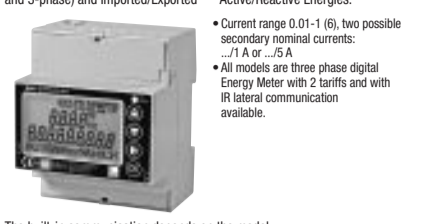


Three-phase Digital Energy Meter CT connected (.../5 A or .../1 A)

Operating instructions

The Energy Meter provides all relevant measures for the evaluation of an electrical network: L, U, PF, THD%, Powers (displayed for each phase and 3-phase) and Imported/Exported Active/Reactive Energies.



The built-in communication depends on the model:

Code	Model	Communication
889-301; 889-301CH*	M3PRO 1-5 MID	2 SO Pulse outputs MID certified
889-302; 889-302CH*	M3PRO 1-5 Modbus MID	Built in RS-485 Modbus RTU MID certified
889-303; 889-303CH*	M3PRO 1-5 M-Bus MID	Built in M-Bus (1 unit Load) MID certified

(*) For Swiss market only active energy on display

RISK OF ELECTRIC SHOCK, BURNS OR EXPLOSION

This device must be installed and maintained ONLY by qualified and duly authorized personnel.

During its installation, be sure there is no voltage applied.

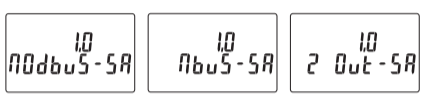
Frontal of the Energy Meters



- UP button: to scroll pages and change parameters
- DOWN button: to scroll pages and change parameters
- MENU/ESC button: to change menu and stop modification procedure of a parameter
- OK button: to confirm the modification of a parameter

Device Switch-on

When the device is switched on, the firmware version and the model appear on the display for one second. (Preliminary Page)

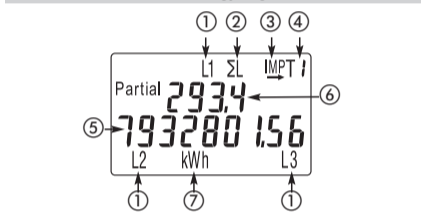


Display Back light

If no button is pushed for 40 seconds, the display goes back to the Main Page and the backlight is switched off.

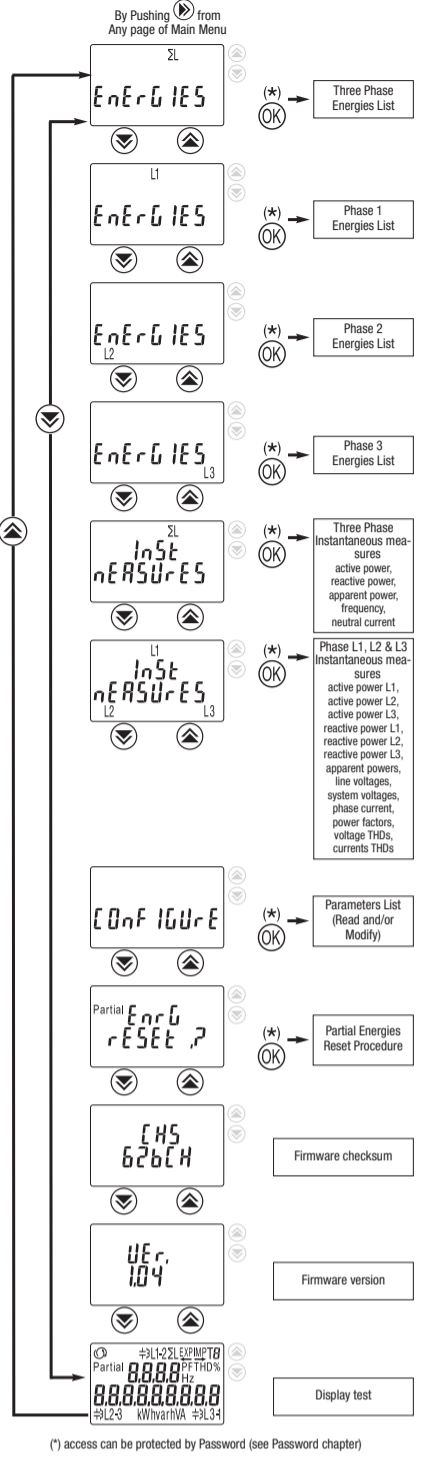
The first button pushing does not change the page but is used to switch the backlight on.

Main Energy Page



- Appears if V (L-N) >= 92 VAC
- Three-phase energy
- "Imported" / "Exported" flowing power direction
- working tariff
- Three-phase Active Energy register
- Corresponding Partial Energy register
- Energy Unit

Selection Menu



(*) access can be protected by Password (see Password chapter)

Parameters in models with M-Bus on-board

- M-Bus Primary Address. Selectable in the range 1...250. The default value is 0, but, once modified to a value 1...250, it is no longer possible to go back to 0.
- M-Bus Baud Rate. Available Baud Rates are: 300, 600, 1200, 2400, 4800 and 9600. The default baud rate is 2400.
- Unique M-Bus Secondary Address, not modifiable.

Password

In Configure Menu it is possible to protect the access to sub-menus of Selection Menu by a password.

Password can be enabled (ON password) or disabled (OFF password), the default value is OFF.

Once requested, to enter the password user must push both UP button and DOWN button at the same time for 4 seconds.

Partial Energies Reset Procedure

When this page is on the display, it is possible to reset the Partial Energies (Main Energies are not resettable).

By pushing the OK button again, the Partial Energies are reset.

By pushing push MENU/ESC button or no button is pressed for 40 seconds, the procedure is stopped, and the display goes back to "Energ Reset?" page.

Phase Sequence Error

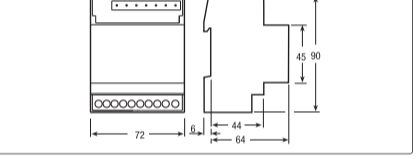
In case the cabling sequence is wrong, this message appears. In this condition, the Energy Meter continues to measure and to increase the Energy Registers, but its calculation is not correct.

By pushing OK button for 5 seconds, this message disappears until next restart.

Unrecoverable Internal Errors

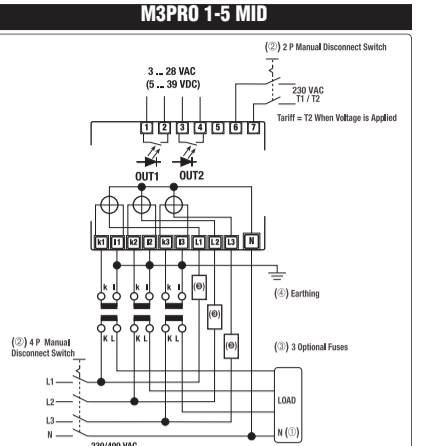
In case the display shows these messages, the device has got a malfunction and must be replaced.

Dimension

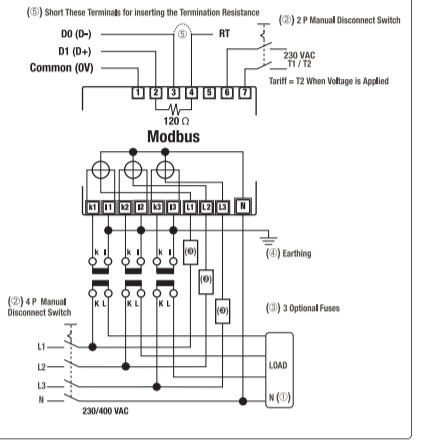


Wiring diagram

The Energy Meter has OVERVOLTAGE CATEGORY III (according to IEC 60664-1 Ed. 2.0:2007), hence its direct connection to the Public Electricity Grid is not allowed. The Energy Meter is intended for MDOOR installation only (according to EN 50470-1 and IEC 62052-31). The Energy Meter must be installed on a DIN-rail and inside a cabinet with a protection degree (IP rating) equal to (or better than) IP51. Direct connection of currents inputs to the Energy Meter is NOT ALLOWED: external CTs insertion with proper insulation level are mandatory.



M3PRO 1-5 Modbus MID



Alternative wiring diagram



Alternative wiring diagram, with only 2 external CTs.

To be used only under the following conditions:

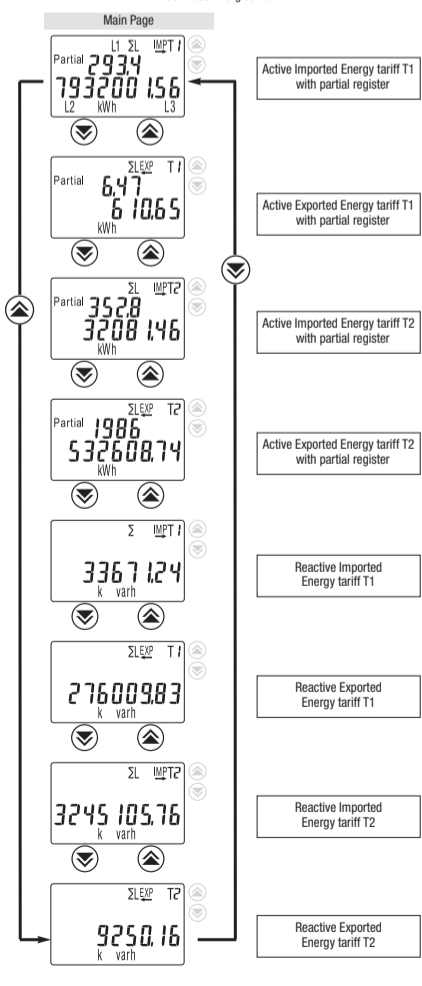
- The load is 3 wires (no neutral) and there is no current leakage (I1 - I2 - I3 = 0)
- Only 3-phase measures (P, Power and Energies) are meaningful.

Selecting values at secondary side

After a long pressure (5 seconds) on OK button in the Main Page, for 120 seconds the whole set of parameters displayed and transmitted through bus, are referred to Secondary Side of CTs.



Main Menu



Note: Main Page and consequently page sequence could be different, according to the flowing power and working tariff

Parameters List

- External CT related parameters
 - External CT Primary nominal current
 - .../5A: configurable between 5 A to 10000 A with step 5 A
 - .../1A: configurable between 1 A to 2000 A with step 1 A
 - The default value is 5 A
 - External CT Secondary nominal current
 - .../1A or .../5A
 - The default value is -5
- Password Enabled/ Disabled

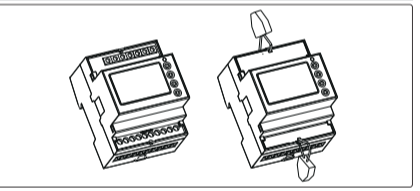
Parameters in SO model

- Pulses per kWh
 - 1... 10000 depending on CT ratio.
 - The default value is 5000
- Pulse time length
 - Duration of ON pulse for SO outputs: 30 to 100 ms.
 - The default is 100 ms
- SO outputs configuration mode
 - In - Out
 - SO1 proportional to Imported Active Power
 - SO2 proportional to Exported Active Power
- Act-React
 - SO1 proportional to Imported Active Power under T1
 - SO2 proportional to Imported Reactive Power under T2
- TAR1-TAR2
 - SO1 proportional to Imported Active Power under T1
 - SO2 proportional to Imported Active Power under T2
- Password Enabled/ Disabled

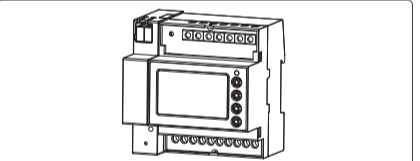
Parameters in models with Modbus on-board

- Modbus Address. Selectable in the range 1...247. The default address is 1.
- Modbus Baud Rate. Available Baud Rates are: 1200, 2400, 4800, 9600, 19200 and 38400. The default baud rate is 19200.
- Modbus Parity. Available Parity are None, Even and Odd. The default Parity is None.
- Modbus Number of Stop Bits (1 or 2). The default number of Stop Bits is 1.
- Password Enabled/ Disabled

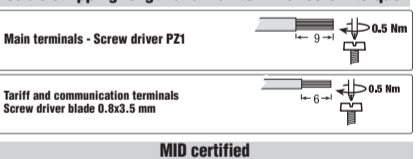
Sealable terminal covers



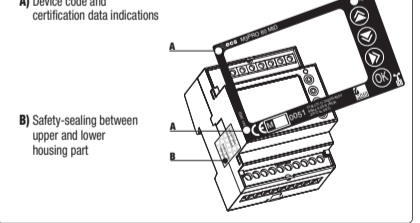
Connectable IR Communication Modules



Cable stripping length and max terminal screw torque



MID certified



Note

Device code and certification data indications	Notes
A) Device code and certification data indications	
B) Safety-sealing between upper and lower housing part	

Technical Data

Data in compliance with CLC/TR 50579, EN 62059-32-1, EN 50470-1, EN 50470-3

		ENGLISH	
		CT connected Pulse output SO	CT connected built-in communication Modbus / M-Bus
General characteristics			
Housing	DIN 43880	4 modules	4 modules
Mounting	EN 60715	DIN rail	DIN rail
Depth	35 mm	70	70
Weight	g	335	335
Operating features			
Connectivity	to three-phase network	n° wires	4
Storage of energy values and configuration	internal FLASH memory		yes
Display tariffs identifier	for active energy	n° 2	T1 and T2
Approval (according to EN 50470-1, EN 50470-3)			
Type of connection	-	CT .../5 A or .../1 A	CT .../5 A or .../1 A
Reference Voltage Un	VAC	230	230
Reference Voltage Un	VAC	400	400
Reference Current (Iref)	A	1	1
Minimum Current (Imin)	A	0.01	0.01
Maximum Current (Imax)	A	6	6
Starting Current (Ist)	A	0.001	0.001
External CT	max. CT ratio	A	10.000/5 A or 2.000/1 A
	ratio adjusting step	A	5 or 1
		A	50
Reference Frequency (fn)	-	3 (4)	3 (4)
Number of phases (number of wires)	-	3 (4)	3 (4)
Certified Measures	Active Energies (accor. to EN 50470-3) and Active Powers	kWh	→ kWh, ← kWh
		class	B
Supply Voltage and Power Consumption			
Operating Supply Voltage range	VAC	92 ... 276 / 160 ... 480	92 ... 276 / 160 ... 480
Maximum Power Dissipation (Voltage circuit)	VA (W)	<2 (0.6)	<2 (0.6)
Maximum VA burden (Current circuit) @ Imax	VA	<0.7	<0.7
Voltage Input Waveform	-	AC	-
Overload capability			
Voltage	-	continuous; phase/phase	VAC
		1 second; phase/phase	VAC
		continuous; phase/N	VAC
		1 second; phase/N	VAC
		continuous	A
		temporary (0.5 s)	A
Current	-	continuous	A
		temporary (0.5 s)	A
Measuring Features			
Voltage range	phase/phase	VAC	160 ... 480
	phase/N	VAC	92 ... 276
		A	0.002 ... 6
Frequency range	Hz	45 ... 65	45 ... 65
Measured Quantities	-	kWh	kWh
Display features			
Phase sequence error indication	-	PHASE Err	PHASE Err
Display type	LCD backlight	3x4 digits-9 digits (Energy)	3x4 digits-9 digits (Energy)
		mm x mm	6.00 x 3
Working tariff indications	min/max displayed energy	0.01 / 99999999.9	0.01 / 99999999.9
Display refresh period	s	1	1
Safety			
Protective class	class	II	II
AC voltage test (EN 50470-3, 7.2)	KV	4	4
Degree of pollution		2	2
Operational voltage	VAC	300	300
Impulse voltage test	1/250 μs-kV	6	6
Housing material flame resistance	UL 94	V0	V0
Safety-sealing between upper and lower housing part	-	yes	yes
Pulse Outputs (SO signals)			
Pulse Output 1	acc. to IEC 62053-3	adjustable	kWh (T1) →, kWh →, kWh (T1) →, kWh →, kWh →
Pulse Output 2	adjustable	adjustable	kWh (T2) →, kWh →, kWh (T2) →, kWh →, kWh →
Pulse Rate	adjustable	adjustable	1 ... N (s)
			(+) N - dep. on CT-ratio and Pulse on Time
Connection terminals			
Pulse ON-time	adjustable	ms	30 ... 100
Operating Voltage	Min - Max	VAC (VDC)	3 ... 28 VAC (5 ... 39 VDC)
Pulse ON maximum current		mA	90
Pulse OFF leakage current		μA	1
Isolation class	-	-	SELV circuit
Embedded communication Modbus			
Physical interface	RS485 - 3 Wire	-	-
Internal termination resistor		-	120 Ω
Baud rate	adjustable	-	1200-2400-4800-9600-19200-38400
Parity	adjustable	-	Even, None
Stop Bit	adjustable	-	1, 2
Address	adjustable	-	1-247
Isolation class	-	-	SELV circuit
Embedded communication M-Bus			
Baud rate	adjustable	-	300-600-1200-2400-4800-9600
Unit load	-	-	1
Isolation class	-	-	SELV circuit
Optical metrological LED			
Front mounted red LED (meter constant)	proportional to active imp/exp Energy	p/kWh	10.000
IR Connectable Communication Modules			
For communication modbus connection (LAN-TCP/IP / M-Bus / Modbus RTU / KNX)	-	yes	yes
Connection terminals			
Screwdriver for mains terminals	head with Z +/-	POZDRIV	P21
Screwdriver for tariff and communication terminals	slotted head	mm	0.8 x 3.5
Terminal capacity main current paths	solid wire min. (max)	mm²	0 (4)
	stranded wire with sleeve min. (max)	mm²	0 (4)
	solid wire min. (max)	mm²	0 (2.5)
	stranded wire with sleeve min. (max)	mm²	0 (2.5)
Environmental conditions (storage)			
Temperature range	°C	-25 ... +70	-25 ... +70
Environmental conditions (operating)			
Temperature range	°C	-25 ... +55	-25 ... +55
Mechanical environment	M1	-	-
Electromagnetic environment	E2	-	-
Installation	indoor	-	-
Altitude (max.)	meters	<2000	<2000
Humidity	yearly average, not condensing	<75%	<75%
	on 30 days per year (not condensing)	<95%	<95%
IP rating	-	IP51(*)/IP40	IP51(*)/IP40

(*) The metering equipment must be installed inside a cabinet with IP rating IP51 or better.

