

INSTALLATION AND USER INSTRUCTIONS

SunMate.IO Pulse HW064



07 2024
Version 1.0.0

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1. Preface

Acronyms

1.1. Product Definition:

The **SunMate.IO Pulse Datalogger** is a device designed to communicate directly with solar inverters via the MODBUS protocol and with the SunMate.IO IoT platform via MQTT.

1.2. Software SaaS Definition:

The **SunMate.IO Portal** is a Software as a Service (SaaS) platform that provides automation, tooling, and visibility for the end-user, enhancing the functionality and usability of the SunMate.IO Pulse Datalogger.

1.3. Description of the user:

The SunMate.IO Pulse Datalogger is designed for end-users, while the installation procedure is intended for certified electricians.

1.4. User Capabilities:

- **Control:** The product allows end-users to control the solar inverter and solar inverter battery via the Software SaaS. This can be done through automated processes or by manually adding states to the inverter, such as stopping the export of power to the grid.
- **Default Behavior:** Users can disable actions and automations directed towards the solar inverter to ensure no changes are made. This is the default behavior.
- **Data Reading:** The product will read sensor data from the inverter every 5-15 seconds by default.

1.5. Installation Requirements:

- **Qualification Needed:** The physical installation of the product requires certified expertise to work with electricity and high voltage systems.
- **System Shutdown:** The system should be turned off from the input power during installation to ensure safety. Proper precautions must be taken to avoid any risk of electric shock or other hazards.
- **Timing:** The intended installation of the product is meant to be carried out together with the solar inverter installation, although it can also be done later by certified electricians.
- **Compliance:** The end-user should ensure compliance with local regulations and laws.

1.6. Explanation of safety warnings

- **DANGER!** Danger indicates a hazard with a high level of risk which, if not avoided, can result in serious injury or death.
- **WARNING!** Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
- **CAUTION!** Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
- **NOTICE** Indicates information considered important, but not hazard related.

1.7. Retaining instructions

- Read and understand this manual and its safety instructions before using this product. Failure to do so can result in serious injury or death.
- Follow all the instructions. This will avoid fire, explosions, electric shocks or other hazards that may result in damage to property and/or severe or fatal injuries.
- Keep all safety information and instructions for future reference and pass them on to subsequent users of the product.
- Updated documentation and User-Manuals can be found on:
<https://www.sunmate.io/user-manual>

1.8. Obtaining documentation and information

Internet

The latest version of the documentation is available at the following address:

<http://www.sunmate.io/user-manual>

Ordering documentation

Documentation, user instructions and technical information can be ordered by sending e-mail to SunMate.IO ApS at support@sunmate.io

Documentation feedback

If you are reading SunMate.IO ApS product documentation on the internet, any comments can be submitted on the support website. Comments can also be sent to support@sunmate.io .

We appreciate your comments.

2. Description of the product

2.1. Purpose of the product

The **SunMate.IO Pulse Datalogger** enables the Software SaaS to gather information from the solar inverter and battery. It also allows setting parameters on the solar inverter, such as prioritization and battery discharge schedules.

Key Features:

- **Data Gathering:** The product collects data from the solar inverter and battery, transmitting this information to the Software SaaS for monitoring and analysis.
- **Parameter Setting:** Users can set various parameters on the solar inverter through the Software SaaS, allowing for customized operation, such as determining priority settings or managing battery discharge timings.
- **Connectivity:**
 - **Wi-Fi Connection:** The product connects to the end-user's Wi-Fi network and communicates directly with the SunMate.IO IoT Backend via MQTT for sending and receiving data.
 - **Home Assistant Integration:** The product supports direct communication with Home Assistant, enabling end-users to import data into the Home Assistant platform. To integrate with Home Assistant, users must have an account on the Software SaaS and obtain an API key to add the product to Home Assistant.
- **Compatibility:** The product is exclusively compatible with SunMate.IO Software, ensuring seamless integration and operation within the SunMate.IO ecosystem.

2.2. Technical Data

Parameter	Unit
Power	10-24 W
Voltage	5-12 V
Power Type	DC 1A
Weight	67 grams
Software version	1.0
Operating temperature	10°C to 70°C
Humidity range	20 to 50 % relative humidity (RH)
MODBUS	RS485 A+B+GND
WIFI	2.4 GHz only
Bluetooth	Disabled
Warranty	None
Rights of Complaint / Statutory Warranty	2 years
Expected Lifetime	+4 years

2.3. Product compliance

Directive 2011/65/EU
Directive 2015/863/EU

Directive 2014/53/EU

This product complies to:

- RoHS
- Radio Equipment Directive (RED)

Safety Instructions

WARNING!

Hazardous Voltage Inside: Can shock, burn, or cause death. Keep out.

High Voltage: Contact with high voltage can result in severe injury or death. Only certified electricians should perform the installation.

Electric Shock Risk: Improper handling of the device during installation can lead to electric shock. Ensure the system is completely shut down before beginning installation.

Fire Hazard: Incorrect wiring or installation can cause overheating or fire. Follow all installation guidelines carefully.

3. How to use the product safely

3.1. How to Use the Product Safely

- **System Shutdown:** Ensure the system is completely shut down during installation and maintenance to prevent electric shock or other injuries.
- **Proper Installation:** Only certified electricians should install the device to ensure safety and compliance with local regulations.
- **Regular Monitoring:** Regularly monitor the device and software for any alerts or issues to address them promptly.

3.2. Safety Information for Vulnerable People

- **Supervision:** Ensure that children, elderly individuals, and those with disabilities are supervised around the installation area.
- **Restricted Access:** Keep the installation area restricted to prevent accidental contact with hazardous components.

3.3. Personal Safety

- **Protective Gear:** Wear appropriate protective gear, including gloves and safety glasses, when handling the device.
- **Avoid Wet Conditions:** Do not install or handle the device in wet or damp conditions to prevent electric shock.

3.4. Work Area Safety

- **Clear Area:** Ensure the work area is clear of unnecessary personnel and equipment.
- **Adequate Lighting:** Make sure the work area is well lit to avoid accidents during installation.

3.5. Electrical Safety

- **Compliance:** Adhere to all local electrical codes and regulations during installation.
- **Proper Tools:** Use appropriate, non-conductive tools to handle and install the device.
- **Double-Check:** Verify all connections and settings before powering the system back on to ensure safe operation.

4. Preparation

How to transport and store the product

4.1. Lifting, handling, and transporting the product

To lift the product safely:

- Use a gentle grip to avoid damaging the device.
- Avoid applying excessive force.
- Ensure the product is stable before lifting.

To handle the product safely:

- Hold the product securely with both hands.
- Keep the product away from moisture and dust.
- Avoid dropping or bumping the product.

To transport the product safely:

- Place the product in a protective container.
- Ensure the product is cushioned to prevent damage during transit.
- Do not expose product outside of the operating temperatures see 2.2

Storing the Product:

- Place the product in a cool, dry location.
- Avoid storing the product in warm or humid places.
- Never store the product inside the inverter.

4.2. Packing contents

The SunMate.IO Pulse consist of:

Parts:

- The Datalogger
- Lose External Antenna to attach to the Datalogger

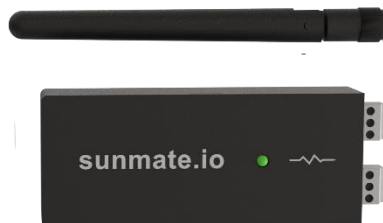


Figure 1: Datalogger Parts

4.3. Conditions for assembling

The antenna can be fastened by screwing it onto the antenna stick.



Figure 2: Antenna stick

4.4. Installation of the product

Requirements to installation:

1. Internet Connectivity:

- **Protocol:** MQTT
- **DNS Address:** `iot.sunmate.io`
- **IP Configuration:** Support for Floating/Dynamic IPs. Ensure the firewall allows connections to the DNS name.
- **Port:** 8883
- **Security:** Only encrypted traffic is permitted.

2. Wi-Fi Configuration:

- Ensure a 2.4 GHz Wi-Fi access point is available for the datalogger to connect.

3. Power Supply:

- A USB-C power supply rated 5-12V, DC 1A with a maximum cable length of 1 meter is required.

4. Device Requirements:

- A device capable of connecting to a 2.4 GHz Wi-Fi network is needed for setup.

Installation procedure

Step 1: Disconnect the MODBUS/RS485 Terminal Block from the SunMate.IO Pulse.



Figure 3: Connection terminal

Step 2: Connect the Terminal Block:

- **MODBUS RS485 A** to the A port on your solar inverter, battery, or Modbus device.
- **MODBUS RS485 B** to the B port.
- **MODBUS RS485 GND** to the GND port.
- Ensure all terminal screws are securely fastened.

WARNING: Do not connect the Terminal Block to the Datalogger before completing the setup.

Step 3: Power Setup:

- Connect the USB-C power adapter. The datalogger indicator will turn orange; wait 1 minute.

Step 4: Connect to Wi-Fi:

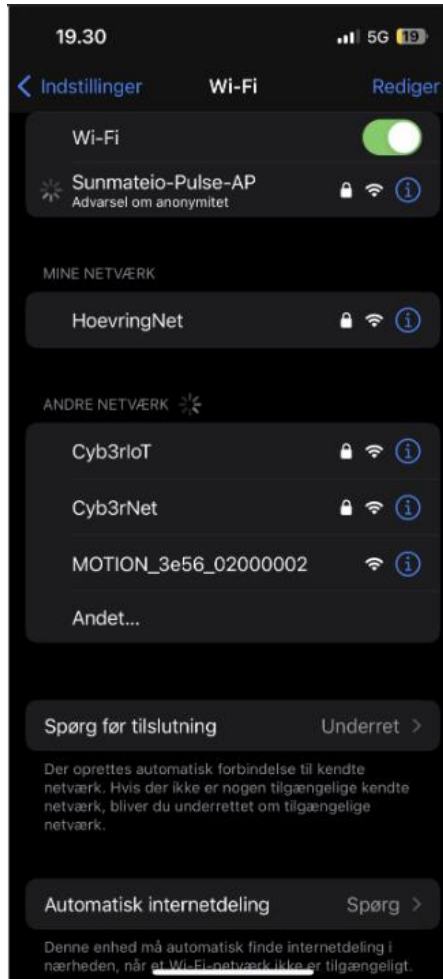
- On your device (e.g., iPhone), open Wi-Fi settings and connect to the SSID Sunmateio-Pulse-AP with the password SunMates!
- **Note:** If the access point isn't visible, wait an additional minute or reboot device.

Step 5: Configure Network Settings:

- Open a web browser and navigate to <http://192.168.4.1>. (Picture A)
- Select your Wi-Fi network, enter the SSID and password, and click 'Save' (Picture B)

- Allow 1-2 minutes for the Datalogger to establish a connection.

Picture A



Picture B

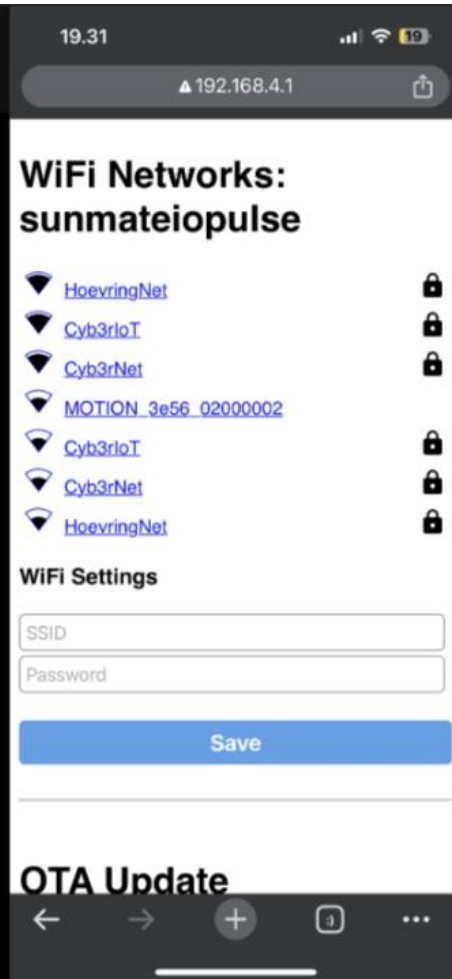


Figure 4: Procedure for setting local WiFi Network settings.

Indicator Lights:

- **Green:** Successful connection; proceed to final steps.
- **Red:** Check the device and network settings.
- **Orange:** If persistent, repeat steps 4-5

Step 6: Finalize Installation:

- Power off the datalogger (disconnect USB-C cable).
- Reconnect the Terminal Block with cables attached.
- Power on the datalogger (reconnect USB-C cable).
- Verify connectivity and data flow on the SunMate.IO Portal (<https://portal.sunmate.io>)
- Make sure the MODBUS/RS485 Terminal screws has been securely fasten

4.5. How to commission the product

4.5.1. Pre-Commissioning Checklist

Before beginning the commissioning process, ensure all installation steps have been completed successfully. Verify the following:

- All connections are secure and correctly configured (MODBUS RS485 A, B, and GND).
- The device has successfully connected to the Wi-Fi network.
- The device settings have been configured correctly via the web portal.
- The power supply is stable and within specified limits.

4.5.2. Step-by-step Commissioning Procedure

Step 1: Initial Power-Up

- Turn on the Datalogger by connecting the USB-C power cable. Observe the startup sequence and ensure the indicator light functions as expected <TODO Add photo>:
 - **Orange Light:** Indicates the device is initializing. If the orange light persists, it suggests there is no Wi-Fi connection. In this case, repeat the installation procedure to ensure all settings are correctly configured.
 - **Green Light:** Signifies a successful network connection and that the datalogger is fully functional.
 - **Red Light or Persistent Orange:** Indicates a problem that requires troubleshooting.

Step 2: Verify Device Configuration & Data Retrieval

- Access the SunMate.IO administrative portal interface at <https://portal.sunmate.io> and go into Dashboard at <https://portal.sunmate.io/dashboard-live>

Check following example in the Exhibit below.

1. Exhibit A: Check on the Dashboard if the Datalogger is ONLINE by checking when the last update is, and if its green (If its red, please check datalogger for light indication)
2. Exhibit B: Check on the Dashboard if the Datalogger is B is **Normal** or other expected Battery/Inverter status
3. Exhibit C: Check on the Dashboard if there is any Load info within the last 15 minutes, if so, data retrieval is successful

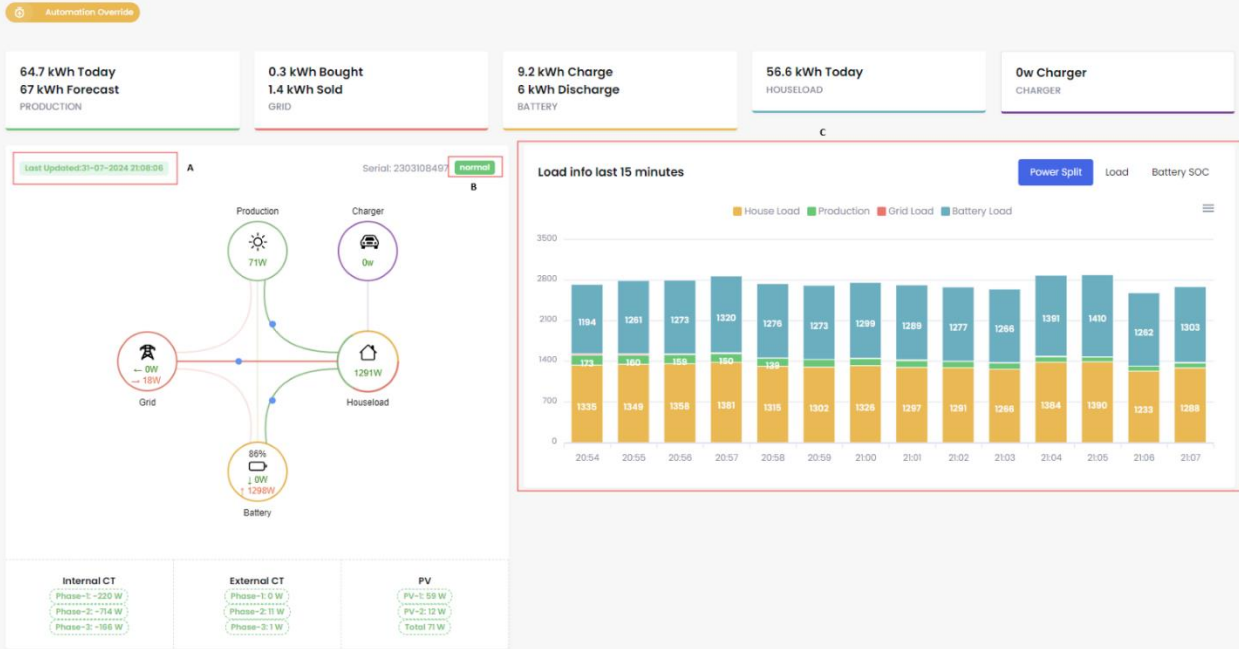


Figure 5: Virtual dashboard

5. Operation/Use

This product is a simple proxy for communication between the solar inverter and our backend system. All operational tasks should be performed in the SunMate.IO Portal.

All Dataloggers come pre-configured to the customer with individual accounts for each datalogger to enhance security.

5.1. Adding Datalogger

To set up the product with the Portal:

- 1) A. Create User Account at <https://portal.sunmate.io>

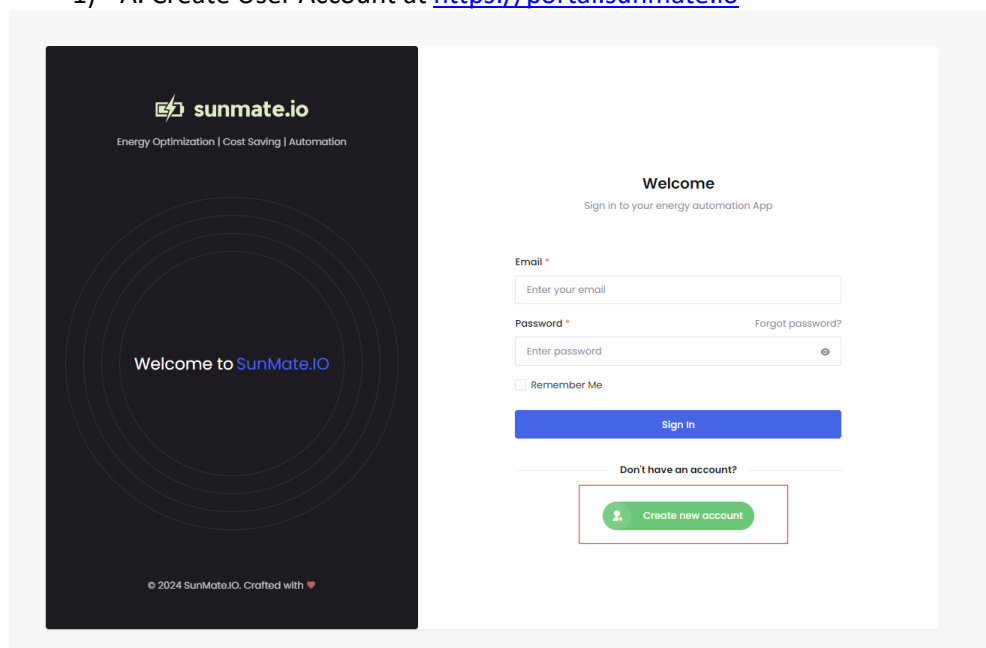
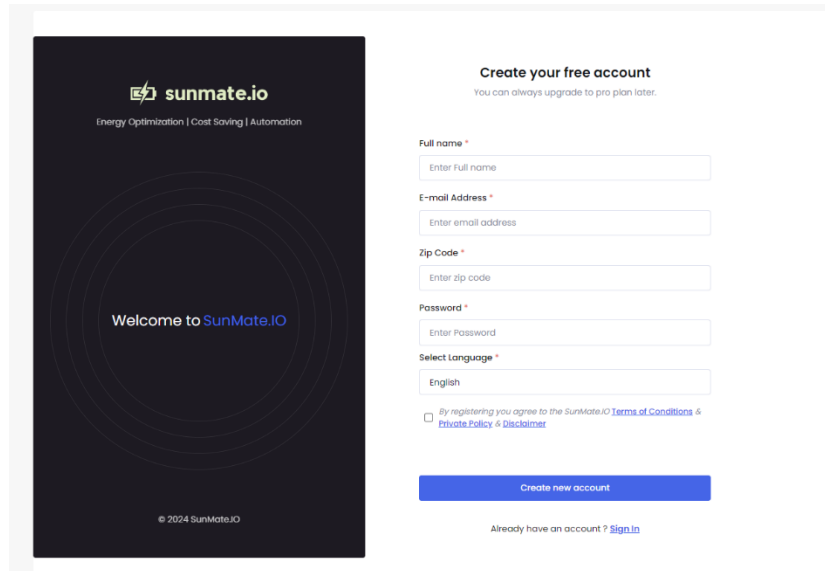


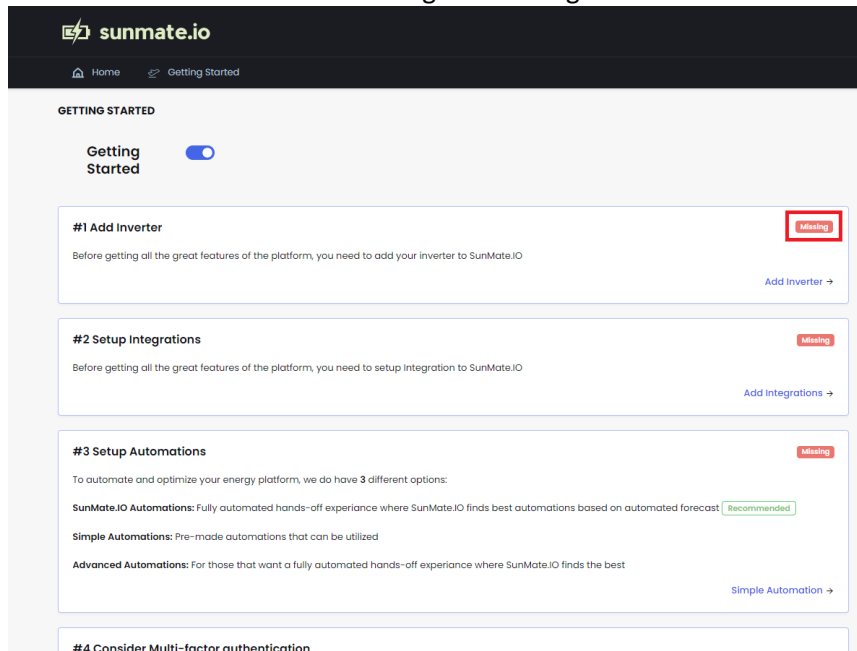
Figure 6: SunMate.io Login portal

- 2) Fill out user identification and acknowledge all terms and conditions.



The registration form is titled "Create your free account" and includes a sub-header "You can always upgrade to pro plan later." It contains several input fields: "Full name", "E-mail Address", "Zip Code", "Password", and "Select Language". There is a checkbox for terms and conditions, a "Create new account" button, and a "Sign In" link for existing users.

- 3) Once registration is complete, you will receive an e-mail with confirmation.
- 4) You will be redirected to Getting Started
- 5) Click on Add Inverter on the Getting Started Page



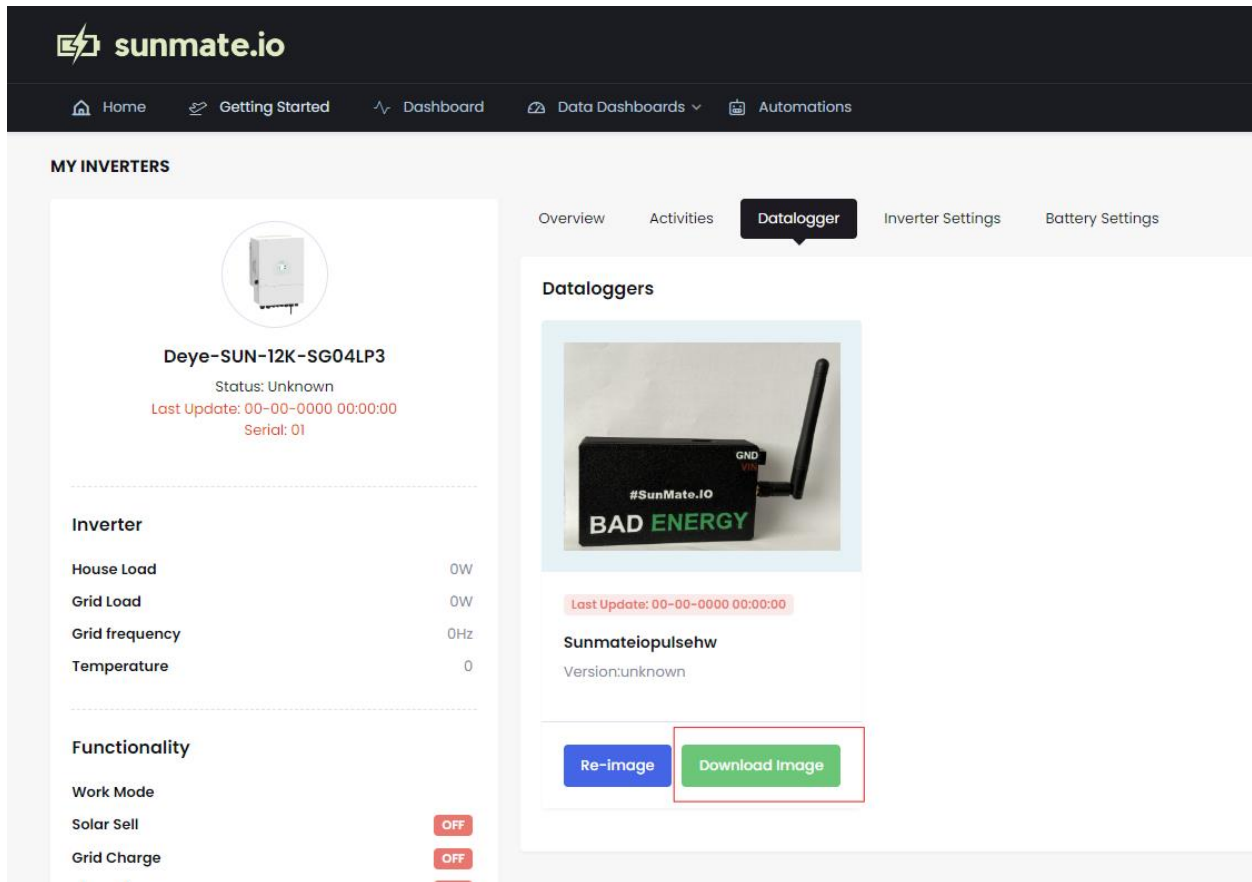
The "GETTING STARTED" page features a navigation bar with "Home" and "Getting Started" links. A toggle switch for "Getting Started" is turned on. The main content area lists four steps:

- #1 Add Inverter** (Missing): "Before getting all the great features of the platform, you need to add your inverter to SunMate.IO" with an "Add Inverter" link.
- #2 Setup Integrations** (Missing): "Before getting all the great features of the platform, you need to setup integration to SunMate.IO" with an "Add Integrations" link.
- #3 Setup Automations** (Missing): "To automate and optimize your energy platform, we do have 3 different options:"
 - SunMate.IO Automations:** Fully automated hands-off experience where SunMate.IO finds best automations based on automated forecast (Recommended)
 - Simple Automations:** Pre-made automations that can be utilized
 - Advanced Automations:** For those that want a fully automated hands-off experience where SunMate.IO finds the bestwith a "Simple Automation" link.
- #4 Consider Multi-factor authentication**

- 6) Fill out all information and Select your Datalogger Type (SunMate.IO Pulse)

7) Click on Inverters on top menu and select your newly created inverters settings icon

8) Go under Datalogger and Click Download Image (Automatically started as background process and can take 20-30 min to finish, please make sure to refresh the page)



MY INVERTERS

Deye-SUN-12K-SG04LP3
 Status: Unknown
 Last Update: 00-00-0000 00:00:00
 Serial: 01

Inverter

House Load	0W
Grid Load	0W
Grid frequency	0Hz
Temperature	0

Functionality

Work Mode	OFF
Solar Sell	OFF
Grid Charge	OFF

Dataloggers

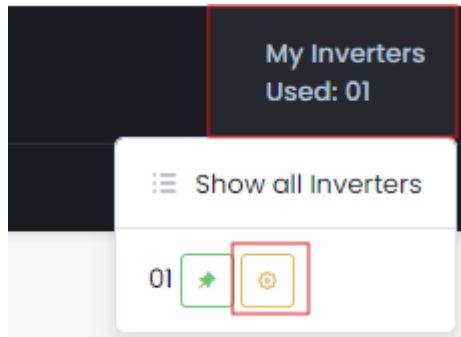
Sunmateiopulsehw
 Version: unknown

Buttons: Re-image, Download Image

9) Download the newly created Image

5.2. Make your Installation file (Image file) Ready for installation

- 1) Log on to SunMate.IO Portal <https://portal.sunmate.io>
- 2) Select your inverter from the Inverter List and click Settings icon



3) Go under Datalogger Menu and select **Re-image**

MY INVERTERS



Deye-SUN-12K-SG04LP3

Status: Unknown

Last Update: 00-00-0000 00:00:00

Serial: 01

Inverter

House Load 0W

Grid Load 0W

Grid frequency 0Hz

Temperature 0

Functionality

Work Mode

Solar Sell OFF

Grid Charge OFF

Overview

Activities

Datalogger

Dataloggers



Last Update: 00-00-0000 00:00:00

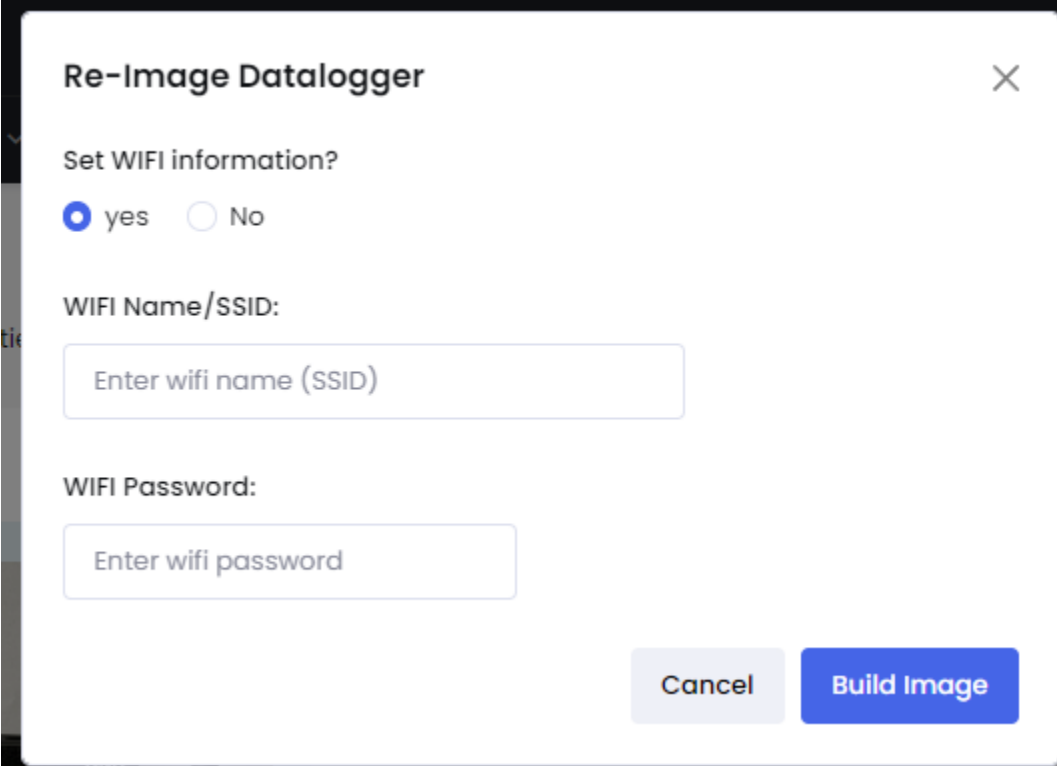
Sunmateiopulsehw

Version:unknown

Re-image

Download Image

4) (OPTIONAL) Type in WIFI settings



Re-Image Datalogger ✕

Set WIFI information?

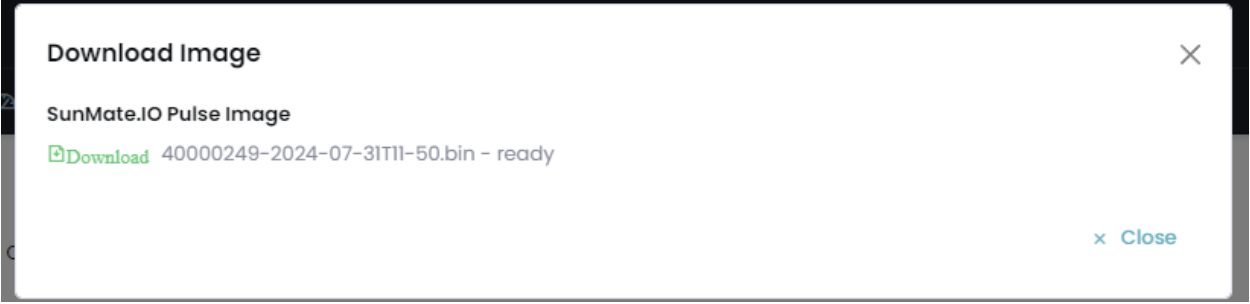
yes No

WIFI Name/SSID:

WIFI Password:

Cancel Build Image

- 5) Click on: Build Image
- 6) It takes 20-30 minutes before the image generation is finished, refresh the portal every 5 minutes to check if any new image has been available.



Download Image ✕

SunMate.IO Pulse Image

[Download](#) 40000249-2024-07-31T11-50.bin - ready

✕ Close

- 7) Click on Download Image button and proceed to

5.3. Installation of Image to Datalogger

Step 0: Ensure you have the following prerequisites:

- Computer with either Windows or Mac Operating System
- Additional USB-C cable from the computer to the datalogger
- Installed driver

WARNING: Please note that the driver is provided by the manufacturer of the PCB. While we aim to ensure its functionality, we do not assume responsibility for any issues that may arise.

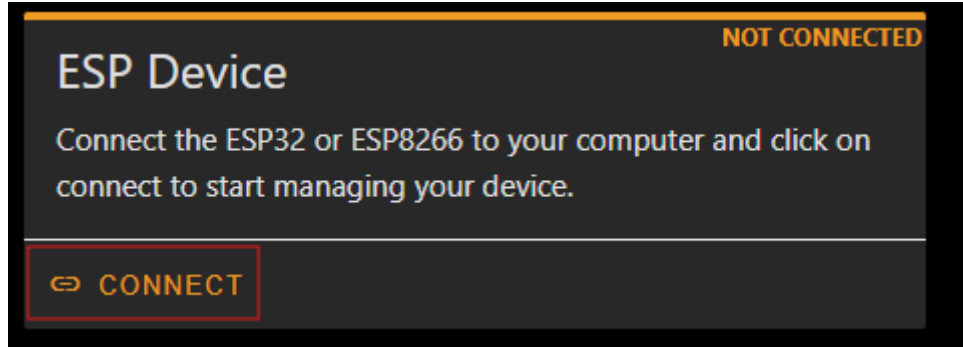
MAC: https://github.com/Xinyuan-LilyGO/CH9102_Mac_Driver

Windows: https://github.com/Xinyuan-LilyGO/CH9102_Driver

Step 1: Make sure to disconnect datalogger from the Power and the Terminal block.

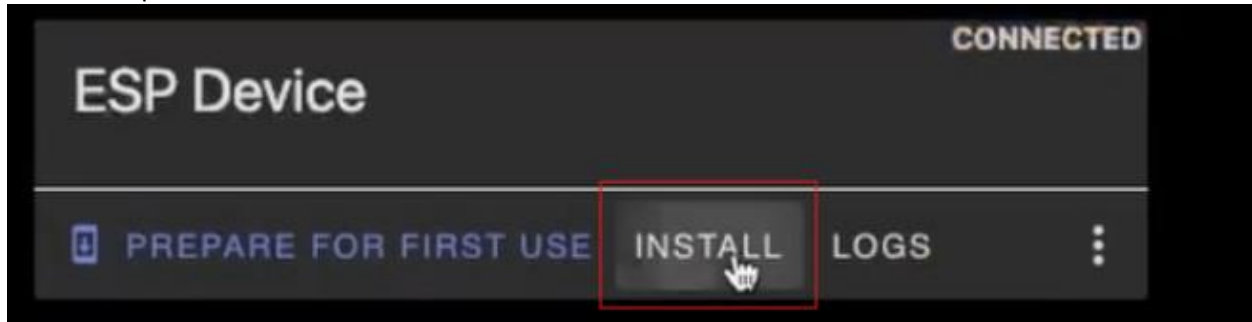
Step 2: Connect the USB-C cable from the Datalogger to your computer.

Step 3: Select Connect and choose your device from the list.



Step 4: Click Install button and select the downloaded image file.

Step 5: Click Install and wait until it finishes.



Step 6: Once completed, unplug the USB-C cable and re-connect it to the

5.4. Emergency and exceptional situations

5.4.1. In case of emergency

- Power OFF the Solar Inverter / Battery / Modbus Device (Please follow manufacturer manual)
- Call for help if any danger has happened.
- Unplug Datalogger from Power and Terminal Block to your Solar Inverter/Battery/MODBUS device.
- Contact your Certified Electrician

5.4.2. In case of inverter not behaving as expected or minor anomaly.

- Unplug Datalogger from Power and Terminal Block to your Solar Inverter/Battery/MODBUS device
- Check if issue persist if so, please use Vendor based configuration App to set the settings
- Contact SunMate.IO Support: support@sunmate.io

6. Maintenance and cleaning

NOTICE: Make sure the Datalogger is dust and within the acceptable humidity and temperature.

How to maintain the product

All maintenance is done from the SunMate.IO Portal.

6.1. Troubleshooting and repairs by non-skilled person

WARNING: Do not attempt any repairs, which are not present in the table below.

Effect	Cause	Solution
Status LED is Yellow	Datalogger cannot establish internet connection.	<ol style="list-style-type: none"> 1. Ensure your home WiFi has connection to the Internet 2. Ensure Datalogger is paired successfully to the home WiFi network (see Step 4 and Step 5 from the Installation procedure)
Datalogger cannot connect to local WiFi Network	<ol style="list-style-type: none"> 1. Credentials are not correct 2. You are trying to connect to 5GHz network 	<ol style="list-style-type: none"> 1. Re-enter credentials – see Step 4 and Step 5 from the installation procedure. 2. Connect to a 2.4GHz network.
Status LED is Red	The connection to SunMate.IO backend is not reachable.	<ol style="list-style-type: none"> 1. Ensure your home WiFi has connection to the Internet 2. Ensure Datalogger is paired successfully to the home WiFi network (see Step 4 and Step 5 from the Installation procedure) 3. Ensure firewall is open to iot.sunmate.io on port 8884 4. Try to reimage Datalogger, rebuild a new Image, if issue still persist contact support

Page http://192.168.4.1 cannot be reached	Client device connecting to Datalogger is not on the Datalogger Access Point	<ol style="list-style-type: none"> 1. Disconnect your computer from any other internet connection (LAN, Mobile dongle or other WiFi Network) 2. Ensure the computer is connected to the network Sunmateio-Pulse-AP
Image upload is not successful	Datalogger is in failure state	<ol style="list-style-type: none"> 1. Datalogger may need to be reset, open the cover and push reset button on the board when the datalogger has power on 2. Try to reconnect power

6.2. Troubleshooting and repair by skilled person

WARNING: If any of the proposed solution do not give the expected result, contact SunMate.IO support.

Effect	Cause	Solution
Status LED is not on	Datalogger does not have power	Verify the Inverter is powered on. Verify the wires of the datalogger are in excellent condition and connected properly

7. Disposal

The SunMate.IO Pulse Datalogger is WEEE certified, which means it must NOT be disposed of in regular trash. Instead, the Datalogger must be taken to an authorized electronic waste disposal facility.

At SunMate.IO, we are committed to protecting the environment. Ensuring proper disposal of electronic devices is part of our dedication to sustainability and reducing our ecological footprint. Please join us in this effort by recycling your Pulse Datalogger responsibly. Your actions contribute to a healthier planet for future generations.

SunMate.IO has already paid for the disposal of the Datalogger.



8. Product Responsibility

SunMate.IO is approved “Dansk Producent Ansvar” and follows the Danish Law.

Registration: 15.7.2024

Check the registration here: <https://producentansvar.dk/forside/dpa-soegning/detaljeside/?oid=producers-44735725>

9. CE



Conformité Européenne - The CE mark indicates that a product has been assessed by the manufacturer and deemed to meet EU safety, health and environmental protection requirements.

Hereby, SunMate.IO ApS declares that the radio equipment type PULSE HW064, PULSE HW164, PULSE HW264, Pulse HW384 are in compliance with Directive 2014/53/EU. They are also compliant with EU RoHS 2 (Directive 2011/65/EU) and RoHS 3 (EU 2015/863)

The full text of the EU declaration of conformity is available at the following internet address:
<https://www.sunmate.io/compliance> The full declaration of conformity is also available from our EU responsible party.

Manufacturer and EU Responsible Party

SunMate.IO ApS
Duehusvej 85
4632 Bjæverskov
Denmark

Supported frequency Bands: 2.4GHz Wi-Fi.

Maximum radio-frequency power: 17.13 Power (dBm), 19.15 EIRP (dBm)