Tense Electric Electronic

ENERGY ANALYZER

* 2x16 LCD display
* With 3-phase voltage and 3-phase current transformer
* Easy-to-use Turkish menu
* It shows per-phase and total active (P, ΣP) powers.
* It shows per-phase and total reactive (Q, ΣQ inductive and capacitive) powers.
* It shows Cosφ value of each phase.
* It shows voltage values (V) of each phase.
* It shows current value (I) of each phase.
* It shows total imported active energy (ΣkWh) value.
* It shows total exported active energy (ΣkWh) value.
* It shows total inductive reactive energy (ΣkVArh) value.
* It shows total capacitive reactive energy value (ΣkVArh).
* It shows the minimum values.
* It shows the maximum values.
* It shows demand values.
* You can reset the energy values.
* The records can be reset.
* The demand drawing time can be adjusted.

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MADE IN TURKEY CE

1 - General

TPM-01 energy analyzer measures the load on the system and voltage, current, Cosφ, active power, reactive power minimum and maximum values, demands and energies related to this load on the system.

Figure-1

Figure-2

2 - Start-up of the Device

When the device energized for the first time, the figure-1 is displayed. It indicates that the set-up process will start.

Approximately 3 seconds later, the figure-2 is displayed. Current transformer value is entered.

Adjust the value written on the current transformer by pressing UP and DOWN buttons. Press the MENU button in order to start the current transformer test.

3 - Display Images:

After the set-up process, firstly the figure-3 is displayed. In order to see the other measured values, press the DOWN button. You can set the values that you want or do not want to be displayed by setting the relevant option to active (ON) or passive (OFF) in the Advanced Settings menu.

Figure-3

Figure-3: It shows that the value and direction (imported/exported) of the Active (P) power of the R phase and that whether the reactive value is inductive or capacitive. You can display the values of the next phase by pressing the DOWN button.

Figure-4

Figure-4: It shows the total Active (imported) power value and also total inductive and capacitive reactive power values. You can display the information about the next value by pressing the DOWN button.

Figure-5

Figure 5: It shows the total Active (exported) power value and also total inductive and capacitive reactive power values. You can display the information about the next value by pressing the DOWN button.

Figure-6

Figure-6: It shows Cosφ values of each phase. You can display the information about the next value by pressing the DOWN button.

Figure-7

Figure-7: It shows the total cosine (Cosφ) value. You can display the information about the next value by pressing the DOWN button.

Figure-8

Figure-8: It shows the inductive/active and capacitive/active rates within the last 20 hours. You can display the information about the next value by pressing the DOWN button.

Figure-9

Figure-9: It shows the frequency values of each phase. You can display the information about the next value by pressing the DOWN button.

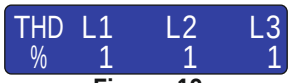


Figure-10

Figure-10: It shows total current-based harmonic distortion of each phase. You can display the information about the next value by pressing the DOWN button.

Figure-11

Figure-11: It shows total current-based harmonic distortion of the three-phase. You can display the information about the next value by pressing the DOWN button.

Figure-12

Figure-12: It shows the power factor values of each phase. You can display the information about the next value by pressing the DOWN button.

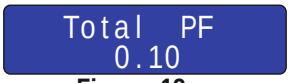


Figure-13

Figure-13: It shows the power factor value of the three-phase. You can display the information about the next value by pressing the DOWN button.

Figure-14

Figure-14: It shows the current values of each phase. You can display the information about the next value by pressing the DOWN button.

Figure-15

Figure-15: It shows the voltage values of each phase. You can display the information about the next value by pressing the DOWN button.

Figure-16

Figure-16: It shows total imported active energy values. You can display the information about the next value by pressing the DOWN button.

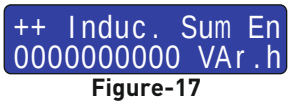


Figure-17

Figure-17: It shows total imported inductive energy values. You can display the information about the next value by pressing the DOWN button.

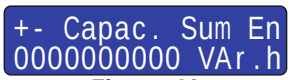


Figure-18

Figure-18: It shows total imported capacitive energy values. You can display the information about the next value by pressing the DOWN button.

Figure-19

Figure-19: It shows total imported active power demand values. You can display the information about the next value by pressing the DOWN button.

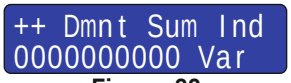


Figure-20

Figure-20: It shows total imported inductive power demand values. You can display the information about the next value by pressing the DOWN button.

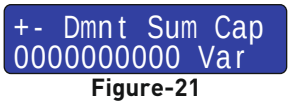


Figure-21

Figure-21: It shows total imported capacitive power demand values. You can display the information about the next value by pressing the DOWN button.

Figure-22

Figure-22: It shows total current demand value. You can display the information about the next value by pressing the DOWN button.

Figure-23

Figure-23: It shows maximum current values of each phase. You can display the information about the next value by pressing the DOWN button.

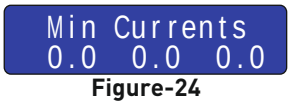


Figure-24

Figure 24: It shows minimum current values of each phase. You can display the information about the next value by pressing the DOWN button.

4 - Menu Usage:

If you press the MENU button for 1 second, figure-25 will be displayed. There are advanced settings menu and expert settings menu. Press ESC (quit) button in order to quit from the main menu or the other menus.

Figure-25

Figure-25: In advanced settings menu, you can adjust the current transformer value or the demand time, set the values that you want or do not want to be displayed by setting the relevant option to active (ON) or passive (OFF). In order to get in the advanced settings menu, press the UP or DOWN button and be sure that the cursor is on YES. Then, if you press the MENU button, you can get in the advanced settings menu. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu. Press UP or DOWN button in order to adjust any value on the menu and then press the MENU button.

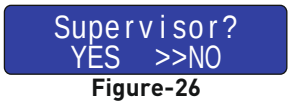


Figure-26

Figure-26: In supervisor settings menu, you can perform any transactions regarding to measurements and delete all records related to the measurements. In order to get in the expert settings menu, press the UP or DOWN button and be sure that the cursor is on YES. Then, if you press the MENU button, you can get in the expert settings menu. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu. In order to adjust any value on the menu, press UP or DOWN button, be sure that the cursor is on YES and then press the MENU button.

5 - Advanced Settings Menu:

Figure-27

Figure-27: When you get in the advanced settings menu, firstly the figure-27 is displayed. It is used for the current transformer value is changed. In order to change the current transformer value, adjust the value by pressing UP or DOWN buttons and press the MENU button. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-28

Figure-28: It is used for adjusting the demand receiving time. In order to change the time, adjust the value by pressing UP or DOWN buttons and press the MENU button. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-29

Figure-29: This mode must be set to ON in order to display any value regarding to energy. If the mode is set to OFF, no values regarding to energy will be displayed and in order to activate it, set the value to ON by pressing the UP button. In order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-30

Figure-30: It is used in order to display the total energy value on the three-phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

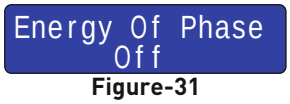


Figure-31

Figure-31: It is used in order to display the energy values of each phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

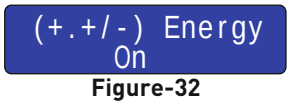


Figure-32

Figure-32: It is used in order to display the imported two-layer active energy and four-layer reactive energy. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

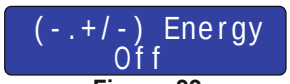


Figure-33

Figure 33: It is used in order to display the values of exported two-layer active energy and four-layer reactive energy. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

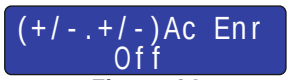


Figure-34

Figure-34: It is used in order to display the values of two-layer active energy and four-layer reactive energy. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-35

Figure-35: It is used in order to display two-layer reactive energy values. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-36

Figure-36: It is used in order to display single-layer active energy values. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

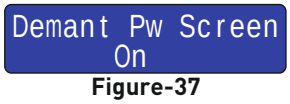


Figure-37

Figure-37: In order to display any values regarding to power demands, this mode must be set to ON. If this mode is set to OFF, no values regarding to power demands will be displayed. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-38

Figure-38: It is used in order to display total power demands of the three-phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-39

Figure-39: It is used in order to display power demands of the each phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-40

Figure-40: It is used in order to display imported two-layer active and four layer reactive demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-41

Figure-41: It is used in order to display exported two-layer active and four layer reactive demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

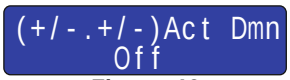


Figure-42

Figure 42: It is used in order to display the four-layer active and four-layer reactive power demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-43

Figure-43: It is used in order to display two-layer reactive power demand. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-44

Figure-44: It is used in order to display single-layer reactive power demand. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-45

Figure-45: In order to display any values regarding to current, this mode must be set to ON. If this mode is set to OFF, no values regarding to current will be displayed. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-46

Figure-46: It is used in order to display total current demand of the three-phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-47

Figure-47: It is used in order to display current demands of the each phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-48

Figure-48: It is used in order to display imported current demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-49

Figure-49: It is used in order to display exported current demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-50

Figure 50: It is used in order to display the single-layer current demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-51

Figure-51: In order to display any values regarding to voltage, this mode must be set to ON. If this mode is set to OFF, no values regarding to voltage will be displayed. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-52

Figure-52: It is used in order to display voltage demand of the three-phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu..

Figure-53

Figure-53: It is used in order to display voltage demands of the each phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-54

Figure-54: It is used in order to display imported voltage demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-55

Figure-55: It is used in order to display exported voltage demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-56

Figure 56: It is used in order to display the single-layer voltage demands. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-57

Figure-57: In order to display any values regarding to maximum and minimum values, this mode must be set to ON. If this mode is set to OFF, no values regarding to maximum and minimum values will be displayed. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-58

Figure-58: It is used in order to display maximum and minimum current values. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-59

Figure-59: It is used in order to display maximum and minimum voltage values. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-60

Figure-60: It is used in order to display maximum and minimum values of three-phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-61

Figure-61: It is used in order to display maximum and minimum values of each phase. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-62

Figure-62: It is used in order to display the imported maximum and minimum values. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-63

Figure-63: It is used in order to display the exported maximum and minimum values. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-64

Figure-64: It is used in order to display the single-layer maximum and minimum values. In order to activate it, set the value to ON by pressing the UP button and in order to deactivate it, set the value to OFF by pressing the DOWN button. Press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

6 - Supervisor Settings Menu:

Figure-65

Figure-65: When you get in the expert settings menu, firstly the figure-73 is displayed. It is used for adjusting the period of data collection from the measurement processor. In order to change the value, adjust the value by pressing UP or DOWN buttons and press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-66

Figure-66: It is used in order to increase the measurement sensitivity under low current values. In order to change the value, adjust the value by pressing UP or DOWN buttons and press the MENU button after changing the value. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-67

Figure-67: It is used in order to reset the records regarding to energy values. In order to reset the values, press the UP and DOWN buttons and be sure that the cursor is on YES. The values can be reset by pressing the MENU button. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-68

Figure-68: It is used in order to reset the maximum and minimum records. In order to reset the values, press the UP and DOWN buttons and be sure that the cursor is on YES. The maximum and minimum records can be reset by pressing the MENU button. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-69

Figure-69: It is used in order to reset demand records. In order to reset the values, press the UP and DOWN buttons and be sure that the cursor is on YES. The demand records can be reset by pressing the MENU button. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

Figure-70

Figure-70: It is used in order to reset the values in the advanced and expert settings menu to factory settings. In order to reset the values, press the UP and DOWN buttons and be sure that the cursor is on YES. The values in the advanced and expert settings menu can be reset by pressing the MENU button. You can press the MENU button in order to navigate on the menu and the ESC button in order to quit from the menu.

7 - Points to Take into Consideration in the Selection and Connection of Current Transformer:

- Be sure that the current transformer value is higher than the maximum current drawn from the system.
- It is recommended to use a current transformer in class (can be specified as class, cl, kl) 0,5
- In order to prevent any mistake while connecting the output terminals of the current transformer, use cables in different colors for each phase or designate a number for each cable.
- Keep the cables connected to the output terminals of the current transformer away from the high-voltage line.
- In order to prevent any shake on the current transformer, fix it on the bus-bar, cable or rail.

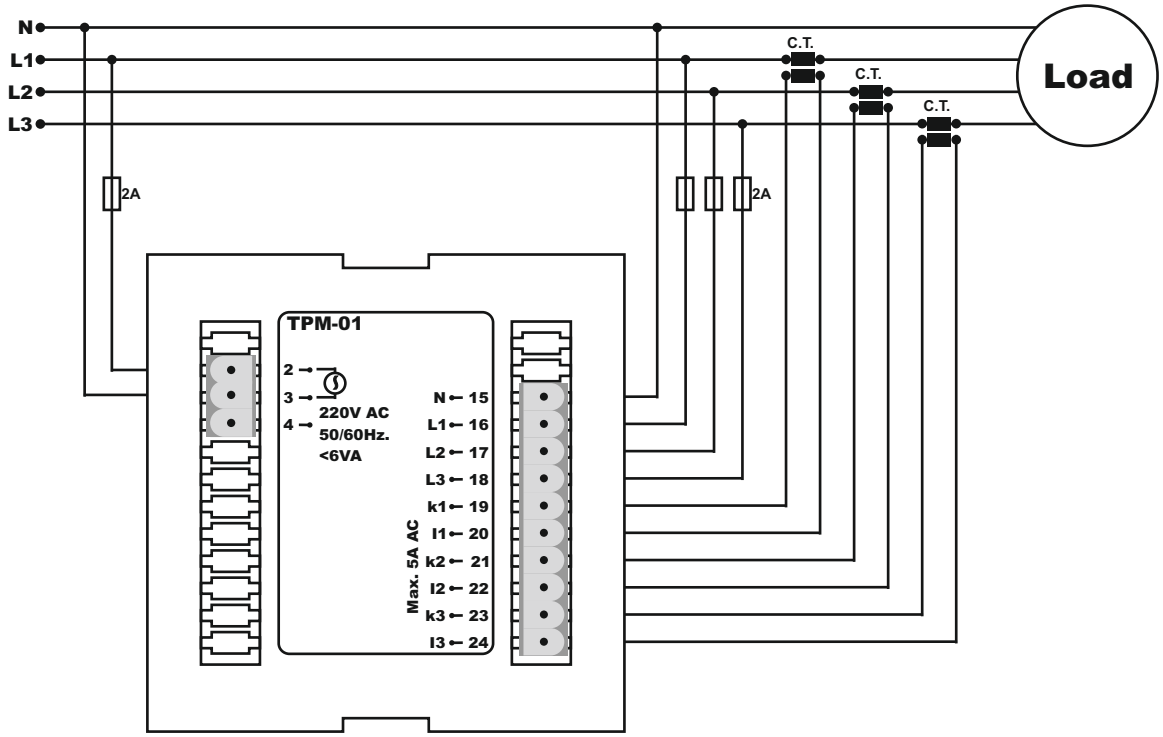
8 - Warnings:

- Use the device according to the instructions specified by us.
- Do not expose the LCD display directly to sunlight in order to avoid any harm on it.
- Note that the temperature level on the panel to which the device is mounted is at the range of operating temperature of the device (0^0C – 55^0C).
- There must be a space of 5cm behind the device after its installation.
- Fix the device securely to the front-cover of the panel with the apparatus delivered together with the device.
- Be sure that the panel to which the device is mounted does not operate in a humid environment.
- Place a switch or circuit breaker on the system during installation of the device.
- Place the switch or circuit breaker close to the device or in a location which is easily accessible for the operator.
- Please note that the cables must not be energized during installation.
- Flexible monitored and twisted cables must be used for the input and output lines which are not connected to the mains. These cables must be kept away from lines and devices carrying high voltage.
- Installation of the device and electrical connections must be performed by the technical personnel according with the instructions specified in the user's manual.
- The feeder cables must be compatible with the requirements of IEC 60227 or IEC 60245

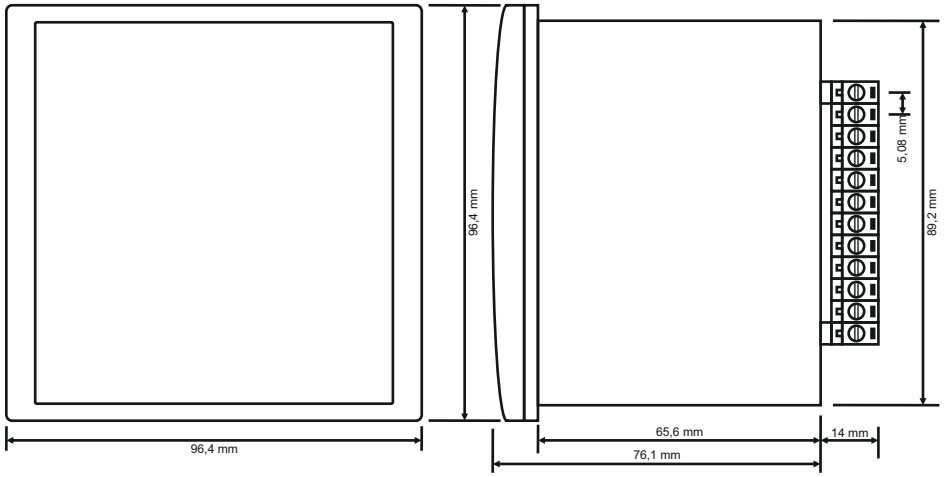
9 - Maintenance of the Device

De-energize and disconnect the device. Clean the body of the device with a dry or damp-dry cloth. Do not use conductive or other chemical substances as a cleaning agent that can damage the device. After cleaning the device, make its connections and check whether it is working by energizing it.

10- Connection Diagrams



11 - Dimensions:



12 - Technical Specifications:

Operating Voltage	160V - 240V AC
Operating Frequency	50 / 60 Hz
Operating Power	<6VA
Operating Temperature	-20ºC.....55ºC
Voltage Measurement Range	1V - 280V AC
Current Measurement Range	5mA - 5,5A AC (Resistive Load)
Current Transformer Ratio	5/5A.....10000/5A
Measurement Sensitivity	%±1
Display	2x16LCD
Cable Diameter	1.5mm²
Connection Type	Plug in terminal
Mounting	Front-mounte to the panel
Operating Altitude	<2000meter
Weight	<500Gr.
Protection Class	IP41(Front panel),IP00(Body)
Panel Hole Dimensions	91mm x 91mm

13 - Table of Contents

15 - Contact Information

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