\pm 0.02^{2)}$  | $0/-0.04^{1)}$<br>$\pm 0.02^{2)}$  | 0.007                | 0.007               |
|                | SP (super precision) | $0/-0.02$                          | $0/-0.02$                          | 0.005                | 0.005               |
|                | UP (ultra precision) | $0/-0.01$                          | $0/-0.01$                          | 0.003                | 0.003               |

| Size              | Accuracy class       | Height tolerance of H (T <sub>H</sub> )       | Width tolerance of N                          | Height variance of H | Width variance of N |
|-------------------|----------------------|-----------------------------------------------|-----------------------------------------------|----------------------|---------------------|
| <b>45, 50, 55</b> | C (Normal)           | ±0.1                                          | ±0.1                                          | 0.03                 | 0.03                |
|                   | H (high)             | ±0.05                                         | ±0.05                                         | 0.015                | 0.02                |
|                   | P (precision)        | 0/-0.05 <sup>1)</sup><br>±0.025 <sup>2)</sup> | 0/-0.05 <sup>1)</sup><br>±0.025 <sup>2)</sup> | 0.007                | 0.01                |
|                   | SP (super precision) | 0/-0.03                                       | 0/-0.03                                       | 0.005                | 0.007               |
|                   | UP (ultra precision) | 0/-0.02                                       | 0/-0.02                                       | 0.003                | 0.005               |
| <b>65</b>         | C (Normal)           | ±0.1                                          | ±0.1                                          | 0.03                 | 0.03                |
|                   | H (high)             | ±0.07                                         | ±0.07                                         | 0.02                 | 0.025               |
|                   | P (precision)        | 0/-0.07 <sup>1)</sup><br>±0.035 <sup>2)</sup> | 0/-0.07 <sup>1)</sup><br>±0.035 <sup>2)</sup> | 0.01                 | 0.015               |
|                   | SP (super precision) | 0/-0.05                                       | 0/-0.05                                       | 0.007                | 0.01                |
|                   | UP (ultra precision) | 0/-0.03                                       | 0/-0.03                                       | 0.005                | 0.007               |

Unit: mm

<sup>1)</sup> Assembled linear guideway

<sup>2)</sup> Unassembled linear guideway

Table 3.4: Tolerances of height and width – MG series

| Size                              | Accuracy class | Height tolerance of H | Width tolerance of N | Height variance of H | Width variance of N |
|-----------------------------------|----------------|-----------------------|----------------------|----------------------|---------------------|
| <b>02, 03, 05, 07, 09, 12, 15</b> | C (Normal)     | ± 0.04                | ± 0.040              | 0.030                | 0.03                |
|                                   | H (high)       | ± 0.02                | ± 0.025              | 0.015                | 0.02                |
|                                   | P (precision)  | ± 0.01                | ± 0.015              | 0.007                | 0.01                |

Unit: mm

## 4 Transport and setup

### 4.1 Delivery condition

The following delivery states are possible for linear guideways:

- **Mounted:** Blocks are already mounted on the rail.
- **Not mounted:** Block and rail are supplied separately.

### 4.2 Scope of delivery

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

### 4.3 Transport to the installation location

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

Lifting heavy loads can cause damage to health!

- ▶ Assembly and maintenance of the linear guideways only by qualified personnel!
- ▶ Take the mass of the parts into account during transport. Use suitable lifting gear!
- ▶ Comply with the applicable industrial safety regulations for handling suspended loads.
- ▶ Secure linear guideways against tipping before transport!

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

During transport the block can move uncontrollably on the profile rail and cause injuries.

- ▶ Keep the profile rail as level as possible to prevent the blocks from sliding off the rail uncontrollably.

 **Caution!** Danger of property damage!

Deflection during transport impairs the function and accuracy of the linear guideways.

- ▶ Support long linear guideways at several points during transport!

#### Note

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

#### 4.3.1 Environmental conditions

|                      |                              |
|----------------------|------------------------------|
| Ambient temperature: | +5 °C to +40 °C              |
| Installation site:   | Level, dry, vibration-free   |
| Atmosphere:          | Non-corrosive, non-explosive |

#### Safety equipment to be provided by the operator

Possible safety equipment/measures:

- Personal protective equipment according to UVV
- Electrosensitive protective equipment
- Mechanical safety equipment

## **4.4 Storage**

- Always store linear guideways in the transport packaging so they are protected from impacts.
- The storage room must be dry, frost-free and free of corrosive atmosphere.
- Clean and protect used linear guideways before storage.

## 5 Assembly

### **Warning!** Risk of injury!

There is an increased risk of injury during assembly.

- ▶ During assembly and disassembly, transport the linear guideway horizontally. If this is not possible, prevent the mounted blocks from running off the profile rail by attaching a suitable holding device!
- ▶ For large or long linear guideways, use lifting gear for assembly if necessary!

### **Attention!** Risk of damage to health and the environment!

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

- ▶ Only use suitable substances that are safe for humans. Observe the manufacturer's safety data sheets.
- ▶ Dispose of substances appropriately.

### 5.1 Preliminary work

- Do not remove the transport packaging until immediately before assembly to avoid damage.
- Keep the profile rail as level as possible to prevent the blocks from sliding off the rail uncontrollably.
- After removing the transport securing device, keep the profile rail as horizontal as possible to prevent the blocks from running off the profile rail in an uncontrolled manner.
- If you have ordered a one-piece profile rail from the CG series with a cover strip, disassemble the cover strip first in accordance with section [5.3.4](#).
- Avoid getting the profile rail dirty during installation. Chippings and other items must be removed. All cleaning information can be found in section [7.1](#).

### 5.2 Profile rails

The installation position of the profile rails depends on the requirements of the machine and the load direction. The accuracy of the profile rail is determined by how straight and level the contact surfaces are because the profile rail is pressed against them when the screws are tightened. Profile rails that are not pressed against a contact surface may have greater tolerances in terms of straightness.

### **Caution!** Damage caused by tension on the linear guideway!

Linear guideways are extremely precise guides. Tension due to incorrect installation can result in premature failure of the linear guideways.

- ▶ The assembly instructions described in chapter [5](#) must be observed!

#### **Note**

Please observe the assembly tolerances in section [12.2](#).

### 5.2.1 Labelling of the linear guideways

The reference edge of the profile rail is marked by arrows on the top of the rail. For very short rail sections, the reference side is labelled on the front side of the rail with an arrow.

Fig. 5.1: Labelling of reference side of a profile rail

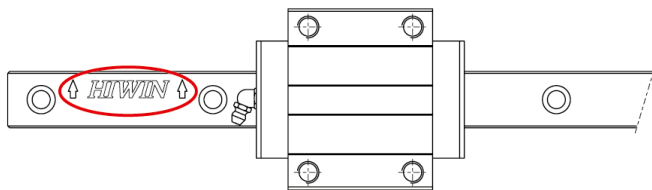
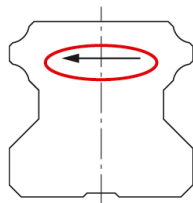


Fig. 5.2: Labelling of reference side for short profile rails and for the PG series



### 5.2.2 Different types of linear guideways

R-rails are assembled using mounting bolts from above; T-rails are assembled using mounting bolts from below. The information below describes the process of assembling the R-rail; the T-rail is assembled in the same way.

Fig. 5.3: T-rail



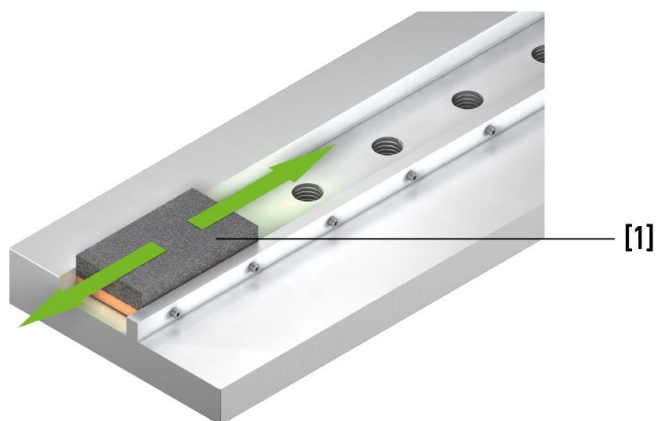
Fig. 5.4: R-rail



### 5.2.3 Cleaning the mounting surface

- Remove all dirt from the mounting surface
- Holes and reference edge must be burr-free; remove burrs with an oil stone if necessary [1].

Fig. 5.5: Cleaning the mounting surface

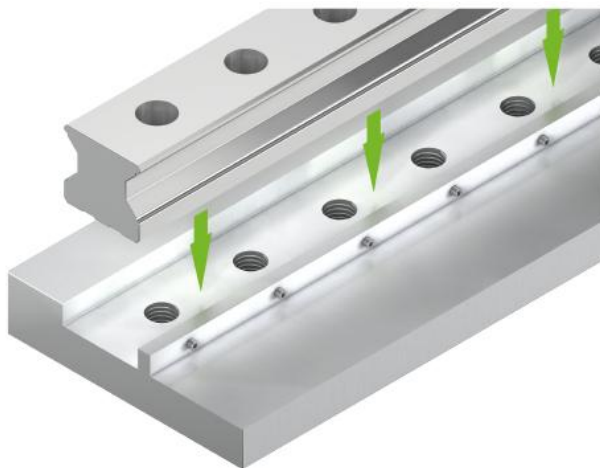


### 5.2.4 Mounting the profile rail on a reference edge

#### A. Attaching the profile rail

- Place the reference side of the profile rail (see section [5.2.1](#)) against the reference edge of the machine bed.
- Loosely attach the mounting bolts.

Fig. 5.6: Placing the profile rail on the reference edge



#### B. Tensioning the profile rail with the machine bed

##### Note

Maintain the permissible tolerances for the mounting areas and mounting deviations of the relevant series in accordance with section [3.3](#), [3.4](#), and [3.5](#)

##### Note

The profile rails can be tensioned using a terminal block or vices.

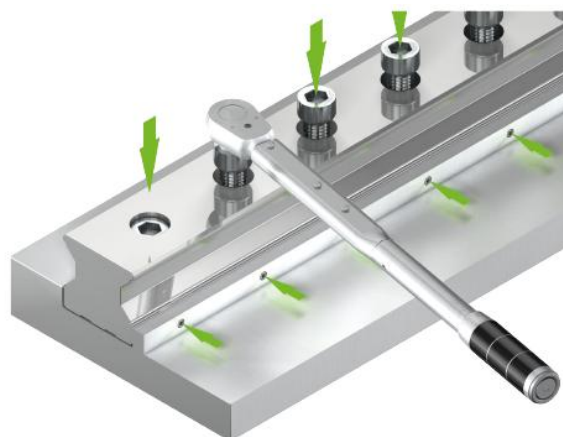
##### Tensioning of the profile rail using a terminal block:

- Tighten the allen set screws on the terminal block in order to press the profile rail firmly on to the machine reference edge.
- Working in three steps, tighten the mounting bolts on the profile rail using a torque spanner to the specified tightening torque.

##### Note

For a listing of the optimum torques for the screws, see section [5.5](#) on [page 41](#).

Fig. 5.7: Tensioning using a terminal block



✓ The profile rail has been mounted.

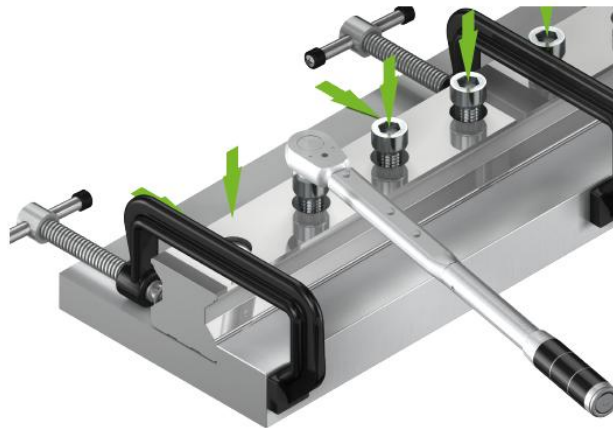
#### Tensioning of the profile rail using vices:

- Use the vices to press the profile rail against the machine bed's reference edge.
- Tighten the profile rail's mounting bolts.
- Repeat this process for all fixing points.
- Working in three steps, tighten all mounting bolts on the profile rail using a torque spanner to the specified tightening torque.

#### Note

For a listing of the optimum torques for the screws, see section [5.5](#) on [page 41](#).

Fig. 5.8: Tensioning using vices



- ✓ The profile rail has been mounted.

#### 5.2.4.1 Assembling the profile rail without a reference edge

- Mount a block on the reference rail.

#### Note

Mount the block according to section [5.4.2 Assembly](#).

- Mount a dial gauge on the block.
- Align the dial gauge with a reference edge.

#### Note

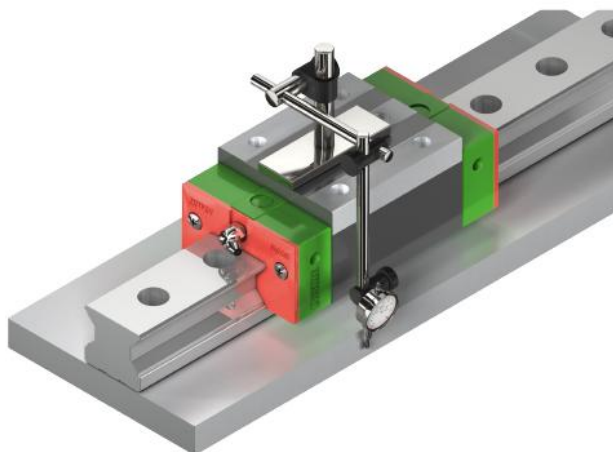
The reference edge should stretch from the beginning to the very end of the machine bed so that the profile rail can be aligned across the entire length of the machine bed.

- Move the profile rail a few centimetres along the reference edge using the block and align it.
- Tighten the profile rail's mounting bolts.
- Repeat this process for all fixing points.
- Tighten the mounting bolts using a torque spanner to the specified tightening torque.

#### Note

For a listing of the optimum torques for the screws, see section [5.5](#) on [page 41](#).

Fig. 5.9: Block with mounted dial gauge



- ✓ The profile rail has been mounted.

## 5.2.5 Mounting the profile rail on the follow-on side

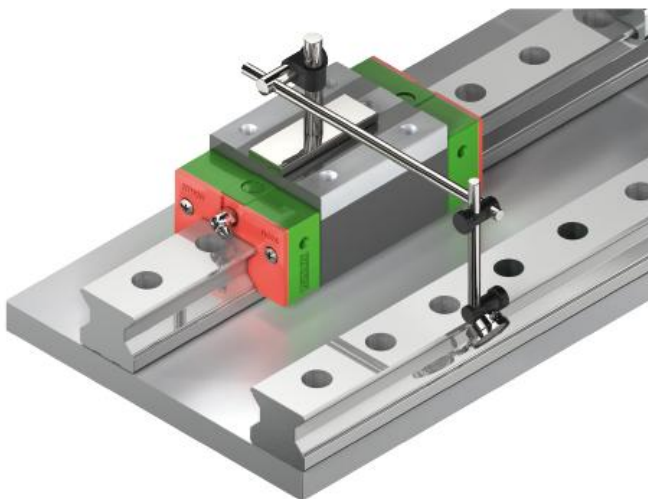
### 5.2.5.1 Requirements

- A reference rail must be mounted.
- A block is mounted on the reference rail.

### 5.2.5.2 Aligning the follow-on rail with a reference rail using a dial gauge

- Place the dial gauge on the mounted block of the aligned reference rail.
- Attach the dial gauge sensor to the follow-on rail.

Fig. 5.10: Scanning and aligning the follow-on rail with the reference rail



- Using the block that the dial gauge is mounted on, gradually move the follow-on rail over the reference rail.
- Tighten the mounting bolts of the next rail one after the other, working from one end of the guideway to the other.
- Tighten the mounting bolts using a torque spanner to the specified tightening torque.

#### Note

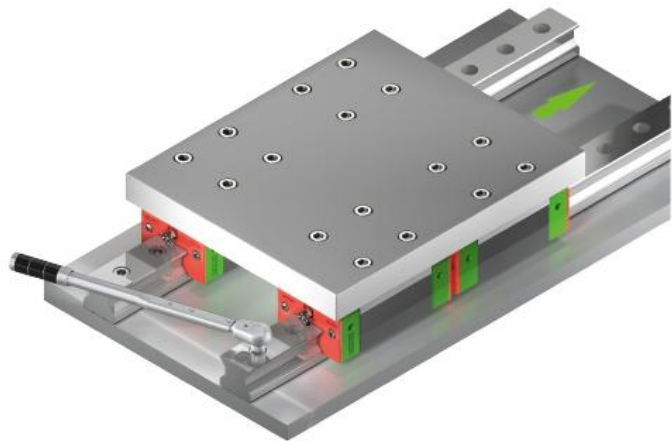
For a listing of the optimum torques for the screws, see [5.5 on page 41](#).

- ✓ The follow-on rail is mounted and aligned parallel with the reference rail.

### 5.2.5.3 Aligning the follow-on rail with a reference rail using a plate

- Mount a plate on two blocks on the aligned reference rail.
- Mount the other side of the plate on two blocks on the follow-on rail to be aligned.
- ✓ This setup results in the second rail being positioned in parallel.
- Gradually move the plate over the rails.

Fig. 5.11: Plate mounted on the block



- Tighten the mounting bolts of the next rail one after the other, working from one end of the guideway to the other.
- Tighten the mounting bolts using a torque spanner to the specified tightening torque.

**Note**

For a listing of the optimum torques for the screws, see section 5.5 on page 41.

- ✓ The follow-on rail is mounted and aligned parallel with the reference rail.

### 5.2.6 Mounting of attached profile rails

Attached (multi-part) rails must be mounted according to the applied markings. The joints on each section are marked consecutively in alphabetical order and with the rail or pair number so that each rail section can be clearly assigned.

Fig. 5.12: Labelling of attached multi-part rails

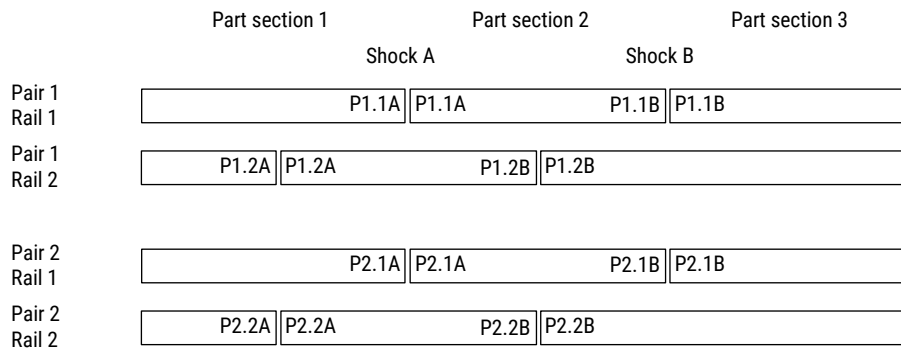
|        | Part section 1 |      | Part section 2 |      | Part section 3 |  |
|--------|----------------|------|----------------|------|----------------|--|
|        | Shock A        |      | Shock B        |      |                |  |
| Rail 1 | S1.A           | S1.A | S1.B           | S1.B |                |  |
| Rail 2 | S2.A           | S2.A | S2.B           | S2.B |                |  |

Each joint is labelled on the top of the rail. The label provides help during initial assembly and can be removed at any time without leaving any residue.

**Note**

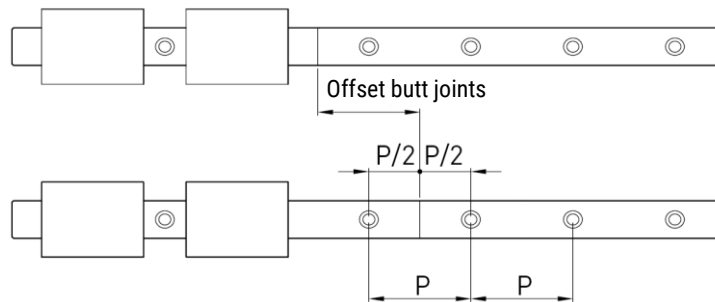
After initial assembly of the profile rails, the labels must be removed.

Fig. 5.13: Labelling of attached multi-part paired rails



With paired multi-part rails, mounting the butt joints with an offset is recommended.

Fig. 5.14: Arrangement of attached multi-part rails



## 5.3 Covering the mounting holes

To protect the block from soiling and to protect the dust protection sealing lips, the profile rails' mounting holes must be closed using cover caps (in the case of R-rails, fixing is carried out from above). The type of cover depends on the environmental and operating conditions: plastic, steel or brass cover caps, or a cover strip, may be used. Plastic cover caps are generally recommended when using coated rails. Plastic cover caps are mounted as described in section 5.3.1.2. Steel and brass cover caps are pressed in using an assembly tool as described in section 5.3.1.3. The cover strip is mounted as described in section 5.3.2.

### 5.3.1 Cover caps

**! Caution!** Damage caused by cover caps that have been incorrectly pressed in!

Pressing in the cover caps can result in a burr or result in the cover caps being pressed in too deep. This can later result in damage to the block and dust protection.

- Use an oil stone to remove any burrs that have occurred.
- Remove any cover caps that have been pressed in too deep and press in new cover caps.

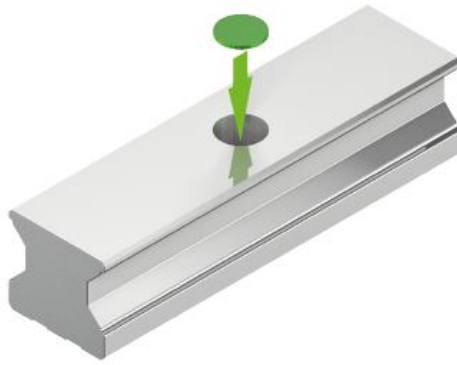
#### 5.3.1.1 Requirements

- The profile rails are mounted and fixed in accordance with the descriptions in section 5.2.4 / 5.2.5.
- The profile rails are free of dirt and oil (see section 7.1).

#### 5.3.1.2 Mounting plastic cover caps

- Place the plastic cover cap centrally on the hole.
- Ensure parallelism between the top of the rail and the top of the cover cap.

Fig. 5.15: Positioning the plastic cover cap



- Place a suitable press-in block vertically on the cover cap.
- Use a plastic hammer to drive the cover cap into the press-in block by hitting it in the centre.
- If the cover cap is not yet fully pressed in, repeat the described procedure until the cover cap is pressed in flush with the top of the profile rail.

Fig. 5.16: Pressing in the plastic cover cap using a press-in block

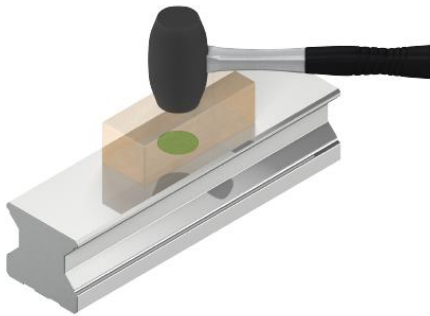
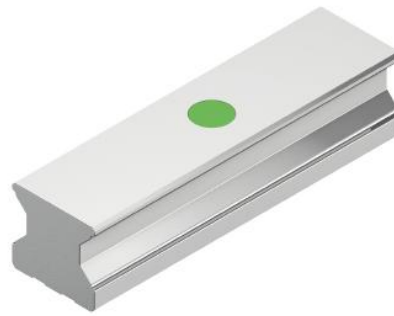


Fig. 5.17: Ready-mounted plastic cover cap



✓ The plastic cover cap is mounted.

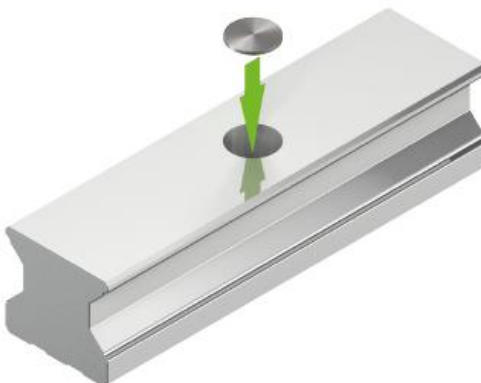
### 5.3.1.3 Mounting steel or brass cover caps

#### Note

We recommend using the HIWIN assembly tool to ensure correct mounting of the steel and brass cover caps. Information on this can be found in section [11.2](#).

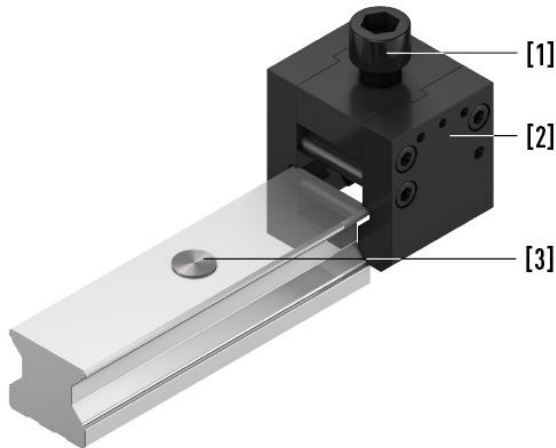
- Place the steel or brass cover cap centrally on the hole.
- Ensure parallelism between the top of the rail and the top of the cover cap.

Fig. 5.18: Positioning steel or brass cover cap



- Move the press-in block [4] (see Fig. 5.21) of the assembly tool [2] to the upper end position by loosening the screw [1].
- Slide the assembly tool onto the front of the profile rail.

Fig. 5.19: Positioning the assembly tool on the profile rail

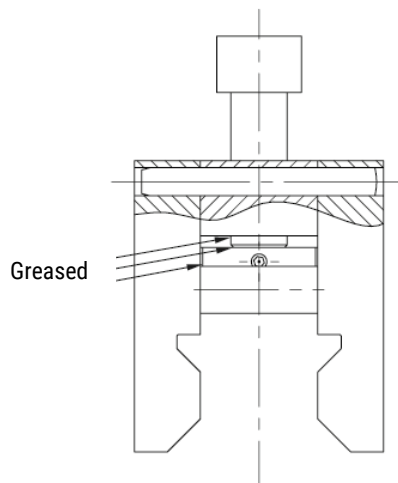


- Position the press-in block [4] (see Fig. 5.21) centrally over the hole or the cover cap [3].
- Move out the press-in block by tightening the screw [1] until the stamp makes contact with the cover cap and some resistance can be felt when tightening the screw.
- Before actually pressing in the cover cap, check to make sure the cover cap has not tilted.
- Press the cover cap in by continuing to tighten the screw [1] until the press-in block makes contact with the profile rail.

**Note**

The assembly tool must be greased at the following points (see Fig. 5.20)

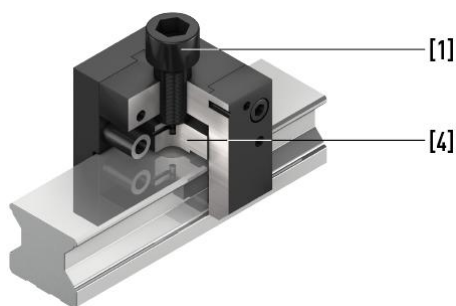
Fig. 5.20: Greasing the assembly tool



**Note**

The required tightening torque for pressing in the cover caps depends on several factors and can vary considerably. Please note the maximum values specified in Table 5.1.

Fig. 5.21: Pressing in the cover cap by tightening the screw



- Loosen the screw [1].
- Check the results of the pressing process.
- If the cover cap is not yet fully pressed in, repeat the described procedure.
- A burr may form while the cover cap is being pressed in.
- Remove this burr.

Fig. 5.22: Ready-mounted steel or brass cover cap



- ✓ The steel or brass cover cap is mounted.

Table 5.1: Recommended maximum tightening torques for pressing in steel and brass cover caps

| Series/size                         | Cover cap           |                     |                                |
|-------------------------------------|---------------------|---------------------|--------------------------------|
|                                     | Brass <sup>1)</sup> | Steel <sup>1)</sup> | Maximum tightening torque [Nm] |
| <b>HG15, RG15</b>                   | 5-001344            | –                   | 15                             |
| <b>HG20, RG20</b>                   | 5-001350            | 5-001352            | 20                             |
| <b>HG25, RG25</b>                   | 5-001355            | 5-001357            | 20                             |
| <b>HG30, HG35, UR35, RG30, RG35</b> | 5-001360            | 5-001362            | 20                             |
| <b>HG45, UR45, RG45</b>             | 5-001324            | 5-001327            | 85                             |
| <b>HG55, UR55, RG55</b>             | 5-001330            | 5-001332            | 85                             |
| <b>HG65, RG65</b>                   | 5-001335            | 5-001337            | 110                            |

<sup>1)</sup> Not recommended for coated rails

### 5.3.2 Cover strip

**⚠ Attention!** Risk of injury due to sharp-edged cover strip!

The edges of the cover strips can be very sharp.

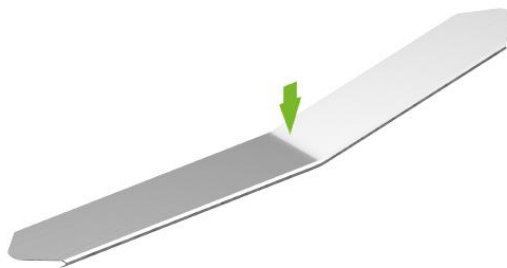
- ▶ Wear protective gloves when unpacking, assembling and disassembling!
- ▶ Prevent uncontrolled unfurling when the cover bands are rolled up by holding the ends of the bands!

**⚠ Caution!** Damage to the linear guideway due to damaged cover strips!

Damaged cover strips impair dust protection and lead to premature wear of the linear guideway

- ▶ Avoid deformations and kinks as shown in [Fig. 5.23!](#)
- ▶ Replace damaged cover strips immediately!

Fig. 5.23: Damaged cover strip



#### Note

In addition to the cover caps, a cover strip is available for the UR/CG/CRG series as an alternative way to close the mounting holes.

#### 5.3.2.1 Delivery condition

One-piece profile rails are delivered with the cover strip mounted, as shown in [Fig. 5.24](#). The belt ends are folded and the belt clamps are mounted.

Fig. 5.24: Cover strip mounted on rail



For multi-part profile rails, the cover strip is supplied separately. The cover strip is delivered rolled up in a transport carton as shown in [Fig. 5.25](#). The cover strip clamps are enclosed.

Fig. 5.25: Cover strip in the transport box



### 5.3.2.2 Mounting the cover strip without a mounted block

#### Note

We recommend using the HIWIN assembly/disassembly tool to ensure correct mounting of the cover strip. Information on this can be found in section [11.2](#).

#### A. Positioning the cover strip

- Clean the profile rail using a suitable cleaning agent (see section [7.1](#)).
- Place the cover strip on the profile rail.
- Maintain distance  $L_S$  in accordance with [Table 5.2](#).

Fig. 5.26: Cover strip with machined tape end and distance  $L_S$

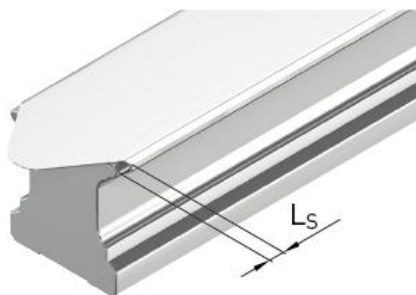


Table 5.2: Strip end distance

| Size | Distance $L_S$ [mm] |
|------|---------------------|
| 15   | 5.0                 |
| 20   | 8.0                 |
| 25   | 9.5                 |
| 30   | 10.0                |
| 35   | 10.0                |
| 45   | 11.0                |
| 55   | 12.0                |
| 65   | 14.5                |

#### Note:

For cover strip length > 4000mm, follow steps "B1" and "B2".

#### B. Clamping the cover strip

- Clamp the cover strip onto the profile rail over a length of approx. 15 cm.
- To do this, press the fold of the cover strip on one side of the profile rail.
- Press down the second fold on the opposite side.

Fig. 5.27: Mounting the cover strip

**B1. Clamping the cover strip (only with cover strip > 4000 mm)**

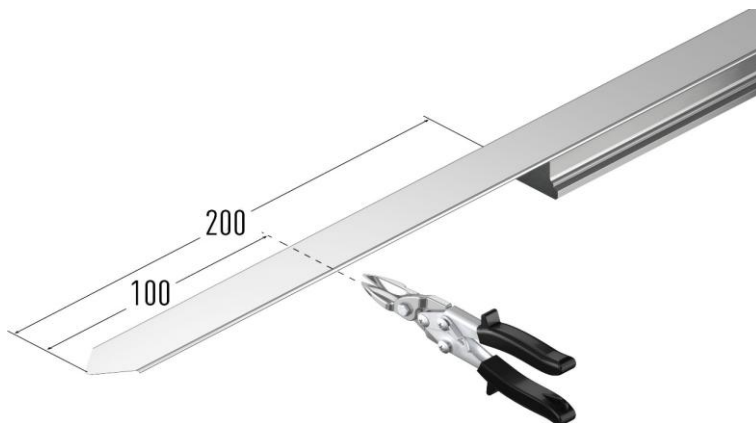
- Clamp the cover strip onto the profile rail over a length of approx. 3 cm.
- To do this, press the fold of the cover strip on one side of the profile rail.
- Press down the second fold on the opposite side.
- Cover strip is approx. 200 mm longer than the profile rail

Fig. 5.28: Clamp on cover strip approx. 3 cm

**B2. Cutting the cover strip (only with cover strip > 4000 mm)**

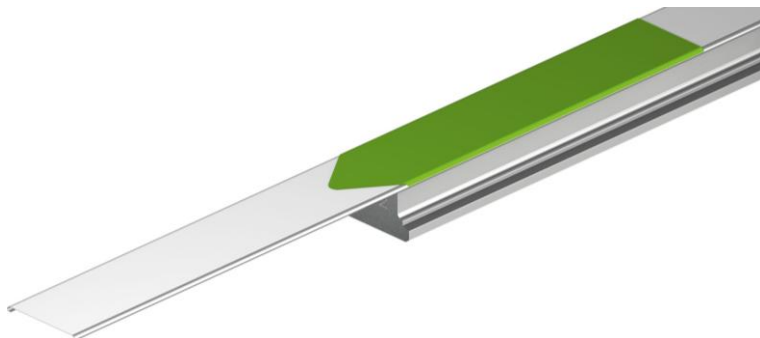
- Cut off approx. 100 mm of the protruding cover strip (see [Fig. 5.29](#))

Fig. 5.29: Cut off approx. 100 mm of the protruding cover strip



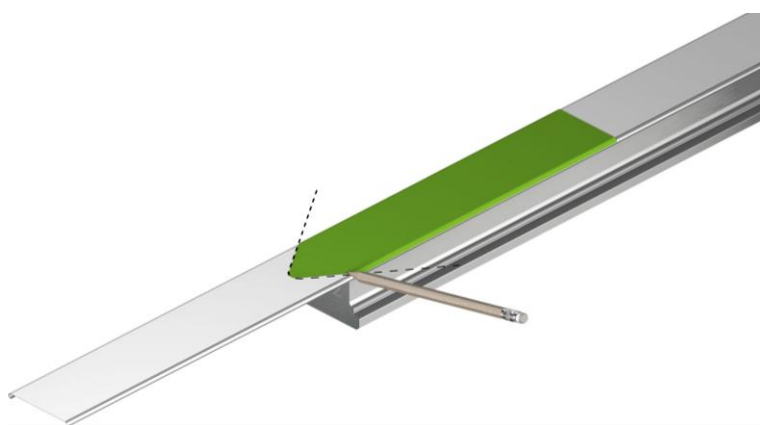
- Using the cut-off 100 mm of the cover strip as a template, position the template at the strip end of the profile rail (see [Fig. 5.30](#) and [Fig. 5.31](#)). Note distance  $L_s$  at the end of the strip (see [Table 5.2](#)).

Fig. 5.30: Use the cut-off 100 mm as a template



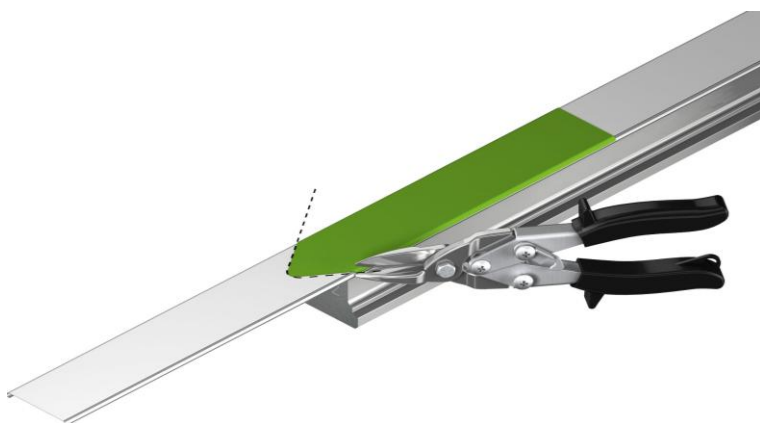
- Draw the outline on the cover strip using the template.

Fig. 5.31: Drawing contour



- Cut the contour of the cover strip with tin snips.

Fig. 5.32: Cutting the cover strip to size



- Deburr the cut end of the strip with a file.
- If necessary, carefully correct the protruding corners of the cover strip with a hammer.

Fig. 5.33: Incorrectly and correctly touched up cover strip

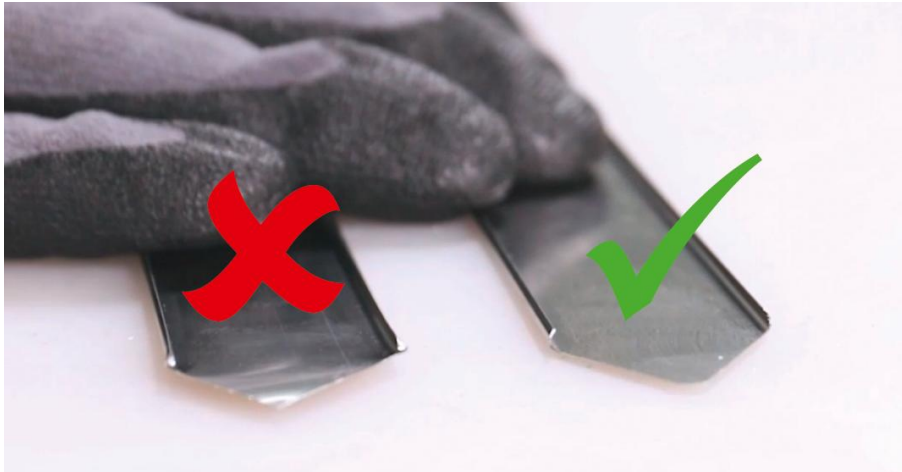


Fig. 5.34: Manually cut cover strip



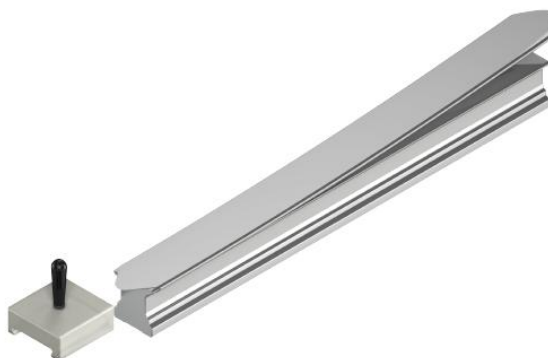
### C. Assembly using the HIWIN assembly tool

#### Note

We recommend using the HIWIN assembly/disassembly tool to ensure correct mounting of the cover strip. Information on this can be found in section [11.2](#).

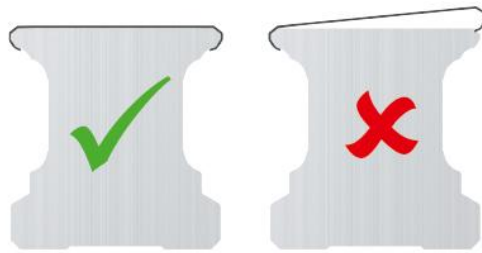
- Place the assembly tool on the front of the rail (see [Fig. 5.35](#)).
- Push the assembly tool over the entire rail.

Fig. 5.35: Mounting the cover strip using the assembly tool



- ✓ The cover strip is resting flush on the upper side of the profile rail.

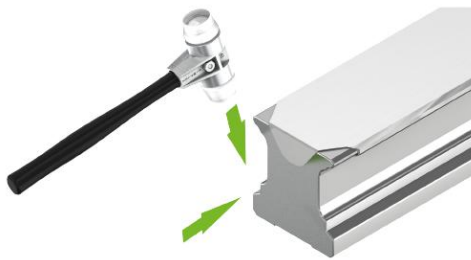
Fig. 5.36: Correctly and incorrectly fitted cover strip



#### D. Bending over the strip ends

- Carefully bend the two strip ends of the cover strip with a rubber hammer.

Fig. 5.37: Bending over the strip ends



- ✓ The cover strip has been mounted.

### 5.3.2.3 Mounting the cover strip with a mounted block

#### ! Caution! Damage to the cover strip!

Pushing the cover strip on to the rail or moving it under the block can result in the cover strip snapping off due to excessively high levels of pressure being exerted on it.

- ▶ Carefully slide the cover strip onto the rail!
- ▶ If the cover strip is difficult to slide on, repeat the steps described under B.

If a cover strip needs to be retrofitted or a damaged one needs to be replaced while one or more blocks are mounted on the rail, it is necessary to create a sliding range on the cover strip. An expanding mandrel is required for this purpose.

#### A. Setting the position of the sliding range

- Push the block as far as possible to the end of the rail
- Measure length  $L_L$  according to [Fig. 5.38](#) or [Fig. 5.39](#) from the start of the block to the end of the rail.
- The minimum length of the sliding range must be 150 mm longer than length  $L_L$ .

#### Note

The following maximum sliding ranges must not be exceeded:

- Rail without magnetic tape 1000 mm
- Rail with magnetic tape 500 mm

If larger sliding ranges are necessary due to the design, consult HIWIN.

Fig. 5.38: Sliding range ( $L_L$ )

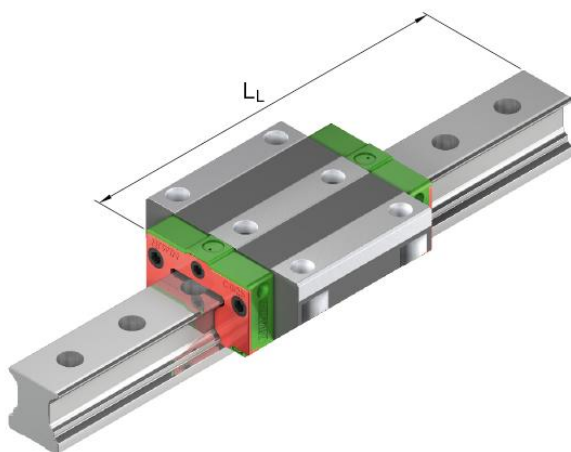
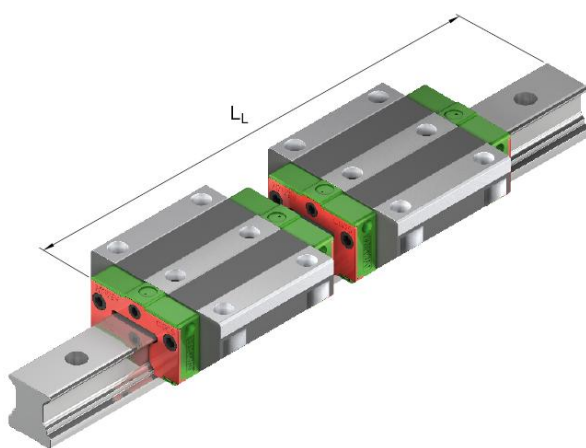


Fig. 5.39: Sliding range ( $L_L$ ) with two blocks



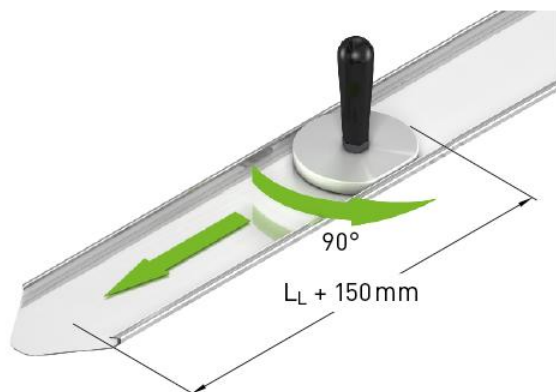
## B. Creating the sliding range

### Note

We recommend using an expanding mandrel to widen the cover strip. For information, see section 11.2.

- Place the expanding mandrel on the inner end of the sliding range so that the flat sides are aligned parallel with the cover strip.
- Turn the mandrel 90°.
- Pull the mandrel with one hand to the beginning of the cover strip while holding it with the other hand.

Fig. 5.40: Widening the sliding range using the expanding mandrel



- ✓ The cover strip's sliding range has been widened.

### C. Checking the sliding range

- Place the cover strip at the beginning of the profile rail.
- Push the cover strip slightly on to the profile rail.

#### Note

Repeat the steps in B if it is still not possible to push the cover strip on to the profile rail.

### D. Assembly

- Clean the profile rail using a suitable cleaning agent (see section 7.1).
- Position the block as close as possible to the end of the profile rail.
- Push the cover strip on to the profile rail. The widened sliding range must be pushed under the block at this point.
- To facilitate this and minimize friction, you can:
  - Hold the non-widened range upwards (see Fig. 5.41).
  - Carefully pull the cover strip from the other side of the block (see Fig. 5.42).

#### Note

Ensure that the strip does not snap.

#### Note

For rails with magnetic tape, make sure that the magnetic tape is not displaced during cover strip assembly. (See Fig. 5.43)

Fig. 5.41: Hold the non-widened area upwards

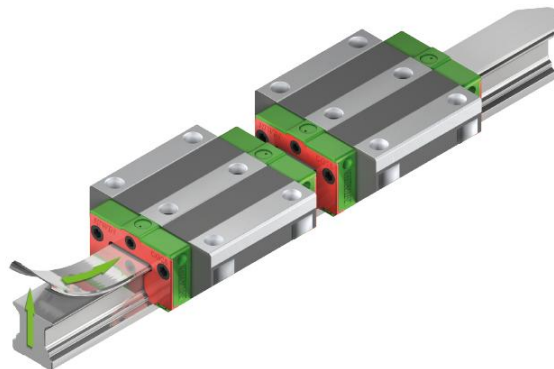


Fig. 5.42: Carefully pull from the other side of the block

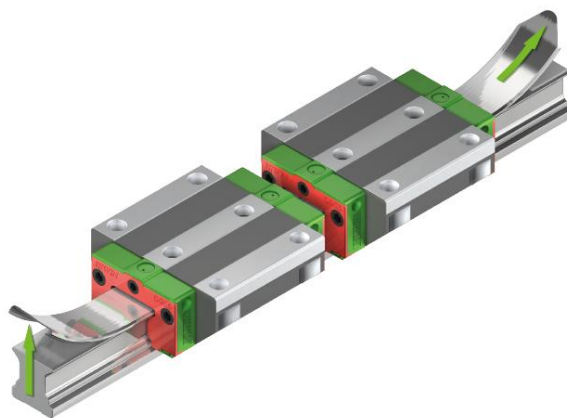
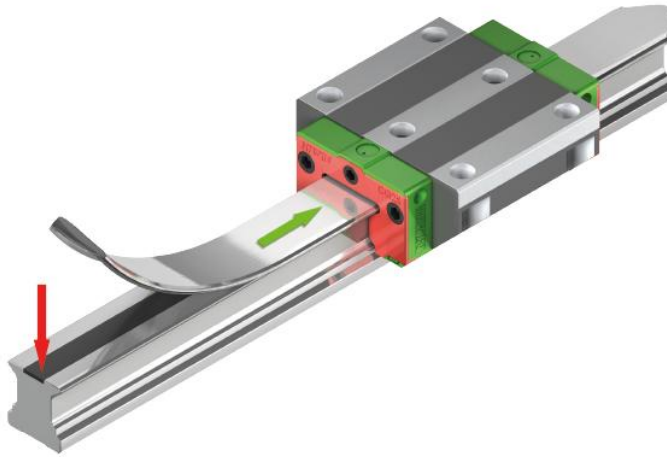


Fig. 5.43: Do not move the magnetic tape during assembly



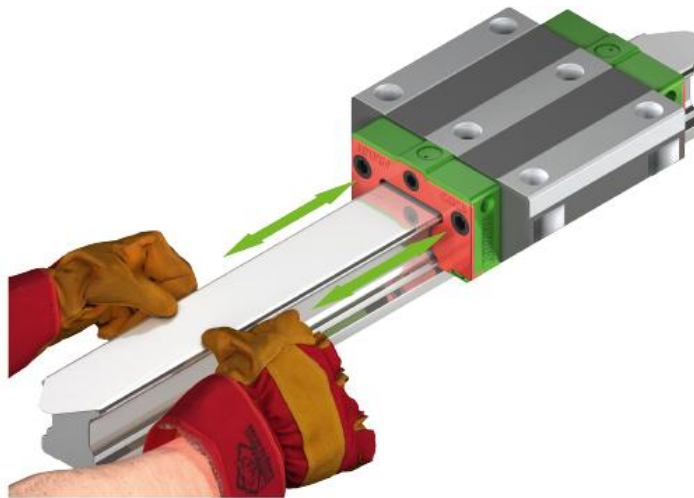
- Place the cover strip on the profile rail.

**Note**

Distance  $L_s$  must be maintained in accordance with [Table 5.2](#).

- Press down the cover strip fold that has not been widened on the reference side of the profile rail.
- Press down the second fold on the opposite side.

Fig. 5.44: Mounting cover strip on the rail



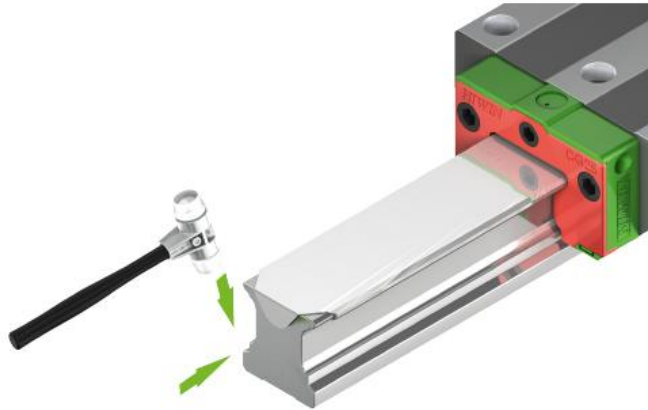
- ✓ The cover strip is resting flush on the upper side of the profile rail.

Fig. 5.45: Correctly and incorrectly fitted cover strip



- Carefully bend the two strip ends of the cover strip with a rubber hammer (see Fig. 5.46).

Fig. 5.46: Bending over the strip ends



- ✓ The cover strip has been mounted.

### 5.3.3 Strip securing

To prevent the cover strip lifting up, it is secured at both front sides of the profile rail. There are two different methods of securing the strip:

- Securing the strip via steel clamps
- Securing the strip via front-side clamping bolts

#### 5.3.3.1 Requirements

- The profile rail has been mounted.
- The cover strip has been mounted.
- The block has been mounted.

#### 5.3.3.2 Securing the strip using steel clamps

- Place the steel clamps [2] on both sides of the profile rail.
- Screw in the allen set screw [1] until the steel clamps are fixed securely.

Fig. 5.47: Placing the steel clamps on the profile rail

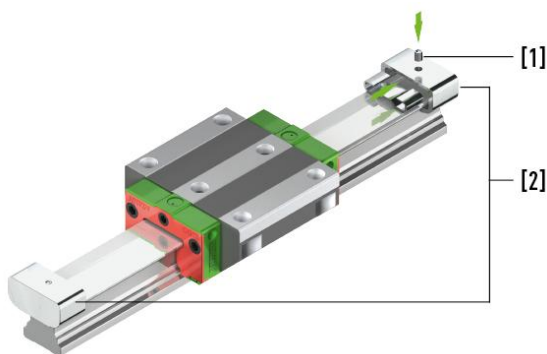
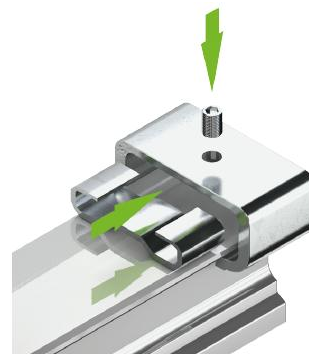


Fig. 5.48: Mounting the steel clamp

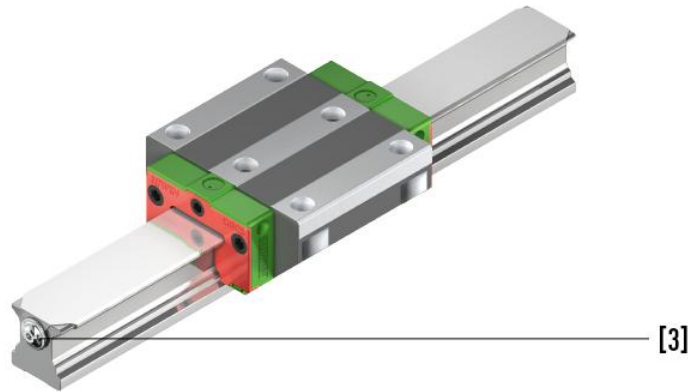


- ✓ The strip has been secured.

### 5.3.3.3 Securing the strip using front-side clamping bolts

- Screw the clamping bolts [3] to the front sides of the profile rail.

Fig. 5.49: Mounting the front-side strip securing method



- ✓ The strip has been secured.

### 5.3.4 Dismantling the cover strip

#### Note

We recommend using the HIWIN assembly/disassembly tool to ensure correct disassembly of the cover strip. Information on this can be found in section [11.2](#).

- Lift the cover strip on the front side of the profile rail using the disassembly tool [1] (see [Fig. 5.50](#)).
- Lift it carefully over the entire length of the rail.

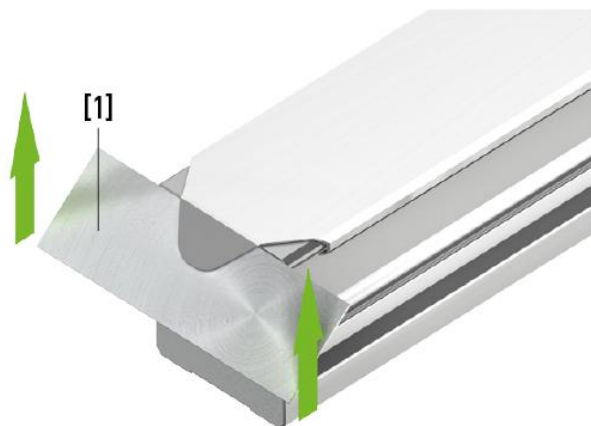
#### Note

For rails with magnetic tape, make sure that the magnetic tape is not displaced during cover strip disassembly.

#### Note

Ensure that the cover strip does not snap.

Fig. 5.50: Dismantling the cover strip



## 5.4 Block

**! Caution!** Damage to the block can be caused by removing the block insert too early.

Removing the block insert too early can cause damage to the block and result in rolling elements being lost.

► Remove the block insert only by pushing on the block!

**! Caution!** Damage to the block can be caused if cut edges have not been deburred.

Cut edges that have not been deburred can damage the end seals on the block.

► Always check the cut edges of the profile rail (if necessary cover strip) for burrs!

► If necessary, remove burrs with an oil stone or a brass wire brush.

### Note

We generally recommend a chamfer on the end face of the profile rail for mounting the blocks.

### 5.4.1 Requirements

- The end seals on the block have been greased. This makes assembly easier and reduces the risk of damage to the seal during assembly.

### 5.4.2 Assembly

#### Note

Be careful when pushing the block on to the profile rail:

Blocks with medium and high preloads require more force to push them on compared to those with low preloads. Ideally, blocks with high preloads should be delivered already mounted.

#### Note

Please bear in mind the following when working with R-rails (with bored holes for mounting from above):

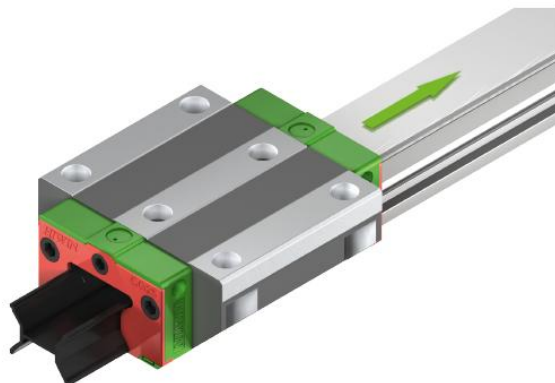
Provided that the mounting holes have not yet been sealed with cover caps or a cover strip, reduce the amount by which the block moves on the profile rail to a minimum. Otherwise, the dust protection sealing lips can become damaged.

- Attach the block to the rail in the required mounting direction on the front side, so that it is resting flush on the rail.
- Carefully push the block on to the rail.

#### Note

During this process, make sure that the block does not tilt.

Fig. 5.51: Pushing the block on to the profile rail.



- ✓ The block insert is automatically pressed out and the block is mounted on the profile rail.

### 5.4.2.1 Special feature for mounting QH, QE and QW blocks

**! Caution!** Damage to the block if the maximum screw-in depth is not observed!

The block mounting holes for the HIWIN linear guideways in the QH, QE and QW series are linked to the ball return channels (see Fig. 5.52). Using screws that are too long can damage the rolling elements.

► Do not exceed the maximum screw-in depths indicated in [Table 5.3!](#)

#### Note:

Fluids must not be used as thread lockers.

Fig. 5.52: Illustration of mounting hole and ball return channel

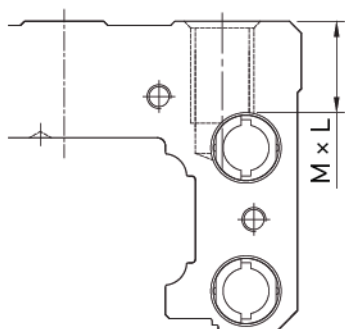


Table 5.3: Maximum screw-in depth – QH, QE and QW blocks

| Model | Max. screw-in depth M x L [mm] | Model | Max. screw-in depth M x L [mm] |
|-------|--------------------------------|-------|--------------------------------|
| QHH20 | M5 x 6                         | QEH25 | M6 x 9                         |
| QHH25 | M6 x 8                         | QEH30 | M8 x 10                        |
| QHH30 | M8 x 10                        | QWH27 | M6 x 6                         |
| QHH35 | M8 x 12                        | QWH35 | M8 x 8                         |
| QEH20 | M5 x 7                         |       |                                |

#### Note

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

### 5.4.2.2 Specific features to bear in mind when assembling an adjacent structure on UR, RG, QR and CG series blocks

Each block in the UR, RG, QR and CG series is provided with two additional central threaded holes. These are sealed with green seal stoppers on delivery.

In order to achieve high rigidity for the linear guideway even in cases of high loads, we generally recommend using all available threaded holes to fix the adjacent structure in place.

#### Note

In blocks from the URW, RGW and QRW series, you also have the option of securing your adjacent structure from below. Before the block is assembled, it must be secured to the adjacent structure.

## 5.5 Tightening torques of the mounting bolts

Insufficient tightening of the mounting bolts severely affects the accuracy of the linear guideway; the following tightening torques for the respective screw sizes are recommended.

Table 5.4: Tightening torques of mounting bolts ISO 4762-12.9

| Screw size | Torque [Nm] | Screw size | Torque [Nm] |
|------------|-------------|------------|-------------|
| <b>M2</b>  | 0.65        | <b>M8</b>  | 40          |
| <b>M3</b>  | 2.3         | <b>M10</b> | 70          |
| <b>M4</b>  | 5.0         | <b>M12</b> | 100         |
| <b>M5</b>  | 10.0        | <b>M14</b> | 170         |
| <b>M6</b>  | 18.0        | <b>M16</b> | 250         |

### Note

Recommended tightening torques of 12.9 DIN EN ISO 4762

Fixing screws according to VDI 2230 for  $\mu K = \mu G = 0.125$

### Note

Screw-in depth at least  $2 \times$  thread diameter

### Note

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

### Note

Each block in the URW, RG, QR and CG series is provided with two additional central threaded holes. These are sealed with green seal stoppers on delivery.

In order to achieve high rigidity for the linear guideway even in cases of high loads, we generally recommend using all available threaded holes to fix the adjacent structure in place.

## 6 Commissioning

**⚠ Attention!** Risk of damage to health and the environment!

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

- ▶ Only use suitable substances that are safe for humans. Observe the manufacturer's safety data sheets.
- ▶ Dispose of substances appropriately.

**! Caution!** Risk of damage to the linear guideways due to missing or incorrect lubrication!

Lack of initial lubrication or excessive lubricant quantities/pressure can damage or destroy the product.

- ▶ Never put the linear guideway into operation without initial lubrication!
- ▶ The specified work steps must be followed without fail in order to avoid damage to the product!

### Note

If you have ordered a mounted linear guideway, remove the green stoppers before commissioning. These stoppers secure the block on the profile rail.

The standard lubrication conditions for the products can be found in section [8.10](#). Please follow the commissioning instructions in accordance with section [8.11](#).

## 7 Maintenance and cleaning

Maintenance is only required in the form of lubrication. See chapter [8](#).

### 7.1 Cleaning

**! Caution!** Damage to the linear guideway due to improper cleaning!

Using non-approved cleaning agents and tools can cause damage to the profile rail.

- ▶ Observe the legal regulations and the manufacturer's instructions for handling the cleaning products!
- ▶ Avoid damage to the profile rail by sharp objects!
- ▶ When cleaning, make sure that no metal particles get into or remain in the block!

#### Permissible cleaning and maintenance actions:

- Linear guideways can be cleaned with petroleum ether and oil.
- Trichloroethylene or a comparable cleaning agent can be used as a degreasing agent.
- To prevent corrosion, all parts must be dried, preserved or lubricated after cleaning.

## 8 Lubrication

### 8.1 Basic information on lubrication

Machine elements in linear technology require a sufficient supply of lubricants to ensure their function and service life.

The following specifications and notes are intended to assist the user in selecting a suitable lubricant, the appropriate lubricant quantity and determining the lubrication intervals.

These lubrication instructions do not release the user from checking the specified lubrication intervals in practice and correcting them if necessary. After each lubrication process, check whether there is sufficient lubricant on the machine element (check whether there is a lubricant film).

#### Lubricants

- Reduce wear and tear
- Protect from dirt
- Prevent corrosion

The lubricant is a constructional element and should be taken into consideration when designing a machine. When selecting the lubricant, the operating temperature range and the operating and ambient conditions must be taken into account.

### 8.2 Safety

**! Caution!** Damage due to incorrect lubricant!

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

- ▶ Use the correct type of lubricant (grease, oil) according to the specifications in these assembly instructions!
- ▶ Observe the manufacturer's safety data sheets.

#### 8.2.1 Intended use of the lubricants

Prolonged and repeated contact with the skin should be avoided if possible. Clean wetted skin areas with soap and water. Use skin protection products during work and moisturising cream after work. If necessary, wear oil-resistant protective clothing (e.g. gloves, apron). Do not clean hands with petroleum, solvents, water-miscible or water-mixed cooling lubricants. Oil mist must be extracted at the point of origin.

Protective goggles must be worn to avoid eye contact. If eye contact nevertheless occurs, rinse the affected areas with plenty of water. If eye irritation persists, consult an eye doctor.

In case of accidental ingestion, do not induce vomiting under any circumstances. Immediate medical attention is required.

Safety data sheets according to 91/155/EEC are usually available for lubricants. Here you will find detailed information on health, accident and environmental protection.

Lubricants are usually products that are hazardous to water. That is why they must not get into the soil, water or sewage system.

#### 8.2.2 Safety instructions for storing the lubricants

Lubricants must be stored in well-sealed packaging in a cool, dry location. They must be protected against direct sunlight and frost.

Lubricants must not be stored together with:

- Food
- Oxidising agents

### 8.3 Lubrication connectors

HIWIN profile rail blocks offer three options for attaching a lubrication connector:

- On the front end
- On the side
- From above

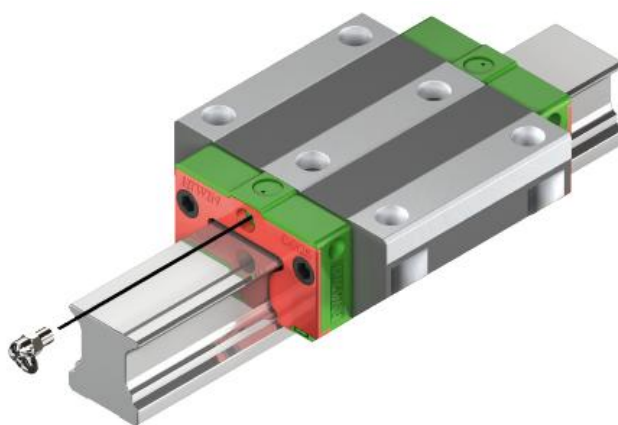
#### Note

Not all blocks have a lubrication connector.

#### 8.3.1 Lubrication connector on the front side

It is possible to fit a lubrication adapter on both end faces of the block. Each lubrication connector that is not in use is sealed with a sealing screw. This is the HIWIN standard configuration.

Fig. 8.1: Lubrication connectors on the front



#### 8.3.2 Lubrication connectors on the side

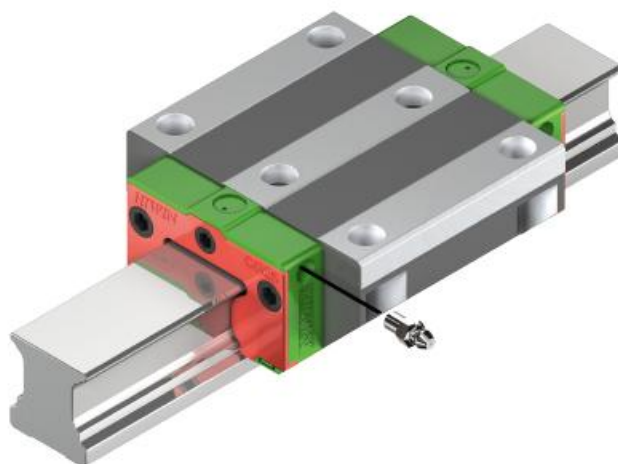
**! Caution!** Damage to the block due to improper opening of the lubrication hole!

- ▶ Do not use drills to open the lubrication hole, otherwise there is a risk of chips entering the block!

#### Note

In the CG series, these holes are prepared so they are ready for use and sealed with a sealing screw.

Fig. 8.2: Lubrication connector on the side



The block has a hole in both plastic deflectors on the left and right to attach a lubrication adapter to the side.

For series HG, QH, EG, QE, WE, QW, RG and QR, a thread must be cut into the prepared side hole using a blind hole tap. The maximum thread depth according to [Table 8.1](#) must not be exceeded. Then clean the hole; it must be free of chips and other impurities. Finally, the lateral lubrication hole in the base must be opened using a metal mandrel.

**Diameter of the metal mandrel:**

- Diameter 2.5 mm up to size 35
- Diameter 3.0 mm from size 45

**Note**

If the first wall is broken through, do not press any further, otherwise there will be a break-through into the recirculation system of the rolling elements.

**Note**

When using the side lubrication connector, it should not be fitted on the reference side, but on the opposite side. Should it be necessary to mount the lubrication connector on the reference side, make sure that the lubrication connector does not protrude beyond the reference side of the block. Opened lateral lubrication holes can be closed with a sealing screw if necessary.

**Note**

Straight taper or ball grease nipples are used for lateral lubrication. For flanged blocks, we recommend the use of the respective HIWIN lubrication adapters according to [Table 8.1](#) due to the small distance between block flange and grease nipple. Alternatively, funnel grease nipples can also be used.

Table 8.1: Lateral lubrication hole – dimensions and grease nipple

| Block type                                                                                                                                          | Thread    | Thread length in mm |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------|
| HG 15<br>EG 15<br>RG 15, 20<br>CRG 15, 20<br>WE 21, 27<br>QW 21, 27                                                                                 | M4        | 4.5                 |
| HG 20, 25, 30, 35<br>QH 20, 25, 30<br>EG 30, 35<br>QE 25, 30, 35<br>CG 25, 30, 35, 45<br>WE 21, 27, 35<br>QW 21, 27, 35<br>RG 25<br>CRG 25<br>QR 25 | M6 × 0.75 | 6                   |
| HG 45, 55, 65<br>QH 45<br>RG 45, 55, 65<br>CRG 45, 55, 65<br>QR 45                                                                                  | ½ PT      | 10                  |
| QH, QE 15,<br>QR 20                                                                                                                                 | M4        | 4.5                 |
| QH 35<br>UR35, UR45, UR55<br>RG 30, 35<br>CRG 30, 35<br>QR 30, 35                                                                                   | M6 × 0.75 | 6                   |
| EG 20, 25<br>QE 20                                                                                                                                  | M6 × 0.75 | 6                   |
| CG 15, 20<br>WE 17<br>QW 17                                                                                                                         | M3        | 4.5                 |
| WE 50                                                                                                                                               | ½ PT      | 10.0                |

### 8.3.3 Lubrication connector from above

Fig. 8.3: Lubrication connector from above

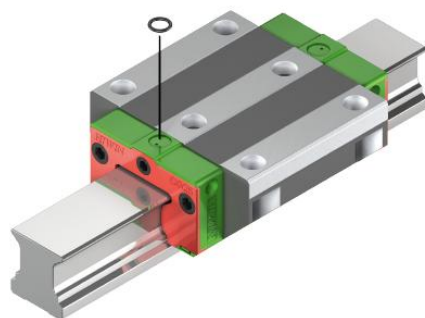


Fig. 8.4: Lubrication connector from above (HGH/QHH, CGH, URH, RGH/QRH), see section [8.3.3.1](#)

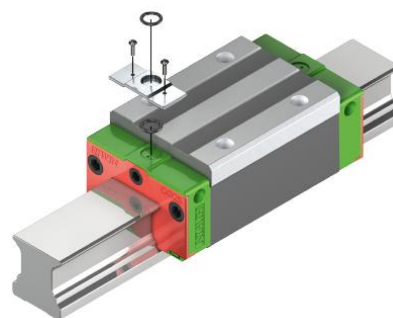


Fig. 8.5: Lubrication connector from above (application)



Lubrication of the block can also be done from above. In this case, an O-ring is used as a seal. See Table 8.2 for the size of the O-ring. If you order the block with the option of lubrication from above selected, the lubrication hole will be open and the required O-ring enclosed. If the block is ordered without lubrication, the hole must first be opened.

In the recess for the O-ring, there is a further recess.

- Open them with a 1.5 mm diameter drill to a maximum depth of  $T_{\max}$  according to Table 8.2.

**Note**

Once lubrication holes have been opened for lubrication from above, they can no longer be closed with a sealing screw.

Fig. 8.6: O-ring for covering the lubrication connector from above

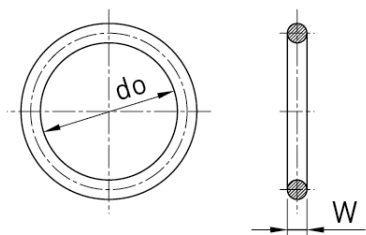


Fig. 8.7: Maximum penetration depth  $T_{\max}$

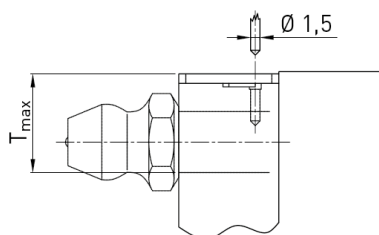


Table 8.2: Specifications of O-ring for lubrication connector from above

| Series/Size | O-ring         |            |            | Lubrication hole from above      |
|-------------|----------------|------------|------------|----------------------------------|
|             | Article number | do [mm]    | W [mm]     | Max. depth T <sub>max</sub> [mm] |
| HG/QH_15    | 20-000386      | 2.5 ± 0.15 | 1.5 ± 0.15 | 3.75                             |
| HG/QH_20    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 5.70                             |
| HG/QH_25    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 5.80                             |
| HG/QH_30    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 6.30                             |
| HG/QH_35    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 8.80                             |
| HG/QH_45    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 8.20                             |
| HG_55       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 11.80                            |
| HG_65       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 10.80                            |
| EG/QE_15    | 20-000386      | 2.5 ± 0.15 | 1.5 ± 0.15 | 6.90                             |
| EG/QE_20    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 8.40                             |
| EG_25       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 10.40                            |
| QE_25       | 80171785       | 3.0 ± 1.5  | 2.5 ± 0.15 | 10.40                            |
| EG/QE_30    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 10.40                            |
| EG/QE_35    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 10.80                            |
| CG_15       | 20-000386      | 2.5 ± 0.15 | 1.5 ± 0.15 | 3.75                             |
| CG_20       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 5.70                             |
| CG_25       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 5.80                             |
| CG_30       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 6.30                             |
| CG_35       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 8.80                             |
| CG_45       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 8.20                             |
| WE_21       | 20-000386      | 2.5 ± 0.15 | 1.5 ± 0.15 | 4.20                             |
| WE_27       | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 5.80                             |
| WE/QW_35    | 20-000387      | 4.5 ± 0.15 | 1.5 ± 0.15 | 7.60                             |
| QW_21       | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 4.20                             |
| QW_27       | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 5.80                             |
| UR_35       | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 8.65                             |
| UR_45       | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 9.5                              |
| UR_55       | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 11.6                             |
| RG_15       | 20-000386      | 2.5 ± 0.15 | 1.5 ± 0.15 | 3.45                             |
| RG_20       | 20-000386      | 2.5 ± 0.15 | 1.5 ± 0.15 | 4.00                             |
| RG/QR_25    | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 5.80                             |
| RG/QR_30    | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 6.20                             |
| RG/QR_35    | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 8.65                             |
| RG/QR_45    | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 9.50                             |
| RG_55       | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 11.60                            |
| RG_65       | 20-000376      | 7.5 ± 0.15 | 1.5 ± 0.15 | 14.50                            |

**Note**

It may be necessary to use spacers (HIWIN lubrication adapters) to mount the lubrication.

### 8.3.3.1 Spacers (lubrication adapter)

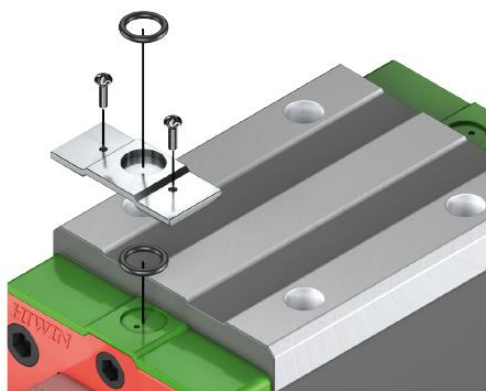
For series HG/QH, UR, RG/QR and CG (types HGH/QHH, RGH/QRH and CGH), spacers (lubrication adapter TCN, Top-CoNnector) must be fitted to compensate for the difference in height between the deflector and the block mounting surface.

The adapters are only delivered assembled, the matching O-ring is included in the scope of delivery when ordering this option.

#### Availability of lubrication adapter TCN:

- HG/QH\_15, HG/QH\_25, HG/QH\_30, HG/QH\_35, HG/QH\_45, HG\_55
- RG\_15, RG\_20, RG/QR\_25, RG/QR\_30, UR/RG/QR\_35, UR/RG/QR\_45, UR/RG\_55
- CG\_25, CG\_30, CG\_35, CG\_45

Fig. 8.8: Structure of lubrication adapter



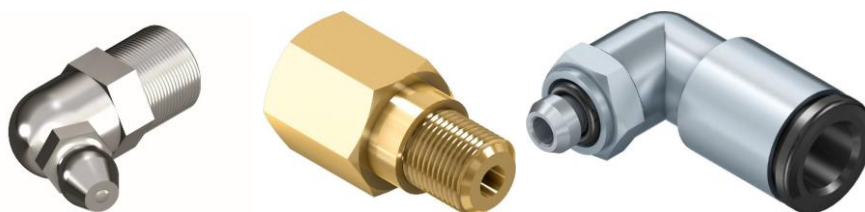
### 8.3.4 Grease nipple Lubrication adapters and push-in fittings

Various grease nipples, lubrication adapters and push-in fittings are optionally available.

Fig. 8.9: Grease nipple

Fig. 8.10: Lubrication adapters

Fig. 8.11: push-in fittings



Information on the appropriate lubrication connector for your block, depending on the sealing system, can be found in the lubrication connector configurator at [hiwin.de](https://hiwin.de).

## 8.4 Use of central lubrication systems

If a central lubrication system is used, carrying out the initial lubrication (see section 8.11) separately with a manual grease gun before connecting it to the system is recommended. Also make sure that all lines and elements up to the consumer are filled with lubricant and do not contain any air pockets.

Long cable runs and small cable diameters should be avoided. The cables are to be laid uphill. The pulse number results from the partial quantities and the piston distributor size. In addition, the lubrication system manufacturers' instructions must be observed.

## 8.5 Lubricating pressure

HIWIN linear guideways can be lubricated using oil, grease or low-viscosity grease, depending on the specific application. The required lubricating pressure depends on the size, the lubricant, the length of the feed line and the type of lubrication connector used.

### Minimum lubricating pressure on the block:

- Grease or low-viscosity grease: 6 bar
- Oil lubrication: 3 bar

The maximum permissible lubricating pressure on the block is 30 bar.

**! Caution!** Damage to the block can be caused by excessive lubricating pressure levels or lubricant quantities.

Seals are at particular risk of damage on blocks with double seals, SW seals or ZWX seals.

- ▶ Carry out lubrication according to the assembly instructions.
- ▶ Make sure you use the right lubricating pressure levels and lubricant quantities.

## 8.6 Selecting a lubricant

Oils, greases or low-viscosity greases can be used as lubricants. The same lubricants are used as for rolling bearings. As a rule, the selection of a lubricant and the infeed method can be adapted to fit in with the lubrication of the other machine components.

Essentially, the selection of a lubricant depends on the operating temperature and various operation-related factors, e.g. load, vibrations, oscillation or short-stroke applications. Special requirements – such as use in combination with strong or aggressive media, in clean rooms, in a vacuum or in the food industry – also need to be considered.

### Grease lubrication

For grease lubrication, we recommend lubricating greases for rolling bearings and friction bearings with mineral oil as the base oil and thickeners specified by DIN 51825 (K1K, K2K). In heavy-duty applications, we recommend using EP additives (KP1K, KP2K), NLGI class 1 or 2. Using greases of other consistency classes is possible subject to the approval of the lubricant supplier.

### Lubrication with low-viscosity grease

In centralised lubrication systems, low-viscosity greases are frequently used, as they are distributed more effectively over the whole system due to their soft structure.

### Oil lubrication

Lubricating oils offer the advantage of more even distribution and reach the contact surfaces more effectively. However, this also means that lubricating oils collect in the lower area of the product as a result of the force of gravity and thus cause soiling more quickly. For this reason, higher quantities of lubricant are required than with grease lubrication. As a rule, oil lubrication is only suitable when centralised lubrication units are being used or for products equipped with a long-term lubrication unit.



### Note

For wall mounting, we generally recommend grease or low-viscosity lubricant; for oil lubrication, we generally ask that you consult us, as insufficient lubrication may occur depending on the installation position.

### 8.6.1 Lubricant recommendations

The following table lists examples of applications and suitable lubricants.

**! Caution!** Damage caused by using the wrong greases!

Greases with solid particles such as graphite or  $\text{MOS}_2$  can cause damage.

► Do not use any grease containing solid particles such as graphite or  $\text{MoS}_2$ !

#### Note

The information on lubricants serves to provide examples and is only intended as an aid to selection. Other lubricants may be selected after clarification of the specific application with the lubricant supplier. In addition, the lubrication system manufacturers' instructions must be observed.

Table 8.3: Recommended lubricants – grease, low-viscosity grease and oil

| Type of application         | Grease                                  |                                   | Low-viscosity grease                                                                                                      |                        | Oil                        |                           |
|-----------------------------|-----------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------|---------------------------|
|                             | Manufacturer                            | Description                       | Manufacturer                                                                                                              | Description            | Manufacturer               | Description               |
| Standard                    | HIWIN                                   | G05                               | Klüber Lubrication München                                                                                                | MICROLUBE GB 00        | Klüber Lubrication München | Klüberoil GEM 1-150 N     |
|                             | Klüber Lubrication München              | MICROLUBE GL 261                  | Mobil                                                                                                                     | Mobilux EP 004         | FUCHS                      | GEARMASTER CLP 320        |
|                             | Mobil                                   | Mobilux EP 1                      | FUCHS                                                                                                                     | GEARMASTER LI 400      | FUCHS                      | RENOLIN CLP 150           |
|                             | FUCHS                                   | LAGERMEISTER BF 2                 | FUCHS                                                                                                                     | RENOLIT EPLITH 00      | -                          | -                         |
|                             | LUBCON                                  | Turmogrease CAK 2502              | -                                                                                                                         | -                      | -                          | -                         |
|                             | FUCHS                                   | RENOLIT LZR 2 H                   | -                                                                                                                         | -                      | -                          | -                         |
|                             | Klüber Lubrication Munich <sup>1)</sup> | ISOFLEX TOPAS AK 50 <sup>1)</sup> | -                                                                                                                         | -                      | -                          | -                         |
| Heavy load                  | HIWIN                                   | G01                               | We recommend that you consult a lubricant manufacturer regarding the use of these lubricants for heavy-duty applications. |                        |                            |                           |
|                             | Klüber Lubrication München              | Klüberlub BE 71-501               |                                                                                                                           |                        |                            |                           |
|                             | FUCHS                                   | LAGERMEISTER EP 2                 |                                                                                                                           |                        |                            |                           |
|                             | LUBCON                                  | TURMOGREASE Li 802 EP             |                                                                                                                           |                        |                            |                           |
|                             | FUCHS                                   | RENOLIT LZR 2 H                   |                                                                                                                           |                        |                            |                           |
| Clean room                  | HIWIN                                   | G02                               | We recommend that you consult a lubricant manufacturer regarding the use of these lubricants for heavy-duty applications. |                        | Klüber Lubrication München | Klüber Tyreno Fluid E-95V |
|                             | Klüber Lubrication München              | ISOFLEX TOPAS NCA 152             |                                                                                                                           |                        | Mobil                      | Mobilgear 626             |
|                             | FUCHS                                   | GLEITMO 591                       |                                                                                                                           |                        | FUCHS                      | RENOLIN CLP 100           |
| Clean room with high speeds | HIWIN                                   | G03                               | -                                                                                                                         | -                      | -                          | -                         |
|                             | Klüber Lubrication München              | ISOFLEX TOPAS NCA 52              | -                                                                                                                         | -                      | -                          | -                         |
| High speeds                 | HIWIN                                   | G04                               | Klüber Lubrication München                                                                                                | ISOFLEX TOPAS NCA 5051 | Klüber Lubrication München | Klüberoil GEM 1-46 N      |
|                             | Klüber Lubrication München              | ISOFLEX NCA 15                    | Mobil                                                                                                                     | Mobilux EP 004         | FUCHS                      | RENOLIN ZAF B 46 HT       |
|                             | LUBCON                                  | Turmogrease Highspeed L 252       | FUCHS                                                                                                                     | GEARMASTER LI 400      | -                          | -                         |

| Type of application                      | Grease                     |                          | Low-viscosity grease       |                          | Oil                        |                      |
|------------------------------------------|----------------------------|--------------------------|----------------------------|--------------------------|----------------------------|----------------------|
|                                          | Manufacturer               | Description              | Manufacturer               | Description              | Manufacturer               | Description          |
|                                          | FUCHS                      | RENOLIT HI-Speed 2       | FUCHS                      | RENOLIT SF 7-041         | -                          | -                    |
| <b>Short stroke and high frequencies</b> | HIWIN                      | G06                      | Fuchs                      | Renolit G-FHT 00         | Fuchs                      | Renotac 345          |
|                                          | Klüber Lubrication München | Microlube GL 261         | Klüber Lubrication München | Microlube GB 0           | Klüber Lubrication München | Klüberoil GEM 1-220  |
|                                          | Mobil                      | Mobilgrease XHP 222      | -                          | -                        | -                          | -                    |
| <b>Low temperatures</b>                  | HIWIN                      | G07                      | Fuchs                      | Renolit GLS 00           | Aral                       | Vitam HF 32          |
|                                          | Fuchs                      | Renolit S2               | Klüber Lubrication München | Klübersynth UH 1 14-1600 | Esso                       | Univis N 32          |
|                                          | Klüber Lubrication München | Isoflex LDS 18 Special A | -                          | -                        | -                          | -                    |
| <b>Food grade according to USDA H1</b>   | Klüber Lubrication München | Klübersynth UH1 14-151   | Klüber Lubrication München | Klübersynth UH1 14-1600  | Klüber Lubrication München | Klüberoil 4 UH1-68 N |
|                                          | Mobil                      | Mobilgrease FM 102       | Mobil                      | Mobilgrease FM 003       | -                          | -                    |
|                                          | FUCHS                      | GERALYN 1                | FUCHS                      | GERALYN 00               | -                          | -                    |

<sup>1)</sup> Recommended for MG series

### 8.6.1.1 Description of types of application

#### Standard applications

Load: max. 15% of the dynamic load rating  
 Temperature range: -10 °C to +80 °C  
 Speed: < 1 m/s

#### Heavy-duty applications

Load: max. 50% of the dynamic load rating  
 Temperature range: 0 °C to +80 °C  
 Speed: < 1 m/s

#### Clean room applications

Load: max. 50% of the dynamic load rating  
 Temperature range: -10 °C to +80 °C  
 Speed: < 1 m/s

#### Clean room applications with high speeds

Load: max. 50% of the dynamic load rating  
 Temperature range: -10 °C to +80 °C  
 Speed: > 1 m/s

#### Applications with high speeds

Load: max. 50% of the dynamic load rating  
 Temperature range: -10 °C to +80 °C  
 Speed: > 1 m/s

#### Short stroke and high frequencies

Load: Max. 50 % dynamic load rating  
 Temperature range: -10 °C to +80 °C  
 Acceleration: 15–30 m/s<sup>2</sup>

#### Low temperatures

Load: Max. 50 % dynamic load rating  
 Temperature range: -50 °C to 0 °C  
 Speed: < 1 m/s

#### Applications for the food sector according to USDA H1

Load: max. 15% of the dynamic load rating  
 Temperature range: -10 °C to +80 °C  
 Speed: < 1 m/s

## 8.7 HIWIN greases

Table 8.4: Overview of HIWIN greases

| Grease type | Area of application                  | Article number                                                                    |                                                                                     |
|-------------|--------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|             |                                      | Cartridge 70 g                                                                    | Cartridge 400 g                                                                     |
|             |                                      |  |  |
| <b>G01</b>  | Heavy-duty applications              | 20-000335                                                                         | 20-000336                                                                           |
| <b>G02</b>  | Clean room applications              | 20-000338                                                                         | 20-000339                                                                           |
| <b>G03</b>  | Clean room applications + high speed | 20-000341                                                                         | 20-000342                                                                           |
| <b>G04</b>  | Heavy velocity                       | 20-000344                                                                         | 20-000345                                                                           |
| <b>G05</b>  | Standard grease                      | 20-000347                                                                         | 20-000347                                                                           |
| <b>G06</b>  | Short stroke and high frequencies    | 20-002195                                                                         | 20-002196                                                                           |
| <b>G07</b>  | Low temperatures                     | 20-002197                                                                         | 20-002198                                                                           |

## 8.8 Miscibility of lubricants

The miscibility of different lubricants must be tested. Lubricating oils based on mineral oil with the same classification (e.g. CL) and similar viscosity (maximum one class difference) are miscible.

Greases are miscible if their base oil and thickening type are the same. The viscosity of the base oil must be similar. The NLGI class may differ by a maximum of one level.

If lubricants other than those specified are used, shorter relubrication intervals and reduced performance must be expected. Possible chemical interactions between plastics, lubricants and preservatives must be expected.

Table 8.5: Miscibility of HIWIN greases

|            | G01 | G02 | G03 | G04 | G05 | G06 | G07 |
|------------|-----|-----|-----|-----|-----|-----|-----|
| <b>G01</b> | ●   | ●   | ●   | ○   | ○   | ○   | ○   |
| <b>G02</b> | ●   | ●   | ●   | ●   | ●   | ●   | ●   |
| <b>G03</b> | ●   | ●   | ●   | ●   | ●   | ●   | ●   |
| <b>G04</b> | ○   | ●   | ●   | ●   | ●   | ●   | ●   |
| <b>G05</b> | ○   | ●   | ●   | ●   | ●   | ●   | ●   |
| <b>G06</b> | ○   | ●   | ●   | ●   | ●   | ●   | ●   |
| <b>G07</b> | ○   | ●   | ●   | ●   | ●   | ●   | ●   |

● Miscible ○ Partially miscible

Table 8.6: Compatibility of basic grease products with HIWIN greases

|                       | G01 | G02 | G03 | G04 | G05 | G06 | G07 |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| <b>QH, QE, QW, QR</b> | ○   | ●   | ●   | ●   | ●   | ●   | ●   |

● Miscible ○ Partially miscible

# Note

## Recommendation:

In the case of lubricants that are only partially miscible, the old grease must be used up as far as possible before the new grease is introduced. The relubrication quantity with the new grease must be increased for a short time.

In the case of lubricants that are not miscible, the old grease must be completely used up before the new grease is introduced.

## 8.9 Grease guns and lubrication adapters

### A1: Hydraulic gripping coupling

For conical grease nipples according to DIN 71412, outer diameter 15 mm

Fig. 8.12: A1



### A2: Hollow mouthpiece (not available individually)

For conical and ball grease nipples to DIN 71412/ DIN 3402, outer diameter 10 mm

Fig. 8.13: A2



### A3: Hollow mouthpiece with lubrication adapter

For ball grease nipples according to DIN 3402, outer diameter 6 mm

Fig. 8.14: A3



### A4: Round mouthpiece with lubrication adapter

For funnel type grease nipples according to DIN 3405, outer diameter 6 mm

Fig. 8.15: A4



### A5: Pointed mouthpiece with lubrication adapter

Fig. 8.16: A5



### A6: Angled pointed mouthpiece with lubrication adapter

Fig. 8.17: A6



### Set of lubrication adapters and nozzles

Fig. 8.18: Lubrication adapters and nozzles A3, A4, A5, A6



### Set GN-400C: Grease gun large and adapter A1, A2

Fig. 8.19: GN-400C



### Set GN-80M: Grease gun small and adapter A1, A2

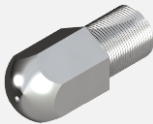
Fig. 8.20: GN-80M



Table 8.7: Overview of HIWIN grease guns and accessories

| Article number | Contents           |                     |                                                     | Direct filling | Cartridge | Grease quantity per stroke |
|----------------|--------------------|---------------------|-----------------------------------------------------|----------------|-----------|----------------------------|
|                | GN-80M (Fig. 8.20) | GN-400C (Fig. 8.19) | Set of lubrication adapters and nozzles (Fig. 8.18) |                |           |                            |
| 20-000352      | ■                  | –                   | –                                                   | ■              | 70 g      | 0.5-0.6 cm <sup>3</sup>    |
| 20-000332      | ■                  | –                   | ■                                                   | ■              | 70 g      | 0.5-0.6 cm <sup>3</sup>    |
| 20-000353      | –                  | ■                   | –                                                   | ■              | 400 g     | 0.8-0.9 cm <sup>3</sup>    |
| 20-000333      | –                  | ■                   | ■                                                   | ■              | 400 g     | 0.8-0.9 cm <sup>3</sup>    |
| 20-000358      | –                  | –                   | ■                                                   | –              | –         | –                          |

Table 8.8: Overview of grease nipples and recommended grease gun adapter

|                                                                                   | Grease nipple         | Recommended grease gun adapters     |
|-----------------------------------------------------------------------------------|-----------------------|-------------------------------------|
|  | Ball grease nipple    |                                     |
|                                                                                   | M3 × 0.5 P            | A2 <sup>2)</sup> , A3 <sup>1)</sup> |
|                                                                                   | M4 × 0.7 P            | A2, A3 <sup>1)</sup>                |
|  | Conical grease nipple |                                     |
|                                                                                   | M6 × 0.75 P           | A1, A2 <sup>1)</sup>                |
|                                                                                   | 1/8 PT                | A1, A2 <sup>1)</sup>                |
|  | Grease nipple cone    |                                     |
|                                                                                   | M3 × 0.5 P            | A4                                  |
|                                                                                   | M4 × 0.7 P            | A4                                  |
|                                                                                   | M6 × 0.75 P           | A4                                  |

<sup>1)</sup> Optional for limited installation space

<sup>2)</sup> Not possible for an MG15 block that is already mounted on the rail (use A3)

## 8.10 Standard lubrication condition of the linear guideways on delivery

Depending on the product group and scope of delivery, the linear guideways are delivered in the following states.

- **Preserved blocks** are wetted over the entire surface with an anti-corrosion oil. Before commissioning, initial lubrication must be carried out in accordance with section 8.11.
- **Basic greased blocks** are delivered with a reduced grease quantity. The lubrication channels are largely free of grease. This facilitates lubricant changeover and enables the changeover from grease to oil lubrication. The basic greasing is sufficient for mounting the linear guideway. Before commissioning, initial lubrication must be carried out in accordance with section 8.11.
- **Initial greased blocks** are greased with the recommended grease quantity according to section 8.13.

Table 8.9: Standard lubrication condition for blocks mounted on profile rails

| Series                         | lubrication condition |
|--------------------------------|-----------------------|
| HG, EG, CG, WE, QH, QE, QW, QR | Initial greasing      |
| UR, RG, MG, CRG                | Preserved             |

Table 8.10: Standard lubrication condition for blocks not mounted on profile rails

| Series                          | lubrication condition |
|---------------------------------|-----------------------|
| HG, EG, CG, WE, UR, RG, MG, CRG | Preserved             |
| QH, QE, QW, QR                  | Basic grease          |

### Note

For basic greasing of the linear guideways, a grease for rolling and slide bearing with mineral oil as the base oil and thickeners according to DIN 51825 (K2K), NLGI class 2, is used. Base oil viscosity for QR: 100 mm<sup>2</sup>/s at 40 °C; base oil viscosity for QH, QE, QW: 200 mm<sup>2</sup>/s at 40 °C.

### Note

If the lubrication condition deviates from the standard stated here, the specific lubrication condition will be stated in the order confirmation.

## 8.11 Initial lubrication during commissioning

**! Caution!** Risk of damage to the linear guideways due to missing or incorrect lubrication!

Lack of initial lubrication or excessive lubricant quantities/pressure can damage or destroy the product.

- ▶ Never put the linear guideway into operation without initial lubrication!
- ▶ The specified work steps must be followed without fail in order to avoid damage to the product!

### Note

During initial lubrication, the required quantity of grease is applied to the block in order to achieve the specified lubrication intervals. The lubrication channels are then completely filled with grease, a change from grease to oil lubrication is then no longer possible without cleaning the block.

### 8.11.1 Performance

- Apply the amount of grease specified in section [8.13](#) by slowly pressing the grease gun.
  - Move the block by about three block lengths.
  - Repeat this process two more times.
  - Move the block over the entire travel distance and check the entire profile rail to see whether a lubricant film can be detected.
- ✓ The initial lubrication process for the linear guideway has been carried out.

### Note

If a lubricant film cannot be detected along the entire length of the profile rail, increase the quantity of lubricant used.

#### 8.11.1.1 Initial lubrication for short-stroke applications

For short stroke applications (stroke < 2 × block length), initial lubrication must be carried out as follows:

##### Stroke < 2 × block length:

Provide lubrication connectors on both sides of the block and carry out lubrication according to section [8.11.1](#) for each lubrication connector.

### Note

Stroke < 0.5 × block length: Please consult HIWIN.

#### 8.11.1.2 Initial lubrication – MG series

A grease nipple for grease lubrication is available for size 15 in the case of miniature type MG. For sizes 2, 3, 5, 7, 9 and 12, we recommend using a suitable lubricant (e.g. Isoflex Topas AK 50).

- Apply the lubricant evenly to the ball bearing races along the entire length of the profile rail.
  - Move the block along the entire stroke.
  - Remove any surplus grease if necessary.
- ✓ The initial lubrication process for the MG linear guideway has been carried out.

### Note

If minimum displacement resistance is required or the environmental conditions are very clean, we recommend lubricating the MG series with oil (see section [8.13.3](#)).

## 8.12 Changing lubricant

Before you change to a different lubricant, the entire block must be thoroughly cleaned. More information on this can be found in section 7.1.

### Note

Lubricants only need to be removed if they cannot be mixed.

## 8.13 Lubricant quantities

### Note

The lubricant quantities given below are guide values which may vary depending on the ambient conditions.

### Note

If the linear guideways are installed vertically, to the side or with the linear guideway upwards, the relubrication quantities must be increased by approx. 50%.

### 8.13.1 Lubricant quantities for grease lubrication

Table 8.11: Lubricant quantity for grease lubrication – series HG, QH, EG, QE, CG, WE, QW, UR, RG, QR

| Size   | Initial lubrication partial quantity [cm <sup>3</sup> ] |                |                      | Relubrication quantity [cm <sup>3</sup> ] |                |                      |
|--------|---------------------------------------------------------|----------------|----------------------|-------------------------------------------|----------------|----------------------|
|        | Medium load (S)                                         | Heavy load (C) | Super heavy load (H) | Medium load (S)                           | Heavy load (C) | Super heavy load (H) |
| 15, 17 | 0.2 (3 ×)                                               | 0.3 (3 ×)      | –                    | 0.2                                       | 0.3            | –                    |
| 20, 21 | 0.3 (3 ×)                                               | 0.5 (3 ×)      | 0.7 (3 ×)            | 0.3                                       | 0.5            | 0.7                  |
| 25, 27 | 0.4 (3 ×)                                               | 0.8 (3 ×)      | 1.0 (3 ×)            | 0.4                                       | 0.8            | 1.0                  |
| 30     | 0.6 (3 ×)                                               | 1.3 (3 ×)      | 1.7 (3 ×)            | 0.6                                       | 1.3            | 1.7                  |
| 35     | 0.8 (3 ×)                                               | 1.9 (3 ×)      | 2.4 (3 ×)            | 0.8                                       | 1.9            | 2.4                  |
| 45     | –                                                       | 3.8 (3 ×)      | 4.6 (3 ×)            | –                                         | 3.8            | 4.6                  |
| 50, 55 | –                                                       | 6.3 (3 ×)      | 7.7 (3 ×)            | –                                         | 6.3            | 7.7                  |
| 65     | –                                                       | 10.0 (3 ×)     | 13.5 (3 ×)           | –                                         | 10.0           | 13.5                 |

Table 8.12: Lubricant quantity for grease lubrication – MG series

| Size  | Initial lubrication partial quantity [cm <sup>3</sup> ] |               | Relubrication Quantity [cm <sup>3</sup> ] |               |
|-------|---------------------------------------------------------|---------------|-------------------------------------------|---------------|
|       | Average load (C)                                        | High load (H) | Average load (C)                          | High load (H) |
| MGN15 | 0,04 (3 ×)                                              | 0,06 (3 ×)    | 0,04                                      | 0,06          |
| MGW15 | 0,07 (3 ×)                                              | 0,09 (3 ×)    | 0,07                                      | 0,09          |

### 8.13.2 Lubricant quantities for fluid grease lubrication

### Note

The quantities for lubrication with fluid grease are identical to the lubricant quantities for grease lubrication.

### 8.13.2.1 Piston distributor size for metering units (single-line systems) for fluid grease lubrication

To ensure sufficient lubrication, the following minimum sizes for piston distributors to be used must be observed. The time interval between the individual lubrication pulses results from the relubrication quantity, the relubrication interval and the piston distributor size:

$$\text{Spacing of the lubrication pulses (km)} = \frac{\text{Piston distributor size (cm}^3\text{)}}{\text{Relubrication quantity (cm}^3\text{)}} \times \text{relubrication interval (km)}$$

### 8.13.3 Lubricant quantities for oil lubrication

When using a central lubrication system, make sure that all lines and elements up to the consumer are filled with lubricant and do not contain any air pockets. Long cable runs and small cable diameters should be avoided. The cables are to be laid uphill.

The pulse number results from the partial quantities and the piston distributor size. The interval between two pulses is calculated from the quotient of the number of pulses and the relubrication interval.

In addition, the lubrication system manufacturers' instructions must be observed.

8.13: Lubricant quantities for oil lubrication – series HG, QH, EG, QE, CG, WE, QW, UR, RG, QR

| Size   | Initial lubrication partial quantity [cm <sup>3</sup> ] |                |                      | Relubrication quantity [cm <sup>3</sup> ] |                |                      |
|--------|---------------------------------------------------------|----------------|----------------------|-------------------------------------------|----------------|----------------------|
|        | Medium load (S)                                         | Heavy load (C) | Super heavy load (H) | Medium load (S)                           | Heavy load (C) | Super heavy load (H) |
| 15, 17 | 0.3 (3 x)                                               | 0.3 (3 x)      | –                    | 0.3                                       | 0.3            | –                    |
| 20, 21 | 0.5 (3 x)                                               | 0.5 (3 x)      | 0.5 (3 x)            | 0.5                                       | 0.5            | 0.5                  |
| 25, 27 | 0.7 (3 x)                                               | 0.8 (3 x)      | 1.0 (3 x)            | 0.7                                       | 0.8            | 1.0                  |
| 30     | 0.9 (3 x)                                               | 1.0 (3 x)      | 1.2 (3 x)            | 0.9                                       | 1.0            | 1.2                  |
| 35     | 1.2 (3 x)                                               | 1.5 (3 x)      | 1.8 (3 x)            | 1.2                                       | 1.5            | 1.8                  |
| 45     | –                                                       | 1.7 (3 x)      | 2.0 (3 x)            | –                                         | 1.7            | 2.0                  |
| 50, 55 | –                                                       | 2.5 (3 x)      | 2.8 (3 x)            | –                                         | 2.5            | 2.8                  |
| 65     | –                                                       | 4.5 (3 x)      | 4.8 (3 x)            | –                                         | 4.5            | 4.8                  |

#### Note

With miniature guide MG, we recommend oil lubrication via the profile rail. Apply the lubricant evenly, for example with a suitable brush, over the entire length of the profile rail on the ball tracks. Move the block along the entire stroke and remove excess oil.

### 8.13.3.1 Piston distributor size for metering units (single-line systems) for fluid oil lubrication

To ensure sufficient lubrication, the following minimum sizes for piston distributors to be used must be observed. The time interval between the individual lubrication pulses results from the relubrication quantity, the relubrication interval and the piston distributor size:

$$\text{Spacing of the lubrication pulses (km)} = \frac{\text{Piston distributor size (cm}^3\text{)}}{\text{Relubrication quantity (cm}^3\text{)}} \times \text{relubrication interval (km)}$$

## 8.14 Relubrication

**! Caution!** Risk of damage to the linear guideways due to incorrect lubrication quantities.

Too little or excessive lubricant quantities/pressure can damage or destroy the product.

- Make sure relubrication is done regularly and in sufficient quantity!
- The specified work steps must be followed without fail in order to avoid damage to the product!

The lubrication intervals are very much dependent on the operating conditions (loads, speeds, acceleration) and the ambient conditions (temperature, fluids, contamination, etc.). Ambient influences such as high loads, vibrations, long travel distances and dirt can shorten the lubrication intervals. After the lubrication period has expired, add the lubricant quantities according to the information in section 8.13 by operating the grease gun once or by setting the central lubrication system accordingly.

**Note**

Check whether a film of lubricant is visible on the entire profile rail. If this is not the case, increase the amount of lubricant.

**Note**

If the long-term lubrication unit is empty and will not be refilled or replaced, the "grease lubrication" relubrication interval applies.

### 8.14.1 Relubrication intervals for grease lubrication

The relubrication intervals depend, among other things, on the  $P_{eff}/C$  load ratio. Here  $P_{eff}$  stands for the equivalent effective dynamic load and  $C$  for the dynamic load rating.

Fig. 8.21: Relubrication intervals with grease lubrication, one-sided and two-sided long-term lubrication unit (E2/EC) for HG, EG, CG, WE. The long-term lubrication unit (E2/EC) is not available for the WE series.

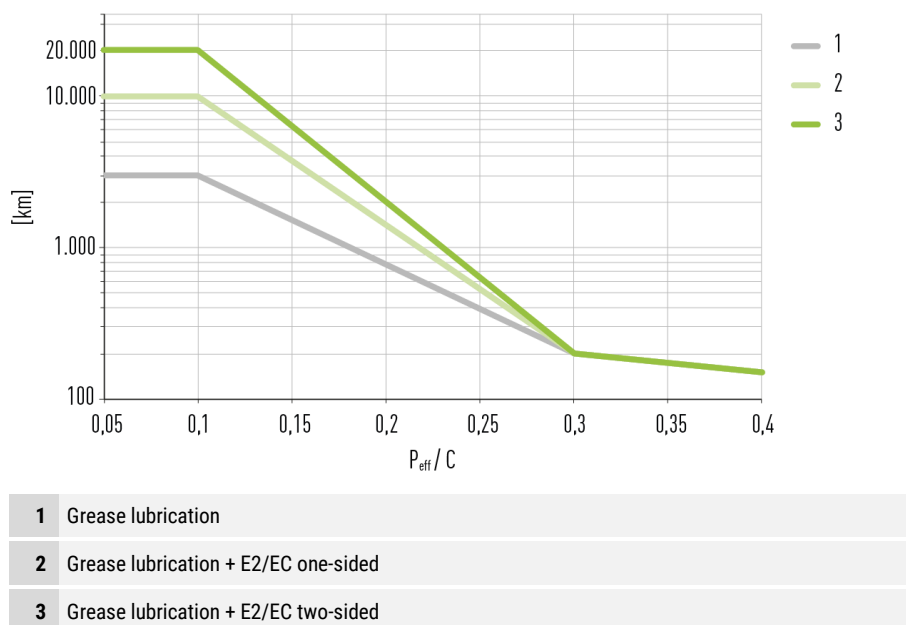
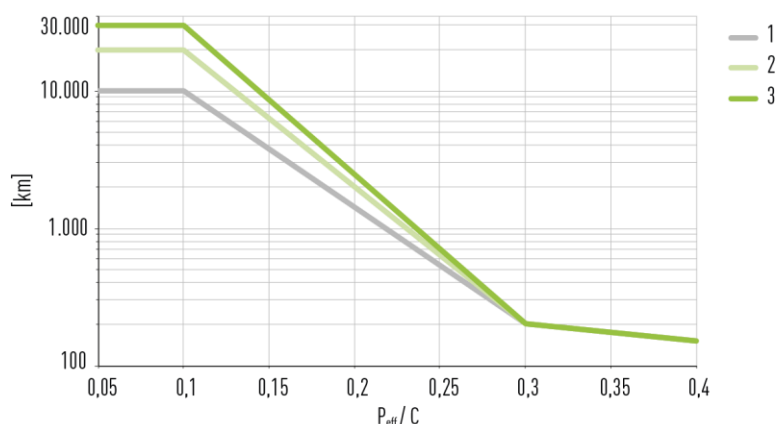
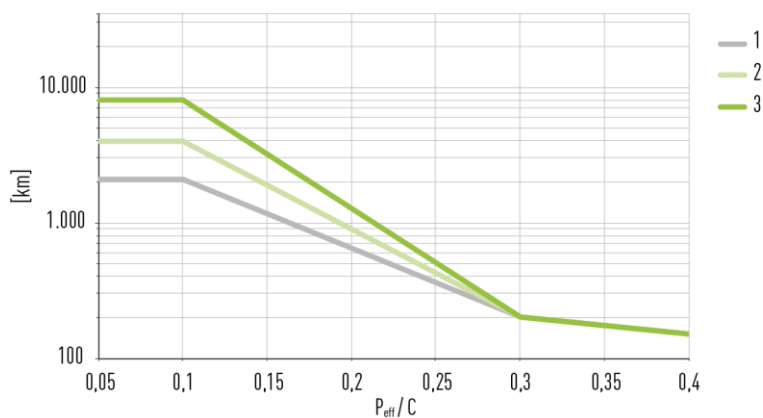


Fig. 8.22: Relubrication intervals with grease lubrication, one-sided and two-sided long-term lubrication unit (E2/EC) for QH, QE and QW. The long-term lubrication unit (E2/EC) is not available for the QW series.



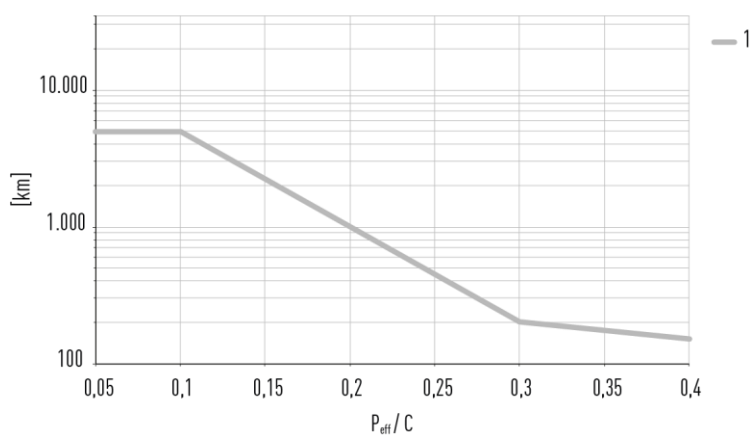
|   |                                   |
|---|-----------------------------------|
| 1 | Grease lubrication                |
| 2 | Grease lubrication + E2 one-sided |
| 3 | Grease lubrication + E2 two-sided |

Fig. 8.23: Relubrication intervals with grease lubrication, one-sided and two-sided long-term lubrication unit (E2/EC) for UR and RG.



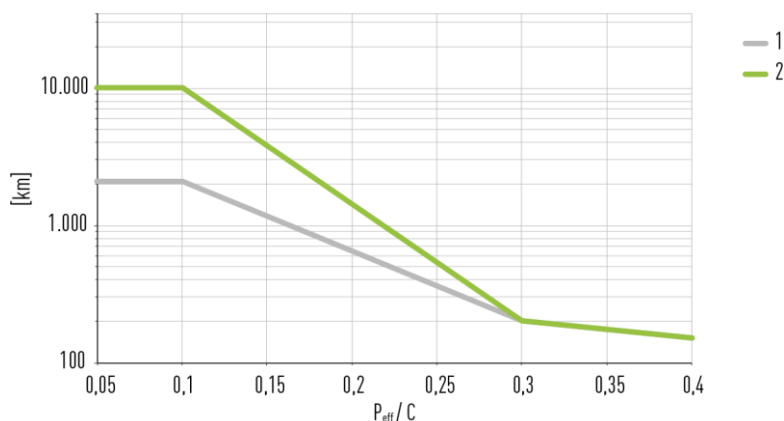
|   |                                   |
|---|-----------------------------------|
| 1 | Grease lubrication                |
| 2 | Grease lubrication + E2 one-sided |
| 3 | Grease lubrication + E2 two-sided |

Fig. 8.24: Relubrication intervals with grease lubrication, one-sided and two-sided long-term lubrication unit (E2/EC) for QR. The long-term lubrication unit (E2/EC) is not available for the QR series.



|   |                    |
|---|--------------------|
| 1 | Grease lubrication |
|---|--------------------|

Fig. 8.25: Relubrication intervals with grease lubrication, one-sided and two-sided long-term lubrication unit (E2/EC/EL) for MG. The long-term lubrication unit (EL) for MG cannot be refilled. ISO FLEX TOPAS AK 50 is recommended for lubrication.



- |   |                                   |
|---|-----------------------------------|
| 1 | Grease lubrication                |
| 2 | Grease lubrication + EL two-sided |

#### Note

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

$v > 3 \text{ m/s}$ ,  $a > 30 \text{ m/s}^2$ , media impact, temperatures  $< 20 \text{ }^\circ\text{C}$  or  $> 30 \text{ }^\circ\text{C}$ , dirty environment, excess soil.

#### 8.14.2 Relubrication intervals for fluid grease lubrication

The relubrication intervals with fluid grease lubrication are shortened by 25% compared the relubrication intervals with grease lubrication (see section [8.14.1](#)).

#### 8.14.3 Relubrication intervals with oil lubrication

The relubrication intervals with oil lubrication are reduced to 50% of the relubrication intervals with grease lubrication (see section [8.14.1](#)).

## 9 Disposal

### ! Caution! Environmentally hazardous substances!

Environmentally hazardous substances, such as oils, can cause serious damage to the environment.

- ▶ Always clean contaminated components before disposal!
- ▶ Clarify proper disposal with disposal companies and, if necessary, with the responsible authorities!

| Liquids                |                                                                 |
|------------------------|-----------------------------------------------------------------|
| Lubricants             | Dispose of as hazardous waste in an environmentally-safe manner |
| Soiled cleaning cloths | Dispose of as hazardous waste in an environmentally-safe manner |
| Block                  |                                                                 |
| Steel components       | Sort by type before disposal                                    |
| Plastic components     | Dispose of as residual waste                                    |
| Profile rails          |                                                                 |
| Steel components       | Sort by type before disposal                                    |
| Plastic cover caps     | Dispose of as residual waste                                    |

## 10 Troubleshooting measures

| Fault                                                             | Possible cause                                              | Remedy                                                                     |
|-------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>High running noise of the linear guideway during operation</b> | Travel speed of the linear guideway too high                | Checking the permissible travel speed (see section 12.1)                   |
|                                                                   | Insufficient lubrication                                    | Lubricate the linear guideway as specified by the lubrication instructions |
| <b>Blocks require high displacement forces</b>                    | Preload of the block on the profile rail too high           | Inspection of the required preload of the block                            |
|                                                                   | Insufficient lubrication                                    | Lubricate the linear guideway as specified by the lubrication instructions |
| <b>Block loses balls</b>                                          | The block is damaged or the seals on the block are damaged. | Contact HIWIN support.                                                     |

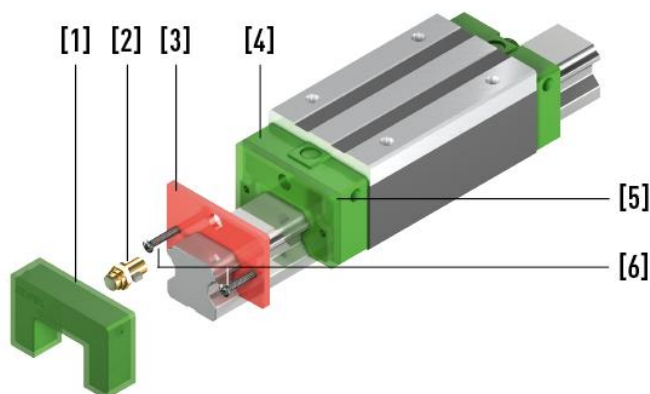
## 11 Accessories

### 11.1 Long-term lubrication unit

#### 11.1.1 Long-term lubrication unit E2 for HG/QH, EG/QE, RG series

The long-term lubrication unit can be mounted on one or both sides of the block. Long-term lubrication unit E2 consists of a lubrication unit [5] between the recirculation system [4] and the end seal [3], a connecting piece [2] and the replaceable oil cartridge [1]. Lubricant from the oil cartridge passes via the connecting piece to the lubrication unit, which then transfers the lubricant to the track of the profile rail.

Fig. 11.1: Exploded view of long-term lubrication unit E2 for HG, EG, RG series



|   |                            |
|---|----------------------------|
| 1 | Oil tank                   |
| 2 | Connecting piece           |
| 3 | End seal                   |
| 4 | Deflector                  |
| 5 | Long-term lubrication unit |
| 6 | Mounting bolts             |

##### 11.1.1.1 Assembly

- If necessary, disassemble the existing grease nipple and the end seal.
- Place the long-term lubricating unit [5] on the block.
- Place the end seals(s) [3] before the long-term lubrication unit [5].
- Tighten the fastening screws [6].
- Mount the connecting piece [2].

##### Note

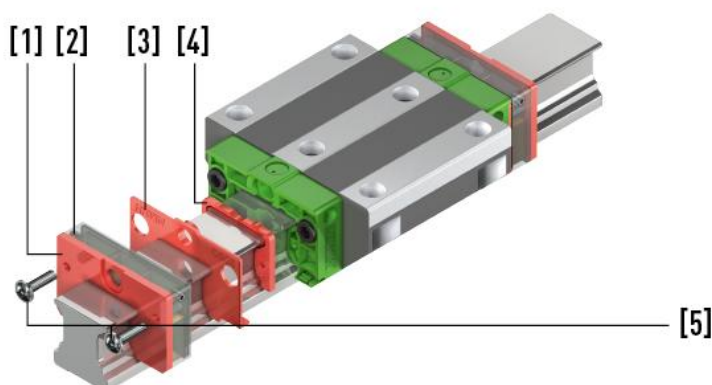
The screw size and the size of the connecting piece can vary depending on which type of dust protection is used.

- Push the oil cartridge [1] onto the long-term lubrication unit until it engages with an audible click.
- ✓ Long-term lubrication unit E2 is mounted.

### 11.1.2 Long-term lubrication unit EC for CG series

The long-term lubrication unit can be mounted on one or both sides of the block. Long-term lubrication unit EC for the CG series consists of a lubrication unit including oil cartridge [2] and an additional end seal [1]. The ball track is lubricated via the long-term lubrication unit.

Fig. 11.2: Exploded view of long-term lubrication unit EC for CG series



|   |                            |
|---|----------------------------|
| 1 | End seal                   |
| 2 | Long-term lubrication unit |
| 3 | Standard scraper           |
| 4 | Standard end seal          |
| 5 | Mounting bolts             |

#### 11.1.2.1 Assembly

- Remove the standard end seal [4]. To do so, dismantle the existing grease nipple/lubrication plug screw and the standard scraper [3] if necessary.
- Place the standard scraper [3] on the block.
- Place the long-term lubricating unit [2] on the block.
- Place the end seal(s) [1] in front of the long-term lubrication unit [2].
- Tighten the fastening screws [5].

#### Note

The screw size and the size of the connecting piece can vary depending on which type of dust protection is used.

- ✓ Long-term lubrication unit EC is mounted.

### 11.1.3 Relubrication intervals

#### Note

The relubrication intervals or running performances can be found in chapter [8.14.1](#).

#### Note

You can either fill the long-term lubrication unit using an injector via the fill holes on the side or you can replace the whole component.

#### Note

The long-term lubrication unit (EL) for MG cannot be refilled.

Table 11.1: Oil quantity of the long-term lubrication unit

| Model         | Oil quantity [cm <sup>3</sup> ] |
|---------------|---------------------------------|
| HG15E2/QH15E2 | 1.6                             |
| HG20E2/QH20E2 | 3.9                             |
| HG25E2/QH25E2 | 5.1                             |
| HG30E2/QH30E2 | 7.8                             |
| HG35E2/QH35E2 | 9.8                             |
| HG45E2/QH45E2 | 18.5                            |
| HG55E2        | 25.9                            |
| HG65E2        | 50.8                            |
| EG15E2/QE15E2 | 1.7                             |
| EG20E2/QE20E2 | 2.9                             |
| EG25E2/QE25E2 | 4.8                             |
| EG30E2/QE30E2 | 8.9                             |
| EG35E2/QE35E2 | 10.3                            |
| CG15EC        | 1.2                             |
| CG20EC        | 1.8                             |
| CG25EC        | 1.8                             |
| RG25E2        | 5.0                             |
| RG30E2        | 7.5                             |
| RG35E2        | 10.7                            |
| RG45E2        | 18.5                            |
| RG55E2        | 26.5                            |
| RG65E2        | 50.5                            |
| MGN07EL       | 0.05                            |
| MGN09EL       | 0.10                            |
| MGN12EL       | 0.19                            |
| MGW09EL       | 0.29                            |
| MGW12EL       | 0.33                            |

E2/EL:

Standard oil:

Mobil SHC 636

Fully synthetic on hydrocarbon basis (PAO)

Viscosity class: ISO VG 680

Oils of the same classification and viscosity can be used as a substitute.

EC:

Standard oil:

Total Carter SH 680

Synthetic oil (PAO)

Viscosity class: ISO VG 680

## 11.2 Additional assembly and disassembly tool

Table 11.2: Assembly tool for pressing in steel or brass cover caps

| Series/size  | Article number |
|--------------|----------------|
| HG_15        | 5-002519       |
| HG_20        | 5-000915       |
| HG_25        | 5-000916       |
| HG_30        | 5-000917       |
| HG_35        | 5-000918       |
| HG_45        | 5-000919       |
| HG_55        | 5-000920       |
| HG_65        | 5-000921       |
| RG_20        | 12-000542      |
| RG_25        | 12-000309      |
| RG_30        | 12-000310      |
| UR_35, RG_35 | 12-000311      |
| UR_45, RG_45 | 12-000312      |
| UR_55, RG_55 | 12-000313      |
| RG_65        | 12-000314      |

Table 11.3: Assembly/disassembly tool for cover strip

| Size (all series) | Article number |
|-------------------|----------------|
| 15                | 5-002557       |
| 20                | 5-002417       |
| 25                | 5-002416       |
| 30                | 5-002554       |
| 35                | 5-002555       |
| 45                | 5-002556       |

Table 11.4: Expanding mandrel

| Size (all series) | Article number |
|-------------------|----------------|
| 15                | 5-002725       |
| 20                | 5-002726       |
| 25                | 5-002727       |
| 30                | 5-002728       |
| 35                | 5-002729       |
| 45                | 5-002730       |
| 55                | 5-002731       |
| 65                | 5-002732       |

## 12 Appendix

### 12.1 Maximum speeds and accelerations for HIWIN linear guideways

The following maximum speeds and accelerations are permissible for HIWIN linear guideways <sup>1)</sup>:

Table 12.1: Permissible maximum speeds and accelerations for HIWIN linear guideways

| Model              | Max. speed $v_{\max}$ [m/s] | Max. acceleration $a_{\max}$ [m/s <sup>2</sup> ] |
|--------------------|-----------------------------|--------------------------------------------------|
| QH, QE, QW         | 5                           | 100                                              |
| HG, EG, CG, WE, QR | 5                           | 80                                               |
| MG                 | 5                           | 50                                               |
| UR, RG, CRG        | 3                           | 30                                               |

<sup>1)</sup> Depending on the respective application, higher values are possible, please consult HIWIN.

### 12.2 Assembly tolerances

Provided that the requirements for the accuracy of the mounting surface are met, the precision and rigidity of the linear guideways can also be achieved without any problems. To ensure fast assembly and smooth movement, HIWIN offers linear guideways with light preload (Z0) that compensate for deviations on the mounting surface over a wide range.

#### Note

If the displacement forces of the blocks increase sharply after assembly, there is most likely a distortion. In this case, be sure to check the mounting surfaces for contamination and burrs, as well as the permissible mounting tolerances.

#### 12.2.1 Tolerance of parallelism of reference surface (P)

Fig. 12.1: Tolerance of parallelism of reference surface (P)

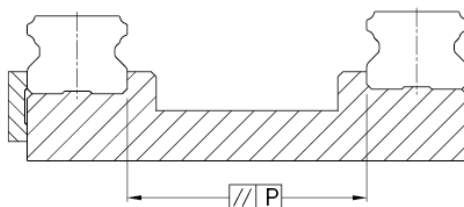


Table 12.2: Maximum tolerance for parallelism (P)

| Series         | Size | Preload class |    |    |
|----------------|------|---------------|----|----|
|                |      | Z0            | ZA | ZB |
| HG/QH          | 15   | 25            | 18 | –  |
|                | 20   | 25            | 20 | 18 |
|                | 25   | 30            | 22 | 20 |
|                | 30   | 40            | 30 | 27 |
|                | 35   | 50            | 35 | 30 |
|                | 45   | 60            | 40 | 35 |
| HG             | 55   | 70            | 50 | 45 |
|                | 65   | 80            | 60 | 55 |
| EG/QE<br>EG/QE | 15   | 25            | 18 | –  |
|                | 20   | 25            | 20 | 18 |
|                | 25   | 30            | 22 | 20 |
|                | 30   | 40            | 30 | 27 |
|                | 35   | 50            | 35 | 30 |
|                | 15   | 25            | 18 | –  |
| CG             | 15   | 9             | 5  | 4  |
|                | 20   | 11            | 7  | 5  |
|                | 25   | 12            | 8  | 6  |
|                | 30   | 14            | 9  | 7  |
|                | 35   | 15            | 11 | 8  |
|                | 45   | 19            | 12 | 10 |
| WE             | 15   | 20            | 15 | 9  |
|                | 50   | 40            | 30 | 27 |
| WE/QW          | 21   | 25            | 18 | 9  |
|                | 27   | 25            | 20 | 13 |
|                | 35   | 30            | 22 | 20 |

Unit: µm

| Series          | Size | Preload class |    |    |
|-----------------|------|---------------|----|----|
|                 |      | Z0            | ZA | ZB |
| UR<br>RG<br>CRG | 15   | 5             | 3  | 3  |
|                 | 20   | 8             | 6  | 4  |
|                 | 55   | 21            | 14 | 11 |
|                 | 65   | 27            | 18 | 14 |
| UR<br>RG/QR     | 25   | 9             | 7  | 5  |
|                 | 30   | 11            | 8  | 6  |
|                 | 35   | 14            | 10 | 7  |
|                 | 45   | 17            | 13 | 9  |

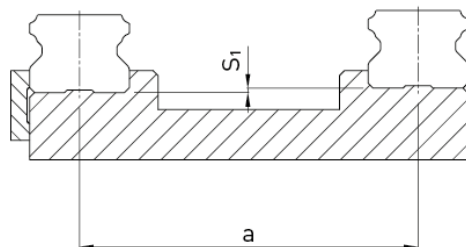
Unit: µm

| Series | Size | Preload class |    |    |
|--------|------|---------------|----|----|
|        |      | ZF            | Z0 | Z1 |
| MG     | 02   | 2             | 2  | 2  |
|        | 03   | 2             | 2  | 2  |
|        | 05   | 2             | 2  | 2  |
|        | 07   | 3             | 3  | 3  |
|        | 09   | 4             | 4  | 3  |
|        | 12   | 9             | 9  | 5  |
|        | 15   | 10            | 10 | 6  |

Unit:  $\mu\text{m}$

### 12.2.2 Tolerance of height of reference surface ( $S_1$ )

Fig. 12.2: Tolerance of height of reference surface ( $S_1$ )



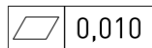
Applies to series HG/QH/EG/QE/WE/QW/MG

$$S_1 = a \times K$$

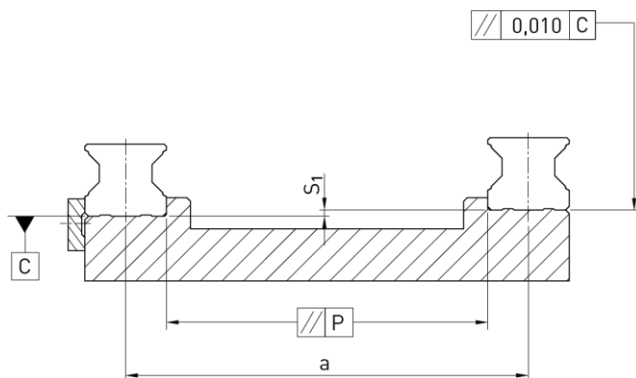
$S_1$  Maximum height tolerance [mm]

$a$  Distance between rails [mm]

$K$  Coefficient of height tolerance



Accuracy requirement for all reference surfaces for rail fastening



Applies to series CG/UR/RG/QR

$$S_1 = a \times K - T_H$$

$S_1$  Maximum height tolerance [mm]

$a$  Distance between rails [mm]

$K$  Coefficient of height tolerance

$T_H$  Tolerance of height according to Table 3.4

Table 12.3: Coefficient of height tolerance (K)

| Series | Size    | Preload class        |                      |                      |
|--------|---------|----------------------|----------------------|----------------------|
|        |         | Z0                   | ZA                   | ZB                   |
| HG     | 55      | $6.0 \times 10^{-4}$ | $4.2 \times 10^{-4}$ | $3.4 \times 10^{-4}$ |
|        | 65      | $7.0 \times 10^{-4}$ | $5.0 \times 10^{-4}$ | $4.0 \times 10^{-4}$ |
| HG/QH  | 15      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | –                    |
|        | 20      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.0 \times 10^{-4}$ |
|        | 25      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.4 \times 10^{-4}$ |
|        | 30      | $3.4 \times 10^{-4}$ | $2.2 \times 10^{-4}$ | $1.8 \times 10^{-4}$ |
|        | 35      | $4.2 \times 10^{-4}$ | $3.0 \times 10^{-4}$ | $2.4 \times 10^{-4}$ |
|        | 45      | $5.0 \times 10^{-4}$ | $3.4 \times 10^{-4}$ | $2.8 \times 10^{-4}$ |
| EG/QE  | 15      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | –                    |
|        | 20      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.0 \times 10^{-4}$ |
|        | 25      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.4 \times 10^{-4}$ |
|        | 30      | $3.4 \times 10^{-4}$ | $2.2 \times 10^{-4}$ | $1.8 \times 10^{-4}$ |
|        | 35      | $4.2 \times 10^{-4}$ | $3.0 \times 10^{-4}$ | $2.4 \times 10^{-4}$ |
| CG     | 15 – 45 | $2.8 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.2 \times 10^{-4}$ |
| WE     | 15      | $1.3 \times 10^{-4}$ | $0.4 \times 10^{-4}$ | –                    |
|        | 50      | $3.4 \times 10^{-4}$ | $2.2 \times 10^{-4}$ | $1.8 \times 10^{-4}$ |
| WE/QW  | 21      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $0.9 \times 10^{-4}$ |
|        | 27      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $0.9 \times 10^{-4}$ |
|        | 35      | $2.6 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.4 \times 10^{-4}$ |
| UR/RG  | 15 – 65 | $2.2 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.2 \times 10^{-4}$ |
| QR     | 25 – 45 | $2.2 \times 10^{-4}$ | $1.7 \times 10^{-4}$ | $1.2 \times 10^{-4}$ |

Table 12.4: Coefficient of height tolerance (K) for MG series

| Series | Size | Preload class        |                      |                       |
|--------|------|----------------------|----------------------|-----------------------|
|        |      | ZF                   | Z0                   | Z1                    |
| MG     | 05   | $0.4 \times 10^{-4}$ | $0.4 \times 10^{-4}$ | $0.04 \times 10^{-4}$ |
|        | 07   | $0.5 \times 10^{-4}$ | $0.5 \times 10^{-4}$ | $0.06 \times 10^{-4}$ |
|        | 09   | $0.7 \times 10^{-4}$ | $0.7 \times 10^{-4}$ | $0.12 \times 10^{-4}$ |
|        | 12   | $1.0 \times 10^{-4}$ | $1.0 \times 10^{-4}$ | $0.24 \times 10^{-4}$ |
|        | 15   | $1.2 \times 10^{-4}$ | $1.2 \times 10^{-4}$ | $0.40 \times 10^{-4}$ |

### 12.2.3 Height tolerance of the mounting surfaces of the blocks ( $S_2/S_3$ )

Fig. 12.3: Maximum height tolerance  $S_2$

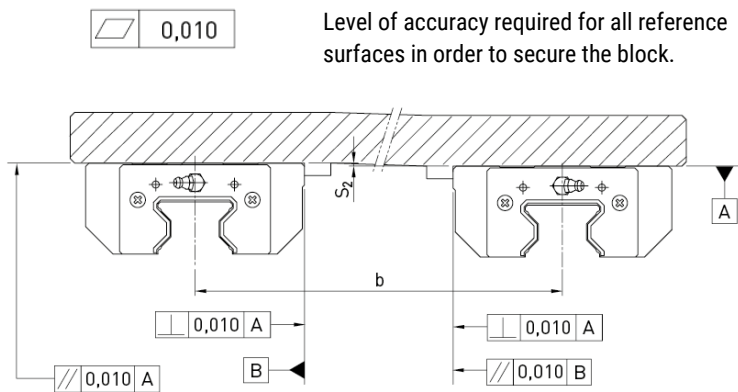
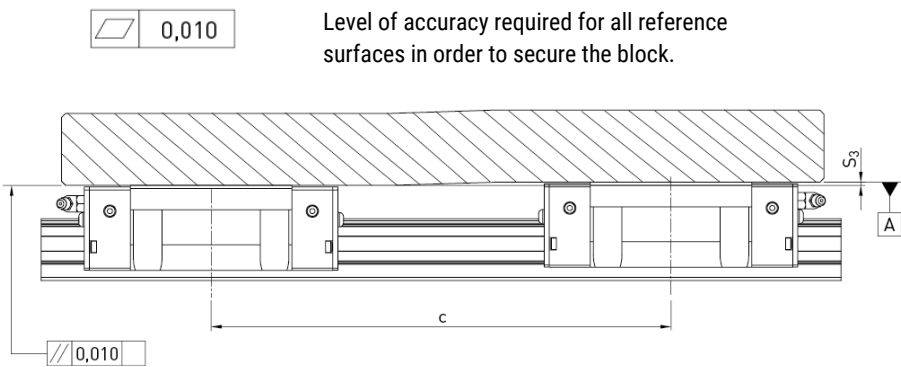


Fig. 12.4: Maximum height tolerance  $S_3$



The height tolerance of the reference surface when two or more block are used in parallel ( $S_2/S_3$ )

$$S_2 = b \times K$$

$S_2$  Maximum height tolerance [mm]  
 $b$  Distance between blocks [mm]  
 $K$  Coefficient of height tolerance

$$S_3 = c \times K$$

$S_3$  Maximum height tolerance [mm]  
 $c$  Distance between blocks [mm]  
 $K$  Coefficient of height tolerance

Table 12.5: Coefficient of height tolerance ( $K$ ) of series CG

| Series | Size    | Load type            |                      |
|--------|---------|----------------------|----------------------|
|        |         | CG_C                 | CG_H                 |
| CG     | 15 – 45 | $4.2 \times 10^{-5}$ | $3.0 \times 10^{-5}$ |

Table 12.6: Coefficient of height tolerance ( $K$ ) of series CG

| Series | Size    | Load type            |                      |
|--------|---------|----------------------|----------------------|
|        |         | UR/RG_C/QR_C         | UR/RG_H/QR_H         |
| UR/RG  | 15 – 65 | $4.2 \times 10^{-5}$ | $3.0 \times 10^{-5}$ |
| QR     | 25 – 45 | $4.2 \times 10^{-5}$ | $3.0 \times 10^{-5}$ |

## 12.2.4 Requirement for the mounting surface – MG series

The following requirements for the mounting surface must also be adhered to in the case of the MG series.

### Note

The values in the table apply to preload classes ZF and Z0. For Z1 or if more than one rail is mounted on the same surface, the table values must be at least halved.

Table 12.7: Requirements for the mounting surface – MG series

| Series/Size | Required flatness of the mounting surface |
|-------------|-------------------------------------------|
| MG_05       | 0.015/200                                 |
| MG_07       | 0.025/200                                 |
| MG_09       | 0.035/200                                 |
| MG_12       | 0.050/200                                 |
| MG_15       | 0.060/200                                 |

Unit: mm

## 12.2.5 Shoulder heights and edge roundings

Inaccurate shoulder heights and edge roundings of mounting surfaces impair accuracy and may conflict with the block or rail profile. The following shoulder heights and edge profiles must be observed to avoid assembly problems.

### 12.2.5.1 HG and QH series

Fig. 12.5: Shoulder height and fillets – HG/QH series

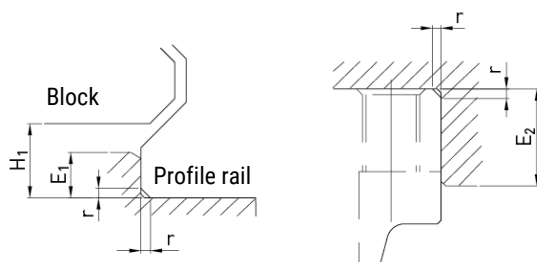


Table 12.8: Shoulder heights and edge roundings

| Series/Size | Max. radius of edges $r$ | Shoulder height of the reference side of rail $E_1$ | Shoulder height of the reference side of block $E_2$ | Clearance height under block $H_1$ |
|-------------|--------------------------|-----------------------------------------------------|------------------------------------------------------|------------------------------------|
| HG_15       | 0.5                      | 3.0                                                 | 4.0                                                  | 4.3                                |
| QH_15       | 0.5                      | 3.0                                                 | 4.0                                                  | 4.0                                |
| HG/QH_20    | 0.5                      | 3.5                                                 | 5.0                                                  | 4.6                                |
| HG/QH_25    | 1.0                      | 5.0                                                 | 5.0                                                  | 5.5                                |
| HG/QH_30    | 1.0                      | 5.0                                                 | 5.0                                                  | 6.0                                |
| HG/QH_35    | 1.0                      | 6.0                                                 | 6.0                                                  | 7.5                                |
| HG/QH_45    | 1.0                      | 8.0                                                 | 8.0                                                  | 9.5                                |
| HG_55       | 1.5                      | 10.0                                                | 10.0                                                 | 13.0                               |
| HG_65       | 1.5                      | 10.0                                                | 10.0                                                 | 15.0                               |

Unit: mm

### 12.2.5.2 EG and QE series

Fig. 12.6: Shoulder height and fillets – EG/QE series

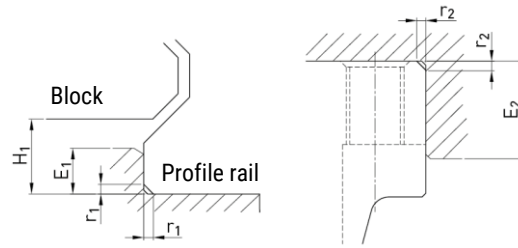


Table 12.9: Shoulder heights and fillets – EG/QE series

| Series/<br>Size | Max. radius of<br>edges $r_1$ | Max. radius of<br>edges $r_2$ | Shoulder height<br>of the reference<br>side of rail $E_1$ | Shoulder height<br>of the reference<br>side of block $E_2$ | Clearance height<br>under block $H_1$ |
|-----------------|-------------------------------|-------------------------------|-----------------------------------------------------------|------------------------------------------------------------|---------------------------------------|
| EG/QE_15        | 0.5                           | 0.5                           | 2.7                                                       | 5.0                                                        | 4.5                                   |
| EG/QE_20        | 0.5                           | 0.5                           | 5.0                                                       | 7.0                                                        | 6.0                                   |
| EG/QE_25        | 1.0                           | 1.0                           | 5.0                                                       | 7.5                                                        | 7.0                                   |
| EG/QE_30        | 1.0                           | 1.0                           | 7.0                                                       | 7.0                                                        | 10.0                                  |
| EG_35           | 1.0                           | 1.0                           | 7.5                                                       | 9.5                                                        | 11.0                                  |
| QE_35           | 1.0                           | 1.5                           | 7.5                                                       | 9.5                                                        | 11.0                                  |

Unit: mm

### 12.2.5.3 CG series

Fig. 12.7: Shoulder height and fillets – CG series

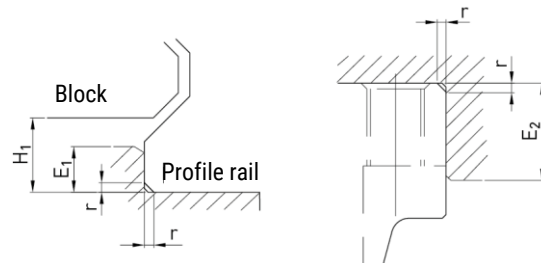


Table 12.10: Shoulder heights and fillets – CG series

| Series/<br>Size | Max. radius of<br>edges $r$ | Shoulder height of<br>the reference side of<br>rail $E_1$ | Shoulder height of<br>the reference side of<br>block $E_2$ | Clearance height<br>under block $H_1$ |
|-----------------|-----------------------------|-----------------------------------------------------------|------------------------------------------------------------|---------------------------------------|
| CG_15           | 0.5                         | 3.0                                                       | 4.0                                                        | 4.3                                   |
| CG_20           | 0.5                         | 3.5                                                       | 5.0                                                        | 4.6                                   |
| CG_25           | 1.0                         | 5.0                                                       | 5.0                                                        | 6.1                                   |
| CG_30           | 1.0                         | 5.0                                                       | 5.0                                                        | 7.0                                   |
| CG_35           | 1.0                         | 6.0                                                       | 6.0                                                        | 7.6                                   |
| CG_45           | 1.0                         | 8.0                                                       | 8.0                                                        | 9.5                                   |

Unit: mm

#### 12.2.5.4 WE and QW series

Fig. 12.8: Shoulder height and fillets – WE/QW series

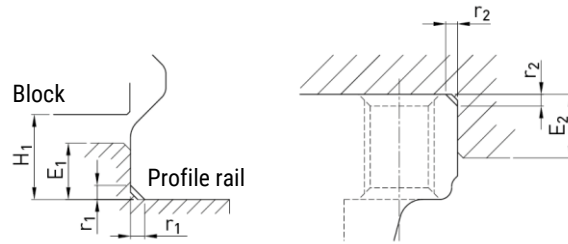


Table 12.11: Shoulder heights and fillets – WE/QW series

| Series/<br>Size | Max. radius of<br>edges $r_1$ | Max. radius of<br>edges $r_2$ | Shoulder height<br>of the reference<br>side of rail $E_1$ | Shoulder height<br>of the reference<br>side of block $E_2$ | Clearance height<br>under block $H_1$ |
|-----------------|-------------------------------|-------------------------------|-----------------------------------------------------------|------------------------------------------------------------|---------------------------------------|
| WE_17           | 0.4                           | 0.4                           | 2.0                                                       | 4.0                                                        | 2.5                                   |
| WE/QW_21        | 0.4                           | 0.4                           | 2.5                                                       | 5.0                                                        | 3.0                                   |
| WE/QW_27        | 0.5                           | 0.5                           | 3.0                                                       | 7.0                                                        | 4.0                                   |
| WE/QW_35        | 0.5                           | 0.5                           | 3.5                                                       | 10.0                                                       | 4.0                                   |
| WE_50           | 0.8                           | 0.8                           | 6.0                                                       | 10.0                                                       | 7.5                                   |

Unit: mm

#### 12.2.5.5 MG series

Fig. 12.9: Shoulder height and fillets – MG series

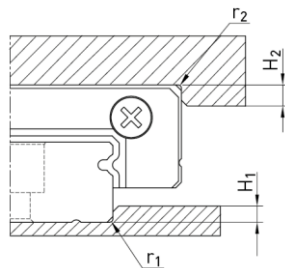


Table 12.12: Shoulder heights and fillets – MG series

| Series/<br>Size | Max. radius of<br>edges $r_1$ | Max. radius of<br>edges $r_2$ | Shoulder height of $H_1$ | Shoulder height of $H_2$ |
|-----------------|-------------------------------|-------------------------------|--------------------------|--------------------------|
| MGN02           | 0.1                           | 0.2                           | 0.5                      | 1.5                      |
| MGN03           | 0.1                           | 0.2                           | 0.6                      | 1.5                      |
| MGN05           | 0.1                           | 0.2                           | 1.2                      | 2.0                      |
| MGN07           | 0.2                           | 0.2                           | 1.2                      | 3.0                      |
| MGN09           | 0.2                           | 0.3                           | 1.7                      | 3.0                      |
| MGN12           | 0.3                           | 0.4                           | 1.7                      | 4.0                      |
| MGN15           | 0.5                           | 0.5                           | 2.5                      | 5.0                      |
| MGW05           | 0.1                           | 0.2                           | 1.2                      | 2.0                      |
| MGW07           | 0.2                           | 0.2                           | 1.7                      | 3.0                      |
| MGW09           | 0.3                           | 0.3                           | 2.5                      | 3.0                      |
| MGW12           | 0.4                           | 0.4                           | 3.0                      | 4.0                      |
| MGW15           | 0.4                           | 0.8                           | 3.0                      | 5.0                      |

Unit: mm

### 12.2.5.6 UR, RG and QR series

Fig. 12.10: Shoulder height and fillets – UR/RG/QR series

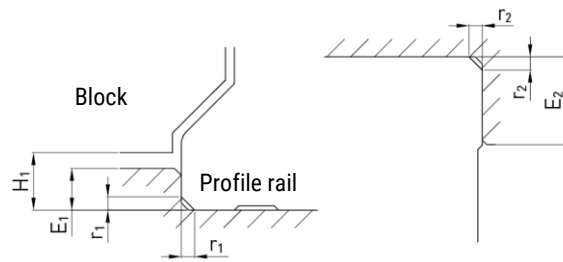


Table 12.13: Shoulder heights and fillets – UR/RG/QR series

| Series/<br>Size | Max. radius of<br>edges $r_1$ | Max. radius of<br>edges $r_2$ | Shoulder height<br>of the reference<br>side of rail $E_1$ | Shoulder height<br>of the reference<br>side of block $E_2$ | Clearance height<br>under block $H_1$ |
|-----------------|-------------------------------|-------------------------------|-----------------------------------------------------------|------------------------------------------------------------|---------------------------------------|
| UR_35           | 1,0                           | 1,0                           | 6,0                                                       | 6,0                                                        | 7,0                                   |
| UR_45           | 1,0                           | 1,0                           | 7,0                                                       | 8,0                                                        | 8,0                                   |
| UR_55           | 1,5                           | 1,5                           | 9,0                                                       | 10,0                                                       | 10,0                                  |
| RG_15           | 0.5                           | 0.5                           | 3.0                                                       | 4.0                                                        | 4.0                                   |
| RG_20           | 0.5                           | 0.5                           | 3.5                                                       | 5.0                                                        | 5.0                                   |
| RG/QR_25        | 1.0                           | 1.0                           | 5.0                                                       | 5.0                                                        | 5.5                                   |
| RG/QR_30        | 1.0                           | 1.0                           | 5.0                                                       | 5.0                                                        | 6.0                                   |
| RG/QR_35        | 1.0                           | 1.0                           | 6.0                                                       | 6.0                                                        | 6.5                                   |
| RG/QR_45        | 1.0                           | 1.0                           | 7.0                                                       | 8.0                                                        | 8.0                                   |
| RG_55           | 1.5                           | 1.5                           | 9.0                                                       | 10.0                                                       | 10.0                                  |
| RG_65           | 1.5                           | 1.5                           | 10.0                                                      | 10.0                                                       | 12.0                                  |

Unit: mm

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