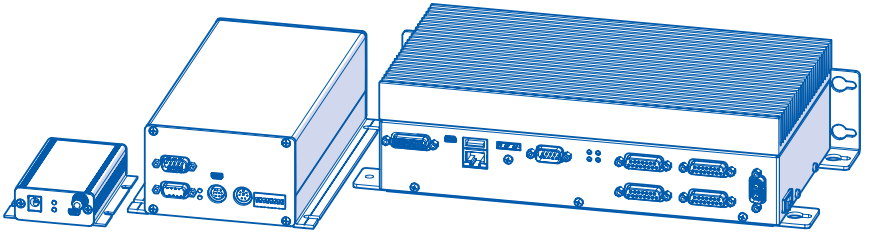
Digital Motor Controllers and Drivers

Short Instructions

C-413 / C-414 / C-663 / C-863 / C-867 / C-877 / C-884 / E-861 / E-872.401 / E-873



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 These short instructions are superseded by any new release.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 the PI website.

Downloading and reading the manual

Für die Handlungsschritte bei Auspacken, Installation, Inbetriebnahme, Betrieb und Wartung sind zusätzliche Informationen aus den Handbüchern des Positionierers und/oder des verwendeten Controllers erforderlich. Manuals can be titled as follows: "User Manual", "Technical Note".

Downloading manuals from the website

1. Open the website www.pi.ws.
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 the PI customer service via service@pi.de.

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Downloading manual packages as ZIP file

If you have 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.

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 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.

Safety information

Observe the safety and warning notes in the manual to ensure safe installation, startup, operation, and maintenance of the product.

Installation

Installing the PC software

Installing the software on 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.
3. If necessary: Use the PIUpdateFinder 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 **./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 non-critical 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 necessary, the electronics can be connected to a protective earth conductor using the protective earth connector (threaded bolt or threaded hole) on the rear panel of the housing. The protective earth connector is labeled with the protective earth conductor symbol ⏚.

Requirements

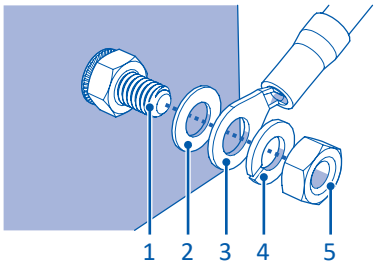
- The electronics are switched off.

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, seated on the protective earth connector upon delivery of the electronics
- Suitable wrench or screwdriver

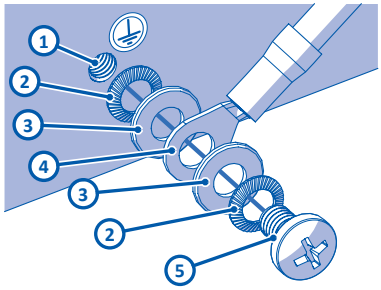
Connecting the protective earth conductor

1. Attach 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.



Connect the protective earth conductor (variant with threaded bolt)

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



Connect the protective earth conductor (variant with threaded hole)

1 M4 threaded hole
2 Safety washer
3 Flat washer
4 Cable lug of the protective earth conductor
5 M4 screw

Connecting the positioner

NOTICE

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

➢ use original PI parts only to connect the positioner to the electronics.

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

NOTICE

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.

- You have read and understood the user manual of 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 agains 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:

- 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 th the USB interface

➢ Connect the USB cable to th 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 RJ45 socket on the electronics and the network acces point or PC.

Connecting the power adapter to the electronics

Requirements

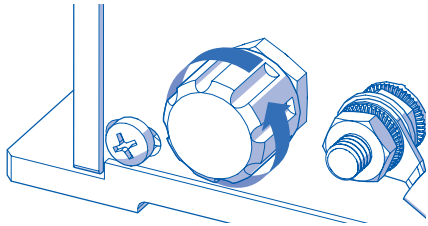
- The power cord is **not** connected to the power socket.

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

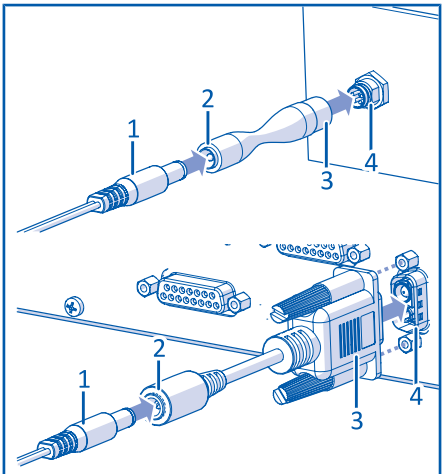
➢ If necessary: Remove the protective cap from the power adapter connector on the electronics.



Connecting with cable adapter

1. Connect the cable adapter (**3**) to the power adapter connector (**4**) of the electronics.

2. 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.



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

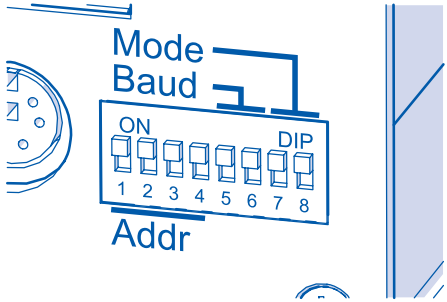
CAUTION

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 installed the positioner and the 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 PI 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 user manual for PIMikroMove.

if you have connected the electronics to the network or PC via TCP/ IP interface:

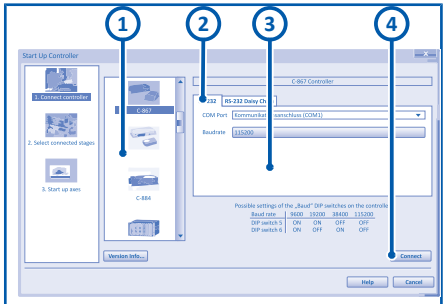
- Network with DHCP server: No adjustment of the factory settings of the interface parameters is necessary.
- Network without DHCP server or with direct connection (electronics connected directly to the Ethernet socket on the PC):
  - The startup behavior of the electronics must be changed so that the electronics use a static IP address (see manual).
  - IP addresses and subnet masks of the electronics and the 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

1. Open 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.



1	Controller selection field
2	Tabs for interface
3	Interface parameters
4	"Connect" button

Starting motion

NOTICE

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

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

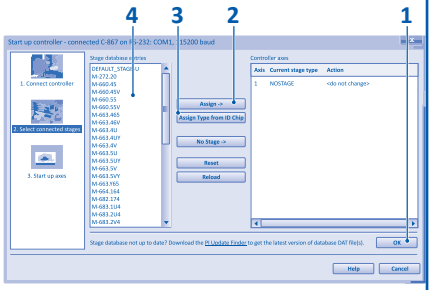
Automatic configuration of the electronics for the connected positioner

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 **Start up controller** window shows the **Select connected stages** step:



1	"OK" button
2	"Assign" button
3	"Assign Type from ID Chip" button
4	"Stage database entries" field

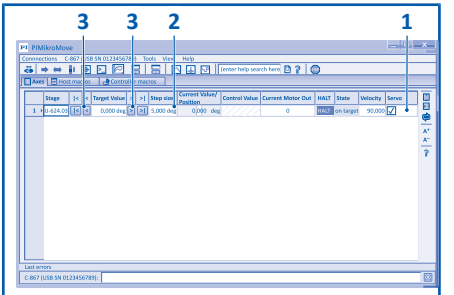
1. Select the corresponding positioner type in the **Stage database entries** field (1).
2. Select **Assign** (2) or **Assign Type from ID Chip** (3).
3. Confirm with **OK** (4) to load the parameter settings for the selected positioner type from the positioner database.
4. In the **Save all changes 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 llimit of the travel range, **Pos. limit** for a move to the positive physical limit of the travel range.
6. 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 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**.

→ The main window of PIMikroMove opens.

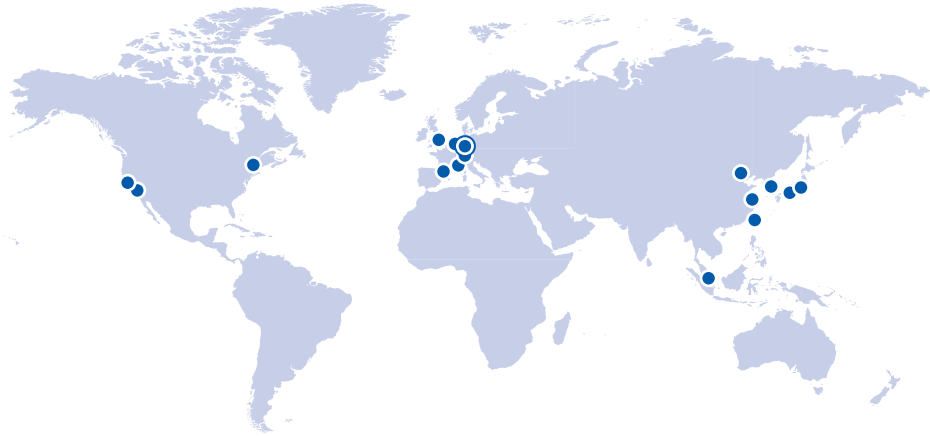
Performing initial motion

1. If necessary, switch the servo mode on again (**Servo**, column 1).
2. Set the step size to a reasonable value for your test motion (**Step size**, column 2).
3. 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).



1	"Servo" checkbox
2	"Step size" field
3	Arrow buttons



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