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Symbols, safety



Important, safety information, recommendation



Maintenance

General safety information

The data and the information contained in the Notes on Use and Installation are intended exclusively for product description and assembly. The information does not release the user from conducting their own assessments and checks. It should be noted that our products are subject to natural wear and tear as well as an aging process.

These Notes on Installation and Use include important information for the safe and appropriate use of the product. In the case of a sale, rent or other transmission of the product, the latter must be accompanied by the Notes on Use and Installation.

During the assembly, operation and maintenance of the driven linear unit, it must be ensured that all moving parts are secured against accidental switch-on or moving. Rotating and moving parts can lead to serious injury! Please make sure to read and observe the following safety precautions.

- Any work with or close to the driven linear unit must be performed under the motto "safety first".
- Switch the drive unit off before you begin a task close to the driven linear unit.
- Secure the drive unit against accidental switch-on, e.g. by installing signs near the switch or remove the fuse from the power supply.
- Do not reach into the working area of the moving parts of the driven linear unit while it is operating.
- Secure the moving parts of the driven linear unit against accidental contact by installing protective devices and enclosures.
- Please take note of the applicable regulations for accident prevention and environmental protection in the country of use and the workplace.
- Use item products only in technically perfect condition.
- Non-use of original spare parts leads to the expiry of the warranty!
- Check if the product has obvious defects.
- Use the product exclusively within the range of performance described in the technical data.
- Make sure all the safety devices belonging to the product are available, suitably installed and fully functional.

You are not allowed to change the position of, avoid or disable safety devices.

The driven linear unit described here corresponds to the state-of-the-art and respects the general principles of safety at the date of printing of the present Notes on Use and Installation. Nonetheless, the hazard for personal injury and damage to property remains when the fundamental safety instructions and warning notices mentioned in the present Notes on Use and Installation are not observed. We accept no liability for any damage that may arise from them. In the interest of further development, we reserve ourselves the right to technical changes. Keep the present Notes on Use and Installation readily accessible to all users. Please take notice of the superordinate instructions for use of the complete machinery or equipment. The general hazard warning refers to the whole life cycle of the partly completed machinery.

1. Transport

Please note the transport instructions on the packaging. Make sure to leave the product in the original packaging and protect it from humidity and damage until assembly. Please note that moving parts are fixed and can cause no damage during transport.

2. Assembly

Always switch the relevant system component off-circuit before you assemble the product or plug/unplug it. Secure the system against re-starting. Lay the cables and conducts so that they cannot be damaged and nobody can trip over them. Avoid places with risk of slipping, tripping or falling.

3. Putting into service

Let the product acclimatise for some hours before putting it into service. Make sure the partly completed machinery is tightly and safely integrated to the complete machinery. Only put fully installed products into service.

4. During operation

Allow the access to the direct operational area of the system only to people authorised by the operator. This also applies for downtimes of the system. Moving parts must not be accidentally actuated. In case of emergency, error or other irregularities, switch off the system and secure it against restarting. Make sure people cannot be shut in the system's danger zone.

5. Cleaning

Close all openings with appropriate protective devices so that no detergent can enter the system. Use no aggressive detergents. Do not use a high-pressure cleaner for the cleaning.

6. Putting into service and maintenance

Perform the required maintenance work in the time intervals described in the operating instructions. Make sure no connection line, connection or component

is released until the system is under pressure and tension. Secure the system against restarting.

7. Disposal

Dispose of the product according to the national and international provisions of your country.

Correct use

The driven linear unit is a product in accordance with the Machinery Directive 2006/42/EC (partly completed machinery). The driven linear unit can only be used in accordance with the technical data and safety regulations of the present documentation. The internal rules and guidelines of the country of use must be respected. Unauthorised structural changes to the driven linear unit are not permitted. We accept no liability for any damage that may arise from them.

You are authorised to assemble, operate and maintain the drive linear unit only if:

- The driven linear unit has been integrated to the complete machinery according to the intended applications and safety requirements.
- You have read the Notes on Use and Installation carefully and understood them.

- You are qualified.
- You have the authorisation of your company.
- You exclusively use the original accessories of the manufacturer.

In case of unsafe and inappropriate operation of the driven linear unit, there is a danger of serious injury from crush and shear points.

Inappropriate use

The inappropriate use refers to applications differing from the use authorised by the Notes on Use and Installation and the appropriate use. We accept no liability for any damage that may arise.

Application

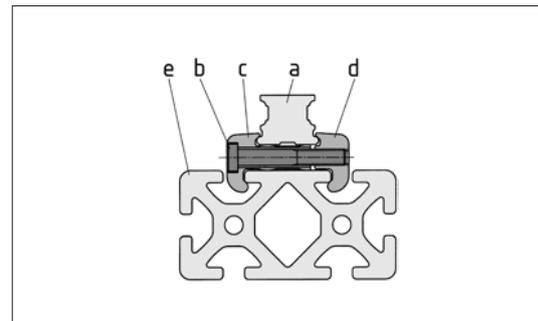
Four-row linear guide system (with full complement) on a profiled steel rail. The individual Bearing Carriages can be loaded from all directions and can absorb moments around all axes. The key features of linear guide system PS 4-25 include high load-carrying capacity and rigidity and a compact design. Any Bearing Carriage PS 4-25 can be freely combined with any Linear Guide Rail PS 4-25, so that one or more carriages can be mounted on one rail and carriages can be exchanged.

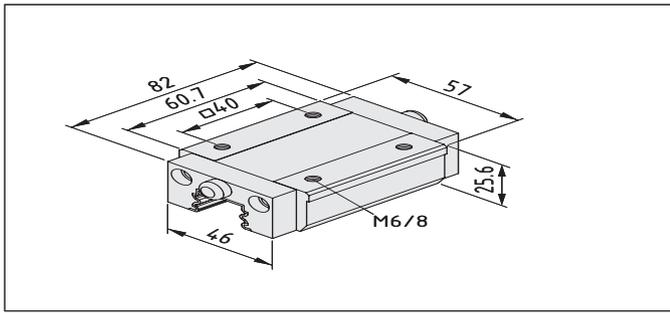
The linear guide system is pre-tensioned as standard.

Linear guide system PS 4-25 comprises the following components:

- Linear Guide Rail PS 4-25 (a)
- Fastening screws DIN 6912 M6x40 (b)
- Guide Rail Mounting Profile PS 4-25 (c)
- Guide Rail Clamping Profile PS 4-25 (d)
- Line 8 profile (e)

And Bearing Carriage PS 4-25:



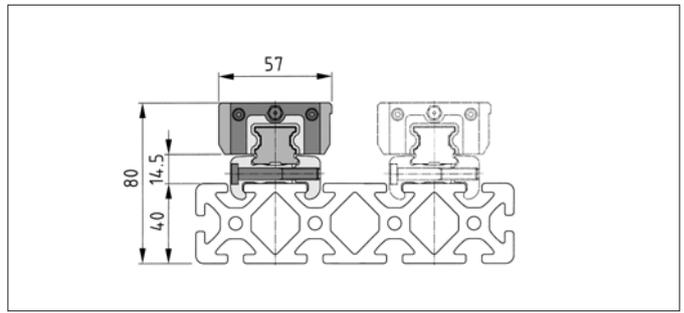


The carriages must be used in combination in order to accommodate high forces and moments.

Solutions involving several carriages on a single rail and several carriages on parallel rails are also possible.

Guide systems with parallel rails on a single support profile can be constructed on the Line 8 profile groove without elaborate alignment measures due to the special fastening geometry of the rail.

Carriage constructions comprising two or more Bearing Carriages running on two parallel rails stop the individual Guide Rails from tilting in the profile groove



and reduce torsional load. In order to retain the permitted positional tolerances when implementing a design such as this, the parallel Guide Rails must be mounted on one and the same support profile!

Guide Rails should not be connected end-to-end (e.g. to extend the length of the guide).

The use of parallel rails on different support constructions will require the amount of alignment and fastening work typically associated with profile rail guides (machining screw-fit surfaces, using parallel segments, etc.).

Technical Data



Note: The static and dynamic load rating and moment characterise the rolling-ball contact between the carriage and rail and can be used to calculate the service life.

The permissible load for a linear guide system depends on the load-carrying capacity of the guiding elements, the strength of the screw connections and the design of the profile frame.

A minimum stroke length ($h_{min.}$) is required to ensure that the rolling-ball contact is sufficiently lubricated. The carriage is charged at the factory with lithium-based grease. Lithium-based grease with a mineral-oil base can be used for re-lubrication.

Given the contact pressure of the wipers, a displacement force of 10 N per Bearing Carriage must be taken into account irrespective of the load.

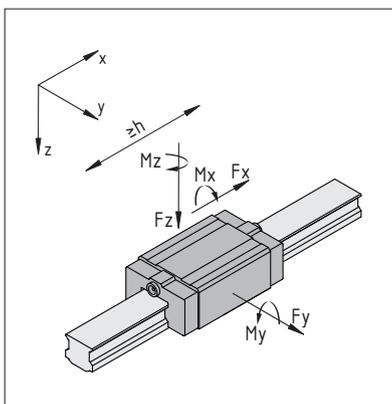


The load rating is identical for loads on all spatial axes. Static load safety factor $S_0 = C_0 / P$ greater than 4 should always be selected.

The dynamic load rating C is based on a nominal service life of 100,000 m travel, i.e. 90 percent of a sufficiently large sample of identical bearings achieve this duty cycle without any sign of material fatigue.

In each individual case, however, it is important to check the link to the connecting structure in order to verify that it is able to support the forces and moments applied to the linear guide system!

The base of the Guide Rail, in combination with Guide Rail Mounting Profile PS 4-25 and Guide Rail Clamping Profile PS 4-25, is designed to fit the Line 8 profile groove.



	PS 4-15	PS 4-25
$F_y = F_z$	1,000 N *	2,500 N
M_x	15 Nm	60 Nm
$M_y = M_z$	10 Nm	25 Nm
C	7,200 N	17,900 N
C_0	14,500 N	37,000 N
$v_{max.}$	5 m/s	5 m/s
ϑ	-10 – +100 °C	-10 – +100 °C
$h_{min.}$	120 mm	180 mm



The upper contact face of the Bearing Carriage is designed to accommodate a Line 8 profile. However, carriages can of course also be designed in other forms. In such instances, the central ribs on the rear of the Bearing Carriage provide the sole contact surface. Button-Head Screws ISO 7380 and Locating Washers 8 can be used to fasten Profiles 8 to the Bearing Carriage.

Preparations for Assembly



Important: Care and cleanliness during assembly of a linear guide system are crucial for the correct functioning and long service life of this machine element. For this reason, all components, the work bench and the connecting structure must be kept clean!

Compliance with the following instructions will ensure the greatest possible operating reliability by eliminating any errors during assembly. The Bearing Carriage is supplied in protective packaging. It is slotted onto a plastic protective rail that keeps the ball bearings in their tracks and provides protection against impacts.

The end caps of the Bearing Carriage, which are screwed onto the end faces, must not be removed under any circumstances! Doing so would open and

dislodge the re-circulating segments of the raceway, thus rendering the Bearing Carriage unusable.

In addition, tampering of this nature will invalidate any guarantee!

To ensure the linear guide system runs smoothly, all the fastening screws should be tightened under controlled conditions using the tightening torques specified in these instructions and in accordance with the screw tightening schedule. Furthermore, a chemical screw fixing agent should be used, particularly if it is at all likely that the screws could lose tension.

Check the cut edges of the Guide Rail and remove any burrs with an oilstone. Do not slide the Bearing Carriage onto the Guide Rail until you need to, as the seal on the head can be damaged if not handled correctly.

Installing the Guide Rail

Due to internal stresses that can be generated when Guide Rails are ground to shape, a rail may not be perfectly straight when supplied.

However, it will be brought into line with the profile grooves when clamped into place on the profile by the screw connection between the Guide Rail Mounting Profile and the Guide Rail Clamping Profile. Thanks to this clamping principle, rails can be designed without drillholes, which means that no Caps or finishing work is required.

Both ends of the 3800 mm-long Guide Rails are pre-prepared in the factory so that the Bearing Carriage can be slotted on.

If a rail has to be shortened, it is important to ensure when subsequently aligning the rail that the carriage can be slotted on at the non-shortened end.

If the Guide Rail is being installed flush to an enclosing construction, the carriage must be slotted onto the rail prior to assembly.

The self-centring rail clamping system also directly supports the Guide Rail and fastens it to any Line 8 support profile with a minimum width of 80 mm. Profiles 8 light and 8 E should not be used as support profiles.

Take particular care to ensure that the Guide Rail does not tilt and that the Guide Rail is correctly aligned in terms of position and angle.

The permissible load for a linear guide system depends on the load-carrying capacity of the guiding elements, the strength of the screw connections and the design of the profile frame.

When arranging a carriage on two parallel Guide Rails, tighten the Guide Rail Mounting Profiles PS 4-25 and Guide Rail Clamping Profiles PS 4-25 around the relevant Guide Rails to ensure the rails run parallel to the grooves. Next, align the base plate of the carriage with all the Bearing Carriages, screw it in place loosely, run it back and forth over the entire stroke distance several times and then tighten the screw fittings ($M_T = 10 \text{ Nm}$, see Section on "Mounting the Bearing Carriage").

Setting up the Guide Carriage and Lubricating the Linear Guide System

Remove the Bearing Carriage from its protective packaging. The carriage is charged with grease at the factory and can also be re-lubricated with lithium-based greases. If using oil-based lubricants, the grease should first be carefully wiped off the ball tracks.

Position the carriage – still on its protective rail – in front of the Guide Rail and slide it carefully onto the Guide Rail, being careful not to tilt or twist the carriage while doing so.

When sliding the carriage onto the rail, pay particular attention to the wipers in the end cap. They must not be dislodged from their seatings in the end cap and the lip seals must not be allowed to fold over. If the lip seals are folded over despite careful fitting, they can be realigned by pushing the carriage over the end of the rail.

Push the Bearing Carriage once carefully along the entire length of the Guide Profile, checking resistance. If you can feel friction, this is most likely due to the fact that the seals have not yet bedded in. This friction will diminish as the flexible elements settle and adjust to the rail.

Ensure that the Bearing Carriage is supplied with lubricant, as this has a major influence on the service life of the linear guide system. Two different methods of lubrication can be used on the linear guide system:

Oil lubrication: Minimum volume 0.9–1.2 cm³

Oil type: Only EP-additive oils for mixed friction, CLP to DIN 51 517 or LP to DIN 51 524. Viscosity between ISO-VG 32 and ISO-VG 68 for an operating temperature range of 0°C to 70°C. In the case of lower or higher operating temperatures, select alternative viscosity as appropriate. The oil can be topped up via the funnel-type lubricant nipple. Grease lubrication: Initial volume 1.0–2.0 g; or at least until grease is expelled.

Grease type: Lithium-saponified greases with a mineral-oil base. The carriages are filled with grease at the factory. The initial volume of grease should be applied by hand to the rows of ball bearings; one stroke of a grease gun should then be applied to the lubricant nipple to ensure that the lubrication channels are filled.

A funnel-type lubrication nipple with a 120° taper to DIN 3405 (Form D) is located at each end of the carriage. However, it is only necessary to apply lubricant at one end of the carriage. While doing so, move the carriage gently forward and back.

Important: All types of lubricant give rise to lubricant seepage. For this reason, you should design the connecting structure to ensure that any seepage is caught and can be properly disposed of.

Place the carriage construction carefully onto the Bearing Carriage(s) and move the loosely-mounted complete carriage several times along the entire length of the rail without applying any load. Next, screw the components together. In doing so, carefully select the correct screw length and, in particular, note the maximum permissible tightening torque for the screws. Intended for use are four M6 screws, property class 10.9, to be tightened with the permissible tightening torque $M_T = 10 \text{ Nm}$. To complete the assembly process, move the Bearing Carriage along the entire length of the rail again, ensuring in particular that there is no backlash and that resistance is consistent. The main causes of faults in linear guide system PS 4-25 are assembly errors, inadequate protection from soiling and insufficient lubrication. It is therefore important to ensure that the wipers, which also have a sealing function, are not damaged. How frequently the linear guide system will need to be re-lubricated also depends on operating conditions.

Maintenance

If the wiper elements in the end caps of the Bearing Carriage are damaged or become very worn, they must be replaced. Depending on operating conditions, you should check the wipers every six months or if you notice excessive lubri-

cant seepage, replacing them as necessary. The wipers can be replaced even when the carriage is mounted on the Guide Rail. Never unscrew the end cap of a Bearing Carriage!

Replacing the Wipers



Insert a piece of wire 1 mm in diameter into the holes in a wiper and prise the sides out of the end cap. Use a flat-headed screwdriver to disengage the locating tab of the wiper under the lubricating nipple and lift the wiper away from the Guide Rail. Place a new wiper (0.0.443.28) on the Guide Rail and push it towards the end cap, ensuring it is precisely aligned. Use the flat side of a flat-headed screwdriver to press the wiper carefully into the rear slots of the end cap. Take particular care to ensure that the locating hooks are not bent!

Push the Bearing Carriage along the rail to check that the wiper is securely engaged.

item Industrietechnik GmbH shall not be held liable for damage caused by incorrect installation or improper maintenance or handling of the linear guide system! After refilling with lubricant, resistance to movement may briefly increase until, after a number of strokes, the lubricant has been evenly distributed.

Re-lubrication



In principle, the precise timing for subsequent lubrication and the volume of lubricant required should be determined under actual operating conditions. If the lubrication intervals are excessively long or if the volume of lubricant is inadequate, this will be indicated by a reddish-brown discolouration of the lubricant, primarily in the reversing position of the stroke movement. In such cases, re-lubricate immediately and correct the lubrication interval and volume of lubricant. Clean the Guide Rail and the lubricating nipple.

Fill the Bearing Carriage via a lubricating nipple with the following volumes of lubricant:

Oil lubrication: Approx. 0.9-1.2 cm³

Grease lubrication: Guide value 0.5-2 g; or at least until fresh grease is expelled.

Move the Bearing Carriage along the entire stroke or for a distance of at least twice the length of the Bearing Carriage. Ensure that the Guide Rails are covered with a visible film of lubricant along their entire length. Apply additional lubricant to the rails, if necessary. Prior to any long period out of service and before resuming operation, the linear guide system should be re-lubricated with oil or grease.

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You find the Notes on Use and Installation online, in the download section for this product.

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