

COUNTIS *E15/E16*

Single-phase energy meter
Direct - 80 A M-BUS

EN



COUNTIS E15



COUNTIS E16 - MID



www.socomec.com/en/countis-e1x

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1. DOCUMENTATION

All documentation on the COUNTIS E15/E16 is available online at:
www.socomec.com/en/countis-e1x



2. HAZARDS AND WARNINGS

The term "device" used in the paragraphs below refers to the COUNTIS E15/E16.

The assembly, use, servicing and maintenance of this equipment must only be carried out by trained, qualified professionals.

SOCOMEK shall not be held responsible for failure to comply with the instructions in this manual.

2.1. Risk of electrocution, burns or explosion

- Only duly authorised and qualified personnel may work or install/uninstall the device.
- The instructions are valid together with the specific instructions for the device.
- The devices are designed only for their intended purpose as set out in the instructions.
- Only accessories authorised or recommended by SOCOMEK may be used in association with the devices.
- Before proceeding with installation, maintenance, cleaning, disassembly, connection, or maintenance work, the device and system must be cut off from the mains to avoid electrocution and damaging the system and device.
- These devices are not designed to be repaired by the user.
- For any questions related to the disposal of the device, please contact SOCOMEK.

Failure to comply with the instructions of the device and this safety information can cause bodily injury, electric shock, burns, death or damage to property.

2.2. Risk of damaging the unit

To ensure that the unit operates correctly, make sure that:

- The unit is correctly installed.
- There is a maximum voltage at the voltage input terminals of 288 VAC phase-neutral
- The network frequency indicated on the device is observed: 50 or 60 Hz.
- There is a maximum current of 80 A at the current input terminals (I1).

Failure to respect these precautions could cause damage to the unit.

2.3. Responsibility

- Assembly, connection and use must be carried out in accordance with the installation standards currently in force.
- The unit must be installed in accordance with the rules given in this manual.
- Failure to observe the rules for installing this unit may compromise the device's intrinsic protection.
- The unit must be positioned within an installation which complies with the standards currently in force.
- Any cable which needs to be replaced may only be replaced with a cable having the correct rating.

3. PRELIMINARY OPERATIONS

To ensure the safety of staff and the equipment, it is vital to read and absorb the contents of these instructions thoroughly before commissioning.

Check the following points as soon as you receive the package containing the unit:

- The packaging is in good condition
- The unit has not been damaged during transportation
- The device reference number conforms to your order
- The package includes:
 - 1 device
 - 1 sealing kit (for COUNTIS E16)
 - 1 Quick Start guide

4. INTRODUCTION

4.1. Introducing the COUNTIS E15 / E16

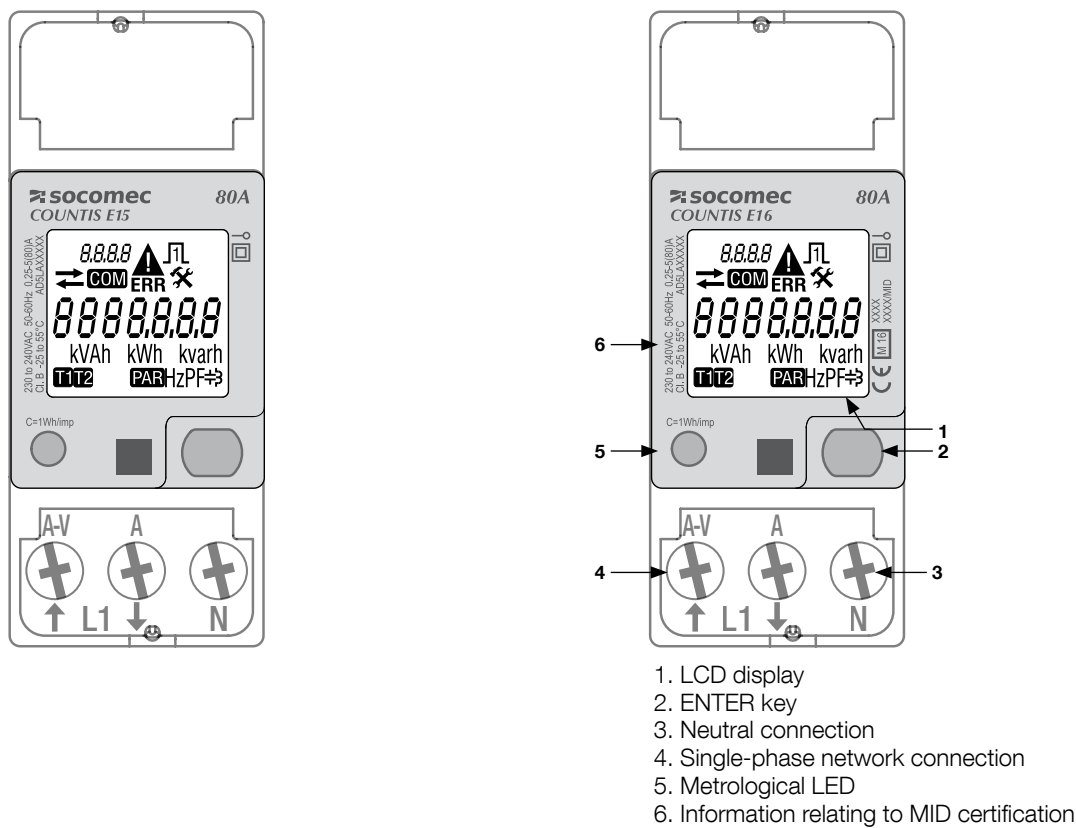
The COUNTIS E15 and E16 are modular active and reactive electrical energy meters that display consumed energy. They are designed for single-phase networks and allow a direct connection of up to 80 A. They are equipped with an M-BUS communication Bus.

4.2. Functions

- Measures and displays total and partial energy
- Dual tariff management: T1 / T2
- Electrical parameter measurements: I, U, V, f
- Power, power factor
- M-Bus communication
- MID version (according to reference)

Description	Reference
COUNTIS E15	4850 3045
COUNTIS E16 - Version MID	4850 3046

4.3. Front panels

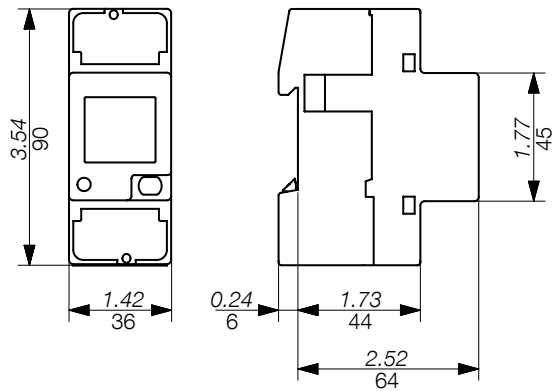


4.4. LCD display



4.5. Dimensions

Dimensions: in/mm



4.6. Electrical readings

4.6.1. Measurements

Settings vary by model.

Realtime values	Symbol	Unit of measure	LCD display	Via communication
Neutral voltage	V	V	●	●
Current	I	A	●	●
Power factor	PF		●	●
Apparent power	S	kVA		●
Active power	P	kW	●	●
Reactive power	Q	kvar	●	●
Frequency	f	Hz	●	
Direction of current	↺		●	
Logged data				
Total active, reactive energy	Ea, Er	kWh, kvarh	●	●
Total apparent energy	Eap	kVah	●	
Total reactive, inductive and capacitive energy	Er	kvarh	●	
Total active and reactive energy for each tariff (T1/T2)	Ea, Er	kWh, kvarh	●	●
Active, partial energy for each tariff (T1/T2)	Ea	kWh	●	
Partial active and reactive energy	Ea, Er	kWh, kvarh	●	●
Miscellaneous				
Current tariff	T	1/2	●	
Partial meters	BY	START/STOP	●	
State of the pulse output	⏏	Active / inactive	●	

5. INSTALLATION

The paragraphs below describe how to install the device.

5.1. Recommendations and safety

Refer to the safety instructions (section "2. Hazards and warnings", page 4 4)

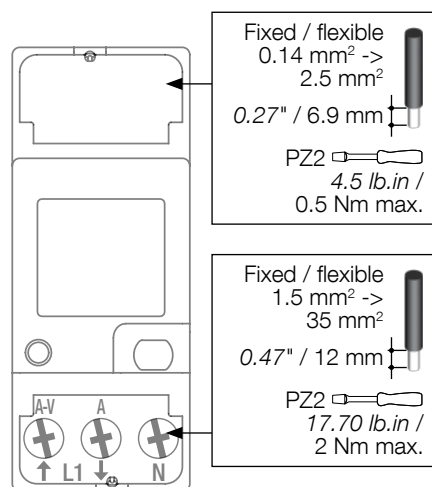
- Keep away from electromagnetic interference generator systems,
- Avoid vibrations with accelerations greater than 1 g for frequencies lower than 60 Hz.

5.2. DIN rail mounted

The COUNTIS E15/E16 can be mounted on a 35-mm DIN rail (EN 60715TM35). They must be used inside electrical cabinets.

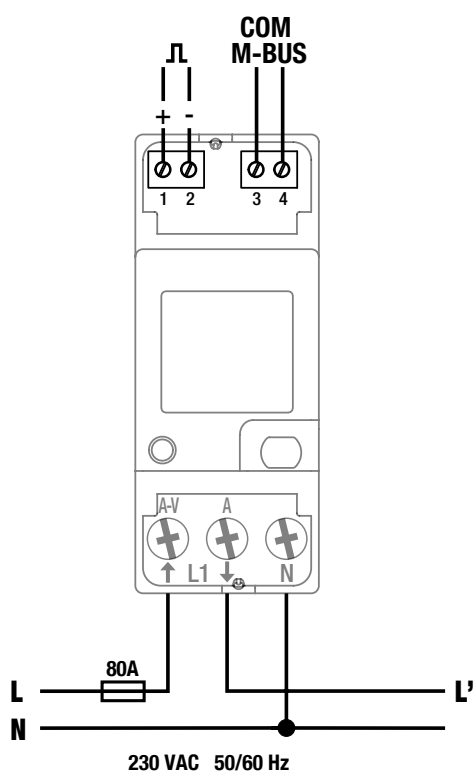
6. CONNECTION

6.1. Connecting the COUNTIS E15/E16



6.2. Connection to the electrical network and to the loads

The COUNTIS E15/E16 are intended for single-phase networks with neutral.



Pulse output

1: +
2: -

Optocoupler pulse outputs

Terminals 4-5 must be supplied with voltage between 5 and 27 VDC (27mA max)

M-BUS

3-4: M-Bus connection

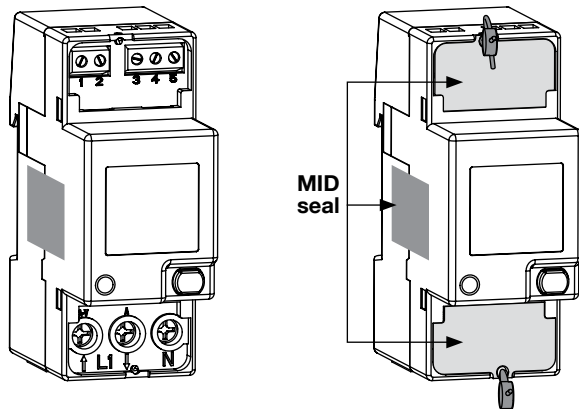
Network

L1 A-V: Phase input
L': A: Phase output
N: Neutral connection

7. MID COMPLIANCE

The following points must be taken into consideration to ensure that the device is used in compliance with directive MID 2014/32/EU:

- **Type of network**
COUNTIS E16 meters comply with the MID directive for connection to networks: 1P+N (see "6.2. Connection to the electrical network and to the loads", page 10)
- **Fitting terminal covers**
After connecting the device, ensure that the terminal covers are fitted properly and secured by the plastic seals provided with the device.
- **Communication**
The information provided via the M-BUS COM is transmitted for information only and has no legal value.
- **MID Declaration of Conformity**
The MID Declaration of Conformity is available on the website: www.socomec.com/en/countis-e1x



8. COMMUNICATION

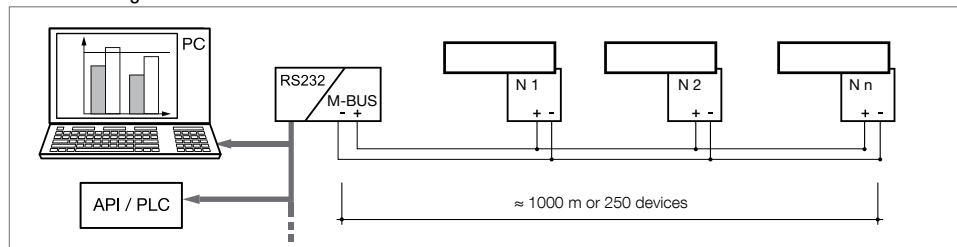
8.1. General information

In a standard configuration, an M-BUS connection is used to connect 250* devices to a PC or a controller over a distance of 1000 metres**.

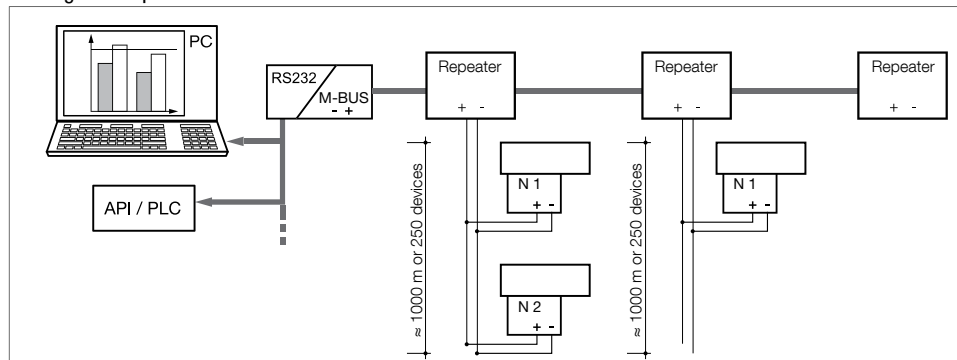
* depending on the M-BUS capacity

** depending on the number of devices and the communication speed

M-BUS cabling



Cabling with repeater



8.2. Recommendations

Use a non-shielded JYSTY Nx2x0.8 mm twisted pair (0.5 mm²).

If the distance of 1000 m is exceeded and/or the number of devices is greater than 250, add a repeater to allow additional devices to be connected.

If there are more than 250 units, use the secondary address only.

8.3. Communication structure

The device communicates via an M-BUS protocol which involves a master/slave dialogue. The COUNTIS units (slaves) are compatible with the 2 primary and secondary addressing modes. You can configure the primary and secondary addressing modes via the device's interface.

8.4. Communication tables

The communication tables and relevant notes are available online on the COUNTIS E15/E16 documentation page at:

www.socomec.com/en/countis-e1x




9. CONFIGURATION

The device can be configured directly from the COUNTIS E15/E16 screen in programming mode or via the communication link. The paragraphs below describe configuring using the screen.


9.1. Onscreen configuration

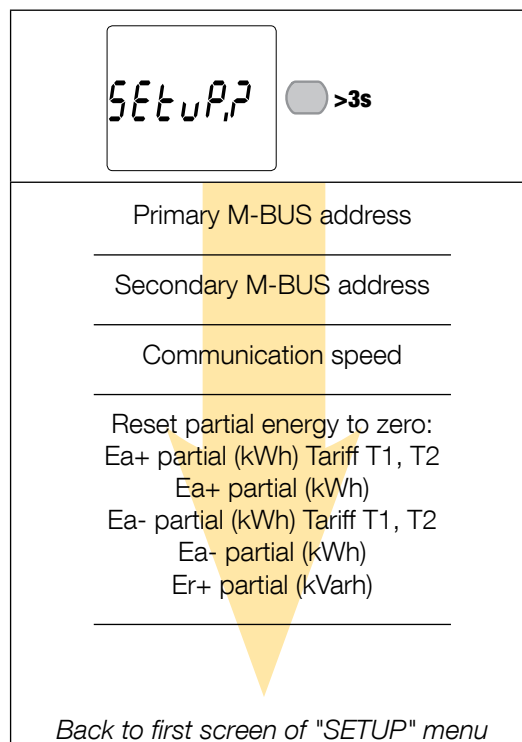
From the screen, go to programming mode to change your communication settings. How to browse through the programming mode is described in the following stages:

Function	Where	Buttons	Press
Switch menus	Every page except SETUP menu		Double speed (x2 < 0.5 sec)
Switch pages within a menu	Every page within a menu		Realtime
Go to SETUP menu	Menu page SETUP		> 3 sec
Change a value/digit	SETUP pages		realtime
Confirm a value/digit	SETUP pages		Double speed (x2 < 0.5 sec)
Exit SETUP menu	SETUP Menu		> 3 sec
Start/stop the displayed partial meter	Partial meter menu		> 3 sec
Reset the displayed partial meter to zero	Partial meter menu		> 3 sec
Display test	Every page with the exception of SETUP and partial meters		> 10 sec

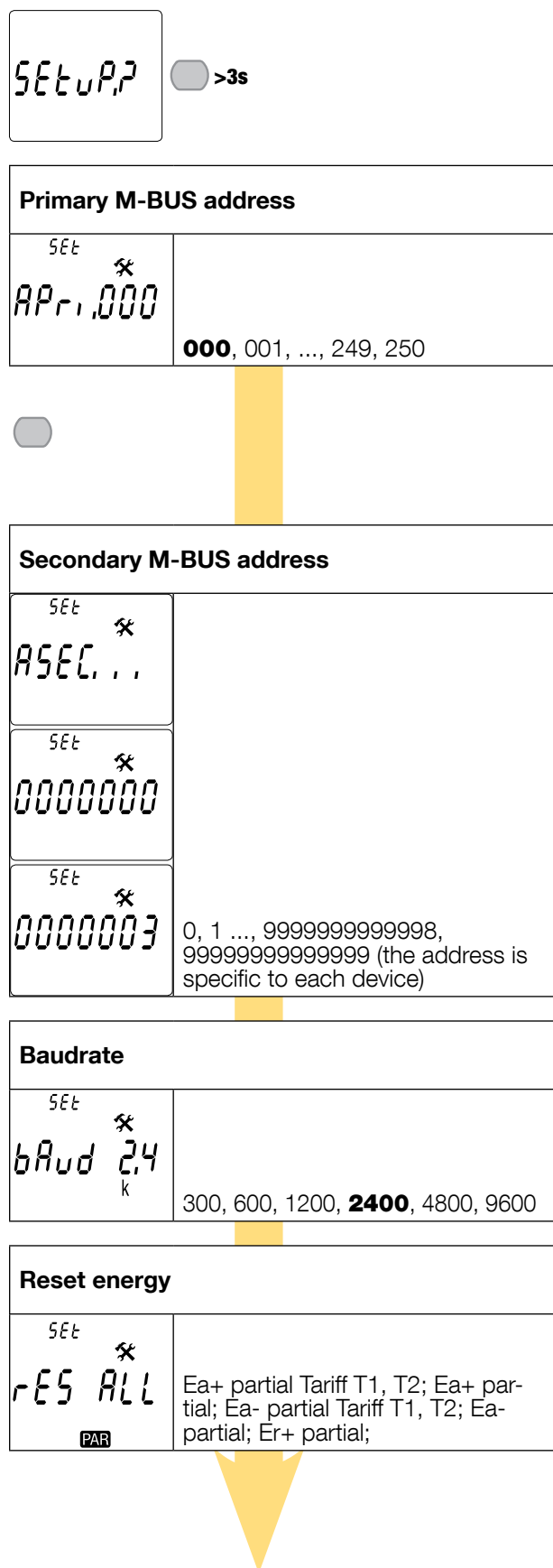
9.1.1. View of the entire "SETUP" menu

In the SETUP menu, press "  " for 3 seconds to put the device into programming mode.

Press "  " to go to the different screens:



9.1.2. Detailed view of menu "SETUP"

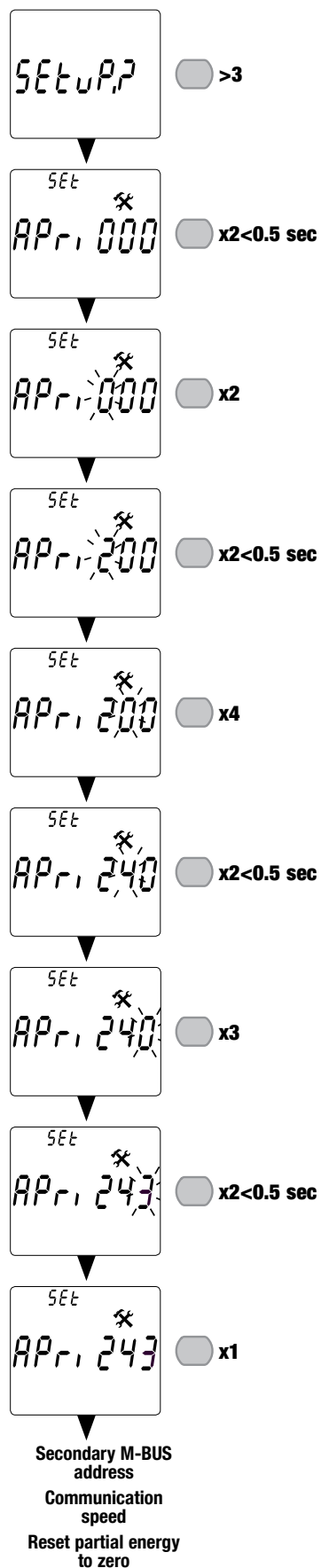


Back to first screen of "SETUP" menu

9.1.3. Example: setting the communication address

In "SETUP" mode (see page 14), go to the "APri primary address" screen

Example: changing the communication address to 243.



10. USE

Switch menus by pressing "  " twice for at least 0.5 seconds.
Press "  " to see the electrical readings or menu information.

The menus and related measurements are described in the table below:

Tariff (Tar.)	Total (tot)	Partial and realtime readings (P. rt)	Information (inFo)
<div> <div>Tariff 1 - Imported and exported active energy</div> <hr/> <div>Tariff 1 - Imported and exported reactive energy</div> <hr/> <div>Tariff 2 - Imported and exported active energy</div> <hr/> <div>Tariff 2 - Imported and exported reactive energy</div> <hr/> </div>	<div> <div>Total imported and exported active energy</div> <hr/> <div>Total apparent energy</div> <hr/> <div>Total imported and exported inductive reactive energy</div> <hr/> <div>Total imported and exported capacitive reactive energy</div> <hr/> <div>Total imported and exported reactive energy</div> <hr/> </div>	<div> <div>Partial imported active energy by tariff</div> <hr/> <div>Partial imported active energy</div> <hr/> <div>Partial exported active energy by tariff</div> <hr/> <div>Partial exported active energy</div> <hr/> <div>Partial imported reactive energy</div> <hr/> <div>Active and reactive power</div> <hr/> <div>Voltage</div> <hr/> <div>Current</div> <hr/> <div>Power factor</div> <hr/> <div>Frequency</div> <hr/> </div>	<div> <div>Metrological firmware version</div> <hr/> <div>Non-metrological firmware version</div> <hr/> <div>Checksum of metrological firmware</div> <hr/> <div>Checksum of non-metrological firmware</div> <hr/> <div>Installed communication port</div> <hr/> </div>
Back to first screen of "Tar." menu	Back to first screen of "tot" menu	Back to first screen of "P.rt" menu	Back to first screen of "InFO" menu

XX = default value

10.1. Detailed view of the tariff menu, "Tar."

Imported active energy, tariff 1

\rightarrow

ϵR_r

000062.2

kWh

\rightarrow

ϵR_r

000062.2

kWh

Exported active energy, tariff 1

\leftarrow

ϵR_r

000062.2

kWh

\leftarrow

ϵR_r

000062.2

kWh

Imported reactive energy, tariff 1

\rightarrow

ϵR_r

000062.2

kvarh

\rightarrow

ϵR_r

000062.2

kvarh

Exported reactive energy, tariff 1

\leftarrow

ϵR_r

000062.2

kvarh

\leftarrow

ϵR_r

000062.2

kvarh

Imported active energy, tariff 2

\rightarrow

ϵR_r

000062.2

kWh

\rightarrow

ϵR_r

000062.2

kWh

Exported active energy, tariff 2

\leftarrow

ϵR_r

000062.2

kWh

\leftarrow

ϵR_r

000062.2

kWh

Imported reactive energy, tariff 2

\rightarrow

ϵR_r

000062.2

kvarh

\rightarrow

ϵR_r

000062.2

kvarh

Exported reactive energy, tariff 2

\leftarrow

ϵR_r

000062.2

kvarh

\leftarrow

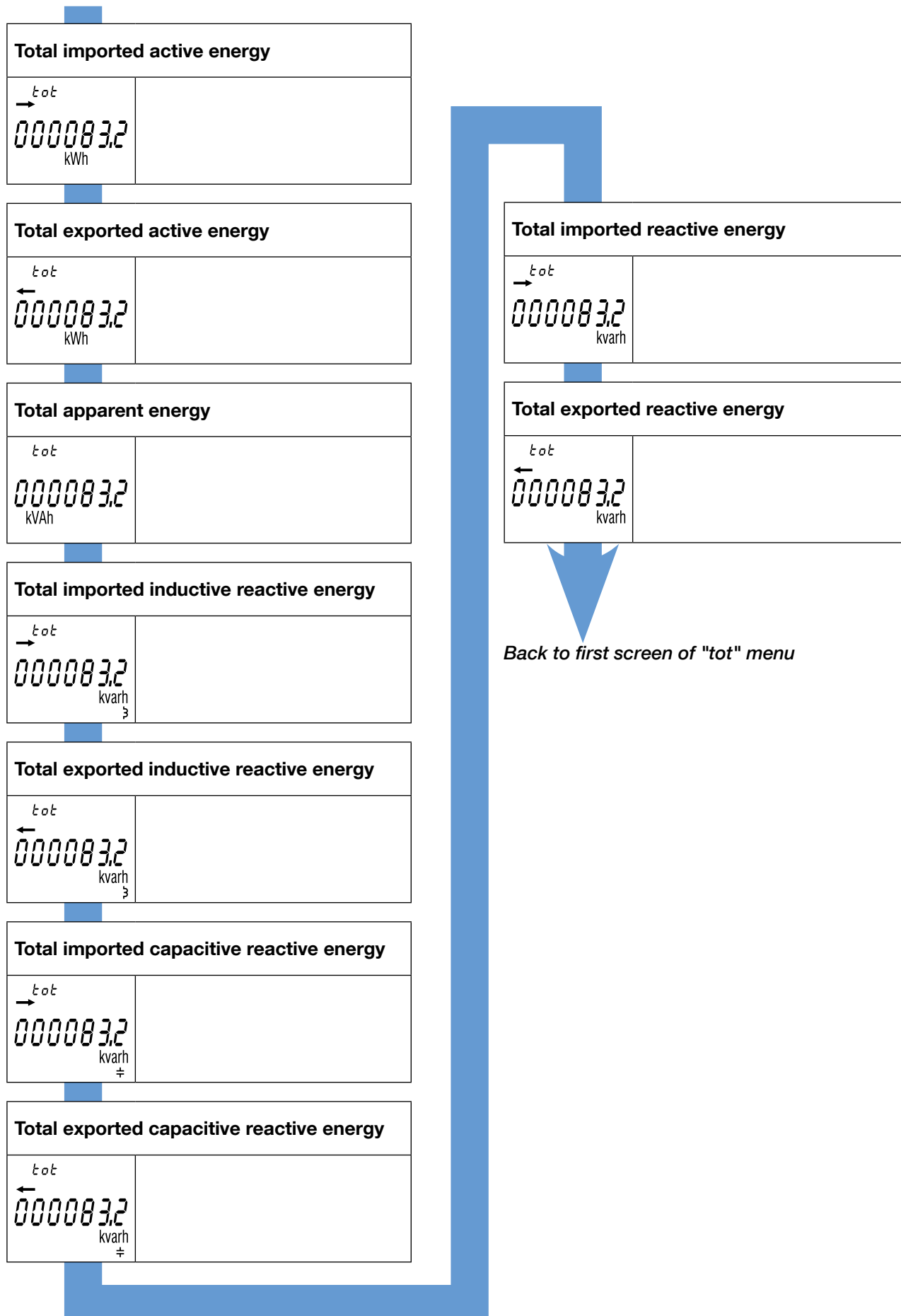
ϵR_r

000062.2

kvarh

Back to first screen of "Tar." menu

10.2. Detailed view of the total menu, "tot"



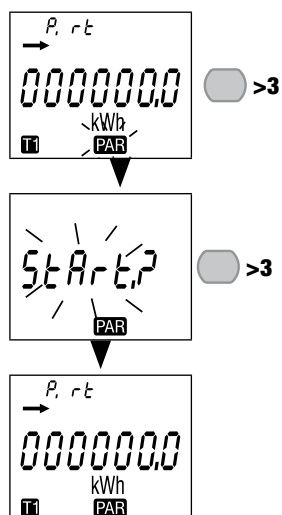
10.3. Detailed view of the menu for partial and realtime readings, "P. rt"

Imported partial active energy for tariff T1	
<div><div>P. rt</div><div>→</div><div>000083.2</div><div>kWh</div><div>T1PAR</div></div>	
Imported partial active energy for tariff T2	
<div><div>P. rt</div><div>→</div><div>000083.2</div><div>kWh</div><div>T2PAR</div></div>	
Partial imported active energy	
<div><div>P. rt</div><div>→</div><div>000083.2</div><div>kWh</div><div>PAR</div></div>	
Exported partial active energy for tariff T1	
<div><div>P. rt</div><div>←</div><div>000083.2</div><div>kWh</div><div>T1PAR</div></div>	
Exported partial active energy for tariff T2	
<div><div>P. rt</div><div>←</div><div>000083.2</div><div>kWh</div><div>T2PAR</div></div>	
Partial exported active energy	
<div><div>P. rt</div><div>←</div><div>000083.2</div><div>kWh</div><div>PAR</div></div>	
Partial imported reactive energy	
<div><div>P. rt</div><div>→</div><div>000083.2</div><div>kvarh</div><div>PAR</div></div>	

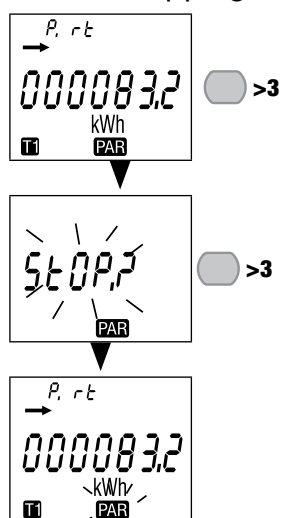
Realtime active power	
<div><div>P. rt</div><div>→</div><div>08.32</div><div>kW</div></div>	
Realtime reactive power	
<div><div>P. rt</div><div>→</div><div>08.32</div><div>kvar</div><div>±</div></div>	
Realtime voltage	
<div><div>P. rt</div><div>V</div><div>228.2</div></div>	
Realtime current	
<div><div>P. rt</div><div>A</div><div>00.00</div></div>	
Realtime power factor	
<div><div>P. rt</div><div>PF±</div><div>0.000</div></div>	
Frequency	
<div><div>P. rt</div><div>Hz</div><div>50.01</div></div>	

Back to first screen of "P. rt" menu

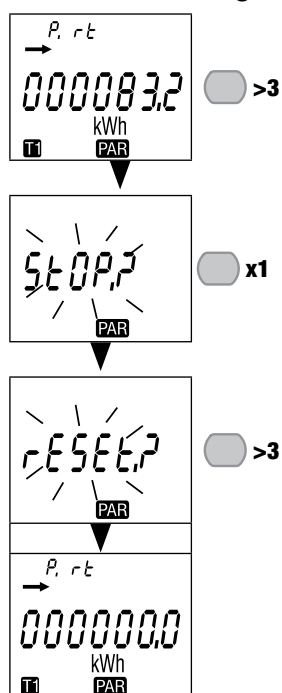
10.3.1. Starting up the partial energy meter



10.3.2. Stopping the partial energy meter



10.3.3. Resetting the partial energy meter to zero



10.4. Detailed view of the menu "info"

Metrological firmware version	
Info	
Fr 1 1.22	

Non-metrological firmware version	
Info	
Fr 2 3.00	

Checksum of metrological firmware	
Info	
C5 1C 1b6	

Checksum of non-metrological firmware	
Info	
C5288C 1	

Installed communication port	
Info	
RS-485	



Back to first screen of "info" menu

11. DIAGNOSTICS MESSAGES

The following message appears if there are connection or malfunction errors.

11.1. Malfunction



- If you see this message, the meter has malfunctioned and must be replaced.

12. ASSISTANCE

Causes	Solutions
Device not working	Check the neutral and phase cable connections
Error message	Check the meter is working OK

13. CHARACTERISTICS

GENERAL FEATURES	
Compliant with	European EMC Directive No. 2014/30/EU dated 26/02/2014 LV Directive No. 2014/35/EU dated 26/02/2014 Measuring Instrument Directive MID No. 2014/32/EU dated 26/02/2014 EN50470-1/-3 IEC 62053-21/-23
Frequency	50 and 60 Hz (± 1 Hz)
Power supply	Self-supplied
Rated dissipated power (Wmax.)	7.5VA (0.5W)
FEATURES	
Single-phase connectivity	2 wires 230 - 400V
Stores energy readings and settings	In FRAM memory
Identifies display of tariffs	T1 and T2
CURRENT MEASUREMENTS	
Type	Single-phase - direct 80 A
Input consumption	0.5VA max. per phase
Startup current (Ist)	20mA
Minimum current (Imin)	0.25A
Transition current (Itr)	0.5A
Reference current (Iref)	5A
Permanent overload (Imax)	80A
Intermittent overload	30 Imax for 1/2 cycle
OVERLOAD CAPACITY	
DC voltage Un	288 VAC
Realtime voltage Un (1 s)	300 VAC
DC current Imax	80 A
Realtime current Imax	30 Imax for 1/2 cycle
VOLTAGE MEASUREMENTS	
Range of measurement	230-240V $\pm 20\%$
Consumption	7.5VA max. per phase
Permanent overload	290V phase-neutral
FREQUENCY MEASUREMENT	
Frequency measurement	45-65 Hz
ENERGY MEASUREMENT	
Active	Yes
Reactive	Yes
Total and partial reading	Yes
MID metering	Bidirectional with single-phase
Resolution	10 Wh, 10 varh
ENERGY ACCURACY	
Active energy Ea+	Class B (EN 50470-3) E16 Class 1 (EN 62053-21)
Reactive energy Er+	Class 2 (EN 62053-23)
TARIFF for Ea+	

Tariff management	Yes (via communication)
Number of tariffs managed	2
METROLOGICAL LED (Ea+)	
Pulse value	1000 pulses / kWh
Colour	Red
PULSE OUTPUT	
Type	Opto-isolated - 5 ... 27VDC 27mA according to EN 62053-31
Pulse weight	100 Wh
DISPLAY	
Type	7-digit LCD with backlight
Refresh time	1 s
Backlight activation time	10 s
Active energy: 1 display, 7-digit	000000.0 - 999999.9 kWh
Reactive energy: 1 display, 7-digit	000000.0 - 999999.9 kvarh
Apparent energy: 1 display, 7-digit	000000.0 - 999999.9 kVAh
Realtime active power: 1 display, 4-digit	00.00 - 99.99 kW
Realtime reactive power: 1 display, 4-digit	00.00 - 99.99 kvar
Realtime voltage: 1 display, 4-digit	000.0 ... 999.9 V
Realtime current: 1 display, 4-digit	00.00 ... 99.99 A
Power factor: 1 display, 4-digit	0.001-1.000
Frequency: 1 display, 4-digit	45.00-65.00 Hz
COMMUNICATION	
M-BUS	2 wires + shielding/ half duplex
Protocol	M-BUS
Baudrate	300, 600, 1200, 2400, 4800, 9600 bps
Load unit	1
SAVING	
Energy registers	In FRAM memory
ENVIRONMENTAL CONDITIONS	
Mechanical environment	M1
Electromagnetic environment	E2
Operating temperature range	-25°C to +55°C
Storage temperature	-25°C to 75°C
Humidity	≤ 80%
Installation	Internal (box/cabinet)
Vibrations	±0.075 mm
HOUSING	
Dimensions W x H x D (mm)	Modular - width of 2 modules (DIN 43880) 36 x 90 x 64
Installation	On DIN rail (EN 60715)
Connection capacity, tightening torque	See chapter "6. Connection", page 10
Protection index	Front: IP51 - casing: IP20
Insulation class	Class II (EN 50470-1)
Weight	205 g

14. GLOSSARY OF ABBREVIATIONS

info	Menu information
Fr1	Metrological firmware version
Fr2	Non-metrological firmware version
CS1	Checksum of metrological firmware
CS2	Checksum of non-metrological firmware
tAr.	Tariff menu
tot	Total menu
P. rt	Partial and realtime readings menu
SEtuP.	Setup menu
APri.	Primary M-BUS address
ASEC.	Secondary M-BUS address
bAu.	Communication speed in bauds (bits per second)
rES	Reset partial energy
SAVE?	Confirm selection
Y	Save and exit
N	Exit without saving
C	Continue without saving

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