

## Installation Instructions

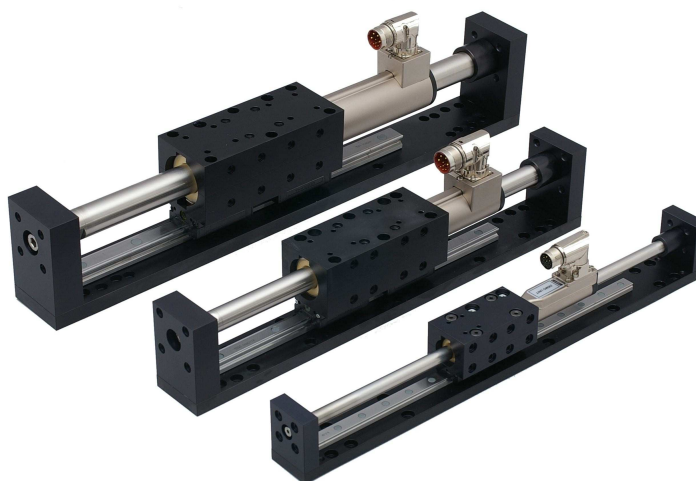
for uncomplete machines  
according to machinery directive 2006/42/EG app. VI

## Maintenance Instructions

## Declaration of Conformity and CE-marking

according to machinery directive 2006/42/EG app. II 1. B.

## **HighDynamic<sup>®</sup>** Linearmotor-stages HA01-23, HA01-37, HA01-48




## Content



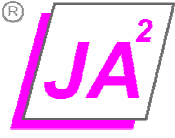
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## 1. General information

### 1.1 Introduction

	<p>This manual includes instructions for the assembly, installation, maintenance, transport, and storage of linearmotor-stages. The document is intended for electricians, mechanics, service technicians and warehouse staff.</p>
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### 1.2 Explanation of symbols

	<p>Round command symbols tell how and what to do!</p>
	<p>Triangular warning symbols are warnings of danger!</p>
	<p>This symbol stands for JA<sup>2</sup> GmbH!</p>

### 1.3 Liability



JA<sup>2</sup> GmbH, as manufacturer of the linearmotor-system products, is not responsible for any damage caused by improper use, application or handling of materials manufactured or supplied not by JA<sup>2</sup> GmbH and is not responsible for any consequential damages of any sort, relating to the use of the products.

JA<sup>2</sup> GmbH's warranty is limited to repair or replacement stated in our standard warranty policy. Product warranties are void if our systems are used with other products not manufactured by JA<sup>2</sup> GmbH, unless such use was specifically approved by JA<sup>2</sup> GmbH.

Further reference is our "AGB".

### 1.4 Copyright



This work is protected by copyright!

All rights belong to JA<sup>2</sup> GmbH!

Product names and product signets marked by ® are protected brands.



We give permission for copying this work for further machine-documentation.

Technical changes can be subject to changes!

## 2. Intended use

### 2.1 Use of linearmotor-stages



The linearmotor-stages are high dynamic actuators! According to european law and rules 2006/42/EG the actuators are incomplete machines, which are further mounted in complete machines. Their typical applications are mounting-, handling-, packaging- and test-units.

### 2.2 Mounting the incomplete machine in a complete machine



When assembling the incomplete machine, the following conditions must be met, before they can be assembled correctly and without compromising the health and safety of persons with other parts to form a complete unit:

- The installation of the machine must be carried out by qualified personnel!
- This document must be read and understood completely before installation!
- All warnings in this document must be observed!

A risk assessment for the complete machine must be implemented and respected!

### 2.3 Operating conditions



#### Conditions

- operating temperature nat. convection 0°C to 40°C
- motor temperature -10°C to +80°C for std. linearmotors
- motor temperature -10°C to +110°C for HP-linearmotors (marked with -HP).
- winding temperature error > 90°C for std. linearmotors
- winding temperature error > 120°C for HP-linearmotors
- relative air humidity ≤ 60 % not condensing
- storage temperature -15°C to +70°C

The linearmotor-stage must be protected against extreme weather conditions.





Air in storage area must not contain any harmful gases.

The max. installation altitude is 4'000 m above sea level. From 1'000 m, derating of 1 °C per 100 m is to be considered for air cooling.

Nominal operating voltage of linearmotors is ≤ 72 VDC.

### 3. Safety instructions

#### 3.1 Warnings for handling, mounting, genral use and storage of linearmotor-stages

	<p><b>Contusion</b> Sliders of linearmotors contain neodymium magnets and have a strong attractive force. Careless handling could cause fingers or skin to become pinched between sliders and iron parts. This may lead to contusions, bruises, and bone fractures. Wear heavy protective gloves when handling sliders.</p>
	<p><b>Pacemaker / implanted heart defibrillator</b> Magnetic sliders could affect functioning of pacemakers and implanted heart defibrillators. For the duration of a strong approach to a magnetic field, these devices switch into test mode and will not function properly. If you wear one of those devices keep the following distances between the pacemaker / defibrillator and slider: - 250 mm (10") for slider diameters 27 mm and 28 mm (PL01-27 / 28) - 150 mm (6") for slider diameters 19 mm and 20 mm (PL01-19 / 20) - 100 mm (4") for slider diameter 12 mm (PL01-12) Warn other persons who wear these devices to avoid getting too close to sliders.</p>
	<p><b>Magnetic field</b> Magnets integrated in the linearmotor sliders produce a strong magnetic field. They could damage TV's, laptops, computer hard drives, credit and ATM cards, data storage media, mechanical watches, hearing aids, and speakers. Keep magnets away from devices and objects that could be damaged by strong magnetic fields. Please keep a minimum distance of 250 mm (10") from the above mentioned objects.</p>
	<p><b>Combustibility</b> When machining magnets, the drilling dust can easily ignite. Machining the sliders and the magnets inside is not permitted.</p>



**Mechanical handling**

Neodymium magnets are brittle, heat-sensitive, and easily oxidized. Colliding magnets could crack. Sharp splinters could be catapulted for several meters and cause eye injury. When drilling or sawing a magnet with improper tools, the magnet may break. The heat that arises may demagnetise the magnet. The magnet will oxidise and disintegrate due to the damaged coating. Machining the sliders and the magnets they contain is not permitted.



**Linearmotor slider**

Linearmotor sliders must be handled with care, especially when not mounted in stator. Damaging or warping the slider can result in shortened life and/or failure of the motor. The slider is essentially a high-precision machine component consisting of neodymium magnets and plastic materials assembled in a thin steel tube. Do not use sliders which are already damaged on the surface (scratches, deformation, etc.). This can cause further damage to the stator.



**Effects on people**

According to the current level of knowledge, magnetic fields of permanent magnets do not have a measurable positive or negative effect on people. It is unlikely that permanent magnets constitute a health risk, but it cannot be ruled out entirely.


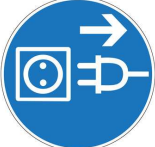




- For your own safety, avoid constant contact with magnets.
- Store large magnets at least one meter away from your body.



**Temperature resistance**

Keep sliders away from unshielded flame or heat.  
Temperature greater than 120°C will cause demagnetization.

### 3.2 Warnings for intended use




 	<p><b>Fast-moving machine parts</b> The linearmotor-Stages are fast-moving machine parts. The user must take all necessary precautions to prevent access during operation (provide covers, guards, etc.)!</p>
	<p><b>Burn hazard</b> The sliders of linearmotors can reach temperatures of 80 °C, which may cause burns upon contact.</p>
	<p><b>Bruises and sprains</b> Our linear motor-systems can apply very high acceleration, high top speeds and forces more than 1,000 N. Depending on the application and the duration of exposure corresponding protective devices must be used!</p>
	<p><b>Severing of limbs</b> Our linearmotor-systems can supply very high acceleration, high top speeds and top executives of more than 1,000 N. Depending on the application and the duration of exposure corresponding protective devices must be used!</p>
	<p><b>Risk assessment and performance level (PL)</b> A general requirement to minimize risks in installation of our products in a machine can not be given, because the residual risk of type of machine, the installation situation and the applied protective devices depends. For risk assessment and for determining the PL, we recommend the software SISTEMA for evaluation of safety-related machine control systems according to DIN EN ISO 13849!</p>




## 4. Maintenance dismounting and mounting

### 4.1 Maintenance of linearmotors


The stators will be shipped with an initial lubrication and are ready for use.


	<p><b>Maintenance of linearmotors</b>                  Maintenance will only be required if the motors run 'dry' or there is a heavy pollution of the motors.                  Under normal industrial conditions (5 day, 8 h / day) one inspection every 3 months is adequate.                  The inspection cycle must be shortened if severe motor loads or deviating conditions exist. These conditions are for example:</p> <ul style="list-style-type: none"> <li>- Permanent fouling</li> <li>- Direct sunshine</li> <li>- Low Humidity</li> <li>- Outdoor operation</li> <li>- Increased operating temperature</li> </ul>
	<p><b>Inspection of linearmotors</b>                  Inspections have to be executed according to the operating condition and the load of motors. Following points have to be checked during inspection:</p> <ul style="list-style-type: none"> <li>- Is there a film of lubricant on the slider?                      If not -&gt; Lubrication</li> <li>- Is there the lubricant not adhesive?                      If not -&gt; Cleaning (stator, slider) + Lubrication</li> <li>- Can the slider be moved easily?                      If not -&gt; Cleaning (stator, slider) + Lubrication</li> <li>- Is the slider free of scratches or dents?                      If not -&gt; Remove slider</li> </ul> <p>A black 'Zebra'-pattern of the grease is absolutely normal after short use!</p>
	<p><b>Lubrication of linearmotors</b>                  To improve the sliding characteristics between the stainless steel surface of the slider and the plastic slide bearing lubricant LU02 is prescribed.                  To lubricate the linearmotor pull the sliders carefully out of the stator.                  Clean slider and stator with a soft disposable paper, ideally with the help of methylated spirits or alcohol.                  Then lubricate the bore of the stators with about 2-3 g (0.1 oz) grease LU02.                  There should only be a slight film of lubricant.                  Finally, slider should be lubricated with a slight film of lubricant.  <b>Important note:</b> Do not over lubricate!</p>


Lubricant for	Description and application
Linearmotor stator / slider 	LU02-lubricant is deliverable in bulks of <ul style="list-style-type: none"> <li>- 8 gramm item-No. 2550039</li> <li>- 45 gramm item-No. 2550007</li> <li>- 1.000 gramm item-No. 2550102</li> </ul> This grease corresponds to Klübersynth UH1 14-31 of Klüber GmbH, which is also suitable for FDA food processing industry.

#### 4.2 Maintenance of linear guides

The linear guides will be shipped with an initial lubrication and are ready for use.

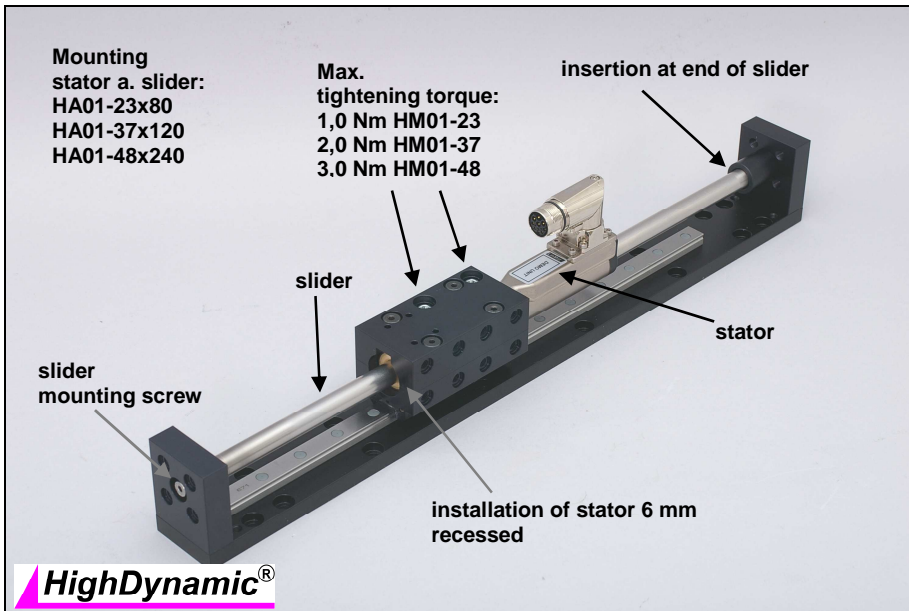
	<p><b>Maintenance of linear guides</b></p> <ul style="list-style-type: none"> <li>- Maintenance is recommended after a mileage of 5.000 km.</li> </ul>
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	<p><b>Lubrication of linear guides</b></p> <p>Grease can be applied by grease nipple. Alternatively the old grease can be washed out with the help of methylated spirits or alcohol. Then new grease can be applied.</p>
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Lubricant for	Description and application
Carriages 	for general applications THK-grease AFA for FDA-applications Klübersynth UH1 14-151 Klüber Lubrication GmbH

### 4.3 Dismounting and mounting of linearmotor-stages

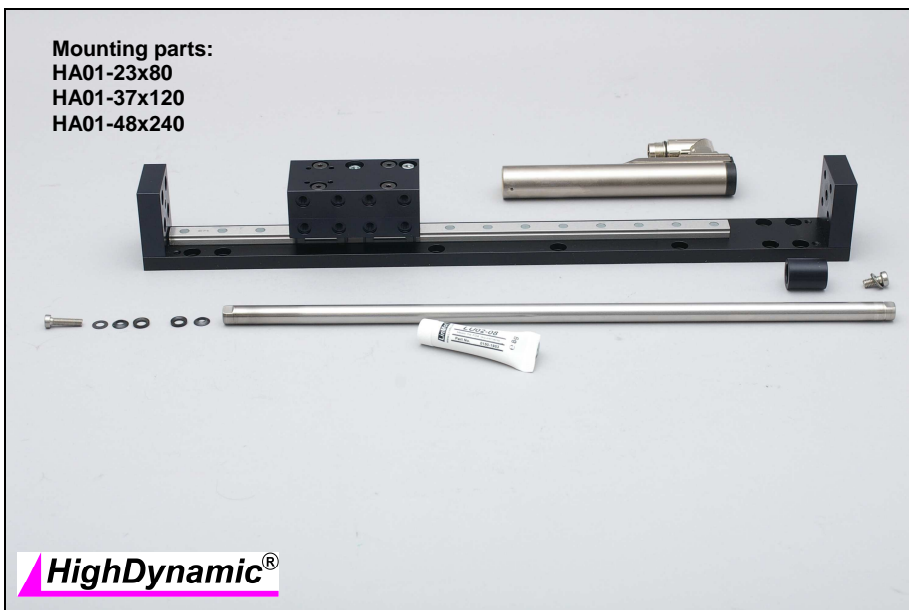
#### Mounting of HA01-23, HA01-37 and HA01-48



#### Friction forces!

Attention!  
Friction-forces must be measured motion-controllers disconnected!  
 $F_r \leq 10 \text{ N}$  HA01-23  
 $F_r \leq 20 \text{ N}$  HA01-37  
 $F_r \leq 25 \text{ N}$  HA01-48

If friction-force is higher, loosen slider mounting screw, tighten it again and optimize friction-force over whole stroke.



**5. Declaration of conformity and CE-marking**



Following declaration of conformity is generated by computer!  
We declare, that this declaration has legal validity!

## Declaration of Conformity and CE-marking

We, JUNG ANTRIEBSTECHNIK U. AUTOMATION GMBH declare under our sole responsibility that the product

Maschine: HighDynamic<sup>®</sup> Linearmotor-Stages HA01

Drawingnumber: 0407.000.0

is conform to the provisions of

machinery directive 2006/42/EG app. II 1. B.

We hereby declare that the mentioned incomplete machine complies with the health and safety requirements of Annex I of the EC Machinery Directive 2006/42 / EC!

The following EC guidelines were applied:

- 2004/108 / EC Electromagnetic Compatibility Directive

Wettenberg, 11<sup>th</sup> January 2017



Wilhelm Jung

CEO of

JUNG ANTRIEBSTECHNIK U.  
AUTOMATION GMBH