

EP.16A and TP.16A smart plug



The EP.16A is an 'energy plug' which is placed in an socket. The module measures the energy consumption of the coupled consumer and can also turn it on/off.

The TP.16A is a 'thermostat plug' and can turn an electric heater on/off depending on the measured room temperature.. The communication for energy measurement and switching is done wirelessly at 868MHz-FSK to the MILO web server, or to the MEMO

web server or to both simultaneously. At this frequency, only products that do not transmit continuously (1% per hour = 36s.), so the chance of interference is minimal.

With this module, it is therefore easy to measure consumption and consumption costs of individual household appliances and to display it on the central data logger web server. Up to 16 plugs can be connected to the MILO or to MEMO web server.

Note: The EP.16A and TP.16A is only available with PEN-earth. However, the male connection is compatible with both RAND and PEN earth sockets and on the female side also fit the universal RAND/PEN earth plugs so you can use this plug both in Belgium and in the Netherlands.

1. Connect

In order to ensure a guaranteed RF reception, the MILO (or Memo if possible) must be strategically set up so that the distance from MILO to the plugs is minimal. Testing of the plugs has shown that a distance of 30 meters in a building with stone walls is certainly feasible. Outdoors, the distance quickly amounts to 100 meters..

Make sure that there are no metal objects (e.g. cabinet) directly against a plug. This can drastically weaken the RF signal. Too close to the ground or in the immediate vicinity of magnetic block transformers may also adversely affect the reception strength.

In summary:

- Brick, concrete: 20%-40% loss
- Wood, plaster wall: 5%... 20% loss
- Reinforced concrete: 40%... 90% loss
- Closed metal space: 90%... 100%

2. Configuration in Milo server via tablet of PC:

Enter in MiLo:

Each plug itself has a (unique) serial number. It has to be introduced into the MILO, give a name for the visualization, then 'JOIN' (see below) and that's where the case is done!

- EP.16A: serial numbers start with 10S, followed by 5 digits.
- TP.16A: serial numbers start with 10T, followed by 5 digits.

Sample configuration:

Modules	RF	FW	JOIN	RSSI	GW_TOOL	Name	Units	Puls/h
SN04	10S00011	18.2.21.1 *		-6259dBm	TV - DIGICORDER	kWh	0	
SN00	10S00003	18.2.21.1 *		-8280dBm	RADIO	kWh	0	
SN02	10S00009	18.2.21.1 *		-5754dBm	PC - PRINTER	kWh	0	
SN05	10S00013	18.2.21.1 *		-7574dBm	KOFFIEZET	kWh	0	
SN03	10S00010	18.2.21.1 *		-7674dBm	FRIGO	kWh	0	
SN07	10S00016	18.2.21.1 *		-8276dBm	DIEPVRIEZER	kWh	0	
SN12	02B00021	17.12.30.3 *		-3500dBm	WATER	m3 W	2000	
SN13	02B00033	17.12.30.3 *		-3900dBm	CV BRANDER	l Fuel	3000	
SN01	10S00005	18.2.21.1 *		-3333dBm	GARAGE	kWh	0	
SN14	02C00014	17.12.30.3 *		-3500dBm	WATER	m3 W	2000	

A matching 'icon' per module can be selected from the list on the right: first click on the box just for the name, then click on the desired icon on the right of the list. After entering the serial numbers and names, this must be confirmed by pressing 'SAVE'. Password: 'adminMILO'

JOIN MAC: For the security of the RF network, each module must have the same PIN as your MILO. So only your own plugs can connect to your MILO. (see 'JOIN MAC')

IP 192.168.0.124	PORT 8081	RSSI -83dBm
MAC 18:fe:34:d5:2e:ae	JOIN MAC	1a 59 13

JOIN:

At the first time the MILO and the plugs are initially commissioned, they must receive the PIN. Only modules that are completed in the list of serial numbers can be linked.

Druk op 'JOIN', nu staat de MILO in een 'scanmode'.

When you plug in, it will flash slowly for 30 seconds. This is the 'JOIN' mode. After some time, the LED will blink quickly for 2seconds. Now the plug is paired with the MILO.

Note: This procedure can only be performed if the plug has no power supply for more than 2 hours (internal backup has a long discharge time). When, when plugging into the socket, the LED does not blink, and you want to pair it with the MILO, you first have to hold down the power button, and then then press the plug under voltage. Now let go of the key. Now the LED will blink.

Repeat this action for each plug. When all plugs are linked, press back on 'JOIN' button to get out of JOIN mode.

RSSI:

After all modules are linked, the communication of the connected plugs can be tested. Press RSSI. (with 'JOIN' off) With each module, the reception strength is shown. (Pressing 'RSSI' several times may be necessary!)

The larger the number, the weaker the signal. The limit is about -105 dBm.

Note: If, after several attempts with 'RSSI', no value is given to a module, check that the plug is getting voltage (LED on plug should burn). See if the distance is not too large (concrete can also give a lot of damping). Move the plug at a shorter distance from the MILO. When it does work, you can possibly move the MILO in such a way that all plugs display a good reception. (< -100dBm is ideal). The antenna on the MILO is quite vertical, but experimentally it can be 'focused' until one has a good result for all plugs.

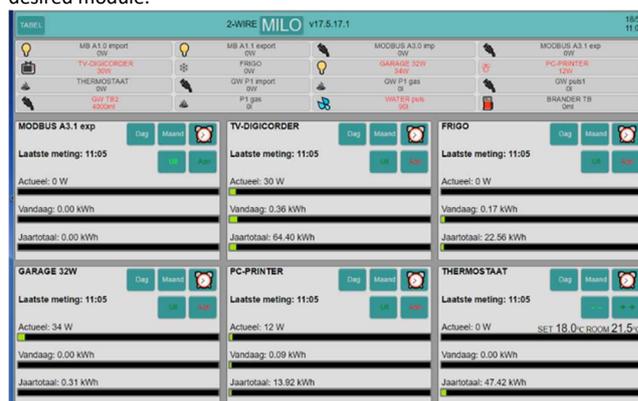
Note: Next to 'Modules' is a 'RF' fill-in field. This allows you to set the transmission strength of all plugs. This value goes from 4(dBm) to 17(dBm). Default, this value stands at 14. (=20mW). When you need a small transmission range, and the RSSI of all plugs is less than 75-80dBm, you can reduce the transmission power. Just set this value higher than 14 if large distances need to be covered and the RSSI is quite bad.

Note. Next to the firmware version there is an asterisk '' (JOIN OK) or a question mark '?' (JOIN NOT OK) If '?' repeat the 'JOIN' procedure for this module.*

Note. The first time it is also recommended to carry out an upgrade: Do this if all plugs "joined": joined select at 'UPGRADING - START' and if newer Firmware is available, everything will be up-to-date (time up to about 15 minutes)

3: User interface in MiLo

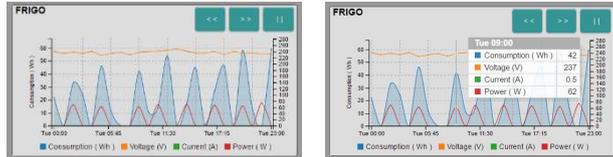
Once all plugs are "joined" each module will now be visible on the MILO: At the top there are 'shortcuts', with which you can quickly 'scroll' to the desired module.



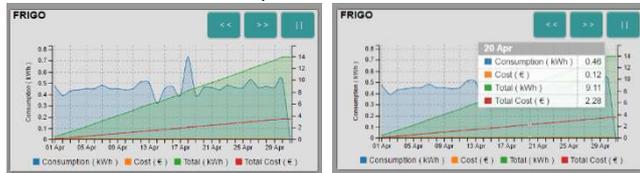
EP.16A modules: ON-OFF: With these modules you can turn the output on or off. (if the blocking function is on, you can test it by pressing 'OUT'. The status will go off on the MILO for a while, but the plug itself is not allowed to switch! After about 5-10sec the status on the MILO will again show 'TO'. So you can't do on-line operation with blocked modules.

Measurements: Current power, daily consumption and annual total is shown. A new consumption measurement is made every 5 minutes. (time is 'Last measurement')

Day: Click 'Day' and the course of consumption, voltage, power and consumption per hour is shown. With the keys '<' '>' you can go back up to 7 days. If you click on the graph itself, a 'pop-up' screen will be shown with the information from that hour.



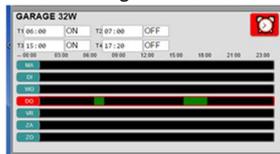
Month: Click on 'Month' and then the course of consumption and cost per day is shown, and total consumption and total consumption from new year. With the keys '<' '>' you can go back up to 12 months. If you click on the graph itself, a 'pop-up' screen will be shown with the information of the chosen day.



Clock:

Any (unp blocked output) can also let you switch in a weekly regimen. Click on 'Clock' and you will see a screen with the days, each with up to 4 switching times per day. If you want to switch an output with this clock function, first click on the day you want. This zone will now be red-lined. With the times 'T1', 'T2', 'T3' and 'T4' you can enter the time and a status (ON-OFF)

Please note: The times will always be in increasing order. So T1 will always be smaller than or equal to T2, T2 smaller than or equal to T3 and T3 smaller than or equal to T4. This condition is automatically checked by the MILO. Raising T1-T2 or T3 can also increase other times!



The status is a toggle function. Every time you click on this zone, the status will turn on or off. Example: Thursday: garage on from 06:00 to 07:00 and from 15:00 to 17:20

If you don't need 1 or 2 switching times, 2 consecutive times must be THE SAME, with "OFF" status.

Example: Saturday: garage on from 07:00 to 19:00 (block T3-T4 is not running because both times are equal)



After clicking back on 'KLOK', a confirmation is requested for the retention of these clock times(adminMILO). When you give an incorrect login or click 'Cancel', nothing is saved.

TP.16A modules: With this thermostat module, you can enter the desired set point by pressing '+ +' or '- -'. The set point can be arranged per half degree and goes from 5 to 40°. The differential is fix 0.5°.

Any temperature correction can be introduced at the configuration of the MILO:

If the measured room temperature is too high, you should enter a negative correction under the last column 'Pulse/h'. The value can be entered per 0.1° so that 1° = 10, 2.5° = 25 etc.

Vb Room temperature is 2.5° too much, so -2.5° = -25

Note In case of positive correction, there should be no + sign, only the value.

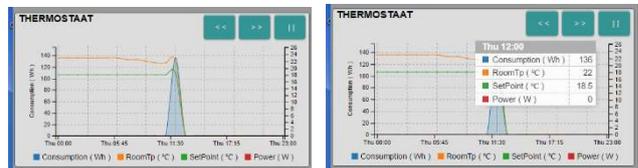
SN06	10S00008	17.4.15.1	-46dBm	GARAGE 3ZW	kWh	0
SN07	10S00009	17.4.15.1	-70dBm	PC-PRINTER	kWh	0
SN08	10T00001	17.5.4.2	-76dBm	THERMOSTAAT	kWh	-25
SN09	03PN5001	17.5.18.1	-90dBm	GW P1 import	kWh	0
SN10	03PN5003	17.5.18.1	-92dBm	GW P1 gas	m3 G	0
SN11	02C00001	17.5.18.1	-91dBm	GW puls1	m3 W	100
SN12	02C00004	17.5.18.1	-90dBm	GW TB2	l Fuel	4000
SN13	02C00003	17.5.17.4	-92dBm	GW TB2	m3 G	0



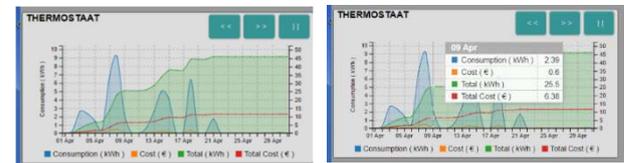
The set point, room temperature, current consumption, daily consumption and annual total is shown.

Just like the EP.16A modules, you can also view the daily and monthly consumption.

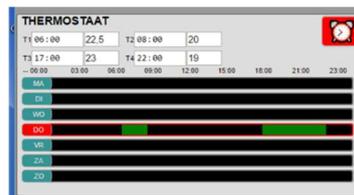
Day: Click 'Day' and then the course of consumption, room temperature, set point and power per hour is shown. With the keys '<' '>' you can go back up to 7 days. If you click on the graph itself, a 'pop-up' screen will be shown with the information from that hour.



Month: Click on 'Month' and then the course of consumption and cost per day is shown, and total consumption and total consumption from new year. With the keys '<' '>' you can go back up to 12 months. If you click on the chart itself, a 'pop-up' screen will be shown with the information of the chosen day



Clock: The clock times are ditto EP.16A, but the status is now the set point (if half degrees are desired, you need to type a comma, followed by the value: e.g. 20,5)



Example: Thursday at 06:00 to 22.5°. At 08:00 to 20°. At 17:00 to 23° and at 22:00 to 19°.

4. Configuration in MEMO2 server via tablet of PC:

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



Enter the serial number printed on the module: Vb.. 10S00042 The fashion is always 'BISTABLE', and the Modbus address must be 'UNIQUE'. (range 1-254). The subaddress is empty or 0. The 'UNITS' are fix on kWh

When pressing 'ZEND', 'Module NOK' will appear. The RF module must first be 'linked' or 'joined' with the MEMo2.

JOIN:



To get into the 'JOIN mode', you need to plug it in. socket

The status LED on the plug will now flicker for about 60 seconds. Now press the text bar that says "NoK Module." 'JOIN 30sec' will now appear. (timeout = 30sec)

Then press 'ZEND'. With a successful connection, 'Module OK' now comes in and the flashing of the LED stops.

Press 'TEST' and you can now read the FW version.

You will also be able to read the RSSI at the first channel (reception strength)

NOTE: This procedure can only be performed if the plug has no power supply for more than 2 hours (internal backup has a long discharge time). When, when plugging into the socket, the LED does not blink, and you want to pair it with the MEMo2, you first have to hold down the power button, and then then press the plug under voltage. Now let go of the key. Now the LED will blink.

5. General note:

- A plug can be linked simultaneously on a MEMo and a MiLo server. Depending on whether the plug was first linked in MEMo or first in MiLo, you fill in the MAC address that is communicated



- Firmware upgrade of a plug can be done both via the MiLo and the MEMo2 web server

Manual operation

The plugs have a pressure key at the bottom. This allows you to manually turn the plug on or off.

The LED will go on or off according to the condition of the exit.

Attention: If a consumer is already connected, it may not be turned on or off quickly! (e.g. rotating freezer, refrigerator...) Therefore, it is best to test the on-off function without connected devices.

Block function:

When certain appliances are never allowed to be switched (such as the example above: refrigerator, freezer...) one can block the output so that there is no more operation possible on the MILO or MEMo: Press the key at the bottom of the plug and keep pressing. The LED will blink. Keep pressing (approx 5sec) until the LED turns on. Now the plug is always on. (Pressing less than 5sec is ignored).

Unblock function:

If you want to bring the plug back manually, press back at least 5sec until the LED goes off. Now you can turn the output on or off at any touch of the key.

With the TP.16A plug (thermostat) you cannot block only the output manually turn on or off. (keep pressing for about 3 seconds until the LED goes on or off)

7. Technical information:

General:

Power supply: 230Vac/50Hz
Own consumption: 0.5 VA
Maximum switching current: 16A ohmic load
Maximum power: 3000Watt
Range to MILO: indoor approx 30m, outdoor 100m

Operating conditions:

Operating temperature range: 10 °C to 50 °C
Storage temperature range: -10 °C to 60 °C
Maximum humidity: 90%, no moisture condensation
Max. mounting height : 2000m

Physical properties:

Housing: plastic, self-extinguishing acc. UL94-V0
Degree of protection: IP20, EN 60529
Mounting: Schuko type E (rand + pen earth)
Dimensions (h x b x l): 62mm x 90mm x 36mm
Weight: about 65 grams

Connections:

Wireless: RF868MHz with FSK modulation,
Transmission power: 20mW, -110dBm sensitivity
Connection consumer: Schuko type E (edge + penaarnding)
Load: max 13A/3000Watt resistive, max. 2.6A/600VA inductive

Labels:

RoHS: Ricent-toxic, acc. to guidelinesWEEE/RoHS
CE: In accordance with EMC and low voltage directive: HBES – EN 50090-2-2 and EN60950 – 1: 2006.
Impact voltage : module has been tested and approved on 3kVac. (50 Hz, 1 min)

8. Installation instructions

The installation must be carried out by an approved installer and in accordance with the rules in force.

During installation, account must be taken of (non-exhaustive list):

- the laws, standards and regulations in force.
- the state of the art at the time of installation.
- this manual which only mentions general provisions and must be read in the context of each specific installation.
- the rules of good craftsmanship.

Do not open the device – the warranty expires when the device is opened. This manual must be attached to the file of the electrical installation. The 2-Wire website always has the latest manual of the product.

9. Support

Do you want to exchange the product in case of a possible defect? Please contact your wholesaler or the 2-wire support service. The contact details can be found on our website www.2-wire.net/contact/

10. Guarantee conditions

The warranty period is two years from delivery date. The date of delivery is the invoice date of purchase of the product by the consumer. If there is no invoice available, the production date applies.

The consumer is obliged to inform Qonnex bvba in writing of the lack of conformity, and this at the latest within two months of adoption.

In the event of a lack of conformity, the consumer is only entitled to a free repair or replacement of the product, which is determined by Qonnex.

Qonnex is not responsible for any defect or damage caused by improper installation, improper or negligent use, improper operation, product transformation, maintenance in violation of maintenance regulations or an external cause such as moisture damage or damage from span. The mandatory provisions in national legislation on the sale of consumer goods and the protection of consumers in countries where Qonnex sells directly or through distributors, agents or permanent representatives take precedence over the above provisions

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