



Solar PV Monitoring & Analytics

Installation Guide – WM-Mega, WM-Mini2, WM-Mini3 & WM-Mini3-4G

[Power Control- Zero Export Device]

Internet of Things

Solar Energy



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Introduction

This Manual explains how to install WM-Mega/Mini2/Mini3/Mini3-4G Logger with any Modbus RTU/TCP Device for purpose of setting up Power Control or Zero Export Device functionality.

Important Information

This manual is intended for skilled people. Only qualified people with the appropriate skills should be allowed to perform the tasks set forth in this manual.

What should the technician know before going for the installation?

1. MODBUS communication and connections
2. How to do daisy chain connection
3. For enabling Zero Export/DG Sync technician should have know-how of installing multi-function meter with CT's.
4. Basic LAN Networking

Note:

- For meter installation support, Installers/EPC are required to reach meter manufacture/supplier
- Installation support for meter installation is not in scope of TrackSo

Incorrect installation or servicing may result in a risk of electric shock, fire, or other safety hazard.

TrackSo is not liable to any damages incurred to the person or the property due to incorrect installation of data loggers or any other device at the site. Please ensure you have the right information and equipment to perform the installation.

Tools and Materials Needed

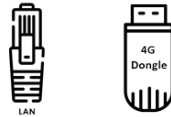
Read manual before beginning the installation to be sure you have everything you need.



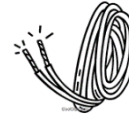
Laptop
With Internet
Connectivity



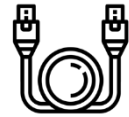
Modbus RS485 Enabled
Bi-Directional Meter with
CT's for Grid or DG Side



Internet Connectivity for
Device
(Lan or Dongle with Sim)



2 & 4 Core Wire for
Modbus-RS-485
Connections



CAT6 cable for Modbus
TCP based Inv
Connections & Internet



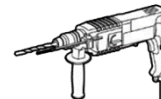
Screw Driver



Multi Meter



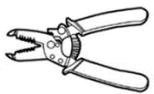
Allen Key Set



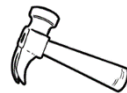
Hammer Drill



Pliers



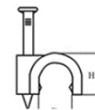
Wire Stripper



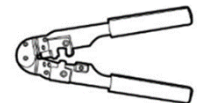
Hammer



Cable Ties



Saddle Clips

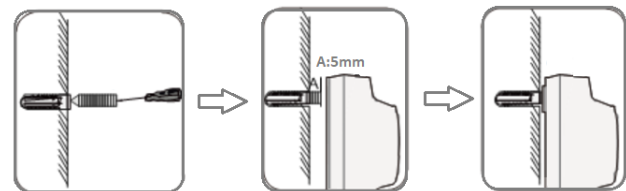


RJ45 Crimping Tool

Installation Location

To keep the device away from damage & working normally, following conditions should be met when choosing installation place.

- For outdoor installation or operation under adverse conditions the device must be mounted in an additional casing that meets the requirements of the required protection class.
- Direct sunshine, vibration and pressure should be avoided.
- Area for connecting cables should face downwards
- Hang the Data Logger kit (IP65 box supplied) on the wall instead of drilling in the box.



Power Supply

1. Be sure that the power supply voltage remains within the allowed range to avoid any damage to device.
2. Connecting the supply voltage to the RS485 port will damage the data logger and other connected equipment's.
3. Install **Power Backup (UPS)** for continuous working of Data Logger as per site requirements. Sample Specs (12V DC /2A)- <https://amzn.to/2NnFmMy>
4. **Overvoltage Protection**- Its highly recommended to install of a surge protective device (SPD's etc.) to help to ensure an efficient level of device availability as per site requirements. More Details- <https://bit.ly/3pigZy0>

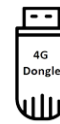
Modbus RS485 Wiring

1. **RS485 Cable**- Using random cables instead of shielded twisted-pair of RS485 cables for communication connections affects the longevity of the solution. Kindly use proper shielded twisted-pair of RS485 Modbus cable for long-term error free usage. (Example- Belden #3106A)
2. Use 0.5 mm² RS485 cable for runs up to 300 meters and 0.75 mm² for runs up to 1200 meters
3. Run RS485 cable away from high voltage lines and earthing lines and in a separate conduit.
4. Always use a continuous length of wire, avoid combing wires to attain the needed length.
5. Use the wire trays for routing where possible and avoid creating sharp bends in the wires
6. **Overvoltage Protection**- Its highly recommended to install of a surge protective device (SPD's etc.) to help to ensure an efficient level of device availability as per site requirements. More Details- <https://bit.ly/3pigZy0>
7. When there are external devices (such as weather monitoring system) connected to the Data Logger, add corresponding communication SPD according to onsite condition.
8. More Details about wiring- <https://trackso.in/project/rules-perfect-cabling-modbus-rtu-rs485-communication-systems/>

Internet Connectivity

For Connecting Model: **WM-Mega/WM-Mini2/WM-Mini3** with Internet following two Options are available:

- LAN
- USB Dongle (Specific Models are supported)



Arrange any one or both Internet connectivity options and insure they are working.

List of compatible dongles is available in FAQ's section in: <https://trackso.in/power-control-zero-export/>

For Connecting: Model **WM-Mini3-4G** with internet you can either use 4G/3G/2G networks or LAN

Remote Link to Device

Once the device is connected to internet you will be able to access the device remotely by entering mac-id at below link:

Remote Link : <http://remote.trackso.in>
Mac-id Format : XX-XX-XX-XX-XX-XX
Default Login : **User:** admin
Password: admin



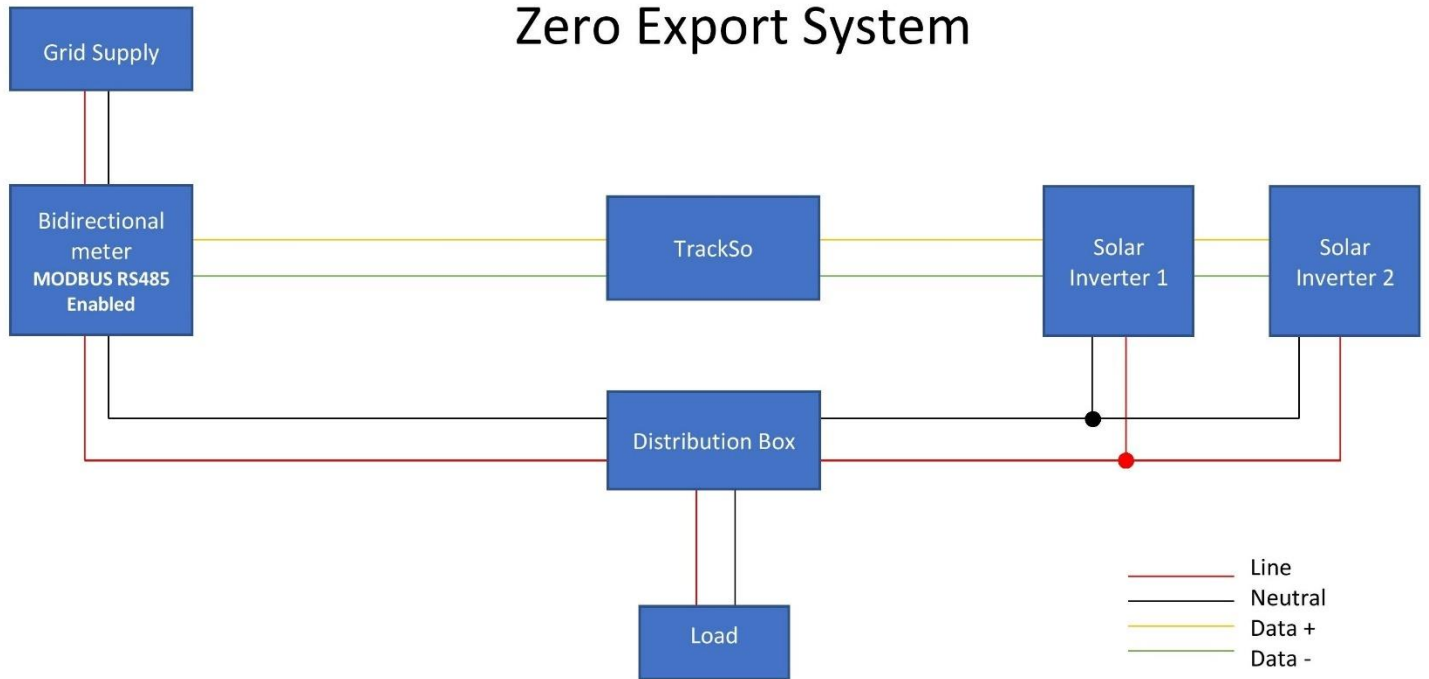
Mac id is printed on right-side of the device

Steps for Installation

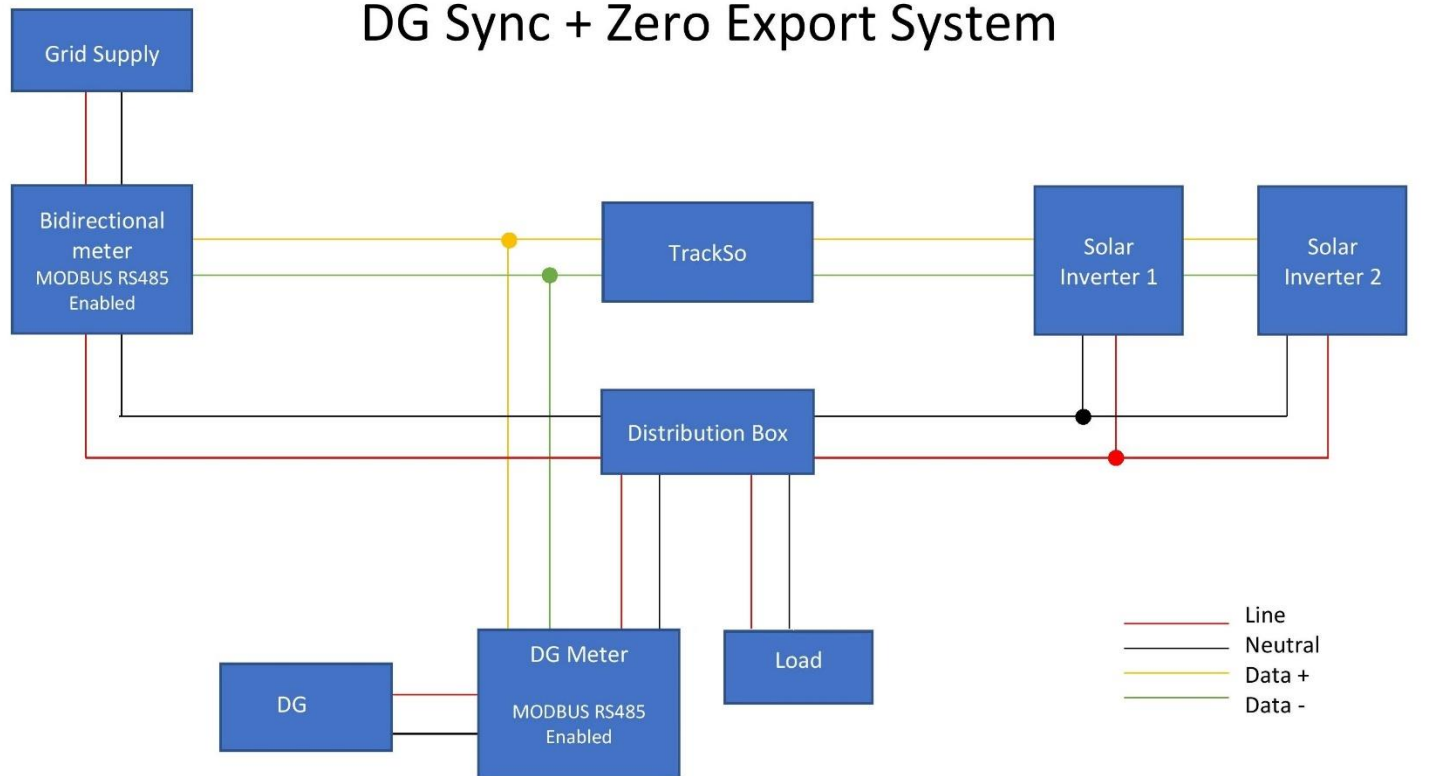
Overview of steps involved in installation & enabling of Power Control: Zero Export

- Step 1:** Create basic single line diagram of your plant on a paper and identify the material required for your site.
- Step 2:** Arrange all the necessary material & tools required for the installation
- Step 3:** Connect WM-Mega/WM-Mini2/WM-Mini3 to Internet via LAN or Dongle. Insure you are able to access it remotely
- Step 4:** Connect WM-Mega/WM-Mini2/WM-Mini3 to all Inverters and Bi-Directional Meters installed
- Step 5:** Login to Remote Link and Navigate to Device and verify all equipment's are displayed as "Active"
- Step 6:** Navigate to Settings > Power Control and enable Zero Export [Reach TrackSo support]
- Step 7:** Verify working of Power Control: Zero Export Device

Zero Export System



DG Sync + Zero Export System



Connecting WM-Mega/WM-Mini2/WM-Mini3 to Internet

Once you have finalized the internet connectivity option, follow either of the next 3 methods for connecting device with internet.

Method- 1 Connecting WM-Mega/WM-Mini2/WM-Mini3 using a USB Dongle

1. Power on the device and connect any supported dongle in the USB port.
2. Use Dongle manual Check the internet connectivity status by using as LED Light pattern of dongle. (Sample dongle manual of Huwai- E3372: <https://imgur.com/a/Wztt63z>)
3. Once internet is available as per dongle LED Pattern. Open <http://remote.trackso.in/> in incognito window of any browser and enter Mac id of your device.
4. If Internet is available, you will see the Welcome to Wattmon page, the device is now available online for checking status and ready for sending data on portal.



Login using default details

user: admin

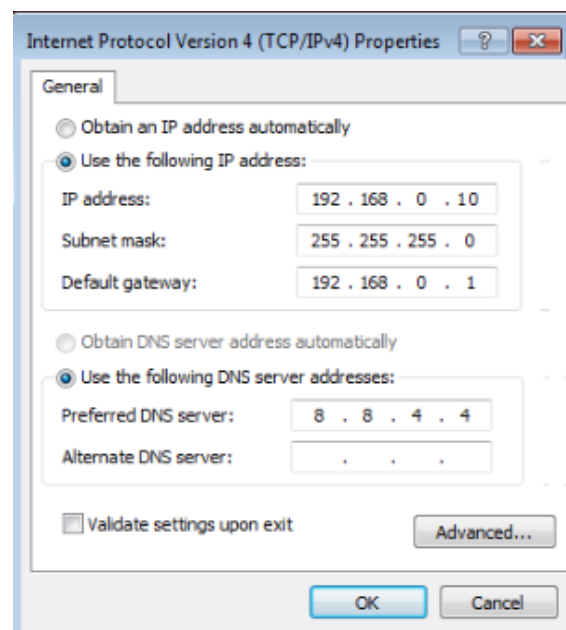
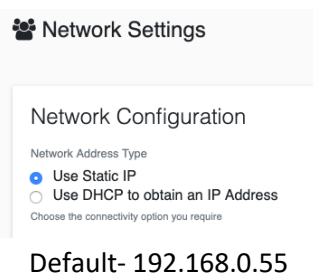
password: admin

If you were not able to connect to internet via Dongle, follow:

Method- 2 Connecting WM-Mega/WM-Mini2/WM-Mini3 using LAN [Static IP based Internet Connection]

The device comes preconfigured with Static Ip- **192.168.0.55**

If the IP address range of your computer is the same as that of the device, you can access the WEB UI of device by opening a web browser and trying to open 192.168.0.55 in the address bar. To determine your IP address, run cmd.exe and type in *ipconfig* and press *Enter*. When using Microsoft Windows, if the IP address is in a different range, you will need to temporarily change your IP by following these steps



Detailed step by step procedure (with screenshot) is available at-

<https://bit.ly/2K98OIB>

Steps to set required Static IP address:

1. Open Network and Sharing Centre, and click on Local Area Connection.
2. In the Local Area Connection Status window, click on Properties.
3. In the Properties window, select Internet Protocol Version 4 (TCP/IPv4) and click on Properties.
4. Make a note of the information displayed so you can restore this later. (If you do not reconfigure your connection after you setup the device, your Internet connection may not work.)

5. Enter the following values into their respective places, and save.

Laptop Network Settings to be changed to:

IP address: 192.168.0.10

Netmask: 255.255.255.0

Default Gateway: 192.168.0.1

6. Open your browser and type in 192.168.0.55 and press enter. You should see the Welcome to Wattmon page.
Login using default details
user: admin
password: admin
7. After logging in navigate to Settings > Control Panel > Network Settings and enter the desired Static IP Settings
8. Save the changes and reboot. If the settings are successfully applied, you will *not* be able to reach the login screen of your device
9. Return your computer to the original network settings by following steps 1-4.
10. Open a browser and type in the new IP Address assigned by you to your device and press Enter. If you see the Welcome to Wattmon page, the network setup for your device is completed.
Login using default details
user: admin
password: admin

The screenshot displays the Wattmon web interface. The browser address bar shows the URL 192.168.0.55/app/network.cgi. The page header includes the Wattmon logo, navigation links for Dashboard, Graphs, Settings, and Admin, and the firmware version: Firmware Rev. 2.1135 - WattmonOS 3.1 (WM-MEGA). The breadcrumb trail is Home / Control Panel / Network Settings. The main heading is Network Settings, with options for Help, Close, Defaults, and Apply Changes. The Network Configuration section is active, showing the 'Use Static IP' option selected. Below this, the IP Address is set to 172.16.0.227 and the Network Mask is set to 255.255.252.0. A note at the bottom of the configuration area states: 'Usually this will be 255.255.255.0 but adjust according to your local network requirements.'

Method-3 Connecting WM-Mega/WM-Mini2/WM-Mini3 using LAN [DHCP based Internet Connection]

Follow these steps to change the Network setting from Static IP (192.168.0.55) to DHCP

1. Follow Method-2 Steps 1 to 6 to reach Network Settings option
2. After logging in navigate to Settings > Control Panel > Network Settings
3. Change Network Settings from Static to DHCP
4. Save Changes & Reboot

The screenshot shows the Wattmon web interface. The address bar displays '192.168.0.55/app/network.cgi'. The navigation menu includes 'Wattmon', 'DASHBOARD', 'GRAPHS', 'SETTINGS', and 'ADMIN'. The page title is 'Network Settings'. The 'Network Address Type' section has two radio buttons: 'Use Static IP' (unselected) and 'Use DHCP to obtain an IP Address' (selected). Below this, it says 'Choose the connectivity option you require'. Action buttons include 'HELP', 'CLOSE', 'DEFAULTS', and 'APPLY CHANGES'.

Slave Connections & Settings

Now connect required Inverters and meters to device Modbus.

Following link with guide you on how to connect and do slave setting

Inverter/Meters - For Connections and Settings, refer to 'Installation Manual [Inv Brand]' on:

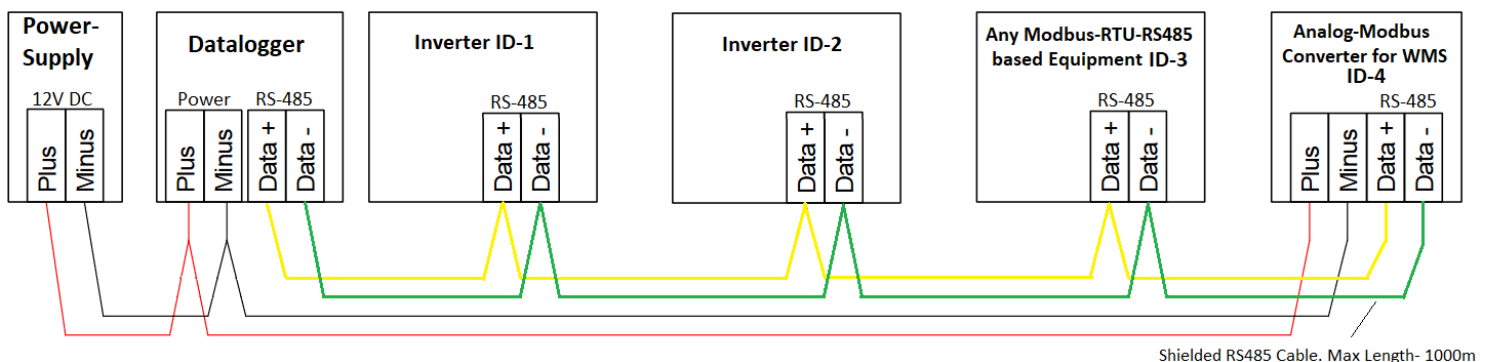
<https://trackso.in/trackso-installation-manuals/>

WMS (if any) - For physical installation and mounting of sensors, refer to 'Datasheet & Installation Guide – [sensor name]' on <https://trackso.in/datasheets/>

Note: - Remove any other Monitoring device connected to the setup (such as Inverter WiFi Sticks).

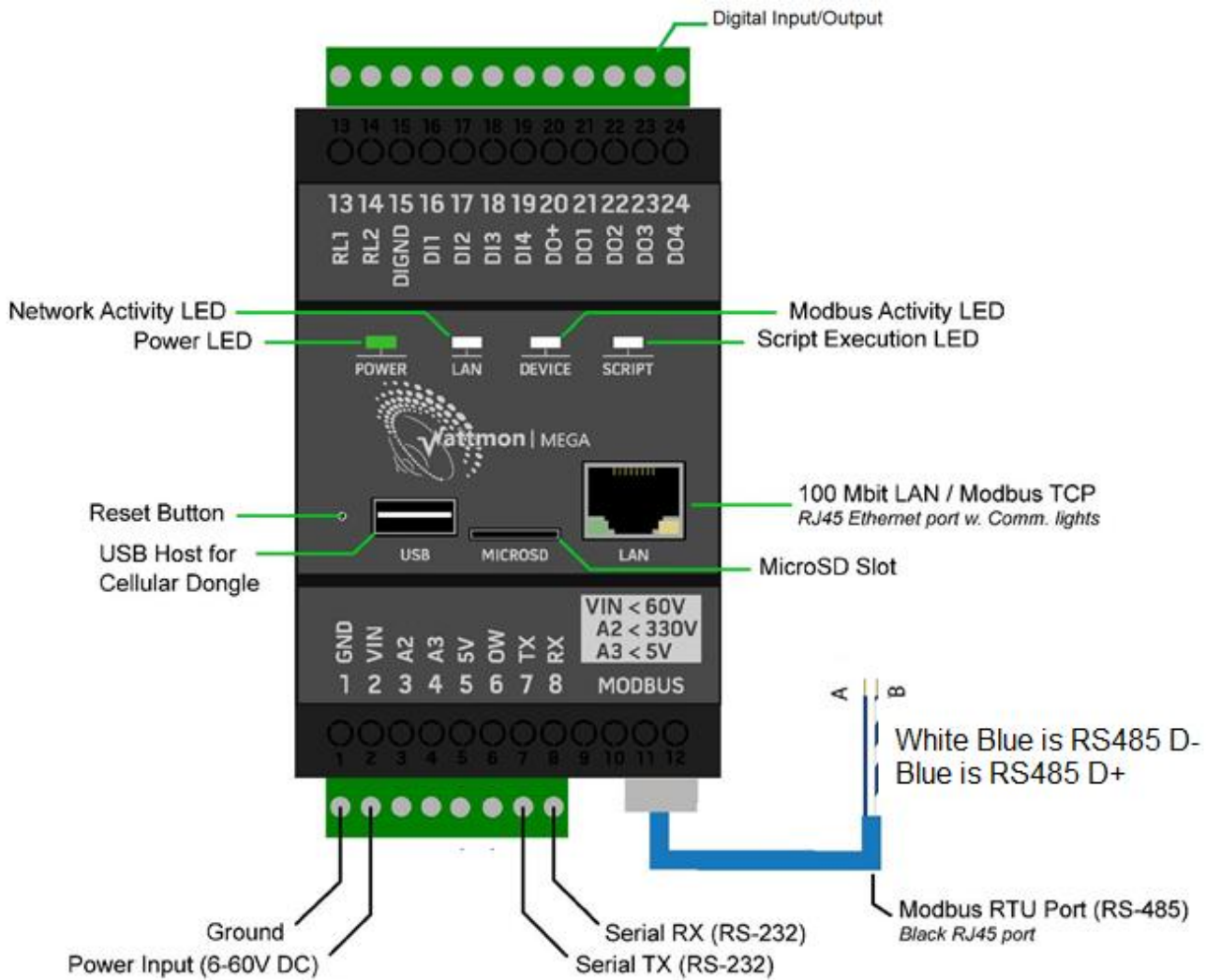
Sample Connection Diagram

Sample diagram -Connecting 4 Modbus RTU RS485 based equipment's (Inverter/MFM Meter/WMS/SMB)



Pinout details

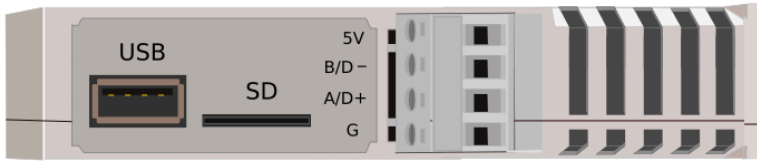
WM-Mega



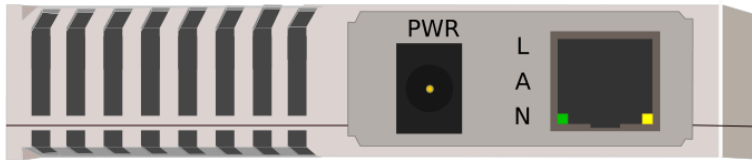
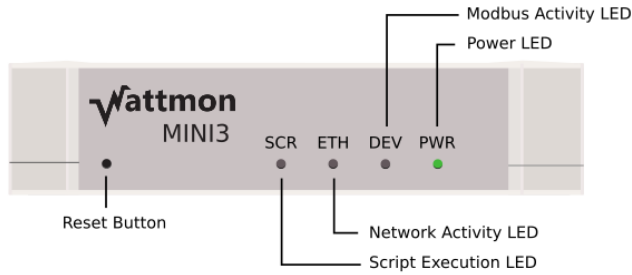
WM-Mini and WM-Mini2



WM-MINI3



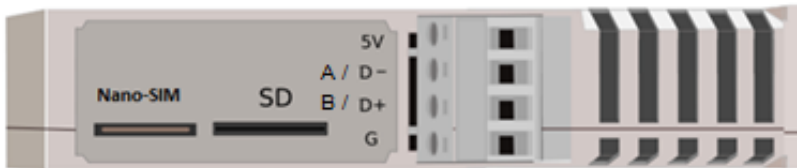
Pin 1- 5V DC Output
Pin 2- RS485 D+
Pin 3- RS485 D-
Pin 4- Ground



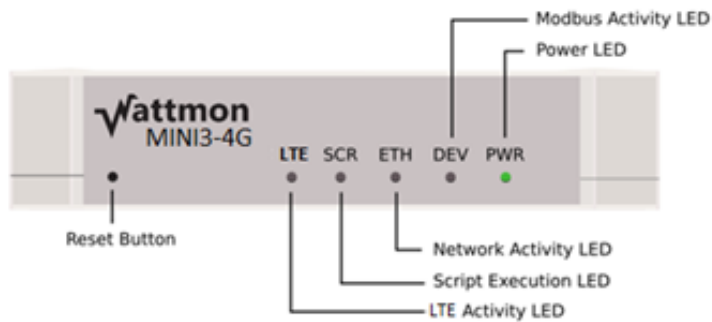
PWR- 12V DC Input for powering up Data Logger

LAN- for Connecting LAN Network

WM-MINI3-4G



Pin 1- 5V DC Output
Pin 2- RS485 D-
Pin 3- RS485 D+
Pin 4- Ground



Nano-Sim Slot



PWR- 12V DC Input for powering up Data Logger

LAN- for Connecting LAN Network

Checking Connected Device Status

Your device is pre-configured and will display the list of devices you wanted to monitor. After logging in navigate to Settings > Devices to view the list of pre-configured devices.

The screenshot shows the Wattmon web interface. At the top, there is a navigation bar with 'Wattmon', 'DASHBOARD', 'GRAPHS', 'SETTINGS', and 'ADMIN'. The 'SETTINGS' menu is open, and 'Devices' is highlighted. Below the navigation bar, there is a breadcrumb trail: 'Home / Control Panel / Modbus Devices'. The main content area is titled 'Modbus Devices' and displays a table of connected devices. The table has columns for 'ID', 'Channel', 'Name', 'Role', 'Status', and 'Options'. One device is listed with ID '126', Channel 'TCP Channel 1', Name 'ae9a536b8c', Role 'TrackSo SMA Sunny Tripower 60 and SHP1', and Status 'Active'.

On Modbus Devices page following relevant details are displayed:

1. Id assigned to slave
2. Slave name (inv brand name/sensor etc)
3. Status (Active/Error)

Status- Next to the Type of a device is the Status – if online and connected, it will display as **Active**, and if not connected properly, then as **Error**.

Once all the devices (inverters/sensor) are connected and having Status **Active**, you can restart the logger and check data on portal in 10 mins.

If the status remains **Error** then kindly correct the connections/settings and refresh this page to re-check this page.

Power Control (Zero Export/DG Sync)

If you have also purchased Power Control License for enabling Zero Export or DG Sync. You will be required to enable the power control feature by calling TrackSo Support.

Please note its suggested to enable power control only when all the devices/systems are in Active State. Once Power Control is active status its status is displayed on the 1st screen after login on welcome page.

The screenshot shows the Wattmon web interface. At the top, there is a navigation bar with 'Wattmon', 'DASHBOARD', 'GRAPHS', 'SETTINGS', and 'ADMIN'. The 'SETTINGS' menu is open. Below the navigation bar, there is a breadcrumb trail: 'Home / Control Panel / Modbus Devices'. The main content area is titled 'Live Energy Overview' and displays a green icon of a solar panel with the word 'Solar' next to it. A notification banner at the top of the main content area reads: '[pc] Inverter 0 old percent=100 and new percent=28.5 [pc] Inverter 1 old percent=100 and new percent=34.6'.

Verify Zero export is working properly

It has been observed that during installations, installer emphasizes on the installation of the device and leave the site when it is done. One important aspect that is majorly missed is to verify the working of the Power Control (ZED).

Following webpage covers the steps with sample visuals through which installer can appropriately verify the installation and working of Zero Export Device.

Link <https://trackso.in/knowledge-base/how-to-ensure-if-zero-export-is-working-properly/>

Exceptions

The purpose of this application is to avoid the Asset Owner to export energy back to the Grid. Normally, there are several seconds delay expected from the Inverter to respond to the power curtailment command. The frequency of the Inverter being power curtailed will depend on the Load fluctuation. Similarly, whether the response speed of the inverter towards power curtailment could meet expectation would also depend on the speed of Load changes. The Asset Owner shall pay attention to site suitability for this application. For example, a site with many VFD and Compressor will have frequent fast load changes and may not be suitable

Others Important Details

Detailed Manuals

Note: Detailed Installation manual is available at the Manufacturers website.

Link- http://wattmon.com/dokuwiki/_media/hardware/wattmons/wattmon_quick_start_guide.pdf.

We have tried to extract basic information for your use to help you bring your system online without any issues.

FAQ's

➔ **How to reset device to default Network Setting of Static Ip – 192.168.0.55?**

In order to reset the IP address on your device to the default static ip 192.168.0.55, press and hold the reset button (located to the left of the USB port - you will need a pin to access it) for about 5 seconds until the Script light stops blinking, and re-power your device.

➔ **Installing a Bi-Directional meter on Grid side is mandatory for Zero Export?**

Yes, this is mandatory. Compatible brands list is available [here](#)

More Details available on - <https://trackso.in/power-control-zero-export/>

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