Digital Motor Controllers and Drivers
Short instructions
C-663 / C-863 / C-867 / C-877 / C-884 / E-861 / E-871 / E-872.401 / E-873

User Information

These short instructions contain an overview of the most important safety instructions and handling instructions for installation and startup of motor controllers and motor drivers (hereinafter referred to as "electronics") 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 These short instructions are superseded by any new release.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, 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 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. Enter the product number up to the period (e.g., C-663) into the search field.
5. Click Downloads.
   The manuals are shown under Documentation.
6. 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.
General Safety Instructions

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 from PI.

The electronics may only be used in compliance with the technical specifications and instructions in this 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

Installing the PC Software

Installing the PC software in Windows
1. Start the installation wizard by double-clicking the PI_<product number>.CD_Setup.exe file in the installation directory (root directory of the CD).

The InstallShield Wizard window opens so that programs and the manuals for the electronics can be installed.
2. Follow the instructions on the screen.
3. If necessary: Update the PC software and positioner database with the PI Update Finder (see manual).

Installing the PC software in Linux
1. Unpack the tar archive from the /linux directory of the product CD to a directory on your PC.
2. Change to the directory where the tar archive was unpacked.
3. As superuser (root privileges), execute 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.

- Set up the electronics with a gap of at least 10 cm to the top and rear panels and at least 5 cm to the sides. If this is not possible, make sure that the surroundings are cooled sufficiently.
- Ensure sufficient ventilation at the place of installation.
- Keep the ambient temperature at a noncritical level (5-40 °C).

Startup

The collision of a moving part at the end of the travel range, or with an obstacle, as well as high accelerations, can cause damage to or considerable wear on the positioner.

- Do not deactivate the limit switch evaluation by the electronics.
- Stop the axis in time.
- If you use a system for closed-loop operation: Avoid motion in open-loop operation.

Unsuitable settings can cause the positioner to oscillate. Oscillation can damage the positioner and/or the load affixed to it.

- If the positioner is oscillating (unusual operating noise), immediately switch off the servo mode or the electronics.
- Change the parameter settings of the electronics (see manual).
- If there is any oscillation during the reference move, follow the instructions under „Troubleshooting” in the manual.
If 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:

1. Bore the required holes into the surface.
2. 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 ohm at 25 A at all connection 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 wrench

**Connecting the protective earth conductor**

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

**Connecting the Positioner**

**NOTICE**

Connecting a positioner with incompatible drive type to the electronics can cause irreparable damage to the positioner or the electronics. Even positioners with mechanically compatible connectors may not be electrically compatible with the electronics.

- ✔ Only connect positioners to the electronics that have a compatible drive type.

**Requirements**

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

**Tools and accessories**

- Positioner with compatible drive type
- If necessary: Compatible adapter from PI
- If necessary: Suitable extension cable from PI

**Connecting the positioner**

1. Plug the motor connector of the positioner into the electronics.
2. If necessary: Plug the sensor connector of the positioner into the electronics.
3. If possible: Secure the connectors against unintentional removal.

**Connecting the PC**

**NOTICE**

Connecting the USB and RS-232 interfaces of the electronics to the PC at the same time can damage the PC or the electronics.

- ✔ Connect either the USB or the RS-232 interface to the PC.

**Requirements**

- ✔ The PC is equipped with a vacant RS-232 or USB interface.
- ✔ A network access point is available for the electronics.
Tools and accessories
- Suitable cable, e.g.,
  - RS-232 null modem cable
  - 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 the RS-232 interface
1. Connect the RS-232 null modem cable to the RS-232 connector on the electronics and a vacant RS-232 interface on the PC.
2. Use the integrated screws to secure the connection against accidental disconnection.

Connecting to a network
- Connect the network cable to the RJ-45 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 cable 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 (m)

Electronics with Sub-D 2W2C panel plug

Connecting the power adapter to the electronics without cable adapter
- Connect the power adapter to the power adapter connector on the electronics.
- Connect the power cord to the power adapter.
**Startup**

The PIMikroMove PC software is recommended for initial startup. With PIMikroMove, you can adjust the settings of the electronics to the positioner either temporarily or permanently 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.
- Observe 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).

✔ If available: You have set the DIP switches on the electronics according to your application (see manual). Electronics that are not a part of a daisy chain network must have address 1, if they are to be used in PIMikroMove.

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**Switching the Electronics On**

1. Connect the power cord of the power adapter to the power socket.

2. If necessary: Move the toggle switch on the electronics to the position.

**Establishing Communication with PIMikroMove**

1. Start PIMikroMove.

   The Start up controller window opens for the Connect controller step.

   - If the Start up controller window does not open automatically, select the Connections > New… menu item in the main window.

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<table>
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<tr>
<th>Address</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>...</th>
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<td>ON</td>
<td>ON</td>
<td>ON</td>
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</table>

**Baud rate**

- 9600
- 19200
- 38400
- 115200
Choose the corresponding electronics in the field listing the electronics for selection (1).

3. Select the tab in the right-hand side of the window that corresponds to the interface and type of connection for the electronics (2).

4. If necessary: Set the interface parameters according to the electronics (3).

5. If necessary: Select the electronics from the list (3).

6. Click the **Connect** button (4) to establish communication.

### Starting Motion

**NOTICE**

Selecting an incorrect positioner type in the PC software can damage the positioner.

- Make sure that the type of positioner selected in the PC software matches the positioner that is connected.

If the **Stage Type Configuration** window opens:

- Click the **Yes, configure for ...** button to load the appropriate parameter set from the positioner database.

If the **Select connected stages** step is displayed in the **Start up controller** window:

1. Select the matching positioner type.
   a. Mark the matching positioner type in the **Stage database entries** (1) field.
   b. Click **Assign** (2).
   or
   - Click **Assign Type from ID Chip** (3)

2. Confirm with **OK** to load the parameter settings for the selected positioner type from the positioner database.

3. In the **Save all changes permanently?** window, select whether the settings for the electronics should be stored temporarily or permanently:
   - **Keep the changes temporarily**: The settings are reset when the electronics are rebooted.
   - **Save all settings permanently on controller**: All settings are stored in the permanent memory of the electronics and are available after rebooting or for use with other software.
4. If necessary: Do the reference move for the axis in the **Start up axes** step so that the electronics know the absolute axis position.
   a. Click the corresponding button to start the reference move:
      - **Ref. switch**: Reference move to the reference point switch
      - **Neg. limit**: Reference move to the negative physical limit of the travel range
      - **Pos. limit**: Reference move to the positive physical limit of the travel range
   b. If a message appears warning that the servo mode is switched off: Click the **Switch on servo** button to switch the servo mode on (closed-loop operation).
   c. After a successful reference move, click **OK > Close**.

The main window of PIMikroMove opens.

- Test the motion of the axis several times.
  - a. Set the step size to a sensible value for your test motion (**Step size** column, 1).
  - b. Click the arrow buttons (< and >, 2) to start motion in the corresponding direction with the selected step size.

Depending on the drive type and the load, parameter changes may be necessary for fast, precision positioning (see manual).

### PIMikroMove: Main window

![PIMikroMove main window](image)

1. **Step size** field
2. **Arrow buttons**