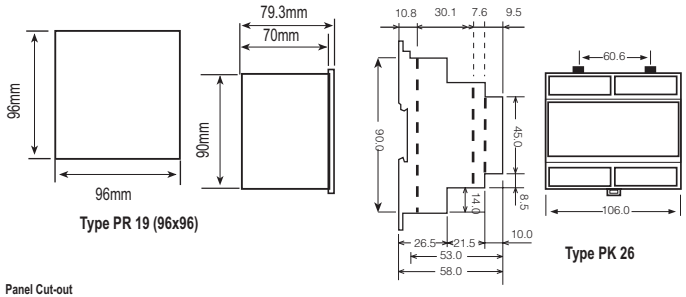
MULTIMETER
EPM-06 / 06C / 06CS

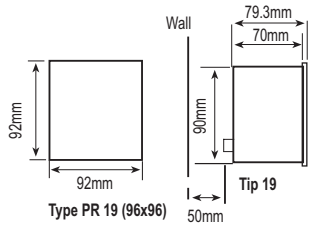
Dimensions



Type PR 19 (96x96)

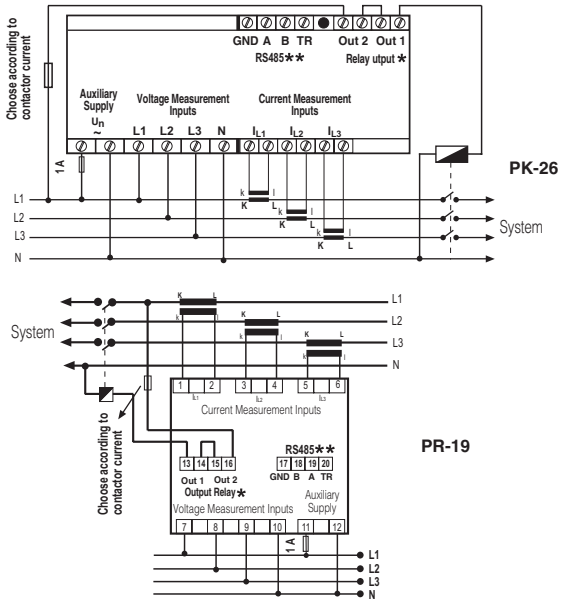
Type PK 26

Panel Cut-out



Type PR 19 (96x96)

Connection Diagram



* Available only for EPM-06C/06CS
** Available only for EPM-06CS

Note: For CT-25 models:
k: When CT-25 is used, Red cable is connected to k terminal.
I: When CT-25 is used, Black cable is connected to I terminal.

CE

MULTIMETER
EPM-06 / 06C / 06CS

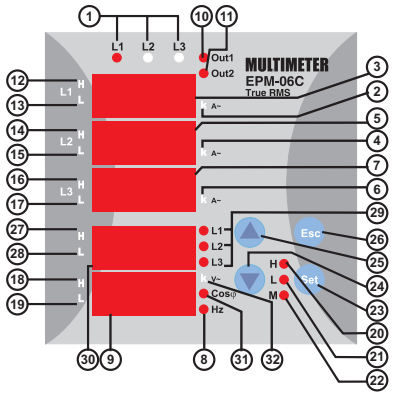
INDEX

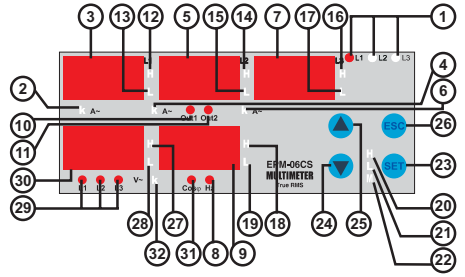
Output, SP Current and SP Volt menus are available for EPM-06C/06CS; RS-485 menu is available for EPM-06CS.

PRECAUTIONS FOR INSTALLATION AND SAFE USE

⚠ The current terminal connections must be implemented with using CT-25.

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 assured 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 and neutral current)**. Measurement parameter is the unit of kilo when LED is turned on. ie: kA, kV
5 ..... Display for L2 and neutral current.
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 ..... Display for frequency and Cosφ (forEPM-06C/06CS).
10 ..... First warning output LED (Out1). Turned on when the output is activated.
11 ..... Second warning output LED (Out2). Turned on when the output is activated.
12 ..... Over current / voltage warning output for L1. (EPM-06C/06CS)
13 ..... Low current / voltage warning output for L1. (EPM-06C/06CS)
14 ..... Over current / voltage warning output for L2. (EPM-06C/06CS)
15 ..... Low current / voltage warning output for L2. (EPM-06C/06CS)
16 ..... Over current / voltage warning output for L3. (EPM-06C/06CS)
17 ..... Low current / voltage warning output for L3. (EPM-06C/06CS)
18 ..... Over current / frequency warning output for frequency (EPM-06C/06CS).
19 ..... Low current / frequency warning output for frequency (EPM-06C/06CS).
20 ..... **H** LED for max. instant current and voltage. Max. instant currents and voltages are displayed when this LED is turned on.
21 ..... **L** LED for min. instant current and voltage. Min. instant currents and voltages are displayed when this LED is turned on.
22 ..... **M** LED for max. demand. Max. demand values are displayed when this LED is turned on.
23 ..... 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.
24 ..... Downward selection button. And also switching between the phases for EPM-06C/06CS.
25 ..... Upward selection button. And also switching between the phases for EPM-06C/06CS.
26 ..... ESC button. Displaying the neutral current during the measurement mode. Escaping from the menu. And also used for switching off the Latch function while this function has activated.
27 ..... Over voltage warning LED which is displayed in fourth display.
28 ..... Low voltage warning LED which is displayed in fourth display.
29 ..... These LEDs are used for which phase refers to measurement of voltage in 4th display.
30 ..... Display for monitoring the phase voltages (According to related phase).
31 ..... This LED; indicates Cosφ when L1, L2 or L3 activated for monitoring voltage values in 4th display.
Indicates average value of **inductive Cosφ when L1-L2** are activated.
Indicates average value of **capacitive Cosφ when L2-L3** are activated.
32 ..... **k** LED for monitored phase in 4th display.

General information

EPM-06/06C/06CS is designed for measuring the below parameters in a 3-Phase system. Phase current, frequency, neutral current and voltages (Phase-Phase and Phase-Neutral).

EPM-06C/06CS;

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.

Below measurement and application can be implemented with EPM-06/06C/06CS.

1) Phase currents (IL), Neutral current (IN), frequency and Cosφ (EPM-06C/06CS); Phase-Phase and Phase-Neutral voltages can be measured.
2) Existence of live phases can be observed by L1-L2-L3 LEDs on the device.
3) Min. and max. values for measured currents and voltages can be monitored with only one button.
4) Max. demand values for measured current can be monitored, demand time can be defined in "dE ti" menu.
5) A 4 digit password can be defined from pin menu in order to prevent the change of settings by unauthorized person.
6) Current transformer ratio is programmable. (1 .... 2000)
Current transformer ratio can be programmed in term of "turn number" between 1.....20 (for CT-25 adapted devices).
Voltage transformer ratio is programmable. (0.1 .... 4000)
7) A user defined measurement range is used for monitoring the voltages and currents; and Out1 & Out2 outputs are used for warning the user and disconnecting the device in case of exceeding the limits of measurement range.
8) In case of using the device for measuring the current values of motors etc., start delay (AUto rSt) function can be used for preventing the equipment against the improper tripping, which is because of the demurrage current.
9) When a failure has occured use the Latch function, in order to keep the device with saving its position (Latched), even if the failure conditions are removed.
7th, 8th and 9th subjects are valid for EPM-06C/06CS.

Using the Buttons:

Some buttons and button groups are used for the below special function when device is in the measurement mode (Without selecting a menu).

▲ ▼ Switching between the phase-phase voltages in fourth display. Used for changing the menu settings and parameters in programming mode.

SET : Used for monitoring min. / max. currents and voltages or max. demand values. Switching to the programming mode if it pressed for 3 sec. In programming mode; it is used for switching to the menu and saving changes for the parameters.

ESC : Switching between neutral current and phase current in measurement mode. Switching to the previous menu and escaping the programming menu without saving the changes.
If the Latch function is turned on (EPM-06C/06CS); output will be released when current(s) of system is exceed the defined values. When the system's current turns back to normal values then output doesn't react. Output can be trigged by the "ESC" button.

Commissioning and menu setting (for EPM-06/06C/06CS)

Energize the device after implementing the connections respected to the user manual.
Enter the proper menu settings in order to correct measurements and applications.

Current Transformer Ratio Setup:
In this menu, current transformer ratio is set between 1 - 2000. (This menu is not available in the devices which are adapted with CT-25.)
Note: If the current transformer is not used between the system and device, current transformer ratio is entered as '1'.
i.e.: If a current transformer which has a ratio of 30/5A is used between the system and device;
Current transformer ratio is entered as = 30/5 = 6.

SET Press SET button for 3 sec. (trA Fo menu is displayed)
SET Press SET button; trA Fo Ctr menu is displayed (In CT-25 adapted devices, trA Fo trn is displayed instead.)
(**Not:** trA Fo Utr or Con nEC tıo n menu can be displayed by scrolling the UP/DOWN buttons.)
SET Press SET button. Blinking the first digit of displayed value appears. ("trA Fo Utr" or "Con nEC tıo n" menu can be programmed similarly.)
▲ ▼ SET 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, "trA Fo Ctr" is displayed. (Data is entered but is not activated yet. For activating the new data please follow the below steps).
ESC Press ESC button one by one until "SAU E SEt yES" is displayed.
SET 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 the Turn Number:
This menu is available for CT-25 adapted devices. User defines the turn number, which is the number of how many tour the current cable has rounded into the CT-25. Numbers can be selected between 1-20. Greater the number of turn means greater the sensivity.

trn	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
In min.(A)	2.00	1.00	0.66	0.50	0.40	0.33	0.28	0.24	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.11	0.10	0.10
In max.(A)	120	60.0	40.0	30.0	24.0	20.0	17.1	15.0	13.3	12.0	10.9	10.0	9.23	8.57	8.00	7.50	7.05	6.66	6.31	6.00

Voltage Transformer Ratio:
In this menu, voltage transformer ratio is set between 0000,1 - 4000,0.
Note: If the voltage transformer is not used between the system and EPM-06, voltage transformer ratio is entered as '1'.
Example: If a voltage transformer which has a ratio of 34.5KV/100V is used between the system and device; Voltage transformer ratio is entered as 345. (34500/100)

Selecting the Connection Type :
Connection can be selected as Star or Delta in this menu.
Phase-Neutral voltage monitoring can be implemented if the "Star" connection is selected.
Phase-Phase voltage monitoring can be implemented if the "Delta" connection is selected.

NOTE: When the "Delta" connection is selected, "neutral current monitoring" can not be implemented even if it is activated and displaying function of ESC button will be disabled also.

User Password Setup:
In this menu user password is defined and activated.
You must define and activate a 4 digit user password for preventing device settings from the illegal usage.
There are 2 sub menu in the Pın menu.

Activating the user password :
This menu is used for activating the user password.
After the user password is activated for entering to the menus; if the SET button is pressed for 3 sec., while the instant values are observed, user password is required. If the user password is entered wrong device does not latch.
Note: Factory default value of user password is **"0000"**

SET Press SET button for 3 sec. (trA Fo menu is displayed)
Find the "Pın" menu by scrolling UP/DOWN buttons.
SET Press SET button (Pın ACt IUA tE is displayed.)
SET Press SET button. Blinking the first digit of displayed value appears.
▲ ▼ SET 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, "Pın ACt oF" is displayed."on" can be selected by scrolling UP/DOWN buttons. (Data is entered but is not activated yet. For activating the new data please follow the below steps).
ESC Press ESC button one by one until "SAU E SEt yES" is displayed.
SET 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).

Changing of User Password:
This menu is used for changing the user password.
Note: Factory default value for user password is **"0000"**

SET Press SET button 3 sec. (trA Fo menu is displayed.)
Find the "Pın" menu by scrolling UP/DOWN buttons.
SET Press SET button (Pın ACt IUA tE is displayed.)
Find the "Pın CHA n9E" menu by scrolling UP/DOWN buttons.

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

Serial Communication (for EPM-06CS)
EPM-06CS have MODBUS RTU communication protocol which is optical isolated. All measured parameters can be transfer to the computer. Transformer ratios and communication parameters can be set. Saved values can be reset.
Programmed parameter for communication explained below.

SET Press SET button 3 sec. (trA Fo menu is displayed.)
▲ ▼ Find RS-485 menu by scrolling UP/DOWN buttons.
SET Press SET button (Adr ESS menu is displayed.)
▲ ▼ Find "Adr ESS / bAU d / PArity" menu by scrolling UP-DOWN buttons.
SET Press SET button ("001 / 9600 /no" menu is displayed.)
▲ ▼ Enter the parameter values by scrolling UP/DOWN buttons (001...247 / 2400...38400 /no, EUEn, odd).
SET Press SET button, "Adr ESS / bAU d / PArity" is displayed. (Data is entered but is not activated yet. For activating the new data please follow the below steps)
ESC Press ESC button one by one until "SAU E SEt yES" is displayed.
SET 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).

MODBUS RTU PROTOCOL (Available only for EPM-06CS)

Standart MODBUS RTU message is shown below.

T	ADDRESS 8 BIT	FUNCTION 8 BIT	DATA NX8BIT	CRCH	CRCL	T

The T times corresponds to a time in which data must not be exchanged on the communication bus to allow the connected devices to recognize the end of one message and the beginning of another. This time must be at least 3.5 characters at the selected baud rate. Address range (1-247) is address of the connected device. The data field contains data sent to the slave by master or data sent to master by slave.
CRC is a error check method by using MODBUS RTU protocol and consists of 2 bytes.

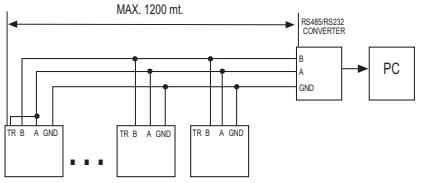
Available Modbus Function:

03H	READ HOLD REGISTERS
06H	PRESET SINGLE REGISTER
10H	PRESET MULTIPLE REGISTERS

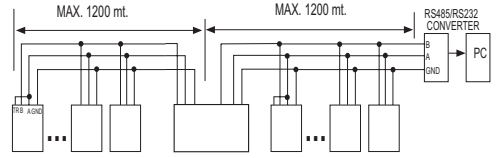
Read Hold (03) function is used for reading measured values and set value. If any request of reading of a register, excepted mentioned in register table, device will send an error message.
For example to read phase1 voltage by sending a message to the device.
01 03 00 00 00 02 XX XX
01 Device address
03 Function
00 MSB address
00 LSB address
00 Register number MSB
02 Register number LSB
XX CRC MSB
XX CRC LSB
Preset Single Register (06) function is used for writting the setting values, erasing the energy counter or resetting the min., max., max. demand values. Current transformers ratio can be set 0-2000, voltage transformer ratio can be set 1-40000.
i.e. Setting CT as 100;
01 06 80 02 00 64 XX XX
01 Device address
06 Function
80 MSB address
02 LSB address
00 Data MSB
64 Data LSB
XX CRC MSB
XX CRC LSB
Preset Multiple Register(10H) is used to set more then one register at same time.
i.e. Setting CT as 100, Ut as 20.0;
01 10 80 00 00 02 04 00 C8 00 64 XX XX
01 Device Address
10 Function
80 MSB address
00 LSB address
00 Register number MSB
02 Register number LSB
04 Byte count
00 Data MSB
C8 Data LSB
00 Data MSB
64 Data LSB
XX CRC MSB
XX CRC LSB

EPM-06CS COMPUTER CONNECTION

31 DEVICES CAN BE CONNECTED AT THE SAME LINE



MAX. 247 DEVICES CAN BE CONNECTED AT SAME LINE BY USING REPEATER.



Technical Features

Rated Voltage (Un)	: Please look at back side of the device.
Operating frequency (f)	: 45-65 Hz
Auxiliary Supply Power Consumption	: < 4 VA
Measuring Input Power Consumption	: < 1 VA
Measurement range	
Current	: 0.05-5.5A~
	: 2 - 120 A~ for CT-25
Voltage	: 10-300 V AC (Phase - Neutral)
	10-500 V AC (Phase - Phase)
Class	: 1±1% digit [(10%-100%) x full scale]
Current Transformer Ratio	: 1 ... 2000
Turn number for CT-25 adapted models	: 1 20
Voltage Transformer Ratio	: 1 ... 4000
Max. Ctr x Vtr	: 40.000
Communications (for EPM-06CS)	: MODBUS RTU (RS 485) Optic isolated, programmable
Baud Rate (for EPM-06CS)	: 2400-38400 bps
Address (for EPM-06CS)	: 1-247
Parity (for EPM-06CS)	: No, Odd, Even, 8 Data Bits, 2 Stop Bits
Output Relays (for EPM-06C/06CS)	: 2 NO, 5A 1250 VA
Ambiant Temperature	: -5°C; +50°C
Display	: Red LED display
Dimensions	: PR-19, PK-26
Equipment Protection Class	: Double Insulation - Class II (⧈)
Box Protection Class	: IP 40
Terminal Protection Class	: IP 00
Box Material	: Nonflamable
Mounting	: Panel Mounted (PR-19) Rail Mounted (PK-26)
Wire Thickness for Terminal Block	: 2.5 mm²
Weight	: 0.45 kg (PR-19, PK-26)
Mounting Category	: Class III
Panel Size	: 91x91 mm (PR-19) 46x107 mm (PK-26)

Default Settings

.../5A type

Ctr - 0001 Utr - 0001 **trn - 01** ConnEC - StAr
Pin Act - oF Pin - 0000
dt - 15

CUr Hı L-1 - 5.000 CUr Hı L-2 - 5.000 **CUr Hı L-3 - 5.000** CUr Hı L-n - 5.000 **CUr Hı HyS - 0.100** Hı on dEL - 010.0 **Hı oFF dEL - 010.0** CUr Lo L-1 - 0.000

CUr Lo L-2 - 0.000 CUr Lo L-3 - 0.000 **CUr Lo L-n - 0.000** CUr Lo HyS - 0.200 **Lo on dEL - 010.0** Lo oFF dEL - 010.0 **Str Art dEL - 0.000** Auto reset - oFF **Cur ins trp - oFF**

Out relay - U-I **Latch - oFF** Out Inverse - oFF

bAUd - 9600 AddrES - 001 **PArty - no**

UoL Hı L-1 - 250 UoL Hı L-2 - 250 **UoL Hı L-3 - 250** UoL Hı HyS - 10 **Hı on dEL - 003.0** Hı oFF dEL - 003.0 **UoL Lo L-1 - 180** UoL Lo L-2 - 180

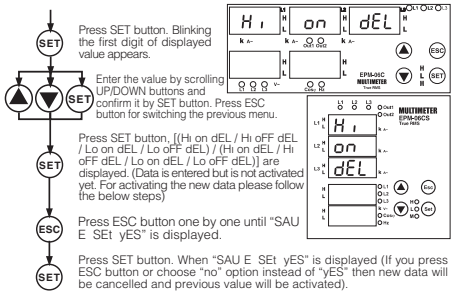
UoL Lo L-3 - 180 UoL Lo HyS - 010.0 **Lo on dEL - 003.0** Lo oFF dEL - 003.0 **UoL PHS SEq - oFF** UoL ins trP - oFF

Frq Hı - 63 Frq Hı HyS - 01.00 **Frq Lo - 47** Frq Lo HyS - 01.00 **Frq on dEL - 003.0** Frq oFF dEL - 003.0

CT-25 type

CUr Hı L-1 - 100.0 CUr Hı L-2 - 100.0 **CUr Hı L-3 - 100.0** CUr Hı L-n - 100.0 **CUr Hı HyS - 2.000** Hı on dEL - 010.0 **Hı oFF dEL - 010.0** CUr Lo L-1 - 0.000

CUr Lo L-2 - 0.000 CUr Lo L-3 - 0.000 **CUr Lo L-n - 0.000** CUr Lo HyS - 2.000 **Lo on dEL - 010.0** Lo oFF dEL - 010.0 **Str Art dEL - 0.000** Auto reset - oFF **Cur ins trp - oFF**



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

Enter the value by scrolling UP/DOWN buttons and confirm it by SET button. Press ESC button for switching the previous menu.

Press SET button, [(Hı on dEL / Hı oFF dEL / Lo on dEL / Lo oFF dEL) / (Hı on dEL / Hı oFF dEL / Lo on dEL / Lo oFF dEL)] are 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).

Setpoints for Frequency :
In this menu, Frequency range can be defiend according to High and Low values of Frequency measurement.
If the frequency of the system decreases the Frq Hı value; output is switched **on** and LED is turned **on**. (Refer to Output menu) and H LED for frequency is turned **off**.
If the frequency of the system exceeds the high set value, H LED relating to frequency blinks, output switched **off** at the end of defined time (Frq on dEL), LED turned **off** (Refer to Output menu) and H LED for frequency is turned **on** continuously.
If the frequency of system are under the high set value (Frq Hı) as a hysteresis (Frq Hı HyS), output is turned on at the end of defined time (Frq oFF dEL), LED is turned **on** and H LED is turned off. at the end of the adjusted time (Frq oFF dEL), output1 LED turns **on** and Hı LEDs turn **off**.
If the frequency of the system is over the low set value (Frq Lo), output is turned **on**, LED is turned **on** L LED is turned **off**.
If the frequency of the system decreases the low set value (Frq Lo), L LED blinks; output is turned **off** at the end of defined time (Frq ond), LED is turned **off** and L LED is turned **on** continuously.
If the frequency of the system is over the low set value (Frq Lo HyS) as a hysteresis (Frq Hys), output is turned **on** at the end of defined time (Frq oFF dEL), LED is turned **on** and L LED is turned **off**.

Note: System frequency is measured for L1.

There are 6 submenus.
Frq Hı, Frq Lo, Frq Hı HyS, Frq Lo HyS, Frq on dEL, Frq oFF dEL.

Max. value for system frequency, this value can be defined between 0...70.00 Hz. If the value is set to zero (0), the high frequency warning is disabled.

Min. value for system frequency, this value can be defined between 0...70.00 Hz. If the value is set to zero (0), the low frequency warning is disabled.

Note: Attention for common using of output and relay LED for voltage.

In this menu, required hysteresis value can be defined between 0...20.00 Hz. in order to switching **off** the “high frequency” warning.

In this menu, required hysteresis value can be defined between 0...20.00 Hz. in order to switching **off** the “low frequency” warning.

Delay-on time for activation of alarm for high and low frequency value.
This value can be defined between 000.0..999.9 in term of second..

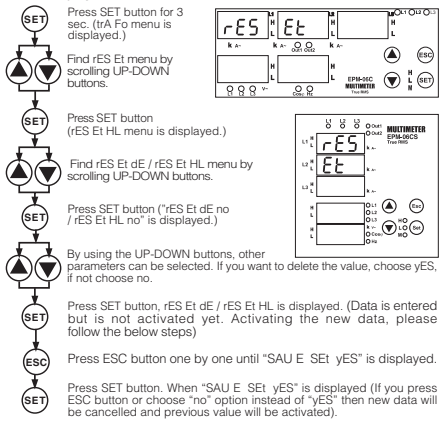
Delay-off time for disactivation of alarm for high and low frequency value.
This value can be defined between 000.0..999.9 in term of second..

Phase sequence can be turned **on/off** in this menu. Inversed phase voltage which is applied to the measurement inputs (L1-L2-L3), can be monitored. Default setting is **off**. In order to let the device to warn user in case of inversed phase situation please change the **off** position as **on** in “UoL PHS SEq” menu. Phase sequence function is disabled if the selection is selected **off**.
L1, L2 and L3 LEDs blink and output output released immediately when “UoL PHS SEq” is turned **on** and phase sequence is inverted with any reason.
Note: Output 2 is used if U-I is selected and Output1 is used if H-L is selected in Output menu for the Phase Sequence monitoring.

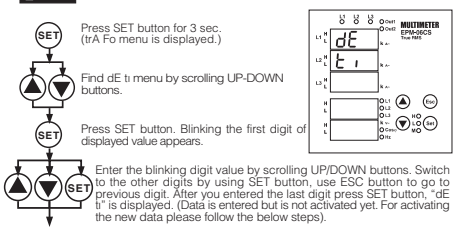
Instant Tripping Function.
At position **ON**, if any **VL-L / VL-N** values exceeds 1.5 times of high voltages (UoL Hı L-1/L-2/L-3) values; the “voltage output” switches **OFF** instantly, output LED turned **OFF** and H LED, for related voltage, is turned **ON** . (Please refer to **“Output”**.)

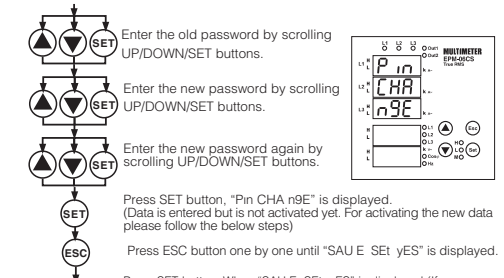
If any phase voltage decrease 0.5 times low voltages (UoL L-1/L-2/L-3); the “voltage output” switches **OFF** instantly, output LED turned **OFF** and Lo LED, for related voltage, is turned **ON** .
(Refer to Page-4 for **“CUr ınS trP”, “AUt o rSt” and “UoL ınS trP”***)*

Reset function.
In this menu, values of min., max., max. demand are erased. It Saves the instantaneously measured min. and max. values of the device into its memory. Please kindly look at to the section of **FUNCTIONS OF BUTTONS** for min. and max. values.
Note: Measured electrical parameters which are saved to the memory are not affected from the electric interruptions. In the rES Et HL or rES Et dE menu; when you choose yES and quit from all menus, if you confirm the changes, min., max. and max. demand values of all parameters are erased at the same time.



Demand Time.
Max. Demand time can be defined between 01-60 minute in this menu.





Enter the old password by scrolling UP/DOWN/SET buttons.

Enter the new password by scrolling UP/DOWN/SET buttons.

Enter the new password again by scrolling UP/DOWN/SET buttons.

Press SET button, “Pın CHA n9E” 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).

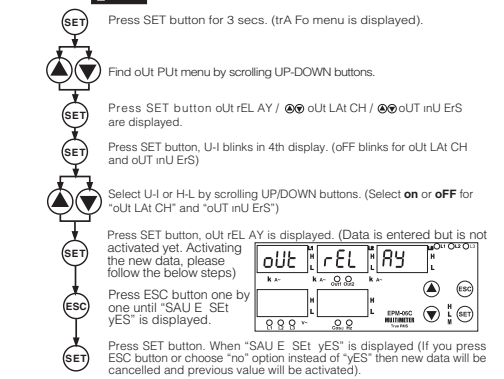
Output menu (only for EPM-06C/06CS) :
In this menu, using of oUt PUt function is explained with details below.

Out Relay function:
In this menu high-low or voltage-current monitoring is determined for Out1 and Out2 outputs.

Note: When **U-I** (voltage-current) is selected; Out2 is monitoring according to high or low voltage, frequency values and phase sequence, Out1 is monitoring according to high or low-current value.
When **H-L** (high-low) is selected; Out2 is monitoring according to high values for voltage, frequency and low-current, Out1 is monitoring according to low values for voltage or current.

Out Latch function:
If the Latch function is turned **on**;
OUT1-OUT2 outputs, which are released when a failure has occured, keep remained at its position even if the failure is over. Press (ESC) button in order to triggering the relay when the failure situation is removed.
If the Latch function is turned **off**;
Released outputs triggered at the end of delay off time when the failure situation is removed.

Out inverse function:
If “oUt ınU ErS” function is selected **off**;
Device is started with closed output contacts (out1, out2) in the normal network conditions according to settings.
Otherwise devices started with open position of the contacts.
Default setting is **“off”**.



Programming “SP CUr rnt” :
Using purposes of submenus of “SP CUr rnt” explained below with details.

⚠ In case of using the device for measuring the current values of motors etc., start delay (AUto rSt) function can be used for preventing the equipment against the improper tripping, which is because of the demurrage current. If the system current decreases 50mAxCtr then start-up delay is resetted and related output detect the system automatically. This feature must be observed in case of using this function.

In this menu, high set points for current values are programmed. Hı values for IL1, IL2, IL3 and IN can be entered one by one. If all the current values are under the Hı value; Out1 output is switched on, LED of Output1 turned **on** and LED of H turned **off**.

If any current (IL1, IL2, IL3 and IN) exceeds the high set value, H LED blinks. Output 1 output switches off at the end of the defined time (Hı on dEL), Output 1 LED turned **off** and H LED turned **on** continuously.
If all currents (IL1, IL2, IL3 and IN) are below the high set value (Hı) as a hysteresis current (CUr Hı HyS), output 1 output switches on at the end of the defined time (Hı oFF dEL), output 1 LED turned **on** and H LED turned **off**.
This menu has 7 sub menus.
CUr Hı L-1, CUr Hı L-2, CUr Hı L-3, CUr Hı L-n, CUr Hı HyS, Hı on dEL, Hı oFF dEL

Note: High Current values are programmed for IL1, IL2, IL3 and IN separately but CUr Hı HyS (hysteresis), Hı on dEL (delay on time) and Hı oFF dEL (delay off time) values are common and they have same values for IL1, IL2, IL3 and IN.

In this menu, low set points for current values are programmed. Lo values for IL1, IL2, IL3 and IN can be entered one by one. If all the current values are over the Lo value; Out1 output is switched on, LED of Output1 turned **on** and LED of L turned **off**.

If any current (IL1, IL2, IL3 and IN) exceeds the low set value, L LED blinks and Output 1 output switches off at the end of the defined time (Lo on dEL), Output 1 LED turned **off** and L LED turned **on** continuously.
If all currents (IL1, IL2, IL3 and IN) are over the low set value (Lo) as a hysteresis current (CUr Lo HyS), output 1 output switches on at the end of the defined time (Lo oFF dEL), output 1 LED turned **on** and L LED turned **off**.
This menu has 7 sub menus.
CUr Lo L-1, CUr Lo L-2, CUr Lo L-3, CUr Lo L-n, CUr Lo HyS, Lo on dEL, Lo oFF dEL

Note: Low Current values are programmed for IL1, IL2, IL3 and IN separately but CUr Lo HyS (hysteresis), Lo on dEL (delay on time) and Lo oFF dEL (delay off time) values are common and they have same values for IL1, IL2, IL3 and IN.

In this menu, max. current value for IL1 is programmed. The current value can be programmed between; 0,001....5,000 A (Ctr = 1); 000,1....120,0 A (for CT-25 adapted device trn=1). If the value is set to zero (0), the high current warning is disabled (CUr Hı L-2 and CUr Hı L-3 are programmed similarly). Refer *“SP Cur Hı” for details.*

In this menu, min. current value for IL1 is programmed. The current value can be programmed between; 0,001....5,000 A (Ctr = 1); 000,1....120,0 A (for CT-25 adapted device trn=1). If the value is set to zero (0), the low current warning is disabled (CUr Lo L-2 and CUr Lo L-3 are programmed similarly). Refer *“SP Cur Lo” for details.*

In this menu, required hysteresis current for high current warning is programmed. (same for IL1, IL2, IL3 and IN.)
The current value can be programmed between; 0,001....2,500 A (Ctr = 1)
000,1....60,00 A (for CT-25 adapted device trn=1)
Refer *“SP Cur Hı” for details.*

In this menu, required hysteresis current for low current warning is programmed. (same for IL1, IL2, IL3 and IN.)
The current value can be programmed between; 0,001....2,500 A (Ctr = 1)
000,1....60,00 A (for CT-25 adapted device trn=1)
Refer *“SP Cur Lo” for details.*

Delay time for activating the output for high current warning. It is common for all currents (IL1, IL2, IL3 and IN)
The value can be programmed between 000,0 and 999,9 in terms of seconds.
(Refer “SP Cur Hı” for details.)

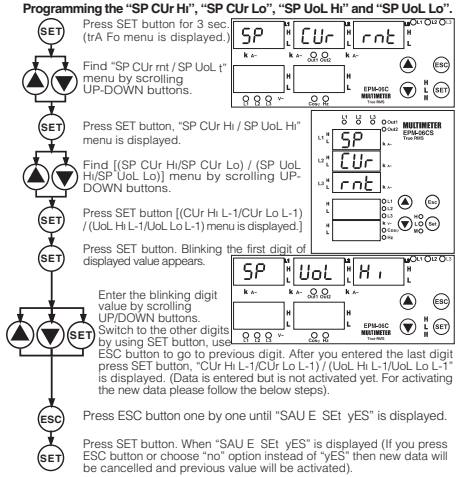
Delay time for activating the output for low current warning. It is common for all currents (IL1, IL2, IL3 and IN)
The value can be programmed between 000,0 and 999,9 in terms of seconds.
(Refer “SP Cur Lo” for details.)

Delay time for releasing the output for high current warning. It is common for all currents (IL1, IL2, IL3 and IN)
The value can be programmed between 000,0 and 999,9 in terms of seconds.
(Refer “SP Cur Hı” for details.)

Delay time for releasing the output for low current warning. It is common for all currents (IL1, IL2, IL3 and IN)
The value can be programmed between 000,0 and 999,9 in terms of seconds.
(Refer “SP Cur Lo” for details.)

(Refer to Page-5)

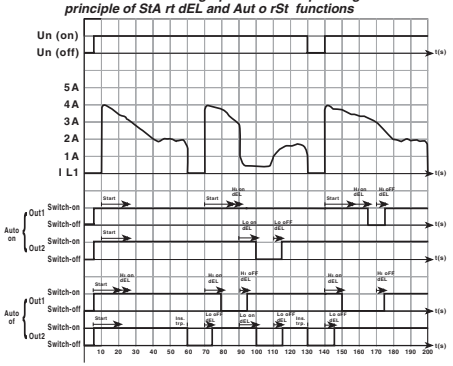
Programming the "SP CUr Hı", "SP CUr Lo", "SP UoL Hı" and "SP UoL Lo".



Start-up delay:
Start Delay Time is used to prevent from faulty switchings caused by motor start-up current (demurrage current).
Out1 remain switched ON in this time period (When U-I is selected); In this time period, even if the current value exceeds the limits device doesn't sense it as a warning. The device doesn't give a warning even if the current value isn't in the setting interval.
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.

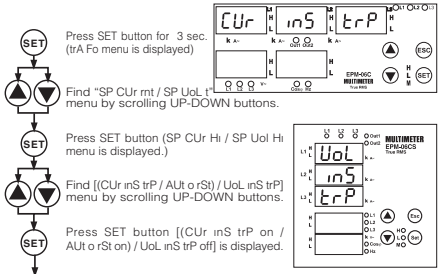
Please refer to below graphics for the operating principle of StA rt dEL and Aut o rSt functions



Hı on dEL = 10 sec.
Lo on dEL = 10 sec.
Hı oFF dEL = 5 sec.
Lo oFF dEL = 5 sec.
Start = 15 sec.
CUr Hı L1 = 3A
CUr Lo L1 = 1A
Ins. trp = on

Instant Tripping Function.
At position **ON**, if any phase current (IL1, IL2, IL3 and IN) exceeds 1.5 times of high (CUr Hı L-1, L-2, L-3, 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 (CUr Lo L-1, L-2, L-3, 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 "CUr ınS trP", "AUt o rSt" and "UoL ınS trP"



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

If all voltage (Phase-Neutral / Phase-Phase) are below the high set value (Hi) as a hysteresis voltage (UoL Hı HyS), releated output is switched on at the end of the "delay off time" (Hı oFF dEL), 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 "UoL Hı HyS" (hysteresis) and "Hı on dEL" (delay on time) and "Hı oFF dEL" (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 UoL Hı L-1, L-2 and L-3 values automatically according to connection.

Example : If the connection type is selected as Star (with neutral); UoL Hı HyS=10V UoL Hı L-1=250V, UoL Hı L-2=255V, UoL Hı 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;
UoL Hı L-1 (L1-L2 Phase to phase voltage) = 433 V
UoL Hı L-2 (L2-L3 Phase to phase voltage) = 441 V
UoL Hı L-3 (L3-L1 Phase to phase voltage) = 450 V
UoL Hı HyS = 10 V.

There are 6 submenus.
UoL Hı L-1, UoL Hı L-2, UoL Hı L-3, UoL Hı HyS, Hı on dEL, Hı oFF dEL.

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; releated output is switched **on**, its LED turned **on** (please refer "Output") and releated L LEDs are turned **off**.
If any of the voltage valueses (Phase-Neutral / Phase-Phase) decrease the Lo value, L LED blinks and releated output is switched **off** at the end of "delay on time" (Lo on dEL), its LED turned **off** (please refer "Output") and releated L LED is turned **on** continuously.
If all voltage (Phase-Neutral / Phase-Phase) values increase the low set value (Lo) as a hysteresis voltage (UoL Lo HyS), releated relay is switched **on** at the end of the "delay off time" (Lo oFF dEL), 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 "UoL Lo HyS" (hysteresis), "Lo on dEL" (delay on time) and "Lo oFF dEL" (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 UoL Lo L-1, L-2 and L-3 values automatically according to connection.
Example : If the connetion type is selected as Star (with neutral); UoL Lo Hys=10V
UoL Lo L-1=180V, UoL Lo L-2=175V, UoL Lo 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;
UoL Lo L-1 (L1-L2 Phase to phase voltage) = 311 V
UoL Lo L-2 (L2-L3 Phase to phase voltage) = 303 V
UoL Lo L-3 (L3-L1 Phase to phase voltage) = 294 V
UoL Lo HyS = 10 V.
There are 6 submenus.
UoL Lo L-1, UoL Lo L-2, UoL Lo L-3, UoL Lo HyS,Lo on dEL, Lo oFF dEL.

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 Hı" 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.*

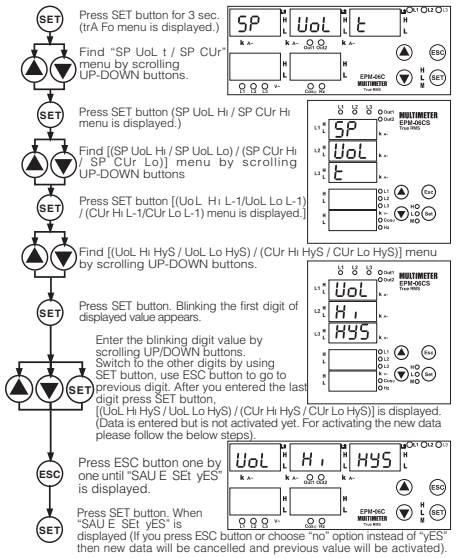
Note: *L2 and L3 phases can be programmed similarly.*

(Refer to Page-4 for **SP CUr Hı, SP CUr Lo, SP UoL Hı 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 Hı" 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"



"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 Hı" 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 Hı" 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.)*

"Hı on dEL", "Hı oFF dEL", "Lo on dEL", "Lo oFF dEL" settings are explained for SP UoL t and SP CUr rnt