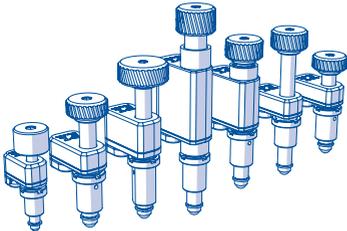


PiezoMike Linear Actuators

Short Instructions

N-45x / N-47x / N-48x



User Information

These short instructions contain an overview of the most important safety and handling instructions for installing and operating linear actuators with PIShift piezo motors with the product codes given above (x: any number).

Subject to change. These short instructions are superseded by any new release. The latest respective release is available for download on our website.



Downloading and Reading the Manual

The actions during installation, startup, and maintenance require additional information from the manuals of the linear actuator and/or the electronics used.

Manuals may be titled as follows: „User Manual“, „Technical Note“.

Downloading the Manuals from the Website

1. Open the website **www.pi.ws**.
2. Search the website for the product number (e.g., C-663.12) or the product family (e.g., PICMA® Bender).
3. Click the corresponding product to open the product detail page.
4. Click **Downloads**.
The manuals are shown under **Documentation**.
5. Click the desired manual and fill out the enquiry form.
The download link will then be sent to the email address entered.

If you cannot find the manual you are looking for or if you have any questions: Contact our customer service department via service@pi.de.



Safety

Intended Use

The linear actuator is a laboratory device as defined by DIN EN 61010-1. It is intended for indoor use and use in an environment that is free of dirt, oil, and lubricants.

In accordance with its design, the linear actuator is intended for positioning and adjusting loads in one axis at various velocities in interval operation. The linear actuator is **not** intended for applications in areas, in which a failure would present severe risks to human beings or the environment.

The intended use of the linear actuator is only possible when completely installed and connected, and in conjunction with suitable electronics. The linear actuator may only be installed, operated, maintained, and cleaned by authorized and appropriately qualified personnel.

General Safety Instructions

The linear actuator was built according to state-of-the-art technology and recognized safety standards. Improper use of the linear actuator may result in personal injury and/or damage to the linear actuator. The operator is responsible for correct installation and operation of the linear actuator.

- ▶ Only use the linear actuator for its intended purpose, and only use it if it is in good working order.
- ▶ Read the user manual.
- ▶ Immediately eliminate any faults and malfunctions that are likely to affect safety.
- ▶ Do **not** disassemble the linear actuator.
- ▶ Do **not** remove the fine-thread screw completely from the base body.

If a protective earth conductor is not properly connected, touching the linear actuator in the case of malfunction can result in minor injuries from electric shock.

- ▶ Connect the protective earth conductor via a sufficiently conductive mechanical attachment.
- ▶ Make sure that the contact resistance at all connection points relevant for attaching the protective earth conductor is $<0.1 \Omega$ at 25 A.
- ▶ Do **not** remove the protective earth conductor during operation. If the protective earth conductor has to be temporarily removed (e.g., for modifications), reconnect the linear actuator to the protective earth conductor before restarting.
- ▶ Observe the applicable standards for the protective earth conductor connection.

The piezo actuator in the drive of the linear actuator can remain electrically charged after disconnecting the electronics. Temperature changes can also induce charges in piezo actuators. Touching charged parts can result in minor injuries from electric shock.

- ▶ Do **not** touch the contacts in the connector. Mechanical forces can damage or misalign the linear actuator.
- ▶ Avoid shocks and drops.
- ▶ Observe the maximum permissible forces (see manual).

Moisture, liquids, and electrically conductive materials (e.g., metal dust) that penetrate the linear actuator can destroy the drive of the linear actuator. Electric flashovers are possible as a result of increased conductivity of the air in certain air pressure ranges.

- ▶ Avoid operating the linear actuator in environments that can increase the electric conductivity.
- ▶ Operate the linear actuator only within the permissible ambient conditions and classifications (see manual).

If the linear actuator is vacuum-compatible, attention must be paid to cleanliness.

- ▶ Only touch the linear actuator with powder-free gloves.

Dirt, condensation, and inappropriately applied lubricant render the drive of the linear actuator inoperable.

- ▶ Keep the linear actuator free of dirt and condensation.
- ▶ Do **not** remove the lubricant that was applied to the fine-thread screw of the at the factory.
- ▶ Do **not** relubricate the fine-thread screw of the linear actuator.

Installation

Operating voltages that are excessively high or incorrectly connected can cause damage to the linear actuator.

- ▶ Only operate the linear actuator with electronics and original accessories from PI.
- ▶ Observe the operating voltage range of the linear actuator (see manual).
- ▶ Observe the correct pin assignment.

Increased friction impedes the motion and increases the wear of the linear actuator.

- ▶ Avoid lateral forces on the fine-thread screw and on the tip.
- ▶ Make sure that friction between the the tip and contact surface is as low as possible.

Heat produced during operation can affect your application.

- ▶ Install the linear actuator so that the application is not affected by the dissipating heat.
- ▶ Ensure sufficient ventilation and heat dissipation from contact surfaces.

Startup and Operation

An operating frequency that is too high can cause damage to the linear actuator.

- ▶ Observe the operating frequency range of the linear actuator (see manual).

The permanent application of a high static voltage to linear actuators leads to a considerable reduction in the lifetime of the piezo ceramic.

- ▶ When the linear actuator is not used, switch off the electronics.

The fine-thread screw of the linear actuator can get stuck at the hard stop. Getting stuck can reduce the lifetime of the linear actuator.

- ▶ Stop the linear actuator when it reaches the hard stop or command a motion away from the hard stop.
- ▶ If the fine-thread screw of the linear actuator has become stuck: Turn the screw head by hand to loosen the fine-thread screw.

Unintentional motion of the linear actuator is possible when it is connected to the electronics.

- ▶ Before connecting the linear actuator, check whether a macro is defined as the startup macro in the electronics and if necessary, cancel the selection.

The linear actuator can overheat in continuous operation with maximum load.

- ▶ Select the motor power depending on the duty cycle and ambient temperature (see manual).
- ▶ Observe the operating conditions (duty cycle, ambient temperature) (see manual).



Mounting the Linear Actuator and Connecting it to a Protective Earth Conductor

Requirements

- ✓ The linear actuator is not connected to the electronics.
- ✓ You have provided a suitable mechanical mounting (see manual).
- ✓ The mechanical mounting is connected to the protective earth conductor. The contact resistance at all protective earth connections is $<0.1 \Omega$ at 25 A.



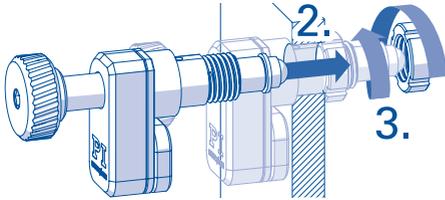
NOTICE!

Overtightening the mounting nut can damage the linear actuator.

- ▶ Hand-tighten the mounting nut only.

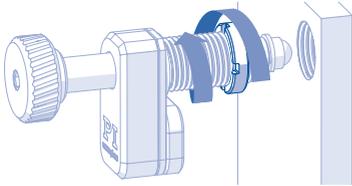
Linear Actuator with Clamping Shank

1. Remove the mounting nut from the mounting thread of the linear actuator.

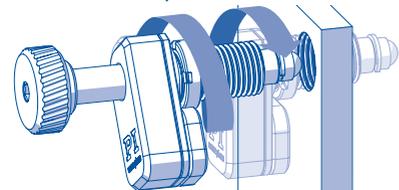


2. Position the linear actuator in the mechanical mounting.
3. Screw the mounting nut into the mounting thread and **hand-tighten** the mounting nut with the hook wrench.

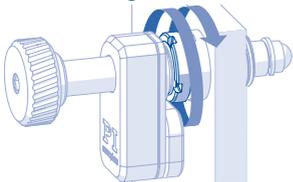
Linear Actuator with Mounting Thread



1. Screw the mounting nut in the direction of the base body.



2. Screw the linear actuator as far as necessary into the threaded hole of the mechanical mounting.



3. Hold the base body of the linear actuator and at the same time, screw the mounting nut in the direction of the mechanical mounting.
4. **Hand-tighten** the mounting nut with the hook wrench.



Starting up the Linear Actuator



CAUTION!

If a protective earth conductor is not properly connected, touching the linear actuator in the case of malfunction can result in minor injuries from electric shock.

- ▶ Start up the linear actuator only when the protective earth conductor has been properly installed (see manual).

The instructions required for startup and operation are in the manual of the electronics used.



Maintenance

12 hours after installation:

- ▶ Check that the linear actuator is affixed firmly.

Do **not** relubricate the linear actuator if you suspect wear.



Old Equipment Disposal

In accordance with EU law, electrical and electronic equipment may not be disposed of in EU member states via the municipal residual waste.

Dispose of your old equipment according to international, national, and local rules and regulations.

PI undertakes environmentally correct and free disposal of all old PI equipment made available to the market after 13 August 2005.

If you have an old device from PI, you can send it to PI free of charge.