

UNIMOTION

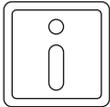
MAINTENANCE AND ASSEMBLY
INSTRUCTIONS

MTV SERIES



NOTES

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GENERAL INFORMATION

USED SYMBOLS



Remark, note



Warning!



Danger!

Risk of coming into contact with power conducting parts! Cut off power supply!



Caution!

Keep Linear Unit clean!
Cover it, if necessary!



For more information see the catalogue



Do not use glue in current step



Use dedicated tools for the current step



Use different tightening torque than in the table on page 1.005.0

TIGHTENING TORQUES

Following tightening torques are recommended for screws of strength class 8.8

8.8	M2	M2,5	M3	M4	M5	M6	M8	M10	M12
M _{max} [Nm]	0.4	0.7	1.3	2.8	5.6	9.6	23	45	74



Screw



Tightening torque

Following tightening torques are recommended for screws of the self locking device

8.8	M2,5	M3	M4	M5	M6	M8
M _{max} [Nm]	1.2	2.1	4.9	9.7	17	41

GENERAL SAFETY INSTRUCTIONS

To ensure the right functionality of the MTV Linear Unit, it must be handled with care. It is not allowed to put any tools or any other items which can cause damage to the linear unit on the linear unit.

The Linear Unit must be protected against any liquid that can cause damage to it.

The MTV Linear unit must be placed in a dry, clean environment. For information on the conditions in which the linear module can operate please contact us.

If the Linear Unit isn't in use, place it in a dry, clean environment and cover it to prevent any damage.

SAFE OPERATION

The linear unit must not be put into service until the final machinery into which it is installed has been declared in conformity with the provisions of the Machinery Directive, where appropriate.

Each operation of the Linear Unit that is not in compliance with its intended use can lead to the product being damaged, accidents and at the same time stoppages in production. To ensure a safe operation please refer to this Instruction Manual and the operating manual of other machinery where the Linear Unit is to be incorporated.

The linear unit satisfies the requirements of EC Machinery Directive 2006/42/EC according to the European or national standards of Safety of machinery:

- EN ISO12100-1
- EN ISO 12100-2



Checking linear unit

In accordance with the EU Health and Safety Directive 89/655/EEC article 4a, the operating company must subject the unit to thorough checking prior to putting it into operation, after carrying out repairs, and after malfunctions have occurred.



Requirements for personnel

The linear units may only be installed, operated, maintained, repaired or dismantled by appropriately qualified personnel in accordance with specification User manual. All qualified personnel must have read and understood this Instruction manual.

MODIFICATION OF LINEAR UNIT

The linear unit must not be modified without our written consent. Any such unauthorised modification will void our liability in respect of the unit. The operating company may only carry out the maintenance and repair work detailed in this Instruction manual.

LABELS AND NOTICES

All notices and labels attached to the linear unit must be fully visible and must not be removed. They must ensure compliance with all the instructions contained on them. Damaged or illegible notices and labels must be replaced.

WARRANTY

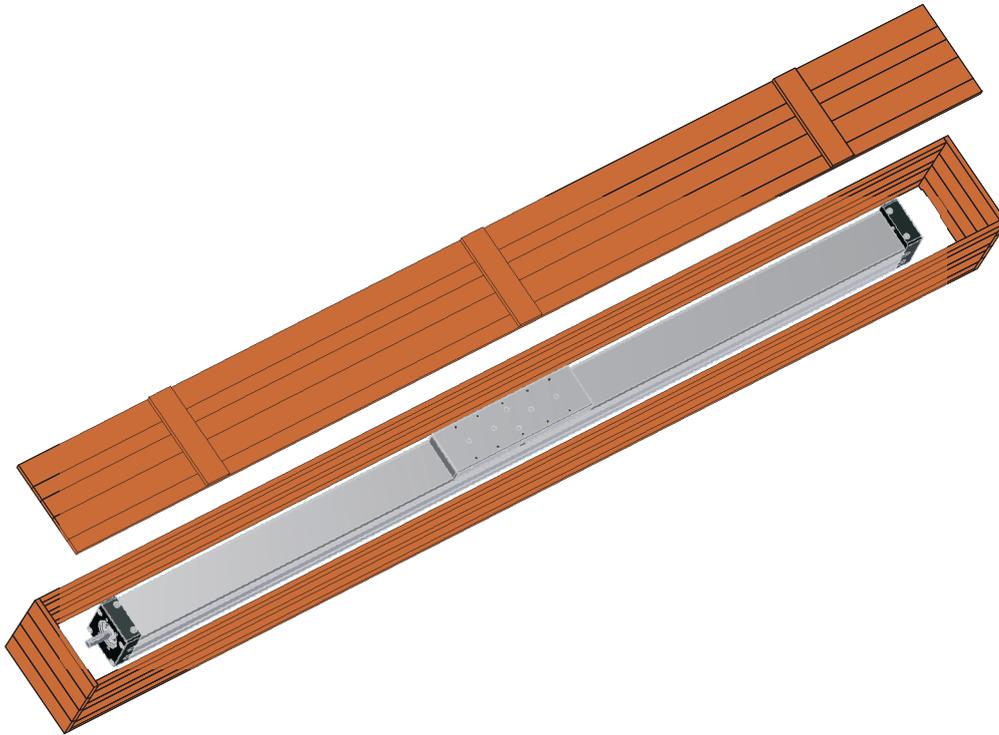
The warranty conditions are laid down in the terms and conditions of delivery and payment issued at the time of order. Warranty cover will be annulled if:

- the unit is not operated in accordance with the stipulated regulation use;
- the instructions set out in this operating manual are not followed;
- the unit is modified without the consent of the manufacturers;
- the screws sealed by locking varnish are unlocked.

The manufacturer's warranty in respect of maintenance and repair work applies only if original replacement parts are used.

HANDLING THE LINEAR UNIT

The Linear units are carefully packed in a HARD WOODEN BOX for a safe transportation.



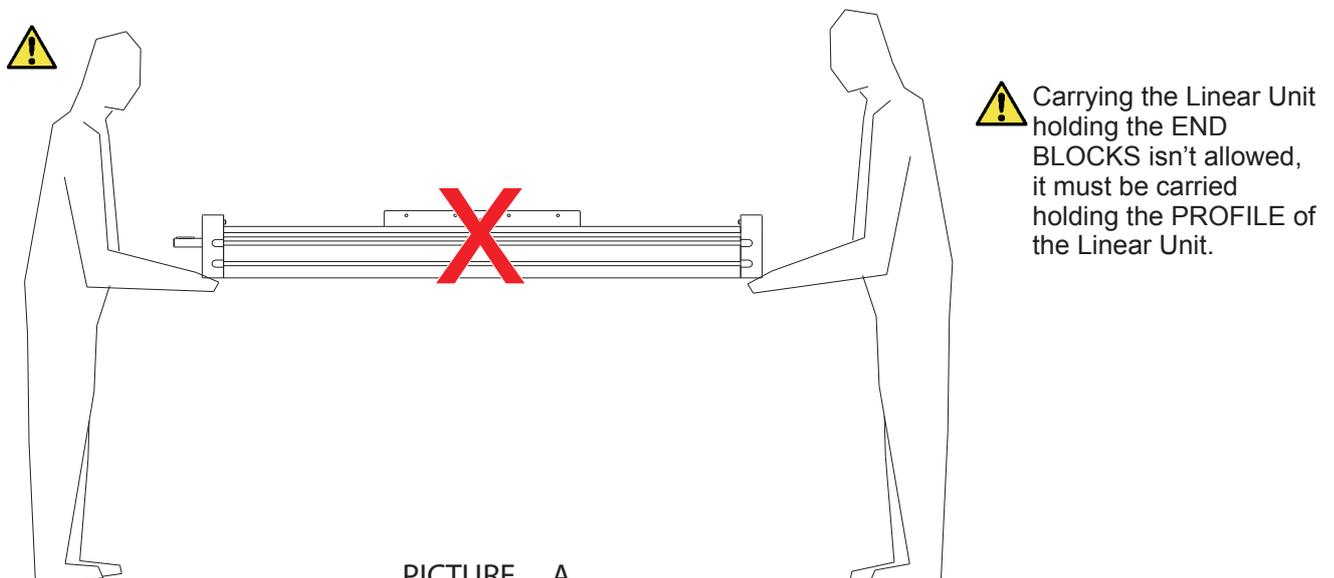
To take the Linear Unit out of the box, please consider the following handling instructions:

- Never lift the Linear Unit by the END BLOCKS - see PICTURE A
- Never grab by the PROTECTION STRIP of the Linear Unit
- Never grab by the CARRIAGE

To take the Linear Unit out of the box, a suitable lifting tool is needed. Always lift and carry the Linear Unit by the main profile.

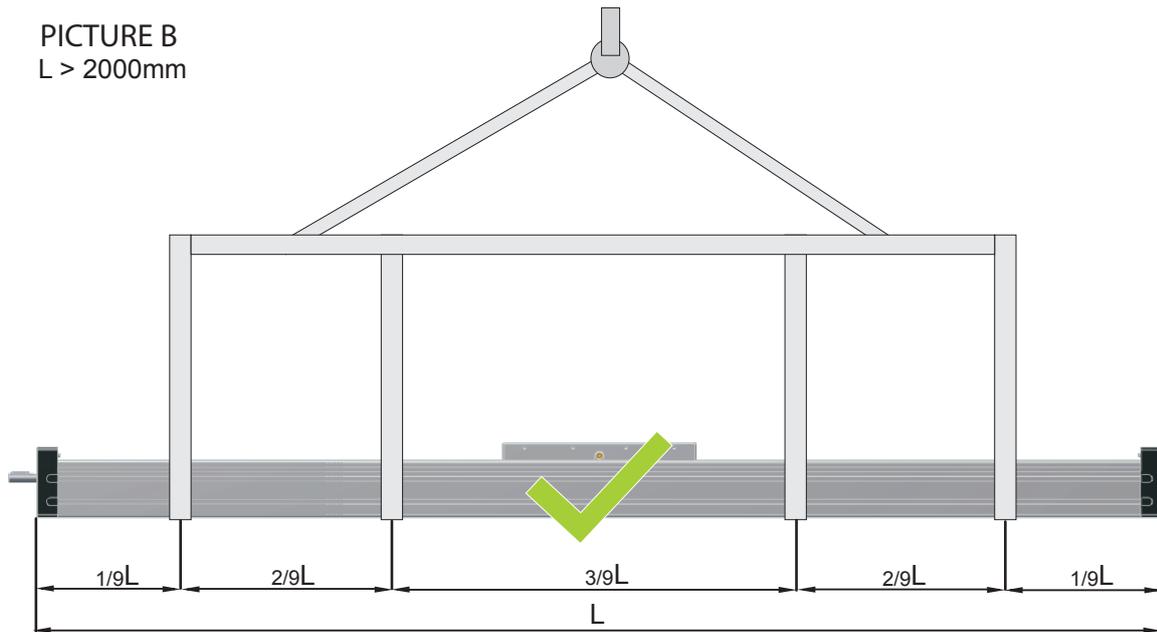
The Linear Unit must be supported all the time during the handling until it is fixed - mounted on the place, where it is meant to be. For correct handling please refer to page number 1.020.0

PICTURE A is showing, that handling with the Linear Unit in this position is wrong, because the profile, guides and other components might get deflected or damaged.



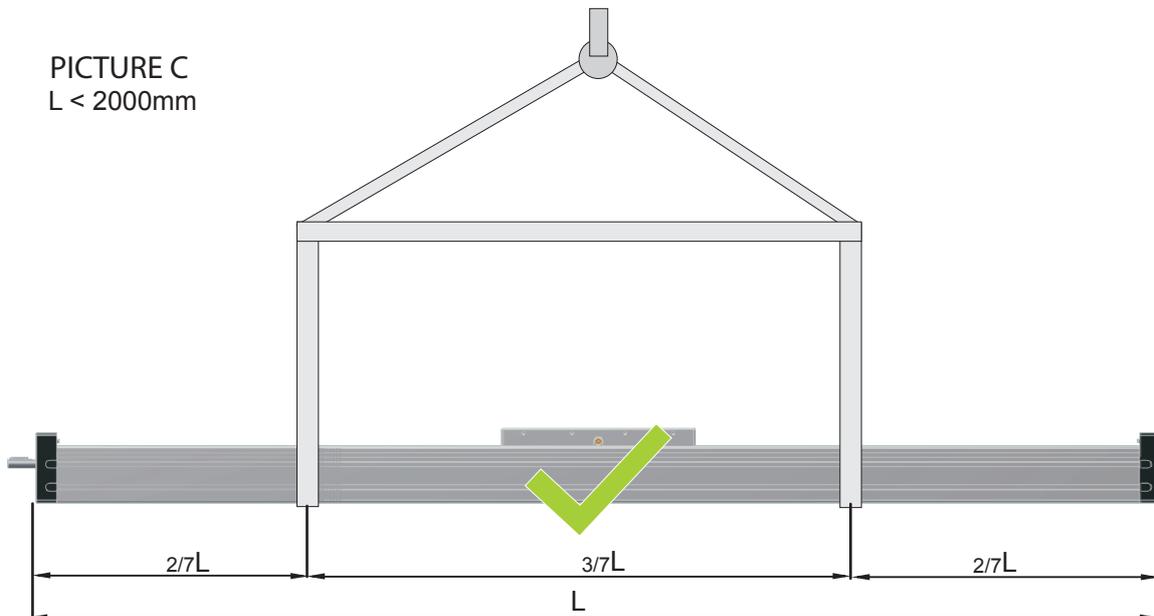
PICTURE B is showing correct handling of the Linear Unit.

PICTURE B
 $L > 2000\text{mm}$



PICTURE C is showing correct handling of the Linear Unit.

PICTURE C
 $L < 2000\text{mm}$



WARNING

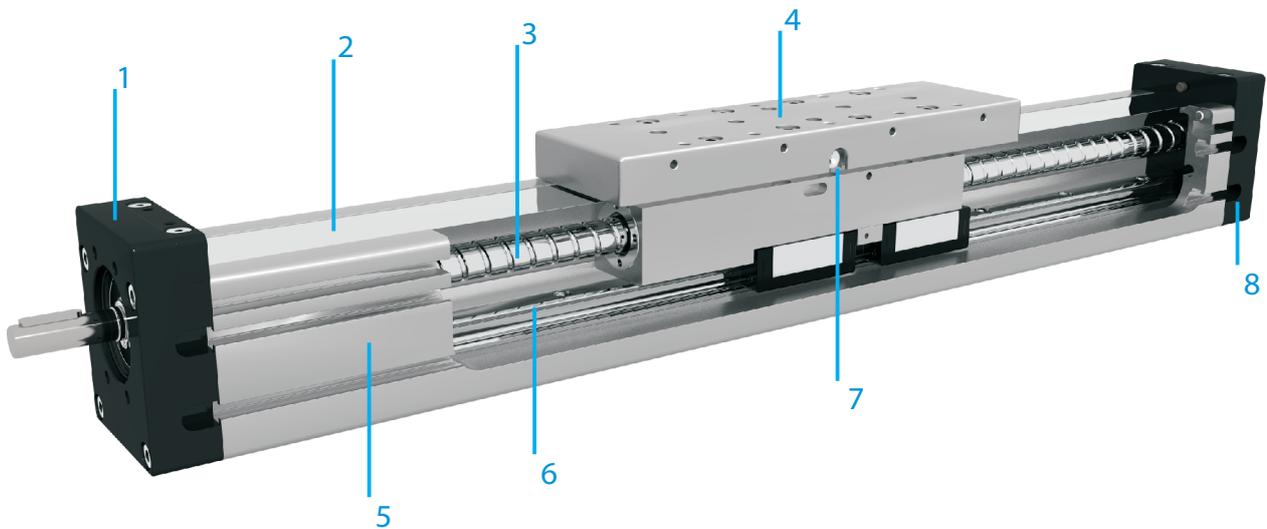


Calculate the weight of the linear unit in order to choose the suitable lifting tool for the transportation.

Please refer to the catalogue UNIMOTION - LINEAR UNITS for weight calculations.

Linear Unit needs to be stored in dry place and protected against corrosion. Make sure that there is no danger for the Linear Unit to get damaged.

PRODUCT DESCRIPTION



- 1 - Drive block with floating bearing
- 2 - Corrosion-resistant protection strip
- 3 - Ball screw tolerance ISO7 (ISO5 available on request)
- 4 - Carriage; with built in Magnets
- 5 - Aluminium profile-Hard anodized
- 6 - Integrated Linear Ball Guideway
- 7 - Central lubrication port; both sides
- 8 - End block with fixed bearing

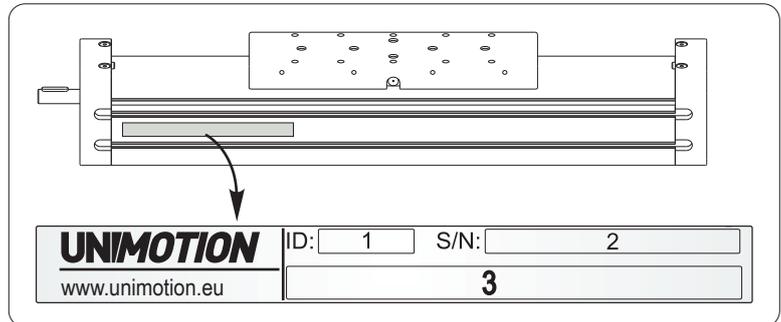


OVERVIEW

Identification label and additional or replacement parts of the Linear Unit

- 1 - ID number
- 2 - Serial number
- 3 - Type of Linear Unit (ordering code)

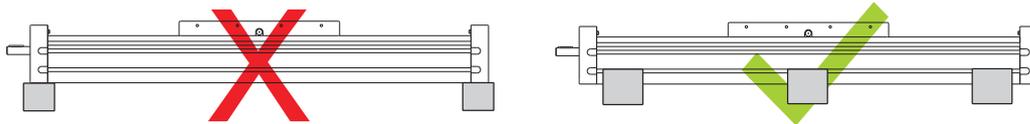
 In the case of ordering additional or replacement parts for the Linear Unit there must be given all data from the identification label.



 The label must be fully visible (in particular details of the serial number) and must ensure compliance with all the instructions contained on it. Damaged or illegible labels must be replaced.

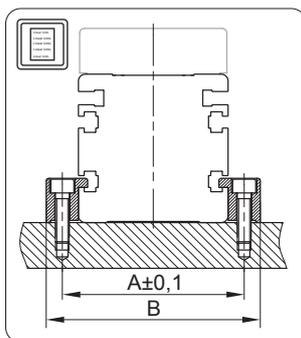
MOUNTING

Fixing system



 The Linear Unit must be mounted by the aluminium profile with evenly distributed clamping fixtures along the entire length!

 Number of clamping fixtures
Please refer to our catalogue UNIMOTION Linear Units on page 7.000.0

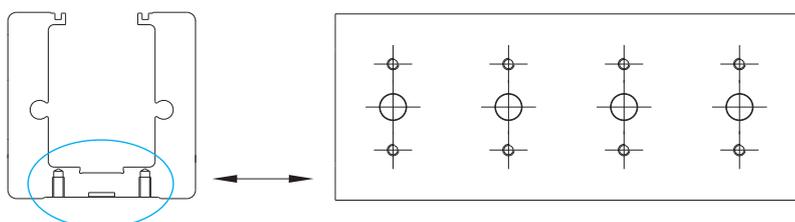


The linear units are mounted by using fixtures which are placed in the slot on the side of the profile.

MTV	A [mm]	B [mm]
40	50	64,4
65	78	93
80	93	108
110	130	150

Fixing system - T AP/PIN Holes

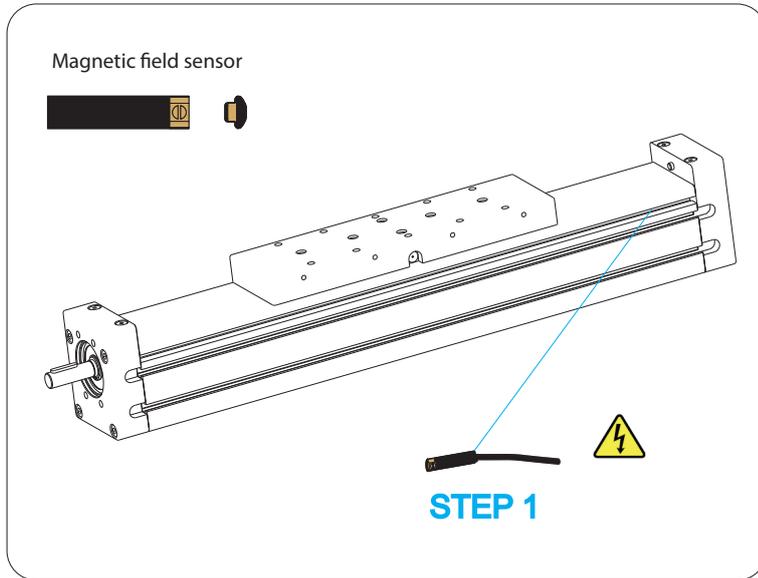
Fixing the Linear Unit can also be done by the bottom of profile using TAP / PIN holes, which can be made on request.



 TAP / PIN holes can only be made based on the manufacturer's drawing of the position and depth of the TAP / PIN holes. For the drawings showing position and depth of TAP/PIN holes, please contact us.

MOUNTING

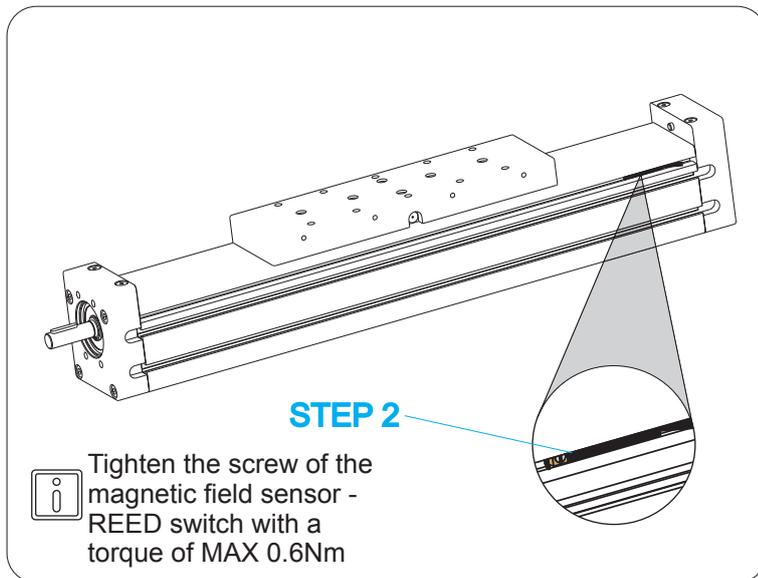
Magnetic field sensor - REED SWITCH



STEP 1: The magnetic field sensor must be placed in the slot of the profile, that is made for this purpose.



For INFO about Profile slots see UNIMOTION Catalogue. Placing of the sensor can be done on the left or right side of the profile of the Linear Unit.



STEP 2: After the magnetic field sensor is inserted and positioned in the right location in the slot, tighten the screw of the sensor.

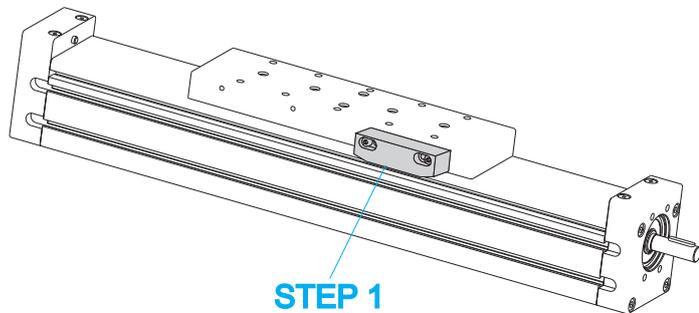
 Tighten the screw of the magnetic field sensor - REED switch with a torque of MAX 0.6Nm

MOUNTING

Mechanical and inductive switch

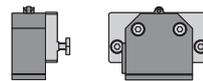
STEP 1: Mount the activation block on the side of the carriage by the thread holes. The activation block can be mounted on the carriage on the left or right side. After the activation block is placed, tighten the screws.

Activation block

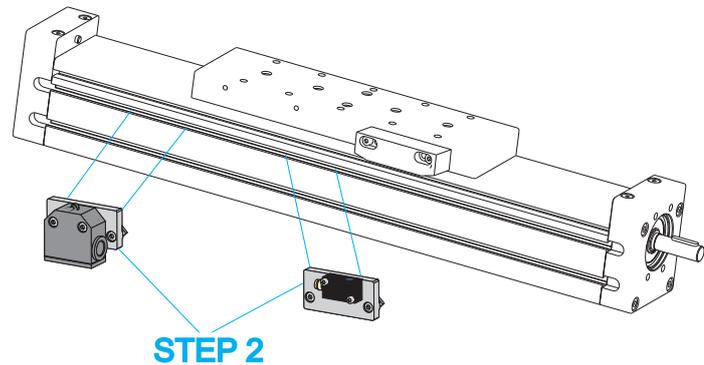
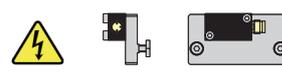


STEP 2: Place either the mechanical switch or the inductive switch with brackets in the slots and position them in the desired location. The mechanical or inductive switch with brackets can be placed in the slots either on the left or right side of the profile of the Linear Unit.

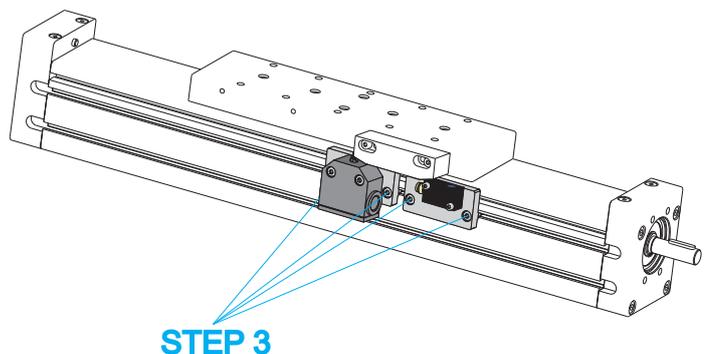
Mechanical switch with the bracket



Inductive switch with the bracket



STEP 3: After the mechanical or inductive switch with bracket is placed in the desired place in slots, tighten the screws of the bracket.



For tightening torques for the screws please refer to page number 1.005.0

MOUNTING

Motor with coupling

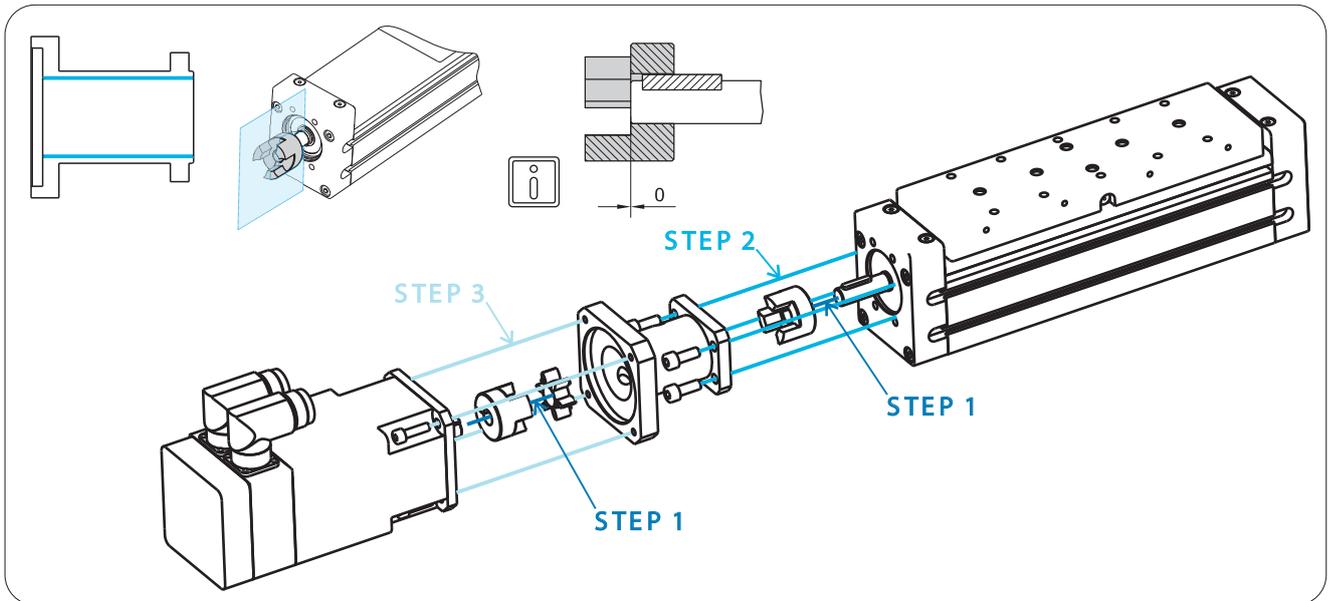
If motor adapter has inner through hole of the same size its entire length.

STEP 1: Attach one half of the coupling to the shaft of the linear unit and other to the shaft of the motor.

Insert coupling spider into one half of the coupling.

STEP 2: Attach motor adapter to the linear unit.

STEP 3: Attach motor to the motor adapter.

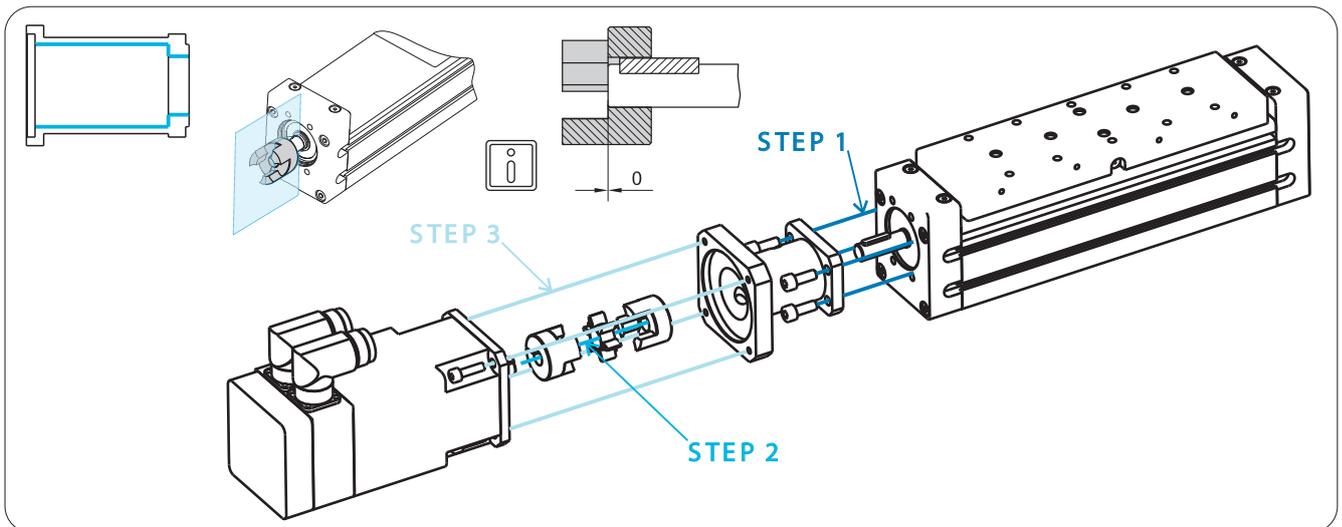


If motor adapter has inner through hole with the narrowing at one end.

STEP 1: Attach motor adapter to the side on which the through hole is narrower.

STEP 2: Attach complete coupling to the axle on the wider side of the hole.

STEP 3: Assemble two parts together and tighten the remaining screw on the coupling through appropriate hole in motor adapter.



Tighten the screws on the coupling halves with coupling tightening torque. 

 The maximum torque and maximum speed of the motor must never exceed the limits of the Linear Unit! 

 For tightening torques for the screws please refer to page number 1.005.0

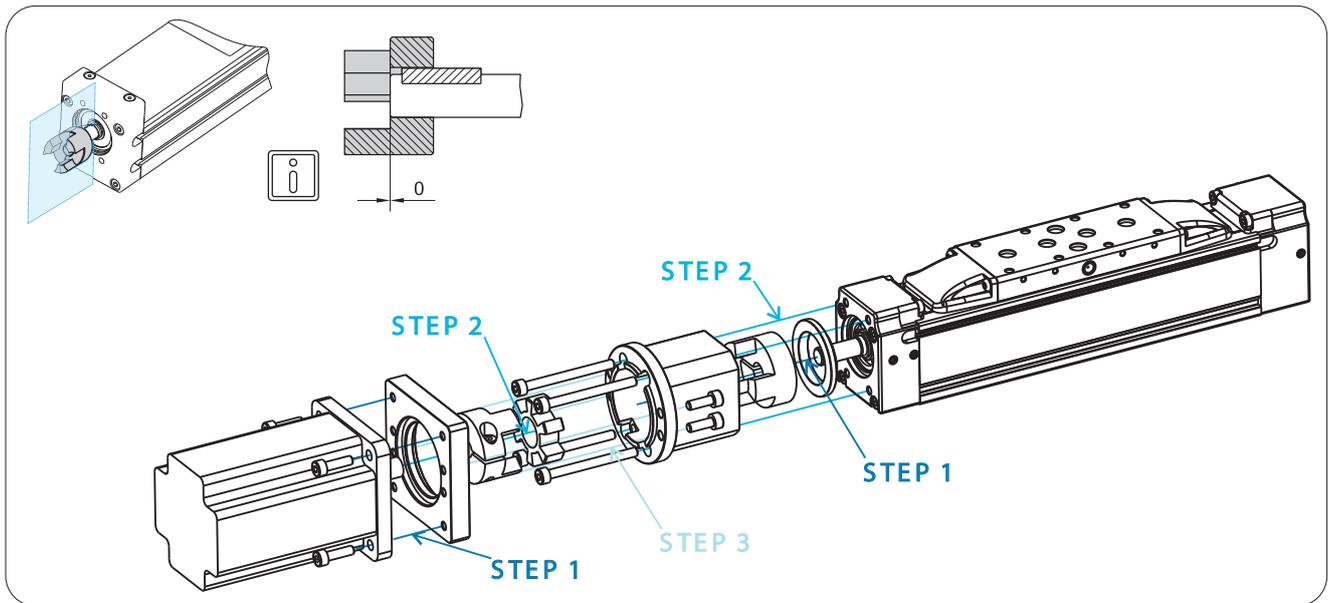
MOUNTING

Motor with coupling MTV 40

STEP 1: Insert centering ring to the linear unit and attach one half of the coupling to the linear unit. Attach connector plate to the motor.

STEP 2: Attach other half of the coupling to the motor and insert coupling spider to either half of the coupling. Attach connector body to the linear unit.

STEP 3: Align coupling halves and join connector plate and body.



Tighten the screws on the coupling halves with coupling tightening torque. 

 The maximum torque and maximum speed of the motor must never exceed the limits of the Linear Unit! 

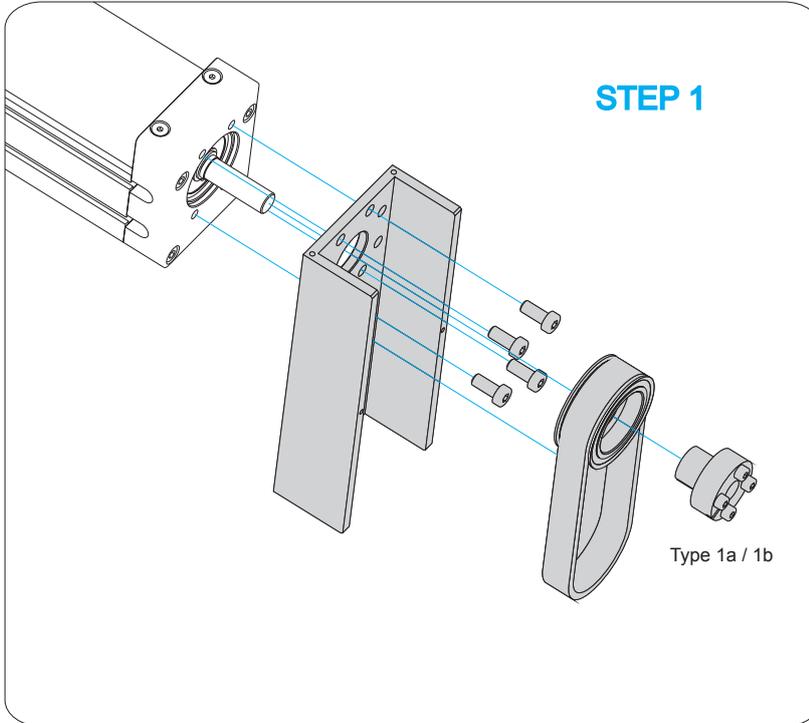
 For tightening torques for the screws please refer to page number 1.005.0

MOUNTING

Motor Side Drive - MSD



The maximum speed and the maximum torque of the motor must not exceed the limits of the Linear Unit CTV. For the values of speed and torque, please see our catalogue UNIMOTION Linear Units.

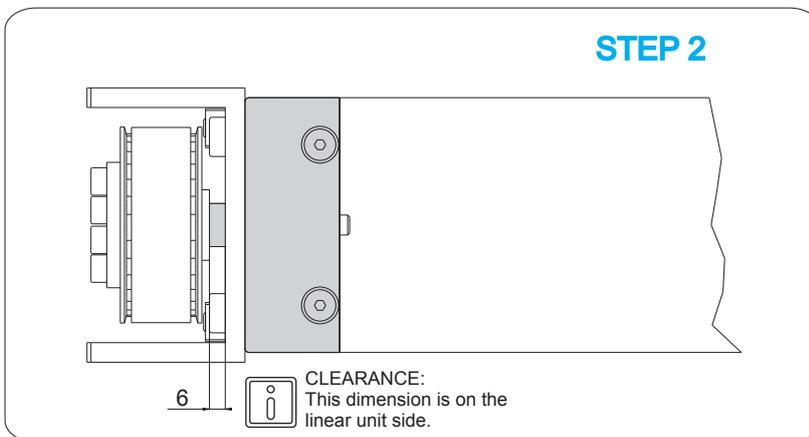


STEP 1

STEP 1: The housing of the motor side drive - MSD must be mounted and screwed on the drive block of the linear unit. The housing can be mounted in any way - UP, DOWN, RIGHT or LEFT.



The motor side drive - MSD can only be used on the Linear unit with the ball screw journal without keyway - ball screw journal type 0 - more info see our catalogue „UNIMOTION Linear Units“ on page 6.005.0



STEP 2

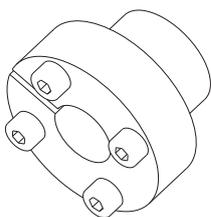
STEP 2: After the housing has been mounted on the Linear Unit, the belt sprocket with toothed belt and self locking device must be fitted on the ball screw journal of the Linear Unit. Adjust the clearance as shown in the picture.

6

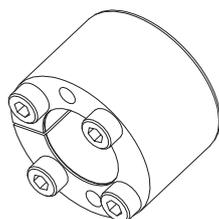


CLEARANCE:
This dimension is on the linear unit side.

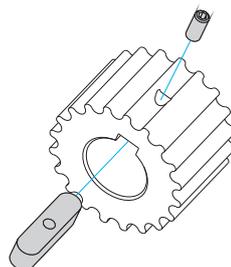
Type 1a



Type 1b



Type 2



Types of journal tensioning units.



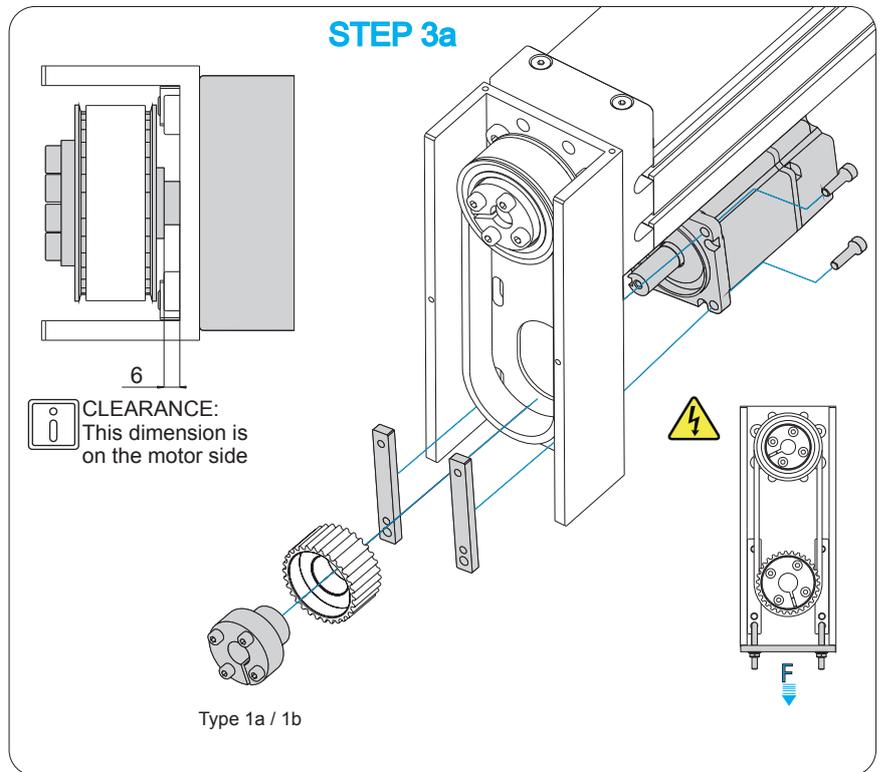
For tightening torques for the screws please refer to page number 1.005.0

MOUNTING

Motor side drive - MSD

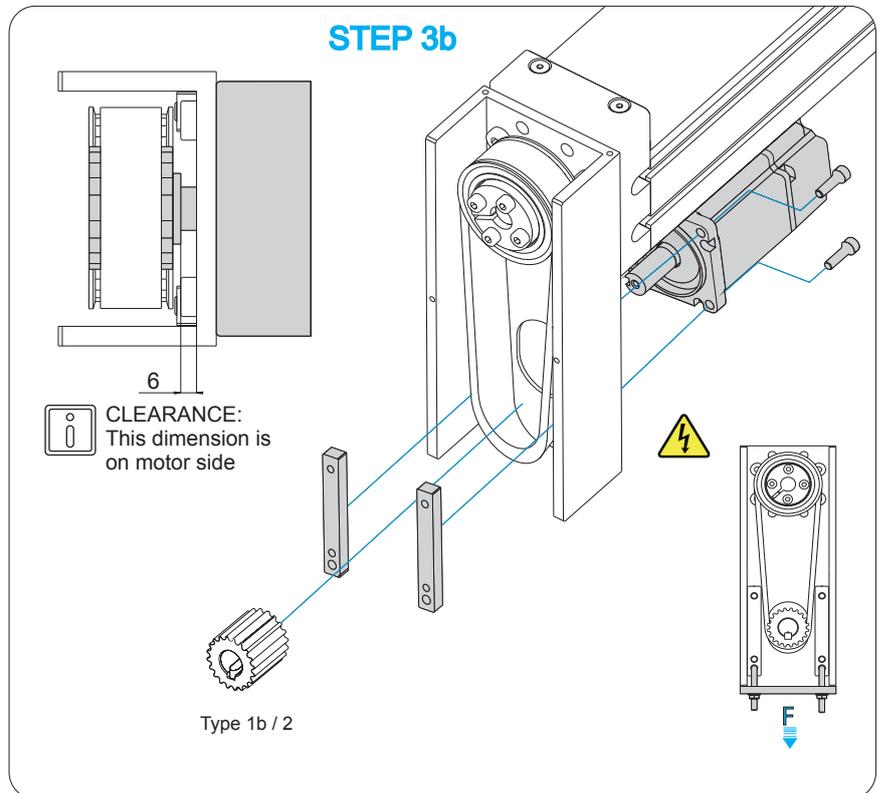
RA TIO i:=1

STEP 3a: Mount the motor onto the housing and lightly tension the tightening screws of the motor.
 When the motor is mounted, mount the belt sprocket with the tension unit onto the motor journal.
 Adjust the clearance as shown in the picture. Tension the tension unit. Tension the motor with the belt with the pretensioning force F and tighten the motor down on the housing. The pretensioning force F depends of the size of the Linear Unit and motor.



RA TIO i:=1,5 or 2

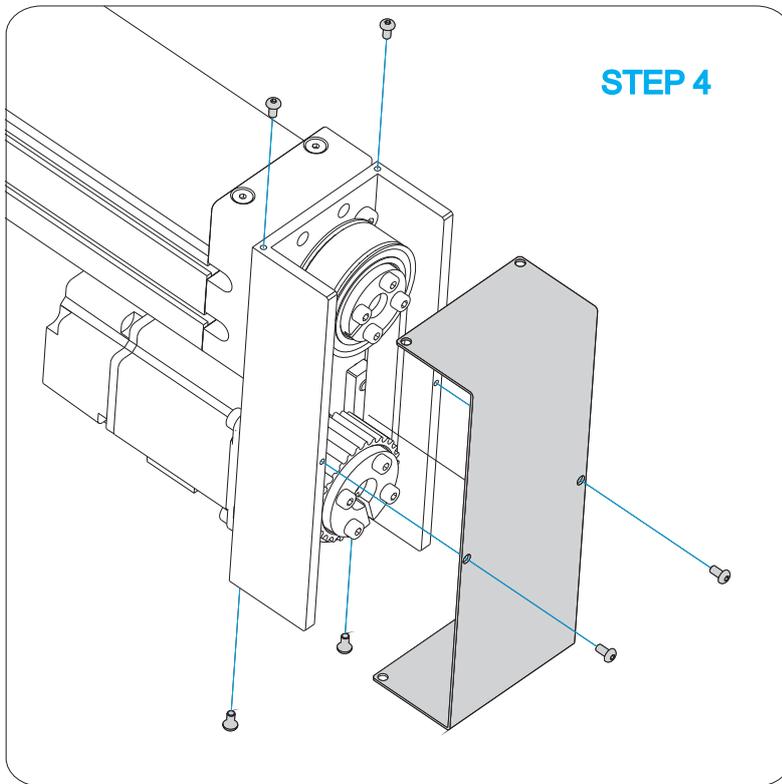
STEP 3b: Mount the motor onto the housing and tension lightly the tightening screws of the motor.
 When the motor is mounted, mount the belt sprocket tension unit onto the motor journal.
 Adjust the clearance as shown on the picture. Tension the tension unit. Tension the motor with the belt with the pretensioning force F and tighten the motor down on the housing. The pretensioning force F depends of the size of the Linear Unit and motor.



 For tightening torques for the screws please refer to page number 1.005.0

MOUNTING

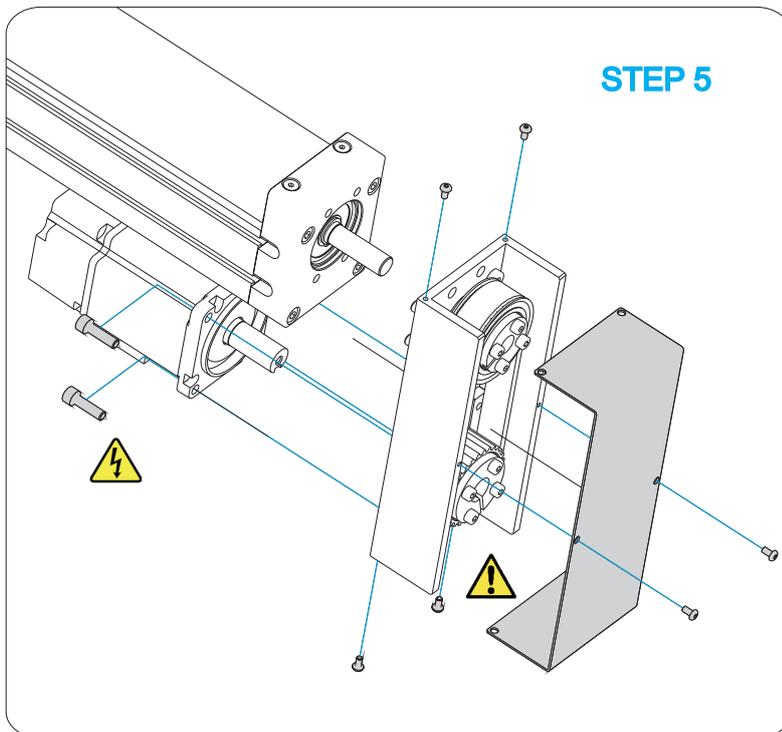
Motor Side Drive - MSD



STEP 4: Mount the protection cover on the housing of the motor side drive - MSD. Tighten the screws.

 Before the initial start-up, check if everything is OK:

- electrical wiring
- mounted elements
- tightened screws
- correct tensioning of the belt



STEP 5: To dismount the motor side drive - MSD, take precautions, such as turning of the power supply and prevent the carriage from dropping, if it is in vertical position. To dismount the MSD properly, look at the mounting procedure.

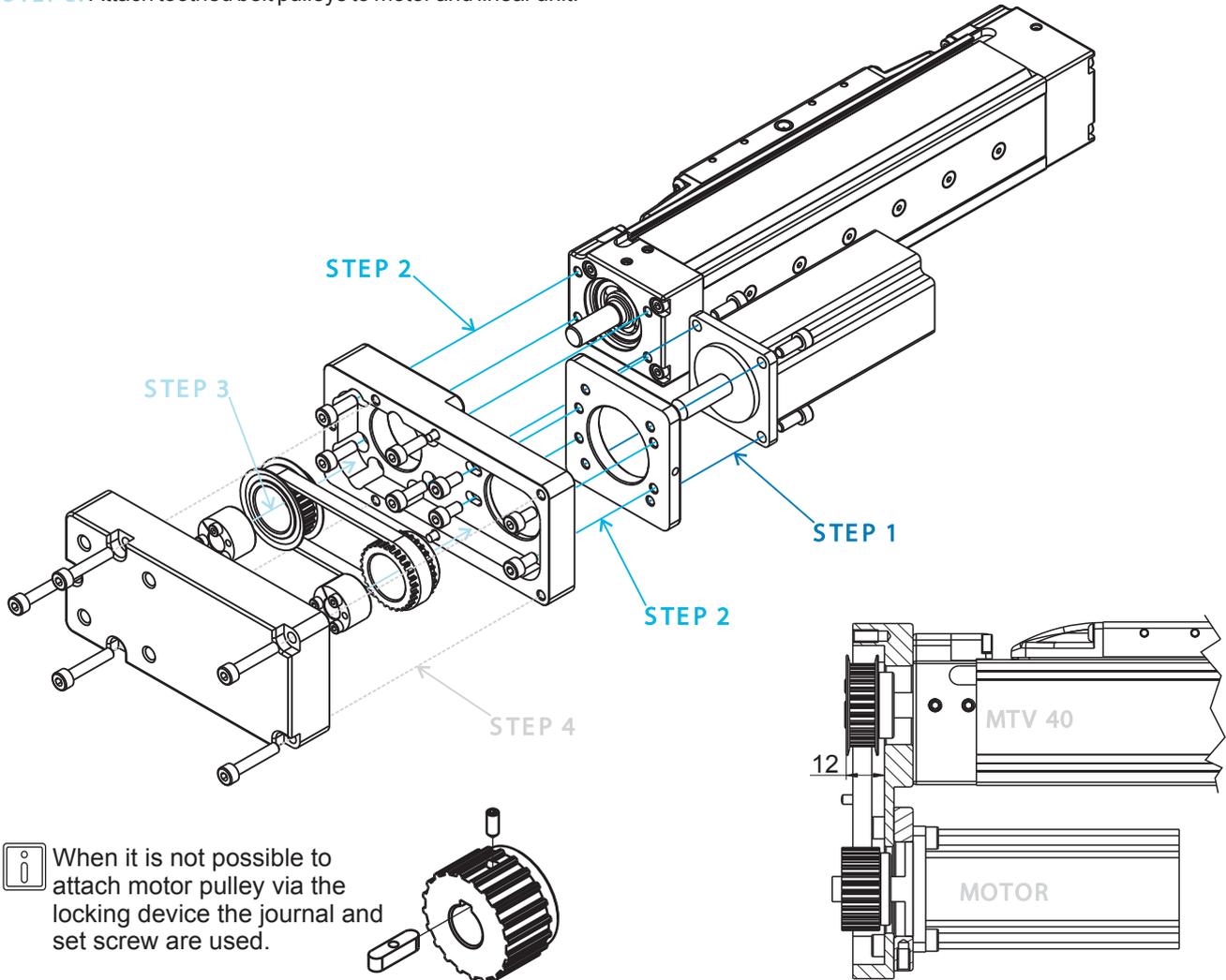
 Take care when loosening the mounting screws on the motor when the toothed belt is tensioned.

 For tightening torques for the screws please refer to page number 1.005.0

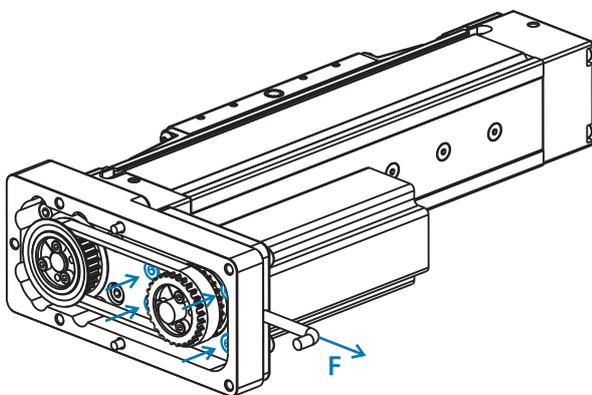
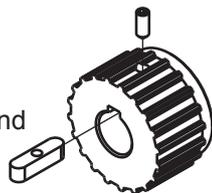
MOUNTING

Motor side drive (MSD) - MTV 40

- STEP 1:** Attach motor side drive plate to the motor and housing to the linear unit.
- STEP 2:** Attach motor with plate to the housing. do not tighten the screws - the plate needs to slide on the housing for tightening the toothed belt.
- STEP 3:** Attach toothed belt pulleys to motor and linear unit.



 When it is not possible to attach motor pulley via the locking device the journal and set screw are used.



STEP 4: Attach MSD cover to the housing with five screws and remove tensioning hook if needed.

 For tightening torques for the screws please refer to page number 1.005.0

Tensioning the toothed belt
 To tension the toothed belt, apply specified force to the MSD plate, in such direction that the belt tensions. While the force is applied, tighten the screws that attach the MSD plate to the MSD housing. Force can be applied to the tensioning hook or alternatively directly to the thread in the side of the plate. The tensioning force must not exceed specification. It should be noted that excessive tensioning force may result in breaking of the motor or linear unit shaft.

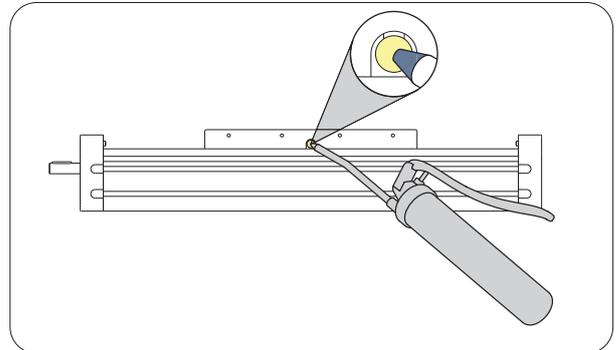
MAINTENANCE



For each Linear Unit the basic lubrication is done in the factory before shipment. All bearings have been lubricated for life and do not require any additional lubrication under normal operating conditions.

Lubrication of the ball nut and the carriage

Ball nut and carriage lubrication is done via lubricating nipple DIN 3405 D at the center of the carriage.



Lubrication of the cover strip

Apply a thin oil film to the cover strip. To ensure that the oil is applied equally on the cover strip move the carriage up and down the profile. Please note that, if the linear unit is working in an area with many dust particles, the lubrication must be reapplied more often.

Lubricant

Recommended grease for the lubrication

Lubcon TURMOGREASE LC 802 EP

Recommended oil for steel cover strip

Lubcon TURMOFLUID ED 13



For lubrication and re-lubrication of linear units only grease lubricant must be used! Do not use the grease which contains solid parts!

Lubricant quantities and intervals

	Ball nut type	Ballscrew [d x l]	Travel path [km]	Grease relubrication quantity
				[cm ³]
MTV 40	RSY	12 X 5	250	0,7
		12 X 10	500	1
MTV 65	RSY	16 X 5	250	4
		16 X 10	500	4,2
		16 X 16	800	4,4
MTV 80	RSY	20 X 5	250	5
		20 X 10	500	6
		20 X 20	1000	7
		20 X 50	2500	9,5
MTV 1 10	RSY	32 X 5	250	8,6
		32 X 10	500	8,9
		32 X 20	1000	9,4
		32 X 32	1600	11,8



The lubrication intervals in the table are sufficient for normal operating conditions. For any special operating conditions please contact us.

The lubrication intervals are every 500 operating hours or after the travel path specified in the table is reached. The lubrication intervals are at what is reached sooner.

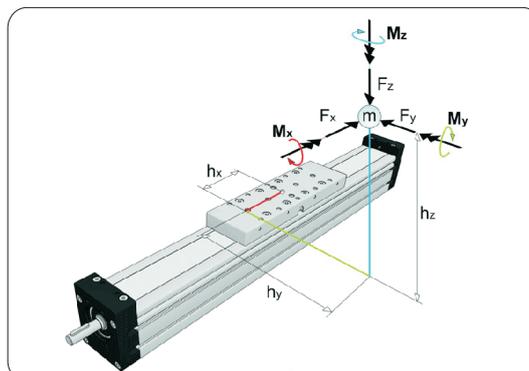
Normal operating conditions

Temperature: 0 °C - 60 °C

Travel speed: = 1 m/s

Ball screw speed (RPM): 2500 1/min

Load: = 0.2 C



REPLACEMENT OF ASSEMBLIES - MTV SERIES



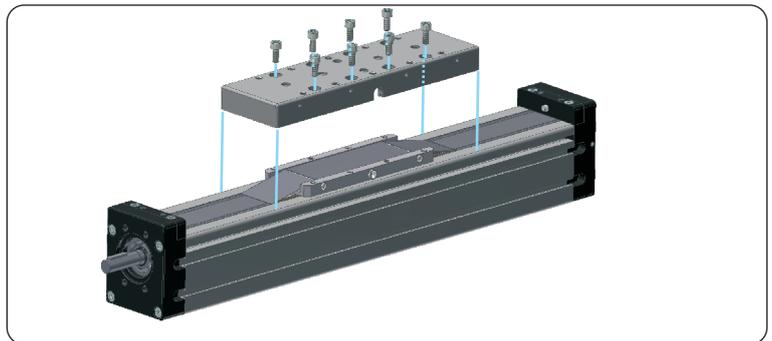
- any furthermentioned modifications, without our written consent, will void our liability in respect of the linear unit,
 - before any operation make sure that the module is disconnected from the power grid to prevent possible injuries caused by the electrical current or moving parts,

Removing the cover plate

MTV 65, MTV 80, MTV 110
 STEP 1: remove the screws.

STEP 2: remove the cover plate.

Note: for installing the cover plate reverse the order of steps.



Replacing the protection strip

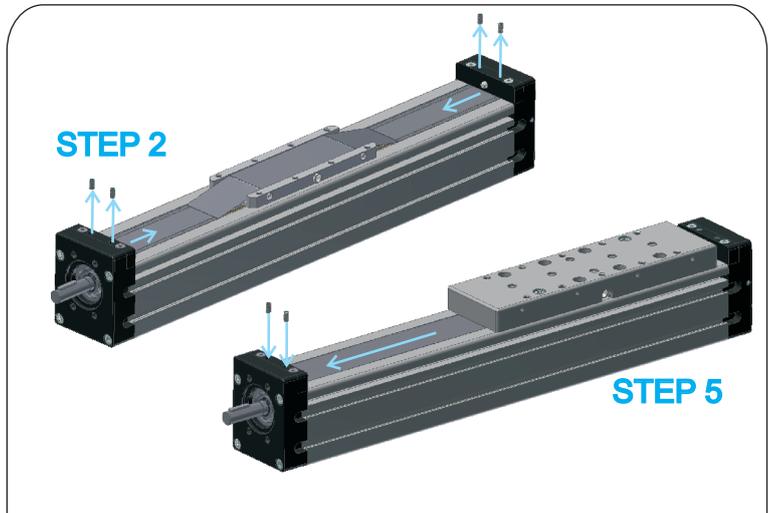
MTV 65:
 STEP 1: remove the cover plate.

STEP 2: loosen set screws holding the protection strip.

STEP 3: remove protection strip and replace it with new one.

STEP 4: attach the protection strip to one end of the profile and screw cover plate on the carriage.

 STEP 5: slide the carriage as close to the fixed end of the protection strip as possible. Slide with a hand over the protection strip towards the loosened end to tighten it. At the end block hold the protection strip tensioned and tighten two set screws to fix the strip.



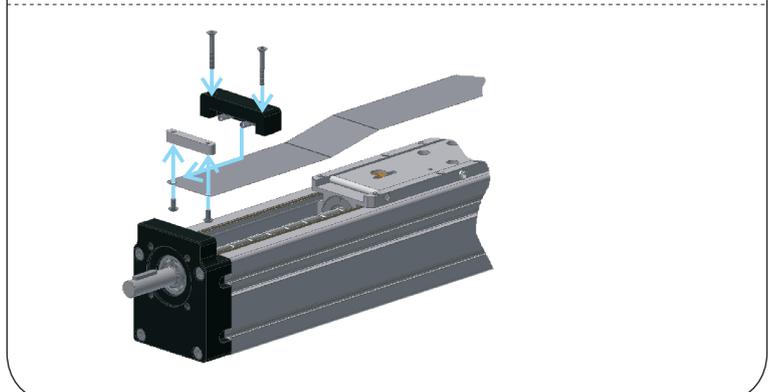
MTV 80, 110:
 STEP 1: remove the cover plate.

STEP 2: unscrew tensioner cover screws and remove cover.

STEP 3: remove protection strip and move tensioner plates to the new protection strip.

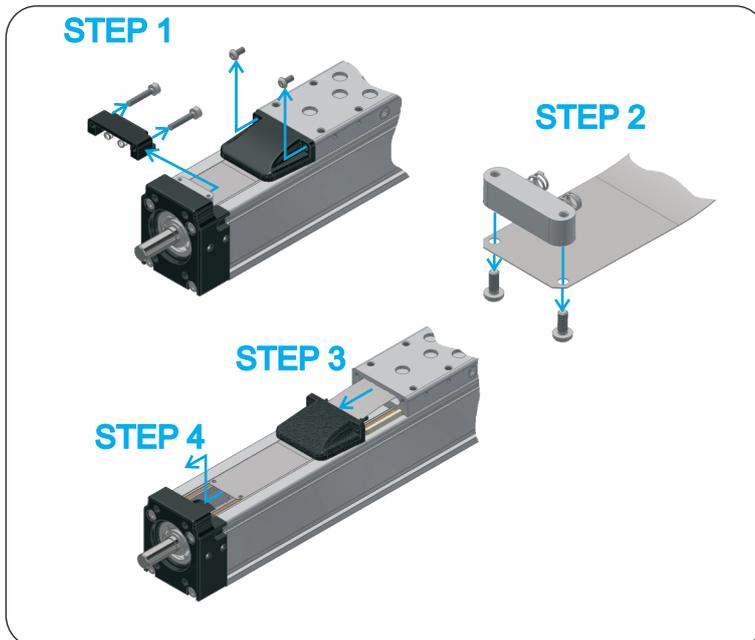
STEP 4: place protection strip with attached tensioner plates on the linear unit.

STEP 5: reinstall tensioner covers and tighten the screws. Make sure that springs lie in appropriate holes. Reinstall the cover plate.



Note: all the screws (except set screws) must be glued (Loctite 243) and screwed with the torque specified in the table on page 1.005.0 unless written otherwise at the individual steps.

Replacing the protection strip



MTV 40

STEP 1: on both sides remove the screws that hold protection strip tensioner and carriage endblock. Take care not to lose springs in one of the tensioners!

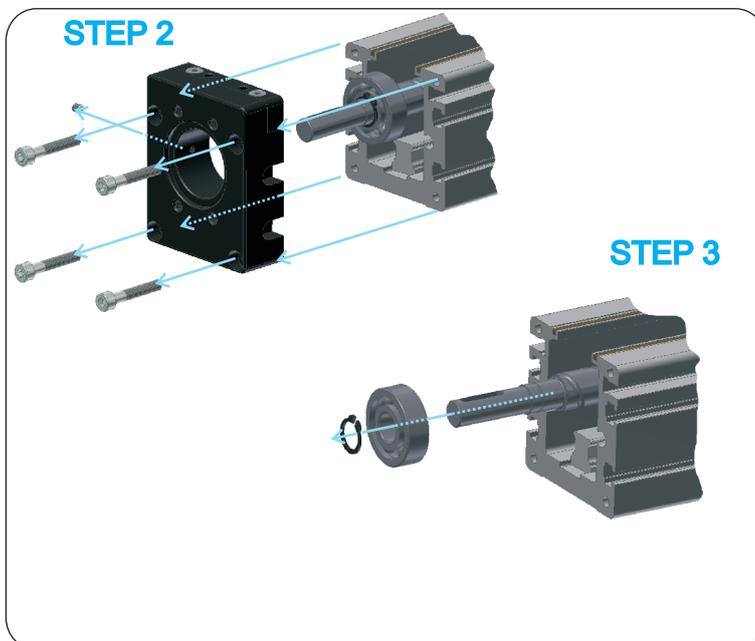
STEP 2: remove tensioner tiles from protection strip by removing two screws on each side.

STEP 3: slide carriage endblock away from the carriage and off the protection strip.

STEP 4: remove protection strip from the carriage.

STEP 5: install new protection strip to the linear unit by reversing all the steps.

Replacing the floating bearing



STEP 1: remove the cover plate and shaft key if necessary. Detach the protection strip from front end block.

STEP 2: remove four screws attaching the frontal end block to the profile and the set screws securing the bearing. Remove frontal end block.

STEP 3: remove the circlip and bearing from the shaft. Do not pull the bearing by outer ring!

STEP 4: put new bearing on the spindle and secure it with circlip. Do not push the bearing by the outer ring.

STEP 5: slide the frontal end block back in the place and secure it with screws. Secure the bearing with the set screw. Have the carriage as close as possible to the frontal end block during this step.

STEP 6: attach the protection strip and cover plate to the module as it is described in previous chapters.

Note: all the screws (except set screws) must be glued (Loctite 243) and screwed with the torque specified in the table on page 1.005.0 unless written otherwise at the individual steps.

Removing the spindle and spindle nut

MTV 65, MTV 80, MTV 110

STEP 1: remove the frontal end block and the floating bearing as described in the previous chapters.

STEP 2: move the carriage as close to the end of the spindle as possible. Remove key holding screw and nut key. Remove the carriage nut and the ball nut.

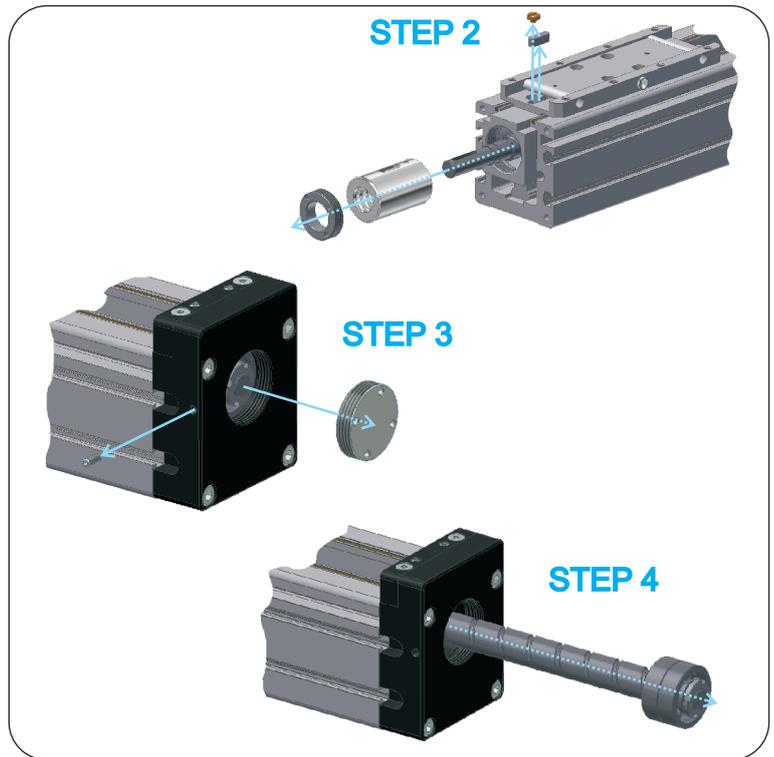
Note: when removing the ball nut put it on the tube that has outer diameter the same as is inner diameter of the spindle so that the balls will not fall out.

STEP 2 MTV80: remove the screws in the rear end block and slide the carriage to that end to unscrew the carriage nut.

STEP 3: loosen the locking set screw on the side of the rear end block and remove the bearing cover.

STEP 3 MTV80: remove the spindle, ball nut and the rear end block. Loosen locking set screw in the side of the rear end block. Remove the ball nut from the spindle.

STEP 4: slide the spindle with fixed bearing out of the rear end block.



MTV 40

STEP 1: remove the frontal end block, the floating bearing and protection strip as described in the previous chapters.

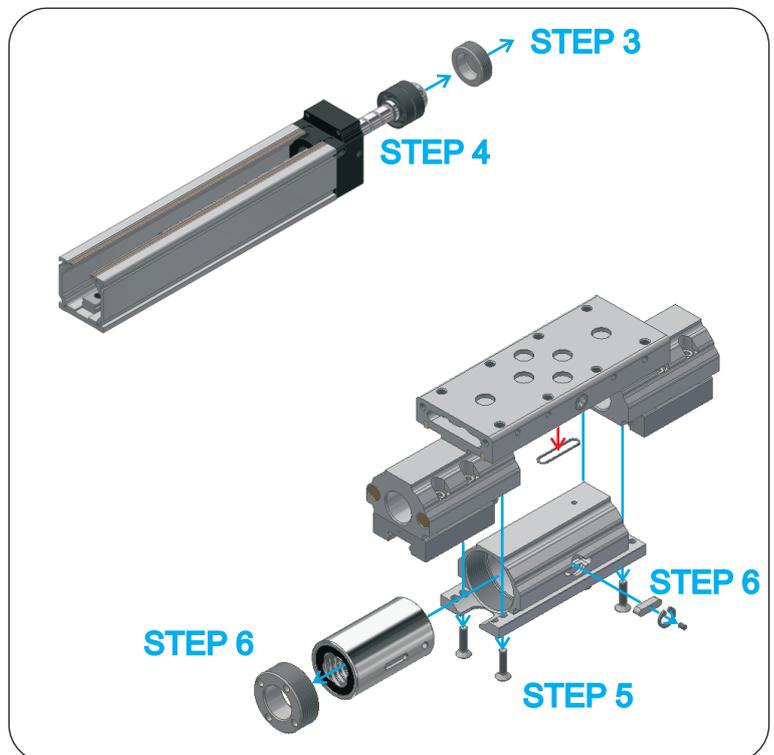
STEP 2: remove carriage from the linear unit.

STEP 3: loosen the locking set screw on the side of the rear end block and remove the bearing cover.

STEP 4: slide the spindle with fixed bearing out of the rear end block.

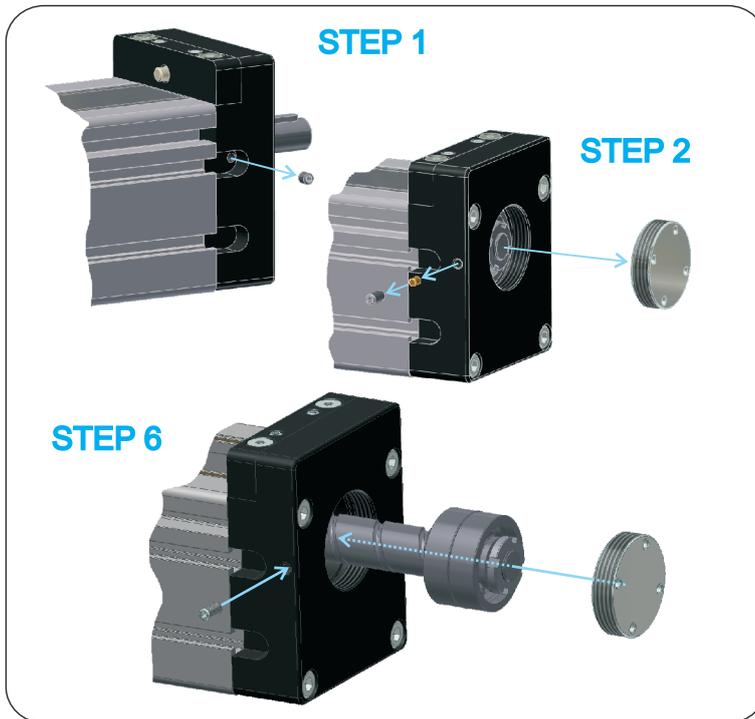
STEP 5: Remove four screws from the carriage and remove casing with the ball nut.

STEP 6: remove carriage nut, circlip and nut key. remove ball nut from the casing.



Note: all the screws (except set screws) must be glued (Loctite 243) and screwed with the torque specified in the table on page 1.005.0 unless written otherwise at the individual steps.

Replacing the fixed bearing



STEP 1: slide the carriage as close as possible to the front end block and remove the set screw(s) in the front end block, save the rubber cylinders and reuse them in step 6.

STEP 2: remove set screw and the bearing cover from the rear end block and save the brass cylinder (reuse it in step 6).

STEP 3: slide the carriage towards the rear end block together with the spindle, so that the fixed bearing comes out of the rear end block.

STEP 4: remove fixed bearing. Save the spacing ring that lies between two bearings.

STEP 5: mount new fixed bearing. Insert the spacing ring between two bearings and make sure that the bearings are turned correctly. **MA**

STEP 6: assemble the module back together by:
 - sliding the carriage towards frontal end block,
 - inserting the fixed bearing cover (do not use glue),
 - inserting the set screw that was removed from frontal end block and one from rear end block. Tighten set screw(s) in the frontal end block to 1 Nm and then loosen it for half a turn.

Removing the carriage

MTV 65, MTV 80, MTV 110

STEP 1: remove the spindle and the ball nut from the linear unit as described in previous chapters.

STEP 2: slide the carriage from the module.

Note: all the screws (except set screws) must be glued (Loctite 243) and screwed with the torque specified in the table on page 1.005.0 unless written otherwise at the individual steps.

Replacing the rail

Note: when replacing the rail consider that if the rail is damaged it is possible that the carriage is also damaged. We recommend that you change rail and carriage together as this is the only way to ensure smooth operation.

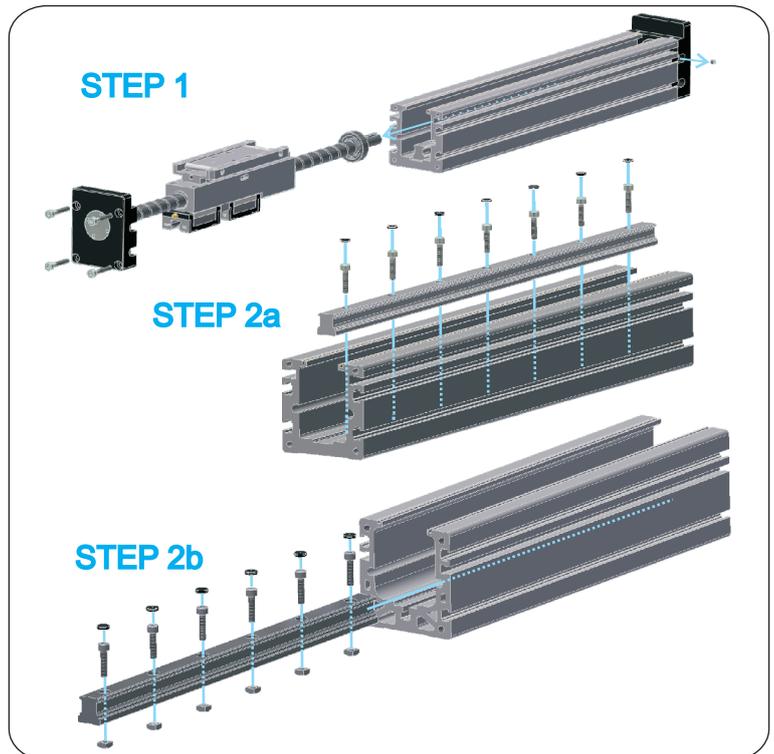
STEP 1: remove the cover plate and protection strip. Unscrew screws in the rear end block and loosen set screw(s) in the frontal end block. Slide the carriage with the spindle and ball nut from the module.

STEP 2a - MTV 40, 65: remove plastic plugs and screws from the rail and remove rail from the module. On MTV 40 the screws connect the rail from the bottom side of the profile.

STEP 2b - MTV 80, 110: remove plastic plugs, loosen the screws and slide the rail with screws out of the profile.

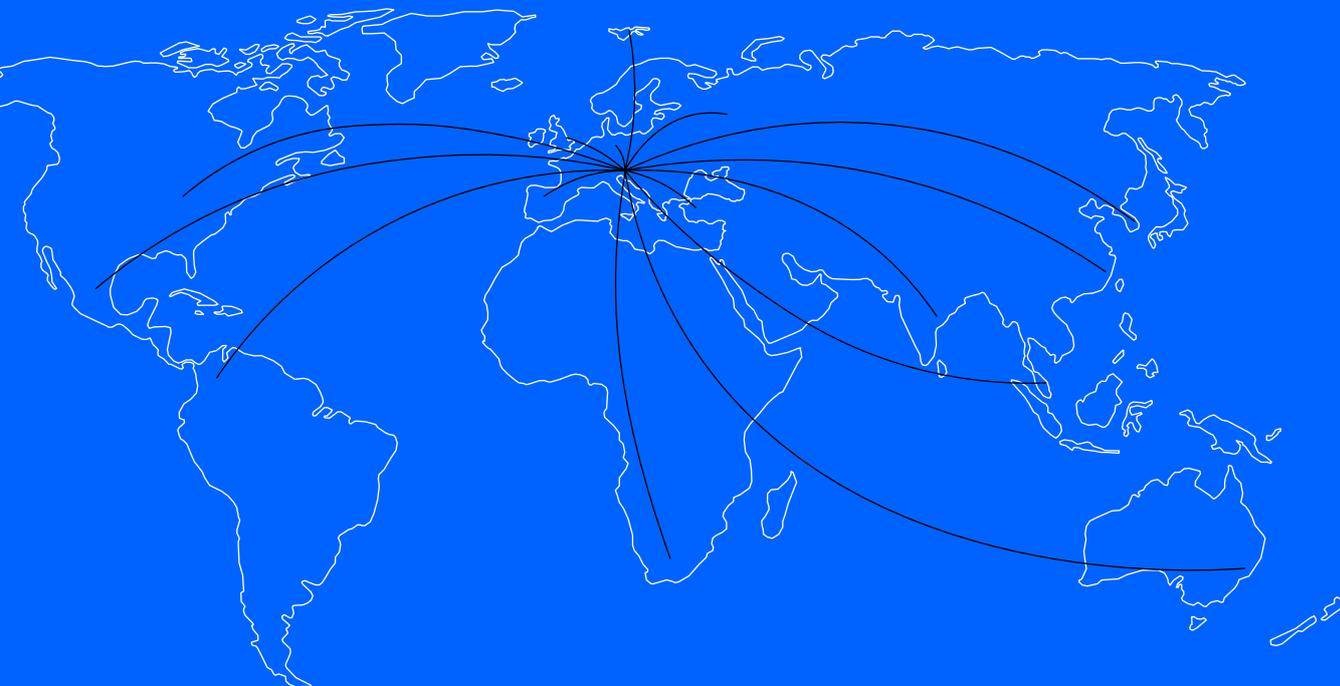
 STEP 3: replace the rail with new one and insert it into the profile. Center the rail in the profile with caliper and tighten the screws.

STEP 4: finish by installing the carriage, spindle, frontal end block... by reversing steps in previous chapters.



Note: all the screws (except set screws) must be glued (Loctite 243) and screwed with the torque specified in the table on page 1.005.0 unless written otherwise at the individual steps.

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