



POWER-ADAPT

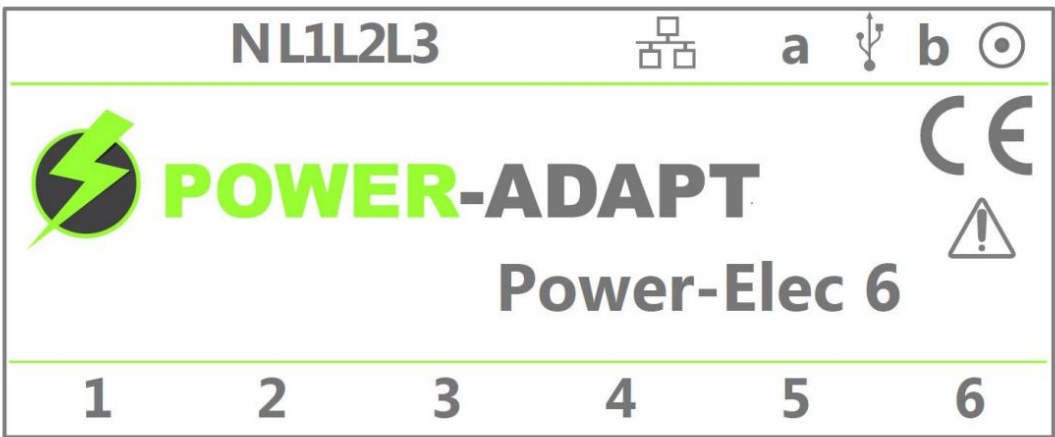
by  **ECO-ADAPT**

**Energy submetering
solution**



Power-Elec 6

Communicating multi-output electrical
energy measuring unit



User Manual

Eco-Adapt

www.eco-adapt.com - 01 70 61 67 05

Adresse postale : 39 rue de Châteaudun, 75009 Paris - France

Summary

1. Danger and warning	3
2. General presentation.....	4
3. Installation.....	5
Installation of the Power-Elec-6 control unit in the electrical cabinet	3.1
3.2 Connection of voltage inputs	
3.3 Connections for current measurement	
A. Use of split current transformer	
B. Use of Rogowski loop	
3.4 Specificities depending on the type of departure	
A. Single-phase P + N installation	
B. Three-phase 3P + N installation	
3.5 Interfaces de communication	
A. Wi-Fi direct	
B. LoRaWAN	
C. Ethernet Modbus TCP	
4. Configuration.....	10
4.1 Wi-Fi connection to the configuration interface	
4.2 Configuration of electrical outlets	
4.3 LoRaWAN configuration	
4.4 Ethernet configuration	
4.5 Modbus TCP configuration	
4.6 BACnet configuration	
4.7 Instant viewing	
4.8 Software update	
5. Technical characteristics.....	21
6. Meaning of the status diodes	23
7. Annexes.....	25

1. Danger and Warning

- For the safety of personnel and equipment, it is imperative to read this entire notice before installation and commissioning of equipment.
- The installation, commissioning and operation of the equipment described in this manual can only be carried out by personnel with the required authorizations. This document is not intended to serve as a guide for people without training.
- Be sure to respect the operating ranges of the device described in the “Technical characteristics” section in order to avoid any risk of destruction of the equipment and serious injury.
- Be sure to respect the rated values of current transformers and Rogowski loops. If currents are measured outside the specified range, the sensors and the meter may be damaged.
- In order to protect the Power-Elec-6 meter against overvoltages, it is imperative to place a surge protector upstream of it if it is installed in an overvoltage category III circuit. Refer to the *Choice of surge protector* appendix to obtain the characteristics of the device to be installed.
- In the event of use not specified in these instructions, the protection provided by the product may be compromised.
- Failure to comply with this notice cannot engage the manufacturer's liability. Local standards, directives, provisions and regulations must be observed.

Safety symbols

The following symbols may appear in the documentation or on the device. They warn you of potential dangers or draw your attention to information that may clarify or simplify a procedure.



Safety Alert – This symbol alerts the user to potential hazards when handling the product and directs the user to consult the documentation.

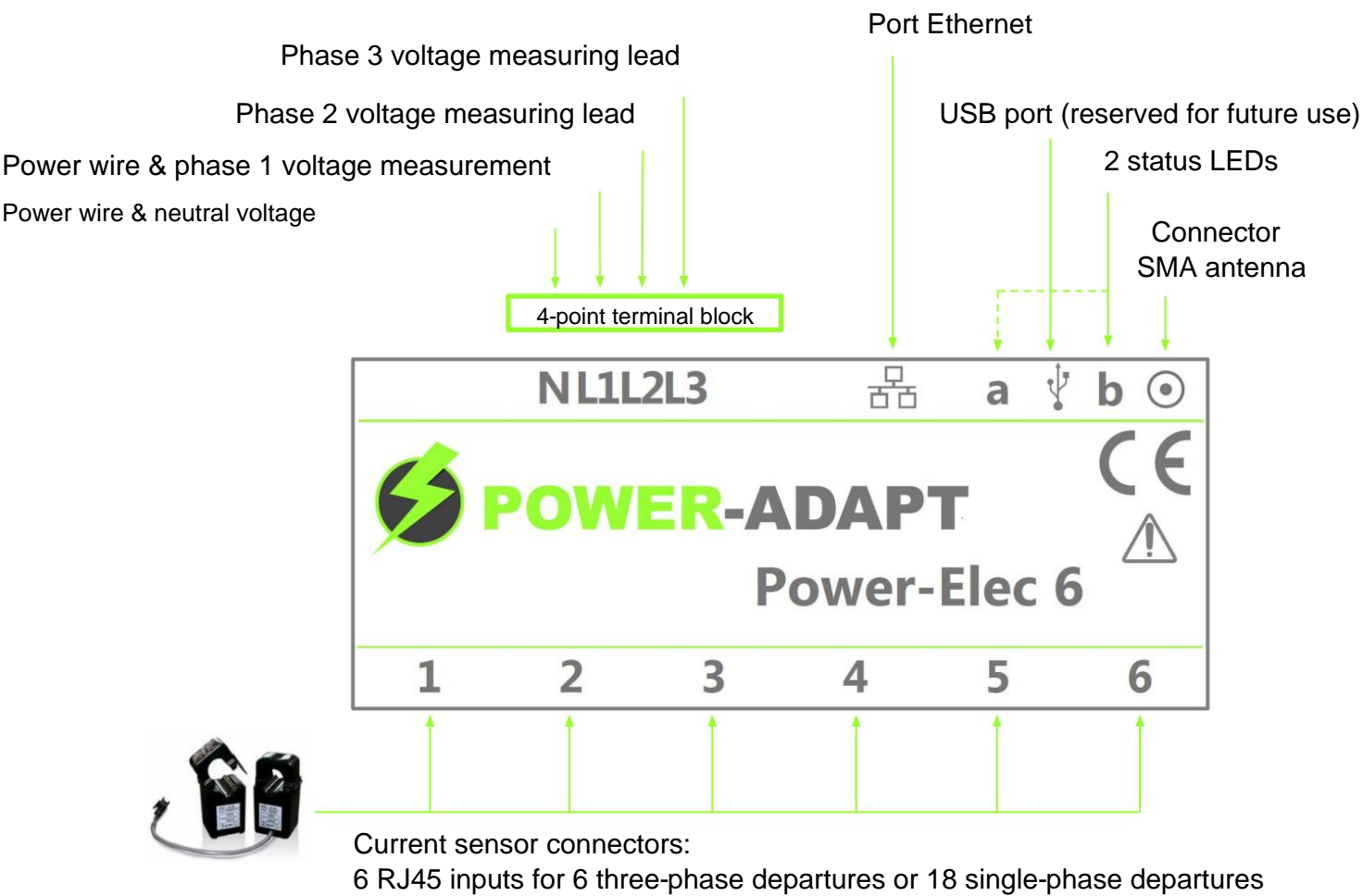


Risk of Electric Shock – The presence of this symbol indicates that a risk of electric shock exists, which could result in death, serious injury or destruction of equipment if the instructions are not followed.



In accordance with legislation, this product must not be disposed of with household waste so as not to cause harm to the environment or human health. Please contact Eco-Adapt for further information on how to dispose of this product.

2. General presentation



The **Power-Elec 6** control panel is a communicating electrical sub-metering solution that can measure up to **6 three-phase feeders** or **18 single-phase feeders** in the same electrical cabinet (or a combination of the two), making it an ideal tool for under -counting. It provides electrical energy meter functions (active, reactive energy, power factor) and integrates communication interfaces to a supervision solution.

It generates its own Wi-Fi network to allow its configuration from a microcomputer or smartphone quickly and easily.

Depending on the configuration, the counting data is transmitted in Modbus TCP via the Ethernet interface or wirelessly according to the LoraWAN specification.



The main advantages of the solution are optimization of space in the cabinets, saving time during installation and reducing costs.

3. Installation

3.1 Installation of the Power-Elec-6 control unit in the electrical cabinet

- The Power-Elec 6 meter must be installed in a mechanical, electrical and fire resistant (box, cabinet).
- Identify a free space in the electrical cabinet (6 DIN modules) on a DIN rail in the TGBT. If there is no available space, plan to install a separate box with a DIN rail support.
- Ensure that the current transformers, once placed around the current cables of the electrical feeders to be measured, can be connected to the Power-Elec-6 central unit with the cables provided, 2.5m long.
- Identify a free circuit breaker to connect the voltage acquisition and power supply wires from the Power-Elec-6 control unit. A single-phase circuit breaker is sufficient if all of the electrical feeders to be measured are single-phase on the same phase. Otherwise, a 3P+N circuit breaker will be necessary.
- Mount the Power-Elec-6 control unit on the DIN rail.

3.2 Connection of voltage inputs



- Before any operation on the 4-point connector, ensure that the start used is recorded.
 - Voltage connections to the Power-Elec-6 control unit are made via the 4-point connector provided. The wiring connecting the electrical network to the 4-point connector must support a voltage of 400V and be less than 1.50m. The current flowing on these cables is minimal, if not zero.
 - In order to protect the Power-Elec-6 meter against overvoltages, it is imperative to place a surge protector upstream of it if it is installed in an overvoltage category III circuit. Refer to the *Choice of surge protector* appendix to obtain the characteristics of the device to be installed.
- Place a single-phase or three-phase circuit breaker depending on the configuration upstream of the meter, this acting as a device for disconnecting the product power supply. This device must be located in an easily accessible location.
 - Connect terminals L1 and N to the 4-point connector to power the meter and measure the voltage in “single-phase” configuration.
 - Also add terminals L2 and L3 in three-phase. Be careful to identify the phases, and to connect them in direct direction L1 ÿ L2 ÿ L3 in “three-phase” configuration.
 - Connect the 4-point connector to the Power-Elec-6 control unit.

3. Installation

Once the installation of the voltage acquisitions has been carried out, ensure that:



- The insulation between the different circuits is maintained. To do this, ensure that cables under dangerous voltage are kept out of reach of the Ethernet, USB and SMA connectors even if one of them were to become detached from the connector.
- Terminals L1, L2 and L3 as well as external circuits connected to its terminals do not are not accessible, nor linked to accessible parts.

3.3 Connections for intensity measurement

Two options are offered in the Power-Adapt range to carry out current measurement according to the maximum intensity to be measured and according to the section of the current conductors in place:

A. Current transformers or B. Rogowski loops.

These devices are wired in groups of three and connectable to the Power-Elec-6 control unit via an RJ45 connector. An RJ45 group therefore makes it possible to measure a three-phase feeder or three single-phase feeders.

The Power-Elec-6 control unit has 6 RJ45 inputs, which allows the measurement of a maximum of 18 currents in single-phase or 6 in three-phase.

Current measuring devices should be placed around current conductors as shown below. The RJ45 end can be connected to one of the 6 inputs available on the Power-Elec-6 control panel.



- Use only the current transformers and Rogowski toroids listed in the appendix. The RJ45 current acquisition inputs are not intended to be connected to transformers that do not have internal protection.
- It is strictly forbidden to connect a telecommunications network to the RJ45 current acquisition inputs. This could cause accessible parts of the product to become dangerously energized in the event of an overvoltage on the telecommunications network.

A. Use of split current transformer

Split current transformers (clamps) can be clipped around current conductors. There is no need to log the installation. The clips close with a double clip (you should hear 2 clicks). The order of the phases must be respected, the clamps of an RJ45 group being numbered from 1 to 3.



The clamp can then be correctly positioned on its cable using plastic collars, to be tightened on either side of the clamp, using the small lugs provided for this purpose (see illustration *opposite*).

Note: the mounting direction of the clamps is indicated on the side of the clamp, the direction of the arrow must be oriented from the source towards the equipment. Details of the RJ45 cabling specification are given in the appendix.

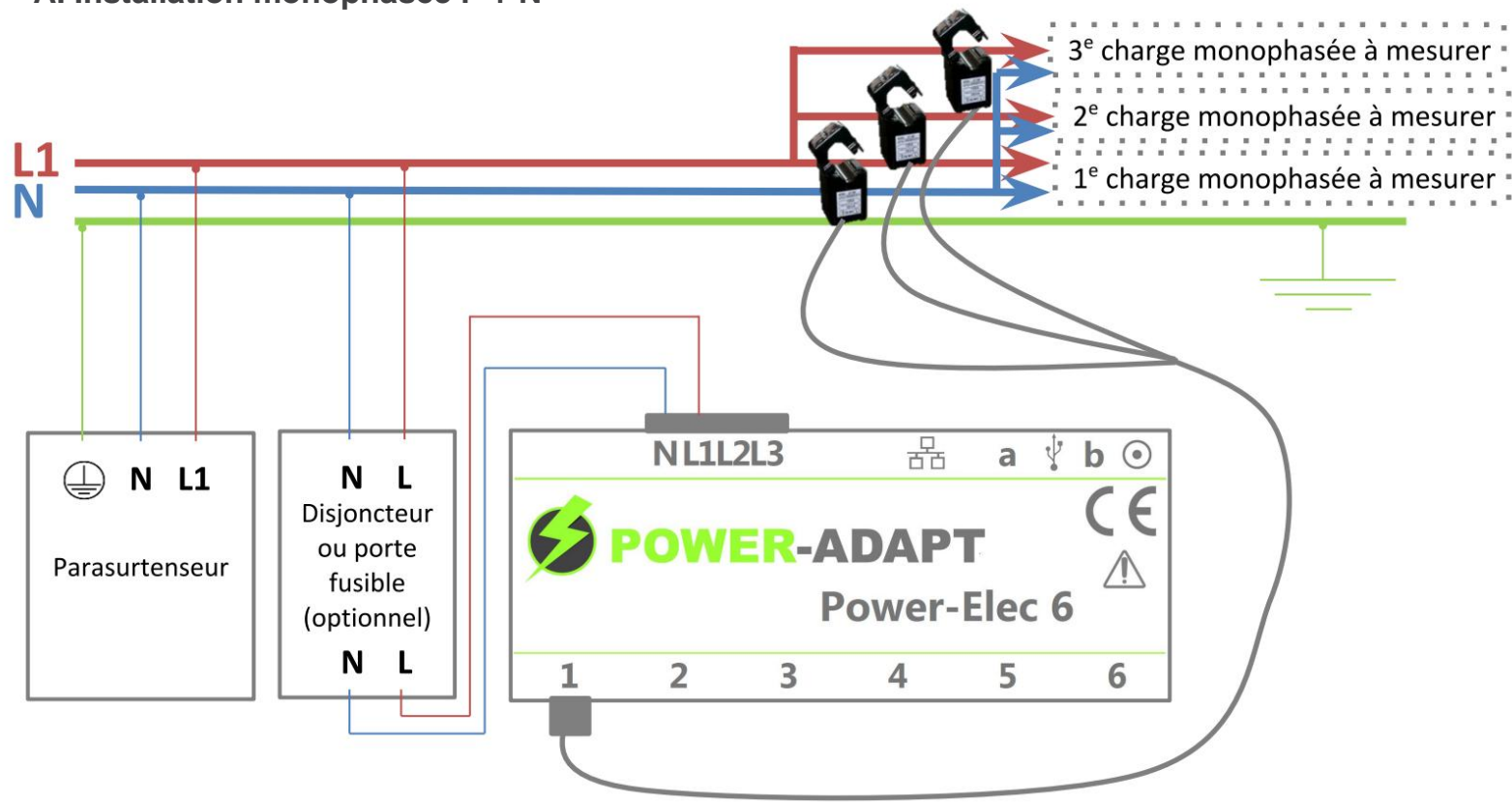
B. Use of Rogowski loop



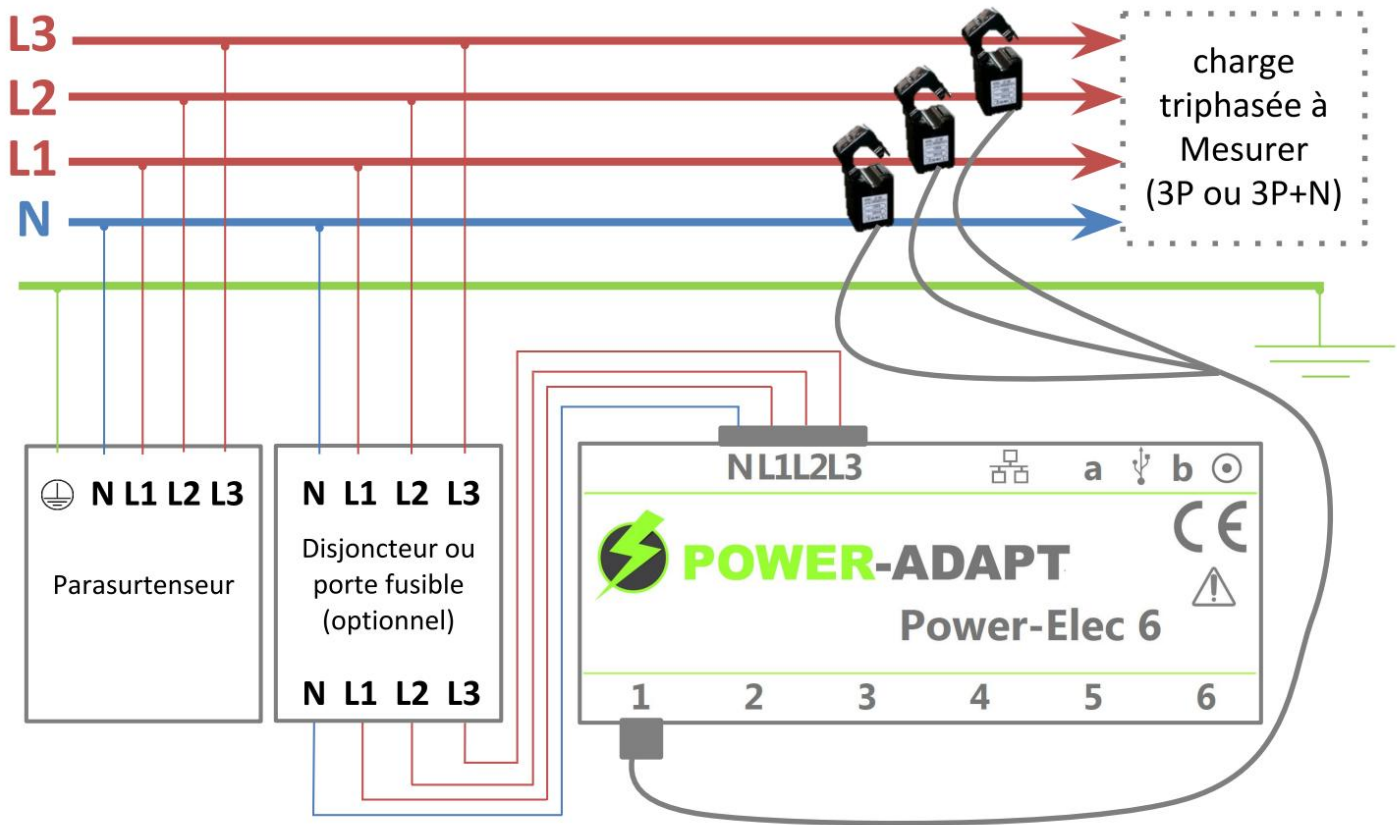
Rogowski loops can be clipped around current conductors. There is no need to log the installation. Try to center the cable as much as possible in the toroid.

3.4 Specificities depending on the type of departure

A. Installation monophasée P + N



B. Three-phase installation 3P + N



3.5 Interfaces de communication

A. Wi-Fi direct

The Power-Elec-6 control unit broadcasts its own Wi-Fi network in “hotspot” mode, to allow software configuration via a microcomputer, tablet or smartphone.

No special installation procedure is required for activating Wi-Fi. The Wi-Fi network is automatically launched by the control unit when it starts up. It is operational less than a minute after being powered on.

B. LoRaWAN

LoRaWAN radio data transmission requires connecting an 868MHz antenna to the dedicated SMA connector. It is recommended to use a remote antenna when the control unit is installed in a closed metal cabinet, as radio transmission may in this case be disrupted by the *Faraday cage effect*.

The LoRaWAN software activation procedure is shown in the next chapter.

C. Ethernet Modbus TCP

If the counting data must be transmitted via Modbus TCP, it is necessary to connect the Power-Elec-6 control unit to the target Ethernet network using a standard RJ45 network cable via the Ethernet connector.

Software configuration is required to enable the panel's Ethernet connectivity. This is done via the configuration interface accessible via Wi-Fi.

4. Settings

The configuration requires having a computer equipped with a Chrome 65.0 browser (Windows 7 or +) or a tablet or smartphone.

When powered on, the status LED “a” flashes **GREEN** after a delay of 5 seconds and the Power-Elec 6 control unit initializes in less than a minute. As soon as LED “a” lights up steadily in **GREEN**, the system is operational. You can then connect to the configuration interface.

4.1 Wi-Fi connection to the configuration interface

You can connect to the Power-Elec 6 central Wi-Fi network by searching for the name of the associated network. The name of the Wi-Fi network is in the form: PE6-***** where the last 8 characters correspond to the last 8 characters of the serial number indicated on the Power-Elec 6 control unit box. For example, for the Power_Elec 6 central unit identified by serial number (SN): 37381234 56ABCDEF:

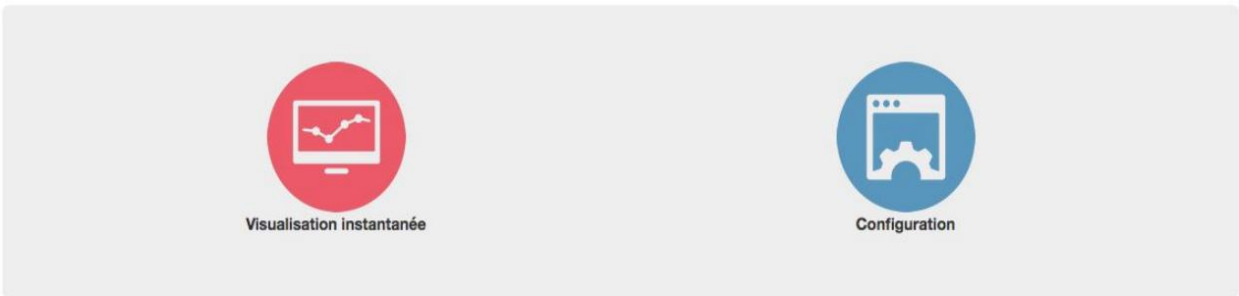
- The name of the associated Wi-Fi network is: PE6-56abcdef
- The Wi-Fi password is: pe6admin

QRCode connection

By using a previously installed QRcode scanning application on your tablet or smartphone, it is also possible to connect directly by scanning the QRCode on the front of the Power-Elec 6 box.

Once connected to the Wi-Fi network, enter the following URL into the address bar of your internet browser: <http://powerelec.net>. On the home page, you can access the following menus:

- **“Configuration”** menu to manage the entire configuration of the Power-Elec 6 central unit
- **“Instant view”** menu to view the instantaneous measured data



4. Settings

Web authentication

Access to the “**Configuration**” menu requires authentication to configure the connectors. By clicking on the “**Configuration**” icon , an authentication pop-up appears and invites you to enter the username and password.

- Username: admin
- Mot de passe: adminpe6

The “**Configuration**” menu gives you access to all the parameters of the electrical sub-metering unit including the configuration:

- BACnet
- Modbus
- Ethernet
- Radio
- System
- Electrical Measurement

In each of its submenus, you can return to home by clicking on the home button or the POWER-ADAPT logo



4. Settings

4.2 Configuration of electrical feeders

Click on the “**Electrical Measurement**” tab to access the configuration of the 6 connectors:

ÿ Choose the connector mode

- Single phase
- Three-phase (or with Neutral)
- Balanced three-phase (or with Neutral)

ÿ Activate the send via the On/Off button and enter the name of the associated send **using alphanumeric characters WITHOUT SPECIAL CHARACTERS (exception for the space character).**

ÿ Select the phase for the associated channel:

- In single-phase mode: The phase number is written on the current transformer
- In balanced three-phase / N mode: The phase is that measured by the current transformer

ÿ Select the corresponding type of current transformer:

- TC 10mm 5A
- TC 10mm 30A
- TC 16mm 70A
- TC 24mm 200A
- TC 36mm 400A

ÿ For Rogowski flexible tori choose:

- Tore souple Rogowski

ÿ Specify the current multiplier coefficient. To be used when the feed is distributed by several cables and the measurement is made on a single cable. The multiplier coefficient corresponds to the number of cables (For a single cable measured, the value is 1).

ÿ Click on '*inverted*' if the current transformer has been mounted upside down

ÿ If necessary, initialize the value of the active and reactive energy index offset before starting electrical measurements (Optional option. By default, the energy indexes are initialized to 0)

ÿ Validate the connector configuration via the “**Save configuration**” button

4. Settings



Menu de Configuration

Mesure Electrique

Système

Radio

Ethernet

Modbus

BACnet

Mode du Connecteur 1

Monophasé

Connecteur 1 Voie 1

Activer ce départ

On

Nom

Ordinateur 1

Phase pour cette voie

1

Le numéro de la voie est inscrit sur le capteur de courant.

Capteur de courant (TC)

Adapter T1 5A

Coefficient multiplicateur de courant

1

A utiliser lorsque le départ est distribué par plusieurs câbles et que la mesure se fait sur un seul câble. Le coefficient multiplicateur correspond au nombre de câble.

4. Settings

4.3 Configuration LoRaWAN

On the web configuration interface, access the Radio service in the **“Radio”** tab. You can activate the service by clicking the On/Off button.



- Set the Radio Protocol (LoRa by default)
- Set the Radio Frequency (868 Mhz by default in Europe: EU 868)
- Set the Radio Transmission Period (PT) to the desired granularity (10 minutes per default)
- Select the type of data to transmit in the Radio Transmission Profile:
 - Sending ACTIVE energy indexes only (PT: 10 minutes)
 - Alternating sending of ACTIVE AND REACTIVE energy indices (PT: 20 minutes) • Validate *

the activation of the Radio service via the **“Save configuration”** button

- Wait a few seconds while pairing with the LoRa network
- The **ORANGE “b”** LED will light up then flash for a few seconds during the LoRa network connection
- In case of connection to the LoRa network, the success message appears **“Connected to the LoRa network”** on the web interface. The **ORANGE “b”** LED remains lit.
- In case of connection failure when activating the radio service on the web interface, the error message **“Not connected to the LoRa network”** appears. The radio service is deactivated and the **“b”** LED **ORANGE** goes out.

You can try to activate the radio service again if necessary. Please check the SMA connector and antenna type if the problem persists.

* In the transmission profile 'active and reactive energy index', the active and reactive energy indexes are sent alternately every 20 minutes.

4. Settings



Menu de Configuration

Mesure Electrique▼ Système▼ Radio Ethernet Modbus BACnet

Paramètres Radio

Activation Radio

On

Protocole Radio

LoRa

Fréquence Radio

868 MHz (EU)

Période de transmission Radio

10 minutes

Profil de transmission Radio

Index d'énergie active et réactive import

Enregistrer la configuration

Connecté au réseau LoRa dernièrement

4. Settings

4.4 Configuration Ethernet

The Power-Elec 6 control panel configuration interface allows you to modify the Ethernet IPv4 connection parameters. To do this, connect to the Wi-Fi network of the Power-Elec 6 control unit and access the “**Ethernet**” tab in the “**Configuration**” Menu.

The Ethernet interface ONLY supports static or manual IP configuration. The DHCP protocol is not supported on the Ethernet interface. By default, this IP address is **192.168.1.66** for all Power-Elec units in the local subnet **192.168.1.0/24**.

If, however, you wish to assign another fixed IP address and/or in another local subnet, enter the corresponding parameters:

- Address IP
- Subnet mask
- Router IP address (or gateway)
- DNS server address (optional)

Validate the configuration and wait a few seconds while the settings are saved.

Connect the panel to your local subnet using an RJ45 Ethernet cable on the Ethernet interface. You can access its configuration interface through the IP address by entering the following URL in the address bar of your web browser: <http://192.168.1.66> or with the new configured IP address: http://****

 POWER-ELEC 6 MAC Address: 00:1E:AC:FD:41:5C

Menu de Configuration

Mesure Electrique ▾ Systeme ▾ Radio **Ethernet** Modbus BACnet

Paramètres Ethernet

La configuration Ethernet du Power-Elec 6 est réalisée en assignant une adresse IP locale statique. DHCP n'est pas pris en charge sur cette interface Ethernet.

Activation Ethernet

On

Adresse IP

192

168

1

66

Masque de sous-réseau

255

255

255

0

Adresse IP Routeur

192

168

1

1

DNS (optionnel)

4. Settings

DIRECT ETHERNET PC CONNECTION

By default, the Ethernet IP address is **192.168.1.66** for all Power-Elec panels in the local subnet **192.168.1.0/24**.

If you wish to connect directly via Ethernet from your computer to the control unit without going through a router or gateway, you will first need to modify the IPv4 properties of your computer's network card in MANUAL mode to position yourself in the same subnetwork as the Power-Elec 6 central unit.

For example, configure your computer's Ethernet network card using the following IP address and save your changes:

IP Address: 192.168.1.10

Subnet Mask: 255.255.255.0

Default gateway: 192.168.1.1

You can access the configuration interface, via the Ethernet interface using an RJ45 Ethernet network cable connected to your computer, by entering the following URL in the address bar of your web browser: <http://192.168.1.66>

Sous Windows 10:

1. Select **Start**, then **Settings > Network & Internet**
2. Select **Manage known networks**, choose the **Ethernet** network whose settings you want to modify, then select **Properties**.
3. Under IP Assignment, select **Edit**.
4. Under **Change IP settings**, choose **Manual**, then enable the IPv4 option .
5. To specify an IP address, in the **IP Address**, **Subnet Prefix Length**, and **Gateway boxes**, Enter the IP address settings.
6. When finished, select **Save**.

Under Windows 8.1 or 7:

Do one of the following:

- In Windows 8.1, click the **Start button**, start typing **Show network connections**, and then select **Show network connections** from the list.
- In Windows 7, open the **Network Connections** window by clicking the **Start button** and clicking selecting **Control Panel**. In the search box, type **adapter**, and then under **Network and Sharing Center**, select **Show network connections**.

Right-click the **Local Area Connection (Ethernet) connection**, and then choose **Properties**.

1. Select the **Network Management tab**. Under **This connection uses the following**, select **Internet Protocol version 4 (TCP/IPv4)** and then choose **Properties**.
2. To specify an IP address, select **Use the following IP address**, and then in the **IP Address**, **Mask** boxes **Subnet** and **Default Gateway**, enter the IP address settings.
3. When finished, select **OK**.

You can return to your computer's initial Ethernet configuration by changing the Network card's IPv4 settings to AUTOMATIC or DHCP mode.

4. Settings

4.5 Configuration Modbus TCP

The Power-Elec 6 control unit supports the Modbus TCP protocol. It allows measurement data to be transmitted via its Ethernet interface. It can thus present its measurement data from all the configured departures.

On the web configuration interface, access the Modbus service in the “**Modbus**” tab. You can activate the service by clicking the On/Off button 

☑ Validate the activation of the Modbus service via the “**Save configuration**” button

The web configuration interface also presents a Modbus mapping table with the addresses of the data registers.

4.6 Configuration BACnet

The Power-Elec 6 control unit supports the BACnet protocol. It allows measurement data to be transmitted via its Ethernet interface. It can thus present its measurement data from all the configured departures.

On the web configuration interface, access the BACnet service in the “**BACnet**” tab. You can activate the service by clicking the On/Off button 

☑ Specify the BACnet instance number of your control unit

☑ You can modify the name of your Power-Elec 6 central unit (Optional. Default: PE6). *Please use alphanumeric characters WITHOUT SPECIAL CHARACTERS (exception for space character).*

☑ You can specify the geographical location of your plant (Optional). *Please use alphanumeric characters WITHOUT SPECIAL CHARACTERS (exception for space character).*

☑ Validate the activation of the BACnet service via the “**Save configuration**” button

The web configuration interface also presents an architecture table of BACnet objects available on the Power-Elec 6 control unit.

4. Settings

4.7 Instant viewing

On the home page, click on “**Instant View**” to view the instantaneous measured data including:

- Import active/reactive power
- Import active/reactive energy index
- Intensity
- Tension
- Power factor
- Frequency

Note: *This functionality requires configuration of electrical feeders and connection with operating equipment. No data will be visible without these prerequisites.*

Tips for checking values:

- Voltages: It must be around ~220-240V for *single-phase* or *three-phase modes with neutral* and ~400V for three-phase mode (*without neutral*). A check is possible with a reference multimeter if necessary.
- Currents: The currents of each phase must be positive if the device consumes power energy. A check is possible with a reference clamp meter.



SW version : 1.17 HW version: 4

30363036

Déconnexion



Visualisation instantanée		
Connecteur1 - Voie 1 - 'p1'	Connecteur1 - Voie 2 - 'p2'	Connecteur1 - Voie 3 - 'p3'
Puissance active185.24 W	Puissance active185.26 W	Puissance active184.54 W
Index énergie active import167.5936 kWh	Index énergie active import166.9677 kWh	Index énergie active import165.6272 kWh
Index énergie active export0.0018 kWh	Index énergie active export0.0020 kWh	Index énergie active export0.0158 kWh
Puissance réactive229.84 VAr	Puissance réactive229.04 VAr	Puissance réactive228.99 VAr
Index énergie réactive import162.0812 kVAr	Index énergie réactive import161.5292 kVAr	Index énergie réactive import162.3187 kVAr
Index énergie réactive export0.0221 kVAr	Index énergie réactive export0.0220 kVAr	Index énergie réactive export0.1767 kVAr
Phase 1 intensité1.26 A	Phase 1 intensité1.25 A	Phase 1 intensité1.25 A
Phase 1 tension235.04 V	Phase 1 tension235.04 V	Phase 1 tension235.04 V
Phase 1 facteur de puissance0.63	Phase 1 facteur de puissance0.63	Phase 1 facteur de puissance0.63
Phase 1 imoymax6.25 A	Phase 1 imoymax6.23 A	Phase 1 imoymax6.22 A
détails des phases	détails des phases	détails des phases

4. Settings

4.8 Software update

















Download the new version of the Power-Elec 6 central software from your computer, tablet or smartphone via our platform or contact Eco-Adapt customer service. The software update operation may take several minutes depending on the connection mode:

- In Wi-Fi, you must connect to the central web interface via its Wi-Fi hotspot network
 - In Ethernet, you must first check the IPv4 parameters of the Ethernet interface of your computer and the Power-Elec 6 control unit
- To perform the update, you must go to the Power-Elec 6 home page by typing the following URL in the address bar of your web browser:
 - Wi-Fi hotspot: <http://powerelec.net>
 - And Ethernet: <http://192.168.1.66> or via the configured IP address
 - Click on the **“Configuration”** tab then authenticate to access the configuration
 - Click on the **“System”** tab then **“Software Update”**
 - *At this time, if you want to cancel the update, exit the web page or navigate to the page welcome*
 - Otherwise click on the **“Software update”** button and wait a few seconds, the Power-Elec 6 control unit is restarting...
 - During restart, the two-color **ORANGE** diode (LED) **“a”** flashes for a few seconds then lights up steadily in **ORANGE**. The plant is operational.
 - At this moment, if you were connected:
 - Using Wi-Fi, reconnect to the Power-Elec 6 central Wi-Fi network and refresh the web page
 - In Ethernet, you will be automatically redirected to the software installation web page
 - *At this time, if you want to cancel the update, click on the **“Cancel”** button. The Power-Elec 6 control unit will restart with the current software version. The **GREEN** **“a”** LED will flash for a few seconds then light up steadily*
 - Otherwise click on the **“Choose File”** button and select the downloaded file, containing the software, from your computer and click on the **“Import software”** button. The installation operation may take a few minutes...
 - Once the operation has been successfully completed, click on the **“Restart”** button, the Power-Elec 6 control unit will restart with the new software version
- During the restart, the **GREEN** LED **“a”** will flash for a few seconds then light up steadily. The control unit is operational and you can then connect to its web interface.

5. Meaning of the status diodes

Meaning of the status diodes in normal operation

The status diodes (LEDs) allow you to define the status of the Power-Elec control unit. Below, a summary table of the LED states in normal operation.






a	b	DESCRIPTION	SIGNIFICATION
		The ORANGE “b” LED is on for 2 seconds	After powering on, the software bootloader runs. The LEDs “a” and “b” flash for an instant and the Power-Elec control unit starts.
		The GREEN “a” LED <i>flashes regularly</i> for 40 seconds	The Power-Elec plant is being started up
		The GREEN “a” LED is lit	The plant is operational. It is in operation
		The “a” GREEN and “b” ORANGE LED is lit	Radio service is active
		The GREEN “a” LED is on. The ORANGE “b” LED <i>flashes with a heartbeat</i> for 5 seconds	The radio service sends a pairing request to the network
		The GREEN “a” LED is on. The ORANGE “b” LED <i>flashes regularly</i> for 5 seconds	After pairing to the network, the radio service sends measurement data
		The two-color GREEN and RED LED “a” <i>flashes regularly</i> for 40 seconds	The software installation software is being started in order to update the software
		The two-color GREEN and RED LED “a” is lit (LED “a” turns to ORANGE color when both LEDs are lit)	The system is operational to perform the software update

Note: LED “a” is a two-color LED (GREEN and RED). When the GREEN and RED LEDs are lit, LED “a” turns ORANGE.

5. Meaning of the status diodes

Meaning of the status LEDs in the event of an alert

The status diodes (LEDs) allow you to define the status of the Power-Elec control unit. Below, a summary table of the LED states during a malfunction.

a	b	DESCRIPTION	SIGNIFICATION
		The ORANGE LED “b” is lit. The GREEN “a” LED is on. The RED “a” LED <i>flashes in time with a heartbeat</i> .	The radio service is active. A disconnection from the LoRa network has been detected. The service attempts to reestablish the connection
		The RED “a” LED <i>flashes during a heartbeat</i>	<div>The system has detected a high VOLTAGE on one of the phases (overvoltage). Please check the connection and power supply to the Power-Elec control unit immediately. There is a risk of damage to your product</div> <div></div>

Note: LED “a” is a two-color LED (GREEN and RED). When the GREEN and RED LEDs are lit, LED “a” turns ORANGE.

6. Technical characteristics

Environmental conditions:

- Indoor use
- Altitude: up to 2,000m •

Operating temperature: 0-50°C • Relative humidity:

80% maximum up to 31°C. Beyond this, linear decrease up to 50% humidity relative to 40°C.

- Network voltage fluctuation: $\pm 10\%$ of nominal voltage
- Overvoltage category: CATII • Pollution

degree: 2

Technical conditions of use: ⚡ Supply voltage:

100-240V~

⚡ Operating frequency: 50/60Hz ⚡ Maximum power consumed: 5W

Rated terminal characteristics: • 4-point terminal

block: product power supply and voltage acquisition

- Maximum voltage relative to earth: 265Vrms/375Vpeak
- Tension maximale (N-L) : 265Vrms/375Vpeak
- Tension maximale (L-L) : 400Vrms /565Vpeak
- Frequency: 50/60Hz
- Measurement category: CAT II
- Allowable transient overvoltage: 2.5kV
- Connection :

Tightening torque: 0.5Nm

Length of cable to strip: 6-7.5mm

Cable section: 1.5-2.5mm² (16-12AWG)

- RJ45 connectors 1 to 6: current acquisition by external transformers or Rogowski toroids
 - Tension max : $\pm 600\text{mV}$
 - Frequency: 50/60Hz
 - Allowable transient overvoltage: $\pm 2\text{V}$
- Ethernet connector: Modbus TCP and BACnet
 - Allowable transient overvoltage: 1.5kV
- USB : usages futures
 - Tension nominale : 5V
 - Courant max : 500mA
- SMA: LoRa/Sigfox
 - Impedance: 50 ohm

6. Technical characteristics

~~External circuit insulation characteristics:~~ • Current transformer:

-Isolation : CAT III

• Tores Rogowski:

-Tension max : 600V

-Allowable transient overvoltage: 10kV

~~Metering:~~ •

Measurement of active and reactive powers and power factor • Measurement of active and reactive energy indices • Up to 18 single-phase feeders, and 6 three-phase feeders • Voltage measurement range (three-phase or single-phase): 100 -240V~ • Current measurement range: 0-7000A (depending on current sensor) • Active energy accuracy: IEC 62053-21 Class 1 • Reactive energy accuracy: IEC 62053-23 Class 2

Communication :

1. Wi-Fi direct
2. Ethernet and Modbus TCP
3. Radio on the 868 MHz ISM band according to the LoRaWAN specification

7. Annexes

Choosing the Surge Protector

In order to guarantee the integrity of the Power-Elec-6 meter, the surge protector mounted upstream must be sized for an installation in overvoltage category III and reduce transient overvoltages to the level of category II (i.e. 2,500V). More specifically it must have the following characteristics:

- ÿ Have common and differential mode protection
- ÿ Integrate protection for each of the phases connected to the meter (L1 or L1, L2, L3), as well as neutral (N) and earth (PE)
- ÿ Maximum residual overvoltage U_p : 2.5kV AC
- ÿ Rated discharge current I_n : 5kA
- ÿ Flow capacity I_{max} : greater than the maximum short-circuit current defined instead d'installation
- ÿ In the case of a surge protector operating by ignition (gas spark gap), the rated follow-on current interruption value must be greater than the maximum short-circuit current defined at the point of installation

7. Annexes

Current transformers and Rogowski toroids from the Power Adapt range

The Power-Elec 6 meter must be used exclusively with the following measuring equipment:

- Current transformers:
 - HQ Sensing JC10F-333/005
 - HQ Sensing JC10F-333/030
 - HQ Sensing JC16F-333/070
 - HQ Sensing JC24F-333/200
 - HQ Sensing JC36S-333/400

If you wish to modify the length of the cable supplied with a 3 TCs kit, the convention to follow is as follows:

<i>RJ45 (8p/8c) pin</i>	<i>thread color</i>	<i>TC</i>	<i>TC connector</i>
1	blanc	3	S1
2	noir	3	S2
3	rouge	2	S1
4	Green	2	S2
5	YELLOW	1	S1
6	blue	1	S2

- Tores Rogowski:

- Accuenergy RCT16-1000

