ReMI manual v1. 5

ReMI, the smart energy switch

The ReMI web server connects to the P1 port and links via Modbus or input contacts to 2-wire energy meters. After connecting to the local WiFi network, you can view the energy consumption up to 2 years ago via a web browser on a device and switch contacts smartly on injection, peak, rate,.... Compatible with DSMR 2.X to 5.x protocol of the Belgian and Dutch meters

ReMI manual v1.5

ReMI, the smart energy switch

1.Fonctiong:

To connect the ReMI web server to the digital meter, a 6P/6C RJ12 'cross' cable is used that is connected to the P1 port. The web server is then connected to 2-wire energy meters via the Modbus connection or can receive consumption pulses via 2 input contacts. After connection, the ReMI must be connected to the local WiFi network. **Stable WiFi and internet are necessary for proper operation.** Via a web browser on a smartphone, tablet or PC you can then get an overview of the total energy consumption up to 2 years ago.

The ReMI is compatible with all digital meters in Belgium* and the Netherlands that use the DSMR 2.X to 5.x protocol. For the Dutch DSMR 2.x and 4.x meters, an optional 12VDC power supply is required.

*(*Activate Belgian meter first, see comments)*

Via P1, ReMI reads :
- Consumption import high rate
- Consumption import low rate
- Consumption export high rate
- Consumption export low rate
- Gas consumption (if measuring device is present)
- Water consumption (if measuring device is available)
- Consumption import high + low rate
- Consumption export high + low rate
- Consumption import – export (positive or negative)
- Rate (high or low rate)
- Quarter power(Belgium)

By default, these 10 measuring positions of the digital meter with corresponding graphs are already pre-configured.

But external meters can also be connected via Modbus, or via pulse, or via WiFi MQTT (MQTT Token necessary!) with: Plugs, THEo and LeON sticks, 2-Wire web servers (LoWi3, ReMI, MEMo3),...

Up to a maximum of 16 measuring channels are provided in the ReMI. Each measuring channel has a storage of the last 10 days for hourly consumption, with a resolution of 5 minutes.
The day-consumption have a storage of 12 months. The month consumes have a storage of 2 years.

In addition to inputs, ReMI also has 2 bi-stable 10A relay outputs, 2 'low-power solid-state' outputs and 4 weekly clocks. With the logic in the web server, these 4 outputs and WiFi MQTT plugs can be based on injection, peak, rate, time,... be controlled

It is always possible to change the order of the measurements, or to make them visible or invisible.

2.Technical characteristics:
- WiFi network 802.11 b/g/n/e/i (2.4 GHz) , which requires internet access.
- Tx power: 802.11 b: +20 dBm; 802.11g: +17 dBm; 802.11 n: +14 dBm
- Rx Sensitivity: 802.11 b: -91 dbm (11 Mbps); 802.11 g: -75 dbm (54 Mbps) 802.11 n: -72 dbm (MCS7)
- Security: WPA/WPA2
- Encryption: WEP/TKIP/AES
- Network Protocols: IPv4, TCP/UDP/HTTP/FTP
- DIN rail module 2mod breed
- WiFi network 2.4 GHz
- P1 port RJ12
- 2 pulse inputs zeopotential (pulse or time)
- 2 optically isolated pulse outputs
- Connector for external power supply 8-15V/1A Average consumption: 5V/ 200mA
- Modbus master or slave configurable
- 2 relay outputs 10A/230V potential-free
- 16 log channels, 10 days with resolution 5minutes, 2 years with day resolution.
- External antenna.

- Built-in time clock which is synchronized daily with an extremely precise NTP clock.
- Included: RJ12-6p6 cable

3.Forpreparation for placing in service:

To be able to use ReMI, you must first connect it once to your WiFi home network. For this you need to know the name (**SSID**) and password of that WiFi network.

ReMI must also get a **FREE and FIXED** IP address because you enter this address in the web browser to get to the ReMI website. During the connection you also need to enter a **subnet mask**, a **gateway IP address** of your WiFi network and a **port number**.

For someone who is not familiar with networking, this is a threshold, so either you now call in the help of a specialist or you use one of the methods below to determine the network settings of your PC and thus the settings for ReMI **in advance** :

To determine network settings:

Method 1:

Connect your PC to your WiFi home network. Go to 'network and internet settings', 'network centre', 'WiFi', 'details' and you will get the
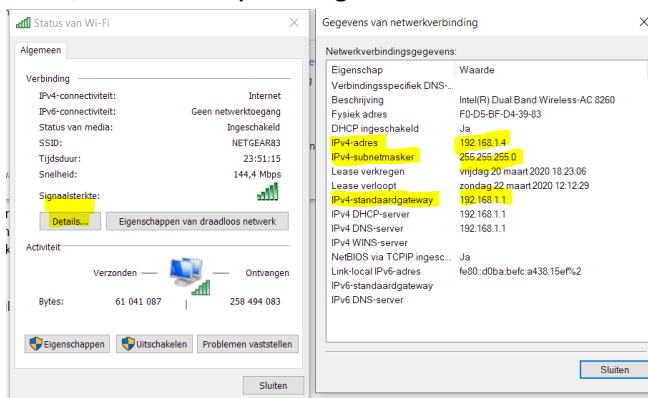

networkaddresses of your PC.

You can also largely copy these addresses for ReMI:

- IPv4 address PC: eg. **192.168.0.209** becomes e.g. **192.168.0.124** for ReMI, test via PING if this address is still free.
- IPv4 SUBNETmask: vb. 255.255.255.0
- IPv4 Gateway: vb. 192.168.0.1
- DNS Server: 192.168.0.1 of 8.8.8.8

Method 2:

Connect your PC to your home network and download and install the IP server scanner tool from 2-WIRE. When you start it, it gives you the network settings of your PC and a proposal of the ReMI network settings for this WiFi network:

https://www.2-wire.net/product/ip-serverscanner/
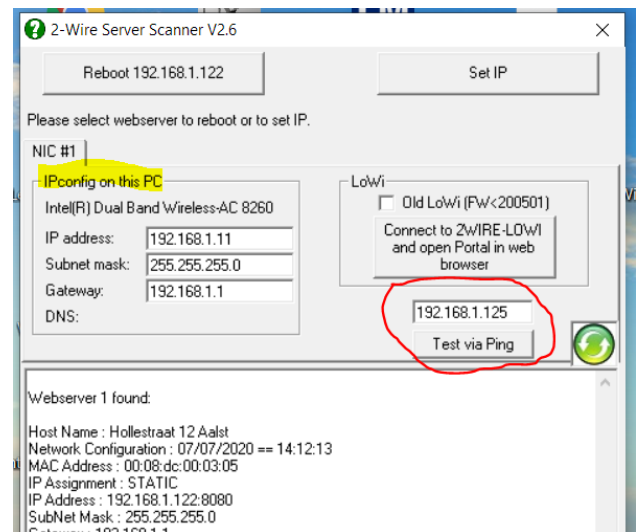
With the server scanner you can possibly test (test via ping) whether the chosen IP address for ReMI from method 1 or 2 is still available so that you can enter it via the REDIRECT method.

Method 3:

We can put the ReMI module in DHCP mode when commissioning. The router will then enter the IP settings itself.

Once ReMI has received an address via DHCP, we can then read the network settings via the IP server scanner and enter them in the web browser to get to the ReMI web pages. (see below)

4.Pairing with WiFi:

The REMI MUST be in the reception range of the 2.4gHz WiFi network and that WiFi network **MUST** be connected to the Internet.

Check WiFi receiving strength with your smartphone. Preferably no metal objects / cabinets nearby and possibly order the WiFi antenna on magnetic base.

Then first connect the power supply 12VDC and only then connect P1 cable. The distance between P1 and ReMI may be max. 3 meters!!

> *NB ONLY when connected to a DSMR 5.x digital meter one does NOT have to connect an external 12 VDC power supply, but because the digital meter only provides enough power, in some cases one has to give ReMI some extra time (approx. 4 minutes) to charge the internal buffer capacity. If the relay outputs are used, an external 12VDC power supply is recommended.*

Once ReMI is properly connected, the PWR LED will be constantly lit. Approx. 3 seconds later, the o ranje COM LED is also constantly lit and then flickers on/off every second This means that ReMI is NOT yet connected to your WiFi network but is available as a "WiFi access point" 2-WIRE REMI"

NB If ReMI is already connected to an accessible

WiFi network and you still want to change the settings, press the JOIN/UPGR switch within 3 seconds after startup (or immediately after the first LED flash) for 5 seconds until the COM LED is continuously lit and to get

to the "access point" status.

Choose 'networking' on your laptop or tablet and if it works properly, the list should now say: '2-WIRE-REMI'. Select this network. If you are asked for a key: 'adminREMI'.

Ayou are tomatically redirected n a maximum of 1-2minuten to a login screen (REDIRECT screen) in your web browser, **REDIRECT page:**
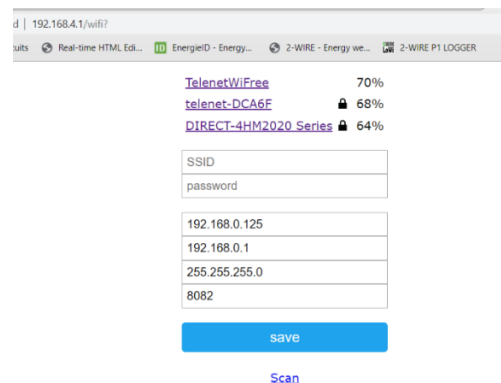
NA. If the redirect does not happen automatically, surf to 192.168.4.1 yourself

NB if it this does not work try with again with smartphone or tablet. If it still does not work, the WiFi signal may be too weak.

4.1 Enter IP data on the REDIRECT page.

The network data from point 3 can be entered here:

Click **on '*Configure WiFi'*** and a list of networks will appear in your area. You can now select your WiFi home network from the list (SSID), and also enter the password of this network.

Default IP addresses have already been entered and you now have to adjust them **according to the settings of your own WiFi network**.

Default settings

- IPaddress: 192.168.0.125 (your REMI web page)
- Gateway: 192.168.0.1 (required for internet access !)
- Mask subnet: 255.255.255.0
- Port No: 8082 (also required for port forwarding in remote control)

After entering **SSID**, **password**, **fixed IP address, SUBNET mask, Gateway**, **DNS** and **portsummer**, which you have determined via method 1 or 2, press SAVE.   And a few moments after that, this screen appears.

192.168.4.1/wifisave?s=telenet-DCA6F&p=ABCDEF0123456789ABCDEF0123&ip=19

MILO Credentials Saved

Connect WiFi to SSID: telenet-DCA6F
IPaddress: 192.168.0.124:8081

If it fails reconnect to 2-WIRE MILO to try again

Your laptop must now be brought back to the existing WiFi network.

On your laptop or tablet, go back to 'networks' and select back your normal network if this has not happened automatically.

Network switching can sometimes take up to 10 seconds.

Now surf to the set IP address and port number: enter in address bar of your browser, eg. 192.168.0.12 5:8082 and you end up on the ReMI website.

4.2 To determine a fixed IP address via DHCP:
If you want your router to assign an IP address itself, you must enter SSID and password and a port number (random number between 800 0 and 9000 on the REDIRECT page and then set the IP address, gateway, subnet mask, DNS all to 0.0.0.0 .

After you have pressed SAVE, a FREE and FIXED IP address is automatically assigned**.**

On your laptop or tablet, go back to 'networks' and select back your normal network if this has not happened automatically.

Network switching can sometimes take up to 10 seconds.

To find out the new IP address now

Download the server scanner on our website. Press the round green button a few times. If the REMI appears in the list, you can write down the found IP address and port number and now surf to the set IP address and port number:

Enter in the address bar of your browser, e.g. 192.168.0.125:8082 and you end up on the ReMI website.

Another way to find out the IP address assigned via DHCP:

Restart and from the moment the LED lights up, press the button for approx. 5 seconds until the LED is constantly lit and go to the REDIRECT again using the methods described in point 4.2.a. On the REDIRECT page the new IP address will now be entered. (if at least your gateway address was ok)

Unfortunately, you now have to fill in your SSID and password and press SAVE or simply unplug before saving.
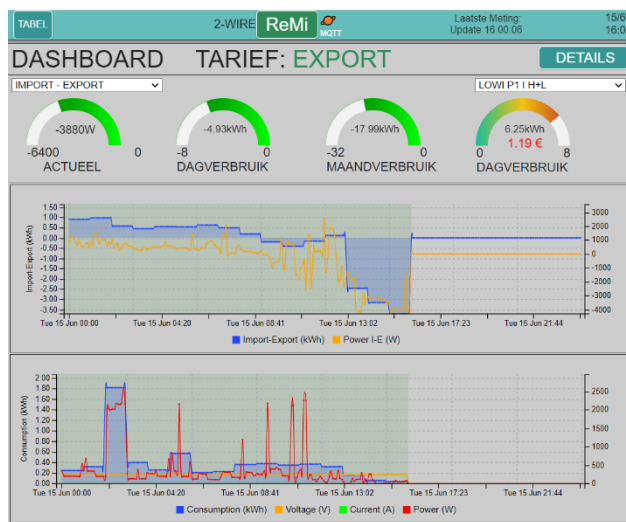
5. ReMI Dashboard:

Now surf to the set IP address and port number (enter in address bar of your browser, eg. **192.168.0.226:8082**)

The port number must follow with a '**:**' decimal point after the IPadres !

> *NA. In your browser you may have to check whether 'SETTINGS - JAVASCRIPT' is turned on!*

A screen should appear as below:

This is the 'DASHBOARD'. You can choose 2 consumers yourself via the dropdown menus.

Here you can see at a glance the main measurements:

The current power, the daily consumption and the monthly consumption. If there is export (PV cells), these measurements can be either positive or negative (energy surplus).

If a gas meter is connected to your digital meter, the gas consumption of the current day can also be shown.

Below these measurements, 1 or 2 graphs will be shown with the daily course of consumption. The

resolution is 5 minutes. You can 'hove' over the graph to see the measurements in detail.

> *NA. The rolling charts on the dashboard are updated every 10 seconds.*

You can see even more details when you click on the 'DETAILS' button.
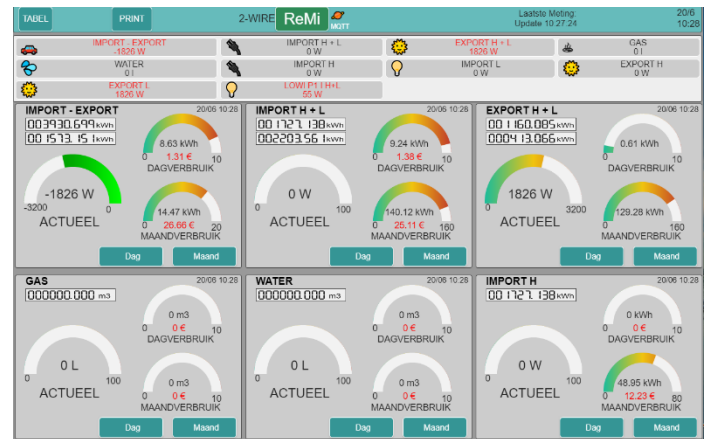
Here you can see the 10 pre-configured log channels. You can scroll the page or press the 'shortcut-buttons' to go directly to the desired channel.

Each measurement is easy to understand: There is an up-to-date power to read, the daily consumption and the monthly consumption. By clicking on 'Day' you can see all consumptions per hour up to 10 days ago.

By clicking on 'Month' you can read the daily consumption and the cost price up to 12 months ago.

Under the name you will also see the current meter reading(s), just like on your digital meter.

After an hour you can see the first hour graph and after a day you can see the first daily graph.
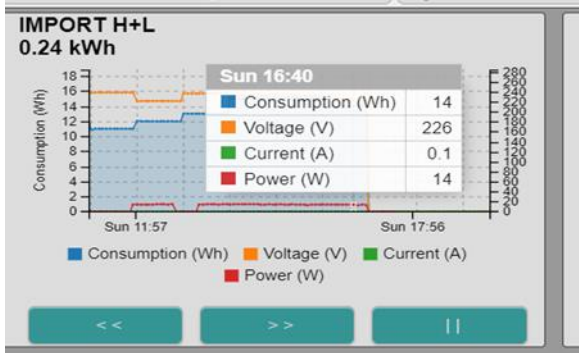
The daily graphs have a resolution of 5 minutes ! You can 'zoom in' with the scroll-wheel of the mouse.

Clicking on 'REMI' will take you back to the 'DASHBOARD'.

6.Configuration:

Press 'REMI' at the top and now you will see the control panel.

NETWORK ,PASS, **IP, PORT**: cannot be changed here. This can only be done through the methods mentioned under point 4. Pairing with WiFi.

RSSI: reception strength of WiFi signal (the lower, the stronger) maximum approx -80dBm.

ReMI Login and PASS: this is the login when you want to log in outside the house. By default this is 'REMI' and '17.1.1.1 ', but can be changed by you (max 26 characters)

> *NA. If you only want to work in the local WiFi network, you do not need to enter a password to access your web server. However, if you want to use the REMI 'remotely', you have to, but first set up a 'portforwarding' in the modem with the port number used. (if no knowledge: ask a specialist, see also FAQ on our website)*

> *NA. For each change, you must always click on 'SAVE' and provide a confirmation to undo any changes. The login is always 'adminREMI' and cannot be changed.*

HTTP Domain and DIR : see annex at the back

MQTT broker en Token:

if data needs to be sent to/from external modules (REMI-LOWIv3-MEMOv3-WiFi Plug), this can be done via an 'MQTT-BROKER'.

This is a server that can receive data and pass it directly to 'subscribers'.

Further explanation will be given later.

LANGUAGE: choice of NL,FR,EN,DU (for the control panel the language always remains English)

2²WIRE

TIME ZONE: for the time clock (NTP) to work properly, the time zone must be selected so that the correct hour is displayed. (standard Brussels) **If the check mark turns green at NTP, you are connected to the Internet.**

UPGRADING: get the REMI kan new firmware (improvements, bugs, new applications). At 'START' (and confirmation with 'adminREMI') it is tested whether new firmware is present on the 2-WIRE server. If so, the REMI will upgrade and restart after about 1-2 minutes. If no new firmware is available, the timeline stops immediately.

> *NA. During an upgrade you should not interrupt this process! Also make sure you have a **stable** and **good** WiFi connection if you want to upgrade!*

> *NA. If the upgrade fails, check if a firewall is turned on and temporarily disable it. Also check your modem's setting to make sure that "block fragmented packets" is not set to ON.*

> *NB Youcan manually pgraden by pressing the switch from ReMI (with internet connection) for approx. 5 seconds until the LED is continuously lit. After 1-2 minutes of upgrade, ReMI restarts on its own.*

> *NA. The firmware version is basically the date written in reverse.21.05.31.2, meaning ' the second version of May 31, 2021*

BETA: If you check BETA and then upgrade, you can try out the latest test version. Once in the BETA version, you can always return to the public version by unchecking BETA and upgrading it again. Sometimes you have to try twice.

SAVE: every change must be confirmed with 'SAVE' + login (**adminREMI).** If you do not want to make a change, choose 'CANCEL'

EXIT: back to the home page.

STYLE B/W: Switch between light and dark layout mode.

COST: energy prices for electricity High and Low Rate (euro cent/kWh), gas and water (euro cents per m3), to be adjusted yourself according to your rates. **Don't enter commas!**

PROTOCOL: here you enter the type of digital meter with which the ReMI module is connected. By default, the Belgian DSMR 5.0 is set.

P1 Status: This function copies the datastring as it comes out of the P1 port automatically to your clipboard after which you can paste it into a document. This feature can be important to detect anomalies in your P1 port.

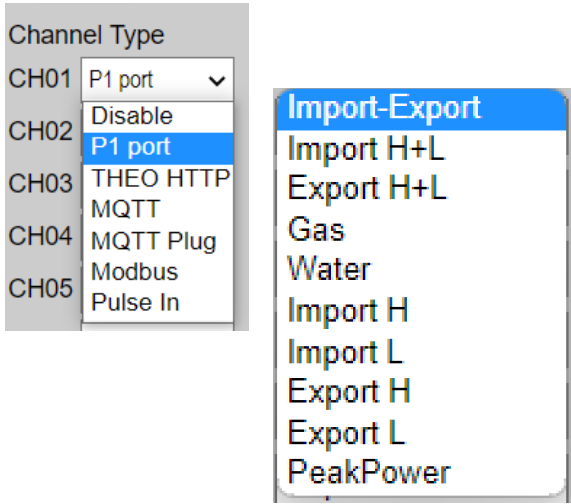**CHANNELS**: up to 16 channels can be logged for 2 years.

Each channel can be a different type:

- P1 port
- THEO (warning)
- MQTT (REMI-LOWIv3-MEMOv3)
- MQTT Plug
- Modbus
- Pulse input.

Afterwards you can enter the 'Device-Id'. This is in function of the Channel Type':

P1 port: selection according to desired data with 'Device Id':

Para1 and Para2 remain at 0 for total consumption + power and power over the 3 phases, or Para2 at 1, 2, 3 for total consumption + power and current of the respective phase. The 'Units' in function of the data: kWh, m3 gas or m3 water.

Peakpower from the Belgian digital meter displays current quarter-hour power and the monthly peak.

THEO HTTP: see module 'THEO'

MQTT: Ifan MQTT broker is set up, one can receive data from a REMI, LOWIv3 or MEMOv3.

Under 'Device Id' the 'MAC address' of this module must be entered, without colons. (always 12, only lowercase allowed)

Under 'Para1' the channel number of this module must be filled in:

With 'THEO' 'Para 1' is always 1 and units = IAQ, With a LOWIv3 or MEMOv3, this must be the desired log channel according to the configuration of this module. (Log channels LOWI-REMI starts from 1 to 16, with MEMOv3 from 0 to 63)

Para2 always remains 0. Units depending on the log channel.

MQTT Plug: Under 'Device Id' the 'MAC address' of this module must be entered, without colons. (always 12, only lowercase allowed)

Under 'Para1' you always have to enter 1, and 'Para2' always 0.

Modbus: Under 'Device Id' you can enter the type of modbus module: only 2-WIRE' modules can be used: EMM.120-EMM220-EMM630- Calorie – Water meter –
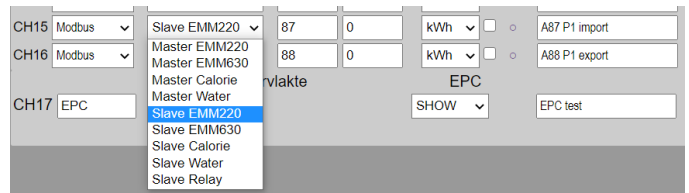
- If ReMI=master (REMI verzor gtthe address retrieval), ALL modbus modules must be on master.
- If ReMI=slave (REMI listens to address retrieval of a master), ALL modbus modules must be slave. NEVER master and slave MIXES !!!

Under 'Para1' comes the desired modbus address, 'Para2' is the subaddress, default 0, only for export 1. The units in function of the log channel.

Example with a 3-phase meter EMM.630 .

Select 'Channel type' = Modbus en 'Device Id' = EMM.630.

On the EMM.630 display you have entered a modbus address e.g. 17 and you now also enter this address at 'para 1' in ReMI.

Para 2 (or sub address) 0 is shows import(=total consumption) over the 3 phases, with para2 (subaddress) 1 export (=total injection) over the 3

| CH13 | Modbus ∨ | Master EMM630 ∨ | 17 | 0 | kWh ∨ ☐ ○ | EMM630 import |
| CH14 | Modbus ∨ | Master EMM630 ∨ | 17 | 1 | kWh ∨ ☐ ○ | EMM630 export |

phases is shown.

The power is also total power over the 3 phases.

With a mono-phase meter, the configuration is almost identical: As a device id you choose EMM-
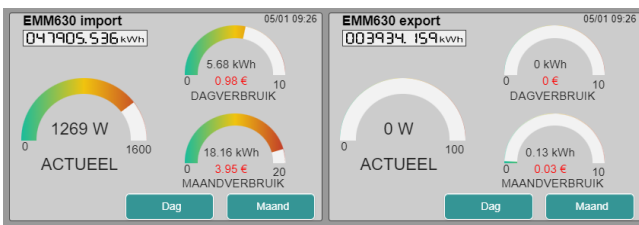
| CH13 | Modbus ∨ | Master EMM22(∨ | 17 | 0 | kWh ∨ ☐ ○ | EMM220 import | ☐ |
| CH14 | Modbus ∨ | Master EMM22(∨ | 17 | 1 | kWh ∨ ☐ ○ | EMM220 export | ☐ |

220 and this setting also works for the EMM.120 series.

Pulse In: There are 2 digital inputs, which can count pulses or measure the time the contact is closed.
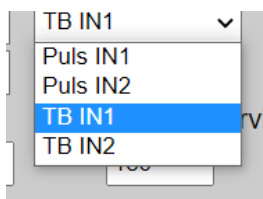
You can select input1 or input2, and the type (pulse or timebase)

'Para1' is always 0, under 'Para2' the 'weight' is filled in : number of pulses per set unit (e.g. 1000 pulses for 1kWHr) or estimated consumption after one hour in Wh or mLh (e.g. 1000wH after one hour of operation) of a constant load.

CH06	Pulse In ∨	Puls IN2 ∨	0	1000	kWh ∨ ☐ ✎	PULS 2 1000/kWh	☐ H
CH07	Modbus ∨	Slave Relay ∨	5	1000	kWh ∨ ☐ 💡	MB slave REL 17	☐ D
CH08	Modbus ∨	Slave EMM220 ∨	25	1	kWh ∨ ☐ ⚙	MB SLAVE A25-1	☐ H
CH09	Pulse In ∨	TB IN1 ∨	0	1000	kWh ∨ ☑ ☆	TB IN1 1000/kWh	☐ D

NAME: this is the name you give to each log channel (max 16 characters)

*NA. If you no longer want to use the external log channel, you can enter the word '**delete**' in the name field, then press 'save'. This will clear the logs and this measurement will no longer be shown. The name is re-entered after deleting, the logs and graphs are gone. Perform this action only channel **per channel**.*
__BUT beware:__. Once confirmed by pressing SAVE you can no longer undo this action!

GENERAL:

- **E**and channel will only be assigned if a NAME has also been entered !!! (minimum 6 characters)
- Unused channels must be set to 'Disable' as the Channel Type.

EPC – HEATING ENERGY FACTOR

Channel EPC calculates the EPC value of a building. To do this, in channel EPC, enter a name in the 'Name' field and a heated floor area in the 'Surface' field. Then tick all the energy channels that contribute to the heating of the building because these are added together. (check mark under EPC)

In the overview table under 'TABLE' you will find the

| | EPC Oppervlakte | EPC | |
| CH17 EPC | 180 | SHOW ∨ | EPC |

total annual energy for heating in KWh at the bottom. Only after 12 months of logging do you get a 100% measured value.

There is also a monthly rolling calculated EPC value in Qh/m². Again, only after 1 year do a 100% measured value log.

SORT:

If you want the order to be changed, you can do this by clicking on the 'SORT' button. (this button will now turn red)

Hover over the channel you want to move, now click the left mousebutton, and drag it up or down to the desired position. Repeat for any other channels.

When you have done it, press 'SORT' again, and press 'SAVE'.

When all channels are adjusted according to your wishes, press 'SAVE' + login.

All data is now saved and you can test everything:

ICONS: each channel can also be made more recognizable in the 'shortcuts' by adding an 'icon' to the name.

- Click on the filed small icon that represents the name. It lights up red.
- Then click on an icon of your choice from the right table. Keep up the good work with other channels.
- This completes the configuration; Do press 'SAVE' to save everything!

THRESHOLDS
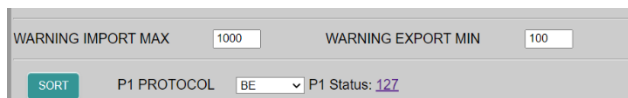
With **WARNING EXPORT MIN** you can enter the minimum injection power from when the LED on the LeON or THEO module flickers green. Only at 0 Watt injection does the green LED switch back to red or blue. The "ReMI" button at the top also follows this threshold.

At **WARNING IMPORT MAX** you can enter the threshold for maximum consumption. Above the threshold, the LED on the LeON or THEo module will flash red or blue. This way you know exactly when

you have a peak consumption. The "ReMI" button at the top also follows this threshold.

LOGIC

In addition to inputs, ReMI also has 2 bi-stable 10A relay outputs, 2 'low-power solid-state' outputs and 4 weekly clocks.

With the logic in the web server, these 4 outputs and WiFi can plug MQTT** based on injection, peak, rate, time,... are controlled.

The 2 relay outputs have channel number 17 and 18, the 2 solid state I/O's have channel number 19 and 20.

In the appendix some more explanation about Logic and setting these 4 outputs.

Press '**EXIT**' to proceed to the 'dashboard' (measurement panel).

7.OVERVIEW DETAIL MEASUREMENTS:

Press the 'DETAILS' button in the DASHBOARD' page.

The DETAIL page will now load according to the configuration done. At the top you will see 'shortcuts'. This gives you a quick overview of all channels, with icon, name, and current consumption (these names are red)

Pressing a name will scroll the screen to the desired place. Below the shortcuts is each channel with a


number of measurements and keys:

The '7 segment displays' give the current state of the measurements. This includes the current capital, depending on the rate (high or low rate). This measurement is adjusted every 10 seconds. On the right is the

daily consumption and the monthly consumption, with the approximate cost price.

CHARTS:
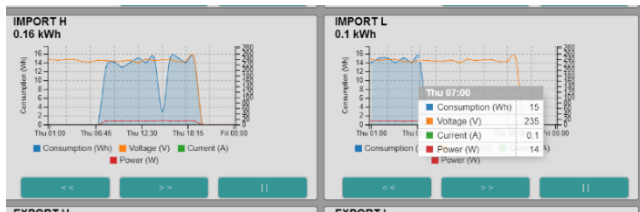
- Day: graphic overview per hour up to 10 days ago
- Month: graphical overview per day up to 1year ago
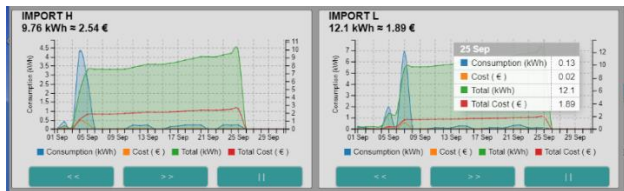
- DAY: up to 10 days back with keys '< <' and '> >', end graph = '||'
- Over a graph 'hoveren' shows a table with the measurements at that moment (V-A-W-Wh)
- MONTH: up to 12 months back with keys '< <' and '> >', end of graph = '||'

- Over a graph 'hovering' shows a table with the measurements at that moment (kWh and cost)
- With the scroll wheel of the mouse one can zoom in

SPECIAL MEASUREMENTS:

IMPORT-EXPORT, TARIFF
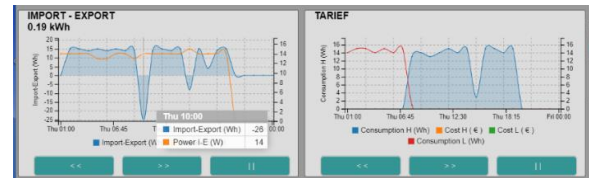Note that with 'IMPORT-EXPORT' all measurements can go negative. (negative = more exports than imports)

TABLE: at the top left is the 'TABLE' key. Click on this button and then the 2-year overview will appear

Graphically, the consumers are shown and arranged according to the energy cost. About 'hovering' shows the cost from New Year.

Below the graph you can see per channel and per month the consumption and cost of the current and previous year. This way you can compare your consumption with last year.

Clicking on 'HOME' returns to the dashboard.

Remarks:

Internet is NECESSARY for proper functioning (time clock, upgrading, graphs)

If the WiFi network should fail and then start up again, you may also have to restart the REMI if
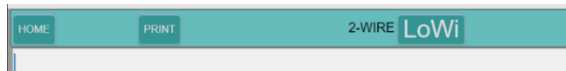
there is no longer a connection on the web page: either connect power off and back, or see if it is not shown on the WiFi networks (2-WIRE REMI)

Re-login may then be necessary (SSID and pass must be entered again)

PRINT CONFIGURATION / ANNUAL OVERVIEW:

When you are in the menu 'CONFIGURATION' or 'ANNUAL OVERVIEW', there is a 'PRINT' button at the top of the menu bar.

You can print the **annual overview** (TABLE page) or the complete **configuration** (SETUP page) or save it on your PC.   The format is PDF.

EXPORT DATA

With the 'PRINT' button on the page 'DETAILS' you can easily export data to Excel. The data can be day logs or month logs just like in the data used in the daily and monthly graphs' . The format and structure of this file is identical to the file created with an FTP client or http client upload.

ReMI does not register counter readings, but does record difference counter readings in Wh for that reason only the current odometer reading in this csv is shown, for verification.
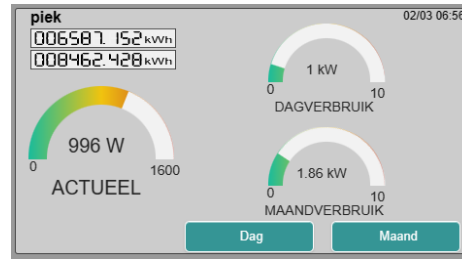
QUARTER POWER

For the Belgian P1 one can select the value

Peakpower. This quarter-hour power is used by the network operator to measure the highest monthly peak and thus calculate your network fee. You can monitor this measured value in the LoWi/ReMI web server. Both real-time quarter power and the highest monthly peak are then displayed.
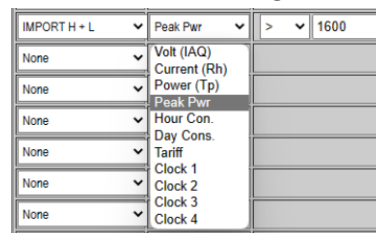

Also in the ReMI logic you can use this value to switch the 4 outputs or the linked smartplugs to this. Switching the P1 "Peak PWR" in logic happens every minute.

QUARTER POWER ON PARTIAL CONSUMPTIONS

In addition to the measured quarter power on total consumption from the P1 port, there are also the **calculated** quarter peaks on partial consumption. The calculation is done for each electrical partial consumption by ReMI every 5 minutes and then goes back to zero with every quarter of an hour transition. This "quarter power" is then shown in the graphs.
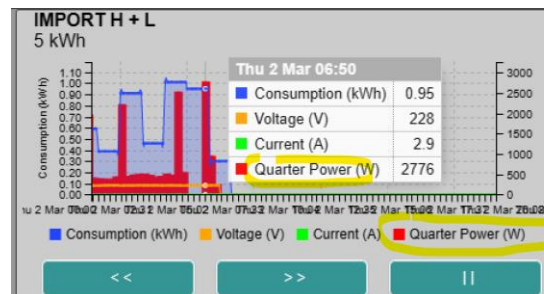
To switch to these quarter-hour abilities, you can choose Peak Pwr in logic. See also FAQ. The circuit here is every 5 minutes.

8. LOGIC and Relay control

At the bottom you will find the logic for the relays, the opto outputs and the RF plugs.

There are 4 switching times with a weekly regime, each with an on and off time (per 15 minutes).

A maximum of 16 logic rules can be created, with an 'AND' or 'OR' connection.

Channel: In the first column, the channel (1-16) is selected, of which we want to check a measurement.

Type: The second column includes the 'type of measurement':

- Volt (of IAQ voor THEO) : controle spanning
- Current (or Rh humidity for THEO) : control of the current
- Power (or Tp temperature for THEO) : control power
- Peak Pwr: control peak power every 5' calculated by ReMI, zie ook FAQ
- Hour Cons :hour consumption
- Day Cons: day consumption
- Tariff : rate high-low from the P1 port
- ClocK1-4: switch times

NA. If 'Tariff' or 'Clock' is selected, the first column will be blank.

Compare Value: One can compare with 'greater than' (>), 'smaller than' (<),

or 'equal to' (=). If the type rate or clock, can only 'equal to'.

When these conditions are met, the logic is "TRUE."

Diff: To prevent 'pinging', a differential can be set. Diff is, for example, the power of the device to be switched

The condition only becomes 'FALSE' when the differential is exceeded. This is the set value (Compare Value) MIN the differential (Diff). Only use the Diff with FOLLOW and INVERS in the output channel. And beware, DIFF must be smaller than the compare value to avoid negative numbers!

Logic: One can create multiple rules of logic in '**AND**' or '**OR**' context, and '**THEN**' when the logic is finished.

Delay On: For 'THEN', the columns 'Delay On' and 'Delay Off' will be visible.

When the conditions are met, the logic is 'TRUE' and a possible switch-on delay '**Delay On**' is considered. This can be set from 0 to 255 minutes.

Delay Off: When the conditions are 'FALSE', a possible shutdown delay is considered. This can be set from 0 to 255 minutes.

> *NB With delay ON you can give priority to switch a certain device first, with the delay OFF you can make a device run for a certain time to avoid switching it on / off too much.*

Output Channel: The result can now be linked to the following outputs:

- WiFi plug (CH1-16), and has a yellow color.
- Relay1 (CH17) or Relay2 (CH18). These have a green color.
- Opto1 (CH19) or Opto2 (CH20). These have a blue color.

The following column determines the power on or off behavior of the logic:
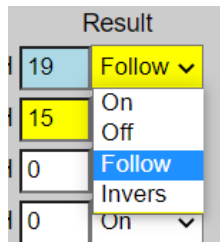
On means that the output is turned on when the logic is 'TRUE'.

Off means that the output is turned off when the logic is 'TRUE'.

Follow means that the output is turned on or off when the logic is "TRUE-FALSE". Set a DIFF value here

Inverse means that the output is turned on or off when the logic is "FALSE-TRUE."(inverting result)
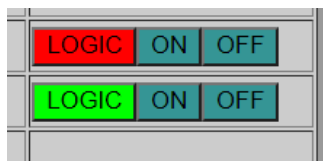
Logica Overrule:

The logic is active if '**LOGIC**' is selected.

To disable the logic, one can set the output to 'ON' or 'OFF'.

The current state of the logic can be recognized by the color:

RED is logic TRUE, GREEN is logic FALSE

and that's not necessarily the same as ON or OFF status of the relay. The status of the relay can be seen on the LED in the front panel of the module.

A few rules:

- Do **not** use negative numbers or **commas**, or '**Import-Export**'
- Compare value must be greater than the Diff value, **difference must not be negative**.
- As a DIFF value, it is best to take the value of the device to be switched and only use it with FOLLOW or INVERSE.

- Logic is executed line after line so without 'parentheses'

Some examples:

Example 1

Charging a 1000 Watt boiler with relay contact 17 on surplus solar energy or during the night.

Logic:
If more than 1500Watt is injected, (boiler 1000Watt so set DIFF to 1000Watt) **OR** if clock is active (on 1 state),**THEN after**
10 minutes delay relay 17 ON **OTHER(**
follow) relay 17 OFF

Set the button to **LOGIC**=auto, or operate manually with **ON** and **OFF** buttons.

example 2 (see also FAQ ReMI about Peak Power)

If 'Peak Power' of MEMO3 fridge > 100W, **AND** 'Peak Power' of MEMO3 fridge < 180W,

OR 'Peak Power' of MEMO3 fridge > 400W, **THEN** CH17 (= Relay1) ON, otherwise OFF. (= **Follow**)

If 'Peak Power' of MEMO3 fridge > 179W, **THEN** CH18 (= Relay2) ON, otherwise OFF. (= **Follow**)

This seems like a weird example, but demonstrates a binary code 00-01-10-11

Truth table:

logic	REL17	REL18
<100Watt	0	0
>100Wen <180W	1	0
>179W	0	1
>400W	1	1

Example 3:

If you want to convert the hourly consumption of a channel to pulses, you can select with CH19 (opto1) or CH20 (opto2), and set the selection to '**Pulse**'. The 'Compare Value' is the '**divide**r':

Standard on 1 means 1Wh = 1 pulse. If at 10 means 10Wh = 1pulse. The pulse width is fix 50msec, so there are a maximum of 10 pulses/sec.

Note: The logic MUST be solid on OFF for pulses consumption! Hourlyconsumption is then selectable, and the output 19 or 20 gequals the difference of the odometer readings as consumption pulses to the outside.

Example 4:

If 'Clock1' to **EN** power > 30W, then CH13(WiFi plug) to NA 5 minutes.

If 'Clock1' off, or power < 30-5 = 25W, then CH13 off AFTER 2 minutes.

Example 5

In the example below, 3 WiFi plugs are switched in the order of the entered ON delay. If there is sufficient injection, the plug switches on 10 (boiler), and if there is still enough injection after 1 minute, plug 11 also switches on,...

8.PROBLEM SOLUTION
MANUAL UPGRADE:
Exceptionally, an error may have occurred in the REMI JavaScript. When you load the webpage, but

do not respond to any '*key'*, an error may have occurred during startup. Reloading the firmware can offer a solution: **Without interrupting the power supply**, you yank the reset button and keep pressing for about 3 to 5 seconds until the LED stops flashing and is constantly lit. Now release the key.

The REMI will now connect to the 2WIRE upgrade server and perform an upgradee of the REMI firmware.

After about 1-2 minutes and a number of flashes , the LED should turn off. As soon as the ReMI shows a heart-beat again, you can reload the page and everything has to work normally again.

> *NA. If there is no response yet with the 'buttons' in the web page, check in your browser whether 'JAVASCRIPT' is turned on!*

LED MEANING:
By following the status of the LED you can know when something goes right or wrong:

Normal start-up :

When connecting RJ12 cable:

- PWR led green light up brightly and stays on constantly, indicating that the P1 provides enough power to start up ReMI processor.
- After a few seconds, the orange COM LED lights up and then switches to an on/off COM LED every second to indicate that ReMI is not linked to a WiFi network and that ReMI is now in "access point" mode and you can connect via the REDIRECT mode (see point 4).
- Once the REMI is connected to the WiFi network, the COM LED will flash quickly a few times.
- The REMI will then synchronize the internal timer with an NTP server. (this can take up to 5 seconds) When the time clock is in order, the LED will flash quickly a few times.
- Now the REMI is ready and you can reload the page.

- Heartbeat: Depending on the rate (high/low), the LED will light up briefly every 3 seconds at high rate, or every 10 seconds at low rate

Wrong boot 1:

At start-up, the PWR LED only lights up veryslightly and no orange COM LED follows. In this case, the P1 port may not provide enough start-up power. ReMI will now charge its own internal buffer capacitor and try to restart it itself after about 4 minutes.

If this does not yet work, it is possible that the ReMI external power supply needs 9..15VDC.

Wrong boot 2:

If the PWR LED is constantly lit and the COM LED keeps flickering on/off every second and you had alreadyconfigured a network, check if the WiFi router is actually on. If the REMI cannot connect , it may be outside the WiFi range.

Also, check that your chosen network is indeed connected to the Internet.
When configuring, you can check the NTP: in addition to the language version, NTP must light up green and that also means that ReMI is connected to the Internet.

 9.
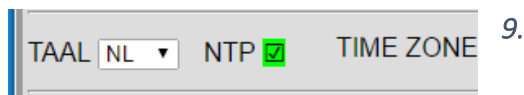
SUMMARY OF COMMISSIONING VIA REDIRECT:
- Must be known: your **WiFi SSID** and **password** (e.g. telenet-DCA6F, pass abcdef....)
- The **IP range** that your router is set to and the subnet **mask** (you can request it via your modem) (default gateway 192.168.0.1, subnet 255.255.255.0)
- Connect the REMI to the P1 port of the digital meter.
- At the first commissioning, the PWR LED will be constantly lit and the COM LED will turn on/off every second. This means that no WiFi network is known yet.
- Go to your WiFi network settings on laptop or tablet.

- Choose '2-WIRE REMI' network
- Wait for the setup page to appear in your browser or surf to (IP 192.168.4.1 or 8.8.8.8)
- Click on 'Configure WiFi'
- Select your network (= SSID)
- Enter your password
- When the IP address is in the same range as your router: do not change anything except the port number. It must be greater than 1024 and less than 60000 (default 8082)
- Send this information : SEND
- Note IP address and port number
- Change back your WiFi network to your existing network.
- Surf in your browser to the listed IP address + port number (e.g. 192.168.0.125:8082)

(creating shortcut on your worksheet is very useful!).

Good luck!

ATTACHMENT 'ERASE 1 CHANNEL

In the configuration replace the chosen name in the 'Name' field with the word '**delete**' and then 'SAVE' with password '**adminREMI'** and the logs of that channel are erased. The name of that channel will be retained

If multiple channels need to be cleared, the above procedure for each channel must be **performed in turn** .

ATTACHMENT FACTORY RESET:253

TO RESET REMI TO FACTORY SETTINGS:

only use iif you want to restore the configuration to the original settings* **AND** delete all existing logs but do not want to delete the SSID, WiFi password, IP address, this can be done in the following way:

*Note: Or sometimes it happens that the database has been damaged and this can be due to incorrect communication, wrong upgrade, by entering special characters (@;-+,) ... and then see in some fields of the setup page '*NaN*'. At that moment you can try to reload the page or restart the web server and if that does not work then you have to apply a factory reset 253.

- Go to the control panel, and set the consumption cost of GAS AND WATER to 253. Note: To get from GAS field to WATER field use the TAB key.
- Confirm with the password 'adminREMI'.
- The LED on the REMI will now light up for about 40 seconds and during this process **DO NOT INTERRUPT ReMI**. Now a 'FORMAT' will be executed and all settings will be reset as fixed by 2-WIRE. During this process, the website will not be accessible.
- After this process, the web page will be accessible again and the REMI will be ready for commissioning. (LED will flash 2x)
- The IP address and port number may be back to default 192.168.0.125:8082 With the

'ServerScanner' tool you can view the network settings, or you can go to the portal to reset.(see 'SETTINGS' on page 3). You may also need to change login and password (see page 8)

ATTENTION: YOU CANNOT UNDO THIS ACTION AFTERWARDS!

ATTACHMENT 'REMOTE ACCESS'

Within the local network, one can reach ReMI by entering the IP address + port number in the web browser. (e.g. 192.168.0.123:**8085**). However, if you also want to be able to reach your ReMI module from outside the home, you can set up a port-forwarding in the internet modem. FAQ E2 on our website explains how this can be done in a telenet modem or you can alsoregister with a provider of a Dynamic DNS address (eg. https://www.noip.com/remote-access).

The bottom line is that you search from the outside for the modem IP address + ReMI port number (e.g. http://78.20.20.19:8085) and the modem then links your port number to the local IP address (e.g. 192.168.0.123:8085) of your ReMI module.

If you surf from outside the house to ReMI, a login and password will be requested. You can set this login and password yourself, but only ifyou surf locally to the ReMI setup page.

If you also want to change the ReMI configuration remotely, you give 'loginMAC and MAC as password:eg
- Login: Dirk**94B97E6A3260**
- Pasw: **94b97e6a3260**

HTTP SERVER ATTACHMENT

All log data can also be sent to an HTTP SERVER. This data can then be further processed for analysis of consumption.

In the configuration page you can set the desired interval via UPLOAD INTERVAL. At the setting 24h the sending will be done overnight between 00:00 and 01:00 (ifv Mac address).

NA. Help with setting up your own http server is NOT intended for laymen or is not provided for in the purchase price of ReMI. HTTP integration is intended for providers of cloud platform services such as www.energieID.be. With these people you can then use their ReMI integration, whether or not for a fee . Data export after Excel can be done via the 'PRINT' button.

HTTP:

- Under 'HT**TP Domain**' the IP address or domain name of the server is entered.
- **If it is an HTTP server, the address (URL) MUST begin with http://**
- **No login or password must be entered at HTTP, as a different type of security has been set up here (see later)**
- Optionally, the folder (**DIR Name**) can be filled in where the file should be written.

Once filled in, the data is saved (**SAVE**), and you can press '**TEST**'. If all server data is ok, a response is received: if 'FAIL', wrong settings have been used.

If in order, there will be a file on the HTTP server with the log data of this day, up to the current hour. (so you can also use this 'TEST' to send the daily file directly to the server)

FILENAAM:

The name of the file is 'Daylog' + date and time:

- HTTP: The extension is '.txt', and the data is encoded with 'base64'

  E.g. **Daylog2019_13_10_26_42.txt** (date = 13/10/2019, time = 10:26:42)

ENCRYPTION

In case of http posts, the MAC address in the URL is sent legibly. The remote server can do an initial test and see if this MAC address is available in its directory list.

The http file in JSON format consists of a header and a body.

- **The header** is encrypted by ReMI with a 'secret key'. The code key for the de-and cryption can be obtained from 2-WIRE after signing an NDA or 'confidentiality agreement'. This header can be used 'as a certificate' to have extra certainty about the identity of the sender.
- **The Body** contains the measurement data in base64 format and can easily be converted to a readable format.

DATA:

- Once coverted from base64, the data can be imported with Excel (separation ';')
- The first line includes the day number 'DAYnr' (0-365), then the date and time of dispatch.
- Next, the MAC address and ID number of the digital meter.
- The resolution of the logs is fix 5 minutes, so there are 12 log dates per hour or 288 logs per day.
- Each log contains 4 data per 5 minutes, so that on a line there are 288 x 4 = 1152 data.
- How to read the data is explained in the following 4 lines (FORMAT – UNITS).
- Each line includes the name of the channel, the serial number assigned here always 0, the UNITS 0-4, the meter reading at 00:00 and the meter reading at 23:55

- Afterwards it says 288x 'DATA1 – DATA2 – DATA3 – DATA4'. The meaning of this data is explained according to the log type. (e.g. Voltage, Current, Power, Energy)
- Note that under 'ENERGY' is the **difference** between the current and the previous measurement.
- With the PRINT button in details you get a preview of the file. The meter readings shown are independent of the chosen day, each of today.

NA. The 'units' are determined according to the type of measurement. '

An addition (>22.10.24) to the http file just after the meter ID:

- *FW: 22.10.24.1*
- *RSSI: 68*
- *REBOOT: 24/12:36 (date-hour-minute)*
- *CONN: xx (number of shipments, after 255: 0)*
- *ERR: xx (number of failed connections)*

ATTACHMENT: Send ReMI VIA MEMo3A

Configuration in MEMo3

In the MEMo3 web server go to /configuration/modules:

Enter a fictitious serial number starting with **40R** followed by a unique number with numbers Vb. **40R**00001

The fashion is always '**BISTABLE**', and the Modbus address must be 'UNIQUE'. (range 1-254) for each of the one to four outputs.

You set the subaddress to zero or leave it blank

From these fictitious relay outputs we now make an energy channel so that the 'power' can be read by the 'ReMI slave'. So 'Para 6' we set to 1000, the 'UNITS' we take kWh. This means: If the relay is closed we have 1000 Watts otherwise 0 Watts.

> *NA. With a relay one can measure a consumption if the consumer has a known fixed power. To calculate the hourly consumption, the on time is multiplied by the constant power that passes through the relay. Relay contact closed for 1 hour is 1000 Wh consumption*.

Per **40R** serial number we can thus create 4 fictitious relay contacts that have 1000Watt power in AAN status. We can then switch these output(s) on or off either manually or via the logic in MEMo3 based on consumption, peak, time,...

And that result is picked up by ReMI-slave via the modbus address as power or no power so that he can physically switch his relay contacts based on that information.

The ReMI only responds to Modbus changes, which means that you do indeed have to change the status in MEMo3 and wait a while for the change to be communicated via Modbus. Manual testing can be done via the on/off button in the MEMo3 control.

Configuration in ReMI

In the ReMI configuration you create a separate log channel for each Memo relay:

Choose channel type 'Modbus' en device id 'Slave Relay'

At para 1 you enter the 'modbus address' and para 2 you enter 'the constant consumption' from the MEMo3 together with a recognizable name and press 'SAVE'

From now on you can select 'this channel' in the logic, type 'Power(Tp)', the selector on a number larger than **2** eg. '>10' this is how ReMI knows that the fictitious relay in MEMo3 is on and ReMi can pass this on: either the relay contact 17 or 18, or the solid-state relays 18 and 19, or to a WiFi plug with log channel 1-16.

From now on, the ReMI output follows the fictitious relay in the MEMo3

In the same way, you could also read fictitious relay contacts from ReMI via MQTT into the MEMo3

2-WIRE 2023
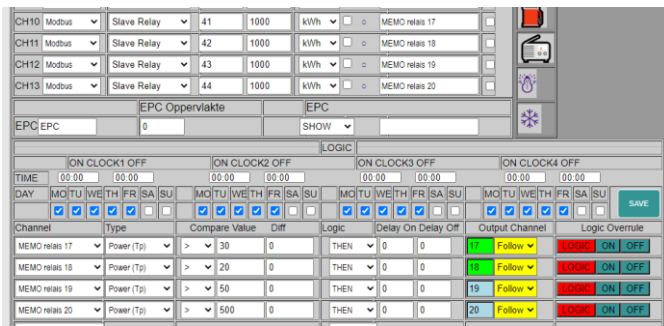
Note:

So we think it would be better if the logic were only written in the MEMo3 in order to keep the overview.

For both configuration and operation, ReMI needs a stable WiFi and internet connection.

In the ReMI, the LOGIC button must be enabled under 'Logic overrule'. There is then no manual operation possible from ReMI

In this way, the 10A relay outputs (17 and 18) and the solid-state outputs (19 and 20) as well as connected WiFi plugs (log channel 1... 16) be switched from MEMo3.