



EM530/EM540

Energy analyzer for three-phase and two-phase systems

USER MANUAL

30/07/2025

Contents

This manual	3	DMD values	24
		Average value calculation (dmd)	24
		Integration interval	24
		Example	24
EM530/EM540	4	LCD display	25
Introduction	4	Home page	25
Description	4	Backlight	25
Available versions	6	Screensaver	25
UCS (Universal Configuration Software)	7	Page filter	25
		Information and warnings	25
Use	8	Restoring the factory settings	26
Interface	8	Restoring the settings using the RESET menu	26
Introduction	8	Restoring the MID menu using the RESET menu	27
SETTINGS menu display	8	WIRING CHECK function	28
INFO menu display	8	Introduction	28
RESET menu display	8	Display check	28
Measurement page display	9	Check from UCS software	28
		Virtual correction from UCS software or UCS Mobile	28
Working with EM530/EM540	10	Tariff management	28
Working with the measurement pages	10	Tariff management via digital input	28
Working with the SETTINGS menu	10	Tariff management Modbus RTU	28
Working with the INFO menu	10	Run-hour meters	29
Working with the RESET menu	10	Maintenance and disposal	30
		Troubleshooting	30
Commissioning	11	Alarms	30
The physical interface	11	Communication problems	30
MID SETTINGS menu	11	Display problem	30
QUICK SETUP menu	12	Download	31
		Cleaning	31
Menu description	14	Responsibility for disposal	31
Introduction	14		
Measurement pages	14		
SETTINGS menu	16		
INFO menu	18		
RESET menu	20		
Input, output and communication	21		
Digital input	21		
Digital output (version O1)	21		
Modbus RTU port (version S1)	22		
M-Bus port (version M1)	22		
Essential information	23		
Alarms	23		
Introduction	23		
Variables	23		
Alarm types	23		

This manual

Information property

Copyright © 2025, CARLO GAVAZZI Controls SpA

All rights reserved in all countries.

CARLO GAVAZZI Controls SpA reserves the right to apply modifications or make improvements to the relative documentation without the obligation of advance notice.

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, 333 mV current sensors, or Rogowski coils without external integrator, 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

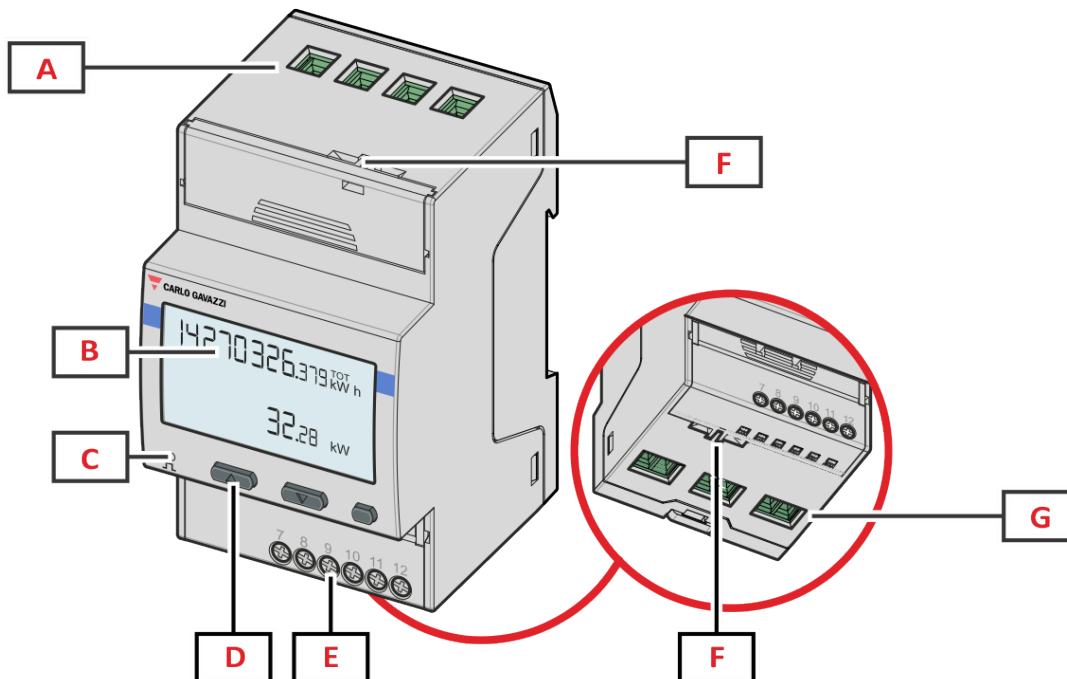


Figure 1 EM530- Front

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

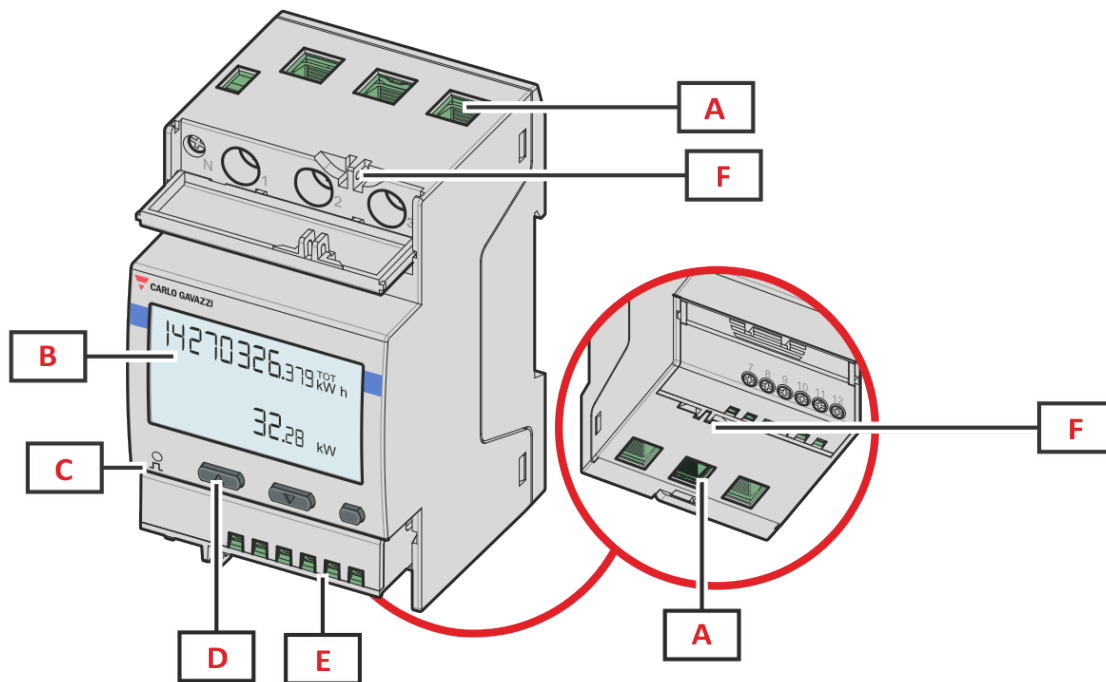


Figure 2 EM540- Front

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

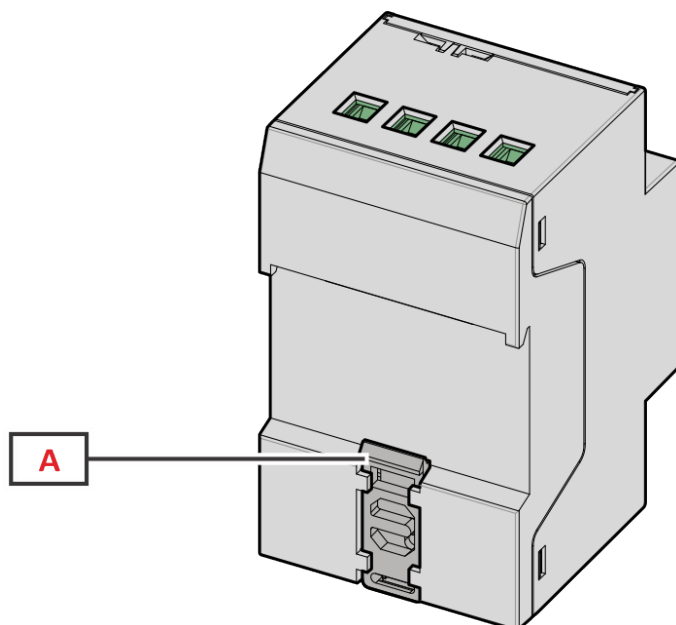


Figure 3 EM530/EM540 - Back

Area	Description
A	DIN rail mounting bracket

Available versions

Part number	Connection	Output	MID approval	cULus approval
EM530DINAV53XO1X	Via CT (5 A secondary output)	Digital output	-	x
EM530DINMV53XS1X	Via CT (333 mV secondary output)	RS485 Modbus RTU	-	x
EM530DINRG53XS1X	Vai Rogowski sensor (100 mA/1000 A)	RS485 Modbus RTU	-	x
EM530DINAV53XS1X	Via CT (5 A secondary output)	RS485 Modbus RTU	-	x
EM530DINAV53XM1X	Via CT (5 A secondary output)	M-Bus	-	x
EM530DINAV53XO1PFA EM530DINAV53XO1PFB EM530DINAV53XO1PFC EM530DINAV53XO1PFD EM530DINAV53XO1PFE	Via CT (5 A secondary output)	Digital output	x	-
EM530DINAV53XS1PFA EM530DINAV53XS1PFB EM530DINAV53XS1PFC EM530DINAV53XS1PFD EM530DINAV53XS1PFE EM530DINAV53XS1PFA70 EM530DINAV53XS1PFB70 EM530DINAV53XS1PFC70 EM530DINAV53XS1PFD70 EM530DINAV53XS1PFE70	Via CT (5A secondary output)	RS485 Modbus RTU	x	-
EM530DINAV53XM1PFA EM530DINAV53XM1PFB EM530DINAV53XM1PFC EM530DINAV53XM1PFD EM530DINAV53XM1PFE	Via CT (5 A 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 EM540DINAV23XO1PFB EM540DINAV23XO1PFC EM540DINAV23XO1PFD EM540DINAV23XO1PFE	Direct connection up to 65 A	Digital output	x	-
EM540DINAV23XS1PFA EM540DINAV23XS1PFB EM540DINAV23XS1PFC EM540DINAV23XS1PFD EM540DINAV23XS1PFE EM540DINAV23XS1PFA70 EM540DINAV23XS1PFB70 EM540DINAV23XS1PFC70 EM540DINAV23XS1PFD70 EM540DINAV23XS1PFE70	Direct connection up to 65 A	RS485 Modbus RTU	x	-
EM540DINAV23XM1PFA EM540DINAV23XM1PFB EM540DINAV23XM1PFC EM540DINAV23XM1PFD EM540DINAV23XM1PFE	Direct connection up to 65 A	M-Bus	x	-

Models: MID PFA

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.

Models: MID PFB and PFD

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) x 1h = 4 kWh

kWh- = 3 x 1h = 3kWh

Models: MID PFC and PFE

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

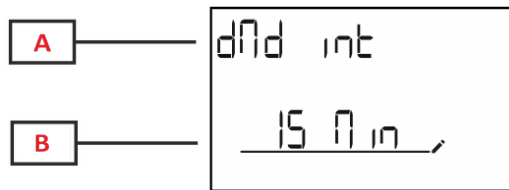
Interface

Introduction

EM530/EM540 is organized into two menus:

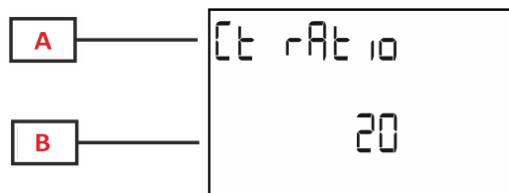
- Measurement pages: pages allowing to display the energy meters and the other electrical variables
- Main menu, divided into three sub-menus:
 - » SETTINGS: pages allowing to set the parameters
 - » INFO: pages displaying general information and the set parameters
 - » RESET: pages allowing to reset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

SETTINGS menu display



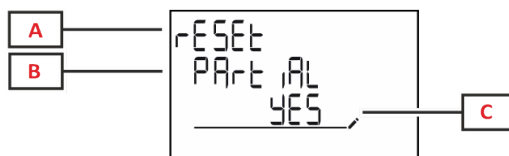
Part	Description
A	Sub-menu title, see "SETTINGS menu"
B	Parameter

INFO menu display



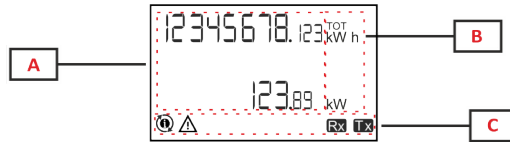
Part	Description
A	Sub-menu title, see "INFO menu"
B	Parameter

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 <i>Note: for the "power factor" the unit indicates whether the value is inductive (L) or capacitive (C)</i>
C	Information and diagnostics

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	

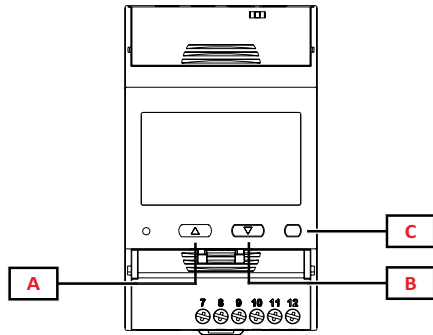
Working with the RESET menu

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

Commissioning

The physical interface

EM530 and EM540 presents identical button-interface, with which you can navigate the available menus.



EM530 Interface

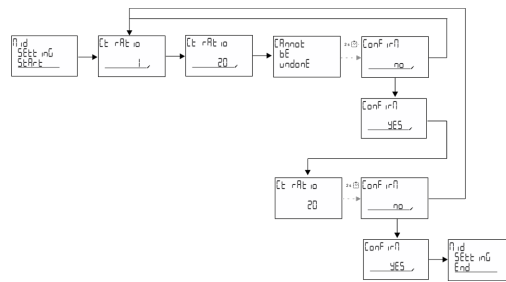
Button	Action
A	UP
B	DOWN
C	CONFIRM

At power on the device allows two preliminary settings,

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

MID SETTINGS menu

MID SETTINGS is available only for EM530 MID models: the procedures allows to set the transformer ratio (CT ratio)



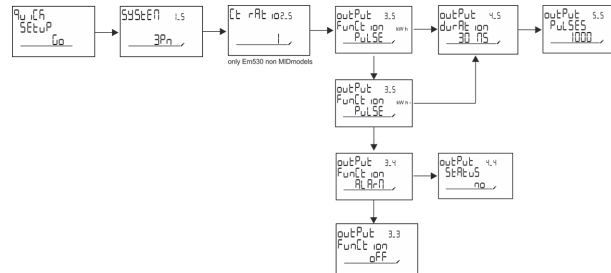
Page title	Submenu	Description	Values	Default
Ct rAtio	-	Transformer ratio	1 to 2000	1

QUICK SETUP menu

This procedure is available when the instrument is switched on for the first time. In EM530 MID models it appears after the MID SETTINGS menu. The QUICK SETUP? starting page looks as follow:

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

The parameters that can be set using the QUICK SETUP depends on the model, the displayed pages are described in the following tables.



Example of EM530 O1 model QUICK SETUP procedure

S1 Models

Page title	Description	Parameters	Values	Default	Note
SYStEM	Electrical system	-	3Pn 3P 2P 1P	3Pn	-
Ct rAtio	Transformer ratio	-	1 to 2000	1	Available only in EM530 AV5 Non-MID models
Pri Cur	Primary current	-	10 to 10000	100	Available only in EM530 MV5 model
Cur Range	Range Rogowski sensor	-	600 A 1200 A 2400 A	600 A	Available only in EM530 RG5 model
RS485	RS485 main parameters	Modbus address	1- 247	1	-
		Baudrate	9.6 kbps 19.2 kbps 38.4 kbps 57.6 kbps 115.2 kbps	9.6 kbps	-
		Parity	None/ Even	None	-
		Stop bit	1 - 2	1	-

M1 Models

Page title	Description	Parameters	Values	Default	Note
SYSTEM	Electrical system	-	3Pn 3P 2P 1P	3Pn	-
Ct rAtio	Transformer ratio	-	1 to 2000	1	Available only in EM530 AV5 Non-MID models
M bus	Primary address	Modbus address	1- 247	1	-
	Baudrate	Baudrate	9.6 kbps 19.2 kbps 38.4 kbps 57.6 kbps 115.2 kbps	9.6 kbps	-

O1 Models

Page title	Description	Parameters	Values	Default	Note
SYSTEM	Electrical system	-	3Pn 3P 2P 1P	3Pn	-
Ct rAtio	Transformer ratio	-	1 to 2000	1	Available only in EM530 AV5 Non-MID models
Output function	Static output function	Pulse	-	-	-
		Alarm	no yes	no	-
		Off	-	-	-
Duration	Duration of the output function in seconds	-	1 to 30	30	-
Pulses	proportion of pulses for kWh	-	1 - 1000	1000	-

Menu description

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

Measurement pages

The displayed pages depend on the selected system.

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

Page	Displayed measurements	Description
17	Thd LL	THD of phase 1-phase2 voltage THD of phase2-phase3 voltage THD of phase3-phase1 voltage
18	Thd A	THD of phase 1 current THD of phase 2 current THD of phase 3 current
19	nEutrAL CurrEnt	Neutral current
20	L1 kVA L2 kVA L3 kVA	Phase 1 apparent power Phase 2 apparent power Phase 3 apparent power
21	L1 kvar L2 kvar L3 kvar	Phase 1 reactive power Phase 2 reactive power Phase 3 reactive power
22	L1 PF L2 PF L3 PF	Phase 1 power factor Phase 2 power factor Phase 3 power factor
23	L1-N V L2-N V L3-N V	Phase 1 voltage Phase 2 voltage Phase 3 voltage
24	L1-2 V L2-3 V L3-1 V	Phase 1-phase 2 voltage Phase 2-phase 3 voltage Phase 3-phase 1 voltage
25	L1 A L2 A L3 A	Phase 1 current Phase 2 current Phase 3 current
26	L1 kW L2 kW L3 kW	Phase 1 active power Phase 2 active power Phase 3 active power
27	L1 kWh TOT L2 kWh TOT L3 kWh TOT	Active energy phase 1 Active energy phase 2 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 3P 2P	3P+N	-
Ct rAtio	-	(CT) current transformer ratio	1 to 2000	1	Non-MID, AV5 models only
Pri Curr		Primary current	10 to 10000	10	Non-MID, MV5 model only
Cur Range	-	Range Rogowski sensor	600 A 1200 A 2400 A	600 A	Non-MID, RG5 model only
MEASurE	-	Measurement mode	A B C	A	Non-MID models only
dMd int	-	DMD interval	1 min 5 min 10 min 15 min 20 min 30 min 60 min	15 min	-
inPut	Function	Digital input function	Tariff: tariff management Status: remote status P reset: partial meters reset 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 19.2 kbps 38.4 kbps 57.6 kbps 115.2 kbps	9.6 kbps	
	StoP bit	Stop bit	1 or 2	1	
M bus	Pri Add	Primary address	1 to 250	0	M1 models only
	bAudrAtE	Baudrate	0.3 kbps 2.4 kbps 9.6 kbps	2.4 kbps	
Output	Function	Function	Off PuLSE (kWh+): pulse output linked to kWh+ PuLSE (kWh-): pulse output linked to kWh- ALARm: linked to alarm status	PuLSE (kWh+)	O1 models only
	durAtion	Pulse duration	30 ms 100 m	30 ms	
	PuLSES	Pulse weight (pulses/kWh)	0.1/1/10/100/500/1000	1000	
	StAtuS	Output status	No (normally open) Nc (normally closed)		

Page title	Sub-menu	Description	Values	Default values	Note
ALARM	EnAbLE	Enable	YES/no	no	-
	VArIAbLE	Monitored variable	kW A V L-N V L-L PF Kvar 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 1 min 2 min 5 min 10 min 15 min 30 min 60 min oFF: always off	On	-
	SC SAVER	Screensaver enabling, see "Screensaver" on page 25	oFF SLidE: slideshow 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 25	ALL 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	-
4	Led PuLS	LED pulse weight	-
5	SyStEM	Electrical system	-
6	Ct rAtio	CT ratio	Non-MID, AV5 models only
7	Pri Cur	Primary current	Non-MID, MV5 models only
8	MEAsurE	Measurement type	-
9	dMd int	Demand calculation interval	-
10	Input Function	Digital input function	-
11	rS 485 AddrESS	Address	S1 versions only
12	rS485 bAudrAtE	Baudrate (kbps)	S1 versions only
13	rS485 PArity	Parity	S1 versions only
14	rS485 StoP bit	Stop bit	S1 versions only
15	M buS PriM Add	M-Bus primary address	M1 versions only
16	M bus bAudrAte	M-Bus baudrate	M1 versions only
17	M bus SEC Add	M-Bus secondary address	M1 versions only
18	output Function	Digital output function	O1 versions only
19	Output StAtuS	Current output status	O1 versions only
20	output duration	Pulse output duration	O1 versions only
21	Output PuLSE	Output pulse weight	O1 versions only
22	ALARm EnAbLe	Alarm enabling	-
23	ALARm VAriAbLE	Linked variable	-
24	ALARm SEt 1	Alarm activation set point	-
25	ALARm SEt 2	Alarm deactivation set point	-
26	ALARm dELAY	Alarm activation delay	-
27	display LIGHT	Backlight timer	-
28	display SC SAVER	Screensaver type	-
29	display home	Home page	-

Page	Page title	Description	Notes
30	display PAGES	Page filter enabling	-
31	display WirinG	Wiring check enabling	-
32	tAriFF	Tariff management	-
33	CHECKSuM	Firmware checksum	-
34	WiRinG	Wiring check code to correct errors	-
35	terminal	Screw terminal phase assignment (press enter to see)	-
36	On time	Total working time	-
37	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:

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

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.	<ul style="list-style-type: none"> •Linked energy (kWh+, kWh-) •Pulse weight •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.

Where to find it	
Communication protocol	https://www.gavazziautomation.com/fileadmin/images/PIM/OTHERSTUFF/COMPRO/EM500_CPP.pdf

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.

Where to find it	
Communication protocol	https://www.gavazziautomation.com/fileadmin/images/PIM/OTHERSTUFF/COMPRO/EM530_EM540_MBus_CPP.pdf

Essential information

Alarms

Introduction

EM530/EM540 manages a measured variable alarm, that can be set either via display (SETTINGS menu) or via serial communication. 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:

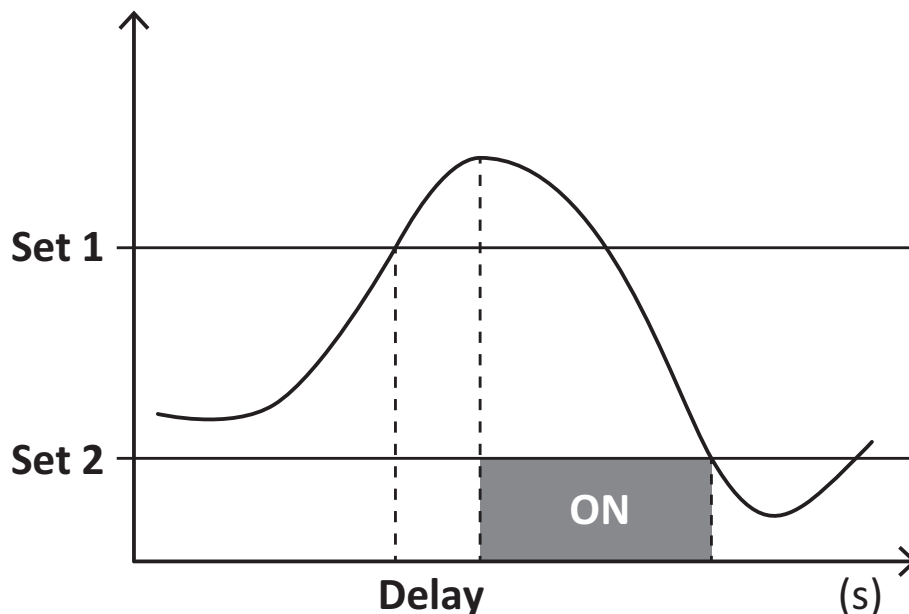
- system active power
- system apparent power
- system reactive power
- system power factor
- phase-neutral voltage (OR logic)
- phase-phase voltage (OR logic)
- current (OR logic)

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

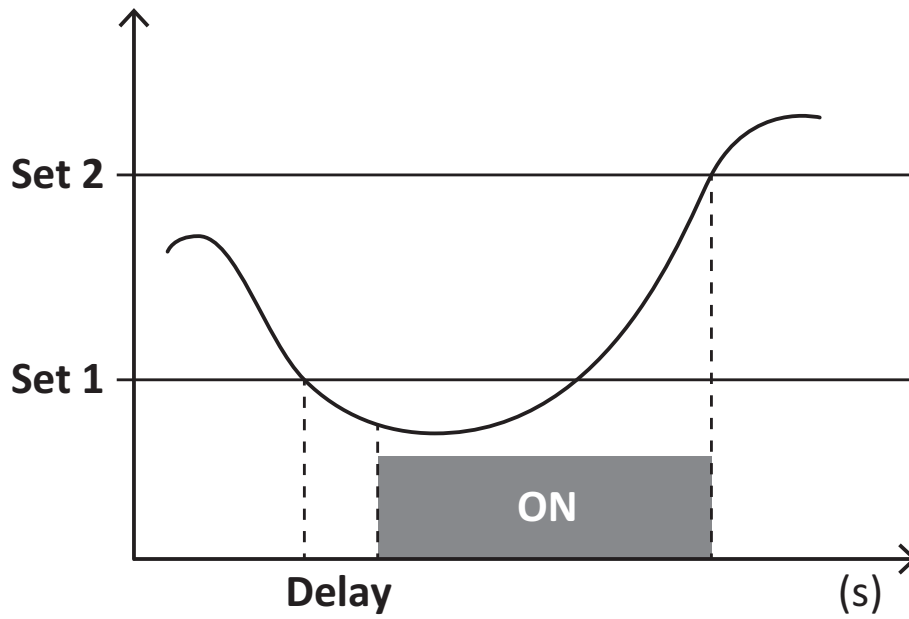
Up alarm (Set point 1 \geq Set point 2)

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)

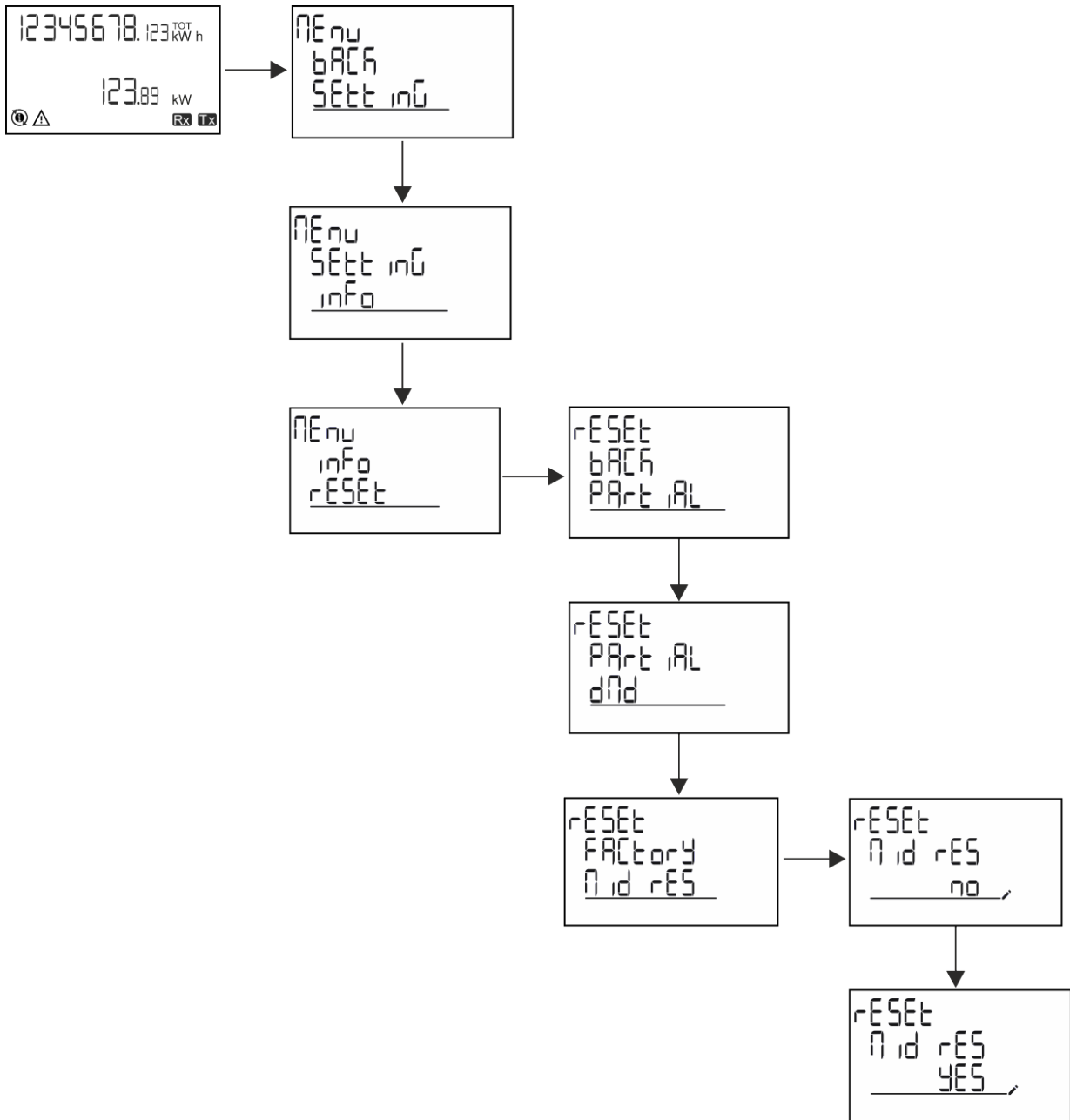
Note: to display all the pages without using the UCS software, you can disable the page filter from the SETTINGS MENU (DISPLAY → PAGES → ALL). By default, the pages included in the filter are: 1 (kWh+ TOT, kW), 2 (kWh- TOT, kW), 5 (VLN, VLL, Hz), 7 (kvarh+ TOT, kvar), 8 (kvarh- TOT, kvar), 25 (L1 A,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

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: <ul style="list-style-type: none">•the power is positive (imported),•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).

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  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

Run-hour meters

EM530/EM540 provides 3 run-hour meters:

Run-hour meter	Increases...
Run hour meter (kWh+)	when the power is positive and the current above $+I_{tr}$.
Run hour meter (kWh-)	when the power is negative and the current is below $-I_{tr}$.
Run hour meter (ON time)	always when the device is ON.

Note: I_{tr} value is reported on the Datasheet, the reference value of the run hour meters can be changed using UCS software or the Modbus command (see Communicaton Protocol).

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
Exported energy meters (kWh-) don't increase	Measurement mode is set to A (default setting)	Set Measurement mode from A to B via keypad or UCS

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 connections
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 1

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
EM530 datasheet	https://gavazziautomation.com/images/PIM/DATASHEET/ENG/EM530_DS_ENG.pdf
EM540 installation manual	https://gavazziautomation.com/images/PIM/MANUALS/ENG/EM540_IM_INST.pdf
EM540 datasheet	https://gavazziautomation.com/images/PIM/DATASHEET/ENG/EM540_DS_ENG.pdf
Modbus RTU communication protocol	https://www.gavazziautomation.com/fileadmin/images/PIM/OTHERSTUFF/COMPRO/EM500_CPP.pdf
M-Bus communication protocol	https://www.gavazziautomation.com/fileadmin/images/PIM/OTHERSTUFF/COMPRO/EM530_EM540_MBus_CPP.pdf
UCS desktop	https://www.gavazziautomation.com/images/PIM/OTHERSTUFF/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.



CARLO GAVAZZI Controls SpA

via Safforze, 8
32100 Belluno (BL) Italy

www.gavazziautomation.com
info@gavazzi-automation.com
info: +39 0437 355811
fax: +39 0437 355880

