PILine® Positioners
Short Instructions
M-67x / M-68x / U-52x / U-62x / U-651 / U-7xx

User Information

These short instructions contain an overview of the most important safety instructions and handling instructions for Positioners with PILine® piezomotors 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 These short instructions are superseded by any new release.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, operation, and maintenance require additional information from the manuals for the positioner and/or the electronics. 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 displayed under Documentation.
5. Click the desired manual and fill out the inquiry 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 Instructions

Intended Use
The positioner is a laboratory device as defined by DIN EN 61010-1. It is intended to be used in interior spaces and in an environment which is free of dirt, oil and lubricants.

In accordance with its design, the positioner is intended for positioning and adjusting of loads at different velocities in interval operation. The positioner 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 positioner is only possible when completely mounted and connected and only in combination with suitable electronics.

The positioner may only be installed, operated, maintained and cleaned by authorized and appropriately qualified personnel.

Installation
Mechanical forces can damage or misalign the positioner.
- Avoid shocks and drops.
- Observe the maximum permissible forces (see manual).
- For XY stages: If the positioner must be brought to a vertical position during installation, secure the motion platforms against slipping.
- Observe the correct alignment of the load (see manual).
  - **Linear stage:** When the motion axis is aligned vertically, the load must be lower than the holding force of the drive (see manual).
  - **Rotary stage:** When the positioner is mounted vertically, the load must be lower than the maximum torque of the drive (see manual).
- Observe the recommended installation position of the positioner (see manual).
- Include the masses of the moved positioners in multi-axis systems in the calculations.

Dirt, oil, lubricant and condensation make the drive of the positioner inoperable.
- Keep the piezomotors free from lubricants.
- Keep the positioner free from dirt and condensation.

Incorrectly mounted screws can cause damage.
- Do not let screw heads protrude.
- Select the screw length according to the depth of the mounting holes.

Collisions can damage the positioner, the load to be moved and the environment.
- Mount the positioner and the load so that the load cannot get jammed or blocked, or collide with objects in the workspace.

Unsuitable mounting can warp the positioner and reduce the accuracy.
- Mount the positioner on an even surface with similar thermal expansion properties (for recommended evenness, see manual).

Unsuitable cables can cause damage to the electronics and can affect the performance of the positioner.
- Only use original parts from PI (see manual).

Heat produced during operation can affect your application.
- Install the positioner so that your application is not affected by the dissipating heat.

Start-Up
If a protective earth conductor is not or not properly connected, touching the positioner can result in minor injuries from electric shock in the case of a malfunction.
- Only operate the positioner with a properly connected protective earth conductor.
- Do not remove the protective earth conductor from the positioner during operation.
- Observe the applicable standards for mounting the protective earth conductor.

Piezomotors can stay electrically charged after being disconnected from the electronics. Temperature changes can also induce charges in the piezomotors. Touching charged parts can result in minor injuries from electric shock.
- Do not touch the contacts in the connector.
Operating voltages that are too high or incorrectly connected can cause damage to the positioner.
- Only use compatible electronics.
- Observe the operating voltage range of the positioners (see manual).
- Observe the correct pin assignment (see manual).

The positioner can carry out unintentional motions when being connected to the electronics.
- Before connecting the positioner, check whether a macro is defined as the start-up macro in the electronics and cancel the selection if necessary.

The positioner can overheat in continuous operation with maximum load.
- Select the motor power depending on the duty cycle and ambient temperature (see manual).

Uncontrolled oscillations can damage your application or the positioners.
- If oscillations occur, immediately switch off the servo mode or stop the positioner.
- Check the settings of the servo-control parameters (see manual).

Using the default parameters for the electronics can damage the positioner in the case of high loads.
- Only use the default parameters for the first start-up (without load if possible).
- Individually adjust the operating parameters (see electronics manual).

High accelerations can cause damage to or considerable wear on the mechanical system.
- Stop the motion immediately if a malfunction of the electronics occurs.
- Approach the end of the travel range at low velocity.

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**NOTICE!**

**Mounting the Positioner and Affixing the Load**

Damage from incorrect mounting.
- Observe the safety instructions in the „Installation“ section.
- Mount the positioner to the provided mounting holes.
- Affix the load to the provided mounting holes.
- Check that the positioner and the load are affixed firmly.

**Correct mounting**

**Mounting on an uneven surface**

**Incorrect alignment of the load**

**Incorrect mounting of the screws**
Connecting the Positioner to the Protective Earth Conductor

**CAUTION!**

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

- Only operate the positioner with a properly connected protective earth conductor.
- Observe the applicable standards for mounting the protective earth conductor.

### Suitable protective earth conductor

- Cross-section of the protective earth conductor \( \geq 0.75 \text{ mm}^2 \).

### Checking the connection of the protective earth conductor

- Make sure that the contact resistance is \(<0.1 \ \Omega \text{ at } 25 \ A\) at all protective earth conductor connections.
- If ground loops occur, contact the PI customer service department.

#### Connection via separate protective earth connection

If a separate protective earth connection is available, it must be used.

- Fasten a suitable cable lug to the protective earth conductor.
- Fasten the cable lug of the protective earth conductor to the protective earth connection using the supplied screw set.
- Tighten the M4 screw with at least three rotations and a torque of 1.2 to 1.5 Nm.

#### Connection via mounting holes

If no separate protective earth connection is available, the positioner has to be mounted on an electrically conductive surface that is connected to a protective earth conductor.

- Affix the positioner on the surface by inserting the screws supplied into all mounting holes.
- Tighten the mounting screws to the torque specified in the manual.
- After at least 12 operating hours, retighten the screws to the torque specified in the manual.

1. M4 screw
2. Toothed washer
3. Flat washer
4. Cable lug
5. Base body of the positioner
6. Protective earth conductor

1. Screw
2. Mounting hole