Digital Motor Controllers and Drivers



Short Instructions

C-413 / C-414 / C-663 / C-863 / C-867 / C-877 / C-884 / E-861 / E-871 / E-872.401 /



User information

These short instructions contain an overview of the most important safety and handling instructions for motor controllers and motor drivers (hereinafter referred to as "electronics") 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 These short instructions are superseded by any new release.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, starting and operating, adapting the settings, and maintenance require additional information from the user manuals for the controller and the hexapod. Manuals can be titled as follows: "User Manual", "Technical Note".

Downloading the manuals from the website

- 1. Open the website <u>www.pi.ws</u>.
- 2. Search the website for the product number (e.g., C-663).
- 3. Select the corresponding product to open the product page.
- 4. Select the **Downloads** tab.
 - → The manuals are shown under Documentation. Software manuals are shown under General Software Documentation.
- 5. Select ADD TO LIST for the desired manual and then select REQUEST.
- 6. Fill out the request form and select **SEND REQUEST**. The download link will then be sent to the entered e-mail address.

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

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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 or system.



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.

General Safety Instructions

NOTICE! 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 stage.

- 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.
- Set the velocity and acceleration accordingly.
- For drives without self-locking, make sure that unexpected motion is not possible.

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

- If the stage is oscillating (unusual operating noise), switch off servo mode or the electronics immediately.
- 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.

NOTICE! Overheating can result in damage to the stage.

Activate I2t monitoring if supported by the electronics.

Installation

Installing the PC software

Installing the software in Windows

- 1. Run the file **PISoftwareSuite.exe** from the PI Software Suite installation package.
 - → The InstallShield Wizard window opens.
- 2. Follow the instructions on the screen.
- If necessary: Use PI Update Finder to update the PC software and positioner database.

Installing the software in Linux

- 1. Unpack the TAR archive from the **/linux** directory in the PI Software Suite installation package to a directory on your PC.
- 2. Change to the directory to which the TAR archive was unpacked.
- 3. As superuser (root privileges), run the ./IN-STALL script to start the installation.
- 4. Follow the instructions on the screen.
- 5. If necessary: Update the PC software and positioner database (see manual).

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Mounting the electronics

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 °C to 40 °C).

If the electronics are to be mounted:

- 1. Bore the required holes into the underlying 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 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 wrench

Connecting the protective earth conductor

1. Attach a suitable cable lug to the protective earth conductor.

2. Attach the cable lug for the protective earth conductor to the protective earth connector using the mounting hardware supplied.



Connecting the positioner

ΝΟΤΙCΕ

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.
- If you need longer cables, use extension cables from PI.

Connecting a positioner with an 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.

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• 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.

or

 An 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 controller and a vacant RS-232 interface on the PC.
- 2. Use the integrated screws to secure the connector 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 adapter
- Power cord supplied or correctly rated power cord

Removing the protective cap

If necessary: Remove the protective cap from the power adapter connector on the electronics.



Connecting with cable adapter

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

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4 Power adapter connector

Connecting 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.

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 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.
- You have installed and updated the software on the PC.
- If available: You have set the DIP switches on the electronics according to your application. Electronics that are not part of a daisy chain network must have address 1, if they are to be used in PIMikroMove.



Address	1	2	3	4	5	 16
DIP 1	ON	ON	ON	ON	ON	 OFF
DIP 2	ON	ON	ON	ON	OFF	 OFF
DIP 3	ON	ON	OFF	OFF	ON	 OFF
DIP 4	ON	OFF	ON	OFF	ON	 OFF

Baud rate	9600	19200	38400	115200
DIP 5	ON	ON	OFF	OFF
DIP 6	ON	OFF	ON	OFF

- You have read and understood the general safety instructions.
- You have read and understood the PIMikro-Move manual.

If you have connected the electronics to the network or PC via 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).
 - IP addresses and subnet masks of the electronics and PC or respectively all further network devices must match accordingly (see manual).

Switching on the eectronics

- 1. Plug the power cord of the power adapter into the power socket.
- 2. If necessary: Move the toggle switch on the electronics to the position |.

Establishing communication with PIMikroMove

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

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

- 2. In the controller selection box (1), select the corresponding electronics.
- 3. On the right side of the window, select the tab that corresponds to the interface and connection type of 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. Select **Connect** (4) to establish communication.



Starting motion

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

Make sure the positioner type selected in the PC software matches the connected positioner.

Automatic configuration of the electronics for the connected positioner

If the Stage Type Configuration window opens:

Select Yes, configure for ... to load the appropriate parameter set from the positioner database.

Manual configuration of the electronics for the connected positioner

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



Start up cont	4 3 2 1		
3. Start	The state of the s		
1	"OK" button		
2	"Assign" button		
3	"Assign Type from ID Chip" button		
4	"Stage database entries" field		
1. M	k the matching positioner type in th		
St	Stage database entries field (1).		

- 2. Select Assign (2) or Assign Type from ID Chip (3).
- 3. Confirm with **OK** (4) to load the parameter settings for the selected positioner type from the positioner database.
- 4. In the Save all changes permanently? window, select Keep the changes temporarily to store the settings temporarily on the electronics (reset by reboot); or select Save all settings permanently on controller to store them permanently (not reset by reboot).
- 5. For electronics with incremental sensor: Start the referencing move during the Start up axes step by selecting the corresponding option: Ref. switch for a move to the reference switch, Neg. limit for a move to the negative physical limit of the travel range, Pos. limit for a move to the positive physical limit of the travel range.
- If a message appears warning that the servo mode is switched off: Select Switch on servo to switch the servo mode on (closed-loop operation).
- 7. After a successful referencing move, confirm with **OK**.

- 8. If available, select **Auto Zero** to start an AutoZero procedure (compensates the weight force for drives without self-locking).
- 9. After a successful AutoZero procedure, confirm with **OK**.
- 10. Select Close.
- \rightarrow The main window of PIMikroMove opens.

Performing initial motion

- 1. If necessary, switch the servo mode on again (Servo, column 1).
- 2. Set the step size to a sensible value for your test motion (**Step size**, column 2).
- To start movement in the corresponding directions with the selected step size, select the arrow buttons (< and >, 3).

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







Companies

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