

Single-phase Digital Energy meters - Direct connection 80 A

Operating instructions

- This family of metering equipments provides the essential measurement capabilities required to monitor a single phase electrical installation.
- There are 3 models, mainly distinguished by the type of remote communication:

- (*) certification parameters: 0 25-6 (80) A, Class B, 230 VAC 50 Hz, -25 °C...+55 °C, Quotients: 3 tariffs.
- Active Energy Class B (according to EN 50470)
- and Reactive Energy Class 2 (according to IEC 62053-23)
- Direct connection up to 63 A)
- Backlight LCD display and 3 push buttons (left, right, and center)
- Energy, V, L, PF, F, P, Q and to configure some parameter(s)
- Display with 8 digits
- Self supplied by the input voltage itself)
- 2 DIN modules with (38 mm)
- 2 tariff controller by 230 VAC digital input
- Depending on the models:
- 2 50 started low voltage table outputs, or
- communication via Modbus RTU or
- communication via M-Bus (1 unit load)

RISK OF ELECTRIC SHOCK, BURNS OR QUALIFIED

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

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

Ordering information

Code	Model	Description
ECSEM36MID	M1PRO 80 Mod	2 x 50 active and 2 tariff, MID certified
ECSEM36MID	M1PRO 80 M-Bus	2 tariff, MID certified
ECSEM36MID	M1PRO 80 Modbus	built-in Modbus - 2 tariff, MID certified

(*) For Swiss market only active energy on display

Display

Value energy

10000 mpkWh

10000 kWh

config reset

OK

Precision control LED

Commands

- Scroll Key:** This key is used to scroll pages and to modify parameters value. Its pushing is accepted only if it is shorter than 1.5 second.
- OK Key:** This key is used alone to enable a new menu function or to confirm a parameter value during its modification. Its pushing is accepted only if shorter than 1.5 seconds.
- ESC Key:** This key is used alone to exit from a sub-menu. To cancel a parameter modification or to go back to the main page. In these cases, its pushing is accepted only <1.5 seconds.
- A long pushing (>1.5 seconds) of the "ESC" key:** is used in the Partial Energy Registers Pages to reset their values.
- Push these 2 keys together:** for at least 1.5 seconds, to enter into the Configuration Menu

Symbols

- Measuring elements
- Protected by double insulation

MID calibrated

A) Device code and certification data indicators

B) Safety-sealing between upper and lower housing part

Dimension

Sealable terminal covers

Cable stripping length and terminal screw torque

80 A direct connection main terminals

Screw driver P22

Tariff and Pz2 outputs terminals

Screw driver blade 0.8x3.5 mm

Communication terminals

Screw driver blade 0.8x3.5 mm

Device Switch-on and Main Page

M1PRO 80 M1PRO 80 M-Bus M1PRO 80 Modbus

2 PULSES 7Mbus 7Modbus

kWh 65231

Energy import (supplied) → Energy export (absorbed) ←

Main Page: This page appears not only at device switch-on, but also in case for 30 seconds no key is pushed. The value is the sum of 2 registers: Imported Act. Energy Tariff T1 + Imported Act. Energy Tariff T2, or, alternatively, the sum of the Exported ones.

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 Menu

kWh 65231

kWh 908664

kWh 17465238 kvarh

kvarh 961

Err 1FF-2

kWh 3657

kWh 52437

kvarh

Instantaneous Measures list

U-1-PF 2

kW kvar

Err 109

Err 82FA

kWh 88888888

kWh 908664

kvarh

Partial Energy Registers List

kWh 146287

kWh 32779

kWh 583095

kWh 89485

kWh 842619

kWh 13742398

kWh 29280

kWh 23452

Instantaneous Measurements List

kW var

kvar T1

23031 U

6185 A

PF 0.904

Fc 50.12

Partial Energy Registers Reset Procedure

kvarh 25437

kvarh 000

Access to the Configuration Menu

23031 U

PSW 0000

PSW 0000

PSW 0010

PSW 0010

PSW 0010

PSW 0010

Technical Data

Data in compliance with EN 50470-1, EN 50470-3, EN 62053-23 and EN 62053-31

General characteristics	DIN 43880	DIN	2 Modules	2 Modules
Housing	EN 60715	35 mm	70	70
Mounting		mm	175	175
Depth		g	175	175
Weight				

Operating features		n°	2	2
Connection	to single-phase network			
Storage of energy values and config.	Internal flash memory		yes	yes
Tariff	for active and reactive energy	n° 2	T1/T2	T1/T2

Approval (according to EN 50470-1, EN 50470-3)				
Reference Voltage Un	VAC	230	230	230
Reference Current (Iref)	A	5	5	5
Minimum Current (Imin)	A	0.25	0.25	0.25
Maximum Current (Imax)	A	80	80	80
Starting Current (Ist)	A	0.015	0.015	0.015
Reference Frequency (fn)	Hz	50	50	50
Number of phases (number of wires)		1 (2)	1 (2)	1 (2)

Certified Measures				
Accuracy	Active Energies (accor to EN 50470-3) and Active Powers	classe	B	B
	Reactive Energies (accor to EN 62053-23) and Reactive Power	classe	2	2

Supply Voltage and Power Consumption				
Operating Supply Voltage range	V (W)	92 - 276	92 - 276	92 - 276
Maximum Power (Disipation Voltage circuit)	VA (W)	<=1 (1)	<=1 (1)	<=1 (1)
Maximum VA burden (Current circuit) @ Imax	VA	=1	=1	=1
Voltage Input Waveform	AC	AC	AC	AC
Voltage Impedance	MΩ	1	1	1
Current Impedance	mΩ	<=20	<=20	<=20

Overload capability				
Voltage	VAC	276	276	276
Temporary (1 s)	VAC	300	300	300
Continuous	A	80	80	80
Current	A	2400	2400	2400

Measuring Features				
Voltage range	VAC	92 - 276	92 - 276	92 - 276
Current range	A	0.015 - 80	0.015 - 80	0.015 - 80
Frequency range	Hz	45 - 65	45 - 65	45 - 65
Measured Quantities		V, A, kWh, kVARh, PF, Hz, kW, kVAR	V, A, kWh, kVARh, PF, Hz, kW, kVAR	V, A, kWh, kVARh, PF, Hz, kW, kVAR

Display features				
Display type	LCD backlighted		6.2 x 3	6.2 x 3
Energy digits dimension	mm	6.3 x 3	6.3 x 3	6.3 x 3
Active Energy	6 digits + 2 decimal digits	min. ... max. kWh	0.01 - 999999.99	0.01 - 999999.99
Reactive Energy	6 digits + 2 decimal digits	min. ... max. kvarh	0.01 - 999999.99	0.01 - 999999.99
Voltage	3 digits + 2 decimal digits	V	92.00 - 276.00	92.00 - 276.00
Current	3 digits + 2 decimal digits	A	0.00 - 80.00	0.00 - 80.00
Power factor	1 digit + 3 dec. digits + capac./induc. indic.		0.000 - 1.000	0.000 - 1.000
Frequency	2 digits + 2 decimal digits	Hz	45.00 - 65.00	45.00 - 65.00
Active Power	2 digits + 2 decimal digits with sign	kW	0.00 - 17.40	0.00 - 17.40
Reactive Power	2 digits + 2 decimal digits with sign	kVAR	0.00 - 17.40	0.00 - 17.40
Running Tariff	1 digit		T1/T2	T1/T2
Display refresh period			1	1

Optical metrological LED				
Front mounted red LED (meter constant)	proportional to active imp/exp Energy	p/kWh	1000	1000

Safety				
Protective class	classe	II	II	II
AC voltage test (EN 50470-3, 7.2)	kV	4	4	4
Degree of pollution		2	2	2
Operational voltage	V	300	300	300
Impulse voltage test	1.2/50 ps-kV	6	6	6
Housing material flame resistance	UL 94	classe	V0	V0
Safety-sealing between upper and lower housing part			yes	yes

Pulse Outputs (ON signals, acc. to IEC 62053-31)				
Pulse Output 1 or 2			selectable	
			kWh →, kWh ←, kWh (T1) →, kWh (T2) →	

Pulse Rate				
Pulse Rate	adjustable	p/kWh - p/kvarh	1 - 1000	
Pulse ON duration	adjustable	msec	30 - 100	
Operating voltage	Min - Max	VAC (DC)	5 - 28 (5 - 39)	
Pulse ON maximum current	in the range 3 - 28 VAC (5 - 39 VDC)	mA	90	
Pulse OFF leakage current	in the range 3 - 28 VAC (5 - 39 VDC)	µA		
Isolation class			SELV	

Tariff				
Tariff 1			open contact	open contact
Tariff 2			VAC 230 ±20%	230 ±20%
Input impedance	MΩ	224	224	224

Embedded communication				
Modbus RTU	RS-485 - 3 wires			baud rate min.-max. 1200-38400 bps
M-Bus	2 wires			baud rate min.-max. 300-8600 bps
Isolation class				SELV

IR Connectable Communication Modules				
For communication module connection (LAN-TC/P / M-Bus / Modbus RTU / KNX)			yes	yes

Connection terminals				
Screwdriver for mains terminals	head with 2 +/-	POZIDRIV	P22	P22
Screwdriver for tariff and communic. terminals	slotted head	mm	0.8 x 3.5	0.8 x 3.5
Terminal capacity main current (max)		mm²	1.65 (33)	1.65 (33)
Terminal capacity for tariff and communication	stranded wire with sleeve min. (max)	mm²	1 (4)	1.65 (33)
	solid wire min. (max)	mm²	1 (4)	1 (2.5)
	stranded wire with sleeve min. (max)	mm²	1 (2.5)	1 (2.5)

Environmental conditions (storage)				
Temperature range	°C	-25 - +70	-25 - +70	-25 - +70

Environmental conditions (operating)				
Temperature range	°C	-25 - +55	-25 - +55	-25 - +55
Mechanical environment			M1	M1
Electromagnetic environment			E2	E2
Installation	Indoor		yes	yes
Altitude (max)	m		<=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.

Tariff 1-2 Energy Registers List

Instantaneous Measurements List

Partial Energy Registers Reset Procedure

Access to the Configuration Menu

Parameters Available in M1PRO 80 Modbus

Modbus Address: 1 ... 247

Baud Rate: 1200-2400-4800-9600-19200-38400

Parity: None-Even and Odd

Stop Bits: 1/2

Password: 0000 ... 9999

Parameters Available in M1PRO 80 M-Bus

M-Bus Primary Address: 0 ... 250

Baud Rate: 300-600-1200-2400-4800-9600

M-Bus Secondary Address (4 MS digits)

M-Bus Secondary Address (4 LS digits)

Password: 0000 ... 9999

Parameters Available in M1PRO 80 S0

S0 p/kWh: 1 ... 1000

Pulse length (ON time): 30 ... 100 msec

S01 Pulse Output Mode

S02 Pulse Output Mode

Password: 0000 ... 9999

Multivalue Parameters Modification

In this example the Parity value is changed from None to Even. In any moment, push the "ESC" key to stop the modification

Numeric Parameters Modification

In this example the Address value is modified from 167 to 18

Diagnostic Message

Error Condition

If the display shows these messages, the meters has got a malfunction and must be replaced.

Service and Maintenance

It should not be necessary to recalibrate device during its lifetime as it is an electronic meter with no moving parts with electronics and voltage and current sensors that do not naturally degrade or change with time under specified environmental conditions. If a degradation in the performance is observed the device has probably been partly damaged and should be sent for repair or exchanged. If the meter is dirty and needs to be cleaned, use lightly moistened tissue with a water based mild detergent. Make sure no liquid goes into the meter as this could damage the meter.

Wiring diagram

Model S0



RT = termination resistance (apply RT in cases recommended by RS-485 norm)

Technical Data

Data in compliance with EN 50470-1, EN 50470-3, EN 62053-23 and EN 62053-31

General characteristics	DIN 43880	DIN	2 Modules	2 Modules
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Operating features		n°	2	2
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Approval (according to EN 50470-1, EN 50470-3)				
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Certified Measures				
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Supply Voltage and Power Consumption				
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Overload capability				
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Measuring Features				
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Display features				
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Optical metrological LED				
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Safety				
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Pulse Outputs (ON signals, acc. to IEC 62053-31)				
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Pulse Rate				
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Tariff				
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Embedded communication				
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IR Connectable Communication Modules				
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Connection terminals				
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Environmental conditions (storage)				
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Environmental conditions (operating)				
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(*) The metering equipment must be installed inside a cabinet with IP rating IP51 or better.

Schema di cablaggio

Modello S0



RT = resistenza di terminazione (applicabile nei casi raccomandati dalla norma RS-485)

Dati tecnici

Secondo Norma EN 50470-1, EN 50470-3, EN 62053-23 e EN 62053-31

Caratteristiche generali	DIN 43880	DIN	2 Moduli	2 Moduli
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