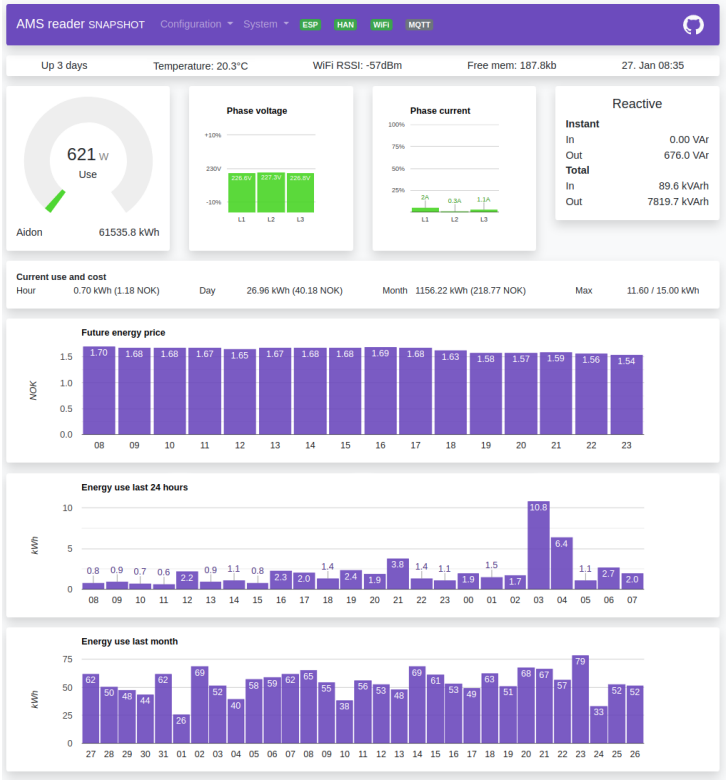
User Manual

Pow-P1





Issue: 16th June 2023
Electronic version available on the product page on https://amsleser.no/ →"Vedlegg"

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1 Introduction

User manual for **Pow-P1** HAN-port reader for AMS power meters, sold by amsleser.no

Pow-P1 connects to the AMS meter P1-port using an RJ12 cable. The device connects to the local Wifi, for transmission of data.

See separate document "Firmware User Manual" available on the product page in the webshop (→ Vedlegg).

Measurement data:

- Are displayed on a browser page via the device IP address or mDNS Hostname.
- Data can be sent to MQTT broker (internal or external / cloud service)

Available data:

- Instantaneous consumption and production (from PV, wind turbine etc) [kW]
- Accumulated energy from (and potentially to) the grid [kWh]
- Voltages on main fuse
- Currents over main fuse
- Information on Wifi and MQTT connection (optional)
- Optional: Day-ahead energy prices from Entso-E (https://transparency.entsoe.eu/)

Pow-P1 is powered from power meter P1-port but can also be powered from its USB contact. It can be simultaneously connected to external power and power meter.

Remember to get the P1 port activated (contact your grid company).

Pow-P1 is used at your own discretion and responsibility.

We recommend to always use latest version firmware.

Pow-P1 can be procured from our webshop: https://amsleser.no/

https://lectronz.com/stores/amsleser/

2 Overview

2.1 User buttons



Fig 1: Two user buttons

Function of the buttons:

- **RES**
  Reboots the microcontroller. Use it if the module is no longer visible on the Wifi network on the expected IP address. Reboot is indicated by colour blinks on the indicator LED (see below).
- **AP (Access Point)**
  Use it to switch the unit to Access Point (AP) mode if you can no longer contact the device (forgot IP address or similar).
  The unit needs external power to the USB connector to operate in AP mode.
  Switch to AP mode by holding the AP button for 5-10 seconds, until the LED starts blinking yellow.
  The unit will then operate as access point:
  - SSID**:** **AMS2MQTT**, no password
  - You can now connect your mobile, pad or PC to this access point SSID, and connect to it in a browser, using this URL: http://192.168.4.1/

  Pow-P1 can now be reconfigured with the right IP address etc, and restarted as a wifi client reachable by its IP address.

2.2 Indicator LED

The unit has one multicolour lamp (RGB LED) hidden under the lid (light shines through the plastic) giving the following signals:

- Boot confirmation blinks (rapid red/green/yellow sequence) at start-up when RESet button is pressed
- **Yellow periodic blinks:** Unit is in access point mode, see paragraph **Error! Reference source not found.**.

- **Blue blinks:** Indicates incoming data from the meter.
  (Could be difficult to see when unit is operational, as it is masked by subsequent green blink, see next point)
- **Green short blink after incoming data :**
  Incoming payload frame recognized as valid data.
- **Red error blink codes**
  See "Firmware User Manual".
- **Firm blue light** when the unit is powered but not connected to P1 port of the meter.

3 Programming / flashing

Units are delivered programmed and tested. New firmware (binary) can be uploaded over wifi.

3.1 Reprogramming over Wifi

See instruction in "Firmware user manual" (download from product page on https://amsleser.no)

3.2 Reprogramming by cable

Pow-P1 can be reprogrammed using a USB cable.

1. Download and unzip file from https://github.com/gskjold/AmsToMqttBridge/releases.
   You will normally want to use latest release.
2. Connect a USB cable between PC and Pow-P1, wait for the device to boot (confirmation blinks).
3. Procedure for reprogramming:
   See https://github.com/gskjold/AmsToMqttBridge/wiki/flashing
4. How to get Pow-P1 in programming mode:
   a. Hold AP/PROG button
   b. Press and release RESET button
   c. Release AP/PROG button

   A COM-port will now open on the connecting PC. If on Windows, open Device Manager to identify COM-port number – and note it down for later use
5. Perform reprogramming as shown on
   https://github.com/gskjold/AmsToMqttBridge/wiki/flashing

4 Configuration and use

See "Firmware user manual" (download from product page on https://amsleser.no)

5 Installing optional temperature sensor

The Pow-P1 can use either an analogue or a digital temperature sensor. This chapter explains how to install them and how to configure them in the firmware.

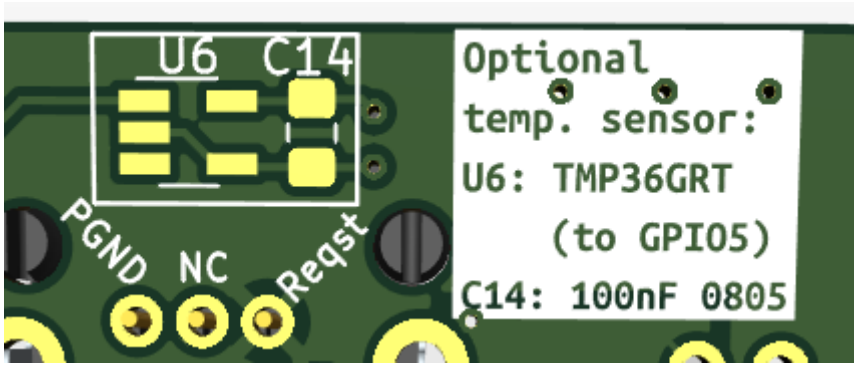
Note:
The firmware can handle only the specific components TMP36GRT (analogue) or Dallas 18B20 (digital).

If you want to use any other analogue or digital temperature sensor, you will need to rewrite sections of the code and rebuild it for your microcontroller. For most of us that would be a significant task.

5.1 Analogue temperature sensor, TMP36GRT

The back side of the Pow-P1 board allows installation of an analogue temperature sensor type **TMP36GRT (SOT-23-5)**. This sensor should be easily available to buy from for instance Aliexpress.

The sensor also needs a 100 nF decoupling capacitor. The board layout is for a 0805 size ceramic chip capacitor.



5.2 Digital temperature sensor, DS18B20

Warning: It is a known issue in the maker community that there are many clones of the Dallas 18B20 temperature sensor on sale from for instance Aliexpress.com, and some of those clones has some more or less serious flaws (google it!). Such clones will in most cases work fine, but we cannot guarantee that they work with our firmware. If you want to be sure to get a working component, buy an original part from a trusted source such as Mouser.com.

The DS18B20 should be installed using the "with an External Supply" method as explained in the datasheet:

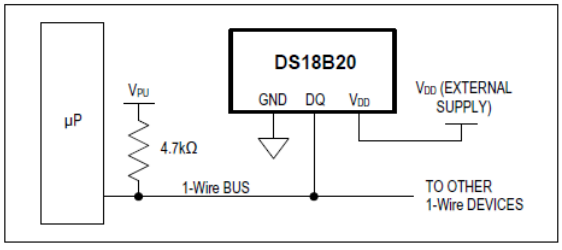


Figure 7. Powering the DS18B20 with an External Supply

In addition to the DS18B20 you need a 4.7 kohm resistor (pullup for the data line).

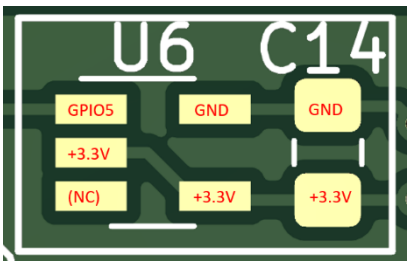
Connections shall be:

DS18B20:

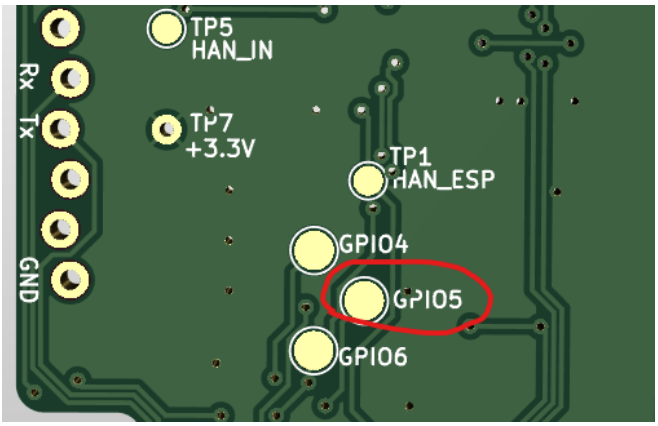
- Component GND pin to GND on the PCB
- Component D_Q pin to GPIO5 on the PCB
- Component V_{DD} pin to 3.3V on the PCB

4.7 kohm pullup resistor shall be connected between GPIO5 and 3.3V

The pads on the PCB are:



GPIO5 is also available on a separate other pad on the back side of the board:

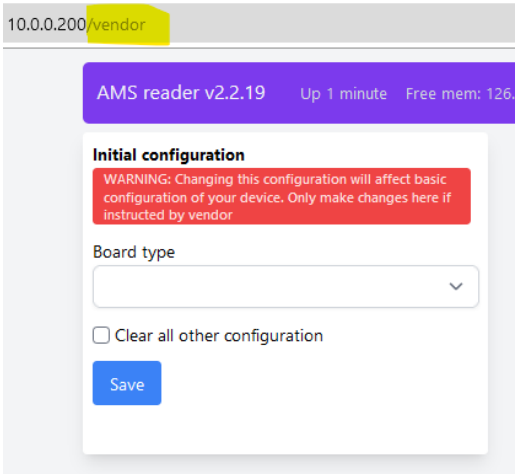


5.3 Configuring the firmware

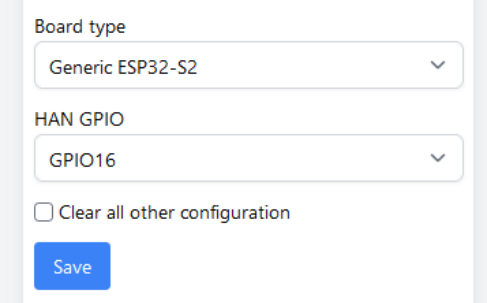
The firmware needs to be configured to read either the analogue or a digital temperature sensor connected on GPIO5. This is not done in the standard configuration delivered on the board, you will need to do the following.

(Example is shown on a device at IP address 10.0.0.200.)

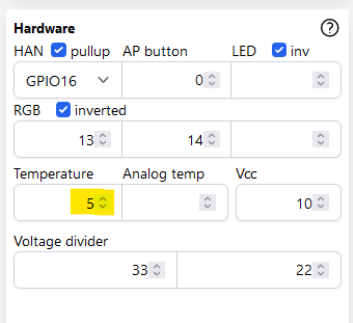
1. Add "/vendor" to the URL on the main page, to get this page:



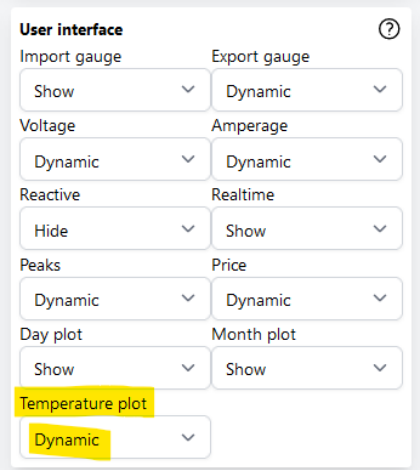
2. Choose "Generic ESP32-S2" and "GPIO16", then do "Save":



3. Now go to the configuration page. There will be a new section named "Hardware".
   For digital sensor DS18B20: Go to the "Temperature" box and select the GPIO number (for instance "5").
   For analogue sensor TMP36GRT: Go to the "Analog temp" box and select the GPIO number (for instance "5").
   This is the setting for a DS18B20 connected to GPIO5:



4. Press "Save".
5. Go back to the configuration page and check that "Temperature plot" is set to either Dynamic or Show



6. Important:
   The device only reads the configuration when it boots, so reboot it by using the orange button on the bottom of the page:



There should now be a temperature graph on the main page.