
# EM530/EM540

Energy analyzer for three-phase and two-phase systems

**USER MANUAL**

01/02/2023

# Contents

# This manual

## Information property



## Safety messages

The following section describes the warnings related to user and device safety included in this document:

***NOTICE**: indicates obligations that if not observed may lead to damage to the device.*

**CAUTION!** Indicates a risky situation which, if not avoided, may cause data loss.

**IMPORTANT: provides essential information on completing the task that should not be neglected.**

## General warnings

This manual is an integral part of the product and accompanies it for its entire working life. It should be consulted for all situations tied to configuration, use and maintenance. For this reason, it should always be accessible to operators.

***NOTICE**: no one is authorized to open the analyzer. This operation is reserved exclusively for CARLO GAVAZZI technical service personnel.*
*Protection may be impaired if the instrument is used in a manner not specified by the manufacturer.*

## Service and warranty

In the event of malfunction, fault, requests for information or to purchase accessory modules, contact the CARLO GAVAZZI branch or distributor in your country.

Installation and use of analyzers other than those indicated in the provided instructions void the warranty.

# EM530/EM540

## Introduction

EM530 is an energy analyzer connected through 5 A current transformers, for two- and three-phase systems up to 415 V L-L.
EM540 is an energy analyzer for direct connection up to 65 A, for two- and three-phase systems up to 415 V L-L.

In addition to a digital input, the unit can be equipped, according to the model, with a static output (pulse or alarm), a Modbus RTU communication port or an M-Bus communication port.

## Description

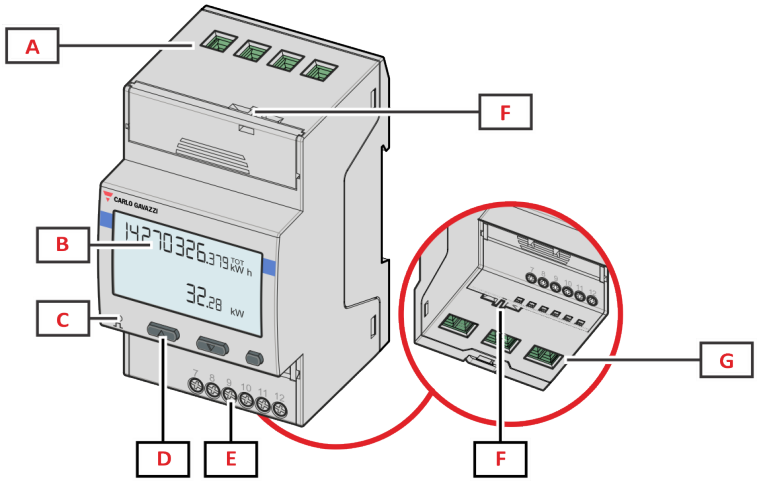



***Figure 1*** *EM530- Front*

| Area | Description |
|---|---|
| **A** | Voltage inputs |
| **B** | Display |
| **C** | LED |
| **D** | Browsing and configuration buttons |
| **E** | Digital input, digital output and communication connections |
| **F** | MID seal housings |
| **G** | Current inputs |

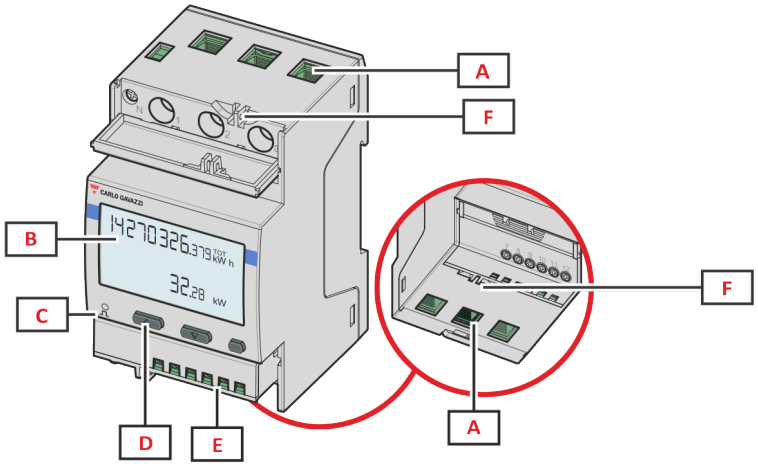



***Figure 2*** *EM540- Front*

| Area | Description |
|---|---|
| **A** | Voltage/current inputs |
| **B** | Display |
| **C** | LED |
| **D** | Browsing and configuration buttons |
| **E** | Digital input, digital output and communication connections |
| **F** | MID seal housings |

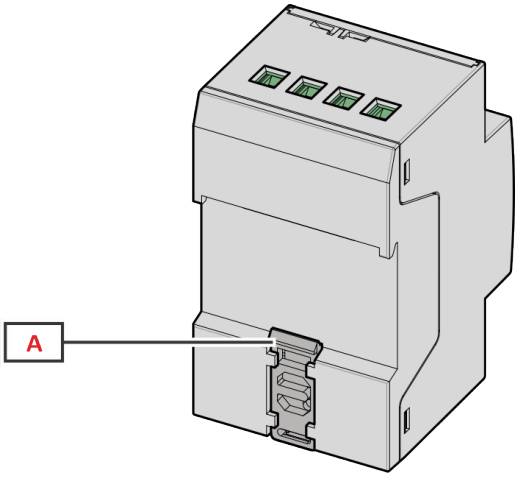



***Figure 3*** *EM530/EM540 - Back*

| Area | Description |
|---|---|
| **A** | DIN rail mounting bracket |

## Available versions

| Part number | Connection | Output | MID approval | cULus approval |
|---|---|---|---|---|
| **EM530DINAV23XO1X** | Via CT (5A secondary output) | Digital output | | x |
| **EM530DINAV23XS1X** | Via CT (5A secondary output) | RS485 Modbus RTU | | x |
| **EM530DINAV23XM1X** | Via CT (5A secondary output) | M-Bus | | x |
| **EM530DINAV23XO1PFA**<br>**EM530DINAV23XO1PFB**<br>**EM530DINAV23XO1PFC** | Via CT (5A secondary output) | Digital output | x | |
| **EM530DINAV23XS1PFA**<br>**EM530DINAV23XS1PFB**<br>**EM530DINAV23XS1PFC**<br>**EM530DINAV23XS1PFA70**<br>**EM530DINAV23XS1PFB70**<br>**EM530DINAV23XS1PFC70** | Via CT (5A secondary output) | RS485 Modbus RTU | x | |
| **EM530DINAV23XM1PFA**<br>**EM530DINAV23XM1PFB**<br>**EM530DINAV23XM1PFC** | Via CT (5A secondary output) | M-Bus | x | |

| Part number | Connection | Output | MID approval | cULus approval |
|---|---|---|---|---|
| **EM540DINAV23XO1X** | Direct connection up to 65 A | Digital output | | x |
| **EM540DINAV23XS1X** | Direct connection up to 65 A | RS485 Modbus RTU | | x |
| **EM540DINAV23XM1X** | Direct connection up to 65 A | M-Bus | | x |
| **EM540DINAV23XO1PFA**<br>**EM540DINAV23XO1PFB**<br>**EM540DINAV23XO1PFC** | Direct connection up to 65 A | Digital output | x | |
| **EM540DINAV23XS1PFA**<br>**EM540DINAV23XS1PFB**<br>**EM540DINAV23XS1PFC**<br>**EM540DINAV23XS1PFA70**<br>**EM540DINAV23XS1PFB70**<br>**EM540DINAV23XS1PFC70** | Direct connection up to 65 A | RS485 Modbus RTU | x | |
| **EM540DINAV23XM1PFA**<br>**EM540DINAV23XM1PFB**<br>**EM540DINAV23XM1PFC** | Direct connection up to 65 A | M-Bus | x | |

### PFA models

Easy connection function: irrespective of the current direction, the power always has a plus sign and contributes to increase the positive energy meter. The negative energy meter is not available.

### PFB models

For each measuring time interval, the individual phase energies with a plus sign are summed to increase the positive energy meter (kWh+), while the others increase the negative one (kWh-).

Example:

P L1= +2 kW, P L2= +2 kW, P L3= -3 kW
Integration time = 1 hour
kWh+ = (2+2) x1h = 4 kWh
kWh- = 3 x 1h= 3kWh

### PFC models

For every measuring interval time, the energies of the single phases are summed; according to the sign of the result, the positive (kWh+) or negative totalizer (kWh-) is increased.

Example:

P L1= +2 kW, P L2= +2 kW, P L3= -3 kW
Integration time = 1 hour
kWh+=(+2+2-3)x1h=(+1)x1h=1 kWh
kWh+=0 kWh

## UCS (Universal Configuration Software)

UCS is available in desktop and mobile versions.

It may connect to EM530 or EM540 via RS485 (RTU protocol, desktop version only).

UCS allows to:

- set up the unit (online or offline);
- display the system state for diagnostic and setup verification purposes

**Overview of the UCS functions:**

- Setting up the system with energy meter connected (online setup)
- Defining the setup with energy non connected, then applying it later (offline setup)
- Displaying the main measurements
- Displaying the state of inputs and outputs
- Displaying the state of the alarms
- Recording the measurements of selected variables
- Check connection and correct wiring errors

# Use

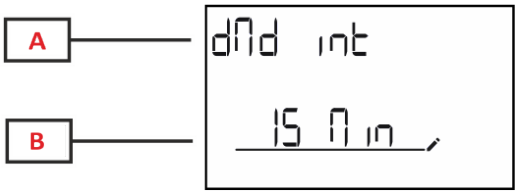
## Interface

### Introduction

EM530/EM540 is organized into two menus:

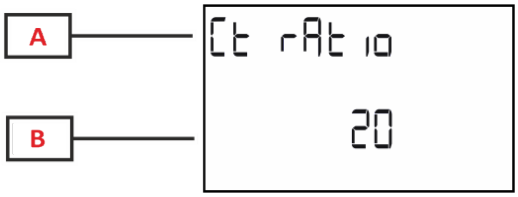
- Measurement pages: pages allowing to display the energy meters and the other electrical variables
- Main menu, divided into three sub-menus:
  - » SETTINGS: pages allowing to set the parameters
  - » INFO: pages displaying general information and the set parameters
  - » RESET: pages allowing to reset the partial counters and the dmd calculation, or to restore the factory settings

### SETTINGS menu display



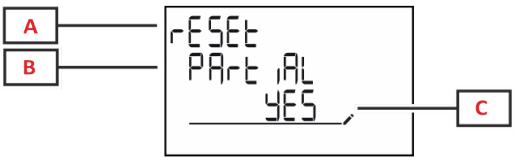

| Part | Description |
|---|---|
| A | Sub-menu title, see “SETTINGS menu” |
| B | Parameter |

### INFO menu display



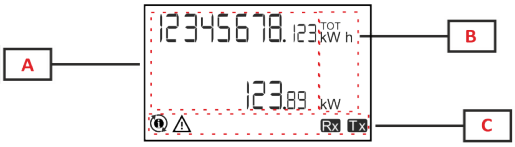

| Part | Description |
|---|---|
| A | Sub-menu title, see “INFO menu” |
| B | Parameter |

### RESET menu display




| Part | Description |
|---|---|
| A | Menu title |
| B | Sub-menu title, see “RESET menu” |
| C | Selection (YES/NO) |

### Measurement page display




| Part | Description |
|---|---|
| A | Measured values/data |
| B | Unit of measurement<br>***Note:*** *for the “power factor” the unit indicates whether the value is inductive (L) or capacitive (C)* |
| C | Information and diagnostics |

## Information and warnings

| Symbol | Description |
|---|---|
|  | ALARM (blinking icon): the value of the variable has exceeded the threshold set. |
|  | WIRING ERROR (steady icons): a wiring fault has been detected, the control operates correctly if the selected system is 3Pn and for each phase:<br>• the power is positive (imported),<br>• PF > 0.7 L or PF > 0.96 C. (Only in EM530) |
|  | Serial communication state (reception / transmission) |
|  | The association of the phase terminal or the direction of the currents have been modified via UCS software to correct virtually a wiring fault. To view the current setup of the terminals, access the info screens ( MENU > INFO > TERMINAL). |

# Working with EM530/EM540

## Working with the measurement pages

| Operation | Button |
|---|---|
| Scroll through the pages |  |
| Enter the Main menu |  |

## Working with the SETTINGS menu

| Operation | Button |
|---|---|
| Scroll through the menu, edit the parameters |  |
| Enter the sub-menu to edit and confirm the operation |  |

## Working with the INFO menu

| Operation | Button |
|---|---|
| Scroll through the menu |  |
| Return to the main menu |  |

## Working with the RESET menu

| Operation | Button |
|---|---|
| Scroll through the menu |  |
| Enter the sub-menu to edit and confirm the operation |  |

# Commissioning

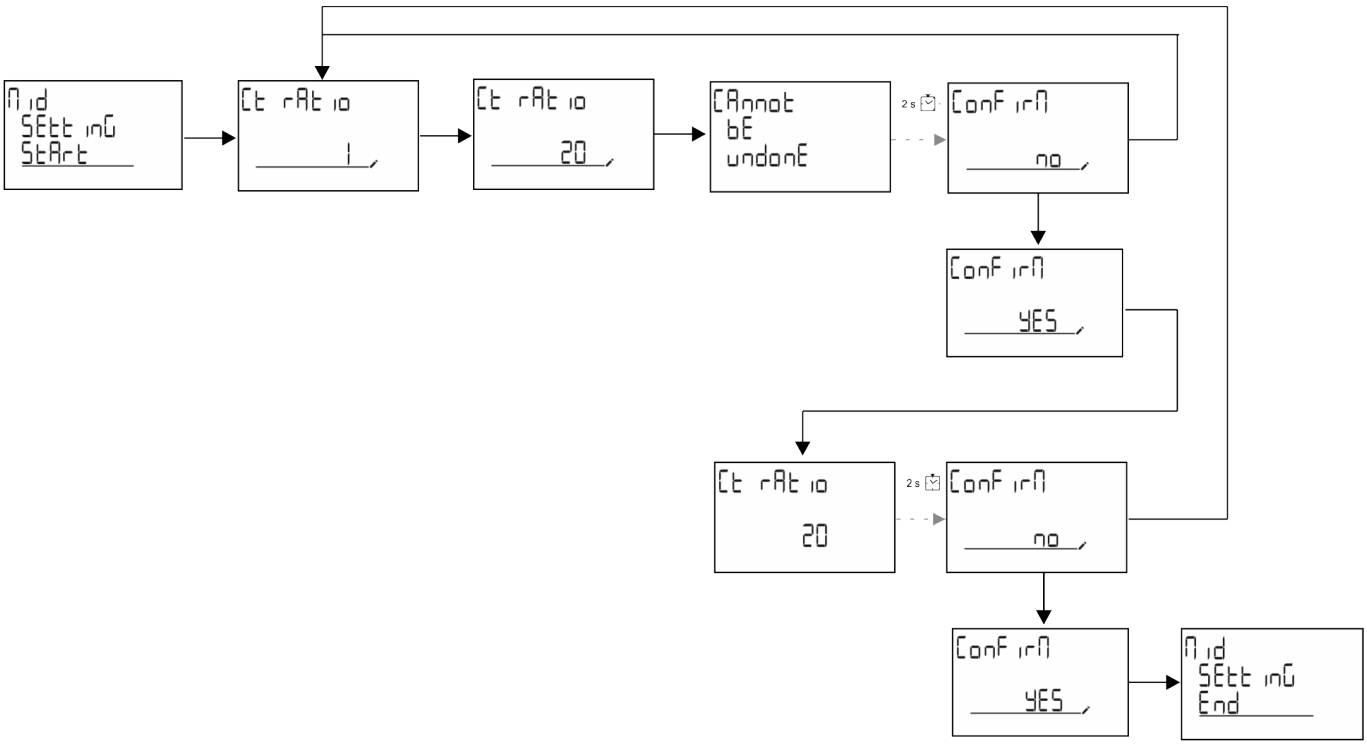
## Preliminary settings

At switch-on, the device displays two preliminary setting menus:

- MID SETTINGS, for EM530, MID models only
- QUICK SETUP

## MID SETTINGS menu

This procedure, only available in MID models, allows to program the current transformer ratio (CT ratio).




## QUICK SETUP menu

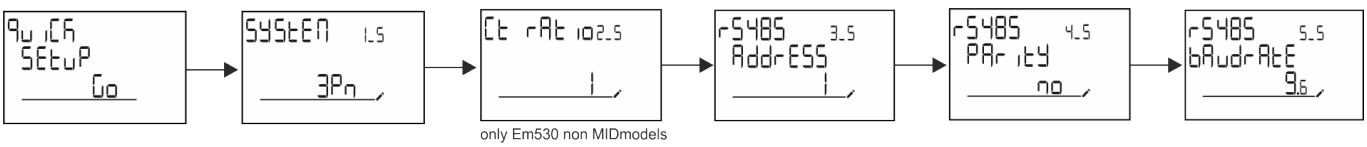
This procedure is available when the instrument is switched on for the first time.

***Note:** the available parameters depend on the model.*

In the “QUICK SETUP?” starting page

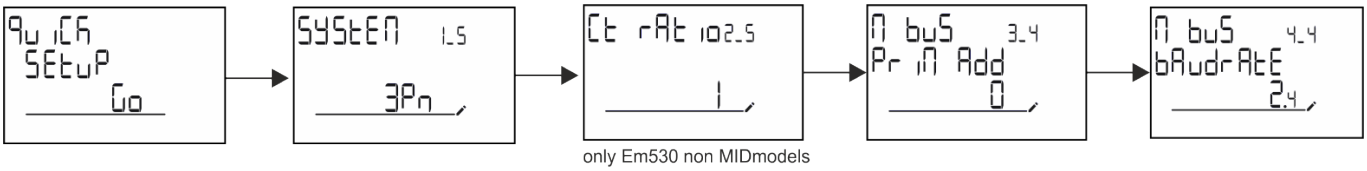
| Select... | To... |
|---|---|
| Go | run the QUICK SETUP procedure |
| no | skip the procedure and no longer display the QUICK SETUP menu |
| LAtEr | skip the procedure and display the QUICK SETUP menu at the next switch-on |

**S1 models**

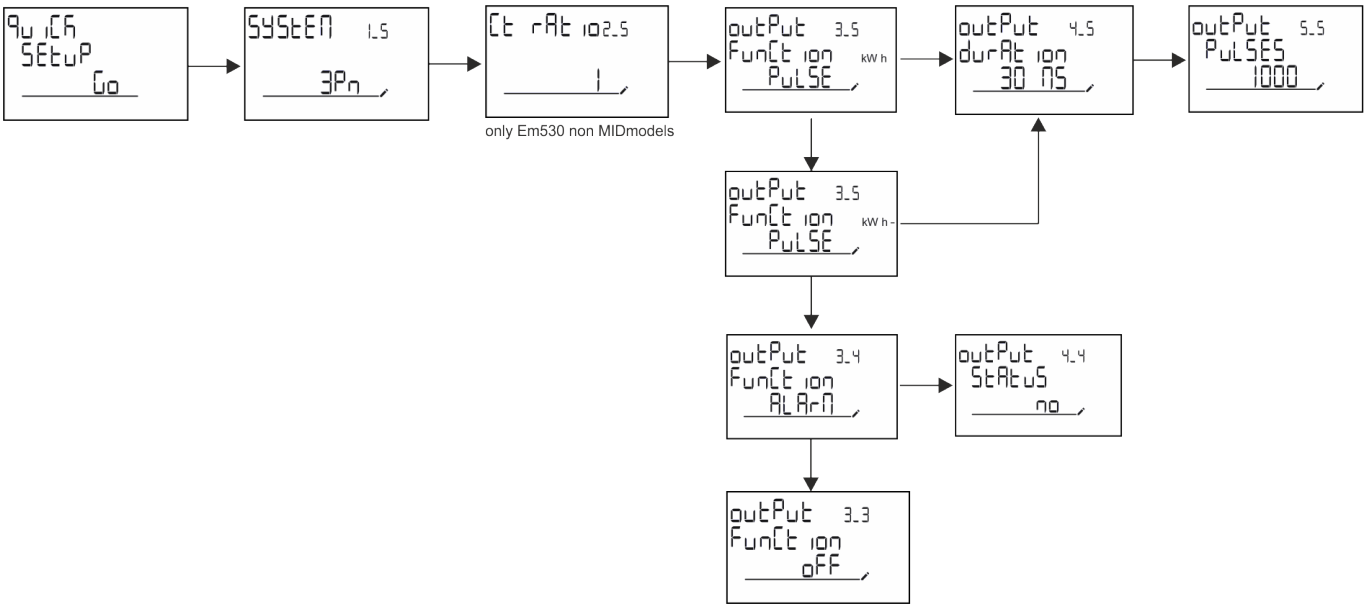



only Em530 non MIDmodels

**M1 models**




**O1 models**



# Menu description

## Measurement pages

The displayed pages depend on the selected system.

| Page | Displayed measurements | Description |
|---|---|---|
| 1 | kWh+ TOT<br>kW | Imported active energy (TOTAL)<br>System active power |
| 2 | kWh- TOT<br>kW | Exported active energy (TOTAL)<br>System active power |
| 3 | kWh+ TOT<br>kWh+ PAR<br>kW | Imported active energy (TOTAL)<br>Imported active energy (PARTIAL)<br>System active power |
| 4 | kWh+ TOT<br>kW<br>PF | Imported active energy (TOTAL)<br>System active power<br>System power factor |
| 5 | VLN<br>VLL<br>Hz | System line-line voltage<br>System line-neutral voltage<br>Frequency |
| 6 | kWh+ TOT<br>kW<br>kW sys DMD P | Imported active energy (TOTAL)<br>System active power<br>Peak demand System active power |
| 7 | kvarh TOT<br>kvar | Imported reactive energy (TOTAL)<br>System reactive power |
| 8 | kvarh- TOT<br>kvar | Exported reactive energy (TOTAL)<br>System reactive power |
| 9 | kVAh TOT<br>kW<br>kVA | Apparent energy (TOTAL)<br>System active power<br>System apparent power |
| 10 | kWh TOT<br>h TOT<br>kW | Imported active energy (TOTAL)<br>Run hour meter (kWh+) TOTAL<br>System active power |
| 11 | kWh- TOT<br>h- TOT<br>kW | Exported active energy (TOTAL)<br>Run hour meter (kWh-) TOTAL<br>System active power |
| 12 | kWh PAR<br>h PAR<br>kW | Imported active energy (PARTIAL)<br>Run hour meter (kWh+) PARTIAL<br>System active power |
| 13 | kWh- PAR<br>h- PAR<br>kW | Imported active energy (PARTIAL)<br>Run hour meter (kWh-) PARTIAL<br>System active power |
| 14 | kWh+ TOT<br>kWh T1<br>kW | Imported active energy (TOTAL)<br>Imported active energy tariff 1<br>System active power |
| 15 | kWh+ TOT<br>kWh T2<br>kW | Imported active energy (TOTAL)<br>Imported active energy tariff 2<br>System active power |
| 16 | Thd<br>Ln | THD of phase 1 voltage<br>THD of phase 2 voltage<br>THD of phase 3 voltage |
| 17 | Thd<br>LL | THD of phase 1-phase2 voltage<br>THD of phase2-phase3 voltage<br>THD of phase3-phase1 voltage |
| 18 | Thd<br>A | THD of phase 1 current<br>THD of phase 2 current<br>THD of phase 3 current |
| 19 | nEutrAL<br>CurrEnt | Neutral current |

| Page | Displayed measurements | Description |
|---|---|---|
| 20 | L1 kVA<br>L2 kVA<br>L3 kVA | Phase 1 apparent power<br>Phase 2 apparent power<br>Phase 3 apparent power |
| 21 | L1 kvar<br>L2 kvar<br>L3 kvar | Phase 1 reactive power<br>Phase 2 reactive power<br>Phase 3 reactive power |
| 22 | L1 PF<br>L2 PF<br>L3 PF | Phase 1 power factor<br>Phase 2 power factor<br>Phase 3 power factor |
| 23 | L1-N V<br>L2-N V<br>L3-N V | Phase 1 voltage<br>Phase 2 voltage<br>Phase 3 voltage |
| 24 | L1-2 V<br>L2-3 V<br>L3-1 V | Phase 1-phase 2 voltage<br>Phase 2-phase 3 voltage<br>Phase 3-phase 1 voltage |
| 25 | L1 A<br>L2 A<br>L3 A | Phase 1 current<br>Phase 2 current<br>Phase 3 current |
| 26 | L1 kW<br>L2 kW<br>L3 kW | Phase 1 active power<br>Phase 2 active power<br>Phase 3 active power |
| 27 | L1 kWh TOT<br>L2 kWh TOT<br>L3 kWh TOT | Active energy phase 1<br>Active energy phase 2<br>Active energy phase 3 |

## SETTINGS menu

This menu allows to set the parameters.

| Page title | Sub-menu | Description | Values | Default values | Note |
|---|---|---|---|---|---|
| SYSTEM | - | System | 3P+N<br>3P<br>2P | 3P+N | |
| CT RAT | - | (CT) current transformer ratio | 1 to 2000 | 1 | Non-MID, AV5 models only |
| MEASurE | - | Measurement mode | A<br>B<br>C | A | Non-MID models only |
| dMd int | - | DMD interval | 1 min<br>5 min<br>10 min<br>15 min<br>20 min<br>30 min<br>60 min | 15 min | |
| inPut | Function | Digital input function | Tariff: tariff management<br>Status: remote status<br>P reset: partial meters reset<br>P StArt: partial meter start/stop | Status | |
| RS485 | AddrESS | Address | 1 to 247 | 1 | S1 models only |
| | PArity | Parity | NO/EVEN | no | |
| | bAudrAtE | Baudrate | 9.6 kbps<br>19.2 kbps<br>38.4 kbps<br>57.6 kbps<br>115.2 kbps | 9.6 kbps | |
| | StoP bit | Stop bit | 1 or 2 | 1 | |

| Page title | Sub-menu | Description | Values | Default values | Note |
|---|---|---|---|---|---|
| M bus | Pri Add | Primary address | 1 to 250 | 0 | M1 models only |
| | bAudrAtE | Baudrate | 0.3 kbps<br>2.4 kbps<br>9.6 kbps | 2.4 kbps | |
| Output | Function | Function | Off<br>PuLSE (kWh+): pulse output linked to kWh+<br>PuLSE (kWh-): pulse output linked to kWh-<br>ALArM: linked to alarm status | PuLSE (kWh+) | O1 models only |
| | durAtion | Pulse duration | 30 ms<br>100 m | 30 ms | |
| | PuLSES | Pulse weight (pulses/kWh) | 0.1/1/10/100/500/1000 | 1000 | |
| | StAtuS | Output status | No (normally open)<br>Nc (normally closed) | | |
| ALARM | EnAbLE | Enable | YES/no | no | |
| | VAriAbLE | Monitored variable | kW<br>A<br>V L-N<br>V L-L<br>PF<br>Kvar<br>kVA | kW | |
| | SEt 1 | Activation threshold | -15000 to 15000 | 0.00 | |
| | Set 2 | Deactivation threshold | -15000 to 15000 | 0.00 | |
| | dELAY | Activation delay | 0 to 3600 s | 0 | |
| dISPLAY | LiGHt | Timer for backlight switch-off | On: always on<br>1 min<br>2 min<br>5 min<br>10 min<br>15 min<br>30 min<br>60 min<br>oFF: always off | On | |
| | SC SAVEr | Screensaver enabling, see "Screensaver" on page 22 | oFF<br>SLidE: slideshow<br>home: homepage | home | Non-MID models only |
| | HOME | homepage | 1 to 27 | 1 | Non-MID models only |
| | PAGES | Measurement page filter enabling, see "Page filter" on page 22 | ALL<br>FiLtEr | OFF | |
| | WirinG | Wiring check enabling | on/OFF | on | |
| PASS | | Password enabling for the SETTINGS and RESET menu | 0 (not protected) to 9999 | 0 (NOT PROTECTED) | |
| End | - | Exit | - | - | |

## INFO menu

This menu allows to display the set parameters.

| Page | Page title | Description | Notes |
|---|---|---|---|
| 1 | YEAr | Production year | |
| 2 | SEriAL n | Serial number | |
| 3 | FW REV | FW revision | |

| Page | Page title | Description | Notes |
|---|---|---|---|
| 4 | Led PuLS | LED pulse weight | |
| 5 | SyStEM | Electrical system | |
| 6 | Ct rAtio | CT ratio | EM530 only |
| 7 | MEAsurE | Measurement type | |
| 8 | dMd int | Demand calculation interval | |
| 9 | Input<br>Function | Digital input function | |
| 10 | rS 485<br>AddrESS | Address | S1 versions only |
| 11 | rS485<br>bAudrAtE | Baudrate (kbps) | S1 versions only |
| 12 | rS485<br>PArity | Parity | S1 versions only |
| 13 | rS485<br>StoP bit | Stop bit | S1 versions only |
| 14 | M buS<br>PriM Add | M-Bus primary address | M1 versions only |
| 15 | M bus<br>bAudrAte | M-Bus baudrate | M1 versions only |
| 16 | M bus<br>SEC Add | M-Bus secondary address | M1 versions only |
| 17 | output<br>Function | Digital output function | O1 versions only |
| 18 | Output<br>StAtuS | Current output status | O1 versions only |
| 19 | output<br>duration | Pulse output duration | O1 versions only |
| 20 | Output<br>PuLSE | Output pulse weight | O1 versions only |
| 21 | ALArM<br>EnAbLe | Alarm enabling | |
| 22 | ALArM<br>VAriAbLE | Linked variable | |
| 23 | ALArM<br>SEt 1 | Alarm activation set point | |
| 24 | ALArM<br>SEt 2 | Alarm deactivation set point | |
| 25 | ALArM<br>dELAY | Alarm activation delay | |
| 26 | display<br>LIGHt | Backlight timer | |
| 27 | display<br>SC SAVEr | Screensaver type | |
| 28 | display<br>home | Home page | |
| 29 | display<br>PAGES | Page filter enabling | |
| 30 | display<br>WirinG | Wiring check enabling | |
| 31 | tAriFF | Tariff management | |
| 32 | CHECKSuM | Firmware checksum | |
| 33 | WiRinG | Wiring check code to correct errors | |

| Page | Page title | Description | Notes |
|---|---|---|---|
| 34 | terminal | Screw terminal phase assignment (press enter to see) | |
| 35 | On time | Total working time | |
| 36 | End | Exit | |

## RESET menu

This menu allows to reset the following settings:

| Page | Page title | Description |
|---|---|---|
| 1 | PArtiAL | It resets the partial meters |
| 2 | DMD | It resets the dmd calculation |
| 3 | tAriFF | It restores the factory settings |
| 4 | total | It resets the total meters (only non MID) |
| 5 | FACtorY | It resets the device to factory settings. In case of MID models all parameters are restored except CT ratio. |
| 6 | MID ReS | In MID models, it resets the CT ratio settings re-enabling first programming menu. This option is available only if the value of the total active energy is below 1 kWh. |
| 7 | End | Exit |

# Input, output and communication

## Digital input

The digital input can perform four functions:

<table>
<tr><th>Function</th><th>Description</th><th>Parameters</th></tr>
<tr><td>Tariff management</td><td>Digital input used to manage the tariff<table><tr><th>Digital input status</th><th>Tariff</th></tr><tr><td>Open</td><td>Tariff 1</td></tr><tr><td>Closed</td><td>Tariff 2</td></tr></table></td><td>-</td></tr>
<tr><td>Remote status</td><td>Digital input is used to check the status via Modbus or M-Bus.<table><tr><th>Digital input status</th><th>Register 300h</th></tr><tr><td>Open</td><td>0</td></tr><tr><td>Closed</td><td>1</td></tr></table></td><td>-</td></tr>
<tr><td>Partial meters start/stop</td><td>Digital input is used to enable/disable the reset of partial meters<table><tr><th>Digital input status</th><th>Partial meter</th></tr><tr><td>Open</td><td>Disabled (in pause)</td></tr><tr><td>Closed</td><td>Enabled</td></tr></table></td><td>-</td></tr>
<tr><td>Partial meter reset</td><td>Digital input is used to enable/disable the increasing of partial meters<table><tr><th>Digital input status</th><th>Action</th></tr><tr><td>Open</td><td>No action</td></tr><tr><td>Closed</td><td>After 3 seconds, reset partial meters</td></tr></table></td><td>-</td></tr>
</table>

## Digital output (version O1)

The digital output can perform two functions:

| Function | Description | Parameters |
|---|---|---|
| Alarm | Output associated with the alarm | Output state when no alarm is active |
| Pulse output | Pulse transmission output for imported active energy consumptions. | • Linked energy (kWh+, kWh-)<br>• Pulse weight<br>• Pulse duration |

## Modbus RTU port (version S1)

Modbus RTU communication port is used to transmit data to a Modbus master (Carlo Gavazzi UWP3.0 or any SCADA, PLC, BMS, etc).

For further information about Modbus RTU communication refer to the communication protocol.

## M-Bus port (version M1)

M-Bus communication port is used to transmit data to a M-Bus master (Carlo Gavazzi SIU-MBM or any third party M-Bus master).

For further information about M-Bus communication refer to the communication protocol.

# Essential information

## Alarms

### Introduction

EM500 manages a measured variable alarm. To set the alarm, define:

- the variable to be monitored (**VARIABLE**)
- alarm activation threshold value (**SET POINT 1**)
- alarm deactivation threshold value (**SET POINT 2**)
- alarm activation delay (**ACTIVATION DELAY**)

### Variables

The unit can monitor one of the following variables:

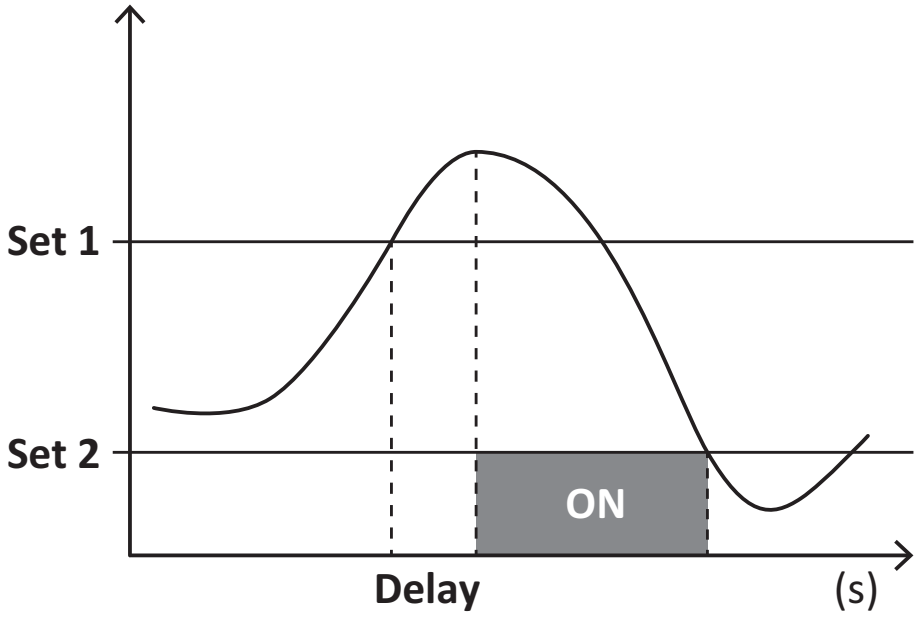
- system active power
- system apparent power
- system reactive power
- system power factor
- phase-neutral voltage (OR logic)
- phase-phase voltage (OR logic)
- current (OR logic)

***Note:*** *if you select a current or a voltage, the analyzer simultaneously monitors all the phases available in the set measurement system and triggers the alarm when at least one of the phases is in alarm (OR logic)*

### Alarm types

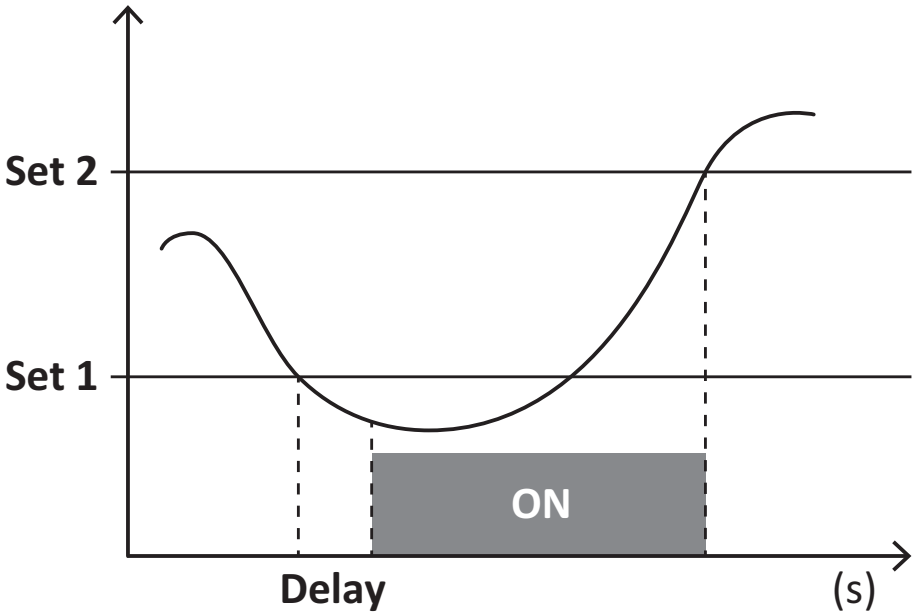
**Up alarm (Set point 1 ≥ Set point 2)**

The alarm activates when the monitored variable exceeds the Set 1 value for a time equal to the activation delay (Delay) and deactivates when the values drops below Set 2.



**Down alarm (Set point 1 < Set point 2)**

The alarm activates when the monitored variable drops below the Set 1 value for a time equal to the activation delay (Delay) and deactivates when it exceeds Set 2.




# DMD values

## Average value calculation (dmd)

EM530/EM540 calculates the average values of the electrical variables within a set integration interval (15 min by default).

## Integration interval

The integration interval starts at switch-on or when the reset command is issued. The first value is displayed at the end of the first integration interval.

## Example

The following is a sample integration:

- reset at 10:13:07
- set integration time: 15 min.

The first value displayed at 10:28:07 refers to the interval from 10:13:07 to 10:28:07.

# LCD display

## Home page

The unit may display the default measurement pages after no operation has been performed for five minutes, if the screensaver is enabled and the screensaver type is as “Home page” (default value).

***Notes:*** *if you select a page that is not available in the set system, the unit displays as its home page the first available page. In MID models the home page cannot be changed and displays the active energy meter.*

## Backlight

EM530/EM540 is equipped with a backlight system. You can set whether the backlight shall always be ON or whether it should automatically switch off after a given interval has elapsed since a button was pressed (1 to 60 minutes).

## Screensaver

If the SCREENSAVER function is enabled (default setting), after 5 minutes have elapsed since a button was pressed the unit will display the home page if the screensaver type is “Home page” (default setting), or it shall activate the slideshow function, which displays the selected pages on a rotating basis.

***Notes:*** *In MID models the screensaver setting is “Homepage” and cannot be changed.*

## Page filter

The page filter makes it easier to use and browse the measurement pages. When you use the buttons, the unit shall only display the pages you are most interested in, which can be selected through the UCS software (S1 version) or is pre-defined (O1 and M1 version)

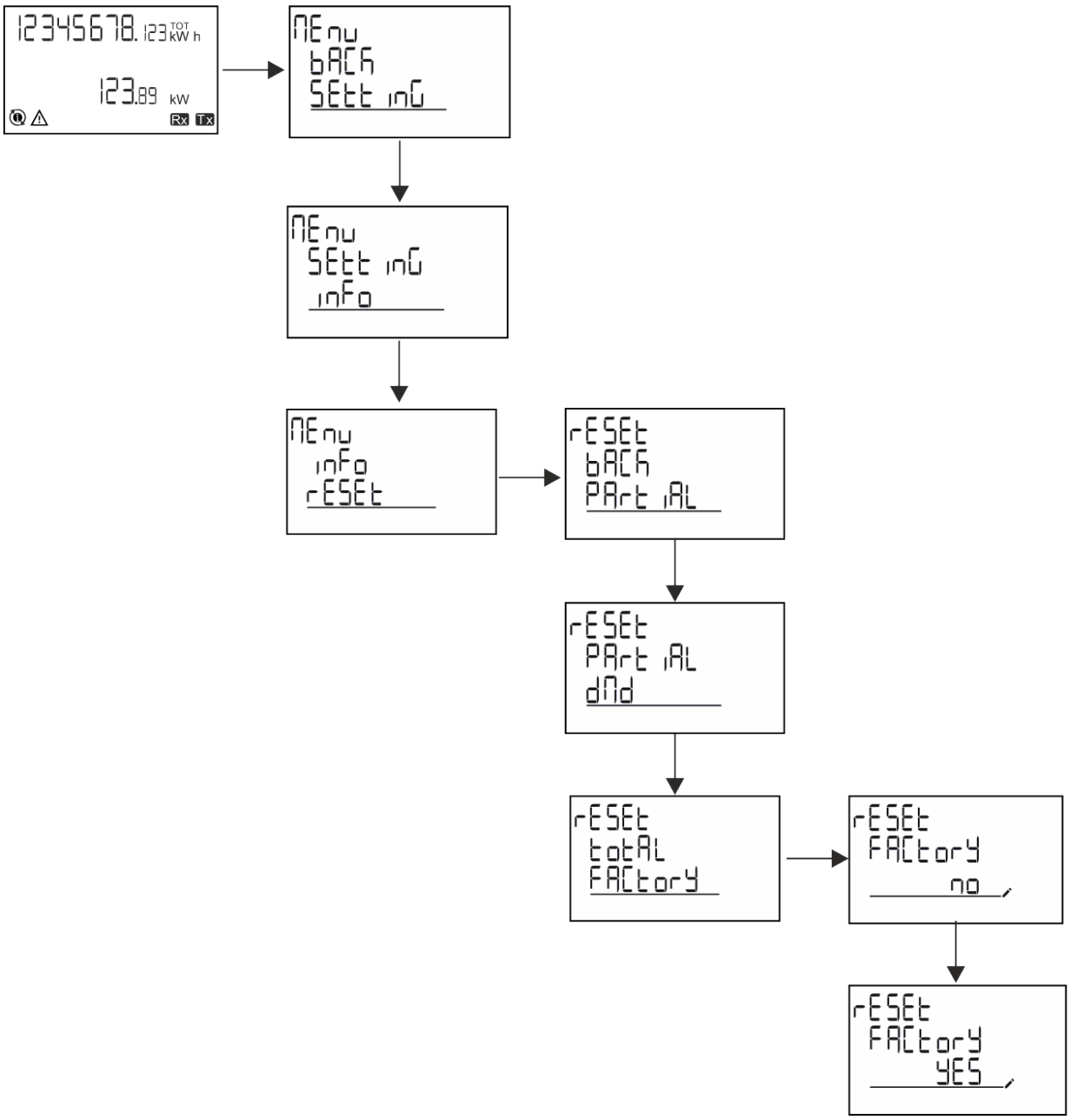
***Note:*** *to display all the pages without using the UCS software, you can disable the page filter from the SETTINGS MENU (DISPLAY → PAGES→ ALL). By default, the pages included in the filter are: 1 (kWh+ TOT, kW), 2 (kWh- TOT, kW), 5 (VLN, VLL, Hz), 7 (kvarh+ TOT, kvar), 8 (kvarh- TOT, kvar), 25 (L1 A, L2 A, L3 A), see "Measurement pages" on page 14.*

# Restoring the factory settings

## Restoring the settings using the RESET menu

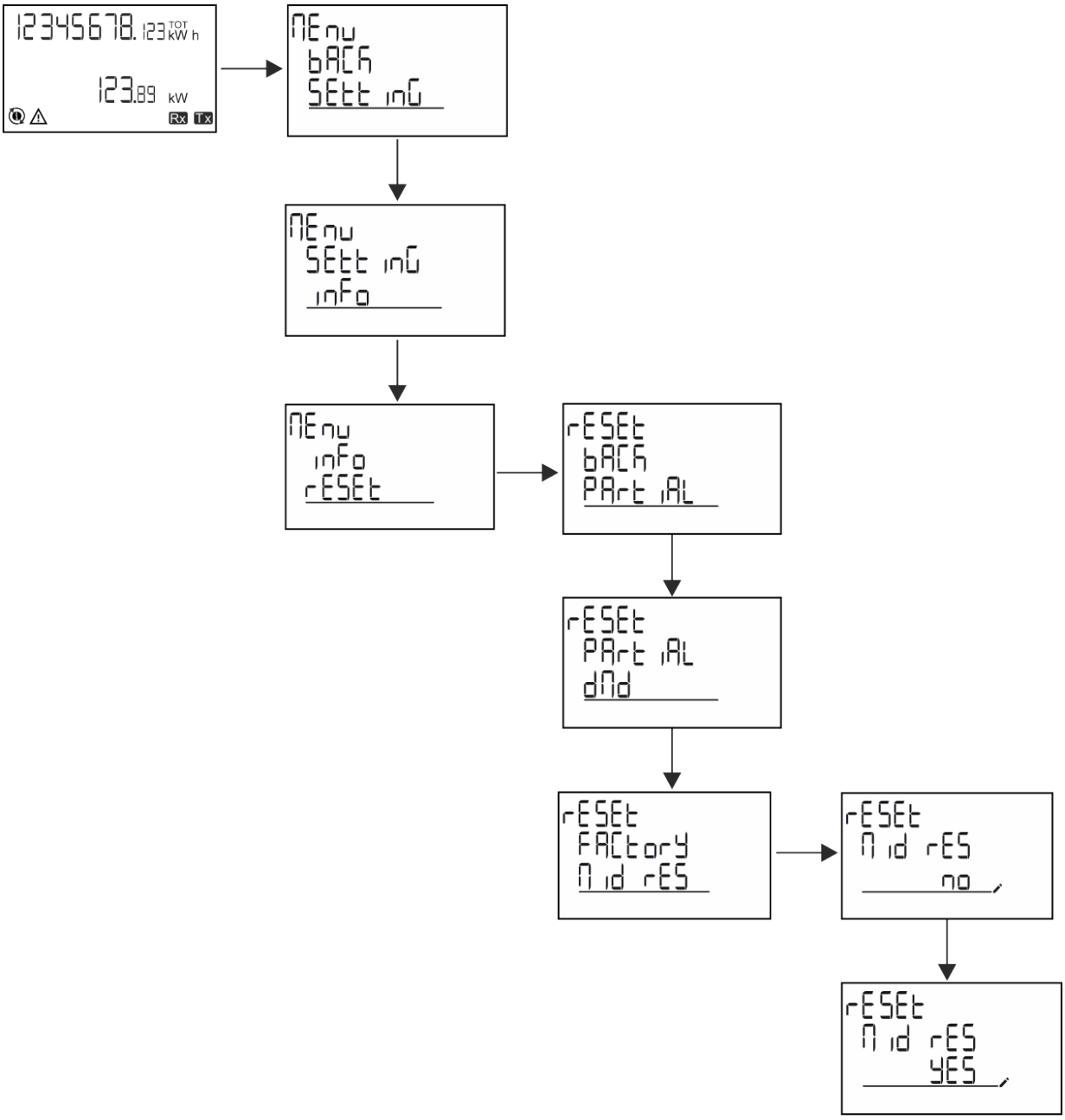
From the RESET menu you can restore all the factory settings. At start-up the QUICK SET-UP menu shall be available again.

***Notes:*** *meters are not reset. In MID models you cannot reset the CT current transformer ratio (CT RATIO).*



## Restoring the MID menu using the RESET menu

To change the set CT ratio and restore the MID settings menu shown at first power on EM530 MID models, enter the reset menu and confirm “MID res”.




***Note:*** *in MID models the reset can only be performed if the energy meter has not exceeded 1 kWh. In case of wrong settings, you can then correct any CT current transformer setting errors (CT ratio), reactivating the MID programming menu.*

***Notes:*** *if active energy has exceeded 1 kWh, the CT ratio cannot be changed.*

# WIRING CHECK function

## Introduction

The WIRING CHECK function allows to check and correct the connections.
For it to work properly, the following three conditions must be met:

1. the set system must be “3P+N”,
2. all voltages must be connected,
3. All currents must be greater than zero, with an offset ranging between a 45° lag and a 15° lead (power factor > 0.7 inductive or > 0.96 capacitive)

## Display check

During operation, if a wiring error is detected the alarm icon will light up.
If the three conditions fail to be met, the following indications shall be displayed in the WIRING info page:

- V MISSING: at least one voltage is missing
- I MISSING: at least one current is missing
- PF OUT OF RANGE: the current-voltage offset is out of range.

## Check from UCS software

By connecting to the analyzer through the UCS software or UCS Mobile, you can verify the connections and perform the steps required to correct the wiring error.

## Virtual correction from UCS software or UCS Mobile

The virtual correction function allows to calculate the wiring error solution and to modify the association of the physical connections with the measurement references.

**Example**

if the connections of terminals 5 and 6 are inverted (voltage 2 and voltage 3), by accepting the proposed solution, voltage 2 shall be the one measured with reference to terminal 6, while voltage 3 shall be the one referring to terminal 5.

The unit shall display the [i] icon, signalling that the association was modified via software and referring to the info pages to check the phase-terminal associations set by UCS.

***Note:** the function is not available in MID models*

# Tariff management

## Tariff management via digital input

To manage tariffs using the digital input set the function of the digital input as tariff (via keypad or UCS software). The current tariff depends on the status of the input

| Digital input status | Tariff |
|---|---|
| Open | Tariff 1 |
| Closed | Tariff 2 |

## Tariff management Modbus RTU

To manage tariffs using the Modbus RTU command enable tariff management via Modbus command from UCS software

| Digital input status | Tariff |
|---|---|
| 0 | No tariff |
| 1 | Tariff 1 |
| 2 | Tariff 2 |

# Maintenance and disposal

## Troubleshooting

***Note:*** *in case of other malfunctions or of any failure, please contact the CARLO GAVAZZI branch or the distributor for your country*

| Problem | Cause | Possible solution |
|---|---|---|
| The 'EEEE' indication is displayed instead of a measurement | The analyser is not used within the prescribed measuring range; as a consequence, the measurement exceeds the maximum permitted value or is the result of a calculation with at least one measurement in error. | Uninstall the analyser |
| | The analyser has just been switched on and the interval defined for the calculation of the average power values (default: 15 min) has not expired yet. | Wait. If you wish to change the interval, access the Dmd page of the Settings menu |
| The displayed values are not the expected ones | Electrical connections are incorrect | Verify the connections |
| | The current transformer settings are incorrect | Check the set current transformer ratio |

### Alarms

| Problem | Cause | Possible solution |
|---|---|---|
| An alarm is triggered, but the measurement has not exceeded the threshold value | The value with which the alarm variable is calculated is in error | Check the set current transformer parameters |
| The alarm is not activated and deactivated as expected | The alarm settings are incorrect | Check the set parameters |

### Communication problems

| Problem | Cause | Possible solution |
|---|---|---|
| No communication can be established with the analyser | Communication settings are incorrect | Check the set parameters |
| | Communication connections are incorrect | Verify the connections |
| | The settings of the communication device (third-party PLC or software) are incorrect | Check the communication with the UCS software |

### Display problem

| Problem | Cause | Possible solution |
|---|---|---|
| You cannot display all measurement pages | The page filter is enabled | Disable the filter, see "Page filter" on page 22 |

# Download

| | |
|---|---|
| **This manual** | https://www.gavazziautomation.com/images/PIM/MANUALS/ENG/EM500_IM_USE_ENG.pdf |
| **EM530 installation manual** | https://gavazziautomation.com/images/PIM/MANUALS/ENG/EM530_IM_INST.pdf |
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| **EM540 datasheet** | https://gavazziautomation.com/images/PIM/DATASHEET/ENG/EM540_DS_ENG.pdf |
| **UCS desktop** | www.productselection.net/Download/UK/ucs.zip |
| **UCS Mobile** | Google Play Store |

# Cleaning

To keep the display clean, use a slightly wet cloth. Never use abrasives or solvents.

# Responsibility for disposal

Dispose of the unit by separately collecting its materials and bringing them to the facilities specified by government authorities or by local public bodies. Proper disposal and recycling will help preventing potentially harmful consequences for the environment and for people.

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