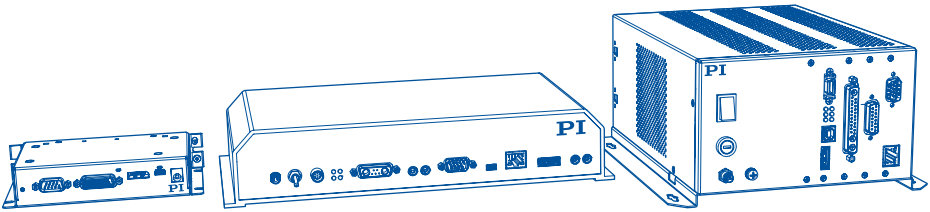
Digital Piezo Controllers

Short Instructions

E-709.xxG / E-727 / E-754



User Information

These short instructions contain an overview of the most important safety information and handling instructions for installation and startup of digital piezo controllers (hereinafter referred to as "electronics") with the above-mentioned product numbers (x: any character).

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 These short instructions are superseded by any new release.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, starting and operating, adapting the settings, and maintenance require additional information from the manuals for the electronics and/or the positioner.

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

Downloading Manual Packages as ZIP File

If you received an installation package with the PI Software Suite, follow the instructions in the file **Manuals\A000T0081-Downloading Manuals from PI.pdf** to download the manuals for your electronics.

Downloading Manuals from the Website

1. Open the website **www.pi.ws**.
2. Search the website for the product number (e.g., E-727).
3. Click the corresponding product to open the product detail page.
4. Click the **Downloads** tab.
   The manuals are displayed under **Documentation**.
5. Click the **ADD TO LIST** button for the desired manual and then click **REQUEST**.
6. Fill out the request form and click **SEND REQUEST**.
   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.

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Safety

Intended Use

The electronics are a laboratory device as defined by DIN EN 61010-1. They are intended for indoor use and use in an environment which is free of dirt, oil, and lubricants.

According to their design, the electronics are intended for operating positioners with piezoceramic actuators. The electronics can be used for static as well as dynamic applications.

Suitable sensors must be used when operating the positioner in a closed loop. PI positioners have the corresponding sensors.

The electronics may only be used in compliance with the technical specifications and instructions in the user manual. The user is responsible for process validation.

The electronics may not be used for purposes other than those stated in the user manual. The electronics may only be installed, operated, maintained, and cleaned by authorized and appropriately qualified personnel.

Installation

Unsuitable cables can cause damage to the electronics and can affect the performance of the positioner.

- ▶ Use genuine PI parts only for connecting the positioner to the electronics.
- ▶ Pay attention to the local safety regulations for all connected parts.
- ▶ If you need longer cables, use extension cables from PI.

Electromagnetic interference in the sensor frequency range (100 kHz) could influence the signal from capacitive sensors.

- ▶ If necessary, ensure adequate shielding (see "Guide to Grounding and Shielding", document number **A000T0074**).

Startup

Unsuitable notch filter settings and unsuitable servo control parameters could cause the positioner to oscillate. Oscillation can damage the positioner and/or the load fixed to it.

- ▶ If the positioner is oscillating (unusual noise), switch off the servo mode or the electronics immediately.
- ▶ Switch the servo mode on only after you have modified the notch filter settings and servo control parameters (see manual).

Installation

Installing the PC Software

Installing the PC software in Windows

1. Run **PISoftwareSuite.exe** in the root directory of the PI Software Suite CD.
   The **InstallShield Wizard** window opens.
2. Follow the instructions on the screen.
3. If necessary: Use PI Update Finder to update the PC software and positioner database (see manual).

Installing the PC software in Linux

1. Unpack the tar archive from the **/linux** directory on the PI software CD to a directory on your PC.
2. Change to the directory where the tar archive was unpacked.
3. As superuser (root privileges), run the **./INSTALL** script to start the installation.
4. Follow the instructions on the screen.
5. If necessary: Update the PC software and positioner database (see manual).

Mounting the Electronics

NOTICE

High temperatures can cause the electronics to overheat.

- ▶ Install the electronics with a sufficient gap on all sides (see manual). If this is not possible, make sure that the surroundings are cooled.
- ▶ Ensure sufficient ventilation at the place of installation.
- ▶ Keep the ambient temperature at a noncritical level (5-40 °C).

Install the electronics near the power supply so that the power plug can be quickly and easily disconnected from the mains.

When the electronics are to be used as a benchtop device:

- ▶ Make sure that the electronics are standing safely and securely.

If the electronics are to be mounted:

- ▶ Bore the required holes into the underlying surface.
- ▶ Insert a suitably sized screw into each recess to fix the electronics.

Connecting the Electronics to the Protective Earth Conductor

If a protective earth connector is available on the electronics, it must be connected to the protective earth conductor.

Requirements

✓ The electronics are switched off.

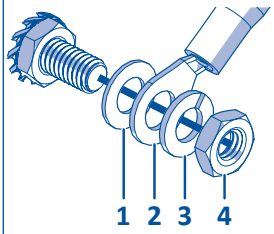
Tools and Accessories

- Suitable protective earth conductor:
  - Cable cross-section ≥0.75 mm²
  - Contact resistance < 0.1 Ω at 25 A at all points relevant for attaching the protective earth conductor
- Mounting hardware for the protective earth conductor; is on the protective earth connector on delivery of the electronics
- Suitable screwdriver or wrench

Connecting the Protective Earth Conductor

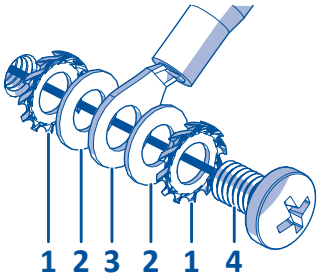
1. Attach a suitable cable lug to the protective earth conductor.
2. Attach the cable lug to the protective earth connector using the mounting hardware supplied.

Connecting the Protective Earth Conductor with a Threaded Bolt



1 Flat washer
2 Cable lug with protective earth conductor
3 Lock washer
4 Nut

Connecting the Protective Earth Conductor with a Screw



1 Lock washer
2 Flat washer
3 Cable lug with protective earth conductor
4 Screw

Connecting the Positioner

Requirements

✓ The electronics are switched off.
✓ You have read and understood the user manual for the positioner.

Tools and Accessories

- Positioner supplied with the electronics or compatible positioner with ID chip
- If necessary: Compatible adapter from PI
- If necessary: Suitable extension cable from PI

Connecting the Positioner

1. Plug the positioner's connector into the electronics.
2. Secure the connector against accidental disconnection.

Connecting the PC

Requirements

✓ The PC has an unused USB interface.
or
✓ An network access point is available for the electronics.

Tools and Accessories

- Suitable cable, e.g.,
  - USB cable
  - Straight-through or crossover network cable

Connecting to the USB interface

▶ Connect the USB cable to the USB socket on the electronics and the USB interface on the PC.

Connecting to a network

▶ Connect the network cable to the Ethernet socket on the electronics and the network access point or PC.

Connecting the power adapter to the electronics

Requirements

✓ The power cord is not connected to the power socket.

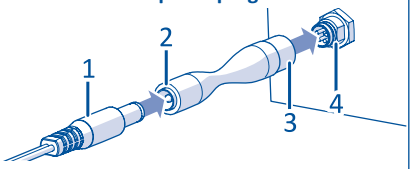
Tools and accessories

- Power adapter supplied or correctly rated power adapter
- If necessary: Cable adapter supplied for the power adapter connector or correctly rated adapter
- Power cord supplied or correctly rated power cord

Connecting the power adapter to the electronics using the cable adapter

1. Connect the cable adapter (3) to the power adapter connector (4) of the electronics.
2. Connect the barrel connector on the cable adapter (3) to the barrel connector socket on the power adapter (1).
3. Connect the power cord to the power adapter.

Electronics with M8 panel plug



1 Barrel connector of the power adapter
2 Barrel connector on the adapter
3 Connector (f) on the adapter
4 Power adapter connector

Connecting the power adapter to the electronics without cable adapter

1. Connect the power adapter to the power adapter connector on the electronics.
2. Connect the power cord to the power adapter.

Startup

The PIMikroMove PC software is recommended for initial startup. You can temporarily or permanently adapt the settings of the electronics to your application with PIMikroMove and start initial motion.

CAUTION

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

▶ Connect the electronics to a protective earth conductor before startup.
▶ Do not remove the protective earth conductor during operation.
▶ Pay attention to the applicable standards for the protective earth conductor connection.

Requirements

- ✓ You have read and understood the PIMikroMove manual and the general notes on startup. The software manuals are on the CD for the electronics.
- ✓ You have installed and updated the software on the PC.
- ✓ You have installed the positioner and electronics as they will be used in your application.
- ✓ You have connected the protective earth conductor, positioner, PC, and power adapter to the electronics.
- ✓ If you have connected the electronics to the network or PC via the TCP/IP interface:
  - **Network with DHCP server:**
    No adjustment of the factory settings of the interface parameters is necessary.
  - **Network without DHCP server** or with direct connection (electronics connected directly to the Ethernet socket on the PC):
    - The startup behavior of the electronics must be changed so that the electronics use a static IP address (see manual).
    - The IP addresses and subnet masks of the electronics and PC or respectively all further network devices must match accordingly (see manual).

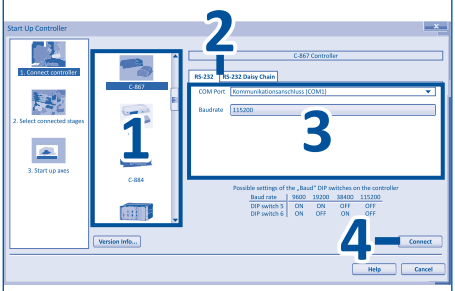
Switching the electronics on

1. Plug the power cord of the power adapter into the power socket.
2. If necessary: Switch the electronics on.

Establishing Communication with PIMikroMove

1. Start PIMikroMove.
   The **Start up controller** window opens for the **Connect controller** step.
2. If the **Start up controller** window does not open automatically, select the **Connections > New...** menu item in the main window.

PIMikroMove: Connect controller



1 Field for electronics selection
2 Tabs for interface and connection type
3 Interface parameters
4 **Connect** button

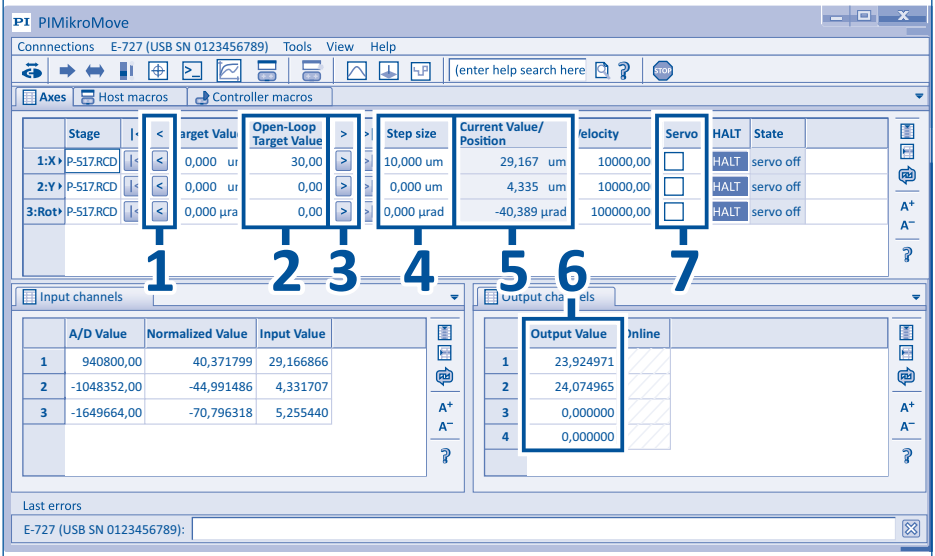
3. Choose the corresponding electronics in the field listing the electronics for selection **(1)**.
4. Select the tab in the right-hand side of the window that corresponds to the interface to the electronics **(2)**.
5. If necessary: Set the interface parameters according to the electronics **(3)**.
6. If necessary: Select the electronics from the list **(3)**.
7. Click the Connect button **(4)** to establish communication.

Starting Test Motion

1. Run the autozero procedure for all linear axes of the positioner in the **Start up controller** window.
2. Click **OK > Close** after running autozero successfully.
   The main window of PIMikroMove opens.
3. Make a backup of the electronics settings.
   a. Click **Parameter Configuration...**. in the controller menu
      The **Device Parameter Configuration** window opens.
   b. Click **File** > **Save Edit Values as** and save the parameter values to a parameter file (**.pam**).

4. Run a motion test in open-loop for each axis of the positioner in the main window of PIMikroMove.
   Check whether the axis position indicators (**Current Value/Position**, **5**) and the voltage of the output channel (**Output Value**, **6**) change during the motion test.
   a. Make sure that servo mode is deactivated for the axis (**Servo**, **7** is not checked).
   b. Set the target value for open-loop operation (**Open-Loop Target Value**, **2**) to **0**.
   c. Set the step size (**Step size, 4**) to a sensible value for your motion test, e.g, **10**).
   d. Click **>** (**3**) several times until **Current Value/Position** (**5**) reaches the upper travel range limit of the axis (see the manual for the positioner).
   Each click on **>** (**3**) increases the **Open-Loop Target Value** (**2**) by the amount of **Step size** (**4**).
   e. Click **<** (**1**) several times until **Open-Loop Target Value** has the value **0** again.

PIMikroMove: Main window

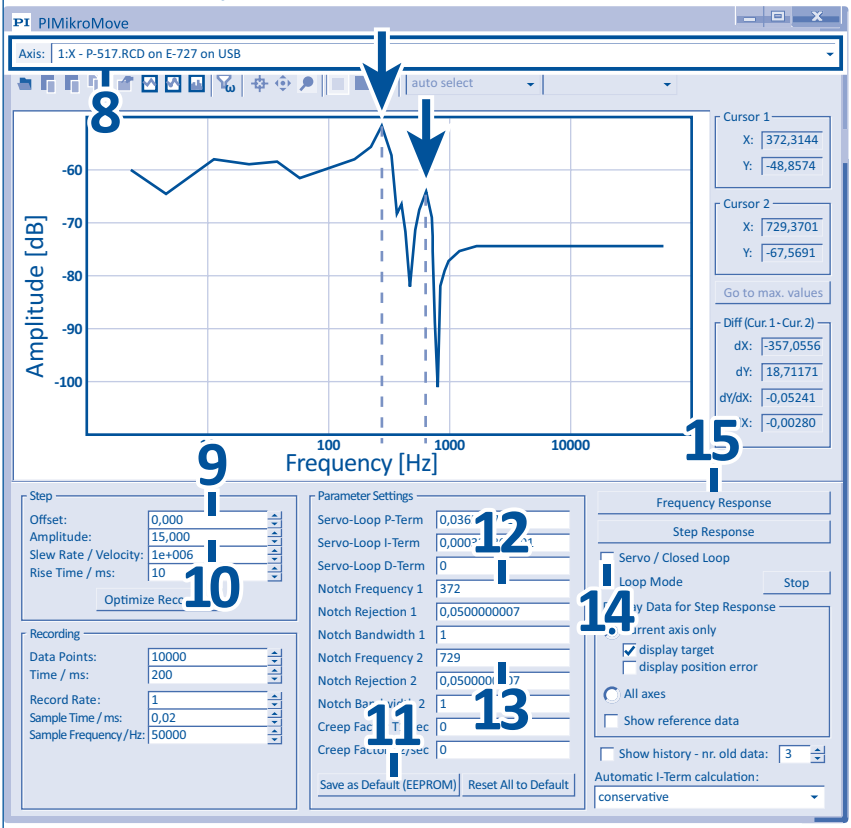


1 Arrow buttons **<** (step back)
2 **Open-Loop Target Value** fields
3 Arrow buttons **>** (step forward)
4 **Step size** fields
5 **Current Value/Position** fields
6 **Output Value** fields
7 **Servo** checkboxes

Setting the notch filter

1. Determine the resonance frequency of each axis.
   a. Click **Dynamic Tuner** in the controller menu.
      The **Piezo Dynamic Tuner** window opens.
   b. Set **Offset** (**9**) to **0**.
   c. Set the **Amplitude** (**10**) to approx. **10%** of the axis travel range.
   d. Make sure that servo mode is deactivated for the axis (**Servo / Closed Loop**, **14**, is not checked).
   e. Click **Frequency Response** (**15**), to measure the impulse response of the axis.
   f. Read the resonance frequencies using the maxima in the spectral representation (arrows).
2. If necessary: Set the notch filter of the electronics.
   a. Enter the lower of the resonant frequencies measured into the **Notch Frequency 1** (**12**) field.
   b. Enter the higher of the resonant frequencies measured into the **Notch Frequency 2 (13)** field.
   c. Set the corresponding **Notch Rejection** fields to 0.05.
   d. Click **Save as Default (EEPROM)** (**11**) to save the settings.

PIMikroMove: Piezo Dynamic Tuner Window



8 Menu for selecting the axis to be measured
9 **Offset** field
10 **Amplitude** field
11 **Save as Default (EEPROM)** button
12 **Notch Frequency 1** field
13 **Notch Frequency 2** field
14 **Servo / Closed Loop** checkbox
15 **Frequency Response** button

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.

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