



(GB)

Code	Model
ECSEM451MID	M3PRO 80 MID

Three phase energy meter, direct connection 80 A with MID declaration of conformity and 2 pulse (S0) outputs.

MID certification concerns active energy only.

User instructions.

Safety instructions

Read this manual carefully BEFORE installing the instrument.

This device must be installed indoor only by a professional electrician fitter according to local applicable installation standards.

Do not plug in or unplug this product when the power supplying is ON. Its use is only permitted within the limits shown and stated in the installation instructions. The device and the equipment connected can be destroyed by loads exceeding the values stated.

Any type of intervention on the products, including cases in which they cease to function or present defects, can be dangerous for the operator's safety and relieves the Manufacturer from all civil and criminal liability.

Function

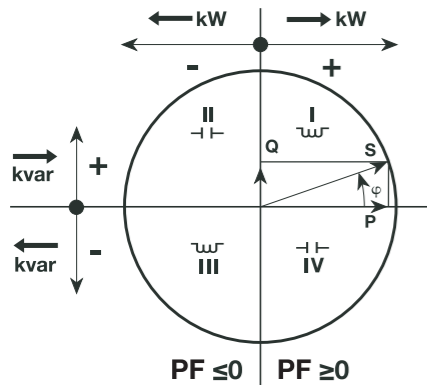
This 4 quadrants meter measures the active and reactive energy used in an electrical installation. This device can manage 2 tariffs by 230 VAC digital input.

Only the total active energy register can be used for billing purposes according to measuring instrument directive (MID).

- Active Energy Class B (according to EN 50470-3:2022)
- Active Power Class 1 (according to IEC 62053-21:2020 and IEC 61557-12:2018)
- Reactive Energy Class 2 (according to IEC 62053-23:2020)
- Reactive Power Class 2 (according to IEC 62053-21:2020).

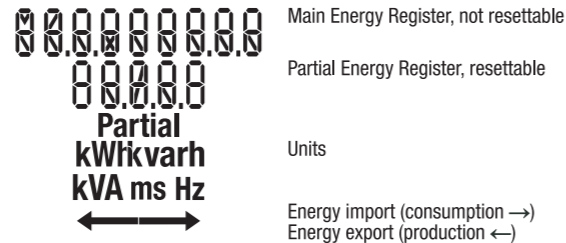
This device has a backlit LCD and 3 push-button keys to read Energies, V, I, PF, F, P, Q and to configure some parameters. The design and manufacture of this meter comply with Standard EN 50470-3:2022 requirements.

Power factor
Convention according to IEC 62053-23:2020



Layout of device

LCD display



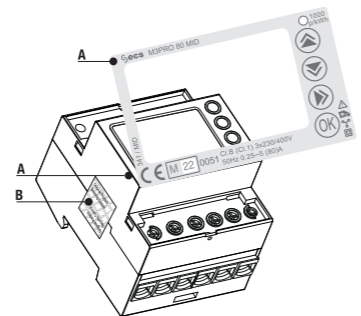
Commands

- 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

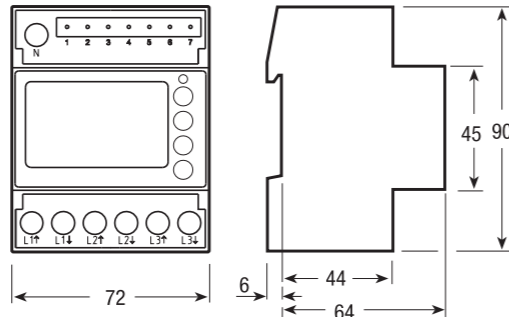
MID certified

A) Device code and certification data indications

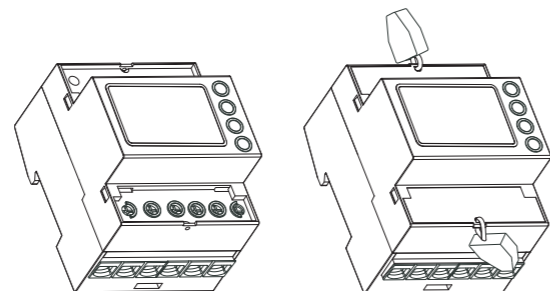
B) Safety-sealing between upper and lower housing part



Dimensions



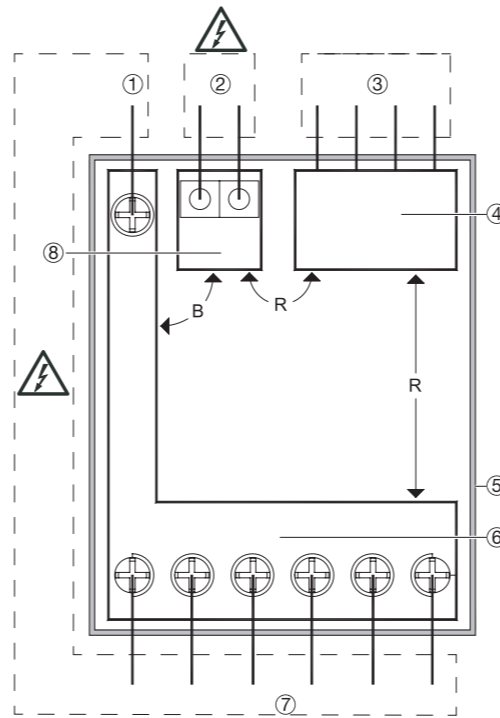
Sealable terminal cover



Wiring

Intended use

The Energy Meter is suitable for use on both impedance grounded networks and not grounded networks.

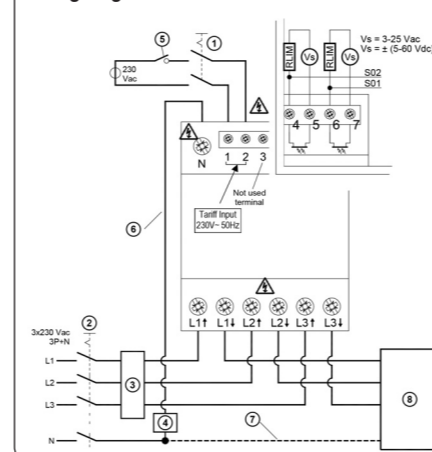


There are no accessible parts

Legend:

- B = Basic insulation
- D = Double insulation
- R = Reinforced insulation
- F = Functional insulation
- ① **HLV TERMINAL**, 1 terminal for neutral
- ② **HLV TERMINAL**, 2 terminal for tariff input
- ③ **SELV TERMINALS**, 4 terminals or 2RJ45 connectors
- ④ **SELV CIRCUIT**, (communication) working voltage <25 Vac, <60Vdc
- ⑤ **PLASTIC CASE (NOT EARTHED)**
- ⑥ **HLV CIRCUIT**, (mains) Working Voltage = 300 Vac
- ⑦ **HLV TERMINAL**, 1 terminal for neutral
- ⑧ **HLV CIRCUIT**, (tariff input) working voltage = 300 Vac

Wiring diagram



- Bipolar disconnector 230Vac
- Four-pole disconnector 3X230Vac, 3P+N. The disconnectors must be clearly labelled and must be easily accessible by the installer
- 3 fuses or 3 circuit breakers
- Fuse or circuit breaker in series with the neutral conductor, to be adopted in case the source neutral is not earthed. The installer is responsible for coordinating the rating and the characteristics of the supply side overcurrent protection. The devices must be correctly sized with respect to the installation voltage, the maximum overcurrent applicable to the meter and the fault current available. The following parameters are to be taken into consideration:
 - Maximum current = 80A
 - Maximum Overload current = 96A
 - Maximum Voltage = 276 Vac
- Control circuit for the tariff: Open contact: Tariff 1, Close contact: Tariff 2
- The connection of the Neutral to the Energy Meter is strictly MANDATORY. Failure to connect affects not only the quality of the measurements, but also electrical safety.
- The connection of the Neutral to the load is not mandatory. However, consider that in a 3P + N network, if the Neutral is not connected to the load, the measurements referred to L1, L2 and L3 no longer have any meaning. Only the 3-phase (ΣL) measurements remain significant.
- 3 wires or 4 wires electrical load. Connection to the neutral is MANDATORY

Installation and uninstallation

The disconnectors (reference ① and ② in the wiring diagram) must be easy to identify and to operate and must be close to the Meter. They both must be in "OFF" position (open circuits) from the beginning to the end of the installation or of the uninstallation. The Energy Meter, the disconnectors and the overload current protection devices must be easily identifiable, must be installed in an adequate cabinet (IP51 and V1) and it must be easy to intervene on them whenever appropriate. Inside the cabinet, do not install any other device with a flammability class worse than V1.

Commissioning

- Recommendations**
- Check the following before putting it into service:
- Make sure that no dangerous voltages are connected to the SELV terminals.
 - Make sure that a phase has not been connected to the Neutral terminal (this would cause the internal protections to intervene with permanent damage to the Meter).
 - Check that the main page appears on the display (see menu description) and not the Phase Sequence Error page.

Maintenance

- Make sure that no voltage is applied to the instrument.
- Only dry cleaning is allowed with a natural fiber cloth (for example cotton or linen) or synthetic fabric that does not leave residual fibers that can remain on the surface of the Energy Meter or that can penetrate into the Energy Meter.

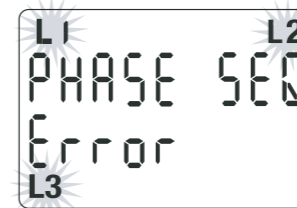
For this Energy meter, no maintenance, repair or replacement of parts is foreseen. Such interventions are to be considered prohibited. In case of malfunction, it must be replaced.

Help in case of problems

Error condition

When partial energy blinks, reset partial energy (maximum partial energy register). When the display shows the message ERROR N02 or ERROR N03, the meter has got a malfunction and must be replaced.

Diagnostic message



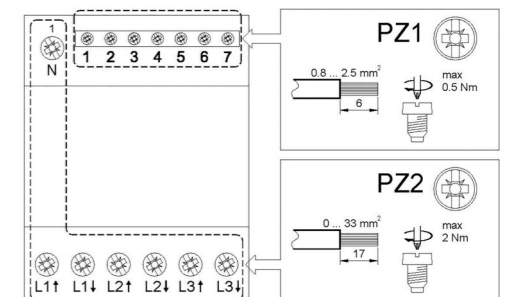
The cabling sequence (L1-L2-L3) is wrong. L1, L2 and L3 icons blink. Invert the voltage wires of 2 phases (phase 1 <-> phase 2 or phase 2 <-> phase 3). Otherwise, by pressing the «OK» button for at least 5 seconds, the message disappears until the next restart.

Notes

Cable section. Cable stripping length

Screwdriver type. Maximum terminal screw torque
Adopted cables shall retard flame propagation.

Cables must therefore comply with IEC 60332-1-2:2004 or have a flammability rate UL 2556 VW-1



Main Menu

Three Phase Energies List

Main Page

Partial Σ L1 Σ L IMP T1

793200 kWh

156 kWh

Partial Σ L2 Σ L EXP T1

647 kWh

61065 kWh

Partial Σ L3 Σ L IMP T2

3528 kWh

3208 kWh

146 kWh

Partial Σ L1 Σ L EXP T2

1986 kWh

532608 kWh

14 kWh

Σ IMP T1

3367 kWh

124 kWh

Σ EXP T1

27600 kWh

983 kWh

Σ IMP T2

3245 kWh

105.76 kWh

Σ EXP T2

9250 kWh

16 kWh

Selection Menu

By Pushing \rightarrow from Any page of Main Menu

Σ L

EnErgIES

Three Phase Energies List

L1

EnErgIES

Phase 1 Energies List

L2

EnErgIES

Phase 2 Energies List

L3

EnErgIES

Phase 3 Energies List

Σ L

InSt nEARSURIES

Three Phase Instantaneous measures active power, reactive power, apparent power, frequency, neutral current

L1 L2 L3

InSt nEARSURIES

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 voltage, phase current, power factors, voltage THDs, currents THDs

CONFIGURE

Parameters List (Read and/or Modify)

Partial Enrg rESEt

Partial Energies Reset Procedure

CHS 626EH

Firmware checksum

S.n. 6574

Serial Number (page required by MID directive)

YEAR 2023

Year of manufacturing (page required by MID directive)

TYPE nEETEr

Instrument type (page required by MID directive)

VER. 1.04

Firmware version

Partial \rightarrow 1-2 Σ L EXP T1 T2 \rightarrow PF THD% \rightarrow Hz

8888 Hz

8888888888

Display test

Password

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

OFF PASSWORD

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

Entr PASSWORD

Parameters in S0 models

Pulses per kWh

- In direct connected models, the following values are available: 1, 2, 5, 10, 20, 50, 100 or 200.
- The default value is 200.

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 under T1
- S02 proportional to Imported Active Power under T2

TAR1-TAR2

- S01 proportional to Imported Active Power under T1
- S02 proportional to Imported Active Power under T2

OFF PASSWORD

• Password Enabled/Disabled

Technical data

Data in compliance with EN 62052-11:2021+A11:2022, EN 62052-31:2016-06, EN 50470-3:2022, EN 62059-32-1:2012

General characteristics			
Housing	DIN 43880	DIN	4
Mounting	EN 60715	DIN rail	35 mm
Depth		mm	60
Weight		g	424
Operating features			
Connection	to three-phase network - number of wires		-
Storage of energy values and configuration	Internal flash non volatile memory		-
Tariff	for active and reactive energy		-
Approval (EN 50470-3:2022)	T1 ... T2 230V		-
Reference Voltage (Un)			
phase / neutral	VAC		230
phase / phase	VAC		400
Nominal Current (In)	A		5
Transition Current (Itr)	A		0.5
Minimum Current (Imin)	A		0.25
Maximum Current (Imax)	A		80
Starting Current (Ist)	A		0.015
Reference Frequency (fn)	Hz		50
Number of phases / number of wires	-		3 / 4
Certified Measures			
Accuracy		kWh kWh	kWh
- Active Energies (accord. to EN 50470-3:2022)	classe		B / 1
- Active Powers (accord. to IEC 62053-21:2020 and IEC 61557-12:2018)	classe		2
- Reactive Energies (accord. to IEC 62053-23:2020)			
- Reactive Power (accord. to IEC 62053-21:2020)			
Supply Voltage and Power Consumption			
Operating Supply Voltage range	V		92 ... 276 / 160 ... 480
Maximum Power Consumption (Voltage circuit)	VA / W		\leq 2 / 0.6
Maximum VA burden (Current circuit) @ Imax	VA		\leq 2
Voltage Input Waveform	-		AC
Voltage impedance	M Ω		1
Current impedance	m Ω		\leq 20
Overload capability			
Voltage		phase / neutral	VAC 276
		phase / neutral	VAC 300
		phase / phase	VAC 480
		phase / phase	VAC 800
Current		A	96
		A	2400
Measuring Features			
Voltage range	phase / neutral	VAC	92 ... 276
	phase / phase	VAC	160 ... 480
Current range	A		0.25 ... 80
Frequency range	Hz		45 ... 65
Measured Quantities	-	V, A, kWh, kvarh, PF, Hz, kW, kvar	
3 phases Energy calculation	-		WELMEC
Display features			
Display type	LCD with backlight	-	7.2 +3.2
Active Energy	7 digits + 2 decimal digits	kWh	0.01 ... 99999999.9
Reactive Energy	7 digits + 2 decimal digits	kvarh	0.01 ... 99999999.9
Voltage	3 digits + 1 decimal digit	V	92.0 ... 276.0
Current	2 digits + 2 decimal digits / 3+1 / 4+0	A	0.00 ... 80.00
Power factor	1 digit + 3 decimal digits with sign + capac./induc. indic.	-	-1.000 ... 1.000
Frequency	2 digits + 2 decimal digits	Hz	45.00 ... 65.00
Active Power	2 digits + 2 decimal digits	kW	0.00 ... 22.08
Reactive Power	2 digits + 2 decimal digits	kvar	0.00 ... 22.08
Apparent Power	2 digits + 2 decimal digits	kVA	0.00 ... 22.08
Display refresh period		s	1
Optical metrological LED			
Front mounted red LED (meter constant)	proportional to active imp/exp Energy	imp/kWh	1000
Safety			
Utilization category	-		UC2
Overvoltage category	-		3
Protective class	classe		II
AC voltage test	kV		4
Degree of pollution	-		2
Operational voltage	V		300
Impulse voltage test (Uimp)		1.2/50 μ s-kV	6.4
Housing material flame resistance	UL 94	classe	V0
Safety-sealing between upper and lower housing part	-		<input checked="" type="checkbox"/>
Printed circuit board flammability class	-		V1
Material Group	-		IIIA
IR Connectable Communication Modules			
For communication modules	-		<input checked="" type="checkbox"/>
Pulse Outputs (S0 signals)			
Pulse Output 1	adjustable	acc. to IEC 62053-3	-
Pulse Output 2	adjustable		-
Pulse Rate	adjustable		p/kWh
			(*) N - dep. on Pulse on Time
Pulse ON-time	adjustable	ms	30 ... 100
Pulse ON maximum current		mA	90
Pulse OFF leakage current		μ A	1
Isolation class	-		SELV circuit
Tariff			
Tariff 1	-		<input checked="" type="checkbox"/>
Tariff 2	VAC		230 \pm 20%
Input impedance	k Ω		224
Environmental conditions			
Storage temperature range	$^{\circ}$ C		-25 ... +70
Operating temperature range	$^{\circ}$ C		-25 ... +55
Mechanical environment	-		M1
Electromagnetic environment	-		E2
Installation	indoor only		<input checked="" type="checkbox"/>
Altitude (max.)	m		\leq 2000
Humidity	-		yearly average, without condensation \leq 75%
	-		on 30 days per year, without condensation \leq 95%
IP rating	-		IP51
	-		in built-in condition (front part)
	-		terminal block
Emission class compatibility CISPR 32	classe		B