

# Service - Safety Manual

Mounting and maintenance instructions

Linear Units

## LT2 series

Code Unit \_\_\_\_\_

Serial number \_\_\_\_\_

Date \_\_\_\_\_



# Linear Units LT2 series

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**Note:** Safety signs used in the instruction manual



This symbol indicates possible danger for persons. Please follow the instructions to prevent injury.



This symbol indicates possible danger for the machine. Please follow the instructions to prevent damage to the machine.



This symbol indicates special information or

- on optimum use or
- on easier operation of the machine.

## 1 Safety

The Linear Unit has been constructed according to current state-of-the-art principles and valid regulations. Special attention has been given to the safety of the user. The Unit complies with the EU Machinery Directive, harmonized standards, European standards or the corresponding national standards

This is confirmed by a manufacturer's declaration.

It is forbidden to start up the linear units until it has been ensured that the machine or plant in which it has been installed complies with the regulations in the EU Machine Directive, the harmonized standards, European standards or the corresponding national standards.



***Proper connections are essential to comply with the law on the electromagnetic compatibility of machine components.***

***Almotion only supplies the mechanical parts and never any electricity or electromagnetic parts, therefore we not accept any liability in this.***

Any electrical installation must be done by a qualified EMC technician.

**The following regulations apply:**

- relevant accident prevention regulations
- generally accepted safety regulations
- EU Directives
- other applicable standards
- national regulations

### 1.1 Significance of the instruction manual

The instruction manual belongs to the designated unit and:

- must be kept readily accessible until the machine is discarded,
- must be handed over to owners or borrowers if the unit is sold or lent.

Always contact the manufacturer if there is anything that you do not understand properly in the instruction manual.



***It is unavoidable that there are still a few risks for persons and property associated with these components. Therefore, every person who works with this unit and is involved with transport, installation, operation, maintenance and repair of the unit must be trained and be aware of the possible dangers. The instruction manual, in particular safety instructions, must be carefully read, understood and followed.***



***No knowledge or inadequate knowledge of the instruction manual voids the liability of Lineartechnik®/Almotion® for any claims. The operator is therefore recommended to have written confirmation of staff training.***

## 1.2 Intended use

The mechanical linear drive units of **LT-series units** are designed exclusively for:

- positioning, continuously moving, conveying, palletizing, loading, unloading, clamping, tensioning, checking, measuring, handling, manipulating, and pushing work pieces or tools in industrial machines.

In general, the main uses of the **LT-series** must be taken into account.

Therefore always consult your supplier.

Any other or additional use is considered as unauthorized. The manufacturer is not liable for damages resulting from such applications. The user is solely responsible. Because of the versatility of the linear unit, the user is always responsible when the use begins

The linear units may only be used in an industrial environment as a part of a machine. The machine has to be developed according to the EG-Directives 2006/42/EG. This is to guarantee the compatibility of machines.

## 1.3 The operator's obligations

In accordance with EU Directive 89/655/EEC Art. 6(1) and 7 on Use of Work Equipment and EU Directive 89/391/EEC Art. 1(1) and 6(1), the operator is obliged to instruct, in particular with regard to safety, staff who are involved with assembly, operation, maintenance, repair or disassembly of a linear unit.

In accordance with EU Directive 89/655/EEC Art. 4a (Use of Work Equipment), the operator is also obliged to check the machine before initial start-up and after repairs and any malfunctioning.

## 1.4 Operating staff

The linear units have been constructed according to state-of-the-art principles and recognized safety regulations. Nevertheless, danger may still be associated with their use. Therefore, the machine should only be operated by competent and trained staff and only used in accordance with their intended use.

Any person involved with assembly, operation, maintenance or disassembly of a linear unit of machine must have read and understood this instruction manual, in particular Chapter 1 "Safety".

**Work on conductive parts, which are never supplied by Almotion, e.g:**

- installation of safety limit switches,
  - installation of a drive and testing of its direction of rotation,
- should be done by trained electricians only !**



### **Notes and signs for risks and danger zones**

The linear units are designed to be safe. However, should there be any remaining risks for persons or property, the user must indicate these risks by the use of signs or written instructions on procedures.

### **Signs and adhesive labels**

Keep marks, signs and adhesive labels so that they can be read in full and always follow them. Replace damaged or illegible signs and labels.

Warranty claims can only be taken in consideration if the original label with the serial number is attached on the unit.

## **1.5 Modifications and alterations**

The linear units may not be modified neither for construction nor safety reasons without written approval of Almotion. Any unauthorized modification will void our liability. Wearing parts and spare parts may only be replaced by our service engineers themselves or after consulting our service department. The new components to be used must always be approved in writing by the manufacturer

In general, safety or protection devices may not be removed or made inactive.

If special add-on parts are used, follow the manufacturer's assembly instructions.

### **The following regulations apply:**

- Relevant accident prevention regulations.
- Generally accepted safety regulations.
- EU Directives.
- National regulations.

## **1.6 Warranty**

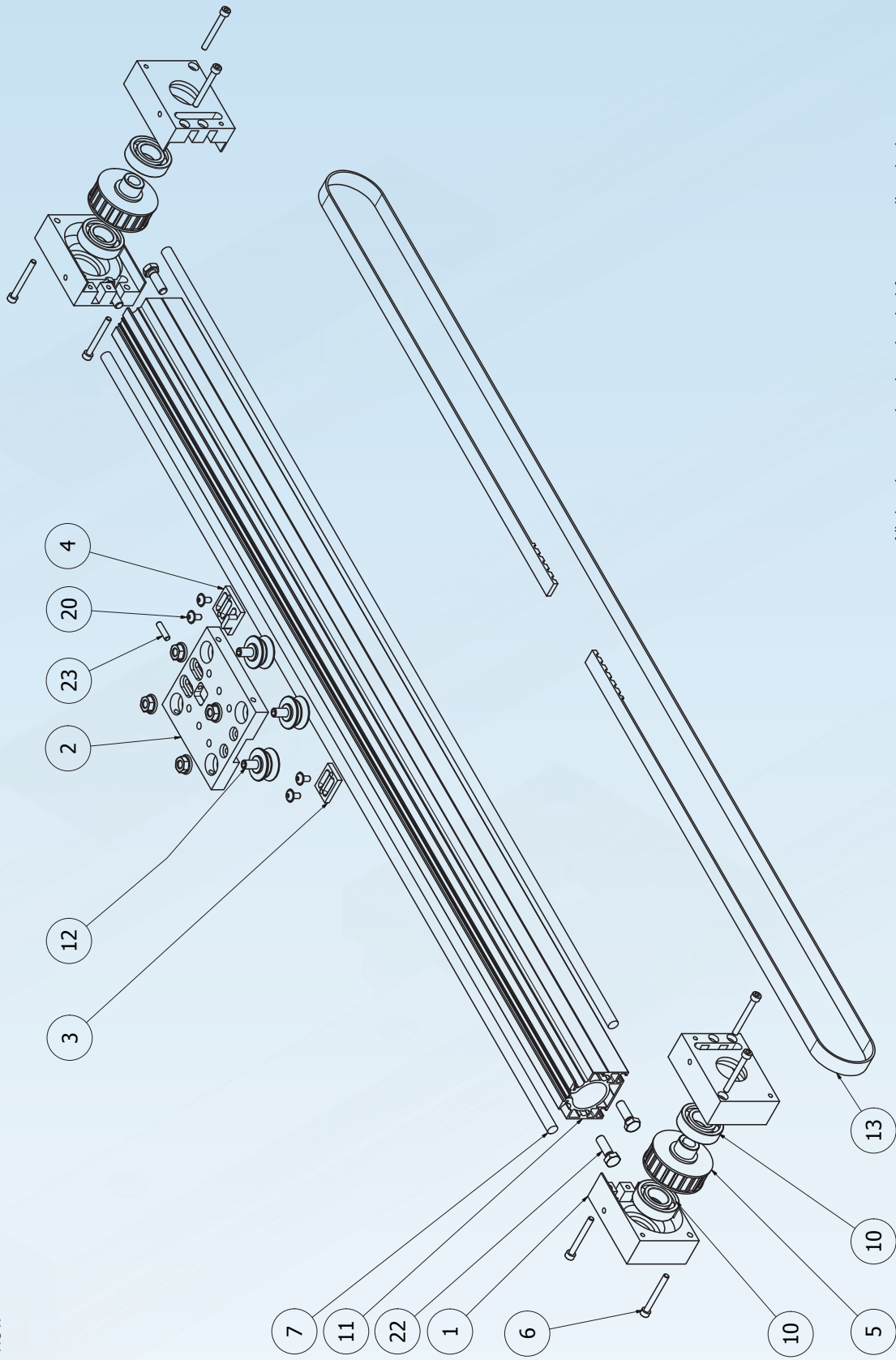
The warranty conditions are laid down in the terms and conditions of delivery and payment issued at time of the order.

Any claim for warranty is voided if :

- the machine has not be used in accordance with its intended use,
- the instructions stated in this instruction manual have not been followed,
- the unit has been modified without the manufacturer's permission,
- the screws sealed by locking varnish are unlocked.
- the original label with the serial number is not attached on the unit.













The manufacturer is only liable if original spare parts have been used for maintenance and repair work.

2.1 Assembly of the linear unit LT2-TR-C8  
Exploded view






All drawings can be downloaded from [www.linear.nl](http://www.linear.nl)

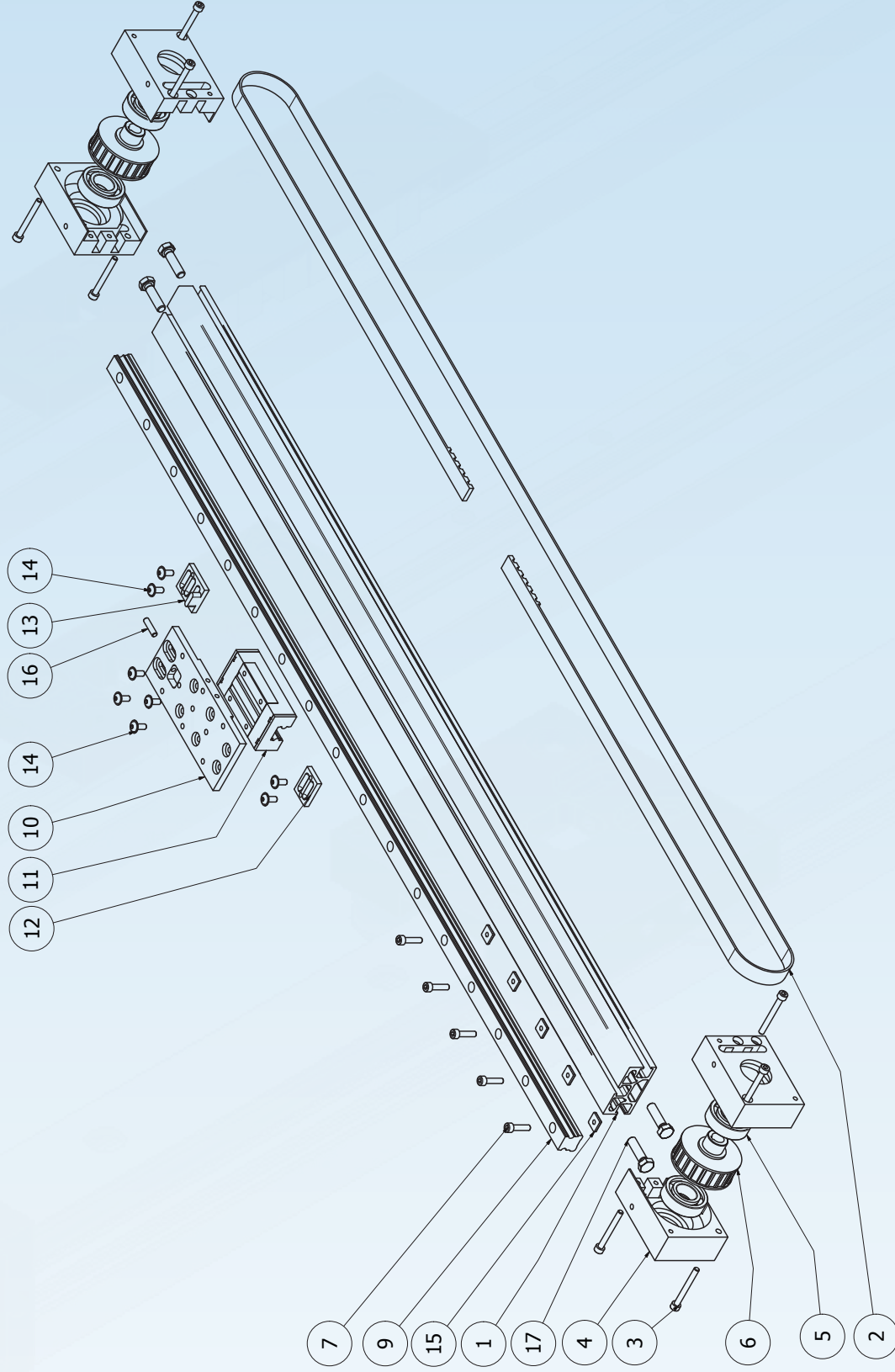
## 2.2 Parts list LT2-TR-C8

Item	Part Number	Thumbnail	QTY	Description
1	7070-7-2		4	End Cap
2	7070-9-2A		1	Carriage
3	7070-9-3		1	Belt Clamp fix 16AT10
4	7070-9-5		1	Belt Clamp adj 16AT10
5	70706V2		2	Pulley 16AT10-36
6	DIN912-M5x45		8	Socket Head screw
7	Hardened Shaft 10h6		xxx	CF53
10	6004-2Z		4	Belt Clamp Tension
11	LT2 profile C8		xxx	Aluminum Profile
12	E208		2	Guidewheel Excentr
12	C208		2	Guidewheel Centr
13	Belt 16AT10		xxx	PU Tooth Belt At10 b=16

Item	Part Number	Thumbnail	QTY	Description
20	ISO7380F-5x10		4	Low head Flange Hex Nut
22	DIN931-M8x25		2	Hex Screw
23	DIN913-M5x25		2	Hex Socket Set Screw
<u>Notes</u>				













2.3 Assembly of the linear unit LT2-TR-S20  
Exploded view







All drawings can be downloaded from [www.linear.nl](http://www.linear.nl)



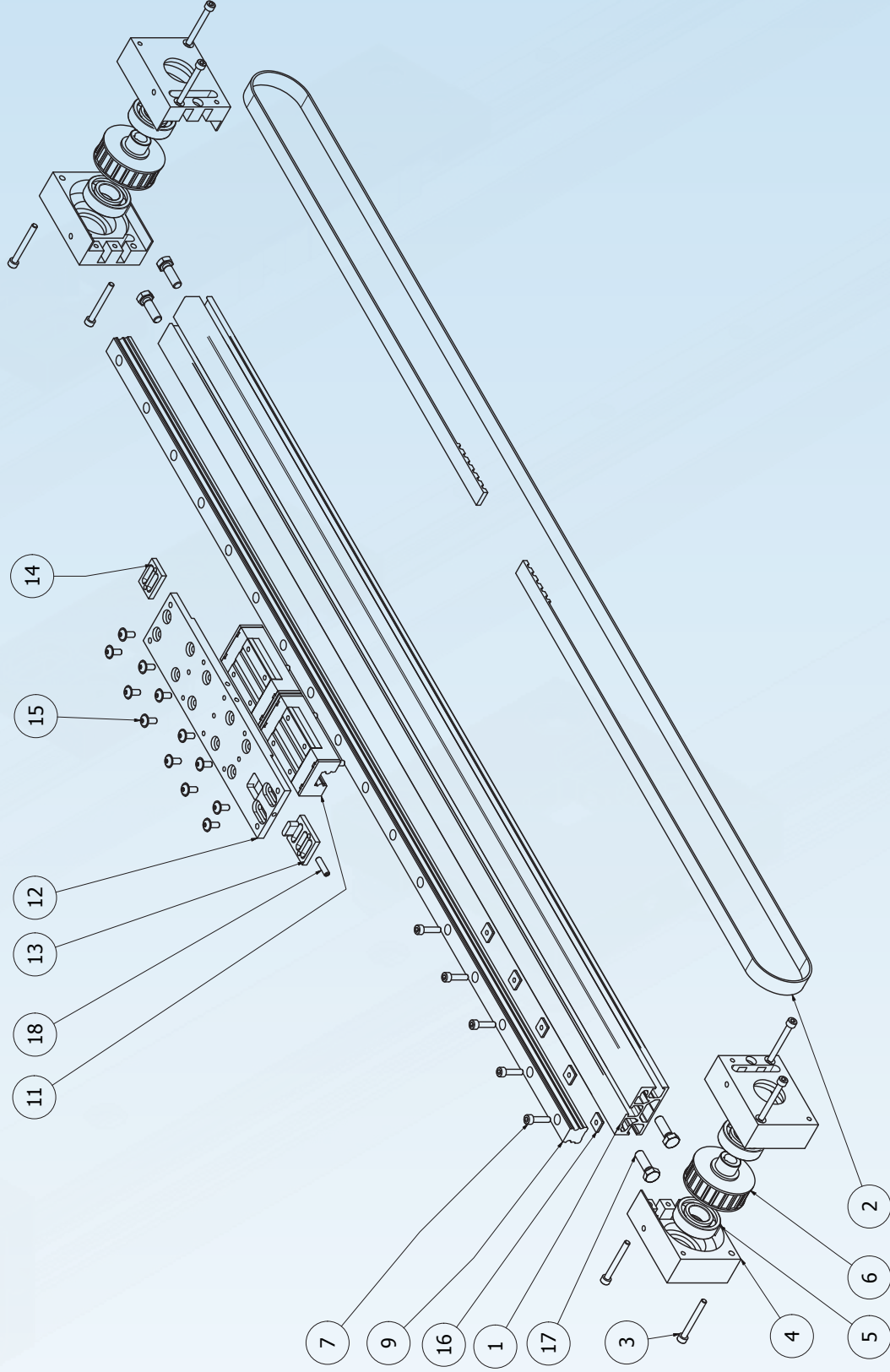
## 2.4 Parts list LT2-TR-S20

Item	Part Number	Thumbnail	QTY	Description
1	LT2 profile rail		xxx	Aluminum Profile
2	Belt 16AT10		xxx	Rail guide
3	DIN912-M5x45		1	Guide Carriage Block
4	7070-7-2		1	Carriage Plate
5	6004-ZZ		4	Socket Head screw
6	70706V.2		1	Belt Clamp Fix
7	7070-9-5-5		1	Belt Clamp Tension
9	HGR-20-R-xxx-H		xxx	Rail Guide HIWIN
10	7070-9-1		1	Carriage
11	QHH-20-CA-Z0-H		1	Guide Block
12	7070-9-3		1	Belt Clamp fix 16AT10
13	7070-9-5		1	Belt Clamp adj 16AT11

Item	Part Number	Thumbnail	QTY	Description
14	ISO7380F-5x12		8	Low head Flange Hex Nut
15	21,1320-M5		4	Square Nut 13x13 M5
16	DIN913-M5x20		1	Hex Socket Set Screw
17	DIN933-M8x25		4	Hex Screw
<u>Notes</u>				

2.5 Assembly of the linear unit LT2-TR-S20D  
Exploded view



All drawings can be downloaded from [www.linear.nl](http://www.linear.nl)

## 2.6 Parts list LT2-TR-S20D

Item	Part Number	Thumbnail	QTY	Description
1	LT2 profile rail		xxx	Aluminum Profile
2	Belt 16AT10		xxx	PU Tooth Belt A10 b=16
3	DIN912-M5x45		8	Socket Head screw
4	7070-7-2		4	End Cap
5	6004-ZZ		4	Ball Bearing
6	70706V.2		2	Pulley 16AT10-36
7	7070-9-5-5		8	Socket Head screw
9	HGR-20-R-xxx-H		xxx	Rail Guide HIWIN
11	QHH-20-CA-Z0-H		2	Guide Block
12	7070-9-1-D		1	Carriage
13	7070-9-5		1	Belt Clamp adj 16AT10
14	7070-9-3		8	Belt Clamp fix 16AT10

Item	Part Number	Thumbnail	QTY	Description
15	ISO7380F-5x12		4	Low head Flange Hex Nut
16	21,1320-M5		1	Square Nut 13x13 M5
18	DIN913-M5x20		4	Hex Socket Set Screw
17	DIN933-M8x25			Hex Screw
				<u>Notes</u>

## 2.7 Toothed belt AT5 and AT10

To make sure the toothed belt has the correct pre-tension it is advised to use a toothed belt tension gauge. For example the Contitech VSM 1 tension gauge for drive belts. If it's not available, please contact your supplier.

## 2.8 Hardened wheels

The hardened wheels are correctly adjusted, if you can block them with your fingers (with some effort) while pushing the carriage.  
If you want more information about this, please contact your supplier.

## 3 Lubrication

### Lubrication

During operation, occasionally check the correct function of the linear drive unit by visual inspection.

Lubrication is only required if you have a recirculating ball rail guide unit.

If you want an exact calculation of the lubrication interval, please contact your supplier.

### The following factors are important for exact determination of the lubrication interval:

- Load
- Speed
- Movement
- Temperature

### Short lubrication intervals are necessary in cases of:

- Effects of dust and moisture
- Heavy loading
- High speed (up to  $V_{max.}$ )
- Short travel



Use only Rolling bearing grease (petroleum-based polycarbamide grease)

Original grease : Fuchs Lubritec URETHYN E/M2.

About 0,5 cm<sup>3</sup>/100 km



## 4 Alignment

A linear actuator with an integrated guide used in a single-axis configuration only needs to meet positioning expectations. The alignment process is straight forward as the actuator works singularly bringing its load into position without any external guidance. Examples are, work-point-to-work-point or alignment-to-fixturing on the equipment.

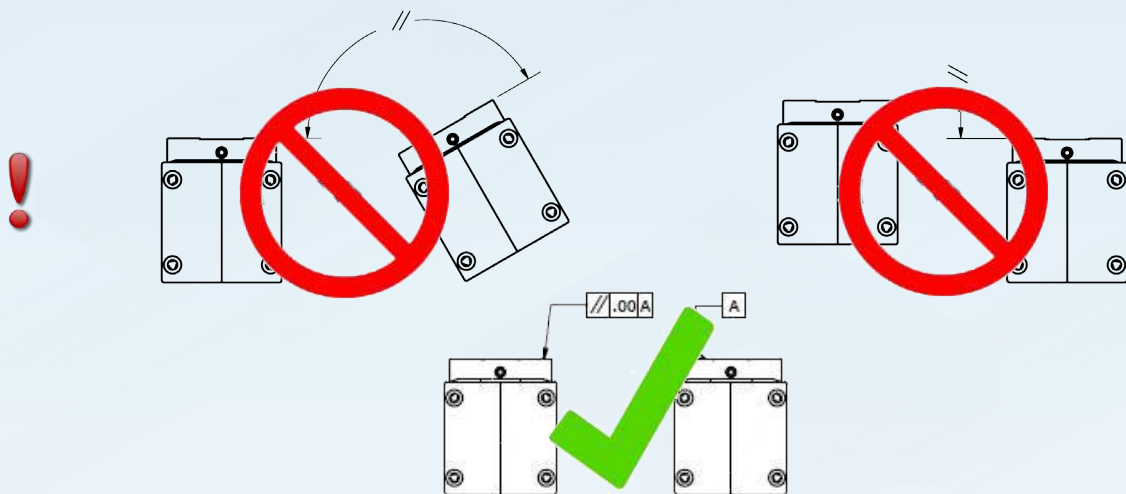
Alignment of linear actuators in multi-axis configurations becomes more challenging as multiple actuators need to work together. Therefore, mounting must consider conditions of parallelism and perpendicularity of all joined devices for optimal performance and maximum service life.

### Parallelism

There are three variables that can affect parallelism when mounting linear actuators. Answering these questions will maximize parallelism and system performance.

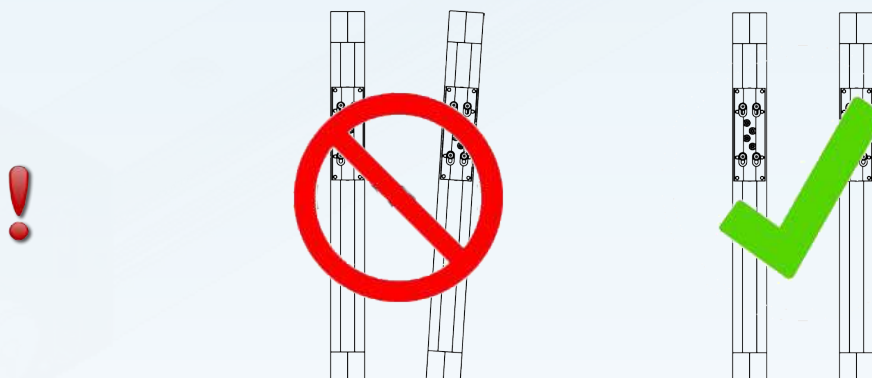
#### Carriages at the same height

Misalignment in this plane will put an unfavorable Mx-axis bending moment on the bearing system of one or both units.



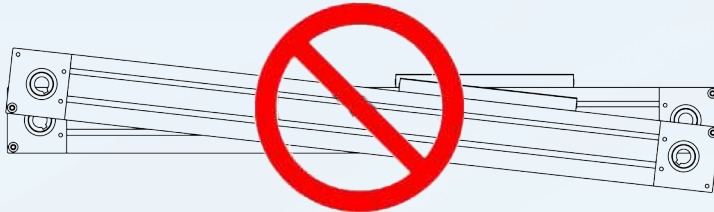
#### Consistent distance between the units.

Misalignment in this plane will apply an unfavorable side load.



## Units must be mounted level

Angular misalignment in the will apply an unfavorable bending moment in the My-axis on the bearing system of both units.



Actual tolerances related to alignment recommendations and mounting vary from actuator series. Profile ball rail systems tend to be quite rigid and alignment is more critical. Guide wheel units often have clearance, which offer some forgiveness in alignment.

When installing linear actuator mounting systems there are a number of measurement tools ranging from gauges to laser systems. Always create one axis as a reference for the X-Y and Z planes and mount the other units with respect to the reference axis. Doing so will help to get the maximum performance and longest life from your linear unit.

### Conclusion

System performance and linear actuator life are affected in many ways when linear are not mounted well. Optimal system and linear actuator performance can be achieved if the actuator and guidance system are carefully mounted so the actuators are in perfect alignment.

## 5 Mounting of the unit

The linear unit must always be fastened on clean and level surfaces.



Our linear unit is a “partly completed machinery” as described in the European Union Machinery Directive 2006/42/EC. The linear unit cannot perform itself. The linear unit is only intended to be incorporated into or assembled with other machinery or partly completed machinery or equipment, thereby forming machinery to which this Directive applies.

## 6 Manufacturers Declaration

### Declaration of Incorporation in accordance with the guidelines for engineering 2006/42/EG for incomplete machines.

The manufacturer: **Almotion bv**  
Tielsestraat 163  
6674 AB Herveld – The Netherlands

declares that the following product **LT2 series** meets the requirements of an incomplete machine according to the EC Machinery Directive 2006/42/EG.

The following basic requirements of the machinery directive 2006/42/EG according to section 1 apply: 1.1.5.; 1.3.2.; 6.1.1 .

The following harmonized standards have been applied:

DIN EN ISO 12100-1 Safety of machinery - Basic concepts, general principles for draft.

Part 1: standard concepts and methods

DIN EN ISO 12100-2 Safety of Machinery - Basic concepts, general principles for draft.

Part 2: operating instructions and specifications

Almotion commits itself to have the manual for inspection. There is also available a paper version.

Commissioning of the linear unit is prohibited until the complete machine is ready, according to the EG-Directives 2006/42/EG.

Herveld, 28-08-2009

Productmanager-Leo Peerboom



Worldwide support for  
linear units.

Please contact us for your  
local technical assistant.



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