



Code ECSEM396 **Model** M3PRO 80 CANbus 24V

The Power Meter evaluates a 3P electrical network (V, VS, I, P, Q, S, PF, F and Active Energy) and makes measures available via CANbus communication. A large backlit LCD allows to easily read most of measures and of devices status. Power Supply is 24 (18...36) Vdc (Auxiliary Supply). CANbus and Aux Supply have the same ground. They are isolated (5kVrms) from mains terminals.

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.

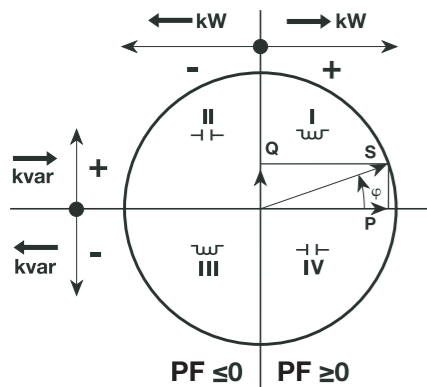
Any type of intervention on the products, including cases in which they cease to function or present defects, can be dangerous for the operator's safety and relieves the Manufacturer from all civil and criminal liability.

Function

Auxiliary Supply Voltage range 18-36 Vdc. Power consumption <= 0.8 W. The Auxiliary supply and CAN bus have the same ground (they are NOT isolated). The circuit is protected against polarity error.

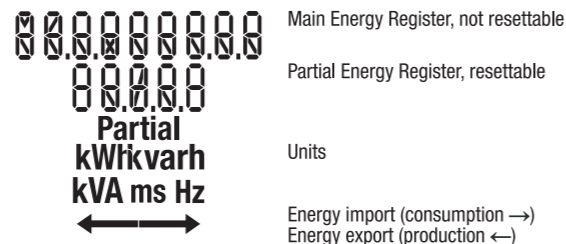
CANbus physical layer. The physical layer of CAN bus is compliant with ISO 11898-1. CAN_HIGH and CAN_LOW signals are duplicated, to facilitate the Daisy chaining connection, if adopted. To apply 120 Ohm termination, a short circuit is required between CAN_TERM and CAN_HIGH_IL. In a CAN network, the termination is mandatory on the first and on the last device. No other device must be terminated.

Power factor
Convention according to IEC 62053-23:2020



Layout of device

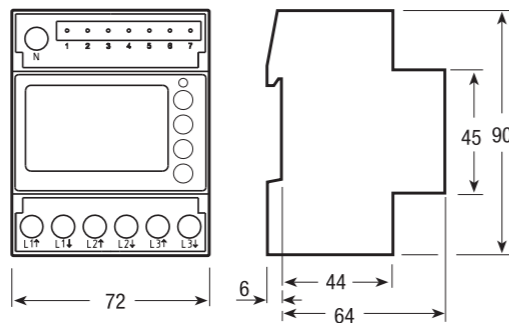
LCD display



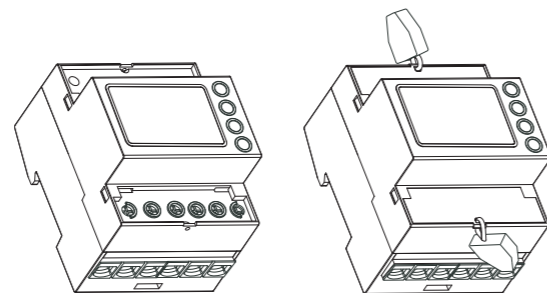
Commands

- 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

Dimensions



Sealable terminal cover

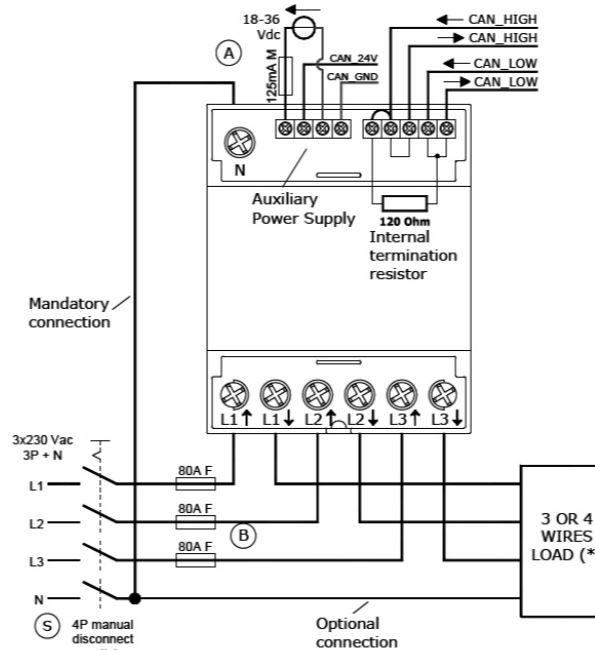


Wiring

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

The Power 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 Power Meter is intended for **INDOOR** installation only (according to EN 50470-1 and IEC 62052-31). The Power Meter must be installed on a DIN-rail and inside a cabinet with a protection degree (IP rating) equal to (or better than) IP51 and a flammability class (acc. to UL 94) = V0

Wiring diagram



NEUTRAL CONNECTION TO THE POWER METER IS MANDATORY

- S** Four-pole disconnectore with a contact separation of at least 3 mm. Cartridge Fuse 22X58mm, Certified according to IEC 60269-1. Fast Acting. Operating current 80 A. Max voltage rating >=276 Vac. Minimum interrupting rating 50kA.
- B** For example: Bussmann C22M80: Voltage rating 500 Vac, Breaking capacity 120 kA, The fuses break the Phase currents. The fuse holder is DIN-rail mounting and must be mounted closely to the device.
- A** Cartridge Fuse 5X20mm, Certified according to IEC 60127-2. Medium Acting. Operating current 125 A. Max voltage rating >50 Vac. Minimum interrupting rating >=20 A. For example: Multifuse 0218.125MPX, Voltage rating 250 Vac, Breaking capacity 35A.

Installation and uninstallation

The disconnectors 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.

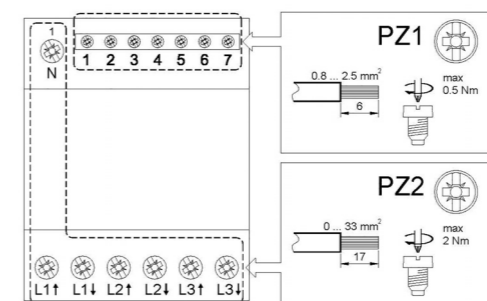
Help in case of problems

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.

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

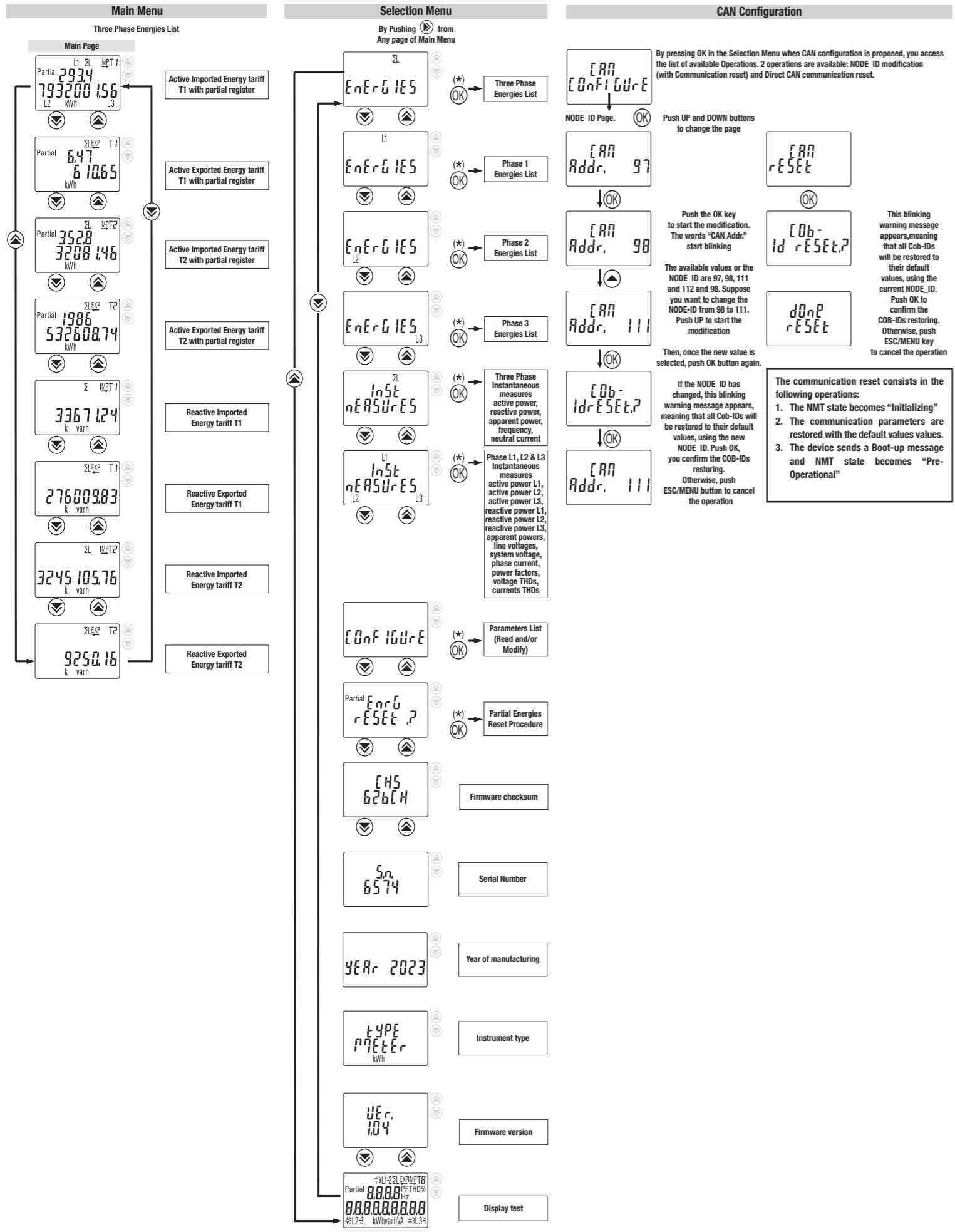


Energy Registers and Available Instantaneous Measures

- Legend:**
- Ea+** Imported Active Energy
 - Er+** Imported Reactive Energy
 - P:** Active Power
 - S:** Apparent Power
 - PF:** Power Factor
 - xx[ΣL]:** three-phase value
 - xx[ΣT]:** total value (including all Tariffs)
 - d:** Available on Display
 - Ea-** Exported Active Energy
 - Er-** Exported Reactive Energy
 - Q:** Reactive Power
 - P_Ea:** Resettable Partial active Energy
 - xx[N]:** value related with Neutral
 - xx[Ly]:** Line y value
 - xx[Tn]:** value related with Tariff
 - b:** Available via Communication Bus

OBIS code	Value	Display	CANopen
1.0.1.8.0.255	Ea+[ΣL][ΣT]	●	
1.0.1.8.1.255	Ea+[ΣL][T1] MID certified	●	●
1.0.1.8.2.255	Ea+[ΣL][T2] MID certified	●	●
1.0.2.8.0.255	Ea-[ΣL][ΣT]	●	
1.0.2.8.1.255	Ea-[ΣL][T1] MID certified	●	●
1.0.2.8.2.255	Ea-[ΣL][T2] MID certified	●	●
1.0.3.8.1.255	Er+[ΣL][T1]	●	
1.0.3.8.2.255	Er+[ΣL][T2]	●	
1.0.4.8.1.255	Er-[ΣL][T1]	●	
1.0.4.8.2.255	Er-[ΣL][T2]	●	
--	P_Ea+[ΣL][Tn]		
--	P_Ea-[ΣL][Tn]		
1.0.21.8.1.255	Ea+[L1][T1]	●	
1.0.41.8.1.255	Ea+[L2][T1]	●	
1.0.61.8.1.255	Ea+[L3][T1]	●	
1.0.22.8.1.255	Ea-[L1][T1]	●	
1.0.42.8.1.255	Ea-[L2][T1]	●	
1.0.62.8.1.255	Ea-[L3][T1]	●	
1.0.21.8.2.255	Ea+[L1][T2]	●	
1.0.41.8.2.255	Ea+[L2][T2]	●	
1.0.61.8.2.255	Ea+[L3][T2]	●	
1.0.22.8.2.255	Ea-[L1][T2]	●	
1.0.42.8.2.255	Ea-[L2][T2]	●	
1.0.62.8.2.255	Ea-[L3][T2]	●	
--	Er+[L1][T1]	●	
--	Er+[L2][T1]	●	
--	Er+[L3][T1]	●	
--	Er-[L1][T1]	●	
--	Er-[L2][T1]	●	
--	Er-[L3][T1]	●	
--	Er+[L1][T2]	●	
--	Er+[L2][T2]	●	

OBIS code	Grandezza	Display	CANopen
--	Er+[L3][T2]	●	
--	Er-[L1][T2]	●	
--	Er-[L2][T2]	●	
--	Er-[L3][T2]	●	
1.0.36.7.0.255	P[L1]	●	●
1.0.56.7.0.255	P[L2]	●	●
1.0.76.7.0.255	P[L3]	●	●
1.0.16.7.0.255	P[ΣL]	●	●
-	Q[L1]	●	●
-	Q[L2]	●	●
-	Q[L3]	●	●
-	Q[ΣL]	●	●
1.0.29.7.0.255	S[L1]	●	
1.0.49.7.0.255	S[L2]	●	
1.0.69.7.0.255	S[L3]	●	
1.0.9.7.0.255	S[ΣL]	●	
1.0.32.7.0.255	V[L1]	●	●
1.0.52.7.0.255	V[L2]	●	●
1.0.72.7.0.255	V[L3]	●	●
-	V[L1-L2]	●	
-	V[L2-L3]	●	
-	V[L3-L1]	●	
1.0.31.7.0.255	I[L1]	●	●
1.0.51.7.0.255	I[L2]	●	●
1.0.71.7.0.255	I[L3]	●	●
1.0.91.7.0.255	I[N]	●	
1.0.33.7.0.255	PF[L1]	●	
1.0.53.7.0.255	PF[L2]	●	
1.0.73.7.0.255	PF[L3]	●	
1.0.13.7.0.255	PF[ΣL]	●	●
1.0.14.7.0.255	Frequenza di rete	●	●



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	64
Weight		g	424
Operating features			
Connection	to three-phase network - number of wires		4
Storage of energy values and configuration	Internal flash non volatile memory		☑
Approval (EN 50470-3:2022)			
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		kWh kWh	kWh
Accuracy			
- Active Energies (accord. to EN 50470-3:2022)		classe	B / 1
- Active Powers (accord. to IEC 62053-21:2020 and IEC 61557-12:2018)			
- Reactive Energies (accord. to IEC 62053-23:2020)		classe	2
- Reactive Power (accord. to IEC 62053-21:2020)			
Supply Voltage and Power Consumption			
Operating Supply Voltage range		V	18 ... 36 Vdc
Maximum Power Consumption (Voltage circuit)		VA / W	≤2 / 0.6
Maximum VA burden (Current circuit) @ Imax		VA	≤2
Voltage Input Waveform		-	AC
Voltage impedance		MΩ	1
Current impedance		mΩ	≤20
Overload capability			
Voltage	continuous	phase / neutral	VAC 276
	temporary (1 s)	phase / neutral	VAC 300
	continuous	phase / phase	VAC 480
	temporary (1 s)	phase / phase	VAC 800
Current	Maximum	A	96
	temporary (10 ms)	A	2400
Measuring Features			
Voltage range	phase / neutral	VAC	184 ... 276
	phase / phase	VAC	320 ... 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		-	vectorial sum
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 μs-kV	6.4
Housing material flame resistance	UL 94	classe	V0
Safety-sealing between upper and lower housing part		-	☑
Printed circuit board flammability class		-	V1
Material Group		-	IIIa
CANbus Version CAN 2.0A			
SELV circuit (*)			Physical layer ISO 11898-1
Frame format			Base Frame format
(*) The Aux. supply ground is internally connected to the ground of CAN driver (not isolated circuits)			
Tariff			
Tariff 1		-	☑
Tariff 2		VAC	230 ±20%
Input impedance		kΩ	224
Environmental conditions			
Storage temperature range		°C	-40 ... +85
Operating temperature range		°C	-25 ... +55
Mechanical environment		-	M1
Electromagnetic environment		-	E2
Installation	indoor only	-	☑
Altitude (max.)		m	≤2000
Humidity	yearly average, without condensation	-	≤75%
	on 30 days per year, without condensation	-	≤95%
IP rating	in built-in condition (front part)	-	IP51
	terminal block	-	IP20
Emission class compatibility CISPR 32		classe	B