

Электрические счетчики трехфазные Socomec Countis E23 и Countis E24 - руководство по эксплуатации. Юнилжет

Постоянная ссылка на страницу: https://www.uni-jet.com/catalog/commutation/schetchiki/socomec-countis-e20-e21.html



COUNTIS E23/E24

Three-phase energy meter Direct - 80 A MODBUS

ΕN







COUNTIS E24 - MID





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1. DOCUMENTATION

All documentation on the COUNTIS E23/E24 is available on the website at the following address:

www.socomec.com/en/countis-e2x



2. HAZARDS AND WARNINGS

The term "device" used in the paragraphs below refers to the COUNTIS E23/E24.

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

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

2.1. Risk of electrocution, burns or explosion

- · This device must only be installed and serviced by qualified personnel who have in-depth knowledge of installing, commissioning and operating the device and who have had appropriate training. He or she should have read and understood the various safety measures and warnings stated in the instructions.
- Before carrying out any work on the unit, switch off the voltage inputs.
- Always use an appropriate voltage detection device to confirm the absence of voltage.
- Replace all devices, doors and covers before turning on power to this equipment.
- Always power the device with the correct rated voltage.
- Install the unit following the recommended installation instructions and in a suitable electrical cabinet.

Failure to take these precautions could cause death or serious injuries.

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, I2 and I3).

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
- 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 E24)
 - 1 Quick Start guide

4. INTRODUCTION

4.1. Introducing the COUNTIS E23 / E24

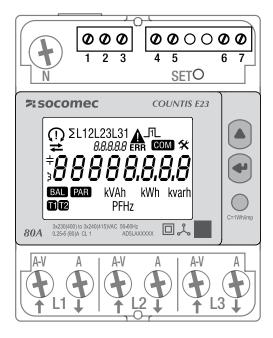
The COUNTIS E23 and E24 are modular active and reactive electrical energy meters that display consumed energy. They are designed for three-phase networks and allow a direct connection of up to 80 A. They are equipped with a MODBUS communication Bus.

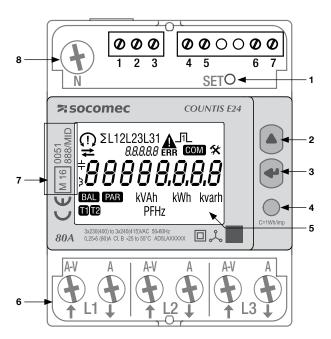
4.2. Functions

- Measures and displays total and partial energy
- Dual tariff management: T1 / T2
- Electrical parameter measurements: I, U, V, f
- · Power, power factor
- RS 485 Modbus communication
- MID version (according to reference)

Description	Reference
COUNTIS E23	4850 3050
COUNTIS E24 - Version MID	4850 3051

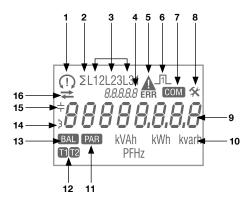
4.3. Front panels





- 1. SET button
- 2. UP button
- 3. ENTER key
- 4. Metrological LED
- 5. LCD display
- 6. Three-phase network connection
- 7. Information relating to MID certification
- 8. Neutral connection

4.4. LCD display



1. Phase sequences: 132

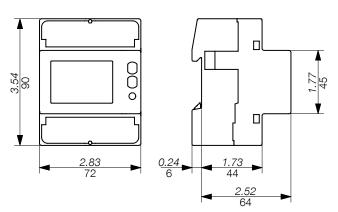
123

one or multiple phases are not detected

- 2. System value
- 3. Value by phase
- 4. Identification of current menu
- 5. Device malfunction. Replace the device
- 6. Active pulse output
- 7. Active communication
- 8. Setup menu
- 9. Main zone
- 10. Measurement Unit
- 11. Partials meters. Flashing = partial meter has stopped
- 12. Tariff display
- 13. Energy balance
- 14. Inductive value
- 15. Capacitive value
- 16. Imported (→) or exported energy or power (←)

4.5. Dimensions

Dimensions: in/mm



4.6. Electrical values measured

4.6.1. Measurements

Settings vary by model.

Realtime values	Symbol	Measure- ment Unit	LCD display	Via communication
	ΣV		•	•
Neutral voltage	V1, V2, V3			•
Discourse to the control of the cont	ΣU	V	•	•
Phase to phase voltage	U12, U23, U31			•
Comment	ΣΙ	Δ.	•	•
Current	I1, I2, I3, IN	A		•
Deviaufactor	∑PF		•	•
Power factor	PF1, PF2, PF3			•
Apparent power	∑S, S1, S2, S3	kVA	•	•
Active power	∑P, P1, P2, P3	kW	•	•
Reactive power	∑Q, Q1, Q2, Q3	kVAr	•	•
Frequency	f	Hz	•	•
Phase sequence	CW / CCW		•	•
Direction of current	₹		•	
Logged data				
Total active and reactive energy	Ea, Er (∑ & by phase)	kWh, kvarh	•	•
Total apparent approv	Eap (∑)	14 /A b	•	•
Total apparent energy	Eap (by phase)	- kVAh -		•
Total reactive, inductive and capacitive	Er (∑)	kvarh	•	•
energy	Er (by phase)	- Kvarn		•
Total active, reactive and apparent energy	Ea, Er (∑)	kWh, kvarh	•	•
for each tariff (T1/T2)	Ea, Er, Eap (∑ & by phase)	kWh, kvarh, kVAh		•
Total reactive, inductive and capacitive	Er (∑)		•	•
energy for each tariff (T1/T2)	Er (by phase)	kvarh		•
Active, partial energy for each tariff (T1/T2)	Ea (∑)	kWh	•	•
Active, reactive and apparent partial energy	Ea, Er, Eap (∑)	kWh, kvarh, kVAh	•	•
Energy balance	Σ	kWh, kvarh	•	•
Miscellaneous				•
Current tariff	Т	1/2	•	•
Partial meters	BY	START/STOP	•	
State of the pulse output	_fL	Active / inac- tive	•	
NOTE: \sum is the sum of the meter readings for each phase	e. divided by 3.			1

4.6.2. Energy balance; definition

	Formula
kWh	(+kWh T1) - (-kWh T1) + (+kWh T2) - (-kWh T2)
kvarh	(+kvarh T1) – (-kvarh T1) + (+kvarh T2) – (-kvarh T2)

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)

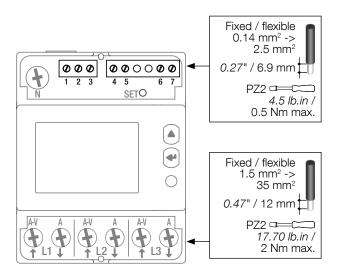
- Keep away from electromagnetic interference generator systems,
- Avoid vibrations with accelerations greater than 1 g for frequencies lower than 60 Hz.

5.2. DIN rail mounted

The COUNTIS E23/E24 can be mounted on a 35-mm DIN rail (EN 60715TM35). They must be used inside electrical cabinets.

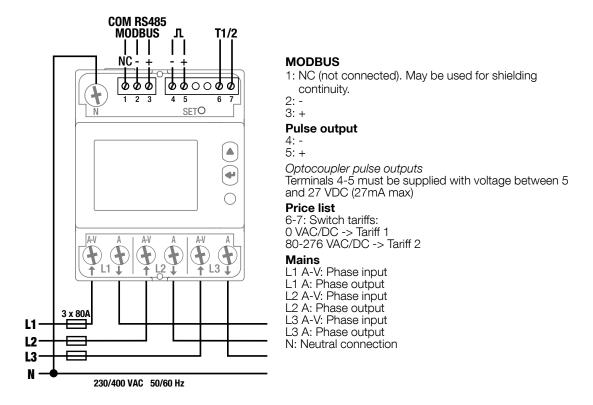
6. CONNECTION

6.1. Connecting the COUNTIS E23/E24



6.2. Connection to the electrical network and to the loads

The COUNTIS E23/E24 are intended for three-phase networks with neutral.



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 E24 meters comply with the MID directive for connection to networks: 3P+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.

Locking the program button

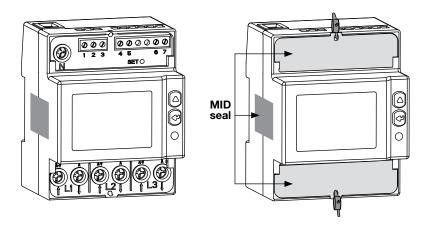
Make sure the SET program button is locked after fitting the terminal cover.

• RS485 communication

The information provided via the RS485 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-e2x

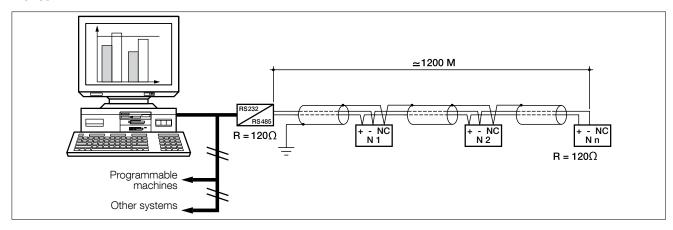


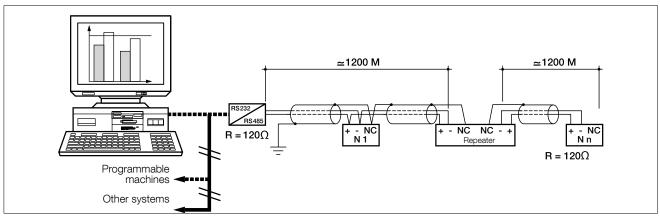
8. COMMUNICATION

8.1. General information

The Modbus communication available on the COUNTIS E23/E24 communicates via an RS485 series link (2 or 3 wires) which is used to operate devices from a PC or an API.

In a standard configuration an RS485 connection is used to connect 32 devices to a PC or a controller over 1200 metres.





8.2. RS485 rules

A LIYCY shielded twisted pair must be used. We recommend using a shielded twisted pair with a general LIYCY-CY shielding in an environment where there is interference or in a very long network with a number of devices.

If the distance of 1200 m is exceeded and/or the number of devices is greater than 32, a repeater must be added to enable additional devices to be connected.

A 120 Ohm resistor must be fixed at both ends of the connection.

8.3. Communication structure

The device communicates via a Modbus protocol which involves a dialogue in accordance with a master/slave structure. The communication mode is the RTU (Remote Terminal Unit) mode with hexadecimal characters composed of at least 8 bits.

Modbus frame structure (master -> slave question):

Slave address	Function code	Address	Number of words to be	CRC 16
			read	
1 byte	1 byte	2 bytes	2 bytes	2 bytes

To comply with the Modbus protocol, the inter-character time must be ≤ 3 silences.

This means the time for 3 characters to be emitted so that the message is processed by the COUNTIS E23/E24. In order to use the information correctly, you must use the Modbus functions in accordance with the codes:

- 3: to read n words (maximum 128).
- 6: to write one word.
- 16: to write n words (maximum 128).

N.B.:

1 word <=> 2 bytes <=> 16 bits 2 words <=> 4 bytes <=> 32 bits

The broadcast communication is available for the log that stores the tariff.

8.4. Communication tables

The communication tables and relevant notes are available on the COUNTIS E23/E24 documentation page on the website at the following address:

www.socomec.com/en/countis-e2x



9. CONFIGURATION

The device can be configured directly from the COUNTIS E23/E24 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 with the exception of SETUP 1/2	•	Realtime
Switch pages within a menu	Every page within a menu	(A)	Realtime
Go to menu SETUP 2	Menu page SETUP	•	> 3 sec
Go to menu SETUP 1	Every page with the exception of SETUP 1	SET	> 3 sec
Change a value/digit	Pages SETUP 1/2	(A)	Realtime
Confirm a value/digit	Pages SETUP 1/2	•	Realtime
Exit menu SETUP 1/2	Menu SETUP 1/2	•	> 3 sec
Start/stop the displayed partial meter	Partial meter menu	+ 🛦	Realtime
Reset the displayed partial meter to zero	Partial meter menu	+ 🛦	> 3 sec
Display test	Every page with the exception of SETUP 1/2	+ •	> 10 sec

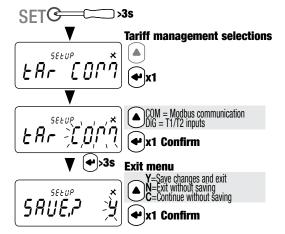
9.1.1. Detailed view of menu "SETUP 1"

You can change the current tariff either via the communication link or via the device's T1/2 inputs.

In the "SETUP 1" menu you can select the tariff management mode.

Press SET for 3 seconds using a screwdriver to put the device into programming mode.

Press to go to the two programming options: COM = Modbus connection or DiG = T1/T2 inputs



9.1.2. View all of the menu "SETUP 2"

In the SETUP 2 menu, press "for 3 seconds to put the device into programming mode.

You can go to the different screens by pressing " ::



Communication address

Communication speed

Communication parity

Communication stop bit

Reset partial energy to zero: Ea+ partial (kWh) Tariff T1, T2 Ea+ partial (kWh) Ea- partial (kWh) Tariff T1, T2 Ea- partial (kWh) Eap partial (kVAh)

Er+ partial (kVarh) Er- partial (kVarh)

Return to the first menu screen, "SETUP 2"

9.1.3. Detailed view of menu "SETUP 2"

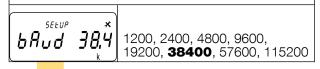


Communication address





Communication speed

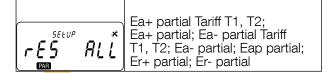


Communication parity

Prty n	n = no o = odd E = even
--------	--------------------------------------

Communication stop bit

Reset energies

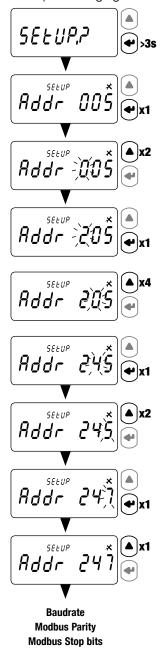


Return to the first menu screen, "SETUP 2"

9.1.4. Example: setting the communication address

In "SETUP 2" mode (see page 14), go to the "Addr communication address" screen

Example: changing the communication address to 247.



All partial counters reset

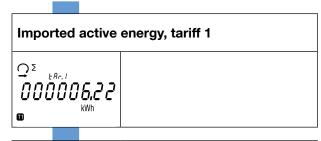
10. USE

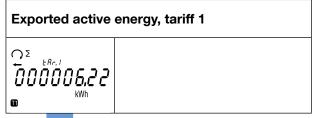
Switch menus by pressing "-". Press "-" to see the electrical readings or information within a menu.

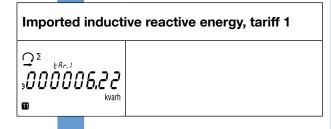
The menus and related measurements are described in the table below:

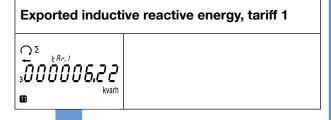
Tariff 1 (Tar.1)	Tariff 2 (Tar.2)	Total (tot)	Partial read- ings and en- ergy balance (Par.b)	Realtime values (rt)	Information (inFo)
Tariff 1 - Imported and exported active energy	Tariff 2 - Imported and exported active energy	Total imported and exported active energy	Partial imported active energy by tariff	Active, apparent and reactive power	Metrological firmware version
Tariff 1 - Imported and exported inductive reactive energy	Tariff 2 - Imported and exported inductive reactive energy	Total apparent energy	Partial imported active energy	Phase/phase and phase/neutral voltage	Non-metrological firmware version
Tariff 1 - Imported and exported capacitive reactive energy	Tariff 2 - Imported and exported capacitive reactive energy	Total imported and exported inductive reactive energy	Partial exported active energy by tariff	Three-phase current	Checksum of metrological firmware
Tariff 1 - Imported and exported reactive energy	Tariff 2 - Imported and exported reactive energy	Total imported and exported capacitive reactive energy	Partial exported active energy	Power factor	Checksum of non-metrological firmware
Go back to first screen, menu "Tar.1"	Go back to first screen, menu "Tar.2"	Total imported and exported reactive energy	Partial apparent energy	Frequency	Installed communication port
		Go back to first screen, menu "tot"	Partial imported and exported reactive energy	Go back to first screen, menu "rt"	Go back to first screen, menu "info"
			Active energy balance Reactive energy		
			balance Go back to first screen, menu "Par.b"		

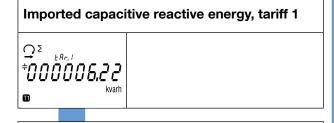
10.1. Detailed view of the menu for tariff 1, "Tar.1"

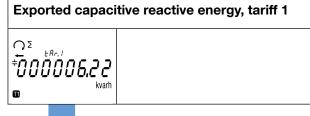


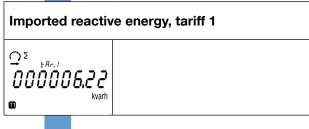


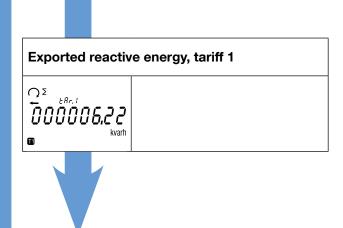






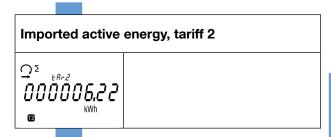


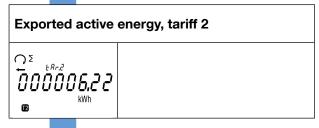


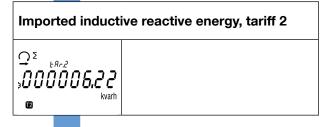


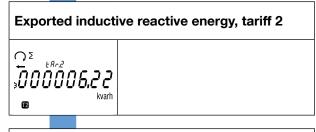
Go back to first screen, menu "Tar.1"

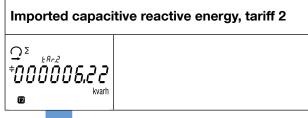
10.2. Detailed view of the menu for tariff 2, "Tar.2"

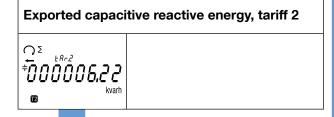


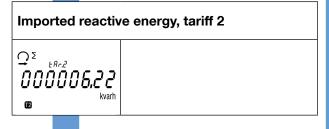


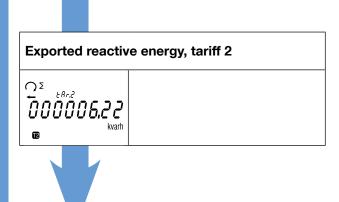






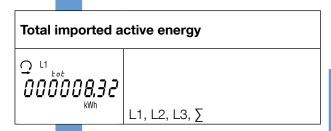




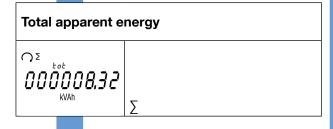


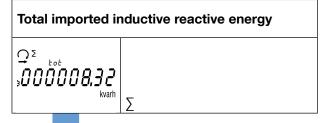
Go back to first screen, menu "Tar.2"

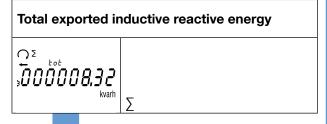
10.3. Detailed view of the total menu, "tot"

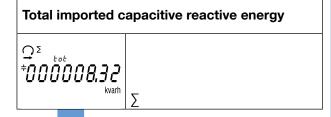


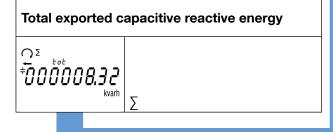
Total exported active energy	
000008,32	
kWh	L1, L2, L3, ∑

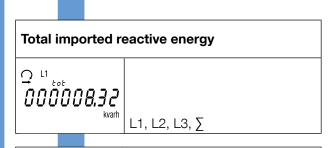


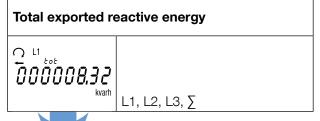






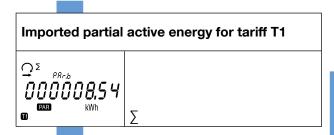


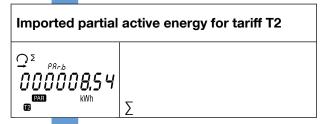


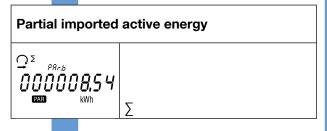


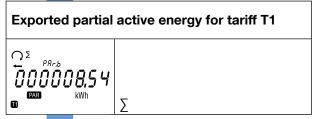
Go back to first screen, menu "tot"

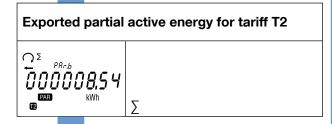
10.4. Detailed view of the menu showing partial readings and the energy balance "Par.b"

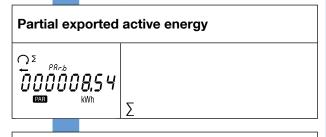


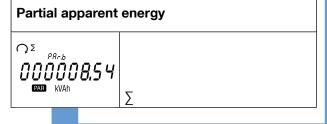


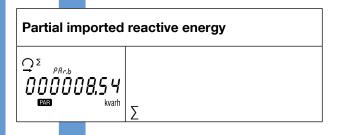


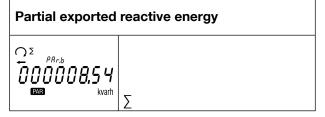


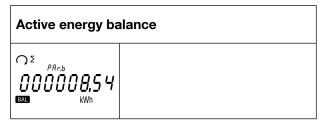


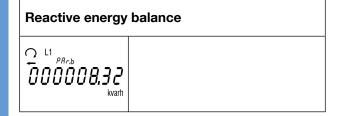






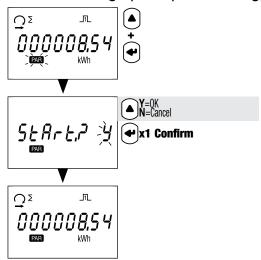




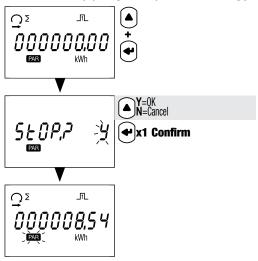


Go back to first screen, menu "Par.b"

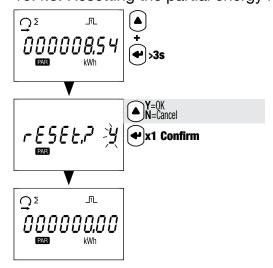
10.4.1. Starting up the partial energy meter



10.4.2. Stopping the partial energy meter



10.4.3. Resetting the partial energy meter to zero



10.5. Detailed view of the menu for realtime readings, "rt"

Realtime active power Q L1 ct 1 450 L1, L2, L3, ∑

Realtime apparent power O L1 1 450 L1, L2, L3, ∑

Realtime reactive power Q L1 ct 1450 L1, L2, L3, ∑

Realtime phase/phase voltage Ω ΣL12 23 31 15 1,3

Realtime phase/neutral voltage Ω ΣL1 2 3 , 075.7

Realtime three-phase current 69,67

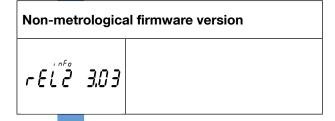
Realtime power factor ΩΣ 0.800

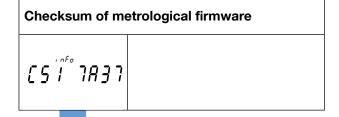
Frequency ΩΣ rt 50.00

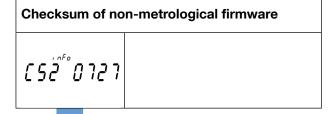
Go back to first screen, menu "rt"

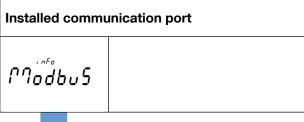
10.6. Detailed view of the menu "info"

Metro	logi	cal firn	nware version
rEĹ	nFo 	1,22	











Go back to first screen, menu "info"

11. DIAGNOSTICS MESSAGES

The following messages appear if there are connection or malfunction errors.

11.1. Missing phases



If one or several phases are not detected, the exclamation point is flashes on the screen. Example: phase not detected

11.2. Reversed phases



If a 123 phase sequence is detected, the symbol appears.
If a 132 phase sequence is detected, the symbol appears.

11.3. 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 1 cable connections.
Phases not shown onscreen	Check the connections
Phases reversed onscreen	Check the network configuration
Error message	Check the meter is working OK

13. CHARACTERISTICS

ENSO470-17-8 EEC 62055-217-23 Frequency	GENERAL FEATURES	
Power supply Self-supplied Rated dissipated power (Wmax.) 3.5VA (1 W) FEATURES Three-phase connectivity 4 wires \$x230/400V to \$x240/415V Stores energy readings and settings In FRAM memory Identifies display of tariffs T1 and T2 CURRENT MEASUREMENTS Type Three-phase - direct 80 A Input consumption 0.5VA max, per phase Startup current (list) 20mA Minimum current (limin) 0.25A Transition current (intin) 0.5A Reference current (ref) 5A Permanent overload (lmax) 80A Intermittent overload (lmax) 80A Reattime voltage Un (1 s) 300 VAC DC current Imax 80 A Reattime current Imax 80 A Reatine current Imax 90 Imax for 1/2 cycle VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max, per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz EMERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading Yes MID metering Biddirectional with three-phase Resolution 10 Wh, 10 vers Permanent Overload Pase Class 8 (EN 50470-3) E24 Class 1 (EN 50253-23) TARIFF for Ea+	Compliant with	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
Rated dissipated power (Wmax.) FEATURES Three-phase connectivity 4 wires 3x230/400V to 3x240/415V Stores energy readings and settings In FRAM memory Identifies display of tariffs CURRENT MEASUREMENTS Type Three-phase - direct 80 A Injust consumption O.5VA max. per phase Startup current (let) O.5A Minimum current (lmin) O.25A Fransition current (lref) SA Permanent overload (lmax) BOA Intermittent overload (lmax) BOA Realtime voltage Un (1 s) DC current lmax BO A Realtime overload Consumption 230-240V ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-phase Permanent overload 290V phase-phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz EMERGY MEASUREMENT Active Persolution Bidirectional with three-phase Reactive Yes Reactive Yes Reactive Yes Resolution Bidirectional with three-phase Resolution Bidirectional with three-phase Resolution Bidirectional with three-phase Resolution Bidirectional with three-phase Permanent overload Permanent ov	Frequency	50 and 60 Hz (± 1 Hz)
Three-phase connectivity 4 wires \$x230/400V to \$x240/415V \$ Stores energy readings and settings In FRAM memory (Identified display of tariffs T1 and T2 CURRENT MEASUREMENTS Type Three-phase - direct 80 A (Input consumption 0.5VA max, per phase Startup current (list) 20mA (Minimum current (limin) 0.25A (Transition current (litr) 0.5A (Reference current (litr) 5 A (Permanent overload (Imav) 80A (Intermittent overload (Imav) 80A (Realtime voltage Un (1 s) 300 VAC (CU current Imax 80 A (Realtime voltage Un (1 s) 300 Imax for 1/2 cycle (VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% (Consumption 2.5VA max, per phase (Permanent overload 2.5VA max, per phase (Permanent overload 3.5VA max, per phase (Permanent ov	Power supply	Self-supplied
A wires 3x230/400V to 3x240/415V	Rated dissipated power (Wmax.)	3.5VA (1 W)
In FRAM memory Identifies display of tariffs T1 and T2 CURRENT MEASUREMENTS Type Three-phase - direct 80 A Input consumption 0.5VA max, per phase Startup current (list) 20mA Minimum current (limin) 0.25A Transition current (lirt) 5A Permanent overload (lmax) Intermittent overload (lmax) D2 voltage Un (1 s) 300 VAC D2 voltage Un (1 s) 300 VAC D3 VAC D4 Current Imax 30 Imax for 1/2 cycle VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max, per phase Permanent overload 280V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Reactive Yes Reactive Yes Reactive Yes Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class 2 (EN 62053-23) TARIFF for Ea+ TariFf for Ea+ Timus Timus (2,5VA max, per phase) Permanent overload (2,6VA) Pass	FEATURES	
Identifies display of tariffs CURRENT MEASUREMENTS Type Three-phase - direct 80 A Input consumption 0.5VA max. per phase Startup current (list) 20mA Minimum current (limin) 0.25A Transition current (liref) 5A Permanent overload (limax) 80A Intermittent overload (limax) 80A Intermittent overload (limax) 80 A Portload CAPACITY DC voltage Un 80 A Realtime voltage Un (1 s) 80 A Realtime current limax 80 A Realtime remasurement 80 A Realtime remasureme	Three-phase connectivity	4 wires 3x230/400V to 3x240/415V
Three-phase - direct 80 A Input consumption 0.5VA max. per phase Startup current (Ist) 20mA Minimum current (Imin) 0.25A Transition current (Irt) 0.5A Reference current (Iref) 5A Permanent overload (Imax) 80A Intermittent overload (Imax) 80A Intermittent overload (Imax) 80A Portland CAPACITY DC voltage Un 288 VAC Realtime voltage Un (1 s) 300 VAC DC current Imax 80 A Realtime current Imax 80 A Realtime current Imax 30 Imax for 1/2 cycle VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 2.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes MID metering Bidirectional with three-phase Rescultion 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class 2 (EN 62053-23) TARIFF for Ea+	Stores energy readings and settings	In FRAM memory
Three-phase - direct 80 A	Identifies display of tariffs	T1 and T2
Input consumption 0.5VA max. per phase	CURRENT MEASUREMENTS	
Startup current (list) 20mA Minimum current (limin) 0.25A Transition current (litr) 0.5A Reference current (litr) 5A Permanent overload (limax) 80A Intermittent overload (max) 80A Realtime voltage Un (1 s) 80 A Realtime voltage Un (1 s) 80 A Realtime current Imax 80 A Realtime voltage Un (1 s) 90 Vpds 90 Vpdss	Type	Three-phase - direct 80 A
Minimum current (Imin) O.25A Transition current (Itr) O.5A Reference current (Itr) SA Permanent overload (Imax) 80A Intermittent overload (Imax) 80A Intermittent overload (Imax) OVERLOAD CAPACITY DC voltage Un Realtime voltage Un (1 s) SO VAC DC current Imax 80 A Realtime current Imax 80 A Realtime current Imax 30 Imax for 1/2 cycle VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max, per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-23) TARIFF for Ea+	Input consumption	0.5VA max. per phase
Transition current (Itri) Reference current (Iref) SA Permanent overload (Imax) 80A Intermittent overload (Imax) 80A Intermittent overload (Imax) 80A Intermittent overload (Imax) 80A Poverload 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 ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Nes Reactive Yes Reactive Yes Reactive Yes Italiand partial reading Yes MID metering Bidirectional with three-phase Rescultion 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-23) TARIFF for Ea+ CALIFIC FOR EA CALIFIC F	Startup current (Ist)	20mA
Reference current (iref) 5A Permanent overload (imax) 80A Intermittent 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 ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Nessurement Yes Reactive Yes Reactive Yes Reactive Yes Reactive Yes Rescultion 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class 8 (EN 50470-3) E24 Class 1 (EN 62053-23) TARIFF for Ea+ TARIFF for Ea+	Minimum current (Imin)	0.25A
Permanent overload (Imax) Intermittent overload Intermittent overl	Transition current (ltr)	0.5A
Intermittent overload OVERLOAD CAPACITY DC voltage Un Realtime voltage Un (1 s) DC current Imax 80 A Realtime current Imax 80 A Realtime current Imax 30 Imax for 1/2 cycle VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Itolal and partial reading Wes MID metering Biclirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Reference current (Iref)	5A
OVERLOAD CAPACITY DC voltage Un 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 ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Permanent overload (Imax)	80A
DC voltage Un (1 s) 300 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 ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class B (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Intermittent overload	30 Imax for 1/2 cycle
Realtime voltage Un (1 s) DC current Imax 80 A Realtime current Imax 30 Imax for 1/2 cycle VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading MID metering Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	OVERLOAD CAPACITY	
DC current Imax Realtime current Imax 30 Imax for 1/2 cycle VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	DC voltage Un	288 VAC
Realtime current Imax VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Realtime voltage Un (1 s)	300 VAC
VOLTAGE MEASUREMENTS Range of measurement 230-240V ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	DC current Imax	80 A
Range of measurement 230-240V ± 20% Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Realtime current Imax	30 Imax for 1/2 cycle
Consumption 3.5VA max. per phase Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	VOLTAGE MEASUREMENTS	
Permanent overload 290V phase-neutral / 500V phase-phase FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Range of measurement	230-240V ± 20%
FREQUENCY MEASUREMENT Frequency measurement 45-65 Hz ENERGY MEASUREMENT Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Consumption	3.5VA max. per phase
Frequency measurement ### Active Search Sea	Permanent overload	290V phase-neutral / 500V phase-phase
Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23)	FREQUENCY MEASUREMENT	
Active Yes Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23)	Frequency measurement	45-65 Hz
Reactive Yes Total and partial reading Yes MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23)	ENERGY MEASUREMENT	
Total and partial reading MID metering Bidirectional with three-phase Resolution 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Active	Yes
MID metering Bidirectional with three-phase 10 Wh, 10 varh ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Reactive	Yes
10 Wh, 10 varh	Total and partial reading	Yes
ENERGY ACCURACY Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	MID metering	Bidirectional with three-phase
Active energy Ea+ Class B (EN 50470-3) E24 Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	Resolution	10 Wh, 10 varh
Class 1 (EN 62053-21) Reactive energy Er+ Class 2 (EN 62053-23) TARIFF for Ea+	ENERGY ACCURACY	
TARIFF for Ea+	Active energy Ea+	
	Reactive energy Er+	Class 2 (EN 62053-23)
Tariff management Yes (via input and communication)	TARIFF for Ea+	
	Tariff management	Yes (via input and communication)

Number of tariffs managed	2
Tariff input	Yes
Input type	Opto-isolated
Voltage	0V> Tariff 1
METROLOGICAL LED (Ea+, Ea-)	80-276 VAC-DC> Tariff 2
Pulse value	1000 pulses / kWh
Colour	Red
PULSE OUTPUT	
Туре	Opto-isolated - 5 27VDC 27mA according to EN 62053-31
Pulse weight	100 Wh
DISPLAY	
Туре	8-digit LCD with backlight
Refresh time	1 s
Backlight activation time	10 s
Active energy: 1 display, 8-digit	000000.01 - 999999.99 kWh
Reactive energy: 1 display, 8-digit	000000.01 - 999999.99 kvarh
Apparent energy: 1 display, 8-digit	000000.01 - 999999.99 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 reactive power: 1 display, 4-digit	00.00 99.99 kVA
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	
RS485	2 wires + shielding/ half duplex
Protocol	Modbus, RTU mode
Baudrate	1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 bps
Insulation	SELV
Load unit	1/8
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 4 modules (DIN 43880) 72 x 90 x 64
Mounting	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	440 g

14. LIST OF ABBREVIATIONS

info	Menu information
rEL1	Metrological firmware version
rEL2	Non-metrological firmware version
CS1	Checksum of metrological firmware
CS2	Checksum of non-metrological firmware
tAr.1	Menu for Tariff 1
tAr.2	Menu for Tariff 2
tot	Total menu
PAr.b	Partial readings and energy balance menu
<u>rt</u>	Realtime values menu
SEtuP.2	Setup 2 menu
Addr	Slave address
bAud	Communication speed in bauds (bits per second)
Prty	Communication frame parity
n	No parity
0	Off parity
E	Even parity
StoP	Frame stop bit
1	1 stop bit
2	2 stop bits
rES	Reset partial energy
ConF?	Confirm selection
Y	Save and exit
N	Exit without saving
С	Continue without saving
tAr	Tariff management option
COM	Tariff management via communication
diG	Tariff management via device input

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