Multimeter
User Manual



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PROPER USE AND SAFETY REQUIREMENTS



Cut all the power when connecting and disconnecting the device to a panel.



Do not clean the device with a solvent or similar material. Only use a dry cloth.



Please do not intervene to the device when a technical problem is encountered and get in contact with a technical service within the shortest time.



If the warnings are not taken into account, our company or the authorized dealer shall not be held responsible for the negative consequences.



Do not dispose in the trash, the device must be delivered to the collection centers (electronic device recycling centers). It should be recycled or disposed of without harming human health and environment.



The installation, assembly, activation and operation of the device should be done and used by only expert professionals and in accordance with safety regulations and instructions.

1. INTRODUCTION

1.1. General Features

The multimeter measures and calculates the current and the voltage values that belong to 3 phases as True RMS. It also measures the frequency and displays these quantities and measurement values on the screen. It can optionally measure neutral-to-earth voltage and displays the values on the screen.

The current transformer and the voltage transformer settings can be made via the menu. In the versions which have output feature, the relay is controlled according to the current and the voltage value ranges that set via the menu.

Multimeter does not require a separate supply input with its new supply design. The device operates if there is energy in one of the voltage inputs (85-265 Volt).

1.2. Technical Features

- Microprocessor based.
- The operating ambient temperature of the device must be between -10 °C and +55 °C.
- The power consumption of the measurement inputs is less than 1 VA.
- It has IP20 protection class.
- The line voltage between phase-phase can be set between 190-31500 V.
- The phase-phase measurement voltage can be set between 100-480 V AC (45-65 Hz) and phase-neutral measurement voltage can be set between 10-280 V AC (45-65 Hz).
- The current transformer ratio can be set between 5/5 and 10000/5.
- Optionally, it can be compatible with CT30 type current transformer.
- To adjust the polarity direction of the current transformer, there are three different modes as automatic, manual and reverse.
- The operating frequency is 45-65 Hz.
- The minimum measurement values are 25 mA and 10 V.
- The measurement accuracy is %1.
- It can measure phase-phase and phase-neutral voltages that belong to three phase, cur rent, frequency value and neutral-to-earth voltage.
- The power consumption is 4.0 -8.5 VA in the relay output version and 3-7 VA in the normal version.
- It can optionally have two 5 A relay outputs.
- It has three 4-digit 7-segment displays.
- The dimensions of the device (width-length-depth) are 97.5x97.5x50.5 mm.
- It operates under 85-265 V AC voltage.
- It has current, voltage (phase-phase), voltage (phase-neutral), frequency, control outputs, menu and k (x1000) LEDs.

1.3. Technical Drawing

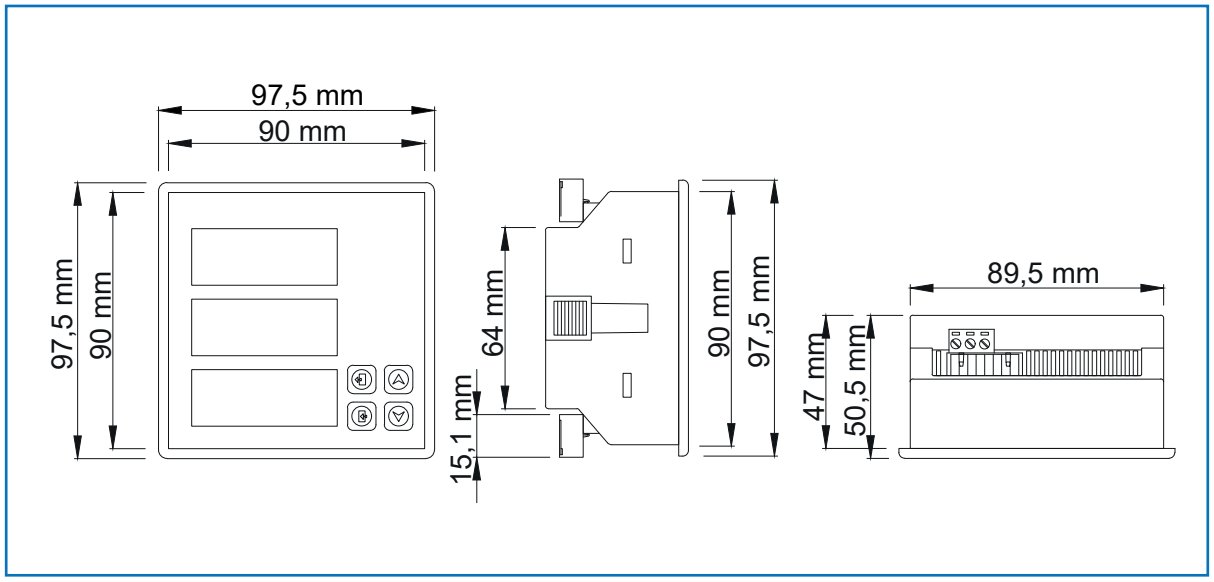


Figure 1.1

1.4. Measurable Line Parameters

The multimeter can measure phase-phase and phase-neutral voltages that belong to L1-L2-L3 phases, current, frequency value and neutral-to-earth voltage.

1.5. Buttons and Functions

	PRG button enables to access the menu when on operation screen. It fulfills selection function when scrolling through the menu.
	It enables to return to the previous process and exit from the menu.
	Up arrow button enables to change parameters displaying on operation screen and stroll between the menus.
	Down arrow button enables to change parameters displaying on operation screen and stroll between the menus.

1.6. Connection Diagram

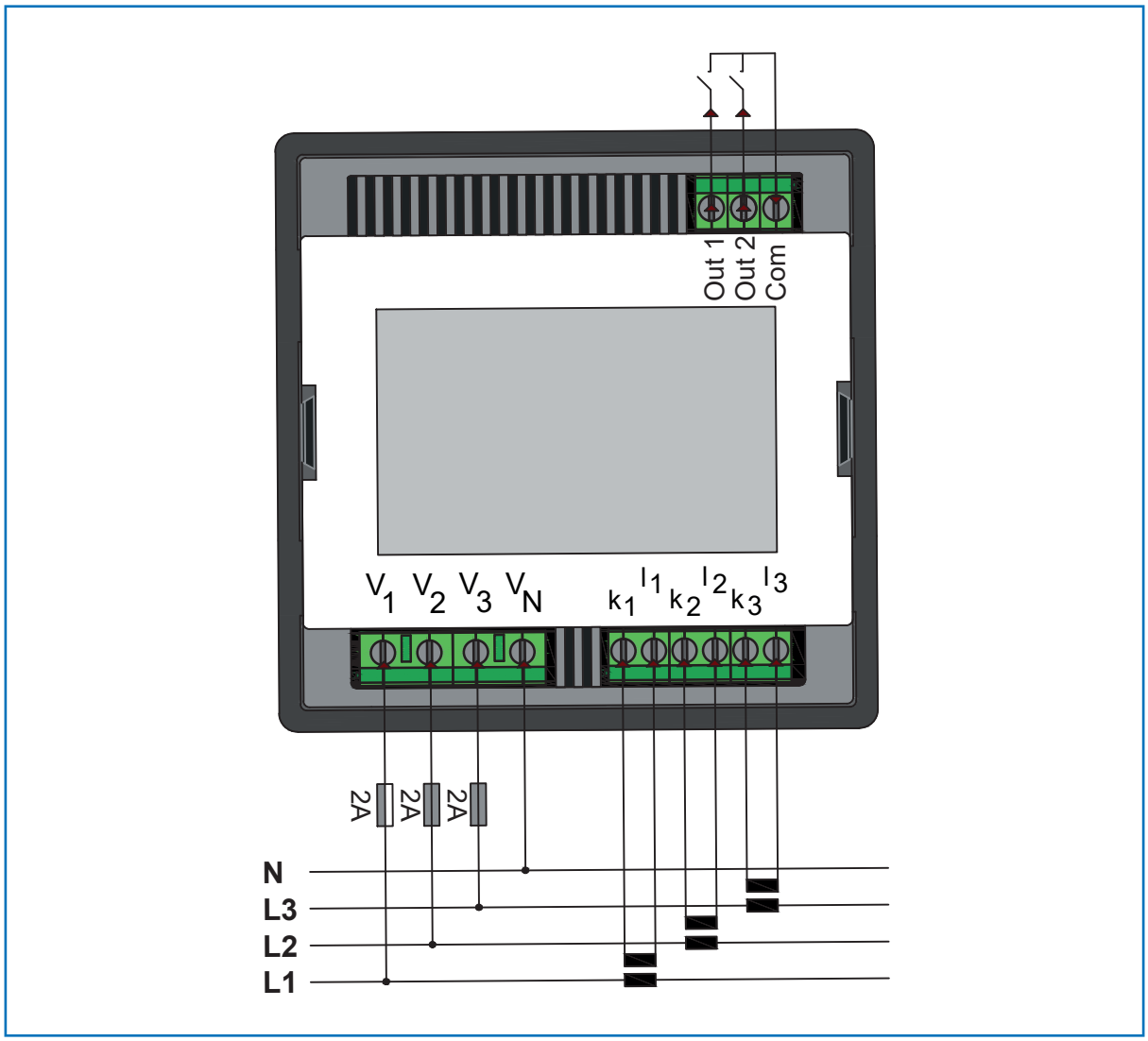


Figure 1.2

2. INSTALLATION

2.1. Device Installation

Make the current and voltage inputs connection of the device according to the Figure 1.2.

Make sure the voltage and current inputs are matched correctly when connecting the device.

Give energy to the device after checking and verifying the connections.

2.2. Installation Menu

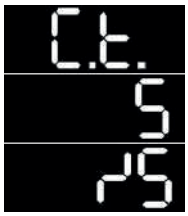


Figure 1.3

After giving energy to the device, the current transformer ratio menu in Figure 2.1 will appear. In this screen, the current transformer ratio is set with the direction buttons and is confirmed with PRG button.

NOTE : The factory default value of the current transformer ratio is 5/5.

2.3. Displaying Quantities on the Screen

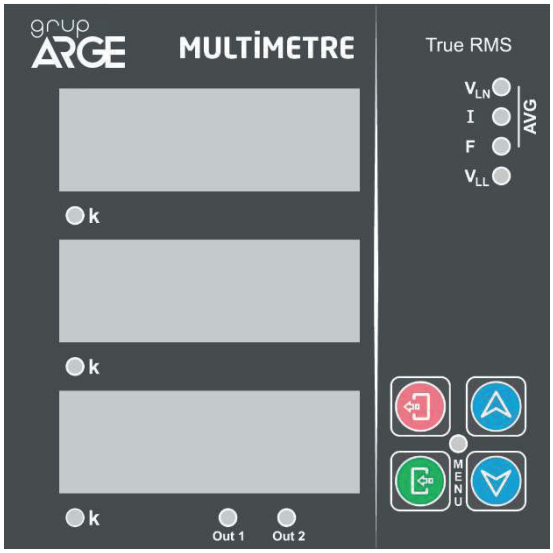


Figure 2.4

There are 8 LEDs (10 in the devices with output option). You can scroll through the parameters with the down and up arrow buttons. Which parameters are displayed on the screen depend on the LEDs that are on.

When the values that belong to three phases are displayed, L1 phase in line 1, L2 phase in line 2 and L3 phase is displayed in line 3.

Example; two LEDs in Figure 2.2 can be on at the same time. The descriptions of LEDs that are on together or alone are as follows.

The LEDs on right,

If VLN LED is on;

The phase-neutral voltage values that belong to L1, L2 and L3 phases are displayed.

If I LED is on;

The current values that belong to L1, L2 and L3 phases are displayed.

If F LED is on;

The frequency values that belong to L1, L2 and L3 phases are displayed.

If VLL LED is on;

The phase-phase voltage values that belong to L1, L2 and L3 phases are displayed.

If VLN, I and F LEDs are on;

Up to down;

1. Line: The average voltage values that belong to L1, L2 and L3 phases are displayed on the screen.
2. Line: The average current values that belong to L1, L2 and L3 phases are displayed on the screen.
3. Line: The average frequency values that belong to L1, L2 and L3 phases are displayed on the screen.

NOTE : There are three K(x1000) LEDs on the left side of the phase screen. If the related LED is on, the unit of the values on the screen is in Kilo.

3. USER MODES

There are three different user modes in total. These modes are adjusted according to certain levels.



User Mode: It is the simplest user mode. The device starts to operate in this mode after the first installation. If the operator or the supervisor passwords are entered, the device exists from this mode.

The authorization of displaying and changing setting are limited in this mode. The user can monitor only electrical quantities that are read.



Operator Mode: A few settings can be made on the device in addition to the user mode. The transition from the user mode to the operator mode can be made by entering 4 digit “0000” password. This password can be changed in password setting menu.



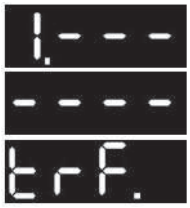
Supervisor Mode: This is the most advanced user mode. All the settings related to the device can be made in this mode. The transition from the user mode to the supervisor mode can be done by entering 4 digit “1000” password. This password can be changed in password setting menu. When the device is in “Operator” or “Supervisor” mode, it transfers to “User”
mode 5 minutes after exiting from the menu.

4. MAIN MENU AND SUB-MENUS

To enter menu, press the PRG button in the front panel of the device. The up and down buttons are used to scroll between menus in the device. There are four main menus in total. Press the PRG button to enter the wanted menu.

NOTE : When scrolling through the menu, holding down to the up button makes the transition fast and the menu come to the top. Moreover, holding down to the down button makes the transition fast and the menu comes to the bottom.

4.1. Transformer Menu



The settings related to the current transformer and voltage transformer is made in the transformer menu.

Figure 4.1

4.1.1. Current Transformer Ratio Menu

The current transformer ratio setting is explained in the installation menu. The present current transformer ratio will be flashing in "CtrC" menu. The current transformer ratio can be adjusted by using the up and down buttons in there. The desired value is selected by pressing PRG button.

The value range that can be entered and factory setting are as follows:

Min. Value: 5/5 - **Max. Value:** 10000/5 – **Factory Default:** 5/5

4.1.2. Line Voltage Menu

"LinE" menu, the line voltage value is set among the values that are seen in the table below.

LINE VOLTAGE	190	380	400	480	500	525	550	650	690
	725	900	1000	6300	10500	11000	14000	15800	28500
	29250	30000	30750	31500					

4.1.3. Measurement Voltage Menu

In "SEnS" menu, the measurement voltage value is set among the values that are seen in the following table.

MEASUREMENT VOLTAGE	100	110	115	120	190	380	400	480

4.2. Password Menu



Figure 4.2

The password menu consists of "ENt.P." menu that the password for switching between different user types is entered and the "n.PAS." menu that the password can be changed in. When setting a new password in the changing password process, the numbers are changed between 0-9 starting from the first digit with the direction buttons and the selected number is approved with the PRG button. This process is repeated for all the 4 digits and then the password is confirmed by pressing the PRG button.

4.3. Control Setting Menu

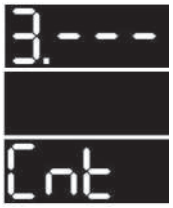


Figure 4.3

The output control settings are made in "Cnt" menu. It determines according to which parameters the device will produce output. A screen like Figure 4.3 will be appeared in the main menu.

There are two output controls as "Out1" and "Out2" in the device.

4.3.1. Out1 Menu

The setting related to the first output control in the"Out1" menu. There are sub-menus as "tYPE", "FiLt", "Inur.", "SEt.A","SEt.b", "t.on","t.oFF" and "t.rdY" in that menu.

Inverse Menu

If "YES" is selected by entering " Inur." menu, the relay outputs will be set reverse to the present state.

Type Menu

By entering "tYPE" menu, the parameter to produce output value will be selected.

"VoLt" → The output controls are managed according to the **voltage** parameter.
"Curr" → The output controls are managed according to the **current** parameter.
"nonE" → For output control, no parameter is selected.

From "tYPE" **menu;**

Filter Menu

"tYPE" menu, it shows what the selected output control parameter should operate over. It enables to control outputs for "Ort" average, "L1" (L1 phase) "L2" (L2 phase), "L3" (L3 phase) or , "L123" (any phase) with the "Filtr" (filter) menu.

Example; if the filter "L1" is selected, the output can be controlled via only "L1" phase.

SetA Menu

A value is given to the parameter that is selected before in the "SEt.a" menu.

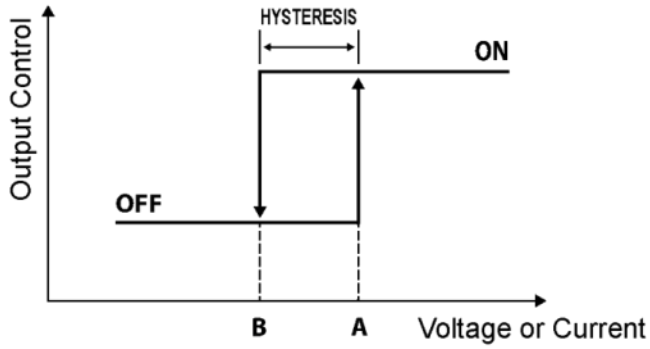
For Voltage:

If the selected parameter is "Volt" the A point in Figure 4.4 indicates the required quantity (0 - 1000) in order for the output to be "On" If the voltage value is bigger than the value that is determined in the, "SEt.a" menu, the analyzer output becomes "On" and "Out 1" LED becomes on. If the voltage value is smaller than "SEt.b" value, the analyzer output becomes "OFF" and "Out 1" LED becomes off.

For Current:

If the selected parameter is "Curr" (current), the A point in Figure 4.4 indicates the required quantity (0 – 999,9) in order for the output to be "On" If the voltage value is bigger than the value that is determined in the "SEt.a" menu, the analyzer output becomes "On" and "Out 1" LED becomes on. If the voltage value is smaller than "SEt.b" value, the analyzer output becomes "OFF" and "Out 1" LED becomes off.

NOTE: The entered values are in Ampere and Volt.



The A and B points in the figure are current and voltage points. If the selected mode (example L1 phase) from the filter menu is bigger than A value, the multimeter related output becomes on. If the measured value is smaller than B, the multimeter output becomes off.

SetB Menu

In "SEt.b" a value is given to the parameter that is selected before in the "tYPE" menu.

For Voltage:

If the selected parameter is "Volt" it indicates the quantity (0 - 1000) of B in Figure 4.4. If the voltage value is smaller than point B value that is determined in "SEt.b" the analyzer output becomes "OFF" and "Out 1" LED becomes off.

For Current:

If the selected parameter is "Curr" (current), it indicates the quantity (0– 0,999) of point B in Figure 4.4. If the current value is smaller than the value that is determined in "SEt.b" the analyzer output becomes "OFF"and "Out 1" LED becomes off.

NOTE: The entered values are in Ampere and Volt.

Relay Control Time Menu

In "t.on" menu, in the case of the electrical values exceed the "SEt.a" value,the time to wait for pulling the relay is determined.

In "t.oFF" menu, in the case of the electrical values drop below the "SEt.b" dvalues, the time to wait for releasing the relay is determined.

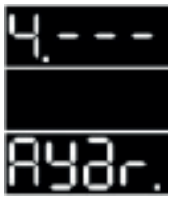
In "t.rdy" menu, the time between the relay pull and release processes are determined. A period of time is waited depends on charge and discharge states of the capacitor and then the relay is pulled or released.

NOTE : The main aim to determine time is to prevent the relay to be pulled and released frequently in case of sudden increasing and decreasing of values.

4.3.2. Out2 Menu

Of "Out.2" menu has the same content and technical features of "Out.1" menu. The only difference is that it uses "Out.2" LED.

4.4. Setting Menu



The settings related to the device are done in this menu. When the figure 4.5 appears on the screen, press the PRG button to enter the menu.

Figure 4.5

4.4.1. Information Menu

There is the information of the serial number of the device "Sr.no" software version "S.UEr", hardware version "h.UEr" access level "A. lu 1" in "InFo" menu.

NOTE: The menu language can be set as Turkish or English with the language option.

4.4.2. Default Settings Menu

All the settings except for the current transformer ratio, voltage transformer ratio, Modbus address and demand period are reset in the "d.SEt." menu. (return to default values). Press the PRG button to enter the menu. There appear two options as "YES" and "nO" If "YES" option is selected with the PRG button, the device will return to the factory default settings.

4.4.3. Reset Menu

The "rSt" (Reset) menu bring the device back to its state before the installation. All the saved information and parameters are reset with this menu. It also provides to use the same device in different panels. Press the PRG button to enter the "rSt" menu. There appear two options as "YES" and "nO" If the "YES" is selected with.

NOTE : The current transformer and voltage transformer ratios do not return to the factory default settings.

4.4.4. Average Menu

In average menu, there appears two options as "SmP 1." (sampling number) and "PErc." (percentage). In "SmP 1." menu, the settings related to how many samples will be taken to make the values on the operating screen are made.

Example, in "SmP 1." menu, if the sampling number is selected as 8, eight samples are taken in total and the average of those samples are displayed on the screen.