

MoCo: P1 to Modbus and Pulse Converter

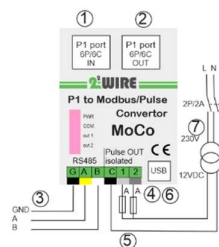


The 'P1 port to Modbus and Pulse Converter' is a standalone module that converts the meter readings of the P1 port to Modbus registers and to consumption pulses at the same time. The pulse outputs are adjustable to import, export, gas or water consumption pulses but also to binary outputs which switch on/off at a set power consumption or injection.

A home automation system or a data logger can read import, export, gas or water consumption via Modbus RTU 9600.8N1 or pulses. Or a household appliance can use a coupled power relay (PEM 01/012) to switch smartly to injection or consumption. The MoCo module also has a P1 OUT to which a second P1 port application can be connected. The module supports both Dutch digital meters (DSMR 2.x, DSMR 4.x, DSMR 5.x) and Belgian digital meters (DSMR 5.x) and AMR meters (A1 port), as well as Scandinavian and Swiss digital meters. By default, the module is set to the Belgian DSMR 5.x meter and to pulse divider 1. Via the Windows configuration software and a USB connection to the PC, these settings can be changed, P1 data can be read, or the firmware can be updated.

The power supply is supplied by the digital meter via the supplied 'RJ12 6P/6C cross cable'. However, with the Dutch DSMR 4.x meter or when using the P1 output, an external 5V/2A USB power supply is required.

1. Connect:



Nutrition:

Coming from the P1 port: only connect the (1) supplied 'RJ12 6P/6C cross' cable (Max.3 meters or P1 extender).

Additional power via USB-C connection is only needed with older digital meters, or when using the P1 OUT connection.(2)

P1 port IN:

(1) The MoCo module supports the Dutch (DSMR 4.x,5.x), the Belgian (DSMR 5.x), as well as the Scandinavian and Swiss digital

meters. The setting of the type of protocol is done via the software tool that you download from the 2-Wire website. By default, the module is set to DSMR 5.x protocol of the Belgian digital meter. With the READ button in the Visualiser Windows tool, the P1 RAW data can be read out to test compatibility.

P1 port OUT:

The data from the P1 IN(1) is transmitted one-to-one to P1 OUT(2). This way, the P1 port remains available for a second P1 application. The 'RJ12 6P/6C' cable to the connected device may be max. 3 meters. Sometimes it may be necessary to power the linked module separately.

RS485:

MoCo simultaneously converts the P1 data to(3) RS485 Modbus RTU at 9600.8N1. The Modbus address can be set via the Visualiser Windows tool. The registers for electricity are the same as those of the EMM.630 meters, while the registers for gas meter and water meter have been added at the rear. Use max.0.5mm² with solid core as a Modbus conductor.

Binary or pulse exits:

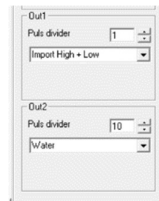
MoCo has 2 solid-state outputs(4). Only use conductors with solid core 0.5mm², max 2.5m. Via the Visualiser tool, each can be set separately, either as a consumption pulse, or as an on/off output:

Operation as pulse output with adjustable divider :

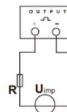
- Import (High/Low/High+Low) electricity (default 1Wh/pulse)
- Export (High/Low/High+Low) electricity (default 1Wh/pulse)
- Gas consumption (default 1liter per pulse)
- Water consumption (default 1liter per pulse)

Every 5 seconds, data is requested from the P1 port. A difference measurement(s) are then made, current reading minus previous meter reading. This difference is divided by the set "divider" and sent to the pulse output(s) in the form of pulses.

Consumption pulses:(4) In the example on the left:



the 2-WIRE tool 'PPC04-MoCo Visualiser'.

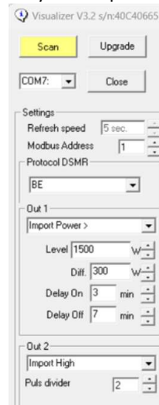


NA. The Pulse output (4) must be powered as shown, respect the polarities. Opto-coupling with potential-free SPST-NO contact.

Contact Range: 5~40VDC
Max. Current Input: 50mA DC

Operation as a relay output with adjustable logic (5)

Both outputs can each be set as a binary output to which one can then apply a simple ON/OFF switch logic based on consumption or injection. If consumption or injection is greater than set value (Level) then relay ON otherwise OFF when the consumption or injection is below Level-diff. Only with export the diff can be >Level so the result can go negative.



Logic In the example on the left:

OUT1 turns ON from >1200 Watt consumption for 3 minutes and turns off after 7 minutes less than 1100 Watt consumption.

OUT 2 translates daily consumption to 2Wh pulses.

NA. For the 2 optically separated outputs, Max. 40Volt DC/50mA applies, which is supplied by the coupled input module or PLC.

NA. Use as a conductor max 3 metres/section 0.5mm² with solid core

NA. Use the optional PEM 01-012 module (5) in conjunction with a 12VDC power supply(6) to convert the solid-state output to a power relay.

USB:

The USB connection (6) is used to connect to the PC application or as a connection for the extra USB power supply.

PPC.04- MOCO Visualiser windows tool:

(DOWNLOAD via website on the product page)

With the Visualizer tool one can configure both the PPC.04 and the MoCo module:

- Display current meter readings and electrical powers.
- Set Modbus address (MoCo only)
- Setting the meter protocol: NL, BE and DK, A1 (MoCo only)
- Configuring the Pulse Output (MoCo Only) and Setting the Divider
- Updating the firmware
- Read the RAW data string from the P1 port and export it.
- There is no SAVE button, every change becomes active automatically.

UPGRADE via the PPC Visualiser: Connect the USB cable to the module and press the "UPGRADE" button.

NA. If you get the message 'Cannot download the file', run the Visualiser as administrator and temporarily disable your Firewall (Windows defender and McAfee,...) because it may be blocking FTP download.

NA. Current firmware version at the top of the PPC Visualiser screen.

LED:

There are 4 LEDs on the module: supply voltage (PWR), communication with the P1 port (COM) and the status/pulses (OUT 1 and OUT 2).

2. Modbus RTU protocol

The interface is RS485, via 3 plug-in terminals (0.5mm² solid core). Make the connection with shielded "twisted pair" cable. All "GND", "A" and "B" connections are in series with each other and in line topology. The cable must be terminated at each end with a resistor of 120 ohms (0.25 Watts min.). A total maximum length of 1000 meters is allowed for the RS485 network provided the correct Modbus cable. Up to 32 electrical nodes can be connected, including the controller. The address of each MoCo can be set to any value between 1 and 247. The format for each byte in RTU is: Modbus RTU 9600.8N1:

- Encoding system: 8-bit per byte
- Data format: 4 bytes (2 registers) per parameter.

- Floating point numbers (32 bit according to IEEE 754) in 2 registers
- 2-byte cyclic redundancy check (CRC)
- Framing: 1 start bit, 8 data bits, no parity and 1 stop bit
- The data transmission rate 9600 baud

The registers display the current values of the measured and calculated values. Each parameter is stored in two consecutive 16-bit registers. The table below details the 3X registry address and the address byte values within each message. Modbus Protocol function code 04 is used to access all parameters. For example, to request:

- Current F1 Starting address=0006 Number of registers =0002
- Current F2 Starting address=0008 Number of registers=0002

Address (Register)	Nr.	Description	Type	Units	Modbus registers		
					Hi Byte	Lo Byte	Obis number vb
30001	1	Voltage F1	FLOAT	Volts	00	00	1-0.32.7.0(V)
30003	2	Voltage F2	FLOAT	Volts	00	02	1-0.52.7.0(V)
30005	3	Voltage F3	FLOAT	Volts	00	04	1-0.72.7.0(V)
30007	4	Current F1	FLOAT	Amps	00	06	1-0.31.7.0(A)
30009	5	Current F2	FLOAT	Amps	00	08	1-0.51.7.0(A)
30011	6	Current F3	FLOAT	Amps	00	0A	1-0.71.7.0(A)
30013	7	Import - Export Power F1	FLOAT	Watts	00	0C	1-0.21.7.0(KW)
30015	8	Import - Export Power F2	FLOAT	Watts	00	0E	1-0.41.7.0(KW)
30017	9	Import - Export Power F3	FLOAT	Watts	00	10	1-0.61.7.0(KW)
30049	10	Highest Current absolute value F123	FLOAT	Amps	00	30	Max I: I1 or I2 or I3 for EV charger
30051	11	Total import Power 3 phase	FLOAT	Watts	00	32	1-0.1.7.0(KW)
30053	12	Total export Power 3 phase	FLOAT	Watts	00	34	1-0.2.7.0(KW)
30073	13	Import H+L	FLOAT	kWh	00	48	1-0.1.8.1(KWh)+1-0.1.8.2(KWh)
30075	14	Export H+L	FLOAT	kWh	00	4A	1-0.2.8.1(KWh)+1-0.2.8.2(KWh)
30077	15	Mbus meter 1	FLOAT	Liter	00	4C	0-1.24.2.3(m3)
30079	16	Mbus meter 2	FLOAT	Liter	00	4E	0-2.24.2.1(m3)
30080	17	Import H	FLOAT	kWh	00	50	1-0.1.8.1(KWh)
30081	18	Import L	FLOAT	kWh	00	51	1-0.1.8.2(KWh)
30082	19	Export H	FLOAT	kWh	00	52	1-0.2.8.1(KWh)
30083	20	Export L	FLOAT	kWh	00	53	1-0.2.8.2(KWh)
30084	21	Mbus meter 1	FLOAT	Liter	00	54	0-1.24.2.3(m3)
30085	22	Mbus meter 2	FLOAT	Liter	00	55	0-2.24.2.1(m3)
30087	23	+Rc(QI)	FLOAT	kvarh	00	56	1-0.5.8.0(kvarh)
30089	24	+Rc(QII)	FLOAT	kvarh	00	58	1-0.6.8.0(kvarh)
30091	25	-Ri(QIII)	FLOAT	kvarh	00	5A	1-0.7.8.0(kvarh)
30093	26	-Rc(QVI)	FLOAT	kvarh	00	5C	1-0.8.8.0(kvarh)

Registers 80 to 85 are normally only for the MEGA.
You can use them without MEGA, but you have to start with a pair of numbers (80-82-84)
If the length is set to 4 (words), you will get 2 consecutive counters.
(e.g. index = 80 and length = 8, then you get I-H-L-EH-EL = 16 bytes)

3. Configuration in a ReMI and in a MEMO3 web server:

If Modbus slave in ReMI: Select Channel Type: "Modbus", Device Id "Master EMM.220" (Mono) or "Master EMM.630" (3-phase). Para1 will have the "Modbus address", Para2 will have "0" for import, "1" for export.

CH11	Modbus	Master EMM220	1	0	kWh	MOCO IMP
CH12	Modbus	Master EMM220	1	1	kWh	MOCO EXP

As a Modbus slave in a MEMO3: Configuration is the same as an EMM meter. Select Type "EMM220-630", Mode "Energy". Enter Modbus address and Modbus sub-address, where:

- Sub-address 0: Import (consumption) + Phase 1
- Sub-address 0: Export (injection) + Phase 2
- Sub-address 0: Phase 3

3. General remark:

- To switch power, pair the solid-state outputs with the optional 12VDC power relay PEM 01/012
- Use single wire with fixed core, max 0.5mm²

- Use the P1 extender as distance P1 to MoCo >3 meters.
- Download the Visualiser Windows tool from the website
- Turn a MoCo into an energy monitor by connecting a LoWi3 or a ReMI to the P1 out.

4. Technical data:

General:

P1 port to Modbus & Pulse Converter: Standalone module converts data P1 port to pulses or to RS485 Modbus RTU.

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 according to . UL94-V0
Degree of protection: IP20, EN 60529
Mounting indoors or in waterproof housing
Dimensions: DIN Rail 2 modules, Weight: about 30 grams

Connections:

INPUTS:

- P1-PORT RJ11 6P6C: via cross-cable to P1-port meter
- PROTOCOLS: DSMR2.0 – 4.0 – 5.0 NL-BE-DK-A1(BE)

EXITS:

- 2 PULSE OUT ISOLATED max 40V/50mA, impedance approx 100 Ohms, take polarity into account.
- P1 PORT OUT 6P6C
- RS485 OUT: Modbus RTU 9600.8N1
- USB-C: Communication to Visualiser tool
- NUTRITION: via P1-PORT or via USB micro USB (5V/100mA)

Labels:

RoHS: Non-toxic, cf. WEEE/RoHS Directives
CE: In accordance with EMC and low voltage directive: HBES – EN 50090-2-2 and EN60950 – 1: 2006.

5. Installation instructions

Installation must be carried out by a certified installer and in accordance with the regulations in force. The module must be built into a fireproof fuse box. During installation, the following must be taken into account (non-exhaustive list):

- the applicable laws, standards and regulations.
- the state of the art at the time of installation.
- This manual, which only mentions general provisions and should be read in the context of each specific installation.
- the rules of good workmanship.
- the specified specs in this manual, otherwise there is a risk of damage to the module.

This manual must be attached to the electrical installation file. On the 2-Wire website you can always find the most recent manual of the product.

6. Support

Would you like to have the product repaired in case of a possible defect? Please contact your supplier or order "inspection module" online.

7. Warranty provisions

The warranty period is two years from the date of delivery. The delivery date is the invoice date of purchase of the product by the consumer. If no invoice is 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 after discovery. 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 a defect or damage resulting from incorrect installation, improper or negligent use, incorrect operation, transformation of the product, maintenance in violation of the maintenance instructions or an external cause such as moisture damage or damage due to overvoltage. 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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