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1 Profile rail guide system – introduction

**IMPORTANT:** The following instructions describe the mounting procedures for an SKF rail guide system. Read these instructions completely before starting the installation process. Failure to follow these instructions could reduce system service life or create a safety risk.

Additional product information can be found in the SKF catalogue Profile rail guides LLT.

**LLT components and material specifications**

**Material specifications**
1. Steel, inductive hardened
2. Steel, case hardened
3. Bearing steel
4. Steel, zinc coated
5. POM, reinforced
6. EPU foam
7. PA 6.6 and Elastomer; alternative low friction S0 shield made from PA 6.6
8. Steel
9. Steel, zinc coated
2 General instructions

The following mounting instructions are applicable to all carriage types.

To maintain the high precision of SKF LLT profile rail guides, the carriages must be handled carefully during transport and mounting.

To provide protection during transport, storage and assembly, LLT rails and carriages are coated with a corrosion inhibiting compound. This compound does not need to be removed if the recommended lubricants are used.

2.1 Typical mounting examples

2.1.1 Rails

Each rail has ground reference edges on both sides.

Options for securing the rails laterally (→ fig. 1)
   1 Stop edges
   2 Retaining strips

Rails that are not laterally fixed must be installed straight and parallel. SKF recommends using a support strip to maintain the rail’s position during installation.

NOTE: Rail ends must be chamfered to prevent seal damage during installation. If two rails are to be joined, do not chamfer either of the mating ends.

Guideline values for the permissible lateral loads for unsupported rails are listed on page 5, table 3.

2.1.2 Carriage

Each carriage has one ground reference side (please refer to dimension $H_2$ in the drawings of the carriages) (→ publication 12942, pages 32 ff).

Options for securing the carriages laterally (→ fig. 1)
   3 Stop edges
   4 Retaining strips

NOTE: If mounted correctly, the carriage should move easily on the rail when pushed.

During assembly, secure the carriage to prevent it from falling.

Guideline values for the permissible lateral loads for unsupported carriages are shown in table 3 on page 5.
2.2 Interface design, screw sizes and tightening torques

- Flange-type carriages can be fastened from above (→ fig. 3) or below (→ fig. 4)
- Slim-type carriages can be fastened from above (→ fig. 5)
- Rails can be fastened from above (→ fig. 4 and 5) or below (→ fig. 3, rail type LLTHR ... D4).

### Table 1

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Dimensions</th>
<th>Screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H_1)</td>
<td>(H_2)</td>
<td>(R_1)</td>
</tr>
<tr>
<td>(H_1)</td>
<td>(H_2)</td>
<td>(R_1)</td>
</tr>
<tr>
<td>15</td>
<td>2.5</td>
<td>3.5</td>
</tr>
<tr>
<td>20</td>
<td>2.5</td>
<td>4.0</td>
</tr>
<tr>
<td>25</td>
<td>3.0</td>
<td>5.0</td>
</tr>
<tr>
<td>30</td>
<td>3.0</td>
<td>5.0</td>
</tr>
<tr>
<td>35</td>
<td>3.5</td>
<td>6.0</td>
</tr>
<tr>
<td>45</td>
<td>4.5</td>
<td>8.0</td>
</tr>
</tbody>
</table>

1) The stated values are only recommendations
2) For SU and SA type carriages, two screws are sufficient to withstand the maximum load.

### Table 2

Tightening torques for mounting screws

<table>
<thead>
<tr>
<th>Screw strength class</th>
<th>Screw</th>
<th>–</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
<th>M10</th>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>for counterparts made out of steel or cast iron</td>
<td>8.8</td>
<td>2.9</td>
<td>5.75</td>
<td>9.9</td>
<td>24</td>
<td>48</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>12.9</td>
<td>4.95</td>
<td>9.7</td>
<td>16.5</td>
<td>40</td>
<td>81</td>
<td>140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for counterparts made out of aluminium</td>
<td>8.8</td>
<td>1.93</td>
<td>3.83</td>
<td>6.6</td>
<td>16</td>
<td>32</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>12.9</td>
<td>3.3</td>
<td>6.47</td>
<td>11</td>
<td>27</td>
<td>54</td>
<td>93</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3

Dimensions and guide values for permissible lateral forces without additional lateral support (→ fig. 2)

<table>
<thead>
<tr>
<th>Carriages</th>
<th>Screw strength class</th>
<th>Carriages</th>
<th>Rails</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, U, R</td>
<td>8.8</td>
<td>12.9</td>
<td>23% C</td>
</tr>
<tr>
<td>LA, LU, LR</td>
<td>8.8</td>
<td>12.9</td>
<td>18% C</td>
</tr>
<tr>
<td>SA, SU</td>
<td>8.8</td>
<td>12.9</td>
<td>12% C</td>
</tr>
</tbody>
</table>
2.3 Position tolerances for attachment holes

The attachment holes of all surrounding parts have to match the tolerances shown in figure 6 and 7.
2.4 Permissible height deviation

The values for height deviation are applicable for all carriage types.

If the values for height deviation $S_1$ (→ table 4) and $S_2$ (→ table 5) are within the specified range, the service life of the rail guide system will not be influenced.

For permissible height deviation in the lateral direction (→ table 4)

$S_1 = a \cdot Y$

where

$S_1 = \text{Permissible height deviation [mm]}$

$a = \text{Distance between the rails [mm]}$

$Y = \text{Calculation factor lateral direction}$

**NOTE:** The height tolerance of $H$ for the carriages has to be taken into account. For additional information on height tolerance, see publication 12942, page 26, table 1. If the difference $S_1 - H < 0$, a new product selection is necessary (other preload, precision).

For permissible height deviation in the longitudinal direction (→ table 5)

$S_2 = b \cdot X$

where

$S_2 = \text{Permissible height deviation [mm]}$

$b = \text{Distance between the carriages [mm]}$

$X = \text{Calculation factor longitudinal direction}$

**NOTE:** The maximum difference $\Delta H$ for the carriages has to be taken into account. For additional information, see publication 12942, page 26, table 1. If the difference $S_2 - \Delta H < 0$, a new product selection is necessary (other preload, precision).
2.5 Parallelism

The parallelism of mounted rails is measured on the rails and the carriages. The values for the deviation in parallelism $P_a$ are applicable to all carriage types.

Deviation in parallelism $P_a$ increases the internal load. If the values are within the specified range in table 6, the service life of the profile rail guide system will not be influenced.

For typical applications, the mounting surface can be slightly resilient.

However, for high-precision applications, the mounting surface must be rigid and the values in the table have to be cut in half.

<table>
<thead>
<tr>
<th>Size</th>
<th>Tolerance class</th>
<th>T1 (2% C)</th>
<th>T2 (8% C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>0.030</td>
<td>0.018</td>
<td>0.010</td>
</tr>
<tr>
<td>20</td>
<td>0.036</td>
<td>0.022</td>
<td>0.012</td>
</tr>
<tr>
<td>25</td>
<td>0.038</td>
<td>0.024</td>
<td>0.014</td>
</tr>
<tr>
<td>30</td>
<td>0.042</td>
<td>0.028</td>
<td>0.018</td>
</tr>
<tr>
<td>35</td>
<td>0.046</td>
<td>0.030</td>
<td>0.020</td>
</tr>
<tr>
<td>45</td>
<td>0.056</td>
<td>0.038</td>
<td>0.024</td>
</tr>
</tbody>
</table>

Carriage type SA + SU

<table>
<thead>
<tr>
<th>Size</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.036</td>
<td>0.044</td>
<td>0.046</td>
<td>0.050</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>0.022</td>
<td>0.026</td>
<td>0.028</td>
<td>0.034</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
3 Mounting profile rail guides

3.1 Shipment

Profile rails and carriages are delivered in their own packaging. Unwrap these components carefully and remove the foam from the carriage. Do not recycle the packaging until the installation is complete. The packaging can be used to protect the components from damage during the mounting process.

3.2 Mounting the carriages

Screw in the grease nipple on the desired end plate and adjust the direction with the right washer (different thickness). Be sure that the ends of the rail are chamfered and deburred to avoid damaging the front seals or internal components. Apply a small amount of oil or grease to chamfers and the front seal of the carriage. Slide the carriage straight and carefully onto the profile rail, avoiding any misalignment.

3.3 Preparation

The threaded holes on the base plate must be first prepared according to the rail size. For hole distances and sizes, please refer to SKF catalog Profile rail guides LLT.

Make sure that the contact surfaces are flat and free of any damage or burrs. Use an oil stone to smooth them if necessary (→ fig. 1). Check the stop edges for dimensional and position accuracy and inspect the corner radii (→ page 5, table 1).

Clean the contact surfaces thoroughly. Coat them with a thin coat of light oil to prevent corrosion.

Make sure that the rails, carriages, base plate, mounting plate and fastening screws all have the same temperature during installation.

Remove the corrosion inhibiting compound from the rail or carriage surfaces that are in contact with other parts. Then apply a thin coat of light oil to these surfaces. Be sure that all drilled and tapped holes are clean and free of debris prior to mounting.
3.4 Mounting the master rail

5 Place the profile rail gently onto the base plate.
6 Insert the screws, making sure that they are unobstructed, e.g. the mounting holes are properly aligned.
7 Partially tighten the screws so that the rail is still loose.
8 Push the rail against the stop edge (fig. 2). The stop edge can be directly machined in the mounting surface or an external/mobile support strip that is only there for mounting. If necessary, hold the rail in place with a retaining strip (3.6 Mounting a retaining strip). In cases where no lateral support is provided, use an external reference surface (fig. 3) or a straight edge for alignment.
9 Using a torque wrench, tighten the centre mounting screw. Then, tighten the remaining screws using an alternating pattern (fig. 4). Torque values are listed in table 2, page 5.
10 Check the parallelism of the fastened master rail to the specific reference. Result should be better than values in table 6, page 8.
3.5 Parallel alignment of subsidiary rail

The already aligned and fastened rail is defined as the master rail. Depending on the base plate design, there are several options for mounting subsidiary rails. Please choose the suitable option listed below.

3.5.1 Option I

**Mounting with two stop edges on the base plate**

If stop edges are provided on both sides of the base plate (Fig. 5), please proceed as described above in 3.4 Mounting the master rail.

3.5.2 Option II

**Mounting with two stop edges on the mounting plate**

If there is no stop edge for the subsidiary rail on the base plate, the second rail can be aligned using a mounting plate with two stop edges.

1. Push in the carriage against the stop edge of the mounting plate (→ fig. 6).
2. Using a torque wrench, tighten the mounting screws to the designated value (→ page 5, table 2).
3. Place the subsidiary rail into position on the base plate.
4. Insert the screws, making sure that they are unobstructed, e.g. the mounting holes are properly aligned. (→ fig. 7).
5. Partially tighten the screws so that the rail is still loose.
6. Slide the mounting plate with the already fastened carriages onto the rails and move it over the full stroke (→ fig. 8).
7. Starting at one end of the rail, pre-tighten the rail screws to approximately 1/3 of their torque value. To maintain parallelism, be sure that the carriage is very close to the screws being tightened. (→ fig. 9).
8. Double-check for parallelism by running the carriages along their full stroke. Then, using a torque wrench, tighten the centre mounting screw. Tighten the remaining screws using the alternating pattern (→ fig. 4, page 10). Torque values are listed in table 2, page 5.

**NOTE:** The resulting parallelism has to be according the values in table 6, page 8.
3.5.3 Option III

Mounting with no stop edges
If there are no stop edges for the subsidiary rail on the base plate and no stop edges for the carriages on the mounting plate, then proceed as follows:

1. Place the subsidiary rail onto the base plate.
2. Insert the screws, making sure that they are unobstructed, e.g. the mounting holes are properly aligned (→ fig. 10).
3. Partially tighten the screws so that the rail is still loose.
4. Slide a carriage onto the mounted master rail and affix a dial indicator to the top of the carriage. Place the tip of the indicator at the center of the ground reference edge of the subsidiary rail (→ fig. 11).
5. Do the alignment and pre-fasten the screws with 1/3 torque (→ fig. 12).
6. Tighten all rail screws, beginning from the center, alternating to the ends (→ fig. 4), with designated torque (→ page 6, table 2) by using a torque wrench. Double check the parallelism along the full stroke.

Note: The resulting parallelism has to be according the values in table 6, page 8.
3.6 Mounting a retaining strip

Profile rail guides can also be mounted without a retaining strip. However, guides are recommended because they absorb lateral forces and reduce the effort to straighten the rails. By using a retaining strip, the load capacity does not have to be reduced as shown on page 5, table 3. For details, refer to chapter 2, General instructions, pages 4 to 8.

Before the retaining strips can be mounted, be sure that all screws are in place and slightly tightened.

1. Tighten the retaining strip screws (↑ fig. 13) with a torque wrench.
2. Then, tighten the rail/carriage screws with a torque wrench. For permitted torque values, see page 5, table 2. Dimensions of the retaining strip, screws and distance between the screw holes depend on each specific customer case.

Check the straightness of the rail with a dial indicator by using a straight edge or an external reference edge (↑ page 10, fig. 3).

3.7 Jointed rails

Jointed rails are generally used when the longest rail length available (approximately 4,000 mm) is insufficient. When joining rails, SKF recommends grinding the base plate and stop edge which will significantly improve raceway alignment. As always, the bottom-side and the reference-edge of the rail are used for alignment. Do not use the top of the rail as a reference surface.

If the base plate does not have a stop edge, use clamps and a straight-edge during the entire installation process so that the rail being installed does not move out of position.

Make sure that the joined rails are well aligned. The gap between two jointed rails should not exceed 20 µm. All rail sections are numbered continuously and close to the joint to avoid mounting errors (↑ fig. 14).

Before using the system, move the carriage over the rail joints. There should be no perceptible difference in terms of noise or resistance. If there is a difference, please repeat the mounting process.
3.8 Installing plastic caps

The plastic caps supplied with each rail guide must be installed flush with the rail surface.

**NOTE:** Caps sticking above the rail surface can damage the seal, generate debris and reduce the service life of the rail guide system. Caps that are sunk below the surface of the rail can collect dirt.

To install the caps, use a rubber mallet and a soft, e.g. plastic or aluminium, flat transition piece. Avoid sharp edges that could damage the rail (→ fig. 15).

3.9 Installing metal plugs

1. Slide the mounting tool onto the rail (→ fig. 17). Slide the mounting tool onto the rail, but remove all brass chips from the press block in advance.

2. Match the center of the mounting tool with the center of the metal plug, then use a hexagonal wrench to tighten the bolt (→ fig. 18). Stop tightening the bolt when the plug is flush with the rail surface.

   Do not overtighten the bolt. 5–10 Nm is sufficient. Repeat this step for the remaining metal plugs.

3. **IMPORTANT:** Before pressing in the plug and during plug alignment, make sure the top surface of the plug is parallel to the top surface of the rail.

4. After pressing the plugs into the rail, check that they are all flush with the rail surface. Then clean the rail to remove any debris.

With fastened rails the plugs have to be destroyed for removal.
4 Maintenance and repairs

4.1 Preventative Maintenance

To avoid dirt from adhering to and embedding into the rails, the rails should be cleaned regularly with a cleaning stroke. SKF recommends a cleaning stroke over the entire length of the rails twice a day or at least after eight hours of operation. Perform a cleaning stroke each time when switching the machine on or off.

4.2 Factory pre-lubrication

LLT carriages are supplied as standard pre-lubricated with SKF LGEP 2 grease. The technical data for this grease can be found in table 1. A preservative is applied to the LLT rails and carriages to protect them during transport, storage and mounting. When using the recommended lubricants, it is not necessary to remove this preservative.

NOTE: In addition, there are unlubricated carriages available on request that are completely protected with a preservative. These carriages must be greased by the customer.

4.3 Initial lubrication

Unless specified otherwise, initial lubrication is not required since SKF profile rail guides are delivered pre-greased and ready to install. In cases where a different type of grease is required, the carriages should be thoroughly cleaned and regreased prior to mounting. Alternatively, the carriages can be ordered without grease. Please refer to table 2 for appropriate grease quantity which must be applied three times.

This initial grease fill should be applied according to the steps below:

1. Grease each carriage according to the quantities listed (→ table 2).
2. Move the carriage back and forth three times. The stroke = carriage length
3. Repeat steps 1 and 2, twice more.
4. Check if a lubricating film is visible on the rail.

<table>
<thead>
<tr>
<th>Size</th>
<th>Grease quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>– cm³</td>
<td>LA, LU, LR</td>
</tr>
<tr>
<td>15</td>
<td>0.4</td>
</tr>
<tr>
<td>20</td>
<td>0.7</td>
</tr>
<tr>
<td>25</td>
<td>1.4</td>
</tr>
<tr>
<td>30</td>
<td>2.2</td>
</tr>
<tr>
<td>35</td>
<td>2.2</td>
</tr>
<tr>
<td>45</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Table 2

A selection of SKF rolling bearing greases

<table>
<thead>
<tr>
<th>Properties</th>
<th>Lubricant (designation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickener</td>
<td>Li, Mineral oil</td>
</tr>
<tr>
<td>Base oil</td>
<td>Li, Mineral oil</td>
</tr>
<tr>
<td>Operating temperature, °C (steady state)</td>
<td>Li, Di-ester oil</td>
</tr>
<tr>
<td>Kinematic viscosity of base oil</td>
<td>Li, Medical white oil</td>
</tr>
<tr>
<td>Consistency class (acc. to NLGI)</td>
<td>Li, –55 up to +110</td>
</tr>
<tr>
<td>Temperature range / Application range</td>
<td>Li, 2</td>
</tr>
<tr>
<td>EP grease</td>
<td>normal</td>
</tr>
<tr>
<td>normal</td>
<td>low</td>
</tr>
<tr>
<td>low</td>
<td>food compatible</td>
</tr>
<tr>
<td>–20 up to +110</td>
<td>–20 up to +110</td>
</tr>
<tr>
<td>200</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>110</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
4.4 Relubrication

The lubrication intervals for profile rail guides depend primarily on the average running speed, operating temperature and grease quality.

The intervals recommended for fixed operating conditions are listed in Table 3. For appropriate grease quantity, refer to Table 2. Where contamination, use of coolants, vibration, shock loads etc. form part of the environmental conditions, it is advisable to reduce relubrication intervals accordingly.

NOTE: For $F_m$ determination, please use publication 12942, formula 10 to calculate constant mean load as described on page 16. Also, consider recommended lubrication intervals given in Table 3.

4.5 Short stroke applications

If the stroke is less than twice the carriage length, both lubrication ports must be used, each filled equally with the grease quantity listed for initial lubrication or relubrication.

Example
- Short stroke application
- Carriage type A
- Size 25

Apply $3 \times 1.4 \, \text{cm}^3$ of grease into each grease nipple.

IMPORTANT: To avoid serious damage to the rail guides, it is important to consider the miscibility of greases when changing from one lubricant to another.

Moreover, you must also consider the possibility of reduced relubrication intervals for short stroke applications and in cases where a chemical interaction with the grease is a possibility.

Please refer to the grease manufacturer’s instructions. In case of incompatibility between lubricants, the carriages should be thoroughly cleaned before relubrication.

4.6 Central lubrication systems

If the application features a central lubrication system using greases with a consistence of 2 or higher on the NLGI scale, contact SKF.

For automatic relubrication systems from SKF, please contact your local SKF representative.

4.7 Initial lubrication with adapter plate or bellow

During the first relubrication of a carriage with adapter plate, it is important to increase the amount of lubricant according to Table 4.

4.8 Repairs

If the LLT profile rail guide system has reached the end of its service life and has to be replaced, SKF recommends replacing the whole system.

Please locate the name of the ordering key written on the carriage and measure the rail length and the E-dimension (the distance from the rail end to the first hole) for re-ordering.
5 Accessories

5.1 Mounting the scraper plate (S1)

1. Remove the grease nipple (→ fig. 1, b) and washers (c.1 and c.2), or the set screw (a).
2. Remove the mounting screws (d).
3. Put the washers for mounting screws (6) into the fixation hole on each side.
4. Attach the metal scraper plate (5) onto the end plate, and position it accurately against the latter.
5. Install the mounting screws (4).
6. Install the grease nipple (2) and washers (3.1 and 3.2) if necessary.
7. If a grease nipple is not required, install a set screw (1) instead.

5.2 Mounting the seal kit (S3)

1. Remove the grease nipple (→ fig. 2, b) and washers (c.1 and c.2), or the set screw (a).
2. Remove the mounting screws (d).
3. Attach the additional front seal (7) onto the end plate, and position it accurately against the latter.
4. Put the washers for mounting screws (6) on both sides. The washers are put between the metal scraper (5) and the additional front seal (7).
5. Attach the metal scraper plate (5) on the additional front seal (7), and align them with each other.
6. Install the mounting screws (4).
7. Install the grease nipple (2) and washers (3.1 and 3.2) if necessary.
8. If a grease nipple is not required, install a set screw (1) instead.

5.3 Mounting an additional front seal (S7)

1. Remove the grease nipple (→ fig. 3, b) and washers (c.1 and c.2), or the set screw (a).
2. Remove the mounting screws (d).
3. Attach the additional front seal (5) onto the end plate, and position it accurately against the latter.
4. Install the mounting screws (4).
5. Install the grease nipple (2) and washers (3.1 and 3.2) if necessary.
6. If a grease nipple is not required, install a set screw (1) instead.
5.4 Mounting the low friction shield (S0)

1 Remove the grease nipple (→ fig. 4, b) and washer (c.1 and c.2), or the set screw (a).
2 Remove the mounting screws (d).
3 Remove the front seal (e) and replace it with the low friction shield (1).

NOTE: Make sure that the foam remains in its correct place.
4 Re-install the mounting screws (d).
5 Install back the grease nipple (b) and washers (c.1 and c.2) if necessary.
6 If a grease nipple is not required, install a set screw (1) instead.

5.5 Mounting an adapter plate (PL)

1 Remove the grease nipple (→ fig. 5, b) and washers (c.1 and c.2), or the set screw (a).
2 Remove the mounting screws (d).
3 Attach the adapter plate with sealing ring (3) onto the end plate, and position it accurately against the latter.
4 Put the washers for mounting screws (4) on both sides.
5 Install the mounting screws (1).
6 Install the original grease nipple (b) and washers (c.1 and c.2) on the lateral side of the adapter plate.
7 Install the set screw (2) on the other side of the adapter plate.

5.6 Mounting the lubrication connector (VN UA)

1 Remove the grease nipple (→ fig. 6, b) and washers (c.1 and c.2), or the set screw (a).
2 Install the lubrication connector (1) onto the lube port.
5.7 Mounting the bellows

Bellows are available for all sizes of profile rail guides. The bellows are used to provide additional protection against dirt, dust and splashed liquids over the entire rail length. Grease nipples are applied laterally and are accessible without disconnecting the bellows.

Pre-assemble the adapter set
See 5.5 (Adapter plate).

Assemble the bellows on the system
1. Move the carriage to the end of the rail. Then put the fixation plate (→ fig. 8, 14) behind the last frame and tighten it together with the bellow and the screws (13) into the adapter plate on the carriage (→ fig. 8).
2. Take the end plate (→ fig. 9, 8), the fixation plate (9), the screws (11) and the bellow and put the fixation plate behind the first frame of the bellow and screw all the parts together (fig. 9).
3. At least fix the end plate (8) with the screw (12) to the threaded hole at the end of the rail (15).

NOTE: To have a look onto the rail, remove the screw at the end of the rail (→ fig. 9, 12) and lift the bellow carefully from the rail or move to the end of the rail.

Bellows kit contents
1. Adapter plate
2. Grease nipple
3. Sealing ring
4. Set screw
5. Mounting screws
6. Bellows with all plates
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