



**Wattmon**

**QUICK START**

**GUIDE**

***2017***

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# Welcome to Wattmon!

Congratulations on the purchase of your Wattmon device.

Wattmon is a versatile platform which can be configured for countless applications. The inbuilt web server provides all of the tools necessary to customize the device. No programming is required to set up actions based on various triggers, which can control I/O lines, send emails and more.

This guide takes you through the devices and teaches you to configure them to various Inverters and Energy Meters. For more information, log onto [www.wattmon.com](http://www.wattmon.com).

*(Note: WattmonPRO supports RS-485 Modbus RTU/TCP and RS-232 Serial interfaces, and several other I/Os, whereas the WattmonMINI supports only RS-485 Modbus RTU/TCP.)*

## Technical Specifications

### Power Requirement

**WattmonPRO:** 6 to 60V DC (*Consumption: 2W without accessory devices*)

**WattmonMINI:** 220V AC

### Connectivity

**LAN:** Built-in LAN port for direct connection to computer or router

**USB:** 2G/3G via a USB Stick

### Body

#### **WattmonPRO**

Dimensions: 130 x 70 x 75mm

Weight: 200g

#### **WattmonMINI**

Dimensions: 112 x 40 x 90mm

Weight: 150g

### Inputs and Output Ports (Applies to only WattmonPRO)

**Analog Inputs:** Three analog input channels with a 10-bit ADC

**1-Wire:** Dallas 1-Wire bus for DS18B20 Temperature Sensors

**RS-232:** Serial port to interface with various third-party devices

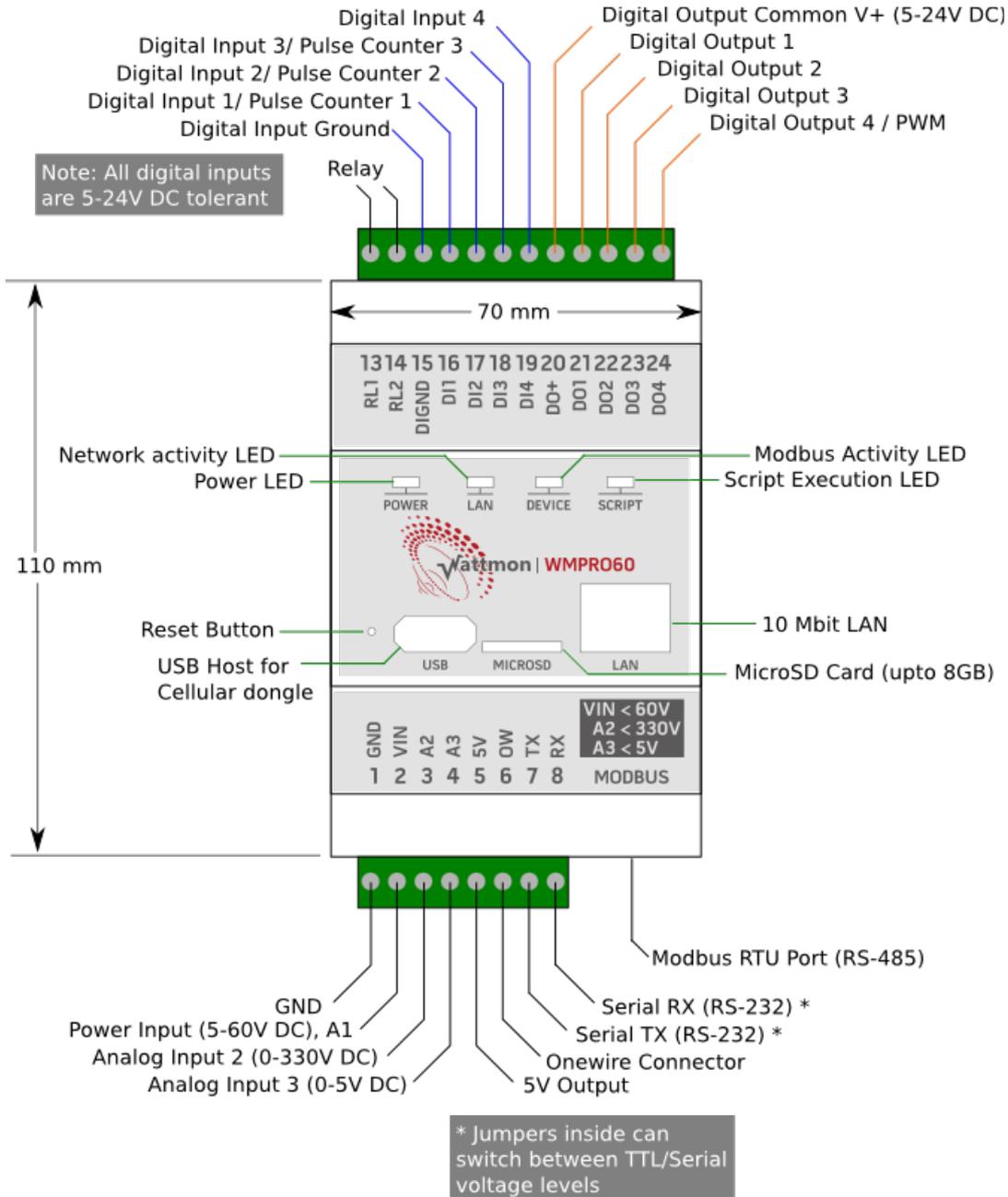
**RS-485:** Modbus RTU/TCP to interface with various Wattmon and third-party devices

**On-board Relay:** Latching relay to switch DC or AC loads of upto 5A

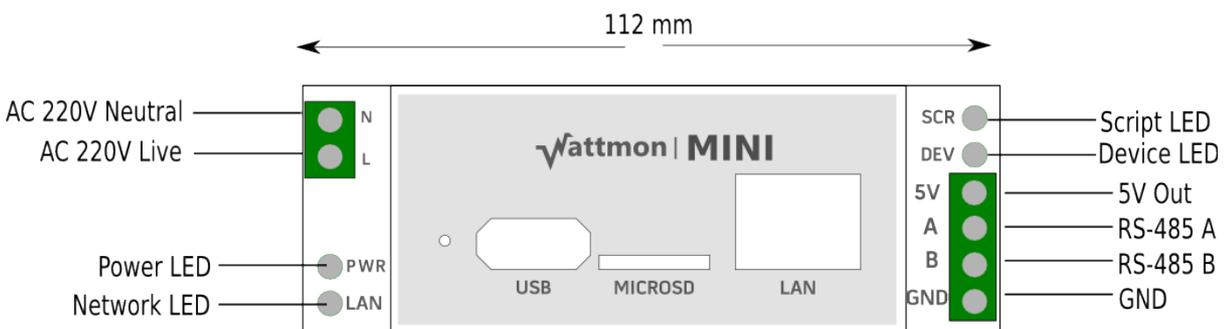
**Digital Inputs:** Opto-Isolated, handle between 4 to 24V DC

**Digital Outputs:** Four digital input channels can handle upto 500mA per pin

# Pinout Diagram - WattmonPRO



# Pinout Diagram – WattmonMINI



## Connecting to your Device

Turn on your device by connecting it to its power source – the WattmonPRO can be powered either by a 12V DC adaptor or by a DC cable connected to a battery. The WattmonMINI needs to be connected to a standard AC power cable by plugging the wires in to the neutral (*N*) and live (*L*) pins on the WattmonMINI.

Once powered on, connect your device via a direct ethernet cable to your computer. The device comes preconfigured to use a static IP address of *192.168.0.55*.

If the IP address range of your computer is the same as that of the Wattmon, you can access the Wattmon by opening a web browser and typing in *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 :

1. Open *Network and Sharing Center*
2. Click on *Local Area Connection*
3. In the *Local Area Connection Status* window, click on *Properties*
4. In the *Properties* window, select *Internet Protocol Version 4 (TCP/IPv4)* and click on *Properties*
5. Make a note of the information displayed so you can restore this later. (If you do not reconfigure your connection after you setup the Wattmon device, your Internet connection may not work.)
6. Enter the following values into their respective places, and save.  
*IP address : 192.168.0.8*  
*Netmask : 255.255.255.0*  
*Default Gateway : 192.168.0.1*
7. Open your browser and type in *192.168.0.55* and press enter. You should see the *Welcome to Wattmon* page.
8. After entering the network settings of your choice, as shown in *Basic Setup – Network Setup*, save the settings and reboot. If the settings are successfully applied, you will not be able to reach the login screen of your Wattmon.
9. Return your computer to the original network settings by following steps 1-5.
10. Open a browser and type in the new IP Address assigned by you to your Wattmon and press enter. You should see the *Welcome to Wattmon* page. Your network setup is now complete.

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

# Understanding the WattmonOS

The Wattmon devices run on our proprietary operating system, called the *WattmonOS*, which is written in C and uses the FreeRTOS task scheduler. It features an interpreter that can process uPHP, our custom scripting language based on PHP. The WattmonOS is best described into two parts – the firmware layer and the application layer. The firmware layer is embedded on the Wattmon flash memory, whereas the application layer is stored on a microSD card. The firmware reads configuration files at power up off the microSD card and initialises the system accordingly.

Do note, while the ‘OS’ version can be updated by updating certain files on the microSD card externally, the firmware update is always performed on the Wattmon device. For more details on the procedure, go to **Advanced Setup** or **F.A.Qs**.

## WattmonOS Interface

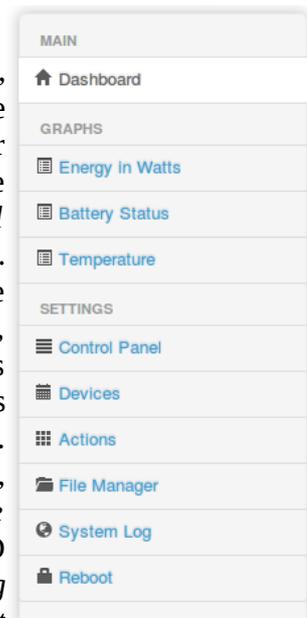
Upon logging into your Wattmon, you will reach the *Dashboard*, which varies based on your monitoring requirement. However, all Wattmon devices feature the header and the menu bar, which are always present on every page of the device, and the control bar which is found in all other pages, under the page title.

The header displays the Wattmon logo along with the login name drop-down, *Theme/Skin* drop-down, date and time, and up time of your Wattmon. The login name displays the login, which can be either *admin* or *guest*, or other as per your choice. The default is *admin*. Upon clicking on the login name, a drop-down menu appears, displaying *Rotate Logs*, which rotates the system log to a new file, *Clear Cache*, which clears the cached files on the device, and *Logout*, which returns the Wattmon to the login screen.

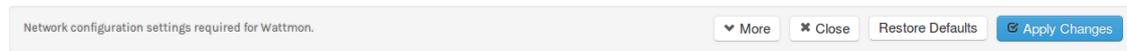


The menu bar consists of various options split into three groups – *Main*, *Graphs*, and *Settings*.

The first group, *Main*, contains an option called *Dashboard*, which returns you to the main screen of your Wattmon. The next are *Graphs* pages, which can vary depending on your setup. These lead to dedicated graphs for the data you are monitoring. The remaining group, *Settings*, consists of *Control Panel*, *Devices*, *Actions*, *File Manager*, *System Log* and *Reboot*. The *Control Panel* takes you to the main settings page of the Wattmon. *Devices* takes you to the page of the same name, wherein you can add, remove, or configure Wattmon modules or 3<sup>rd</sup> party devices connected to your Wattmon. *Actions* lets you set custom commands for automated alerts or functions. For more details on how to configure actions on your Wattmon, refer to the more detailed **Using your Wattmon Guide**. *File Manager* allows you to access the root folder of the microSD card and all the contents of the WattmonOS scripts. *System Log* provides a log of runtime functions on the Wattmon. *Reboot* restarts the Wattmon and returns you to the login screen.



The control bar is not found on the Dashboard, but can be seen on any of the pages accessed via the menu bar. The functions on the control bar can vary from page to page, depending on the required function. You will find more details on this in the next section. However, the control bar always features a *More* button which displays details on a particular page, and commonly features a *Restore Defaults* and an *Apply Changes* button, which either restore the settings on that page to the WattmonOS default, or save the current settings.



You will also notice that each page has a footer, which on the right corner displays the firmware version as well as the OS version on the Wattmon. The device type is mentioned in brackets – *WM-PRO* for the WattmonPRO and *WM-MINI* for the WattmonMINI. On the left corner, the footer displays the year of release for the WattmonOS. The footer notice, on the right side, appears like this -

**Firmware Rev. 1.1040 - WattmonOS 2.15 (WM-PRO)**

## File Manager

The contents of the WattmonOS on the microSD card, including scripts or configuration files, can all be viewed using the *File Manager*. The *File Manager* is used primarily to upload config files locally from your computer and extract them to the root of the microSD, or to restore backups. It is particularly useful when small updates are provided by us to you directly, and not over-the-air.

 **Index of /**

Filter:  New File Upload Files Refresh

Name	Size	Type	Last Modified	Options
 <a href="#">app</a>		Folder		
 <a href="#">cache</a>		Folder		
 <a href="#">config</a>		Folder		
 <a href="#">css</a>		Folder		
 <a href="#">dev</a>		Folder		
 <a href="#">img</a>		Folder		
 <a href="#">js</a>		Folder		
 <a href="#">lang</a>		Folder		
 <a href="#">lib</a>		Folder		
 <a href="#">logs</a>		Folder		
 <a href="#">package</a>		Folder		
 <a href="#">scripts</a>		Folder		
 <a href="#">shell</a>		Folder		
 <a href="#">widgets</a>		Folder		
 <a href="#">changelog.txt</a>	4561	Archive	2017-03-20 10:24	
 <a href="#">config_delta.tar</a>	29184	Archive	2017-03-20 08:25	
 <a href="#">firmware.tar</a>	1373696	Archive	2017-03-20 10:24	
 <a href="#">image.hex</a>	1365740	Archive	2017-03-20 10:24	
 <a href="#">index.cgc</a>	30838	Archive	2017-03-22 15:32	
 <a href="#">index.cgi</a>	10278	Archive	2015-03-23 09:41	

Create Folder:  Create

Upload Files:  No files selected.  
Click on the above link to upload files

Users have to be very careful to not modify files in the *File Manager* as that can seriously damage the setup on your Wattmon, corrupting the settings as well as the logged data.

All files are listed with details such as Name, Size, Type, Last Modified and Options. Options consists of three options, that can vary between files, which are *Edit* , *Delete* and *Uncompress*, each denoted by the following icons respectively:



The control bar features four options – *Filter*, *New File*, *Upload Files* and *Refresh*. *Filter* allows you to search for a particular file. *New File* creates a new folder in the root of the microSD. *Upload Files* allows you to upload a file to the root of the microSD card. *Refresh* allows you to refresh just the File Manager without having to refresh the entire page in your browser, which allows the directory to load faster without using much bandwidth.

To upload a file to root folder of your Wattmon microSD, first go to the *File Manager*. Click on *Upload Files* on the control bar. The page will scroll downwards to an option called *Upload Files : Browse*. Click on the *Browse* button and select the *.tar* file you wish to upload. If you wish to upload multiple files, upload them one by one and not all in one go, as that can sometimes corrupt the files. All configuration or back-up files on the WattmonOS are compressed in a *.tar* format. Once the uploading process starts, the file name will display next to the *Browse* button. Once the file has been uploaded to the Wattmon microSD successfully, you will be greeted with a message saying *Uploaded file:config.tar:OK*, where *config.tar* will be the file you uploaded.

Upload Files:  config\_delta.tar

Click on the above link to upload files

Uploaded file:config\_delta.tar:OK.

To extract the *config.tar* file, click on the Uncompress icon and wait for the extraction to complete. While extracting, the File Manager will display all the files extracted and at the end of it give a confirmation message stating *Uncompressed file config.tar*.

```
Uncompressing Archive, this may take some time, please wait...
config/roles.ini
config/dataLog.ini
config/dns.ini
config/widget.ini
config/packages.ini
config/setup.ini
config/uphp.ini
config/3g.ini
config/crontab.txt
config/graph.ini
config/groups.ini
config/sysvars.ini
config/usb.ini
config/device.ini
config/GrdTie.ini
config/battery.ini
config/GraphWidget.ini
config/
Uncompressed file config_delta.tar
```

# Basic Configuration Setup

Once you boot into your Wattmon device on the computer, you will reach the *Welcome to Wattmon* page, under which you need to enter your login credentials. The default username and password of your Wattmon device are *admin* and *admin* respectively.

## Welcome to Wattmon

Please login with your Username and Password.

admin

\*\*\*\*\*

Login

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Firmware Rev. 1.1040 - WattmonOS 2.15 (WM-PRO)

Upon logging in, you will see the *Wattmon Dashboard*. For more details on the layout of the *Dashboard*, refer to the previous section, **Understanding the WattmonOS**.

The screenshot displays the Wattmon Dashboard interface. At the top, there is a blue header with the Wattmon logo, a user profile for 'admin', a 'Change Theme / Skin' button, and the date 'Tue Jan 10 10:10:30 2017, Up 0.0 hours'. On the left, a sidebar menu lists options: MAIN (Dashboard), GRAPHS (Energy in Watts, Battery Status, Temperature), SETTINGS (Control Panel, Devices, Actions, File Manager, System Log, Reboot). The main content area is titled 'Home / Dashboard' and contains several widgets: 1. 'Battery' widget showing Voltage at 12.2 V, Battery level at 57%, and Status 'Battery is discharging very slowly.' 2. 'Live Energy' widget with a line graph showing Grid (red), Solar (yellow), and Balance (blue) energy flows over time. 3. 'Control' widget with five 'Relay Output' buttons (all OFF) and a 'Mode' dropdown set to 'AUTO'. 4. 'Variables' widget listing: A1 Voltage (12.2), A2 Voltage (12.100001), A3 Voltage (0), Counter 1 (0), Counter 2 (0), Counter 3 (0), and Temperature 1 (0).

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Firmware Rev. 1.1040 - WattmonOS 2.16 (WM-PRO)

To the left of the *Dashboard*, you will find a menu bar of options, including *Control Panel*. Click on *Control Panel* and you'll find a large variety of color-coded options, marking the importance of those settings – the red being critical, the orange being

important, and the green being safe to change. In this part, we shall look at some of the essential basic settings to edit, such as *User* details, *Time*, *Network*, enabling a USB dongle, etc.

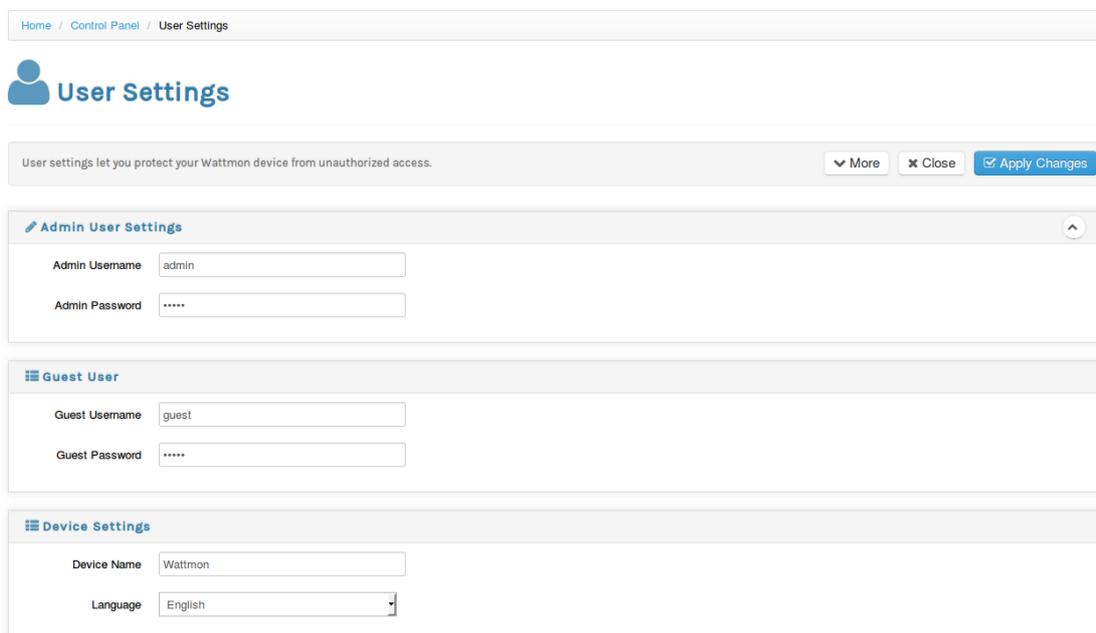
## Users and Security

The *Users and Security* settings allow you to change your default login credentials, set up a Guest account, change the name of your Wattmon device, and set the default language.

The default credentials for the Admin account are *admin* and *admin*. The default credentials for the Guest account are *guest* and *guest*.

The languages supported by Wattmon as of now are English, Spanish (partially) and German (partially).

To save the settings, click *Apply Changes* and wait for a confirmation message. You will need to reboot the Wattmon for changes to take effect.



Home / Control Panel / User Settings

### User Settings

User settings let you protect your Wattmon device from unauthorized access. More Close Apply Changes

#### Admin User Settings

Admin Username:

Admin Password:

#### Guest User

Guest Username:

Guest Password:

#### Device Settings

Device Name:

Language:

## Time Settings

Your Wattmon comes pre-configured to the time zone you are in. If, however, you find the time to be erroneous, or wish to change the time zone, you can change the time and date settings in this section.

There are several options such as SNTP, Date, Time, Use Wattmon Time Server, UTC Offset.

If *SNTP* (Simple Network Time Protocol) is enabled, you will only be able to change the *UTC offset*, to select the time zone of your choice. If *SNTP* is disabled, you will be able to manually change the time and date. We recommend that you keep the option *Use Wattmon Time Server* as enabled, as that allows the Wattmon to automatically update the time on a daily basis. This is the default setting. *If you are using a USB stick for network access, we recommend disabling SNTP as that works only on an ethernet connection.*

Alternatively, if the default settings haven't been changed, you can select the *Sync Time* option to force a time update from the Wattmon Server.

Home / Control Panel / Time and Date Settings

### Time and Date Settings

Configure your time and date settings here More Close Sync Time Apply Changes

#### Date and Time Settings

SNTP Protocol  Do not use SNTP  
 Use SNTP

Date 06 / 03 / 2017 (dd/mm/yyyy)

Time 14 : 48 : 28 (hh:mm:ss)

RTC Seconds Adjust Per Day 7

Use Wattmon Time Server  Disabled  
 Use Wattmon Time Server

UTC Offset [UTC + 5:30] Indian Standard Time, Sri Lanka Time

## Network Setup

These settings give you access to your Wattmon device over a particular IP address on your network.

The default setup uses a Static IP configuration, which can be changed to DHCP if needed. You Wattmon comes preconfigured to work on the *IP address 192.168.0.55*, with the *Netmask set to 255.255.255.0* and the *Gateway to 192.168.0.1*. The *DNS Server* is set as *8.8.8.8*.

Below these settings you will find the TCP settings, displayed as *TCP Server Export*, *TCP Server*, *TCP Server Port*. These settings enable the outbound access to the Wattmon, and should not be changed from the default, which is as displayed in the image below.

Home / Control Panel / Network Settings

### Network Settings

Network configuration settings required for Wattmon. More Close Restore Defaults Apply Changes

IP Address  Static IP  
 Dynamic IP (DHCP)

IP Address 192 . 168 . 0 . 55

Netmask 255 . 255 . 255 . 0

Gateway 192 . 168 . 0 . 1

DNS Server 8 . 8 . 8 . 8

TCP Server Export  Not enabled  
 Enabled

TCP Server remote.wattmon.com

TCP Server Port 7000

MAC Address

The last option is the *MAC Address* (media access control address) of your Wattmon device, which is a 12 digit alpha-numeric unique identifier assigned to network interfaces for communications at the data link layer of a network segment. The unique MAC address for the Wattmon is used as the device key when accessing it from the Internet. You will use this in the **Data Export** settings page

To configure your Wattmon to work on an IP address of your choice, enter the netmask, gateway and DNS settings referring to your modem, assign the Wattmon a unique IP address, and then save the settings by selecting *Apply Changes* and wait for a confirmation message. You will need to reboot the Wattmon to see your changes in effect. Do note, once the Wattmon reboots, it will not log in via the default IP; you will need to update the IP address in the address bar of your browser. To reset the IP address of your Wattmon to its default, select the *Restore Defaults* option, and apply changes.

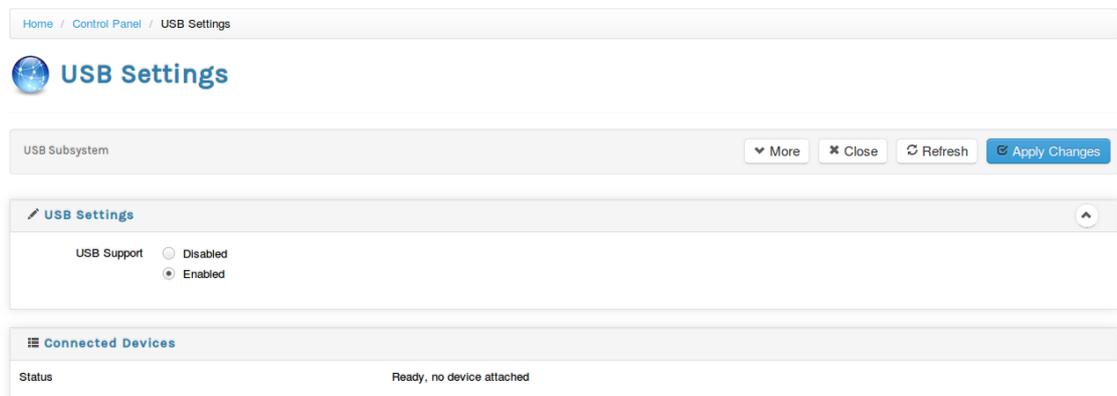
For more details, go to the **Troubleshooting** page.

## USB Devices

Under this setting, you have the option to enable the use of a USB dongle to connect to the Internet.

The default setting will display *USB Support* as *Disabled*. Select *Enabled* and perform a reboot after applying the changes. Insert the dongle into the USB slot on the Wattmon.

Upon logging in to your Wattmon, return to the USB devices page and check the *Status*. If the dongle is detected, the device details will be displayed along with a *Device attached* status. If however the status is *Ready, no device attached*, click on the *Refresh* button till the status changes. If the dongle is not detected, verify that it is compatible with the Wattmon.



So far, only three models are supported : Huawei E303F, Huawei E3531 and Huawei E3531i. Once the device is connected to the Internet, the LED on the dongle will glow solid blue or green. If it is blinking, it could either be connecting or facing other issues.

## Backup Data

Backup enables you to back up your data on the Wattmon. You can choose to backup entire data or specific parts of it.

There are four backup options : *Month Data*, *All Logs*, *Config Files*, and *All Files*.

*Month Data* backs up the logged data for a month from the date of the backup. In *All Logs*, all the logged data since your Wattmon is setup and running will be backed up.

Selecting *Config Files* backs up the configuration settings of your Wattmon. These are most essential as they can often be unique to you. *All Files* backs up everything on the microSD card. *All Logs* and *All Data* could result in a very large file and may take a long time to generate.

Home / Control Panel / Backup

## Backup

Backup your full device or parts of it for your own security. More

### Settings

Backup Options

Month Data  
 All Logs  
 Config Files  
 All Files

Select Month

Start

Upon selecting any of the four provided options, you can click on *Start* and the download link of the back up of your choice will show in a pop-up window. Download the .tar file onto your computer and keep it safe, in case a restore is ever required.

*We recommend that you make a backup of your configuration once you have set your system up, or even in case you received it preconfigured.*

To restore any previously backed-up data, go to *File Manager*, and click on *Upload Files*. The page will scroll downwards to an option called *Upload Files : Browse*. Click on the *Browse* button and select the .tar file you wish to restore. Once the uploading process starts, the file name will display next to the *Browse* button. Once the file has been uploaded to the Wattmon microSD successfully, you will be greeted with a message saying *Uploaded file:backupxxxxxx.tar:OK*, where backupxxxxxx.tar will be the file you uploaded.

The uploaded file will display in the *File Manager* list. On the right of the name will be details of the file, followed by two buttons, one marked as a bin and the other as a briefcase, signifying the *Delete* and *Uncompress* buttons. Select *Uncompress* and the wait till the file extracts itself into the Wattmon directory. Clear the cache and reboot to complete the process. Your back-up has now been successfully restored.

Alternatively, you can also restore backup files from the *backup* folder in the root of the microSD. The *backup* folder contains all the backups made on your Wattmon device. If you wish to restore any particular one, go to the *backup* folder and *Uncompress* the one of your choice.

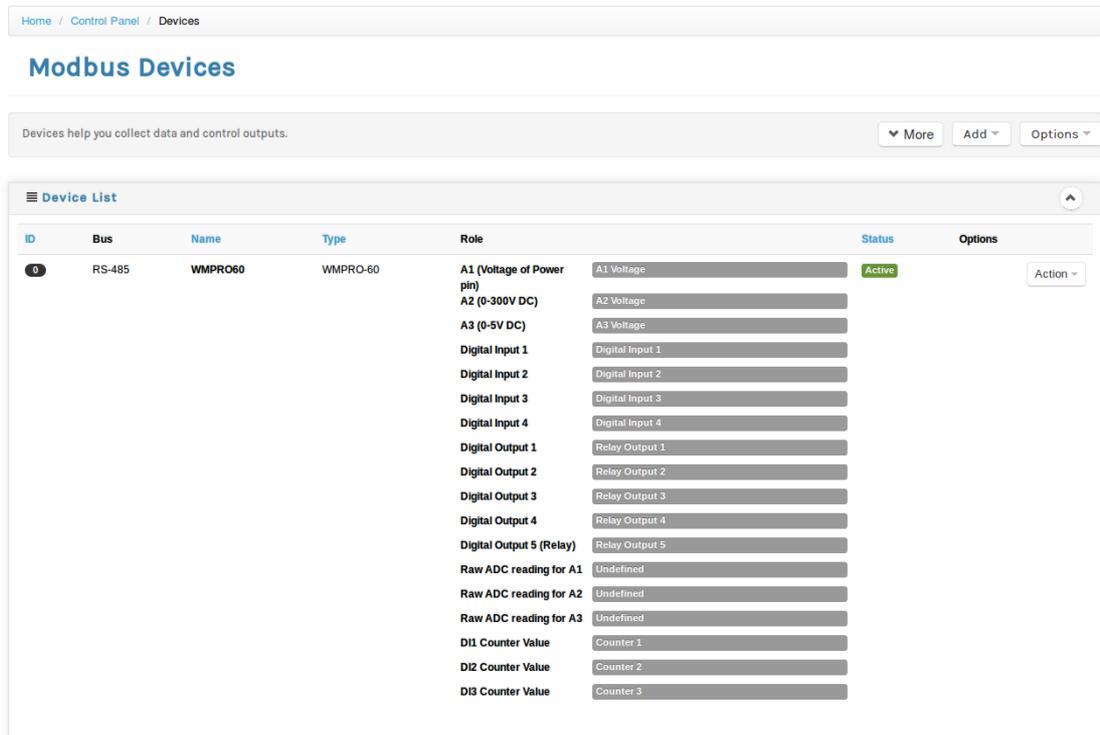
# Advanced Setup

On the *Control Panel* page, you'll find a large variety of red color-coded options, as aforementioned, so marked to showcase the importance of those settings. In this part, we shall look at some of the advanced settings to edit, such as device and data export.

## Devices

The *Devices* page can be accessed through Settings, or from the menu bar. It displays all the active and inactive devices connected to the Wattmon, and allows you to add, remove, or customize any devices.

In the WattmonPRO, this page will display the *WMPRO60* on *ID 0*, which is the WattmonPRO itself, and will list all the functions and roles of the device. On the WattmonMINI, unless a Modbus device has been added, the device list will display no devices. Next to the name of the device is the status – if online and connected, it will display as **Active**, and if not, then as **Error**.



There are three primary options given on this page – *More*, *Add*, and *Options*. *More*, like on all other pages, displays details on the page.

The *Add* option has three drop-down options - *Quick Scan RS-485 Bus for New Wattmon Devices*, *Full Scan RS-485 for New Wattmon Devices*, and *Manually Add a Device*. The first two options are used to scan Wattmon modules once they have been physically connected to the Wattmon; the latter of the two is only used when the first option is unable to detect the device. The *Manually Add a Device* option is used when connecting a 3<sup>rd</sup> party device to the Wattmon devices. Selecting this option will require you to enter the *Device ID*, which has to match that of the Modbus device you are connecting to the Wattmon, *Device Name*, which can be one of your choice, the *Device*

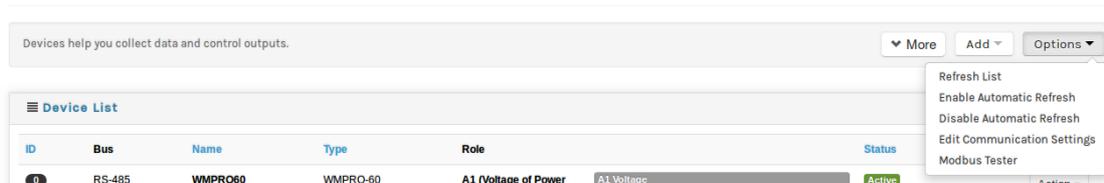
*Type*, which allows you to select the device of your choice from a drop-down menu (note: only if the Modbus device driver is already on the Wattmon will the device show up in this drop-down menu), *Poll Interval* and *Status*, which can be set at *Enabled* if you wish to use the device immediately, or else at *Disabled*. Once these options are complete, you may click on *Update Settings*, which will return you to the devices list with the device added.

## Modbus Devices



The *Options* drop-down offers five functions – *Refresh List*, *Enable Automatic Refresh*, *Disable Automatic Refresh*, *Edit Communication Settings* and *Modbus Tester*. *Refresh List* refreshes the displayed devices, and you are allowed to select whether you wish to have the refreshing done automatically or manually in the next two options. The fourth option, *Edit Communication Settings* allows you to enable or disable communication over RS-485, change the *Baud Rate*, *Parity*, and configure the *Modbus TCP Settings*. The fifth option, *Modbus Tester*, is for advanced users, to manually test the Modbus communication port based on the *Baud Rate*, *Device ID* and the *Register numbers*.

## Modbus Devices



## Package Manager

The package manager setting is divided into two categories : *Available Package List* and *Downloadable Package List*. There are three *Package Types* options available : *Package Updates*, *Complete Packages* and *3<sup>rd</sup> Party Packages*.

The *Available Package List* consists of updates to the Wattmon OS. In order to view updates to a recent OS (i.e. OS v.2.14 to OS v.2.16), select *Package Updates* and then view the *Available Package List*. All displayed updates will be small download, upgrading only the essential files on the WattmonOS. If however you are updating from a much older OS version, then it is recommended that you do a complete install. To do that, click on *Complete Packages*, and then view the *Available Package List*. The displayed options will be the full OS. Click *Install* and the WattmonOS update will download. This may take a while, so we recommend not to use the device during that time. Updating via a complete OS install will not override the configuration settings of your Wattmon.

The *Downloadable Package List* consists of configurations for various setups, such as inverters, weather stations, LCD modules, that need to be installed to be put into effect on your device. To install a particular configuration, select the Action button next to the package name, and choose the Install option. The progress for the installation will display at the bottom of the page. Once the package has been successfully installed, the package will not appear in a grey highlight and the status will be changed to Installed.

## Update and Install Packages - Package Updates

Manage your WattmonOS packages here.

More

Package Types

### Available Package List

ID	Name	Version	Size	Date	Options
157	<b>WattmonOS 2.10 Update</b> Latest update with bug fixes and additional packages	2.10	2314240	2015-07-27 08:52:41	Install
198	<b>WattmonOS 2.11 FULL</b> Full version of WattmonOS can be used to overwrite any older version and updates everything except the config folder	2.11	5857280	2016-03-05 05:02:28	Install
211	<b>WattmonOS 2.11.1 Update</b> Latest changes include an md5 checksum which helps prevent corruption when upgrading firmware via 3G dongles	2.11.1	921600	2016-04-25 07:25:20	Install
220	<b>WattmonOS 2.13 UPDATE</b> Important update for 2.12 users that fixes an issue with firmware updates	2.13	762368	2016-08-31 06:01:53	Install
232	<b>WattmonOS 2.16 UPDATE</b> Package update to WattmonOS 2.16	2.16	987648	2017-01-12 04:36:09	Install
243	<b>WattmonOS 2.17 UPDATE</b> Bug fixes and addition of modbus TCP support as well as exporting data without local logging to extend SD card life	2.17	1019392	2017-02-27 09:24:48	Install

### Downloaded Package List

ID	Name	Author	Version	Status	Options	
1	Kaco	Kaco Inverter Interface Package	Akash Heimlich	1.0	Uninstalled	Action -
2	Sync	Cross Wattmon Variable Synchronization	Akash Heimlich	1.0	Uninstalled	Action -
3	Studer	Studer Inverter Interface Package	Akash Heimlich	1.0	Uninstalled	Action -
4	Fronius	Fronius Multiple Inverter Module	Akash Heimlich	1.3	Uninstalled	Action -
5	GridTie	Grid Tie Inverter Dashboard Panel	Akash Heimlich	1.0	Uninstalled	Action -
6	KWGraph	kW Graph Widget Package	Akash Heimlich	1.0	Uninstalled	Action -
7	Victron	Victron Inverter MK2 Interface Plugin	Akash Heimlich	1.0	Uninstalled	Action -
8	PushData	PushData Plugin for rapid data collection	Akash Heimlich	1.1	Uninstalled	Action -
9	DeltaRPI	Delta RPI Series Inverter Interface Package	Akash Heimlich	1.2	Uninstalled	Action -
10	PowerOne	PowerOne Inverter Package	Akash Heimlich	1.0	Uninstalled	Action -
11	SiteInfo	Site Information Panel for Dashboard	Akash Heimlich	1.0	Uninstalled	Action -
12	Scheduler	Schedule actions on daily, weekly or month intervals	Akash Heimlich	1.0	Uninstalled	Action -
13	OpenWeather	OpenWeather Package	Akash Heimlich	1.0	Uninstalled	Action -
14	BatteryWidget	Battery management plugin	Akash Heimlich	1.0	Uninstalled	Action -
15	SavedCounters	Pulse Counting Inputs Package	Akash Heimlich	1.0	Uninstalled	Action -
16	SysInfoWidget	System Information Widget	Akash Heimlich	1.0	Uninstalled	Action -
17	WeatherWidget	Weather information for your local area	Akash Heimlich	1.0	Uninstalled	Action -
18	VariableWidget	Variable widget for the front page	Akash Heimlich	1.0	Uninstalled	Action -
19	VariableWidget2	Variable widget for the front page	Akash Heimlich	1.0	Uninstalled	Action -
20	LCD	Configure 4x20 LCD Display	Akash Heimlich	1.0	Uninstalled	Action -
21	Forth	Forth Partner Configuration Tool	Akash Heimlich	1.0	Uninstalled	Action -

## Firmware Updater

The Firmware Updater allows you to update your Wattmon to the latest firmware, making sure you are up to date with the latest features.

You will find several firmware versions displayed on the page, details about the changes contained in them, and their dates of compiling. We recommend that you update the

firmware to the latest one, unless you have been instructed otherwise by us.

Some firmware updates will have a *Onewire Support* or a *Modbus TCP* tag attached to their name. The former supports all protocols supported by the WattmonPRO or WattmonMINI except the Modbus TCP; and the latter is the same, except that it doesn't support Onewire but instead has Modbus TCP. If Modbus TCP communication is required by you, please make sure to install the compatible version.

Home / Control Panel / Firmware Updater

### Update Firmware

Update your Wattmon firmware to the latest version to ensure that all features are up to date. Click [More](#) for info on getting the firmware. More

Your current firmware version is 1.1040. [View the change log.](#)

ID	Name	Version	Size	Date	Options
210	<b>Wattmon Firmware 1.1015</b> Added md5 and sha1 functions	1.1015	1372160	2016-04-22 10:54:34	<input type="button" value="Install"/>
216	<b>Wattmon Firmware 1.1025</b> Update to SMTP code and Onewire tasks to improve read time for a larger number of sensors	1.1025	1351680	2016-08-11 08:41:50	<input type="button" value="Install"/>
237	<b>Wattmon Firmware 1.1047 - Onewire Support</b> Fixed bug in implode function causing some portions to not work properly	1.1047	1373184	2017-01-20 10:52:21	<input type="button" value="Install"/>
236	<b>Wattmon Firmware 1.1046 - Modbus TCP</b> Solves issue with memory leak and has modbus TCP support	1.1046	1366528	2017-01-19 05:27:16	<input type="button" value="Install"/>
238	<b>Wattmon Firmware 1.1048 - Onewire Support</b> Fixes a bug which could hang the system when adding certain modbus devices manually	1.1048	1373696	2017-01-24 04:36:33	<input type="button" value="Install"/>
245	<b>Wattmon Firmware 1.1053</b> Important bug fixed for issue in 1052 as well as improved modbus command handling	1.1053	1373696	2017-03-06 09:17:08	<input type="button" value="Install"/>

Do you want to upload a file from your computer instead?

At the bottom of the page there is an option which says - *Do you want to upload a file from your computer instead?* This allows you to upload an *image.hex* (firmware file) directly to your Wattmon, locally from your computer. Click on it to proceed to a new page which provides an option to *Select HEX File: Browse*, using which you can upload the *image.hex* file to your Wattmon from your computer. In order to perform this function, your Wattmon needs to be connected directly to a computer via a LAN cable. Remember to be sure to upload the file properly and not to power off your Wattmon during a firmware update. Interrupting a firmware update can cause your Wattmon to stop functioning properly.

Home / Control Panel / Firmware Update

### Firmware Update

Update your Wattmon firmware to the latest version to ensure that all features are up to date. Click [More](#) for info on getting the firmware. More

Select HEX File:  No file selected.

Do you want to download a file from wattmon.com instead?

## Data Export

The Data Export Settings allow you to configure *Port Forwarding*, *Export to Wattmon Portal*, and the *Custom Server Data Export*.

The *Wattmon Reachability Settings*, or *Port Forwarding*, allows you to reach your device without the need for a static IP address or a DynDNS entry. Once *Enabled*, with the *Port* and *Interval* set correctly (default – 8080 & 5), you will need to *Apply Changes*

and reboot. After this, you will be able to reach your device from this external link :

<http://www.wattmon.com/live?key=A1-B2-C3-D4-E5-F6>, where *A1-B2-C3-D4-E5-F6* will be the MAC address of your Wattmon device.

To *Export to Wattmon Portal*, set the *Status* to *Enabled*, select the *Server* you have been allotted, which is most likely to be *ems.wattmon.com*, set the *Interval in minutes* to 5, unless otherwise specified, set *Use MD5* to *Enabled* and then *Apply Changes*. The *Current Status* of the data export is always displayed, displaying the date and time as well as the file position.

To enable data export to a custom server, follow the same instruction as the *Export to Wattmon Portal*, and enter the custom *URL*. There is a hyperlink below the *URL* box that explains more on the data export file format. The *Current Status* of the data export is always displayed, displaying the date and time as well as the file position.

Home / Control Panel / Data Export Settings

## Data Export Settings

Data Export Configuration More Close Export Now Detect Router Test Settings Apply Changes

### Wattmon Reachability Settings - Only with Port Forwarding

Data export to wattmon.com allows you to reach your device without the need for a static IP address or a DynDNS entry. Wattmon will send your current IP address to the server every X minutes. If you are using a USB cellular dongle, your device should be directly accessible. If you are connected to a DSL modem or other router, you will need to set up port forwarding in order to reach Wattmon from an external network. To find out how to do this, refer to the [user manual online](#).

Once this is configured, you will be able to access your device from this external link:  
<http://www.wattmon.com/live?key=0>

Status: Enabled

Device Key: 0

Port: 8080

Interval in minutes: 5

### Export to Wattmon Portal

Status: Enabled

Select Server: [ems.wattmon.com](#)

Interval in minutes: 5

Use MD5: Enabled

This will add an MD5 checksum to the data to ensure correct delivery. This uses more memory so disable it if you are facing issues with many data points.

Number of Lines per Export: 15

Export Alerts: Disabled

For system specific alerts to be displayed on the cloud portal this needs to be enabled.

Current Status: Last exported on Fri Mar 03 16:31:25 2017.  
File Position: 94  
File Date: 03/03/2017

### Custom Server Data Export Settings

Status: Disabled

URL: 0

For more information on the file format, [click here](#).

Interval in minutes: 5

Number of Lines per Export: 15

Exclude header row: Include header

Include the CSV header or not

Current Status: Last exported on Thu Jan 01 00:00:00 1970.  
File Position: 0  
File Date:

# Modbus Device Setup

Your Wattmon comes preconfigured to the inverter, energy meter or any other modbus device of your choice if you have made that request at the time of the order. If however you wish to re-write the setup, or need to set up the Wattmon from the default setting to work with an inverter or energy meter, you can follow these steps.

There are two ways to make your Wattmon compatible with a 3<sup>rd</sup> party Modbus device. One is by using our existing configuration files, and the other is by manually adding and configuring a device. For the sake of convenience, we have chosen a Delta RPI inverter for the former method and a Secure Elite 440 energy meter for the latter..

## Preconfigured Setup – Delta RPI series

To make your device compatible with the Delta RPI series inverters, first you need to place the configuration file obtained from us (in this case, *config\_delta.tar*), into the root folder of the microSD card. This can be done by either connecting the microSD card to your computer, or through the **File Manager** on the Wattmon.

Go to *File Manager* on the Wattmon, and click on *Upload Files*. The page will scroll downwards to an option called *Upload Files : Browse*. Click on the *Browse* button and select the .tar file you wish to restore. Once the uploading process starts, the file name will display next to the *Browse* button. Once the file has been uploaded to the Wattmon microSD successfully, you will be greeted with a message saying *Uploaded file:config\_delta.tar:OK*

Uncompress *config\_delta.tar* in the File Manager, and wait till the Wattmon confirms that the file has been uncompressed successfully. Reboot once you see the confirmation message.

The screenshot displays the Wattmon dashboard. At the top, there is a blue header with the Wattmon logo, a user profile for 'admin', and a 'Change Theme / Skin' button. Below the header, the dashboard is divided into several sections. On the left, there is a sidebar menu with categories: MAIN (Dashboard), GRAPHS (Energy Yield, AC Voltage, PV Parameters), SETTINGS (Control Panel, Devices, Actions), File Manager, System Log, and Reboot. The main content area features four large colored cards: a green card for 'kW Now', a blue card for 'kWh Generated Today' (0.0), an orange card for 'Total kWh Generated' (0), and a red card for 'Money Saved (INR)' (0). Below these cards, there are labels for 'Site Name', 'Location', 'Policy Number', and 'Date Installed'. A section for 'Installed Solar Capacity (kW)' and 'Installed Inverter Rating (kW)' shows 'No delta inverters detected.' At the bottom right, there is a line graph titled 'kW Generated Today' with a y-axis from 0.00 to 1.00 and an x-axis from 00:00 to 22:00. The graph shows a flat line at 0.00. At the bottom left, it says '© Wattmon 2017' and at the bottom right, 'Firmware Rev. 1.1040 - WattmonOS 2.16 (WM-PRO)'.

Return to the *Dashboard* and you will now notice that your Wattmon is configured to work with the Delta inverter, displaying various parameters and widgets. Connect the Delta inverter to the Wattmon. The WattmonPRO can be connected to the any Modbus

device by using the supplied Modbus Connector Cable, which has a RJ45 jack on one end and two blue and white wires on the other end; the RJ45 jack goes into the Modbus input on the WattmonPRO and the blue and white wires go into the *D+* and *D-* respectively on the Delta inverter. The WattmonMINI features two inputs for a RS-485 connection, *A* and *B*, which can be connected to the *D+* and *D-* on the Delta.

Once the Wattmon is physically connected to the Delta inverter, and both the Wattmon and Delta inverters are powered on, the values should appear on the Dashboard. If however the Dashboard shows no values, there might be a difference in the baud rate on the Wattmon. As shown in **Devices** setup, proceed to *Edit Communication Settings*.

Home / Control Panel / Communication Settings

## Communication Settings

Communication port settings lets you interface with nonstandard modbus equipment. More Close Apply Changes

### Communication Settings

Modbus Support  Enabled - RS-485 (and Modbus TCP If available) will be polled automatically  
 Disabled - Use the RS-485 port for proprietary protocols through scripts

#### Modbus RTU (RS-485) Settings

Baud rate: 9600

Parity  No parity  
 Even Parity  
 Odd Parity

Inter-packet Delay (ms): 10

Timeout (ms): 300

Retry interval for errors (ms): 1000

Max Retries: 5

In the *Communication Settings*, you will notice a header titled *Modbus RTU (RS-485) Settings*, under which will be an option to edit the baud rate. *The default on the Wattmon is set to 9600, while the default on Delta is 19200.* Verify the baud rate on the Delta inverter and if found to be different, enter that value into the Wattmon. Check the parity settings on the inverter too and set the Wattmon to match those as well. Apply changes and reboot. Login and you should find the *Dashboard* displaying values from the Delta inverter.

## Manually Configured Setup – Secure Elite 440-444 (4022)

To manually add a Modbus device to your Wattmon, proceed to *Manually Add a Device* as shown in **Devices** setup. In the Add New Device page, you will notice several options such as *Device ID*, *Device Name*, *Device Type*, *Poll Interval* and *Status*. Set the Device ID so that it doesn't conflict with any existing one on the Wattmon. Alternatively set it at 5 and set the Secure Elite meter to match the ID number. The *Device Name* can be set as per your wish – the logged roles will use this name (for example, if you name the device *Secure*, the *kWh Active* log will be called *Secure\_kWh Active*). The *Device Type* is a drop-down list that displays all the devices compatible with the Wattmon. Failure to select the *Device Type* correctly would result in the Wattmon not being able to communicate with the energy meter, as the Wattmon uses the registers of the selected device to communicate.

In this case, we will be using the *Secure Elite 440-444 (4022)*. The name is so written so to display the device make and model - *Secure Elite 440-444*, while the *4022* is the

device type code given by the Wattmon to identify and communicate with the device. Each device that is compatible and configured to work with the Wattmon has a device type code.

The *Poll Interval* can be left at the default 1000. Set the *Status* to *Enabled* and then click on *Update Settings*. You will be greeted with a pop-up reading *Created the device*. [Click here to return to the list of devices](#). The device will only be usable after a system reboot. Click on *OK*, reboot the Wattmon and then return to the *Devices* page. Make the physical connection between the energy meter and the Wattmon using the same instructions provided in **Preconfigured Setup**.

Home / Control Panel / Devices / Add Device

### Add New Device

Configure your device here in order for it to be usable by WattMon. More

Device ID

Device Name

Device Type

Poll Interval (in ms)  
  
 Select

Status  
 Disabled  
 Enabled

[Update Settings](#)

On the devices page, you will notice that the Secure Elite 440-444 is displayed. If you have correctly configured the meter with the Wattmon, there will be an **Active** Status sign, or else you will find an **Error** Status sign next it to. The page will also display the *Device ID*, the *Communication Bus* type, the *Device Name*, *Device Type*, the roles, the current *Status*, and the *Action* button.

RS-485	Secure Meter	Secure Elite 440-444	R Phase Volts	Undefined	Active	Action
			Y Phase Volts	Undefined		
			B Phase Volts	Undefined		
			R Phase Amps	Undefined		
			Y Phase Amps	Undefined		
			B Phase Amps	Undefined		
			R Power Factor	Undefined		
			Y Power Factor	Undefined		
			B Power Factor	Undefined		
			R Active Power	Undefined		
			Y Active Power	Undefined		
			B Active Power	Undefined		
			Frequency	Undefined		
			kWh Active	Undefined		
			kVAh Apparent	Undefined		
			THD V R	Undefined		
			THD V Y	Undefined		
			THD V B	Undefined		
			THD I R	Undefined		
			THD I Y	Undefined		
			THD I B	Undefined		
			Reactive R	Undefined		
			Reactive Y	Undefined		
			Reactive B	Undefined		

To configure the parameters you wish to log, click on the *Action* sign next to the Secure Elite 440-444 device on the Wattmon, and select the first option *Configure*. The Configure Device page will list all the roles of the Modbus device. The roles will all be listed as *Undefined*. Click on the *Undefined* drop-down for each role you wish to log and select *Create New Role*. Once you have changed the roles you wish to log to say *Create New Role*, select *Apply Changes*. A pop-up windows will say *Need to refresh this page, data was saved*. Select *OK*, and the page will refresh automatically. The Configure Device page will now display the role names for those parameters you wish to log.

Home / Control Panel / Devices / Configure Device

## Configure Device Secure Elite 440-444 (4022)

More Close Calibrate Apply Changes

### Device Settings

Device ID: 6

Device Name: Secure Meter

Poll Interval (in ms): Select - 1000

Status:  Disabled  Enabled

### Configure Roles

<b>R Phase Volts</b>	Secure Meter_R Volts	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Y Phase Volts</b>	Secure Meter_Y Volts	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>B Phase Volts</b>	Secure Meter_B Volts	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>R Phase Amps</b>	Secure Meter_R Amps	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Y Phase Amps</b>	Secure Meter_Y Amps	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>B Phase Amps</b>	Secure Meter_B Amps	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>R Power Factor</b>	Secure Meter_R PF	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Y Power Factor</b>	Secure Meter_R PF	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>B Power Factor</b>	Secure Meter_B PF	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>R Active Power</b>	Secure Meter_R Active W	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Y Active Power</b>	Secure Meter_Y Active W	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>B Active Power</b>	Secure Meter_B Active W	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Frequency</b>	Secure Meter_Freq	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>kWh Active</b>	Secure Meter_kWh Active	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>kVAh Apparent</b>	Secure Meter_kVAh Active	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>THD V R</b>	Secure Meter_THD_V_R	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>THD V Y</b>	Secure Meter_THD_V_Y	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>THD V B</b>	Secure Meter_THD_V_B	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>THD I R</b>	Secure Meter_THD_I_R	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>THD I Y</b>	Secure Meter_THD_I_Y	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>THD I B</b>	Secure Meter_THD_I_B	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Reactive R</b>	Secure Meter_P_REACTIVE_R	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Reactive Y</b>	Secure Meter_P_REACTIVE_Y	Edit Role	Scale:1	Read Only Float Register (Little Endian)
<b>Reactive B</b>	Secure Meter_P_REACTIVE_B	Edit Role	Scale:1	Read Only Float Register (Little Endian)

If you wish to log the data from the Modbus device on the Wattmon, or wish to export to a cloud server, you will need to add the new roles in the data log. For more details on *Data Log*, download the *Using your Wattmon* guide from [here](#).

# Troubleshooting your Wattmon

## Wattmon doesn't work

There are several things which can cause an issue in the functioning of your Wattmon. We look at the common ones below :

- a) Check that your Wattmon has power. If the *Power / PWR* light on the Wattmon is on, power is ok. If not, use a multimeter to measure the voltage between pin 1 and 2 of your Wattmon. If you do not get a voltage, identify and correct the cabling or change the adapter. If you do get a voltage at the input (>6V DC for WattmonPRO / 220V AC for WattmonMINI), then your Wattmon is damaged and would need to be shipped back for repair.
- b) Make sure the original microSD card is properly inserted. Without a properly configured microSD card, your Wattmon will not work. If you have lost the card or it is damaged, download a WattmonOS .zip file from the website [here](#) and unzip it onto a blank 8 GB Class 4 microSD card. Insert the new card before powering up.
- c) Perform a firmware update on the Wattmon by downloading the latest Firmware from [here](#). Place the file (*image.hex*) into the root folder of the microSD card and insert it into the Wattmon. Press and hold the reset button and power up the Wattmon. You should notice the *Script / SCR* light flash rapidly for a few seconds, then slower for a few seconds, then finally stop. Once it resumes blinking once per second, the firmware update has been successfully completed.
- d) If the *Device / DEV* and *Script / SCR* lights are flashing simultaneously and rapidly, the microSD card is not inserted properly or is damaged. To solve this, go to steps (b) and (c).
- e) If the *Script / SCR* light is not blinking approximately once per second, the most likely issue is software-related. To be sure it is a software or configuration issue, follow steps (b) and (c) above and see if it resolves the issue.
- f) Connect the Wattmon to your laptop via a LAN cable. If you see the green LAN light solid and orange LAN light blinking, the LAN connection should be OK. To connect to your Wattmon, follow the instructions on the **Connecting to your Device** page.

## Unable to connect to the Wattmon over Ethernet

The procedure to connect to your Wattmon is very straightforward. It is described on the **Connecting to your Device** page in various steps. Follow the settings and your Wattmon will be easily accessed over a ethernet connection. If however, you find the instructions difficult to follow, you may download the more detailed **Connecting to your Wattmon guide** from [here](#), which explains the entire procedure in a very comprehensive manner, along with several screenshots of each step.

## Frequently Asked Questions

- What is the default IP address of my Wattmon? How do I reset my Wattmon to the default IP?
  - The default IP address of your Wattmon is 192.168.0.55. It is printed on the label on the right side of the device. In case you forget the IP address you have assigned to your Wattmon, you can reset it up pressing down the reset button on the Wattmon for five seconds, till the *Scripts* lights stop blinking for a few seconds and then resume blinking. Switch off and power on your Wattmon device, and it will return it to the default IP.
  - Alternatively, if you are logged into your Wattmon, you can reset its IP address by selecting *Restore Defaults*.
- What is a MAC address? Where do I find the MAC of my Wattmon?
  - A media access control address (MAC address) of a computer is a 12 digit alpha-numeric unique identifier assigned to network interfaces for communications at the data link layer of a network segment. MAC addresses are used as a network address for most IEEE 802 network technologies, including Ethernet and Wi-Fi.
  - The MAC of your Wattmon can be found printed on the right side of the device along with the serial number. Alternatively, it can be found on the *Network Setup* page in your Wattmon.
- What are the default log-in credentials?
  - The default username and password are *admin* and *admin* respectively.
- How do I check the Wattmon OS version on my Wattmon?
  - Log-in to your Wattmon, and on each page (including the login page), at the bottom right corner, you will find the OS and Firmware version of your Wattmon device.
- How do I check the Wattmon Firmware version on my Wattmon?
  - Log-in to your Wattmon, and on each page (including the login page), at the bottom right corner, you will find the OS and Firmware version of your Wattmon device.
- How do I reflash the Wattmon Firmware?
  - Download the latest Firmware from [here](#). Place the file (*image.hex*) into the root folder of the microSD card and insert it into the Wattmon. Press and hold the reset button (located next to the USB port, accessible with a pin) and power up the Wattmon. You should notice the script light flash rapidly for a few seconds, then slower for a few seconds, then finally stop. Once it resumes blinking once per second, the firmware update has been successfully completed.
- How do I update the Wattmon OS?
  - Download and install the latest OS from the **Package Manager** page.
- Is there a more detailed guide for the Wattmon, explaining all the functions of the device?
  - Yes. The Wattmon Guide can be downloaded from our website. It is in various parts : ***Introduction, Hardware Installations, Connecting to your Wattmon*** and ***Using your Wattmon***, all of which explain in a very detailed manner the functioning of the Wattmon products. You can download it from [here](#).



**Standard Compliance**

*WattmonPRO is classified as a device for Industrial use. The device complies with the following standards:*

**IEC-61000-4-2** – Electrostatic Discharge

**IEC-61000-4-4** – EFT Immunity - 1kV

**IEC 61000-4-5** – EMC Immunity – 1kV

**CISPR-22 Class A** – EMC

**CISPR-11 Class A** – EMC

**WattmonPRO International Article Number (EAN)** – 0640350191555

**WattmonMINI International Article Number (EAN)** –

