DUCA-LCD
468001304

DUCA-LCD 485
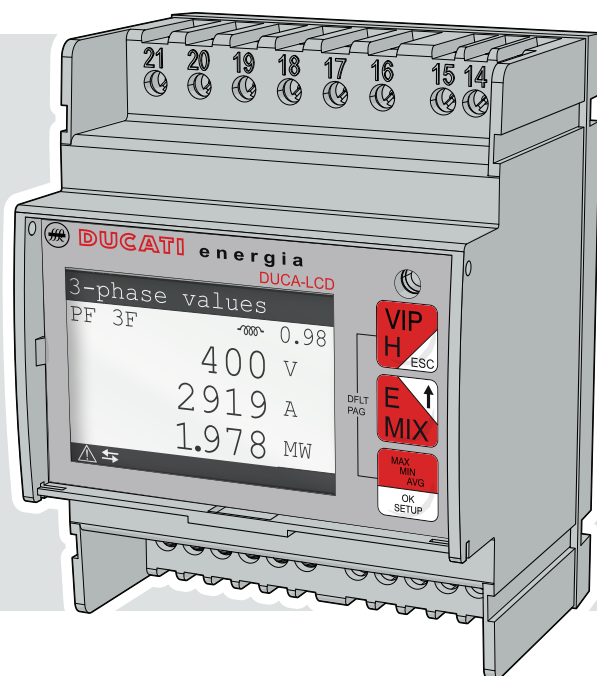468001300

DUCA-LCD ETH
468001305

Network analyser

EN **Assembly and use instructions**

DUCA-LCD

C E

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1   GENERAL INFORMATION

1.1   Reference regulations and conformity

Electrical safety	2014/35/UE 93/68/CEE (Low-Voltage Directive). IEC 61010-1
Electromagnetic compatibility	2014/30/UE
Use of hazardous substances	UE 2011/65/EC – RoHS
Measuring instruments	IEC 61326-1 IEC 62053-21 IEC 62053-23 IEC 62053-31
Degree of casing protection	IEC 60529
Standard dimensions support rail	IEC 60715

DUCA-LCD

1.2 Use and storage of the manual

Carefully read this manual and adhere to the indications described prior to using the device.

This manual contains all of the safety information, the technical aspects and the operating necessary to ensure the correct use of the device and maintain it in safe conditions.

1.2.1 Storage

The manual must be stored close to the device; safe from liquids and anything else which may compromise its legibility.
This manual represents an integral part of the device until it is scrapped.
If the manual is lost or illegible please request a copy from the manufacturer.

1.2.2 Copyright

The copyright of this manual is the property of DUCATI Energia S.p.A.
This manual contains texts, designs and illustrations of a technical nature which must not be disclosed or transmitted to third parties, even partially, without the written authorisation of DUCATI Energia S.p.A.

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1.3   *General safety warnings*

Non-adherence to the following points can lead to serious injury or death.

EN

- Use the suitable personal protection devices and adhere to the current regulations governing electrical safety.
- **This device must be installed exclusively by qualified personnel who have read all of the information relative to the installation.**
- Check that the voltage supply and measure are compatible with the range permitted by the device.
- Ensure that all current and voltage supplies are disconnected prior to carrying out any controls, visual inspections and tests on the device.
- Always assume that all circuits are under voltage until they are completely disconnected, subjected to tests and labelled.
- Disconnect all of the power supply prior to working on the device.
- Always use a suitable voltage detection device to check that the supply is interrupted.
- Pay attention to any dangers and carefully check the work area ensuring that no instruments or foreign objects have been left inside the compartment in which the device is housed.
- The correct use of this device depends on a correct manipulation, installation and use.
- Failure to adhere to the basic installation information can lead to injuries as well as damage to the electric instruments or to any other product.
- NEVER connect an external fuse in by-pass.
- Disconnect all of the input and output wires before carrying out a dielectric rigidity test or an insulation test on an instrument in which the device is installed.
- The tests carried out at a high voltage can damage the device's electronic components.

2   PACKAGING CONTENTS

EN

2.1   Removal of packaging

ⓘ **We recommend that the packaging is stored in a suitable location in compliance with the warranty terms**
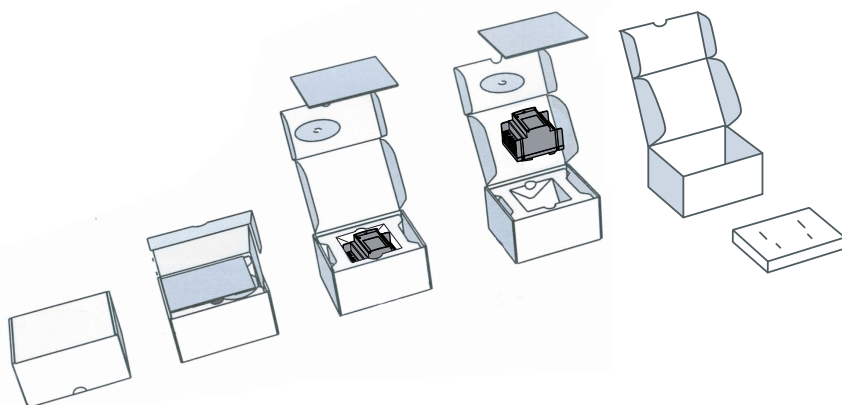
2.2   *Description of the contents*

The packaging includes:
  1) network analyser
  2) User manual
  3) calibration certificate
  4) mini CD with technical documentation

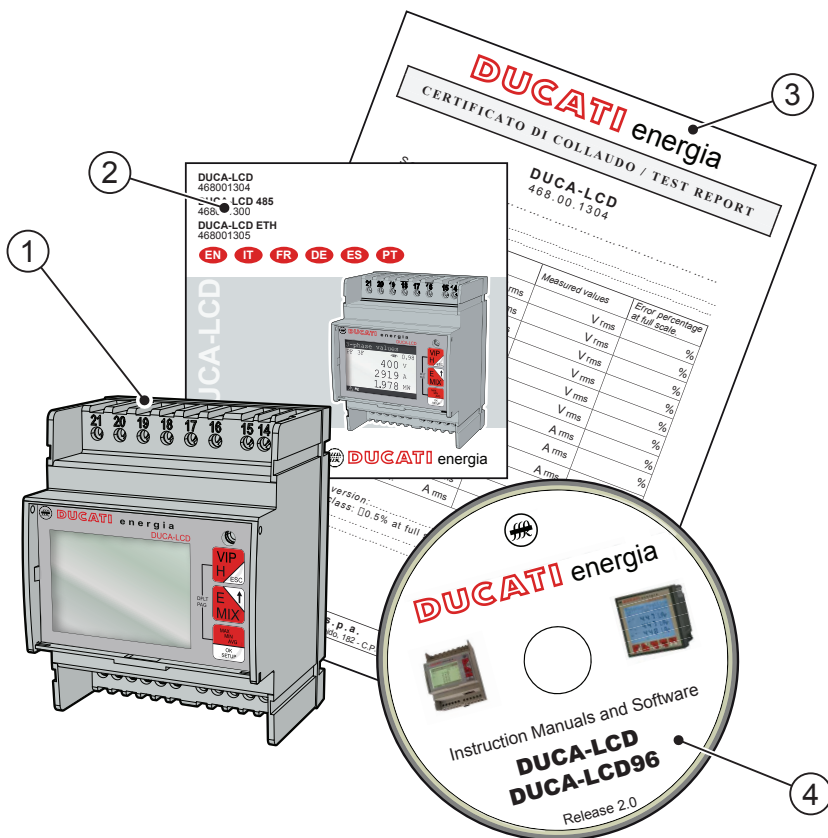**Prior to using the product read the documentation attached and strictly adhere to the indications provided.**

3   TECHNICAL CHARACTERISTICS

EN

3.1   Description of the device

The **DUCA-LCD** network analyser is a DIN rail instrument to take the main electrical measures on three-phase and single-phase networks, designed for monitoring and local or remote analysis of:
- electrical parameters of low- or medium-voltage systems (with 3 suitably connected VTs)
- system energy consumption.

3.2   Measuring functions

All of the DUCA-LCD series models are able to take and process the measure shown below.

1) Voltages (phase neutral and linked) and relative peak values;
2) Currents and relative peak values;
3) Active, reactive and apparent phase powers and the 3-phase system on 2 and 4 quadrants;
4) Power factors or PF phases and the 3-phase system, with distinction icon between the inductive and capacitive load;
5) Frequency (measured on L1-N phase);
6) Active, reactive and apparent energies in single-phase and 3-phase systems on 2 quadrants (with automatic recognition function of the CT directions);
7) Active, reactive and apparent energies in single-phase and 3-phase systems on 4 quadrants (monitoring of energy absorbed and generated by the system);
8) Average power values on a time period programmed by the user;
9) Maximum demand on active and apparent power;
10) Voltage and current THDF or CF (Crest Factor);
11) T1 increase total operating hour counter and T2 decrease partial hour counter;
12) Balance of active, reactive and apparent energy of 3-phase system, balance = absorbed energy - generated energy;
13) Balance of the "partial" active, reactive and apparent energies of the 3-phase system on 4 quadrants in a period that can be programmed by the user, balance = energy absorbed - energy generated;
14) Voltage and current total harmonic distortion (THD) for each individual phase;
15) Voltage and current harmonics up to 31st order
16) Voltage and current time graphs

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> *The change frequency (for each quantity available on display) is equal to 2 volts/second.*

3.3   Models

Models	Inputs and outputs	Communications interface
DUCA-LCD	2 outputs with common programmable as pulses or threshold alarms, 2 inputs with common for active and reactive energy reading or active and generated active energy or active energy and synchronism signal	
DUCA-LCD 485	2 outputs with common programmable as pulses or threshold alarms, 2 inputs with common for active and reactive energy reading or active and generated active energy or active energy and synchronism signal	RS485 Serial with Modbus RTU protocol
DUCA-LCD ETH	2 outputs with common programmable as pulses or threshold alarms, 2 inputs with common for active and reactive energy reading or active and generated active energy or active energy and synchronism signal	Ethernet with Webserver and Modbus TCP protocol

All of the models have the following in common:
- multivoltage power supply;
- multilanguage display with scrolling text;
- self-diagnosis function for the installation control;
- setting of a safety password;
- T1 and T2 hour counters.
- Front LED for pulse or alarm signalling.

DUCA-LCD

3.4 *Overall dimensions*

EN
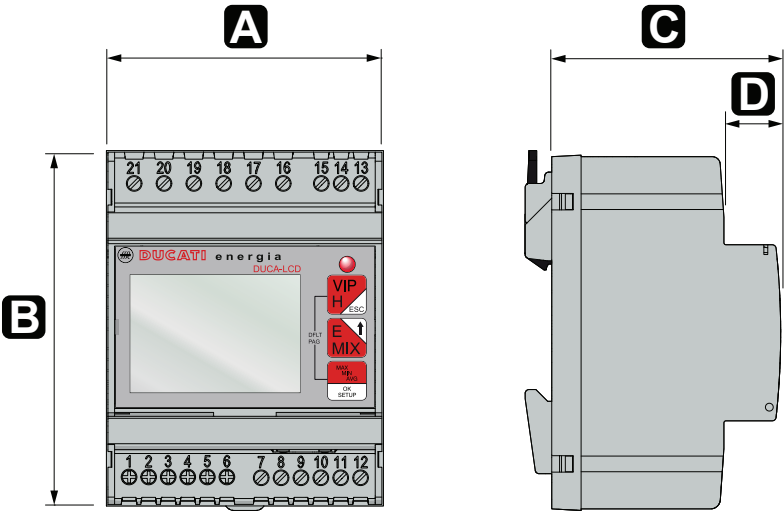
A	70 mm	**C**	58.5 mm
B	90 mm	**D**	14.5 mm

IEC 60715 support rail
X   35 $^{+/- 0.3}$ mm

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3.5   *Technical data*

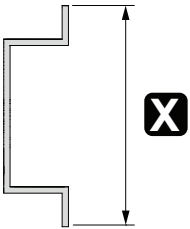| Auxiliary power supply		
Voltage range	[V]	from 24 to 240 a.c./d.c. from 48 to 240 a.c./d.c. DUCA-LCD ETH
Frequency interval	[Hz]	45 ÷ 65
Protection fuse		T 0.5 A

Power consumption	[VA]	13 max

Measure type	Sampling TRMS

Measure accuracy		
Voltage		±0.5% F.S. ±1 digit
Outlet current		±0.5% F.S. ±1 digit
Frequency	[Hz]	40.0 ÷ 99.9: ±0.2% ±0.1 100 ÷ 500: ±0.2% ±1
Power factor		±1% ±1 digit (from cosΦ= 0,3 Inductive to cosΦ= 0,3 Capacitive)
Active power		±1% ±0,1% F.S (from cosΦ= 0,3 Inductive to cosΦ= 0,3 Capacitive)
Active energy		Class 1

Measure interval		
Voltage	[V]	from 10 to 300 a.c. (maximum non-destructive 550 a.c.) VL-N TRMS Visualisations with 0 decimals
Outlet current		from 50 mA to 5 A TRMS Visualisations in A with 2 decimals
Frequency	[Hz]	from 40 to 500 Visualisation: with 1 decimal up to 99.9 with 0 decimals above 100
Power factor		Visualisations with 2 decimals

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Installation		
Distribution networks		Single-phase insertion 3-phase with neutral 3-phase without neutral
Amperometric inputs	[A]	Always use external CT
		Primary from 1 to 10.000 A a.c.
		Secondary 5 A and 1 A a.c. Note: in case of CT secondary at 1 A the accuracy class is declassified to 2.5% F.S. ±1 digit, in range 5%-100% F.S.
Voltmetric inputs	[V]	Direct insertion up to 300 a.c. VL-N
		Indirect insertion with VT: Primary from 60 to 60,000 V a.c. secondary from 60 to 190 V a.c. Note: in case of VT secondary at 1 A the accuracy class is declassified to 2.5% F.S. ±1 digit, in range 5%-100% F.S.
Protection fuse		F 0.1 A

Data change frequency	2 volts/second

Voltage and current harmonics	up to 31st order calculation in ranges from 20 to 500VRMS and from 0.5 to 5ARMS
Fundamental harmonic frequency	50Hz or 60Hz

Energy measure	
Single phase maximum value counted	10 GWh / GVarh / GVAh
3-phase maximum value counted	30 GWh / GVarh / GVAh
Energy balance maximum value counted	10 GWh / GVarh / GVAh with sign
Input pulses maximum energy value counted	40 GWh / GVarh
Minimum quantum of energy that can be displayed (by means of display or through communication interfaces)	10Wh / 10VArh / 10VAh

Terminal characteristics	
Amperometric inputs	2.5 mm² cross-section (max 4 mm2 with stranded cable) - Pitch 5.08 mm
Voltmetric and power supply inputs	Section 2.5 mm² - Step 7.62 mm
Impulsive outputs	Section 2.5 mm² - Step 5.08 mm
RS485 Serial port	Section 2.5 mm² - Step 5.08 mm
Impulsive inputs	Section 2.5 mm² - Step 5.08 mm

Overall dimensions
70 mm x 90 mm x 63 mm (L x H x W)

Weight	[Kg]	0.250 max

Standard normatives	
Standard support rail dimensions	IEC 60715
Protection degree	IEC 60529
Accuracy class	IEC 61326-1, IEC 62053-21, IEC 62053-23, IEC 62053-31.
Electrical safety	IEC 61010-1

User interface		
Display		Scrolling text in several languages to be selected by user.
Display type		Graphical LCD with user-adjustable backlighting
Display dimensions	[mm]	45x31.5

Communication interface	
RS485	
Protocol	Modbus RTU or ASCII DUCATI
Electric standard	RS485 with optical isolation
Baud rate	4.8, 9.6, 19.2 kbps
Parity number	Odd, Even, None
Stop bit	1, 2
Address	1-247 for Modbus RTU; 1-98 for ASCII DUCATI
Connectors	3-pole terminal
Ethernet	
Protocol	Modbus TCP/IP
Connectors	Insulated RJ45 with MDI/MDX auto-crossover function

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Digital output programmed as pulse		
Contact supply external voltage	[V]	48 max (peak ac/dc)
Maximum current	[mA]	100 (peak ac/dc)
Pulse duration	[ms]	50 OFF (min) / 50 ON closed contact
Pulse frequency		10 pulses/s (max)

Digital output programmed as alarm		
Contact supply external voltage	[V]	48 max (peak ac/dc)
Maximum current	[mA]	100 (peak ac/dc)
Alarm activation delay	[s]	1 - 900 s (programmable)
Alarm return hysteresis		0 - 40% (programmable)

| Digital inputs		
Rated voltage	[V]	24 d.c. (absorption = 13 mA)
Max. voltage	[V]	32 d.c. (absorption = 22 mA)
Max. voltage for OFF state	[V]	8 d.c.
Min. voltage for ON state	[V]	18 d.c.

Hour counters		
Count-down timer	[hh:mm]	Count of the system operating time through the activation of a programmable threshold on total current. Upon expiry of the maintenance period set an icon will appear on the display.
Count-up timer	[hh:mm]	Life time of instrument

Climatic conditions		
Storage	[°C]	from -10 to +60
Use	[°C]	from -5 to +55
Relative humidity		Max 93% (without condensation) at 40°C

Protection degree	
Frontal	IP50
At terminals	IP20

4   INSTALLATION

4.1   Assembly

IEC 60715

1

2

3

CLICK

4.2 *Disassembly*

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Network analyser · Rev. 1.0

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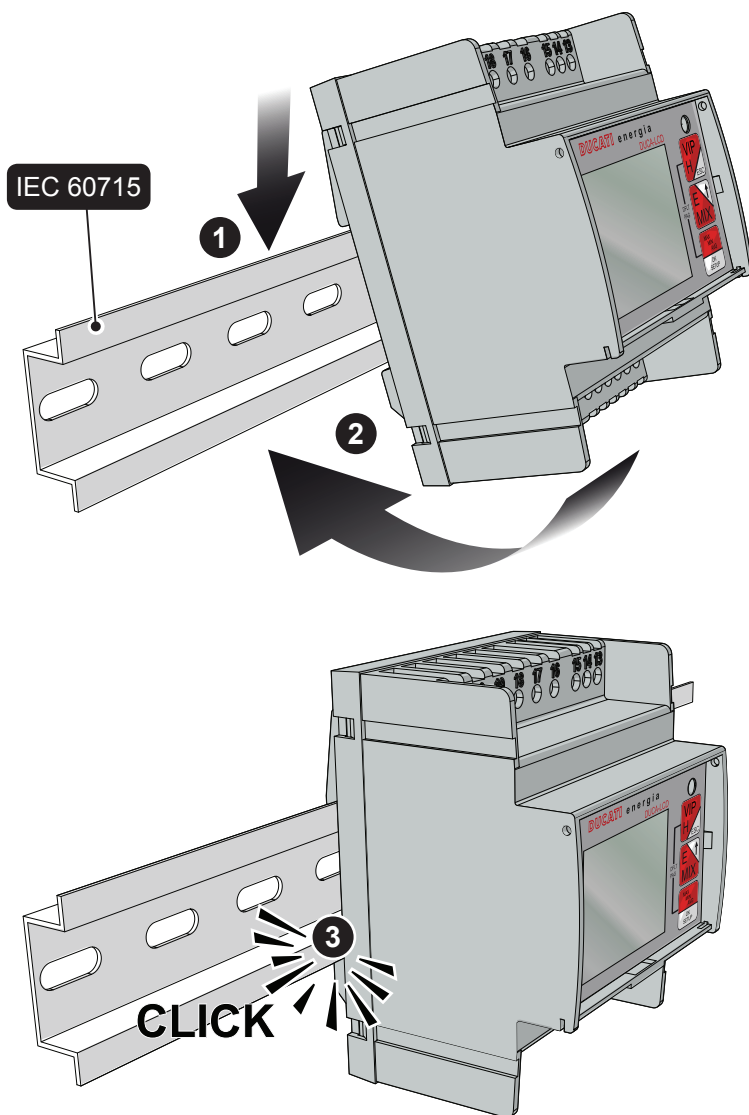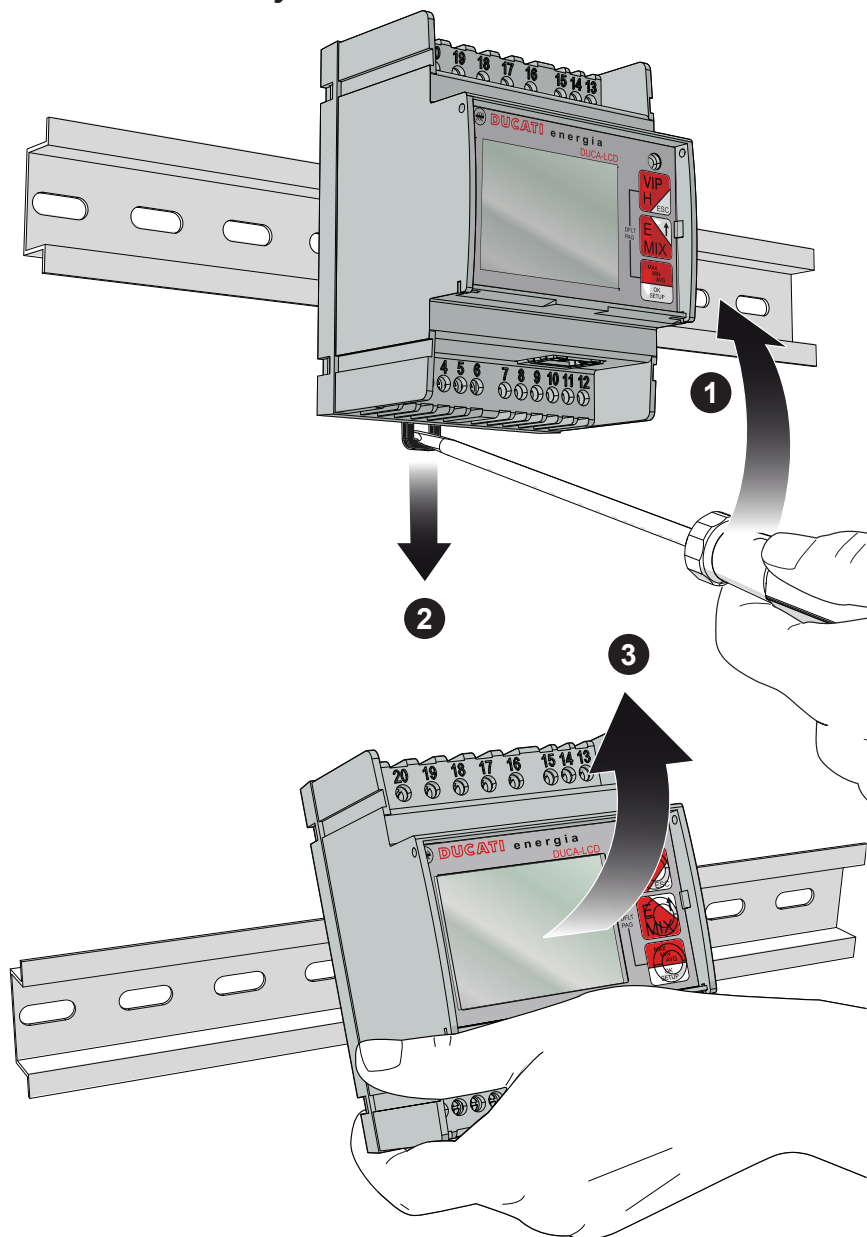
4.3 Connections

The operations to carry out the correct connection of the device, based on the type of network system, are described in this section.

The installation and the cabling of the device must be carried out by qualified personnel.

Danger of electrocution, burning and electric arc.
Use the personal protection devices suitable to comply to the current regulations governing electrical safety.
Prior to carrying out any connections check the sectioning of the electric supply with the voltage detection device.

EN

DUCA-LCD
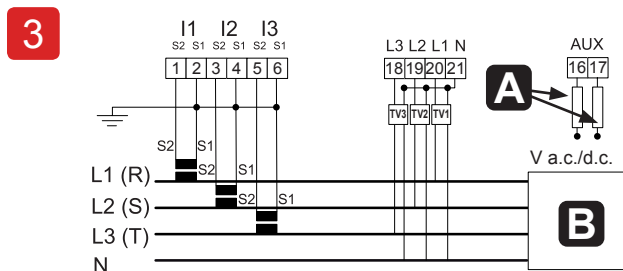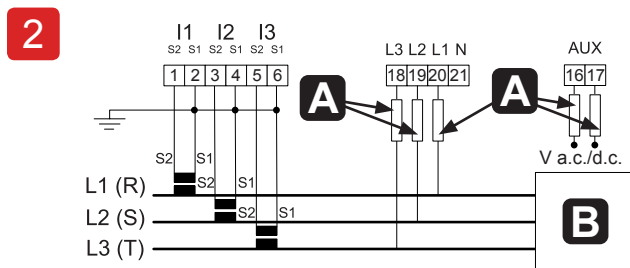468001304

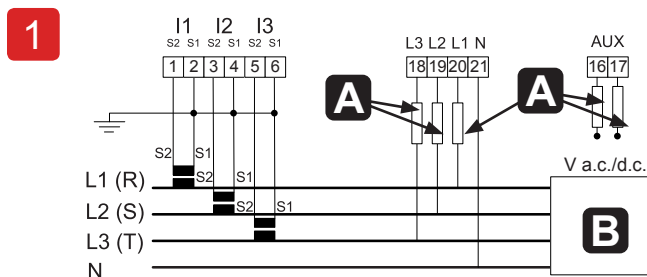## DUCA-LCD 485
468001300

DUCA-LCD ETH
468001305

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Network analyser

Rev. 1.0
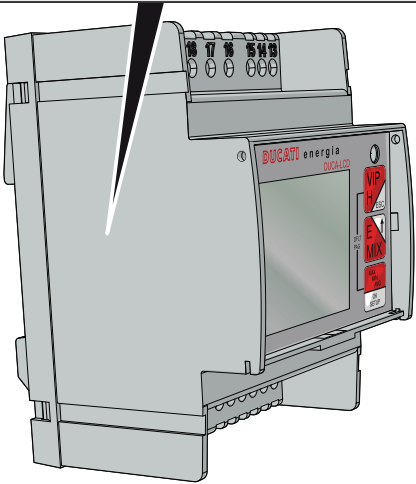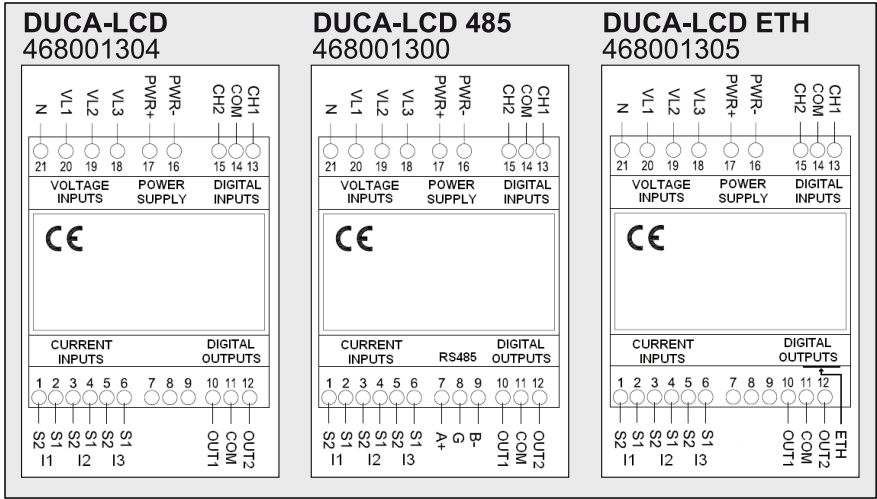
4.3.1   Inputs connections

1 3-phase + neutral with 3 CT

3 3-phase + neutral with 3 CT and 3 VT

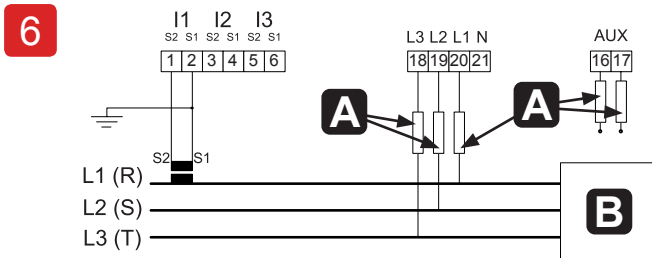**2** 3-phase with 3 CT

A Fuse

B Load

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4   AARON 3-phase with 2 CT

6   Balanced 3-phase with 1 CT

5   Single-phase with 1 CT

A Fuse

B Load

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EN
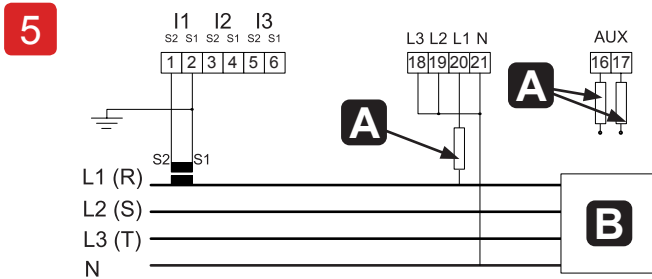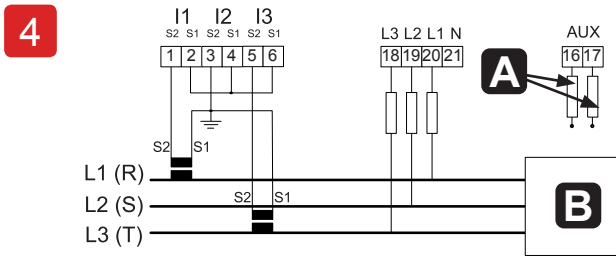
4.3.2 Optional outputs connections

7 Digital outputs as alarms with external relay for loads command

8 Digital outputs as pulses
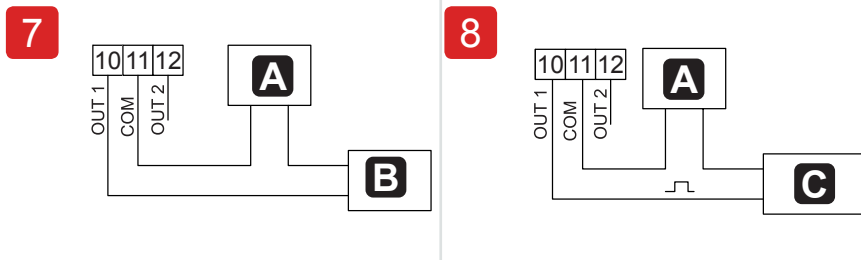
A V aux 48 V a.c./d.c. 100 mA

C Pulse acquisition

B External relay

9 Digital inputs - CH2 connected to reactive energy or generated active energy signal

10 Digital inputs - CH2 connected to synchronism signal

11 RS485
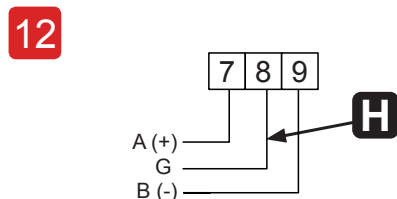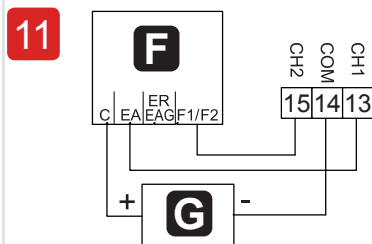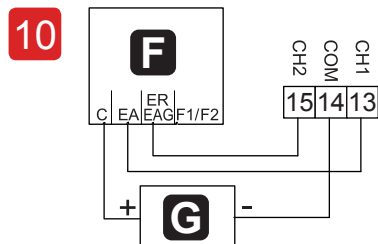
F G.M.C. + ES card

H Ground/Shield

H V aux 24 V a.c./d.c. (32 V d.c. max)

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4.4 Configurations for first use

After having cabled the instrument according to the pre-selected layout, the following operations must be carried out to start to use the analyser:

EN

1) set the language (see paragraph *"5.3.9 Menu Language"*)
2) set the CT transformation ratio (see *"5.3.4.2 Set CT ratio"*)
3) set the VT transformation relationship (see *"5.3.4.3 Set VT ratio"*)

5   OPERATION

5.1   Front panel

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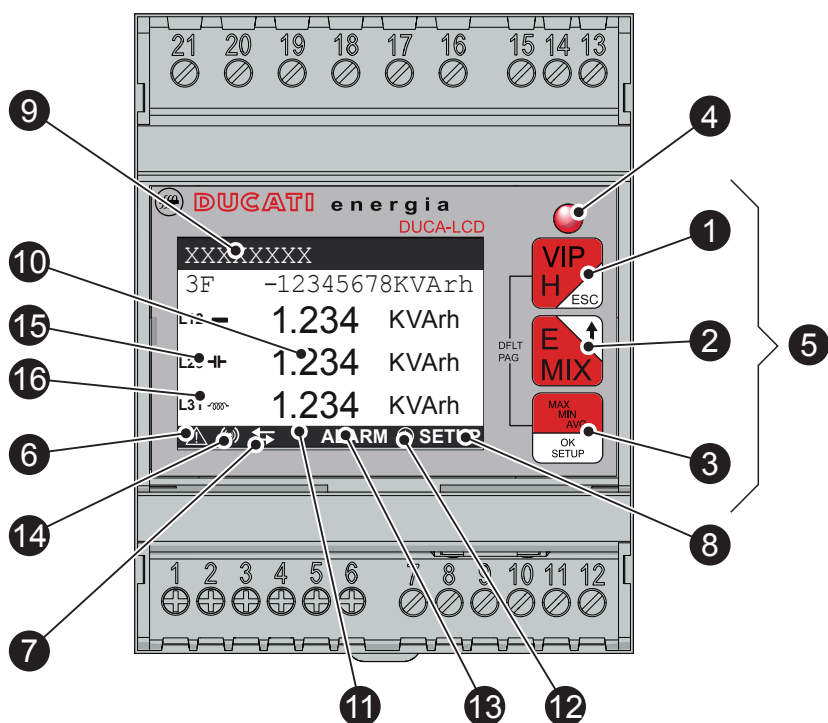|		Description
1		Control key 1
2		Control key 2
3		Control key 3
4		Pulses / alarms LED
5		Control keys unit
6		Device error or warning indicator
7		Data acquisition indicator on 4 quadrants-GENERATION
8		SETUP mode indicator
9		Scrolling descriptive text area
10		Data display area
11		Indicator display area
12		Hour counter indicator
13		Alarms indicator
14		Data transmission to external devices indicator
15		Indicator of capacitive load (PF and reactive power pages)
16		Indicator of inductive load (PF and reactive power pages)

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5.2   Use of device

During normal operating or during the reading of the measure, the device is set in DATA READING mode.

During the configuration of one or more parameters, the device will switch to the SETUP mode (indicated on the display by the **8** icon).

Depending on the active operating mode, the control keys **5** perform a specific function.

---

i   **Switching from the DATA READING to SETUP mode and vice versa is performed by keeping the 3 key pressed down for over 2 seconds.**

---

i   **If the 6 icon is active when switching on, the device is signalling a fault with the installation or internal electronics. See sections *"5.3.10 Menu Self Diagnosis"* and *"6.1 Problems, causes, solutions"* to check the fault and solve the problem.**

EN

5.2.1 Access to the page

To access the device page, press the control keys **5** in sequence.
The following layout explains the meaning of the symbols used in this chapter.

A	Control key sequence
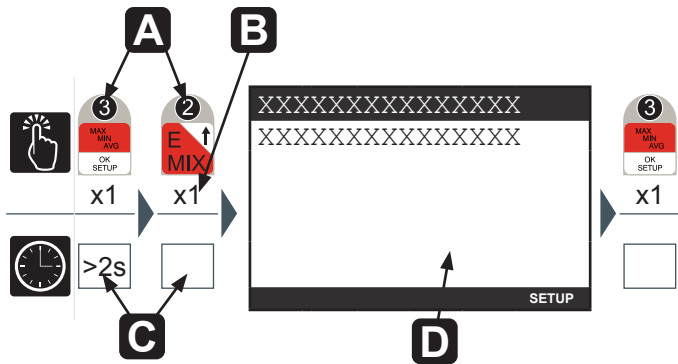
B	Number of times to press the control key
C	How long press the control key
D	Page shown after having carried out the sequence in point **A**

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5.3   Configuration of the SETUP device

To access the SETUP device configuration menu press the **3** key for more than 2 seconds.

The display order of the main page of the menu and the relative configurations are illustrated in the following table:

Menu	Function
Password	Insertion, modification and disabling of device protection password.
Reset	Reset the peak/average, energy, hour counter values and reset the factory setting.
Configurations	Device configurations (electrical network, backlighting, conversion factors, front LED, harmonics parameters etc.)
Single measure	Setting the measure displayed in the single measure page.
Digital output	Digital output configurations.
Pulse Inputs	Pulse digital input configuration.
Communications	Communication module configurations
Language	Language selection.
Self-diagnosis	Insertion control and device status.
Info	Display of device identifying data
Exit Setup	Return to normal DATA READING navigation.

i   **The device returns to the normal DATA READING navigation automatically if it remains waiting for over 3 minutes after any of the keys have been pressed.**

Repeatedly press the ❶ key to reach the Exit page, regardless of the point of navigation you are at.

Press the ❸ key to confirm.

To quickly return to the normal DATA READING navigation mode, keep the ❸ key pressed down for more than 2 seconds.

5.3.1 Control keys

In the SETUP mode, the control keys ❺ navigate between and/or enter data on the various device configuration pages.

| Push-button	Function
❶ VIP H ESC	Return to a higher level menu or cancel modification of the parameter in the data entry phase
❷ E MIX	Circular navigation of the pages or increasing a value in the data entry phase.
❸ MAX MIN AVG OK SETUP	Access to a further menu level or confirmation of a value in the data entry phase.

5.3.1.1   Data entry

EN

Some of the pages require the entry of alphanumerical characters (A-Z, 0-9) in the SETUP mode.

In these cases the page will have a series of fields where the active field will be identified by a cursor.

The data entry procedure (password, etc) is as follows:

1) Use the ❷ key to scroll through the alphanumerical characters in a circular fashion until the required character is reached;

2) Use the ❸ key to confirm a character and move the cursor to the next character (confirming the final character confirms the entire value).

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5.3.2 Password menu
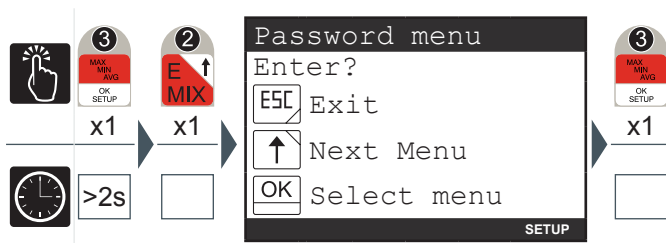
The entry, convalidation, modification and disabling of the device protection password operations can be carried out in this menu.

5.3.2.1 Password creation
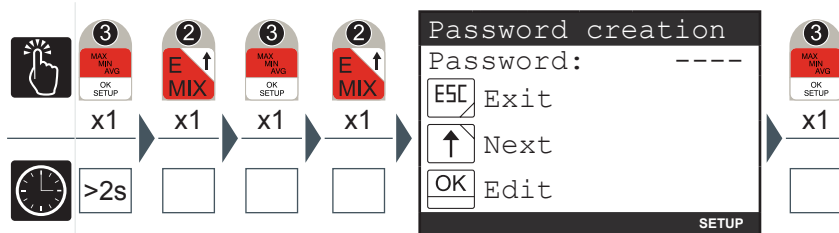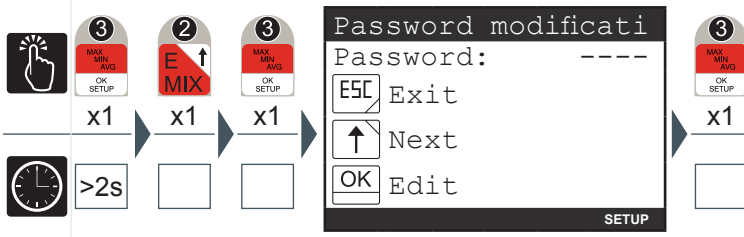

1) Enter the new password (see paragraph *"5.3.1.1 Data entry"*).
2) When the entry is completed a page will appear for a few seconds to confirm the modification which has taken place.

⚠ **In the session subsequent to the setting of the password all of the menus will be protected and in "reading only" mode.**

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5.3.2.2 Password modification


```
Password modificati
Password:        ----
ESC  Exit
 ↑   Next
OK   Edit
                    SETUP
```

1) Modify the password (see paragraph *"5.3.1.1 Data entry"*).
2) When the entry is completed a page will appear for a few seconds to confirm the modification which has taken place.

ℹ **To disable the password set the value 0000.**
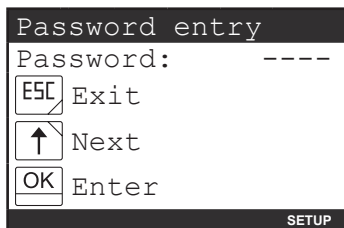
5.3.2.3 Password entry


```
Password entry
Password:        ----
ESC  Exit
 ↑   Next
OK   Enter
                    SETUP
```
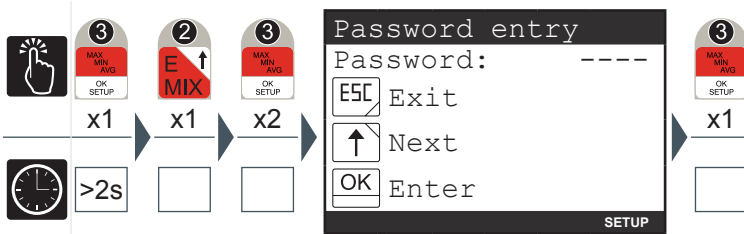
ℹ **The password entry page does not appear if the password has not been previously set.**

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To avoid unauthorised persons intervening in the device configurations parameters, the access to a number of pages, in SETUP mode, requires the entry of a password (if set).
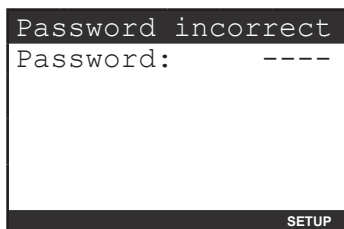
At the password entry request, go to the Password entry page in the Password entry menu and continue as follows:

1) Press the 3

```
┌──────────────────────────┐
│ Password entry           │
│ Password:        ----    │
│ ESC  Exit                │
│ ↑    Next                │
│ OK   Enter               │
│                   SETUP  │
└──────────────────────────┘
```

2) Insert the password (see paragraph *"5.3.1.1 Data entry"*).

If the password is entered incorrectly the following error will be shown

```
┌──────────────────────────┐
│ Password incorrect       │
│ Password:        ----    │
│                          │
│                          │
│                          │
│                   SETUP  │
└──────────────────────────┘
```
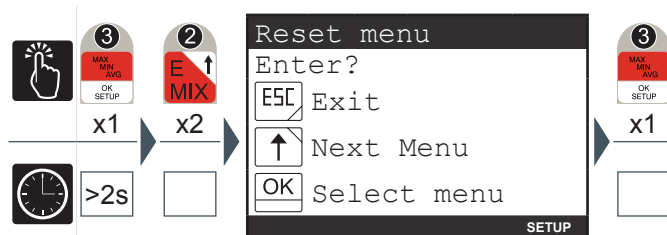
and the device will automatically return to the advanced menu level.

The correct entry of the password enables the modification of all of the parameters for the duration of the configuration session.

DUCA-LCD

5.3.3   Reset menu



The following operations can be carried out in this menu:

- *Peaks reset*, the maximum, minimum and Maximum demand values are reset to zero
- *Average values reset*
- Timer reset: T1 is set to zero, T2 starts from the value set
- *Reset partial energy balances*
- *Energy reset*, all of the energy counts are reset to zero, including the counts from external pulses
- *Total reset:* restores of the factory settings for all of the setup parameters

1)   Use the **2** key to scroll through the pages until you reach the value you wish to reset.

**2)**   Press the **3** key to perform the reset.
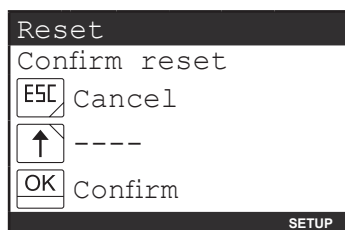
3)   Press the **3** key to confirm the selection or the **1** key to cancel and return to the next menu level up.

5.3.4   Configuration menu
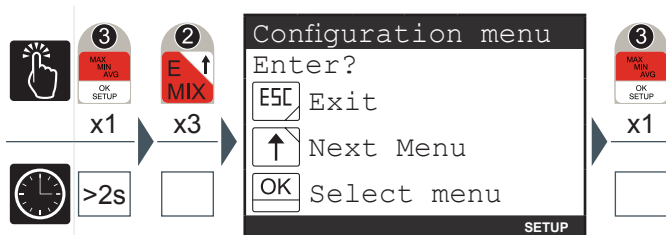
In this menu the settings for the parameters concerning the insertion of the electric network device, the T2 hour counter, the generation functions, the back lighting, the conversion factors used to calculate the values in euro and CO2, the front LED and harmonics can be made.

5.3.4.1   Type of insertion
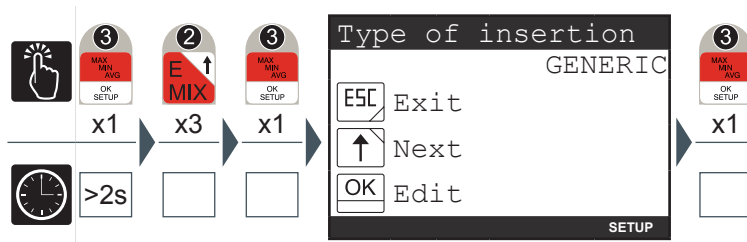
1)   Press the **2** key to navigate between the following options:
   • GENERIC
   • MONOPHASE
   • BALANCED 3-PHASE
   • 3-PHASE (default)
2)   Press the **3** key to confirm.

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Types of insertion	Description / Effect	Note
MONOPHASE	The pages relative to the 3-phase measure are not shown in the navigation menu	Use channel I1 to enter the current and channel L1-N for the voltage
3-PHASE	The self-diagnosis carries out checks on the correct insertion[1]	
BALANCED 3-PHASE	The value of the I1 current is assumed to be valid for the two remaining phases (allows you not to connect I2 and I3)	Use channel I1 to insert the current
GENERIC	The self-diagnosis does not carry out controls on the correct insertion	

[1] See section *"5.3.10 Menu Self Diagnosis"* for more information on the tests performed.

5.3.4.2   Set CT ratio
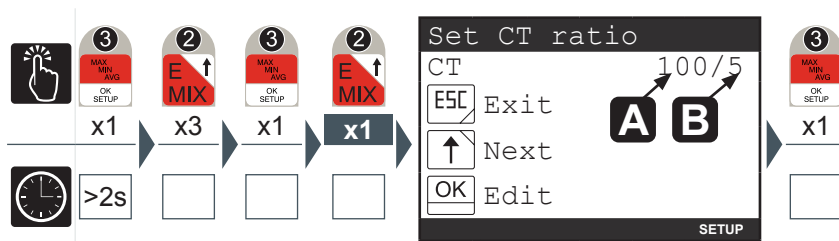
1) Enter a value between 1 V and 10000 V for the current value in **A** (see section *"5.3.1.1 Data entry"*).
2) For the secondary current value, **B** select 1 A or 5 A.
3) Press the ③ key to confirm the value of a single digit or the total value.

If the CT is replaced varying the value of the transformation ratio, before proceeding we recommend:

1) Annotate the value of the energy counts accumulated with the previous ratio.
2) Reset the energy counts.
3) Insert the new value of the transformation ratio.

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5.3.4.3   Set VT ratio
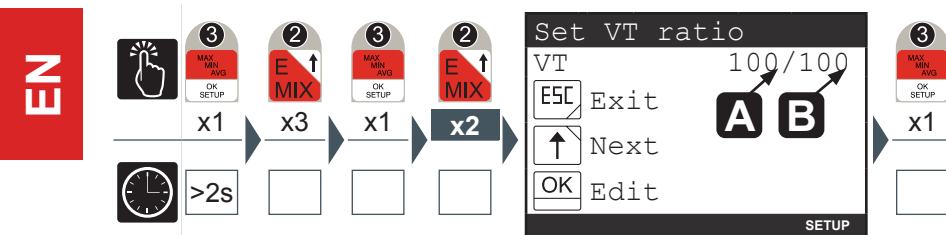
1) Insert a value between 60 V and 60000 V for the primary voltage in **A** (see paragraph *"5.3.1.1 Data entry"*).
2) For the secondary voltage value **B** enter a value between 60 V and 190 V (see section *"5.3.1.1 Data entry"*).
3) Press the **3** key to confirm the value of a single or total value.

In the case of direct insertion without voltage transformers enter 100/100 (default) as the value.
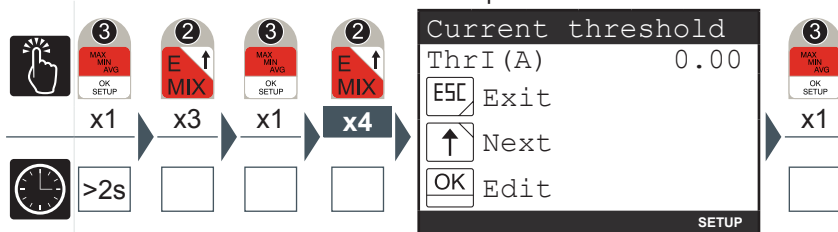
5.3.4.4 Integration time
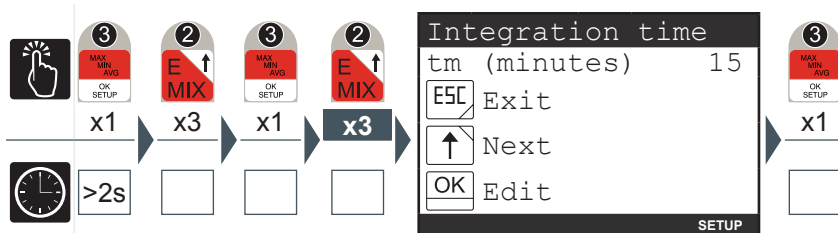
In this page the time intervals used by the device to carry out the calculation of the average values is set.

1) Insert a value between 1 and 60 minutes (see paragraph *"5.3.1.1 Data entry"*).
2) Press the ③ key to confirm.

5.3.4.5 Current threshold for T2 hour counter

The current threshold for the T2 hour counter represents the minimum current value

at which the counter begins the countdown.

1) Enter a value of between 0 and the nominal value of the current transformer used, KA*5 (see section *"5.3.1.1 Data entry"*).
2) Press the ③ key to confirm.

> 🛈 **KA and KV respectively represent the amperometric and volumetric transformation ratio.**

5.3.4.6   Hour counter count-down
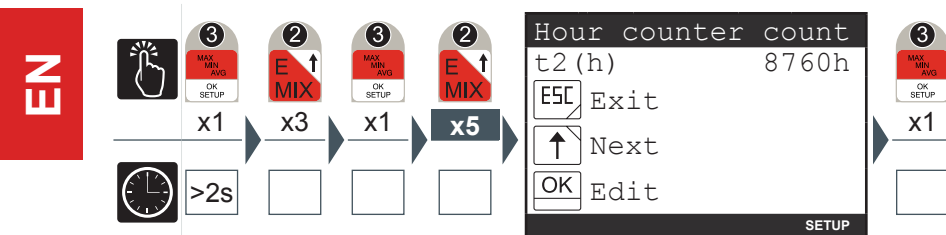
When the count down hour counter completes the countdown the ⑫ symbol will appear on the display.

1) Insert a value between 1 and 26280 minutes (see paragraph *"5.3.1.1 Data entry"*).
2) Press the ❸ key to confirm.

5.3.4.7 Generation

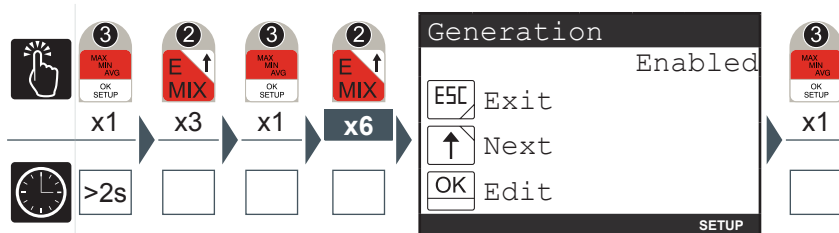By enabling the GENERATION option, the energy counts will be carried out on 4 quadrants separating absorbed energies and powers, shown with the "+" sign, from that generated shown with the "-" sign.
It is important that the insertion of the CT is carried out correctly adhereing to the absorption direction of the current.

1) Press the ❷ key to enable or disable the 4-quadrant data acquisition mode.
2) Press the ❸ key to confirm.

If the Generation option is disabled the instrument will carry out the automatic inversion of the current direction meaning that the active powers will always be positive and the energy count will be carried out on 2 quadrants. In 2-quadrants mode, with each switching on of the instrument, when the current becomes greater than zero, the analyser will automatically read the currents direction for each phase; if the current will be in phase opposition with respect to the relative line voltage, the invertion of the current direction will be carried out.

5.3.4.8   Euro/energy factor


```
Euro/energy factor
€/KWh          0.18
ESC  Exit
↑    Next
OK   Edit
                    SETUP
```
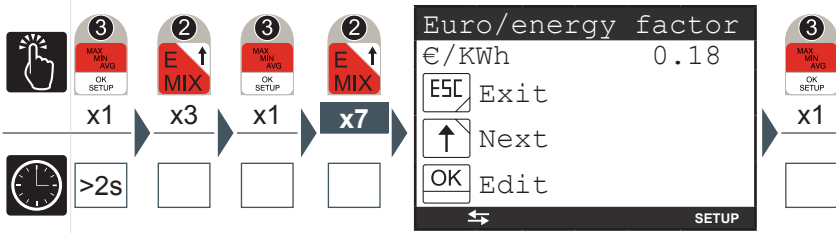
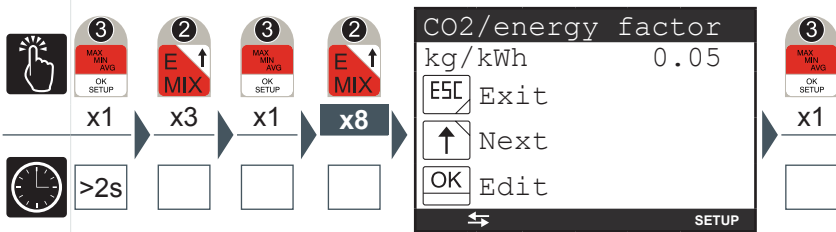The active 3-phase energy, both absorbed and generated, is multiplied by the conversion factor so that the equivalent can be displayed in euro.

1) Enter a value between 0.01 and 9.99 (see section *"5.3.1.1 Data entry"*).
2) Press the ❸ key to confirm.

5.3.4.9   CO2/energy factor

The active 3-phase energy, both absorbed and generated, is multiplied by the


```
CO2/energy factor
kg/kWh         0.05
ESC  Exit
↑    Next
OK   Edit
                    SETUP
```

conversion factor so that the equivalent can be displayed in Kg CO2.

1) Enter a value between 0.01 and 9.99 (see section *"5.3.1.1 Data entry"*).
2) Press the ❸ key to confirm.

5.3.4.10   Frequency mode
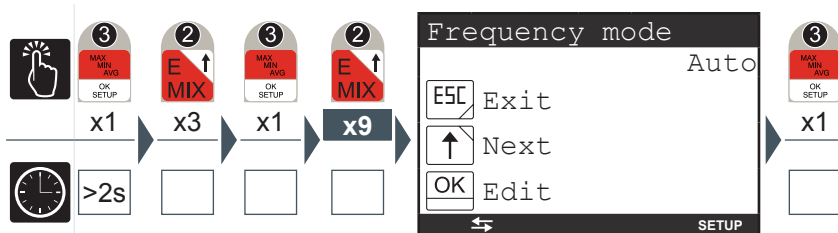
In Auto (default) mode, the analyser calculates the network frequency on the voltage input V1. In the event that there is a large harmonic distortion (e.g. output voltage from an inverter), it is possible to manually set the frequency value to 50Hz or 60Hz in order to preserve correct calculation of the RMS voltage and current values.

1) Press the ② key to navigate between the following options:
    * Auto
    * Inverter 50
    * Inverter 60
2) Press the ③ key to confirm.

5.3.4.11   Number of harmonics
It is possible to select the total number of harmonics calculated by the analyser
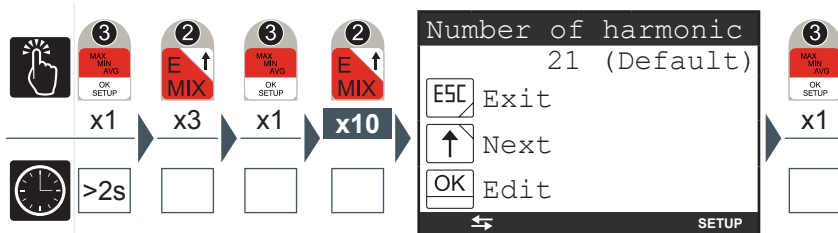
between 21 (default) and 31 (extended). With the setting at 21 (default), the refresh time for the harmonics is less and so the system will respond more quickly to variations in the voltage and current signals.

1) Press the ② key to navigate between the following options:
    * 21 (default)
    * 31 (extended)
2) Press the ③ key to confirm.

5.3.4.12 LED configuration
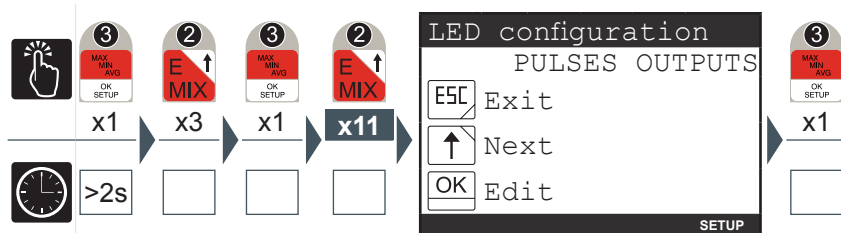
1) Press the ❷ key to navigate between the following options:
   - PULSES OUTPUTS (the LED blinks with each active energy pulse associated with the digital output OUT1)
   - PULSES INPUTS (the LED blinks with each active energy pulse associated with the digital input IN1)
   - ALARMS (the LED turns on if one of the alarms set on the digital outputs OUT1 and/or OUT2 is active)
2) Press the ❸ key to confirm.

5.3.4.13 LCD Backlight
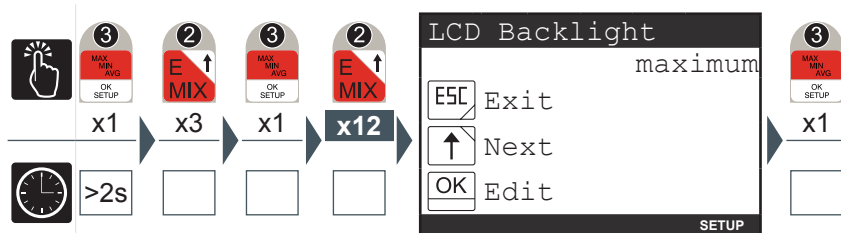
1) Press the ❷ key to navigate between the following options:
   - off
   - intermediate
   - maximum
2) Press the ❸ key to confirm.

5.3.4.14 Backlight Auto Off
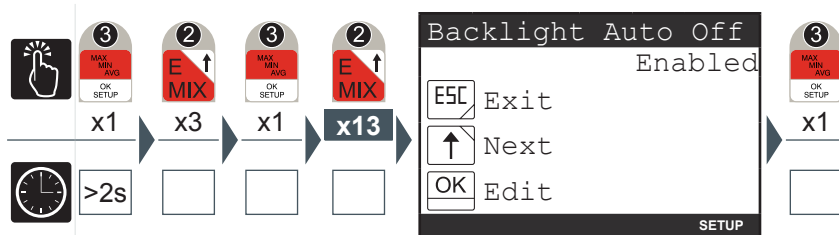
Auto Off automatically switches off the backlighting (if not set to "off") if the control keys ⑤ remain inactive for approx. 3 minutes.

The backlighting can be reactivated by pressing any of the ⑤ control keys.

1)   Press the ② key to enable or disable 'Energy Saving' mode;

2)   Press the ③ key to confirm.

5.3.5   Menu single measure page
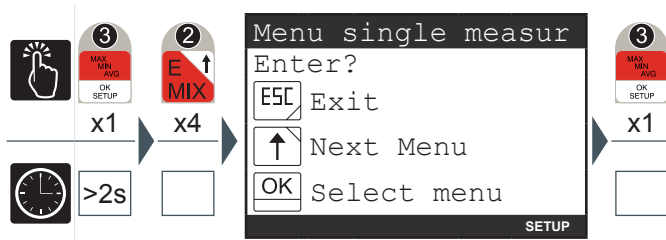
5.3.5.1   Phase selection
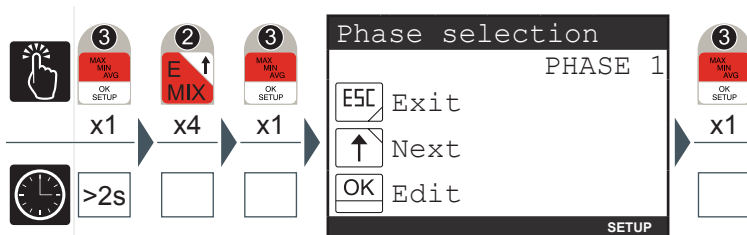
This menu allows you to select the value to display with larger characters on the Single-Measure page for better visibility from a distance (see section *"5.4.2 Voltages, Currents and 3-phase powers"*).

1)   Press the ② key to select the phase of the value to be displayed

- PHASE 1
- PHASE 2
- PHASE 3
- 3-PHASE

2)   Press the ③ key to confirm.

5.3.5.2   Select Measure
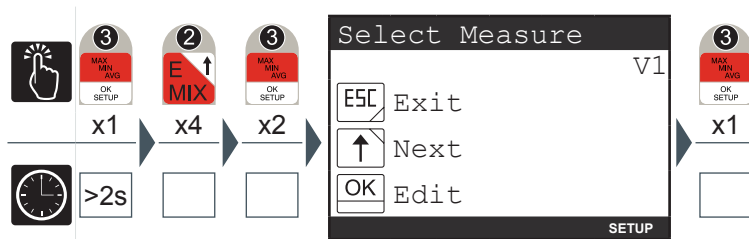
1) Press the ② key to select the measure to be displayed, from

- V (phase-neutral voltage)
- Vxy (linked voltage)
- I (current)
- W (active power)
- VAr (reactive power)
- VA (apparent power)
- PF (Power factor)
- Wh (active energy)
- VArh (reactive energy)
- VAh (apparent energy)
- Wh-gen (generated active energy)
- VArh-gen (generated reactive energy)
- VArh-gen (apparent generated energy)

2) Press the ③ key to confirm.

5.3.6   Digital output menu
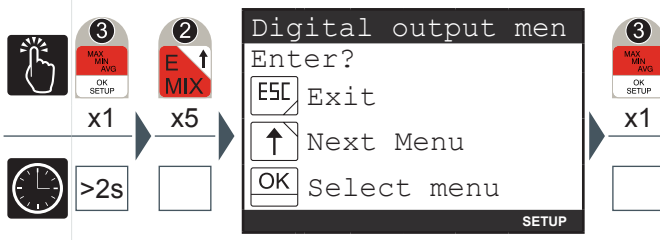
5.3.6.1   Digital output mode

In this menu the parameters associated with the pulses or the alarms of the digital output available on all models, OUT1 and OUT2, can be set.
Select "Pulses" to use OUT1 and OUT2 as pulse output channels associated respectively with the 3-phase active energy and the 3-phase reactive energy.
Select "Alarms" to use OUT1 and OUT2 as alarm output channels.
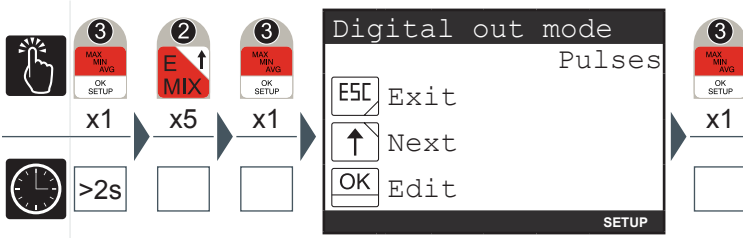
1)   Press the **2** key to select one of the two available options ('Alarms' or 'Pulses').

2)   Press the **3** key to confirm.

5.3.6.2 Energy weight for pulse
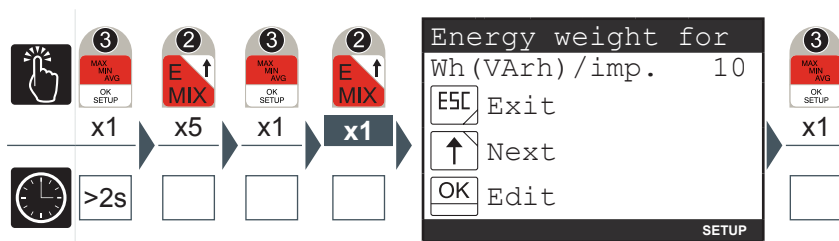
1) Press the **2** key to select one of the following values expressed in Wh/imp for OUT1 and VArh/imp for OUT2:
   - 10
   - 100
   - 1000
   - 10000
2) Press the **3** key to confirm.

5.3.6.3 Alarm1 or alarm2(*) measure
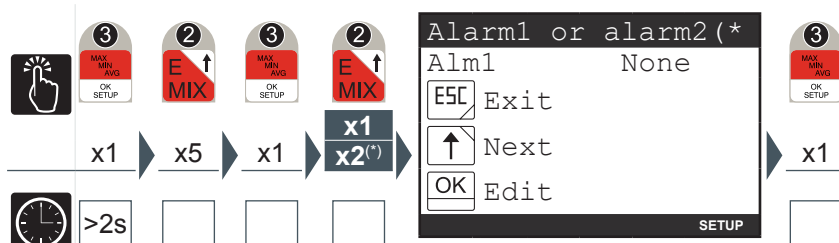
1) Press the **2** key to navigate between the values given in section *"5.3.7.3 Output associated measure table"*.

2) Press the **3** key to confirm.

5.3.6.4   Alarm 1 or 2 threshold
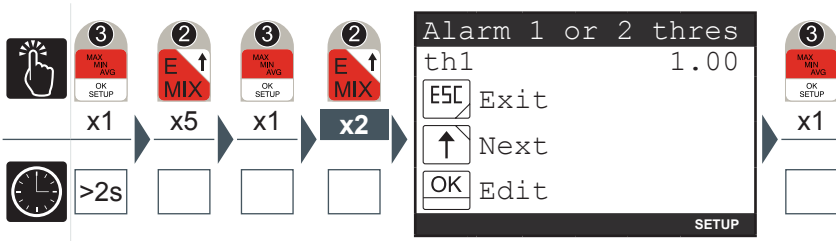
1) Enter the required values (see section *"5.3.1.1 Data entry"*), checking the parameters and the setting intervals (see section *"5.3.7.3 Output associated measure table"*).
2) Press the ③ key to confirm.

5.3.6.5   Alarm 1 or 2 activation
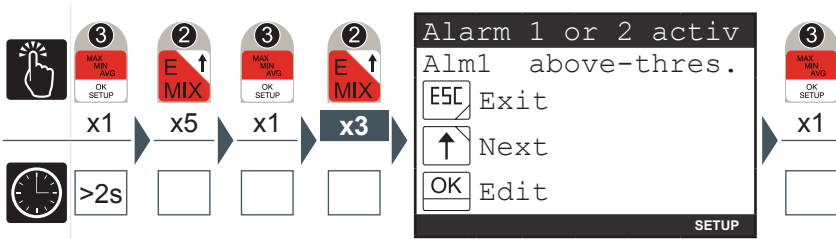
1) Press the ② key to select one of the two available options ('over threshold' or 'below threshold').
2) Press the ③ key to confirm.

5.3.6.6   Alarms 1 or 2 activation delay


```
Alarms 1 or 2 acti
Dly1(s)           10
ESC Exit
↑   Next
OK  Edit
                SETUP
```
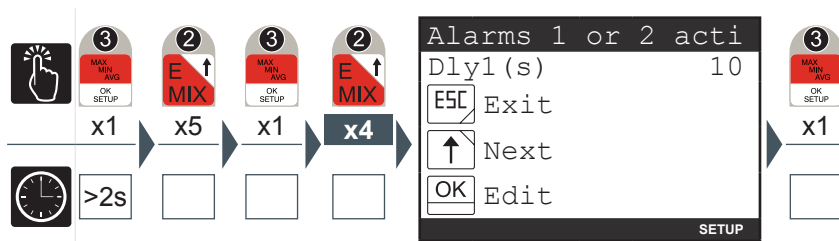
1) Enter a value between 1 and 900 seconds (see section *"5.3.1.1 Data entry"*).
2) Press the ③ key to confirm.

In alarm situations the ⑩ symbol will flash on the display.
Check which alarm is activated on the screen relative to the alarms status.

5.3.6.7   Alarm 1 or 2 hysteresis

1) Enter a value between 0 and 40% (see section *"5.3.1.1 Data entry"*).


```
Alarm 1 or 2 hyste
Hyst1(%)           0
ESC Exit
↑   Next
OK  Edit
                SETUP
```
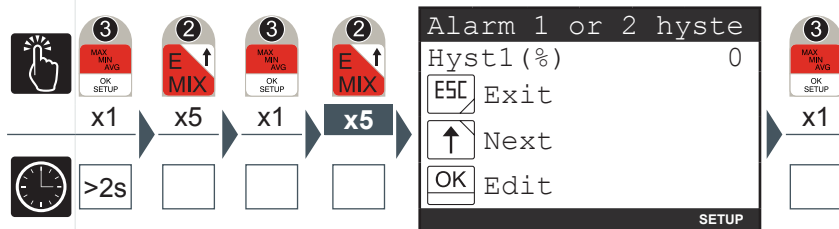
2) Press the ③ key to confirm.

5.3.7   Pulse Inputs
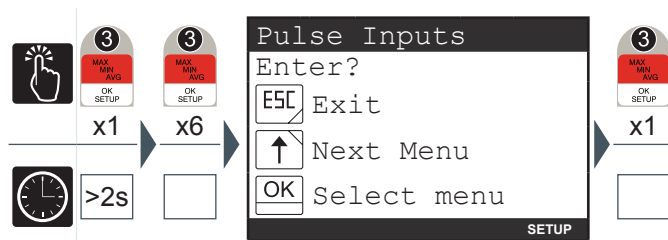
From the Pulse Inputs menu it is possible to set the parameters associated with the pulse reading inputs ("IN1", "IN2").

5.3.7.1   Input pulses factors
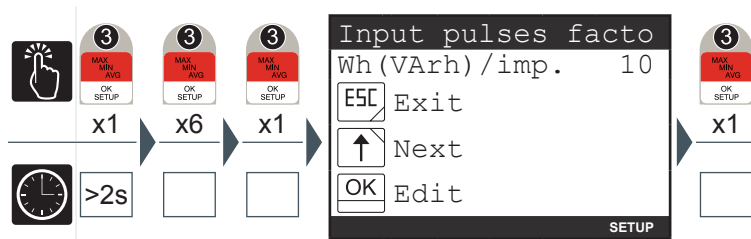
1) Enter the value required between 1 and 10000 Wh/pulse (see section *"5.3.1.1 Data entry"*); in the event of an interface with DUCA47 and SMART+ analysers, the same value must be entered when setting up these instruments.
2) Press the ③ key to confirm.

5.3.7.2   Second channel function (IN2)


```
Second channel fun
                VArh
ESC  Exit
 ↑   Next
OK   Edit
              SETUP
```
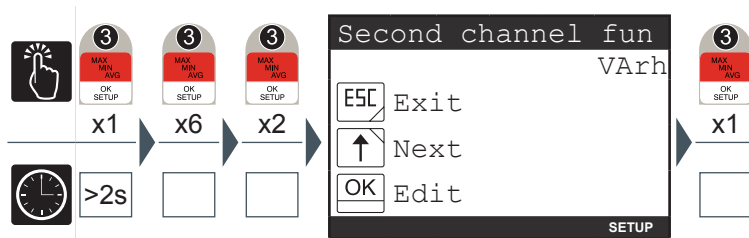
It is possible to select the function associated with the channel IN2 by choosing between Varh (reactive energy pulse reading), Wh_gen (generated active energy pulse reading) or Synchronism (pulse reading for synchronisation of times for average values calculation).

1) Press the ❷ key to select the phase of the value to be displayed
    • VArh (default)
    • Wh_gen
    • Synchronism
2) Press the ❸ key to confirm.

If the "Synchronism" option is enabled, no external protocol synchronism commands will be accepted.

5.3.7.3   Output associated measure table

The following table shows the measures associated to alarm ouput and/or analog output in current.

Quantity	Unit of measure	Max. limit
Frequency	Hz	500
Linked voltage V12	V	KV * 866
Linked voltage V23	V	KV * 866
Linked voltage V31	V	KV * 866
Voltage L1	V	KV * 500
Voltage L2	V	KV * 500
Voltage L3	V	KV * 500
Equivalent 3-phase voltage	V	KV * 866
Current L1	A	KA * 5
Current L2	A	KA * 5
Current L3	A	KA * 5
3-phase current	A	KA * 5
Active power L1	W	KA * KV * 2500
Active power L1	W	KA * KV * 2500
Active power L1	W	KA * KV * 2500
3-phase active power	W	KA * KV * 7500
L1 reactive power	VAr	KA * KV * 2500
L1 reactive power	VAr	KA * KV * 2500
L1 reactive power	VAr	KA * KV * 2500
3-phase reactive power	VAr	KA * KV * 7500
L1 apparent power	VA	KA * KV * 2500
L1 apparent power	VA	KA * KV * 2500
L1 apparent power	VA	KA * KV * 2500
3-phase apparent power	VA	KA * KV * 7500
PF1	-	1.00
PF2	-	1.00
PF3	-	1.00
3-phase PF	-	1.00
T2[1]	h	Activated when 0 is reached
L1 current harmonic distortion (THDI1)	-	-
L2 current harmonic distortion (THDI2)	-	-
L3 current harmonic distortion (THDI3)	-	-
L1 voltage harmonic distortion (THDV1)	-	-
L2 voltage harmonic distortion (THDV2)	-	-
L3 voltage harmonic distortion (THDV3)	-	-

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KA and KV respectively represent the amperometric and volumetric transformation ratio.

5.3.8 Communication menu
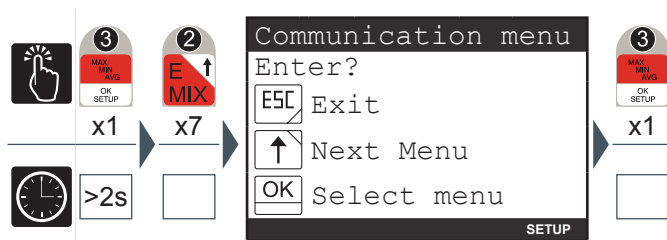
When the communication is active (the instrument answers to requests of a monitoring system), the flashing communication active (14) symbol appears.

5.3.8.1 Serial protocol
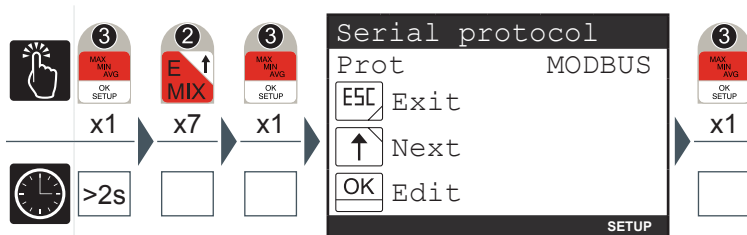
1) Press the **2** key to select one of the two options available ('MODBUS' or 'ASCII').
2) Press the **5** key to confirm.

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5.3.8.2   Address
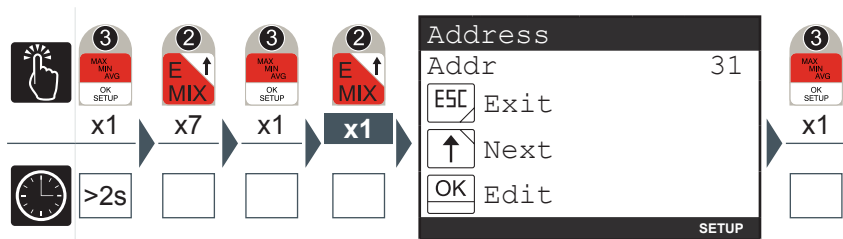
1) Enter a value between 1 and 247 (for Modbus protocol) or between 1 and 98 (for ASCII protocol) (See section *"5.3.1.1 Data entry"*).
2) Press the ③ key to confirm.

5.3.8.3   Baud rate
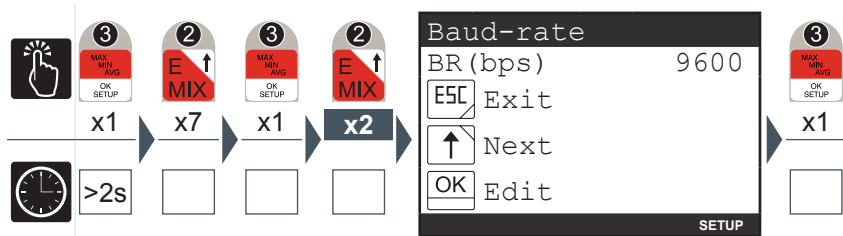
1) Press the ② key to select one of the following available values:
    • 4800
    • 9600 (default)
    • 19200
2) Press the ③ key to confirm.

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5.3.8.4   Parity type
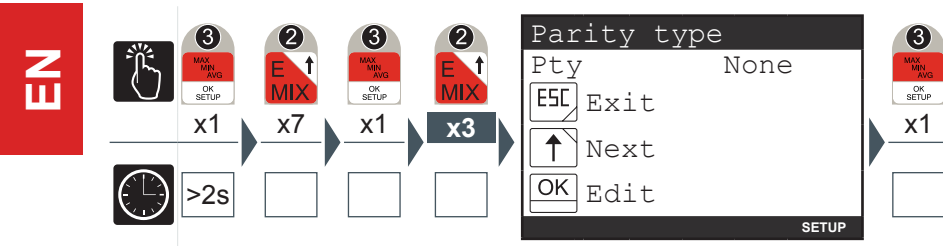
1) Press the ② key to select one of the following available values:
   - None (default)
   - EQUAL
   - ODD
2) Press the ③ key to confirm.

5.3.8.5   Number of stop bits
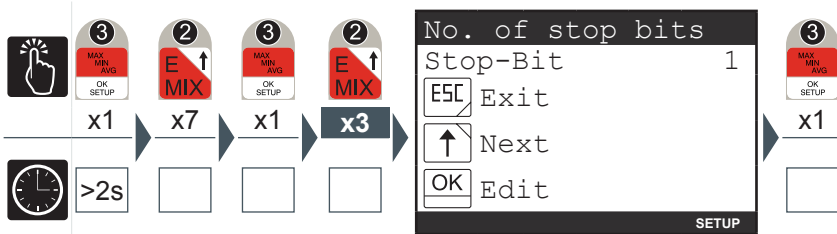
1) Press the ② key to select one of the two available options ('1' or '2').
2) Press the ③ key to confirm.

5.3.8.6   DHCP (DUCA-LCD ETH only)
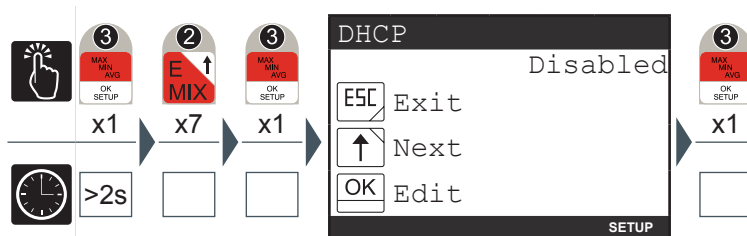
1)   Press the **2** key to enable or disable DHCP.
2)   Press the **3** key to confirm.

5.3.8.7   IP address (DUCA-LCD ETH only)
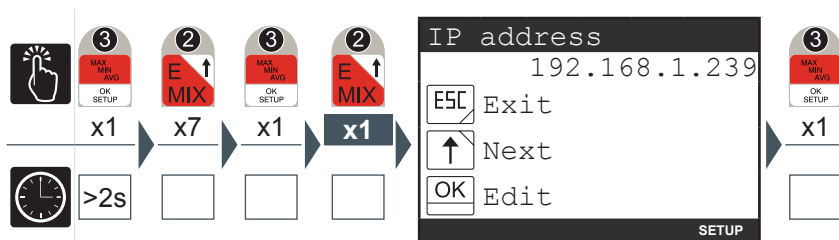
Modification of the IP address is only possible with DHCP = Disabled.
1)   Enter a value between 0 and 255 for each of the 4 fields separated by dots
2)   Press the **3** key to confirm the entry.

5.3.8.8   Host name (DUCA-LCD ETH only)
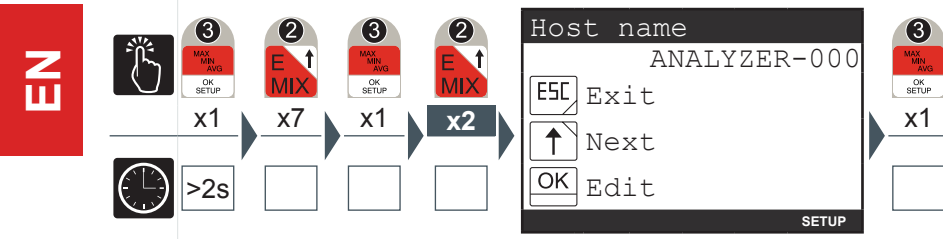
1)   Enter a value between 0 and 999 for the host name numerical field.
2)   Press the ③ key to confirm the entry.

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5.3.9   *Menu Language*
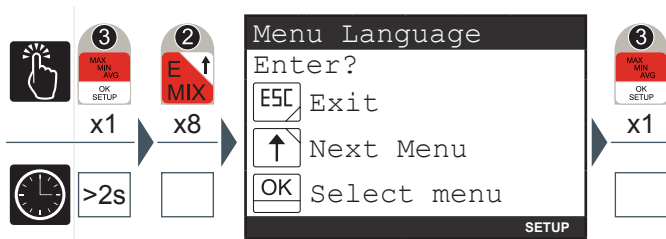
In this menu it is possible to specify the display language of the page.
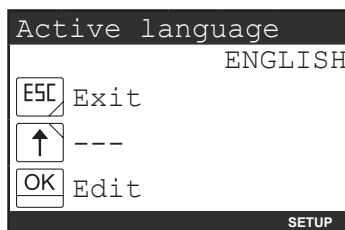
1)   Press the ❸ key to modify the language.

2)   Press the ❷ key to select the required language from those available.

3)   Press the ❸ key to confirm.

5.3.10 Menu Self Diagnosis
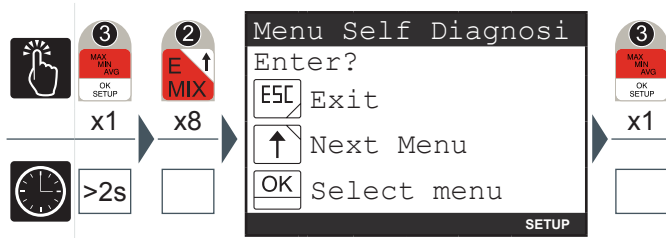
In this menu the device self-diagnosis procedure can be started up.

The instrument is able to carry out a diagnosis on the correctness of the connections made by the user between the device and the network and various parameters, with indications of the code referred to the type of error.

Press the ③ key to carry out the self-diagnosis.

The tests carried out are:
- Internal data memory consistency and integrity control
- Voltage sequence verification
- Verification of the coherence between the insertions carried out and the configurations set
- Current sequence verification
- Uniformity verification of the powers in GENERATION mode (see *"5.3.4.7 Generation"*)

The self-diagnosis procedure is carried out a few seconds after the device is switched on and displays the results of the test on the screen for a few seconds before returning to the default page.

If the self-diagnosis procedure detects non-conformities in the behaviour of the analyser, the ⑬ warning/error symbol will appear on the screen.

Consult the list of error codes (paragraph *"6.1.1 Error codes"*) to trace the cause of the problem.

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5.3.11 Menu info


```
Menu info
Enter?
ESC Exit
 ↑  Next Menu
OK Select menu
                    SETUP
```
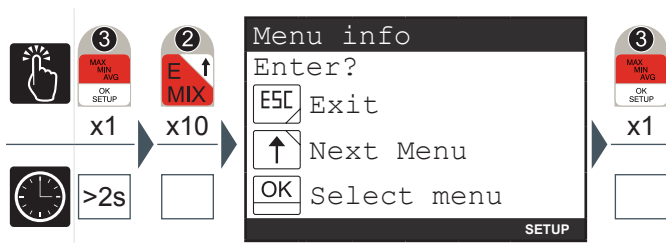
In this menu the identifying data of the device can be displayed, such as:
- Type of configuration
- Series number
- Firmware version

Press the ② key to navigate between the pages and display the information required.

5.3.12 SETUP mode exit

To quickly exit SETUP mode, keep the ③ key pressed for more than 2 seconds.

5.3.13 Setup parameters table and factory settings

Parameter	Settable values	Default
Average time (min)	[1-60]	15
AT ratio	[1-10000A] / (1A or 5A)	5/5
VT ratio	[1÷60000V] / [60÷190V]	direct insertion (100/100)
Output pulses factors (Wh/imp)	10, 100, 1000, 10000	10
Alarm measure 1	See table *"5.3.7.3 Output associated measure table"*	None
Alarm measure 2		
Alarm threshold 1	See table *"5.3.7.3 Output associated measure table"*	Max. limit = high full scale value of the measure associated with the alarm
Alarm threshold 2		
Alarm 1 activation mode	Above threshold or below threshold	Above threshold
Alarm 2 activation mode		
Alarm 1 activation delay (s)	[1-900]	10
Alarm 2 activation delay (s)		
Alarm 1 activation hysteresis (% of the threshold)	[0-40]	0
Alarm 2 activation hysteresis (% of the threshold)		
RS-485 communication protocol	ASCII or MODBUS	MODBUS
Analyser address	MODBUS [1-247] ASCII [1-98]	MODBUS 31 ASCII 31
Baud rate	4.8Kbps, 9.6 Kbps, 19.2 Kbps	9.6 Kbps
DHCP	ENABLED/DISABLED	DISABLED
IP address	xxx.xxx.xxx.xxx	192.168.1.239
Host name	ANALYZER-xxx	ANALYZER-001
Input pulses factors (Wh/imp)	[1-10000]	10
Channel IN2 function	VArh / Wh_gen / Synchronism	VArh
Hour counter T2 (h)	[1-26280]	8760 (= 1 year)
Energy saving (automatic switching off of display backlight)	ENABLED/DISABLED	ENABLED
Display back lighting level	OFF, INTERMEDIATE, MAXIMUM	MAXIMUM

Parameter	Settable values	Default
Configurations	MONOPHASE, 3-PHASE, BALANCED 3-PHASE, GENERIC	3-PHASE
Generation mode	ENABLED/DISABLED	DISABLED
Energy cost factor (€/KWh)	[0-9.99]	0.18
Conversion factor in CO2 (KgCO2/KWh)	[0-9.99]	0.05
Password	4 digit alphanumericals	0000 = disabled
Language	ENGLISH, ITALIAN, FRENCH, SPANISH, GERMAN, PORTUGUESE	ENGLISH
Threshold in current for T2 timer (A)	[0 - KA*5]	0A
Digital output mode	Pulses or alarms	Pulses
Frequency mode	Auto / Inverter50 / Inverter60	Auto
Number of harmonics	21 - 31	21
Select phase (single measure)	PHASE1 / PHASE2 / PHASE3 / THREE-PHASE	PHASE1
Value selection (single measure)	V / I / W / VAr / PF / Wh / VArh / VAh / Whgen / VArgen / VAhgen	V

KA and KV respectively represent the amperometric and volumetric transformation ratio.

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5.4 Data reading

In DATA READING mode, the control keys ❺ allow navigation between the various pages displaying the readings taken by the device.
Each key has a series of pages grouped according to the logic reported in the following table:

Key	Type of reading
❶ VIP H ESC	Three-phase Powers, Currents and Voltages, instantaneous, peak and average values, time graphs, harmonics and single-measure pages
❷ E MIX	Energies, alarms, hour counters and external pulse counters
❸ MAX MIN AVG OK SETUP	Access to peak, average and maximum demand values menus

Press the key corresponding to the data reading which you wish to carry out to display the start page.
Each subsequent pressing of the same key cause the scrolling (cyclic) of the pages available up to the return to the start page.

On the **time graphs** pages, press the ❶ key to scroll through the L1, L2 and L3 graphs (see section *"5.4.2 Voltages, Currents and 3-phase powers"*); press the ❷ button to scroll through the I-V / I / V (**) graphs for the same phase (see section *"5.4.2.1 Time graphs"*).

On the **harmonics** pages, press the ❶ key to scroll through the L1, L2 and L3 graphs (see section *"5.4.2 Voltages, Currents and 3-phase powers"*); press the ❷ button to scroll through the I / V (**) graphs for the same phase.

To view the values of the individual harmonics for a graph:
- Press the ❸ key to display the value of the harmonic H02 (the cursor will be displayed in the graph);
- Press the ❷ key to scroll through the value of the harmonics in ascending order (the cursor will move to the right);
- Press the ❸ key to scroll through the value of the harmonics in descending order (the cursor will move to the left);
- Press the ❶ key to exit the harmonics display mode (the cursor will no longer be displayed).

See section *"5.4.2.2 Harmonics"*.

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The display duration of a page is a maximum of 3 minutes after which the device will return to the default page.

(**) I-V page: voltage and current graph
   I page: current graph
   V page: voltage graph

5.4.1   Default page setting

To reset the default page:
   1)   Display the page you wish to set as the default page;
   2)   Keep the ❶ and ❸ keys pressed down for more than 2 seconds.

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5.4.2   Voltages, Currents and 3-phase powers

3-phase measures

```
3-phase measures
PF 3F          -00- 0.98
        400     V
       2919     A
      1,978     MW
```

x1

Phase-neutral voltages

```
Phase-neutral volt
Freq.          50.0Hz
L1      230     V
L2      231     V
L3      232     V
```

x2

Linked voltages

```
Linked voltages
Freq.          50.0Hz
L12     399     V
L23     401     V
L31     400     V
```

x3

Currents

```
Currents
3F             2919A
L1     2906     A
L2     2919     A
L3     2931     A
```

x4

Active power

```
Active power
3F           1,978MW
L1    653.9    kW
L2    658.8    kW
L3    664.8    kW
```

x5

Reactive power

```
Reactive power
3F       -00- 416.7kVAr
L1 -00-  138.1   kVAr
L2 -00-  139.3   kVAr
L3 -00-  139.3   kVAr
```

x6

Apparent power

```
Apparent power
3F           2.02MVA
L1    668.5    kVA
L2    673.3    kVA
L3    679.4    kVA
```

x7

Power factors

```
Power factors
3F       -00- 0.98
L1 -00-  0.98
L2 -00-  0.98
L3 -00-  0.98
```

x8

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Power factor indicators

Factor Indicators

PF1 0.98
PF2 0.98
PF3 0.98

x9

L1 I-V Graph

L1 I-V Graph

x10

L2 I-V Graph

L2 I-V Graph

x11

L3 I-V Graph

L3 I-V Graph

x12

L1 I Harmonics

L1 I Harmonics
THD   24.1%
30%

0%

x13
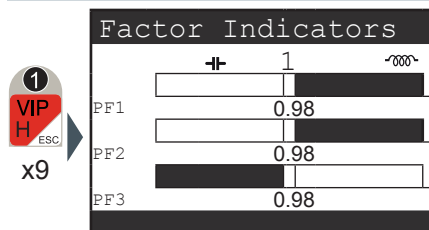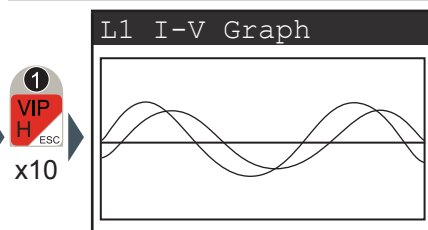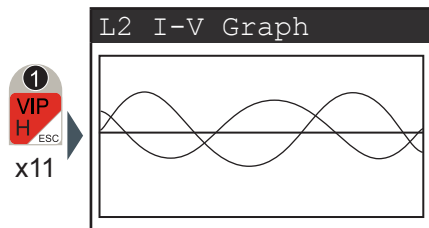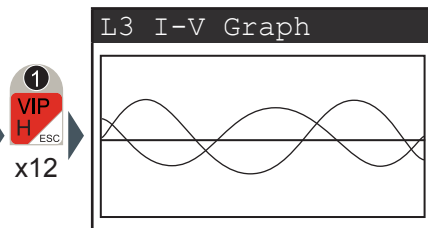
L2 I Harmonics

L2 I Harmonics
THD   24.1%
30%

0%

x14
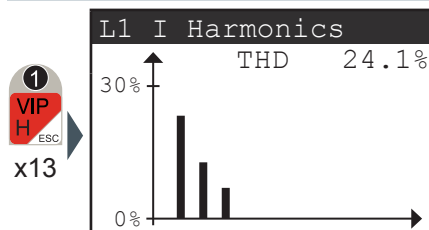
L3 I Harmonics

L3 I Harmonics
THD   24.1%
30%

0%

x15

Single measure page

Single measure pag
L1

230

V

x16

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5.4.2.1 Time graphs

L1 I-V Graph

L1 I Graph

L1 V Graph
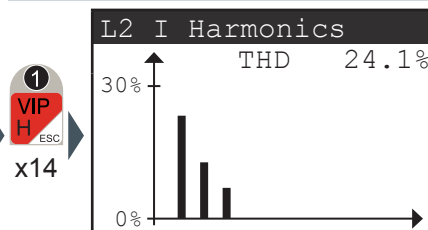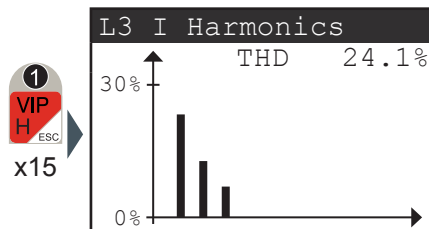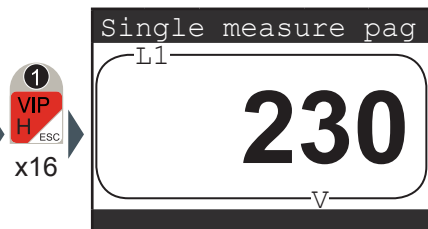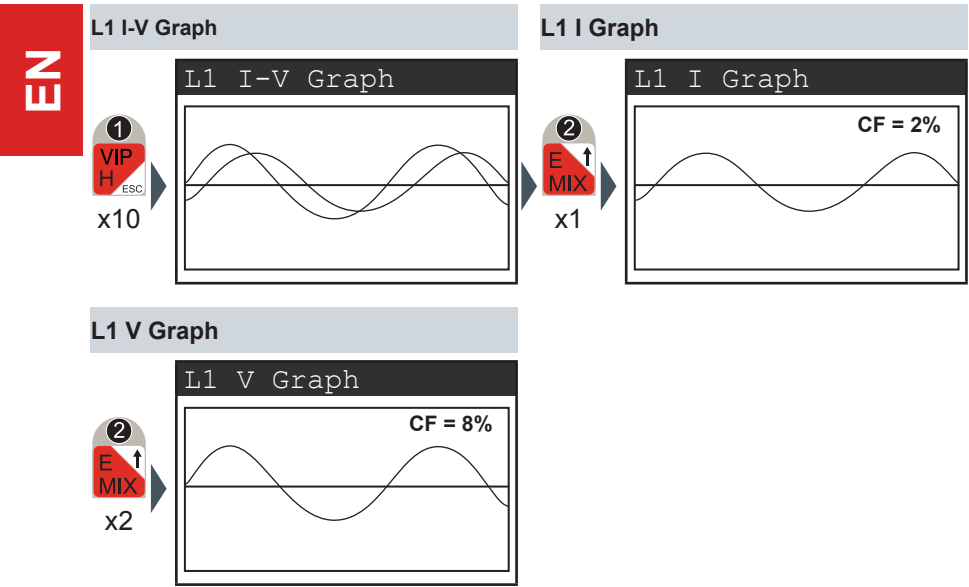
CF = Crest Factor (%)

5.4.2.2   Harmonics

L1 I Harmonics


```
L1 I Harmonics
            THD    24.1%
30%

0%
```

L1 V Harmonics


```
L1 V Harmonics
            THD    24.1%
30%

0%
```

L1 V Harmonics


```
L1 V Harmonics
            THD    24.1%
30%     H02    25.2%

0%
```

L1 V Harmonics


```
L1 V Harmonics
            THD    24.1%
30%     H03    25.2%

0%
```

L1 V Harmonics


```
L1 V Harmonics
            THD    24.1%
30%

0%
```

EN
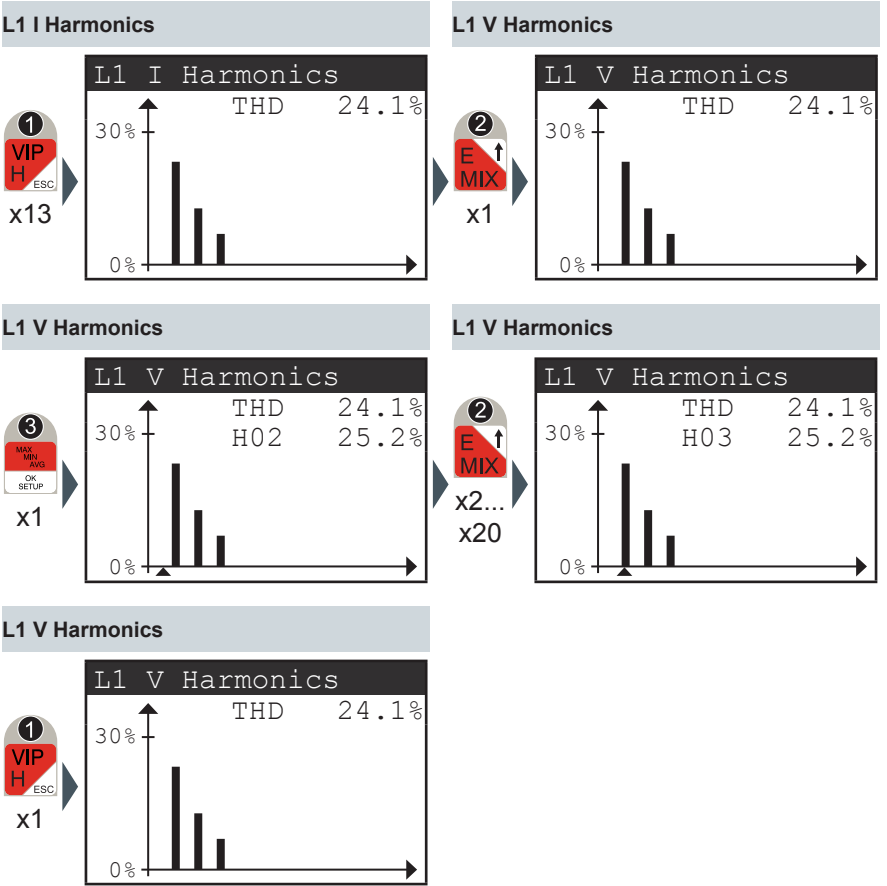
5.4.3 Energies, Alarms, Hour Counter

Active energies

```
Active energies
3F       42.97206MWh
L1    14.21    MWh
L2    14.31    MWh
L3    14.45    MWh
```

② E MIX ↑ x1

Reactive energies

```
Reactive energies
3F       9.16827MVArh
L1    3,040   MVArh
L2    3,064   MVArh
L3    3,064   MVArh
```

② E MIX ↑ x2

Apparent energies

```
Apparent energies
3F       44.09040MVAh
L1    14.58   MVAh
L2    14.69   MVAh
L3    14.82   MVAh
```

② E MIX ↑ x3

Active energies activated

```
Active energies ac
3F          462kWh
L1     180     kWh
L2     150     kWh
L3     132     kWh
⇆
```

② E MIX ↑ x4

Reactive energies generated

```
Reactive energies
3F         462kVArh
L1    180   KVArh
L2    150   KVArh
L3    132   KVArh
⇆
```

② E MIX ↑ x5

Apparent energies generated

```
Apparent energies
3F         462kVAh
L1    180   kVAh
L2    150   kVAh
L3    132   kVAh
⇆
```

② E MIX ↑ x6

Partial balances

```
Partial balances
     10.90  MWh
     2,301  MVArh
     11.15  MVAh
⇆
```

② E MIX ↑ x7

Total balances

```
Total balances
L1   42.51  MWh
L2   8,706  MVArh
L3   43.63  MVAh
⇆
```

② E MIX ↑ x8

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Equivalent active euro energy

```
Equivalent active

        7.8426
                    €
```

②
E
MIX ↑
x9
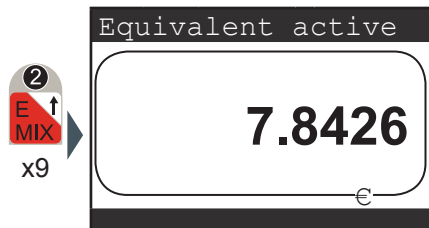
Equivalent active CO2 energy

```
Equivalent active

        2.1835
              KgCO2
```

②
E
MIX ↑
x10
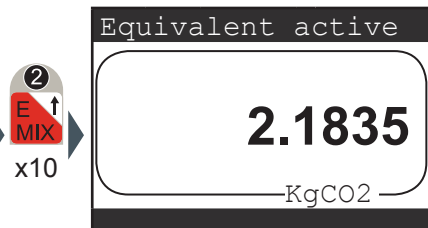
Equivalent active euro energy generated

```
Equivalent active

        350.0
                    €
```

②
E
MIX ↑
x11
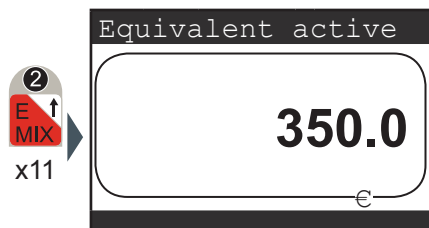
Equivalent active CO2 energy generated

```
Equivalent active

          2.5
              KgCO2
```

②
E
MIX ↑
x12

Alarms status

```
Alarms status
ALM1    ON

ALM2   OFF
```

②
E
MIX ↑
x13
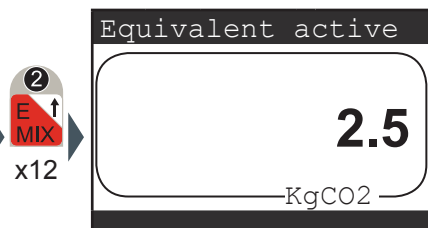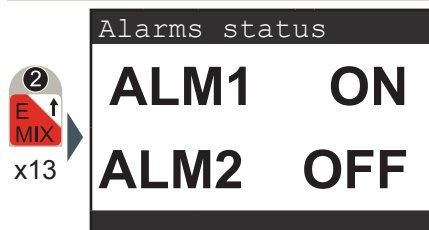
Pulses inputs 1

```
Pulses inputs 1
            950
             Wh
          1,300
              W
```

②
E
MIX ↑
x14
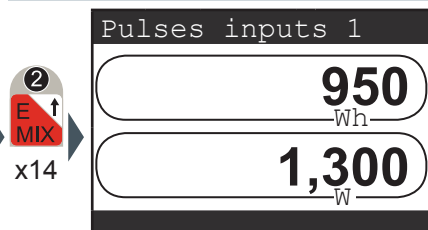
Pulses inputs 2

```
Pulses inputs 2
            120
            VArh
             30
            VAr
```

②
E
MIX ↑
x15
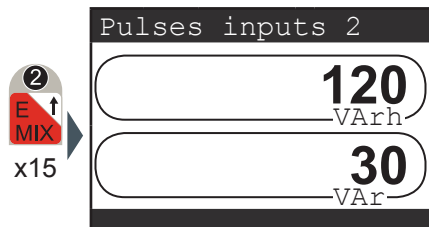
Pulses input counters

```
Pulses input count
IN1  95

IN2  12
```

②
E
MIX ↑
x16

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EN
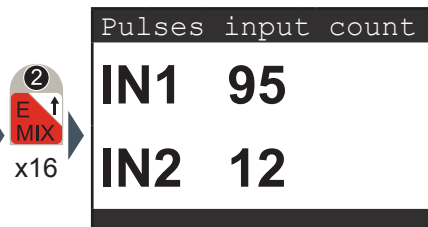
Hour counter 1 free-running	Hour counter 2 count-down


```
Hour counter 1 fre
t1              16:55h
```

2 E MIX ↑
x17


```
Hour counter 2 cou
t2            8743:03
```

2 E MIX ↑
x18

5.4.4 Maximums

Maximum 3-phase measure

```
Maximum 3-phase me

        400    V
       2919    A
      1,978    MW
```

x1

Phase-neutral voltages maximums

```
Phase-neutral volt

L1     230    V
L2     231    V
L3     232    V
```

x1 / x1

Maximum linked voltages

```
Maximum lnkd volta

L12    399    V
L23    401    V
L31    400    V
```

x1 / x2

Maximum current

```
Maximum current

L1    2906    A
L2    2919    A
L3    2931    A
```

x1 / x3

Maximum active power

```
Maximum ac power
3F          1,978kW
L1   653.9   kW
L2   658.8   kW
L3   664.8   kW
```

x1 / x4

Maximum reactive power

```
Maximum reac power
3F        416.6kVAr
L1   138.1   kVAr
L2   139.3   kVAr
L3   139.3   kVAr
```

x1 / x5

Maximum apparent power

```
Maximum ap power
3F          2.021kVA
L1   668.5   kVA
L2   673.3   kVA
L3   679.4   kVA
```

x1 / x6

5.4.5 Minimums

EN

Minimum 3-phase measure

```
Minimum 3-phase me

       400      V
      2919      A
     1,978     MW
```

x2

Minimum phase-neutral voltages

```
Minimum pn voltage

L1     230      V
L2     231      V
L3     232      V
```

x2
x1

Minimum linked voltages

```
Minimum lnkd volta

L12    399      V
L23    401      V
L31    400      V
```

x2
x2

Minimum currents

```
Minimum currents

L1    2906      A
L2    2919      A
L3    2931      A
```

x2
x3

Minimum active powers

```
Minimum act powers
3F           1,978kW
L1    653.9     kW
L2    658.8     kW
L3    664.8     kW
```

x2
x4

Minimum reactive powers

```
Minimum rea powers
3F          416.6kVAr
L1    138.1    kVAr
L2    139.3    kVAr
L3    139.3    kVAr
```

x2
x5

Minimum apparent powers

```
Minimum app powers
3F           2.021kVA
L1    668.5     kVA
L2    673.3     kVA
L3    679.4     kVA
```

x2
x6

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5.4.6 Averages

Average active powers


```
Average active pow
3F           1,978kW
L1    653.9    kW
L2    658.8    kW
L3    664.8    kW
```

Average reactive powers


```
Average react powe
3F       ⌇416.6kVAr
L1 ⌇  138.1   kVAr
L2 ⌇  139.3   kVAr
L3 ⌇  139.3   kVAr
```

Average apparent powers


```
Average app powers
3F          2.021kVA
L1    668.5    kVA
L2    673.3    kVA
L3    679.4    kVA
```

5.4.7 Maximum demand

Maximum active power demand


```
Max active power d
3F           1,978kW
L1    653.9    kW
L2    658.8    kW
L3    664.8    kW
```

Maximum apparent power demand


```
Max apparent power
3F          2.021kVA
L1    668.5    kVA
L2    673.3    kVA
L3    679.4    kVA
```

6 TROUBLESHOOTING

EN

6.1 Problems, causes, solutions

The information contained in this chapter is not exhaustive but an attempt to provide specialised technicians with information to help them in trouble-shooting the most common problems.

⚠ **The instructions in the "Suggested action" section of the table DO NOT AUTHORISE interventions if they compromise safety in any way**

Problem	Possible cause	Suggested action
The display shows ERR INI 3 when turning on	The data in memory are inconsistent	Press a key (the device's SW will load the default values); if the problem reoccurs, contact DUCATI energia
The display shows ERR INI 6	The software is not able to store the data in memory	Contact DUCATI energia
The instrument does not switch on	incorrect or non-connected auxiliary power supply	check the connection and the presence of the auxiliary voltage
the display is completely dark or clear	back lighting is badly regulated	regulate back lighting
the instrument communicates with the pc but the communication is interrupted	non-shielded connection cables	use shielded cables
	lack of terminations	insert the terminations

Problem	Possible cause	Suggested action
the instrument does not communicate with the software	communication cables	check the correct connection of the device
	communication protocol	check that the communication protocol of the device coincides with that used in the software.
	type of connection and communication parameters	check the type of connection and the settings of the device serial port

6.1.1   Error codes

Error message	Type	Description	Suggested action
Mem. Test Failed	Internal memory error	Internal memory damaged	Contact DUCATI energia
V1=0	Voltage Errors	V1 null	Check voltage presence
V2/V3=0	Voltage Errors	V2 and/or V3 null with config. = 3-PHASE or BALANCED 3-PHASE	Check voltage presence or set the correct configuration
Phase V no 120	Voltage Errors	Voltage not at 120° with config. = 3-PHASE or BALANCED 3-PHASE	Check voltage presence or set the correct configuration
I1 = 0	Current Error	I1 null	Check connection layouts check the TA connections and load presence
I2/I3 = 0	Current Error	I2 and/or I3 null with config. = 3-PHASE	Set configuration correctly

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Error message	Type	Description	Suggested action
V2/V3 not 0	Warning	V2 and/or V3 null with config. = SINGLE PHASE	Check the connection layouts or correctly set the configuration
V sequence error	Voltage sequence error	Possible inversion of 2 phases	Check connection layouts
I2/I3 not 0	Warning	12 and/or I3 nothing with config. = SINGLE-PHASE or BALANCED 3-PHASE	Check the connection layouts or correctly set the configuration
I sequence error	Warning	Possible current order inversion error	Check connection layouts
I1/I2 inverted	Warning	Possible inversion of I1 and I2	Check connection layouts
I1/I3 inverted	Warning	Possible inversion of I1 and I3	Check connection layouts
I2/I3 inverted	Warning	Possible inversion of currents I2 and I3	Check connection layouts
CT1 Inversion	Warning	Possible inversion of the CT1 direction in GENERATION mode	Check connection layouts
CT2 Inversion	Warning	Possible inversion of the CT2 direction in GENERATION mode	Check connection layouts
CT3 Inversion	Warning	Possible inversion of the CT3 direction in GENERATION mode	Check connection layouts
ETH Test Failed	Internal Ethernet error	Ethernet interface module damaged	Contact DUCATI energia

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If the operating problems have not been solved or the information is not contained in this manual, please contact the Technical Assistance Service.

Collect as much information as possible relative to the installation and, in particular, the following data:

1) Model and serial number of the instrument (data is indicated on the shield applied on the container at the rear).
2) Purchase date of the materials.
3) Description of the problem.
4) System configuration: type of insertion, CT and VT transformation ratio, connections with external communication devices, etc.

Contact us

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