

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 and with IR lateral communication available.

The built-in communication depends on the model:

Code	Model	Communication
888-301; 888-301CH*	M3PRO 1-5 MID	2 S0 Pulse outputs MID certified
888-302; 888-302CH*	M3PRO 1-5 Modbus MID	Built-in RS-485 Modbus RTU MID certified
888-303; 888-303CH*	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)

10	10	2 10
Modbus-5A	Modbus-5A	2 Out-5A

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

1: Appears if V(L-N) >= 92 VAC
 2: Three-phase energy
 3: "Imported"/"Exported" flowing power direction
 4: working tariff
 5: Three-phase Active Energy register
 6: Corresponding Partial Energy register
 7: Energy Unit

Selection Menu

By Pushing **UP** from Any page of Main Menu

Three Phase Energies List
 EnErG IES

Phase 1 Energies List
 EnErG IES

Phase 2 Energies List
 EnErG IES

Phase 3 Energies List
 EnErG IES

Three Phase instantaneous measures
 active power, reactive power, frequency, neutral current

Phase L1, L2 & L3 instantaneous measures
 active power L1, active power L2, active power L3, reactive power L1, reactive power L2, reactive power L3, apparent powers, line voltages, system voltages, phase current, power factors, voltage THDs, currents THDs

Parameters List (Read and/or Modify)

Partial Energies Reset Procedure

Firmware checksum
 CHS 626EH

Firmware version
 VEr. 104

Display test
 EnErG IES
 rAr IeY
 8888888888
 Hz

(*) 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 "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. 2:2007), 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.

M3PRO 1-5 MID

M3PRO 1-5 M-Bus MID

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 (Σ 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 Page

Main Menu

Three Phase Energies List

- Active Imported Energy tariff T1 with partial register
- Active Exported Energy tariff T1 with partial register
- Active Imported Energy tariff T2 with partial register
- Active Exported Energy tariff T2 with partial register
- Reactive Imported Energy tariff T1
- Reactive Exported Energy tariff T1
- Reactive Imported Energy tariff T2
- Reactive Exported Energy tariff T2

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
 • .1A: 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 S0 model

Pulses per kWh
 • 1 ... 10000 depending on CT ratio.
 • The default value is 5000

Pulse time length
 • Duration of ON pulse for S0 outputs: 30 to 100 ms.
 • The default is 100 ms

S0 outputs configuration mode
 • In - Out
 • S01 proportional to Imported Active Power
 • S02 proportional to Exported Active Power

Act-React
 • S01 proportional to Imported Active Power
 • S02 proportional to Imported Reactive Power

• **TAR1-TAR2**
 • S01 proportional to Imported Active Power under T1
 • S02 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 Even.

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

Main terminals - Screw driver PZ1
 Screw driver blade 0.8x3.5 mm
 Torque: 0.5 Nm

Tariff and communication terminals
 Screw driver blade 0.8x3.5 mm
 Torque: 0.5 Nm

MID certified

Note

- 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

	CT connected Pulse output S0	CT connected built-in communication Modbus / M-Bus
General characteristics		
Housing	DIN 43880	DIN
Mounting	EN 60715	DIN rail
Depth	35 mm	70
Weight	70 mm	70
	335 g	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	T1 and T2
Approval (according to EN 50470-1, EN 50470-3)		
Type of connection	-	CT .../5 A or .../1 A
Reference Voltage Un	VAC	230
Reference Voltage U _{ph}	VAC	400
Reference Current (I _{ref})	A	1
Minimum Current (I _{min})	A	0.01
Maximum Current (I _{max})	A	6
Starting Current (I _{st})	A	0.001
External CT	max. CT ratio	10,000/5 A or 2,000/1 A
	ratio adjusting step	5 or 1
Reference Frequency (f _n)	A	50
Number of phases (number of wires)	-	3 (4)
Certified Measures	→ kWh, ← kWh	→ kWh, ← kWh
Accuracy	Active Energies (accor. to EN 50470-3) and Active Powers	B
Supply Voltage and Power Consumption		
Operating Supply Voltage range	VAC	92 ... 276 / 160 ... 480
Maximum Power Dissipation (Voltage circuit)	VAC (W)	≤2 (0.6)
Maximum VA burden (Current circuit) @ I _{max}	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
	continuous	A 6
	Temporary (0.5 s)	A 120
Measuring Features		
Voltage range	phase/phase	VAC 160 ... 480
	phase/N	VAC 92 ... 276
	A	0.002 ... 6
Frequency range	Hz	45 ... 65
Measured Quantities	-	kWh
Display features		
Phase sequence error indication	-	PHASE Err
Display type	-	3x4 digits-9 digits (Energy)
Active energy: 1 display, 9 digit - 2 tariffs	digit dimensions	6.00 x 3
min/max displayed energy	kWh	0.01 / 99999999.9
Working tariff indications	-	T1 or T2
Display refresh period	-	s 1
Safety		
Protective class	class	II
AC voltage test (EN 50470-3, 7.2)	kV	4
Degree of pollution	-	2
Operational voltage	VAC	300
Impulse voltage test	μs-kV	1.2/50
Housing material flame resistance	UL 94	V0
Safety-sealing between upper and lower housing part	class	yes
Pulse Outputs (S0 signals)		
Pulse Output 1	acc. to IEC 62053-3	kWh (T1) →, kWh →, kWh (T2) →, kWh →, kWh →
Pulse Output 2	adjustable	1 ... N (*)
Pulse Rate	adjustable	(*) N - dep. on CT-ratio and Pulse on Time
Connection terminals		
Pulse ON-time	adjustable	ms 30 ... 100
Operating Voltage	Min - Max	VAC (VDC)
Pulse ON maximum current	-	90 mA
Pulse OFF leakage current	-	1 μA
Isolation class	-	SELV circuit
Embedded communication Modbus		
Physical interface	RS485 - 3 Wire	-
Internal termination resistor	-	D1, D0, Common (GND)
Baud rate	adjustable	1200-2400-4800-9600
Parity	adjustable	None, Even, None
Stop bit	adjustable	1-2
Address	adjustable	1-247
Isolation class	-	SELV circuit
Embedded communication M-Bus		
Unit load	adjustable	-
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
Connection terminals	-	yes
Screwdriver for mains terminals	head with Z +/-	POZIDRIV
Screwdriver for tariff and communication terminals	slotted head	P21
Terminal capacity main current paths	stranded wire min. (max) solid wire min. (max)	0.8 x 3.5 (0.4)
Terminal capacity for tariff and communication	stranded wire with sleeve min. (max) solid wire min. (max) stranded wire with sleeve min. (max)	0.4 (0.4) (0.25)
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 on 30 days per year (not condensing)	≤75%
IP rating	-	IP51(*)/IP40

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

