

# MULTIMETER EPM-04 / 04C / 04CS

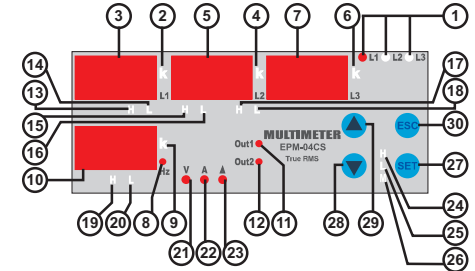
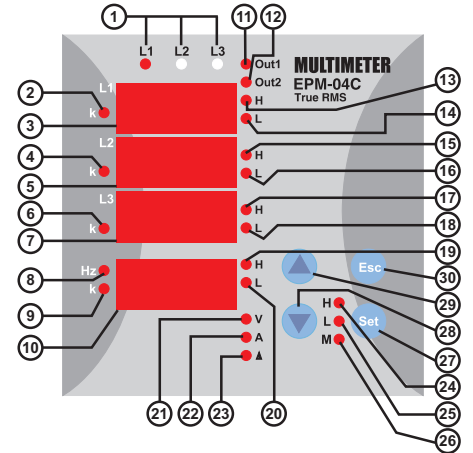
## INDEX

- Precautions for Installation and Safe Usage.....1
- Front Panel and Usage of Buttons.....1
- General Information and Applications.....1
- Using The Buttons.....2
- Transformer Menu (Tr / Trn / Ubr / ConvEClon).....2
- User Password Settings (Pin Menu).....2
- Activating the User Password (Pin Act Menu).....2
- Changing the User Password (Pin Chg Menu).....2
- Output Setting Menu.....3
- Current Setting Menu (SP Current Menu).....3
- High/Low Current Settings (SP Cur Hi, SP Cur Lo Menu).....3
- Hysteresis Settings for High/Low Currents (I-H Hys, I-L Hys Menu).....3
- Delay-on Time for High/Low Currents (I-H ond, I-L ond Menu).....3
- Delay-off Time for High/Low Currents (I-H ofd, I-L ofd Menu).....3
- Start and Auto Function (StAr t dEL and Auto rSt Menu).....4
- Instant Trip Function (Cur inSt rTp Menu).....4
- Voltage Setpoint Menu (SP Volt Menu).....4
- High/Low Voltage Settings (SP UoL Hi, SP UoL Lo Menu).....4
- Hysteresis Settings for High/Low Voltages (U-H Hys, U-L Hys Menu).....5
- Delay-on Time for High/Low Voltages (U-H ond, U-L ond Menu).....5
- Delay-off Time for High/Low Voltages (U-H ofd, U-L ofd Menu).....5
- Frequency Menu.....6
- High/Low Frequency Settings (Frq Hi, Frq Lo Menu).....6
- Hysteresis Settings for High/Low Frequencies (F-H Hys, F-L Hys).....6
- Delay-on / Delay-off Time for High/Low Frequencies (Frq ond, Frq ofd).....6
- Phase Sequence (Voltage Sequence Menu) and Instant Trip (UoL inSt rTp Menu) Menu.....6
- Erasing the Max., Min. and Max. Demand Values (Reset Menu).....6
- Demand Time for Demand and Max. Demand (dE t Menu).....7
- Communication Menu (RS-485).....7
- Technical Features and Default Factory Settings.....7
- Connection Diagram.....8
- Output, SP Current and SP Volt menus are available for EPM-04C/04CS; RS-485 menu is available for EPM-04CS.

**PRECAUTIONS FOR INSTALLATION AND SAFE USE**

In CT-25 (120A) compliant models, only CT-25 current transformer must be used.  
 Other type of CT's have a high risk to damage to device.  
 Failure to follow those instructions will result in death or serious injury.

- Disconnect all power before working on equipment.
- When the device is connected to the network, do not remove the front panel.
- Do not try to clean the device with solvent or the like. Only clean with dry cloth.
- Verify correct terminal connections when wiring.
- Electrical equipment should be serviced only by your component seller.
- Only for rack panel mounting.
- Fuse must be F type and limit value doesn't exceed 1A.
- No responsibility is assumed by manufacturer or any of its subsidiaries for any consequences arising out of the use of this material.



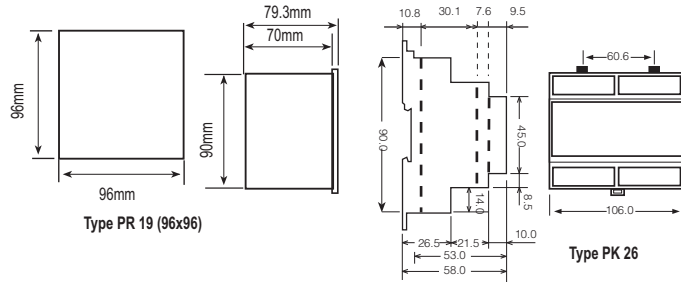
- 1 ..... Phase LEDs. The LEDs turn on when the voltage value, which is applied to one of the current inputs, reach 30 V
- 2 ..... First display's k LED (for L1). Measurement parameter is the unit of kilo when LED is turned on. ie: kA, kV
- 3 ..... Display for L1.
- 4 ..... Second display's k LED (for L2). Measurement parameter is the unit of kilo when LED is turned on. ie: kA, kV
- 5 ..... Display for L2.
- 6 ..... Third display's k LED (for L3). Measurement parameter is the unit of kilo when LED is turned on. ie: kA, kV
- 7 ..... Display for L3.
- 8 ..... Displays network frequency when Hz LED is turned on.
- 9 ..... k LED for neutral current. Measurement parameter is displayed in unit of kilo when this LED is turned on.
- 10 ..... Display for neutral current and frequency (for EPM-04C/04CS).
- 11 ..... First warning output LED (Out1). Turned on when the output is activated.
- 12 ..... Second warning output LED (Out2). Turned on when the output is activated.
- 13 ..... Over current / voltage warning output for L1. (EPM-04C/04CS)
- 14 ..... Low current / voltage warning output for L1. (EPM-04C/04CS)
- 15 ..... Over current / voltage warning output for L2. (EPM-04C/04CS)
- 16 ..... Low current / voltage warning output for L2. (EPM-04C/04CS)
- 17 ..... Over current / voltage warning output for L3. (EPM-04C/04CS)
- 18 ..... Low current / voltage warning output for L3. (EPM-04C/04CS)
- 19 ..... Over current / frequency warning output for frequency and neutral current (EPM-04C/04CS).
- 20 ..... Low current / frequency warning output for frequency and neutral current (EPM-04C/04CS).
- 21 ..... Monitoring the L1, L2, L3 voltages values when V LED is turned on and displays the frequency in 4th display.
- 22 ..... Monitoring the L1, L2, L3 currents values when A LED is turned on and displays the neutral current in 4th display.
- 23 ..... Indicates the activating delta connection when Δ is turned on. Neutral current protection is deactivated even if is activated.
- 24 ..... H LED for max. instant current and voltage. Max. instant currents and voltages are displayed when this LED is turned on.
- 25 ..... L LED for min. instant current and voltage. Min. instant currents and voltages are displayed when this LED is turned on.
- 26 ..... M LED for max. demand. Max. demand values are displayed when this LED is turned on.
- 27 ..... SET button. It is used to enter into the menu and to save the values. If SET button is pressed for 3 sec. in the measurement mode, you can enter into menus. This button is used for monitoring the max. (H), Min. (L) current values and max. demand values in measurement mode.
- 28 ..... Downward selection button.
- 29 ..... Upward selection button.
- 30 ..... ESC button. Escaping from the menu. And also used for switching off the Latch function while this function has activated.

## General information

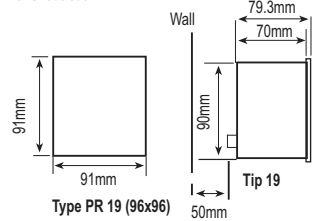
EPM-04/04C/04CS is designed for measuring Phase current, frequency, neutral current and voltages (Phase-Phase and Phase-Neutral) in a 3-Phase system.  
 EPM-04C/04CS;  
 Device has 2 warning output which named as Out1 and Out2. (NO-Normally Open) Please refer to "Output" menu for the functions of the relays.

# MULTIMETER EPM-04 / 04C / 04CS

## Dimensions



## Panel Cut-out

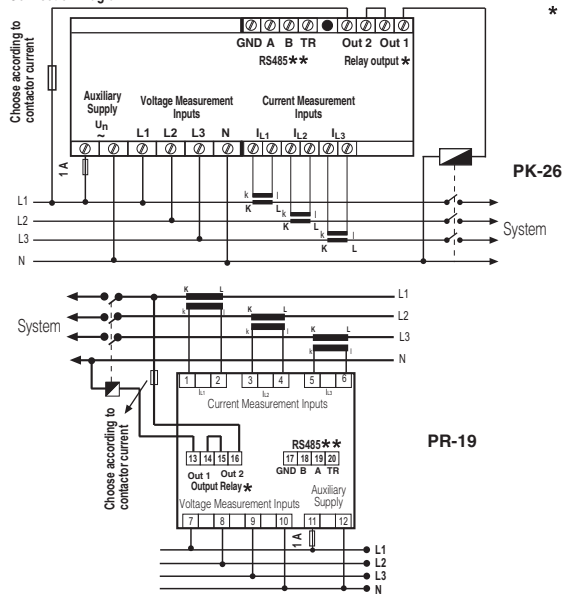


## Summary of the Contact Operations \*

	ALTERNATIVE 1 (U-I)	ALTERNATIVE 2 (H-L)
Out 1	Current --> Under/Over	Voltage --> Under Frequency --> Under Current --> Under Phase Seq.
Out 2	Voltage --> Under/Over Frequency --> Under/Over Phase Seq.	Voltage --> Over Frequency --> Over Current --> Over

\* Valid for EPM-04C/04CS

## Connection Diagram



\* Available only for EPM-04C/04CS  
 \*\* Available only for EPM-04CS  
 Note: For CT-25 models:  
 k: When CT-25 is used, Red cable is connected to k terminal.  
 l: When CT-25 is used, Black cable is connected to l terminal.







# MULTIMETER EPM-04 / 04C / 04CS

## Programming the "SP Cùr Hi", "SP Cùr Lo", "SP UoL Hi" and "SP UoL Lo".

Press SET button for 3 sec. (trA Fo menu is displayed.)

Find "SP Cùr rnt / SP UoL t" menu by scrolling UP-DOWN buttons.

Press SET button. "SP Cùr Hi / SP UoL Hi" menu is displayed.

Find [(SP Cùr Hi/SP Cùr Lo) / (SP UoL Hi/SP UoL Lo)] menu by scrolling UP-DOWN buttons.

Press SET button [(I-H L-1/L-1 L-1) / (U-H L-1/U-L L-1) menu is displayed.]

Press SET button. Blinking the first digit of displayed value appears.

Enter the blinking digit value by scrolling UP/DOWN buttons. Switch to the other digits by using SET button, use ESC button to go to previous digit. After you entered the last digit press SET button. "(I-H L-1/U-L L-1) / (U-H L-1/U-L L-1)" is displayed. (Data is entered but is not activated yet. For activating the new data please follow the below steps).

Press ESC button one by one until "SAU E SET yES" is displayed.

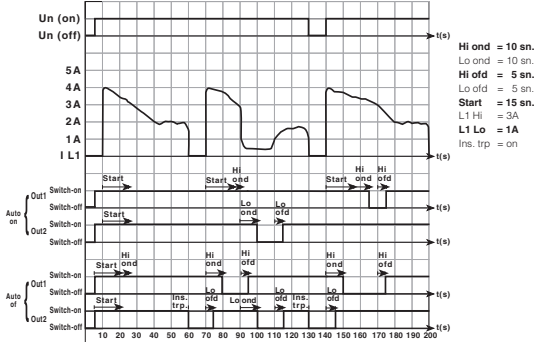
Press SET button. When "SAU E SET yES" is displayed (if you press ESC button or choose "no" option instead of "yES" then new data will be cancelled and previous value will be activated).

**Start-up delay:**  
Start Delay Time is used to prevent from faulty switchings caused by motor start-up current (demurrage current).  
If **Auto Reset** function is selected as ON; Each time that the current decreases "50mAxCtr" value, start-up delay time is reset and when the current value increases "50mAxCtr", start-up delay function is activated.  
If **Auto Reset** function is selected as OFF; if the power supply is switched off and then switched on, start-up delay function is activated.

This function is used with "Auto Reset" function.

**Auto Reset Function:**  
If **Auto Reset** function is selected as ON; Each time that the current decreases "50mAxCtr" value, start-up delay time is reset and when the current value increases "50mAxCtr", start-up delay function is activated.  
If **Auto Reset** function is selected as OFF; if the power supply is switched off and then switched on, start-up delay function is activated.

Please refer to below graphics for the operating principle of STA r t dEL and Aut o rSt functions



**Instant Tripping Function.**  
At position ON, if any phase current (IL1, IL2, IL3 and IN) exceeds 1.5 times of high (I-H L-1, I-H L-2, I-H L-3, I-H L-n) values, the "current output" switches off instantly, output LED turned off and H LEDs for related currents turned on. (Please refer to "Output".)  
At position OFF, if any phase current (IL1, IL2, IL3 and IN) decrease 0.5 times of low (I-L L-1, I-L L-2, I-L L-3, I-L L-n) values, the "current output" switches off instantly, output LED turned off and L LEDs for related currents turned on. (Please refer to "Output".)  
At position OFF, instant tripping function is cancelled.

## Programming "Cùr inS trP", "Aut o rSt" and "UoL inS trP"

Press SET button for 3 sec. (trA Fo menu is displayed.)

Find "SP Cùr rnt / SP UoL t" menu by scrolling UP-DOWN buttons.

Press SET button (SP Cùr Hi / SP UoL Hi menu is displayed.)

Find [(Cùr inS trP / Aut o rSt) / UoL inS trP] menu by scrolling UP-DOWN buttons.

Press SET button [(Cùr inS trP on / Aut o rSt on) / UoL inS trP off] is displayed.

Select "on" in order to activating the "instant trip function" (Aut o rSt), select "off" in order to deactivating the "instant trip function", by scrolling UP/DOWN buttons.

Press SET button. [(Cùr inS trP / Aut o rSt) / UoL inS trP] is displayed. (Selection is entered but is not activated yet. For activating the new data according to connection, please follow the below steps).

Press ESC button one by one until "SAU E SET yES" is displayed.

Press SET button. When "SAU E SET yES" is displayed (if you press ESC button or choose "no" option instead of "yES" then new data will be cancelled and previous value will be activated).

**Programming "SP UoL t":**  
Using purposes of submenus of "SP UoL t" explained below with details.

In this menu, high set points for voltage values are programmed. Hi values for Phase-Neutral / Phase-Phase (according to Star / Delta selection) can be entered one by one.

If all the voltage values (Phase-Neutral / Phase-Phase) are under the Hi value; related relay is switched on, its LED turned on (please refer "Output") and related H LEDs are turned on.

If all the voltage values (Phase-Neutral / Phase-Phase) are over the Hi value; H LED blinks and related output is switched off at the end of "delay on time" (U-H ond), its LED turned off (please refer "Output") and related H LEDs are turned on.

If all voltage (Phase-Neutral / Phase-Phase) are below the high set value (Hi) as a hysteresis voltage (U-H HyS), related output is switched on at the end of the "delay off time" (U-H ofd), its LED turned on (please refer "Output") and H LED is turned off.

**Note:** High Voltage values are programmed for (Phase-Neutral / Phase-Phase) separately but "Hi HyS" (hysteresis) and "Hi ond" (delay on time) and "Hi ofd" (delay off time) values are common; these parameters have same values for Phase-Neutral / Phase-Phase.  
When Connection type (Star/Delta) is selected (refer to Connection menu), device will change the U-H L-1, U-H L-2 and U-H L-3 values automatically according to connection.

**Example:** If the connection type is selected as Star (with neutral); U-H HyS=10V U-H L-1=250V, U-H L-2=255V, U-H L-3=260V and then this connection type is selected as Delta (without neutral), device will change the values after calculated them according to Phase-Phase values.  
**New values:**  
U-H L-1 (L1-L2 Phase to phase voltage) = 433 V  
U-H L-2 (L2-L3 Phase to phase voltage) = 441 V  
U-H L-3 (L3-L1 Phase to phase voltage) = 450 V  
U-H HyS = 10 V.  
There are 6 submenus.  
U-H L-1, U-H L-2, U-H L-3, U-H HyS, U-H ond, U-H ofd.

# MULTIMETER EPM-04 / 04C / 04CS

In this menu, low set points for voltage values are programmed. Lo values for Phase-Neutral / Phase-Phase (according to Star / Delta selection) can be entered one by one.  
If all the voltage values (Phase-Neutral / Phase-Phase) are over the Lo value; related output is switched on, its LED turned on (please refer "Output") and related L LEDs are turned off.  
If any of the voltage values (Phase-Neutral / Phase-Phase) decrease the Lo value; L LED blinks and related output is switched off at the end of "delay on time" (U-L ond), its LED turned off (please refer "Output") and related L LED is turned on continuously.  
If all voltage (Phase-Neutral / Phase-Phase) values increase the low set value (Lo) as a hysteresis voltage (U-L HyS), related relay is switched on at the end of the "delay off time" (U-L ofd), its LED turned on (please refer "Output") and L LED is turned off.

**Note:** Low Voltage values are programmed for (Phase-Neutral / Phase-Phase) separately but "U-L HyS" (hysteresis), "U-L ond" (delay on time) and "U-L ofd" (delay off time) values are common; these parameters have same values for Phase-Neutral / Phase-Phase.  
When Connection type (Star/Delta) is selected (refer to Connection menu), device will change the U-L L-1, U-L L-2 and U-L L-3 values automatically according to connection.

**Example:** If the connection type is selected as Star (with neutral); U-L HyS=10V  
U-L L-1=180V, U-L L-2=175V, U-L L-3=170V and then this connection type is selected as Delta (without neutral), device will change the values after calculated them according to Phase-Phase values.  
**New values:**  
U-L L-1 (L1-L2 Phase to phase voltage) = 311 V  
U-L L-2 (L2-L3 Phase to phase voltage) = 303 V  
U-L L-3 (L3-L1 Phase to phase voltage) = 294 V  
U-L HyS = 10 V.  
There are 6 submenus.  
U-L L-1, U-L L-2, U-L L-3, U-L HyS, U-L ond, U-L ofd.

High value for L1, when the Star is selected; high value for L1-L2, when the Delta selected can be defined in this menu.  
0...300 for Star connection and 0...500 for Delta connection can be defined.  
If the value is set to zero (0), the high voltage warning is disabled. Refer "SP UoL Hi" for details.  
**Note:** L2 and L3 phases can be programmed similarly.

Low value for L1, when the Star is selected; low value for L1-L2, when the Delta selected can be defined in this menu.  
0...300 for Star connection and 0...500 for Delta connection can be defined.  
If the value is set to zero (0), the high voltage warning is disabled. Refer "SP UoL Lo" for details.  
**Note:** L2 and L3 phases can be programmed similarly.

(Refer to Page-4 for SP Cùr Hi, SP Cùr Lo, SP UoL Hi ve SP UoL Lo)

In this menu, required hysteresis voltage for high voltage warning is programmed, (same for Phase-Neutral/Phase-Phase).  
0...200V for Star connection and 0...200V for Delta connection can be defined.  
Refer "SP UoL Hi" for details.

In this menu, required hysteresis voltage for low voltage warning is programmed, (same for Phase-Neutral/Phase-Phase).  
0...200V for Star connection and 0...200V for Delta connection can be defined.  
Refer "SP UoL Lo" for details.

## Programming the "U-H HyS", "U-L HyS", "I-H HyS", "I-L HyS"

Press SET button for 3 sec. (trA Fo menu is displayed.)

Find "SP UoL t / SP Cùr rnt" menu by scrolling UP-DOWN buttons.

Press SET button (SP UoL Hi / SP Cùr Hi menu is displayed.)

Find [(SP UoL Hi / SP UoL Lo) / (SP Cùr Hi / SP Cùr Lo)] menu by scrolling UP-DOWN buttons.

Press SET button [(U-H L-1/U-L L-1) / (I-H L-1/I-L L-1) menu is displayed.]

Find [(U-H HyS / U-L HyS) / (I-H HyS / I-L HyS)] menu by scrolling UP-DOWN buttons.

Press SET button. Blinking the first digit of displayed value appears.

Enter the blinking digit value by scrolling UP/DOWN buttons. Switch to the other digits by using SET button, use ESC button to go to previous digit. After you entered the last digit press SET button. [(U-H HyS / U-L HyS) / (I-H HyS / I-L HyS)] is displayed. (Data is entered but is not activated yet. For activating the new data please follow the below steps).

Press ESC button one by one until "SAU E SET yES" is displayed.

Press SET button. When "SAU E SET yES" is displayed (if you press ESC button or choose "no" option instead of "yES" then new data will be cancelled and previous value will be activated).

"Delay on" time for activating the output for high voltage warning. It is common for all voltages (same for Phase-Neutral/Phase-Phase).  
The value can be programmed between 000.0 and 999.9 in terms of seconds. (Refer "SP UoL Hi" for details.)

"Delay on" time for activating the output for low voltage warning. It is common for all voltages (same for Phase-Neutral/Phase-Phase).  
The value can be programmed between 000.0 and 999.9 in terms of seconds. (Refer "SP UoL Lo" for details.)

"Delay off" time for activating the output for high voltage warning. It is common for all voltages (same for Phase-Neutral/Phase-Phase).  
The value can be programmed between 000.0 and 999.9 in terms of seconds. (Refer "SP UoL Hi" for details.)

"Delay off" time for activating the output for low voltage warning. It is common for all voltages (same for Phase-Neutral/Phase-Phase).  
The value can be programmed between 000.0 and 999.9 in terms of seconds. (Refer "SP UoL Lo" for details.)

## Programming the "U-H ond", "U-H ofd", "U-L ond", "U-L ofd", "I-H ond", "I-H ofd", "I-L ond", "I-L ofd".

Press SET button for 3 sec. (trA Fo menu is displayed.)

Find "SP UoL t / SP Cùr rnt" menu by scrolling UP-DOWN buttons.

Press SET button (SP UoL Hi / SP Cùr Hi menu is displayed.)

Find [(SP UoL Hi / SP UoL Lo) / (SP Cùr Hi / SP Cùr Lo)] menu by scrolling UP-DOWN buttons.

Press SET button [(U-H L-1 / U-L L-1) / (I-H L-1 / I-L L-1) menu is displayed.]

Find [(U-H ond / U-H ofd) / (U-L ond / U-L ofd)] / [(I-H ond / I-H ofd) / (I-L ond / I-L ofd)] menu by scrolling UP-DOWN buttons.