

Wattmon Installation Manual

Rev 1.1

Nov 2014

Chapter 1

Hardware Installation

If you have just purchased your Wattmon device, you will need to go through several steps before you can start using it. The different Wattmon kits come with all the parts necessary to hook the device into your existing battery bank. The first chapter of this guide explains the steps necessary to physically connect your Wattmon up. You will require a pair of pliers, a wire stripper and cutter and the right spanner size for your battery terminal in order to complete this part of the installation.

WattmonSolar Kit

The WattmonSolar kit comes with the following components:

- 1 x Wattmon Device
- 1 x Wattmon C752 Current Sensor
- 1 x Battery power cable
- 2 x 2M Ethernet patch cable
- 2 x 16mm² Lugs



Figure 1.1 WattmonSolar components prior to hooking up with the battery

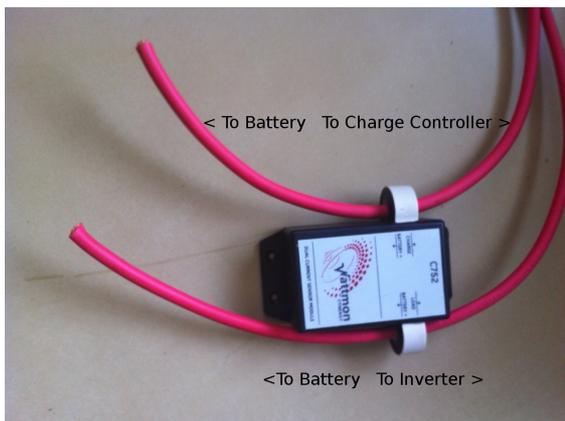
Your battery bank will already have cables connected to the positive and negative terminals. The positive terminal is marked by a + sign or a red dot, and usually a red cable connects to this. If you also have a solar charger attached, you would typically have two cables going to the + terminal. One of these will connect to the solar charge controller and the second will go to the inverter.



Warning: Before disconnecting the cables from the battery, make sure you switch off the inverter and the DC breaker for the charge controller.

Hooking Up The Current Sensor

The Wattmon device requires at least one current sensor in order to collect data and compute battery capacity. The C752 Current Sensor is a dual hall-effect sensor which is used to monitor both solar input and load. For setups without solar, and a grid charger integrated into the inverter, you can hook up the load side only.



After removing the two cables from the positive terminal, cut off the lugs at the end of the cables, and insert them through the holes in the wattmon C752 current sensor as shown in the picture above.

Figure 1.2 C752 Sensor with cables



Next, strip the ends of both cables, insert the lugs, and crimp it with a crimping tool or a pair of strong pliers.

Warning: High currents will be flowing through this so make sure that the contact between the cable and the lug is very good or it could result in sparks or corrosion.

Figure 1.3 Crimping on the lugs



Loosen the negative battery terminal (black one, marked with a -) and remove the nut. Fix on the black wire of the wattmon power cable to this and re-tighten.

Figure 1.4 Negative battery terminal connection



Next, connect both of the thick cables together with the red end of the wattmon power cable to the positive terminal of the battery, and tighten.

Figure 1.5 Positive battery terminal connection



Warning: Be very careful when reconnecting the cables to the positive battery terminal, especially at higher voltages, because you will get a large spark as the internal capacitors of the inverter charge up. Once you make contact again with the battery terminal, do not remove the lug or else it will spark again upon contact each time.



Figure 1.6 Final setup of your WattmonSolar hardware

The final setup should look something like the image above. The stickit notes indicate the connections to be made.

One blue patch cable connects between the Device plug on the Wattmon to the C752 current sensor device (you can plugin it in to either of the two ports on the current sensor). The second blue patch cable goes from the LAN plug on the Wattmon device to your Internet router. If your router is further than 2 meters away, you will need to buy a longer cable. The device will work at up to 100 meters from the router.



Note: Make sure you connect a standard patch cable and not a crossover cable. Connecting a computer directly to the wattmon device over a crossover may not work properly.

Finally, plug in the power jack and make sure the *Power* light comes on. The *Script* light should start blinking to indicate activity. The *LAN* light should also come on.

The hardware portion of the Wattmon setup is now complete. In the next chapter, you will learn about the various software steps to setting up the device.

WattmonHV Kit Installation

The WattmonHV kit is used to monitor high voltage battery banks above 60V DC, up to 330V DC. Since the Wattmon master device requires voltages below 60V DC, you will need to power the Wattmon with an external power adapter which is supplied as part of the kit.

The WattmonHV Kit contains the following items:

- 1 x WM-60 Master Module
- 1 x C752 Current Sensor
- 1 x A5S1 High Voltage Sense module
- 3 x RJ45 patch cable
- 1 x 12V 1A Power Adapter

Setting up the C752 Current Sensor

Read the WattmonSolar setup tutorial above for instructions on connecting the C752 current sensor, this procedure is identical.

Setting up the A5S1 Module

The A5S1 module is a 5-channel analog input module which can measure voltages of up to 330V DC.

Figure 1.7 shows the pinouts on the module. Wire a cable between the battery negative terminal (-) to the GND of the A5S1 module. Next, connect a wire from the battery positive terminal to the V1 terminal of the A5S1 Module. You may want to install a small fuse in between the positive terminal and the battery bank to prevent any problems in case of a short circuit while connecting.



Figure 1.7 A5S1 Module



Warning: High voltage DC is lethal! Do NOT attempt to do this unless you know what you are doing, and make sure to switch off ALL devices and breakers before connecting anything to the battery terminal. Wear shoes, and never touch both the battery positive and negative terminals at the same time.

Finally, you will need a 220V socket nearby to power the Wattmon.

WattmonHybrid Kit Installation

The WattmonHybrid kit is used to monitor battery banks up to 60V DC. An additional I3O2 module gives you 3 digital inputs and 2 relay outputs that let you control things based on software settings. This kit is identical to the WattmonSolar kit with the addition of the I3O2 module.

The WattmonHybrid Kit contains the following items:

- 1 x WM-60 Master Module
- 1 x C752 Current Sensor
- 1 x I3O2 I/O Module
- 3 x RJ45 patch cable
- 1 x Battery connection cable

Setting up the C752 Current Sensor

Read the WattmonSolar setup tutorial above for instructions on connecting the C752 current sensor, this procedure is identical.

Setting up the I3O2 Module

The I3O2 module can be wired up in a variety of ways depending on your requirements. This document explains how to connect it up to a Contactor to power higher current loads. The internal relay on the I3O2 module can handle up to 5A of current, which is sufficient to power a light or other low power load but not enough to control an inverter or pump.

The Out1 terminals connect directly to the internal relay, and will be closed (shorted together) when the output is set to ON in software. The O1 light will also glow. The Out2 terminals operate in the same manner.

If you wish to connect push button switches, float sensor or other contact type inputs to Wattmon, take a wire from the 5V terminal and wire it through your switch/float/relay to either of the IN ports (IN1, IN2, IN3). When your switch is ON, the corresponding IN light will glow and Wattmon will read a digital value of 1. When your switch is OFF, you will get a digital value of 0 in the software. This can be used to automate a tank pumping system with float, among many other applications.



Wiring Up a Contactor

A contactor is a device that lets you power a high current load from a small input

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current. Usually, two terminals marked A1 and A2 are used to power the contactor. By connecting 220V (Live) to A1, and 220V (Neutral) to A2, you energize the internal coils and the contactor makes a connection between the high power input and output terminals. Contactors can be either single phase or 3-phase and come in different power ratings. Below is a diagram of how to connect up a contactor.

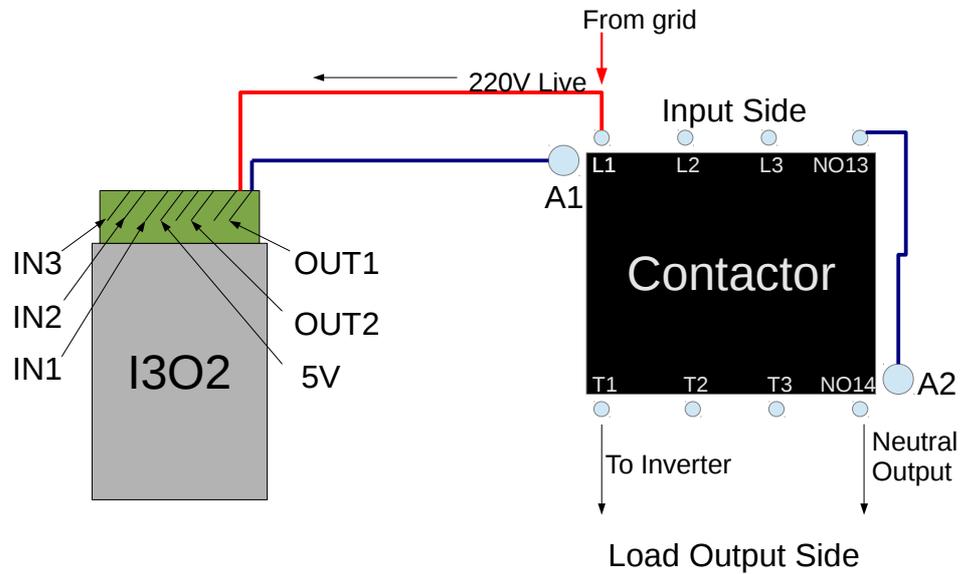


Figure 1.8 Connection diagram for I3O2 module and Contactor

For software configuration, refer to the I3O2 module configuration section later in the manual.

Once wiring has been completed, connect the patch cable from the C752 module to the I3O2 module (into either port).

Chapter 2

Connecting to your Wattmon

This chapter assumes you are using Microsoft Windows. If you are on any other operating system, the procedure will vary slightly but you will most probably be able to follow the logic and find similar options in your operating system.

If you are connecting to Wattmon via a direct cable to your laptop or computer, you will need to read the section on Connecting via a static IP.

2.1 Connecting via DHCP

If you are connecting to your Wattmon for the first time and you have a DSL modem or other Internet router, plug in your Wattmon to any port in the back of your router. Make sure DHCP is turned on in the router.

In your browser, navigate to <http://www.wattmon.com/live/>

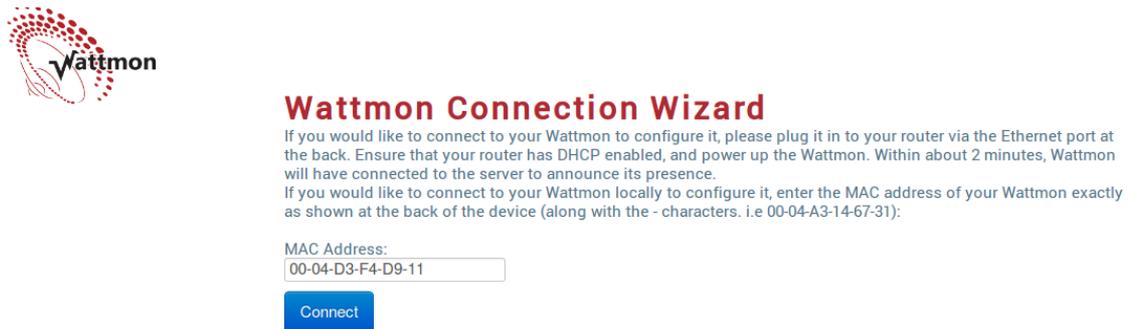


Figure 2.1 Wattmon.com live connection wizard

On the back side of your Wattmon, you will see the MAC address. Copy this into the **MAC Address** field, including the – characters, in capital letters. Next, click the **Connect** button.



Figure 2.2 Wattmon.com live connection wizard step 2

The page will refresh once every few seconds until the Wattmon device contacts the server. Once your Wattmon has reached wattmon.com, you will see the screen as shown in figure 2.2. At this point you can save the link as a bookmark if you wish. To connect to your Wattmon, click *Go To Wattmon*. You will now be asked to log in, skip the next section and go on to section 2.3.

2.2 Connecting via a Static IP

There are several steps involved in getting your Wattmon configured the first time. The first step is to make sure you can ping your Wattmon device. Wattmon comes preconfigured to run on DHCP. In order to reset the device to a static IP, power up your Wattmon, then press and hold the reset button for about 5 seconds until the script light stops blinking. Then re-power your Wattmon. Wattmon will now use a static IP address of 192.168.0.55. If you are comfortable with networking you can just skim through the following sections and pick out the relevant information.

2.2.1 Computer Network Configuration

Most machines connect to the network using a mechanism called DHCP which automatically assigns your computer an IP address. These IP addresses come in different IP subnets dependign on the manufacturer of your router. The most common IP ranges are 192.168.0.x and 192.168.1.x. If your IP address range is different from the Wattmon default IP address range, you will need to temporarily reconfigure your computer's IP address using the following guide in order to set up Wattmon.

2.2.1.1 Determine Your IP Address

If you are unsure of your IP address, run `cmd.exe` (Click the *Start* button in Windows, and in the search box type `cmd.exe` and press enter). In the window that appears, type in:

```
ipconfig
```

and press Enter.

You should see something similar to the figure below.

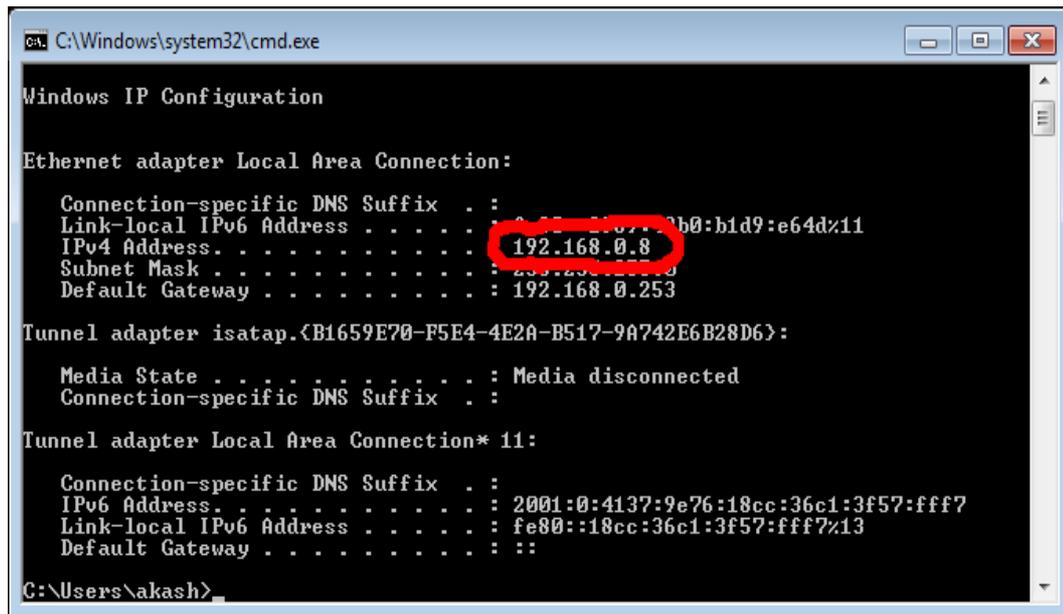


Figure 2.3 Results of ipconfig command showing your IP address

The IP Address is in this case **192.168.0.8** which is in the same range (**192.168.0**) as the Wattmon, so you can skip the step where you need to set your IP temporarily. If for example your IP address would be 192.168.1.7 (192.168.1 range) you would need to temporarily change the IP address to configure Wattmon.

2.2.1.2 Configure Your IP Address

In order to set your IP Address, you need to open the network and sharing center as follows:

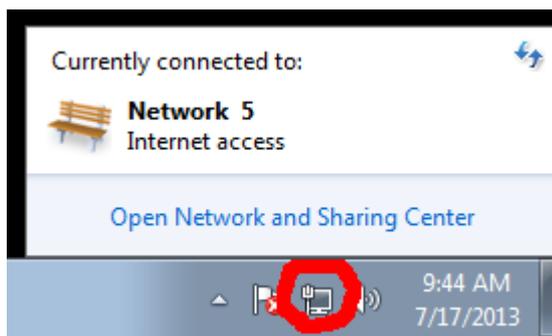


Figure 2.4 Opening the Network and Sharing Center

On the lower right hand corner of the task bar, click the *Network* icon, and then click *Open Network and Sharing Center*.

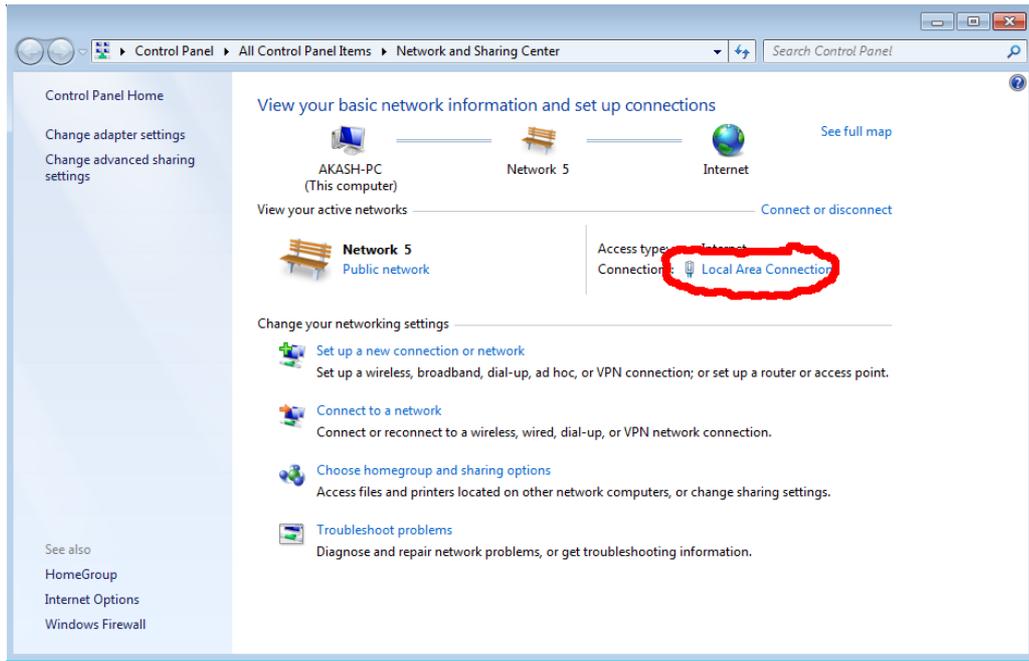


Figure 2.5 Network and Sharing Center

Next, click the *Local area Connection* or *Wireless connection* settings in a similar location on the screen to the red circled area. The *Connection Status* window appears (Figure 2.6). Click the *Properties* button.

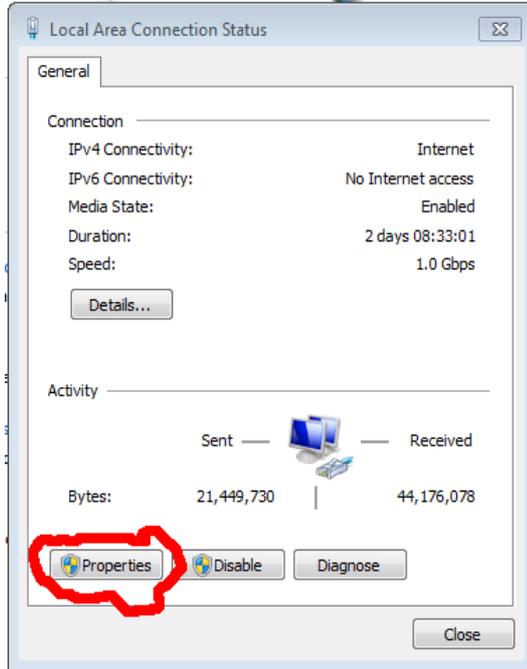


Figure 2.6 Connection Status Window

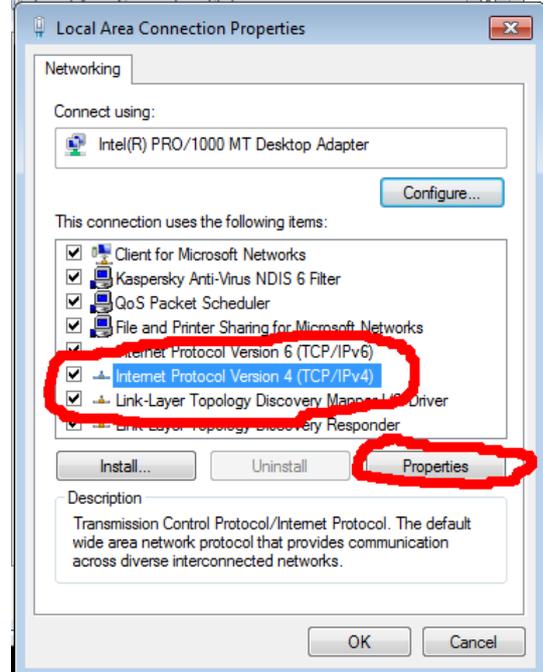


Figure 2.7 Connection Properties Window

Next, in the *Properties* window, Select *Internet Protocol Version 4* in the list and click *Properties*.

Now copy over the exact information you see in the *Properties* window, including which radio buttons are checked and the values in all the fields so you can restore this later.



Warning: If you do not properly reconfigure your connection after you finish setting up Wattmon, your Internet connection may not work anymore.

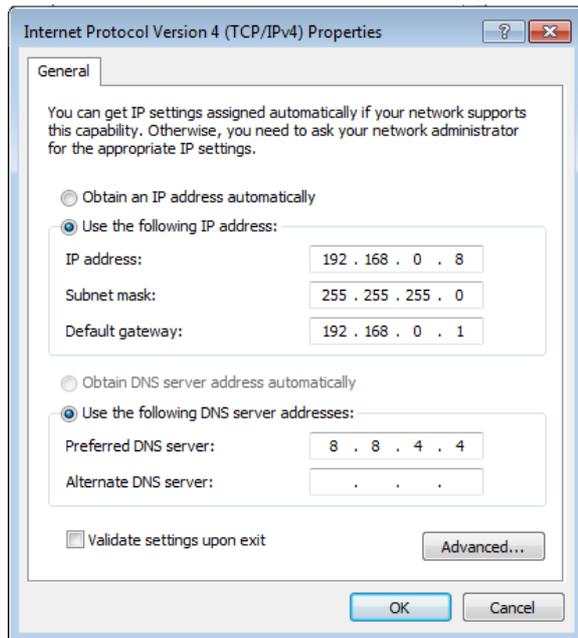


Figure 2.8 TCP/IP Properties Window

Enter the following information into the corresponding fields:

- If Obtain an IP Address is selected, check the User the Following IP address before you see the right fields.
- IP Address: 192.168.0.8
- Netmask: 255.255.255.0
- Gateway: 192.168.0.1

You can ignore the DNS section.

Click *OK* until the settings are applied.

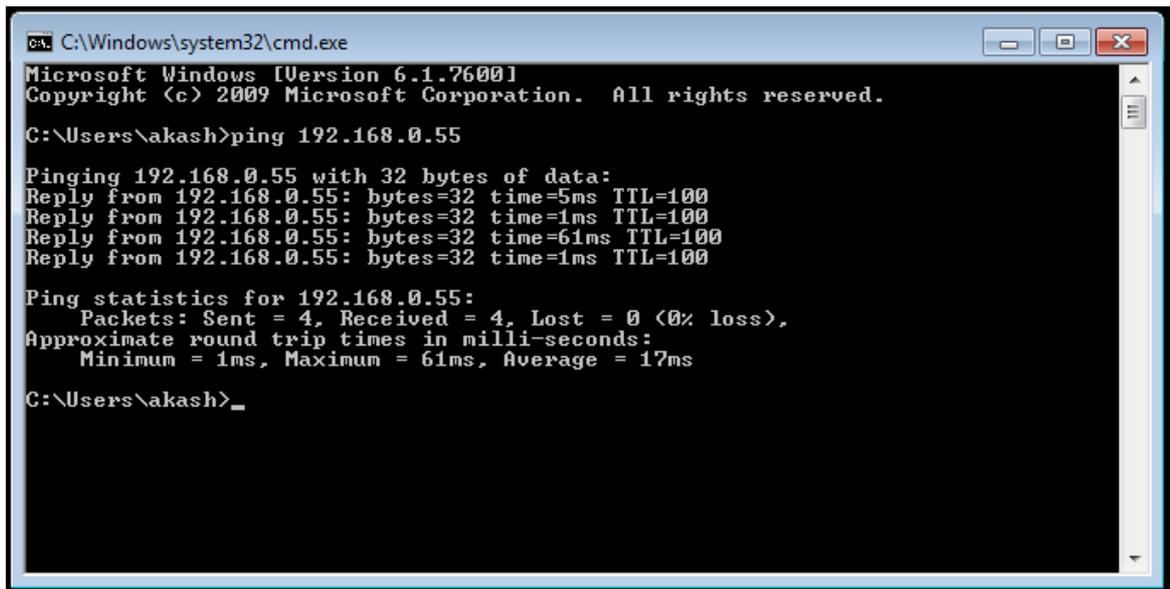
Your internet connection will now be unusable until you restore the settings to their original values. Follow the same instructions to reach this page and then just re-enter the settings you noted down previously to restore your Internet connection once the Wattmon IP address is properly configured.

2.2.1.3 Ping Wattmon

Once you have an IP address in the same range, run *cmd.exe* again, and this time type in:

```
ping 192.168.0.55
```

and press *Enter*. You should see something similar to what is shown below and there should be a reply from the device.



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\akash>ping 192.168.0.55

Pinging 192.168.0.55 with 32 bytes of data:
Reply from 192.168.0.55: bytes=32 time=5ms TTL=100
Reply from 192.168.0.55: bytes=32 time=1ms TTL=100
Reply from 192.168.0.55: bytes=32 time=61ms TTL=100
Reply from 192.168.0.55: bytes=32 time=1ms TTL=100

Ping statistics for 192.168.0.55:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 61ms, Average = 17ms

C:\Users\akash>_
```

Figure 2.9 Ping response showing successful connection to the Wattmon device

If instead you see a response as shown in Figure 2.10 it means that you have either not switched on the Wattmon or connected it properly, or that you may have missed a step when trying to set the IP. Check your cabling, and finally verify that the IP address matches 192.168.0.8 if you set it manually in the previous step. If not, repeat the previous step until this matches.

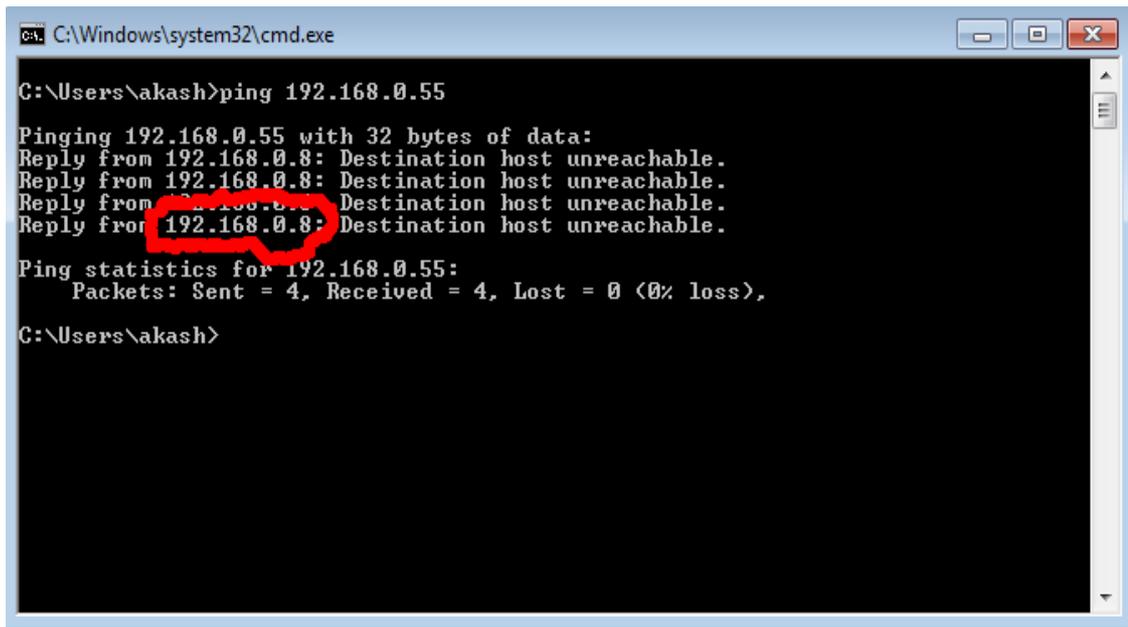


Figure 2.10 Ping response showing a connection problem

Once you get the ping successfully working you can connect to your device through a browser and start the next part of the setup.

Open your favorite browser (Chrome, Safari and Firefox are recommended) and type in <http://192.168.0.55> in the address bar, then press *Enter*. You should see the Wattmon login page – continue to section 2.3 to continue.

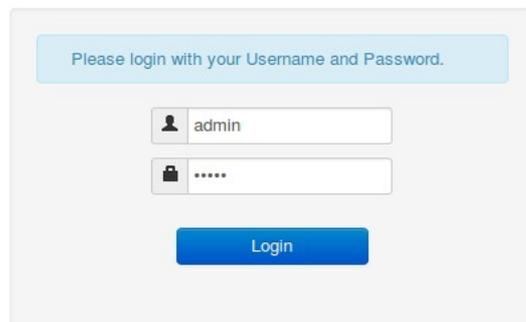
Chapter 3

Using your Wattmon

3.1 Logging in to Wattmon

If you have completed steps 2.1 or 2.2 properly, you will see a page similar to Figure 3.1. In the corresponding boxes, enter *admin* as the username and *admin* as the password, and click *Login*.

Welcome to Wattmon



Please login with your Username and Password.

Login

Figure 3.1 Login page of Wattmon

Once you are logged in, you will see the main Wattmon page as shown in figure 3.2.

3.2 Wattmon Dashboard

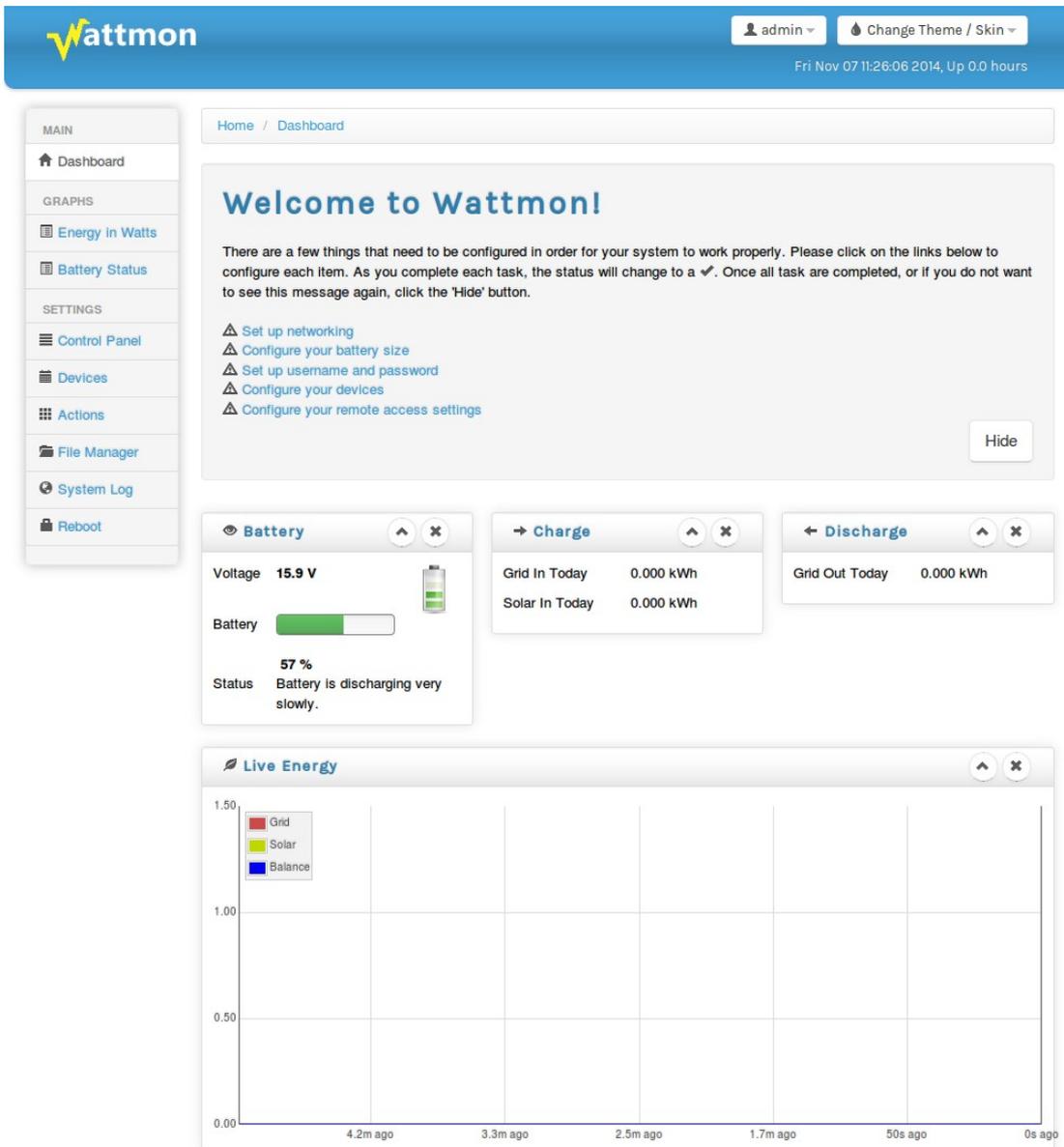


Figure 3.2 Wattmon Dashboard page

The Wattmon dashboard page provides relevant information about the current state of your battery bank and energy flow values for the day. In new installations, the Welcome To Wattmon panel gives you an easy way to configure important system parameters. Once you have completed the setup of each of these items, they alert sign will be replaced with a tick mark. At this point you can click the Hide button to remove this panel in future. See the following sections for information on how to configure the various Wattmon options for correct functioning.

Battery Widget

The Battery widget displays battery voltage and battery state of charge. Initially, the state of charge will be wrong – Wattmon needs the battery to reach full before it can re-calibrate the state-of-charge value. See the Battery Configuration section for more information on this.

Charge Widget

The Charge Widget displays information on energy flowing into your battery bank from Solar or Grid. Grid energy is the energy that your inverter is producing to charge your batteries from the mains grid.

Energy is accumulated and the total energy in kWh for the day is shown in the widget, allowing you to ascertain whether for example your solar panels are functioning optimally.

Discharge Widget

The discharge widget shows all energy leaving the battery through your inverter or other load. The accumulated discharge energy is shown in kWh (for the current day) as well.

Live Energy Widget

Live energy is shown in the form of a graph. The individual energy inputs (Solar, grid charge, grid discharge) are shown in different colors and the energy balance (sum of all input and output energy) is shown in purple. The graph is updated once a second and show the last 5 minutes of energy usage when the Wattmon dashboard is kept open in the browser. Upon re-opening the window this will be blank, and build up slowly, you will see the graph appear from right to left. Energy below 0 indicates a discharge, and energy above 0 indicates a charge.

Admin button

At the top of the window, the Admin button has two three options: Rotate Logs, Clear Cache, Logout

Rotate Logs

This option will rename the log file in the Logs folder and create a blank log file

Clear Cache

This will force delete all .cgc compiled files, and needs to be done if some pages do not appear properly or if you are making changes to the page source code.

Logout

Disconnects the session

Change Theme/Skin button

This drop down contains different skins, and lets you load a different style sheet to modify the color scheme of your Wattmon.

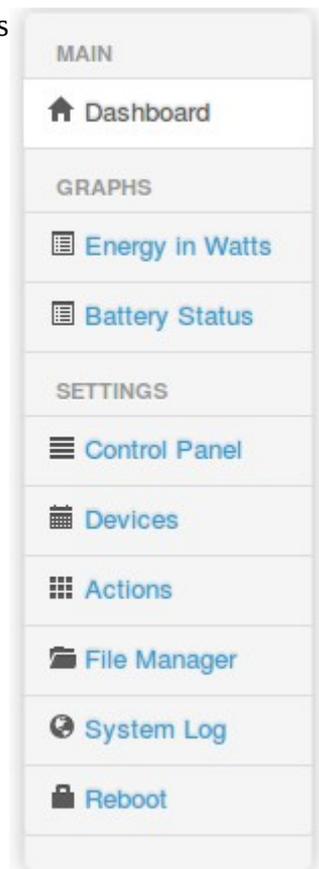
Date & Time Field

The Wattmon real time clock keeps track of system time and this time is displayed just below the buttons in the top part of the window. In case you lose connectivity between the browser and the Wattmon, you will see a message here indicating how long ago the last successful connection happened.

Main Navigation Menu

The main navigation at the left hand side of the dashboard lets you navigate to important pages, described below.

Menu	Description
<i>Dashboard</i>	Returns to the Dashboard page
<i>Energy In Watts</i>	Displays the daily and month graphs of energy generated and consumed
<i>Battery Status</i>	Displays battery status (voltage and percentage) on a daily or monthly basis
<i>Control Panel</i>	Settings page with buttons to configure Wattmon
<i>Devices</i>	Devices page with options to configure your modules
<i>Actions</i>	Action management to automate Wattmon
<i>File Manager</i>	Access to file system with options to edit and delete files
<i>System Log</i>	System log view
<i>Reboot</i>	Reboots the Wattmon



Additional Widgets

Additional widgets can be added to the dashboard from the control panel. Some plugins will also have dashboard widgets that appear, such as the Scheduler plugin. See the *Configuring Widgets* section for more information.

3.3 Graph Pages

Wattmon displays data from CSV files in intuitive graphs. By default, two types of graph are provided with Wattmon – The *Energy in Watts* graph and the *Battery Status* graph. These can be accessed from the navigation menu on the left of the window.

Every graph page has a navigation bar at the top, where you can click the < and > buttons to switch between days (or months, in month mode). The *Select* button lets you choose a day to view from a drop-down calendar. You can switch between *Day View* mode and *Month View* mode by clicking the respective buttons – See figure 3.3 and 3.5 for images showing both of these modes.

3.3.1 Energy In Watts Graph

The Energy In Watts (Figure 3.3) shows *Solar charge* (green), *grid charge* (blue) and *load* (red). The total kWh for each type are shown above the graph.



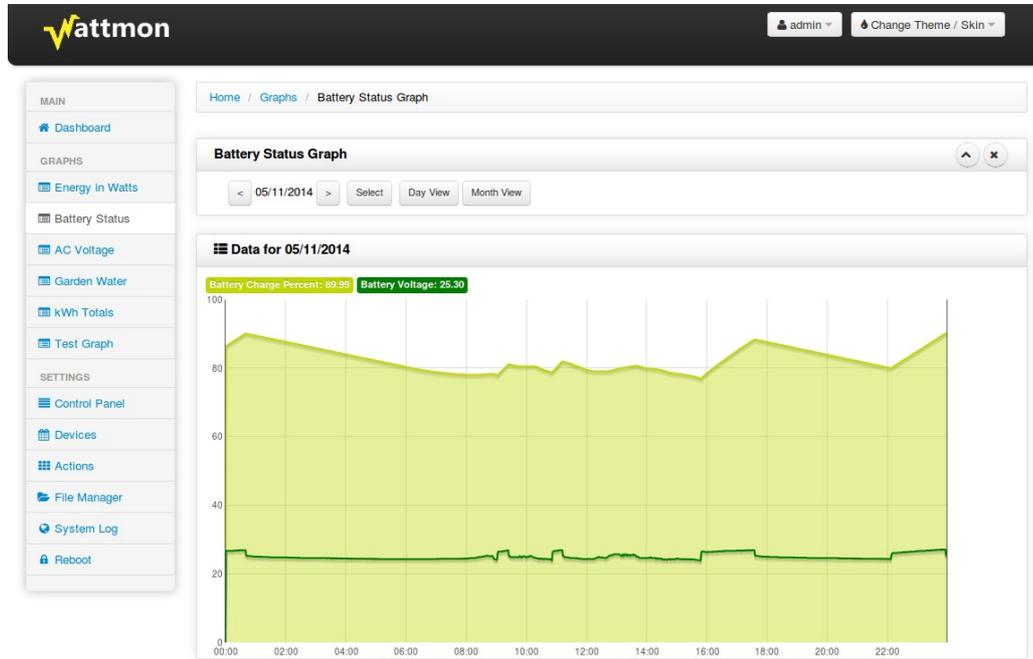
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Figure 3.3 Energy Graph view by day

3.3.2 Battery Status Graph

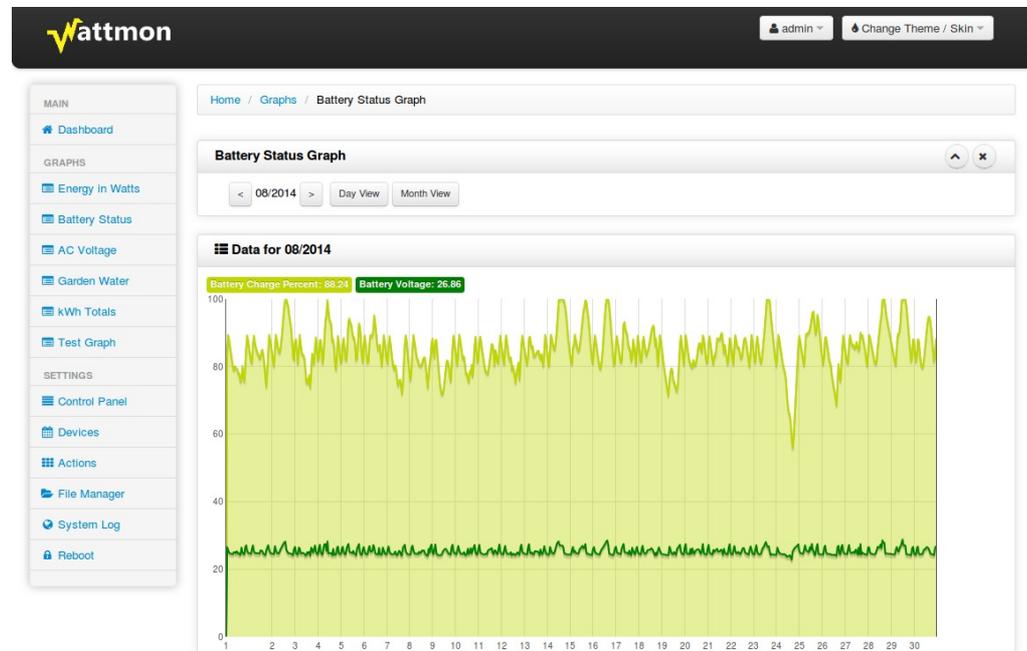
This graph displays both battery voltage and the calculated state of charge (SOC).



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Figure 3.4 24-hour view of Battery status



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Figure 3.5 Month overview of battery status

3.4 Control Panel

The *Control Panel* provides you with buttons to all the important configuration options available to Wattmon. A detailed explanation of each of the buttons can be found in the following sections.

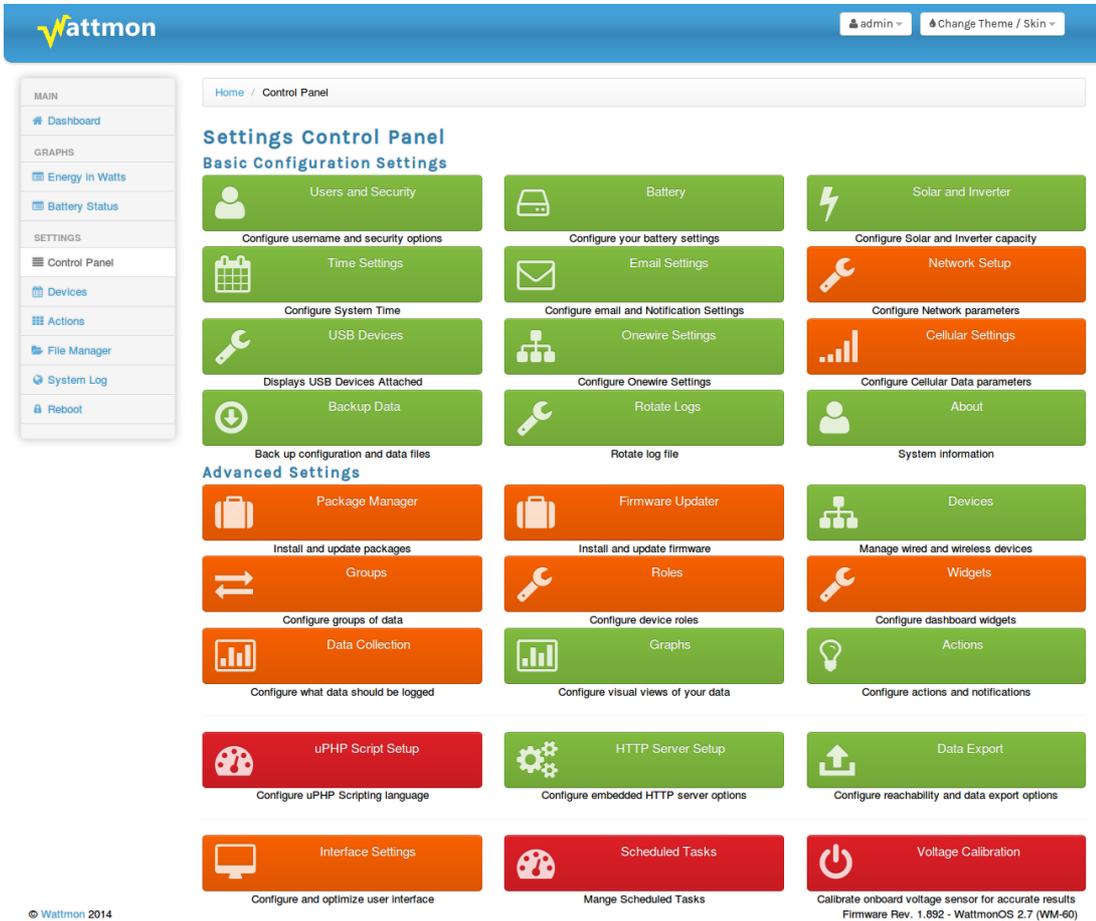


Figure 3.6 Control Panel page

3.4.1 Users and Security

There are two different security levels for Wattmon: admin mode and guest mode. Admin mode allows you to make changes to any part of the system whereas guest mode lets you only view the dashboard and graphs.

Figure 3.7 shows the security settings page. In the respective fields, enter the administrator username and password, and guest username and password. Defaults are: admin / admin for the admin user, and guest / guest for the guest user.

The *device name* field is used to specify the name of your Wattmon. This is used both in the title of the page and as the NetBIOS name. The default name is *Wattmon*. You could then open up your wattmon just by its name from Windows – for example: <http://wattmon/> or from a command line: `ping wattmon`.

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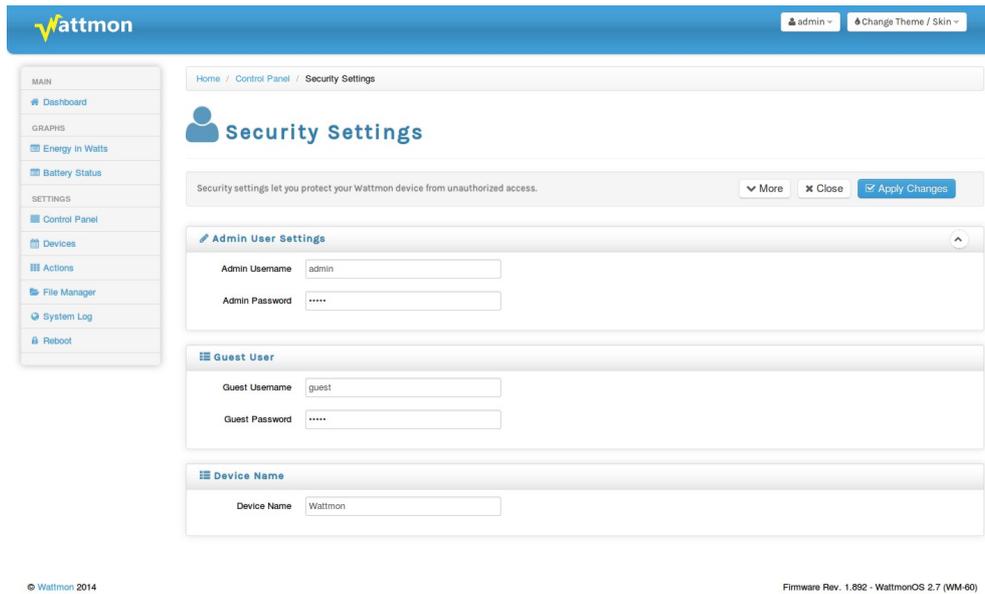


Figure 3.7 Security Settings page

3.4.2 Battery

The Battery and Charge settings page lets you specify your battery voltage and size. This is a required setup step in order to obtain correct state of charge calculations.

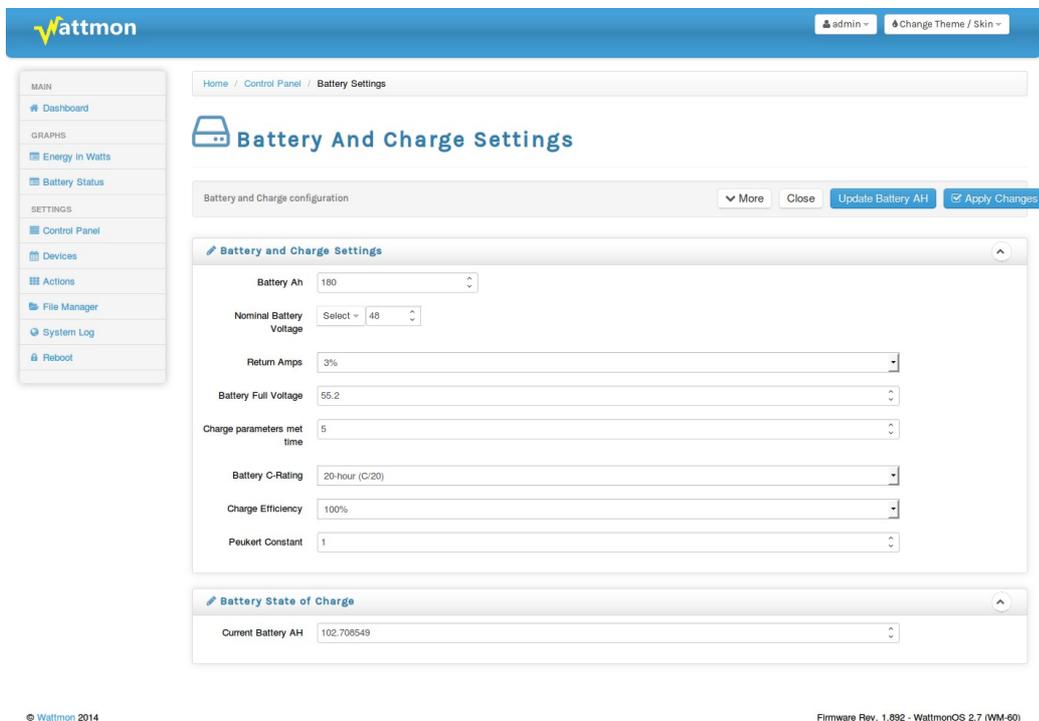


Figure 3.8 Battery and Charge Settings page

The settings are described below:

Battery AH field

Enter the Amp Hour setting of your battery bank here. This could be 100, 200, 300, etc.

Nominal Battery Voltage

Enter the battery voltage of your battery pack – this will usually be in multiples of 12. Wattmon can run directly off a battery bank of up to 48V DC. If you have a higher voltage bank, you will need to use the HV kit, which has an A5S1 module to interface with the battery bank. In this case you will need to set the voltage here to your battery pack voltage, and link the External Voltage role to your device. This is described in the how-tos in chapter 4.

Return Amps

This is used in the battery recalibration algorithm. Enter a percentage here – or select not used. When the battery is greater or equal to the battery full voltage, and the charge amps drop to below this percentage of the total battery capacity, the battery state of charge will be automatically reset to 100%.

Battery Full Voltage

The *Battery Full Voltage* field is automatically updated when you change the system voltage. The default is 13.8V DC per 12V battery, but this can be modified based on your charger settings.

This field is important for the automatic battery percent calculation. Whenever the battery voltage reaches the Battery Full Voltage preset, it will reset the battery percent to 100% regardless of what it was previously. This is useful if your system is not completely full very often and some errors get introduced into the system over time, but be sure to not put this too low as it will affect the calculations.

Charge Parameters Met Time

This lets you specify how long (in minutes) you wish the above parameters to hold true for before the battery gets reset to full.

Battery C-Rating

The *Battery C-Rating field* is used for the Peukert calculations if that is activated. This is the discharge rate at which the battery AH is calculated. Normally this is 20h.

Charge Efficiency

The State of charge algorithm can be tweaked if required. By default, it is suggested to leave the charge efficiency at 100% unless you notice inconsistencies. This value is used to update the state of charge.

For example, if you set the *Charge efficiency* to 90%, and you charge at 10A DC, the

battery will be updated as if it is only getting 9A DC, assuming that there are losses in the electrolytes, etc.

Peukert Constant

The *Peukert constant* can be set for the battery and will affect the discharge current vs state of charge. For low discharge currents in relation to the battery Ah, this can be left at 1. For high discharge rates, you can set up the peukert constant if you know it (Typically 1.05-1.15). This will adjust the way the battery percent is calculated.

Once settings have been updated, click *Apply Changes* to save them. A reboot is required for the settings to take effect, but this can be done once all other settings are configured.

Current Battery AH

This is the calculated value of the remain AH in the battery bank. You can manually set this to the battery AH value to reset the battery status to full when installing the system. Click the *Update battery AH* button to save the changes.

3.4.3 Time Settings

Wattmon has an internal Real Time Clock (RTC) with a lithium battery that should keep accurate time for years when not in use. The time can be manually updated from the *Time and Date Settings* page when the *Do not use SNTP* option is selected. If you wish to automatically update the system time from the Internet regularly, select the *Use SNTP* option. This will also update the internal RTC clock, so you could do this at first system boot and then disable it.

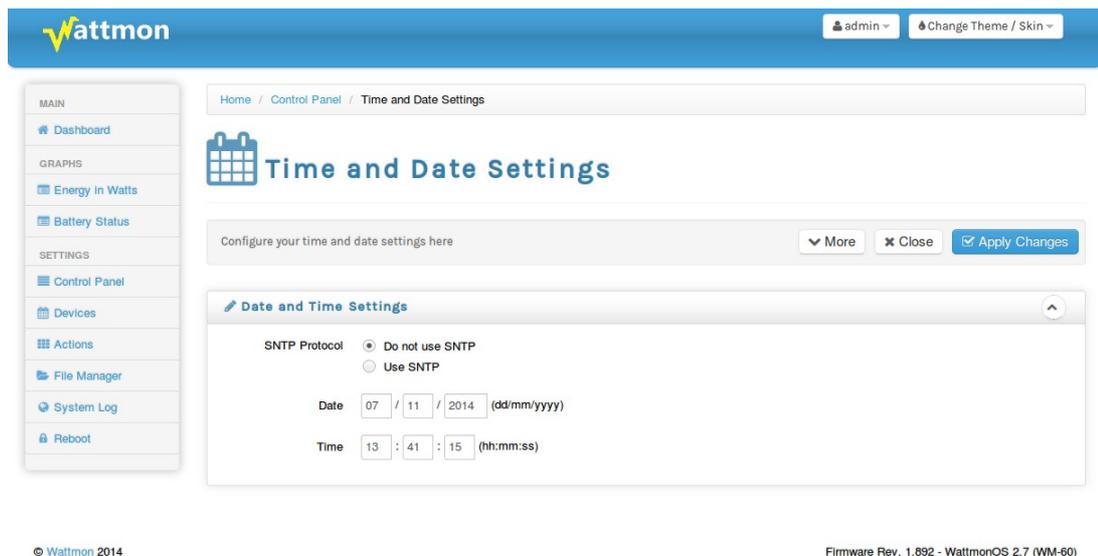


Figure 3.9 Time and Date Settings

3.4.4 Email Settings

Wattmon actions can be configured to alert you by email when certain conditions are met. In order for this to work, you will need to enter accurate SMTP server details. SSL with upto 2048 bit encryption is supported. If you are using gmail, use the following parameters:

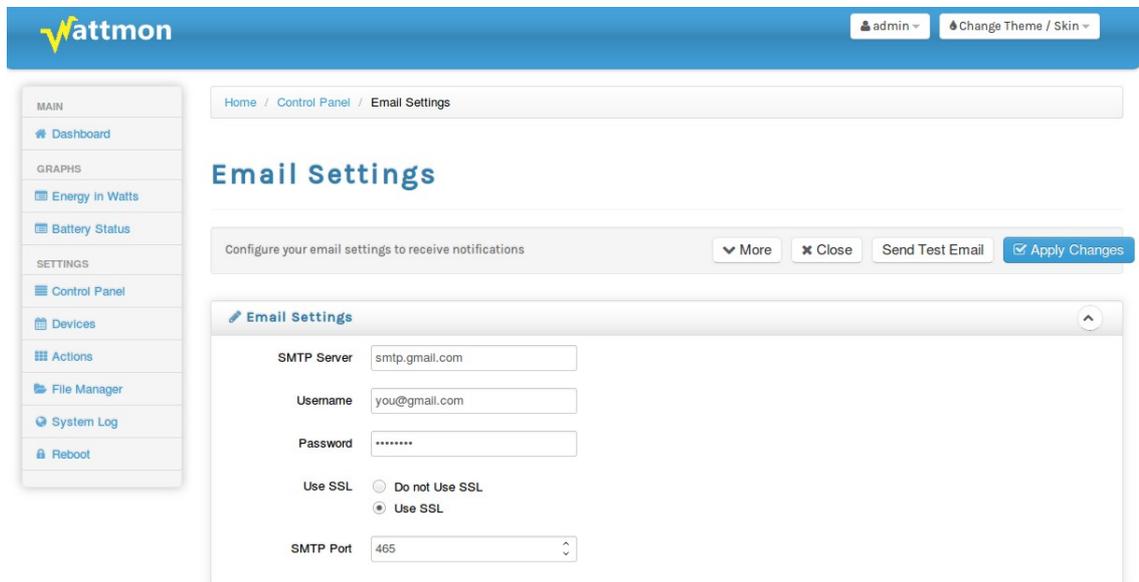
SMTP Server: smtp.gmail.com

Username: your gmail email address

Password: your gmail password

Use SSL: yes

SMTP Port: 465



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Figure 3.10 Email Settings page

Click the *Apply Changes* button to save changes. In order to test out the settings, click the *Send Test Email* button and enter your email address in the popup window. You will see a message indicating success or failure, and you should get a test mail in your inbox if everything went well.

3.4.5 Network Settings

The LAN port can operate in two modes: DHCP and Static IP. In DHCP mode, Wattmon will automatically obtain an IP address from the router or DSL modem. This is the default mode when you get your new Wattmon. If you wish to reach your device from the Internet, you will need to configure it with a static IP. To do this, Select Static IP as shown in figure 3.11.

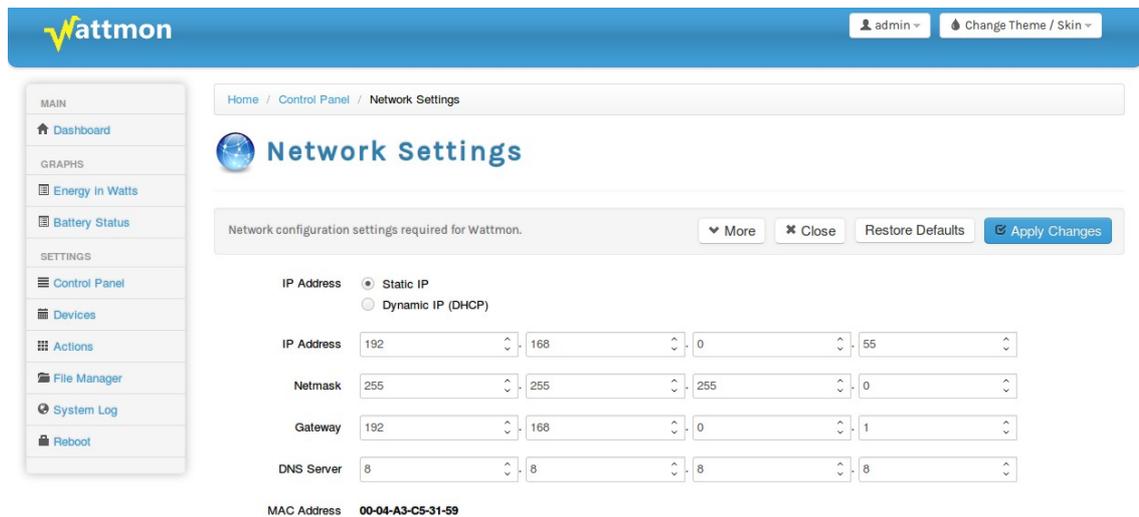


Figure 3.11 Network Settings Page

In the IP address field, enter the address which is in your local subnet. Most DSL routers will work in a range of 192.168.0.2 to 192.168.0.254.

Netmask

Enter the netmask, usually 255.255.255.0

Gateway

This is the address of your DSL modem, and is normally equal to your IP address with a 1 in the last field. For example, if your IP is 192.168.0.5 then your gateway will be 192.168.0.1

DNS Server

Enter a public DNS server such as google (8.8.8.8) or OpenDNS (208.67.222.222) in order for Wattmon to be able to reach the server.

Mac Address

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.

3.4.6 USB Devices

If you plan on connecting a 3G Dongle, you can enable *USB Support* in this page. If you are not using USB, it is recommended to disable it to save memory.

The *Connected Devices* panel shows information about the currently plugged-in device. If you have an unrecognised USB device, you will need to configure it. There is a tutorial on the website called “Installing a USB 3G Dongle” which explains the procedure.

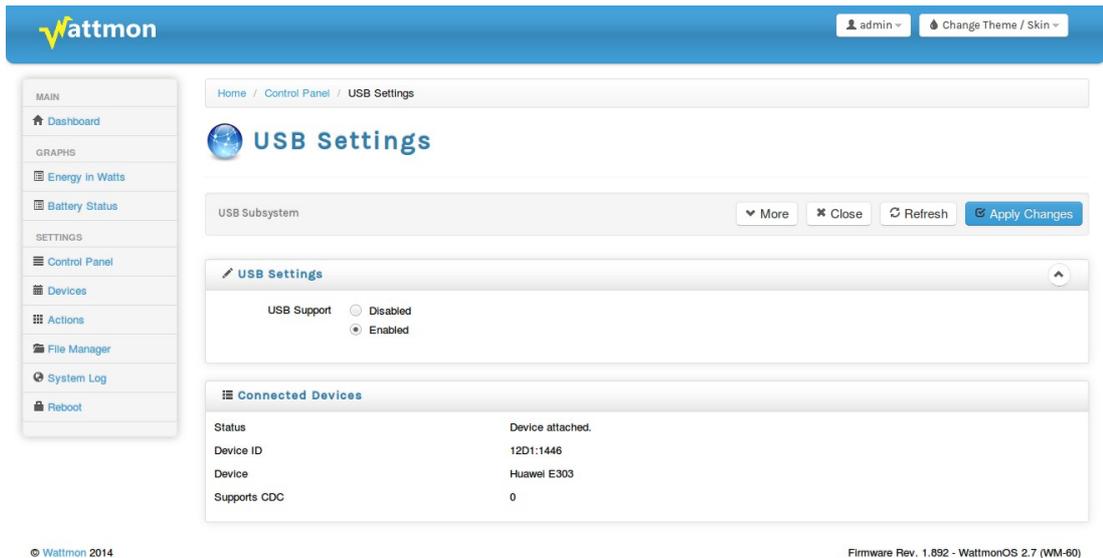


Figure 3.12 USB Settings Page

Click the Refresh button on the page to reload the information – this will be used when configuring your driver configuration file for unsupported models.

USB devices need to support the CDC class in order to work properly – no other type is presently supported. This means that plugging in a USB Flash drive will not work, for example. USB Support is only intended to be able to interface with low cost USB cellular dongles that support the AT command set, in order to provide an affordable remote monitoring solution. Before purchasing a dongle, make sure that it does support AT commands, many of the recent ones no longer have this option.

3.4.7 Onewire Settings

The Dallas Onewire allows you to interface with a variety of sensors and chips. Wattmon presently only supports the DS18B20 temperature sensor. Extensive information on configuring a onewire sensor is available on the website.

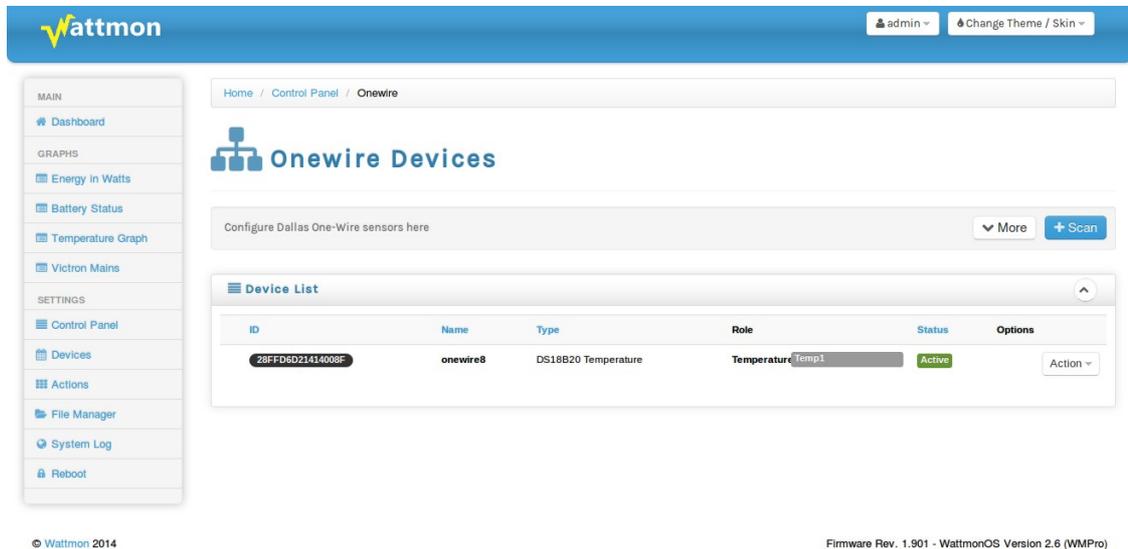


Figure 3.13 Onewire Devices page

All onewire devices are shown in the Device List. After plugging in a new device, click the Scan button to detect the new sensor(s). The ID of the device in the list is the unique onewire device ID. In order to configure the sensor to be used in Wattmon, click *Action > Configure* in the list.

3.4.7.1 Configuring a Onewire Sensor

The onewire sensor configuration page lets you change settings per onewire device. The Device ID is automatically detected and should not be changed.

The fields in the window are described below:

Device Name

This should be a unique name for the device, and will be automatically assigned when the device is detected after a scan. You can change this if required.

Poll Interval

Enter the interval in ms between device polls – this determines how often the temperature value is read. A value below 1 second may be unrealistic if you have multiple devices, since each device requires a minimum of about 500 ms to read.

Status

You can enable or disable the device here

Configure roles

The configure roles lets you assign a system role to the device. For Onewire sensors there is only one role: temperature. This can be assigned to any of the preset roles, or you can use the Roles editor to create a new role beforehand to be assigned to this.

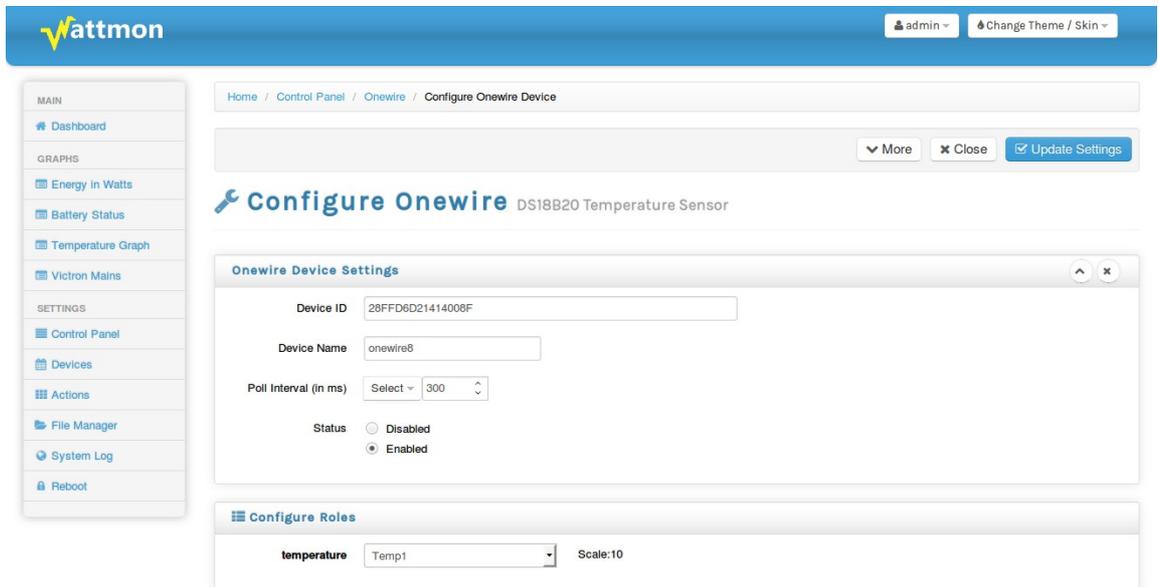
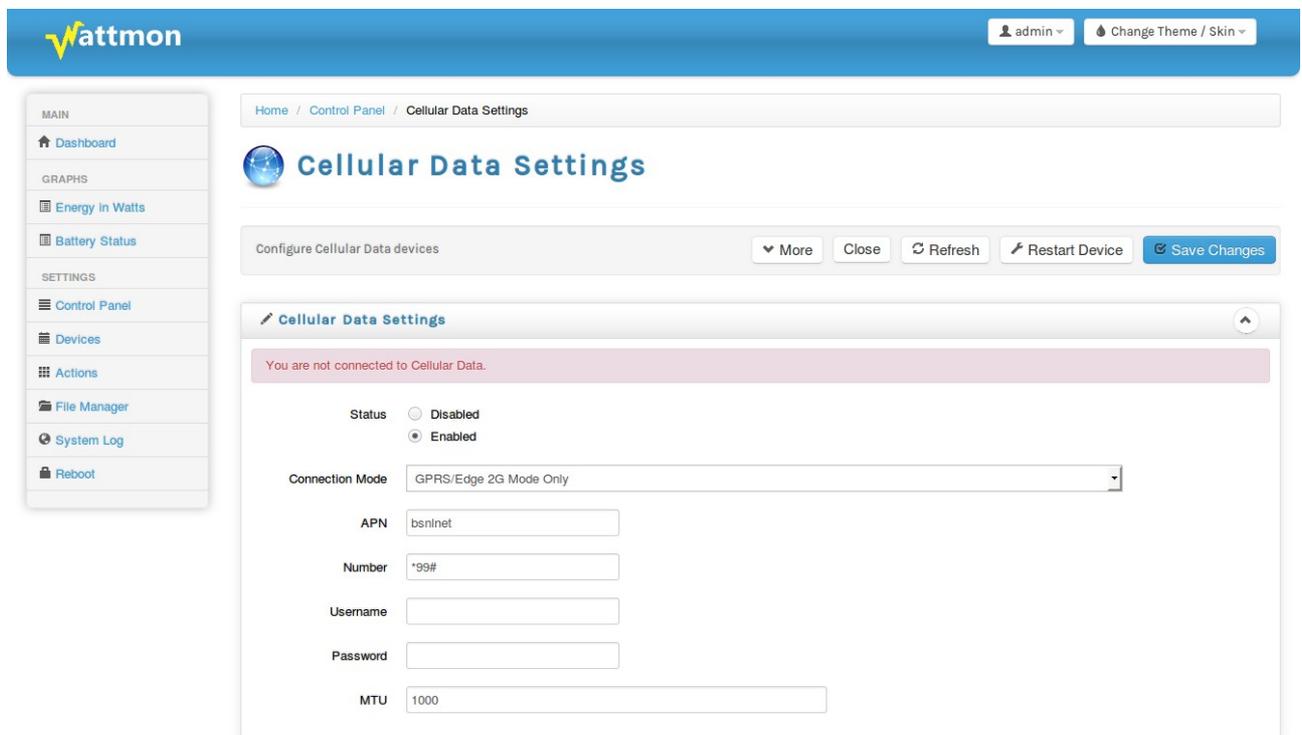


Figure 3.14 Onewire Device Edit page

3.4.8 Cellular Settings



Wattmon Installation Manual

3.4.9 Backup Data

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3.4.10 Rotate Logs

3.4.11 About



About

ID	STA	IP	INFO
0	0	192.168.0.7 CL	glyphicons-halfings.png 9 TCP_LISTEN
1	0	192.168.0.7 CL	lib2.min.js 7 TCP_LISTEN
2	0	192.168.0.7 CL	sprite.png 9 TCP_LISTEN
3	0	192.168.0.7 OP PR	about.cgi 3 TCP_ESTABLISHED
4	112	(null) CL	0 GET_DNS

PID	SCRIPT	FLG	RUN MS
0000	(null)	0000	8699925
0001	about.cgi	0064	0515

Wattmon Installation Manual

3.4.12 Package Manager

The screenshot displays the Wattmon Package Manager interface. At the top, there is a blue header with the Wattmon logo on the left and user information (admin) and theme options (Change Theme / Skin) on the right. A navigation sidebar on the left lists various system functions. The main content area is titled 'Update and Install Packages - Package Updates' and includes a breadcrumb trail: Home / Control Panel / Package Manager. Below the title, there is a sub-header 'Manage your WattmonOS packages here.' with a 'More' dropdown and a 'Package Types' dropdown. The interface is divided into two main sections: 'Available Package List' and 'Downloaded Package List'.

Available Package List

ID	Name	Version	Size	Date	Options
53	WattmonSolar	1.10	1689600	2013-10-07 05:18:58	Install
65	WattmonOS WattmonOS is the new version of WattmonSolar for the Wattmon Platform	2.0	4044800	2014-01-31 06:28:52	Install
107	WattmonOS 2.6 UPDATE Upgrade to version 2.6 from 2	2.6	1044480	2014-09-09 10:59:04	Install
115	WattmonOS 2.7 UPDATE Minor UI improvements, added a scheduler package that can optionally be installed	2.7	1320960	2014-11-03 10:09:48	Install

Downloaded Package List

ID	Name	Author	Version	Status	Options
1	BatteryWidget Battery management plugin	Akash Heimlich	1.0	Uninstalled	Action ▾
2	BatteryWidgetAjax			Uninstalled	Action ▾
3	SysInfoWidget System Information Widget	Akash Heimlich	1.0	Uninstalled	Action ▾
4	TestWidget			Uninstalled	Action ▾
5	VariableWidget Variable widget for the front page	Akash Heimlich	1.0	Uninstalled	Action ▾
6	Scheduler Schedule actions on daily, weekly or month intervals	Akash Heimlich	1.0	Uninstalled	Action ▾

3.4.13 Firmware Updater

Wattmon Installation Manual

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.

ID	Name	Version	Size	Date	Options
108	Wattmon Firmware 1.893	1.893	1095680	2014-08-26 11:04:12	Install
109	Wattmon Firmware 1.894 This has an option for custom modbus rates and parity settings	1.894	1095680	2014-09-09 10:10:30	Install
110	Wattmon Firmware 1.895 Added a new action type and updated modbus settings	1.895	1095680	2014-09-16 11:03:57	Install
111	Wattmon Firmware 1.896 Bug fixes in modbus digital output which sometimes cause erratic switching of devices	1.896	1105920	2014-09-23 06:30:36	Install
112	Wattmon Firmware 1.897 This version has an additional action type to allow for delays in actions	1.897	1105920	2014-10-04 06:21:20	Install
113	Wattmon Firmware 1.898 This fixes a small bug introduced in 1.897 related to adding new devices.	1.898	1105920	2014-10-06 06:53:18	Install
114	Wattmon Firmware 1.900 This has several new features and improvements and solves some old bugs such as intermittent reboots when viewing web pages	1.900	1157120	2014-11-03 06:47:41	Install
116	Wattmon Firmware 1.901 Minor but important update to 1.900 which caused potential reboots when upgrading firmware	1.901	1157120	2014-11-03 11:50:20	Install

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

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3.4.14 Devices

Home / Control Panel / Devices

Modbus Devices

Devices help you collect data and control outputs.

Scanning:

ID	Name	Type	Role	Status	Options
2	Device2	C752 Current Sensor	Current 1 Current 2	Undefined Undefined	Last access 5s ago Action

Wattmon admin Change Theme / Skin

Home / Control Panel / Devices / Configure Device

Configure Device 75A Dual Current Sensor on Modbus (1002)

More Close Calibrate Apply Changes

Device Settings

Device ID: 2

Device Name: Device2

Poll Interval (in ms): Select 300

Status: Disabled Enabled

Configure Roles

Current 1	Solar DC Input to Battery	Scale:100	Read Only Register
Current 2	Bidirectional DC to Battery	Scale:100	Read Only Register

Wattmon

admin Change Theme / Skin

Home / Control Panel / Devices / Calibrate Device

Calibrate Device 75A Dual Current Sensor on Modbus (1002)

Calibrate your device using the registers available. More Close Configure Apply Changes

Settings saved.

Read/Write Registers

Offset to 0 current Sensor 1	2058
Multiplier calibration for current 1	964
Divider calibration for current 1	100
Invert current 1	0
Offset to 0 current Sensor 2	2540
Multiplier calibration for current 2	964
Divider calibration for current 2	100
Invert current 2	1

Read Only Registers

Current 1	0
Raw ADC current 1 reading	2058
Current 2	0
Raw ADC current 2 reading	2540

3.4.15 Groups

Wattmon Installation Manual

Home / Control Panel / Groups

Groups

System groups More + Add Group

Group List

ID	Group Name	Type	Show	Options
0	Not grouped	Not consolidated	Hidden	Edit
1	Wind	Consolidate into battery 1	Hidden	Edit
2	Grid	Consolidate into battery 1	Visible	Edit
3	Solar	Consolidate into battery 1	Visible	Edit

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3.4.15.1 Edit Group

Home / Control Panel / Groups / Configure Group

Configure Group: Solar

Group configuration More Close Apply Changes

Group Settings

Group ID:

Group Name:

Group Type:

Group Visibility:

Group Icon:  Select

Group Color:

3.4.16 Roles

Home / Control Panel / Roles

Roles

System roles More + Add Role

ID	Role Name	Type	Group	Devices	Options
1	Solar DC Input to Battery	Read Only Value	3	1001,1100,1002	Edit
2	Current Monitor: Charger Input to Battery	Read Only Value	2	1001,1100,1002	Edit
3	Bidirectional DC to Battery	Read Only Value	2	1001,1100,1002	Edit
4	Current Monitor: DC Output Only from Battery	Read Only Value	2	1001,1100,1002	Edit
5	Current Monitor: External Sensor 1 not conned	Digital Out	1	1001,1100	Edit
6	AC Current Monitor	Digital Out	0	1001,1100,1101,1190	Edit
7	Relay for Main Inverter Input	Digital Out	2	1005,1006	Edit
8	Relay Output 1	Digital Out	0	1005,1006	Edit
9	Mains Voltage	Digital Out	0	1005,1006,1190	Edit
10	Relay Output 2	Digital Out	0	1005,1006	Edit

3.4.16.2 Edit Role

The screenshot displays the Wattmon web interface. At the top, the Wattmon logo is on the left, and the user 'admin' and 'Change Theme / Skin' options are on the right. A sidebar on the left contains navigation menus for MAIN, GRAPHS, SETTINGS, and other system functions. The main content area shows the breadcrumb 'Home / Control Panel / Roles / Configure Device' and the title 'Configure Role: Current Monitor: Charger Input to Battery'. Below the title, there are buttons for 'More', 'Close', 'Save As New', and 'Apply Changes'. The 'Role Settings' section contains the following fields:

- Role ID: 2
- Role Name: Current Monitor: Charger Input to Battery
- Display on dashboard: No
- Group ID: Grid
- Role Type: Device: Read Only Value
- Role Definition: Current

The 'Assign Role to Devices' section features a table with three rows of devices, each with an 'Action' dropdown menu.

ID	Device	Options
1	C501 Current Sensor	Action ▾
2	Current Sensor	Action ▾
3	C752 Current Sensor	Action ▾

3.4.17 Widgets

Wattmon Installation Manual

Wattmon admin | Change Theme / Skin

Home / Control Panel / Widgets

Widgets

More | Add Widget

Widget List

ID	Title	Template	Icon	Width	Options	
0	Battery	/widgets/widget_battery.inc	icon-eye-open	4	Visible Hide	Action
1	Charge	/widgets/widget_charge.inc	icon-arrow-right	4	Visible Hide	Action
2	Discharge	/widgets/widget_discharge.inc	icon-arrow-left	4	Visible Hide	Action
3	Live Energy	/widgets/widget_flotr.inc	icon-leaf	12	Visible Hide	Action

3.4.17.2 Edit Widget

Wattmon admin | Change Theme / Skin

Home / Control Panel / Widgets / Configure Widget

Configure widget: Live Energy

Widget configuration | More | Close | Apply Changes

Widget Settings

Widget ID: 3

Widget Title: Live Energy

Widget Width: 12

Widget Visibility: Visible

Widget Template: /widgets/widget_flotr.inc

Widget Icon: icon-leaf

3.4.18 Data Collection

Wattmon Installation Manual

Home / Control Panel / Data Collection

Data Collection

Data collection settings More + Add Data Group

Group List

ID	Group Name	Status	Info	Options
1	KwH Log	Active	Created: 12/02/14 Num Entries: 21 Num Days: 4	Action
2	Test	Disabled	Created: undefined Num Entries: 0 Num Days: 0	Action

3.4.18.2 Edit Data Collection

Home / Control Panel / Data Logging / Configure Data Group

Configure Group: KwH Log

Group configuration More Close Apply Changes

Data Group Settings

Data Group Name: KwH Log

Log File Type: Log files split by day and month

Data Group Status: Enabled

Log Interval: 15

Data Points

ID	Value Type	Value	Scale	Function	Options
1	System Variable	Solar Watts	*1	AVERAGE	Action
2	System Variable	Grid Charge Watts	*1	AVERAGE	Action
3	System Variable	Grid Load Watts	*1	AVERAGE	Action
4	System Variable	Battery Voltage	*1	AVERAGE	Action
5	System Variable	Battery Percent	*1	AVERAGE	Action
6	System Variable	Solar kWh Today	*1	MAX	Action
7	Device Variable	Relay for Main Inverter Input	*1	MAX	Action
8	System Variable	Inverter kWh Charge Today	*1	MAX	Action
9	System Variable	Inverter kWh Discharge Today	*1	MAX	Action
10	Device Variable	Temp1	*1	MAX	Action
11	Device Variable	Temperature 2	*1	MAX	Action
12	Device Variable	Temperature 3	*1	MAX	Action
13	Device Variable	Relay Output 1	*1	MAX	Action
14	System Variable	Wind Speed	*1	MAX	Action

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ID	Value Type	Value	Scale	Function	Options
1	System Variable	Solar Watts	1	AVERAGE	Action
2	System Variable	Grid Charge Watts	* 1	AVERAGE	Action

3.4.19 Graphs

The screenshot shows the Wattmon web interface. At the top, there is a blue header with the Wattmon logo and user controls for 'admin' and 'Change Theme / Skin'. A left sidebar contains navigation options under 'MAIN', 'GRAPHS', and 'SETTINGS'. The main content area is titled 'Graphs' and includes a description: 'Graphs let you display information about a running system.' Below this is an 'Add Graph' button and a table of existing graphs.

ID	Graph Name	Data Collection	Status	Options
1	Energy in Watts	KwH Log	Active	Action
2	Battery Status	KwH Log	Active	Action

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3.4.19.2 Edit Graph

Wattmon Installation Manual

Home / Control Panel / Graphs / Configure Graph

Configure Graph: Energy in Watts

Graph configuration More Close Apply Changes

Graph Settings

Graph Name: Energy in Watts

Data Group: KWH Log

Graph Status: Enabled

Graph Data

ID	Data Point	Title	Type	Color	Function	Options
1	Sysvar: Solar Watts	Solar Charge	Undefined Noise:0	#C2D856 Filled Area	Plot value, aggregate as kWH	Action
2	Sysvar: Grid Load Watts	Load Watts	Undefined Noise:0	#FF8D70 Inverted Filled Area	Plot value, aggregate as kWH	Action
3	Sysvar: Grid Charge Watts	Grid Charge Watts	Undefined Noise:0	#BAD6FF Line	Plot value, aggregate as kWH	Action

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3.4.20 Actions

You will need to reboot the device for changes to take effect.

Home / Control Panel / Actions

Actions

Action List

ID	Action	Status	Time	Options
0	Start charging	Always Active		Action

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3.4.20.2 Edit Action

The screenshot shows the Wattmon web interface. At the top, there is a blue header with the Wattmon logo on the left and user information (admin) and a 'Change Theme / Skin' dropdown on the right. A notification bar at the top states: 'You will need to reboot the device for changes to take effect.' Below this is a breadcrumb trail: 'Home / Control Panel / Actions / Configure Action'. The main heading is 'Configure Action Start Charging'. On the right side of the main content area, there are three buttons: 'More', 'Close', and 'Apply Changes'. A left sidebar contains a navigation menu with categories: MAIN (Dashboard), GRAPHS (Energy in Watts, Battery Status), SETTINGS (Control Panel, Devices, Actions, File Manager, System Log, Reboot). The 'Configure Action' section is divided into three panels: 1. 'Action Settings': 'Action Name' is 'Start Charging'. 'When is this active?' has 'When' set to 'All of the below conditions match (boolean AND)'. 'Delay (secs) before trigger' is '0'. 'Status' is 'Always Enabled'. 2. 'Action Trigger Condition(s)': A table with one condition: ID 1, Value Type 'System Variable', Value 1 'Battery Percent', Comparison 'Is Less than', Value 2 'Fixed Value', Value 2 Type '70', and an 'Action' dropdown. 3. 'Actions to Execute': A table with one action: ID 1, Action 'Switch On', Variable 'Relay Output 1', and an 'Action' dropdown.

Wattmon

admin Change Theme / Skin

You will need to reboot the device for changes to take effect.

Home / Control Panel / Actions / Configure Action

Configure Action Start Charging

More Close Apply Changes

Action Settings

Action Name: Start Charging

When is this active?

When: Any of the below conditions match (boolean OR) All of the below conditions match (boolean AND)

Delay (secs) before trigger: 0

Status: Disabled Always Enabled Enabled during time range Disabled during time range Execute at a fixed time Execute at a fixed interval (seconds) Manually triggered

Action Trigger Condition(s)

ID	Value Type	Value 1	Comparison	Value 2	Value 2 Type	Options
1	System Variable	Battery Percent	Is Less than	Fixed Value	70	Action

Actions to Execute

ID	Action	Variable	Options
1	Switch On	Relay Output 1	Action

3.4.21 uPHP Script Setup

Wattmon Installation Manual

The screenshot displays the Wattmon web interface. At the top, the Wattmon logo is on the left, and 'admin' and 'Change Theme / Skin' are on the right. A navigation sidebar on the left lists: MAIN (Dashboard), GRAPHS (Energy in Watts, Battery Status), SETTINGS (Control Panel, Devices, Actions, File Manager, System Log, Reboot). The main content area shows the breadcrumb 'Home / Control Panel / uPHP Settings' and the title 'uPHP Settings'. Below this is a 'Scripting language configuration' section with 'More', 'Close', and 'Apply Changes' buttons. The 'uPHP Settings' panel contains the following configuration items:

Debug Method	Serial Port
Debug Level	Medium
Max Execution Time (secs)	10
Max Concurrent Script	2
Session Expire Time (secs)	600
Startup Script	/scripts/runonce.cgi
Error Log	/logs/log.txt

Below the Error Log field is a 'View' button and the text '* include full path'.

3.4.22 HTTP Server Setup

Wattmon Installation Manual

The screenshot shows the Wattmon web interface. At the top, there is a blue header with the Wattmon logo on the left, a user dropdown menu showing 'admin', and a 'Change Theme / Skin' button. A left sidebar contains a navigation menu with categories: MAIN (Dashboard), GRAPHS (Energy in Watts, Battery Status), SETTINGS (Control Panel, Devices, Actions, File Manager, System Log, Reboot), and a 'You will need to reboot the device for changes to take effect.' notification bar. The main content area is titled 'HTTP Server Settings' and includes a breadcrumb 'Home / Control Panel / HTTP Server Settings'. Below the title is a 'Graph Settings' panel with the following configuration: 'Access Log' set to 'Do not generate access log', 'HTTP Log File' set to '/logs/http.txt' with a 'View' button, 'Server Port' set to '80', and 'Secure PUT var' set to 'logged_in'. Action buttons include 'More', 'Close', and 'Apply Changes'.

3.4.23 Data Export

The screenshot shows the 'Data Export Settings' page in the Wattmon interface. It features a breadcrumb 'Home / Control Panel / Data Export Settings' and a title 'Data Export Settings' with an upward arrow icon. The configuration area includes 'Data Export Configuration' with buttons for 'More', 'Close', 'Detect Router', 'Test Settings', and 'Apply Changes'. A 'Warning' box states: 'Warning: DHCP is enabled, and therefore remote access to this Wattmon will most likely not be possible. Edit Settings'. Below this, explanatory text reads: '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.' A note says: 'Once this is configured, you will be able to access your device from this external link: <http://www.wattmon.com/live?key=00-04-A3-C5-31-59>'. The settings are: 'Status' (Enabled), 'Device Key' (00-04-A3-C5-31-59), 'Port' (8080), and 'Interval in minutes' (3).

Detect Router

Wattmon Installation Manual

Data Export Configuration Detect Router Test Settings Apply Changes

Router model: [NETGEAR DGN1000v3](#) ×
Get detailed instructions on how to configure port forwarding at this link: [NETGEAR DGN1000v3 Port Forwarding Guide](#)

Test port Forwarding

Data Export Configuration Detect Router Test Settings Apply Changes

Success! Port forwarding is properly configured and your IP is ×

3.4.24 Interface Settings

[Home](#) / [Control Panel](#) / [User Interface Settings](#)

User Interface Settings

Interface configuration Apply Changes

User Interface Settings ↑

Load Optimization	<input type="text" value="Only essential files from SD Card, optimized for remote access"/>
Dashboard Refresh Rate	<input type="text" value="Every second"/>
Max Execution Time	<input type="text" value="10 seconds"/>
Max Low Memory Errors	<input type="text" value="400"/>

3.4.25 Scheduled Tasks

3.4.26 Voltage Calibration

3.5 File Manager

- MAIN
- Dashboard
- GRAPHS
- Energy in Watts
- Battery Status
- SETTINGS
- Control Panel
- Devices
- Actions
- File Manager
- System Log
- Reboot

Index of /

Filter:

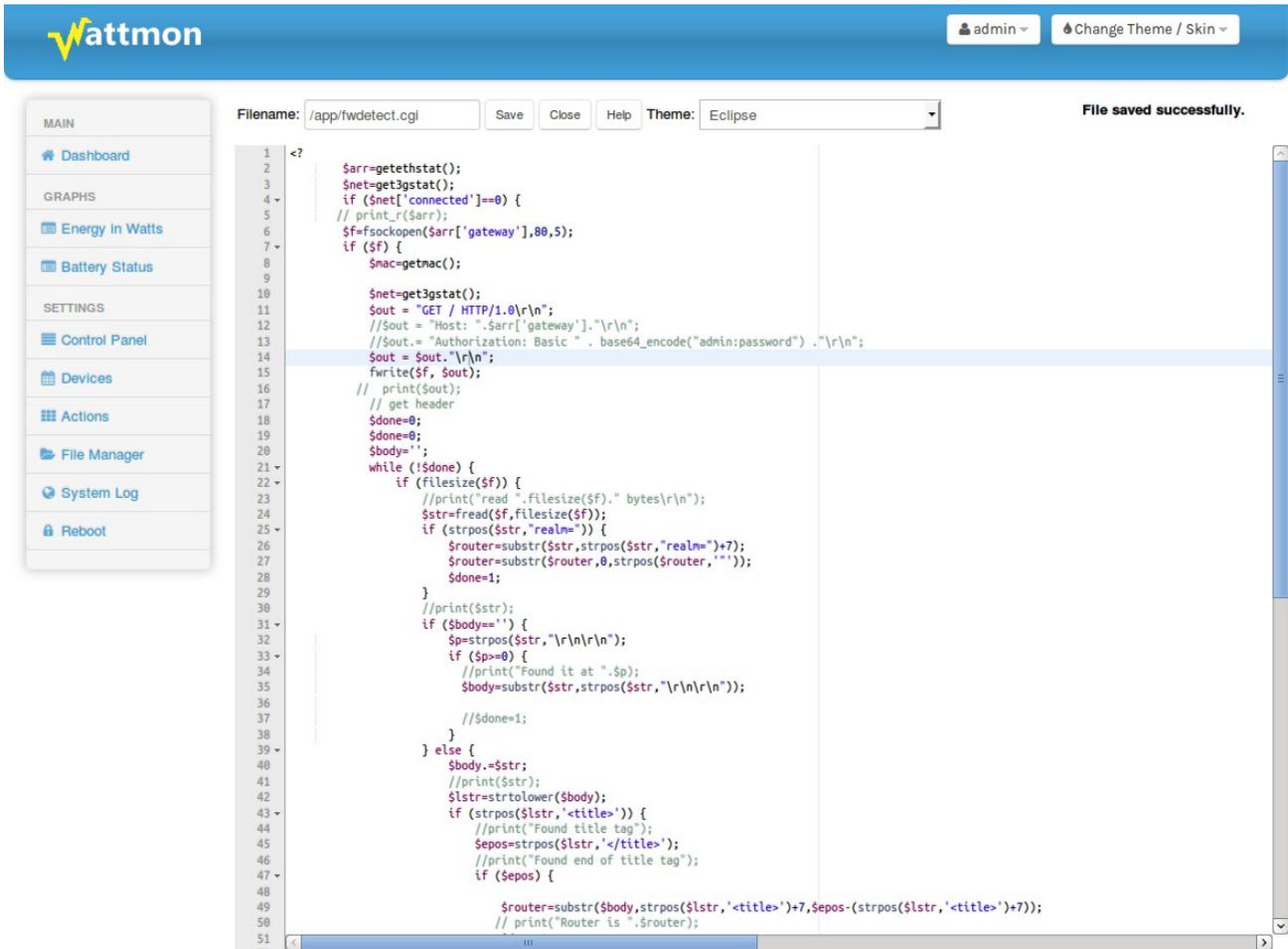
Name	Size	Type	Last Modified	Options
app		Directory		
cache		Directory		
config		Directory		
css		Directory		
dev		Directory		
img		Directory		
js		Directory		
lib		Directory		
logs		Directory		
package		Directory		
scripts		Directory		
shell		Directory		
widgets		Directory		
firmware.tar	1157120	Archive	2014-11-07 14:11	
image.hex	1150140	Archive	2014-11-07 14:11	
index.cgc	20745	Archive	2014-11-07 14:12	
index.cgi	6981	Archive	2014-08-23 09:10	
package.tar	1320960	Archive	2014-11-07 11:23	

Create Folder:

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

Editor

Wattmon Installation Manual



The screenshot shows the Wattmon web interface. At the top, there is a blue header with the Wattmon logo on the left and a user menu (admin) and a theme selector (Change Theme / Skin) on the right. Below the header is a sidebar with a 'MAIN' section containing navigation links: Dashboard, Energy in Watts, Battery Status, Control Panel, Devices, Actions, File Manager, System Log, and Reboot. The main content area is a file editor for the file `/app/fwdetect.cgi`. The editor shows the following shell script code:

```
1 <?
2 $arr=getethstat();
3 $net=get3gstat();
4 if ($net["connected"]==0) {
5 // print_r($arr);
6 $f=fsockopen($arr['gateway'],80,5);
7 if ($f) {
8 $mac=getmac();
9
10 $net=get3gstat();
11 $out = "GET / HTTP/1.0\r\n";
12 // $out = "Host: ".$arr['gateway']."\r\n";
13 // $out.= "Authorization: Basic ". base64_encode("admin:password")."\r\n";
14 $out = $out."\r\n";
15 fwrite($f, $out);
16 // print($out);
17 // get header
18 $done=0;
19 $done=0;
20 $body="";
21 while (!$done) {
22 if (filesize($f)) {
23 //print("read ".filesize($f)." bytes\r\n");
24 $str=fread($f,filesize($f));
25 if (strpos($str,"realm=")) {
26 $router=substr($str,strpos($str,"realm")+7);
27 $router=substr($router,0,strpos($router,""));
28 $done=1;
29 }
30 //print($str);
31 if ($body=="") {
32 $p=strpos($str,"\r\n\r\n");
33 if ($p==0) {
34 //print("Found it at ".$p);
35 $body=substr($str,strpos($str,"\r\n\r\n"));
36
37 // $done=1;
38 }
39 } else {
40 $body.=$str;
41 //print($str);
42 $lstr=strtolower($body);
43 if (strpos($lstr,'<title>') {
44 //print("Found title tag");
45 $epos=strpos($lstr,'</title>');
46 //print("Found end of title tag");
47 if ($epos) {
48
49 $router=substr($body,strpos($lstr,'<title>')+7,$epos-(strpos($lstr,'<title>')+7));
50 // print("Router is ".$router);
51 }
52 }
```

A notification at the top right of the editor area states "File saved successfully."

Chapter 4

Wattmon How-Tos

