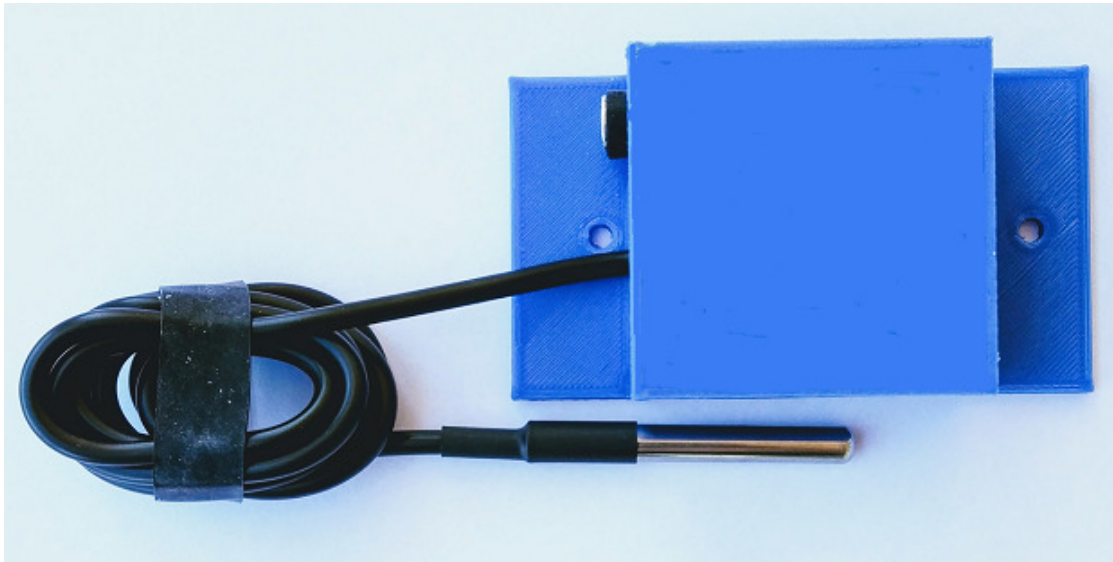




Tasmota-Plus Smart Gauge - Temperature



SG-TEMP User Guide

V20210419

Latest Version of this document available at:

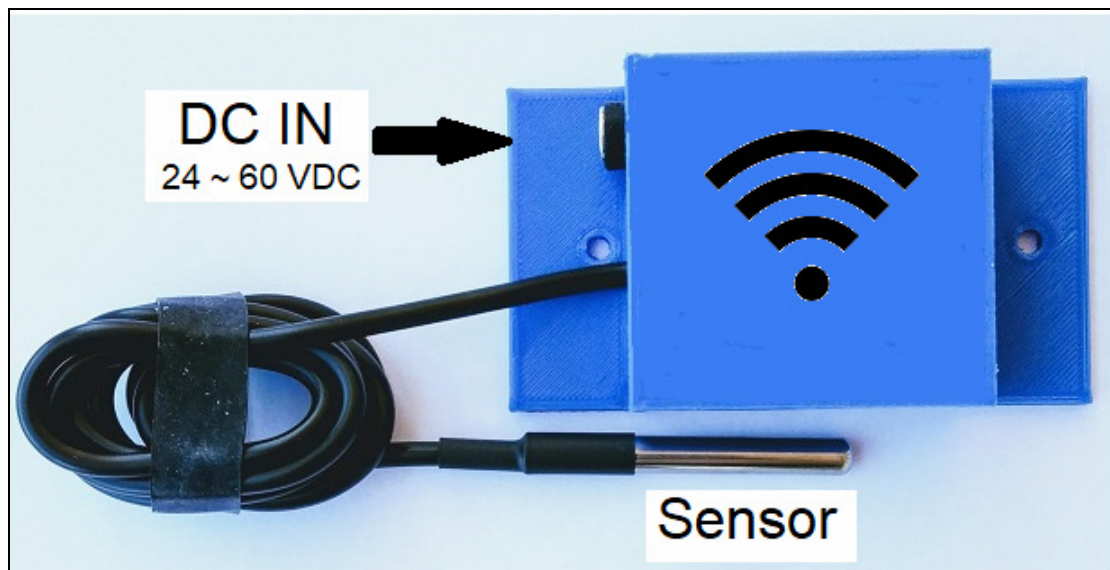
<https://github.com/UBWH/ubwh.github.io/blob/master/assets/UserGuides>

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Introduction

The SG-TEMP is a Temperature sensor with a smart WiFi interface.



Features include:

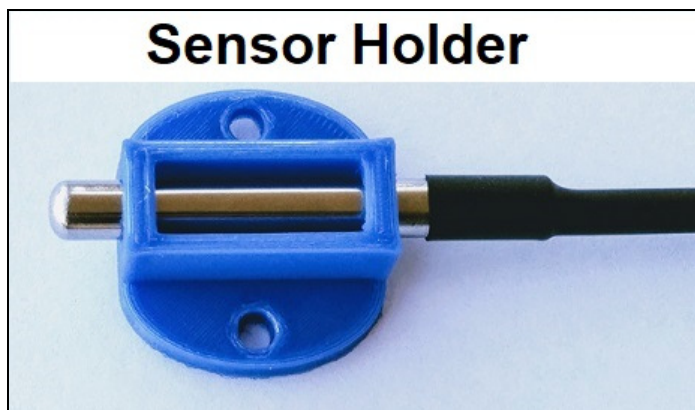
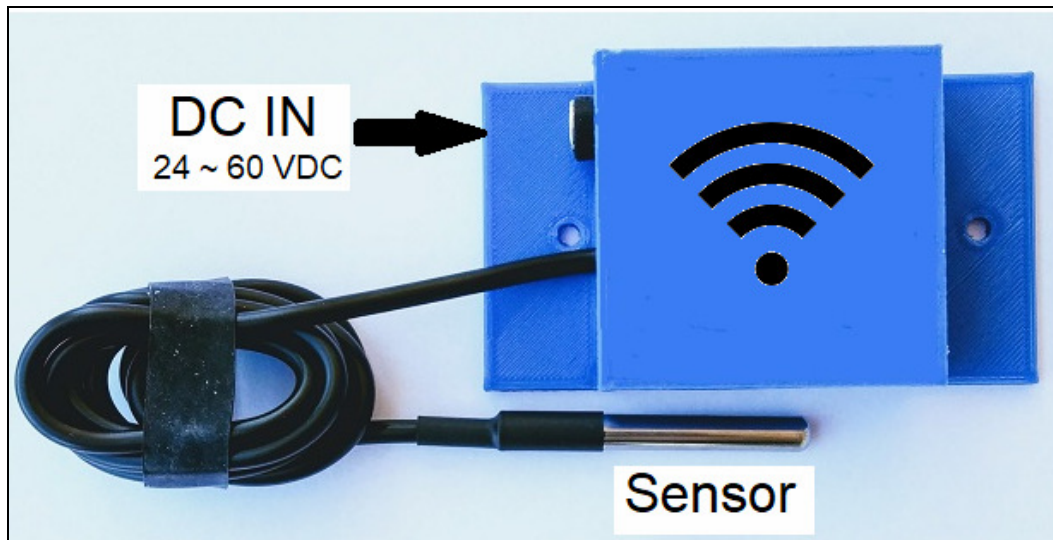
Temperature monitoring	Real-time temperatures can be viewed locally, or from anywhere in the world, accessible by any web browser.
Temperature logging	When combined with an openHAB/MQTT ¹ server, current and past temperatures are accessible locally, or from anywhere in the world, accessible by any web browser.
Flexible DC power supply	This device is powered by un-regulated DC. (Power supply not included) Voltages between 24 and 60 VDC can be used.
Relay	A SPST ² relay (16 A / 240 V) is included, which can be temperature controlled (ON/OFF). For example: a Fan or Heater could be turned on/off as the temperature passes user-defined set-points.
External switch monitoring	A user-supplied, external switch can be connected and monitored; i.e. Open or Closed.

Table 1 – Available Features

¹ <https://openhab.org> & <https://mqtt.org>

² Single Pole, Single Throw

Hardware



The **SG-TEMP** comes pre-assembled and tested. It consists of:

- a waterproof temperature sensor,
- a waterproof cable,
- a wall-mount enclosure with built-in SS-1CHPro³ smart WiFi interface, and
- a bonus wall mount sensor holder.

Accessing the Relay and Switch Terminals

Gently pry off the enclosure cover with a small, flat-bladed screwdriver inserted from the base.

Consult the SS-1CHPro User Guide for details:

<https://tinyurl.com/28nybtzx>

³ <https://ubwh.com.au/SS-1CHPro>

Requirements

The SG-TEMP requires:

- **Initial Setup**
 - A device with a Web Browser & WiFi interface, located close to the SG-TEMP. A smart-phone, or tablet will usually be sufficient.
- **Operation**
 - A WiFi Access Point (AP) connected to the local LAN⁴, within the WiFi Range⁵ of the SG-TEMP.
 - A DHCP⁶ server on the LAN.
- **Ongoing Management**
 - Any device with a Web browser and connected to the same LAN as the SG-TEMP.

⁴ Local Area Network. See https://en.wikipedia.org/wiki/Local_area_network

⁵ See Specifications, page 19

⁶ Dynamic Host Configuration Protocol: See https://en.wikipedia.org/wiki/Dynamic_Host_Configuration_Protocol

Web Browser Interface

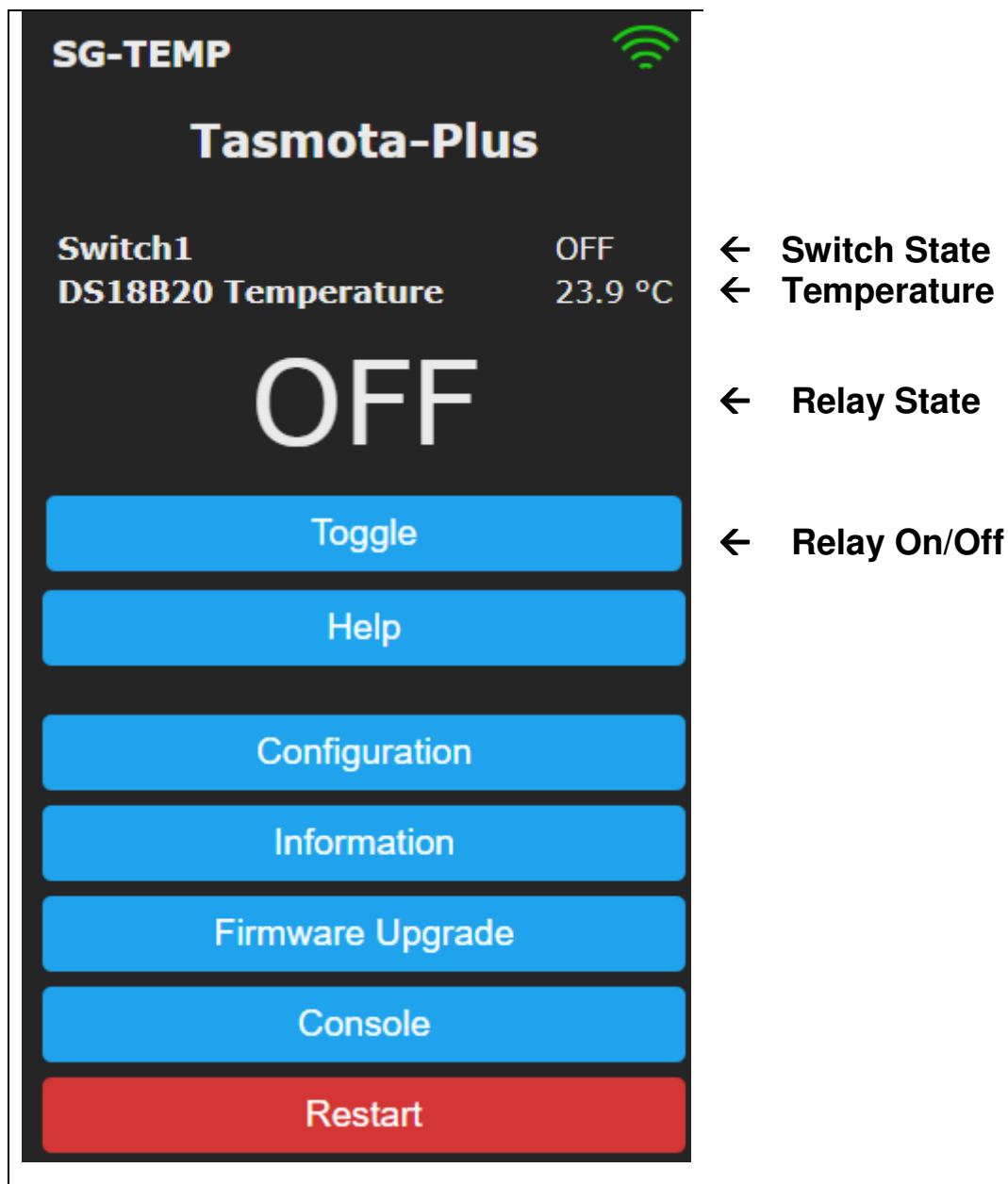


Figure 1 - The Tasmota Web Interface is available from any Web browser

Simply use any web browser to open the web page

`http://<device.ip.address>/`

See documentation here: <https://tasmota.github.io/docs/WebUI/>

Power Options

The DC-IN port is a common 2.1mm x 10 mm , centre-positive jack.

There are two common installation scenarios:

Near a Power Point (GPO)

In this case, simply use any DC power supply between 24 and 60V that has a suitable DC plug.

Example suitable power supply: <https://ubwh.com.au/PSU-24VDC-24W>

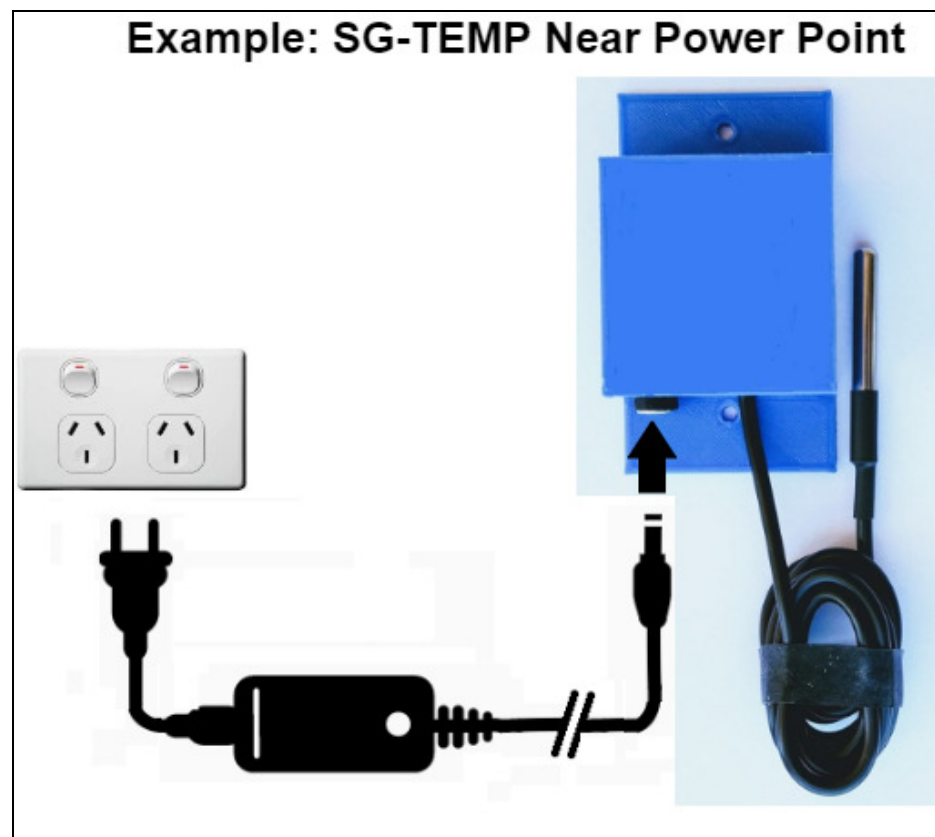


Figure 2 – Powering the SG-TEMP from a nearby power point

Far from a Power Point (GPO)

In this case, one recommendation is to use a common passive PoE⁷ power supply that provides either 24 or 48 VDC, with widely available LAN⁸ cable.

One end of the LAN cable can be terminated with either a:

- **DC Plug**, soldered onto the conductors carrying the PoE voltage, or
- **RJ45 LAN plug**, with a PoE Splitter⁹ to break out the DC to a 2.1mm plug.

Example suitable power supplies:

<https://ubwh.com.au/POE-24-12W>

<https://ubwh.com.au/POE-48-24W>

<https://ubwh.com.au/WI-PS306GF-UPS-V2>



Figure 3 – Powering the SG-TEMP over distance with passive PoE

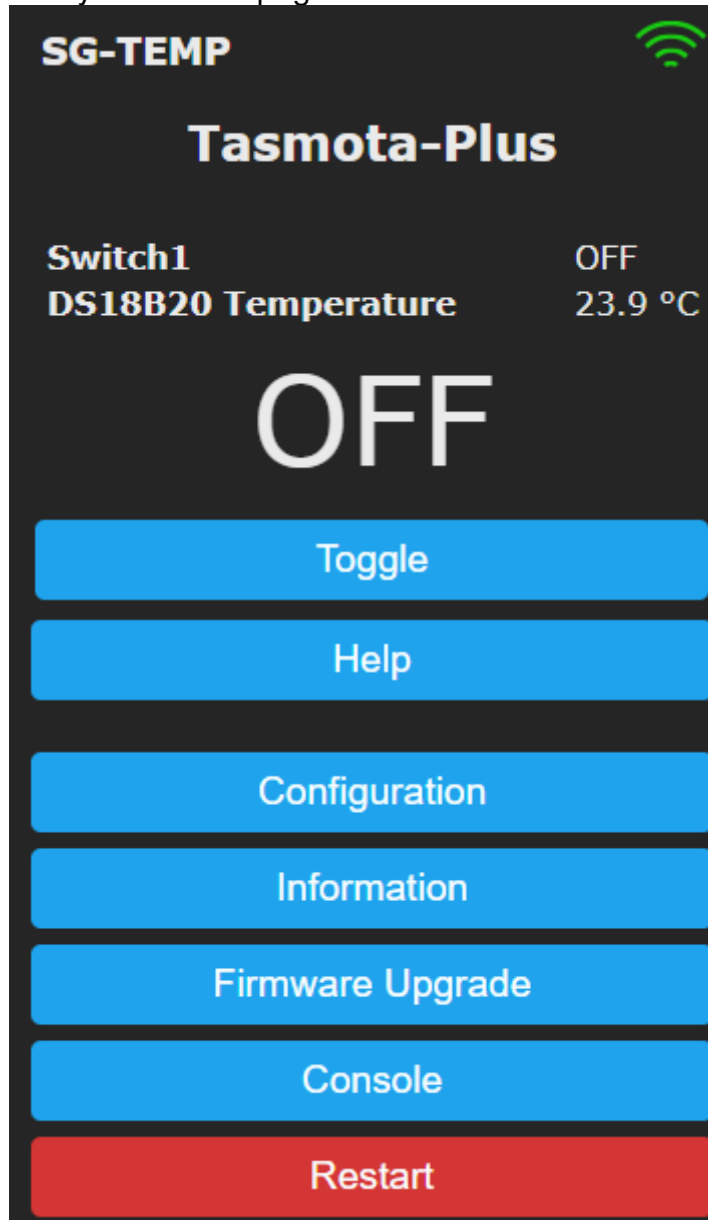
⁷ Power-Over-Ethernet

⁸ e.g. CAT5e

⁹ e.g. <https://ubwh.com.au/POE-P-SPLIT>

Getting Started

1. Power the SG-TEMP.
2. Follow the **Getting Started** instructions in the **SS-1CHPro User Guide**¹⁰ until you see this page.



Using the Web Interface

See the **SS-1CHPro User Guide**¹¹

¹⁰ <https://tinyurl.com/28nybtzx>

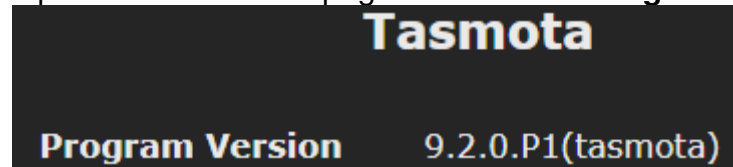
¹¹ <https://tinyurl.com/28nybtzx>

Firmware

From time to time, new Tasmota-Plus firmware may be released for your device.

Checking the installed version

Open the Information page and note the **Program Version** currently installed.



Checking the latest released version

Use your web browser to visit:

<http://ubwh.com.au/tasmota/Tasmota-Plus/SG-TEMP-ReleaseNotes.php>

Updating

If you choose to update the firmware to the latest version, there are two methods.

Over The Air (OTA)

This is the simplest.

Open the Firmware Upgrade page.

Enter this OTA Url:

<http://ubwh.com.au/tasmota/Tasmota-Plus/tasmota-SG-TEMP.bin.gz>

Click **Start upgrade**

A screenshot of the "Upgrade by web server" form. It has a title "Upgrade by web server" and a label "OTA Url". Below the label is a text input field containing the URL "http://ubwh.com.au/tasmota/Tasmota-Plus". At the bottom of the form is a blue button labeled "Start upgrade".

File Upload

With a web browser on your local PC, visit

<http://ubwh.com.au/tasmota/Tasmota-Plus/tasmota-SG-TEMP.bin.gz>

Save the file on your local computer.

Open the Firmware Upgrade page.

Choose the file just downloaded.

Click **Start upgrade**

A screenshot of the "Upgrade by file upload" form. It has a title "Upgrade by file upload" and a label "Choose file". Below the label is a text input field containing "No file chosen". At the bottom of the form is a blue button labeled "Start upgrade".

Factory Reset Procedure

See the *SS-1CHPro User Guide*¹²

Relay Control based on Temperature

Using the Tasmota Rules¹³ feature, the relay can be controlled by temperature.

This is done by setting two values:

- Relay ON set-point temperature
- Relay OFF set-point temperature

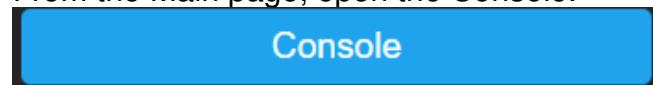
Note: Do not set these two values the same, as the relay may switch ON/OFF rapidly.

In the steps below you will define 3 *Rules*. These rules remain active after a reboot or power cycle.

Hint: To avoid typing mistakes, it is recommended to Copy (from the PDF file of this document) and Paste (to the Console input line).

Step 1 – Common Configuration

From the Main page, open the Console.



Enter these 2 commands, followed by the [Enter] key on your keyboard.

```
RULE2 ON system#boot DO BACKLOG VAR3 %VAR1%; VAR4 %VAR2%  
ENDON
```

```
BACKLOG RULE1 ON; RULE2 ON; RULE3 ON
```

Continue to next page.

¹² <https://tinyurl.com/28nybtzx>

¹³ <https://tasmota.github.io/docs/Rules/>

Two cases are given below. Follow Step 2a or Step 2b:

Step-2a – Relay ON when Temperature is too HIGH

Enter these 2 commands, followed by the [Enter] key on your keyboard.

<code>RULE3 ON DS18B20#temperature>%VAR4% DO BACKLOG POWER1 ON; VAR4 1000; VAR3 %VAR1% ENDON</code>
<code>RULE3 + ON DS18B20#temperature<%VAR3% DO BACKLOG POWER1 OFF; VAR3 -1000; VAR4 %VAR2% ENDON</code>

Step-2b – Relay ON when Temperature is too LOW

Enter these 2 commands, followed by the [Enter] key on your keyboard.

<code>RULE3 ON DS18B20#temperature>%VAR4% DO BACKLOG POWER1 OFF; VAR4 1000; VAR3 %VAR1% ENDON</code>
<code>RULE3 + ON DS18B20#temperature<%VAR3% DO BACKLOG POWER1 ON; VAR3 -1000; VAR4 %VAR2% ENDON</code>

Step 3 – Changing the Set-point Temperatures

The set-point temperatures are set in RULE1.

<p>Hint: VAR2 must be higher than VAR1 e.g. VAR1 21 VAR2 22 e.g. VAR1 -6 VAR2 -5</p>
--

To change the set-point temperatures to (e.g.) 21 & 22, enter these 2 commands, followed by the [Enter] key on your keyboard.

<code>RULE1 ON system#init DO BACKLOG VAR1 21; VAR2 22 ENDON</code>
<code>RESTART 1</code>

http:// Command Interface



Simple commands as below will (e.g.) turn the Relay ON.

Note: %20 in a URL = Space character

From Web Browser

`http://<device.ip.address>/cm?cmnd=power1%20on`

From Windows or Linux command/terminal window

`curl http://<device.ip.address>/cm?cmnd=power1%20on`

From a Windows Batch file (*.bat file)

`curl http://<device.ip.address>/cm?cmnd=power1%%20on`

Note: need double % characters if in a batch file

From a PHP script (*.php file)

```
file_get_contents(  
    'http://<device.ip.address>/cm?cmnd=power1%20on');
```

You can retrieve the **Switch and Temperature Status** as below.

`http://<device.ip.address>/cm?cmnd=status%208`

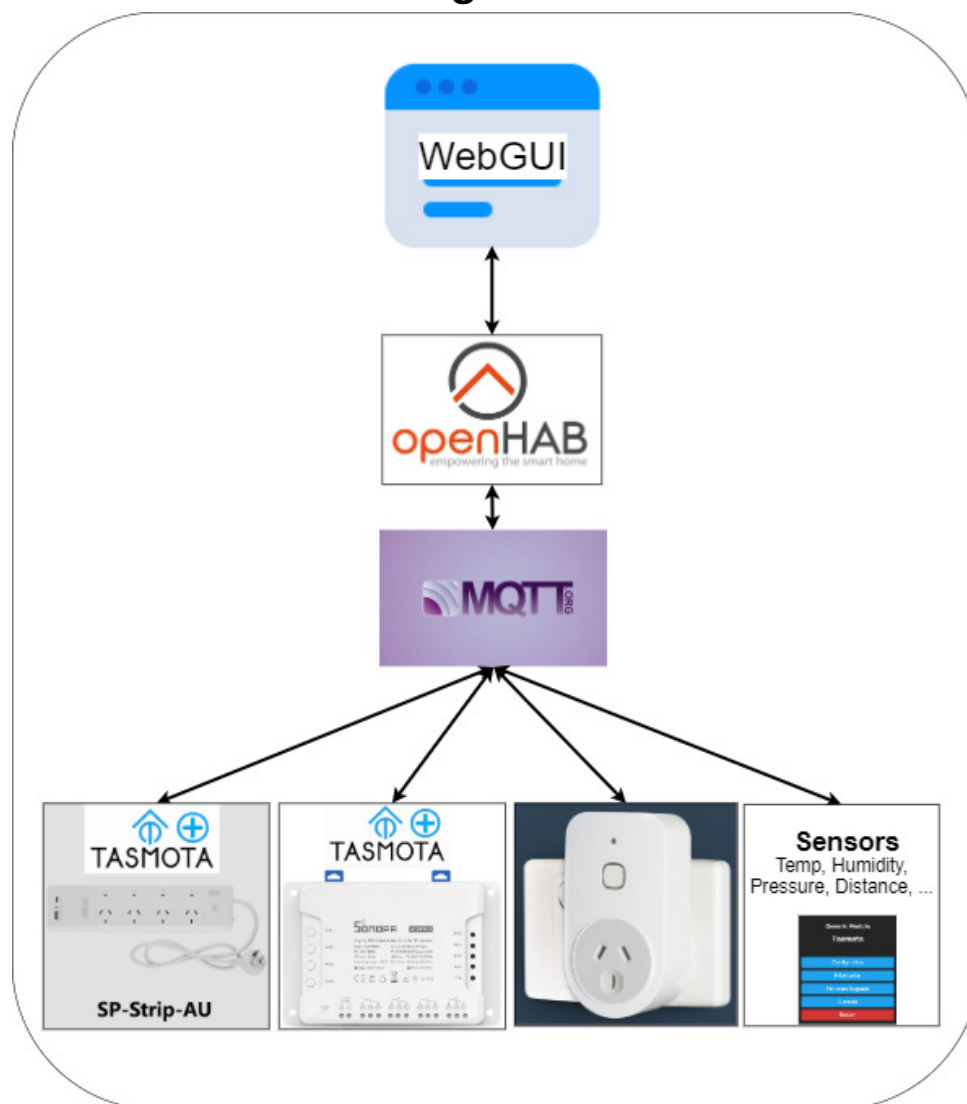
A typical JSON response looks like:

```
{  
    "StatusSNS":{  
        "Time":"2021-01-18T02:06:53",  
        "Switch1":"OFF",  
        "DS18B20":{  
            "Id":"011937A99651",  
            "Temperature":24.4  
        },  
        "TempUnit":"C"  
    }  
}
```

More information:

<https://tasmota.github.io/docs/Commands/#management>

Centralised Monitoring & Control



While this device can operate 100% stand-alone, it can also be monitored and controlled, along with multiple other devices, from a single management platform.

One popular management platform is **openHAB**¹⁴.

In simple terms:

- MQTT compatible devices (e.g. Tasmota) connect to an **MQTT Broker**¹⁵.
Status information sent TO the MQTT broker.
Commands received FROM the MQTT broker.

¹⁴ <https://www.openhab.org/> (Freeware, Open source)

¹⁵ <https://mqtt.org/> (Freeware, Open source)

- **openHAB** also connects to the MQTT broker.
Status information received FROM the MQTT broker.
Commands sent TO the MQTT broker.
- Users interact via web pages (WebGUI)

WebGUI Interfaces

openHAB supports a number of User Interfaces (UIs). Each UI is highly customisable.

The images below show example visualisations.

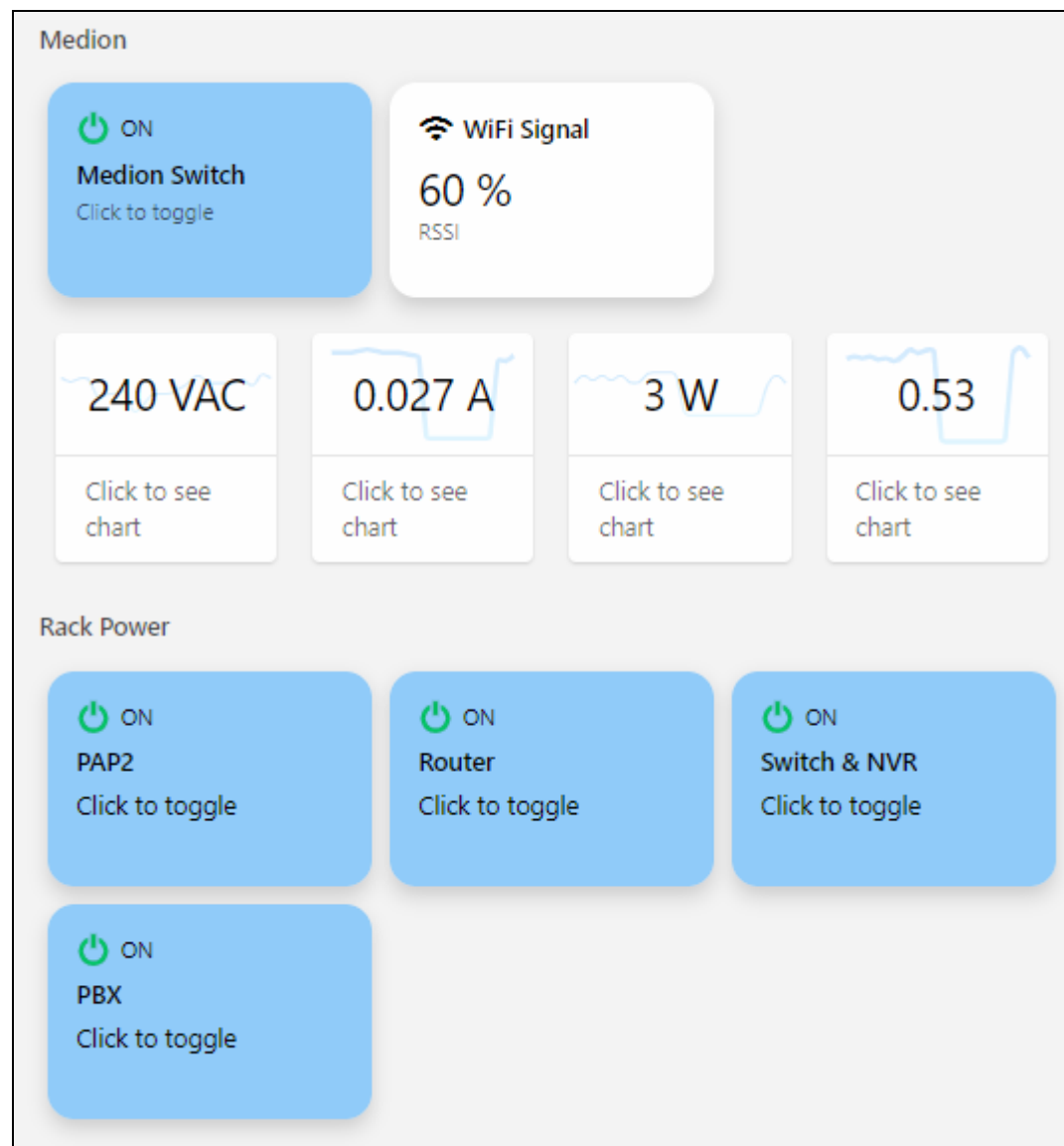


Figure 4 - Classic UI. Mobile friendly.



Figure 5 - Basic UI. Mobile friendly.



Figure 6 - Panel UI. Ideal for touch screens.

openHAB Channel Definition (Example)

Below is shown the channel definition for an SG-TEMP correctly integrated into openHAB.

Values that will be different for each installation have been replaced with XXXXXX.

```
UID: mqtt:topic:XXXXXX
label: SG-TEMP
thingTypeUID: mqtt:topic
configuration:
  payloadNotAvailable: Offline
  availabilityTopic: tele/tasmota_XXXXXX/LWT
  payloadAvailable: Online
bridgeUID: mqtt:broker:xxxxxxxxx
channels:
  - id: Temp
    channelTypeUID: mqtt:number
    label: Temp
    description: null
    configuration:
      stateTopic: tele/tasmota_XXXXXX/SENSOR
      transformationPattern: JSONPATH:$.DS18B20.Temperature
      unit: C
  - id: Relay
    channelTypeUID: mqtt:switch
    label: Relay
    description: ""
    configuration:
      commandTopic: cmnd/tasmota_XXXXXX/POWER
      stateTopic: stat/tasmota_XXXXXX/POWER
      off: OFF
      on: ON
  - id: Switch
    channelTypeUID: mqtt:switch
    label: Switch
    description: ""
    configuration:
      stateTopic: tele/tasmota_XXXXXX/SENSOR
      transformationPattern: JSONPATH:$.Switch1
```

openHAB Sample History Plot

The plot below shows an example history from an SG-TEMP sensor immersed in a water tank.

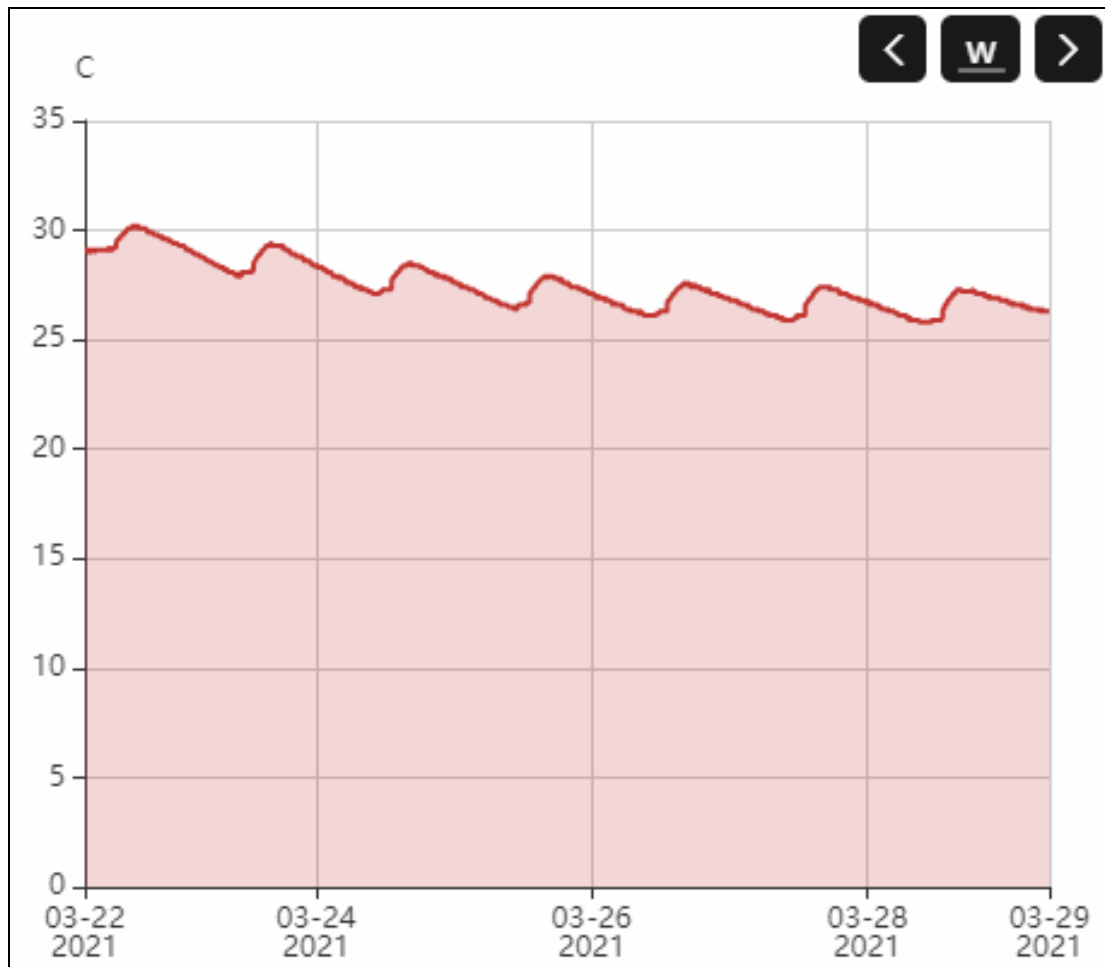


Figure 7 - Tank water temperature over 1 week

Specifications

Temperature sensor	Type: Range ± 0.5 °C Accuracy Waterproof Length Diameter	DS18B20 -55 °C to +125 °C -10 °C to +85 °C Yes (to length of cable) 50 mm 6 mm (6.5 mm over black jacket)
Cable	Length Diameter Waterproof	900 mm 3.7 mm Yes
Enclosure	Material Dimensions Weight Mounting holes	PLA 90 x 50 x 27 mm (W x L x H) 60 g (including SS-1CHPro) 2 x 3 mm dia (71 mm spacing)
Power supply	DC Only Connector Power consumption	24 to 60 V DC (unregulated) 2.1 x 10 mm , Centre positive < 1W (= 40 mA @ 24 V)
WiFi	Range Standards	20 m (Typical, no walls) 10 m (Typical, walls) 802.11b/g/n 2.4 GHz