Housed PICMA® Actuators to 100 V
PZ303EK Short Instructions
P-810, P-820, P-830, P-840 to P-845

User Information

These short instructions contain an overview of the most important safety information and handling instructions for installing and operating piezo actuators with the above-mentioned product numbers.

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 These short instructions are superseded by any new release.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 piezo actuator 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 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 Information

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

In accordance with its design, the piezo actuator is intended for positioning loads and generating force in one axis.

The piezo actuator is not intended for applications in areas where failure would be a considerable risk for people or the environment.

The intended use of the piezo actuator is only possible when completely mounted and connected and only in conjunction with suitable electronics.

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

Actuators with stranded wires:
When installing actuators that were equipped with stranded wires at the factory, the operator is responsible for electrical safety and electromagnetic compatibility according to the applicable standards.

Electrical Dangers
Temperature changes and compressive stress can induce charges in piezo actuators. After disconnection from the electronics, the piezo actuator can remain charged for several hours. Touching or short-circuiting the contacts in the connector or the stranded wires can lead to minor injuries from electric shock.

- Do not touch the open ends of the stranded wires or the contacts in the plug connector.
- Do not disassemble the piezo actuator.
- Piezo actuators with stranded wires: If the piezo actuator is not connected to the electronics, discharge it and and keep it short-circuited after discharging.

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

- Operate the piezo actuator only with a properly connected protective earth conductor.
- Observe the applicable standards for mounting the protective earth conductor.

Moisture, liquids and electrically conductive materials (e.g., metal dust) that penetrate the housing of the piezo actuator can destroy the piezo actuator.

- Operate the piezo actuator only under permissible ambient conditions (see manual).
- Do not operate a vacuum-compatible piezo actuator during evacuation or ventilation.

Excessively high or wrongly connected operating voltages can cause damage to the piezo actuator.

- Use compatible electronics and cables from PI only.
- Pay attention to the operating voltage range of the piezo actuator (see manual).
- Pay attention to the pin assignment respectively the polarity of the stranded wires (see manual).

Continuously high voltages can reduce the lifetime of the piezo actuator.

- If possible, limit the maximum operating voltage during continuous operation.
- Discharge the piezo actuator when it is not in use.

Mechanical Dangers
Mechanical forces can destroy the piezo actuator.

- Avoid shocks and drops.
- Do not exceed the maximum permissible forces (see manual).
- Avoid torques, bending, lateral, and pull forces on the piezo actuator.
- Do not connect the both ends of the piezo actuator rigidly.
- Align the center of load to the piezo actuator’s motion axis.

Excessively high operating frequencies can destroy the piezo actuator.

- Select the operating frequency according to the application.
- Pay attention to the resonant frequency and dynamic forces (see manual).
Excessively steep edges in the control signal or excessively fast discharging can trigger a strong mechanical impulse and damage the piezo actuator.

- Avoid steep edges in the control signal.
- Discharge the piezo actuator before short-circuiting.
- If the connecting cable is accidentally pulled out during operation, switch off the electronics before you reconnect.

Uncontrolled oscillation can damage the piezo actuator or your application.

- If oscillation occurs, switch off the servo mode or stop the piezo actuator immediately.
- Check the servo control settings respectively the settings for the operating parameters (see the user manual).

Attention must be paid to appropriate cleanliness when handling vacuum-compatible piezo actuators.

- Touch the piezo actuator only when wearing powder-free gloves.
- If necessary, wipe the piezo actuator clean.

**Thermal Dangers**

The surface of the piezo actuator can heat up during operation. Touching the piezo actuator can result in minor injuries from burning. The piezo actuator could be destroyed by overheating.

- If possible, cool the piezo actuator or install touch protection.
- Adjust the operating time, operating frequency, and operating voltage so that the maximum operating temperature is not exceeded.
- Vacuum-compatible piezo actuators: Pay attention to reduced heat dissipation in a vacuum.

**Incorrect Mounting**

1. Do not connect the both ends of the piezo actuator rigidly.
2. Avoid angles and uneven loads.
3. Avoid lateral forces, torques and tilting torques as well as impermissibly high pull forces.

**Correct Mounting**

1. Align the center of load to the motion axis.
2. Use ball tips or flexure guides (flexure joints) for lateral forces and torques.
3. Compensate any minor unevenness by gluing the entire surface.
4. Non-preloaded actuators: If necessary, preload suitably to avoid pull forces.

**Installation**

**General Notes on Installation**

Depending on the model (see manual), the piezo actuator and the load are fixed with glue or a screw connection.

The connection to protective earth is ensured by mounting the piezo actuator onto an electrically conductive surface connected to a suitable protective earth conductor.
Screwing on the Piezo Actuator

Tools and Accessories
- Electrically conductive surface
- Electrically conductive screw
- Open-end wrench
- Screwdriver or wrench

Requirements
- Piezo actuator with stranded wires: The piezo actuator is discharged and short-circuited.
- The surface has a mounting hole for fixing the piezo actuator.
- The surface is connected to a protective earth conductor with a cross section of \( \geq 0.75 \text{ mm}^2 \).

Screwing on the Piezo Actuator
1. Secure the base of the piezo actuator with the open-end wrench.
2. Fix the piezo actuator to the surface by tightening the screw (see manual for maximum torque).

Gluing the Piezo Actuator

Tools and Accessories
- Electrically conductive surface
- Electrically conductive adhesive (e.g., silver-filled epoxy resin)

Requirements
- Piezo actuator with stranded wires: The piezo actuator is discharged and short-circuited.
- The glued surfaces were prepared according to the specifications of the adhesive manufacturer.
- The surface is connected to a protective earth conductor with a cross section of \( \geq 0.75 \text{ mm}^2 \).

Gluing the Piezo Actuator
1. Apply the adhesive according to manufacturer’s instructions.
2. Spread the adhesive over the entire contact surface when gluing the load to the tip.

Checking the Connection of the Protective Earth Conductor
- Make sure that the contact resistance at all protective earth connections is \(< 0.1 \Omega \) at 25 A.
- If ground loops occur, contact the PI customer service department.

Screwing the Load

Tools and Accessories
- Screw or nut
- Open-end wrench
- Screwdriver or wrench

Requirements
- Piezo actuator with stranded wires: The piezo actuator is discharged and short-circuited.
- Screwing the Load
  1. Secure the tip with the open-end wrench.
  2. Tighten the screw or nut (see manual for maximum torque).

Gluing the Load

Tools and Accessories
- Adhesive (e.g., cold-hardening epoxy resin)

Requirements
- Piezo actuator with stranded wires: The piezo actuator is discharged and short-circuited.
- The glued surfaces were prepared according to the specifications of the adhesive manufacturer.

Gluing the Load
1. Apply the adhesive according to manufacturer’s instructions.
2. Spread the adhesive over the entire contact surface when gluing the load to the tip.

Starting and Operating the Piezo Actuator
The instructions required for startup and operation are in the manual for the electronics used.

Discharging and Short-Circuiting the Piezo Actuator
The piezo actuator must be discharged in the following cases:
- Before short-circuiting
- When not in use
- Before reconnecting when the connecting cable was accidentally pulled out of the electronics during operation
- Before assembly work
Discharging the Piezo Actuator Connected to the Electronics

- Set the piezo voltage on the electronics to 0 V.

Discharging the Piezo Actuator not Connected to the Electronics

Piezo actuator without connector:
1. Ensure adequate protection against touching live parts.
2. Short-circuit the piezo actuator for a few seconds with a suitable 10 kΩ discharge resistor.

Piezo actuator with connector:
- Connect the piezo actuator to the switched-off electronics from PI.

Short-Circuiting a Discharged Piezo Actuator

1. Disconnect the piezo actuator from the electronics if it is still connected.
2. Short-circuit the piezo actuator by twisting the stranded wires or using a suitable shorting clamp.

Maintenance

The piezo actuator is maintenance-free.

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.