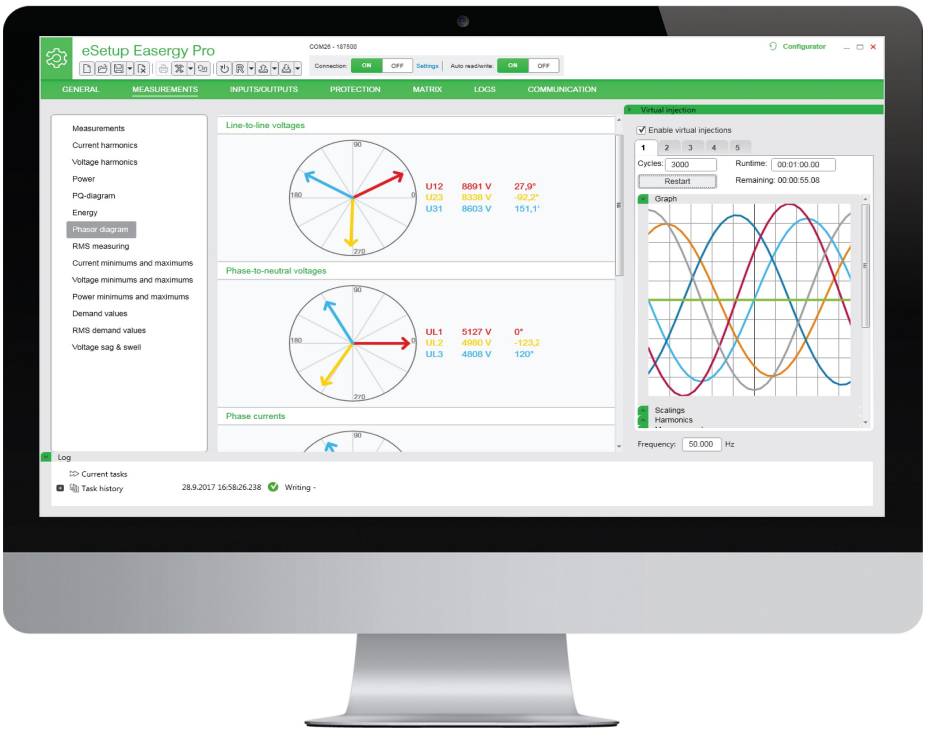
eSetup Easergy Pro

Setting tool

Publication version: P3eSetup/en M/A002

User manual



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1 About this manual

1.1 Hazard categories and special symbols

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury or equipment damage.

NOTICE

NOTICE is used to address practices not related to physical injury or equipment damage.

Protective grounding

The user is responsible for compliance with all the existing international and national electrical codes concerning protective grounding of any device.

Please Note

Use the device's password protection feature to prevent untrained persons from interacting with this device.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Electrical equipment should be installed, operated, serviced, and maintained only by trained and qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

Failure to follow this instruction will result in death or serious injury.

1.2 Legal notice

Copyright

Disclaimer

No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this document. This document is not intended as an instruction manual for untrained persons. This document gives instructions on device installation, commissioning and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact Schneider Electric and request the necessary information.

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1.3 Purpose

This manual gives you an overview of the EcoStruxure eSetup Easergy Pro setting and configuration tool (later called Easergy Pro) and instructions on how to set up the connection and use the tool to create configurations for Easergy P3 relays (later called relays).

1.4 Abbreviations and terms

This section defines some abbreviations and terms used in this manual.

Table 1.1: Abbreviations and terms

Term	Definition
Access level	The access levels restrict the rights to modify the relay settings in Easergy Pro.
Commissioning	A phase during which the the product installation and configuration is tested and verified.
DI	Digital input
Download	To read data from a relay to Easergy Pro
Engineering	A phase during which the relay is set and programmed to meet the functional specification of its intended application.
IEC	International Electrotechnical Commission. An international standardization organisation.
IEC 61850	IEC 61850 is a standard for vendor-agnostic engineering of the configuration of intelligent electronic devices for electrical substation automation systems to be able to communicate with each other.
Latching	Output relays and indication LEDs can be latched, which means that they are not released when the control signal is releasing. Releasing of latched relays is done with a separate action.
LED	Light-emitting diode
Relay	Easergy P3 protection relay
RMS	Root mean square
Setting file	An EPZ file that stores the configuration of one relay.
Setting view	A view in Easergy Pro that opens from a sub-menu, for example **General > Objects** where you can view and edit the relay settings.
USB	Universal serial bus

Figure 1.1 shows the names used in this manual of the Easergy Pro menus, views and buttons.

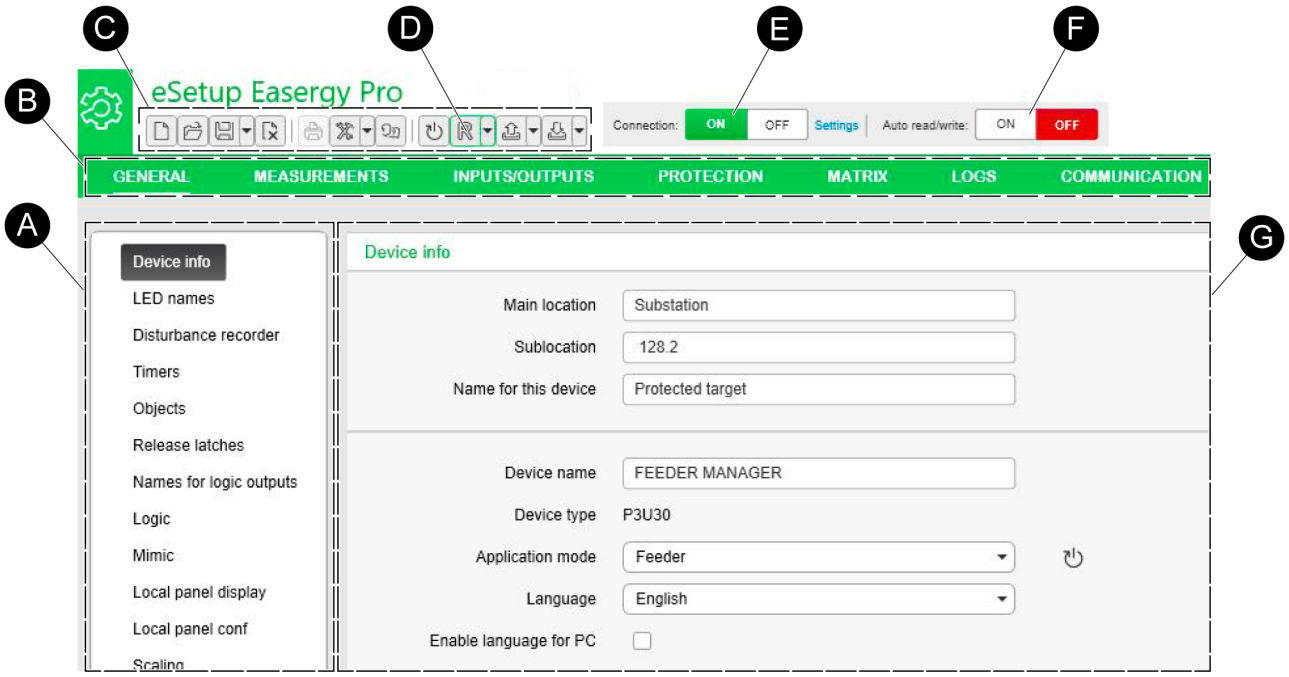

Figure 1.1: Easergy Pro main view

A Sub-menu
B Main menu
C Toolbar
D Icon
E Connection buttons
F Auto read/write buttons
G Setting view

2 Easergy Pro overview

This chapter gives you an overview of Easergy Pro, the system requirements for the tool, a brief description of the access levels and an overview of how you can use Easergy Pro in different phases of the relay's lifetime.

2.1 Tool overview

Easergy Pro is a software tool for setting up and configuring Easergy P3 relays. You can use it:

- during engineering to prepare the configuration
- during commissioning to adjust the settings and to test the relay
- during operation to retrieve data from the relays and to update the system.

For more information on how to use Easergy Pro in different phases, see Chapter 2.4 Using Easergy Pro during the relay's lifetime.

Easergy Pro has a graphical interface with a toolbar and menu where the relay settings and parameters are grouped under seven sub-menus:

- General
- Measurements
- Inputs/outputs
- Protection
- Matrix
- Logs
- Communication

NOTE: The contents of the menus depend on the relay type and the selected application mode.

Easergy Pro working principles

Easergy Pro stores the relay configuration in a setting file. The configuration of one physical relay is saved in one setting file. The setting file can be saved for later use.

When starting to work with Easergy Pro, you have three options:

- create a new setting file without connecting to a relay
- open an existing (previously saved) setting file without connecting to a relay
- connect to a relay and read the settings from the relay

Easergy Pro can be connected to a single relay via the USB port in the relay's front panel or to a group of relays via Ethernet. For more information on how to set up the connection, see Chapter 3 Setting up the connection.

2.2 System requirements

To use Easergy Pro, you need:

- PC with:
  - Windows 7 or newer operating system
  - 512 MB RAM
  - 50 MB disk space
- Easergy Pro downloaded to the PC
- USB cable, type B (order code REL52822) for connecting the PC to the relay

NOTE: Download the latest version of Easergy Pro from http://easergy.schneider-electric.com.

2.3 Access levels

Easergy Pro has three access levels. The purpose of the access levels is to prevent accidental or unwanted modification of the configurations, parameters or settings.

Table 2.1: Access levels

Access level	Description	Default password
User	Possible to read for example parameter values, measurements and events.	No password required
Operator	Possible to control objects and to change for example the protection stages settings.	1
Configurator	The configurator level is needed during the commissioning of the relay, for example, for setting the scaling of the voltage and current transformers.	2

NOTE: Change the password after logging in for the first time.

The setting file remembers the access level that is used when the settings are read from the relay for the first time. For example, if the setting file was created with the user access level, it cannot be changed to configurator level setting file later.

2.4 Using Easergy Pro during the relay's lifetime

NOTICE
RISK OF SYSTEM SHUTDOWN After writing new settings or configurations to a relay, perform a test to verify that the relay operates correctly with the new settings. **Failure to follow these instructions can result in unwanted shutdown of the electrical installation.**

This section gives you an overview of how you can use Easergy Pro in different phases of the relay's lifetime: during engineering, commissioning and operation.

Engineering

During the engineering phase, you can use Easergy Pro to set and program the relay to meet the functional specification of its intended application.

You can prepare the configuration without having any physical relay. For this purpose, use a previously saved setting file of a relay of the same type or create a new setting file as described in Chapter 5.2 Creating a setting file.

During engineering, you can use Easergy Pro for example for the following tasks:

- Go to **General > Device info** to get the device order code.
- Set the characteristics of the current transformers, voltage transformers or sensors connected to the relay in **General > Scaling** and select the protection functions to be activated and their settings in the **Protection** menu.
- If a specific operation logic is required, build it with a graphic editor in **General > Logic**.
- Map the relay's digital inputs and different internal signals to the relevant functions, to the LEDs and the digital outputs by using different matrices in the **Matrix** menu.
- Draw the single-line diagram that appears on the relay's front display for switchgear control and select the measurements to be displayed in **General > Mimic**.
- Select the communication protocol to be used and set the communication parameters and data in the **Communication** menu. For the IEC 61850 protocol, configure the DataSet and the Report Control Blocks to be published and select the GOOSE data to be subscribed to.

- Complete the configuration with setting additional functions, for example disturbance recorder in **General > Disturbance recorder**, event logging system in **Logs**, and clock synchronization in **General > Clock Sync**.

Commissioning

During the commissioning phase, you can use Easergy Pro to ease the verification of the installation and to ensure that the relay settings and configurations are as wanted. Secondary injection and operational testing can be supported by Easergy Pro and final setting changes stored in the relay.

During commissioning, you can use Easergy Pro for example for the following tasks:

- Check the status of inputs and reverse the polarity or add a filtering delay, if necessary in **Inputs/Outputs > Digital Inputs**.
- Check the wiring by forcing status change of the output relays in **Inputs/Outputs > Relays**.
- See in real time the value and the phasor of injected currents and voltages in **Measurements > Phasor Diagram**.
- Use **Virtual injection** for testing the protection settings and circuit breaker tripping, for checking LEDs and connected outputs. Virtual injection enables injecting simulated current and voltage with second, third, and fifth harmonic content into the relay, thus allowing simple testing without an external secondary testing device.
- To test the logic, open **General > Logic** or the **Matrix** menu: the active signals appear in a different color and are updated in real time. You can make changes to the logic or the matrix and apply them to the relay.

Operation

During operation, you can perform the relay’s service data analysis through measurements, fault capturing and event logs using Easergy Pro.

During normal operation:

- Check the power monitoring and power quality data in **Measurements**.
- Get a waveform capture or program the recording of a power trend in **General > Disturbance recorder**.

After a trip, use Easergy Pro to understand the fault:

- Check the fault log of the protection function that has tripped the circuit breaker in the **Protection** menu.
- Download the disturbance record from **Tools > Download disturbance records…** and check it.

3 Setting up the connection

This section contains instructions on how to set up the connection between Easergy Pro and a relay or multiple relays.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Only qualified personnel should operate this equipment. Such work should be performed only after reading this entire set of instructions and checking the technical characteristics of the relay.

Failure to follow this instruction will result in death or serious injury.

3.1 Connecting to a single relay using USB cable

1. Connect the USB cable between the PC running Easergy Pro and the local port of the relay.
2. On the Easergy Pro toolbar, click the **ON** connection button. The **Login** pop-up window opens.
3. Select the right USB serial port and connection speed.
4. Click **Connect**. A new window showing the relay information opens.
5. Click the desired operating level: **User**, **Operator** or **Configurator**. Easergy Pro main view opens.

3.2 Connecting to relays via Ethernet

You can connect to a single relay or multiple relays via Ethernet.

1. On the Easergy Pro toolbar, click the **ON** connection button. The **Login** pop-up window opens.
2. Click **ETHERNET**.
3. Select the right IP address from the drop-down menu.
   - For the relay's IP address, see the relay front panel menu **BUS/ETHERNET PORT**.
   - To save the defined connection settings, click the disk icon.
4. Click **Connect**. A new window showing the relay information opens.
5. Click the desired operating level: **User**, **Operator** or **Configurator**. Easergy Pro main view opens.

4 Menus, toolbar and buttons

This chapter contains an overview of the Easergy Pro menus, setting views and toolbar.

4.1 Main menu and setting views

Figure 4.1: Main menu

The main menu contains seven sub-menus that contain a various number of setting views where you can view and edit the relay settings:

- General
- Measurements
- Inputs/Outputs
- Protection
- Matrix
- Logs
- Communication

NOTE: The menus' contents depend on the relay type and application. The menu contents peresented in this chapter are examples and contain the most typical setting views that most relay types have.

General

This section describes the settings views in the **General** sub-menu.

Table 4.1: Example of the General menu

Setting view	Description
Device info	General data about the relay and the setting tool. Check for example the relay's order code or setting tool version or adjust the display contrast. Set the relay's location and give an individual name for it. Change the password for the currently active access level.
LED names	Check and change LED names.
Disturbance recorder	Disturbance recorder version, recorder channels and recorder log.
Timers	Program timers to preset functions.
Objects	Adjust settings related to object status data and object control (open/closed).
Release latches	Release latches or set a DI to release latches. Adjust the latch release signal pulse.
Names for logic outputs	Change the names for logic outputs.
Logic	Use the graphic logic editor to add extra logic functions in addition to the protection stages.
Mimic	Draw a single-line diagram that appears on the relay's local display for switchgear control and select the measurements to be displayed. Check and control the status (on/off) of virtual inputs. Set local or remote control for the relay.
Local panel display	Check the the local panel display's properties and current real-time view. Control the relay remotely.
Local panel conf	Adjust the local panel display settings.
Scaling	Set the scaling of current and voltage transformers and the voltage measurement mode.
System clock	Adjust settings related to the clock (for example daylight saving time, DST).
Clock sync	View the clock status data.
Card info	View the circuit card types and status data.
Diagnosis	View various diagnostic information.

Measurements

This section describes the settings views in the **Measurements** sub-menu.

Table 4.2: Example of the Measurements menu

Setting view	Description
Measurements	View current and voltage measurements.
Current harmonics	View the total harmonic distortions and harmonics for phase currents.
Voltage harmonics	View the total harmonic distortions and harmonics for phase voltages.
Power	View power values calculated by the relay.
Pq diagram	Power quality diagram
Energy	View and adjust settings related to the amount of energy that has passed through the protected line, calculated by the relay from the currents and voltages.
Phasor diagram	See in real time the value and the phasor of injected currents and voltages.
RMS measuring	See root-mean-square values of power, currents and voltages. The relay calculates these values taking the harmonic components into account.
Current minimums and maximums Voltage minimums and maximums Power minimums and maximums	See the minimum and maximum values for currents, voltages and power. Clear the values or set digital inputs to clear them.
Demand values RMS demand values	See the calculated mean values for currents. Set the demand time.
Voltage sag & swell	Monitor voltage sags and swells and adjust settings related to them. The sag and swell logs contain the start time, phase information, duration and the minimum, average and maximum voltage values of each sag and swell event.

Inputs/Outputs

In the **Inputs/Outputs** menu, you can:

- change the names for digital or virtual inputs and output relays, virtual outputs and function buttons
- check the status of inputs/outputs, reverse their polarity (normal open or normal closed) or add a filtering delay, if necessary
- set function modes for the fuction keys.

Protection

In the **Protection** menu, you can view and change the settings and statuses for various protection functions. The available protection functions depend on the relay type and application.

The protection stage groups consist of the following four parts:

- **Stage enabling**: Enable or disable the protection stage by checking or clearing the selection box.
- **Stage status** shows the state of the input signals used by the protection stage, the present state of the stage, the estimated time to trip, and the start/trip counters.
- **Stage settings** contain limit and delay settings for the stage.
- **Fault log** shows the stage's last eight events in descending order (the last event is on the first row).

Example: Changing the phase overcurrent I> start setting

1. Go to **Protection > Phase overcurrent I>**.
2. To change the setting value, click the text field next to **Pick-up setting [xIn]**, and type the desired value in the text field.
3. To write the change to the relay, from the toolbar, select **Write settings > Write changes**.
4. To verify that the new value is now in the relay, from the toolbar, select **Read settings > Read current view**.

Matrix

Under **Matrix**, you can use matrices to map the relay's digital inputs and different internal signals to the relevant functions, to the LEDs and the digital outputs.

Table 4.3: Example of the Matrix menu

Matrix	Description
Output matrix	Connect output signals of the various protection stages, digital inputs, logic outputs and other internal signals to output relays, virtual outputs, and so on.
Block matrix	Prevent protection stages from operating by using input signals from other protection stages, digital inputs and arc sensors.
Auto-recloser matrix	Control the auto-recloser.
Object block matrix	Inhibit the control of objects (circuit breakers, isolators and earthing switches).

Logs

Under **Logs**, you can view event logs.

Table 4.4: Example of the Logs menu

Log	Description
Month max	Registers the monthly maximum current values.
Event buffer	Registers all events. An event contains the following information: • full time stamp • event code • short description
Running hour counter	Monitor the service time of protected objects.
Voltage interrupts	View the detected voltage interruptions.
Event enabling	View and edit the selections for event enabling.
DI event texts	View and edit DI event names used on the local display or setting tool.

Communication

Under **Communication**, you can configure the data transfer protocols, for example Ethernet settings.

4.2 Toolbar

Figure 4.2: Toolbar

The toolbar contains icons with easy access to some of the most common tasks in Easergy Pro, for example opening or saving a setting file or releasing latches. The icon functions are explained in Table 4.5.

Table 4.5: Toolbar

Icon	Name	Description
	Create setting file	Create a new setting file.
	Open file	Open a previously saved setting file.
	Save	Save the setting file on your PC.
	Close file	Close the currently open setting file.

Icon	Name	Description
	Tools	• Update firmware • Update language • Get ICD file • Download disturbance records
	View help	Open help for the currently displayed view.
	Restart device	Restart the relay.
	Reset	• Release all latches • Clear matrix • Clear events
	Read settings	• Read current view • Read all settings
	Write settings	• Write changes • Write current view • Write all settings

4.3 Connection and auto read/write buttons

Use the **Connection on/off** buttons to open and shut down the connection to a relay and the **Settings** link to view and modify the connection settings.

After connecting to a relay, the **Auto read/write** buttons appear. The auto read/write function is off by default.

Figure 4.3: Connection and Auto read/write buttons

Activate the auto read/write function by clicking the **on** button. When auto read/write is on, changes are automatically read from the relay to Easergy Pro and written from Easergy Pro to the relay.

5 Configuration without connection to a relay

This chapter contains instructions on how to create configurations without connecting to a relay.

5.1 Setting file

Easergy Pro stores ther relay configuration, that is, information about the relay settings, events and fault logs in a setting file.

You can save the setting file on your PC and use it later for many purposes, for example:

- Making changes to the settings offline. The file keeps track of changes that are made offline. When the tool is connected to the relay, all changes can be transmitted to the relay at once.
- Copying settings between relays.
- Archiving purposes. Store a copy of the setting files when relays are commissioned and reconfigured.
- Troubleshooting.

5.2 Creating a setting file

1. On the toolbar, click the **Create setting file** icon. The **Create configuration** pop-up window opens.
2. Select the right relay type, firmware version, application mode, voltage measurement, ordering code, and communication protocols.
3. Click **Create**. A new, empty setting file is created.
4. Define the settings in the different menus. See the section Engineering.

NOTE: Not all Easergy Pro features are available when working without connection to a relay.

5.3 Opening a previously saved setting file

You can use a previously saved setting file as the basis when creting the configuration for a relay of the same type.

To open a setting file:

1. On the Easergy Pro toolbar, click the **Open file** icon. The **Open a file** window opens.
2. Browse to the location where the file has been saved, and click **Open**. The setting file opens.

5.4 Saving the setting file on your PC

1. On the Easergy Pro toolbar, click the **Save** icon. The **Save a file** window opens.
2. Browse to the folder where you want to save the file. Type a descriptive file name, and click **Save**.

NOTE: By default, the setting file *.epz is saved in the eSetup Easergy Pro folder.

6 Configuration with connection to a relay

This chapter contains instructions on how to read or write settings when connected to a relay or relays and how to copy settings from one relay to another.

6.1 Reading settings from the relay

When connected to a relay, Easergy Pro works in on-demand mode, which means that all settings are not automatically read from the relay but a menu or view is read from the relay only when you open that view. To read all settings from the relay, select **Read settings > Read all settings**.

Also, if settings have in a later phase been changed via the relay's front panel, you can update the changes to Easergy Pro with the **Read** command.

On the Easergy Pro toolbar, click the **Read settings** icon and select:

- **Read current view** to read the changes only for the currently displayed view.
- **Read all settings** to read all settings from the relay.

NOTE: Before saving a setting file, make sure you have read all settings from the relay. Otherwise, the setting file is incomplete and does not contain all the settings.

6.2 Writing settings to the relay

After you have updated the relay settings in Easergy Pro, write the changes to the relay. On the Easergy Pro toolbar, click the **Write settings** icon, and select:

- **Write changes** to save the changed made in all views.
- **Write current view** to save only the changes made in the currently displayed view.
- **Write all settings** to save all settings in all views.

NOTICE
RISK OF SYSTEM SHUTDOWN After writing new settings, configurations or firmware to a relay, perform a test to verify that the relay operates correctly with the new settings. **Failure to follow these instructions can result in unwanted shutdown of the electrical installation.**

6.3 Copying settings between relays

You can copy the whole configuration of one relay to another relay of the same type. This makes it easy to quickly configure several relays with the same settings.

1. In Easergy Pro, open the configuration you want to copy. You can either open a previously saved setting file or connect to a relay and read its settings.
2. Connect to the relay to which you want to write the settings.
3. To write the settings to the relay, from the toolbar, select **Write settings > Write all settings**.

7 Updating the relay firmware and language

This chapter contains instructions on how to update the relay firmware and language.

NOTICE
LOSS OF PROTECTION OR RISK OF NUISENCE TRIPPING • The relay is not functional during updating. Protection functions are not operational and output relays may change their status during the updating process. • Communication protocols are not functional during the updating process. Connections to SCADA or any other external system are lost during the firmware update. • Disconnect trip circuits or any other signals that may disturb the protected system from the relay. **Failure to follow these instructions can result in unwanted shutdown of the electrical installation.**

7.1 Updating the firmware

Preparations before the firmware update

- Download and save the settings from the relay before starting the firmware update.
- Ensure that the laptop battery has capacity for at least for 30 minutes or plug in the laptop power supply. Updating the firmware typically takes 10-15 min.

During the firmware update

- Make sure that the laptop does not go to “sleep mode” while the firmware is being updated.
- Do not turn off the supply voltage for the relay.
- Do not disconnect the USB cable.

Updating the firmware

1. Start Easergy Pro.
2. Update the connection settings in Easergy Pro.

a.

Figure 7.1: Settings link

Next to the connection buttons, click **Settings**. The **Settings** window opens.

b.

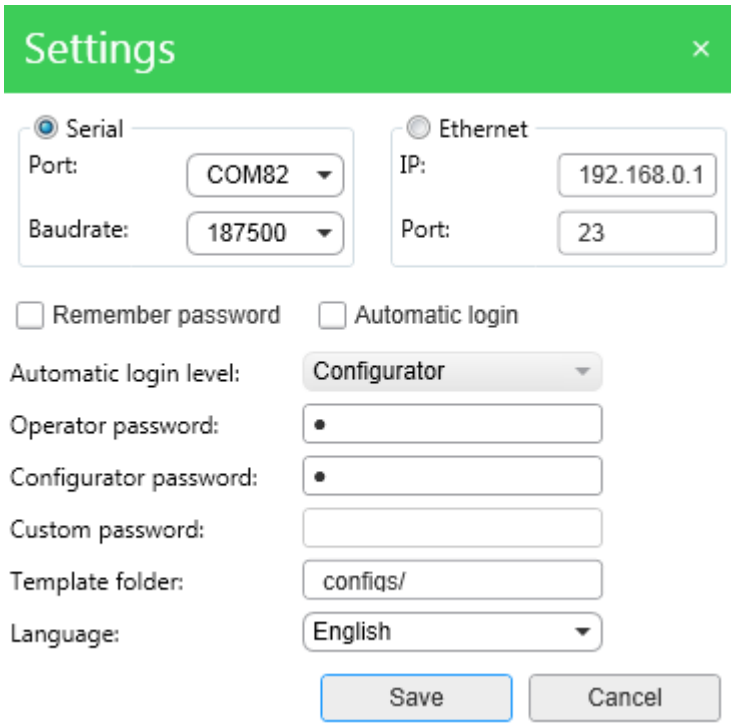

Figure 7.2: Settings window

Select **Serial**, and update the connection settings as follows:

- Port: as suggested by PC
- Baudrate: 187500
- Automatic login level: Configurator
- Oparator password: 1
- Configurator password: 2

c. Click **Save** to save the settings. The **Settings** window closes.

3.

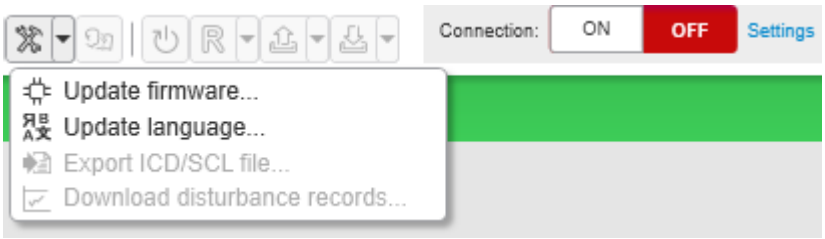

Figure 7.3: Update firmware

From the toolbar, select **Tools > Update firmware**.

4. Locate and select the file containing the new firmware.

NOTE: Easergy P3Ux and Easergy P3x3x have separate files.

5. Click **Open** to start the update. The **Updating firmware** window opens.

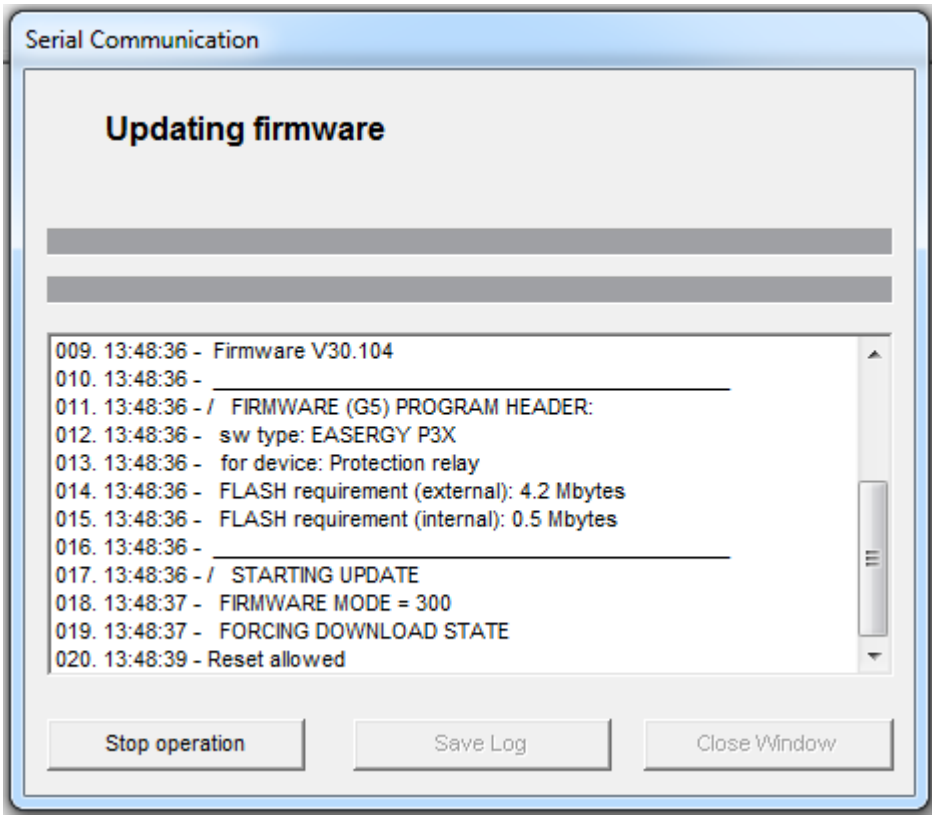

Figure 7.4: Updating firmware

Wait until the **Updating firmware** window closes indicating that the update is complete even if the relay starts and looks operational. After this, the firmware is up and running and the relay is ready for testing.

After the update

NOTICE
RISK OF SYSTEM SHUTDOWN After writing new settings, configurations or firmware to a relay, perform a test to verify that the relay operates correctly with the new settings. **Failure to follow these instructions can result in unwanted shutdown of the electrical installation.**

- Verify the relay parameters and settings after firmware update.
- Secondary side testing with the relay testing equipment is recommended.
- Restore the updated relay and all connections to their original state.

7.2 Updating the language

1. From the toolbar, select **Tools > Update language**.
2. Select the language file.
3. Select the language package repository.
4. Click **Download**.
5. Click **Update**.

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