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## Symbols, safety



Meaning:  
Important, safety information, recommendation



Maintenance

## General safety information

The details and information in the installation guide are provided solely for the purposes of describing the product and the assembly and disassembly of variants of Linear Unit LRE 8 D14 80x40 KU 80. The text below usually refers to these as the Linear Unit or LRE. This information does not discharge the user from the obligation to carry out his own assessments and checks. It is important to bear in mind that our products are subject to a natural process of wear and ageing. These notes contain important information that will enable you to use the product safely and appropriately. When sold, rented out or otherwise passed on to another party, this product must be handed over with the installation guide.

When installing, disassembling, operating and maintaining the Linear Unit, it is important to ensure that all moving elements are secured so that they cannot be switched on and moved unintentionally. Rotating and moving parts can cause serious injury! You must therefore read and follow the safety instructions set out below.

- All work on and with the Linear Unit must be performed with "safety first" in mind.
- Always switch off the drive unit before you start working on the Linear Unit.
- Ensure the drive unit cannot be switched on unintentionally, e.g. by affixing warning notices at the activation point or by removing the fuse from the power supply.
- Do not place your hand within the operating range of the Linear Unit's moving parts when the unit is still switched on.
- Fit guards and covers to the moving parts of the Linear Unit to ensure they are not touched unintentionally.

- Observe the regulations pertaining to accident prevention and environmental protection that apply in the country and place of work where the product is being used.
- Use only products that are in perfect working order.
- Failure to use original spare parts will invalidate the product warranty!
- Check the product for obvious defects.
- Use the product only within the performance range described in the technical data.
- Ensure that all the safety equipment associated with the product is present, properly installed and in full working order.
- Do not alter or circumvent safety equipment, or render it ineffective.

The Linear Unit described here corresponds to the state of the art and takes into account the general principles of safety applicable at the time this installation guide was published. Nevertheless, failure to observe the safety instructions and warning notices in this installation guide may result in personal injury and damage to property.

We will assume no liability for any resulting damage or injury. We reserve the right to make technical changes that represent technical advances. Keep these installation notes in a place where they can be easily accessed by all users. Observe the directions contained in the main user guide for the completed machine.

The general safety information applies to the entire lifecycle of the partly completed machine.

#### 1. During transportation

Observe the handling instructions on the packaging. Until it is installed, the product must be stored in its original packaging, protected from moisture and damage. Ensure that moving parts are secured when in transit and cannot cause any damage.

#### 2. During installation

Always deactivate the power to the relevant system part and ensure it is not live before installing the product and/or plugging it in or unplugging it. Ensure the system cannot be switched back on. Lay cables and lines in such a way that they cannot be damaged and do not represent a trip hazard. Avoid areas that pose slip, trip and fall hazards.

#### 3. During commissioning

Allow the product to acclimatise for a few hours before starting to use it. Ensure that the partly completed machine is securely and safely integrated into the completed machine. Only start up a product that has been installed in full.

#### 4. During operation

Ensure that only persons who have been authorised by the operator have access to the immediate operating area of the system. This also applies when the system is not in operation. It must not be possible to actuate moving parts unintentionally. In the event of an emergency, malfunction or other irregularity, deactivate the system and ensure it cannot be switched back on. Prevent the possibility of persons becoming trapped in the system's accessible hazard zone.

#### 5. During cleaning

Close all openings with suitable protective equipment to ensure that cleaning agents cannot penetrate the system. Do not use aggressive cleaning substances. Do not use a high-pressure cleaner when cleaning the system.

#### 6. During maintenance and servicing work

Carry out the prescribed maintenance work at the intervals stipulated in the user guide. Ensure that no line links, connections or components are removed while the system is live and under pressure. Ensure the system cannot be switched back on.

#### 7. During disposal

Dispose of the product in accordance with the national and international regulations that apply in your country.

## Correct use

Linear Unit LRE 8 D14 80x40 KU 80 with Controller and Motor is a partly completed machine as defined in the Machinery Directive (2006/42/EC). It must only be used in accordance with the technical data and safety requirements set out in this document. Internal company requirements and the regulations that apply in the country where the product is being used must be observed. You must not make any design modifications to the aforementioned Linear Unit yourself. We will assume no liability for any resulting damage or injury. You may only install, operate and maintain the Linear Unit if:

- The Linear Unit has been integrated properly and safely into the completed machine,
- You have carefully read and understood the installation guide,

- You are appropriately qualified,
- You are authorised to do so by your company,
- You are using only original equipment from the manufacturer.

Unsafe or inappropriate use of the Linear Unit runs a risk of serious injury through crushing and cuts.

## Improper use

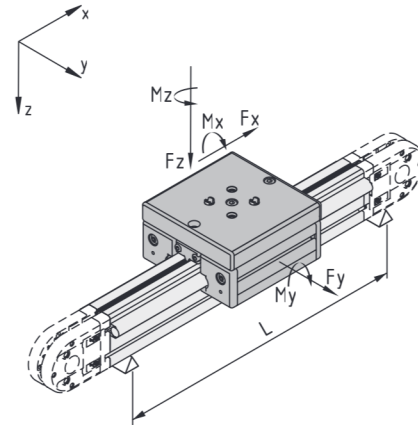
Improper use is defined as any use of the product for purposes other than those authorised in the assembly guide and under the definition of correct use. We will assume no liability for any resulting damage or injury.

## Operating parameters

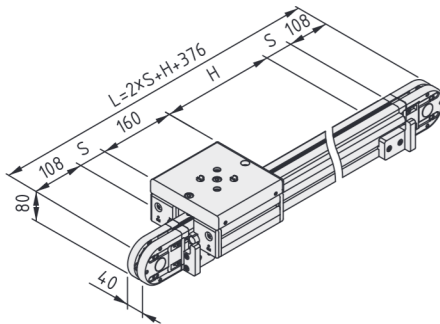
Linear Unit LRE 8 D14 80x40 KU 80 is generally constructed from Line 8 profiles that have been cut to size and various assemblies. Before starting installation work, it is important to check that all parts are present.

The maximum possible drive torque is:  $T_D = 20 \text{ Nm}$

The frictional torque or starting torque without load for the Linear Unit, depending on the Chain Reverse Units and Chain tension, is:  $T_F = 1 \text{ Nm}$



	Support width L <sub>max</sub> when F <sub>z</sub> max [mm]	Support width L <sub>max</sub> when F <sub>y</sub> max [mm]	F <sub>y</sub> max [N]	F <sub>z</sub> max [N]	M <sub>x</sub> max [Nm]	M <sub>y</sub> max [Nm]	M <sub>z</sub> max [Nm]	Operating load F <sub>x</sub> max [N]
Linear Unit LRE 8 D14 80x40 KU 80	1400	600	2400	1600	40	64	96	620



### Linear Unit LRE 8 D14 80x40 KU 80

Maximum stroke $H_{\max}$	5760	mm
Safety clearance S	12	mm
Basic mass (when stroke length = 0 mm) $m_1$	7.7	kg
Mass per mm of stroke $m_2$	8.1	g/mm
Total mass $m =$	$m_1 + H * m_2$	
Repeatability	0.5	mm
Maximum acceleration	5	$\text{m/s}^2$
Maximum travelling speed	2	m/s
Feed constant	203.2	mm/r

1 pce.

0.0.664.54

**!** The safety distance S is a reserve distance to accommodate tolerances and carriage overtravel under high loads and accelerations at the reversal point. It must be factored into the equation depending on the capabilities of the drive and Controller, but in any event should not be smaller than shown!

Environmental considerations:

Storage temperature:  $-20^\circ\text{C}$  to  $+70^\circ\text{C}$

Relative humidity: 5% to 85%

Linear Unit LRE is intended as a permanent fixture to be used in an area that is protected from the weather.

The area should be free from mould and fungus and show no traces of rodents or other pests.

Do not install or use in close proximity to industrial plants that produce chemical emissions.

Do not install or use near sources of sand or dust.

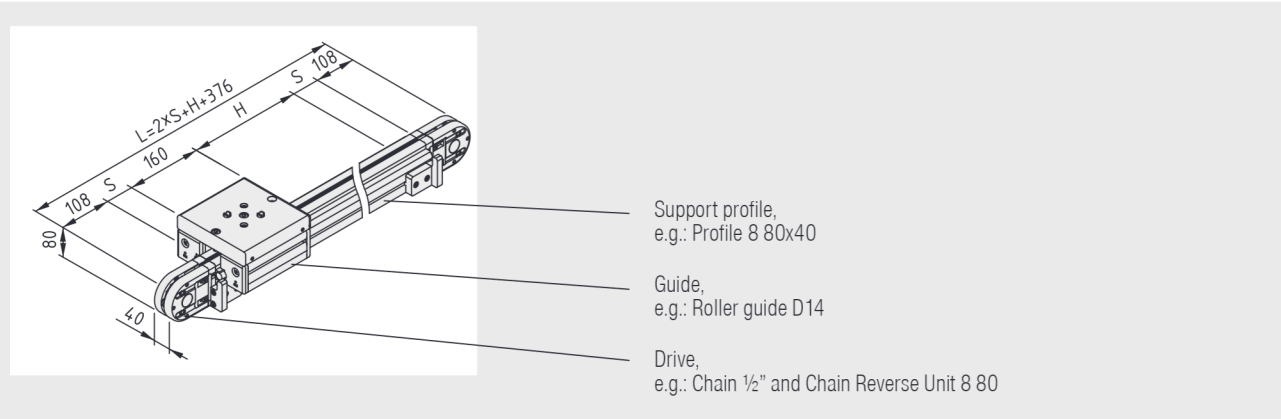
Do not install or use in an area that is regularly exposed to high-energy surges such as those caused by presses or heavy machinery, for example.

In case of doubt regarding resistance to certain chemicals such as test oil, alloyed oils, aggressive cleaning substances, solvents or brake fluid, we advise that you consult your specialist representative.

Consult the manufacturer if using in very salty air. Deflection in the linear axis of the LRE should not exceed 1 mm over an axis of 1000 mm. In scenarios where high demands are placed on the system dynamics, supports should be added every 300 mm to 600 mm. These supports must not affect the Reverse Units.



## Preparation



Fundamentally, a Linear Unit converts a rotary motion into a translational motion.

A Linear Unit is made up of:

- Guide
- Drive
- Support profile

These components are picked for assembly and assembled in part or in full, depending on customer wishes.

## Installation

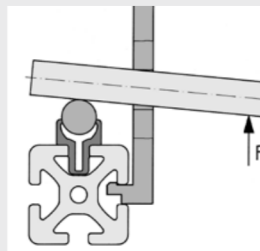
### Shaft-Clamp Profile and Shaft:

There are various methods for assembling support profile, Shaft-Clamp Profile and Shaft.

To make installation easier, apply a film of oil or grease to the outer surfaces of the Shaft-Clamp Profile that come into contact with the support profile before pressing it into the groove. Do the same to the contact points between the Shaft and Shaft-Clamp Profile and to the guiding Shaft itself. When working with short support profiles that have not yet been connected to a fixture, it is advantageous to undertake installation in the following steps:

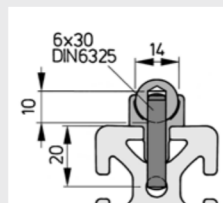
- Press the Shaft-Clamp Profile into the relevant groove of the support profile
- Use a vice (fitted with protective jaw plates) to press in the Shaft
- Follow the same sequence for the other side

On longer stretches, when the support profiles have already been installed or are being held in a vice and the Shaft-Clamp Profile has been pressed into place, you can press the shaft into the Shaft-Clamp Profile section by section using the Mounting Aid (0.0.265.38) and a lever in the form of a suitable round steel bar.



When higher loads are involved, it is advisable to secure the Shaft. Ideally, a Combination Drilling Jig (c) should be used to machine the Shaft, Shaft-Clamp Profile and Support Profile as detailed in the following steps:

- Using a carbide drill, cut a blind hole in the Shaft, 40 mm from the end face (as shown in the drawing)
- At the same distance from the end face, cut a through hole (d) through the Shaft-Clamp Profile and Support Profile together, up to the centre bore of the Support Profile
- Press dowel pin (b) DIN 6325 into the Shaft
- Install the Shaft into the Shaft-Clamp Profile as described above



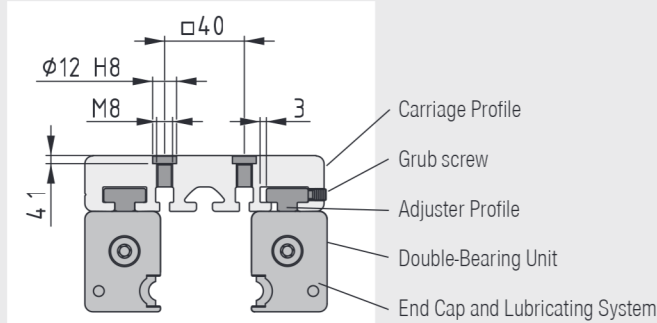
- b = DIN 6325-6x30 dowel pin
- c = Order No. 0.0.373.55 for Shaft D14
- d =  $\varnothing 6$  mm

## Slide LRF 8 D14 160x160

Once the support profile has been machined, prepared and connected with the Shaft-Clamp Profiles, the guide carriage can be slotted into place on it.

Slot the carriage on before fitting the End Cap and Lubricating System (or remove the latter first).

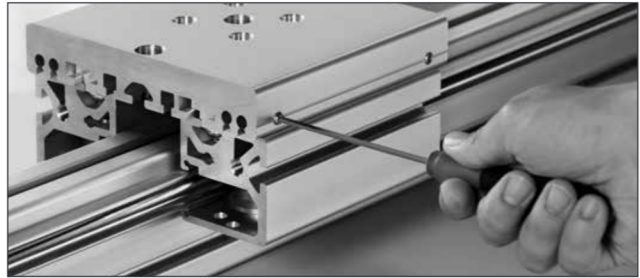
The LRF guide carriages in the various sizes as appropriate to the width of the support profile are partially assembled. One Double-Bearing Unit is pre-assembled ready for use, screwed firmly into place and cannot be adjusted. The other Double-Bearing Unit is supplied with adjustment screws on the side that protrude slightly.



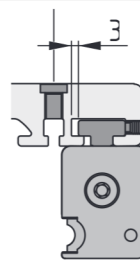
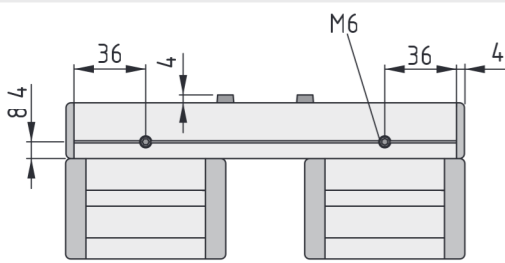
Slot the guide carriage in its preassembled state onto the support profile that you fitted the guiding Shafts to earlier.

Next, tighten the grub screws on the side alternately, making small adjustments until there is no play between the Slide and guiding Shafts. Check the Slide unit is free from play by pushing it along the entire length of the guiding Shafts and make any adjustments that are necessary. Next, secure the position of the Double-Bearing Unit from below using two Hexagon Socket Head Cap Screws M8.

Finally, install the End Cap and Lubricating Systems and Caps.

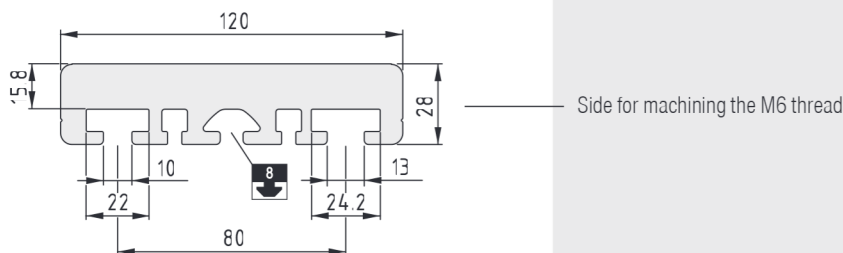


Tightening torque for the lock screws M8x16: 25 Nm



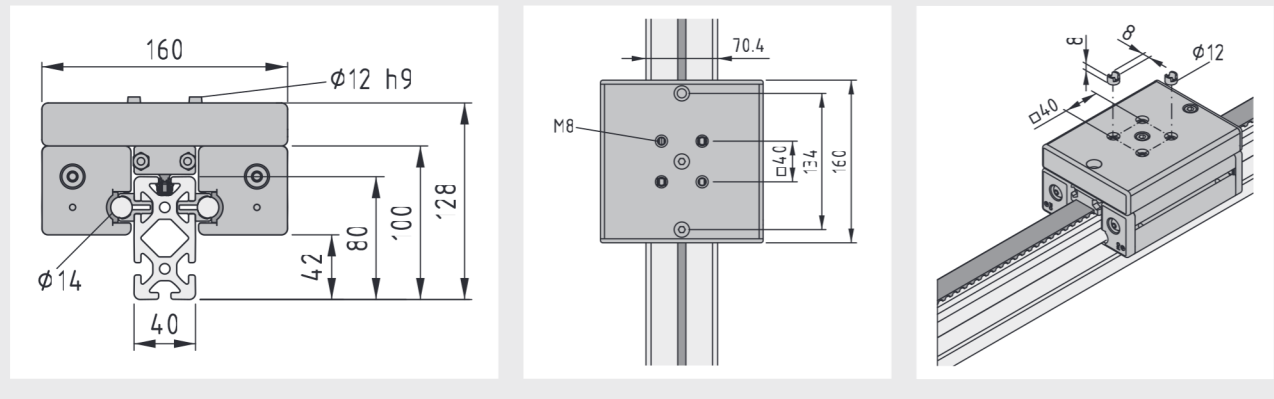
Slide Profile LRF 8 features two special grooves – one with an aperture width of 10 mm, the other with an aperture width of 13 mm (see drawing). The groove with the 13 mm aperture accommodates the play adjustment mechanism on the slide. Play is adjusted by means of two threaded M6 through holes at the side (see drawings) and two M6 grub screws.

**⚠ Risk of mistaking the correct side for drilling!**



## Application options

In combination with Profile 8 80x40 as a support profile and Slide LRF 8 D14 160x160:



The Slides have a flat surface for accommodating application-specific mounting holes. The practical positioning collars  $\varnothing 12$  h9 ensure that applications are mounted with exceptional precision. As a result, changeover and maintenance operations can be completed in record time. Various support profiles are available so that profile deflection can be minimised for high loads and support spans.

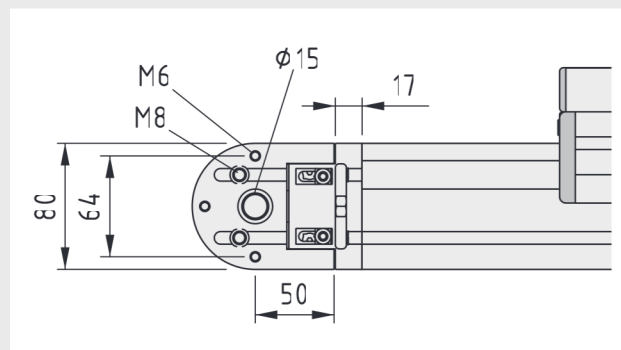
## Chain Reverse Unit 8 80 with bore

Once the carriage has been fitted to the support profile and adjusted to eliminate play, the Chain Reverse Units can be prepared.

Chain Reverse Units 8 80 with Bore for an expanding hub coupling are used to drive or reverse Chain  $\frac{1}{2}$ " to build Linear Units combined with guides, Gearboxes and Drive Units.

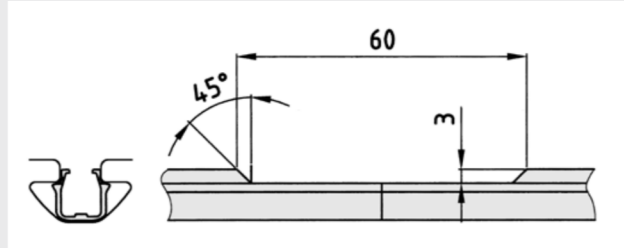
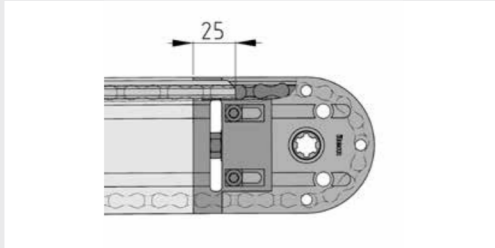
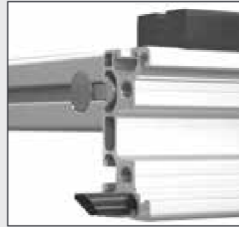
## Application options

In combination with Profile 8 80x40 as a support profile:

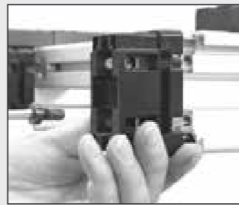


## Basic construction of the Chain and Chain Reverse Unit

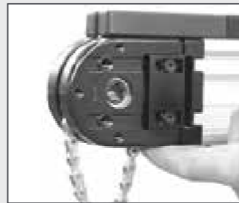
Chain Guide Profiles 8 must be pushed into the profile grooves before the Chain Reverse Units are fastened to the frame profile. Measure the length of Chain Guide Profiles 8 so they overhang each side of the frame profile by 25 mm. This overhang guides the Chain into the Chain Reverse Unit. Machine the Chain Guide Profile as shown in the figure below for a length of 60 mm. This is where the Chain will be inserted into the guide and sealed. It may be expedient to locate this partial opening on the top of the chain guide.



Screw the Chain Reverse Unit Tensioning Blocks to the end face of the frame profile. To do this, tap an M8x16 thread into the core bores of the profile. Push the Chain Reverse Unit fully onto the Tensioning Block and screw it loosely into place using M6x35 clamping screws.



Introduce the Chain into the Chain Guide Profile at the point you machined earlier. A drift pin can be used to draw the first link in the Chain through the guide and into the Chain Reverse Units.

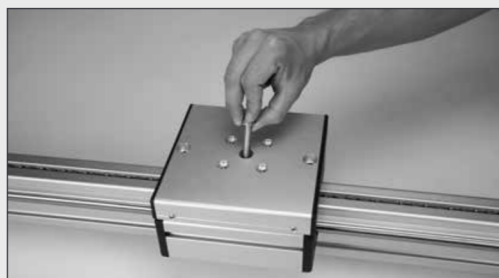
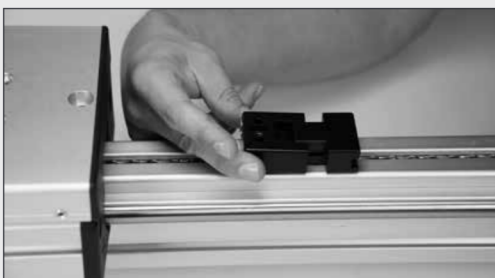
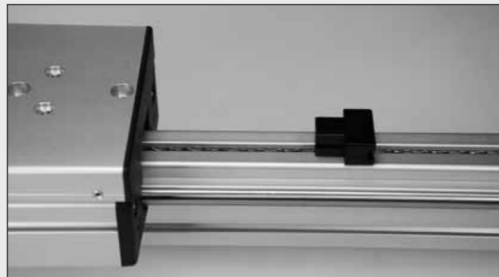
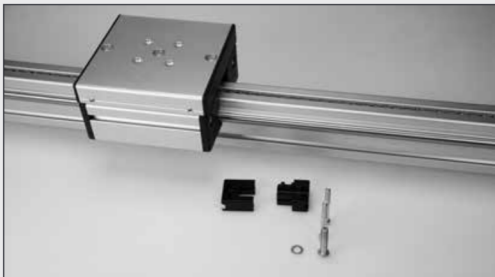


Pull the two end links of the Chain out of the chain guide at the prepared point and connect them with Chain Link 1/2". It may be expedient to use needle-nosed pliers to bring the chain links together, as these can be inserted between the rollers of the end links. Now insert the two-part Chain Link 1/2" into each end roller and connect the two.

Adjust the chain tension by tensioning the 13 A/F clamping nuts between the Tensioning Block and Chain Reverse Unit. Tighten the two M6 clamping screws (tightening torque  $T_T = 10 \text{ Nm}$ ) to fix the Chain Reverse Unit in this position.

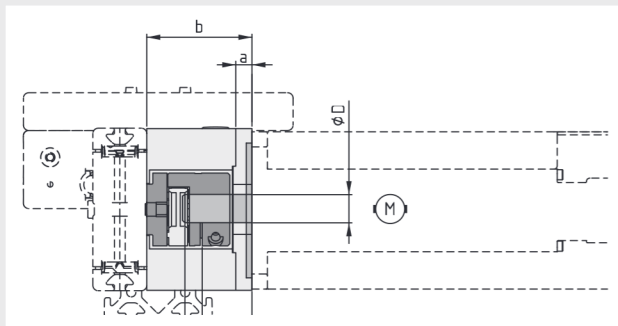
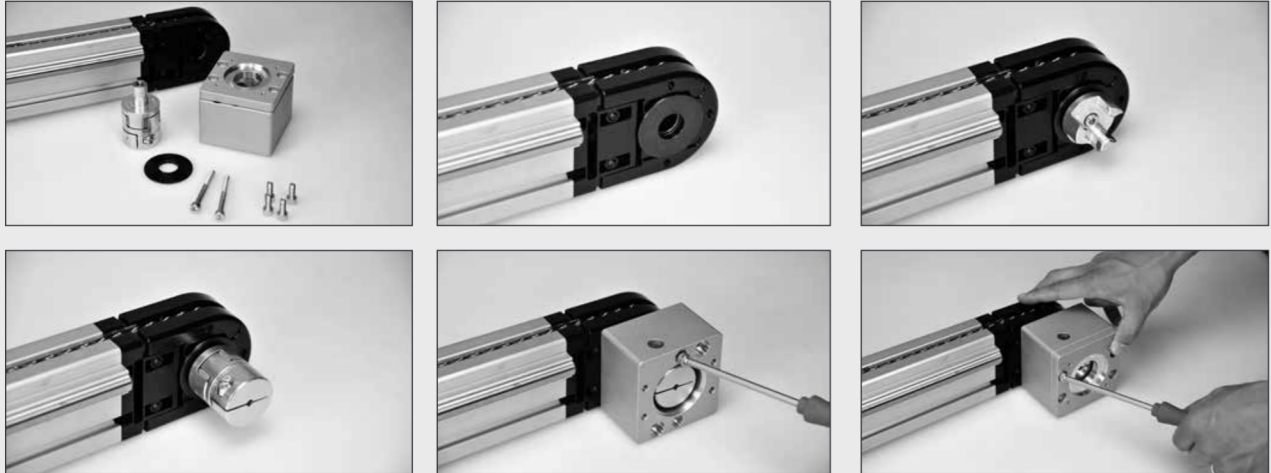
The Chain Carrier connects the drive chain to the carriage. To make this connection, insert the chain pick-up into the desired position on the Chain and

screw it tightly with the connecting block. Next, position the carriage over the connecting block and screw it into place in the centre.



## Connecting Drive Set 8 40 D40/D15 – 0.0.668.02

The Chain is driven at Chain Reverse Units 8 80. The housings of the Chain Reverse Units feature a thread for screw-attaching Drive Set 8 40 D40/D15.



[mm]	8 40 D40/D15
$\phi D$	6-24
a	10
b	64
$k_{min}$	31.7
$k_{max}$	40

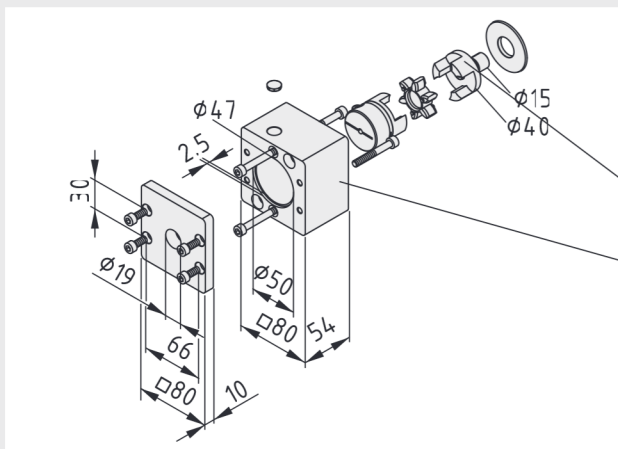
Two Hexagon Socket Head Cap Screws DIN 7984 M6x45 are supplied with the Drive Set for this purpose and are screwed through the Coupling Housing and into Chain Reverse Unit 8 80.

Tightening torque:  $T = 14 \text{ Nm}$

Machine the drive casing or Adapter Plate according to the requirements of the motor or gearbox you are using and then screw it to the motor or gearbox. Take the coupling half that is to be connected to the drive shaft and drill a hole in it to match the drive shaft then connect the coupling half and the shaft.

The torques transferred by the clamp connection factor in the maximum mating play for the shaft fits: Shaft k6 / hole H7.

Force is transferred from the coupling to the drive shaft by means of frictional resistance. The Shaft and the hole in the coupling hub must be degreased and cleaned to ensure the frictional resistance is effective. Hexagon Socket Head Cap Screws must be secured against working loose.

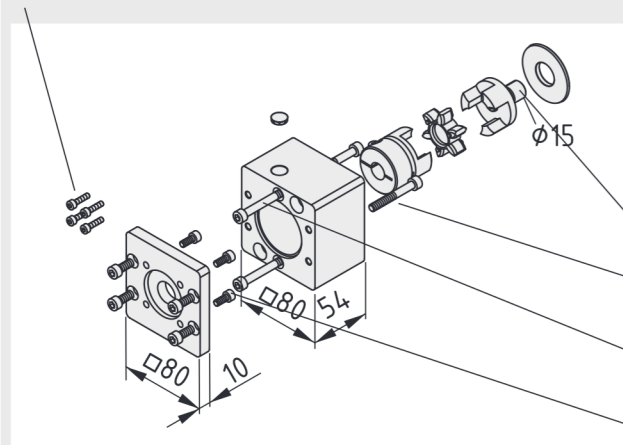


Coupling half that accommodates the drive shaft

Coupling Housing with hole (that can be sealed) to allow an Allen key through to generate the necessary clamping force on the drive shaft.

## Connecting Drive Set 8 D40/D15 AP/WP 60 – 0.0.672.73

Hexagon Socket Head Cap Screw DIN 912 M4x16



- Expanding hub coupling D15 mm
- Hexagon Socket Head Cap Screw DIN 912 M6x45 for connecting a Chain Reverse Unit
- Hexagon Socket Head Cap Screw DIN 912 M6x60 for connecting a Chain Reverse Unit
- Hexagon Socket Head Cap Screw DIN 912 M5x12

Drive Set 8 D40/D15 AP/WP 60 (0.0.672.73) is used solely to connect item drives. The Drive Set is fully prepared for installation on the corresponding Linear Unit. The drive shaft transfers drive torque without backlash. Hexagon Socket Head Cap Screws DIN 912 M6x60 are supplied with the Drive Set for this purpose and are screwed through the Coupling Housing of the Drive Set and into the housing of the Chain Reverse Unit. Tightening torque:  $T = 13 \text{ Nm}$

The torques transferred by the clamp connection factor in the maximum mating play for the shaft fits: Shaft k6 / hole H7. Force is transferred from the coupling to the drive shaft by means of frictional resistance. The Shaft and the hole in the coupling hub must be degreased and cleaned to ensure the frictional resistance is effective. Hexagon Socket Head Cap Screws must be secured against

working loose. Hexagon Socket Head Cap Screws M6x20,  $T = 13 \text{ Nm}$ .

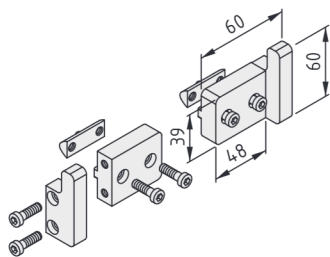
Next, use the prepared Centring Piece to fasten the Gearbox flush on the Adapter Plate of the Drive Set. Use Hexagon Socket Head Cap Screws DIN 912 M5x12 for this purpose ( $T = 10 \text{ Nm}$ ). Hexagon Socket Head Cap Screws DIN 912 M4x16 ( $T = 6 \text{ Nm}$ ) are included in the Drive Set for the purpose of fastening the Motor to the Gearbox.

Working through the Coupling Housing, create a friction-based connection between the clamping hub screw ( $T = 9.6 \text{ Nm}$ ) of the clamp coupling half and the drive shaft.

## Slide Stop LRE 8

The robust aluminium Slide Stop LRE 8 stops the carriage on a Linear Unit travelling past the calculated or desired point, and also acts as a homing point for the system. Thanks to its special shape, the Slide Stop can be used with shafts in various diameters and fitted at any position.

**Note:** When configured using item MotionDesigner®, most LRE-type Linear Units from item are automatically fitted with a Slide Stop that can be moved to a different position or removed entirely, as required. Some models, such as Linear Units KLE, are designed in such a way that an additional Slide Stop is unnecessary.



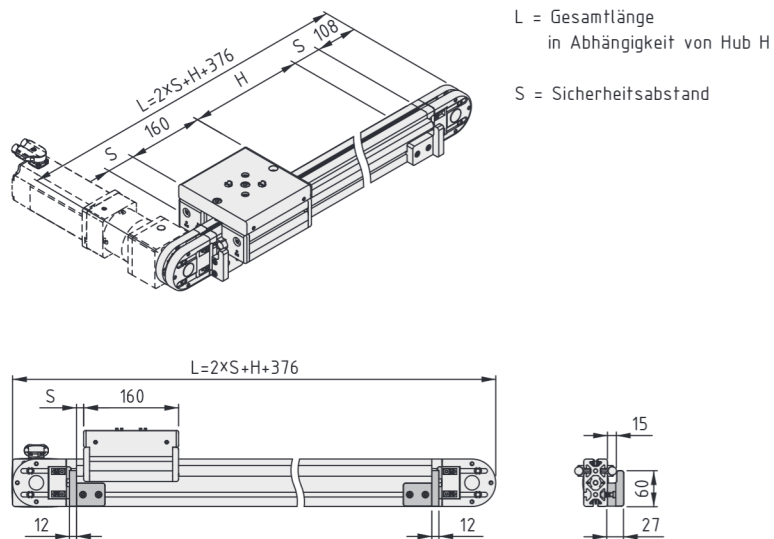
Basic unit  
Slide Stop





To fit Slide Stop LRE 8, first mark the desired end position on the support profile of the linear axis. This position does not need to match the maximum travel, but rather can be adapted to the transport task at hand.

Linear Unit LRE 8 D14 80x40 KU 80



The drawings and formulae can be used to help calculate the relevant end positions when installing the Slide Stops in relation to travel. You can use both sides of the support profile to install Slide Stop LRE 8.

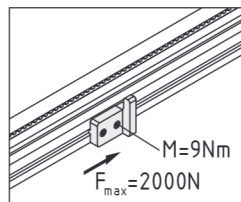
In the case of Linear Units LRE with a rack drive, Slide Stop LRE 8 can only be installed on the side opposite the Motor. Roll the T-Slot Nuts into the groove under the shaft on the side where you are going to install the Stop.

Use two screws (M6) to attach the basic unit, but do not tighten them at this stage. When installing the basic unit, make sure the threads are facing toward the Reverse Unit.

Next, slide the basic unit along the groove until the outside edge facing the Reverse Unit is in line with the mark you made earlier and then tighten with the appropriate torque.

Finally, use two M6 screws to attach the Slide Stop to the basic unit and tighten with the appropriate torque -  $M = 9 \text{ Nm}$ .

Max. load



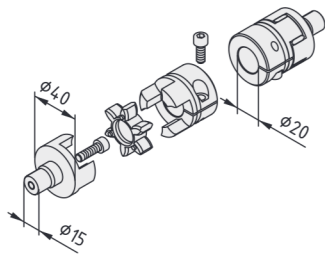
## Synchronising the iLMU

Synchronising Sets are used when two Linear Units are to be run in parallel. item Synchronising Sets comprise couplings that are fitted between two Linear Units and are connected by a Synchroniser Shaft that has been manufactured in the appropriate length. This ensures that the end result is a highly customised and flexible design.

Synchronising Sets from item can be used to operate two Linear Units in parallel with just one motor. They comprise shaft Couplings that are tailored to the relevant Linear Unit and designed to compensate for slight misalignments and withstand the stated torque over long-term use. The Couplings are pre-prepared to accommodate a Synchroniser Shaft. Besides featuring a compact design,

expanding hub couplings are also easy to use. The friction-based connection is created by tightening the central screw with the specified tightening torque. An integrated pull-off thread makes them easy to dismantle. First, the central screw is removed, then a longer screw is driven into the same position to effortlessly relieve tension in the Coupling. How long a Synchroniser Shaft can be depends on its operating speed. To determine the maximum length for a given speed or the maximum speed for a given length, please consult the information contained in the diagrams.

Linear Unit	Art. No.	Synchronising Set	Art. No.
Linear Unit LRE 8 D14 80x40 KU 80	0.0.664.54	Synchronising Set D40/D15	0.0.662.50

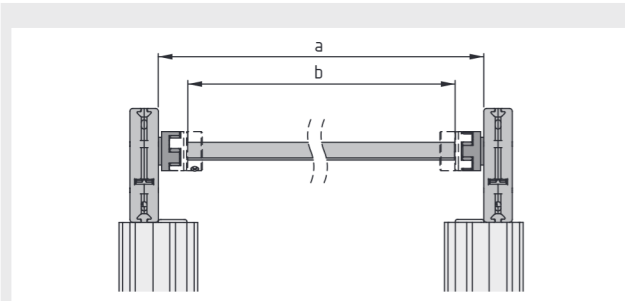


### Synchronising Set D40/D15

2 Coupling Halves D40/D20, Al  
 2 expanding hub coupling halves D40/D15, St and Al  
 2 Coupling Inserts D40, PU, green  
 Tightening torque, expanding hub screw: 9.6 Nm  
 Tightening torque, clamping hub screw: 9.6 Nm  
 m = 198.0 g

1 set

0.0.662.50



A suitable Tube St (sawn to length) turns the Synchronising Set into a complete Synchroniser Shaft.

Tube D20x3 St		
Synchronising Set	b	a
D40/D15	a - 50 mm	Distance between Linear Units



## Maintenance

End Cap and Lubricating Systems are essential in order to protect and lubricate the Bearing Units. These should be fitted back in place only when the guide carriage has been mounted on the Shafts. Otherwise, it is important to ensure the movable wipers are pressed back when sliding the guide carriage onto the Shaft, to ensure they are not bent. Wipers located in the internal recesses of the end-face End Cap and Lubricating Systems are also designed to take up the lubricant. They are pressed against the guiding Shaft by a spring. These wipers are supplied pre-charged with lubricant and can be topped up with lubricant as required via the hole in the cap. In the event of considerable soiling, you may need to replace the wipers. Suitable for use in dry conditions and over the temperature range -20°C to +70°C.

If operating conditions are unusual - e.g. special type of installation, dust, short stroke, influence of solvents etc. the lubrication intervals must be adapted accordingly.

This information does not discharge the user from the obligation to carry out his own assessments and checks.

It is important to bear in mind that our products are subject to a natural process of wear and ageing.

The rollers of the guide are maintenance-free. The spring-loaded end cap and lubricating felts can be topped up with lubricant as required via a hole.

Recommended re-oiling period: Every 6 months or every 2500 km. The felt pieces are supplied in ready-oiled condition.

Synthetic lubrication oil ISO VG 460, e.g. item Track Oil for Linear Guides (0.0.612.75).

Add the following quantity to each maintenance hole at the end of each maintenance interval: 2 ml

Greases containing solid particles (e.g. graphite and MoS<sub>2</sub> additives) must not be used!

Oil Can for Linear Guides (one actuation delivers approx. 1 ml of oil).

To ensure adequate lubrication, the carriage must cover a minimum travel distance. Minimum stroke length [mm]: 320 mm

Maintenance work needs to be carried out at regular intervals to ensure a chain drive continues to run smoothly:

### 1. Lubrication

Once installation is complete, lubricate the Chain. Either oil or grease-based lubricant can be used, as appropriate to the circumferential speed of the Chain in the Chain Reverse Units, environmental requirements and the anticipated loads. It is important to note that transported goods can also come into contact with the lubricant, particularly when using the system as a transfer chain. Lubrication must be checked regularly in line with the use of the Chain. It must not be allowed to run dry under any circumstances.

### 2. Chain tension and backlash

Chains are traction devices that cannot be reversed without backlash. The correct chain backlash can be set using the Chain Tensioning Blocks of the Reverse Units, or by moving the Adapter Plate of the Chain Counter-Reverse Unit. The tension on the Chain will need to be readjusted after a running-in time of around 100 hours. The backlash on the Chain should be checked and corrected at regular intervals, e.g. after lubricating.

### 3. Chain elongation and wear

Over long periods of use, the links in the Chain become elongated and articulated surfaces are worn down by friction. When an overall elongation of 3% is reached, the Chain is worn-out and must be replaced. When replacing the Chain, check for wear on the drive sprocket wheel and, if appropriate, the sprocket wheels of any chain-driven conveyor rollers. Any visible trace of erosion on the edges of the teeth is an indication that these drive components also need to be replaced.

Ideal operating conditions:

Ambient temperature: 10°C ... 40°C

Load: < 5%

# item

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

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