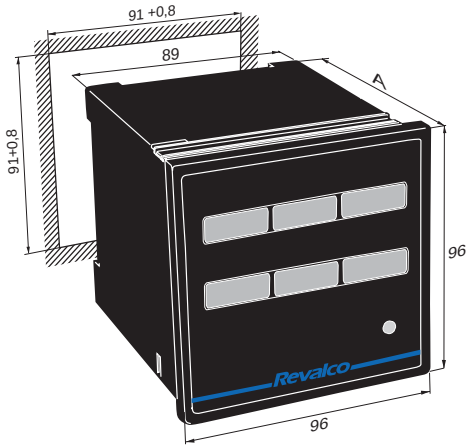
LED THREE-PHASE MULTIFUNCTION METERS

DIMENSIONS in mm



- **A** = 97,3 without terminal cover
- **A** = 116,5 with terminal cover

TECHNICAL CHARACTERISTICS

	2RAN96	2RAN96R	2RAN96C	2RAN96CS	2RAN96C485	2RAN96CS485
ELECTRICAL PARAMETERS						
- Voltage phase-phase	•	•	•	•	•	•
- Voltage phase-neutral	•	•	•	•	•	•
- Current	•	•	•	•	•	•
- Total Active Power			•	•	•	•
- Total Reactive Power			•	•	•	•
- Total Apparent Power			•	•	•	•
- Total Active Energy			•	•	•	•
- Partial Active Energy			•	•	•	•
- Total Reactive Energy			•	•	•	•
- Power Factor			•	•	•	•
- Frequency			•	•	•	•
- Phase sequence			•	•	•	•
- Partial and Total working hours			•	•	•	•
The software is available, free of charge, on our internet address www.revalco.it					•	•
Possibility to use the output contacts by software (for example: turn-on or turn-off an engine)						•
STANDARD POWER SUPPLY	230 VAC 50/60Hz					
NOMINAL INPUT VALUES Voltage	500V					
Primary current	from 5A to 6000A selectable by button located at the front					
Secondary current	5A (1A on request)					
Frequency	from 40 to 60 Hz					
SELECTABLE CAPACITIES	from 5A to 1000A with steps of 5A – from 1000A to 6000A with steps of 50A					
PRECISION CLASS	2% ± 2 digit (Power and Energy) 0,5% ± 2 digit (all other values)					
CONSUMPTION	4VA					
PROTECTION DEGREE	IP20 on terminals - IP40 on front					
INSULATION CLASS	II					
WORKING TEMPERATURE	-5°C ..... +50°C					
STORAGE TEMPERATURE	-20°C ..... +70°C					
TEST VOLTAGE	2kV at 50Hz for 1 minute					
MEMORY	EEPROM					
TWO OUTPUT REED RELAYS with high power (max 20VA), switching voltage (1000VDC) or peak AC		NO (0,5A-1000V)		NO (0,5A-1000V)		NO (0,5A-1000V)
SERIAL OUTPUT					RS485	
PROTOCOL					MODBUS SLAVE RTU	
INSULATION VOLTAGE					3kV	
WEIGHT Kg	0,55					

2RAN96

OPERATION

- Powering the instrument you can see the following page  Main fault

- By pressing the front button, the introduction page of this analyser appears, on which the actual version is also identified. 

In this position, the configuration selection menu page will appear (see at the bottom of this page)
To enter into the configuration menu maintain pressure on the front button for a few seconds

- Maintaining pressure on the front button you will see the parameters displayed on this page
Releasing the button the measurements will be shown

three voltages phase/phase

three currents

- Maintaining pressure on the front button you will see the parameters displayed on this page
Releasing the button the measurements will be shown

three voltages phase/neutral

three currents

CONFIGURATION SELECTION MENU

- By pressing the front button for a few seconds a flashing page appears, indicating that you are entering into the configuration selection menu, and you will see for example:

Maintain pressure on the front button untill the following page is displayed.
Releasing the button the further pages will be **automatically** shown

- After a few seconds the CT selection page appears, by pressing the front button you can select the required CT value. From 5A up to 999A with steps of 5A

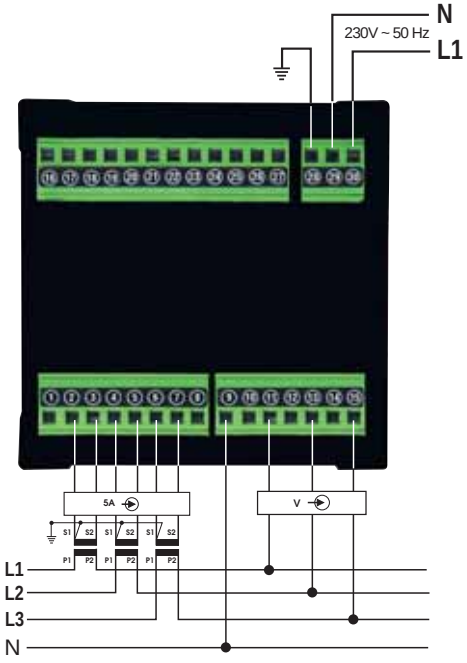
From 1000A up to 6000A with steps of 50A for their display it is necessary to refer in kA values where this unit measurement is indicated by the illumination of the light located on the extreme right of the display . To fast forward maintain pressure on the front button

The example shows the displays of a 1200A CT

- After a few seconds the page of the mathematical medium n° of samples appears; practically it is the stability filter of the measurement. The numbering goes from 1 to 60; the higher is the selected number the slower is the change of displays.

- Automatically the following page appears: here it is possible to select and memorise the main page that you want to see after the initial energising of the instrument. By pressing in succession the front button, the various titles of the pages available appear and when you see the one required release the button to memorise it.
After 5 seconds the next page appears.

CONNECTION DIAGRAM



2RAN96R

OPERATION

- Powering the instrument you can see the following page 

Main fault

- By pressing the front button, the introduction page of this analyser appears, on which the actual version is also identified. 

In this position, the configuration selection menu page will appear (see at the bottom of this page)
To enter into the configuration menu maintain pressure on the front button for a few seconds

- Maintaining pressure on the front button you will see the parameters displayed on this page 

three voltages phase/phase

three currents

Releasing the button the measurements will be shown

- Maintaining pressure on the front button you will see the parameters displayed on this page 

three voltages phase/neutral

three currents

Releasing the button the measurements will be shown

- Maintaining pressure on the front button you will see the parameters displayed on this page 

Showing the actual situation of the thresholds

Releasing the button ,the activation(ON) or the deactivation(OFF) of the two thresholds (th1 and th2) appears

CONFIGURATION SELECTION MENU

- By pressing the front button for a few seconds a flashing page appears, indicating that you are entering into the configuration selection menu, and you will see for example: 

Maintain pressure on the front button untill the following page is displayed. 

Releasing the button further pages will be **automatically** shown

- After a few seconds the CT selection page appears, by pressing the front button you can select the required CT value. From 5A up to 999A with steps of 5A 

From 1000A up to 6000A with steps of 50A for their display it is necessary to refer in kA values where this unit measurement is indicated by the illumination of the light located on the extreme right of the display . To fast forward maintain pressure on the front button 

The example shows the displays of a 1200A CT

- After a few seconds the page of the mathematical medium n° of samples appears; practically it is the stability filter of the measurement. The numbering goes from 1 to 60; the higher is the selected number the slower is the change of displays. 

- Automatically the following page appears: here it is possible to select and memorise the main page that you want to see after the initial energising of the instrument. By pressing in succession the front button, the various titles of the pages available appear and when you see the one required release the button to memorise it.
After 5 seconds the next page appears. 

1st alarm threshold configuration page

When pressing the front button it is possible to choose between: OFF,
Hi (max alarm),
Lo (min alarn) 

- On the further page it is possible to select the delay time of the 1st threshold
When pressing the front button it is possible to choose between: OFF - On (excitation relay delay) or
On - OFF (disexcitation relay delay) 

- On the further page it is possible to select the delay time up to max 30 seconds 

- On the further page it is possible to select the parameter to which applies the **1st** alarm threshold between:

3U alarm applied simultaneously to the three phase-neutral voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm

3UF alarm applied simultaneously to the three phase-phase voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm

3i alarm applied simultaneously to the three currents, where is enough that one of the three currents exceeds the selected value to activate the alarm

i1 alarm applied to the L1 current phase

i2 alarm applied to the L2 current phase

i3 alarm applied to the L3 current phase

U1 alarm applied to the L1 phase-neutral voltage phase

U2 alarm applied to the L2 phase-neutral voltage phase

U3 alarm applied to the L3 phase-neutral voltage phase

U12 alarm applied to the L1-L2 voltage phase

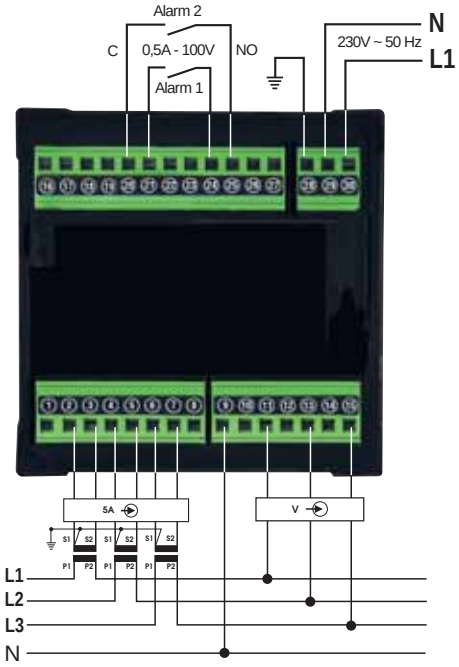
U23 alarm applied to the L2-L3 voltage phase

U31 alarm applied to the L3-L1 voltage phase

- The further page shows also the percentage value of the alarm.It is possible to modify the percentage value of the alarm; by pressing the front button the percentage is varied with steps of 1%(to fast forward maintain pressure on the front button) and displayed on the page is the equality between the numerical value and the percentage.
  Example: having choosen the parameter 3UF, the percentage 51% correspond to 255V

Now the 2nd alarm threshold configuration page appears
Where it is necessary to act exactly as explained above

CONNECTION DIAGRAM



2RAN96C / 2RAN96C485

OPERATION

- Powering the instrument you can see the following page  Main fault

- By pressing the front button, the introduction page of this analyser appears on which the actual version is also identified.  or 

In this position, the configuration selection menu page will appear (see at the bottom of this page)
To enter into the configuration menu maintain pressure on the front button for a few seconds

- Maintaining pressure on the front button you will see the parameters displayed on this page
  Releasing the button the measurements will be shown
  
  three voltages phase/phase
  three currents

- Maintaining pressure on the front button you will see the parameters displayed on this page
  Releasing the button the measurements will be shown
  
  three voltages phase/neutral
  three currents

- Maintaining pressure on the front button you will see the parameter displayed on this page
  Releasing the button the measurement will be shown
  
  Total Active Power, expressed in Watt

- Maintaining pressure on the front button you will see the parameter displayed on this page
  Releasing the button the measurement will be shown
  
  Total Reactive Power expressed in Var

- Maintaining pressure on the front button you will see the parameter displayed on this page
  Releasing the button the measurement will be shown
  
  Total Apparent Power, expressed in VA

- Maintaining pressure on the front button you will see the parameter displayed on this page
  Releasing the button the measurement will be shown
  
  Total Active Energy expressed in kWh

- Maintaining pressure on the front button you will see the parameter displayed on this page showing the quantity of energy used in 15 min
  Releasing the button the measurement will be shown
  
  Relative Active Energy, expressed in kWh, memorised every 15 min.

  
  The flashing symbol means that the instrument is counting the used energy during 15 minutes; when the symbol becomes static it means that the 15 minutes are passed and the final value is shown. To zero this value, maintain pressure on the front button.

- Maintaining pressure on the front button you will see the parameter displayed on this page
  Releasing the button the measurement will be shown
  
  Total Reactive Energy expressed in kVar

- Maintaining pressure on the front button you will see the parameters displayed on this page
  Capacitive (cAP) or Inductive Power Factor (ind) in number (coS), or in electrical degrees (dEG)
  Frequency from 30hz to 70Hz (FrE)
  Releasing the button the measurement will be shown
  

- Maintaining pressure on the front button you will see the parameters displayed on this page
  
  Phase sequence
  Releasing the button this indication appears no (not correct sequence)
  or YES (correct sequence)

- Maintaining pressure on the front button you will see the parameter displayed on this page
  Hourmeter indicating the working hours of the instrument, the memorisation of the time occurs every 15 min
  Releasing the button the measurement will be shown
  

- Maintaining pressure on the front button you will see the parameter displayed on this page
  Releasing the button the measurement will be shown
  
  Partial hourmeter indicating the working hours of the instrument

  (zeroing in the next page)
  

- Maintaining pressure on the front button you will see the parameters displayed on this page:
  Releasing the button the measurement will be shown
  
  Actual analogue bar of the Active Power respect to the Total Apparent Power
  Actual analogue bar of the Reactive Power respect to the Total Apparent Power

This page serves to give an immediate visual display showing the situation of the installation
Releasing the button you can see for example at cosφ1 the following display:

Active Power
Reactive Power

If the value of the cosphi goes down, the phase displacement angle is immediately displayed, and the Active Power's bar goes down while the Reactive Power's bar will increase as for example in the figure:

Active Power

Reactive Power

- Maintaining pressure on the front button you see the parameter displayed on this page
  Visual simulation of the rotation of the electromechanical active kWh-meter indicating how much energy you are using at that time
  Releasing the button the graphics will be shown

- Maintaining pressure on the front button you see the parameter displayed on this page
  Releasing the button the graphics will be shown

Analogue display bar of the Active Power (settable)

If for example the selected CT is 50/5A but it is well known that the installation is already at 100% with 40A, You'll set the instrument in the way that with 40A the bar shows 100%

CONFIGURATION SELECTION MENU

- By pressing the front button for few seconds a flashing page appears, indicating that you are entering into the configuration selection menu, and you will see for example:

or

Maintain pressure on the front button untill the following page is displayed. Releasing the button the further pages will be **automatically** shown

- After a few seconds the CT selection page appears, by pressing the front button you can select the required CT value. From 5A up to 999A with steps of 5A

From 1000A up to 6000A with steps of 50A and for their display it is necessary to refer in kA values where this unit measurement is indicated by the illumination of the light located on the extreme right of the display . To fast forward maintain pressure on the front button
The example shows the displays of a 1200A CT

- After a few seconds the page of the mathematical medium n° of samples appears; practically it is the stability filter of the measurement. The numbering goes from 1 to 60; the higher is the selected number the slower is the change of displays.

- After a few seconds the following page appears, on which it is possible to select the end scale value of the analogue bar of the Active Power (Act Ratio). The indicated example shows a value of 92% that can be modified (with steps of 1%) by pressing the front button(To fast forward maintain pressure on the front button)

Releasing the button the page will show also the numerical equality in Watt of the percentage choosen
In function of the nominal calibration data. If for example the CT 50/5A is selected and the percentage is 92% you'll see:
where 6900W correspond to the end scale (92%)

calculated as follow: 92% = Vnom 230V ph/n (400V ph/ph) x CT value 50/5A x 3

230 x 50 = 11500 11.500 : 5 = 2300 2300 x 3 = 6900

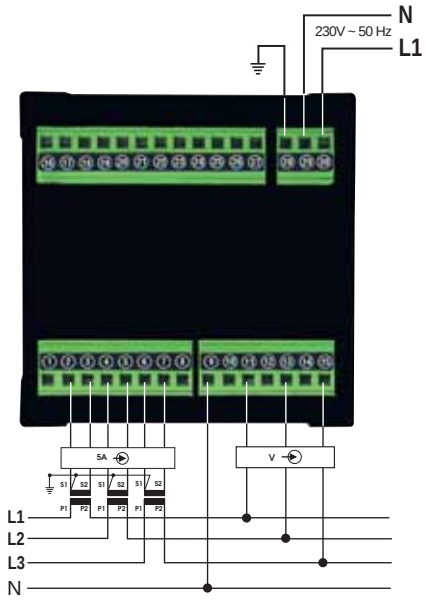
- Automatically the following page appears: here it is possible to select and memorise the main page that you want to see after the initial energising of the instrument. By pressing in succession the front button, the various titles of the pages available appear and when you see the one required release the button to memorise it.

- After 5 seconds the next page appears(version 1RAN96C485 only) on which, by pressing the front button, it is possible to change the address to assign)

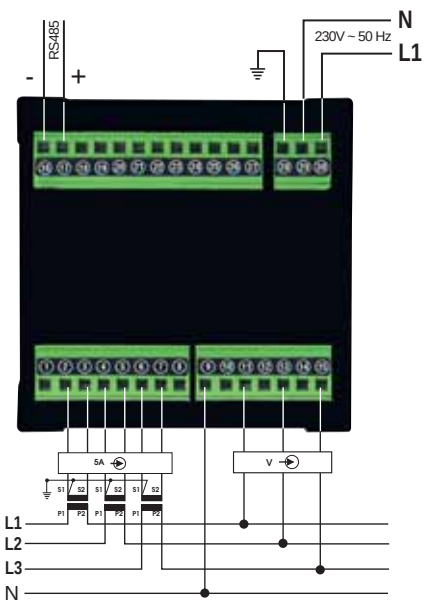
serial address

CONNECTION DIAGRAMS

2RAN96C



2RAN96C485



SERIAL COMUNICATION

See page 214

2RAN96CS / 2RAN96CS485

OPERATION

- Powering the instrument you can see the following page 

Main fault

- By pressing the front button, the introduction page of this analyser appears, on which the actual version is also identified.

or


In this position, the configuration selection menu page will appear (see at the bottom of this page)
To enter into the configuration menu maintain pressure on the front button for a few seconds

- Maintaining pressure on the front button you will see the parameters displayed on this page
Releasing the button the measurements will be shown

three voltages phase/phase
three currents

- Maintaining pressure on the front button you will see the parameters displayed on this page
Releasing the button the measurements will be shown

three voltages phase/neutral
three currents

- Maintaining pressure on the front button you will see the parameter displayed on this page
Releasing the button the measurement will be shown

Total Active Power, expressed in Watt

- Maintaining pressure on the front button you will see the parameter displayed on this page
Releasing the button the measurement will be shown

Total Reactive Power expressed in Var

- Maintaining pressure on the front button you will see the parameter displayed on this page
Releasing the button the measurement will be shown

Total Apparent Power, expressed in VA

- Maintaining pressure on the front button you will see the parameter displayed on this page
Releasing the button the measurement will be shown

Total Active Energy expressed in kWh

- Maintaining pressure on the front button you will see the parameter displayed on this page showing the quantity of energy used in 15 min
Releasing the button the measurement will be shown

Relative Active Energy expressed in kWh memorised every 15 min.


The flashing symbol means that the instrument is counting the used energy during 15 minutes; when the symbol becomes static it means that the 15 minutes are passed and the final value is shown. To zero this value, maintain pressure on the front button.

- Maintaining pressure on the front button you will see the parameter displayed on this page
Releasing the button the measurement will be shown

Total Reactive Energy expressed in kVar,

- Maintaining pressure on the front button you will see the parameters displayed on this page
Capacitive (cAP) or Inductive Power Factor (ind) in number (coS), or in electrical degrees (dEG)
Frequency from 30Hz to 70Hz (FrE)
Releasing the button the measurement will be shown

- Maintaining pressure on the front button you will see the parameter displayed on this page

Phase sequence
Releasing the button this indication appears : no (not correct sequence)
or YES (correct sequence)

- Maintaining pressure on the front button you will see the parameter displayed on this page
Hourmeter indicating the working hours of the instrument, the memorisation of the time occurs every 15 min
Releasing the button the measurement will be shown

- Maintaining pressure on the front button you will see the parameter displayed on this page
Releasing the button the measurement will be shown

Partial hourmeter indicating the working hours of the instrument

(zeroing in the next page)

- Maintaining pressure on the front button you will see the parameter displayed on this page

Actual situation of the thresholds
Releasing the button, the activation (**ON**) or the deactivation (**OFF**) of the two thresholds (th1 and th2) appears showing

- Maintaining pressure on the front button you see the parameters displayed in this page
  Releasing the button the measurement will be shown

Actual analogue bar of the Active Power respect to the Total Apparent Power

Actual analogue bar of the Reactive Power respect to the Total Apparent Power

This page serves to give an immediate visual situation of the installation
Releasing the button you can see for example at cosφ1 the following display

Active Power

Reactive Power

If the value of the cosphi goes down, the phase displacement angle is immediately displayed, and the Active Power's bar goes down while the Reactive Power's bar will increase as for example in the figure:

Active Power

Reactive Power

- Maintaining pressure on the front button you see the parameter displayed on this page
  Visual simulation of the rotation of the electromechanical active kWh-meter indicating how much energy you are using at that time
  Releasing the button the graphics will be shown

- Maintaining pressure on the front button you see the parameter displayed on this page
  Releasing the button the graphics will be shown

Analogue display bar of the Active Power (settable)

If for example the selected CT is 50/5A but it is well known that the installation is already at 100% with 40A,
You'll set the instrument in the way that with 40A the bar shows 100%

CONFIGURATION SELECTION MENU

- By pressing the front button for a few seconds a flashing page appears, indicating that you are entering into the configuration selection menu, and you will see for example:

or

Maintain pressure on the front button untill the following page is displayed.
Releasing the button the further pages will be **automatically** shown

- After a few seconds the CT selection page appears, by pressing the front button you can select the required CT value. From 5A up to 999A with steps of 5A

From 1000A up to 6000A with steps of 50A and for their display it is necessary to refer in kA values where this unit measurement is indicated by the illumination of the light located on the extreme right of the display. To fast forward maintain pressure on the front button

The example shows the display of a 1200A CT

- After a few seconds the page of the mathematically medium n° of samples appears; practically it is the stability filter of the measurement. The numbering goes from 1 to 60; the higher is the selected number the slower is the change of displays.

- After a few seconds the following page appears, on which it is possible to select the end scale value of the analogue bar of the Active Power (Act Ratio). The indicated example shows a value of 92% that can be modified (with steps of 1%) by pressing the front button
  (To fast forward maintain pressure on the front button).

Releasing the button the page will show also the numerical equality in Watt of the percentage choosen
In function of the nominal calibration data. If for example the CT 50/5A is selected and the percentage is 92% you'll see:
where 6900W correspond to the end scale (92%)

Calculated as follow: 92% = Vnom (230V ph/n, (400V ph/ph)) x CT value (50/5A) x 3

230 x 50 = 11500 11.500 : 5 = 2300 2300 x 3 = 6900

- Automatically the following page appears: here it is possible to select and memorise the main page that you want to see after the initial energising of the instrument. By pressing in succession the front button, the various titles of the pages available appear and when you see the one required release the button to memorise it.

- After 5 seconds the next page appears. (version RANM6CS485 only)
  on which, by pressing the front button, it is possible to change the address to assign

serial address

1st alarm threshold configuration page
Where pressing the front button it is possible to choose between: OFF
Hi (max alarm),
Lo (min alarn)

- On the further page it is possible to select the delay time of the 1st threshold
  Where pressing the front button it is possible to choose between: OFF - On (excitation relay delay) or
  On - OFF (disexcitation relay delay)

- On the further page it is possible to select the delay time up to max 30 seconds

- On the further page it is possible to select the parameter to which apply the **1st** alarm threshold between:

3U alarm applied simultaneously to the three phase-neutral voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm
3UF alarm applied simultaneously to the three phase-phase voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm
3i alarm applied simultaneously to the three currents, where is enough that one of the three currents exceeds the selected value to activate the alarm
i1 alarm applied to the L1 current phase
i2 alarm applied to the L2 current phase
i3 alarm applied to the L3 current phase
U1 alarm applied to the L1 phase-neutral voltage phase
U2 alarm applied to the L2 phase-neutral voltage phase
U3 alarm applied to the L3 phase-neutral voltage phase
Act alarm applied to the Active Power
rEA alarm applied to the Reactive Power
APP alarm applied to the Apparent Power
U12 alarm applied to the L1-L2 voltage phase
U23 alarm applied to the L2-L3 voltage phase
U31 alarm applied to the L3-L1 voltage phase
FrE alarm applied to the frequency
deg alarm applied to the electrical degrees of the Power factor
CoS alarm applied to the COSphi of the Power Factor

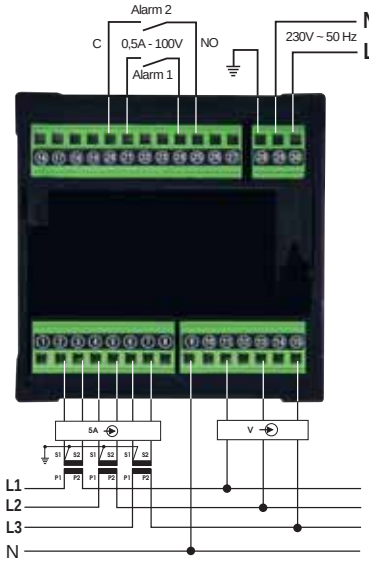
- The further page shows also the percentage value of the alarm.It is possible to modify the percentage value of the alarm; by pressing the front button the percentage is varied with steps of 1%(to fast forward maintain pressure on the front button) and displayed on the page is the equality between the numerical value and the percentage. Example: having choosen the parameter 3UF, the percentage 51% correspond to 255V

Now the 2nd alarm threshold configuration page appears
Where it is necessary to act exactly as explained before

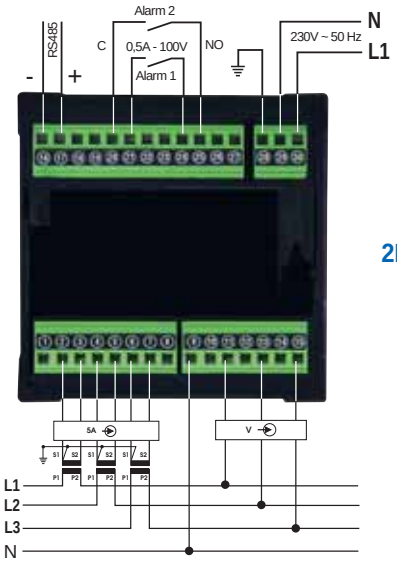
If in the configuration phase you decide NOT to use one or both threshold, these will remain available to be controlled via MODBUS SLAVE RTU, by the controll software.

CONNECTION DIAGRAMS

2RAN96CS

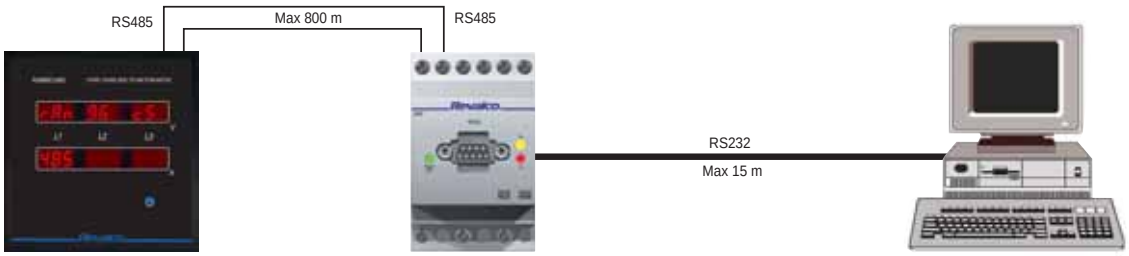


2RAN96CS485



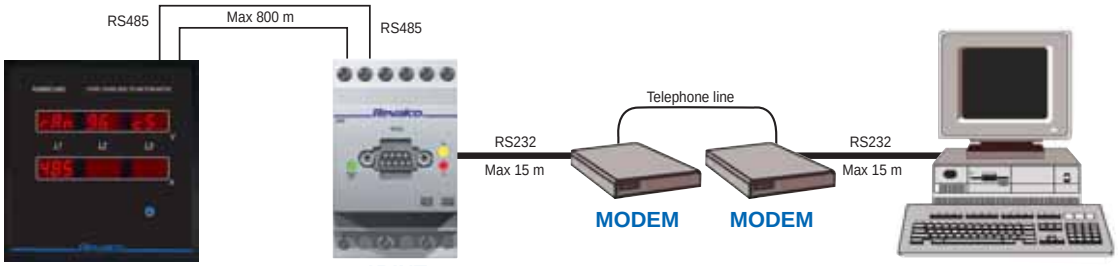
SERIAL COMMUNICATION

Scheme n. 1: Connection between instruments and PC for distances up to 800m



2RAN96C485
2RAN96CS485
1RINT

Scheme n. 2: Connection via Modem



2RAN96C485
2RAN96CS485
1RINT
MODEM
MODEM