Linear Unit GSF 6 60 TR 12x3

assembly guide

Contents

Symbols, safety 3
General safety information 3
Correct use 4
Improper use 4
Product description 4
Technical data 5
Fitting the carriage 6
Drive Set 7
Fitting Drive Set 6 60 D30/D12 SE 60 7
Fitting Parallel Drive Set 6 60 D12-1 SE 60 10
Accessories for Linear Unit GSF 6 60 TR 12x3 12
- Proximity Switch KLE 6 60x60 12
- Cover Profile 6 LE 12
- Profile Fastening Set 6/8 80x60 12
- Hand-Wheel D60 D12 13
- Transverse Carriage Plate 6 60 119x119 13

Checklist 13
Repair and maintenance 14
Care and cleaning 14
Disposal 14
Product development and documentation 14

Symbols, safety

Important information

Observe directions for disposal

Observe directions for disposal

Maintenance

Note! Failure to observe this safety instruction can result in material damage

Warning! Failure to observe this safety instruction is likely to result in material damage, serious injury or death

Caution! Failure to observe this safety instruction can result in material damage, serious injury or death

Caution! Failure to observe this safety instruction can result in material damage or injury

General safety information

The details and information in this guide are provided for the purposes of describing the product and its assembly only. This information does not discharge users from the obligation to conduct their own assessments and checks. It is also important to bear in mind that our products are subject to a natural process of wear and ageing.

This guide contains important information that will enable you to use the product safely and appropriately. When the product is sold, rented out or otherwise passed on to another party, this guide must be handed over with it. You must therefore read and follow the safety instructions set out below.

- All work on and with Linear Unit GSF 6 60 TR 12x3 must be performed with “safety first” in mind.
- Switch off the power to Linear Unit GSF 6 60 TR 12x3 before carrying out any work on the linear axis.
- 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 item 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 all the safety equipment associated with the product is present, properly installed and in full working order.
- Do not alter the position of safety equipment, circumvent it or render it ineffective.

Linear Unit GSF 6 60 TR 12x3, as described here, corresponds to the state of the art and takes into account the general principles of safety applicable at the time this guide was published. Nevertheless, failure to observe the safety instructions and warning notices in this 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 changes that represent technical advances. Keep this guide in a place where it can be accessed by all users at any time. This general safety information applies to the entire lifecycle of Linear Unit GSF 6 60 TR 12x3.

Correct use

Linear Unit GSF 6 60 TR 12x3 is a component and must only be used in accordance with the technical data and safety requirements set out in this document. Combining Linear Unit GSF 6 60 TR 12x3 with a Motor and controller creates a partly completed machine as defined in Machinery Directive 2006/42/EC. 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 Linear Unit GSF 6 60 TR 12x3 yourself. We will assume no liability for any resulting damage or injury. You may only install, operate and maintain Linear Unit GSF 6 60 TR 12x3 if:

- Linear Unit GSF 6 60 TR 12x3 has been integrated into its surroundings in a proper and safe manner.
- You have carefully read and understood this guide.
- You are appropriately qualified.
- You are authorised to do so by your company.
- You are using only original equipment from the manufacturer.

Linear Unit GSF 6 60 TR 12x3 is designed for indoor use.

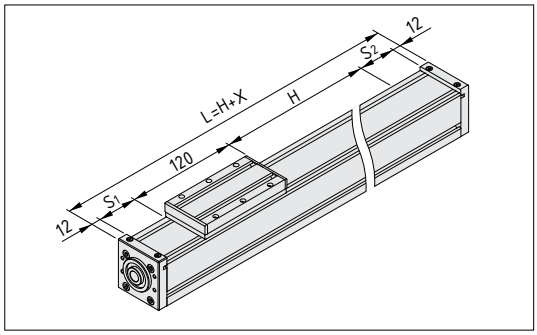
Improper use

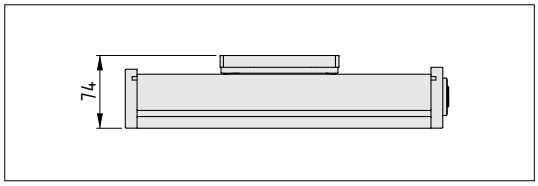
Improper use is defined as any use of the product for purposes other than those authorised in the installation guide and under the definition of correct use. We will assume no liability for any resulting damage or injury.

Product description

Thanks to integrated spindle supports, the full stroke length of up to 2800 mm can also be utilised at maximum travel speed and in continuous operation. This makes sliding rail guidance an especially economical solution for lifting tasks. The maintenance-free turnkey system achieves a duty cycle of up to 1000 km and the Line 6 grooves on the aluminium support profile ensure compatibility with the item Building Kit System. The Linear Unit is ready for use. Appropriate accessories can be added and it is configured using the free online tool item MotionDesigner®.

Linear Unit GSF 6 60 TR 12x3:





Basic unit	Stroke range [mm]	X [mm]	S_1 [mm]	S_2 [mm]	Basic mass [kg]
0.0.709.07	0 - 930	200	32	24	1.345
0.0.714.01	931 - 1860	210	37	29	1.408
0.0.714.08	1861 - 2800	220	42	34	1.472

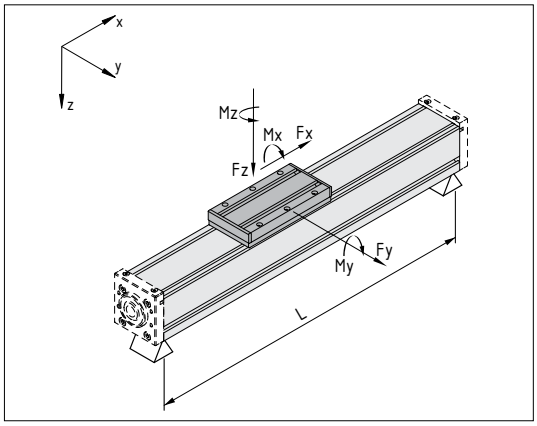
Distances S1 and S2 are made up as follows:

S1: Distance to fixed bearing (22 mm) + safety clearance (S_{min} = 10 mm) + n x spindle support (5 mm)

S2: Distance to floating bearing (14 mm) + safety clearance (S_{min} = 10 mm) + n x spindle support (5 mm)

In all versions, the safety clearance of 10 mm is the clear area that is also entered e.g. during the homing run.

Technical data



Maximum stroke:	2800 mm
Safety clearance:	10 mm
Mass per mm of stroke:	3.388 g/mm
Repeatability:	0.5 mm
Maximum acceleration:	1 m/s²
Maximum speed:	0.03 m/s
Feed:	3 mm/revolution
Mounting dimension:	60 mm x 60 mm
Spindle lead:	3 mm
Maximum operating load:	250 N

	Support width L_{max} at $F_{z\,max}$ [mm]	Support width L_{max} at $F_{y\,max}$ [mm]	$F_{y\,max}$ [N]	$F_{z\,max}$ [N]	$M_{x\,max}$ [Nm]	$M_{y\,max}$ [Nm]	$M_{z\,max}$ [Nm]	Operating load $F_{x\,max}$ [N]
Linear Unit GSF 6 60 TR 12x3	2500	2800	100	75	1	5	6.5	250

Ambient conditions:

Storage temperature: -20°C to +70°C

Relative humidity: 5% to 85%

Linear Unit GSF 6 60 TR 12x3 is intended as a permanent fixture to be used in an area that is protected from the weather.

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

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 Linear Unit GSF 6 60 TR 12x3 should not exceed 1 mm over an axis of 1000 mm.

Fitting the carriage

Screw on the carriage plate.

First, use a mallet to fit the Caps X 6 60x12.

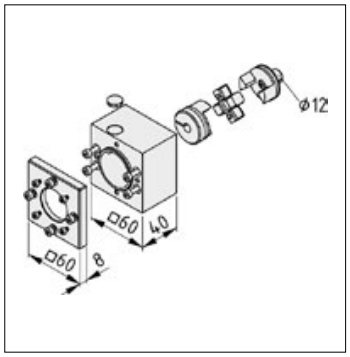
The carriage plate must be aligned by hand so that it is centred on and parallel with the carriage.

Tightening torque M_T = 1.5 Nm

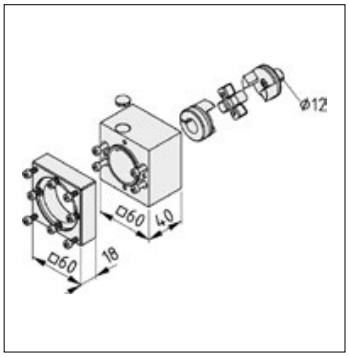
Drive set

There are several possible options for connecting a motor to Linear Unit GSF 6 60 TR 12x3.
Universal Connection Sets make it possible to connect a third-party motor.

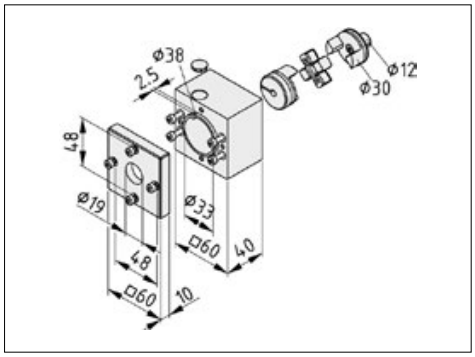
Drive Set 6 60 D30/D12 SE 40
0.0.692.53



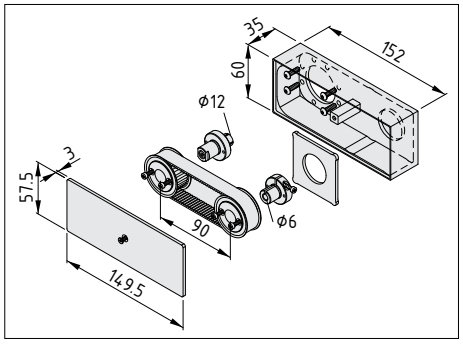
Drive Set 6 60 D30/D12 SE 60
0.0.692.55



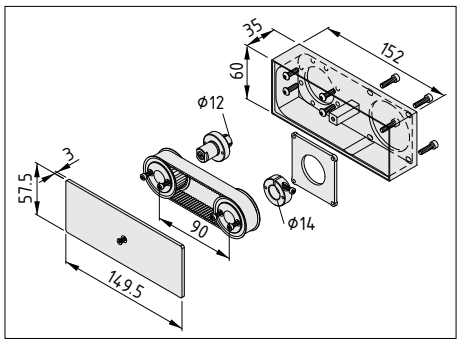
Drive Set 6 60 D30/D12
0.0.704.53



Parallel Drive Set 6 60 D12-1 SE 60
0.0.708.27

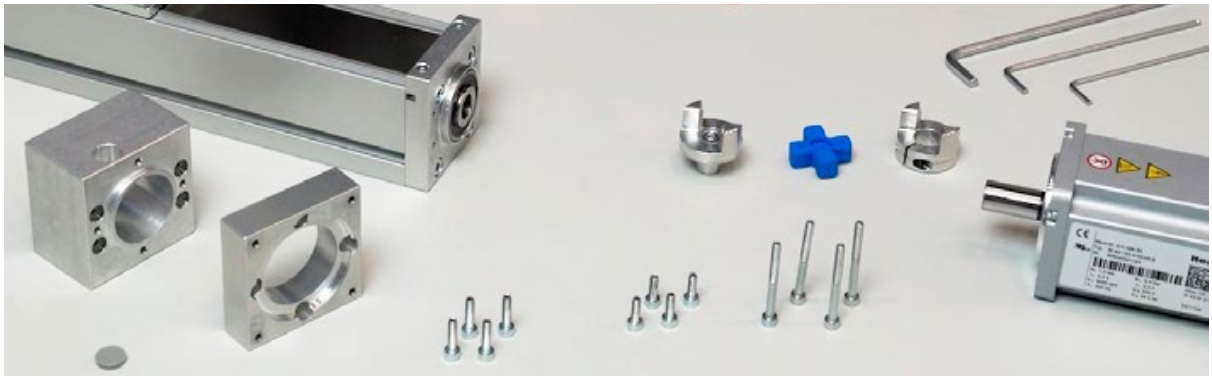


Parallel Drive Set 6 60 D12-1
0.0.708.42

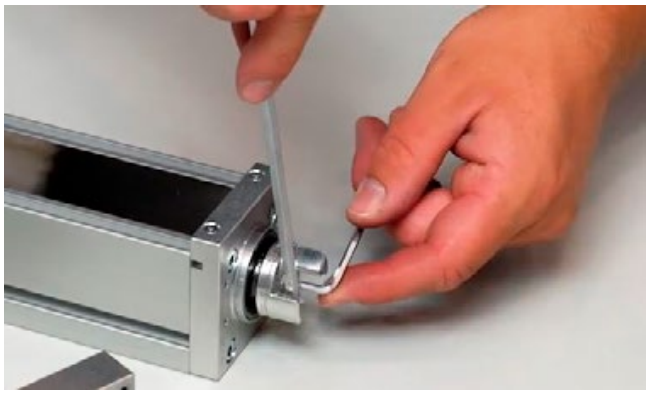


Caution! Rotating parts can cause serious injuries.

Fitting Drive Set 6 60 D30/D12 SE 60



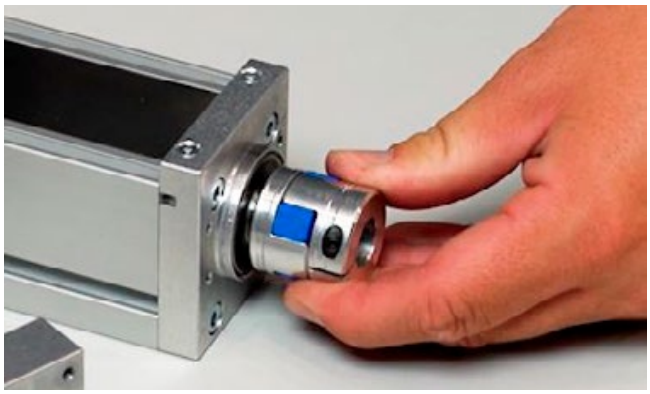
Servomotors from item can be connected directly to the linear axis with the help of the relevant Drive Sets. Motors from other manufacturers can be adapted using the universal Drive Set. The flange plate must be adapted accordingly for this purpose.



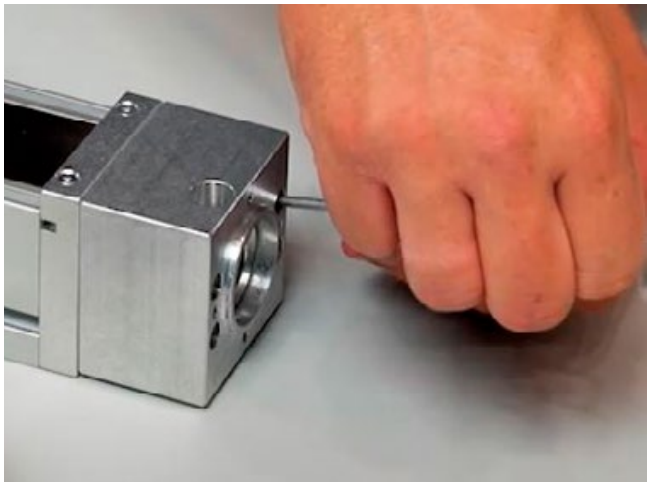
This example describes how to fit Motor SE 60 with the help of Drive Set 6 60 D30/D12 SE 60.

Start by inserting the expanding hub coupling half into the D12 bore of the Linear Unit and tightening the expanding hub screw. The coupling half can be secured in place using a second Allen key.

Tightening torque M_T = 2.8 Nm

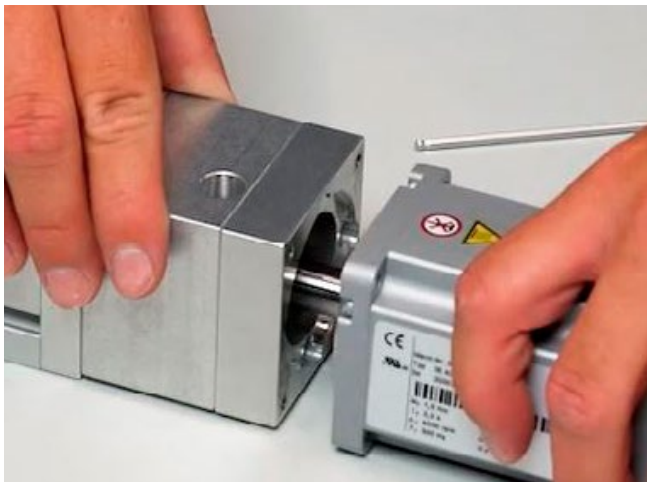


Fit the Coupling Insert followed by Coupling Half D30/D14 so that they are mounted flush on the expanding hub coupling half. The clamping screw of Coupling Half D30/D14 should be aligned as shown.



Now fit the Coupling Housing and tighten it using the four Hexagon Socket Head Cap Screws M4x40 so that it is mounted flush with the fixed bearing.

Tightening torque M_T = 3 Nm



Next, use the four Hexagon Socket Head Cap Screws M4x12 to screw down the adapter plate for Motor SE 60 so that it, too, is flush with the Coupling Housing.

Tightening torque M_T = 3 Nm

Connect Motor SE 60 (the motor shown here) to the Drive Set and secure it in place using the four Screws M4x18.

Tightening torque M_T = 3 Nm

Four Hexagon Socket Head Cap Screws M4x10 are used to secure Motor SE 40 (also available but not shown here).

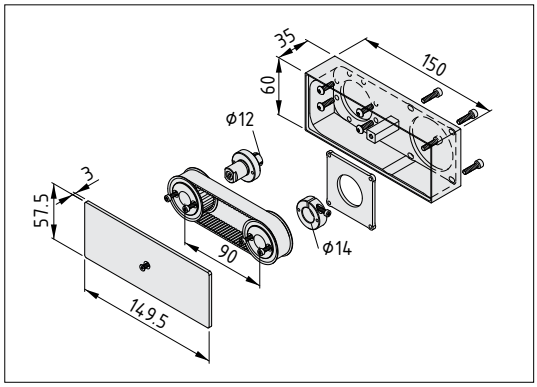
Tightening torque M_T = 1.2 Nm

Finally, tighten the clamping hub screw of Coupling Half D30/D14 through the maintenance hole. Use a Cap to seal the hole.

Tightening torque M_T = 2 Nm

Tip! If using a third-party motor, fit this with the help of Drive Set 6 60 D30/D12 (0.0.704.53). The installation process is as described above, except that the universal adapter plate must be machined and adapted to match the third-party motor's connection dimensions.

Fitting Parallel Drive Set 6 60 D12-1 SE 60



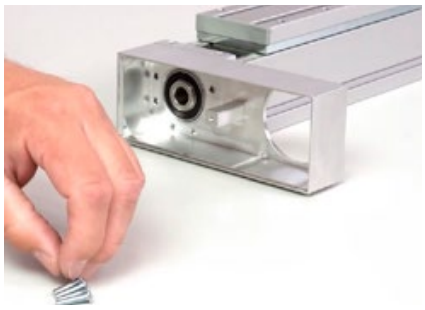
This example describes how to fit Motor SE 60 with the help of Parallel Drive Set 6 60 D12-1 SE 60.

Parallel Drive Set 6 60 D12-1 SE 60 combines Linear Unit GSF 6 60 TR 12x3 with a Motor at an angle of 180°. The fact the drive is positioned parallel to the Linear Unit means exceptionally space-saving applications can be realised.

A timing-belt drive ensures non-slip power transmission. As a plug-and-play solution, it requires no machining when using size 60 item Motors.

Maximum permissible torque of coupling – drive side: M_{max} = 3.7 Nm

Efficiency: η = 1



Screw the Parallel Drive Set's housing onto the fixed bearing of Linear Unit GSF 6 60 TR 12x3 . Only the smaller opening in the housing is designed to fit the fixed bearing.

Use four Button-Head Screws ISO 7380-M4x16 as fastening elements and apply a tightening torque of M_T = 1.2 Nm.

Screw the expanding hub shaft into the fixed bearing of Linear Unit GSF 6 60 TR 12x3, using a spanner to counter hold while tightening.

Tightening torque for expanding hub clamping screw: M_T = 2.8 Nm.

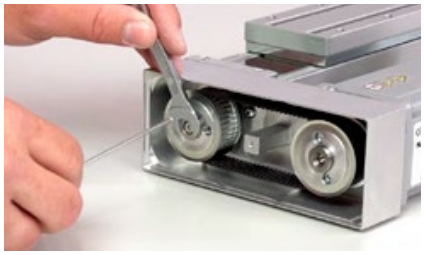
Caution!

Now clamp the clamping ring on the shaft of the size 60 Motor. Slide the clamping ring onto the Motor shaft, ensuring there is a gap of 1 mm between the Motor housing and the ring.

Tightening torque for clamping ring screw: M_T = 1.2 Nm.

Use the included Hexagon Socket Head Cap Screws DIN 912-M4x16 and the threaded plate to also fasten the size 60 Motor to the Parallel Drive Set's housing. The threaded plate is held in the Parallel Drive Set's housing while the Motor is attached from the outside.

Initially, only tighten the screws by hand so as to allow a certain amount of movement.



Slide the timing pulleys – already fitted with the Timing Belt – into the housing and fasten them to the clamping ring on the Motor shaft / to the expanding hub shaft. A spanner can be placed on the expanding hub shaft to counter hold the connection.

Tightening torque for Hexagon Socket Head Cap Screws M3x16: M_T = 1.2 Nm.

Applying the maximum possible manual force, push the Motor outwards so that the Timing Belt is tensioned and slip-free operation of the drive is ensured.

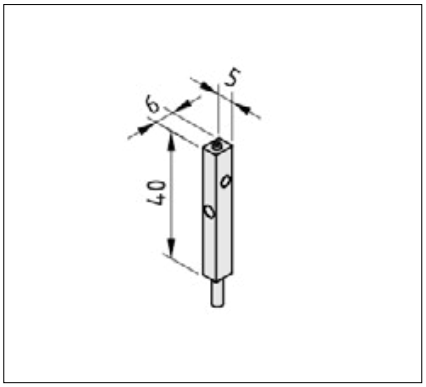
Tightening torque for Motor's Hexagon Socket Head Cap Screws M4x16: M_T = 3 Nm.

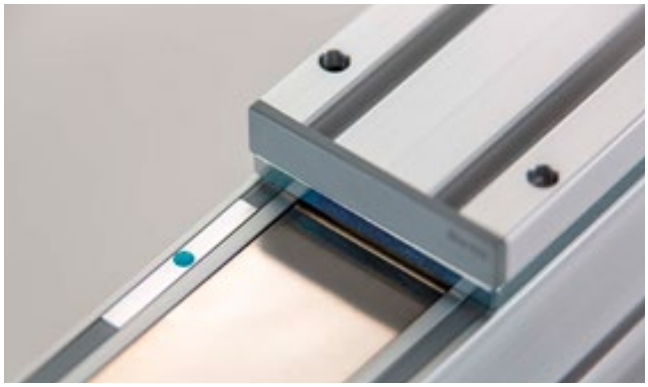
Finally, screw on the cover securely. Tightening torque for Countersunk Screw M3x10: M_T = 1.2 Nm.

Tip! If using a third-party motor, fit this with the help of Parallel Drive Set 6 60 D12-1 (0.0.708.42). The installation process is as described above, except that the universal adapter plate must be machined and adapted to match the third-party motor's connection dimensions.

Accessories for Linear Unit GSF 6 60 TR 12x3

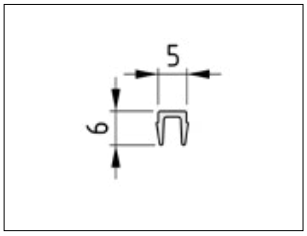
Proximity Switch KLE 6 60x60 - 1NC (0.0.604.41)
Proximity Switch KLE 6 60x60 - 1NO (0.0.609.31)





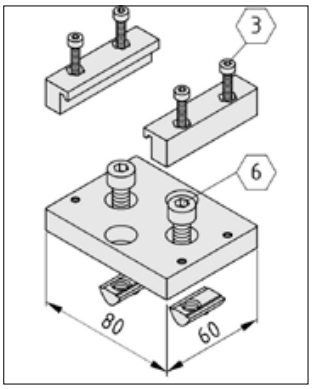
Inductive proximity switch, positive switching
Housing Al, anodized, natural
Fixing mechanism, fixing screws
Voltage = 10...30 V DC
Maximum switching current = 150 mA
Sensing range = 2 mm
Cable, grey, l = 10 m; d = 3 mm

Cover Profile 6 LE, grey similar to RAL 7042 (0.0.603.88)



The support profile of Linear Unit GSF 6 60 TR 12x3 features two indentations running along the top to accommodate Proximity Switch KLE and cables. These grooves are to be sealed with cover profiles to ensure a smooth, easy-to-clean surface.

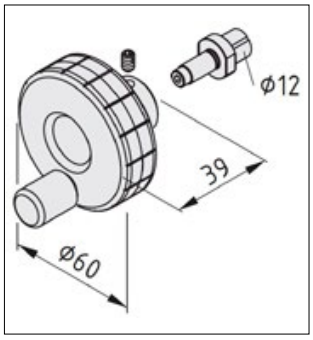
Profile Fastening Set 6/8 80x60



Profile Fastening Set 6/8 80x60 creates a friction-based connection between a component that has a Line 6 groove on its side and a base that features a Line 8 groove. This means, for example, that a 60 mm-wide profile of a Line 6 linear technology solution can be fastened to a support profile from Line 8 or an item Groove Plate.

The installation process is very easy and the shape of the fastener means that the components centre themselves. In addition, the friction-based connection provides a secure hold, even when fastening dynamic solutions based on item linear technology.

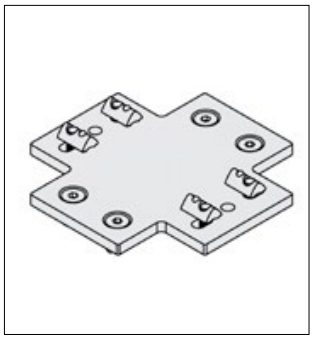
Hand-Wheel D60 D12 (0.0.714.12)



Adjustment made simple! Hand-Wheel D60 D12 can be used to operate linear axes with a D12 hollow shaft by hand. This means adjustments can easily be made at a low torque.

Easy to install, the Hand-Wheel can be used both as an alternative to a motor in development applications and for making manual adjustments in production applications. Featuring a rotating cylindrical knob, the Hand-Wheel can transmit a torque of up to 3.7 Nm.

Transverse Carriage Plate 6 60 190x119 (0.0.714.07)



The Transverse Carriage Plate 6 60 119x119 is a universal attachment for add-on components on the linear unit GSF 6 60 TR12x3. Alternatively, it can be screwed onto the slide, which is included in the scope of delivery.

Checklist

Assembling Linear Unit GSF 6 60 TR 12x3		
Notes	Checked	Comments
Visual inspection		
Screws tightened		
Carriage aligned		
Unusual running noises during manual test run		
Rubbing		

Date: Signature:

Repair and maintenance

The spindle unit of GSF 6 60 TR 12x3 is maintenance-free.

The spindle unit of Linear Unit GSF 6 60 TR 12x3 is fully greased when initially assembled. This initial greasing cannot be renewed.

The spindle unit of Linear Unit GSF 6 60 TR 12x3 must be renewed after a service life of 1000 km.

Initial greasing is with Klüber Klüberplex BEM 41-301.

If operating conditions are unusual, e.g. special type of installation, dust, short stroke, influence of solvents etc., the service life of the spindle unit of Linear Unit GSF 6 60 TR 12x3 must be adapted to the specific usage scenario.

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

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

Care and cleaning

Incorrect care and/or cleaning risks causing damage.

A cloth and a standard domestic cleaning agent are adequate for cleaning Linear Unit GSF 6 60 TR 12x3. Check that the substances you are using are suitable for use on paints and plastics. Aggressive cleaning agents and pressure washers may damage the product.

Disposal

The product can be recycled or re-used (after any necessary refurbishment and replacement of parts). The use of appropriate materials and easy dismantling ensure the product can be recycled. Improper disposal of Linear Unit GSF 6 60 TR 12x3 can pollute the environment.

You should therefore dispose of Linear Unit GSF 6 60 TR 12x3 in full accordance with the laws of your country.

Inappropriate disposal poses a hazard to the environment.

Transport packaging:

Dispose of the packaging using the return and collection systems that are available to you.

Product development and documentation

A process of continuous product development ensures that products from item Industrietechnik GmbH always exhibit a high standard of innovation.

Consequently, there could be inconsistencies between this guide and the product you have acquired. item Industrietechnik GmbH can also not exclude the possibility of errors. We therefore ask for your understanding that the information, illustrations and descriptions provided here cannot constitute an entitlement to any claims.

You can find the latest version of this guide at www.item24.com.

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