

optec M3PRO 1-5 MID ENGLISH

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, F, THD%, Powers (displayed for each phase and 3-phase) and Imported/Exported Active/Reactive Energies.

- Current range 0.01-1 (6), two possible secondary nominal currents: /1 A or /5 A
- All models are three phase digital Energy Meter with 2 tariffs.



The built-in communication depends on the model:

Code	Model	Communication
HC.ECSOP69	M3PRO 1-5 Modbus MID	Built in RS-485 Modbus RTU MID certified
HC.ECSOP68	M3PRO 1-5 M-Bus MID	Built in M-Bus (1 unit Load) MID certified

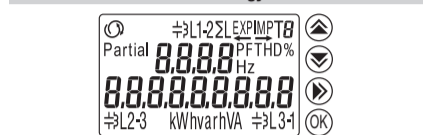
(*) For Swiss market only active energy on display

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.

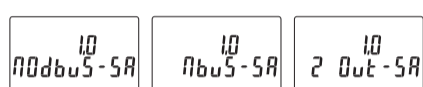
Frontal of the Energy Meters



- 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)

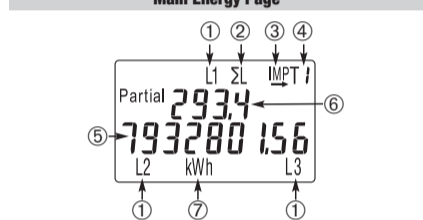


Display Back light

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

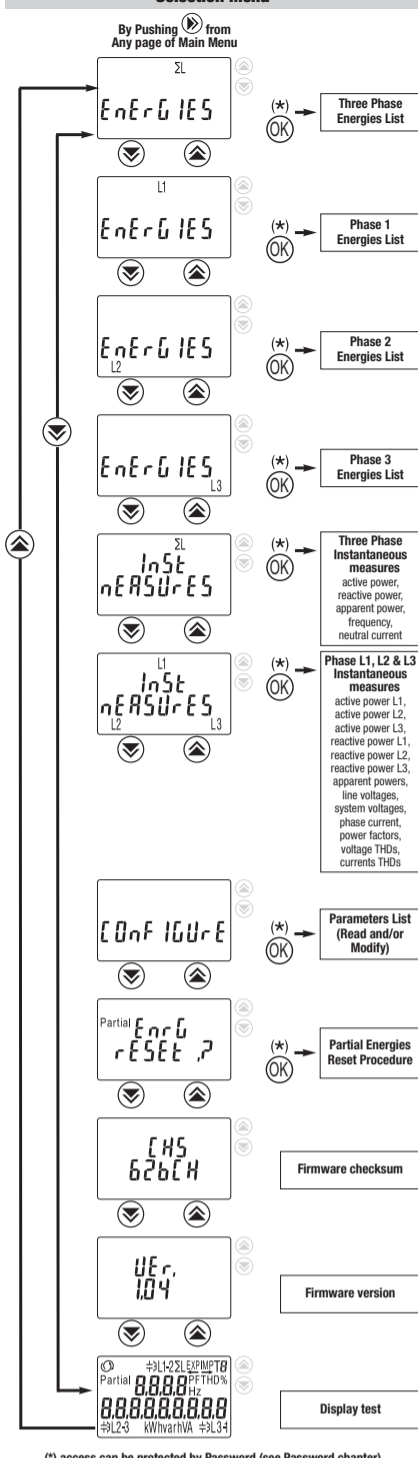
The first button pushing does not change the page but is used to switch the backlight on.

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



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 "Eng Reset?" page.

Phase Sequence Error

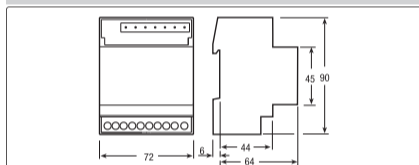
In case the cabling sequence is wrong, this message appears. In this condition, the Energy Meter continues to measure and to increase the Energy Registers, but its calculation is not correct.

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

Unrecoverable Internal Errors

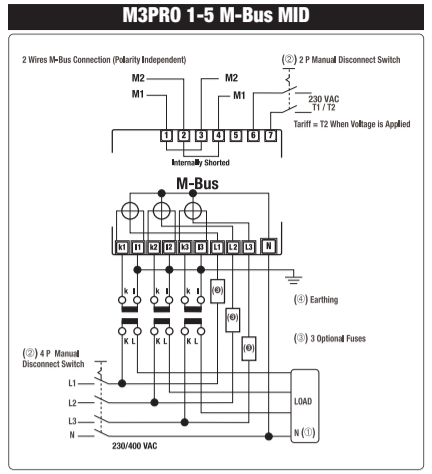
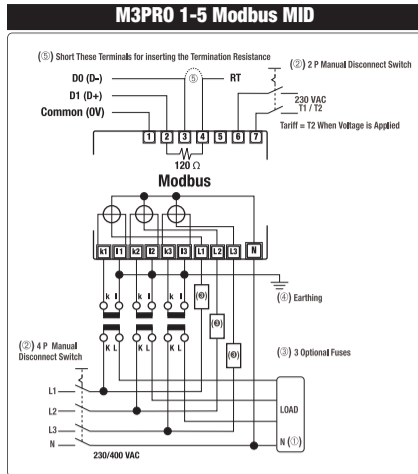
In case the display shows these messages, the device has got a malfunction and must be replaced

Dimension



Wiring diagram

The Energy Meter has **OVERVOLTAGE CATEGORY III** (according to IEC 62052-31 that refers 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 INDOOR 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.



- The connection of the Neutral Wire to the "N" terminal of the Power Meter is mandatory. Its connection to the Load is optional, but, in the case, only 3-phase measures (Powers and Energies) are meaningful, while measures referred to L1, L2, and L3 are meaningless.
- These manual disconnect switches are mandatory for safe installing operation. Their purpose and location must be easily evident to installation personnel
- These fuses are not mandatory, they are recommended to protect the line, not the device itself. Use >= 6 A fast (F) or >= 1 A delayed (T).
- Earthing of secondary windings of CTs is governed by the laws in force in the Countries where the device is installed. Current transformers must not be operated with open terminals since dangerous high voltages might occur which may result in personal injuries and property damage; furthermore, in this case the transformers are exposed to thermal overload.
- Short-circuit terminals 3 and 4 to activate the terminating resistor on the last counter

Secs

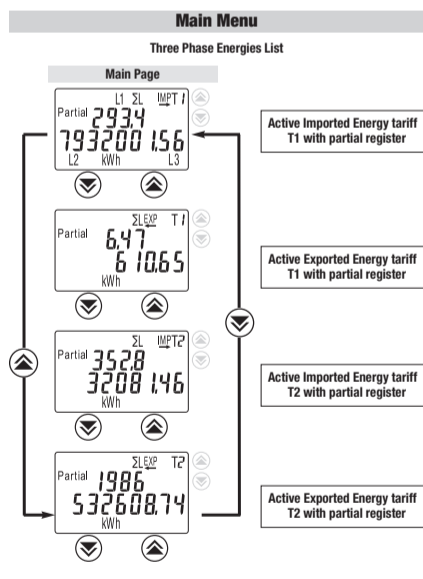
manufactured by Herholdt Controls srl - 20132 Milano (Italy)

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

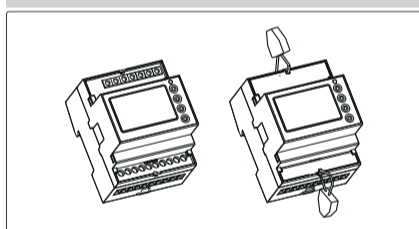
Parameters List

- External CT related parameters**
- External CT Primary nominal current**
 - /5A: configurable between 5 A to 10000 A with step 5 A
 - /1A or /5A: 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

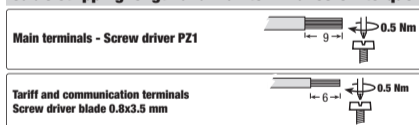
Parameters in models with Modbus on-board

- 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



Cable stripping length and max terminal screw torque



MID certified

- Device code and certification data indications
- 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 built-in communication Modbus / M-Bus
General characteristics		
Housing	DIN 43880	DIN 4 modules
Mounting	EN 60715	DIN rail
Depth		70 mm
Weight		335 g
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
Reference Voltage Un	Line to Neutral	VAC 230
Reference Voltage Un	Line to Line	VAC 400
Reference Current (Iref)		A 1
Minimum Current (Imin)		A 0.01
Maximum Current (Imax)		A 6
Starting Current (Ist)		A 0.001
External CT	max. CT ratio	A 10.000/5 A or 2.000/1 A
	ratio adjusting step	A 5 or 1
Reference Frequency (fn)		A 50
Number of phases (number of wires)		- 3 (4)
Certified Measures		kWh → kWh, ← kWh
Accuracy	Active Energies (accor. to EN 50470-3) and Active Powers	class B
Supply Voltage and Power Consumption		
Operating Supply Voltage range		VAC 92 ... 276 / 160 ... 480
Maximum Power Dissipation (Voltage circuit)		VA (W) <= 2 (0.6)
Maximum VA burden (Current circuit) @ Imax		VA <= 0.7
Voltage Input Waveform		- AC
Overload capability		
Voltage	continuous; phase/phase	VAC 480
	1 second; phase/phase	VAC 800
	continuous; phase/N	VAC 800
	1 second; phase/N	VAC 300
Current	continuous	A 6
	Temporary (0.5 s)	A 120
Measuring Features		
Voltage range	phase/phase	VAC 160 ... 480
	phase/N	VAC 92 ... 276
Current range (secondary winding)		A 0.002 ... 6
Frequency range		Hz 45 ... 65
Measured Quantities		kWh
Display features		
Phase sequence error indication		- PHASE Err
Display type	LCD backlight	n° digits 3x4 digits-9 digits (Energy)
	digit dimensions	mm x mm 6.00 x 3
Active energy: 1 display, 9 digit - 2 tariffs + display import or export (arrow)	min/max displayed energy	kWh 0.01 / 9999999.9
Working tariff indications	1-digit	T1 or T2
Display refresh period		s 1
Safety		
Protective class		class II
AC voltage test (EN 50470-3, 7.2)		kV -
Degree of pollution		- 2
Operational voltage		VAC 300
Impulse voltage test		1.2/50 µs-kV 6
Housing material flame resistance	UL 94	class V0
Safety-sealing between upper and lower housing part		- yes
Embedded communication Modbus		
Physical interface	RS485 - 3 Wire	- D1, D0, Common (GND)
Internal termination resistor		- 120 Ω
Baud rate	adjustable	- 1200-2400-4800-9600-19200-38400
Parity	adjustable	- Odd, 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
Connection terminals		
Screwdriver for mains terminals	head with Z +/-	PZIDRIV PZ1
Screwdriver for tariff and communication terminals	slotted head	0.8 x 3.5 mm
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)
Terminal capacity for tariff and communication		mm² 0 (2.5)
Environmental conditions (storage)		
Temperature range		°C -25 ... +70
Environmental conditions (operating)		
Temperature range		°C -25 ... +55
Mechanical environment		- M1
Electromagnetic environment		- E2
Installation	Indoor	- yes
Altitude (max.)		meters <= 2000
Humidity	yearly average, not condensing	- <= 75%
IP rating	on 30 days per year (not condensing)	- <= 95%
		- IP51**IP40

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

