

PowerRouter Unifit

# Installation Manual



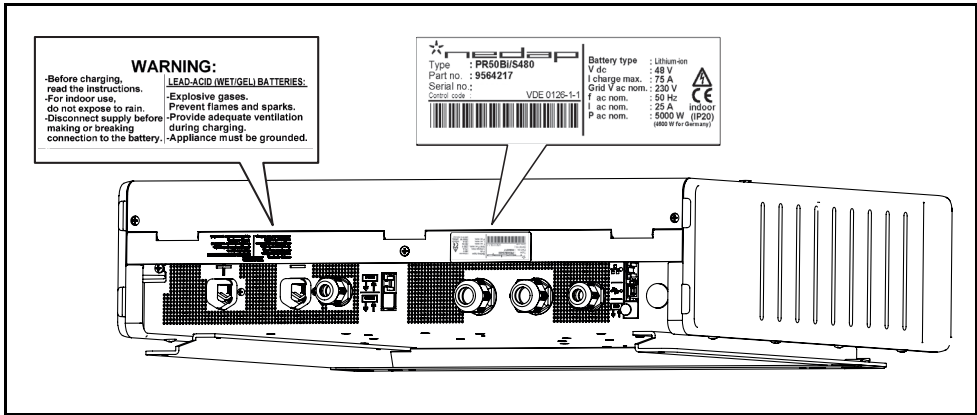
**PowerRouter**  
love your energy



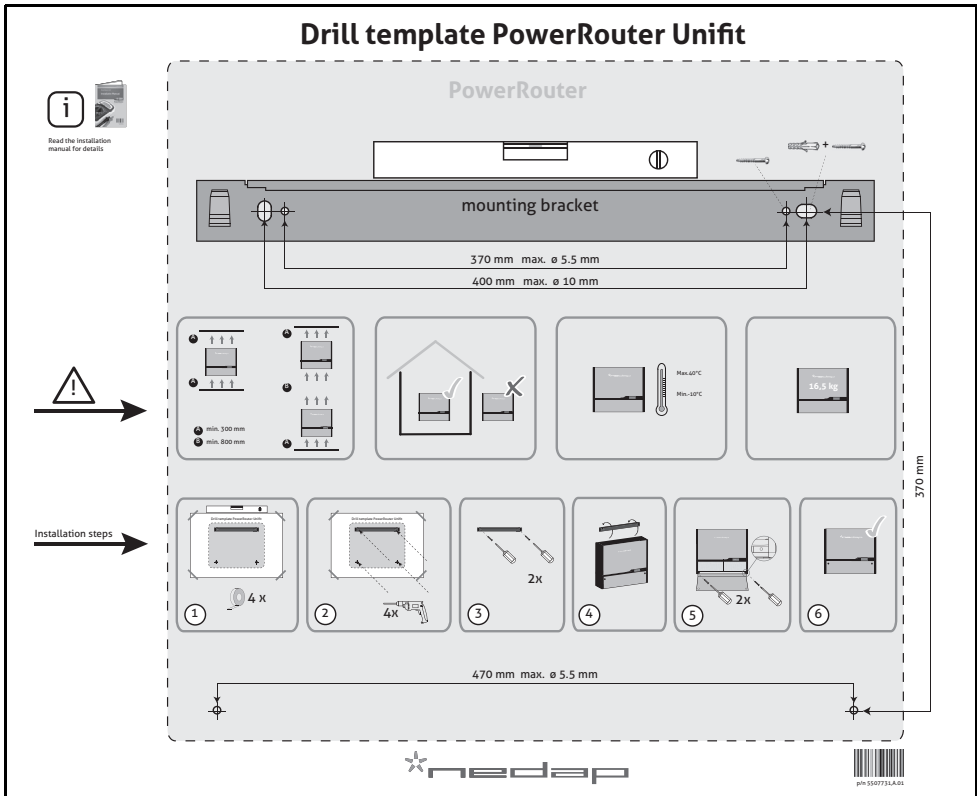
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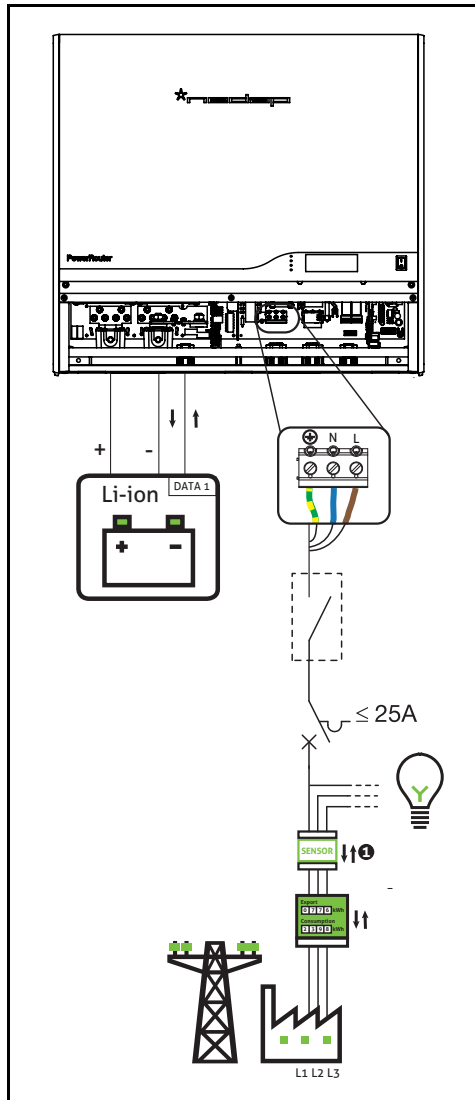
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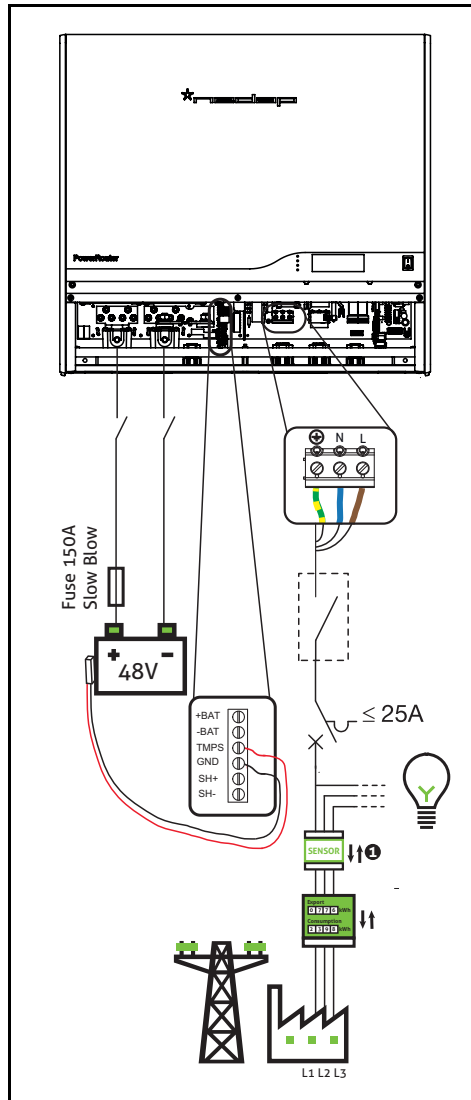
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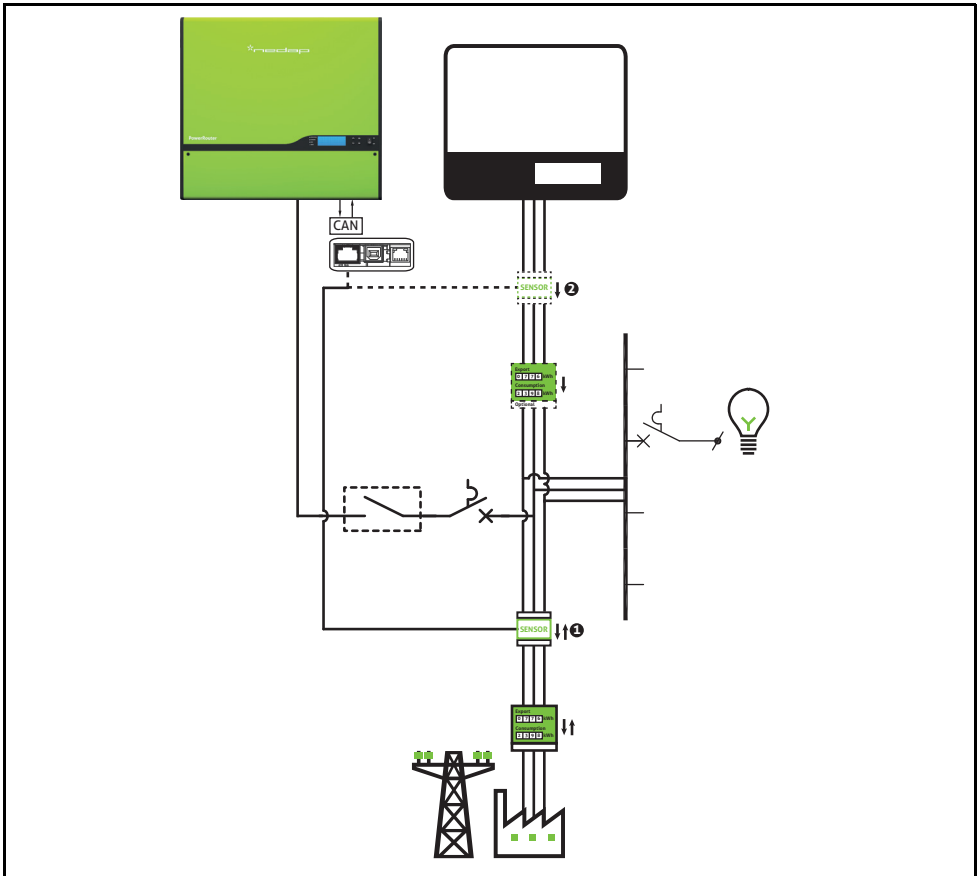
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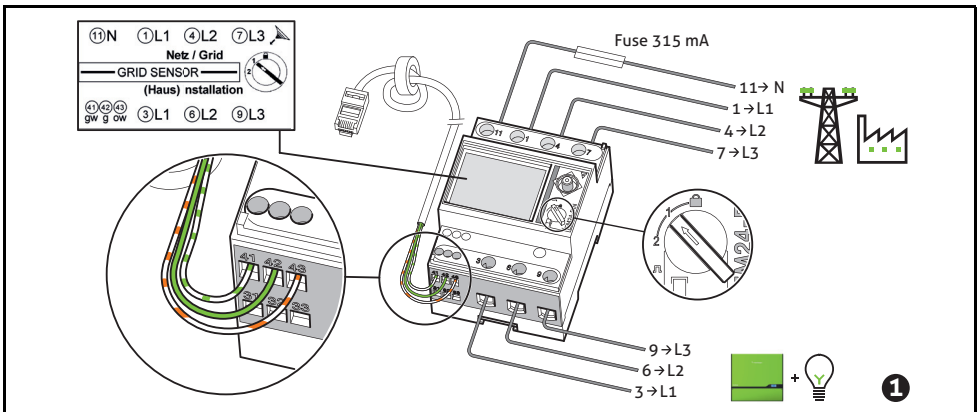
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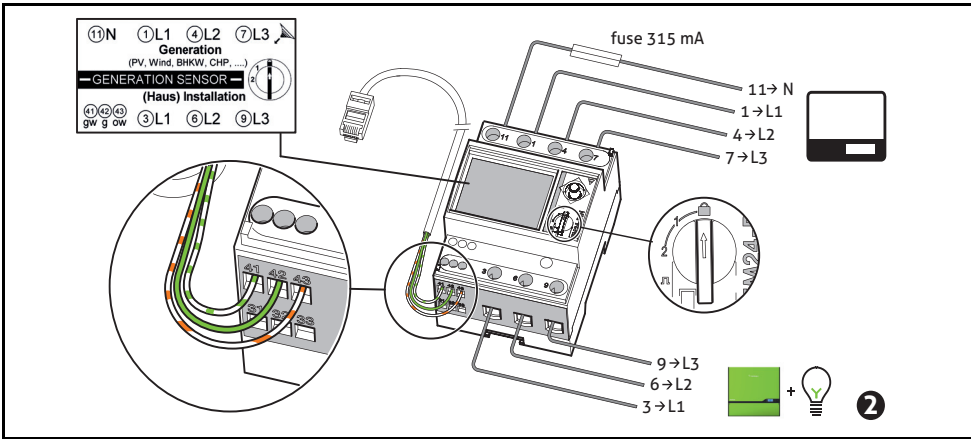
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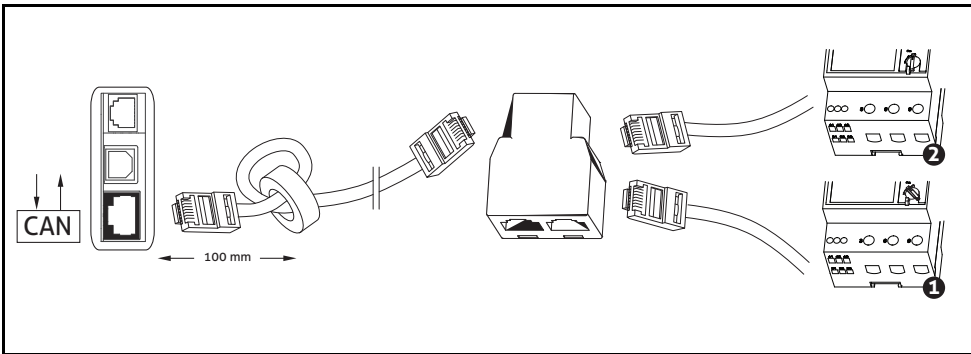
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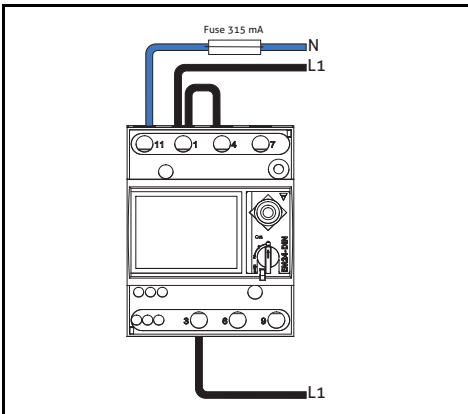
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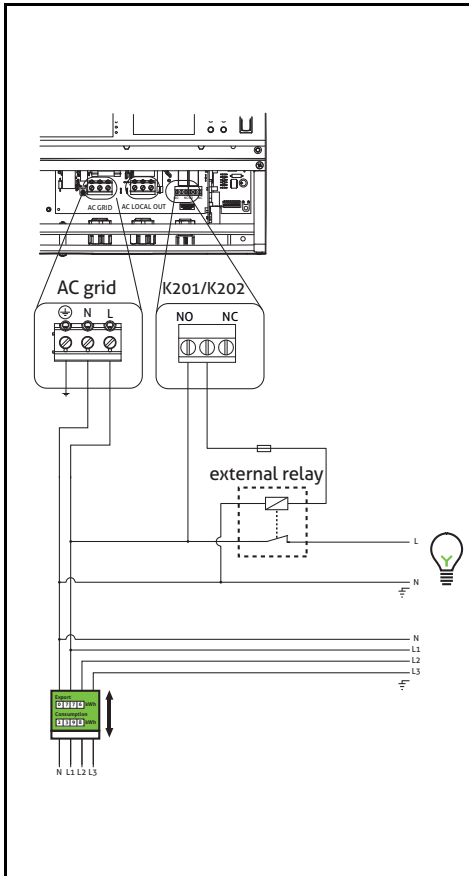
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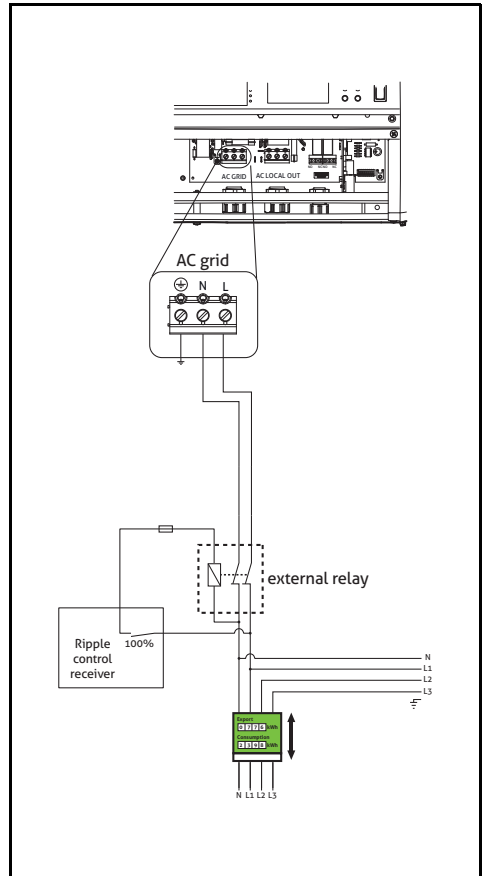
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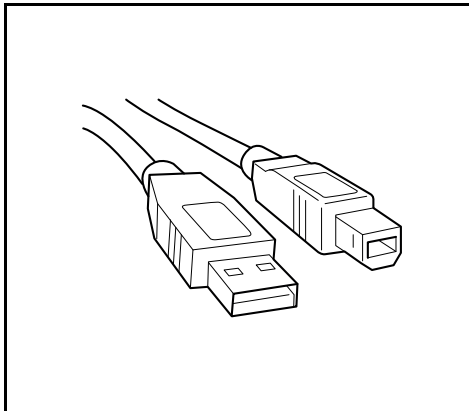
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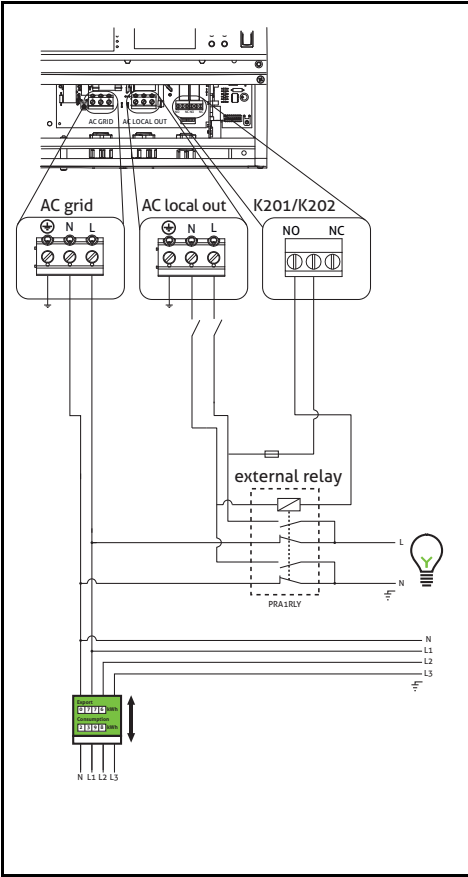
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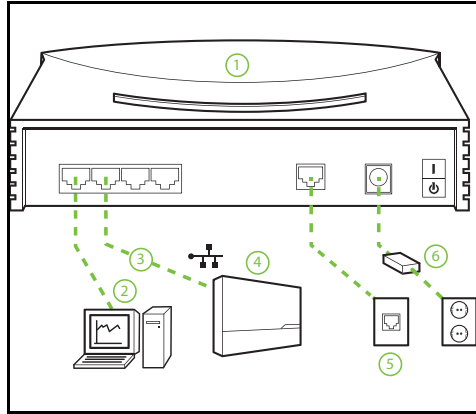
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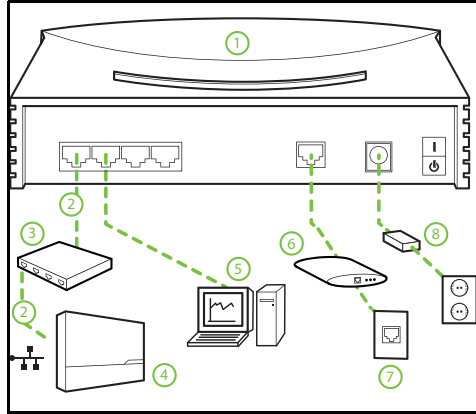
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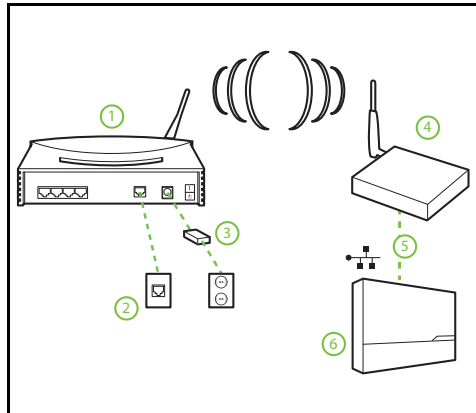
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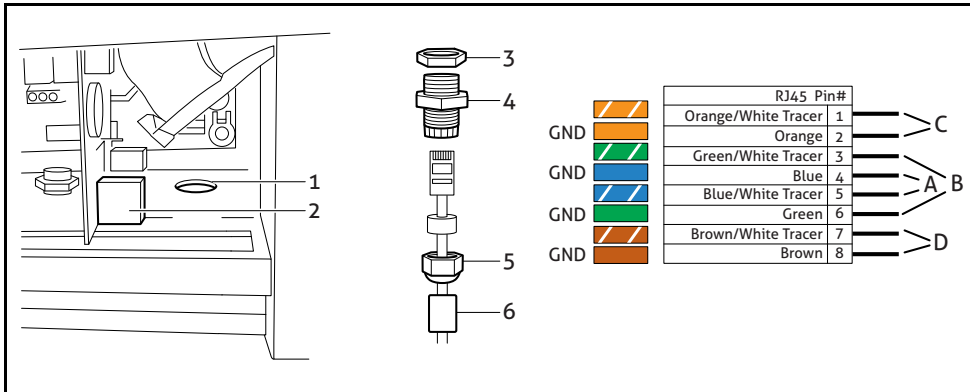
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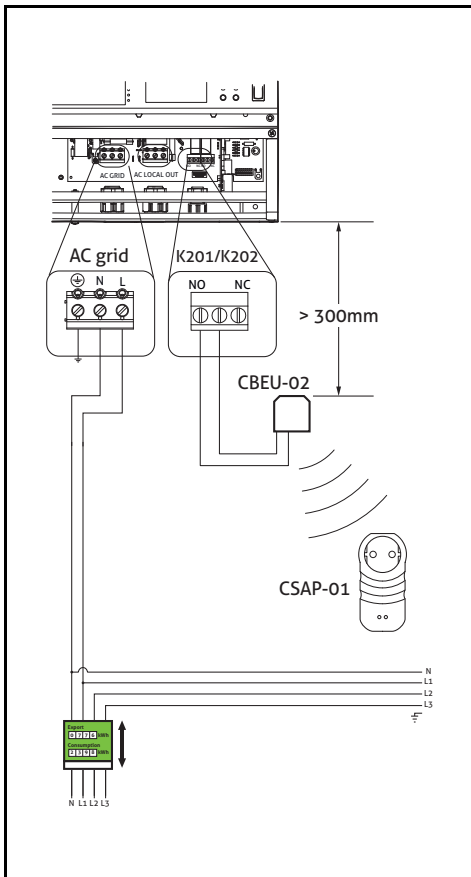
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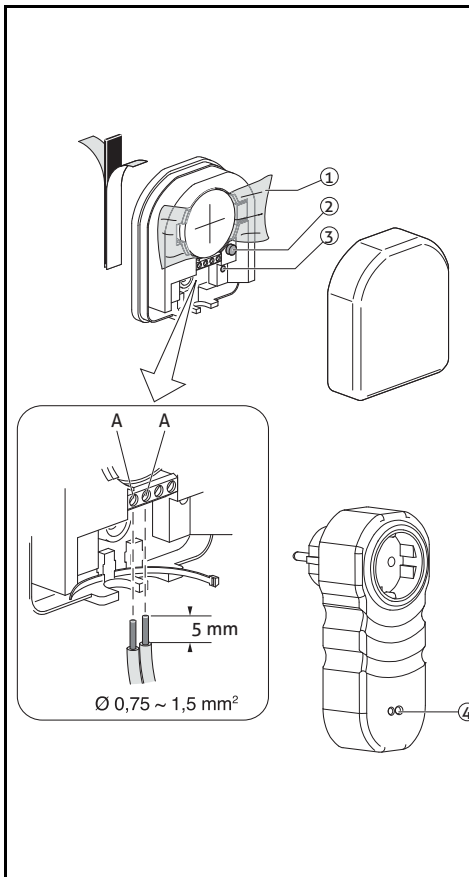
17



18



19





20

the PowerRouter  
you're in charge

Enter your username and password and click on login

Username

Password

Keep me logged in

[Forgot password?](#)

[New user](#)

Login

21

the PowerRouter  
you're in charge

Enter the following data about your PowerRouter and click on register

Part no.

Serial no.

Control code

Register

22

the PowerRouter  
you're in charge

Welcome New User! For us to be of good service we ask you to enter the following data.

Step 1 of 3: Account

Language

Choose a password (and repeat it exactly)  
We will mail you this password as a reminder

Username\*

New password\*

Password confirmation\*

Please leave your E-mail address for your password confirmation. Further, we may contact you periodically for new PowerRouter features and updates

Email address\*

\* Mandatory

Continue

23

the PowerRouter  
you're in charge

Welcome New User! For us to be of good service we ask you to enter the following data.

Step 2 of 3: Your name and address

First name

Last name

Street

House number  -

Zip code

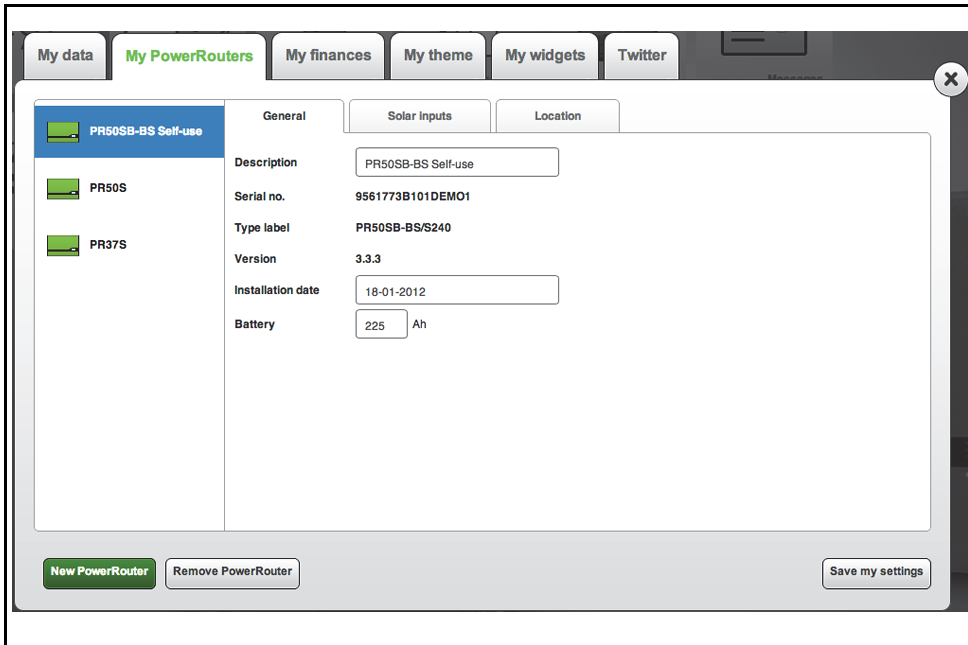
City

State

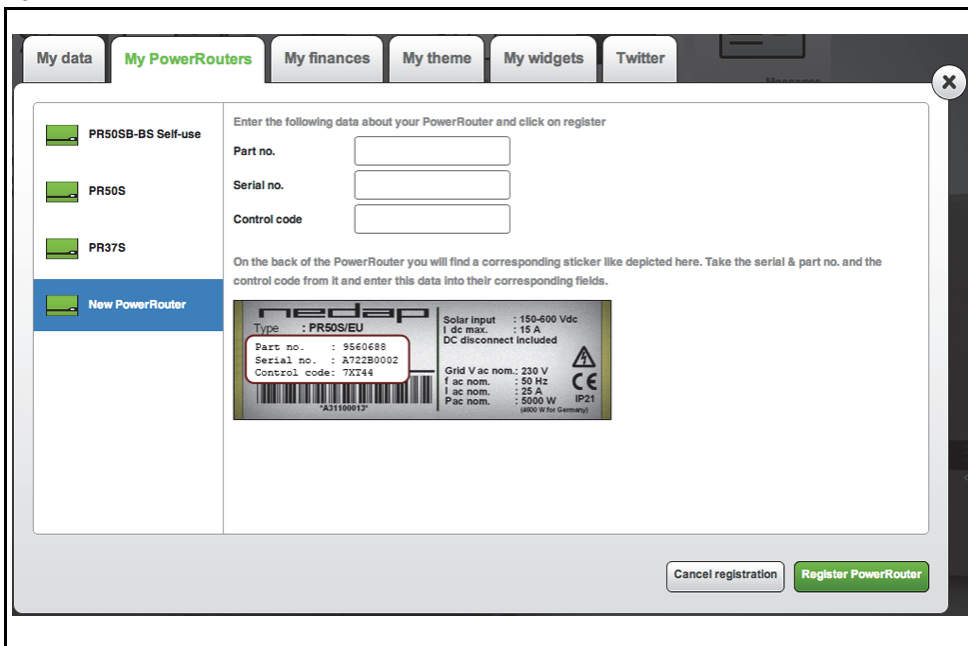
Country

Back to Step 1 Finish

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# 1 Introduction

## 1.1 Applicability

This installation manual is intended for qualified installation personnel. It describes how you can safely install, connect, start and decommission the following PowerRouter types:

- PowerRouter Unifit (Li-ion): PR50Bi/S48 | PR37Bi/S48
- PowerRouter Unifit (Lead acid): PR50B/S48 | PR37B/S48 | PR30B/S48

## 1.2 Symbols used in the documentation



### DANGER

---

This symbol indicates a hazardous situation which, if not avoided, could result in death or serious injury.

---



### WARNING

---

This symbol indicates a situation which, if the instructions are not followed, could result in injury and damage to the equipment.

---



### CAUTION

---

This symbol indicates a situation which, if the instructions are not followed, could result in damage to the equipment or malfunctioning.

---



---

This symbol indicates additional information to ensure optimal operation of the system.

---

## 1.3 Warranty

### PowerRouter factory warranty conditions

Our quality control program ensures that each PowerRouter product is manufactured to exact specifications and is thoroughly tested before leaving the factory.

### 5 year warranty

The Nedap factory warranty period is 5 years from the purchase date of the PowerRouter system. The warranty conditions are based on EU Directive 99/44/EC, without prejudice to any legal rights.

### Extended warranty

For all PowerRouter systems you can acquire a 5-year extension to the PowerRouter factory warranty, for a total of 10 years of warranty coverage. The extended warranty can only be purchased within 6 months of the PowerRouter delivery date.

**Warranty conditions**

If a PowerRouter becomes defective during its warranty period, one of the following services will be performed at no charge for materials, but exclusive of labour costs, at the discretion of the PowerRouter Helpdesk:

- Repair at Nedap N.V.
- Repair on site
- Exchange for a replacement unit (of equivalent value according to model and age)

**Exclusion of liability**

Warranty claims and liability for direct or indirect damage are excluded if arising from:

- Transport and storage damage
- Incorrect installation and/or commissioning
- Modifications, changes or attempted repairs by untrained and unauthorised personnel
- Incorrect use or inappropriate operation
- Insufficient ventilation of the device
- Failure to observe the applicable safety regulations
- Force majeure (e.g. lightning, overvoltage, storm, fire)
- Cosmetic shortcomings which do not influence the functioning of the unit
- Damage due to moisture and/or other environmental conditions



---

*The installer/dealer who installed the PowerRouter must report the defective PowerRouter system to the PowerRouter Helpdesk. Nedap reserves the right to replace the unit with one having equal or better specifications, at Nedap's judgement.*

---

**Information for Australian purchasers - Consumer statutory rights**

In Australia, this warranty is given by, and all Australian warranty claims should be directed to:

**Nedap Energy Systems Australia**

4B/4602 Mitchell Highway  
Lucknow NSW 2795

Telephone: 1300 939 430  
Email: support-au@PowerRouter.com

The benefits to the consumer given by this factory warranty are in addition to other rights and remedies of the consumer that are stipulated by law, and which are not affected by this factory warranty.

Our products come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonable foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

**Disclaimer**

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## 2 Safety

### 2.1 General safety

Before installing or using the PowerRouter, read all of the instructions and alerts on the hardware and in the user and installation manual.

**WARNING**

---

*The local output is floating if the system is not connected to the public grid*

---

### 2.2 PowerRouter

There are two markings on the PowerRouter (figure 1):

- A marking with battery warnings.
- A type label that provides technical specifications.



---

*The image shows an example of the markings. The markings may be different depending on the PowerRouter type.*

---

### 2.3 Local Out

**DANGER**

---

**The Local Out delivers electrical power (230 V, 50 Hz).**

---

**WARNING**

---

*As an extra safety measure it is required that a 2-pole emergency switch is installed at the AC LOCAL OUT connection (if used). This emergency switch must be connected in accordance with the UPS-safety standard.*

---

### 2.4 Public grid

**DANGER**

---

**The AC grid delivers electrical power (230 V, 50 Hz).**

---

**WARNING**

*Before you connect the PowerRouter to the Public AC grid, contact the local utility company. They have to confirm that it is allowed to connect the system.*

---

## 2.5 Batteries

**DANGER**

**Batteries deliver electric power and can cause an energy or fire hazard when they are shorted, or incorrectly installed.**

---

**WARNING**

- Series fuse protection is required for the 48V lead-acid batteries. (48V Li-ion batteries have fuse protection inside.)
  - Batteries must be located in a designated battery area. A battery area must comply with the local regulations. This is because of the dangers of hydrogen gas and battery acid.
  - Explosive gasses. Prevent flames and sparks. Provide adequate ventilation during charging.
- 

**CAUTION**

*The battery temperature sensor is installed on the 48V lead-acid batteries. The PowerRouter uses the sensor input to optimise charging of the batteries. When the batteries overheat, the PowerRouter stops charging the batteries.*

---



*48V Li-ion batteries do not need the battery temperature sensor.*

---

## 3 General description

### 3.1 PowerRouter Unifit - intended use

The PowerRouter Unifit is a battery manager, designed for indoor use. This is a universal retrofit unit to extend any brand of solar inverter or other generation unit to a generation system with battery storage. It can be used for battery storage of generated energy to maximise self-use or to provide backup. For more information visit [www.PowerRouter.com](http://www.PowerRouter.com).

The PowerRouter is compliant with the following directives:

- 2004/108/EC (EMI)
- 2006/95/EC (low voltage directive)



#### CAUTION

---

*The PowerRouter has no serviceable parts inside.*

---

#### 3.1.1 Internet connection

When the PowerRouter is connected to the internet the monitoring tool [myPowerRouter.com](http://myPowerRouter.com) provides detailed system information (for example performance, battery state of charge) of your PowerRouter. Keep the system up to date with the latest features by remotely updating the PowerRouter to the latest firmware.

#### 3.1.2 PowerRouter Installation Tool

The Installation Tool helps you to initialize the PowerRouter, make advanced settings, and update the PowerRouter firmware if applicable.

Before you can use the Installation Tool, you must download and install the tool on your computer. The Installation Tool includes the latest available firmware version, so no additional downloads are required.



---

*You can download the PowerRouter Installation Tool and guideline via the PowerRouter website. You need your login details for this website. You can request login details via [www.PowerRouter.com/partners](http://www.PowerRouter.com/partners). Check the website regularly for updates to the PowerRouter Installation Tool.*

---

### 3.2 3-phase grid sensor (required accessory PRA3SENSE)

With the signal from this 3-phase sensor, the PowerRouter determines the energy consumption with the public grid for a 3-phase system. The PowerRouter uses this data to measure the amount of energy which can be stored in the batteries or if any energy is required for consumption from the batteries. With the 3-phase sensor the consumption of the self generated solar energy is maximised. The 3-phase grid sensor can be ordered via your local Business Partner.

### 3.3 3-phase generation sensor (accessory PRA3GSENSE)

With the signal from this 3-phase sensor, the PowerRouter determines the amount of energy produced by the generating energy source already installed (solar inverter or other energy source). With the installation of this sensor and connecting the system to internet the complete system can be monitored in one place: myPowerRouter.com. The 3-phase generation sensor can be ordered via your local Business Partner.



#### CAUTION

---

*The two 3-phase sensors are programmed in a different way. In order for the sensor communication to work properly, you need a PRA3SENSE and a PRA3GSENSE during installation.*

---

### 3.4 External relay (accessory PRA1RLY)

The external relay can be ordered via your local Business Partner. You can use the external relay to:

- Use energy management (figure 10).

If the amount of solar energy fed to the public grid exceeds the programmed value, the PowerRouter can switch on additional loads via the external relay. How long the load stays switched on can be programmed through the advanced settings in the Installation Tool.

- Isolate the PowerRouter from the public grid by a ripple control receiver (figure 11).

The ripple control receiver is not included. The disconnection is according to the German directive EEG2012. Only the disconnect contacts of the relay are used.

- Setup a backup power supply (figure 13).

If the public grid fails, the external relay is energised. The switch over to the local AC grid is done via one of the user-selectable relays (K201 / K202) of the PowerRouter.

### 3.5 Wireless Energy Management Kit (accessory PRAxWEMK)

The Wireless Energy Management Kit (WEMK) can be used with PowerRouter products to support energy management. If the amount of solar energy fed to the public grid exceeds the programmed value, the PowerRouter can switch on additional loads via the WEMK. The WEMK is available in several country specific versions and can be ordered via your local Business Partner. The WEMK contains a:

- Binary input module (Eaton CBEU-02/xx).
- Wireless plug-in actuator (Eaton CSAP-01/xx).



#### CAUTION

---

*The plugs on this product are country specific. Please order the correct version for your country.*

---

## 3.6 Batteries

The PowerRouter Unifit for Li-ion models function with approved 48V Li-ion batteries. The PowerRouter Unifit for lead acid models function with any 48V lead-acid batteries. Proper settings can be made via the Installation Tool.



### CAUTION

- 
- Never connect 24V lead acid batteries to the PowerRouter Unifit.
  - Always check the specifications of the supplier, before making battery settings.
- 

## 3.7 Battery temperature sensor



### CAUTION

---

*The battery temperature sensor must be installed on the 48V lead-acid batteries.*

---

The PowerRouter uses the sensor input to optimise charging of the batteries. When the batteries overheat, the PowerRouter stops charging the batteries. Proper settings can be made via advanced settings in the Installation Tool.



---

*48V Li-ion batteries do not need the battery temperature sensor.*

---

# 4 Installation

## 4.1 Check the contents of the PowerRouter box

The PowerRouter box must contain the following:

- The PowerRouter Unifit.
- Manual set for PowerRouter Unifit, including the drill template
- Wall-mounting bracket.
- Clip-on ferrite core for the UTP cable (Internet).
- Cable gland (for installation in Italy).
- Clip-on ferrite core for the digital input (for installation in Italy).
- Battery temperature sensor (only for PRxxB/S48)

## 4.2 Determine the mounting location

The installation location of the PowerRouter must meet the following:

- The PowerRouter must be mounted indoors.
- Mount the PowerRouter as close as possible to the meter cupboard.
- Do not mount the PowerRouter in direct sunlight.
- Do not mount the PowerRouter during periods of precipitation or high humidity (>95%). Moisture trapped within the location may cause corrosion and damage to the electronic components.
- When the internal temperature is too high, de-rating will occur. The PowerRouter reduces the power output if the internal temperature becomes too high.
- The location is not accessible for children.
- The PowerRouter emits a slight hum during operation. This noise is normal and has no effect on performance, but it can be disturbing if the unit is installed on a wall in a living area, on the outside of a wall that is near a living area, or on certain types of materials (thin wood panels or sheet metal).
- The wall should be within  $\pm 5^\circ$  vertical.
- The mounting surface must be able to support the extra weight of the PowerRouter Unifit (16.5 kg).
- The type information sticker must be visible after mounting the PowerRouter (figure 1). The sticker contains the serial number which is the login code for the Installation Tool and to register at [myPowerRouter.com](http://myPowerRouter.com) for logging and monitoring.
- The outside dimensions of the PowerRouter Unifit are 545 x 502 x 149 mm (W x H x D).
- The PowerRouter must be installed with 300 mm clearance at the top and bottom of the unit.
- If multiple generation units are stacked there must be 800 mm of clearance between each system.

**DANGER**

- 
- Do not mount the PowerRouter on or underneath flammable construction materials.
  - Do not mount the PowerRouter in areas where highly flammable materials are stored.
  - Do not mount the PowerRouter in areas where there is a danger of explosion.
- 

**WARNING**

---

*To prevent electric shock or other injury, check for existing electrical or plumbing installations in the walls before drilling the holes for the PowerRouter.*

---

**CAUTION**

- 
- Ensure that there is sufficient clearance for the airflow around the PowerRouter! Local regulations may require larger working clearances.
  - If you mount the PowerRouter in a cabinet, closet or other relatively small enclosed area, sufficient air circulation must be provided in order to dissipate the heat generated by the unit.
- 

### 4.3 Mount the PowerRouter Unifit

The PowerRouter is shipped with a wall-mounting bracket that is suitable for use on most walls.

To mount the PowerRouter:

1. Use the drill template provided with the PowerRouter to drill the holes for the wall-mounting bracket. (Follow the illustrated instructions on the drill template, figure 2.)
2. Mount the wall-mounting bracket.
3. Mount the PowerRouter Unifit.
4. Open the lower front cover.
5. Mount the additional screws (use a screwdriver with a blade-length of at least 160 mm).

### 4.4 Connect the AC grid

**WARNING**

---

*Before you connect the PowerRouter to the Public AC grid, contact the local utility company. They have to confirm that it is allowed to connect the system.*

---

**CAUTION**

---

*The PowerRouter Unifit and the already installed generation unit can be installed in a 1-phase as well as a 3-phase situation. Please make sure the PowerRouter Unifit and the inverter already installed are on the same phase to prevent load imbalances.*

---

See figure 3 for the connection overview.

1. Install an AC Disconnect Switch between the PowerRouter and the AC grid.
2. Strip the insulation off the wires. To prevent overheating of the wires, you must use wires with a conductor size of 4 mm<sup>2</sup>.
3. Pass the wires through the strain-reliefs at the bottom of the PowerRouter (max. cable length inside connection area of 35mm).
4. Connect the earth ( $\perp$ ) according local regulations.
5. Connect the phase (L) and neutral (N) wire from the AC grid to the AC disconnect switch, and from the AC disconnect switch to the AC GRID terminal on the PowerRouter.
6. Tighten the strain-reliefs with a torque between 4 Nm and 6 Nm.

## 4.5 Connect the 48V Li-ion batteries

See figure 3 for the connection overview.

1. Use battery cables with a cross sectional area of 35 mm<sup>2</sup> to 50 mm<sup>2</sup> and a maximum length of 2.5 m per cable.
2. Strip approximately 25 mm of insulation from the cable.
3. Insert the cable into the terminal of the PowerRouter (red to the positive terminal, black to the negative terminal).
4. Tighten the cable connection with a torque between 15 Nm and 20 Nm.
5. Connect the battery cables to the battery following the manufacturers manual.
6. Insulate the battery poles.
7. Connect a CAT5e UTP cable (or better), between the PowerRouter DATA1 port and the 48V Li-ion battery unit (the maximum length of the UTP cable is 10 m).



### WARNING

- Batteries must be located in designated battery areas, and must comply with the local requirements.
- To prevent overheating of the contacts, you must tighten all screws and bolts according the manufacturers recommendation.
- Insulate the battery poles to prevent in-advert shorting. Shortened poles may lead to sparks, fire hazard, or damage to the batteries



### CAUTION

- Miswiring can cause damage to the PowerRouter. Read the label on the battery.
- Always use the directions of the battery manufacturer when installing batteries.
- Never exchange 48V batteries with 24V batteries.



Check [www.PowerRouter.com/li-ion](http://www.PowerRouter.com/li-ion) for supported Li-ion batteries.



## 4.6 Connect the 48V lead-acid batteries

See figure 4 for the connection overview.

1. Install a Battery Disconnect Switch (2-pole isolation) between the PowerRouter and the batteries. Use battery cables with a cross sectional area of 35 mm<sup>2</sup> to 50 mm<sup>2</sup> and a maximum length of 2.5 m per cable.
2. Install a fuse (150 A slow-blow) in series with the positive battery cable. It must be installed on a fixed surface, as close as possible to the battery.
3. Strip approximately 25 mm of insulation from the cable.
4. Insert the cable into the terminal of the PowerRouter (red to the positive terminal, black to the negative terminal).
5. Tighten the cable connection with a torque between 15 Nm and 20 Nm.
6. Use cable lug (eyelet terminal) on the other end of the battery cable.
7. Insulate the battery poles.
8. Clean the surface near the (+) pole where you will place the temperature sensor.
9. Stick the self-adhesive battery temperature sensor onto the battery near the (+) pole.
10. Connect the sensor wires to the TMPS (red wire) and GND (black wire) terminals of the PowerRouter.



### WARNING

- Batteries must be located in designated battery areas, and must comply with the local requirements. This is because of a possible build-up of hydrogen gas and battery acid.
- To prevent overheating of the contacts, you must tighten all screws and bolts according to the manufacturer's recommendation.
- Insulate the battery poles to prevent in-advert shorting. Shortened poles may lead to sparks, fire hazard, or damage to the batteries



### CAUTION

- Miswiring can cause damage to the PowerRouter. Read the label on the battery.
- Always use the directions of the battery manufacturer when installing batteries.
- Never exchange 48V batteries with 24V batteries.

## 4.7 Connect the sensors

### 4.7.1 Connect the 3-phase grid sensor (PRA3SENSE - required)

See figure 5 for the connection overview. The sensor is pre-configured and requires no setup; only hard wiring is required.

1. Disconnect the Public AC grid.
2. Mount the 3-phase grid sensor in the position (no. 1) as shown in figure 5
3. Set the 3-phase grid sensor switch in the '1' Position as shown in figure 6.
4. Connect the 3-phase grid sensor in accordance with the configuration as shown in figure 6 ("3P.n"). Cable cross-section area: 4 mm<sup>2</sup> - 16 mm<sup>2</sup>. Tighten the screws with a torque between 1.7 Nm and 3 Nm.

5. Connect the 1 meter sensor cable to the 3-phase grid sensor (included).
  - a. Green/white wire -> sensor terminal 41.
  - b. Green wire -> sensor terminal 42.
  - c. Orange/white wire -> sensor terminal 43.
6. A CAT5e UTP cable (or better), with a maximum length of 25 meters, may be used to extend the connection (RJ45-connector type: T-568B).
7. Place the ferrite core with one loop in the cable. The ferrite core must be within 10 cm of the PowerRouter.
8. Insert the RJ45 plug at the end of the sensor cable into the PowerRouter CAN port.
9. After initialising (section 4.12), check the PowerRouter display for correct operation of the sensor – “Service menu –Status – Sensor”. If correct, “OK” will appear on the display (This may take up to 3.5 minutes after start-up).

**CAUTION**


---

*Make sure the sensor is correctly installed. Incorrect installation will result in no self-use maximization, can damage the sensor or will deplete the battery.*

---

**CAUTION**


---

*For an installation of the sensor in a 1-phase situation, make sure the sensor is connected as shown in figure 9. Terminal 4 must always be powered. For further details on the sensor please refer to the manufacturer's manual.*

---

#### **4.7.2 Connect the 3-phase generation sensor (PRA3GSENSE)**

See figure 5 for the connection overview. The sensor is pre-configured and requires no setup; only hard wiring is required.

**CAUTION**


---

*The 3-phase generation sensor is installed in a different way as the 3-phase grid sensor.*

---

1. Disconnect the Public AC grid and the generation unit already installed.
2. Mount the 3-phase generation sensor in the position (no. 2) as shown in figure 5
3. Check if the 3-phase generation sensor switch is in the 'locked' Position.
4. Connect the 3-phase generation sensor in accordance with the configuration as shown in figure 7 (“3P.n”). Cable cross-section area: 4 mm<sup>2</sup> - 16 mm<sup>2</sup>. Tighten the screws with a torque between 1.7 Nm and 3 Nm.
5. Connect the 2 meter sensor cable to the 3-phase generation sensor.
  - a. Green/white wire -> sensor terminal 41.
  - b. Green wire -> sensor terminal 42.
  - c. Orange/white wire -> sensor terminal 43.
6. A CAT5e UTP cable (or better), with a maximum length of 25 meters, may be used to extend the connection (RJ45-connector type: T-568B).

7. Insert the RJ45 plug at the end of the sensor cable into the splitter delivered with the 3-phase generation sensor. Also connect the UTP cable of the 3-phase grid sensor to the splitter, as shown in figure 8.
8. Place the ferrite core with one loop in the cable. Connect a CAT5e UTP cable (or better) from the splitter to the PowerRouter CAN port. The ferrite core must be within 10 cm of the PowerRouter as shown in figure 8.

**CAUTION**


---

*For an installation of the sensor in a 1-phase situation, make sure the sensor is connected as shown in figure 9. Terminal 4 must always be powered. For further details on the sensor please refer to the manufacturer's manual.*

---

## 4.8 Connect the external relay (accessory)

### 4.8.1 Connect the external relay for energy management

See figure 10 for the connection overview.

1. Connect the external relay. Use one of the user-selectable contacts K201 / K202.
2. Program the user-selectable contacts K201 / K202 via advanced settings in the installation tool (see chapter 5).

**CAUTION**


---

*The load that is connected to the relay must be 1-phase.*

---




---

*For this function the value for energy export to the grid must be >0, measured by the 3-phase grid sensor.*

---

### 4.8.2 Connect the external relay to isolate the PowerRouter from the public grid

This option is only applicable for Germany (directive EEG2012). See figure 11 for the connection overview of the external relay.

### 4.8.3 Connect the external relay for a backup power supply

See figure 13 for the connection overview.

1. Connect the load to the external relay.
2. Strip the insulation off the wires. Use wires with a conductor size of 4 mm<sup>2</sup>.
3. Pass the wires through the strain-relieves at the bottom of the PowerRouter.
4. Connect the phase (L) and neutral (N) wire from the external relay to the AC LOCAL OUT terminal on the PowerRouter.
5. Install an AC Disconnect Switch between the AC local out and the external relay.
6. Tighten the strain-relieves with a torque between 4 Nm and 6 Nm.
7. Connect the external relay control wires. Use one of the user-selectable contacts K201 / K202.
8. Program the user-selectable contacts K201 / K202 via advanced settings in the installation tool (see chapter 5).

**DANGER**

The “local out” output is only suitable for 1-phase loads. Connecting 1-phase of a 3-phase load, may lead to damage to the 3-phase load.

**CAUTION**

- Batteries will not be charged if the local out has a continuous load with an average load of 80% of the rated power. If the batteries are not charged they may be severely damaged and the lifetime may be reduced. Make sure the batteries get charged by reducing the connected loads or intermittent use.
- Connect the earth ( $\oplus$ ) according local regulations.

## 4.9 Install the Wireless Energy Management Kit (PRAxWEMK)

See figure 18 for the connection overview and figure 19 for installation details.

1. Open the binary input module.
2. Connect two wires to the connection AA of the binary input module.
3. Fix the location of the wires with a cable tie.
4. Remove the foil (1) from the battery.
5. Press the button (2) once. The LED (3) flashes once and stays on for a few seconds.
6. While the LED is on press the button (2) once.  
The LED (3) flashes twice and stays on for a few seconds. If the LED is off the configuration is completed.



*If the LED flashes three or four times, repeat the step above until the LED flashes twice.*

7. Press the button (4) once (<0.5s) to set the wireless plug-in actuator in teaching mode.
8. Short circuit the contacts AA and keep it this way. This simulates activation of the binary input module, the wireless plug-in actuator should make a clicking sound twice (switch on).
9. Press the button (4) once (<0.5s) to set the wireless plug-in actuator in normal mode.
10. Remove the short circuit from the contacts AA.



*It is advised to install the Binary input module in a standard mounting box (plastic).*

11. Install the binary input module with the double sided tape. The binary input module must be installed at least 300mm away from the PowerRouter.
12. Connect the two wires to the PowerRouter programmable contact K201/K202.
13. Install the cover on the binary input module.
14. Install the wireless plug-in actuator in the desired wall outlet.
15. Program the contact K201/K202 for energy management (refer to chapter 5).

**CAUTION**

- 
- The maximum load of the wireless plug-in actuator is 8A.
  - The maximum range of the binary input module is 50m. Walls, ceilings and metal constructions will limit the range. (For details refer to the manuals delivered with the binary input module and wireless plug-in actuator.)
- 



- 
- *For this function the value for energy export to the grid must be >0, measured by the 3-phase grid sensor.*
  - *Additional xComfort products that can be ordered at Eaton. For installation of additional xComfort components refer to manual delivered with the product, or contact your local Eaton dealer.*
- 

## 4.10 Connect the additional cable (Italy)

The additional cable is only applicable for Italy (directive CEI-021). See figure 17 for the connection overview.

1. Remove the plate from the knock-out hole (1).
2. Place the cable gland (4) from the bottom through the hole.
3. Fasten the cable gland with the nut (3) on the inside of the PowerRouter.
4. Slide the cable through the cable gland.
5. Connect the cable to the connector (2) (max. cable length inside connection area is 100 mm.).
6. Fasten the cable-nut (5) with a torque of 4 Nm.
7. The cable can be connected to an external receiver from the power company. In figure 16;  
Contact closure A (blue) activates the remote trip.  
Contact closure B (green) activates the move frequency band signal.  
C (orange) and D (brown) are not connected, for later use.
8. Install the clip-on coil (6) on the cable within 10 cm of the PowerRouter.

## 4.11 Switch on the system

1. Close the lower front cover with the two lock-washers and screws.
2. For 48V Li-ion batteries switch on the unit.  
For 48V lead-acid batteries set the external battery disconnect switch to on.
3. Set the external AC disconnect switch to on.
4. Switch on the PowerRouter (use the switch in the display area).

## 4.12 Initialise the PowerRouter - Installation Tool

The PowerRouter Unifit is now connected, but must be initialised first to work properly. This process can only be done using the PowerRouter Installation Tool.

1. Connect a PC, with the PowerRouter Installation Tool installed (version R3.9 or higher), to the PowerRouter's USB port (use a USB cable as shown in figure 12).
2. Follow the Installation wizard, which is shown automatically:
  - a. Select the country of installation.
  - b. Set the status display settings.
  - c. Select li-ion or lead-acid batteries.
  - d. Select the battery brand and type - the PowerRouter will be initialised using the recommended settings for this battery type.
  - e. Click on Install - the Installation Tool will now initialise the PowerRouter.
3. Configure the advanced settings when applicable, for example energy management (see chapter 5).
4. Generate the installation report.



---

*You can download the PowerRouter Installation Tool and guideline via the PowerRouter website. You need your login details for this website. You can request login details via [www.PowerRouter.com/partners](http://www.PowerRouter.com/partners). Check the website regularly for updates to the PowerRouter Installation Tool.*

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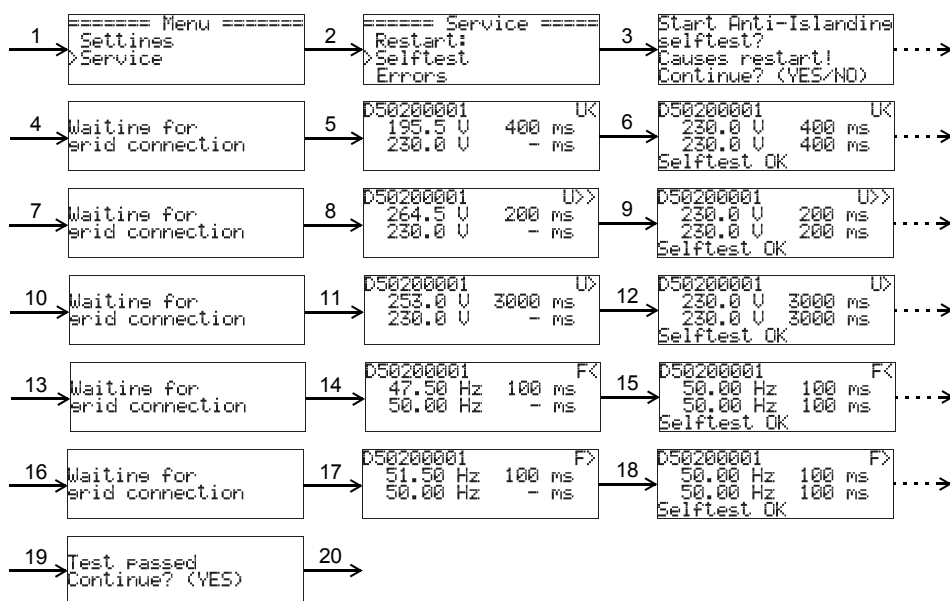
### 4.12.1 Run the selftest (Italy)

The selftest is only applicable for Italy (directive CEI-021). If the country is set to Italy, the selftest is available via the service menu on the display.

The Italy Selftest is meant to check the upper and lower limits of the AC voltage and AC frequency at which the PowerRouter will disconnect from the grid. If the test fails, the PowerRouter is not allowed to connect to the grid.



The example displays below show the self test OK. If the test fails the display will show *Selftest fail*.



1. Press YES, and use UP/DOWN to select *Service*.
2. Press YES, and use UP/DOWN to select *Selftest*.
3. Press YES to go to the *Selftest*.
4. Press YES to continue, or NO to cancel.
5. Wait until the grid is connect and the voltage lower trip test starts.
6. Wait until the test is finished (*Selftest OK* or *Selftest fail*).
7. Press YES to continue.
8. Wait until the grid is connect and the voltage upper trip test starts.
9. Wait until the test is finished (*Selftest OK* or *Selftest fail*).
10. Press YES to continue.
11. Wait until the grid is connect and the average voltage upper trip test starts (takes 10 minutes).
12. Wait until the test is finished (*Selftest OK* or *Selftest fail*).
13. Press YES to continue.

14. Wait until the grid is connect and the frequency lower trip test starts.
15. Wait until the test is finished (*Selftest OK* or *Selftest fail*).
16. Press **YES** to continue.
17. Wait until the grid is connect and the frequency upper trip test starts.
18. Wait until the test is finished (*Selftest OK* or *Selftest fail*).
19. Press **YES** to continue.
20. The display should show *Selftest passed*. Press **YES** to continue.

**CAUTION**


---

*If the test is cancelled the PowerRouter reacts as if the selftest failed.*

---




---

*If the PowerRouter switches off during the selftest, or the display shows an error, restart the PowerRouter and redo the test. If the selftest fails the second time contact your local Business Partner.*

---

## 4.13 Connect the PowerRouter to the internet

**CAUTION**


---

*Install the clip-on coil on the UTP cable within 10 cm of the PowerRouter.*

---

### 4.13.1 Connect to an internet modem / router

An example of a connection is shown in figure 14. The PowerRouter can be connected to any of the available ports. The numbers in the drawing are:

1. Internet modem / router.
2. Connected computers.
3. CAT5e UTP cable (or better).
4. PowerRouter.
5. DSL, ISDN, or cable connection.
6. Power adapter for the internet modem / router.

### 4.13.2 Connect via a switch to an internet router

An example of a connection is shown in figure 15. The PowerRouter can be connected to any of the available ports of the switch. The numbers in the drawing are:

1. Internet Router.
2. CAT5e UTP cable (or better).
3. Ethernet switch or additional router.
4. PowerRouter.
5. Connected computers.
6. Internet modem.
7. DSL, ISDN, or cable connection.
8. Power adapter for the internet router.



### 4.13.3 Connect to a wireless access point

An example of a connection is shown in figure 16. The numbers in the drawing are:

1. Internet modem / router.
2. DSL, ISDN, or cable connection.
3. Power adapter for the internet modem / router.
4. Wireless access point.
5. CAT5e UTP cable (or better).
6. PowerRouter.



#### CAUTION

- The wireless access point must support wireless client function, and it must have a RJ45 connection. If in doubt consult your supplier.
- The PowerRouter cannot connect to the internet via a proxy server.

### 4.13.4 Register the PowerRouter on myPowerRouter.com

1. Make sure you have the Part.no., Serial no., and Control code available as mentioned on the type label of the PowerRouter (figure 1).
2. Check the internet connection via menu > service > status > internet connection. The display should show OK.
3. Go to a computer and open *myPowerRouter.com*.
4. In the login screen click *New user* (figure 20).
5. Fill out the Part.no., Serial no., Control code, and click *Register* (figure 21).
6. Fill out the fields in the window (figure 22), and click *Continue*.
7. Fill out the fields in the window (figure 23), and click *Continue*.
8. You will receive a confirmation e-mail.

### 4.13.5 Register additional PowerRouter systems to a single login

You can register additional PowerRouter systems to a single login / user. To do this:

1. Login on *myPowerRouter.com*.
2. Click *My PowerRouter*.
3. Click *New PowerRouter* (figure 24).
4. Fill out the Part.no., Serial no., Control code, and click *Register PowerRouter* (figure 25).



#### CAUTION

- The PowerRouter internet connection will not work if a proxy server is being used.
- Do not use the AC local out of the PowerRouter to provide power to the internet router, or internet switch, the connection will be lost during a reset.



- 
- *The PowerRouter only uses internet port 80. This is the default setting on most networks.*
  - *The PowerRouter needs a DHCP server within the network. This should be provided by the internet router or the internet switch.*
  - *To test the connection, connect a PC with a dynamic IP address to the connection that you will use for the PowerRouter. Open a web page. If the web page opens, the connection works.*
  - *The maximum length of the CAT5e UTP cable (or better) is 20 meters. If you need to clear a longer distance, you can use an additional router or switch, and an additional cable of 20 meters.*
  - *Power-line communication may result in an unreliable internet connection.*
-

# 5 Installation Tool

## 5.1 Introduction

After the initialisation with the PowerRouter Installation Tool it is possible to make advanced settings to further optimise the PowerRouter.

Below you find an overview of features that are available in the installation tool, under advanced settings. Each feature has a short description, for detailed information refer to the help available in the installation tool or the guideline (download from [www.PowerRouter.com](http://www.PowerRouter.com)).



### CAUTION

---

*The installation tool has a menu option re-install. If you use this wizard, default battery settings will be provided. Based on these settings the PowerRouter resets other battery settings overwriting any customized battery settings. Any customized battery settings will be lost.*

---




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*You can download the latest version of the PowerRouter installation tool and guideline via the PowerRouter website. You need your login details for this website. You can request login details via [www.PowerRouter.com](http://www.PowerRouter.com). Check the website regularly for updates to the PowerRouter installation tool.*

---

## 5.2 Display settings

### 5.2.1 Back-light

Sets the time the PowerRouter's back-light stays on after pressing a button.



### 5.2.2 Display

Select the information that will be shown by default in the display of the PowerRouter.



### 5.2.3 Language

Select the language of the display of the PowerRouter.



## 5.3 PowerRouter settings

### 5.3.1 Self-use

Within the limits of the battery it can be determined how far the battery is discharged. Support for backup can be turned on and off. During self-use the maximum compensation with battery power can be limited.



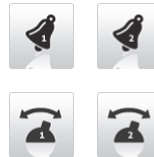
### 5.3.2 Winter mode

Wintermode sets the time period in which it is not efficient to use the battery for self-use compensation.



### 5.3.3 Alarm 1 / Alarm 2

The PowerRouter is provided with 2 user-selectable relays referred as K201 and K202. This chapter describes the different alarms you may assign. After specifying the alarm it needs to be assigned to the relay icon, appearing next to the alarm icon in the installation tool. The relay icon can be selected after configuring the alarm.



#### Off

This is the default selection for an alarm relay. It is off or not used.

#### Grid voltage alarm

When the grid voltage is outside of the desired range the alarm relay is inactive. This can be used to switch on loads or sound an alarm when the grid voltage is out of range.

For example to protect sensitive loads against high voltage. Or to switch on additional loads when the grid voltage is high. Which is usually an indication of high feed-in power.

#### Battery State of Charge (SoC)

Alarm based on the battery state of charge. The alarm relay is activated when the battery State of Charge is outside the specified range.

#### Battery temperature alarm

Alarm based on the temperature of the battery pack. The alarm relay is activated when the temperature of the battery pack is above the specified range.

#### Battery voltage alarm

Alarm based on the voltage of the battery pack. The alarm relay is activated when the battery voltage below the specified range.

#### Grid connection alarm

Alarm based on whether the system is connected to the grid. The relays are inactive if the system is in standby and no grid is available to power the relays.



#### CAUTION

---

*This alarm is not to be used for backup functionality.*

---

**Energy management**

Switch on additional loads when a surplus of solar energy is available to increase the self-use.

**Self-use with backup**

Alarm based on whether the system is connected to the grid. When disconnected from the grid, the PowerRouter will switch to backup mode.

**5.3.4 Standby**

Select that the PowerRouter can go in standby. The PowerRouter will go in to standby when there is no solar power or battery power available.

**5.3.5 Standby timer**

Select a time interval, in which the PowerRouter goes to standby.

**5.4 Grid****5.4.1 Country**

Set the country grid settings for a specific country.

**CAUTION**

*It is not allowed to select a different country, than the country where the PowerRouter is installed.*

**5.4.2 Grid limits**

All grid limits can be changed in order to allow specific settings, which may be required by the utilities.

**5.4.3 EEG 2012**

Set the dedicated parameters to your installation size to comply with the German EEG 2012 regulation.

**5.4.4 Reactive power control**

Set the reactive power curve in order to comply with the local utility requirements (only available for countries where this rule applies).

**5.4.5 Dynamic feed-in limiter**

With the dynamic feed-in limiter the output of the system can be adjusted. You can:

- Limit the output of the system.
- Limit the output to the grid after the point where the load is connected to the grid.



## 5.5 Battery pack

You can change:

- Product type
- Battery brand
- Battery type



### CAUTION

---

*Incorrect settings may harm the batteries.*

---

### 5.5.1 Battery discharging

This option is not available for 48V Li-ion batteries. For 48V lead-acid batteries the cyclic DOD and the max. DOD can be set.



### CAUTION

---

*Incorrect settings may harm the batteries.*

---

### 5.5.2 Battery charging

This option is not available for 48V Li-ion batteries. For 48V lead-acid batteries you can change:

- Charging method.
- Absorption and float charge
- Charge current.



### CAUTION

---

*Incorrect settings may harm the batteries.*

---

### 5.5.3 Maintenance charge

This option is not available for 48V Li-ion batteries. For 48V lead-acid batteries you can set the interval of when to perform the maintenance charge.



# 6 Operation

## 6.1 Display menu

### Open the menu

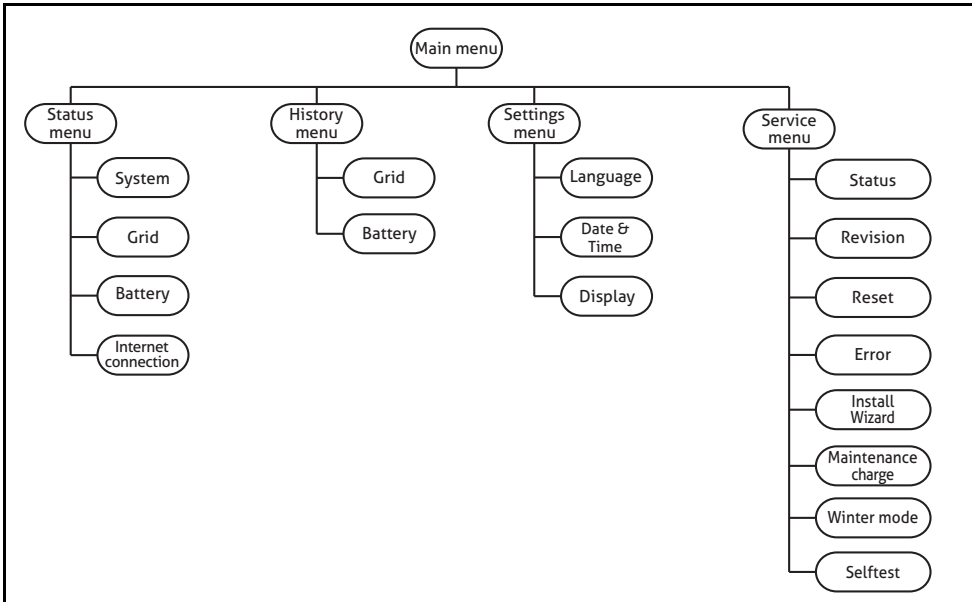
- Press any button on the display to open the menu.

### Navigate through the menu

- Use the UP/DOWN buttons to navigate through the menu.
- Use YES to open the selected item.
- Use NO to return to the previous item.

### Select and change settings

- Use YES to change a selected setting.
- Use the UP/DOWN buttons to change the selected setting.
- Use YES to confirm the changed setting.
- Use NO to cancel the change.



# 7 Troubleshoot

## 7.1 Troubleshooting

If you encounter difficulty with the operation of your PowerRouter, follow the steps below:

- Check the LED status.
- Check the error message on the LCD display, and the error history.
- If the difficulty remains, contact your installer / dealer.

Collect the following information before you contact your installer or dealer (figure 1):

- Model number
- Serial number
- Brief description of the problem
- LED status
- Displayed error message
- Error history
- Software version and ID number

## 7.2 Check the LED status

When an error has occurred the LEDs will either be OFF or FLASHING as follows:

PowerRouter state	Operational (blue)	Charging (blue)	Grid (blue)	Error (red)
Normal Operation	on	*	*	off
Standby	blinking	off	off	off
Not initialised	blinking	off	off	blinking
System check	off	on	*	off
Soft error	on	*	*	on
Hard error	off	off	off	blinking
Firmware update**	off	off	*	on
Validating the grid	*	*	blinking	*
Grid connected	*	*	on	*
Fast charging batteries	*	blinking	*	*
Charging batteries	*	on	*	*
Using battery power	*	off	*	*

\* The LED can be on, blinking, or off.

\*\* The PowerRouter is receiving / installing an update, this process may last for 25 minutes. The display will show a progress bar from 0% to 100%. During this time you must not do any other actions on the PowerRouter.



## 7.3 Check the error messages

The PowerRouter shows the latest error message on the display. The last ten error messages are stored in the error history. For possible solutions see section 7.5.

Most errors are cleared automatically by the system if the error condition disappears. If an error message does not clear itself, press the NO button for at least 3 seconds to clear the error.

## 7.4 Error explanation

### 7.4.1 Hard error

When a hard error occurs the PowerRouter goes into a safe mode and will not function until the user has turned the system off and on or a reset is performed. A hard error is indicated when the error LED is flashing.

### 7.4.2 Soft error

When a soft error occurs the module in which the error originated will go into a safe mode. Other modules in the PowerRouter will continue to operate. The PowerRouter can recover from the error automatically. A soft error is indicated when the error LED is on.

### 7.4.3 Error code

Example: **P027-H**

**P** The first letter indicates where the error originated within the PowerRouter

P - Platform

B - Battery module

G - Grid module

**027** The number indicates which error has occurred

**H** The second letter indicates the level of the error that occurred

H - Hard error

S - Soft error

## 7.5 Errors



Check [www.PowerRouter.com](http://www.PowerRouter.com) for the latest version of the error list.

Error	Level	Explanation	Action
P027-H P028-H P029-H G025-H	Hard	A grid error has occurred.	<ul style="list-style-type: none"> <li>Restart the system (section 7.6.1).</li> <li>The system should recover from the error after the restart.</li> <li>Contact your dealer if this error occurs frequently.</li> </ul>
P058-H	Hard	After a firmware update one of the modules has an incompatible firmware version.	<ul style="list-style-type: none"> <li>Contact your dealer for the correct firmware package.</li> <li>Update the firmware of the system with the correct version.</li> <li>Restart the system (section 7.6.1).</li> </ul>
P073-H	Hard	Last grid connection self test (italy only) has failed.	<ul style="list-style-type: none"> <li>Restart the self test, succesful completion of the self test clears this error.</li> </ul>
P081-H	Hard	The Installation Tool failed to write the anti-islanding settings to the PowerRouter.	<ul style="list-style-type: none"> <li>Restart the system (section 7.6.1).</li> <li>Run the installation tool or install wizard again.</li> <li>Contact your dealer if this error occurs frequently.</li> </ul>
P092-H G034-H B026-H	Hard	The PowerRouter configuration is incorrect.	<ul style="list-style-type: none"> <li>Contact your dealer if this error occurs.</li> </ul>
P098-H G036-H B028-H	Hard	The firmware in the PowerRouter does not match the hardware.	<ul style="list-style-type: none"> <li>Contact your dealer if this error occurs.</li> </ul>
P100-S	Soft	There was too much load variation during the sensor test.	<ul style="list-style-type: none"> <li>Turn off the loads connected to the same phase as the PowerRouter.</li> <li>Restart the system (section 7.6.1).</li> </ul>
P105-S	Soft	The PowerRouter needs a 1-phase or 3-phase sensor to operate in the selected scenario. This sensor was not detected.	<ul style="list-style-type: none"> <li>Make sure the connection of the 1-phase or 3-phase sensor is correct and in the right position. For detailed information see the related section in this manual.</li> <li>Restart the system (section 7.6.1).</li> </ul>
P106-S	Soft	The connection between the PowerRouter and the 3-phase sensor has been lost, or the 3-phase sensor has no power.	<ul style="list-style-type: none"> <li>Check the connection between the PowerRouter and the 3-phase sensor.</li> <li>Check the power connection of the 3-phase sensor.</li> <li>Restart the system (section 7.6.1).</li> </ul>
P111-S	Soft	The PowerRouter was not able to configure the 3-phase sensor.	<ul style="list-style-type: none"> <li>Make sure the 3-phase sensor is connected properly.</li> <li>Make sure the 3-phase sensor is not in the locked position.</li> <li>Restart the system (section 7.6.1).</li> </ul>
P115-H	Hard	The PowerRouter cannot function correctly because some hardware modules were not detected.	<ul style="list-style-type: none"> <li>Contact your dealer if this error occurs.</li> </ul>
P118-H	Hard	The Installation Wizard failed.	<ul style="list-style-type: none"> <li>Restart the system (section 7.6.1).</li> <li>Run the installation tool or install wizard again.</li> <li>Contact your dealer if this error occurs frequently.</li> </ul>

P124-S	Soft	The PowerRouter cannot function without connected batteries.	<ul style="list-style-type: none"> <li>• Make sure the batteries are properly connected and configured.</li> </ul>
P125-S	Soft	Insufficient battery charge available to perform normal operation. The battery will be charged to the required levels and normal operation will resume.	<ul style="list-style-type: none"> <li>• The error will disappear when the battery is sufficiently charged.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
G001-S G037-S	Soft	The internal temperature of the grid module (G) is too high.  The output power of the module is reduced.	<ul style="list-style-type: none"> <li>• Check the PowerRouter airflow (section 7.6.2)</li> <li>• Once the module cools down the error will disappear and normal operation will resume</li> <li>• Contact your dealer if this error occurs frequently</li> </ul>
G002-S	Soft	An overvoltage occurred on the power backbone. The grid module (G) will be temporarily turned off	<ul style="list-style-type: none"> <li>• Once the voltage drops below the safe level the error will disappear and normal operation will resume.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
G003-S	Soft	An undervoltage occurred on the power backbone. The grid module (G) will be temporarily turned off (e.g. the load on the local out is higher than the power available in the PowerRouter).	<ul style="list-style-type: none"> <li>• Make sure the loads on the local out are turned off.</li> <li>• After one minute the error will disappear and normal operation will resume.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
G007-S	Soft	The voltage level on the local out is too high in a situation where no voltage is expected.	<ul style="list-style-type: none"> <li>• If this error occurs during installation make sure the grid is connected to the "AC GRID" connection.</li> <li>• When this error occurs during normal operation an error has occurred in connection with the anti-islanding safety requirements.</li> <li>• Restart the system (section 7.6.1).</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
G011-S	Soft	An undervoltage occurred on the local out. The local out will be temporarily turned off.	<ul style="list-style-type: none"> <li>• Make sure the loads on the local out are turned off</li> <li>• After one minute the error will disappear and normal operation will resume</li> <li>• Contact your dealer if this error occurs frequently</li> </ul>
G012-S	Soft	An overvoltage occurred on the local out. The local out will be temporarily turned off (e.g. a very high load connected to the local out was suddenly disconnected).	<ul style="list-style-type: none"> <li>• Make sure the loads on the local out are turned off.</li> <li>• After one minute the error will disappear and normal operation will resume.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
G013-H	Hard	A short circuit was detected on the PowerRouter local out.	<ul style="list-style-type: none"> <li>• Make sure the loads on the local out are turned off.</li> <li>• Check the wiring connected to the local out for a short.</li> <li>• Restart the system (section 7.6.1).</li> </ul>
G015-S	Soft	There was an internal communication error within the PowerRouter.	<ul style="list-style-type: none"> <li>• After one minute the error will disappear and normal operation will resume.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
G023-H	Hard	The local out output was overloaded.	<ul style="list-style-type: none"> <li>• Turn off the loads connected to the PowerRouter.</li> <li>• Restart the system (section 7.6.1).</li> </ul>
G025-H	Hard	See P027-H.	

G028-H	Hard	An error occurred on one of the internal voltage supplies of the grid module (G).	<ul style="list-style-type: none"> <li>Restart the system (section 7.6.1).</li> <li>The system should recover from the error after the restart.</li> <li>Contact your dealer if this error occurs frequently.</li> </ul>
G029-S	Soft	The grid module (G) start-up procedure failed.	<ul style="list-style-type: none"> <li>After one minute the error will disappear and normal operation will resume.</li> <li>Contact your dealer if this error occurs frequently.</li> </ul>
G031-H	Hard	There was an overpower on the output of the PowerRouter.	<ul style="list-style-type: none"> <li>Turn off the loads connected to the PowerRouter.</li> <li>Restart the system (section 7.6.1).</li> </ul>
G034-H	Hard	See P092-H.	
G036-H	Hard	See P098-H.	
G039-S	Soft	The output power of the grid module (G) has been reduced because the grid frequency was too high.	<ul style="list-style-type: none"> <li>The error will disappear and normal operation will resume when the grid frequency is within approved limits.</li> </ul>
G040-S	Soft	The output power of the grid module (G) has been reduced because the grid voltage was too high.	<ul style="list-style-type: none"> <li>The error will disappear and normal operation will resume when the grid voltage is within approved limits.</li> </ul>
G041-S	Soft	The output power of the grid module (G) has been reduced because the 10 minute average of the grid voltage was too high.	<ul style="list-style-type: none"> <li>The error will disappear and normal operation will resume when the 10 minute average of the grid voltage is within approved limits.</li> </ul>
G043-H	Hard	Error occurred in anti-islanding settings.	<ul style="list-style-type: none"> <li>Restart the system (section 7.6.1).</li> <li>Run the installation wizard or tool again and select country.</li> </ul>
B004-S	Soft	The battery temperature sensor indicates the temperature of the batteries is too high.	<ul style="list-style-type: none"> <li>Check the ambient temperature of the room where the batteries are located. The ambient temperature of the room in which the PowerRouter is located must not exceed 40 degrees Celsius.</li> <li>The error will be cleared when the temperature decreases.</li> </ul>
B007-S B008-S B009-S B014-S B015-S B016-S B017-S B018-S B019-S B030-S	Soft	<p>The internal temperature of the battery module (B) is too high.</p> <p>The output power of the module has been reduced.</p>	<ul style="list-style-type: none"> <li>Check the PowerRouter airflow (section 7.6.2).</li> <li>When the module cools down the error will disappear and normal operation will resume.</li> <li>Contact your dealer if this error occurs frequently.</li> </ul>
B010-H B012-H	Hard	The voltage level of an internal battery module (B) circuit was out of bounds.	<ul style="list-style-type: none"> <li>Check the following: <ul style="list-style-type: none"> <li>the battery capacity settings with the Installation Tool.</li> <li>the quality of the batteries.</li> </ul> </li> <li>Make sure the loads on the local out are turned off.</li> <li>Restart the system (section 7.6.1).</li> </ul>
B011-H B013-H B021-H	Hard	An overcurrent was detected in one of the internal circuits of the battery module (B).	<ul style="list-style-type: none"> <li>Make sure the loads on the local out are turned off.</li> <li>Restart the system (section 7.6.1).</li> </ul>

B020-S	Soft	An overvoltage occurred on the power backbone. The grid module (G) will be temporarily turned off.	<ul style="list-style-type: none"> <li>• When the voltage drops below the safe level the error will disappear and normal operation will resume.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
B024-H	Hard	The battery module (B) detected a short on the module input.	<ul style="list-style-type: none"> <li>• Check the wiring of the battery to the PowerRouter.</li> <li>• Restart the system (section 7.6.1).</li> </ul>
B026-H	Hard	See P092-H.	
B028-H	Hard	See P098-H.	
B038-S	Soft	There was an internal communication error within the PowerRouter.	<ul style="list-style-type: none"> <li>• After one minute the error will disappear and normal operation will resume.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
B055-H	Hard	The battery module (B) detected an overvoltage on the module input.	<ul style="list-style-type: none"> <li>• Check the wiring of the battery to the PowerRouter.</li> <li>• Restart the system (section 7.6.1).</li> </ul>
B056-S	Soft	Battery voltage is too high.	<ul style="list-style-type: none"> <li>• When the voltage drops below the limit the error will disappear.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
B058-H	Hard	The battery current shunt is not present, or not detected (negative battery cable).	<ul style="list-style-type: none"> <li>• Connect the current shunt in the negative battery cable.</li> <li>• Without the current shunt the PowerRouter cannot measure the current coming from, or going into the battery.</li> </ul>
B062-H	Hard	The internal firmware of the battery module is faulty	<ul style="list-style-type: none"> <li>• Update the PowerRouter Firmware.</li> <li>• Contact your dealer if this error occurs frequently.</li> </ul>
B063-S B064-S B065-S	Soft	An internal error occurred in the battery module.	<ul style="list-style-type: none"> <li>• Contact your dealer if this error occurs frequently.</li> </ul>

Revision date: 26th August 2014

## 7.6 Procedures

### 7.6.1 Restart the PowerRouter

The PowerRouter can be restarted in any of the following ways:

- Turn the system off and on with the on/off switch on the display.
- Use the restart function in the service menu.

### 7.6.2 Check the PowerRouter airflow

If an over-temperature condition occurs check the following:

- Make sure the ambient temperature in the room where the PowerRouter is located does not exceed 40 degrees Celsius.
- Make sure the airflow through the PowerRouter is not obstructed. Check the air output at the top and the air input at the bottom.
- Open the connection area of the PowerRouter and make sure the internal fans are turning (this step must be performed by a trained service engineer).

### 7.6.3 Check the internet connection

Open the display menu and navigate to Main Menu > Service Menu > Status. The display will show information about the internet status like: Internet connection status (ok, error, counting), Last date and time when the PowerRouter was connected to the internet, the IP number and status of the firmware distribution.

### 7.6.4 Look up the firmware versions and id number

Open the display menu and navigate to Main Menu > Service Menu > Revision. Here you will find:

- The firmware versions of the various internal modules.
- The PowerRouter's unique identification number here.

### 7.6.5 Reset the PowerRouter

If the PowerRouter is not working as expected, it may help to perform a restart.



#### CAUTION

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*Notify the end-user before you do a restart. A restart of the PowerRouter can result in a temporary power failure. This means that no power will be available for the end-user. The restart takes less than 1 minute.*

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1. Notify the end-users that there may be a brief power interruption.
2. Open the display menu.
3. Navigate to the restart procedure.
4. Activate the restart procedure.

# 8 De-installation

**DANGER**

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To safely de-install the PowerRouter, you must follow the instructions in this chapter.

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## 8.1 De-installation

To de-install the PowerRouter:

1. Switch the PowerRouter unit OFF.
2. For 48V Li-ion batteries, switch off the battery pack unit.  
For 48V lead-acid batteries, set the external battery disconnect switch to OFF.
3. Switch the AC switches OFF (grid and local out).
4. Wait at least 5 minutes, to ensure the unit is completely de-energised.
5. Disconnect the communication wires.
6. Disconnect any optional connections.
7. Disconnect the AC wires.
8. Disconnect the battery wires.
9. The PowerRouter can now be removed for disposal or repair.

**CAUTION**

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- De-installation must be carried out by qualified personnel. Contact your installer/dealer.
  - 48V Li-ion batteries are indicated as dangerous goods and may require special transportation. Check the documentation of the supplier and local regulations.
- 

## 8.2 Disposal

When the PowerRouter reached the end of its service life, or is defect beyond repair:

- Dispose of the PowerRouter according to local regulations.
- Submit the PowerRouter to a collection point for electrical and electronic waste recycling.

**CAUTION**

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*The PowerRouter must be disposed of according to local regulations.*

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# 9 Technical specifications

## 9.1 Technical specifications - PowerRouter Unifit (Li-ion models)

Output (AC)	5.0 kW - PR50Bi/S48	3.7 kW - PR37Bi/S48
Continuous output power	5000 W (DE: 4600 W)	3700 W (DE/UK/PT: 3680 W)
AC output current	25 A (DE: 22A)	18 A
Cos Phi	1 (DE, IT: 0.9 ind. ... 0.9 cap. adjustable)	
Output voltage	230 Vac $\pm$ 2% , 50 Hz $\pm$ 0.2 % , 1-phase (180-264 Vac, 45-55 Hz , true sine wave <3% THD, single phase)	
AC performance (local out)	5000 VA (DE: 4600 VA)	3700 VA
Peak power (local out)	1.5 x Pnom., 10 sec. ; 1.2 x Pnom., 30 sec.(depending battery size)	
Protection	electronic, fused	
Standby losses	< 3 W	
User interface	display with 4-button operation	
Connectivity	Ethernet (RJ45), TCP/IP	
User-selectable relays	2 provided. NO/NC, 250Vac, 1 A, 24 Vdc, 5 A	

### 48 Vdc Lithium-ion batteries

Battery voltage range (Vout)	42 - 56 Vdc
Charge current	0 - 75 A
Short circuit protection	electronic, at max. charge current, switch off <1 sec
Compatibility	list of suitable batteries can be requested <a href="http://www.PowerRouter.com">www.PowerRouter.com</a>

### General

Operating temperature range	-10 °C to +50 °C (Power reduction to maintain secure working conditions)
Storage temperature	-40 °C to +70 °C
Air humidity	maximum 95%, non-condensing
Legal permits and standards	CE, VDE-AR-N 4105:2011-08, EEG 2012 VDE 0126.1.1, G83/2; G59/3 (UK), RD1699/2011(ESP)
Warranty	5 years (optional: extension to 10 years)

### Mechanics

Dimensions (W x H x D)	545 x 502 x 149 mm
Protection category	indoor use (IP20)
Weight	16.5 kg
Topology	galvanically isolated transformer
Cooling	controlled air cooling



## 9.2 Technical specifications - PowerRouter Unifit (lead acid models)

Output (AC)	5.0 kW - PR50B/S48	3.7 kW - PR37B/S48	3.0 kW - PR30B/S48
Continuous output power	5000 W (DE: 4600 W)	3700 W (DE/UK/PT: 3680 W)	3000 W
AC output current	25 A (DE: 22A)	18 A	15 A
Cos Phi	1 (DE, IT: 0.9 ind. ... 0.9 cap. adjustable)		
Output voltage	230 Vac $\pm$ 2% , 50 Hz $\pm$ 0.2 % , 1-phase (180-264 Vac, 45-55 Hz , true sine wave <3% THD, single phase)		
AC performance (local out)	5000 VA (DE: 4600 VA)	3700 VA	3000 VA
Peak power (local out)	1.5 x Pnom., 10 sec. ; 1.2 x Pnom., 30 sec.(depending battery size)		
Protection	electronic, fused		
Standby losses	< 3 W		
User interface	display with 4-button operation		
Connectivity	ethernet (RJ45), TCP/IP		
User-selectable relays	2 provided. NO/NC, 250Vac, 1 A, 24 Vdc, 5 A		

48 Vdc lead acid batteries (Wet/Gel), AGM	5.0 kW	3.7 kW	3.0 kW
Battery voltage range (Vout)	42 - 56 Vdc		
Max. charge current	75 Adc, programmable	75 Adc, programmable	55 Adc, programmable
Charging curve	3-stage adaptive with maintenance		
Short circuit protection	electronic, at max. charge current, switch off <1 sec		
Temperature compensation	included		
Voltage measurement	integrated		
Current shunt	integrated		

General	
Operating temperature range	-10 °C to +50 °C (Power reduction to maintain secure working conditions)
Storage temperature	-40 °C to +70 °C
Air humidity	maximum 95%, non-condensing
Legal permits and standards	CE, VDE-AR-N 4105:2011-08, EEG 2012 VDE 0126.1.1, G83/2; G59/3 (UK)
Warranty	5 years (optional: extension to 10 years)

Mechanics	
Dimensions (W x H x D)	545 x 502 x 149 mm
Protection category	indoor use (IP20)
Weight	16.5 kg
Topology	galvanically isolated transformer
Cooling	controlled air cooling



All specifications apply at 25°C unless stated otherwise.

# PowerRouter



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