

# Installation Guide Linear Motors

ENG

## P01 Stainless Steel



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# 1 General information

## 1.1 Introduction

This manual includes instructions for the assembly, installation, maintenance, transport, and storage of linear motors. The document is intended for electricians, mechanics, service technicians, and warehouse staff. Be sure to observe the general safety instructions as well as those in each chapter at all times. Keep this manual accessible to the assigned staff.

## 1.2 Explanation of symbols



Triangular warning symbols warn against a danger.



Round command symbols tell what to do.

## 1.3 Qualified personnel

All work such as transport, installation, commissioning and service is only allowed to be carried out by qualified personnel. Qualified personnel in the sense of the safety instructions in this documentation are persons who are familiar with the transport, installation, assembly, commissioning and operation of the product and who have the appropriate qualifications.

This manual must be read carefully before transport, installation, commissioning, service and all safety-related information must be adhered to.

## 1.4 Liability

NTI AG (as manufacturer of LinMot linear motors and MagSpring products) excludes all liability for damages and expenses caused by incorrect use of the products. This also applies to false applications, which are caused by NTI AG's own data and notes, for example in the course of sales, support or application activities. It is the sole responsibility of the user to check the information and information provided by NTI AG regarding their safety-relevant correctness. In addition, the entire responsibility for safety-related product functionality lies exclusively with the user. Product warranties are void if products are used with stators, sliders, servo drives or cables not manufactured by NTI AG unless such use was specifically approved by NTI AG.

NTI AG's warranty is limited to repair or replacement as stated in our standard warranty policy as described in our "terms and conditions" previously supplied to the purchaser of our equipment (please request copy of same if not otherwise available). Further reference is made to our general terms and conditions.

## 1.5 Copyright

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## 2 Safety instructions



### Contusions

Sliders contain neodymium magnets and have a strong attractive force. Careless handling could cause fingers or skin to become pinched between two sliders. This may lead to contusions, bruises, and bone fractures. When handling sliders, wear thick protective gloves and keep a minimum distance between sliders. Refer to the "Minimum distance from slider" section for minimum distance.

To reduce the risk of injury, never more than one slider should be held or transported by the same person without packaging.



### Pacemaker / Implanted heart defibrillator

Sliders could affect the 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 minimum distances between the pacemaker / defibrillator and slider:
  - Min. 250 mm (10") for slider Ø 27 mm and 28 mm (PL01-27 / 28 / PL1028)
  - Min. 150 mm (6") for slider Ø 19 mm and 20 mm (PL01-19 / 20)
  - Min. 100 mm (4") for slider Ø 12 mm (PL01-12)
- Inform others who wear these devices to comply with these minimum distances!



### Caution - Risk of Electric Shock !

Before working, make sure that there are no high voltages.



### Fast-moving machine parts

The sliders of LinMot linear motors are fast-moving machine parts. All necessary precautions must be taken to prevent access during operation (provide covers, guards, etc.).



### Automatic restart

The motors can start automatically under certain circumstances! If necessary, a corresponding warning symbol must be provided and protection against entering the hazardous area or a suitable safe electronic disconnection must be provided!



### Risk of injury due to a defect or fault

For areas where a defect or fault can result in substantial property damage or even serious personal injury, additional external precautions must be taken or devices must be installed to ensure safe operation even if a defect or fault occurs (eg. suitable safe electronic disconnection, mechanical interlocks, barriers, etc.).



### Magnetic field

Magnets integrated in the sliders produce a strong magnetic field. They could damage TVs, 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.
- For the above mentioned objects, keep a minimum distance as described in the "Pacemaker / implanted defibrillator" section.
- For non-anti-magnetic watches, keep the double minimum distance.

**Combustibility**

When machining magnets, the drilling dust could easily ignite. Machining the sliders and the magnets they contain is not permitted.

**Burn hazard**

The sliders of LinMot motors can reach temperatures of 80 °C, which may cause burns upon contact.

**Grounding**

All metal parts that are exposed to contact during any user operation or servicing and likely to become energized shall be reliably connected to the means for grounding.

**Mechanical handling**

Neodymium magnets are brittle and heat-sensitive. Machining the sliders and the magnets they contain is not permitted.

- Colliding magnets could crack. Sharp splinters could be catapulted for several meters and cause eye injury.
- By machining the sliders, heat would result which demagnetises the magnets.

**Slider**

Linear motor sliders consist of a high-precision, thin-walled stainless steel tube in which the neodymium magnets are housed. The LinMot sliders should be handled with care. Avoid contact with other sliders or iron parts as this can damage the magnets and the slider surface. Do not grip the sliders with pliers, as this can also damage the surface. 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 slider away from unshielded flame or heat. Temperature above 120°C will cause demagnetization.

### 3 Installation instructions

#### 3.1 Operating conditions



Maximum ambient temperature limits:

- 0 °C<sup>1)</sup>...80 °C

Internal temperature sensor error occurs at:

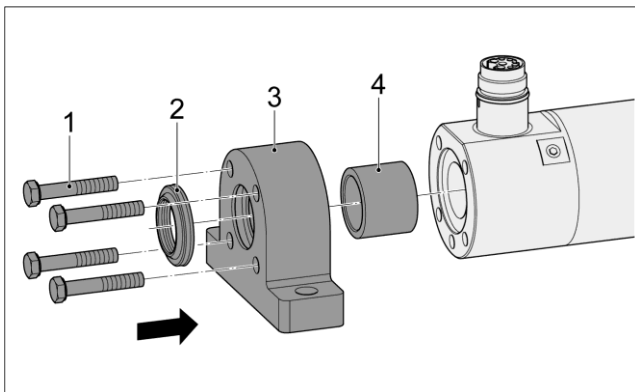
- 90 °C
- 120 °C (for stator type with ending „HP“)

<sup>1)</sup> Lower temperatures on request.

#### 3.2 Instructions for installing the linear motor



Please attend to the safety instructions in chapter 2 during the assembling!



##### 1. Option A: Install stainless steel bearing (front).

Pos. 1:

- Hexagon head screw M5 (3.5 Nm) for PS01-37
- Hexagon head screw M6 (6 Nm) for PS01-48

Pos. 2:

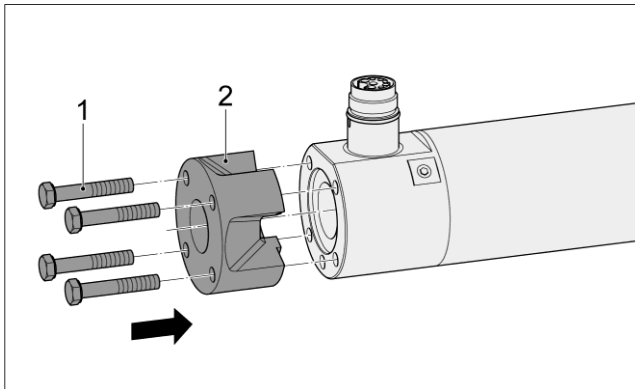
Wiper

Pos. 3:

- Bearing ring (Item PB01) or
- Bearing flange (Item PB03)

Pos. 4:

Bushing for bearing



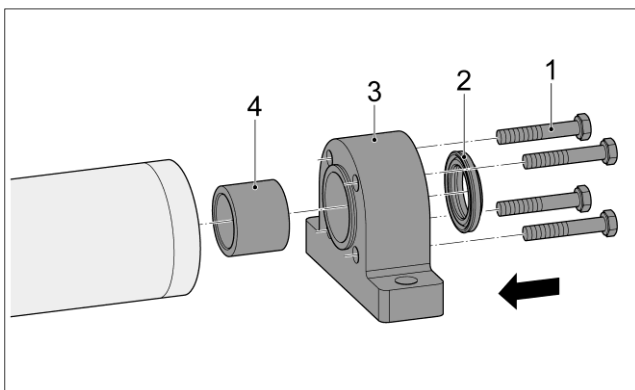
##### 1. Option B: Install washdown bearing (front).

Pos. 1:

- Hexagon head screw M5 (3.5 Nm) for PS01-37
- Hexagon head screw M6 (6 Nm) for PS01-48

Pos. 2:

Washdown bearing



##### 2. Option A: Install stainless steel bearing (rear).

Pos. 1:

- Hexagon head screw M5 (3.5 Nm) for PS01-37
- Hexagon head screw M6 (6 Nm) for PS01-48

Pos. 2:

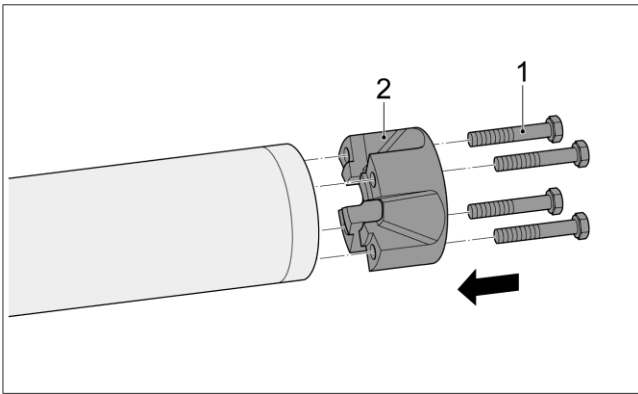
Wiper

Pos. 3:

- Bearing ring (Item PB01) or
- Bearing flange (Item PB03)

Pos. 4:

Bushing for bearing

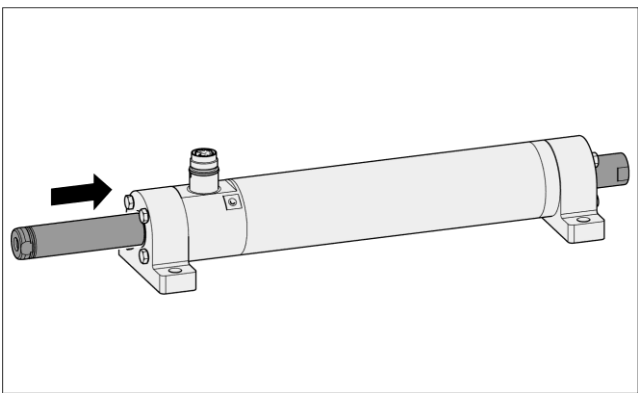


**2. Option B: Install washdown bearing (rear).**

- Pos. 1:  
Hexagon head screw M5 (3.5 Nm) for PS01-37  
Hexagon head screw M6 (6 Nm) for PS01-48
- Pos. 2:  
Washdown bearing



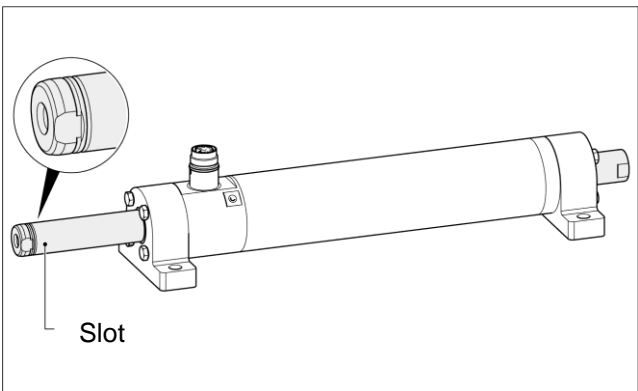
The corresponding bearings must be ordered separately! A selection can be found in chapter 6 "Accessories".



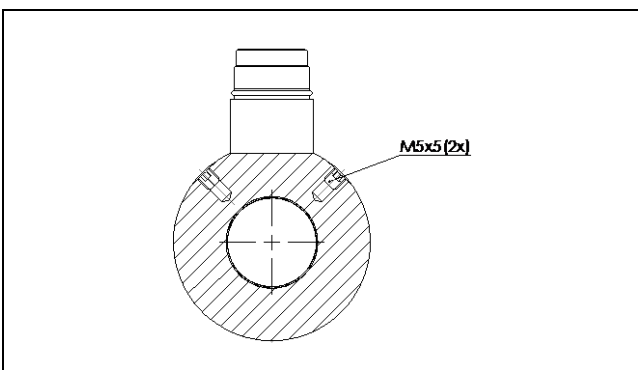
**3. Inserting the slider into the stator.**



The slider is magnetically attracted.



**4. Checking the installed direction of slider**  
After mounting, the slot of the slider is on the connector side.

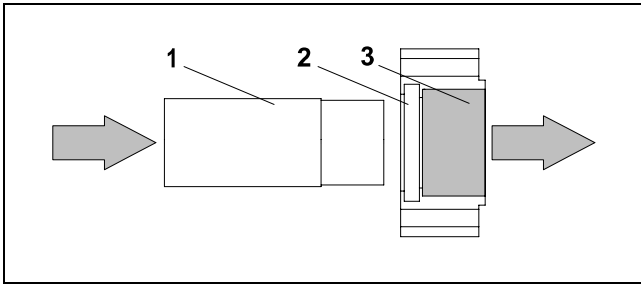


**5. Remove threaded screw.**

For stators in the fluid-cooled version, the threaded screws must be removed and replaced with the corresponding push-in fittings. See further details in section 4.3 "Installation".

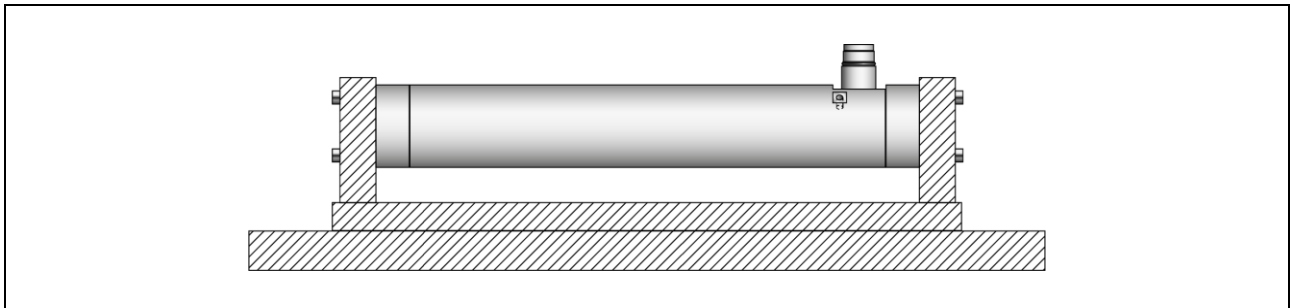


### 3.3 Disassembly of the bearing sleeve



- First remove the wiper seal (item 2) from the stainless steel bearing using pliers.
- The sleeve (item 3) can then be pushed out by hand and using the auxiliary tool (item 1).

### 3.4 Mounting the stator



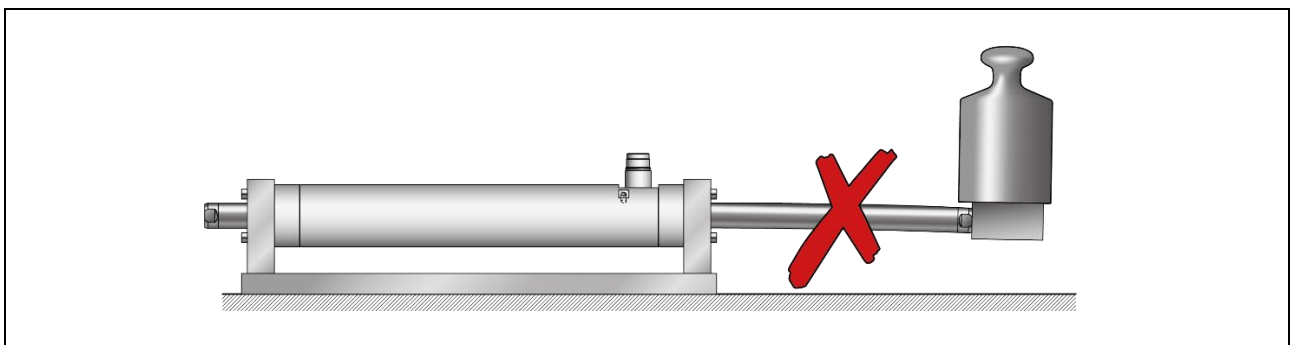
The motor is level and fixed at both ends of the stator using the mounting threads. The drilling pattern is shown in Section 9 "Stator Dimensions".

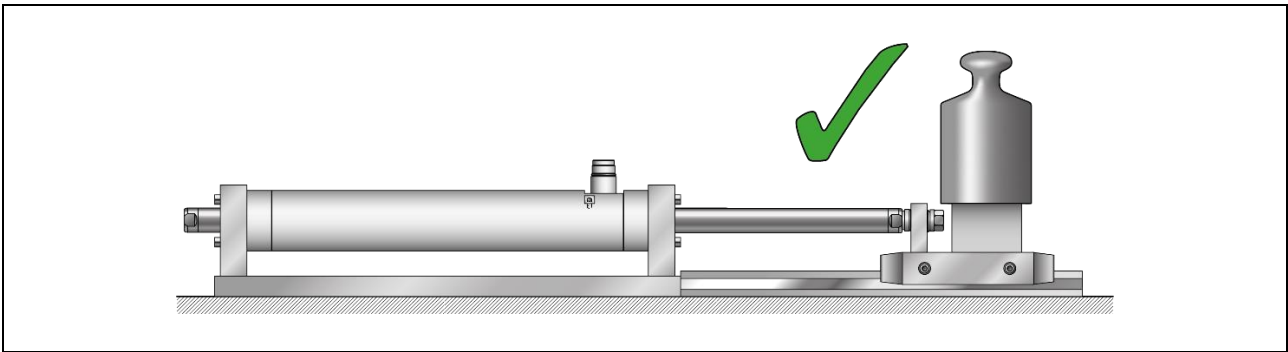


Make sure the torque on the clamp plate screws does not exceed the maximum value.

Thread	Max. torque for screw (Stainless steel A4)
M5	3.5 Nm
M6	6 Nm

### 3.5 Mounting the payload to the slider





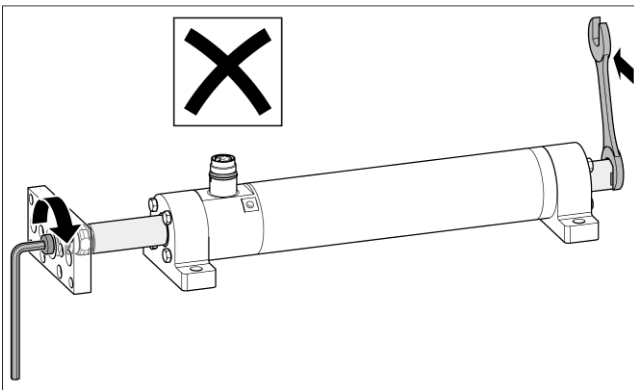
The load is mounted as a fixed bearing using spherical washers and conical seats (see the section 6.5 "Slider mounting kits").



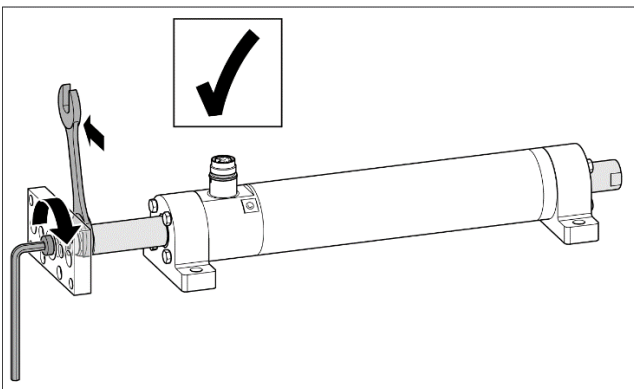
To avoid shear force on slider and wear on stator, the payload has to be beared by a linear guide.



When attaching the load, the wrench for tightening the load must be used only on the load-facing side of the slider. It is important to avoid torsional stress on slider (note figure below).



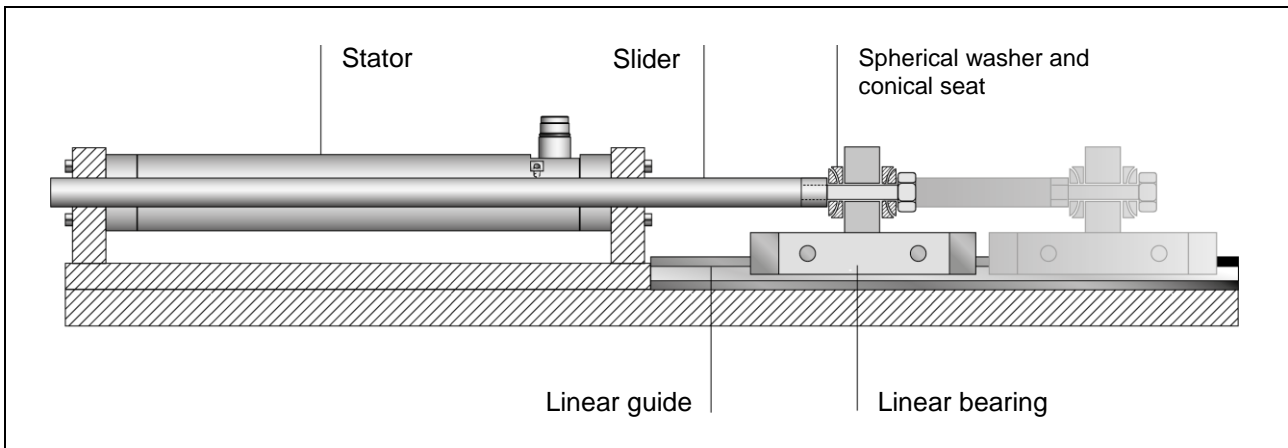
**Incorrect mounting**  
Torsional stress on slider!



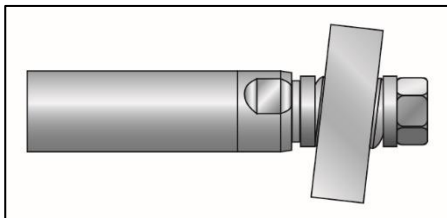
**Correct mounting**

Slider	Thread	Max. torque for screw (Stainless steel A4)
19 mm	M 8	16 Nm
27 mm	M 10	32 Nm

### 3.6 "Moving slider" installation

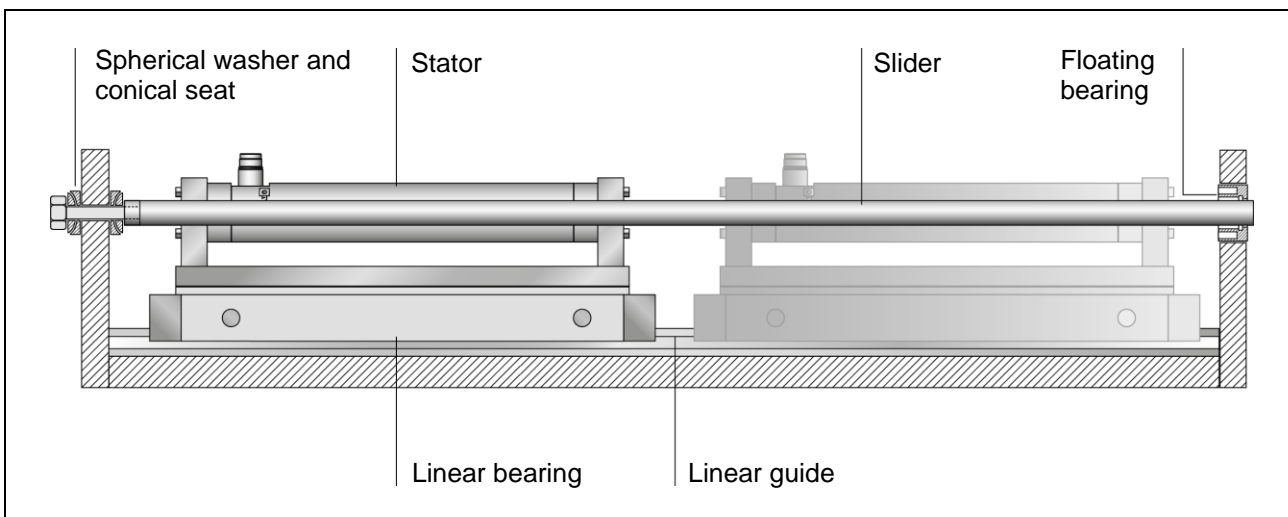


In a "moving slider" installation, the stator is fixed and the slider is the moving part. The load, borne by a linear guide, is attached directly to the end of the slider. In order to compensate for misalignment, spherical axial bearings consisting of spherical washers and conical seats (see the section 6.6 "Slider mounting kits") are used to connect to the load. The mounting kit of slider and an oversized hole for the screw make it possible to adjust a radial and angle offset.



Mounted payload with radial and angle offset.

### 3.7 "Moving stator" installation



In "moving stator" applications, the slider is fixed and the stator is the moving part. The load is attached to the stator, which is mounted on a linear guide. In order to avoid an overconstrained bearing mount and compensate for alignment errors, the slider may be mounted on one end in a fixed bearing with a spherical axial bearing. On the opposite end, the slider is mounted in a floating bearing. Mounting kits are available for mounting the slider (see the section 6.6 "Slider mounting kits").

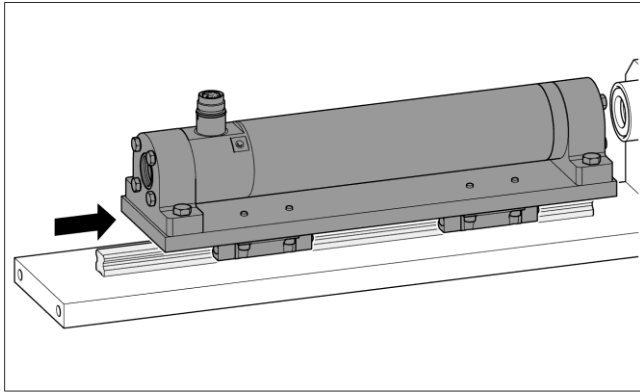
### 3.7.1 Assembling instruction



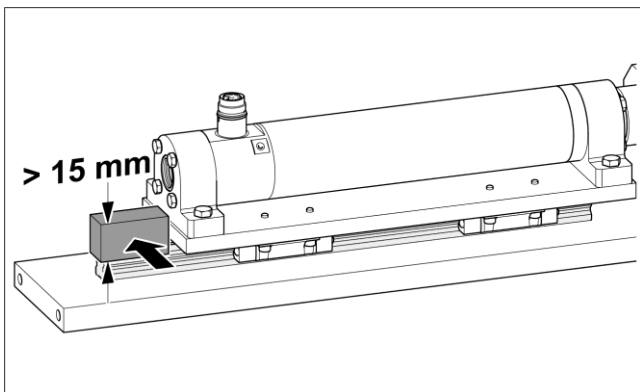
Please attend to the safety instructions in chapter 2 during the assembling!



If moving stator application is used, the minimum bending radius of the motor cable should be adhered to. See chapter Cable, section Technical Data.



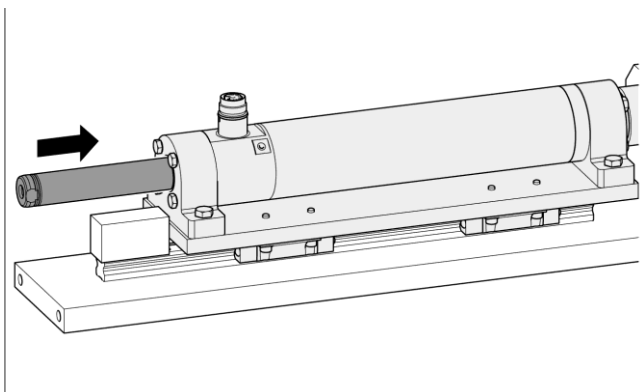
1. Mount stator to its support bearing.



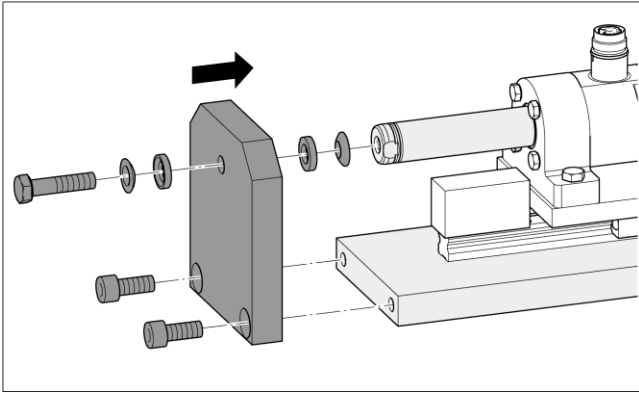
2. Placing a spacer.



Put a spacer (wood, plastic, aluminium with thickness 15 mm) between slider and linear guide. The spacer prevents injuries to the hands and damage to the slider surface!



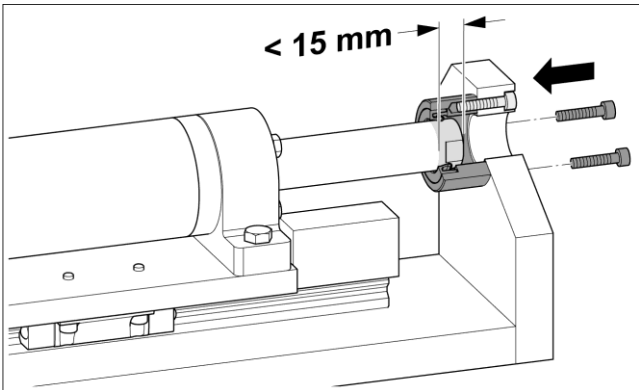
3. Insert slider into stator.



- 4. Installing the slider using the fixed bearing**  
The fixed bearing is screwed to the front end of the slider.



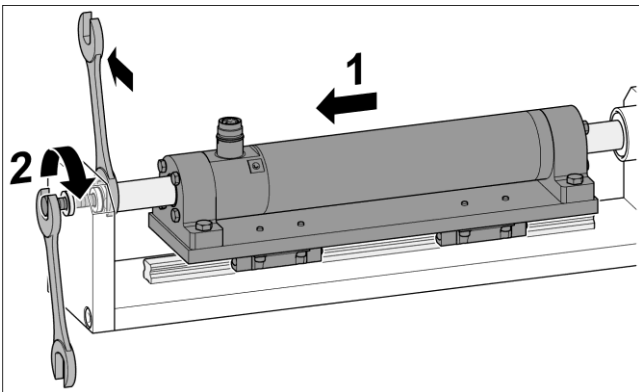
Do not tighten the screw yet!



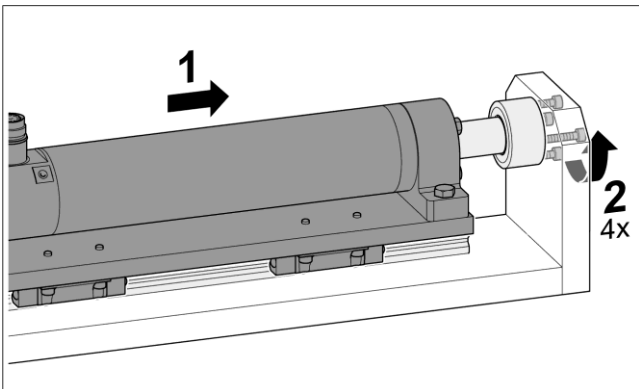
- 5. Mount floating bearing**



Do not tighten the screw!  
The slider is allowed to extend into the floating bearing no more than 15 mm!



- 6. Move stator (back end) to the fixed end of slider, center slider in stator and tighten the screw.**



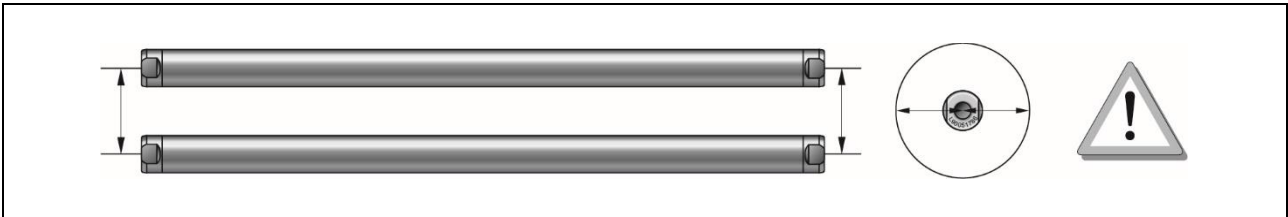
- 7. Move stator (front side) to the floating bearing and tighten screws.**



After the installation of the slider a safety label must be placed close to the slider.

### 3.8 Minimum distance from slider

#### 3.8.1 Minimum distance from slider to slider

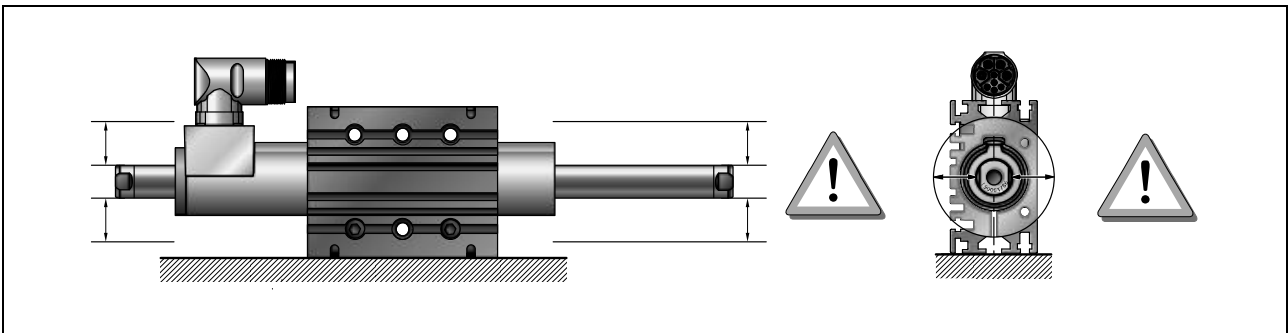


The sliders are made of neodymium magnets and have a strong magnetic attraction. It must be kept a minimum distance between the sliders. This minimized the risk of bruising and secondly, the sliders do not influence each other through their magnetic fields.

Type of slider	PL01-12	PL01-20 / PL01-19	PL01-28 / PL01-27	PL10-28
PL01-12	30 mm (1.18 in)			
PL01-20 / PL01-19		50 mm (1.97 in)		
PL01-28 / PL01-27			80 mm (3.15 in)	
PL10-28				70 mm (2.76 in)

*The data are measured from slider center to slider center.*

#### 3.8.2 Minimum distance from slider to metallic parts



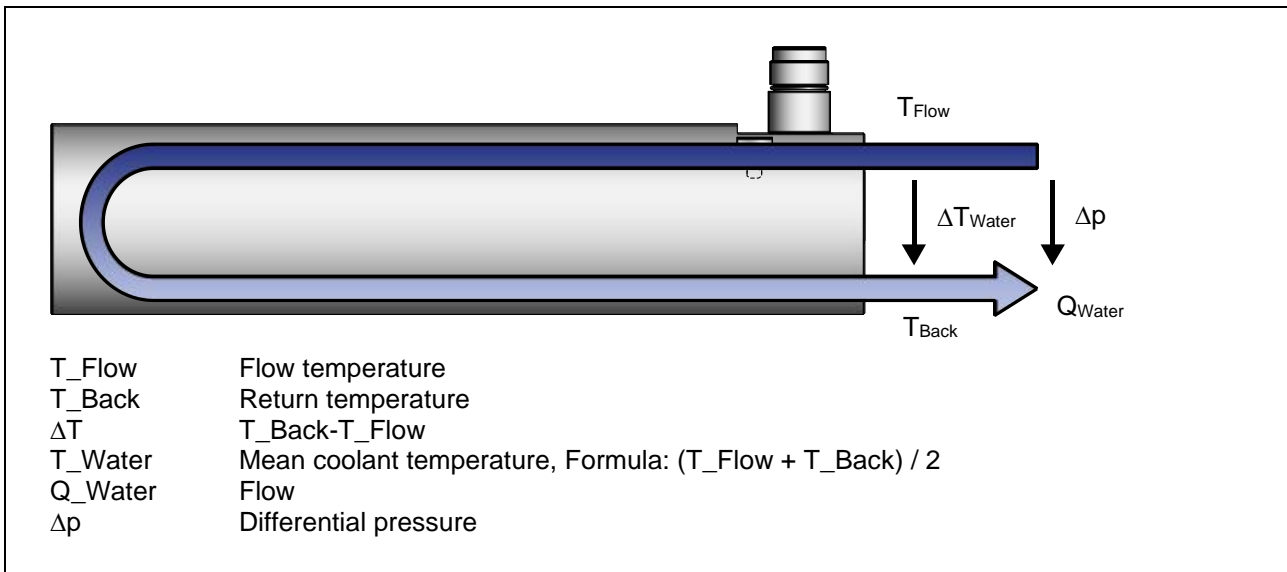
When installing linear motors in modules with metal parts near the slider, undesired forces can arise due to magnetic attraction or eddy currents. These generally manifest as erratic and jerky positioning, or reduced dynamics of the linear motor. In order to avoid this, minimum distances between the slider and any metal parts are to be observed whenever metal materials are used nearby.

Linear Motor	Minimum distance from slider surface to ferromagnetic parts (iron, steel, etc.)	Minimum distance from slider surface to non-ferromagnetic metallic parts (aluminum, bronze, stainless steel, etc.)
P10-70x...	20 mm	10 mm

## 4 Fluid cooling

The heat produced by the motor is dissipated by the liquid cooling. If the motor is operated with a liquid-cooling, the continuous force value increases many times in comparison with the self-cooling.

### 4.1 Design of water cooling



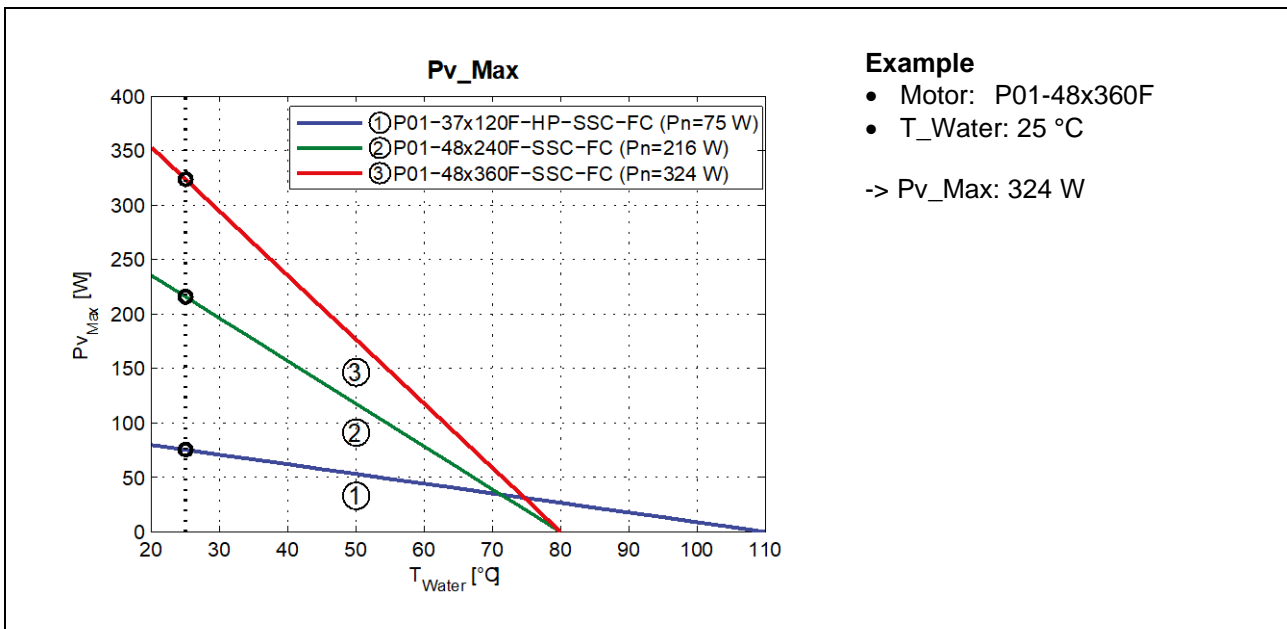
With the water cooling, the coolant is passed through the cooling circuit of the motor flange.

Starting from the adjusted mean coolant temperature T\_Water all other parameters of the cooling circuit may be dimensioned based on the diagrams referred to:

- T\_Water -> P<sub>v\_Max</sub> -> Q\_Water -> Δ p

The design is illustrated by an example in the following.

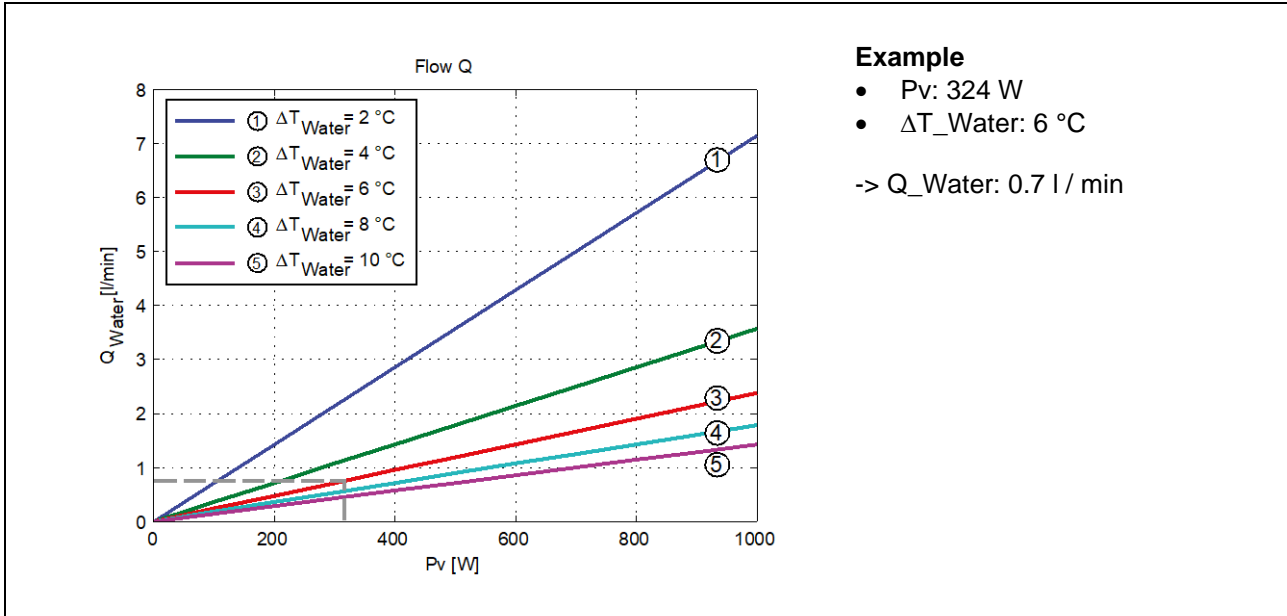
#### 4.1.1 Determination of the max. possible amount of cont. power dissipation P<sub>v\_Max</sub>





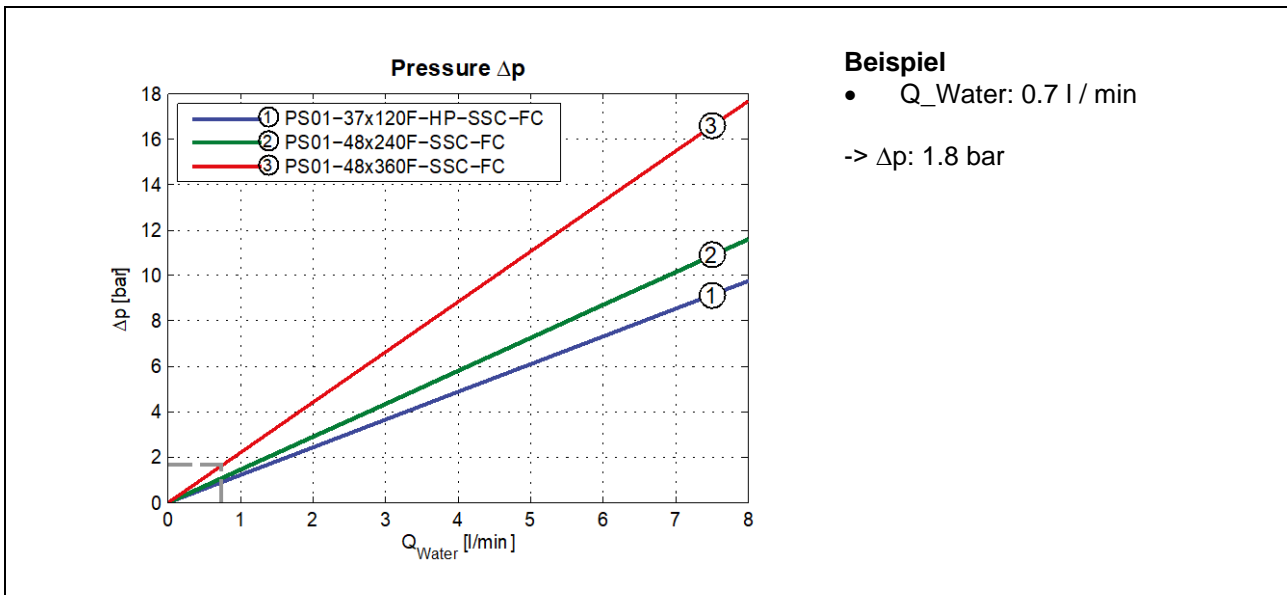
- If the temperature of the cooling liquid is chosen to be lower than the ambient temperature, there is a risk of condensation.
- When used and stored in a frost-prone area, corrosion protection (e.g. Clariant) has to be added.

#### 4.1.2 Determination of water flow Q



To achieve a very regular cooling of the motor, the max. difference between flow and return temperature should not exceed 10 ° C.

#### 4.1.3 Determination of water pressure $\Delta p$



The required water pressure to inject the required water flow depends on the hydraulic resistance of the cooling circuit.



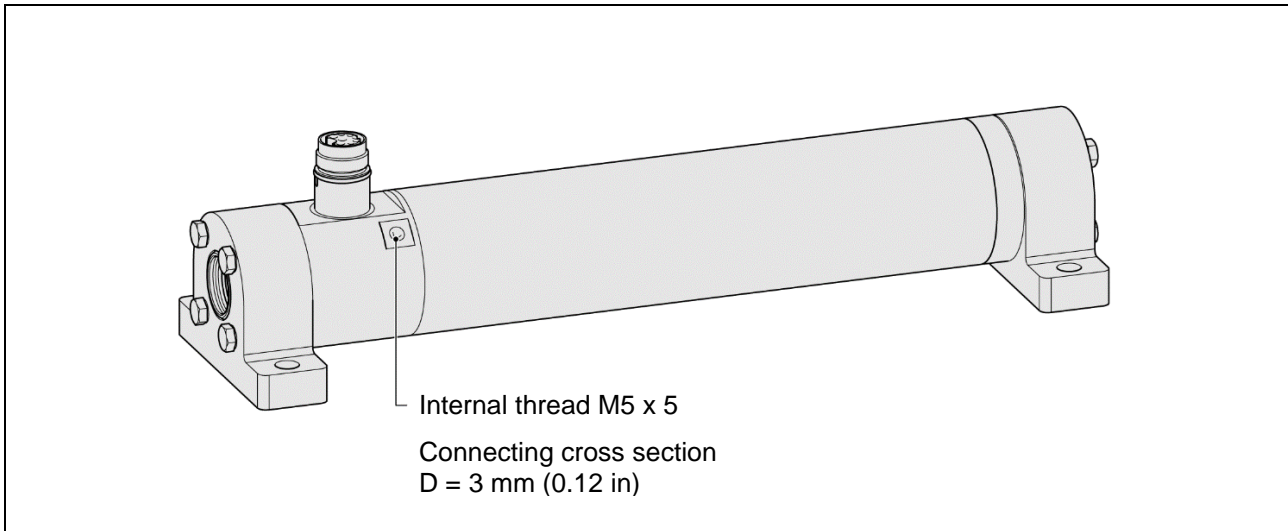
## 4.2 Corrosion protection

It is advised to add a corrosion protection into the cooling medium (water). A suitable agent can be, for example, Protectogen C Aqua by Clariant. Information of the mixing ratio between the cooling medium and the corrosion protection agent can be taken from the manufacturer's instructions.



- Mixing of various corrosion protection agents is to be avoided.
- Corrosion protection products must be matched to the materials of the cooling circuit (see table of materials in the cooling circuit).

## 4.3 Mounting



The supply or conduction of the cooling medium to the stator is carried out via two connecting thread (see illustration above). The connection can be realized by M5 push-in fittings.

## 5 Electrical connection



Do not connect or disconnect motor when there is power on the servo drive.  
 Use only double-shielded original LinMot cable. Cables from other sources must be checked precisely before commissioning.  
 Incorrect connections can destroy the drive and stator.

The stator is connected to protective earth via the motor cable. The screw connections of the C and R connectors must be tightened up to the stop.

### 5.1 Motor cable

Two types of cables are available for Stainless steel linear motors. The cable attached to the stator is not a high flex cable. For moving cable applications please use the special LinMot KS high flex (suitable for cable tracks).



Pay attention to the specific bending radius (fixed / moving) when assembling and installing the cables.

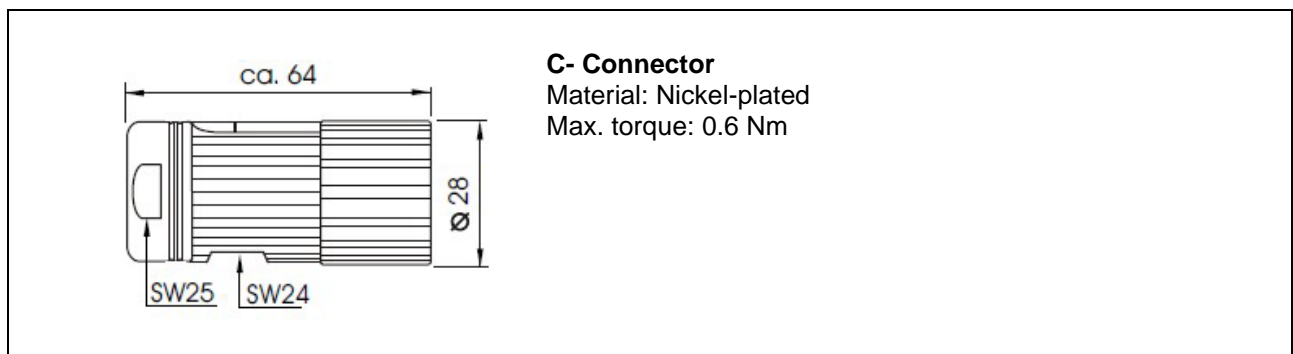
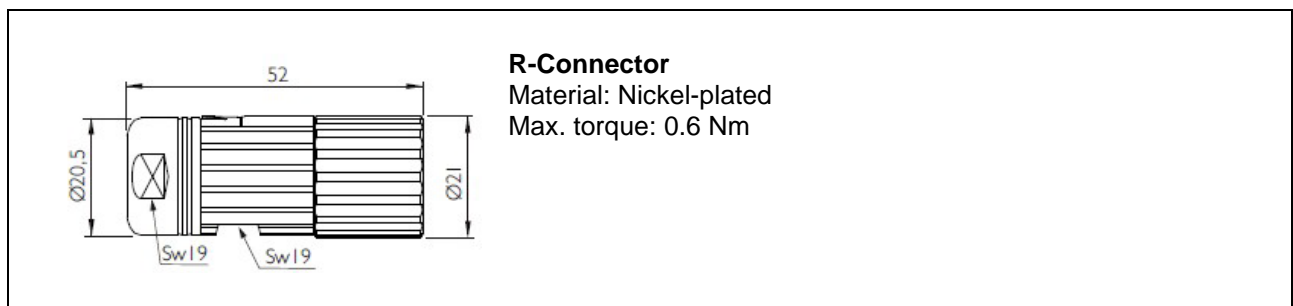
Type of cable	Standard cable		High Flex cable	
	K05-04/05	K15-04/05	KS05-04/05	KS10-04/05
Minimum bending radius for fixed installation	25 mm (1 in)	50 mm (2 in)	30 mm (1.2 in)	50 mm (2 in)
Minimum bending radius when moving	Not suitable for applications with moving motor cable.		60mm (2.4 in) No torsion	100mm (4 in) No torsion

### 5.2 Connector

For a complete encapsulation the standard motor connector is welded to the housing of the stator. The connector is designed for tightening and vertically aligned (see the section 9 „Stator dimensions“). Optionally, LinMot offers the angle connector Cw with protection class IP67 (see the section 9 „Stator dimensions“).

The cable connectors are optionally available in protection class IP67 and IP69K. Motor connector and cable connector are firmly bolted together. Dimensions and tightening torque are shown in the following figure.

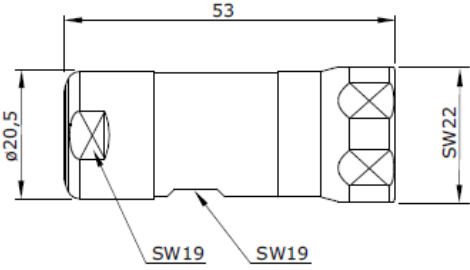
#### 5.2.1 IP class IP67



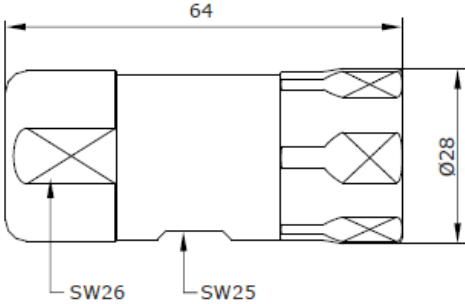
**Ordering information**

Item	Description	Item-No.
MC01-R/f	Motor connector R/f	0150-3129
MC01-C/f	Motor connector C/f	0150-3080

**5.2.2 IP class IP69k**



**R-Connector**  
 Material: Stainless steel (1.4404)  
 Max. torque: 0.6 Nm



**C-Connector**  
 Material: Stainless steel (1.4404)  
 Max. torque: 0.6 Nm

**Ordering information**

Item	Description	Item-No.
MC01-R/f-IP69K-SSC	Motor connector R/f, IP69k, SSC	0150-3347
MC01-C/f-IP69K-SSC	Motor connector C/f, IP69K, SSC	0150-3306

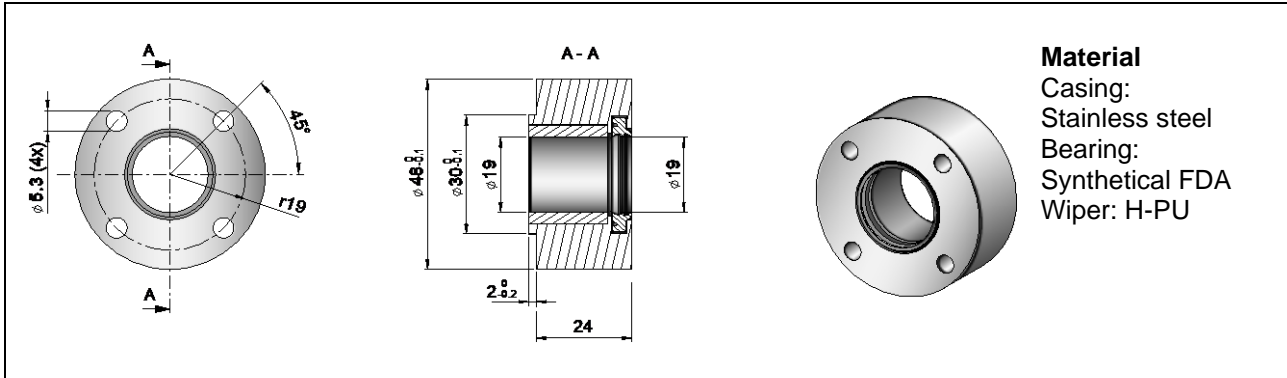
## 6 Accessories

### 6.1 Bearing

For easier maintenance LinMot offers two different interchangeable bearings. In addition to the tubular stainless steel bearings, there is also the variant with a mounting flange. Furthermore, a plastic version is also available to the user. This is specially designed for food processing and enables simple rinsing of the stator and slider.

### 6.2 Stainless steel bearing

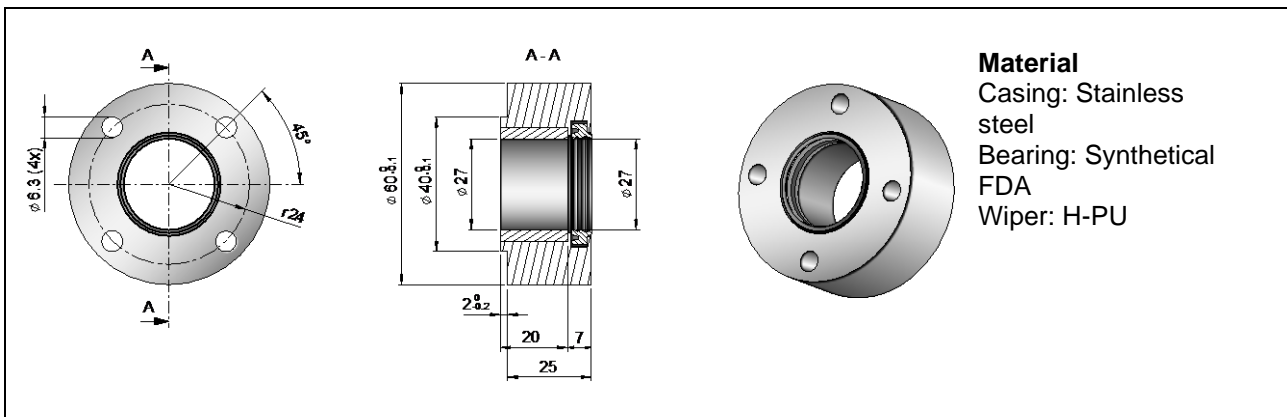
#### 6.2.1 PB01-37x24-P-SSC



#### Ordering information

Item	Description	Item-No.
PBR01-37x24-SSC	Ring for bearing to PS01-37x...-SSC	0150-3291
PBH01-37x24-P-SSC	Tube for bearing to PBR01-37x24-SSC	0150-3292
PAW01-19	Wiper for PL01-19	0150-3223
PB01-37x24-P-SSC	Bearing kit for PS01-37x120...-SSC	0150-3290

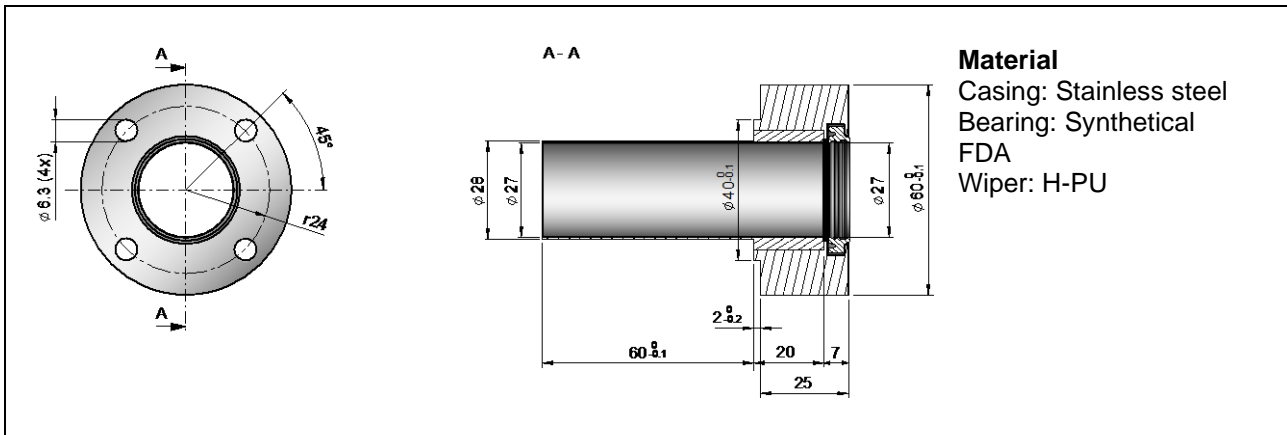
#### 6.2.2 PB01-48x25-P-SSC



#### Ordering information

Item	Description	Item-No.
PBR01-48x25-SSC	Ring for bearing to PS01-48x...-SSC	0150-3278
PBH01-48x25-P-SSC	Tube for bearing to PBR01-48x25-SSC	0150-3279
PAW01-27	Wiper for PL01-27	0150-3224
PB01-48x25-P-SSC	Bearing kit for PS01-48x240...-SSC	0150-3281

**6.2.3 PB01-48x25-80-P-SSC**



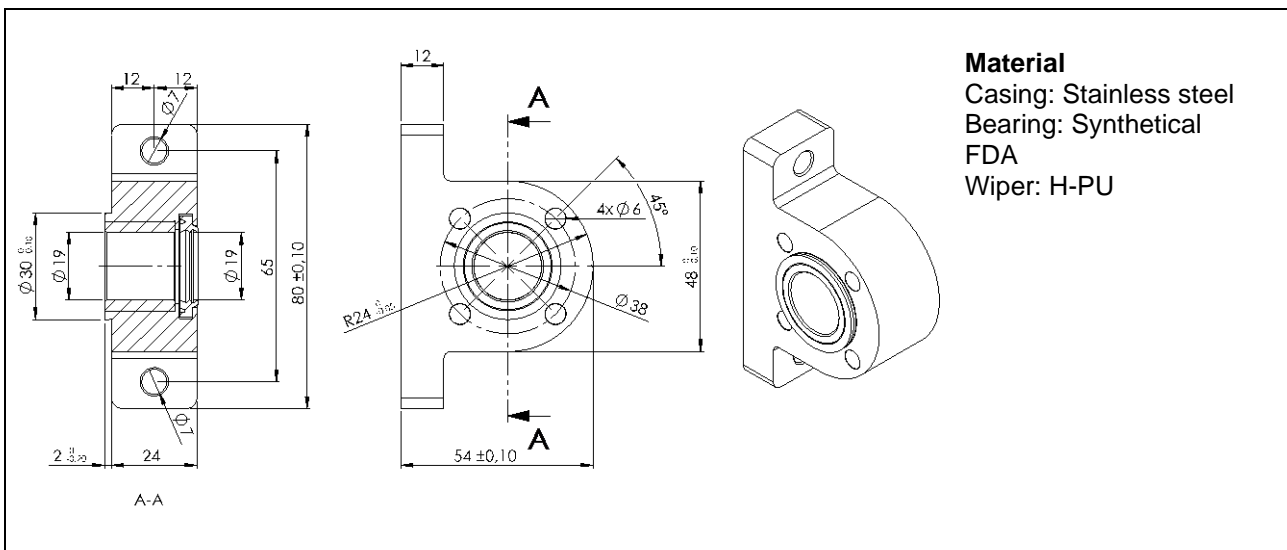
**Material**  
 Casing: Stainless steel  
 Bearing: Synthetical  
 FDA  
 Wiper: H-PU

**Ordering information**

Item	Description	Item-No.
PBR01-48x25-SSC	Ring for bearing to PS01-48x...-SSC	0150-3278
PBH01-48x25-80-P-SSC	Tube for bearing to PBR01-48x25-80-SSC	0150-3402
PAW01-27	Wiper for PL01-27	0150-3224
PB01-48x25-80-P-SSC	Bearing kit for PS01-48x360...-SSC	0150-3413

**6.3 Stainless steel bearing with flange**

**6.3.1 PB03-37x24-SSC**

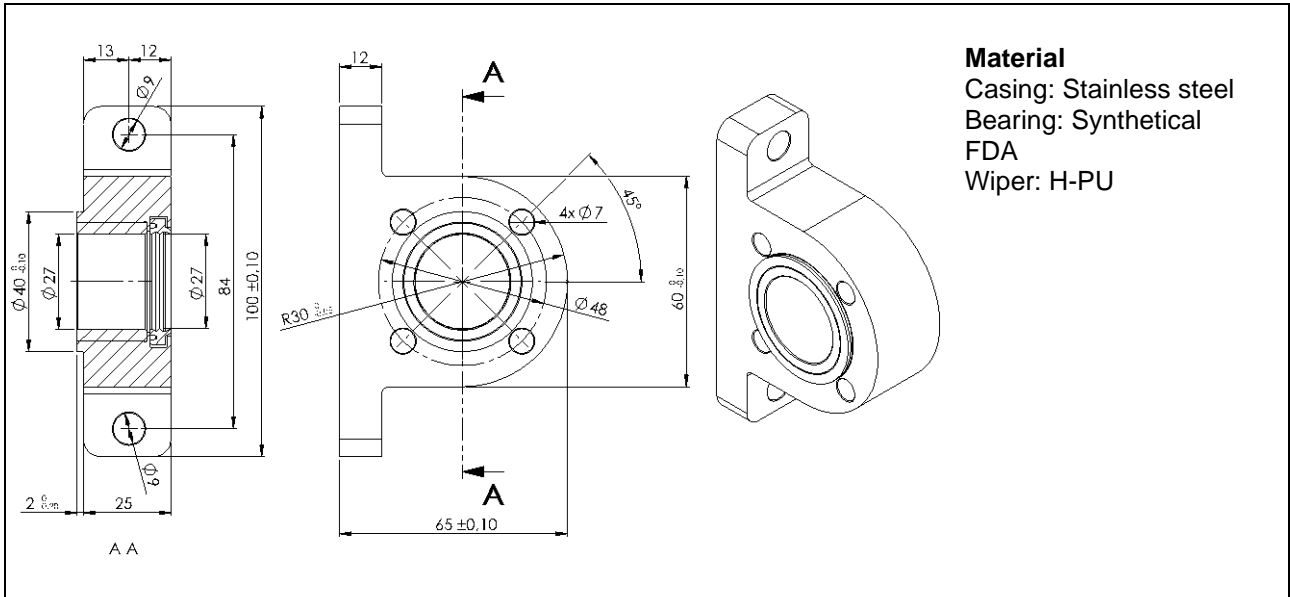


**Material**  
 Casing: Stainless steel  
 Bearing: Synthetical  
 FDA  
 Wiper: H-PU

**Ordering information**

Item	Description	Item-No.
PB03-37x24-SSC	Bearing for PS01-37x...-SSC (Stainless)	0150-3737

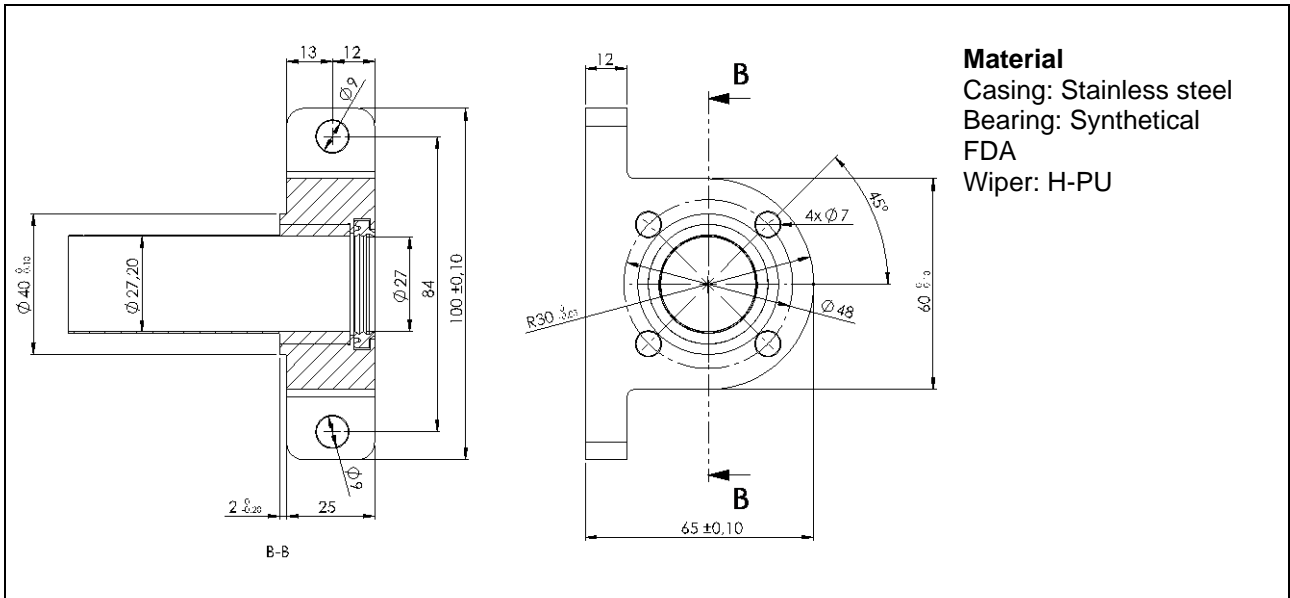
**6.3.2 PB03-48x25-SSC**



**Ordering information**

Item	Description	Item-No.
PB03-48x25-SSC	Bearing for PS01-48x...-SSC (Stainless)	0150-3738

**6.3.3 PB03-48x25-80-SSC**

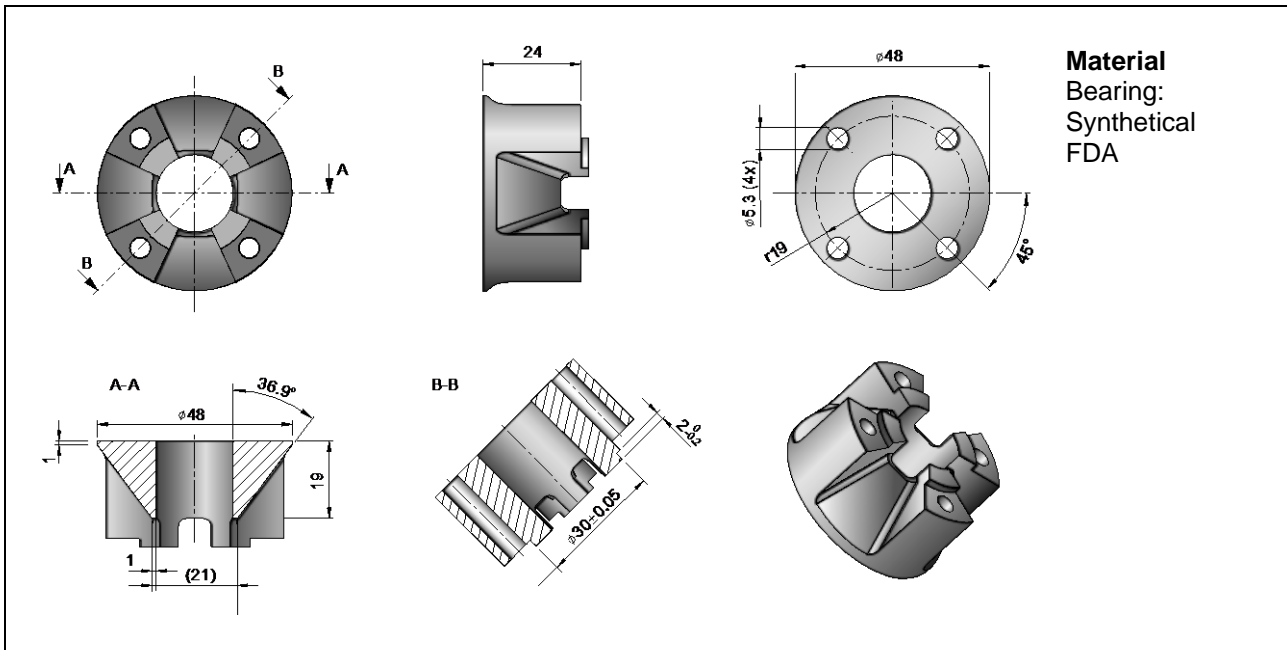


**Ordering information**

Item	Description	Item-No.
PB03-48x25-80-SSC	Bearing for PS01-48x...-SSC (Stainless)	0150-3739

## 6.4 Washdown bearing

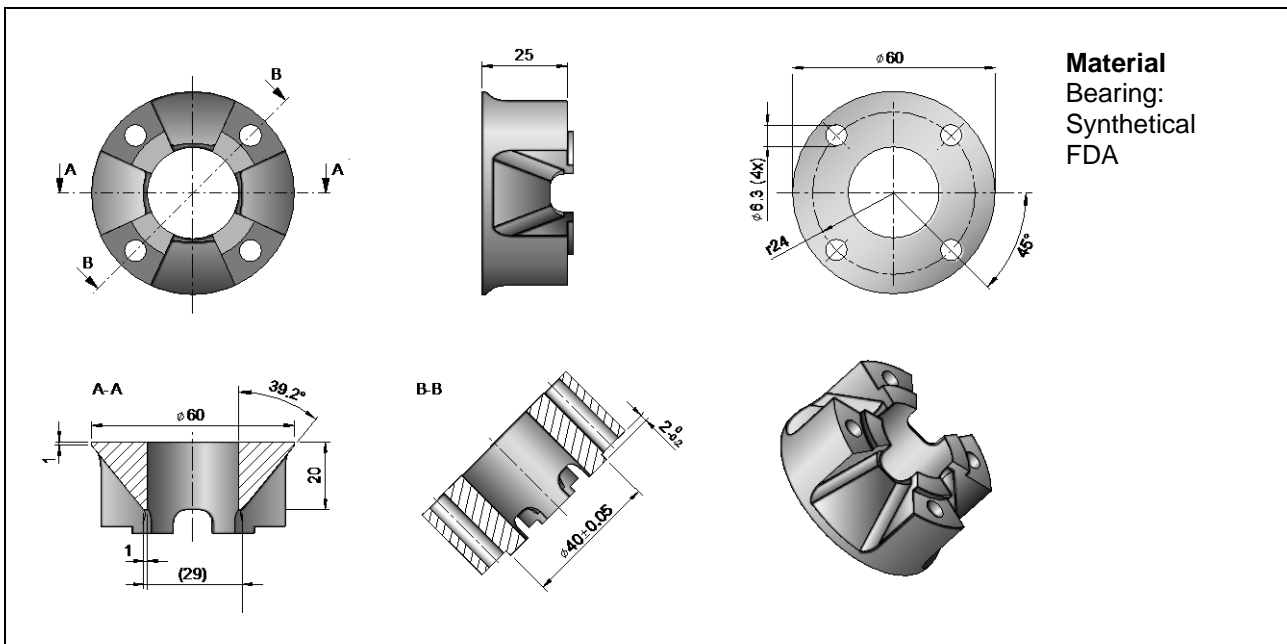
### 6.4.1 PB01-37x24-P-WD



#### Ordering information

Item	Description	Item-No.
PB01-37x24-P-WD	Bearing for PS01-37x...-SSC	0150-3299

### 6.4.2 PB01-48x25-P-WD

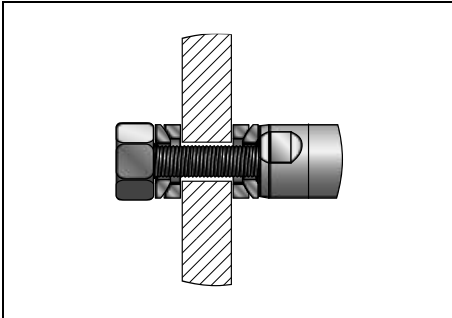


#### Ordering information

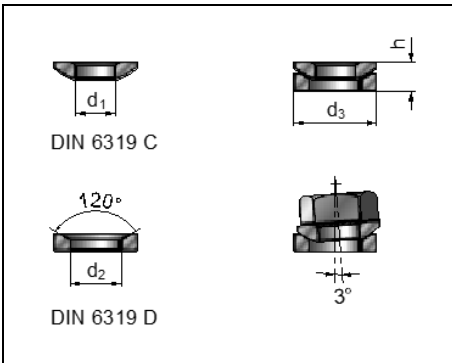
Item	Description	Item-No.
PB01-48x25-P-WD	Bearing for PS01-48x...-SSC	0150-3271

## 6.5 Slider mounting kits

### 6.5.1 Fixed bearing



Slider mounting kit consists of a spring washer, a pair of spherical washers, and a pair of conical seats. It allows the slider to be fixed in the direction of motion. It also helps to compensate for radial and angle offset.

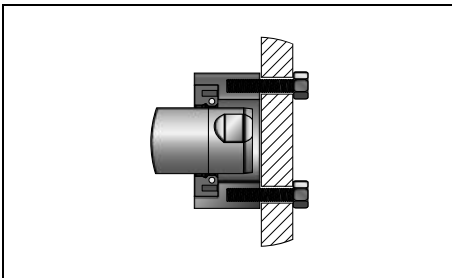


**Material**

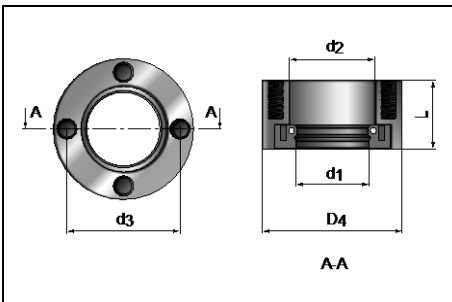
Spherical washer / conical seat: Stainless steel

Item	Item-No.	Slider	Thread	d1	d2	d3	h
PLF01-20-SS (Stainless-st.)	0150-3296	19mm 20mm	M8	8.4mm (0.33in)	9.6mm (0.38in)	17mm (0.67in)	5.5mm (0.22in)
PLF01-28-SS (Stainless-st.)	0150-3297	27mm 28mm	M10	10.5mm (0.41in)	12mm (0.47in)	21mm (0.83in)	6.5mm (0.26in)

### 6.5.2 Floating bearing



Floating bearing assembly that permits radial adjustment of slider position and permits a small amount of radial and axial movement.



**Material**

Housing:  
Bearing:

Stainless steel 1.4305  
Nitrile butadiene rubber  
Spring steel DIN17223

Item	Item-No.	Slider	Thread	d1	d2	d3	D4	L
PLL01-19	0150-3335	19mm	M5	20mm (0.79in)	23mm (0.90in)	30mm (1.18in)	37mm (1.46in)	20mm (0.79in)



PLL01-27	0150-3294	27mm	M5	28mm (1.10in)	32mm (1.26in)	40mm (1.57in)	48mm (1.89in)	20mm (0.79in)
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## 7 Maintenance and test instructions

### 7.1 Stator connector assignment



Do not connect or disconnect motor when there is power on the servo drive. Use only double-shielded original LinMot cable. Cables from other sources must be checked precisely before commissioning. Incorrect connections can destroy the drive and stator.

Connector Type	C-Connector	R-Connector
Series	PS01-48x240F-SSC-C / -w / -FC PS01-48x360F-SSC-C / -w / -FC	PS01-37x120F-HP-SSC-R / FC
	Pin	Pin
Phase1+	A	1
Phase1-	B	2
Phase2+	C	3
Phase2-	D	4 (-)
+5V	E	A
SIGNAL-GROUND*	F	B
Sensor Sin	G	C
Sensor Cos	H	D
Temp sensor	L	E
SHIELD** of stator and stator cable	Case	Case
Connector on the stator (-cables)		



Extension cables are double shielded. The two shields of the extension cables must not be connected together: the inner shield of the extension cables is used as GROUND and must be connected to SIGNAL-GROUND\*; only the outer shield must be connected to SHIELD\*\* of the connector.

## 7.2 Stator checking

The following tables show the resistive value between the different connector pins for each stator type. If the value is not within a range of +/- 10% the stator may be damaged (temperature of the stator for all measurements: 20°C).

### PS01-37x120F-HP-SSC-R (0150-1282)

### PS01-37x120F-HP-SSC-R-FC (0150-1283)

Phase1+ / Phase1-	Red / Orange	Pin 1 / Pin 2	2.6Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	2.6 Ω
5V / GND	White / Brown	Pin A / Pin B	155 Ω
Sensor Sine / GND	Yellow / Brown	Pin C / Pin B	33 kΩ
Sensor Cosine / GND	Green / Brown	Pin D / Pin B	33 kΩ
Temp. Sensor / GND	Black / Brown	Pin E / Pin B	10kΩ
Phase / GND	-	Pin 1,2,3,4 / Pin B	>20 MΩ
All Pin / Shield	-	Pin 1-E / Housing	>20 MΩ

### PS01-48x150G-HP-SSC-C (0150-4589)

### PS01-48x150G-HP-SSC-C-FC (0150-4590)

Phase1+ / Phase1-	Red / Orange	Pin A / Pin B	1.0 Ω
Phase2+ / Phase2-	Blue / Gray	Pin C / Pin D	1.0 Ω
5V / GND	White / Brown	Pin E / Pin F	155 Ω
Sensor Sine / GND	Yellow / Brown	Pin G / Pin F	33 kΩ
Sensor Cosine / GND	Green / Brown	Pin H / Pin F	33 kΩ
Temp. Sensor / GND	Black / Brown	Pin L / Pin F	10 kΩ
Phase / GND	-	Pin A, B, C, D / Pin F	>20 MΩ
All Pin / Shield	-	Pin A-L / Housing	>20 MΩ

### PS01-48x240F-SSC-C (0150-1267)

### PS01-48x240F-SSC-Cw (0150-1274)

### PS01-48x240F-SSC-C-FC (0150-1268)

### PS01-48x240F-SSC-Cw-FC (0150-1275)

Phase1+ / Phase1-	Red / Orange	Pin A / Pin B	1.1 Ω
Phase2+ / Phase2-	Blue / Gray	Pin C / Pin D	1.1 Ω
5V / GND	White / Brown	Pin E / Pin F	155 Ω
Sensor Sine / GND	Yellow / Brown	Pin G / Pin F	33 kΩ
Sensor Cosine / GND	Green / Brown	Pin H / Pin F	33 kΩ
Temp. Sensor / GND	Black / Brown	Pin L / Pin F	10 kΩ
Phase / GND	-	Pin A, B, C, D / Pin F	>20 MΩ
All Pin / Shield	-	Pin A-L / Housing	>20 MΩ

### PS01-48x360F-SSC-C (0150-1270)

### PS01-48x360F-SSC-Cw (0150-2365)

### PS01-48x360F-SSC-C-FC (0150-1271)

### PS01-48x360F-SSC-Cw-FC (0150-2366)

Phase1+ / Phase1-	Red / Orange	Pin A / Pin B	1.5 Ω
Phase2+ / Phase2-	Blue / Gray	Pin C / Pin D	1.5 Ω
5V / GND	White / Brown	Pin E / Pin F	155 Ω
Sensor Sine / GND	Yellow / Brown	Pin G / Pin F	33 kΩ
Sensor Cosine / GND	Green / Brown	Pin H / Pin F	33 kΩ
Temp. Sensor / GND	Black / Brown	Pin L / Pin F	10 kΩ
Phase / GND	-	Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield	-	Pin A-L / Housing	>20 MΩ

### 7.3 Maintenance of linear motors

The person responsible for the operation of the motors must ensure that the specified maintenance work is carried out. The following maintenance schedule is designed for the operating conditions in the food industry with contact of liquid media. The inspection cycle is 2.5 million movement cycles or 1500 friction-kilometer.

#### 7.3.1 Maintenance schedule

When	What	Task
Every 2.5 million movement cycles or 1500 friction-kilometer	External bearing Wiper	Check + Possibly replacing the stainless steel bearing (only plastic tube + wiper!) or washdown bearing. (See section 3.3 "Disassembly of the bearing tube").
	Slider	Check whether the slider surface is clean and not scratched. Scratched sliders must be replaced, otherwise clean the slider. See Section 7.3.2 "Cleaning".
	Electrical connection	Tighten the electrical connection between cable and stator. Tightening torque: 0.6 Nm (C-, R-connector) according to section 5.2 "Connector".
	Fluid cooling (if available)	Check whether the cooling circuit is permanently connected.
	Tightness	<ul style="list-style-type: none"> <li>Check whether the external bearings are firmly bolted to the stator without gap.</li> <li>Tightening torque: <ul style="list-style-type: none"> <li>- Cylinder screw M5 (3.5 Nm) at PS01-37</li> <li>- Cylinder screw M6 (6 Nm) at PS01-48</li> </ul> </li> </ul>
Ease of movement	If friction is felt during movement, the motor must be stopped immediately. Check the alignment of the load bearing and slider.	

#### 7.3.2 Cleaning

- Pull the sliders carefully out of the stator.  
**Attention!:** Strong magnetic attraction forces (note safety instruction "contusions" on page 5.)! Use non-magnetic material (e.g. wood) to cover close-by iron constructions.
- Clean the slider and bearings with a soft disposable paper, using for example acetone or benzene cleaner. Common cleaning agents used in the food industry may also be used. However, these should not leave any residues.
- If the application allows it, it is advantageous to lubricate the slider and the bearings, because this increases the service life.  
The bearings are each greased with 1 g grease LU07. There should only be a light layer of grease on the inside. **Note!:** Avoid overlubrication!  
Sliders with a length of more than 500 mm are lubricated with a grease quantity of 4 g (approx. ½ hazelnut) per meter. Shorter sliders are inserted without lubrication. The grease can be applied by hand or with a soft paper towel.

#### 7.3.3 Cleaning agents / Lubricants

All LinMot stainless steel motors have a protection class of IP69 and are FDA fit. Standard cleaning agents in food and pharmaceutical industries with usual concentration and amount, can be used for the cleaning. If necessary, compatibility with the bearing material (PPS) and the wiper material (H-ECOPUR) must be checked.

##### Ordering information

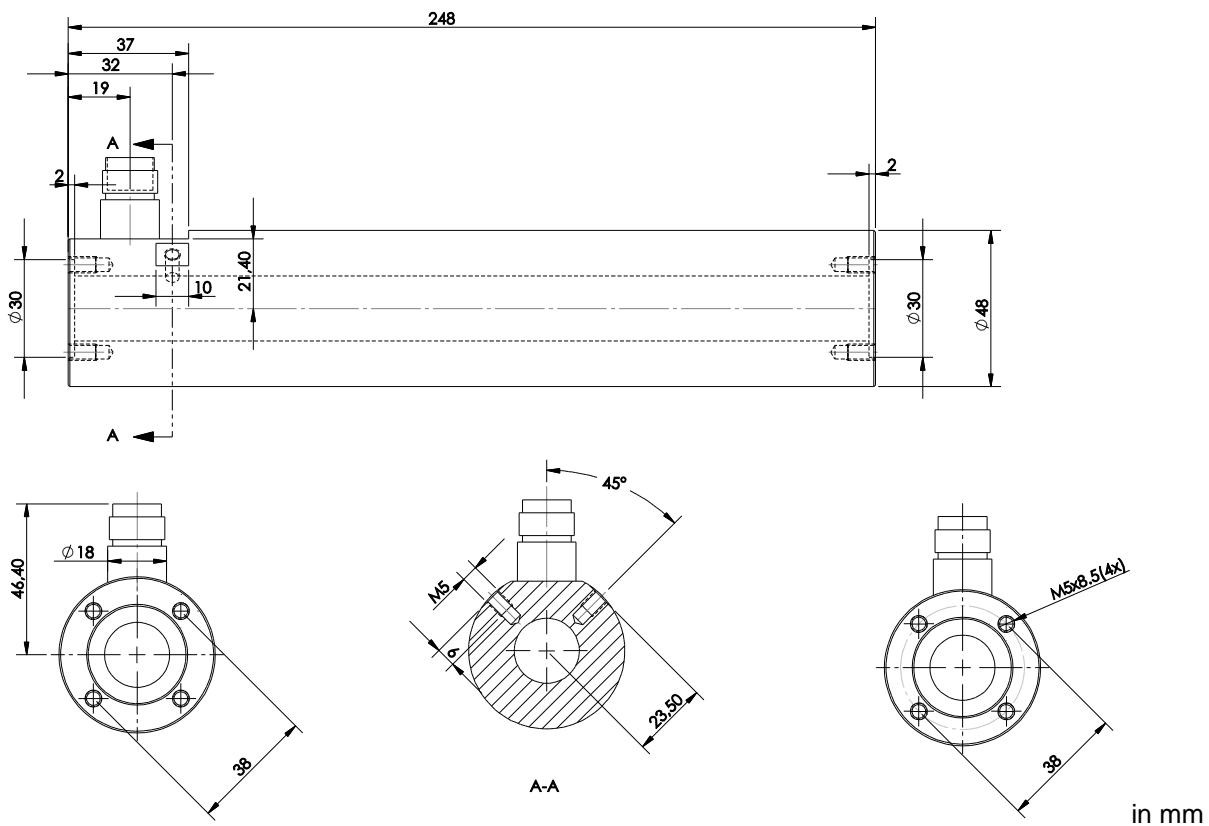
Item	Description	Item-No.
LU07-400	Interflon Food Grease 2* (400 ml)	0150-2744
* With food grade H1 approval.		

## 8 Storage, transport, installation altitude

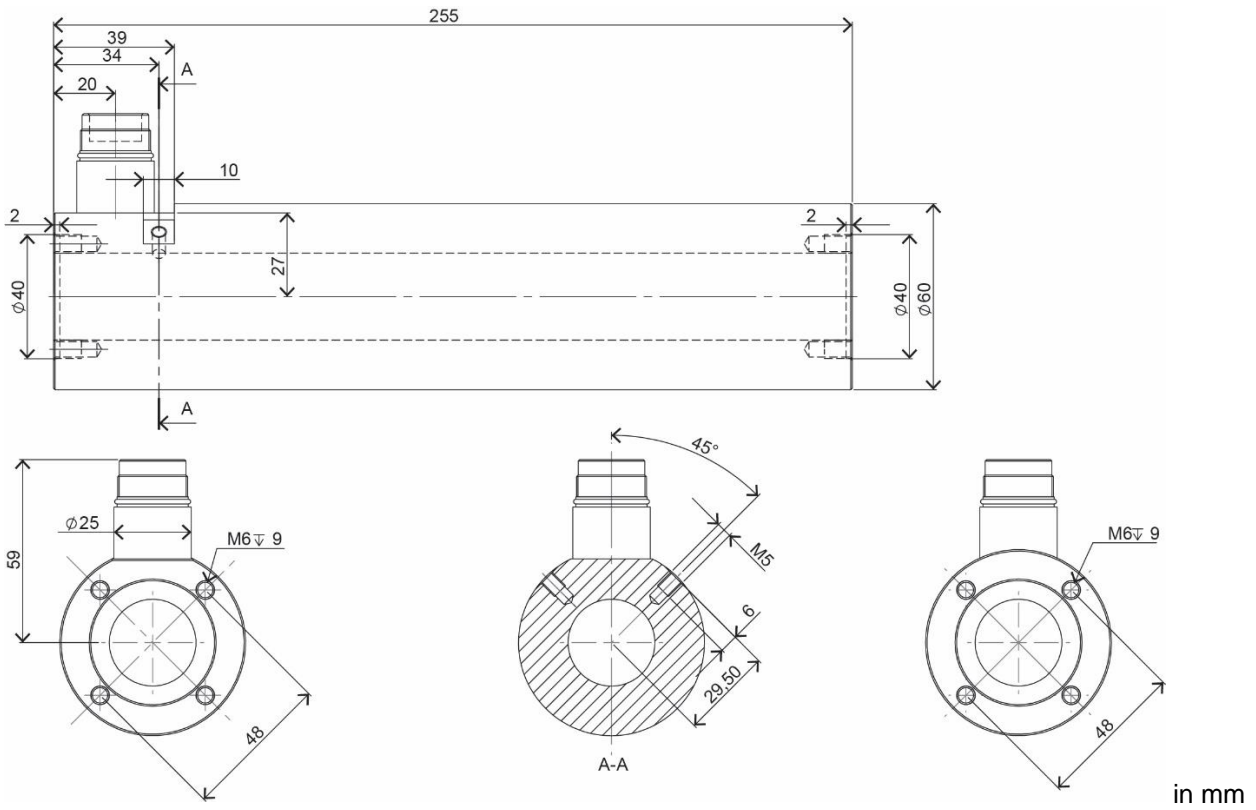
- Sliders are to be stored and transported only in the plastic containers (with cardboard inlay) provided for this purpose, or already installed and secured in LinMot P stators.
- Remove the slider from this plastic containers only for assembling.
- The storage area must be dry, dust-free, frost-free and vibration-free.
- Prescribed storage temperature: -15 °C...70 °C
- The motor must be protected against extreme weather conditions.
- The air in the storage area must not contain any harmful gases.
- The max. installation altitude is 4'000 m above sea level.  
Beyond 1'000 m, a derating of 0.5% per 100 m must be taken into account on the rated force in the case of air cooling.

## 9 Stator dimensions

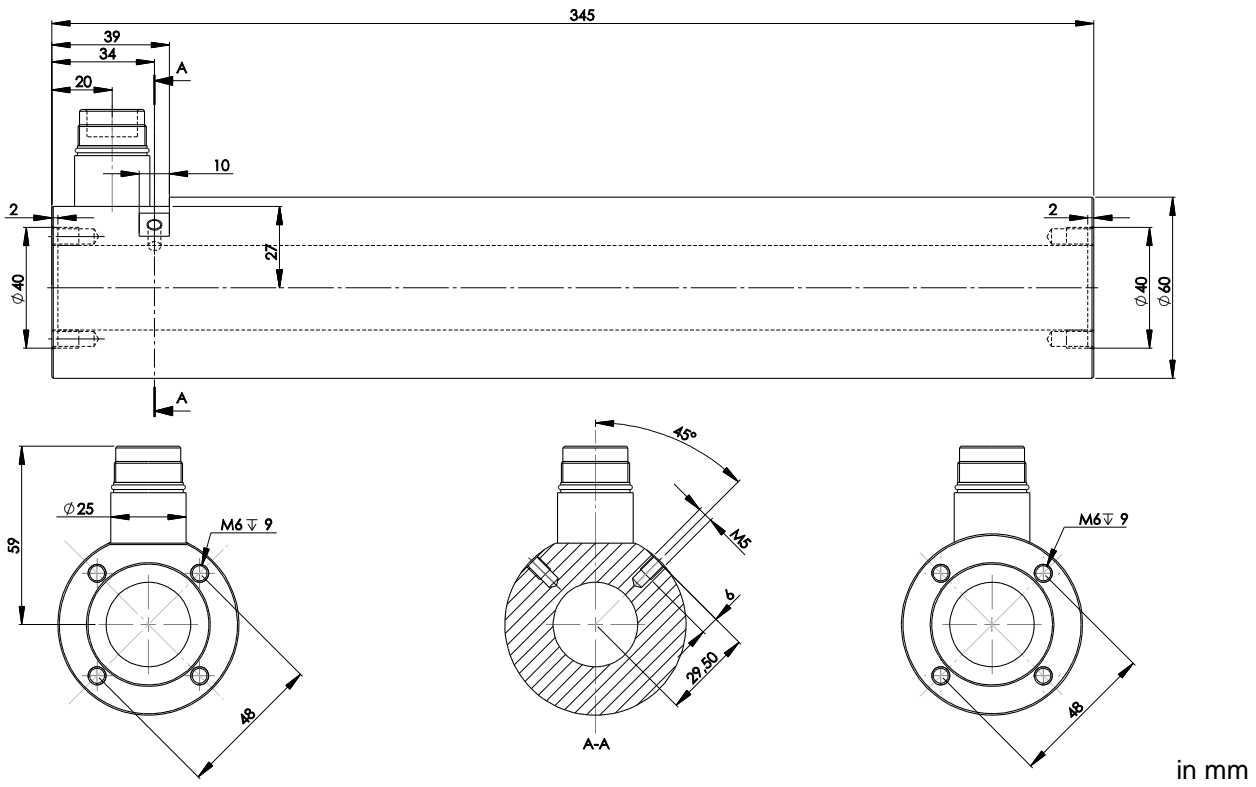
### 9.1 PS01-37x120F-HP-SSC-R (-FC)



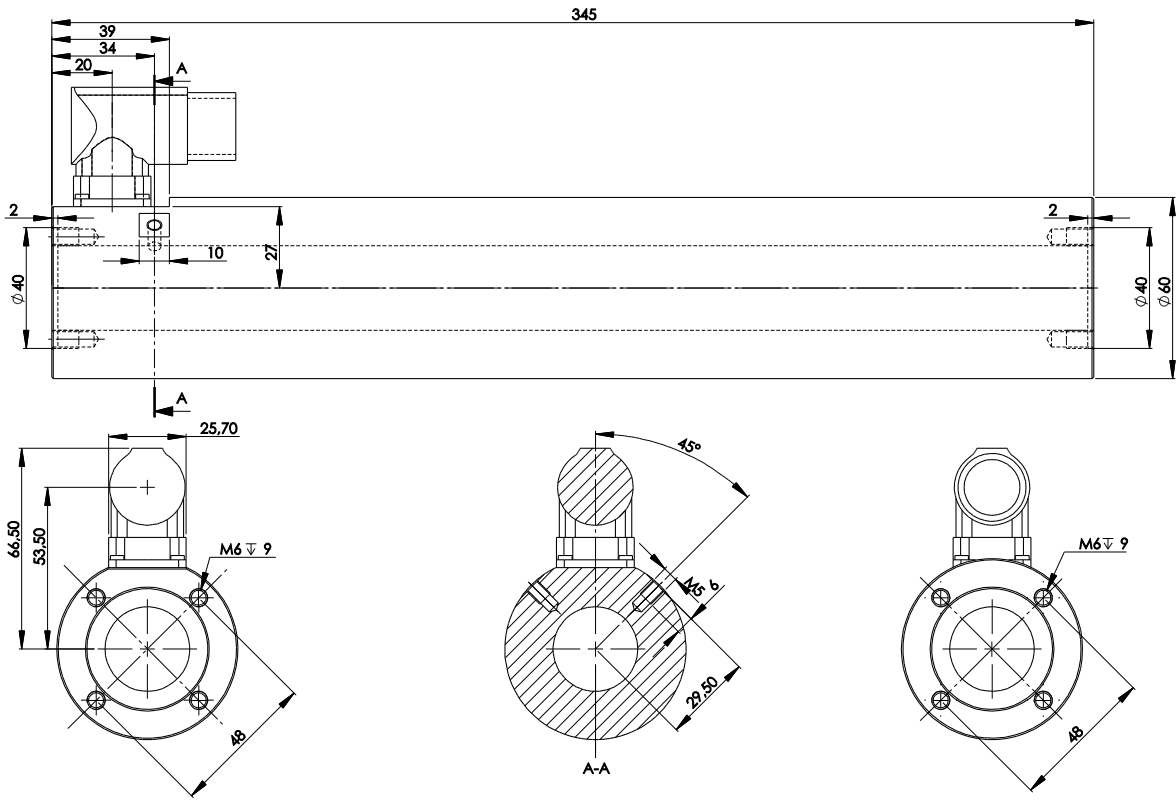
**9.2 PS01-48x150G-HP-SSC-C (-FC)**



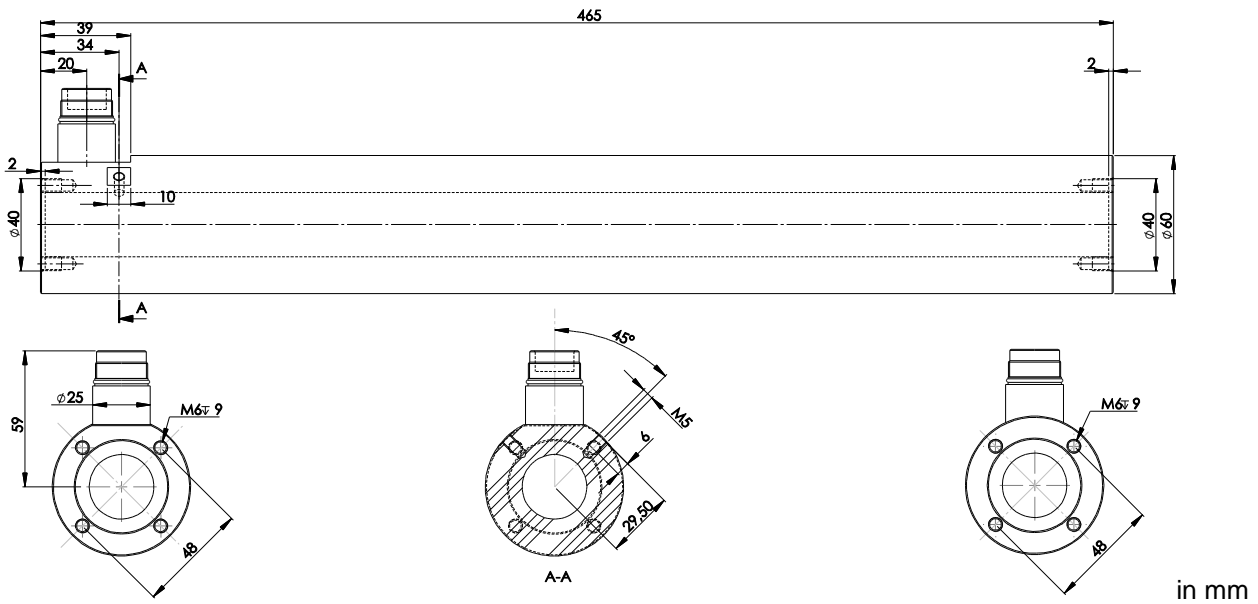
**9.3 PS01-48x240F-SSC-C (-FC)**



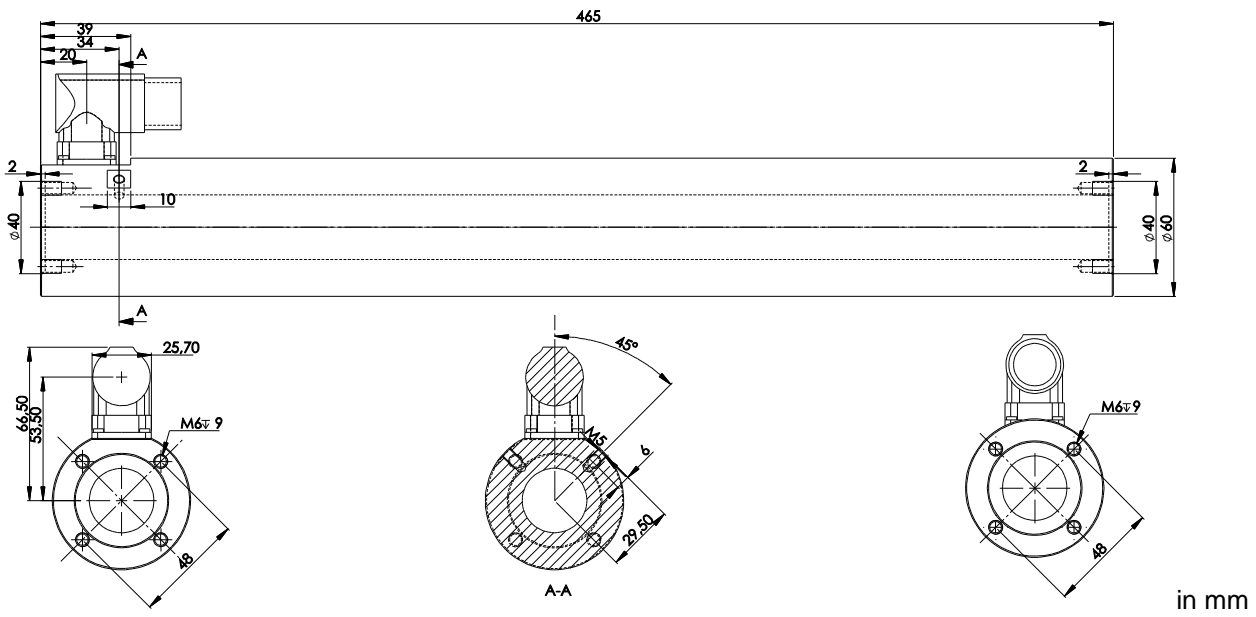
**9.4 PS01-48x240F-SSC-Cw (-FC)**



**9.5 PS01-48x360F-SSC-C (-FC)**







**9.6 PS01-48x360F-SSC-Cw (-FC)**



in mm

**10 International Certificates**

<p>Europe</p> 	<p>See chapter "EU Declaration of Conformity CE-Marking"</p>
<p>UK</p> 	<p>See chapter "UK Declaration of Conformity UKCA-Marking"</p>
<p><b>IECEE CB SCHEME</b></p>	<p>Ref. Certif. Nr. CH-8521</p>
<p>USA / Canada</p> 	<p>File Number E354430 Refers to cURus marked motors</p>

	Ref. Certif. No.
	CH-8521

**IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME**

**CB TEST CERTIFICATE**

Product	Linear motor	
Name and address of the applicant	NTI AG	Bodenackerstrasse 2 SWITZERLAND 8957 Spreitenbach
Name and address of the manufacturer	NTI AG	Bodenackerstrasse 2 SWITZERLAND 8957 Spreitenbach
Name and address of the factory	NTI AG	Bodenackerstrasse 2 SWITZERLAND 8957 Spreitenbach
<i>Note: When more than one factory, please report on page 2</i>	<input type="checkbox"/> Additional Information on page 2	
Ratings and principal characteristics	supplied via servo drive, see TR 17-EL-0006.E02 for details	
Trade mark (if any)	LinMot	
Customers's Testing Facility (CTF) Stage used	---	
Model / Type Ref.	PR series PS series P04 series P05 series	
Additional information (if necessary may also be reported on page 2)	<input type="checkbox"/> Additional Information on page 2	
A sample of product was tested and found to be in conformity with IEC	IEC 61000-6-2:2016 IEC 61000-6-4:2006, IEC 61000-6-4:2006/AMD1:2010 IEC 61000-6-7:2014	
National differences	EU Group Differences; EU Special National Conditions; EU A-Deviations	
As shown in the Test Report Ref. No. which forms part of this Certificate	17-EL-0006.E01 + .E02 + .Z01	



This CB Test Certificate is issued by the National Certification Body

Electrosuisse Luppenstrasse 1 8320 Fehraltorf SWITZERLAND		
Signed by: Martin Plüss		
Date: 2017-03-13		page 1 of 1



## CERTIFICATE OF COMPLIANCE

**Certificate Number** 20171024-E354430  
**Report Reference** E354430-20171023  
**Issue Date** 2017-OCTOBER-24

**Issued to:** NTI AG  
 Bodenaeckerstr 2,  
 8957 SPREITENBACH SWITZERLAND

**This is to certify that  
 representative samples of**

**COMPONENT - INCOMPLETE ROTATING MACHINES  
 AND ROTATING MACHINE PARTS**

Class A Insulated Linear Motor models Series PS01 and  
 PS02


Have been investigated by UL in accordance with the  
 Standard(s) indicated on this Certificate.

**Standard(s) for Safety:** UL 1004-1 - Rotating Electrical Machines – General  
 Requirements

CAN/CSA C22.2 No. 100 - Motors and generators

**Additional Information:** See the UL Online Certifications Directory at  
[www.ul.com/database](http://www.ul.com/database) for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's  
 Certification and Follow-Up Service.

The UL Recognized Component Mark generally consists of the manufacturer's identification and catalog  
 number, model number or other product designation as specified under "Marking" for the particular  
 Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products  
 that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark:  
 may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is  
 required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual  
 recognitions.

Recognized components are incomplete in certain constructional features or restricted in performance  
 capabilities and are intended for use as components of complete equipment submitted for investigation rather  
 than for direct separate installation in the field. The final acceptance of the component is dependent upon its  
 installation and use in complete equipment submitted to UL LLC.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please  
 contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



## 11 EU Declaration of Conformity CE-Marking

NTI AG / LinMot®  
Bodenaeckerstrasse 2  
8957 Spreitenbach

Switzerland

Tel.: +41 (0)56 419 91 91  
Fax: +41 (0)56 419 91 92

declares under sole responsibility the compliance of the products:

- Linear Motors of the Series **PS01-37 SSC**
- Linear Motors of the Series **PS01-48 SSC**

with the EMC Directive 2014/30/EU.

Applied harmonized standards:

- **EN 61000-6-2: 2005 (Immunity for industrial environments)**
- **EN 61000-6-4: 2007 + A1: 2011 (Emission for industrial environments)**

According to the EMC directive, the listed devices are not independently operable products.

Compliance of the directive requires the correct installation of the product, the observance of specific installation guides and product documentation. This was tested on specific system configurations.

The safety instructions of the manuals are to be considered.

The product must be mounted and used in strict accordance with the installation instructions contained within the installation guide, a copy of which may be obtained from NTI AG.

Company: NTI AG  
Spreitenbach, 23.05.2024



Dr.-Ing. Ronald Rohner  
CEO NTI AG

## 12 UK Declaration of Conformity UKCA-Marking

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8957 Spreitenbach

Switzerland

Tel.: +41 (0)56 419 91 91  
Fax: +41 (0)56 419 91 92

declares under sole responsibility the compliance of the products:

- Linear Motors of the Series **PS01-37 SSC**
- Linear Motors of the Series **PS01-48 SSC**

with the EMC Regulation S.I. 2016 No. 1091.

Applied designated standards:

- **EN 61000-6-2: 2005 (Immunity for industrial environments)**
- **EN 61000-6-4: 2007 + A1: 2011 (Emission for industrial environments)**

According to the EMC regulation, the listed devices are not independently operable products.

Compliance of the regulation requires the correct installation of the product, the observance of specific installation guides and product documentation. This was tested on specific system configurations.

The safety instructions of the manuals are to be considered.

The product must be mounted and used in strict accordance with the installation instructions contained within the installation guide, a copy of which may be obtained from NTI AG.

Company: NTI AG  
Spreitenbach, 23.05.2024



Dr.-Ing. Ronald Rohner  
CEO NTI AG

# ALL LINEAR MOTION FROM A SINGLE SOURCE

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