Click the button and download
our free wBox app:

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User manual

energymeter DIN 1- AND 3-PHASE BIDIRECTIONAL ENERGY METER, DIN RAIL MOUNTING

SAFETY RULES

Connect only in accordance with the diagram presented in the manual. Improper connections may be dangerous, it can damage the controller, and loss of the warranty.

DANGER! Risk of death from electric shock (even when the device is switched off) - voltage may be present on the device. All installation work must ALWAYS be performed with the power supply circuit disconnected.

The installation of the device to a power mains that does not meet the quality requirements defined by PN-EN 50160, will result in the loss of the warranty.

The power supply circuits must be protected with overcurrent protection appropriate for 1-phase and 3-phase systems.

CAUTION! The device is designed to operate in an electric network of nominal 230V phase voltage and 400V phase-to-phase voltage. Take special care during installation!

Connection of the controller must be carried out only by persons with the corresponding electrician license.

1 INSTALLATION - BASICS

The connection diagrams can be found at the end of the manual

- Before starting the installation of the controller, disconnect the voltage in the powered circuits. Remember that all installation work must be carried out with the power supply disconnected (switch off the mains circuit breaker).
- The controller should be mounted on a DIN rail in a location protected from unauthorized access - such as a **plastic distribution box** or inside the enclosure of the controlled device. Keep in mind that metal elements (wires, housing parts) negatively affect the wireless range, which may impact the user experience. Due to the operating voltage, the controller terminals must be shielded against accidental contact or short circuits, which could result in electric shock or damage to the device.
- Study the diagram first, and then proceed with installing the controller, paying particular attention to the terminal markings and wire color coding:

  - Connect the neutral wire N (blue) to the N terminal.

  - For a **single-phase system:** connect the phase wire L (brown) to the L1 terminal.

  - For a **three-phase system:** connect phase wires L1 (brown), L2 (black), and L3 (grey) to the corresponding terminals labeled L1, L2, and L3.
- Then install the current transformers on the phase conductors, ensuring the correct direction of the arrow on their housing (the arrow should point from the power supply toward the load):

  - For a **single-phase installation:** install transformer A on the L phase conductor.

  - For a **three-phase installation:** install transformer A on phase L1, transformer B on phase L2, and transformer C on phase L3.
- Connect the installed current transformers to the device. Connect the **red** wire to terminals A+/B+/C+, and the **black** wire to A-/B-/C- (in accordance with the labeling on the transformer housing).

Note! Incorrect installation or reverse connection of the transformer wires will result in incorrect (e.g., negative) measurement values – energy consumption will be displayed as energy production instead.

- After ensuring that the device has been connected according to the diagram and that there are no metal objects near the controller that could accidentally short the contacts, switch on the device by restoring the power supply (turning on the mains circuit breaker).
- The three LEDs located on the front of the device serve as indicators of phase presence (voltage) and the direction of energy flow. They light up in different colors depending on whether the correct voltage is present on a given phase and whether energy is being consumed or fed back into the system. An additional single blue LED, located below the reset button, is responsible for the overall operating status of the device. It indicates the following states:

  - Client connected to the application: steady light for 2 seconds,
  - Connection to the Wi-Fi router: steady light for 4 seconds,
  - Factory reset confirmation: steady light for 5 seconds.

  A detailed legend describing the colors and lighting modes of the LEDs responsible for the status of individual phases is provided below:

Active power	Phase status	LED color
> 3 W	Energy import	red
from -3 W to 3 W	No import / export	white
< -3 W	Energy export	green
Voltage < 200 V or > 280 V	No phase / Incorrect voltage	burgundy (pulsing)

Devices mounted on a DIN rail can generate significant amounts of heat. It is recommended to install with a distance of at least 1 cm between BleBox DIN modules to ensure adequate air flow. In the case of using many DIN modules, it is recommended to force the air circulation in the switchboard mechanically.

2 FIRST START-UP

- Download **the free wBox application.** If you have an Android mobile device, you will find the application in the Play Store. For iOS devices the application is in the App Store.
- Using your mobile phone or tablet, connect directly to the device's access point. Follow these steps:

  - Disable mobile data: To avoid communication issues, temporarily turn off cellular data in your device settings.

  - Connect to the device: Go to the Wi-Fi settings on your smartphone or computer, then find and connect to the network named "energyMeter_DIN-xxxxxxxxxx" (where "xxxxxxxxxx" is the unique serial number of your device).

- Maintain WiFi connection: Your operating system (Android/iOS) may notify you that the network provides no Internet access. In this case, select "Keep connection", "Use anyway", or "Stay connected". This is essential to proceed with the device configuration.

- Open the wBox app. The device will be visible on the main screen. To add it to your account in the app, select "Add device to account." If you are an installer and do not want to assign the device to your account, choose "Use once only".

3 WIFI CONNECTION AND SERVICE (AP) SETTINGS

QUICK INSTALLATION GUIDE
first configuration of the BleBox controller

Scan the QR code or click the link below to access the quick installation guide.

https://blebox.eu/start

- Go to the WiFi settings ("gear" icon in the top right corner of the screen, under the "Connection" section), where you can connect the device to your home WiFi network to control the controller locally or from anywhere in the world. To do this, select the network name from the list of available networks and tap "Connect". If required, enter the WiFi password. While the device is connecting to the home network, your phone or tablet may temporarily disconnect from the device's network.
- You can also configure the network settings using a web browser. After connecting to the controller's wireless network, open a browser and go to www.blebox.eu.
- After reconnecting your phone to the controller's WiFi network, check the "WiFi Client Status" and "Remote Access Status" fields. The controller is equipped with a network connection monitoring system, which will report any issues with the WiFi or Internet connection and their possible causes. If the network is functioning correctly, both fields will display "Connected".
- To communicate with the device from outside your local WiFi network, from anywhere in the world, via the wBox app, the device automatically connects by default to the BleBox cloud service The remote access system is fully encrypted and secure, with data transmitted through European servers of reputable companies. It is possible to disable remote access – click the "Configure" button and toggle the switch for "Remote Access". Note that disabling "Remote Access" will prevent using the controller outside the local network and will also result in loss of access to historical data (including charts) and push notifications to your smartphone. We recommend keeping this feature enabled (it is the default setting).
- Enabling the "Event Log" option allows for the automatic recording of device activity in the BleBox cloud. The system logs events such as notifications defined in the "Actions" section, as well as the history of the controller's connections and disconnections from the network. This feature provides access to the full operational history of the device at any time, even when the controller is currently offline.
- After completing the WiFi network configuration, you can disconnect from the device's network and connect your phone or tablet directly to your home WiFi network. Control via the wBox app will work the same as when your phone or tablet is connected to the device's network. If you leave the local network, for example by leaving home or switching your phone to mobile data, the wBox app will indicate this as "Remote Mode". In this case, you will have access to the device's data, but for security reasons, the settings options will be unavailable.
- In the "Service Connection (AP)" section you can change the name and set a password for the WiFi network broadcast by the device. Keep in mind that changing the network name or password may cause an immediate disconnection from the device after clicking the "Save" button, so you will need to reconnect to the WiFi network.
- It is also possible to completely disable the access point broadcast by the device. To do this, move the "Access Point" slider to the off position and confirm your choice by clicking the "Save" button.
- **Warning!** If the controller does not have a stable connection to the WiFi network ("WiFi Client Status: CONNECTED", with no error warnings), it will not be possible to re-enable the access point – in this case, the only solution is to reset the controller to factory settings. Disabling the access point is recommended only after the controller has been fully configured and you have confirmed that the entire system is functioning correctly.

4 DEVICE SETTINGS

- On the main control screen, which displays imported, exported, and instantaneous active power measurements, go to the device settings (click the "gear" icon in the upper right corner).
- In the "Name and icon" section, you can change the default device name displayed in the wBox app. This allows you to assign a custom, more recognizable label, for example: "Energy meter - workshop", "EV charger", "Photovoltaic panels"
- In the "Device settings" section, in addition to the option to turn off the LED indicators, it is also possible to select the number of phases. After expanding the "Electricity" menu, you can choose either a single-phase or three-phase system. When option "1" is selected, measurements will be displayed only for the first phase. Additionally, below there is a "Measure exported energy" function. Disabling this option will hide information about electricity generation (exported energy) in the interface.

5 MEASUREMENT DATA AND CHARTS

- The main screen of the controller displays real-time readings of active power and active energy (imported and exported). The data is presented separately for each phase as well as in a total summary for all phases. At the bottom of the screen, there is a "Show details" button. Expanding this section provides access to a full list of parameters for each phase, as well as aggregated values.

  The available measurements include:

  - active, reactive, and apparent power;
  - active and reactive energy (imported and exported);
  - frequency;
  - voltage;
  - current intensity.

- Charts and historical measurement data are accessible by clicking the chart icon in the upper right corner of the screen. The "History" section displays a chart for a selected time range, which can be freely modified. Additionally, users can choose the "Chart type" (bar, point, line, or line with points) and the "Interval" (from 5 minutes up to 24 hours). Please note that the availability of intervals depends on the selected time range.
- In the "Sensor" section, you can select the values to be presented on the chart. Options include imported and exported active energy, as well as voltage – both as a total for all phases and individually for each phase. Additionally, an active energy balance chart for all phases is available (vector balancing).
- Measurement data is stored on the BleBox server and is available only when the "Remote access" option is set to "Yes". Data is accessible for 12 months with 1-hour aggregation, while results from the last 7 days feature a detailed 5-minute aggregation.
- Historical measurement data can be exported for further processing, comparison, and archiving in external systems and analytical tools. To do this, click the "three dots" icon in the upper right corner of the screen and then select the "Export" option. You can choose between the ".csv" and ".xlsx" (Excel) formats.
- **Note!** Restoring factory settings resets the imported and exported energy counters stored in the device's memory. A factory reset does not delete historical measurement data stored in the BleBox cloud.

6 CONTROLLING OTHER DEVICES

- The controller allows sending control commands to other BleBox devices over the WiFi network using the local API. Actions are triggered based on specific types of triggers, such as "Power higher/lower than" or "Voltage higher/lower than". This allows for the creation of practical automation scenarios, for example automatically switching off a high-power load when the total power exceeds 20 kW, or turning off a three-phase pump in the event of a voltage loss on any of the phases.
- Go to settings by clicking the gear icon in the top right corner, then select the "Actions" tab. This section is initially empty - to add a new function, click the "Add your first action" button.
- When adding an action in the "When" tab, select a "Trigger type", such as "Power greater than", "Power less than", "Voltage greater than", or "Voltage lower than". In the "Sensor" field, specify the phase or all phases (1+2+3) responsible for triggering the action, and finally, fill in the "Value" field.

- In the “Execute” tab, in the “Result” field, select “Control another device” and then confirm your selection. Next, click the “Select device” button. The controller will scan the network for compatible devices and display them in a list. Choose the device you want to control. If the device does not appear on the list, use the general API-based control method described below or update the firmware of the target controller.

  Note! All controllers must be connected to the same local network, and the “wireless client isolation” option in the AP/router settings must be disabled.

- Next, in the “Call API” field, enter the API command that will trigger the controller.

- Below are the most commonly used API control commands (/s/) for the switchBox controller:

  Switching on the domestic hot water (DHW) heater via switchBox: 1

  Switching off the domestic hot water (DHW) heater via switchBox: 0

- By default, the configured action is executed once when the set threshold is exceeded. In order for it to be triggered again, the value must first drop below the defined limit. There is also an option for cyclic execution of the action after exceeding the threshold, which enables monitoring of a specific state in another controller and prevents the state from changing as long as the value remains above the threshold. In this case, the appropriate repeat option must be selected and a time interval defined.

- If the device was not on the list of discovered compatible devices or you want to control another device on the network, select “Call URL” as the “Action Type”.

- In the “URL” field, enter the API command preceded by the http protocol prefix and the IP address of the controller you want to control. The IP address can be found in the settings of the respective device.

  Warning! All controllers must be on the same local network, and the “Wireless Client Isolation” option in the AP/router must be disabled.

- Below are the most commonly used API commands for the switchBox controller. It is assumed that the IP address of the remote controller is: 192.168.1.123

  Caution! In the router settings (DHCP), a static IP address must be assigned to the controller.

  Switching on the domestic hot water (DHW) heater via switchBox: http://192.168.1.123/s/1

  Switching off the domestic hot water (DHW) heater via switchBox: http://192.168.1.123/s/0

- The “Send URL” action can also be used to transmit measurements to an external server. While creating the action, the “Action Symbols” button is available. It displays a list of available placeholders along with short descriptions. To add a action placeholder, click the “plus button”.

- The most suitable trigger type for this kind of application is the “cyclical” trigger. It allows sending information at various time intervals (minimum every 15 seconds). Below are examples using placeholders, also called action symbols:

- Sending the meter status to an external server:

  http://177.120.11.5/state/{s_state.0}

- Sending the meter status to an external server using a query string:

  http://177.120.11.5/meter?meter_state={s_state.0}

- In the “Summary” tab, name the action, check its correctness, and confirm by clicking the “Save” button.

- A detailed description of control and examples of integrating other controllers using the local, open API can be found on our website https://blebox.eu in the FAQ section, while the complete technical API documentation for BleBox devices is available at: https://technical.blebox.eu

- The added action will appear in the list. Expanding its details allows you to view, among other things, the status of its last execution.

7 NOTIFICATIONS

- The controller allows displaying a system notification on a phone with the wBox app installed, triggered by a specific type of trigger, e.g., “Power greater than”.

- Notifications work only when the controller has a stable Internet connection and the “Remote Access” option is enabled (default setting).

- Notifications are added in a similar way to “Actions” - fill in the form fields, and in the “Do” tab, select “Notification” as the “Result.” Confirm by clicking the “Save” button.

- Additionally, you can create “Custom notifications” with your own message text.

- While creating a “Custom Notification” action, the “Action Symbols” button is available. It displays a list of available placeholders along with short descriptions. To add a placeholder, click the “plus” button.

  Examples of custom notification text:

  - Workshop power limit exceeded
  - Power consumption greater than 5 kW
  - High voltage detected on phase L1
  - PV production above 3 kW
  - Device is exporting energy to the grid
  - Voltage dropped below 200V
  - Daily energy consumption limit exceeded
  - No power consumption - device turned off

- Custom notification text with current state of sensor:

  Meter state: {s_state.0}

- To have a notification appear on your phone, you must allow notifications from the specific BleBox device. This can be done in two ways:

  1. Go to the controller settings, select the “Notifications” tab, and check the option “Action Notifications.”

  2. On the wBox app home screen, open the menu (by tapping the “three lines” icon in the top left corner), then select “Notifications.” Go to the notification settings, find the controller in the device list, and from the dropdown next to it, select “Action Notifications.”

  In both cases, you can also enable other types of notifications. Confirm the changes by tapping the “Save” button in the top right corner of the screen.

- If notifications do not appear despite being configured, check your phone’s system settings (Android/iOS) to ensure that the wBox app has permission to display system notifications.

8 DEVICE TIME AND LOCATION

- Go to the settings, to the “Time and Location” section. In the “Device Time” tab, select your region and location from the list and confirm the changes by clicking “Save.” The device will synchronize its time with an NTP server (if the controller is on a WiFi network with Internet access) or retrieve the time from your phone/tablet. Since the controller does not have battery backup for its clock, the time resets when the power is disconnected. Therefore, it is recommended to keep the controller connected to a WiFi network with Internet access so it can automatically synchronize its clock. This is especially important for controllers that use scheduled operations.

- You can set the controller’s location using your smartphone or tablet. In the “Device Location” tab, click the “Set Location” button. The app will ask if you want to share your location – allow it. The “Coordinates” field should display approximate coordinates of your location. If the “Set Location” button flashes red with the message “Error,” or if the “Coordinates” field does not change from “Not set” to numerical values, the location could not be retrieved. In this case, make sure your phone/tablet has a GPS module and that location sharing is enabled for the wBox app. Setting the location is especially important for controllers that use schedules based on sunrise and sunset times.

TECHNICAL SPECIFICATIONS

supply voltage	230 V AC (1-phase) or 3 x 230 V AC (3-phase), 50 Hz, according to PN-EN 50160
controller energy consumption	< 1 W
protection requirement	circuit breaker (4P for 3-phase, 2P for 1-phase systems)
number of voltage inputs	3 (L1, L2, L3)
type of voltage inputs	phase voltage measurement; compatible with 1-phase and 3-phase systems
phase voltage range	0 - 300 V AC RMS independent for each phase
number of inputs	3 (6 terminals)
inputs type	indirect current measurement (designed for use with external current transformers)
current transformers included in the set	3 pcs.
measurement range	3 x 50 A (3 x 11.5 kW, total 34.5 kW) - applies to the included CTs
measured parameters	**Energy:** active (imported/exported), reactive (imported/exported) **Power:** active, reactive, apparent **Network parameters:** voltage, current, frequency
measurement mode	real-time reading: independent for each phase, total for all phases, total energy consumption over time, vector balance
resolution	active power: 1 W reactive power: 1 var apparent power: 1 VA active energy (imported/exported): 10 Wh reactive energy (imported/exported): 10 varh voltage: 0.1 V current: 0.01 A frequency: 0.1 Hz
measurement history	online access; logging interval (time resolution): 5 min; 1h aggregation applied for data older than 1 week
number of buttons	1
buttons type	tact-switch, reset function
LED indicators	operating status, indication of voltage presence on individual phases, and independent information on the direction of energy flow (consumption or export) or the no-load for each phase (L1, L2, L3)
connector type	terminal block, M3, max 0.5 Nm
wire section	0.05 ÷ 2.5 mm² / 30 ÷ 14 AWG
stripping length	6 mm
housing type	installation module DIN-1; width 17.5 mm
dimensions	90 (98.8) x 17.5 x 64.5 mm
protection level	IP20 according to PN-EN 60529
housing	ABS / acrylic, flammability class V-0 according to UL 94
mounting method	plastic enclosures/distribution boards, mounted on 35 mm DIN rail according to EN 60715
controller operating temperature	-20°C to +50°C
communication standard	µWiFi, compatible with WiFi, 802.11g/n

radio frequency	2.4 GHz
transmission type	two-way, encrypted
API	open https://technical.blebox.eu/
mode	direct connection (as an Access Point), WiFi connection via a standard router, connection with access from any location in the world (requires only access to the Internet)
compatible devices and systems	iOS (e.g. iPhone, iPad), Android, macOS (ARM processors labeled M1 or newer)

TECHNICAL SPECIFICATION OF CURRENT TRANSFORMERS

transfer ratio	1000:1
maximum measured current	50 A / phase
assembly type	threaded through the current wire
maximum outer diameter of the phase wire	ø8.6 mm (max 10 mm²)
length of transformer cable	500 mm
outer dimensions	ø22mm x 10 mm

INFORMATION ADDITIONAL

FIRMWARE UPDATE

To update the controller's firmware, connect it to your home WiFi network (see the "WiFi Connection Settings" section) with Internet access. Then go to the settings, to the "Details, Update, and Help" section, and click the "Check for Update" button. If a newer version is available, the button will change to "Download New Firmware." Click it and wait approximately 1 minute, without closing the interface or performing any other actions. The device will download the latest firmware and then restart. The device ID, hardware version, and firmware version can be viewed in the device details.

HELP

The latest versions of manuals, additional information, and product materials are available on our website: blebox.eu

General inquiries: info@blebox.eu
Service and technical support: support@blebox.eu

Before contacting our support, if possible, prepare the "Service Key" of the controller, available in its settings under the "Details, Update, and Help" tab. By clicking the icon, the key will be copied to your phone's clipboard. Also prepare the "Installation Key" of the wBox app, available in the app's main menu under the "Settings" tab.

The instructions for restoring the controller to factory settings are available at: http://blebox.eu/start/reset

The instructions for reconfiguring the controller are available at: http://blebox.eu/start

Warning! Restoring factory settings resets the controller's configuration but does not remove it from the user accounts it is assigned to. Removing the controller by the owner (the first user who added the device to their account) will also remove it from all other users.

To remove the controller from an account, open the wBox app, go to the main menu and the "Manage Devices" tab, select the controller, and click "Remove Device." Alternatively, you can log in to https://portal.blebox.eu go to the "Devices" tab, select the controller, and in the "Actions" menu (top right corner), click "Remove Device."

for more information visit our website

www.blebox.eu

or send us an email to: info@blebox.eu

support is available at support@blebox.eu

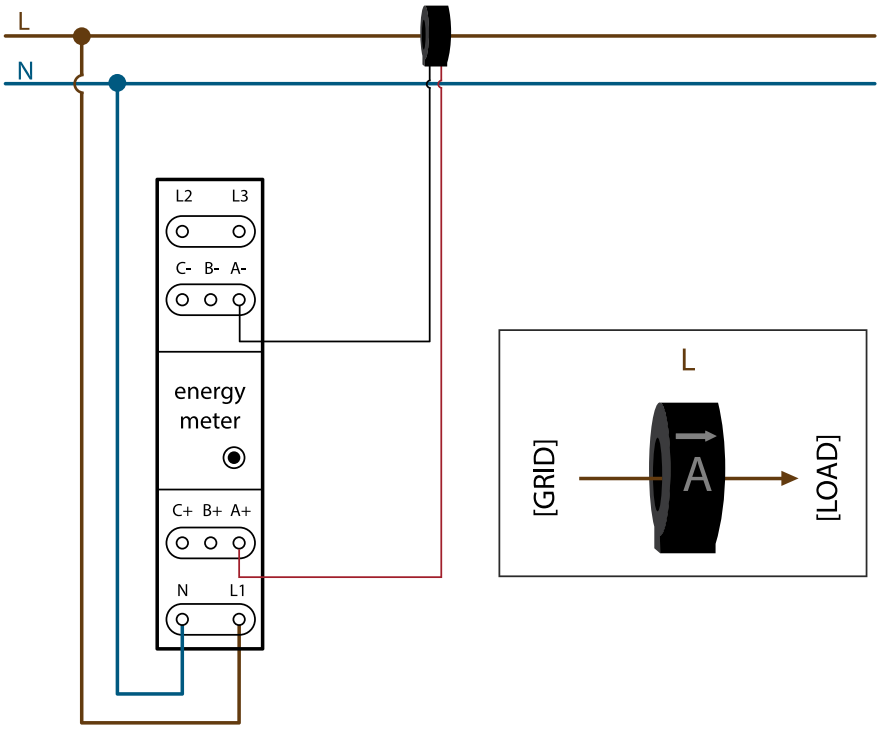
made in Europe

Connection diagrams

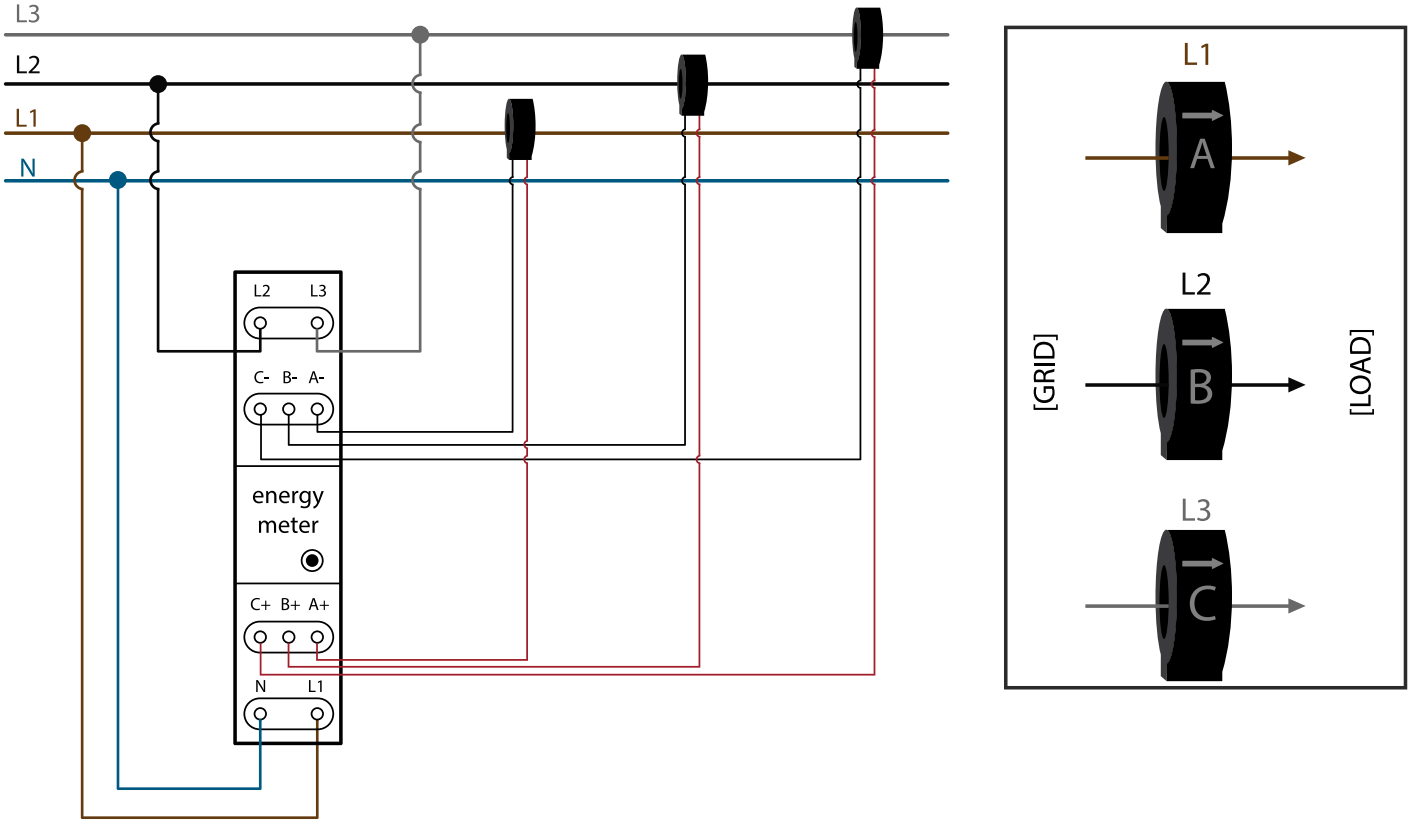
Connection diagrams

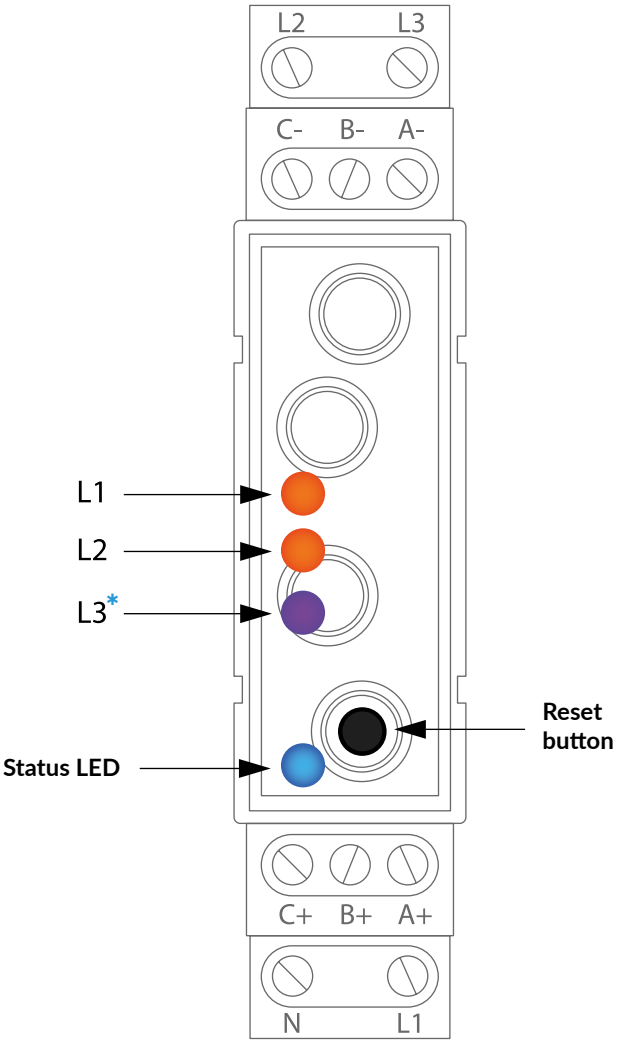
Note! Incorrect installation or reverse connection of the transformer wires will result in incorrect (e.g., negative) measurement values – energy consumption will be displayed as energy production instead.

1. Wiring diagram for the DIN energyMeter in a single-phase system.



2. Wiring diagram for the DIN energyMeter in a three-phase system.





Active power	Phase status	LED color
> 3 W	Energy import	red
from -3 W to 3 W	No import / export	white
< -3 W	Energy export	green
Voltage < 200 V or > 280 V	No phase / Incorrect voltage	burgundy (pulsing)

* Example: voltage loss on phase L3.