Three-phase Digital Energy meters - BASIC - Direct connection 80 A

IIST099-01   Stand 30-07-2012

with additional partial active energy counter resettable and inbuilt communication M-Bus - 2 tariff

Code	Description
DRB-80-3P-M	three-phase digital energy-meter with direct connection 0.25-5 (80) A - **2 tariff** and inbuilt communication **M-Bus (MID calibrated)**

**with additional partial active energy counter resettable and inbuilt communication Modbus RTU - 2 tariff**

Code	Description
DRB-80-3P-MOD	three-phase digital energy-meter with direct connection 0.25-5 (80) A - **2 tariff** and inbuilt communication **Modbus RTU (MID calibrated)**

⚠ WARNING

Installation must be carried out and inspected by a specialist or under his supervision.
When working on the instrument, switch off the mains voltage!

- This family of devices provides a set of energy meters aimed to be directly connected to systems where high current is required. All the meters are equipped with an easy to read LCD on which all the three phases active energy counters are displayed, with a red light LED which blinks in proportion to the measured active energy and with an optocoupler that allows the storage of energy on two different tariffs. Depending on the model, an insulated M-Bus communication interface or an insulated Modbus communication interface is built in, together with two solid state relays which generate pulses proportional to the measured energy. Both the M-Bus, and the Modbus, communication interface offers a set of 59 measurements.
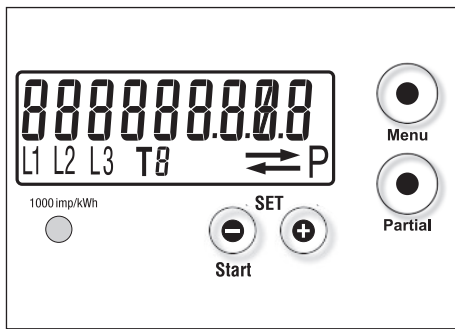
Display

- Energy value
- Energy import (→)
- Energy export (←)
- Energy line (L1-L2-L3)
- Tarif Running tariff, called tariff
- Energy value "Partial"
- Precision control LED

Commands

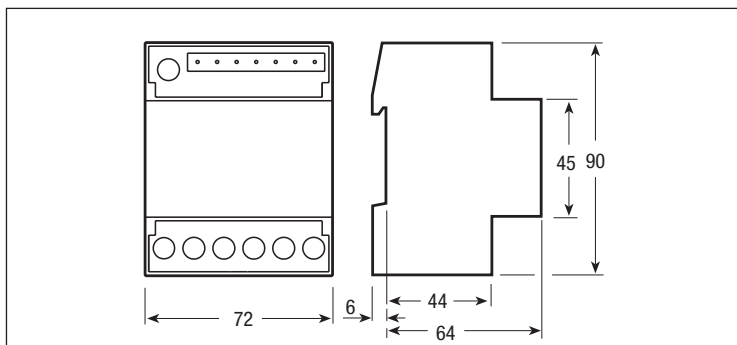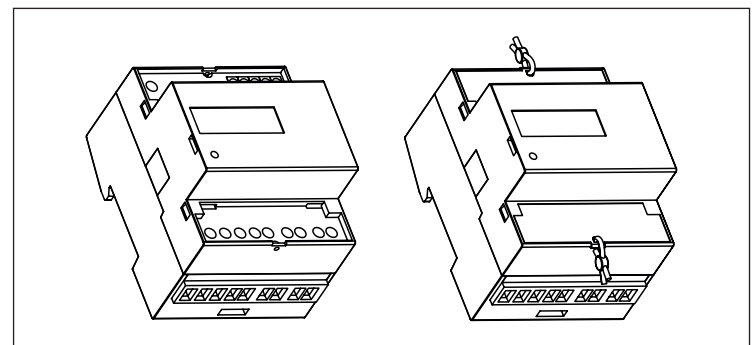- Menu key for reading selection
- Command button for "partial" reading selection
- Parameters set

Dimension

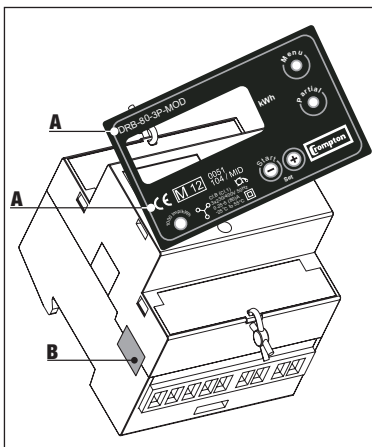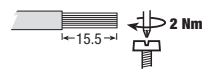### Sealable terminal covers

MID calibrated

DRB-80-3P-M
DRB-80-3P-MOD

A) Device code and certification data indications

B) Tamper proof seal between upper and lower housing part

Cable stripping length and max. terminal screw torque

80 A direct connection main terminals Screw driver PZ2	15.5 / 2 Nm
Tariff and communication terminals Screw driver blade 0.8x3.5 mm	9 / 0.8 Nm
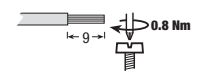
Symbols

- Measuring elements
- Reversal preventing device
- Protected by double insulation

Main Menu

Device Switch ON

Page 1:
In this page the value of the current cumulative 3-phase Active Energy is represented (or the last one that has incremented). The energy may be Active Consumed (right arrow), Active Generated (left arrow), depending on the current Energy flowing arrow, with Tariff T1 or T2.

Page 1 `1056072.8.3` L1 L2 L3 T2 → Menu

Page 2 `89447.65` L1 L2 L3 T2 ← Menu

Page 2-3-4:
In the second third and fourth pages are represented the remaining 3 energy registers.

Page 3 `67065.13` L1 L2 L3 T1 → Menu

Page 4 `27065.13` L1 L2 L3 T1 ← Menu

Page 5:
This page changes depending on the model
• **Model equipped with M-Bus or Modbus**: In this page the Modbus address or the M-Bus primary address appears. This value can be altered, see the section Communication Address

Model M-Bus   **Model Modbus**

Page 5 `Addr      18` Menu   `Addr     210` Menu

Page 6:
This page changes depending on the model
• **Model equipped with M-Bus or Modbus**: In this page the communication baud rate appears. This value can be altered, see the section Communication Baudrate.

Page 6 `br     1200` Menu   `br    19200` Menu

Page 7-8:
These pages are available only for the model equipped with M-Bus. In these pages the Secondary address appears. These address can range from 1 to 99999999, hence requires 2 pages (the 1st for the 4 highest digit, the 2nd for 4 lowest digit). In this example, its value is 68010643.
See the section Communication Address.

Page 7 `Ad2H  6801` Menu

Page 8 `Ad2L  0643` Menu

Page 9:
You can read the index of firmware release.

Page 9 `rEL    1.04` Menu

Page 10:
The checksum is periodically calculated to verify that the firmware is reliable. The result of the calculation appears in this page.

Page 10 `ch    6A2b` Menu

Page 11:
All the display segment are visible.

Page 11 `888888.8.8` L1 L2 L3 T8 ⇄ P Menu
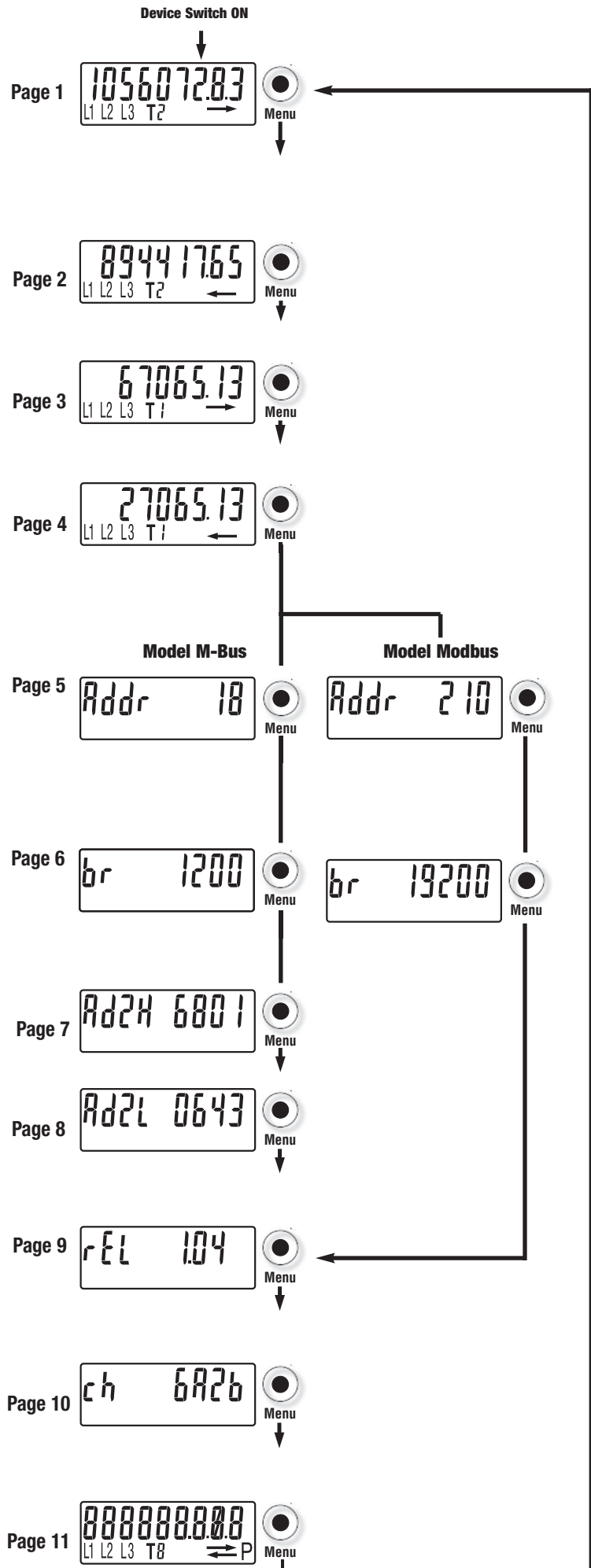
Whichever the page on the display, if no key is pushed for at least 20 sec., the main page appears again.

Partial Counter Menu

In any page of the **"Main Menu"**, a press of the **"Partial key"** gains entry into the **"Partial Menu"** where partial active energy counters are readable in the main, second, third and fourth pages (i.e. for monthly energy consumption). These counters are not saved when the device is switched off.
By pushing the partial key in any of the four pages, you return to the **"Main Menu"**.
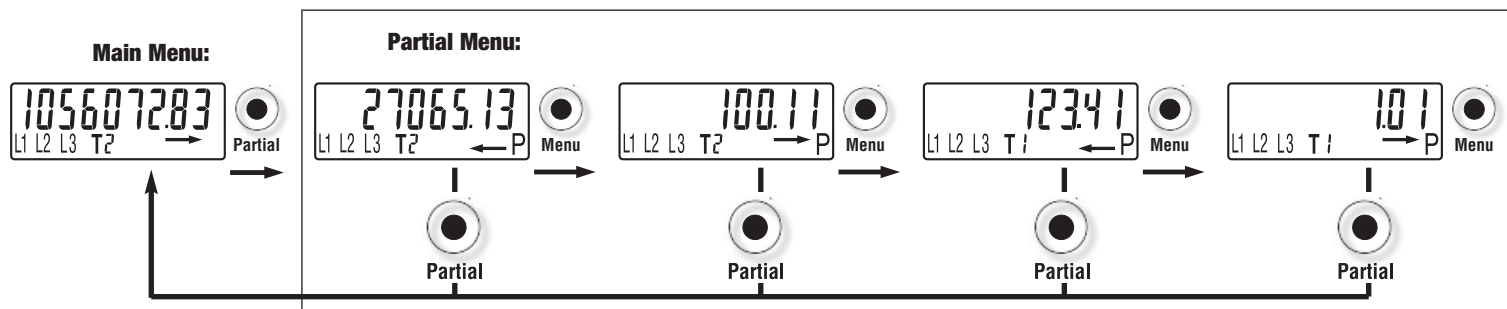
Pressing the **"Menu key"** for 4 sec., in any page of the **"Partial Counters"** allows entry to the zeroing menu of the **"Partial Counters"**, and **"rESET"** appears on the display. The key must be released, and pressed again for a further 4 Seconds to actually do the **"Command Reset"**.
If after 4 sec. from the initial button release the **"Command Reset"** is not done, the display will go back to default without the reset.
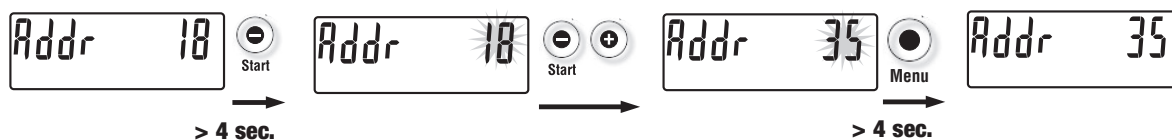

Communication Address

Modbus
In the Address page, by pressing the **"Start (-) key"** for 4 sec, the value of the Address will blink.
Press **"Start (-) key"** or **"(+)"** to change the value. Press the **"Menu key"** for 4 sec. to confirm change, otherwise after 5 seconds the changes will be lost.


M-Bus
Both Primary and Secondary Address can be set. For setting the Primary Address follow the instructions above, the Modbus Address. The Secondary address can range from 1 to 99999999, hence requires 2 pages. In the **"Secondary Address Page 1"** the 4 most significant digits of the Address are set by pressing the **"Start (-) key"** for 4 sec. The value of the Address blinks on the display. Push **"Start (-) key"** or **"(+)"** to change the value. Push the **"Menu key"** for 4 sec. to confirm, otherwise within 5 seconds the change will be lost.
In the **"Secondary Address Page 2"** the 4 least significant digits of the Address are set. Follow the instruction as for the **"Secondary Address Page 1"**
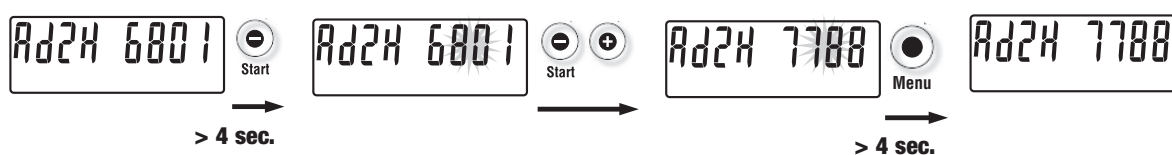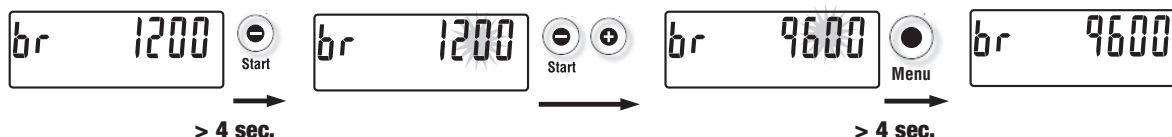

Communication Baudrate

In the Baud rate page, by pressing the **"Start (-) key"** for 4 sec, the value of the Baudrate will blink.
Press **"Start (-) key"** or **"(+)"** to change the value. Press the **"Menu key"** for 4 sec. to confirm change, otherwise after 5 seconds the changes will be lost.


Diagnostic Message

Missing Phases
If one or more phases is not detected, the corresponding phase icon disappears from the bottom row of the display.E.g. L2 is not detected.
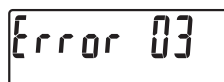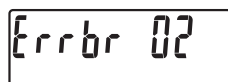

Phase Sequence Error
When the 3 phases are not in the correct zero-crossing sequence this message appears and the phase icons L1 and L2 blink. To make this message disappear, without changing the wiring you can keep the **"Menu key"** pressed for at least 4 sec.
(Warning, this may cause the measurements to be wrong)
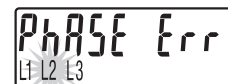
Error Condition
When the display show these messages, the meters has got a malfunction and must be replaced.

Note

TE ENERGY
connectivity

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.
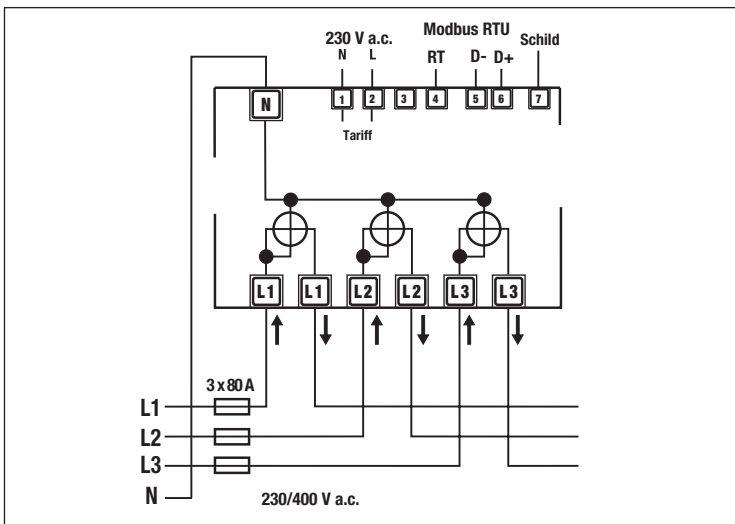
Wiring diagram

Modbus	M-Bus

4 wires connection, monitoring any 4 wires load
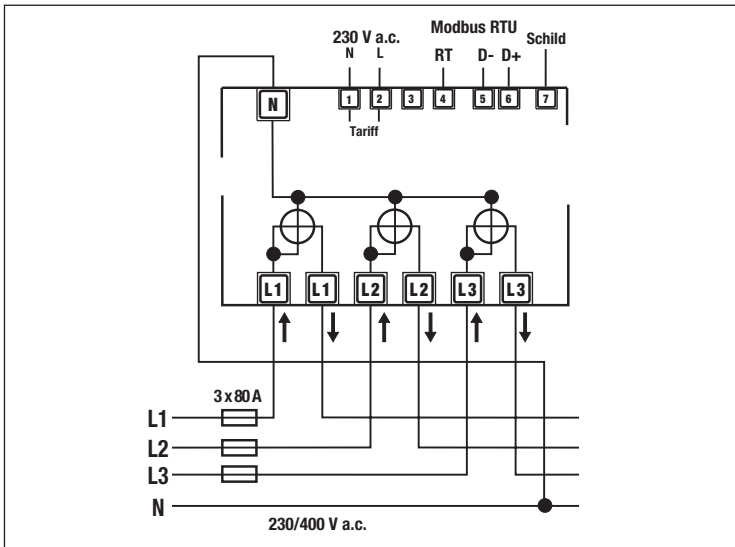
4 wires connection, monitoring any 4 wires load

4 wires connection, monitoring any 3 wires load
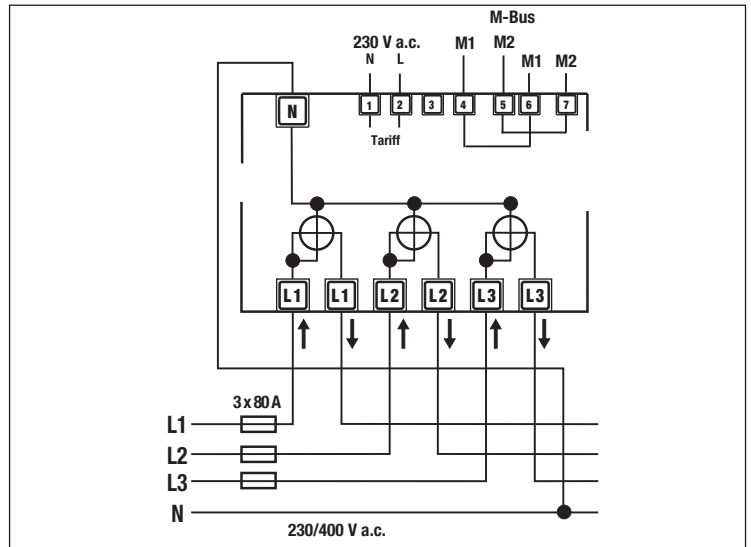
4 wires connection, monitoring any 3 wires load
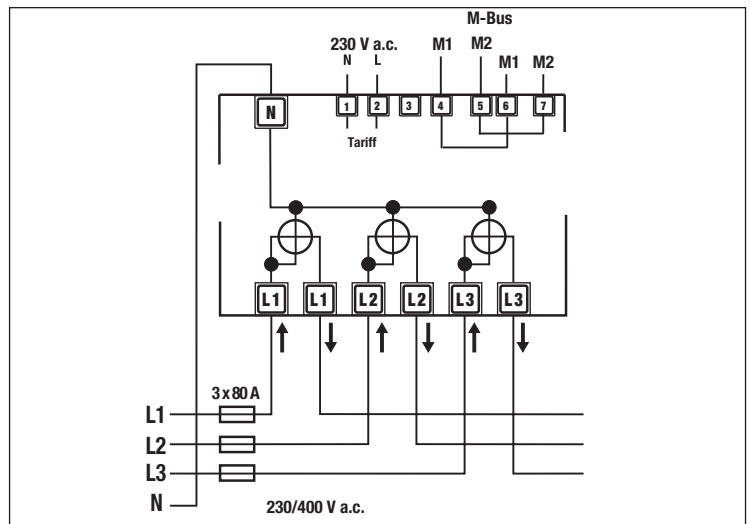
"Neutral wire must be connected to the meter"

Terminal Description

Modbus
- **1-2:** Tariff signal, isolated by a Opto Coupler. When there is a voltage of 230 VAC connected the device store energies on the Tariff 2 registers, otherwise on the Tariff 1 registers.
- **4:** Modbus network. For the termination of the network short this terminal with terminal 3.
- **5:** Modbus network. Data -
- **6:** Modbus network. Data +
- **7:** Modbus network. Shield
- **L1:** Voltage connection of phase 1.
- **L2:** Voltage connection of phase 2.
- **L3:** Voltage connection of phase 3.
- **N:** Neutral connection.

M-Bus
- **1-2:** Tariff signal, isolated by a Opto Coupler. When there is a voltage of 230 VAC connected the device store energies on the Tariff 2 registers, otherwise on the Tariff 1 registers.
- **4-6:** M-Bus network. These terminals are internally connected.
- **5-7:** M-Bus network. These terminals are internally connected.
- **L1:** Voltage connection of phase 1.
- **L2:** Voltage connection of phase 2.
- **L3:** Voltage connection of phase 3.
- **N:** Neutral connection.

Technical data

Data in compliance with EN 50470-1, EN 50470-3			DMB-80-3P-MOD direct connection 80 A inbuilt communication Modbus	DMB-80-3P-M direct connection 80 A inbuilt communication M-Bus
General characteristics				
• Housing	DIN 43880	DIN	4 modules	4 modules
• Mounting	EN 60715	35 mm	DIN rail	DIN rail
• Depth		mm	70	70
Operating features				
• Connectivity	to three-phase network	n° wires	4	4
• Storage of energy values and configuration	digital display (EEPROM)	-	yes	yes
• Display tariffs identifier	for active energy	n° 2	T1 and T2	T1 and T2
Supply				
• Certified voltage range *Un*		VAC	230	230
• Operating voltage range		VAC	184 ... 276	184 ... 276
• Certified frequency *fn*		Hz	50	50
• Operating frequency range		Hz	49 ... 51	49 ... 51
• Rated power dissipation (max.) *Pv*		VA (W)	≤8 (0.6)	≤8 (0.6)
Overload capability				
• Voltage *Un*	continuous; phase/phase	VAC	480	480
	1 second: phase/phase	VAC	800	800
	continuous; phase/N	VAC	276	276
	1 second: phase/N	VAC	300	300
• Current *Imax*	continuous	A	80	80
	momentary (10 ms)	A	2400	2400
Display (readouts)				
• Connection errors and phase out	discernible from phase-sequence indic.	-	PHASE Err	PHASE Err
• Display type	LCD	n° digits	9 (2 decimal)	9 (2 decimal)
	digit dimensions	mm x mm	6.00 x 3	6.00 x 3
• Active energy: 1 display, 9 digit - 2 tariffs	min. measuring energy	kWh	0.01	0.01
+ display import or export (arrow)	max. measuring overflow	kWh	9999999.99	9999999.99
• Instantaneous tariff measurement	1 display, 1-digit	-	T1 or T2	T1 or T2
• Display period refresh		s	1	1
Measuring accuracy				
• Active energy	acc.to EN 50470-3	class	B	B
Measuring input				
• Type of connection			direct	direct
• Voltage *Un*	phase/phase	VAC	400	400
	phase/N	VAC	230	230
• Operating range voltage	phase/phase	VAC	319 ... 480	319 ... 480
	phase/N	VAC	184 ... 276	184 ... 276
• Current *Iref*		A	5	5
• Current *Imin*		A	0.25	0.25
• Operating range current *(Ist ... Imax)*	direct connection	A	0.015 ... 80	0.015 ... 80
• Frequency		Hz	50	50
• Input waveform		-	sinusoidal	sinusoidal
• Starting current for energy measurement *(Ist)*		mA	15	15
Optical interface				
• Front side *(accuracy control)*	LED	imp/kWh	1000	1000
Safety acc. to EN 50470-1				
• Indoor meter		-	yes	yes
• Degree of pollution		-	2	2
• Operational voltage		VAC	300	300
• AC voltage test (EN 50470-3, 7.2)		kV	4	4
• Impulse voltage test		1.2/50 µs-kV	6	6
• Protection class (EN 50470)		class	II	II
• Housing material flame resistance	UL 94	class	V0	V0
• Safety-sealing between upper and lower housing part		-	yes	yes
Embedded communication				
• Modbus RTU baudrate	RS-485 - 3 wires	-	up to 38.400 bps	-
• M-Bus baudrate	2 wires	-	-	up to 9.600 bps
• M-Bus unit load	2 wires	-	-	1
Connection terminals				
• Type cage main current paths	screw head Z +/-	POZIDRIV	PZ2	PZ2
• Type cage pulse output	blade for slotted screw	mm	0.8 x 3.5	0.8 x 3.5
• Terminal capacity main current paths	solid wire min. (max.)	mm²	1.5 (35)	1.5 (35)
	stranded wire with sleeve min. (max.)	mm²	1.5 (35)	1.5 (35)
• Terminal capacity pulse output	solid wire min. (max.)	mm²	1 (4)	1 (4)
	stranded wire with sleeve min. (max.)	mm²	1 (2.5)	1 (2.5)
Environmental conditions				
• Mechanical environment		-	M1	M1
• Electromagnetic environment		-	E2	E2
• Operating temperature		°C	-25 ... +55	-25 ... +55
• Limit temperature of transportation and storage		°C	-25 ... +70	-25 ... +70
• Relative humidity (not condensation)		%	≤80	≤80
• Vibrations	50 Hz sinusoidal vibration amplitude	mm	±0.075	±0.075
• Degree protection	housing when mounted in front (term.)	-	IP51(∗)/IP20	IP51(∗)/IP20

(∗) **For the installation in a cabinet at least with IP51 protection.**