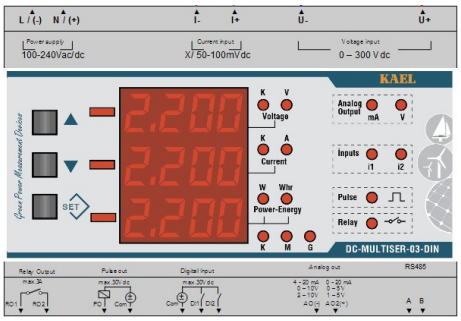
# DC MULTIMETER and ENERGOMETER




Green Power Measurement Device,

- Easy use via menus with shortcuts
- DC current, voltage and power values can be simultaneously monitored.
- Four different types of energy measurement as total, positive, negative and difference can be fulfilled.
- Secondary part of shunt resistance can be set between 50 mV and 100mV
- Voltage, current and power alarms
- Multiple alarms
- Password protection

### input and outputs

- Relay output (1 pc)
- Pulse output (1 pc )
- Digital inputs ( 2 pcs )
- Analogue output ( 1 pc )
- RS-485 MODBUS-RTU

### Measurements

- Voltage
- Current
- Active Power
- Active Energy

**ISO 9001:2008** CE

TÜRKMALI

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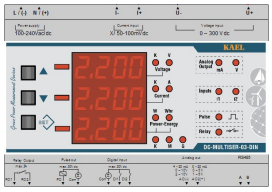
**KAEL** Mühendislik Elektronik Tic. ve San. Ltd.Şti.

## DC- MULTIMETER and ENERGOMETER MODELS



| | DC Current (with Shunt Resistance) Programmable (50-100mV) | DC Current 0-300V dc | DC Current 0-1200V dc | DC Power | DC Energy | Relay Output | Digital input | Pulse Output | Analogue Output (programmable) 4-20mA 0-10V 0-5V 0-20mA 2-10V 1-5V | RS 485 - MODBUS RTU | Auxiliary Supply Voltage 85-265Vac or 100-300Vdc | Auxiliary Supply Voltagei 18-75Vdc | Dimensions (105x90x59 mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DC-MULTISER-1UH-DIN | ■ | ■ | ■ | ■ | ■ | | | | | ■ | ■ | | ■ |
| DC-MULTISER-1UL-DIN | ■ | ■ | ■ | ■ | ■ | | | | | ■ | | ■ | ■ |
| DC-MULTISER-1OH-DIN | ■ | ■ | ■ | ■ | ■ | | | | | ■ | ■ | | ■ |
| DC-MULTISER-1OL-DIN | ■ | ■ | ■ | ■ | ■ | | | | | ■ | | ■ | ■ |
| DC-MULTISER-2UH-DIN | ■ | ■ | ■ | ■ | ■ | 1 | 2 | 1 | 1 | ■ | ■ | | ■ |
| DC-MULTISER-2UL-DIN | ■ | ■ | ■ | ■ | ■ | 1 | 2 | 1 | 1 | ■ | | ■ | ■ |
| DC-MULTISER-2OH-DIN | ■ | ■ | ■ | ■ | ■ | 1 | 2 | 1 | 1 | ■ | ■ | | ■ |
| DC-MULTISER-2OL-DIN | ■ | ■ | ■ | ■ | ■ | 1 | 2 | 1 | 1 | ■ | | ■ | ■ |

## General

With our DC-MULTISER devices, dc current, voltage, active power and active energy may be measured. Moreover, double-sided (positive-negative) current may be measured. The device allows the total, positive and negative operation times to be monitored separately.
Before enabling this device, please read this manual carefully for the safety of both your system and yourself.
Please do not take any actions before contacting our company for any ambiguous matters.

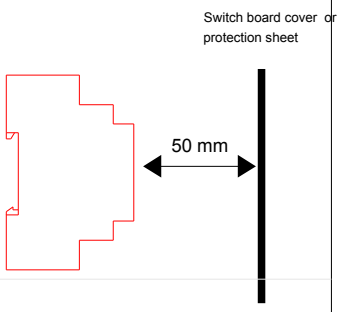
**Tel:** 0.232.877 14 84 (pbx) Fax: 0.232.877 14 49
**Plant:** Atatürk mah. 78 sok. No:10 Ulucak köyü, Kemalpaşa - İZMİR

## Fields of use

- For DC energy management systems
- For wind and solar energy systems
- For industrial DC control applications
- For DC warning systems
- For vessel and yacht electrical systems
- For Metallurgy, galvanoplastics and electro analysis industry

## Assembly Instructions

1- 1-Before starting the assembly of the device, ambient temperature and humidity of the assembly location should be checked.
Otherwise the device may get damaged.
Storage Temperature: -10C....+70C
Ambient Temperature: 0C.....+50C
Humidity: %15 - %95 (without condensation)
2-It should be taken care to ensure that the switchboard on which the device is to be mounted should comply with IP20
3-The device should be mounted on the assembly rail inside the switchboard.
4-Please allow a clearance of at least 50 mm between the front side of the device and the switchboard cover or protection sheet.



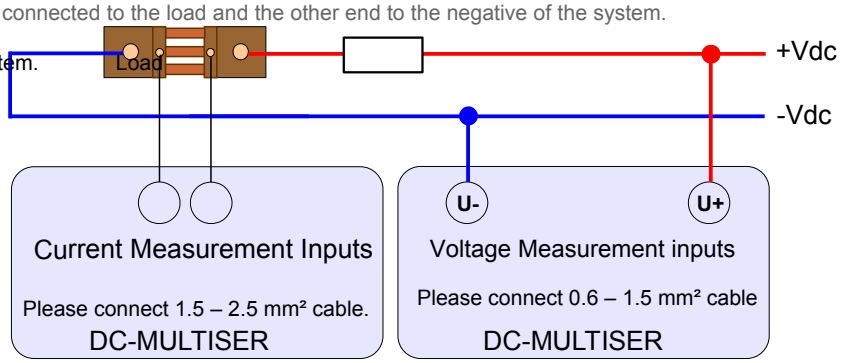

## Making the connections

The connections of the device should be made when the device is deenergised.
The device should be connected as shown in the connection diagramme.
Please make the RS485 connection
Please do not energise the device before carrying out a check for all the connections by means of a gauge.
Current and voltage terminals comply with cables with a max. Cross-section of 2,5mm2
Pulse outputs, inputs and RS485 terminals comply with max. 1,5 mm2 cables
CAT5 (category 5) cable is recommended for RS485 connections
If the system presents power quality problems, insulation transformer or EMC filter should be used for auxiliary power supply.

## Connections

### Current Connections

Please connect the load before shunt resistance. The load should be serial connected to the shunt resistance. One end of the shunt resistance should be connected to the load and the other end to the negative of the system.
Current and voltage inputs are completely insulated from the system.
Secondary value of the shunt resistance may vary between 50mV and 100mV. The relevant value should be set from the menu of the device.

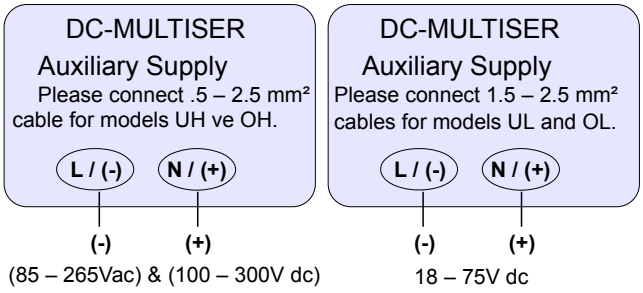



### Voltage Connections:

Measurement range for UH and UL types 0-300 Vdc
Measurement range for OH and OL types 0-300 Vdc

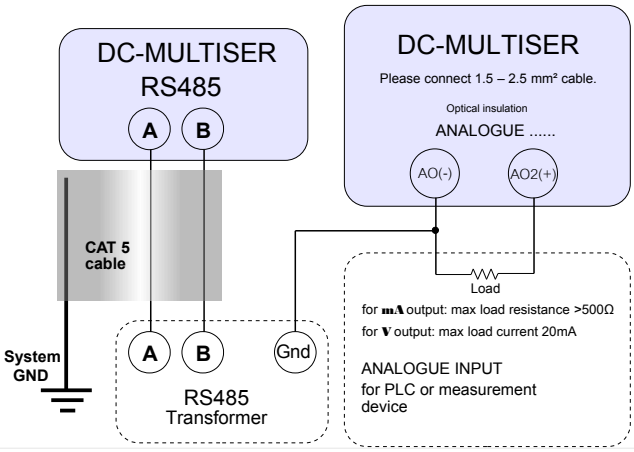
## Auxiliary Power Supply Connections:

- 85 – 265V ac or 100 – 300V dc may be applied for models UH and OH
- 18 – 75V dc may be applied for models OL and UL.




## RS485 Connections:

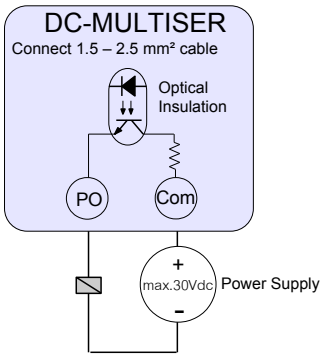
Please make the connections with CAT5 cables. Please ground the cable shield.



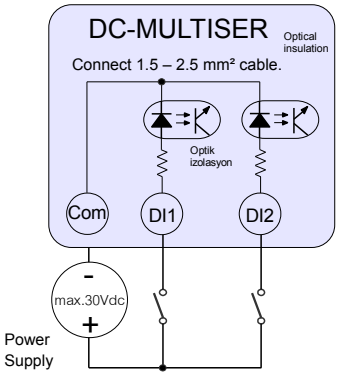

## Analogue output Connections:

- DC-MULTISER has programmable analogue output.
- The output is optically insulated.
- It may be set as 0 - 20mA or 4 - 20mA when it is intended to be used as analogue current output.
- It may be set as 0 -10V, 2 - 10V, 0 – 5V or 1 - 5V when it is intended to be used as analogue voltage output

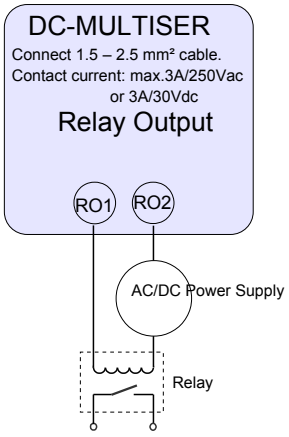
## Pulse Output Connections:




## Digital Input Connections:




## Relay Output Connections:

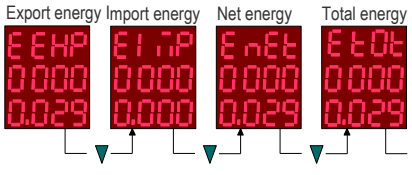


## MEASURED ELECTRICAL PARAMETERS

(dc current, dc voltage, dc power, dc energy )
able to perform measurements in kV, A, kA, W, kW, MW, GW, kWh, MWh, GWh units

## SHORTCUT KEY PROPERTIES

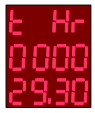
▼ : Allows entry to energy display unit. By presing ▼ key export, import, net (difference) and total energy values may be accessed. Returns to main screen by pressing SET key.




Export enegy = Positive Energy
Import enegy = Negative Energy
Net energy = (Positive Energy) - (Negative Energy)
Total energy = (Positive Energy) + (Negative Energy)

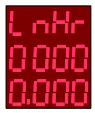
▲ : device number is displayed for 3 sec. in models with RS485 properties

▲ + ▼ : operation time of the device is displayed for 3 sec



▲ + SET operation duration of the device with positive current is displayed for 3 sec

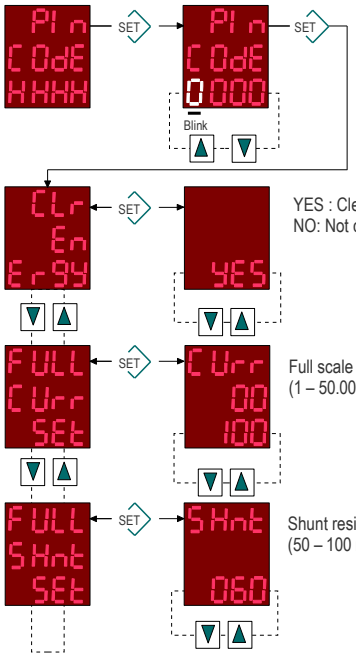
▼ + SET operation duration of the device with negative current is displayed for 3 sec



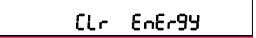
SET : If Latch function is selected in models with alarm properties, alarm should be absolutely deleted by pressing set key.If pressed for 3 sec. It goes to parameter and settings menu.

## ENTRY TO PARAMETERS

If set KEY is pressed for 3 sec. password should be entered before entry to parameters menu. At this stage, HHHH is displayed in the line at the bottom of the screen while the password screen flashes. When SET key is pressed, 0000 figures are displayed in the most bottom line and the screen begins to flash more rapidly. The flashing figures can bet set with ▼ and ▲ keys and next digit can be entered by pressing SET key. When all digits are completed, if the password is correct the first parameter Clear Energy (CLR energy) section may be entered. If the password is incorrect, the device returns to main measurement screen without entering to settings. The default value of the password is 0000. The user can change it.

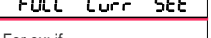



### CLEAR ENERGY



This is where all energies can be cleared.
In this case, pulses that are to be transmitted in the pulse output are also cleared.
**Note :** Energies are reset when factory settings are enabled.

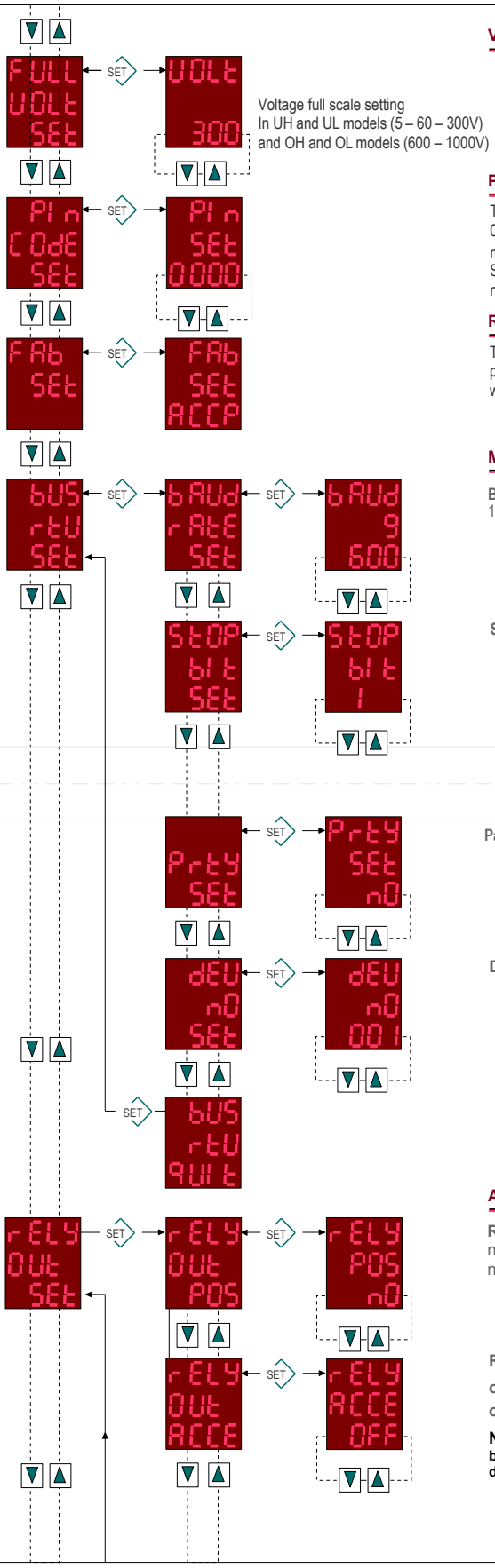
### CURRENT FULL SCALE SETTING



This is where the line current maximum value is set. For ex: if 1000A/60mV shunt is used, then this value should be set as **1000** A.

### SHUNT RESISTANCE mV SETTING

This is the section where shunt resistance mV value can be set.
For ex: if 1000A/60mV shunt is used, then this value should be set as **60** mV yapılmalıdır.




## VOLTAGE FULL SCALE SETTINGS — FULL VOLt SEt

It should be defined according to the maximum value by which measurement is to be made. It may be set as (5 – 60 – 300V) in UH and UL models and (600 – 1000V) in OH and OL models. For ex: if 30 Vdc will be measured as maximum in the system then this value may be set as 60 V

## PASSWORD SETTINGS — PIn CODE SEt

This is where the 4-digit password can be changed. When SET key is pressed, 0000 figure is displayed in the bottommost line and the screen begins to flash more rapidly. The figure in the flashing digit may be set with ▼ and ▲ keys and SET key is pressed to pass to the next digit. When all digits are completed the new password becomes ready to use.

## RETURN TO FACTORY SETTINGS — FAb SEt

This function enables to return to factory settings. When SET key is pressed, Fab Set Wait (wait) is displayed and Fab Set Ok is displayed when all settings are restored to factory settings.

## MODBUS RTU SETTINGS — bUS rtU SEt

**Baud rate:** It may be set as 2400,4800, 9600,19200,28800, 38400,57600 or 115200.

**Stop Bits :** May be set as (1) , (1.5)

or (2).

**Parity :** no , even , odd

**Device No :** 001 .....255

## ALARM RELAY SETTINGS — rELY OUt SEt

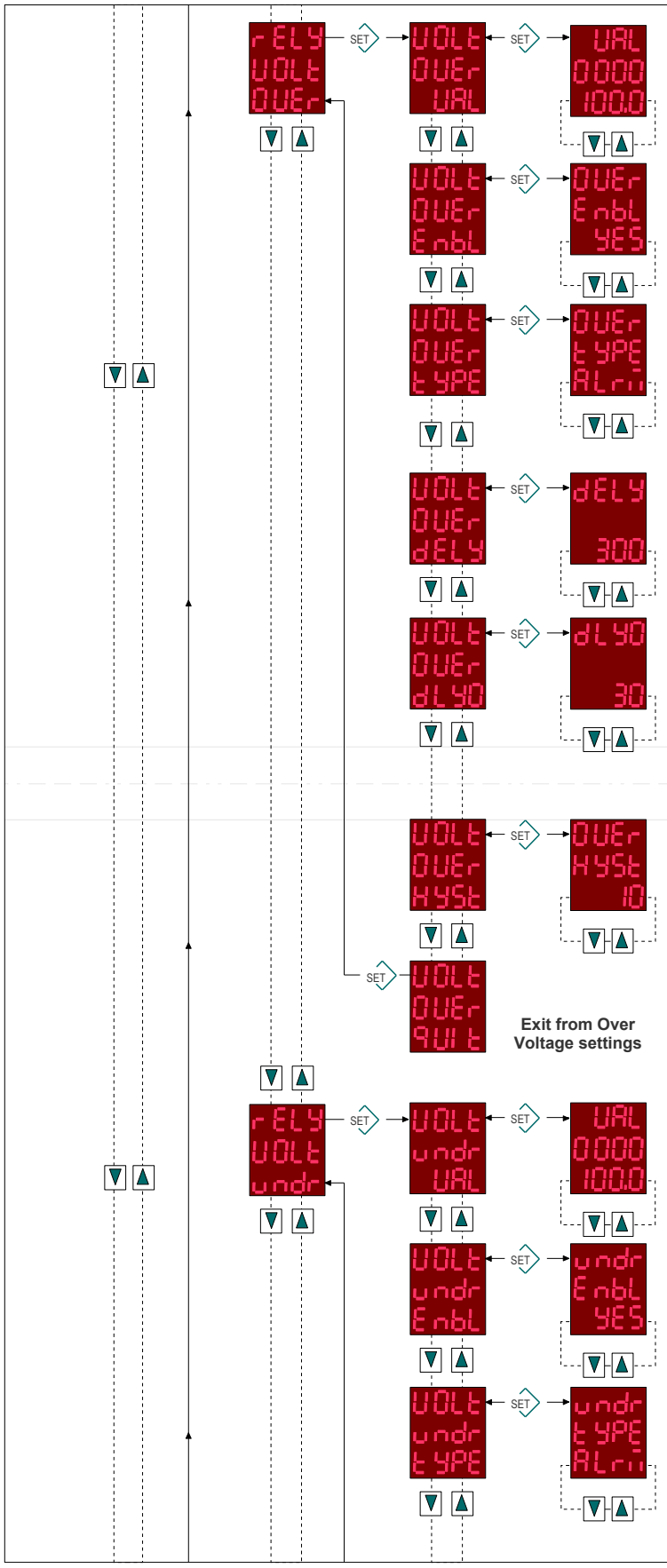
**Relay Contact Position :**
nO (normally switched on)
nC (normaly switched off)

**Remote Access Permit**

**on :** Access enabled

**oFF : Access disabled**

**NOTE: When Remote Access is (on) other parameters in the menu becomes inaccessible and previously set parameters become disabled. This relay output may only be used via remote access.**




## OVER VOLTAGE SETTINGS rELY VOLt OVEr

**Over Voltage Set Value ( Volt Over Val):**
It can bet set between 0.1 and 300 in UH and UL models. It can be set between 0.1 and 1200 V in OH and OL models.

**Over Voltage Alarm Permit (Volt Over EnbL) :** YES ; alarm mode enabled
NO ; alarm mode disabled

**Over Voltage Alarm Mod setting (Volt Over tYPE) :**

ALrn **Alarm mode:** when alarm is set alarm relay is pulled. When alarm is disabled alarm relay releases.

LtCH **Latch mode:** when alarm mode is set alarm relay is pulled. Alarm relay remains pulled even the alarm is disabled. If latch mode iset in models with alarm function, alarm should be certainly disabled by pressing the set key.

nnnt **Momentary mode:** In this mode, as an extra the time seen in the adjacent box is displayed . It may bet set between 300 msn and 5000msn. When alarm is set, alarm relay remains pulled until the end of this time then it is released. This function may be used when continuous alarm is not intended.

**Over Voltage Delay Time (Volt Over dELy) :**
It may be set between 1 – 300 sec. If the measured voltage exceeds the set voltage value, the relay contact is released at the end of the delay time.

**Over Voltage Mistake Repair Time (Volt Over dLy0) :**
It may be set between 1 – 300 sec.

**Over Voltage Hysteresis Value (Volt Over HySt):** May bet set between % (1 – 30)

**Exit from Over Voltage settings**

## LOW VOLTAGE SETTINGS rELY VOLt undr

**Low Voltage Set Value (Volt Undr Val):**
It may be set between 0.1 and 300 V in UH and UL models. It may be set between 0.1 and 1200 V in OH and OL Models.

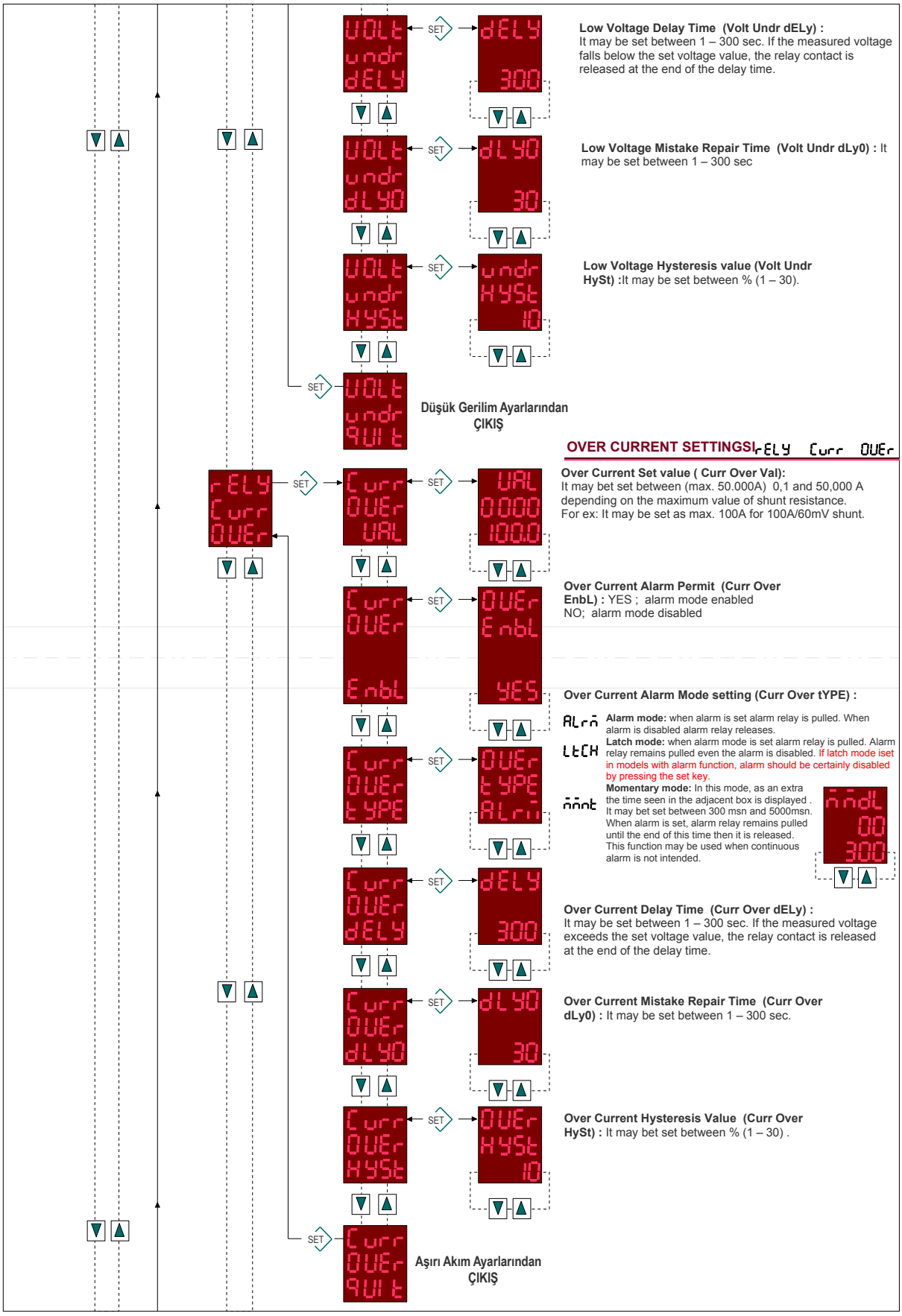
**Low Voltage Alarm Permit (Volt Undr EnbL)**
YES ; alarm mode enabled
NO ; alarm mode disabled

**Low Voltage Alarm Mode setting (Volt Undr tyPE) :**

ALrn **Alarm mode:** when alarm is set alarm relay is pulled. When alarm is disabled alarm relay releases.

LtCH **Latch mode:** when alarm mode is set alarm relay is pulled. Alarm relay remains pulled even the alarm is disabled. If latch mode iset in models with alarm function, alarm should be certainly disabled by pressing the set key.

nnnt **Momentary mode:** In this mode, as an extra the time seen in the adjacent box is displayed . It may bet set between 300 msn and 5000msn. When alarm is set, alarm relay remains pulled until the end of this time then it is released. This function may be used when continuous alarm is not intended.




**Low Voltage Delay Time (Volt Undr dELy) :**
It may be set between 1 – 300 sec. If the measured voltage falls below the set voltage value, the relay contact is released at the end of the delay time.

**Low Voltage Mistake Repair Time (Volt Undr dLy0) :** It may be set between 1 – 300 sec

**Low Voltage Hysteresis value (Volt Undr HySt) :**It may be set between % (1 – 30).

## OVER CURRENT SETTINGSrELY Curr OVEr

**Over Current Set value ( Curr Over Val):**
It may bet set between (max. 50.000A) 0,1 and 50,000 A depending on the maximum value of shunt resistance.
For ex: It may be set as max. 100A for 100A/60mV shunt.

**Over Current Alarm Permit (Curr Over EnbL) :** YES ; alarm mode enabled
NO; alarm mode disabled

**Over Current Alarm Mode setting (Curr Over tYPE) :**

ALrA **Alarm mode:** when alarm is set alarm relay is pulled. When alarm is disabled alarm relay releases.

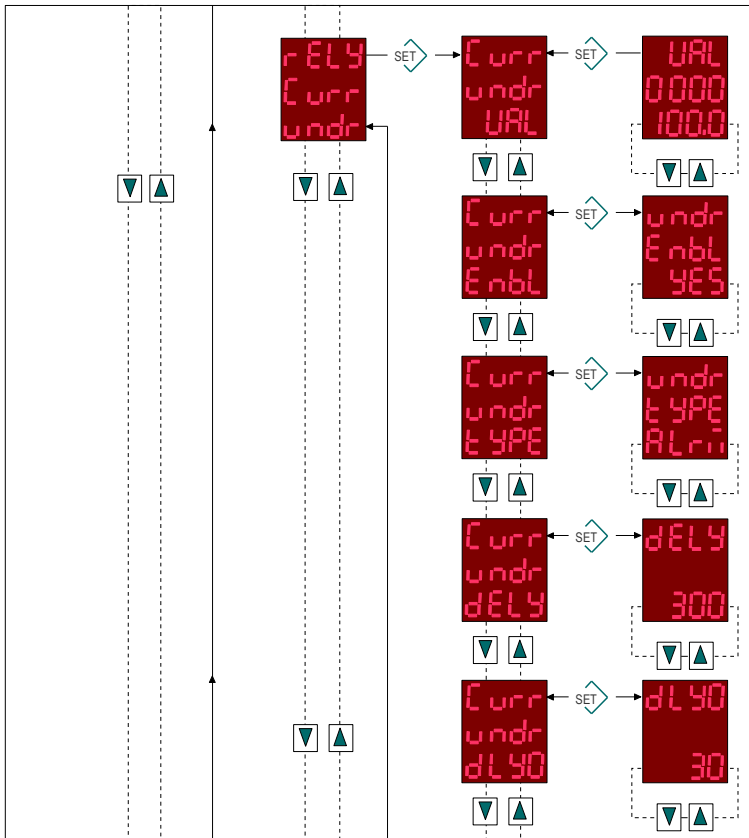
LtCH **Latch mode:** when alarm mode is set alarm relay is pulled. Alarm relay remains pulled even the alarm is disabled. If latch mode iset in models with alarm function, alarm should be certainly disabled by pressing the set key.

nonE **Momentary mode:** In this mode, as an extra the time seen in the adjacent box is displayed . It may bet set between 300 msn and 5000msn. When alarm is set, alarm relay remains pulled until the end of this time then it is released. This function may be used when continuous alarm is not intended.

**Over Current Delay Time (Curr Over dELy) :**
It may be set between 1 – 300 sec. If the measured voltage exceeds the set voltage value, the relay contact is released at the end of the delay time.

**Over Current Mistake Repair Time (Curr Over dLy0) :** It may be set between 1 – 300 sec.

**Over Current Hysteresis Value (Curr Over HySt) :** It may bet set between % (1 – 30) .




## LOW CURRENT SETTINGS rELY Curr undr

**Low Current Set Value (Curr Undr Val):**
It may bet set between (max. 50.000A) 0,1 and 50,000 A depending on the maximum value of shunt resistance.
For ex: It may be set as max. 100A for 100A/60mV shunt.

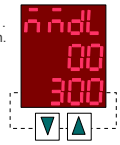
**Low Current Alarm Permit (Curr Undr EnbL) :**
YES ; alarm mode enabled
NO; alarm mode disabled

**Low Current Alarm Mode Setting (Curr Undr tyPE) :**

ALrn **Alarm mode:** when alarm is set alarm relay is pulled. When alarm is disabled alarm relay releases.

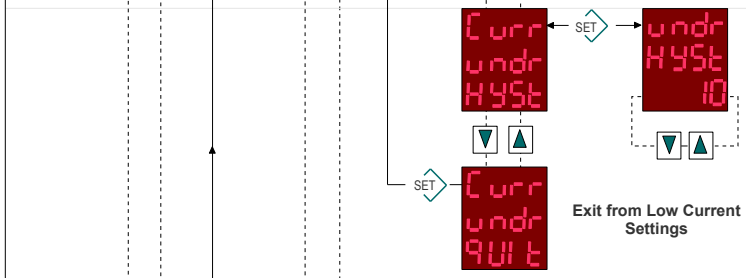
LtCH **Latch mode:** when alarm mode is set alarm relay is pulled. Alarm relay remains pulled even the alarm is disabled. If latch mode iset in models with alarm function, alarm should be certainly disabled by pressing the set key.

mnnt **Momentary mode:** In this mode, as an extra the time seen in the adjacent box is displayed . It may bet set between 300 msn and 5000msn. When alarm is set, alarm relay remains pulled until the end of this time then it is released. This function may be used when continuous alarm is not intended.



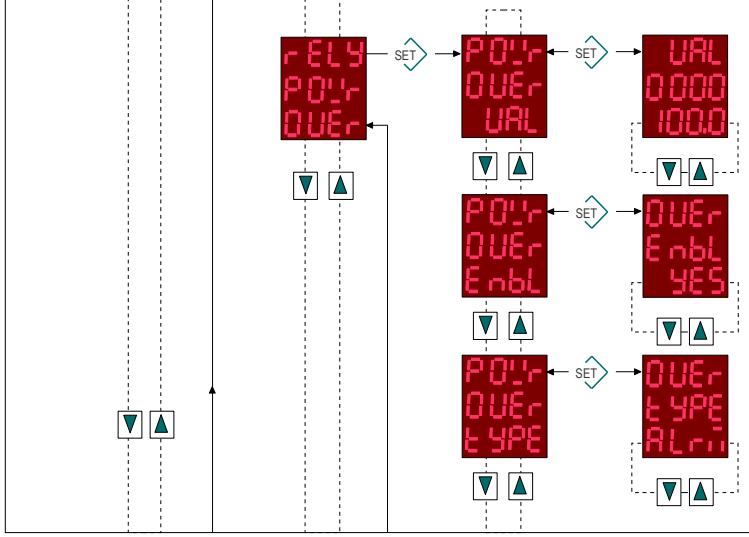

**Low Current Delay Time (Curr Undr dELy) :**
It may be set between 1 – 300 sec. If the measured current falls below set current value, relay contact is released at the end of the delay time.

**Low Current Mistake Repair Time (Curr Undr dLy0) :**
It may be set between 1 – 300 sec.




**Low Current Hysteresis Value (Curr Undr HySt) :** It may be set between % (1 – 30).

**Exit from Low Current Settings**




## LOW POWER SETTINGS rELY POVr OVEr

**Over Power Set Value ( Povr Over Val):**
It may be set as the power value at which the relay should be released when over power is supplied.

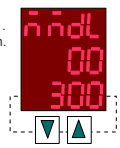
**Over Power Alarm Permit (Povr Over EnbL) :** YES ; alarm mode enabled
NO ; alarm mode disabled

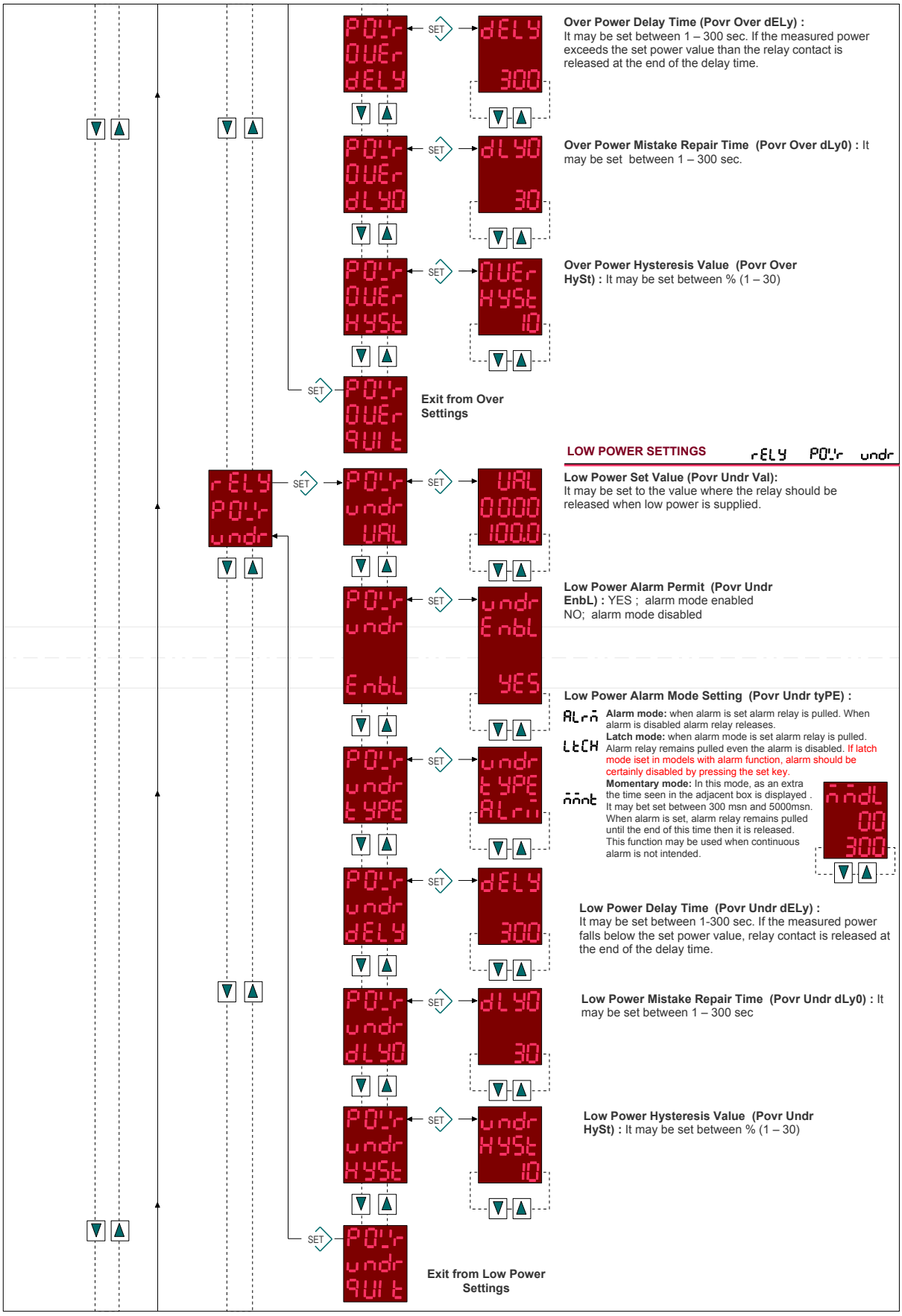
**Over Power Alarm Mode Setting (Povr Over tYPE) :**

ALrn **Alarm mode:** when alarm is set alarm relay is pulled. When alarm is disabled alarm relay releases.

LtCH **Latch mode:** when alarm mode is set alarm relay is pulled. Alarm relay remains pulled even the alarm is disabled. If latch mode iset in models with alarm function, alarm should be certainly disabled by pressing the set key.

mnnt **Momentary mode**: In this mode, as an extra the time seen in the adjacent box is displayed . It may bet set between 300 msn and 5000msn. When alarm is set, alarm relay remains pulled until the end of this time then it is released. This function may be used when continuous alarm is not intended.






**Over Power Delay Time (Povr Over dELy) :**
It may be set between 1 – 300 sec. If the measured power exceeds the set power value than the relay contact is released at the end of the delay time.

**Over Power Mistake Repair Time (Povr Over dLy0) :** It may be set between 1 – 300 sec.

**Over Power Hysteresis Value (Povr Over HySt) :** It may be set between % (1 – 30)

## LOW POWER SETTINGS

rELY POWr undr

**Low Power Set Value (Povr Undr Val):**
It may be set to the value where the relay should be released when low power is supplied.

**Low Power Alarm Permit (Povr Undr EnbL) :** YES ; alarm mode enabled
NO; alarm mode disabled

**Low Power Alarm Mode Setting (Povr Undr tyPE) :**

ALrM **Alarm mode:** when alarm is set alarm relay is pulled. When alarm is disabled alarm relay releases.

LtCH **Latch mode:** when alarm mode is set alarm relay is pulled. Alarm relay remains pulled even the alarm is disabled. If latch mode iset in models with alarm function, alarm should be certainly disabled by pressing the set key.

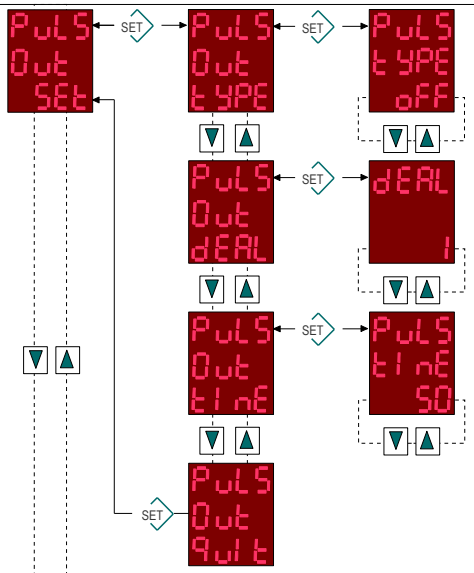
mnnt **Momentary mode:** In this mode, as an extra the time seen in the adjacent box is displayed . It may bet set between 300 msn and 5000msn. When alarm is set, alarm relay remains pulled until the end of this time then it is released. This function may be used when continuous alarm is not intended.




**Low Power Delay Time (Povr Undr dELy) :**
It may be set between 1-300 sec. If the measured power falls below the set power value, relay contact is released at the end of the delay time.

**Low Power Mistake Repair Time (Povr Undr dLy0) :** It may be set between 1 – 300 sec

**Low Power Hysteresis Value (Povr Undr HySt) :** It may be set between % (1 – 30)




## PULSE OUTPUT SETTINGS

PuLS Out SEt

**PuLS tYPE** — **Pulse Types**

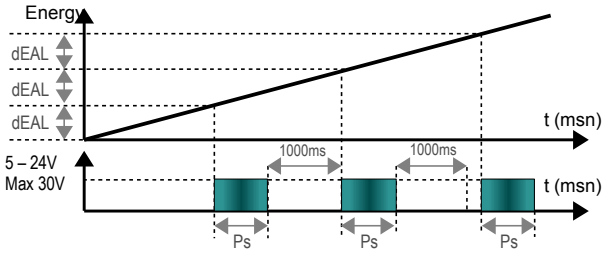
| | |
|---|---|
| oFF | Pulse output disabled |
| tOt | Total energy |
| EHP | Export Energy |
| IMP | Import Energy |

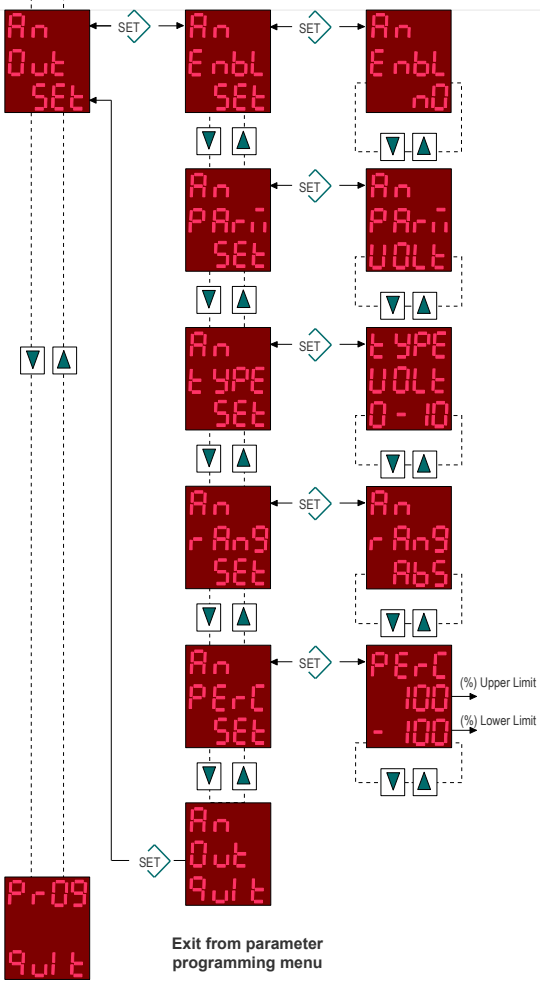
**dEAL :** 1 pulse equivalent energy

It may bet set between 0,1kWh – 1kWh – 10kWh – 100kWh – 10000kWh – 50000kWh

**PuLS timE :** Pulse time (Ps)

It may be set between 50msn – 900 msn .
Pulse OFF Time (Po) is fixed at 1000 msn.




Exit from parameter programming menu

## ANALOGUE OUTPUT SETTINGS

An Out SEt

**EnbL** — **Analogue Output Permit**

| | |
|---|---|
| YES | Analogue output enabled |
| nO | Analogue output disabled |

**PArA** — **Analogue Parameters** The device allows the below parameters be set as analogue output.

| | |
|---|---|
| VOLt | Voltage (V) |
| Curr | Current (A) |
| Powr | Power (W) |

**tYPE VOLt** Voltage output type

| | |
|---|---|
| 0-10 | V |
| 2-10 | V |
| 0-5 | V |
| 1-5 | V |

**tYPE Curr** Current output type

| | |
|---|---|
| 0-20 | mA |
| 4-20 | mA |

**An rAn9** Operation Range Setting

**AbS** In this mode operation is carried out disregarding the symbol of the measured value

**PErC** In this mode, measred value may be set between (+) % 100 ..... (-) % 100 and output is given accordingly. This will be described in details in the following menu below.

**diFF** In this mode output is given only for the measured values between (+) % 100 - (-) % 100. This mode is the same as the operation mode when (PerC) mode is set with the widest limits.

**PErC**

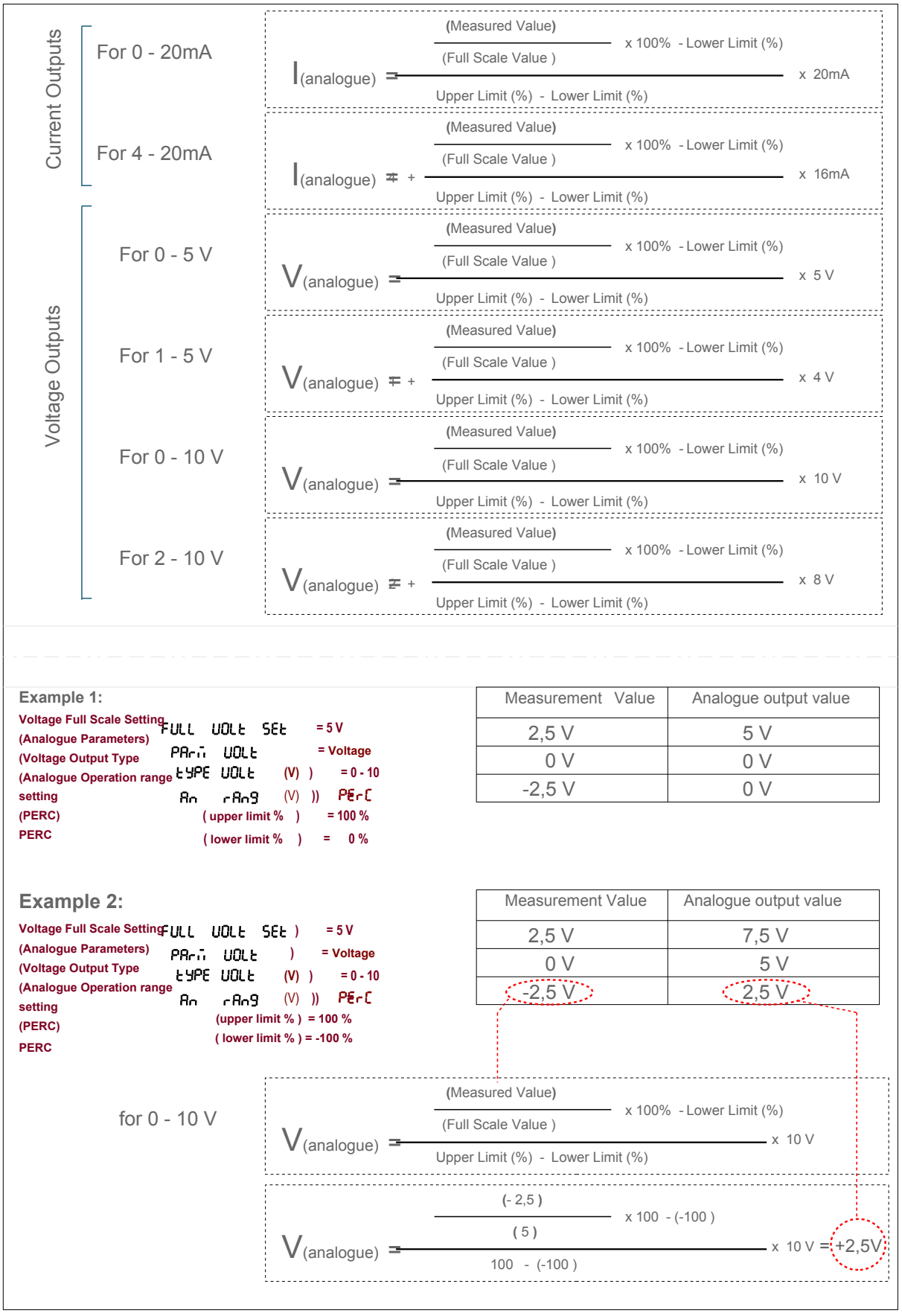
This menu is displayed when PErC is selected in the Analogue measurement range(An rAng). This screen does not appear in other modes

In this mode, output may be given at any value between (+) % 100 ..... (-) % 100 for measured value

**NOTE1 :** (%) Upper Limit Value should be greater than (%) Lower Limit Value

(%) Upper Limit Value cannot be set as % 0.

**NOTE2 :** When measured value is outside the (%) lower limit value, Analogue output will be V/1V or 0mA/4mA. Analogue output may be max. 6V, 12V, 24mA.




**Example 1:**

**Voltage Full Scale Setting (Analogue Parameters)** FULL VOLt SEt = 5 V

**(Voltage Output Type** PArA VOLt = Voltage

**(Analogue Operation range setting** tYPE VOLt (V) ) = 0 - 10

**(PERC)** An rAnG (V) )) PErC

**PERC** ( upper limit % ) = 100 %

( lower limit % ) = 0 %

| Measurement Value | Analogue output value |
|---|---|
| 2,5 V | 5 V |
| 0 V | 0 V |
| -2,5 V | 0 V |

**Example 2:**

**Voltage Full Scale Setting (Analogue Parameters)** FULL VOLt SEt ) = 5 V

**(Voltage Output Type** PArA VOLt ) = Voltage

**(Analogue Operation range setting** tYPE VOLt (V) ) = 0 - 10

**(PERC)** An rAnG (V) )) PErC

**PERC** (upper limit % ) = 100 %

( lower limit % ) = -100 %

| Measurement Value | Analogue output value |
|---|---|
| 2,5 V | 7,5 V |
| 0 V | 5 V |
| -2,5 V | 2,5 V |

for 0 - 10 V

$$V_{(analogue)} = \frac{\text{(Measured Value)}}{\text{(Full Scale Value)}} \times 100\% - \text{Lower Limit (\%)} \;/\; \text{Upper Limit (\%)} - \text{Lower Limit (\%)} \times 10\ V$$

$$V_{(analogue)} = \frac{(-2{,}5)}{(5)} \times 100 - (-100) \;/\; 100 - (-100) \times 10\ V = +2{,}5V$$

**Example 2:**

**Voltage Full Scale Setting** (FULL VOLt SEt ) = 300 V

**(Analogue Parameters)**

**(Current Output Type** (PArA Curr ) = Current

**(Analogue Operation range setting** (tYPE Curr (A) ) = 4 - 20

**(PERC)** (An rAnG (mA) )) PErC

**PERC** (upper limit % ) = 100 %

( lower limit % ) = 0 %

| Measurement Value | Analogue Output Value |
|---|---|
| 300 V | 20 mA |
| 220 V | 15.72mA |
| 0 V | 4 mA |

For 4 - 20mA

$$I_{(analogue)} = 4 + \frac{\frac{(\text{Measured Value})}{(\text{Full Scale Value})} \times 100\% - \text{Lower Limit (\%)}}{\text{Upper Limit (\%)} - \text{Lower Limit (\%)}} \times 16\text{mA}$$

For 4 - 20mA

$$I_{(analogue)} = 4 + \frac{\frac{(220)}{(300)} \times 100 - 0}{100 - 0} \times 16 = 15{,}73\text{mA}$$

## Factory Set Values

**Current Full Scale Setting** : 100A
Shunt **Resistance mV Setting :** 60mV
Voltage Full Scale Setting : 300V /
1000V Password setting: 0000

MODBUS RTU

**Baud Rate** : 9600
**Stop Bits** : 1
**Parity** : no
**Device No** : 1

ALARM SET VALUES

| | |
|---|---|
| **Over Voltage Set Value ( Volt Over Val)** | : 300V / 1000V |
| **Over Voltage Alarm Permit (Volt Over EnbL)** | : no (disables) |
| **Over Voltage Alarm Mode Setting (Volt Over tYPE)** | : alarm mode |
| **Over Voltage Delay Time (Volt Over dELy)** | : 10 sec |
| **Over Voltage Mistake Repair Time (Volt Over dLy0)** | : 10 sec |
| **Over Voltage Hysteresis Value (Volt Over HySt)** | : 30% |
| **Low Voltage Set Value (Volt Undr Val)** | : 150V / 500V |
| **Low Voltage Alarm Permit (Volt Undr EnbL)** | : no (disabled) |
| **Low Voltage Alarm Mode Setting (Volt Undr tyPE)** | : alarm mode |
| **Low Voltage Delay Time (Volt Undr dELy)** | : 10 sec |
| **Low Voltage Mistake Repair Time (Volt Undr dLy0)** | : 10 sec |
| **Low Voltage Hysteresis Value (Volt Undr HySt)** | : 30 % |

| | |
|---|---|
| **Over Current Set Value ( Curr Over Val)** | : 100A |
| **Over Current Alarm Permit (Curr Over EnbL)** | : no (disabled) |
| **Over Current Alarm Mode Setting (Curr Over tYPE)** | : alarm mode |
| **Over Current Delay Time (Curr Over dELy)** | : 10 sec |
| **Over Current Mistake Repair Time (Curr Over dLy0) : 10 sec** | |
| **Over Current Hysteresis Value (Curr Over HySt) : 30 %** | |
| **Low Current Set Value (Curr Undr Val)** | |
| **Low Current Alarm Permit (Curr Undr EnbL)** | : 50A |
| **Low Current Alarm Mode Setting (Curr Undr tyPE)** | : no (disabled) |
| **Low Current Delay Time (Curr Undr dELy)** | : alarm mode |
| **Low Current Mistake Repair Time (Curr Undr dLy0)** | : 10 sec |
| **Low Current Hysteresis Value (Curr Undr HySt)** | : 10 sec |
| | : 30 % |

| | |
|---|---|
| **Over Power Set Value ( Povr Over Val)** | : 30.000VA / 100.000VA |
| **Over Power Alarm Permit (Povr Over EnbL)** | : no (disabled) |
| **Over Power Alarm Mode Setting (Povr Over tYPE)** | : alarm mode |
| **Over Power Delay Time (Povr Over dELy)** | : 10 sec |
| **Over Power Mistake Repair Time (Povr Over dLy0)** | : 10 sec |
| **Over Power Hysteresis Value (Povr Over HySt)** | : 30 % |
| **Low Power Set Value (Povr Undr Val)** | : 15.000VA / 50.000VA |
| **Low Power Alarm Permit (Povr Undr EnbL)** | : no (disabled) |
| **Low Power Alarm Mode Setting (Povr Undr tyPE)** | : alarm mode |
| **Low Power Delay Time (Povr Undr dELy)** | : 10 sec |
| **Low Power Mistake Repair Time (Povr Undr dLy0)** | : 10 sec |
| **Low Power Hysteresis Value (Povr Undr HySt)** | : 30 % |

PULSE OUTPUT RELAY OUTPUT

**RELAY CONTACT POSITION** : nO (normally ON)
**Remote Access Permit** : oFF (Access disabled)

**Pulse Type:** OFF
**Deal** : 1kWh
**Pulse Time:** 100ms

ANALOG OUTPUT

| | |
|---|---|
| **Analogue Output Permit** | :no (disabled) |
| **Parameter** | :VOLT (voltage measurement): |
| **Output type** | 0 – 10 V |
| **Operation Range Setting** | : PERC |
| **PERC % upper limit** | : +100% |
| **PERC % lower limit** | : 0% |

# Technical Information

## 1. Measurements

| Parameter | Measurement Range | Accuracy | Description |
|---|---|---|---|
| Voltage | 0 ~ (±) 5 V | 0,5 % | |
| | 0 ~ (±) 60 V | 0,1 % | |
| | 0 ~ (±) 300 V | 0,1 % | |
| | 0 ~ (±) 600 V | 0,5 % | |
| | 0 ~ (±) 1000 V | 0,5 % | |
| Current | 0 ~ (±) 50.000 A | 0,1 % | For 50 mV and 100mV Shunt Output |
| Power | 0 ~ (±) 60.000 kW | 0,5 % | |
| Energy | 0 ~ (±) 99.999.999,99 kWh | 0,5 % | |

## 2. Measurement Inputs

| Parameter | Input impedence | Description |
|---|---|---|
| DC Voltage | 300 KΩ | DC-MULTISER-1UH-DIN , DC-MULTISER-1UL-DIN , DC-MULTISER-2UH-DIN , DC-MULTISER-2UL-DIN |
| | 2,5 MΩ | DC-MULTISER-1OH-DIN , DC-MULTISER-1OL-DIN , DC-MULTISER-2OH-DIN , DC-MULTISER-2OL-DIN |
| DC Current | 15 KΩ | May be used with shunt. Can be progrramed between 0 ~ (±) 50.000 A/ 50 – 100mV |

## 3. Digital Input (1 pc)

Operation Voltage : 5 – 24Vdc max. 30Vdc

## 4. Relay Output (1 pc)

Operation Voltage : 1NO and max.5A/250
Max Load Voltage Vac : 250 Vac/30Vdc
Max Load Current : 5A

## 5. Analogue Output (1 pc)

Voltage Output Type : 0-10V, 2-10V, 0-5V, 1-5V
Current Output Type : 0-20mA, 4-20mA
Accuracy : 0.2%
Load Capacity : In current type, max. load resistance 750 Ohm
Updating Duration: 200ms : In voltage type, load current max. 20 mA

## 6. RS485

Type : Half dublex
Protocol : Modbus RTU
Baud rate : 2400,4800,9600,19200,28800,38400,57600 or 115200 :
Stop Bits (0.5) , (1) , (1.5) or (2)
Parity : no , even , odd
Device No : 1 .....255

## 7. Operation Voltage

Operation Voltage(Un): 85 – 265 Vac or 100 – 300 Vdc (DC-MULTISER-1UH-DIN, DC-MULTISER-1OH-DIN, DC-MULTISER-2UH-DIN, DC-MULTISER-2OH-DIN)
Operation Voltage (Un): 18 – 75 Vdc (DC-MULTISER-1UL-DIN, DC-MULTISER-1OL-DIN, DC-MULTISER-2UL-DIN, DC-MULTISER-2OL-DIN)
Operation Frequency: 50/60 Hz

## 8. Environment

Device Protection Class : IP 20
Terminal protection class : IP 00
Ambient Temperature : - 5 °C .... + 50 °C
Conneciton Type : to automat rail
Dimensions : 105x90x59 mm