

CALMS d.o.o.

Getting started with the CAL-EDGE-8 device



Product:

CALMS CAL-EDGE-8 monitoring device

Release date:

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1. Notices

Read this manual thoroughly and follow all notes and instructions during installation, operation, and maintenance. The manufacturer accepts no responsibility for damage caused by disregarding this manual.

The manual must be read attentively by both qualified personnel and the end user. It should be stored with the product and kept accessible whenever required. **By installing or using the product, you confirm that you have read, understood, and agreed to follow the instructions provided.**

2. Warnings



Ignoring the warnings can lead to serious injury and/or cause damage!

When handling, operating, or maintaining this product, personnel must follow safe working practices and comply with all applicable health and safety regulations. Incorrect operation or maintenance may create dangerous situations and could result in equipment damage or personal injury. The manufacturer cannot foresee every circumstance that may pose a hazard. If users apply procedures, equipment, or methods not specifically recommended by the manufacturer, they are responsible for ensuring that such use does not damage or compromise the product's safety, and that it poses no risk to people or property.

3. CAL-EDGE-8 monitoring device

The **CAL-EDGE-8 monitoring device** is a highly sophisticated and affordable portable measurement data logger for compressed air systems, designed for experts and auditors. The device connects directly to CALMS web application which provides real time access to data from any web browser for any end user and their service partner. With the new Wireless Mesh solution, the device can connect even to the most distant sensors **WITHOUT any cables**.

Device connects directly to CALMS web application which provides real time access to data from any web browser for any end user and their service partner.

This user manual is focused on helping customers understand the working of the device, avoid common mistakes, and incorporate it into your system as efficiently as possible.

Purchasing the CAL-EDGE-8 includes:

CAL-EDGE-8



CALMS EDGE 8 survey device LTE 4G with 8x AI, Modbus RTU & MODBUS TCP/IP
NEW: WIRELESS MESH SOLUTION ON-BOARD!
Portable Measurement data logger device supporting next protocols: Modbus RTU, MODBUS TCP/IP, OPC UA, (without sensors)
3G/4G Modem SMA with external antenna (with SIM card provided EU/Global)
W-MODBUS gateway on board! (CAL-SENSOR-WBOX not included!)
8x Analog Input with 4pin connector
1 x Ethernet port 10/100 Base-T (LAN)
1x RS485 port
Internal memory eMMC 8GB, optional μ SD 256 GB
Ambient temperature range: -25 to +60°C
Power Supply 24Vdc, 2,1A, 50W, Approval UL / CE / FCC Class A
USB-C for battery operation!

4. Mechanical and electrical installation



Installation work must only be carried out by a competent person under qualified supervision.

A fused isolation switch must be fitted between the main power supply and the CAL – EDGE – 8 device.

The CAL – EDGE – 8 should be mounted in such a location as to allow operational and maintenance access without obstruction or hazard and to allow clear visibility of indicators at all times.

If raised platforms are required to provide access to the CAL – EDGE - 8 they must not interfere with normal operation or obstruct access. Platforms and stairs should be of grid or plate construction with safety rails on all open sides.

4.1. Powering up the CAL-EDGE-8 device and getting it ONLINE

For starting up the device, it needs to be powered on, connected to a **power supply**. The device **must be operated at the supply voltage and frequency for which it is designed**. It is powered with 9-30VDC. When purchasing the device it comes with a power supply included.

What follows is a description of all the terminals on the device:



Figure 1 CAL-EDGE-8 (front side)

On Figure 1 is shown the CAL-EDGE-8 device from its front side where the connectors for power supply, USB-C power supply, MODBUS RTU, ethernet port and two connectors for antennas.

To power on the device connect **24VDC to the 1 terminal on the connector labeled J2** and **0VDC to the 3 terminal on the connector labeled J2** on the device. When successfully powering on the device the **POWER LED** starts burning green. To ensure proper connection, please check the electrical schematic down below.

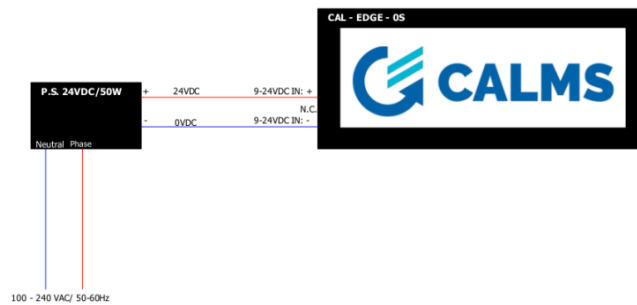


Figure 2 Electrical schematic for the CAL-EDGE-8 device

To ensure the device goes online you must connect an external antenna to the device or connect it to your local network where DHCP server is installed so the device can connect to the internet.

- If you're connecting an antenna, you need to connect it to **the SMA connector labeled MOBILE** and screw it firmly. For best possible signal reception we recommend you mount it as high as possible, or near a window.
 - The CAL-EDGE-8 indicates when the device is ONLINE and how strong the signal is:
 - As soon as the device is ON and is trying to go ONLINE the **STATUS LED is burning blue**.
 - When the device is connected to a network and is ONLINE the **STATUS LED is burning green**.
 - The **Signal Strength LED** indicates how strong the signal is once the device is ONLINE. This strength can also be checked on the CALMS application on the Device Dashboard.
- If you're connecting it to LAN, plug in the ethernet cable into the ethernet port on the device labeled with **LAN**. The LAN port can also be used to connect the device to other TCP/IP protocol capable devices (MODBUS TCP, ADS, OPC UA...). To connect a MODBUS TCP sensor to the device, use the LAN port. Device receives its static IP address (**192.168.0.102**) after start-up if there is not DHCP server in the network.



Figure 3 : CAL-EDGE-8 front side

4.2. Wired MODBUS RTU on the CAL-EDGE-8 device

The CAL-EDGE-8 also supports the widely used protocol in the industry – MODBUS RTU. The unit provides a fully isolated 2-Wire (half duplex) RS485 interface with automatic, transparent hardware flow control. Its easy implementation and configuration ensures that the customer can have a fully operational and functional monitoring device in no time.

To connect a MODBUS RTU sensor to the CAL-EDGE-8 you must first connect it to (external) power supply and connect **Data +** to the terminal 1 on the connector labeled **J1** and **Data –** to the terminal 2 on the connector labeled **J1** accordingly, like shown in the schematic below.

The sensor than must be configured on CALMS. If the MODBUS communication has been established successfully, the **Rx-Tx LED** blinks **green and blue at the same time**.

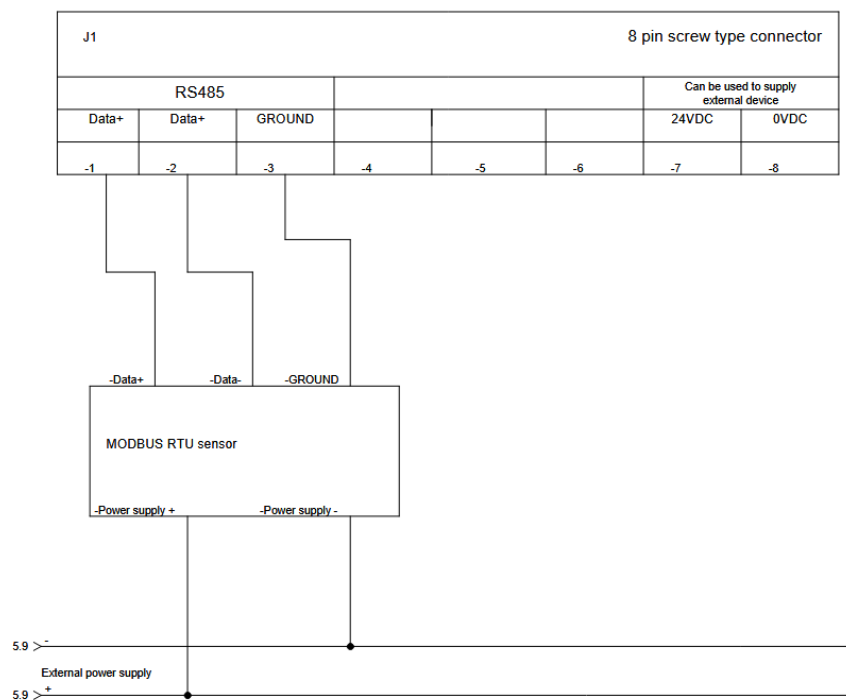


Figure 4 Connection of MODBUS sensors to the CAL-EDGE-8 device

4.3. LEDs description

A correct connection and configuration of the device can be seen on the LED lights in the top side of the device. Please check the table below for a brief explanation of all the LEDs states.

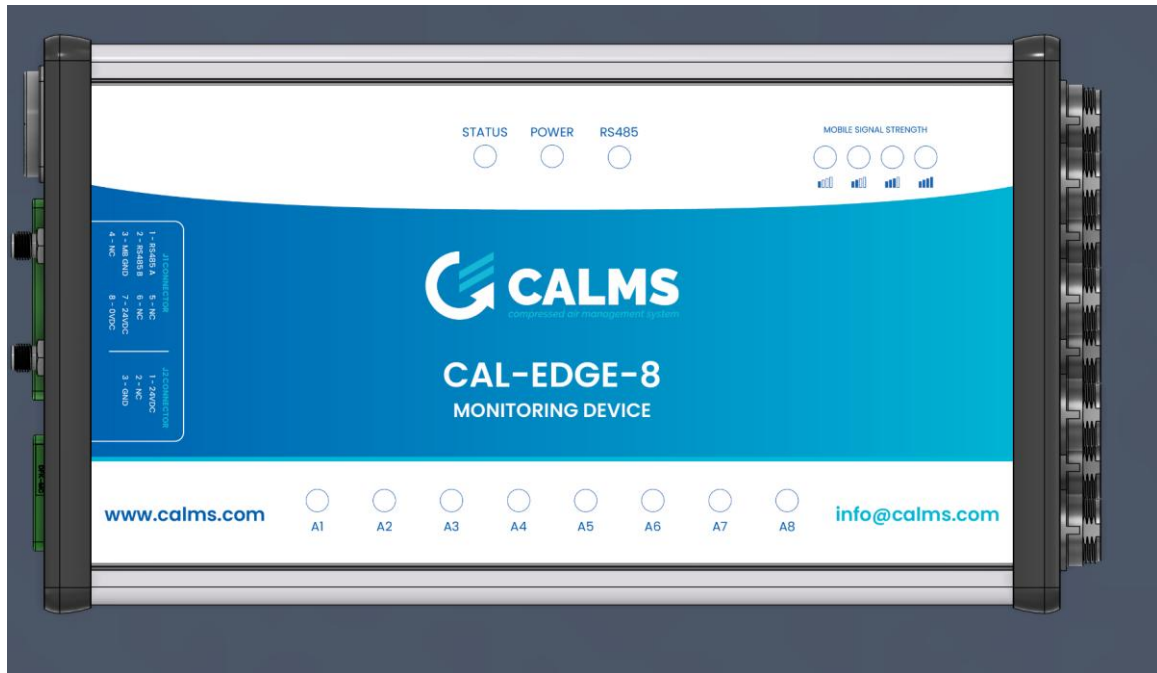


Figure 5 : CAL-EDGE-8 top view

Label LED

POWER LED

Description

Powered on -> green
Not powered on -> Off

STATUS LED

Connecting -> blue
Connected -> green
Error -> red

Rx-Tx LED

Tx, transferring data packets -> green
Rx, receiving data packets -> blue
Off -> no communication

Signal Strength LED

Max. 4 LEDs indicate 100% signal strength
2 LEDs indicate 50% signal strength
Off - no signal

AI LEDs

AI1-AI8 LED if active -> green
If not active -> Off

DISCLAIMER: To make sure the data values from the sensors are efficiently send to CALMS web application, contact the CALMS support team to make sure the sensor is added in the CALMS database. A new sensor must be added in the CALMS database.

5. Wireless MODBUS RTU on the CAL-EDGE-8 device

This new feature on the CAL-EDGE-8 is used to connect even the most distant sensors to the device WITHOUT any cables. For this feature a CAL-EDGE-8 device and a CAL-WIRELESS-BOX is mandatory to have. What follows is a quick description of the CAL-WIRELESS-BOX.

5.1. CAL-WIRELESS-BOX

It is a smaller device that is used to communicate with the CAL-EDGE-8 device through Wireless MODBUS protocol. For more information on that protocol, visit the CALMS documentation page.



The user connects one or multiple sensors to the CAL-WIRELESS-BOX and configures the sensor(s) on the CALMS web application. The CAL-WIRELESS-BOX then sends the data from the sensors to the CAL-EDGE-8 device, which then sends it to the web application.

The device is powered on with 9-30VDC. Once the device is properly powered on the **POWER LED burns green**. To power on the device:

- Connect **9-30VDC** to the terminal 1 on the connector labeled **J2**
- Connect **0VDC** to the terminal 3 on the connector labeled **J2**

Next, connect the antenna provided on the SMA connector labeled **WIRELESS** on the **CAL-WIRELESS-BOX**.

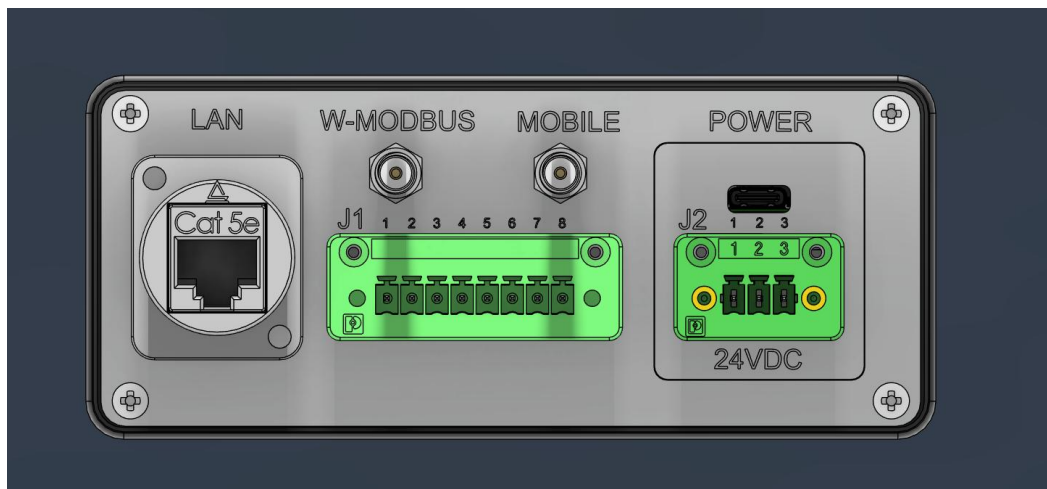


Figure 6 : Wireless Modbus connection

NOTE: For the CAL-WIRELESS-BOX to communicate with the CAL-EDGE-8 device, antenna has to be connected on the CAL-EDGE-8 (connector labeled WIRELESS) and on the CAL-WIRELESS-BOX (connector labeled WIRELESS).

Once the CAL-WIRELESS-BOX is powered on, it tries to connect to the CAL-EDGE-8 device and the **LED labeled STATUS starts burning blue**.

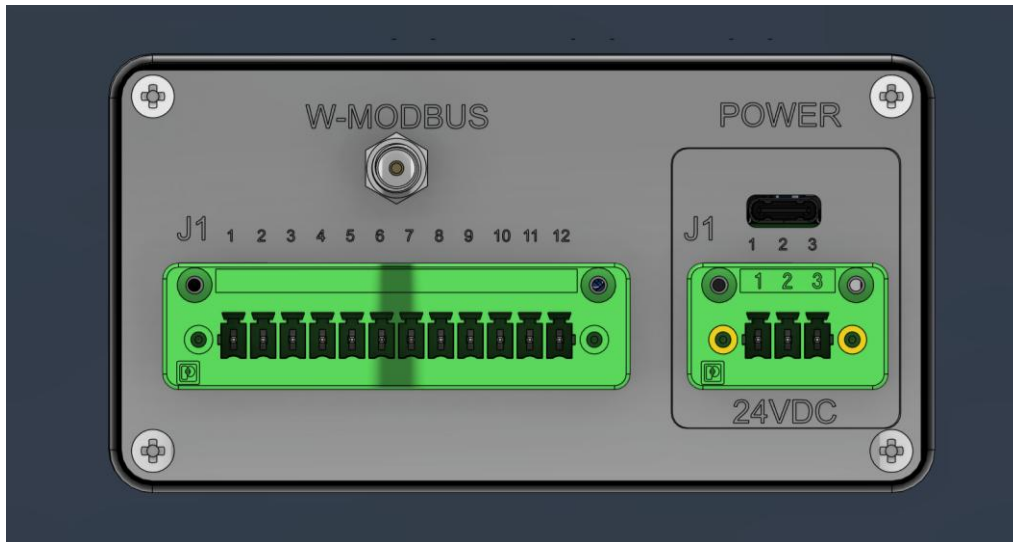


Figure 7 : Front side of the CAL-WIRELESS-BOX

Once it is successfully communicating with the CAL-EDGE-8, the **LED labeled STATUS** starts burning green.

Like on the CAL-EDGE-8 device, there is a **Signal Strength LED** that shows how strong the signal is between the CAL-EDGE-8 device and the CAL-WIRELESS-BOX device.

After the CAL-WIRELESS-BOX is successfully powered on and communicating with the CAL-EDGE-8 device, it is equipped with the following:

- MODBUS RTU terminals
- 2 x AI (analog inputs)
- 2 x DI (digital inputs)
- 2 x DOR (digital relay outputs)

Also, the device has adjustable DIP switches, that are used to adjust the MODBUS parameters of the CAL-WIRELESS-BOX.

DISCLAIMER: The DIP switches on the CAL-WIRELESS-BOX is not used for setting the MODBUS parameters of the sensors. They are used to adjust the parameters for each individual CAL-WIRELESS-BOX communicating with the CAL-EDGE-8, when an analog input, digital input, or digital output is used!

5.2. Connecting a MODBUS RTU sensor to the CAL-WIRELESS-BOX

To properly connect a MODBUS RTU sensor to the CAL-WIRELESS-BOX please follow the instructions below:

- Connect the **Data A** of the sensor to the terminal 1 on the connector labeled J2 on the CAL-WIRELESS-BOX.
- Connect the **Data B** of the sensor to the terminal 2 on the connector labeled J2 on the CAL-WIRELESS-BOX.

The sensor must be externally powered on, so one can also use the terminals 7 (for +24VDC) and 8 (for 0VDC) on the connector labeled J2 on the CAL-WIRELESS-BOX.

Once the sensor is wired, configure it on CALMS, and if done properly it will start sending data to the application and the **Rx-Tx LED** will blink green and blue.

DISCLAIMER: To make sure the data values from the sensors are efficiently send to CALMS web application, contact the CALMS support team to make sure the sensor is added in the CALMS database. A new sensor must be added in the CALMS database.

5.3. LEDs description

A correct connection and configuration of the device can be seen on the LED lights in the top side of the device. Please check the table below for a brief explanation of all the LEDs states.

Label LED	Description
POWER LED	Powered on -> green Not powered on -> Off
STATUS LED	Connecting to the CAL-EDGE-8 device-> blue Connected to the CAL-EDGE-8 device -> green Error -> red
Rx-Tx LED	Tx, transferring data packets -> green Rx, receiving data packets -> blue Off -> no communication
Signal Strength LED	Max. 4 LEDs indicate 100% signal strength with the CAL-EDGE-8 2 LEDs indicate 50% signal strength with the CAL-EDGE-8 Off – no communication with the CAL-EDGE-8
AI LEDs	AI1-AI2 LED if active -> green If not active -> Off
DI LEDs	DI1-DI2 LED if active -> green If not active -> Off
DOR LEDs	DOR1-DOR2 LED if active -> green If not active -> Off

6. Start up procedure on the CALMS web application

After successfully mounting and wiring the device a proper start-up procedure must be done:

1. Every CAL-EDGE-8 device has its own unique serial number, located on the back of the device. On the web application CALMS the device has to be added in your system. First, you open your system and navigate to the **Setup** page. There you click on **»Add device«** and choose your device.

Devices			
Device	Serial number	Status	Add device

Figure 8 How to add a device on CALMS

2. On the **Equipment page** add a sensor on your scheme. If you have purchased the Wireless MODBUS feature you will be asked to choose if the sensor you are configuring is via the Wireless MODBUS or wired MODBUS protocol.

Select connection type
✕

Modbus RTU

W-MODBUS

Figure 9 : Choosing the right connection type

To »connect« the sensor to your device you have to again choose your edge device (serial number) and configure the MODBUS parameters on the CALMS application. The customer is able to change the UnitID of the sensor, the baudrate, parity, data and stop bits so they match with the settings on the sensor.

Tools

General

Compressed Air

Electricity
No elements

Heating
No elements

Water
No elements



Serial number

Year of manufacture

Tag
DPI.01

Model
Dew Point Sensor - Mini Series

☐ Set image as background

Manufacturer
CAA Unconfirmed

Calibration date
dd. mm. llll

Properties
+

Connection configuration (Dew Point Sensor - Mini Series)

Edge device
Test - ED 42

Unit ID
1

Baud rate
9600 (default)

Stop bits
1 (default)

Comm port
Standard RS485 (default)

Data bits
8 (default)

Parity
none (default)

[Hide advanced...](#)

Figure 10 Sensor configuration on CALMS

- If the device is powered on and the sensor is already connected to it and configured on CALMS, the device immediately establishes connection by flashing the **Rx-Tx LED green and blue rapidly**. Also, the device already starts sending data to the web application. The customer has the option to view the live values from the sensors as they are changing by navigating to the **Device dashboard page** and **clicking the Live button**, to enable the live monitoring of the data.

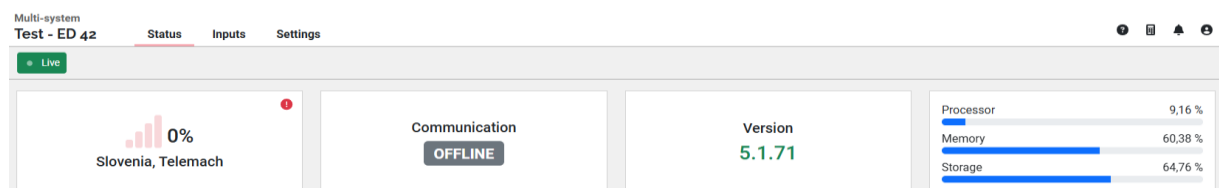


Figure 11 : Device dashboard

- The data collected from the sensor for periods of time can be checked on the **Monitoring page**. There the customer has the option to choose which channels (inputs) to monitor, view them in a graph, choose the inspect period and aggregation.



Figure 12 Monitoring page on CALMS

5. With this the process of adding, configuring and getting data from the CAL-EDGE-8 is finished.



7. Troubleshooting

Below are some troubleshooting tips in case you encounter some of these situations.

In case the wireless MODBUS option is added, there are NO indications on the CAL-EDGE-8 if there are any problems in the communication with the CAL-WIRELESS-BOX.

CAL-EDGE-8 troubleshooting tips:

- **POWER LED is constantly OFF:**

Check the power supply. Device accepts 9-30VDC.

- **STATUS LED is constantly BLUE:**

Check the signal. Connect the antenna firmly on »**MOBILE**« port. Place the antenna near windows and on higher places to get the best possible signal.

Reboot the device.

- **STATUS LED is burning RED:**

Contact the CALMS support team.

- **MODBUS communication is not working:**

Follow the installation guide provided on CALMS (https://docs.calms.com/calms-device-systems-guide/sensor_notes/)

Check the configuration on CALMS (communication parameters)

Restart the CAL-EDGE-8 device.

- **AI LED constantly OFF:**

Check the wiring of the analog sensor, check the sensor if working. Check the configuration on CALMS of the analog sensor.

CAL-WIRELESS-BOX troubleshooting tips:

- **POWER LED is constantly OFF:**

Check the power supply. Device accepts 9-30VDC.

- **Device does not want to connect to CAL-EDGE-8:**

Check if the antenna on the connector labeled WIRELESS is firmly on the port of both devices: the CAL-EDGE-8 and CAL-WIRELESS-BOX.

- **STATUS LED is burning RED:**

Contact the CALMS support team.

- **Rx-Tx LED is constantly OFF:**

Check if the antenna is firmly on the »WIRELESS« port. Place the antenna near windows and on higher places to get the best possible signal.

- **Device doesn't communicate with the Modbus sensor:**

Check the wiring. Swap data **A and B** if necessary. Check the configuration of the sensor on CALMS (Modbus parameters).

- **AI LED constantly OFF:**

Check the wiring of the analog sensor, check the sensor if working. Check the configuration on CALMS of the analog sensor.

8. Contact and support

If you experience any issues that cannot be resolved using this manual, please contact the CALMS support team support@calms.com.

For technical assistance, please, provide the following information when reaching out:

- Serial number (located on the device label)
- Description of the issue
- Steps already taken to resolve the issue



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