

Installation and configuration guide

Panoramic Power – advanced 3rd generation bridge

Version 2: January 2018



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Regulatory Compliance

Conforms to UL Std 61010-1, certified to CAN/CSA Std C22.2 No. 61010-1



The bridge complies with the following certification requirements:

Power supply	Certified AC/DC adapter marked Limited Power Source (LPS), or NEC Class 2, suitably rated for voltage, current and ambient temperature
Electrical rating	5VDC, maximum 1A
Environmental rating	Maximum ambient temperature 60°C Pollution degree 2 Indoor use Relative humidity up to 80%

Product end of use handling (WEEE) - Waste of Electrical and Electronic Equipment:



Centrica Business Solutions is committed to protect the global environment and helping our customers with recycle responsibilities. Disposal of electrical and electronic products must be done according with the local and national regulations. You can return your product to a local collection point. For information about your disposal or collection points, call your distributor or vendor.

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Panoramic Power and the Bridge

The Panoramic Power System monitors electrical energy consumption at the individual circuit level and detects excess usage, allowing organizations to identify and reduce energy and maintenance expenses.

The Panoramic Power System consists of wireless, self-powered sensors engineered to allow for rapid, non-invasive installation, with almost no disturbance to operations. Sensors are easily attached to circuit breakers by just snapping them on to the outgoing electrical cable. They monitor the flow of electricity through the magnetic field it creates and also use it as power source. The sensors do not require any maintenance.

Sensors report the power consumption to the bridge, which, in turn, transfers the information to PowerRadar, the solution's cloud-based analytics platform. A single bridge can collect data from up to 250 sensors and multiple bridges can be used in a single site to increase coverage.



Three models of bridge are available:

- Basic Bridge (PAN-2-H-US/EU)
- Advanced Cellular Bridge (PAN-2-H-3G-US/EU), featuring a SIM card slot.
- Advanced 3rd Generation Bridge (PAN-2H-3G-US/EU V3), featuring a SIM slot and Modbus interface.

The table below lists the key features of each bridge.

Key Features	Basic Bridge	Advanced Cellular Bridge	Advanced 3 rd Gen Bridge
Plug and Play Installation	✓	✓	✓
Flexible Mounting Options	✓	✓	✓
Wi-Fi / Ethernet connectivity	✓	✓	✓
Cellular (3G GSM) connectivity	Via external USB dongle	Via SIM card slot	Via SIM card slot
Store and forward capability in case of network loss	X	✓	✓
Modbus interface	X	X	✓
Field-upgradable firmware	X	✓	✓
Initial configuration	Via the Bridge Configuration Tool (Windows application)	Via built-in web interface	Via built-in web interface

The Advanced 3rd Gen Bridge provides store-and-forward capability. In case of a network loss that impacts connectivity with the PowerRadar® cloud platform, the bridge stores measurements until communication is resumed.

The bridge storage capacity is shown in the table below:

# Connected Sensors	# Days Stored
10	10
20	5
100	1
200	0.5

The Advanced 3rd Gen Bridge includes a Modbus connector used on a project basis.

This guide explains how to install and configure the Advanced 3rd Gen Bridge. For information on the Basic and Advanced Cellular Bridges, see the correlating Installation and Configuration Guides.

Unpacking the Hardware

We recommend that you follow these unpacking instructions.

How to proceed

1. Check the box. If any damage occurred during shipment, contact your sales representative.
2. Open the box. It must include the following items:
 - Bridge
 - Cellular antenna
 - RF antenna, labeled **Rx-1** (Europe) or **Rx-2** (USA)
 - 5V DC wall adapter
 - 4-Piece re-closeable fastener with adhesive
3. Keep the box in case you need to repack the bridge.

Attaching the Antennas

Before performing any connections, mount the antennas onto the bridge as follows:

1. (European model) Screw the RF antenna labeled **Rx-1** to the connector marked **Rx-1**, as shown below.
(US model) Screw the RF antenna labeled **Rx-2** to the connector marked **Rx-2**.



2. Screw the cellular antenna to its connector.
3. Position the antennas as shown below.



Mounting the Bridge

You can install the bridge on a flat horizontal surface or mount it on a wall using screws or the re-closeable fastener.

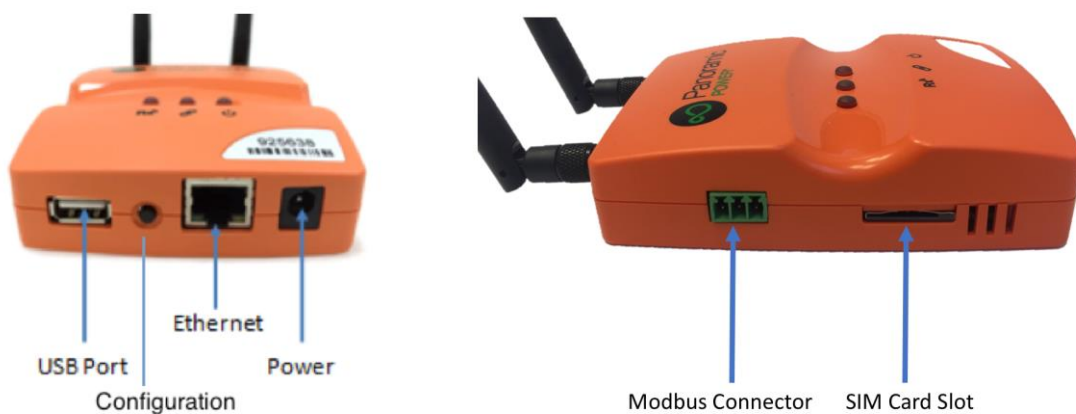
How to proceed

1. Configure the bridge as explained in this guide.
2. Position the bridge at a distance of:
 - Up to 2 meters from the electrical panel, if the panel is covered with a metallic cover.
 - Up to 5 meters, if the panel is not covered.
3. Choose a clean and even surface, located near a power source.
4. Make sure the bridge side vents are not blocked.
5. (Attaching with screws). Use the template on the back of the bridge to measure the distance between the two screws.
6. (Taping to the wall) Peel the adhesive backing off two pieces of the re-closeable fastener and attach them to the back of the bridge.

In the same way, attach the two remaining pieces of the re-closeable fastener to the wall, making sure they are aligned with the pieces on the bridge.

Connecting the Bridge

Depending on the required network configuration, you can connect the bridge to the Internet using Wi-Fi, cellular network, or wired LAN.



Prerequisites

- An Ethernet cable for configuring the bridge.
- An Ethernet cable if you connect to the Internet via wired LAN
- A SIM card if you connect to the Internet via a standard GSM network.

Configuring the Bridge

This section assumes you are familiar with networking procedures.

Accessing the Bridge Web Interface

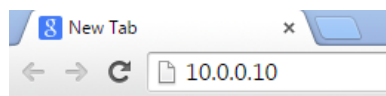
This section describes how to access the bridge web interface for configuring the relevant data communication mode.

Prerequisite

Use Internet Explorer 9.0 (and up), Google Chrome, or Firefox to access the bridge web interface.

How to proceed

1. On your PC, disable your Wi-Fi and disconnect the LAN cable.
2. Connect the bridge to the power source.
3. Once the bridge powers up, it performs a self-test where all LEDs light in sequence. For information on LED status, see [Understanding the Bridge LEDs](#).
4. Make sure **no USB** device is connected to the USB port of the bridge.
5. Press the **Configuration** button for approximately **5 seconds**, until the **Rx** LED lights solid red.
6. Connect the bridge to the PC using the LAN cable, **only after the Rx LED lights solid red** (indicates bridge is in configuration mode)
7. Activate your web browser. In the address bar, enter IP address *10.0.0.10*.



The **Status** page appears (It may take few minutes for the computer to connect to the bridge's DHCP server, you can release and renew your IP address on your computer to speed the process). It displays the current configuration.

Note

In some cases, the first-time loading can take several minutes. If the **Status** page does not appear, wait a few more seconds and refresh the page in the browser.

In case that the page does not load use Ctrl+F5 to refresh the page and force clear of browser's cache.

Panoramic POWER [®] Status	
Status	Bridge ID: 975346
Connection Setup	IP Address: 0.0.0.0
Administration	Subnet Mask: 0.0.0.0
Diagnostics	DNS Server: 0.0.0.0
	Default Gateway: 0.0.0.0
	Ethernet MAC Address: 70:B3:D5:07:D0:74
	Wi-Fi MAC Address: 44:39:C4:89:B2:B3
	Connection Type: Wi-Fi ●●●●●●
	Connection Info: Panoramic , WPA2
	Connection To Panoramic Server: 00:02:42 ●
	Connection To Local Network: 00:02:47 ●
	Firmware Version: 104
	Hardware Version: 8321

Entering Credentials

You need to enter your credentials only once for accessing any of the pages (except **Status**).

How to proceed

1. Select the required page in the side menu.
2. Enter the **Username** and **Password** in the **Authentication Required** screen.

By default, both are *panpwr*. We recommend changing them once you access the tool. See [Modifying the Default Credentials for the Bridge Web Interface](#).
3. Select **Login**.

Configuring the Bridge for Wi-Fi Connection

If the bridge communicates with the server over Wi-Fi, you need to configure which Wi-Fi network and settings to use.

Prerequisites

Ask your network administrator for the following information:

- SSID and Password to access the network
- Username, certificate text, and RSA private key for networks requiring certificates.
- For Wi-Fi and Ethernet connections, verify that the system administrator has opened port 8051 for inbound/outbound TCP/IP traffic.

How to proceed

1. In **Connection Type** select **Connect via Wi-Fi**.
2. To let the system find the **SSID** (network name) and **Security** (encryption method used), click **Find networks**.

Otherwise, enter these values manually.



Connection type: Connect via Wi-Fi

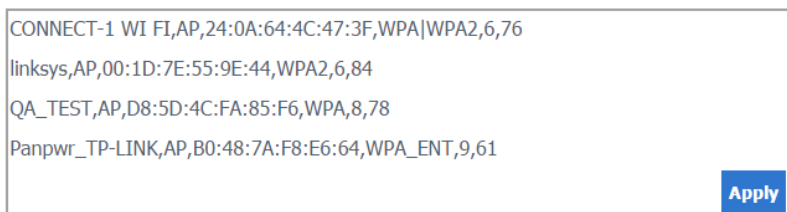
SSID*:

Security*:

Password*:

Find networks

The display shows a list of networks in your vicinity.



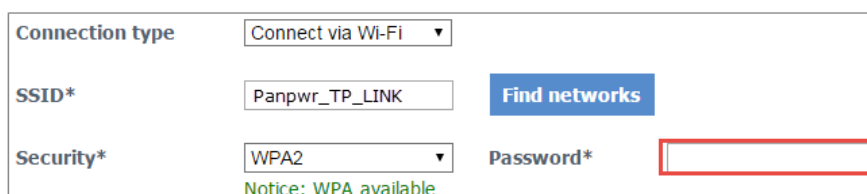
CONNECT-1 WI FI,AP,24:0A:64:4C:47:3F,WPA|WPA2,6,76
linksys,AP,00:1D:7E:55:9E:44,WPA2,6,84
QA_TEST,AP,D8:5D:4C:FA:85:F6,WPA,8,78
Panpwr_TP-LINK,AP,B0:48:7A:F8:E6:64,WPA_ENT,9,61

Apply

Note

In case that the expected Wi-Fi network was not found, or when no network was found, you can click the Find Networks button again, it will attempt to search for networks on a different AP channel.

3. Select the network you want to use and click **Apply**.



Connection type: Connect via Wi-Fi

SSID*: Panpwr_TP_LINK

Security*: WPA2

Notice: WPA available

Password*:

Find networks

If the network supports a mixed encryption mode, the **WPA available** notice appears on the screen.

4. For Open, WEP, and WPA security, enter the password in the field shown in Step 3.
5. For enterprise WPA and enterprise WPA2 security, enter your password in the field shown below. (This is for use with RADIUS server authentication.)

- For a network using certificates, select **Use SSL3/TLS1 Certificate**, and enter the **Username, Certificate, and RSA Private Key**.

Note

SSL3/TLS1 Certificate is mandatory for WPA2 Enterprise configuration. Make sure to check this setting when selecting WPA2 Enterprise as your security configuration.

- In **IP Settings**, select whether you want the bridge to get an IP address automatically (DHCP) or to assign an IP address yourself.

If you select to enter the IP address manually, a number of fields become active (**IP Address, Subnet Mask, etc.**). Fill them in according to your required network settings.

- To save the configuration to the bridge, click **Save Settings**.

IMPORTANT

If you leave this page before saving your settings, they are lost.

- To discard changes made to an unsaved configuration and return to the saved settings, select **Load Configuration from Bridge**.

10. To use settings displayed on the screen to configure another bridge, select **Save Configuration to File**.

This allows you to create different settings only on the screen and save them to a file, without updating the bridge configuration.

For more information, see [Loading the Bridge Configuration from a Configuration File](#).

11. To exit configuration mode, disconnect the bridge from the power source.
12. Install the bridge as explained in [Mounting the Bridge](#).
13. Reconnect the bridge to the power source.

Configuring the Bridge for Cellular Connection

Use a SIM card if you connect to the Internet via a standard GSM network.

Prerequisites

For some SIM cards, the system fills details automatically in the **Connection Setup** page. For others, you need to get the information from the SIM card supplier or the service provider.

How to proceed

1. In **Connection Type** select **Connect via Cellular**.
2. You should always select the **Internal GSM Modem**. The external GSM Modem configuration is deprecated as of this version of the hardware.

Internal GSM Modem External GSM Modem

APN:

MNC: MCC:

PPP authentication type: PAP CHAP None

PPP Username: PPP Password:

Modem init string*: Dialup number*:

3. Use the **View cellular networks** button to verify reception of the relevant cellular network (could take up to 30 seconds). Then enter the **APN** you received from the cellular network operator. If required, enter PPP details.
4. To save the configuration to the bridge, click **Save Settings**.

IMPORTANT

If you leave this page before saving your settings, they are lost.



The screenshot shows a configuration page with two input fields: 'Modem init string*' and 'Dialup number*'. To the right of these fields is a blue 'Save settings' button. Below the fields is a dropdown menu with the following options: 'Load configuration from Bridge', 'Load configuration from file', 'Save configuration to file', and 'Load configuration from Bridge'. To the right of the dropdown menu is a blue 'Apply' button.

5. To discard changes made to an unsaved configuration and return to the saved settings, select **Load Configuration from Bridge**.
6. To use settings displayed on the screen to configure another bridge, select **Save Configuration to File**.

This allows you to create different settings only on the screen and save them to a file, without updating the bridge configuration.

For more information, see [Loading the Bridge Configuration from a Configuration File](#).

7. To exit configuration mode, disconnect the bridge from the power source.
8. Install the bridge as explained in [Mounting the Bridge](#).
9. When using the Internal GSM Modem, insert the SIM card to the slot with the truncated end as shown below.



10. Reconnect the bridge to the power source.

Configuring the Bridge for Wired LAN

If you use a wired connection to access the Internet, there are two methods to allocate an IP address: automatically (DHCP) or manually (Static IP).

Prerequisites

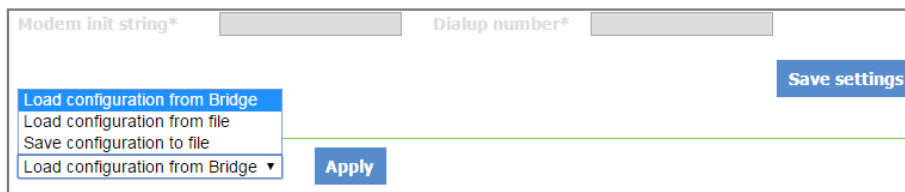
If you need a static IP address for the bridge, make sure to have the network setting information ready before starting the procedure.

How to proceed

1. In **Connection Type** select **Connect via LAN**.
2. In **IP Settings**, select whether you want the bridge to get an IP address automatically (DHCP) or to assign an IP address manually (Static IP).
3. If you select to enter the IP address manually, a number of fields become active (**IP Address, Subnet Mask**, etc.). Fill them in according to your required network settings.
4. To save the configuration to the bridge, click **Save Settings**.

IMPORTANT

If you leave this page before saving your settings, they are lost.



The screenshot shows a configuration interface with two input fields at the top: "Modem init string*" and "Dialup number*", both with greyed-out text. Below these is a blue "Save settings" button. A dropdown menu is open, showing four options: "Load configuration from Bridge" (highlighted in blue), "Load configuration from file", "Save configuration to file", and "Load configuration from Bridge" with a downward arrow. Below the dropdown is a blue "Apply" button.

5. To discard changes made to an unsaved configuration and return to the saved settings, select **Load Configuration from Bridge**.
6. To use settings displayed on the screen to configure another bridge, select **Save Configuration to File**.

This allows you to create different settings only on the screen and save them to a file, without updating the bridge configuration.

For more information, see [Loading the Bridge Configuration from a Configuration File](#).

7. To exit configuration mode, disconnect the bridge from the power source.
8. Install the bridge as explained in [Mounting the Bridge](#).
9. Reconnect the bridge to the power source.

Loading the Bridge Configuration from a Configuration File

You can use the configuration file for configuring other bridges that have similar configuration requirements. For example, if bridges in a chain of stores share the same Internet connection type and access points, you can prepare one configuration file and have it used for configuring other bridges in these locations.

You can also load the configuration file onto the same bridge if its configuration gets corrupted.

Note

If the bridge is configured to connect via secured Wi-Fi, the configuration file does not include passwords for security reasons. You must enter passwords manually for each bridge.

How to proceed

1. Access the bridge web interface.
2. Access the **Connection Setup** page.
3. Select **Load Configuration from File**.
4. Select the relevant file and click **Apply**.
5. (Optional) Enter password manually (for example, Wi-Fi password, SSL Password, RSA Private Key).

Modifying the Bridge Administration Settings

You can modify the bridge default settings or reset all settings, including connections, to factory defaults.

Modifying the Default URL and/or Port of the Panoramic Power Server

IMPORTANT

Do not change the pre-configured address of the Panoramic Power server (*col.panpwrws.com*) and/or port number (*8051*) without explicit instructions from Panoramic Power customer support, as the bridge uses these settings to transmit sensor data to the Panoramic Power cloud.

To access these fields, select **Administration** in the bridge web interface.

Administration

Main Panoramic server host Port

Second Panoramic server host Port

Enable remote firmware update

[Save settings](#)

Modifying the Default Credentials for the Bridge Web Interface

You can change the default user name and password required to access the bridge configuration and **Diagnostics** pages.

How to proceed

1. Access the bridge web interface.
2. Select **Administration**.

Bridge configuration

User Name

Password

Verify password

Save settings

3. Enter the new **Username** and **Password** (up to 15 characters for each field).
4. In **Verify Password** enter the new password again.
5. Select **Save settings**.

Resetting the Bridge Configuration to Factory Defaults

IMPORTANT

Restoring to factory defaults erases all your connection settings!

How to proceed

1. Access the bridge web interface.
2. Select **Administration**.
3. Click **Reset to factory default** at the bottom of the page.
4. At the prompt, click **OK**.

Viewing the Configuration Status

Access the **Status** page to view information such as:

- Bridge versions (if asked by the support team)
- Configured interface
- Connection details (allocated IP, etc.)
- Connection status (for example, if the bridge managed to connect to the local network at all)
- Quality of connections.

The screenshot shows the 'Status' page of the Panoramic POWER interface. On the left is a navigation menu with 'Status' selected. The main content area displays the following information:

Bridge ID:	975346
IP Address:	0.0.0.0
Subnet Mask:	0.0.0.0
DNS Server:	0.0.0.0
Default Gateway:	0.0.0.0
Ethernet MAC Address:	70:B3:D5:07:D0:74
Wi-Fi MAC Address:	44:39:C4:89:B2:B3
Connection Type:	Wi-Fi
Connection Info:	●●●●●●
Connection To Panoramic Server:	Panoramic , WPA2 ●
Connection To Local Network:	00:02:42 ●
Authenticated by Panoramic Server:	00:02:47 ●
Firmware Version:	24834
Hardware Version:	221

How to proceed

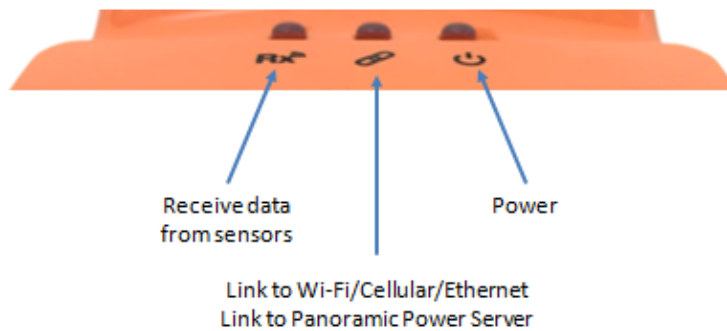
1. (Only if you just saved configuration settings) Disconnect the bridge from the power source and reconnect it.
2. Press the **Configuration** button for approximately 5 seconds, until the **Rx** LED lights solid red.
3. Access the bridge web interface by entering *10.0.0.10* in the browser.
4. Check the status of the configuration.


Green indicators appear in the **Status** page if the bridge connects with the local network and the cloud-based Panoramic Power server.


If the system does not re-establish connection with the Panoramic Power server, access the **Diagnostics** page for further testing.


Understanding the Bridge LEDs

Use the following information to familiarize with the bridge status during normal operation in Wi-Fi, cellular, or Ethernet.



Power  LED	Bridge status
Solid green	Connected to the power source
Blinking red-green	Firmware upgrade in progress
Solid red	Firmware upgrade has failed

Rx  LED	Bridge status
Blinking orange	Receiving sensor data
Solid red	Configuration mode

Link  LED	Physical Link (Ethernet/Wi-Fi/Cellular)	Panoramic Power Server Connected
Off	X	X
Blinking Orange	While connecting	X
Blinking green	✓	X
Solid green	✓	✓

NOTE

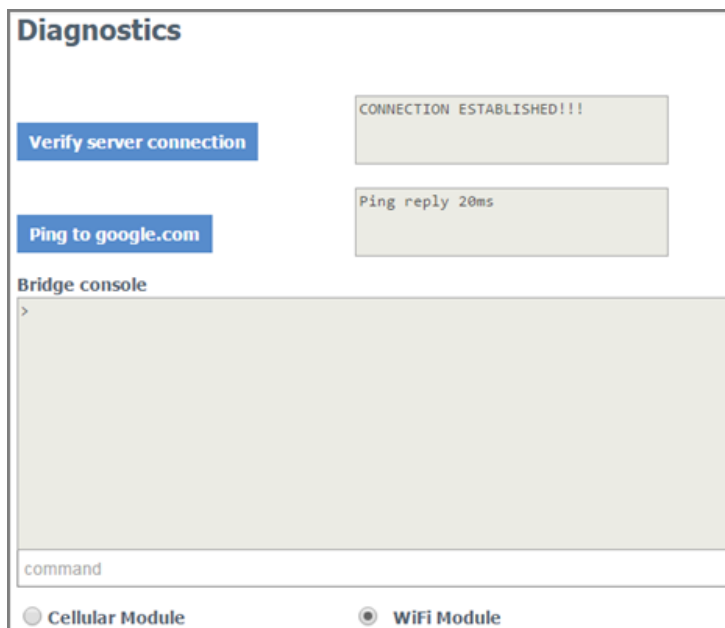
In some cases it may take up to several minutes for the bridge to obtain an IP address and at that stage the Link LED may be Off. It is recommended to wait few minutes before troubleshooting.

Verifying the Wi-Fi or Cellular Connectivity

You can test the connection to the Panoramic Power server or the Internet as described in this section.

How to proceed

1. Access the bridge web interface.
2. Select **Diagnostics**.



3. Click **Verify server connection** to make sure the bridge communicates with the Panoramic Power server.

If there is no connection, check the bridge configuration parameters and network settings. The connection to the Panoramic Power server uses port 8051.

Note

This method does not work if you configured the bridge to work in LAN, and your PC is connected to the bridge!

4. Click **Ping to google.com** to make sure the Internet connection is working.

If there is no connection, check the bridge configuration parameters and network settings.

Note

This method does not work if you configured the bridge to work in LAN, and your PC is connected to the bridge!

5. (For Panoramic Power personnel only) Use technician mode for advanced debugging of the bridge in case of 3G or Wi-Fi connection problems.

Depending on the connection type, select **Cellular Module** or **Wi-Fi Module** for communicating the commands.

Upgrading the Firmware Version

This section explains how to upgrade the bridge to the latest firmware version.

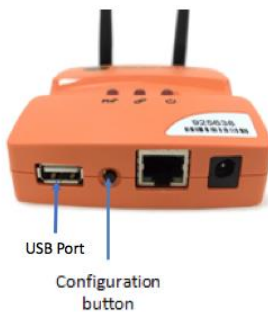
Prerequisites

Make sure you have the following items:

- USB flash drive with the upgraded firmware. Or, a FAT-32 formatted USB flash drive if you need to download the firmware from your email account.

How to proceed


1. (Optional) Download the firmware to the USB flash drive.
2. Connect the USB flash drive to the adapter cable.




3. (Only if the bridge is not yet operational) Boot and wait for the LED self-test sequence to end.

Note

If you proceed to Step 4 before the self-test sequence ends, the bridge enters configuration mode rather than upgrade mode.

4. In case that the bridge is connected to the LAN network, **Disconnect it from the LAN network**
5. Press the **Configuration** button for 10 seconds approximately.
6. The  LED lights orange and green. All other LEDs are off.
7. Wait several minutes for the upgrade process to complete (up to 5 minutes).

After a successful upgrade the bridge reboots. The  LED lights green and the bridge returns to normal operation. A LED self-test sequence occurs, and the bridge returns to normal operation.

8. Disconnect the USB flash drive.

Note

If the Firmware version on the USB drive is identical to the one installed, the bridge will not update and the power LED will turn red. Lower version will result in downgrading the bridge's Firmware and reset of the bridge configuration.

Troubleshooting

If you encounter a problem, try the solutions listed in this section.

Otherwise, contact Customer Support for help at support@panpwr.com.

Problem

The bridge is not receiving sensor data (Rx[®] LED is off).

Solutions

- Try moving the bridge closer to the electrical panel.
- Verify the position of the sensors in the electrical panel: make sure they are visible, or try moving them to the front of the panel.
- Make sure the RF antenna is tightly screwed to the antenna connector of the bridge.
- Make sure the bridge is not in configuration mode (Rx[®] LED lights red).

Problem

The bridge is not connecting to the Panoramic Power server (🔌 LED is not turning solid green).


Solutions

If you are using Ethernet:

- Look at the LAN port (RJ-45 connector) on the bridge. It contains two small built-in LEDs. One of them should light solid green and the other should be blinking orange. If this is not happening, tighten both ends of the LAN cable or replace it.
- If the 🔌 LED blinks green but does not turn solid, it means that local network connectivity is established but the bridge can not access the Panoramic Power server. This is often caused by local firewalls blocking TCP port 8051. Please verify this with your system administrator.

If you are using Wi-Fi:

- Verify the wireless network reception strength in the status page. The level should be at least two (out of five), preferably three (out of five).

- If no reception level is showing and “Connecting...” is shown instead, it means that the bridge cannot establish Wi-Fi network connectivity. In this case, please verify your Wi-Fi credentials (SSID, Security Type or password).
- If the  LED blinks green but does not turn solid, it means that local network connectivity is established but the bridge can not access the Panoramic Power server. This is often caused by local firewalls blocking TCP port 8051. You can verify this using the [Diagnostics](#) tool or with your system administrator.

If you are using Cellular:

- Verify the cellular network reception strength in the status page. The level should be at least three (out of five).
- If no reception level is showing and “Connecting...” is shown instead, it means that the bridge can not establish cellular network connectivity. In this case, please verify your cellular credentials (APN, PPP credentials where needed) and make sure the SIM card has a valid and enabled data plan.
- You can test the cloud connectivity using the [Diagnostics](#) tool.


Problem

The bridge does not connect to the cellular network when using the SIM card ( LED is off).

Solutions

- Make sure the SIM card is in place before connecting the bridge to the power source.
- After verifying the SIM card is tightly secured in its slot, disconnect the bridge from the power source and reconnect it.
- Verify with your service provider that a data plan is enabled for your SIM card. The bridge connects to the cellular data network only if the SIM card has a data plan.
- In low reception areas it may take a while for the bridge to connect. Enter configuration mode and check the reception bar in the **Status** page.

Problem


The bridge does not return to normal operation after firmware upgrade ( LED lights red).

Solution

- Upgrade was unsuccessful, and the bridge rolled back to the previous firmware version.

How to proceed

1. Disconnect the USB flash drive from the bridge.
2. Disconnect and reconnect the power cable to the bridge.

The bridge performs a self-test and the  LED lights green. The bridge is ready for normal operation with the rolled back version.

3. Enter configuration mode and check the running firmware version in the **Status** page).
4. Contact Customer Support for further help.