APEX

Edge Device

Manual

APEX's Edge Device is designed for the monitoring and control of inverters, energy meters and batteries using the onboard RS-232, RS-485, CAN bus or USB interfaces. Supported field devices can be remotely controlled and managed, while monitoring data is stored in Apex's Cloud platform, as well as locally logged to the optional onboard SD Card for a limited period.
For convenience, the device is configured on a local web interface from your mobile device.

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1. INTRODUCTION

APEX's Edge Device is designed for the monitoring and control of inverters, energy meters and batteries using the onboard RS-232, RS-485, CAN bus or USB interfaces. Supported field devices can be remotely controlled and managed, while monitoring data is stored in Apex's Cloud platform, as well as locally logged to the optional onboard SD Card for a limited period. For convenience, the device is configured on a local web interface from your mobile device.
The APEX Edge Device can be used as a field extension module for the MCS microgrid controllers. Functionality includes I/O expansion for additional slave devices as well as as an actuator for remote control and services.
Use cases include intelligent remote load management, field metering, inverter control and state sensing.

1.1 CONTENTS OF THE BOX

Inside the box you should find:

- 1 x Apex Edge Device
- 1 x Power cable
- RJ45 - RJ45 ethernet cable
- Connection diagram (or a QR code to the latest documentation)

1.2 DEVICE DOCUMENTATION

Apex Edge Device documentation includes this manual, its datasheet and the warranty terms.
All latest version documents can be downloaded from
www.ApexSolar.Tech.

1.3 ABOUT THIS MANUAL

This manual describes the correct use and features of the Apex Edge Device. It includes technical data as well as user instructions and specifications to provide information about its correct functioning.

This document is subject to regular updates.

The contents of this manual might change partially or completely, and it is the responsibility of the user to make sure that they are using the latest version which is available at
www.ApexSolar.Tech

Apex reserves the right to modify the manual without prior notice.

2. SAFETY WARNINGS, HAZARDS AND COMPLIANCE

Please read and follow all the below safety instructions and precautions before installation and use of the Apex Edge Device.

2.1 SYMBOLS

The following symbols are used in this manual to highlight and emphasize important information.
The general meanings of the symbols used in the manual, and those present on the device, are as follows:


General Caution


Prohibited


General Electrical Hazard


Direct Current


Information


Reinforced Insulation

2.2 PURPOSE

These safety instructions are intended to highlight risks and dangers of improper installation, commissioning and use of the Edge Device.

2.3 TRANSPORT DAMAGE CHECK

Immediately after receiving the package, make sure that the packaging and the device have no signs of damage.
If the packaging shows any sign of damage or impact, damage of the Edge Device should be suspected and it should not be installed. If this occurs, please contact Apex customer service.

2.4 STAFF

This system should be installed, handled and replaced solely by qualified personnel.

Qualification of the staff mentioned herein must meet all the safety-related standards, regulations, and legislation applicable to the installation and operation of this system in the country concerned.

2.5 SPECIAL HAZARDS

The Apex Edge Device is designed to form part of an electrical installation. Applicable safety measures must be observed and any additional safety requirements should be specified by the company who has installed or configured the system.

The responsibility to select qualified staff lies with the company that the staff work for. It is also the responsibility of the company to assess the ability of the worker to carry out any kind of work and ensure their safety. Staff must comply with workplace health and safety regulations. It is the responsibility of the company to provide their staff with the training
necessary for handling electrical devices and to make sure that they familiarize themselves with the contents of this user manual.

Dangerous voltages may be present in the system and any physical contact could cause serious injury or death.
Please ensure that all covers are securely fastened and that only qualified staff service the Apex Edge Device.
Ensure that the system is switched off and disconnected during handling.

DISPOSAL: Lithium-ion (Li-ion) batteries and devices containing these batteries should not go in household garbage or recycling bins. They can cause fires during transport or at landfills and recyclers. Instead, Li-ion batteries should be taken to separate recycling or household hazardous waste collection points.

REPLACEMENT: To replace and remove the Lithium-Ion button battery, it is essential to securely remove the device cover using the designated tool. Prior to removal, ensure that the battery is free from any damage, signs of overheating, or leaks. If it is safe to proceed, you may extract the battery from the printed circuit board (PCB) and proceed with its replacement using a new one.

2.6 GENERAL HAZARDS RESULTING FROM NON-COMPLIANCE WITH SAFETY STANDARDS

The technology employed in the manufacturing of the Apex Edge Device helps to ensure safe handling and operation.

Nonetheless, the system might pose hazards if it is used by unqualified staff, incorrectly installed or handled in a way that is not specified in this user manual.

Any person in charge of the installation, commissioning, maintenance, or replacement of an Apex Edge Device must first read and understand this user manual, especially the safety recommendations and shall be trained to do so.

2.7 LEGAL / COMPLIANCE

ALTERATIONS

It is strictly prohibited to carry out any alteration or modification to the Apex Edge Device or any of its accessories.

OPERATION

The person in charge of handling the electrical device is responsible for the safety of persons and property.

Insulate all the system's power conducting components which could cause injuries while carrying out any work. Confirm that dangerous areas are clearly marked and access is restricted.

Avoid accidental re-connection of the system using signs, isolating locks and closing or blocking the work site. Accidental reconnection may cause serious injuries or death.

Determine conclusively, using a voltmeter, that there is no voltage in the system before commencing work. Check all the terminals to make sure that there is no voltage in the system.

2.8 LOCAL REQUIREMENTS

In all cases, local regulations shall be followed and take preference over this manual or other documents related to the Apex Edge Device. No part of this manual shall supersede any local laws, bylaws or other regulations. These include but are not limited to: earthing, installation rules, local electrical isolation requirements and so on.

2.9 OTHER CONSIDERATIONS

This device is exclusively designed to communicate with hardware designed for managing energy sources such as the grid, a solar array or a generator and storage via appropriate, approved inverters.

The Apex Edge Device should only be used for this purpose. Apex is not liable for any damages caused by inappropriate installation, use or maintenance of the system.

To ensure safe use, the Apex Edge Device must only be used in compliance with the instructions in this manual.

Legal and safety regulations must also be adhered to, to ensure correct use.

3. DEVICE DESCRIPTION

3.1 TECHNICAL SPECIFICATIONS

Feature	Description
Communications	
Field Serial Interfaces	1 x RS232
	1 x RS485
	1 x CAN Bus
	Modbus TCP (via Ethernet interface)
Cloud Interfaces	Wifi
	Ethernet
	LTE (optional)
	LoRa (optional)
Other Interfaces	Bluetooth
	USB (Type A)
I/O	
Digital I/O	2 x Dry contact outputs, change over • Rated switching current: 5A • Rated switching voltage: 250 VAC / 30 VDC
	2 x Digital Input
ELECTRICAL	
Power Supply	12 - 60V DC
Max Input Current	1.25A
MECHANICAL	
Dimensions	122mm (l) x 124mm (w) x 28mm (h) (excl. connectors)
Mounting Method	Surface Mounted
Ingress Protection	IP20
OTHER	
Storage	SD Card - up to 64GB, FAT32 formatted
Firmware Updates	Local or remote updates
Supported Slave Devices	Please contact us for the latest list of drivers

3.2 INDICATORS

The front of the Apex Edge Device has a multifunction LED which is used to indicate various states and conditions.

LED Colour	Status
Red - Solid	Device Powered on, no connections
Green - Solid	Connected to server, no slaves
Blue - Solid	Connected to at least one slave device, no server
Green / Blue alt.	Server and at least one slave device connected

4. INSTALLATION

4.1 TOOLS REQUIRED

- Appropriate tool for your choice for fastener to secure your Apex Edge Device to the selected surface
- Flat terminal driver, no wider than 2mm
- Laptop and network cable for troubleshooting

4.2 PLANNING THE INSTALLATION

LOCATION

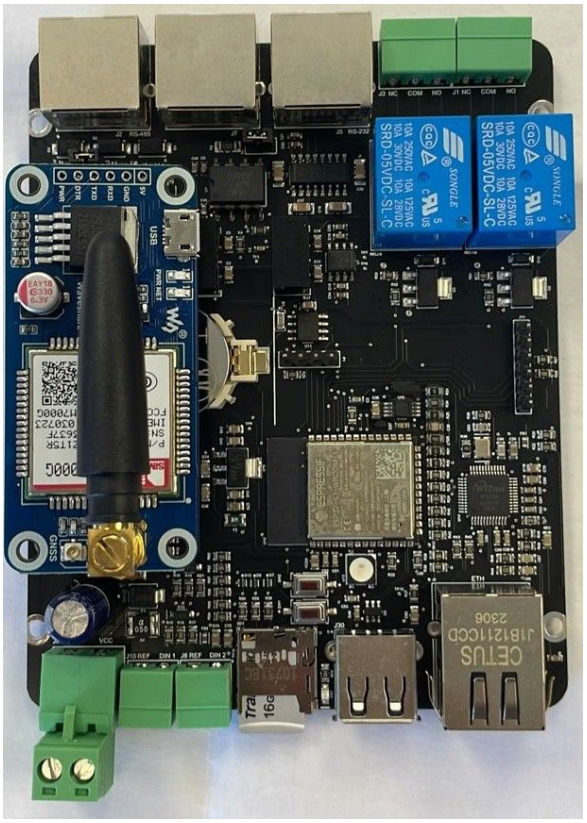
The Apex Edge Device may only be installed indoors and must be protected from moisture, excessive dust, corrosion and humidity. It should never be installed in any location where a potential water leak could occur.

MOUNTING THE EDGE DEVICE

The Edge Device enclosure provides four mounting tabs with 4mm wide slots for your choice of mounting screws or bolts. The Edge Device should be fixed onto a firm surface.

4.3 INSTALLING AN EXPANSION BOARD

If an LTE or LoRa optional expansion board is required, remove the top cover by removing the 4 screws on the underside of the housing. Locate the double row of pin headers on the PC board. Install your SIM card into the LTE module, if appliable. Now locate the expansion card as shown here and push in firmly into place, until it is seated correctly.



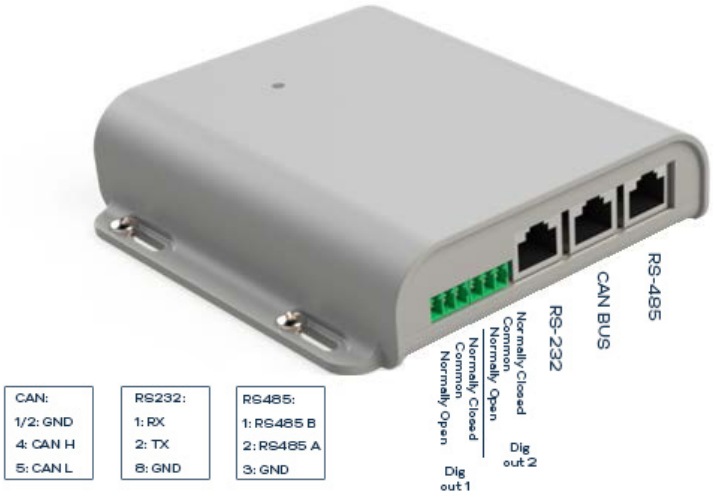
Remove the antenna from the module by unscrewing the nut.
Press or drill out the antenna knock-out from the top cover.
Reassemble the device.
Re-attach the antenna to the connector from the outside of the enclosure and tighten the securing nut securely into place.

4.4 WIRING OF THE EDGE DEVICE

Each end of the Edge Device has a row of connectors. These are used for connecting the power, digital I/O, cloud interface and field communications. The following diagrams show the location of the signals:

PORT CONNECTIONS

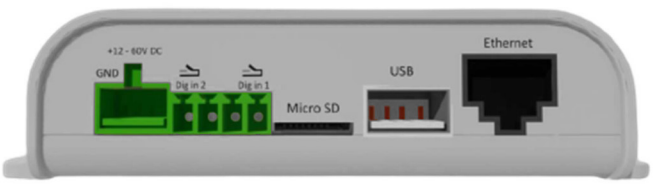
Ethernet	1 x RJ45, 10/100Mbps
USB	USB 2.0 Type 2
Micro SD	FAT32 up to 32GB
Dig in 1 & 2	Dry contact inputs (Voltage free)
Supply	12 – 60VDC
Dig out 1 & 2	Relay outputs – Dry contact (Voltage free) [NO, COM, NC]
RS-232	1 x RJ45
CAN BUS	1 x RJ45
RS-485	1 x RJ45

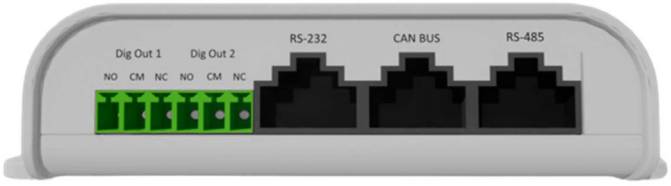


RJ45 Pin no.	CAN Connector	RS232 Connector	RS485 Connector
1	GND	RX	RS485 B
2	GND	TX	RS485 A
3	-	-	GND
4	CAN H	-	-
5	CAN L	-	-
6	-	-	-
7	-	-	-
8	-	GND	-

Relay Connections Recommended Wiring Size: 1.5 mm Flexi

Power Connections Recommended Wiring Size: 1mm Flexi





4.4.1 DEVICE POWER

The Edge Device is powered from a DC supply between 12 and 60V DC, typically directly from the system battery. Connect the supplied power cables to the power terminals on the right side of the device (see image above). Connect the other end either to system battery's terminals or the inverter's battery terminals.

4.4.2 CAN BUS

The device is fitted with 1 CAN interface and is designed to communicate with compatible sub components in the system via CAN bus. It is terminated by default at the factory and should therefore be used at the end of the bus. It can, however, be un-terminated by removing the terminating bridge which is accessed by removing the PCB from the housing. It is located immediately behind the CAN connector, on the top side of the PCB.

4.4.3 NETWORK

The device can connect to a standard 100 base-T Ethernet network for communication with MODBUS TCP equipped slave devices and for remote system monitoring, using a standard RJ45 connector. For remote monitoring, the network requires transparent internet connectivity and a DHCP server.

4.4.4 RS485

For field equipment requiring Modbus RS485 communications, the Edge Device is equipped with 1 x RS485 interface. This port is terminated using an onboard jumper, so the device should be installed at the end of the bus. However, it can be un-terminated by removing the terminating bridge which is accessed by removing the PCB from the housing. It is located immediately behind the RS485 connector, on the top side of the PCB.

4.4.5 I/O

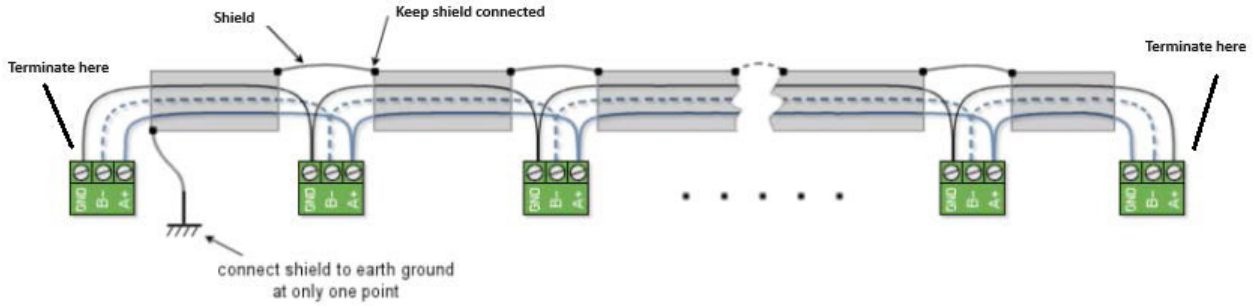
Terminals on the top of the device provide programmable Inputs. These interfaces are used where binary input signals are required. To activate the input, short the 2 terminals of either input with a volt-free contact.

Terminals on the bottom of the device provide programmable Outputs. These interfaces are used where binary output signals are required. The signal is provided by a change-over relay, which provides a volt-free contact. The 3 terminals are Normally Closed, Normally Open and Common.

Note: Switching capacity is 230V AC or 30V DC at a maximum of 5A.

4.4.6 NOTES ON COMMUNICATIONS WIRING

RS485 and CAN connections must be done with a high quality shielded twisted pair communications cable. Please follow this diagram to ensure that your RS485 and CAN busses are correctly laid out and terminated.



Always terminate both ends of the bus and never terminate elsewhere. Incorrect bus wiring will result in the device failing to communicate or communicating erratically.

Termination resistors are included on the Edge Device and are activated by jumper (see 4.4.2 and 4.4.4) but it may be necessary to add external termination resistors on 3rd party devices falling at the end of a bus. These devices should be terminated with 120Ω resistors, placed between the A and B terminals for RS485 or CAN H and CAN L terminals for CAN bus, details of which should be found in the 3rd party product's manual.

5. COMMISSIONING AND OPERATION

5.1 POWERING UP

Check your work. Ensure that all terminals are secure and that there are no frayed or otherwise unsafe terminations at the terminals and connectors.

Ensure that the communications busses are correctly wired and that the bus topology is correct.

Ensure the device is connected to the internet via ethernet, wifi or LTE cellular service.

Apply power.

5.2 STATUS LED

The Edge Device has a multi-colour status LED which indicates its state.

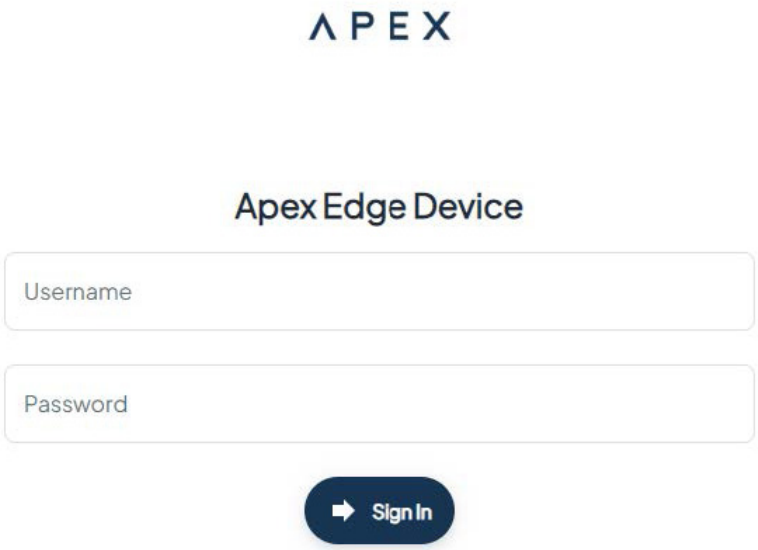
LED Colour	Status
Red - Solid	Device Powered on, no connections
Green - Solid	Connected to server, no slaves
Blue - Solid	Connected to at least one slave device, no server
Green / Blue alt.	Server and at least one slave device connected

5.3 WIFI AND NETWORK CONFIGURATION

A new Apex Edge device will start up with its own Wi-Fi hotspot active.

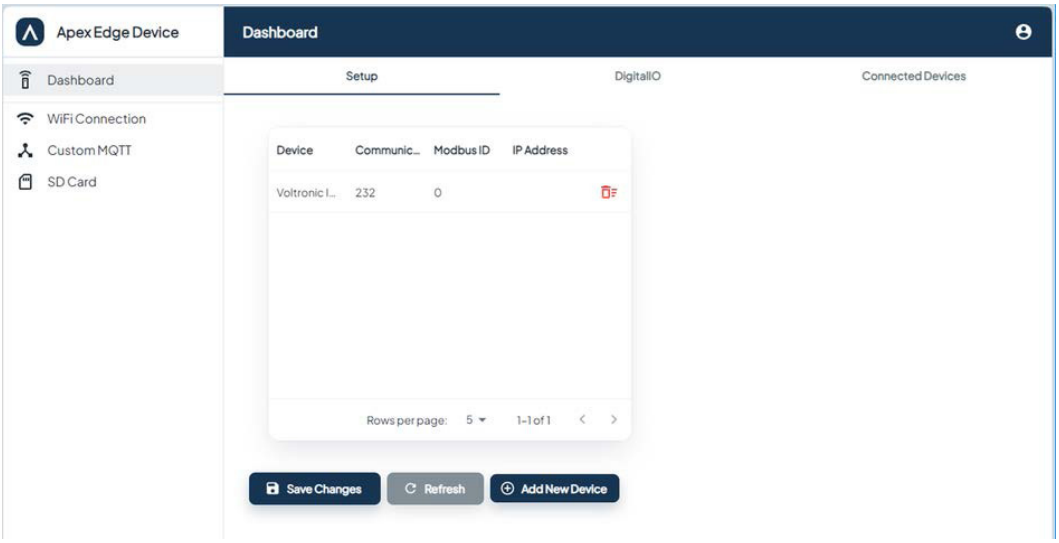
The hotspot can be identified by browsing available Wi-Fi hotspots with a mobile device and searching for one with a name that contains "APEX" and the Edge Device's serial number for example APEX_E23380012.

Select the hotspot that corresponds to that name; the password is 123456789. Once you have joined that network, open a browser and navigate to: http://192.168.4.1



The login screen will open. Enter "admin" and "admin" for the username and password.

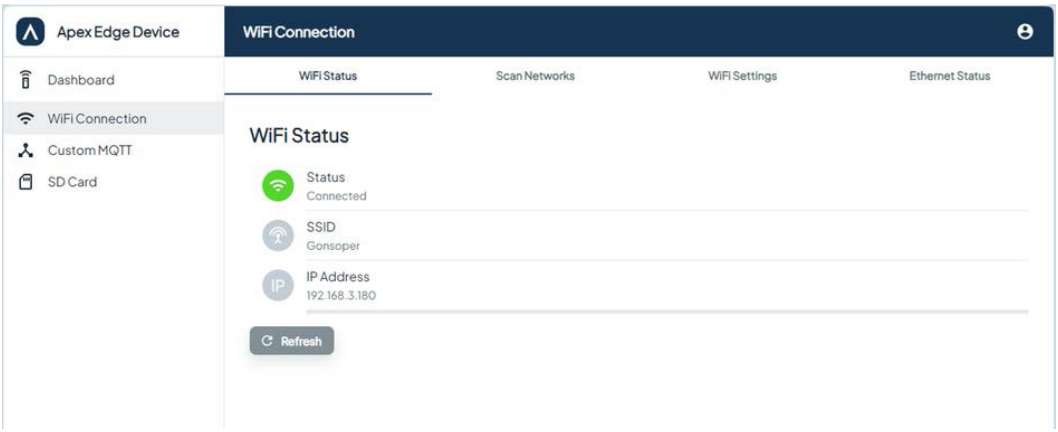
Once in the webpage, the dashboard is the default page from which you can see this view:



You can now configure the device, manage local access and configure network settings – all without an internet connection.

The Apex Edge Device needs to be connected to a network with internet access for the Web App and the other remote communication and management features to work. You can either use Wifi or Ethernet connectivity or an optional 3G expansion board. Given the variable nature of Wifi and cellular networks, Ethernet is always the preferred communication method.

To configure Wifi connectivity, navigate to “Wi-Fi Connection” in the side bar.

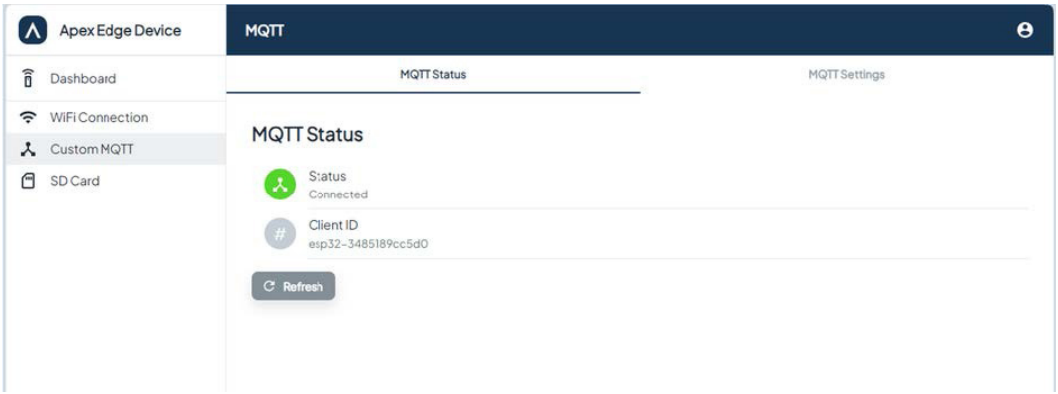


From there, click on Scan networks to view and select from available networks. Select the chosen Wi-Fi network, type in its password and click save.

Connection can be confirmed by viewing the Wi-Fi Status tab. The local portal will now also be available at the IP address shown on your page. Please note that the IP address may change from time to time unless you set a static IP address.

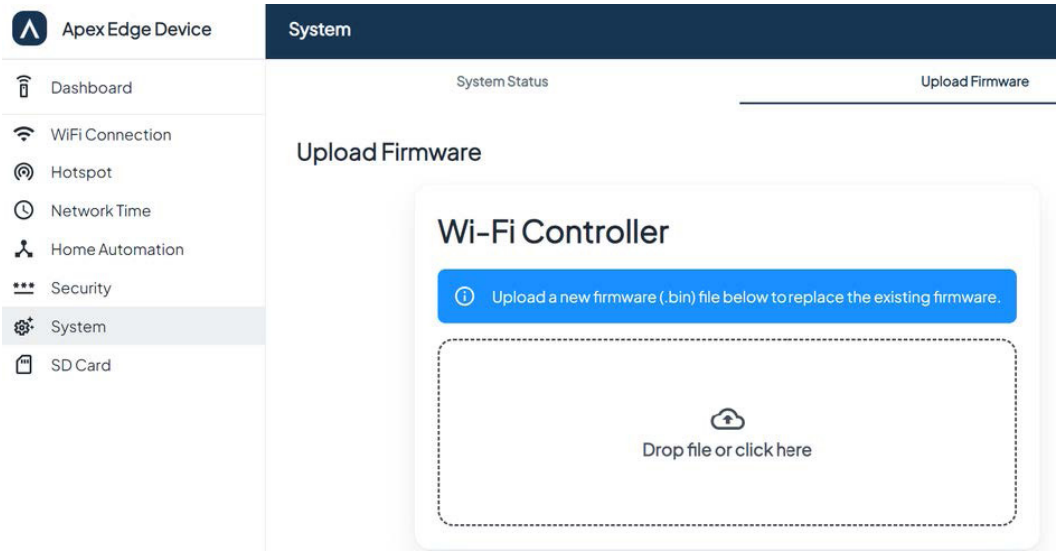
If connected to a LAN, you can view the status of an Ethernet connection in Ethernet Status.

The Status LED on the Apex Edge Device will illuminate Green to indicate that it has successfully joined the network. For further status information, refer to the LED Status colors in the table above. You can now use the Web App and you are now connected to the cloud (but are not yet provisioned).

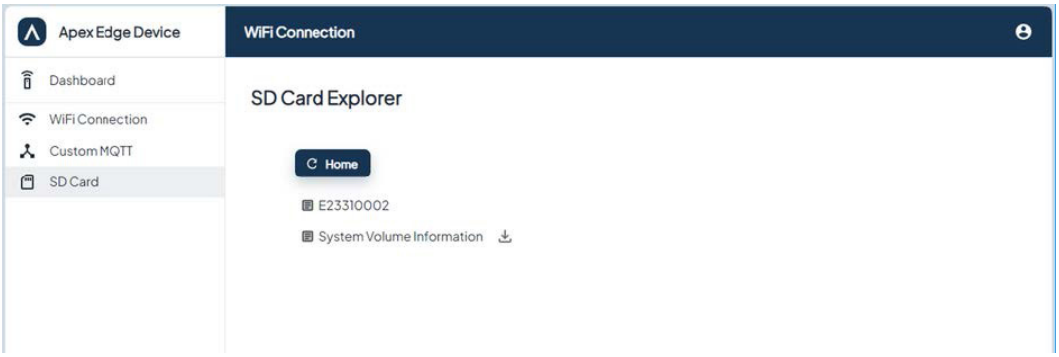


The Custom MQTT menu allows you to configure an additional MQTT Server of your own. Open the MQTT settings tab and fill in your server details. The MQTT Status tab allows you to view the connection status and client ID.

The System menu gives various system-level pieces of information in the System Status tab. You can also Factory Default your device or restart it from here.



In the Upload Firmware tab, you can manually install a new firmware file which could be sent to you by Apex. Drop the .BIN file into the area provided and tap Update.



If an SD card is installed in your Edge Device, it is possible to browse the contents from the SD Card menu. This feature is provided to allow a user to create a copy of the local logs, should they be needed.

5.4 CONFIGURING SLAVE DEVICES

Having connected your slave devices according to the Communication Wiring section you can now proceed to the device configuration.

From the main dashboard, tap “Add new Device” in the Setup area.

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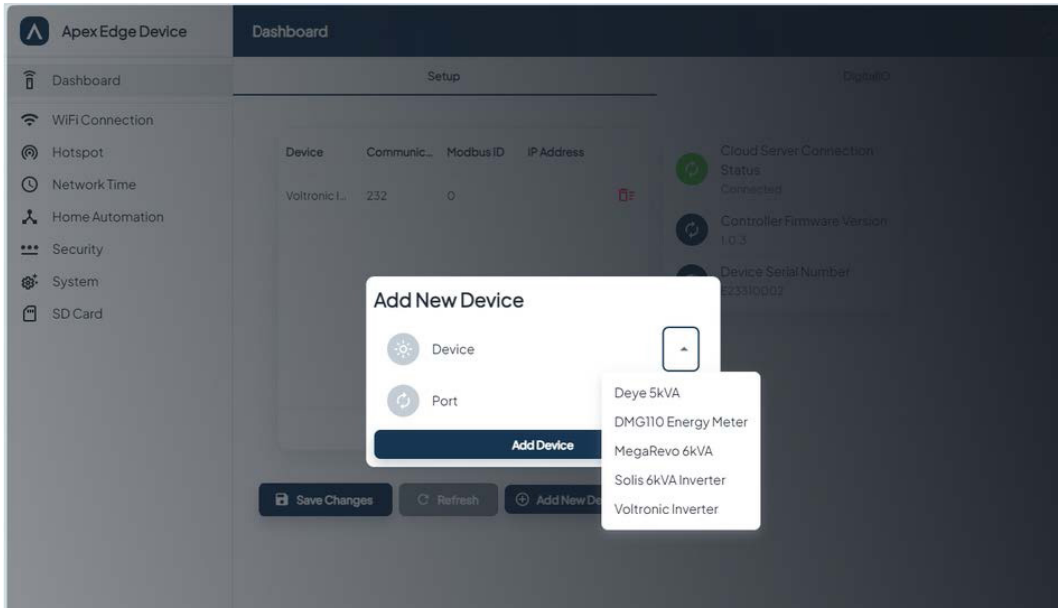
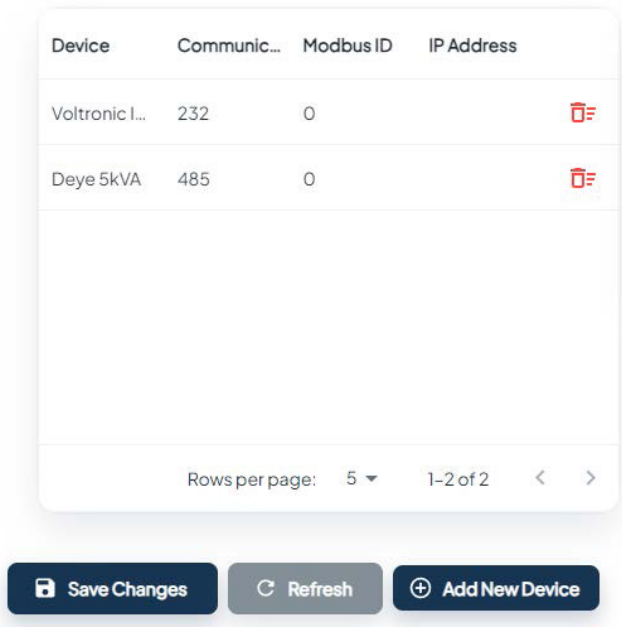


From the Device list, choose your supported device. The Port will automatically be assigned, according to the available driver.

If the device is a MODBUS device, you must enter its Modbus ID (address) on the bus.

Tap add device. This will add it to the list of available hardware but it will not start communicating until you tap “Save Changes” in the next screen.



All of the configured devices are now displayed in the list.

5.5 CLOUD MONITORING PORTAL

This device is monitored using Rubicon's cloud monitoring portal which is located at: monitoring.rubiconsa.com

Please follow the instructions there to either create a new account or use your existing one. Once inside the portal, you can add a new device to an existing site by Navigating to "Devices" and then tapping "Add a new device" or by navigating to your dashboard and tapping "Add a new site" and then adding "New Device" from the Devices tab.

6. CLEANING AND MAINTENANCE

Cleaning and maintenance should only be carried out with the Apex Edge Device disconnected from any supplies. Before taking any action, make sure that the system has been correctly isolated by opening the electrical isolators. To clean the Edge Device, wipe the exterior surface with a damp (not wet) soft, non-abrasive cloth. Pay attention to the cooling slots and any dust build-up thereon which may affect the ability of the Edge Device to dissipate heat generated.

Do not try to repair the device yourself in case of any malfunction. If the need arises, contact Apex customer service. The system does not require any special maintenance, except for standard physical cleaning to ensure good air flow and the maintenance required by any electrical device connected with terminals that need to be periodically checked.

7. ORDERING INFORMATION

Part Number	Description
FG-ED-OO	APEX Edge Monitoring and Control Device
FG-ED-LT	APEX LTE add-on module

8. WARRANTY

The Apex Edge Device is warranted to be free from defects for a period of 2 years from purchase, subject to Apex's Warranty terms and conditions, a copy of which is available at: www.apexsolar.tech

9. SUPPORT

You can contact our support centre for technical assistance with this product or the associated services.

9.1 PRODUCT SUPPORT

When contacting Product Support via telephone or email please provide the following information for the fastest possible service:

- Type of Inverter
- Serial number
- Battery type
- Battery bank capacity
- Battery bank voltage
- Communications type used
- A description of the event or problem
- Edge device serial number (available on product label on the under side of the Edge Device)

9.2 CONTACT DETAILS

Telephone:	+27 (0) 80 782 4266
Online:	https://www.rubiconsa.com/pages/support
Email:	support@rubiconsa.com
Address:	Rubicon SA 1B Hansen Close, Richmond Park, Cape Town, South Africa

You can reach technical support by telephone directly Monday to Friday between 08h00 and 17h00 (GMT +2 hours). Queries outside of these hours should be directed to support@rubiconsa.com and will be answered at the earliest opportunity. When contacting technical support, please ensure that you have the above listed information available.