# ESPEasy CO2-Node

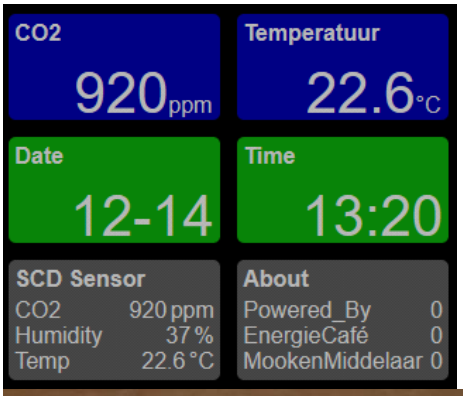
zaterdag 2 november 2024 16:28

| Parameter (conditie) | Waarde |
|---|---|
| CO2 Bereik | 0 .. 40,000 ppm |
| CO2 Nauwkeurigheid (0..2000ppm) | +/- (50 ppm +5%) |
| CO2 Repeatability | +/- 10 ppm |
| CO2 Response Time | 60 sec |
| Temperatuur | -10 .. 60 °C |
| Temperatuur nauwkeurigheid | +/- 1 °C |
| Temperatuur Repeatabiity | +/- 0.1 °C |
| Temperatuur Response Time | 120 s |
| Temperatuur Drift | <0.03 °C /jaar |
| RH Bereik | 0 .. 100 % |
| RH Nauwkeurigheid | +/- 10% |
| RH Repeatability | +/- 0.4% |
| RH Drift | <0.25% / jaar |
| Vermogen Totaal | <0.7 Watt |

Goede CO2 sensor, (photoacoustic NDIR)
Geen auto kalibratie (tenzij je dat instelt)
Kan eenvoudig zelf worden gekalibreerd
Laag stroomverbruik, minder dan 1 Watt
Draait op ESPEasy (freeware) met P2P
Geschikt voor elk home automation systeem
Uitgevoerd als netadapter: 230V
Kosten onderdelen 20 Euro

| Parameter (conditie) | Waarde |
|---|---|
| CO2 Bereik | 0 .. 40,000 ppm |
| CO2 Nauwkeurigheid (0..2000ppm) | +/- (50 ppm +5%) |
| CO2 Repeatability | +/- 10 ppm |
| CO2 Response Time | 60 sec |
| Temperatuur | -10 .. 60 °C |
| Temperatuur nauwkeurigheid | +/- 1 °C |
| Temperatuur Repeatabiity | +/- 0.1 °C |
| Temperatuur Response Time | 120 s |
| Temperatuur Drift | <0.03 °C /jaar |
| RH Bereik | 0 .. 100 % |
| RH Nauwkeurigheid | +/- 10% |
| RH Repeatability | +/- 0.4% |
| RH Drift | <0.25% / jaar |
| Vermogen Totaal | <0.7 Watt |

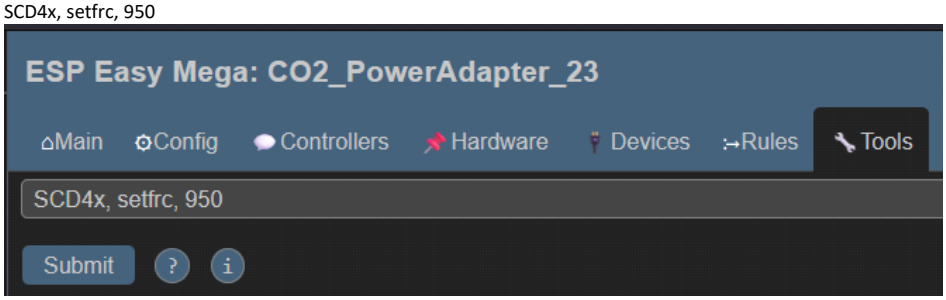
192.168.0..219/index.html.gz




| | |
|---|---|
| Temperatuur (en dus ook RH) is door inbouw wat minder, maar opgesteld op een vaste plaats, kan de temperatuur ( en daarmee ook de RH) eenvoudig worden gekalibreerd. |  |

## Kalibratie

SCD4x, setfrc, 950




Tuya CO2 meter

Response van de sensor
042E = 1070 ppm klopt
Byte 4 stelt iets anders voor, varieert van 3D .. 41 (61..65)
ff 86 04 2e 3d 00 00 00 0b ÿ†..=....
ff 86 04 2d 3d 00 00 00 0c ÿ†.-=....
ff 86 04 2c 3d 00 00 00 0d ÿ†.,=....
ff 86 04 2c 3d 00 00 00 0d ÿ†.,=....
ff 86 04 2b 3d 00 00 00 0e ÿ†.+=....

Als ie in de schakeling zit, zie ik dit op de Rx-pin
0a 30 35 3a 33 31 3a 20 ff 01 86 00 00 00 00 00 79 .05:31: ÿ.†.....y
0a 30 35 3a 33 33 3a 20 ff 01 86 00 00 00 00 00 79 .05:33: ÿ.†.....y
0a 30 35 3a 33 35 3a 20 ff 01 86 00 00 00 00 00 79 .05:35: ÿ.†.....y
En dit op de Tx pin
0a 30 35 3a 33 39 3a 20 ff 86 01 f4 3b 00 00 00 4a .05:39: ÿ†.ô;...J
0a 30 35 3a 34 31 3a 20 ff 86 01 f4 3b 00 00 00 4a .05:41: ÿ†.ô;...J
0a 30 35 3a 34 32 3a 20 ff 86 01 f4 3b 00 00 00 4a
Het eerste stukje lijkt wel een tijdcode, iedere 2 sec een message

**0x86-** Read CO2 concentration

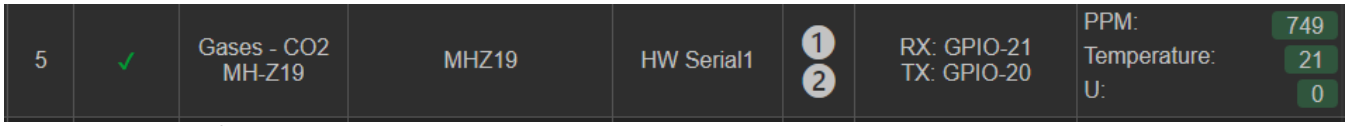
Request

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Start Byte | Sensor # | Command | - | - | - | - | - | Checksum |
| 0xFF | 0x01 | 0x86 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x79 |

Response

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Start Byte | Sensor # | Concentration (High Byte) | Concentration (Low Byte) | - | - | - | - | Checksum |
| 0xFF | 0x86 | HIGH | LOW | - | - | - | - | Checksum |

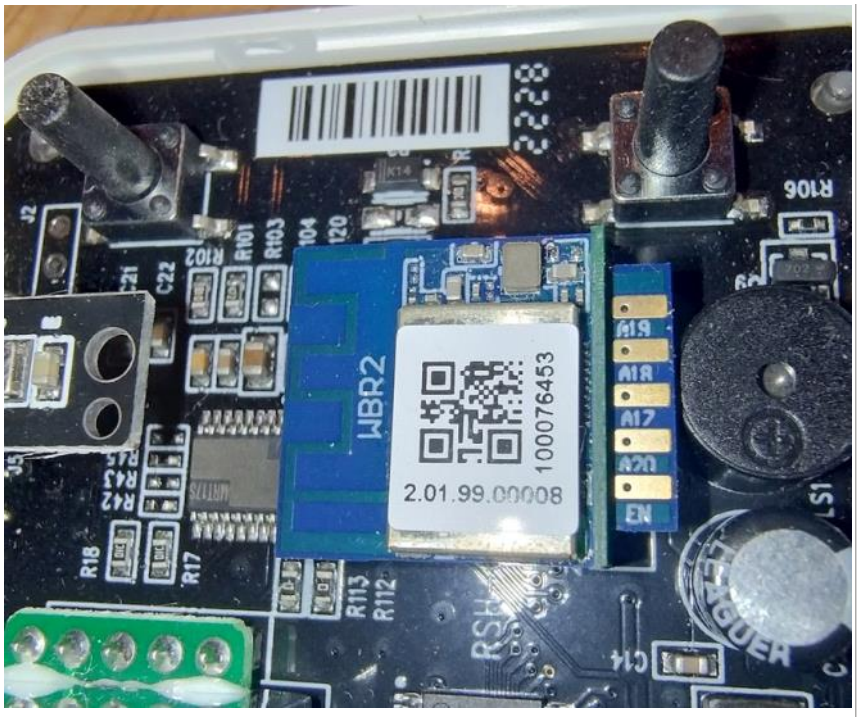
**CO2 concentration = HIGH * 256 + LOW**

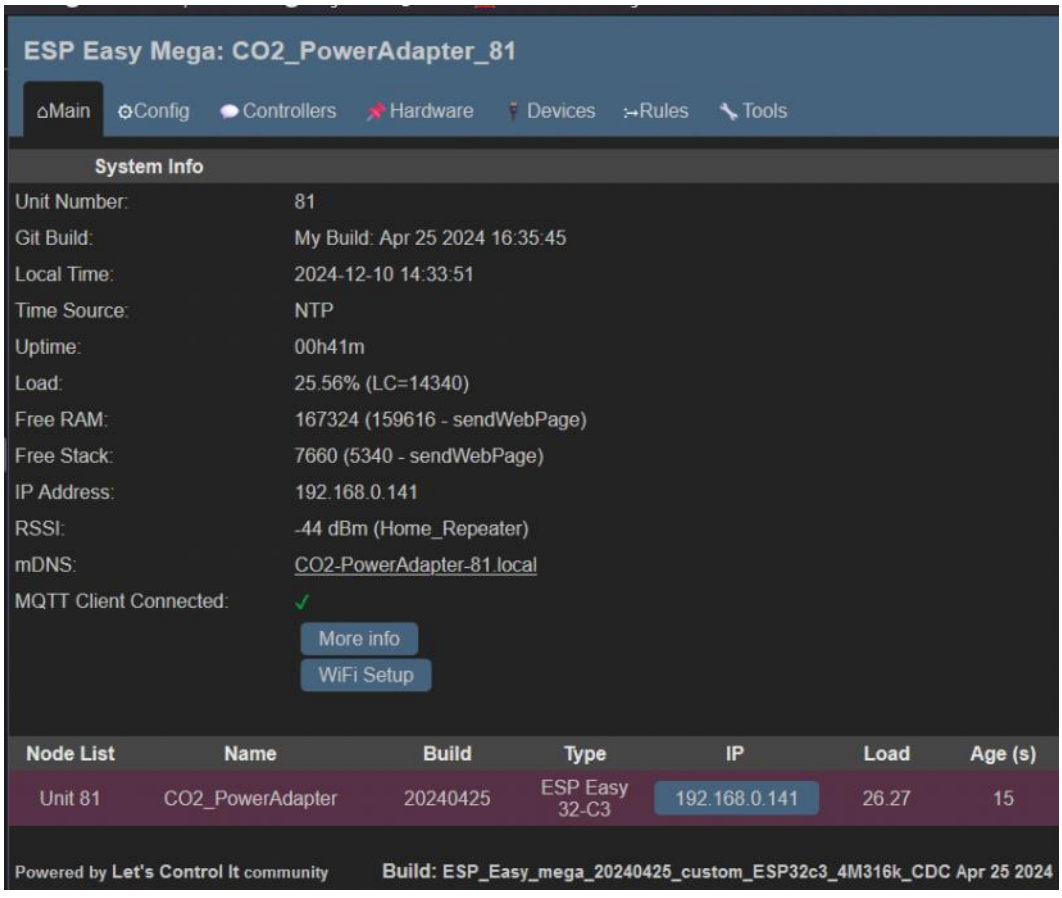



Als ie maar goed start blijft ie het goed doen.

R112=0 Ohm = Rx

R113=0 Ohm = Tx



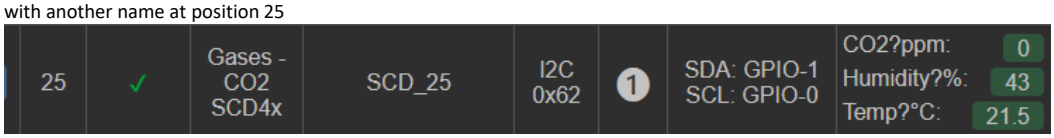

## Copy:

Upload index.html.gz, rules1.txt, config.dat, security.dat

For sensor CO2-5, make a copy of device-1

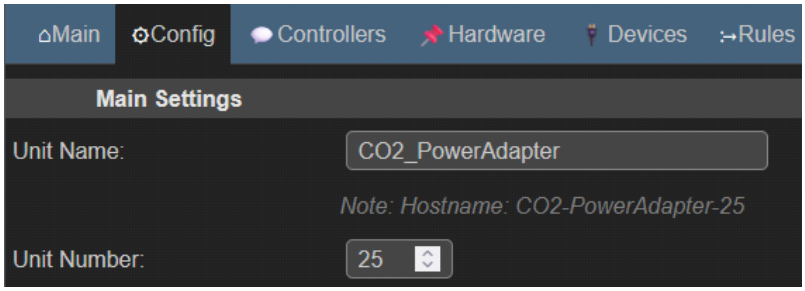
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | ✓ | Gases - CO2 SCD4x | SCD_Sensor | I2C 0x62 | 1 | SDA: GPIO-1 SCL: GPIO-0 | CO2?ppm: 0<br>Humidity?%: 43<br>Temp?°C: 21.4 |

with another name at position 25

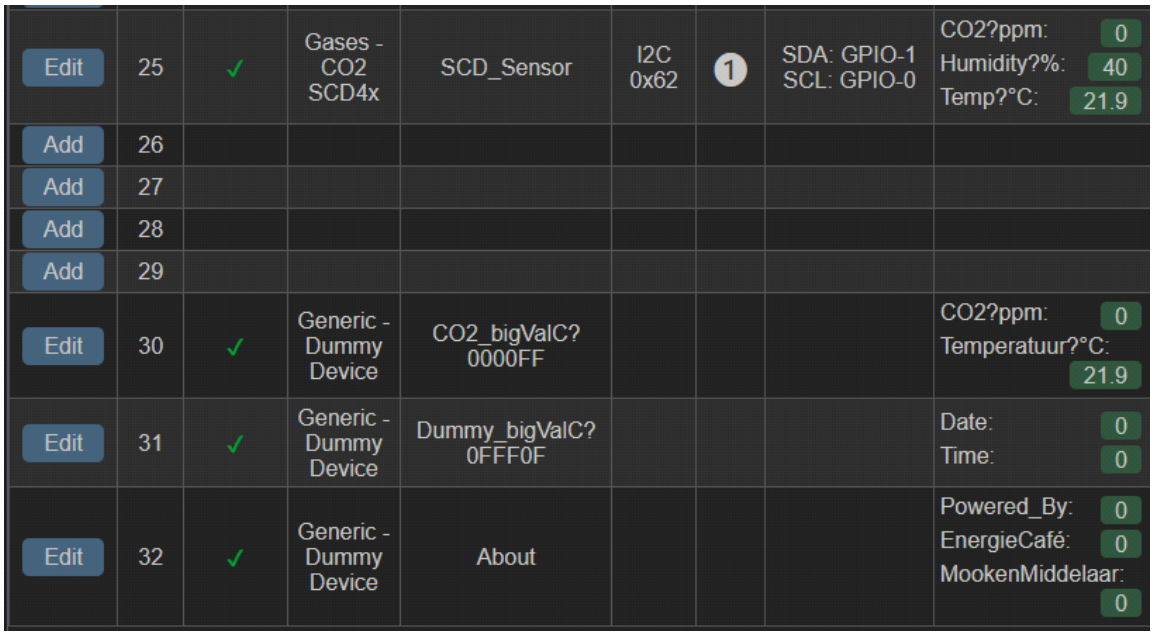



Remove device-1

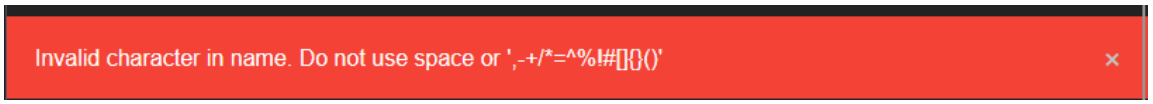
Pas het unit nummer aan:

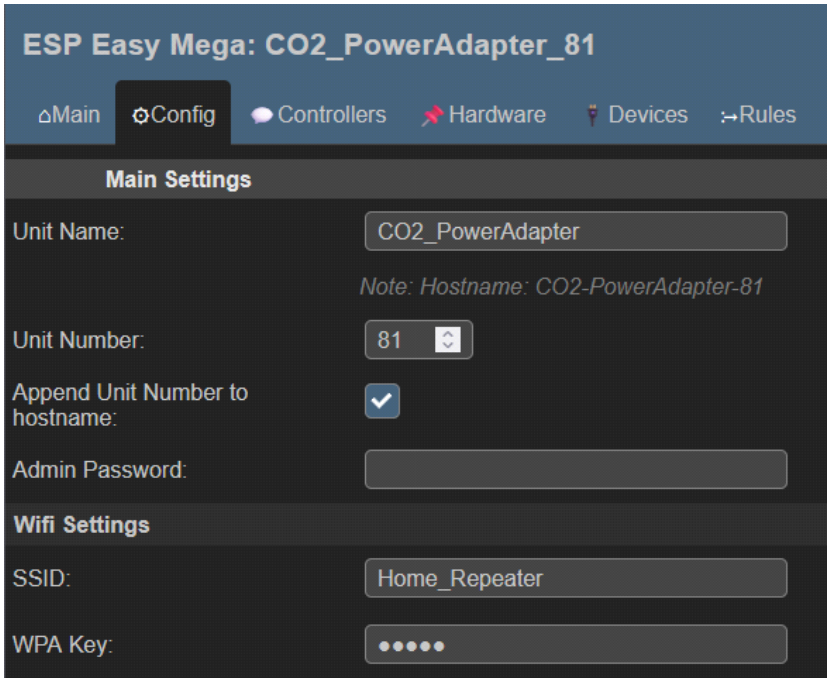


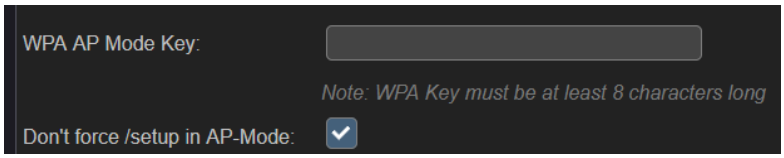

Totaal Devices:

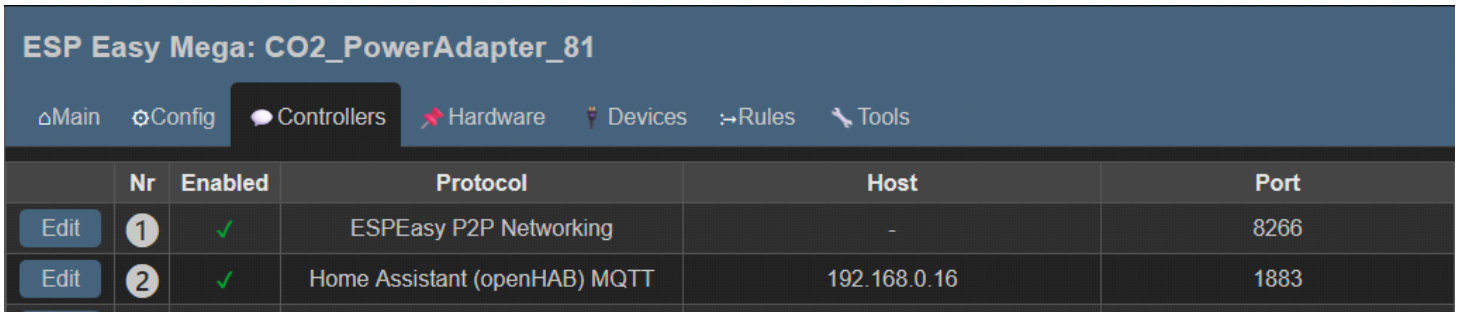


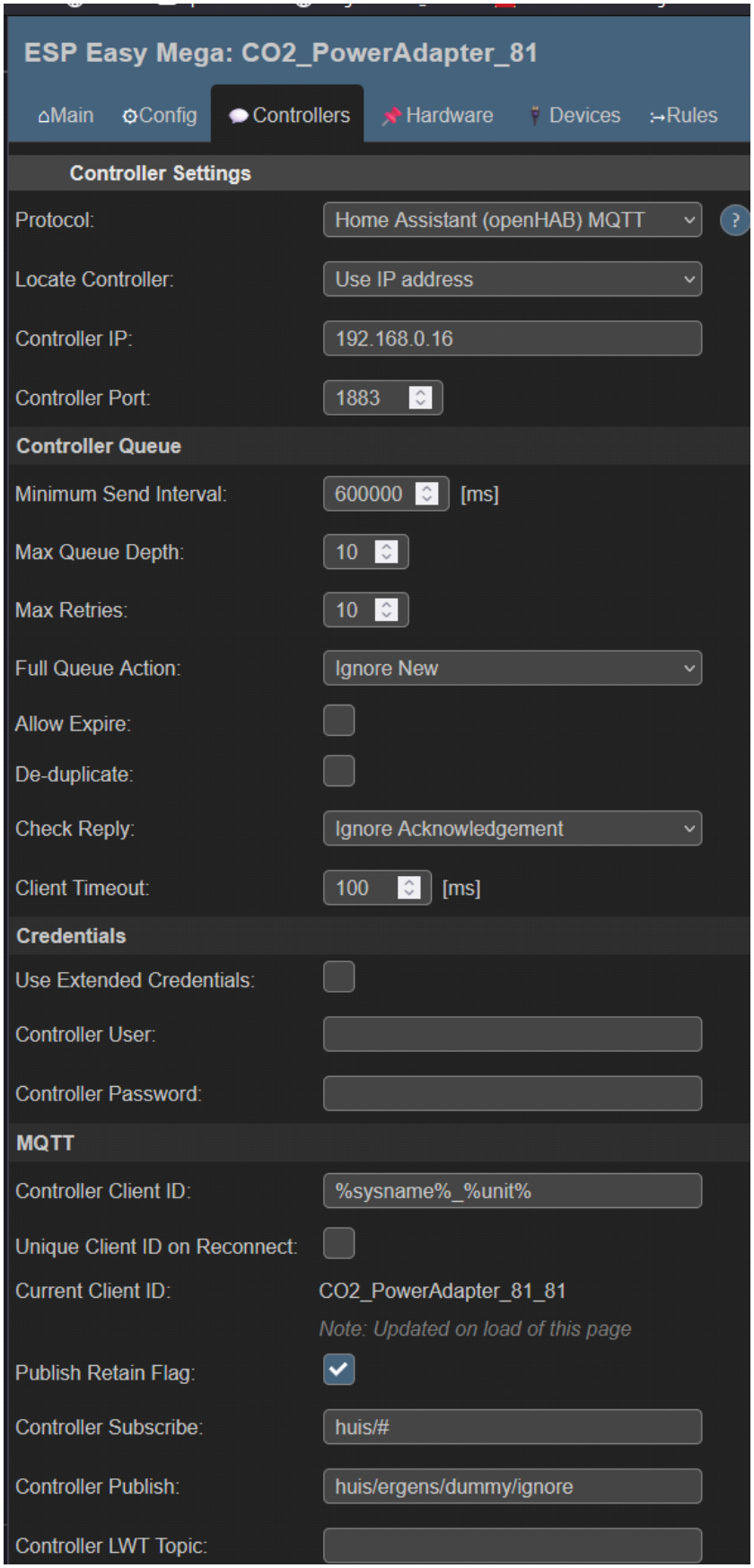

Deze foutmelding wordt door de eenheden veroorzaakt, maar heeft verder geen noemenswaardig effect.

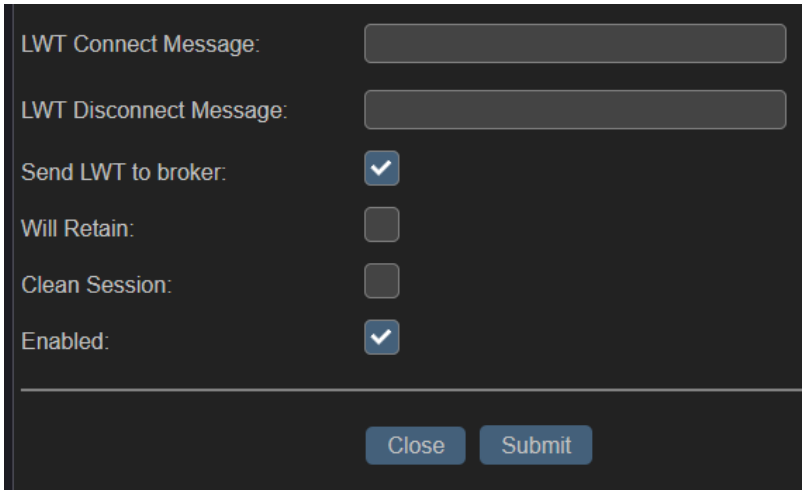


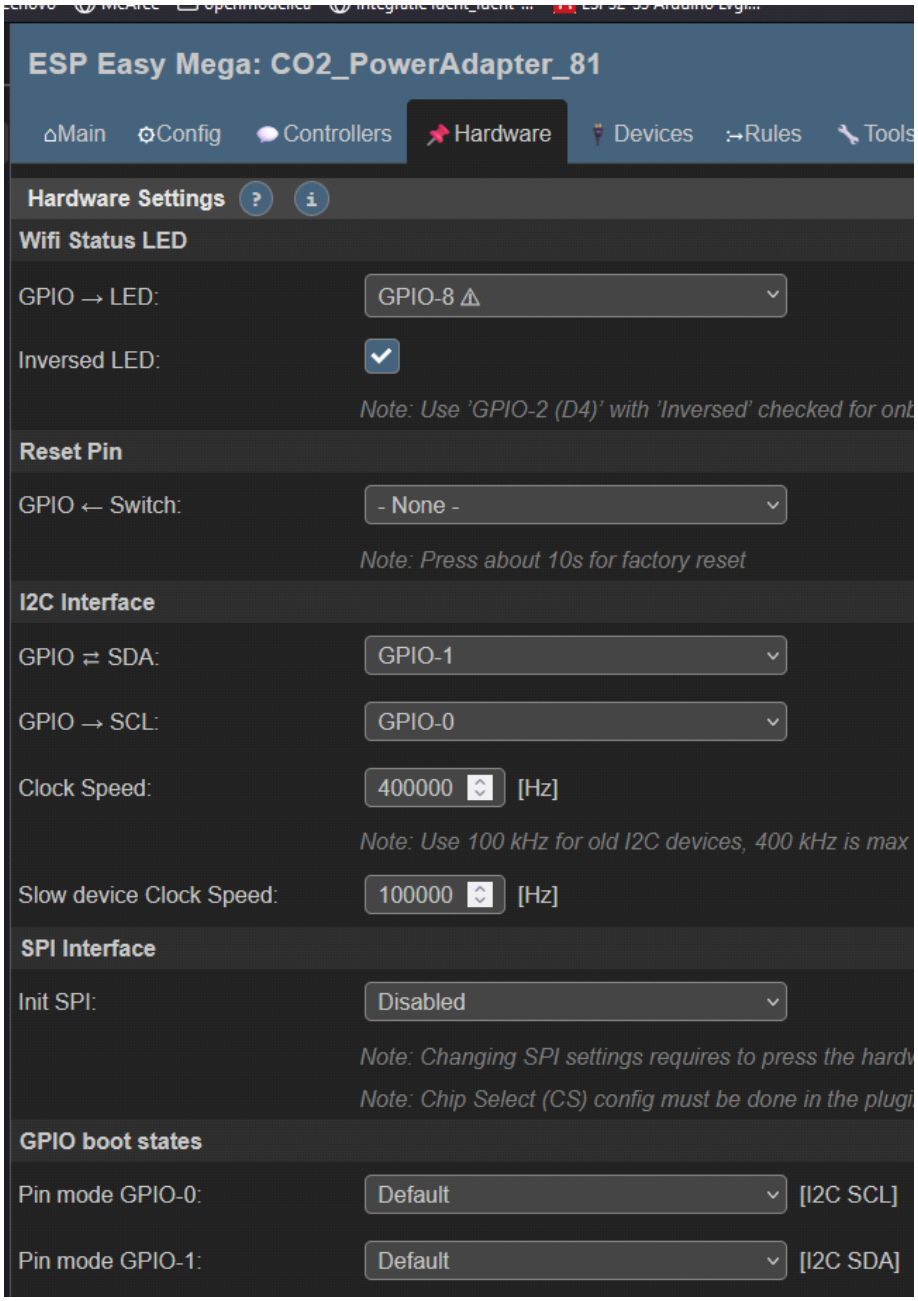

ESP Easy Mega: CO2_PowerAdapter_81
Main
Config
Controllers
Hardware
Devices
Rules
Main Settings
Unit Name:
CO2_PowerAdapter
Note: Hostname: CO2-PowerAdapter-81
Unit Number:
81
Append Unit Number to hostname:
Admin Password:
Wifi Settings
SSID:
Home_Repeater
WPA Key:
•••••

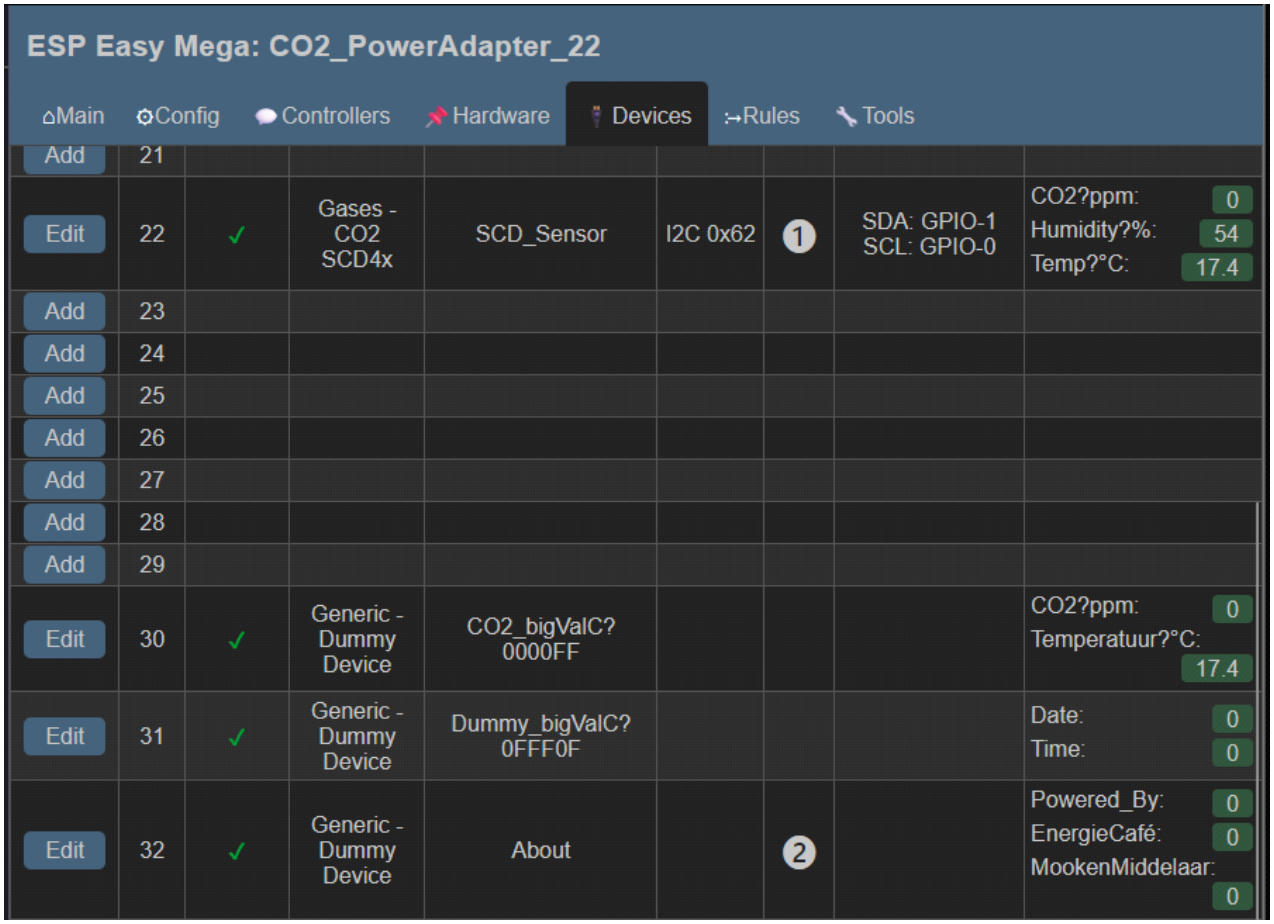

WPA AP Mode Key:
Note: WPA Key must be at least 8 characters long
Don't force /setup in AP-Mode:

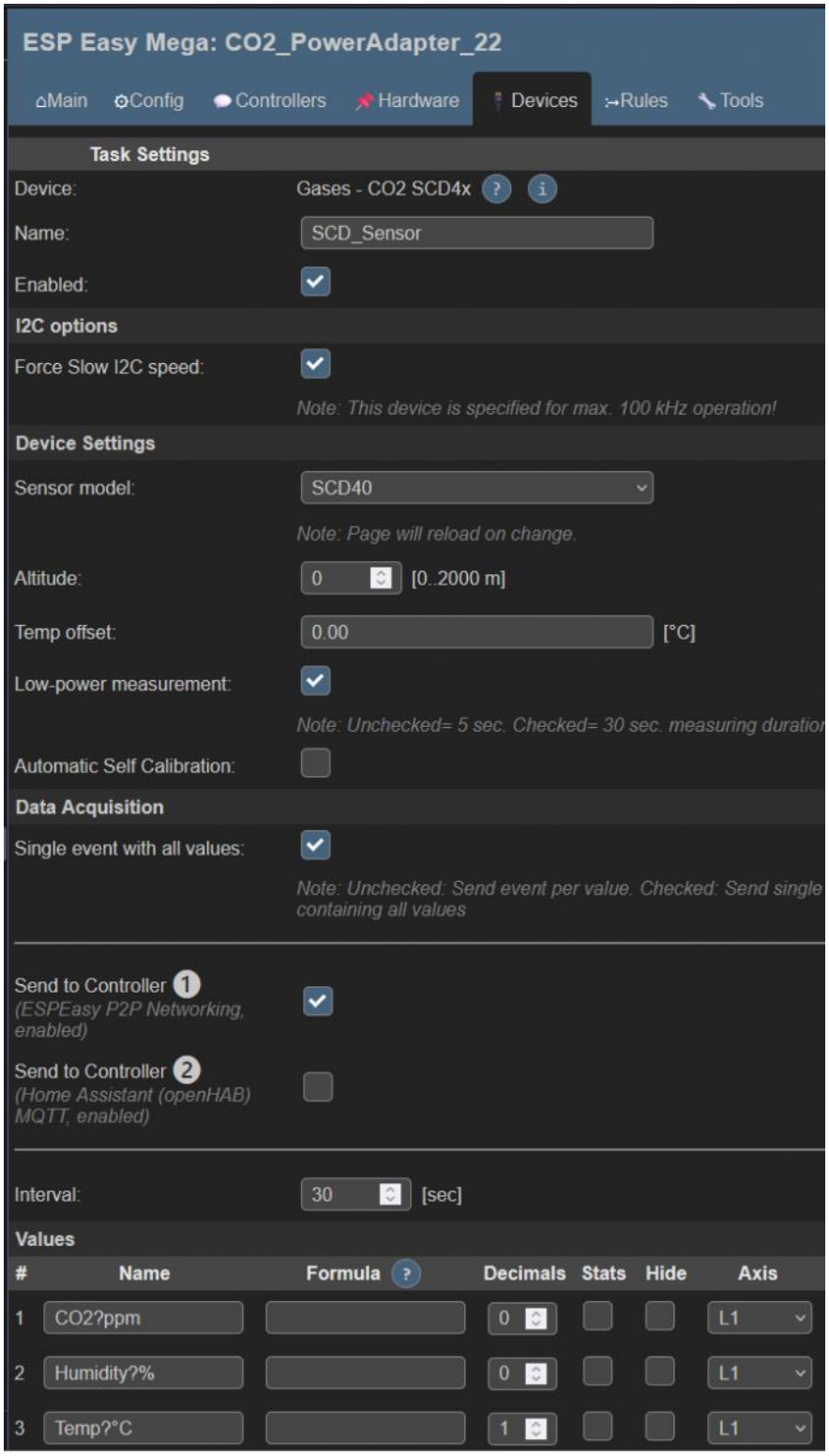

ESP Easy Mega: CO2_PowerAdapter_81
Main
Config
Controllers
Hardware
Devices
Rules
Tools
Nr
Enabled
Protocol
Host
Port
Edit
1
ESPEasy P2P Networking
-
8266
Edit
2
Home Assistant (openHAB) MQTT
192.168.0.16
1883

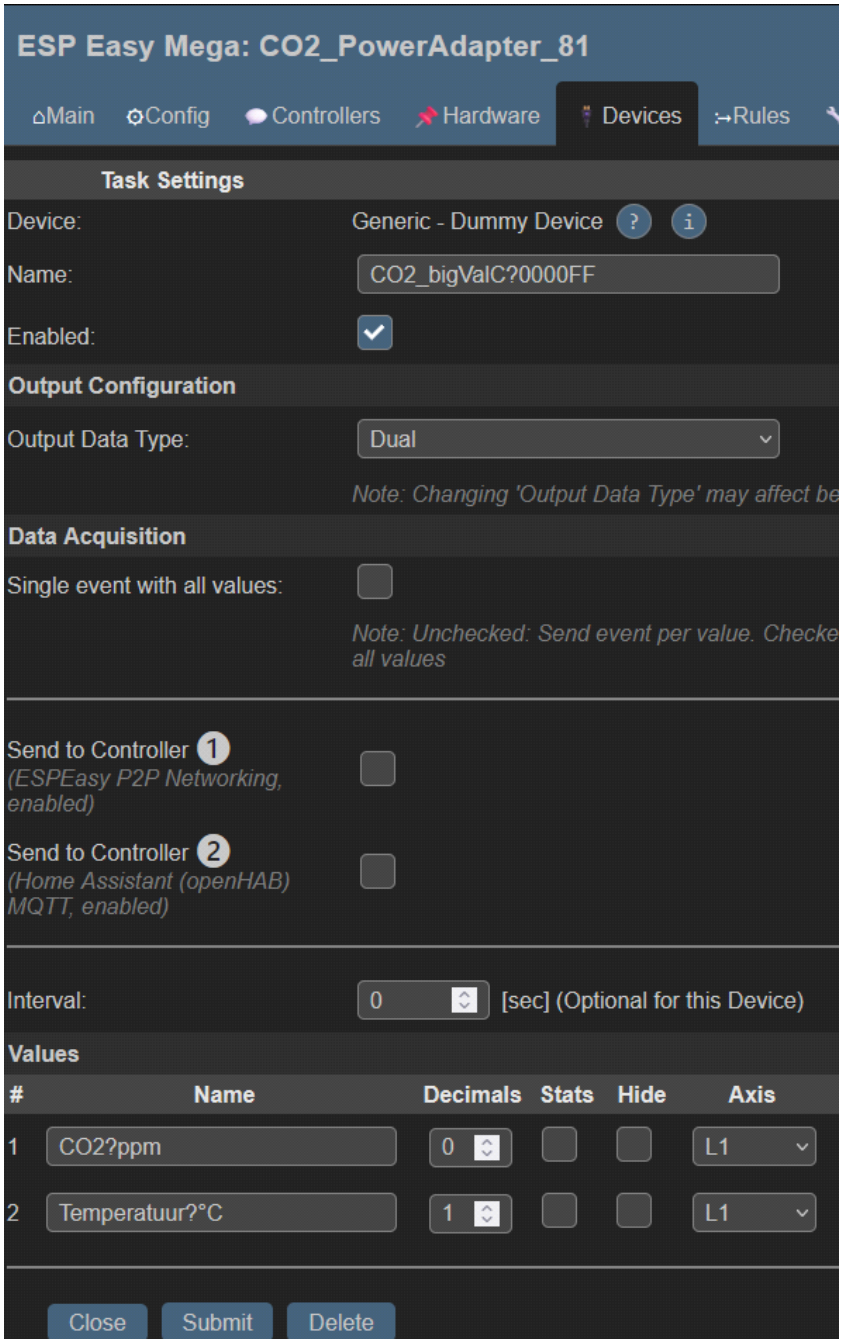

ESP Easy Mega: CO2_PowerAdapter_81
Main
Config
Controllers
Hardware
Devices
Rules
Controller Settings
Protocol:
Home Assistant (openHAB) MQTT
Locate Controller:
Use IP address
Controller IP:
192.168.0.16
Controller Port:
1883
Controller Queue
Minimum Send Interval:
600000
[ms]
Max Queue Depth:
10
Max Retries:
10
Full Queue Action:
Ignore New
Allow Expire:
De-duplicate:
Check Reply:
Ignore Acknowledgement
Client Timeout:
100
[ms]
Credentials
Use Extended Credentials:
Controller User:
Controller Password:
MQTT
Controller Client ID:
%sysname%_%unit%
Unique Client ID on Reconnect:
Current Client ID:
CO2_PowerAdapter_81_81
Note: Updated on load of this page
Publish Retain Flag:
Controller Subscribe:
huis/#
Controller Publish:
huis/ergens/dummy/ignore
Controller LWT Topic:

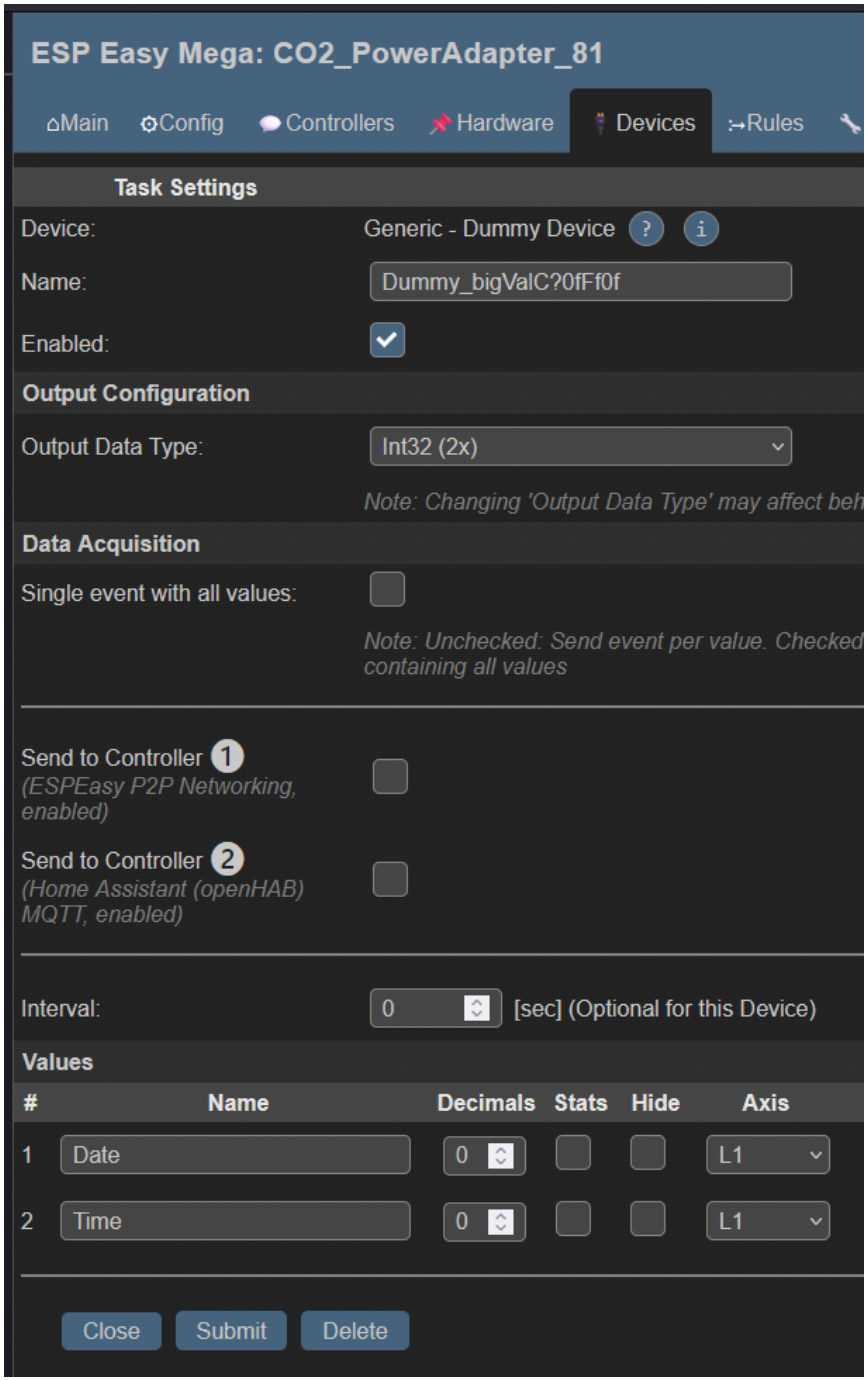

LWT Connect Message:
LWT Disconnect Message:
Send LWT to broker:
Will Retain:
Clean Session:
Enabled:
Close
Submit

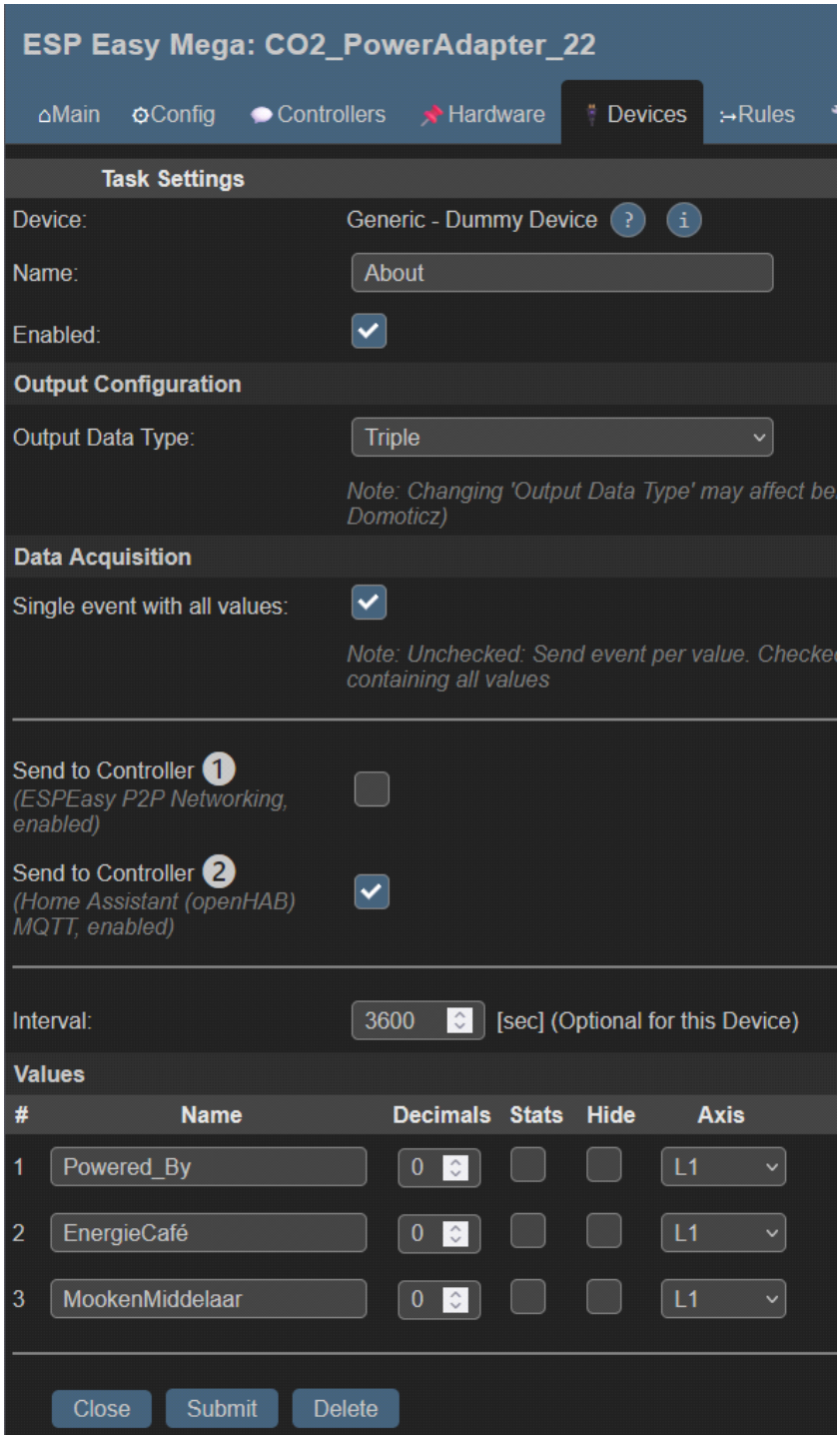

ESP Easy Mega: CO2_PowerAdapter_81
Main
Config
Controllers
Hardware
Devices
Rules
Tools
Hardware Settings
Wifi Status LED
GPIO → LED:
GPIO-8
Inversed LED:
Note: Use 'GPIO-2 (D4)' with 'Inversed' checked for onb
Reset Pin
GPIO ← Switch:
- None -
Note: Press about 10s for factory reset
I2C Interface
GPIO ⇄ SDA:
GPIO-1
GPIO → SCL:
GPIO-0
Clock Speed:
400000
[Hz]
Note: Use 100 kHz for old I2C devices, 400 kHz is max
Slow device Clock Speed:
100000
[Hz]
SPI Interface
Init SPI:
Disabled
Note: Changing SPI settings requires to press the hardv
Note: Chip Select (CS) config must be done in the plugi
GPIO boot states
Pin mode GPIO-0:
Default
[I2C SCL]
Pin mode GPIO-1:
Default
[I2C SDA]

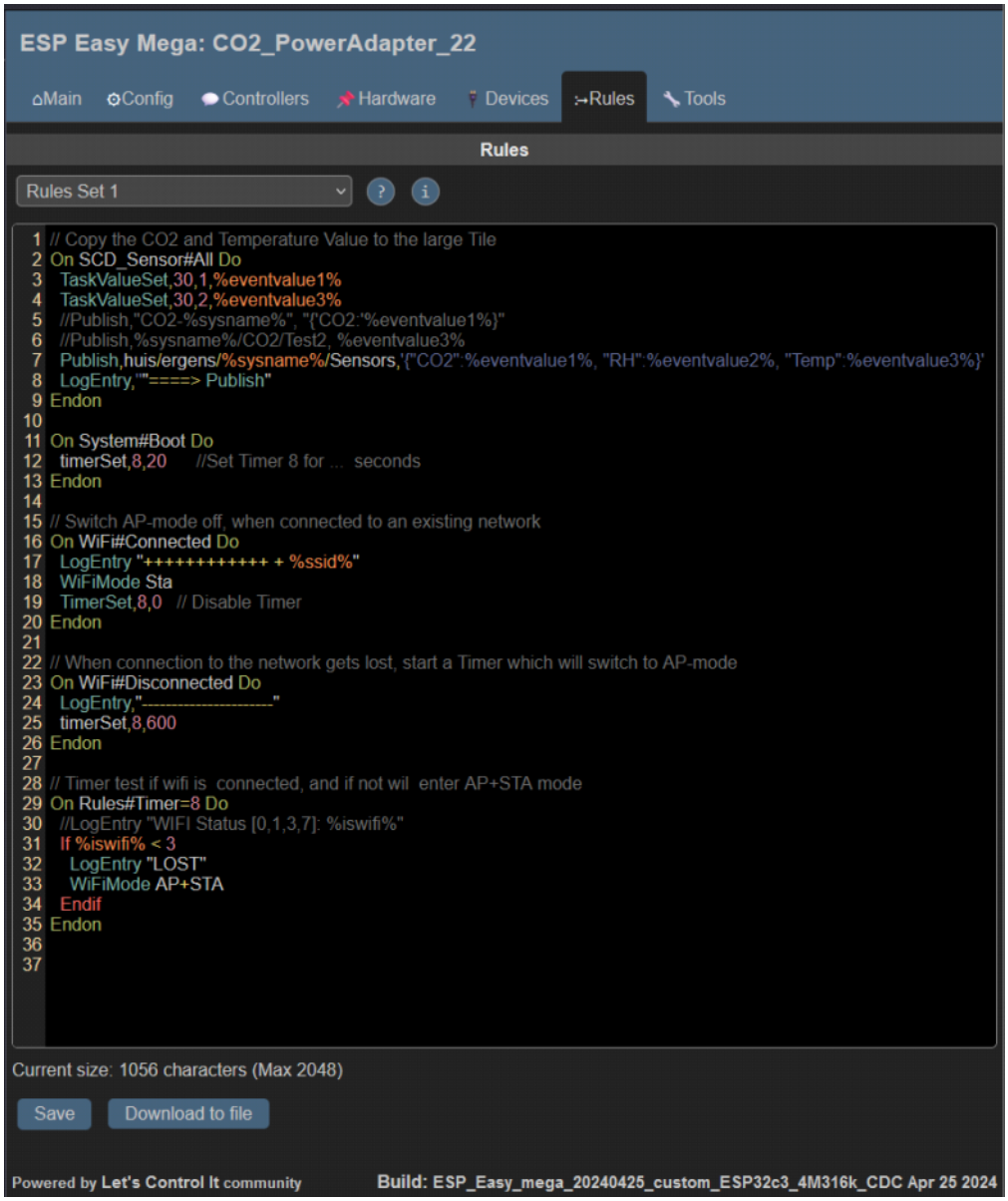

ESP Easy Mega: CO2_PowerAdapter_22
Main
Config
Controllers
Hardware
Devices
Rules
Tools
Add 21
Edit 22 ✓ Gases - CO2 SCD4x SCD_Sensor I2C 0x62 1 SDA: GPIO-1 SCL: GPIO-0 CO2?ppm: 0 Humidity?%: 54 Temp?°C: 17.4
Add 23
Add 24
Add 25
Add 26
Add 27
Add 28
Add 29
Edit 30 ✓ Generic - Dummy Device CO2_bigValC? 0000FF CO2?ppm: 0 Temperatuur?°C: 17.4
Edit 31 ✓ Generic - Dummy Device Dummy_bigValC? 0FFF0F Date: 0 Time: 0
Edit 32 ✓ Generic - Dummy Device About 2 Powered_By: 0 EnergieCafé: 0 MookenMiddelaar: 0


ESP Easy Mega: CO2_PowerAdapter_22
Main
Config
Controllers
Hardware
Devices
Rules
Tools
Task Settings
Device:
Gases - CO2 SCD4x
Name:
SCD_Sensor
Enabled:
I2C options
Force Slow I2C speed:
Note: This device is specified for max. 100 kHz operation!
Device Settings
Sensor model:
SCD40
Note: Page will reload on change.
Altitude:
0
[0..2000 m]
Temp offset:
0.00
[°C]
Low-power measurement:
Note: Unchecked= 5 sec. Checked= 30 sec. measuring duration
Automatic Self Calibration:
Data Acquisition
Single event with all values:
Note: Unchecked: Send event per value. Checked: Send single
containing all values
Send to Controller 1
(ESPEasy P2P Networking, enabled)
Send to Controller 2
(Home Assistant (openHAB) MQTT, enabled)
Interval:
30
[sec]
Values
# Name Formula Decimals Stats Hide Axis
1 CO2?ppm 0 L1
2 Humidity?% 0 L1
3 Temp?°C 1 L1


ESP Easy Mega: CO2_PowerAdapter_81
Main
Config
Controllers
Hardware
Devices
Rules
Task Settings
Device:
Generic - Dummy Device
Name:
CO2_bigValC?0000FF
Enabled:
Output Configuration
Output Data Type:
Dual
Note: Changing 'Output Data Type' may affect be
Data Acquisition
Single event with all values:
Note: Unchecked: Send event per value. Checke
all values
Send to Controller 1
(ESPEasy P2P Networking, enabled)
Send to Controller 2
(Home Assistant (openHAB) MQTT, enabled)
Interval:
0
[sec] (Optional for this Device)
Values
# Name Decimals Stats Hide Axis
1 CO2?ppm 0 L1
2 Temperatuur?°C 1 L1
Close
Submit
Delete

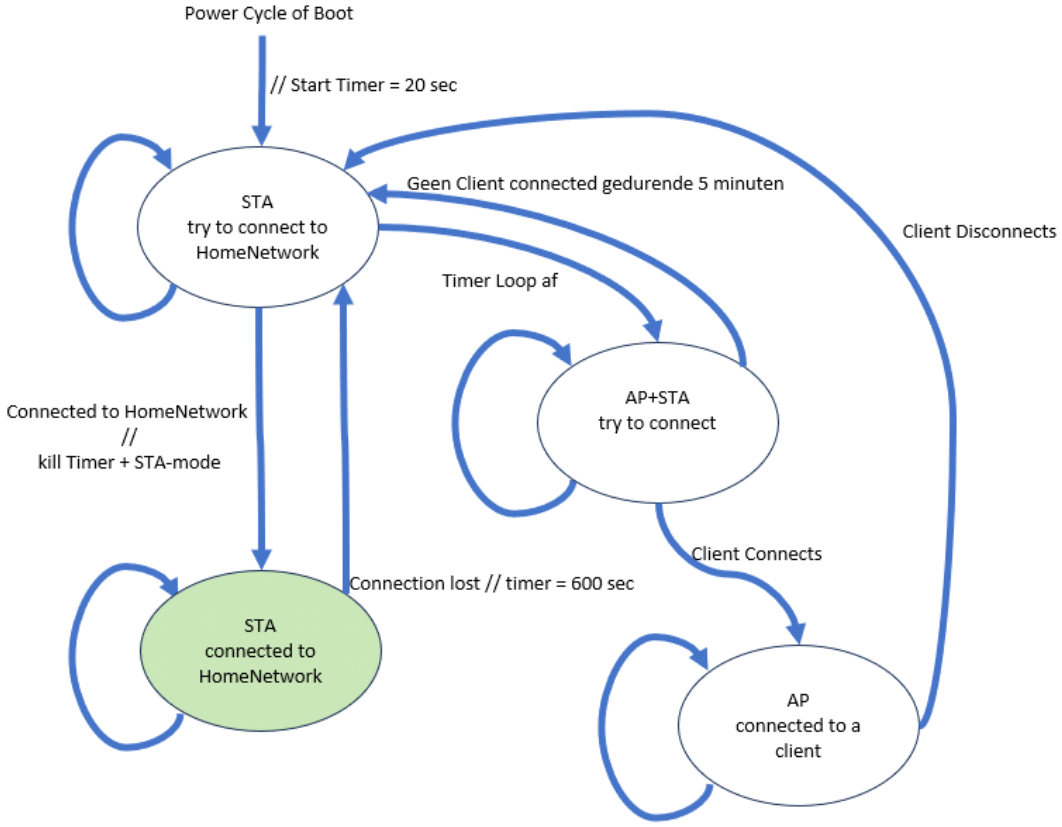

ESP Easy Mega: CO2_PowerAdapter_81
Main
Config
Controllers
Hardware
Devices
Rules
Task Settings
Device:
Generic - Dummy Device
Name:
Dummy_bigValC?0fFf0f
Enabled:
Output Configuration
Output Data Type:
Int32 (2x)
Note: Changing 'Output Data Type' may affect beh
Data Acquisition
Single event with all values:
Note: Unchecked: Send event per value. Checked
containing all values
Send to Controller 1
(ESPEasy P2P Networking, enabled)
Send to Controller 2
(Home Assistant (openHAB) MQTT, enabled)
Interval:
0
[sec] (Optional for this Device)
Values
# Name Decimals Stats Hide Axis
1 Date 0 L1
2 Time 0 L1
Close
Submit
Delete


ESP Easy Mega: CO2_PowerAdapter_22
Main
Config
Controllers
Hardware
Devices
Rules
Task Settings
Device:
Generic - Dummy Device
Name:
About
Enabled:
Output Configuration
Output Data Type:
Triple
Note: Changing 'Output Data Type' may affect be
Domoticz)
Data Acquisition
Single event with all values:
Note: Unchecked: Send event per value. Checke
containing all values
Send to Controller 1
(ESPEasy P2P Networking, enabled)
Send to Controller 2
(Home Assistant (openHAB) MQTT, enabled)
Interval:
3600
[sec] (Optional for this Device)
Values
# Name Decimals Stats Hide Axis
1 Powered_By 0 L1
2 EnergieCafé 0 L1
3 MookenMiddelaar 0 L1
Close
Submit
Delete




```
// Copy the CO2 and Temperature Value to the large Tile
On SCD_Sensor#All Do
 TaskValueSet,30,1,%eventvalue1%
 TaskValueSet,30,2,%eventvalue3%
 //Publish,"CO2-%sysname%", "{'CO2:'%eventvalue1%}"
 //Publish,%sysname%/CO2/Test2, %eventvalue3%
 Publish,huis/ergens/%sysname%/Sensors,'{"CO2":%eventvalue1%, "RH":%eventvalue2%, "Temp":%
eventvalue3%}'
 LogEntry,""====> Publish"
Endon

On System#Boot Do
 timerSet,8,20     //Set Timer 8 for ...  seconds
Endon

// Switch AP-mode off, when connected to an existing network
On WiFi#Connected Do
 LogEntry "++++++++++++ + %ssid%"
 WiFiMode Sta
 TimerSet,8,0   // Disable Timer
Endon

// When connection to the network gets lost, start a Timer which will switch to AP-mode
On WiFi#Disconnected Do
 LogEntry,"----------"
 timerSet,8,600
Endon

// Timer test if wifi is  connected, and if not wil  enter AP+STA mode
On Rules#Timer=8 Do
 //LogEntry "WIFI Status [0,1,3,7]: %iswifi%"
 If %iswifi% < 3
```

```
  LogEntry "LOST"
  WiFiMode AP+STA
 Endif
Endon
```




Als je met een smartphoneconnect to het AP, kom je meteen bij het device. Nadeel is wel dat je telefoon niet meer op het internet zit. Zolang je smartphone verbonden is met het device, zal het device niet naar het homenetwork overschakelen.
De gewone build van ESPEasy werkt al op deze manier.

## ESPEasy-MQTT

| | |
|---|---|
| Hier de 3 standaard MQTT controllers, van boven naar beneden:<br>- Home Assistant<br>- PiDome<br>- Domoticz<br>Alle 3 dus ongeschikt voor onze situatie | ▼ CO2_PowerAdapter_81<br>▼ SCD_Sensor<br>CO2?ppm = 0<br>Humidity?% = 54<br>Temp?°C = 17.8<br>▼ SCD_SensorPI<br>CO2?ppm = 0<br>Humidity?% = 57<br>Temp?°C = 17.3<br>▼ domoticz<br>in = {"idx":7,"RSSI":10,"nvalue":0,"svalue":"0;54;17.8"} |
| | |
| Door een eigen MQTT message te zenden wordt wel een voor ons bruikbare boodschap gemaakt. Helaas komt er ook een "dummy", omdat de MQTT messenger gebruik maakt van de eerst actieve MQTT controller. | ▼ 192.168.0.16<br>▼ huis<br>▼ ergens<br>▼ CO2_PowerAdapter_81<br>Sensors = {"CO2":0, "RH":59, "Temp":16.3}<br>▼ dummy<br>ignore = 59<br>▼ status<br>LWT = Connected |

```
// Copy the CO2 and Temperature Value to the large Tile
On SCD_Sensor#All Do
  TaskValueSet,30,1,%eventvalue1%
  TaskValueSet,30,2,%eventvalue3%
  //Publish,"CO2-%sysname%", "{'CO2':'%eventvalue1%}"
  //Publish,%sysname%/CO2/Test2, %eventvalue3%
  Publish,huis/ergens/%sysname%/Sensors,'{"CO2":%eventvalue1%, "RH":%eventvalue2%, "Temp":%eventvalue3%}'
  LogEntry,""====> Publish"
Endon
```

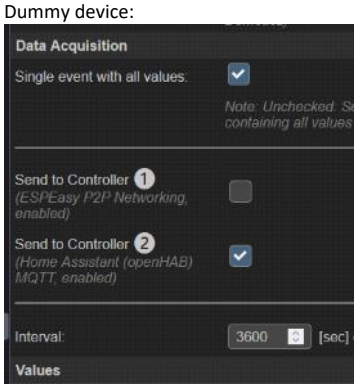
De juiste MQTT message:
Er moet een MQTT Controller aanstaan, anders wordt er met het Publish commando niets uitgezonden.
Verder moet er ook een device zijn dat zijn gegevens wil verzenden via MQTT.

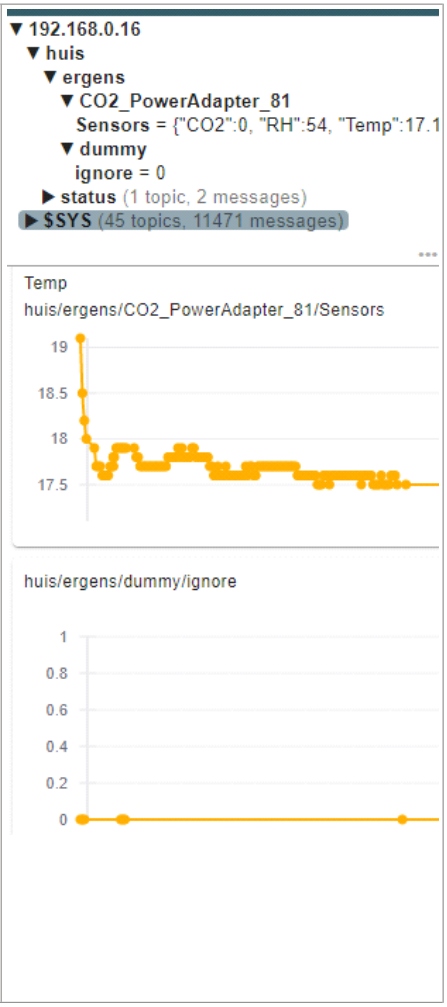
In de actieve MQTT-controller worden ook de MQTT broker en zijn toegang gedefiniëerd.

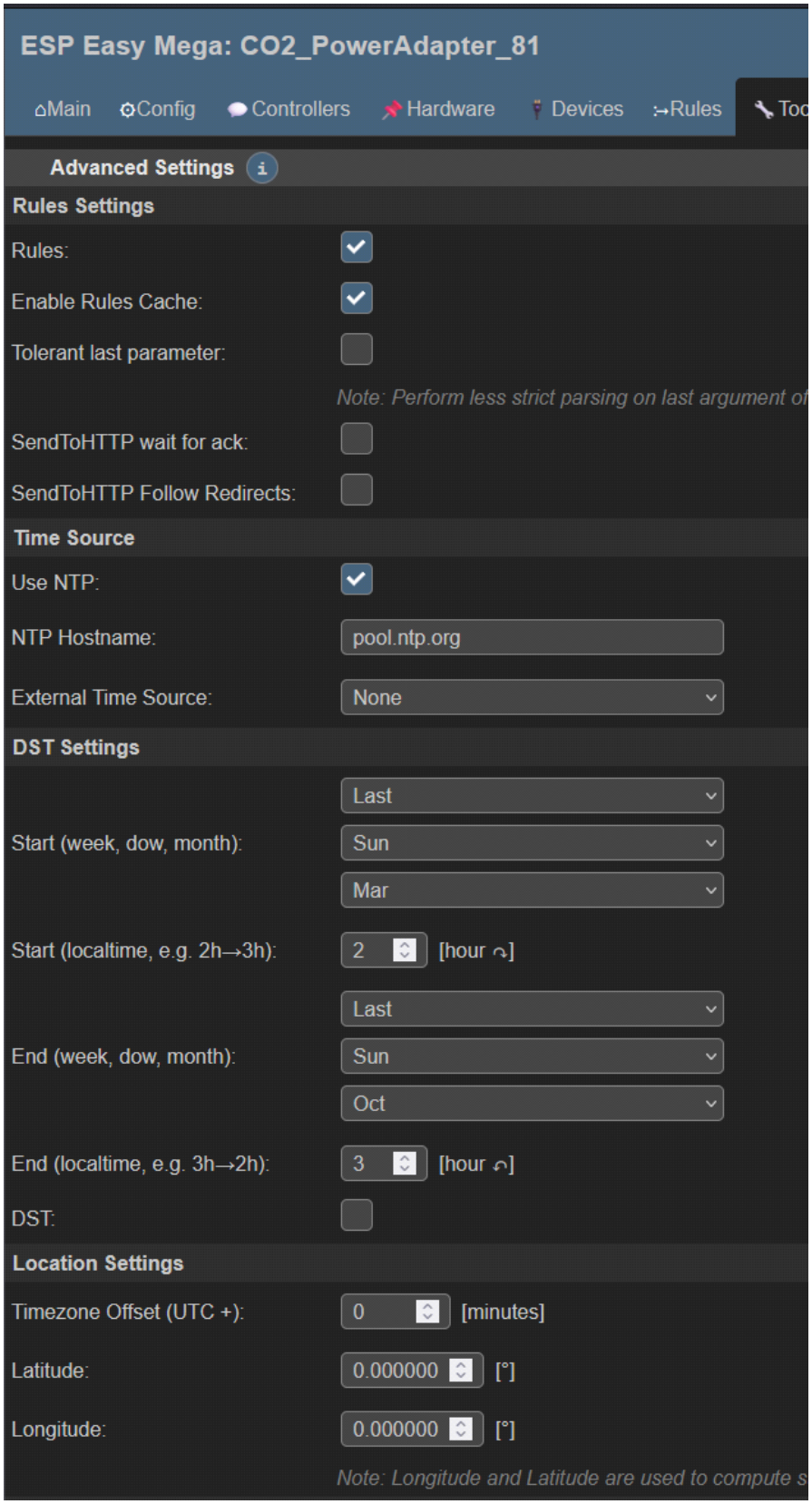
Vervolgens gaat die MQTT controller ook zelf uitzenden als een van de aangesloten devices nieuwe waarden krijgt. Je kunt dit heel sterk beperken door er slechts 1 dummy device iets over MQTT te laten zenden.

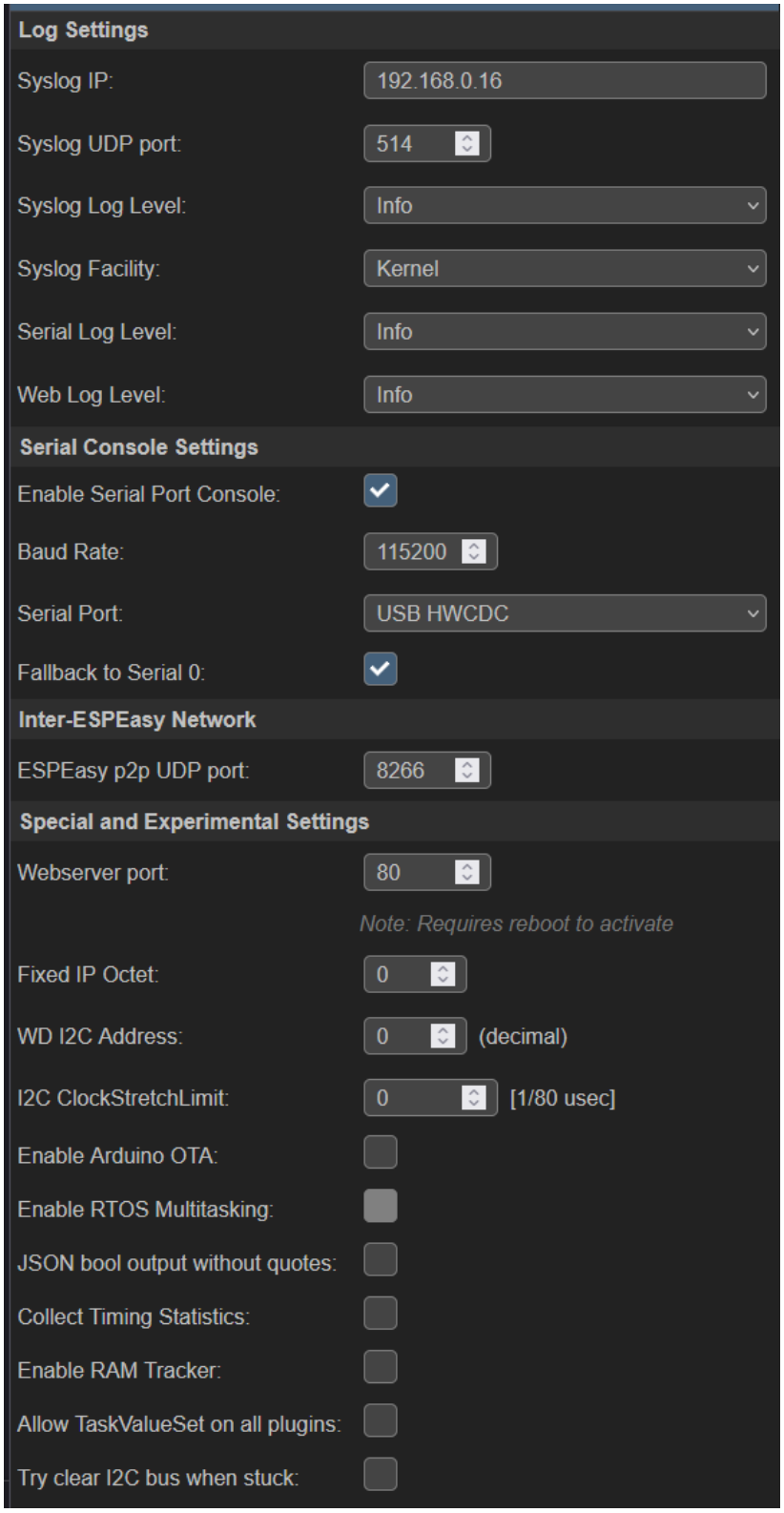
Hier rechts een plaatje:
- Bovenste curve = eigen MQTT message vanuit de rules
- Dummy device, aangesloten op de MQTT controller, waarvan de waarden niet veranderen

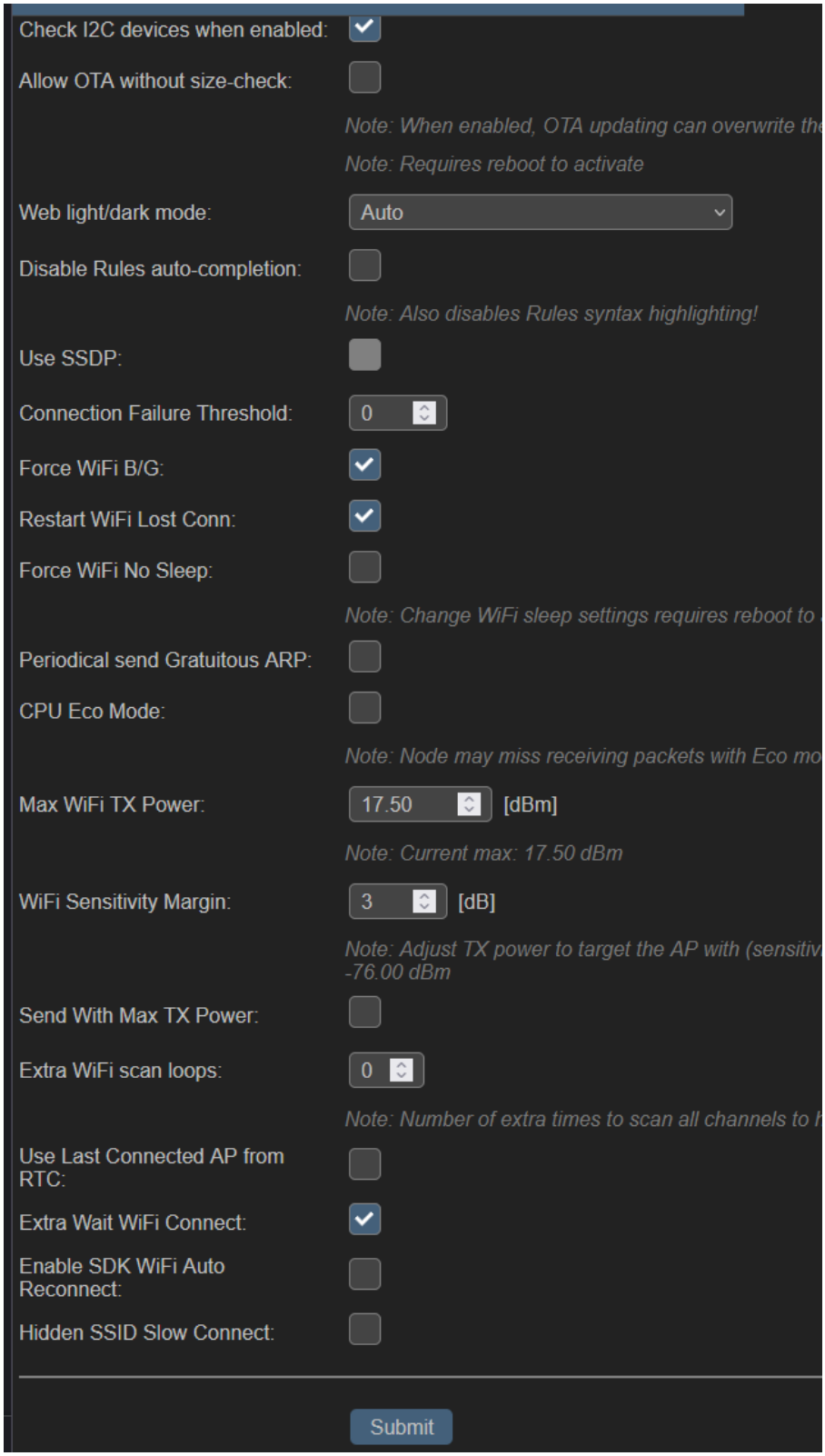
Dummy device:




ESP Easy Mega: CO2_PowerAdapter_81
Main
Config
Controllers
Hardware
Devices
Rules
Advanced Settings
Rules Settings
Rules:
Enable Rules Cache:
Tolerant last parameter:
Note: Perform less strict parsing on last argument of
SendToHTTP wait for ack:
SendToHTTP Follow Redirects:
Time Source
Use NTP:
NTP Hostname:
pool.ntp.org
External Time Source:
None
DST Settings
Last
Start (week, dow, month):
Sun
Mar
Start (localtime, e.g. 2h→3h):
2
[hour ↷]
Last
End (week, dow, month):
Sun
Oct
End (localtime, e.g. 3h→2h):
3
[hour ↶]
DST:
Location Settings
Timezone Offset (UTC +):
0
[minutes]
Latitude:
0.000000
[°]
Longitude:
0.000000
[°]
Note: Longitude and Latitude are used to compute s


Log Settings
Syslog IP:
192.168.0.16
Syslog UDP port:
514
Syslog Log Level:
Info
Syslog Facility:
Kernel
Serial Log Level:
Info
Web Log Level:
Info
Serial Console Settings
Enable Serial Port Console:
Baud Rate:
115200
Serial Port:
USB HWCDC
Fallback to Serial 0:
Inter-ESPEasy Network
ESPEasy p2p UDP port:
8266
Special and Experimental Settings
Webserver port:
80
Note: Requires reboot to activate
Fixed IP Octet:
0
WD I2C Address:
0
(decimal)
I2C ClockStretchLimit:
0
[1/80 usec]
Enable Arduino OTA:
Enable RTOS Multitasking:
JSON bool output without quotes:
Collect Timing Statistics:
Enable RAM Tracker:
Allow TaskValueSet on all plugins:
Try clear I2C bus when stuck:


Check I2C devices when enabled:
Allow OTA without size-check:
Note: When enabled, OTA updating can overwrite the
Note: Requires reboot to activate
Web light/dark mode:
Auto
Disable Rules auto-completion:
Note: Also disables Rules syntax highlighting!
Use SSDP:
Connection Failure Threshold:
0
Force WiFi B/G:
Restart WiFi Lost Conn:
Force WiFi No Sleep:
Note: Change WiFi sleep settings requires reboot to
Periodical send Gratuitous ARP:
CPU Eco Mode:
Note: Node may miss receiving packets with Eco mo
Max WiFi TX Power:
17.50
[dBm]
Note: Current max: 17.50 dBm
WiFi Sensitivity Margin:
3
[dB]
Note: Adjust TX power to target the AP with (sensitiv
-76.00 dBm
Send With Max TX Power:
Extra WiFi scan loops:
0
Note: Number of extra times to scan all channels to h
Use Last Connected AP from RTC:
Extra Wait WiFi Connect:
Enable SDK WiFi Auto Reconnect:
Hidden SSID Slow Connect:
Submit