DPM Three phase LED and LCD meter range

Technical reference manual

BGX701-233-R02

Table of Contents

1 Introduction

This manual is intended for understanding the various functions of AC three phase meter range. It broadly covers the following:

- How to install the meter
- How to configure the meter in setup mode
- How to configure the meter in ConfigView
- How to interpret the displays
- Variant-wise list of supported parameters

2 Precautions and safety practices

- This product must be installed and serviced only by trained personnel. We strongly recommend reading the “Quick Installation Guide” thoroughly before installing the product.
- Use appropriate personal protective equipment (PPE) and follow safe electrical practices.
- DPM meter should only be installed indoors by suitably trained persons.
- Failure to observe precautions can result in serious or even fatal injury and equipment damage.
- Do not exceed the specified voltage and current ratings.
- Check the auxiliary supply voltage and / or polarity before making connections.
- Prior to any work with the product, isolate the voltage inputs and auxiliary power supply and short-circuit the secondary winding of all external current transformers.
- Under no circumstances, the CT connections to the meter should be disconnected while current is flowing in the primary circuit of the external CT.
- Make sure that there are no loose connections, stray wires or exposed conductors.
- Do not use solvents or abrasive materials to clean the unit, use only a slightly damp cloth and isolate the unit from the supply before cleaning it.
- An easily reachable switch and circuit breaker must be provided while installing Auxiliary supply. Make sure to mark it as “Disconnecting Device for the equipment”.
- The equipment does not incorporate internal fuse. External fuse of rating 300V/0.5 A must be incorporated for safety precautions under fault conditions.
- Impact rating is IK06 and rated impact energy level is 1 Joule.
- Care must be exercised during the installation of the meter due to presence of mains voltages. Various points at the rear side operate at hazardous voltages.

The organization is committed to continuous improvement in our products and upgrading the feature set. While we will endeavour to integrate new features seamlessly, there could be instances when the enhancement is not backward compatible. Please check with the company representative for compatibility check before upgrade on an existing product.

Damage Preventing Measures:

Before installation, carryout the following checks and note the maximum voltage and current across the input terminals:

- The voltage of the auxiliary power should be in the range of 40-300 V AC (50/ 60 Hz)/ DC.
- The frequency of the distribution system should be in the range of 45 to 65 Hz.
- The maximum voltage across the voltage-input terminals (V1, V2, V3 and VN) is 500 V AC phase-to-phase.
- A maximum current overload supported by the meter (I1, I2 and I3) is 7.5 A

Failure to comply with the above safety measures could cause serious injuries. If the meter is used in a manner not specified by the manufacturer, the protection provided by connections may be impaired. The manufacturer shall not be held responsible for failure to comply with the instructions in this manual.

3 Terms and standards

3.1 Acronyms

Acronym	Definition
VAF	Voltage, Current, Frequency
LCD	Liquid crystal display
LED	Light emitting diode
PF	Power factor
O/P	Output
Aux	Auxiliary power
P.rate	Pulse Rate
Hist	History

3.2 Measurement units

Unit	Description
A	Ampere (unit of current)
Hz	Hertz (unit of frequency)
kVA	kilovolt ampere
W	Watt
kWh	kilowatt hour
ms	millisecond
V	Volt

4 Overview

The DPM series is a range of digital panel meters for reliable and accurate measurement of AC parameters for industrial and commercial applications. DPM provides true RMS measurement for AC parameters. The table given below provides detailed explanation of the product range available.

Meter	Display	No of digits	Size available		Variants	No. of keys
			96×96	96×48		
Three Phase AC meter	Single line LED	4	Yes	Yes	Voltmeter, Ammeter	2
	Single line LED	6	Yes	No	Energy meter	4
	Multi line (3 lines) LED	4	Yes	No	Voltmeter, Ammeter	2
		4			Active/ Reactive Power meter, Power factor meter, VAF meter	4
	Multi line (4 lines) LCD	5	Yes	No	Voltmeter, Ammeter, Active/ Reactive Power meter, Power factor meter, VAF meter	4

Table 1: Product details: Size and Variants

Variant	Product name
AC Voltage 3 Phase Single Line 4 digit LED, 40- 300 V AC/DC Aux,96X96	DPM V300
AC Current 3 Phase Single Line 4 digit LED, 40- 300 V AC/DC Aux,96X96	DPM I300
AC Voltage 3 Phase Single Line 4 digit LED, 40- 300 V AC/DC Aux,96X48	DPM V300
AC Current 3 Phase Single Line 4 digit LED, 40- 300 V AC/DC Aux,96X48	DPM I300
AC Voltage3 Phase Three Line 4 digit LED, 40- 300 V AC/DC Aux,96X96	DPM V310
AC Current 3 Phase Three Line 4 digit LED, 40- 300 V AC/DC Aux,96X96	DPM I310
AC Power Factor 3 Phase Three Line 4 digit LED, 40- 300 V AC/DC Aux,96X96	DPM P310
AC Active Power 3 Phase Three Line 4 digit LED , 40- 300 V AC/DC Aux,96X96	DPM W310
AC Reactive Power 3 Phase Three Line 4 digit LED , 40- 300 V AC/DC Aux,96X96	DPM R310
AC VAF 3 Phase Three Line 4 digit LED, 40- 300 V AC/DC Aux,96X96	DPM M310
Energy KWh (Cl.1) 3 Phase Single Line 6 Digits + MODBUS, 40- 300 V AC/DC Aux,96X96	DPM E300
AC Voltage 3 Phase Four Line 5 digit LCD, 40- 300 V AC/DC Aux,96X96	DPM V360
AC Current 3 Phase Four Line 5 digit LCD, 40- 300 V AC/DC Aux,96X96	DPM I360
AC Power Factor 3 Phase Four Line 5 digit LCD, 40- 300 V AC/DC Aux,96X96	DPM P360
AC Active Power 3 Phase Four Line 5 digit LCD, 40- 300 V AC/DC Aux,96X96	DPM W360
AC Reactive Power 3 Phase Four Line 5 digit LCD, 40- 300 V AC/DC Aux,96X96	DPM R360
AC VAF 3Phase Four Line 5 digit LCD, 40- 300 V AC/DC Aux,96X96	DPM M360

Table 2: Product name

Three phase DPM series are digital panel meters with single-line and multi-line digital displays.

These are panel-mounted (96*48 and 96*96) meters capable of measuring and monitoring various electrical quantities. These meters are an ideal replacement for analogue ammeter/voltmeter combinations and are suitable for sub-metering of distribution system in Industrial and Commercial applications.

DPM are configurable for HV 3-phase 3-wire, HV 3-phase 4-wire or LV 3-phase 4-wire and have accuracy class of 0.5 % FS.

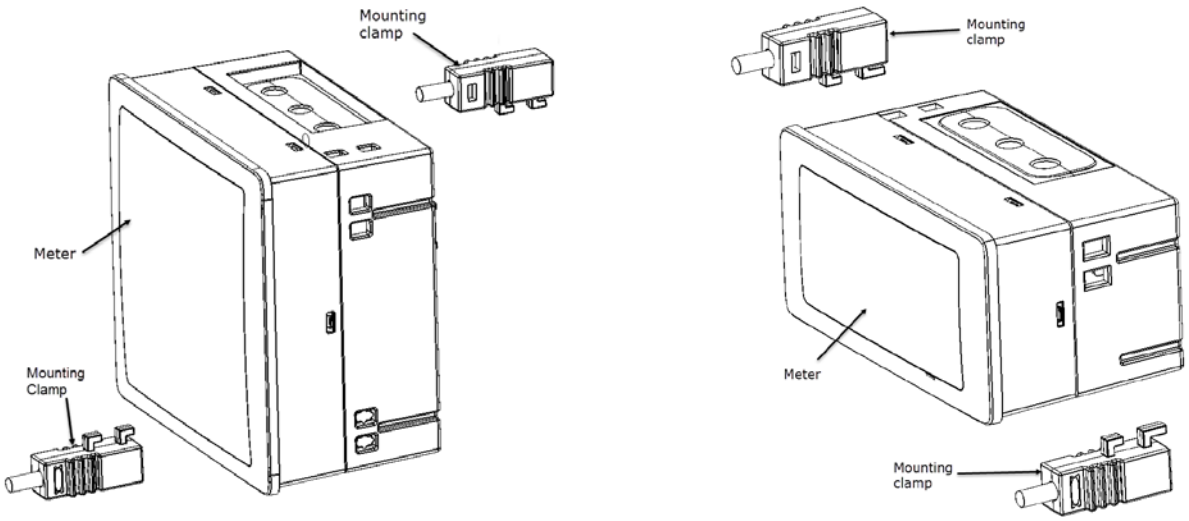


Figure 1: Digital Panel Meter Parts

The meter's front panel has an LED/ LCD. When powered, the LED/LCD is capable of displaying a group of related electrical parameter values.

The meter has external detachable parts as shown in the above figure. These are described in the 'Rear Panel' section.

5 Features and Applications

5.1 Operational features

Display Panel Meter has the following operational features:

- LED and LCD display product ranges
- Reliable and accurate measurement
- User configurable alert thresholds for various parameters
- Unique pass through mechanism for current termination
- Wide range AC/DC auxiliary power supply
- High level of protection degree
- Display of minimum and maximum values
- Touch-sense keys for ease of use-display access and configuration
- Current and power demand monitoring
- Available in two different panel cut-outs
- Field programmable – CT/ PT commissioning etc
- Password protected set-up mode
- Auto unit adjustment for voltage, current, power and energy

These meters are useful for the following applications:

- o High voltage and medium voltage switch gear panels
- o Power Control Centre panels
- o Motor Control Centre panels
- o Low Voltage distribution panels
- o Control and relay panels
- o Test benches
- o Laboratory equipment

5.2 Physical and functional features

5.2.1 Meter dimension (For 96×48 size variant)

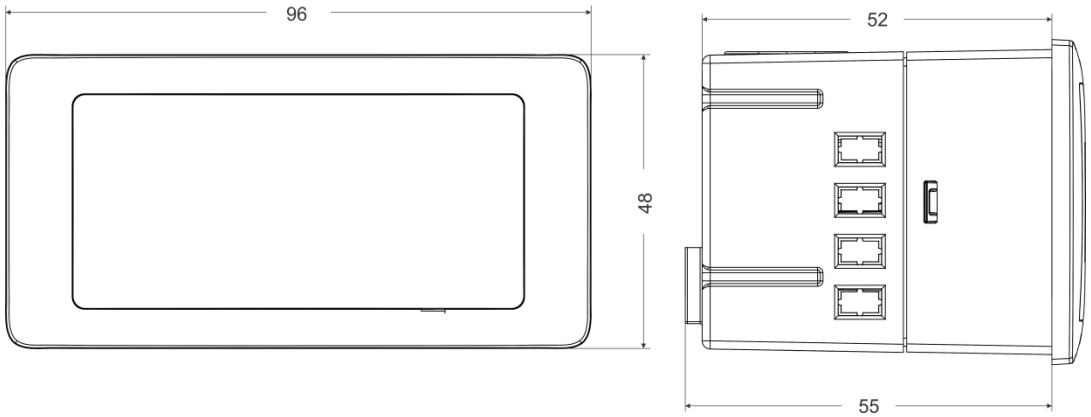


Figure 2: Meter dimensions without mounting screw and parking terminal

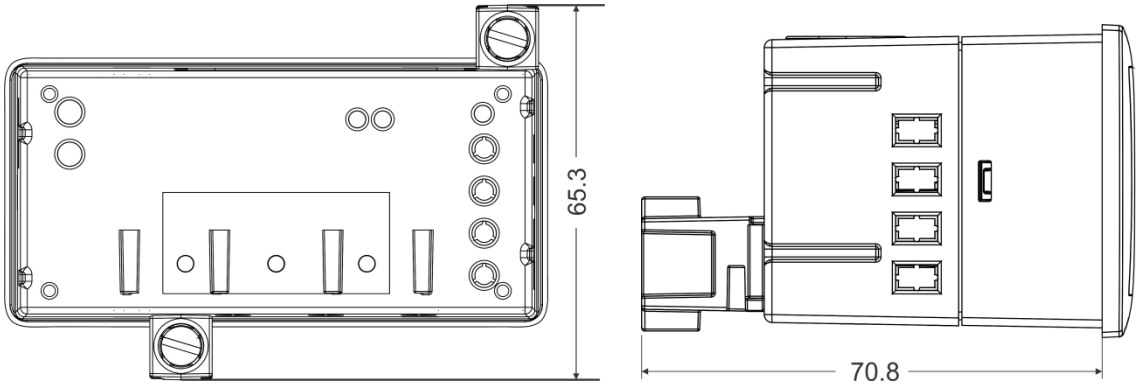


Figure 3: Meter dimensions with mounting screw and parking terminal

Note: All dimensions are in ‘mm’. General Tolerance is ± 1.0 mm

5.2.2 Meter dimension (For 96×96 size variant)

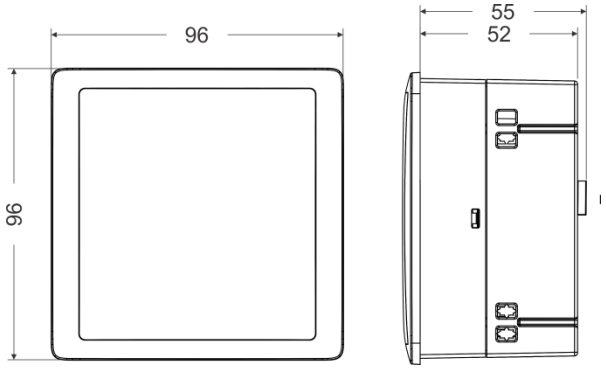


Figure 4: Meter dimensions without mounting screw and parking terminal

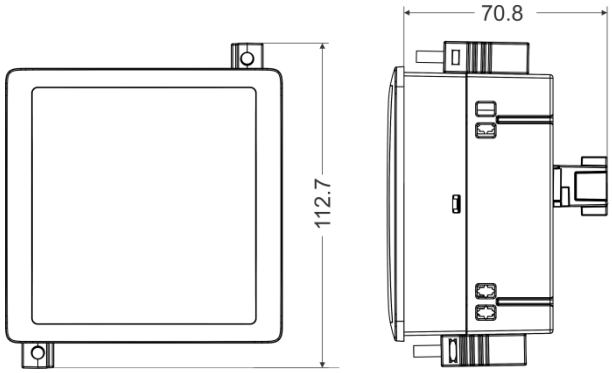
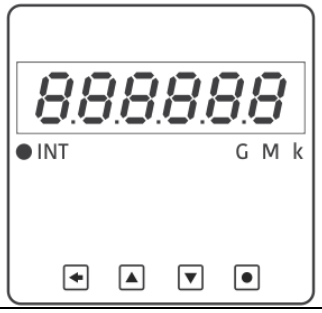


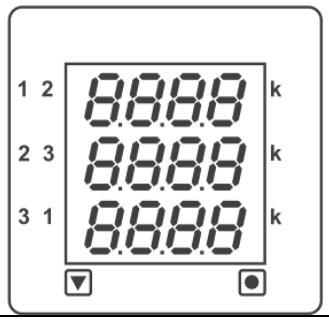
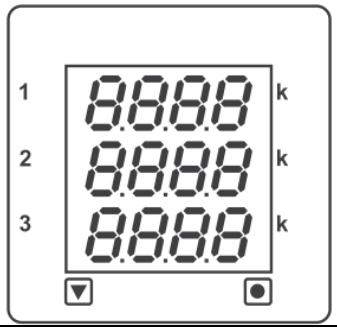
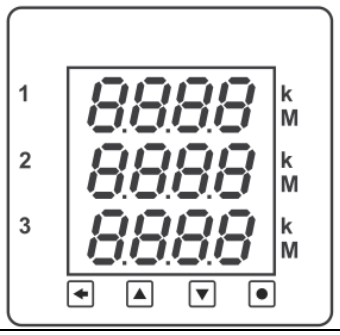
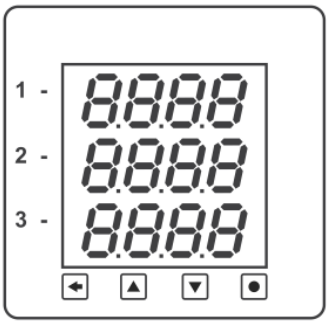
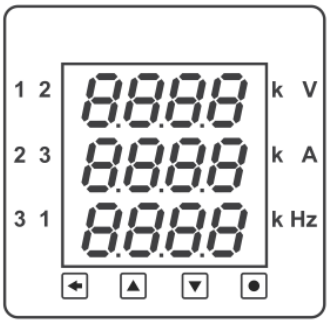
Figure 5: Meter dimensions with mounting screw and parking terminal

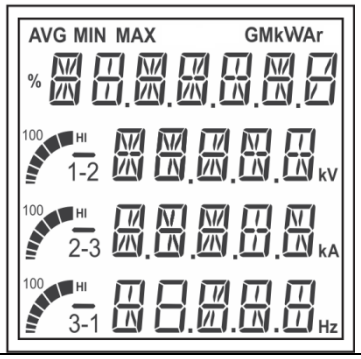
Note: All dimensions are in 'mm'. General Tolerance is ± 1.0 mm

5.2.3 Front panel

The front face of Digital display panel meter has digital LED or LCD, two/ four touch keys and enunciator at the front as shown in the following figure and described below:

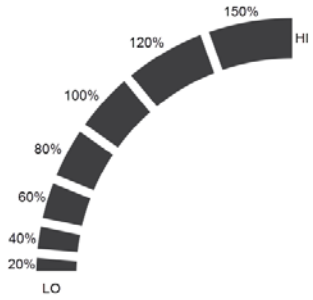
Single line LED displays			
Variant	Display	No. of Touch keys	Enunciator
Voltmeter/ Ammeter		2	Phase indicator (1,2,3) Value multiplier (k)
Energy meter		4	Value multiplier (G, M, k) Energy Integration (INT)

Multiline LED displays			
Voltmeter		2	Phase indicator (1-2,2-3,3-1) Value multiplier (k)
Ammeter		2	Phase indicator (1, 2, 3) Value multiplier (k)
Power meter		4	Phase indicator (1, 2, 3) Value multiplier (k, M)
Power factor meter		4	Phase indicator (1, 2, 3) Lead PF/ Export Power (-)
VAF meter		4	Phase indicator (1-2, 2-3, 3-1) Value multiplier (k) Unit indicator (V, A, Hz)

Multiline LCD display			
Voltmeter/ Ammeter/ Power meter/ Power factor meter/ VAF meter		4	Phase indicator (1-2, 2-3, 3-1) Lead PF/ Export Power (-) Unit indicator (kV, kA, Hz)

1. **Digital Display (LED):** The LED is a 7-segment 4-digit (6-digit in Energy meter) single line/ three line display with character size as 14.2×8.1 mm (Height × Width). The red LED with black background is legible from 5 meter distance which when powered can display various measured basic electrical parameters such as voltage, current, active power, frequency. In addition, inside borders are reserved to display measuring units and indicators.
2. **Digital Display (LCD):** The LCD comprises of 7 digits in first line and five digits in second, third and fourth line with character size as 11×7mm (Height × Width). The white LCD with black background which when powered can display various measured basic electrical parameters such as voltage, current, active power, etc. In addition, inside borders are reserved to display measuring units, indicators and percentage bar graph.

Note: Analogue bar graph in LCD variant shows voltage for voltmeter and current load for al other meters.



Range	Bars Visible
0-15.999%	**0**
16-35.999%	**1**
36-55.999%	**2**
56-75.999%	**3**
76-95.999%	**4**
96-115.999%	**5**
116-135.999%	**6**
136% and above	**7**

3. **Touch key functions (2 touch key variants): V300, I300, V310, I310**

   The touch keys provided on the front panel can be used to navigate through various displays, switching to a different display mode or to perform specific actions at the meter-end such as PT configuration.

The meter has two touch keys on the front, aligned in a row below the LED. Each key has the following specific use in various operating modes:

Key	In Setup mode		
	Long press (5 s)	Short press	
▼ & ●	Enter Setup mode	No function	
		Navigation	**Editing**
▼	No function	Scroll through the parameter list	Increment the value
●	No function	Select the current option	• Confirm or save the entered digit or value. • Move to the next digit or value

Table 3: Touch key functions (In Setup Mode)

Key	In Display mode	
	Long press (5 s)	Short press
▼	No function	Scroll through the parameter list and values
●	Reset Min (Lo) or Max (Hi) values	Scroll through max (Hi) and min (Lo) values

Table 4: Touch key functions (In Display Mode)

Note: V300, I300, V310, I310 are two touch key variants.

Touch key functions (4 keys variant):

The meter has four touch keys on the front, aligned in a row below the LED/ LCD. Each key has the following specific use in various operating modes:

Key	In Setup mode		
	Long press (5 s)	Short press	
▼ & ●	Enter Setup mode	No function	
		Navigation	**Editing**
◄	No function	Go back to the previous option	No function
▲	No function	Scroll through the parameter list	Increment the value
▼	No function	Scroll through the parameter list	Decrement the value
●	No function	Select/ enter the current option	• Confirm or save the entered digit or value. • Move to the next digit or value

Table 5: Touch key functions (In Setup Mode)

Key	In Display mode	
	Long press (5s)	Short press
◄	No function	Alert acknowledgement
▲	No function	Scroll through the parameter list and value (Run hr value in VAF)
▼	No function	Scroll through the parameter list and value
●	Reset Min-Max values	Scroll through max (Hi) and min (Lo) values
▲ & ▼	Freeze the current display (except in Energy meter)	No function

Table 6: Touch key functions (In Display Mode)

Notes:

1.) P310, W310, R310, M310, E300, V360, I360, P360, W360, R360, M360 are four touch key variants.

2.) Scroll lock feature present is used to freeze the current display while the user is working in display mode. It is accessed by pressing ▲ & ▼ key.

3.) 3 Ø ~ indicates three phase meter

5.2.4 Rear panel

On the rear panel, these meters have voltage terminals, current terminals, an auxiliary power supply terminals as shown in the following figure. In addition, there are separate sockets for fitting mounting clamps.

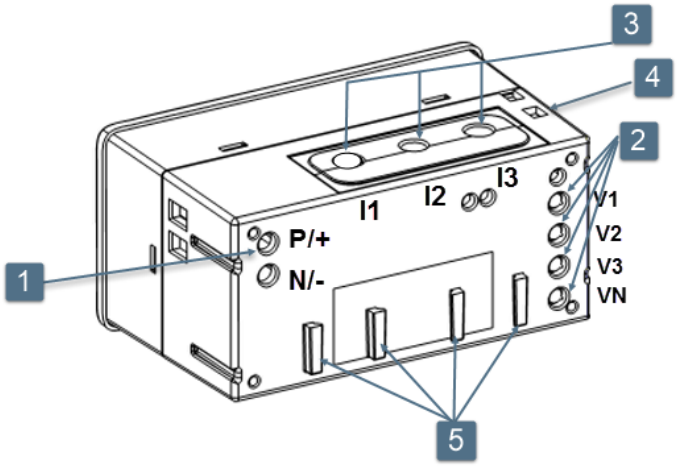


Figure 6: Rear panel details (Size: 96×48)

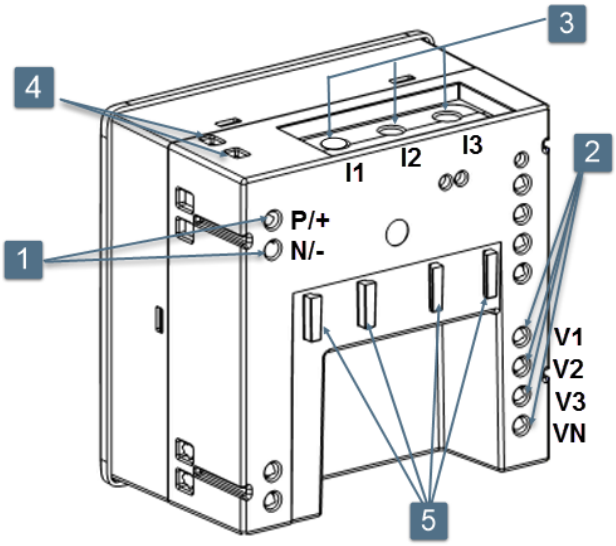


Figure 7: Rear panel details (Size: 96×96)

1	Auxiliary power supply terminals (P/+, N/-)
2	Measurement circuit (V1,V2, V3, VN)
3	CT Pass through
4	Socket for fitting Mounting clamps
5	Guide for fitting Parking terminal

6 Meter Operation

Operating the meter is necessary for the following purpose:

a. Navigating through the display pages in Manual and Auto-display mode.

b. Updating configuration or changing password from the Setup Mode (touch keys).

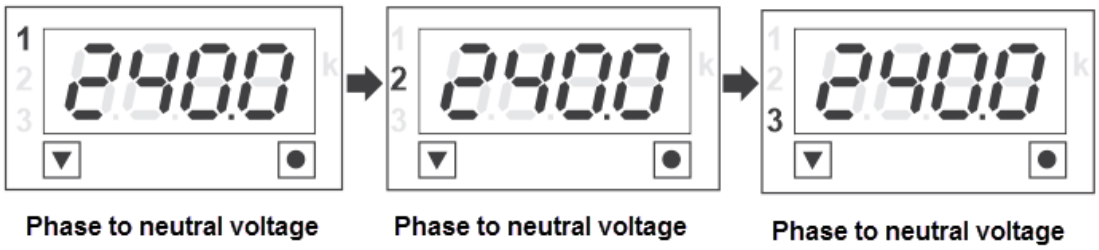
6.1 Meter display mode

By default, the meter display is configured to cycle through a sequence of preset Auto-cycle display pages. This default mode can be switched to the Manual display mode in which you can navigate using the touch keys.

On pressing ● key, the meter will display values of the parameter that is measured by the meter. For example: Voltmeter and Ammeter will display values of the voltage and current respectively.

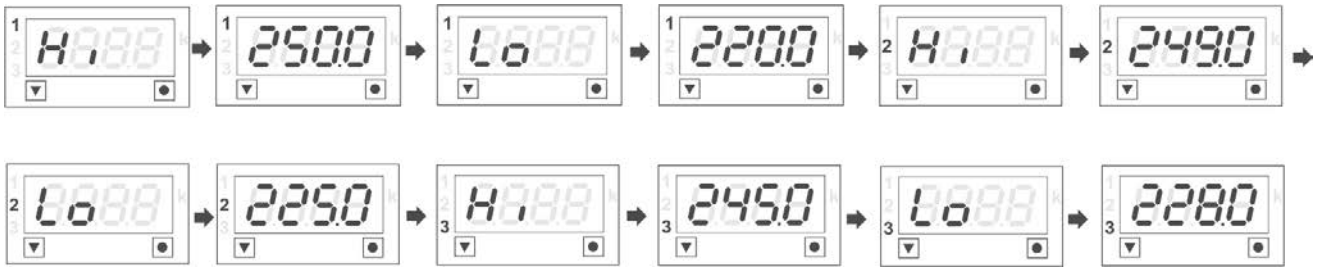
6.1.1 Voltmeter (Single line) display

The below given cycle of displays will appear while meter is running in auto mode.



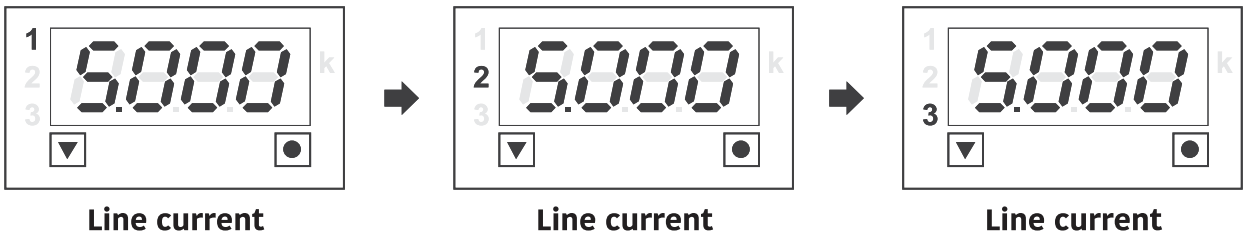
The below given cycle of displays will appear while meter is running in manual mode.

On pressing ● key, the meter will display values of maximum and minimum voltage that is measured by the meter for all the phases as given below:

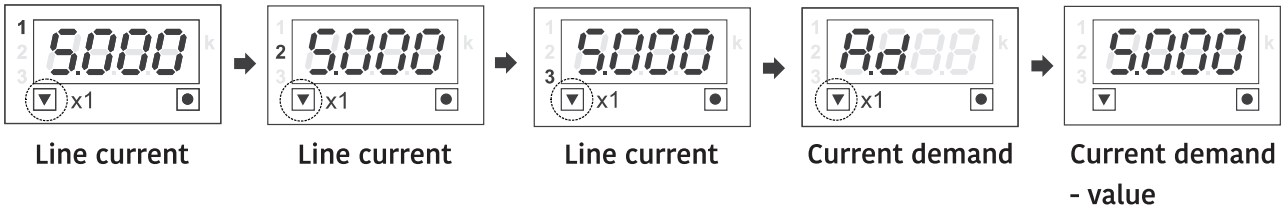


6.1.2 Ammeter (Single line) display

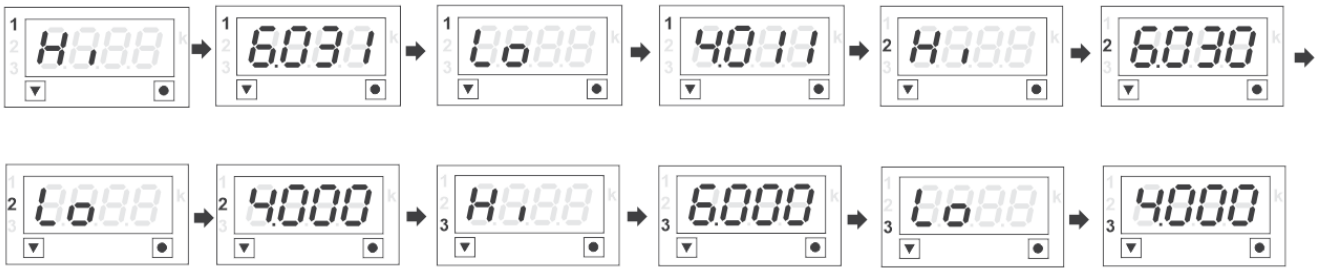
The below given cycle of displays will appear while meter is running in auto mode.



The below given cycle of displays will appear while meter is running in manual mode.

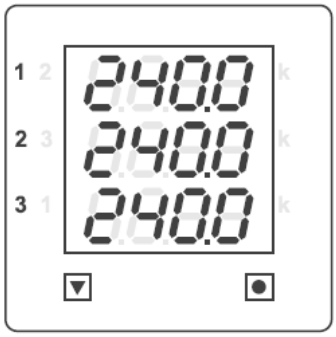


On pressing ● key, the meter will display values of maximum and minimum current that is measured by the meter for all the phases as given below:



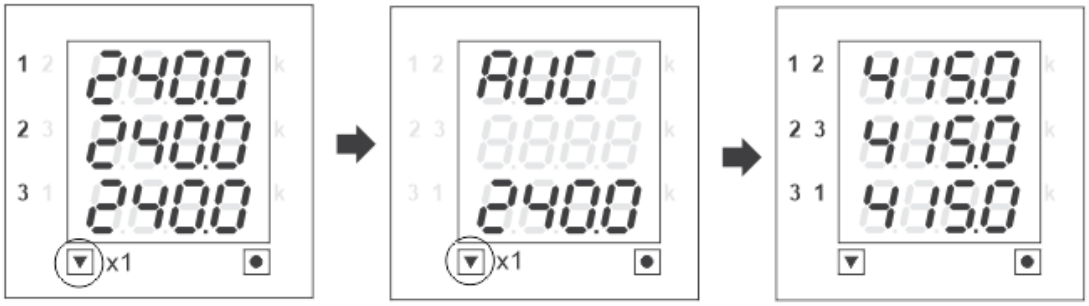
6.1.3 Voltmeter (Three line) display

The below given display will appear while meter is running in auto mode.



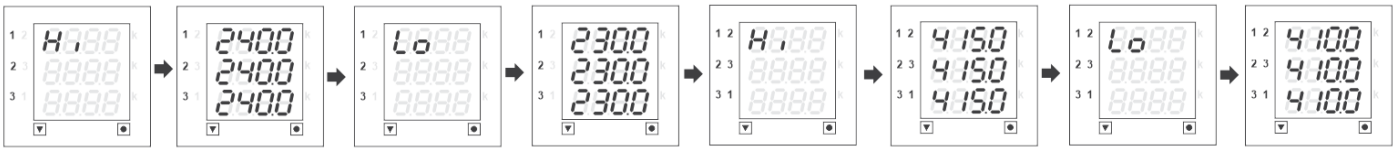
Phase to neutral voltage

The below given cycle of displays will appear while meter is running in manual mode.



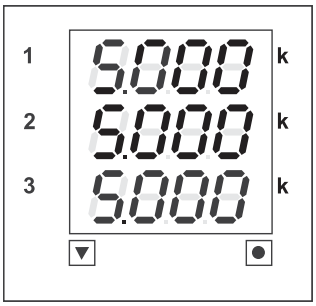
Phase to neutral voltage **Average voltage** **Phase to phase voltage**

On pressing ● key, the meter will display values of maximum and minimum voltage that is measured by the meter for all the phases as given below:



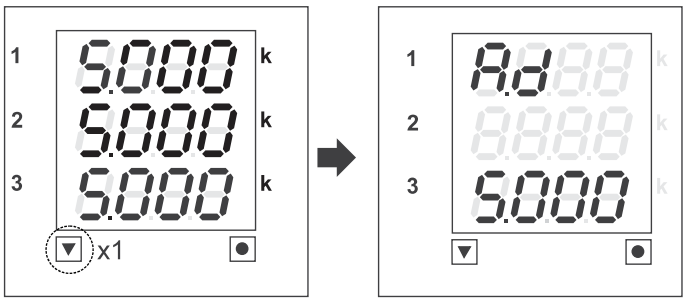
6.1.4 Ammeter (Three line) display

The below given display will appear while meter is running in auto mode.



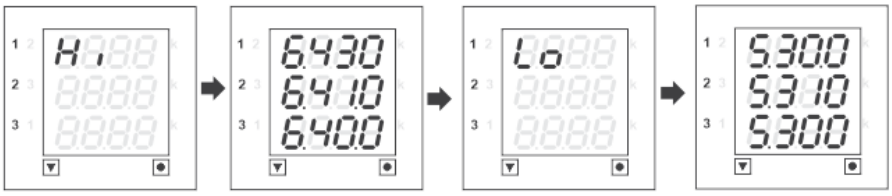
Line current

The below given cycle of displays will appear while meter is running in manual mode.



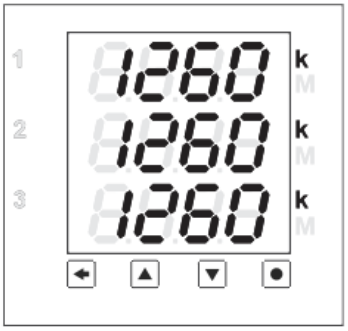
Line current Current demand

On pressing ● key, the meter will display values of maximum and minimum current that is measured by the meter for all the phases as given below:



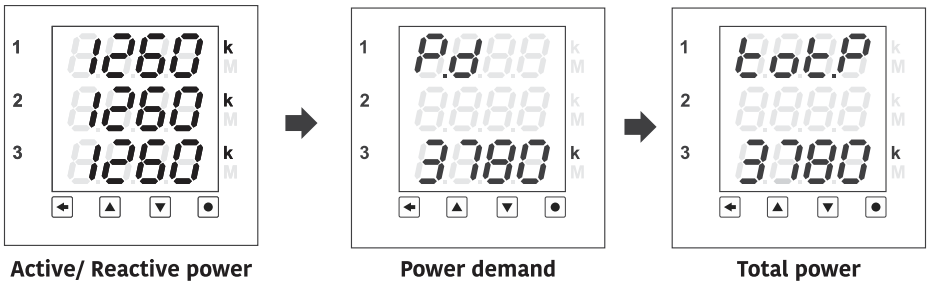
6.1.5 Active/ Reactive Power (Three line) display

The below given display will appear while meter is running in auto mode.



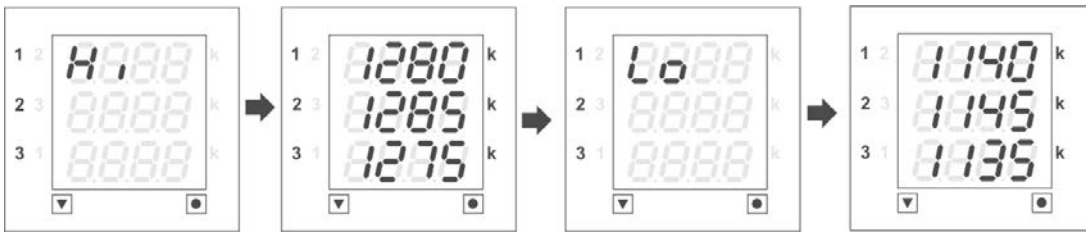
Active/ Reactive Power

The below given cycle of displays will appear while meter is running in manual mode.



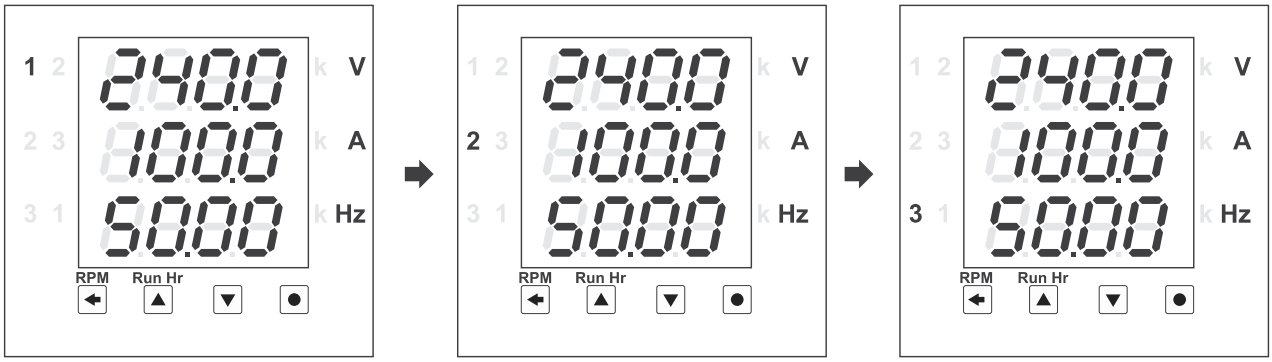
Active/ Reactive power | Power demand | Total power

On pressing ● key, the meter will display values of maximum and minimum active/ reactive power that is measured by the meter for all the phases as given below:



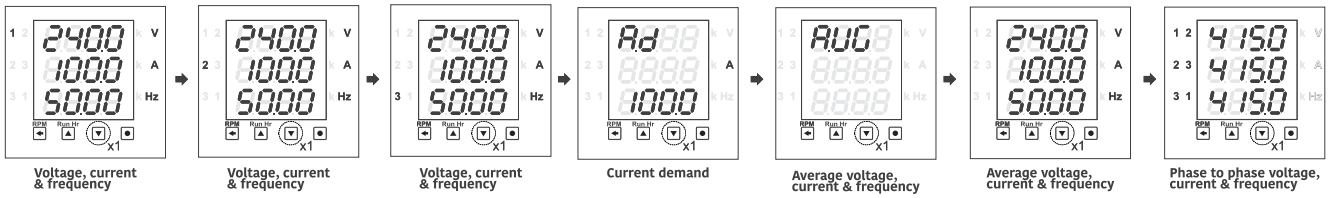
6.1.6 VAF meter (Three line) display

The below given cycle of displays will appear while meter is running in auto mode.

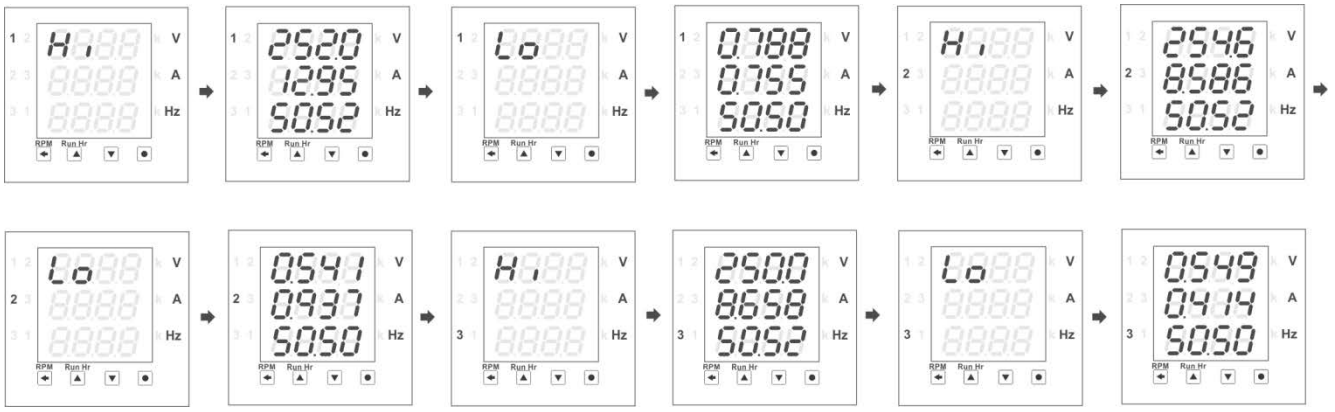


Phase 1 Voltage, current & frequency | Phase 2 Voltage, current & frequency | Phase 3 Voltage, current & frequency

The below given cycle of displays will appear while meter is running in manual mode.

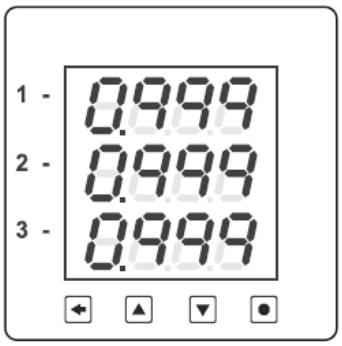


On pressing ● key, the meter will display values of maximum and minimum values of voltage, current and frequency that is measured by the meter for all the phases as given below:



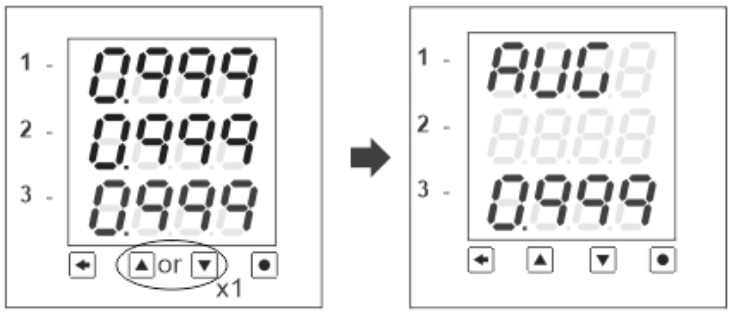
6.1.7 Power factor meter (Three line) display

The below given display will appear while meter is running in auto mode.



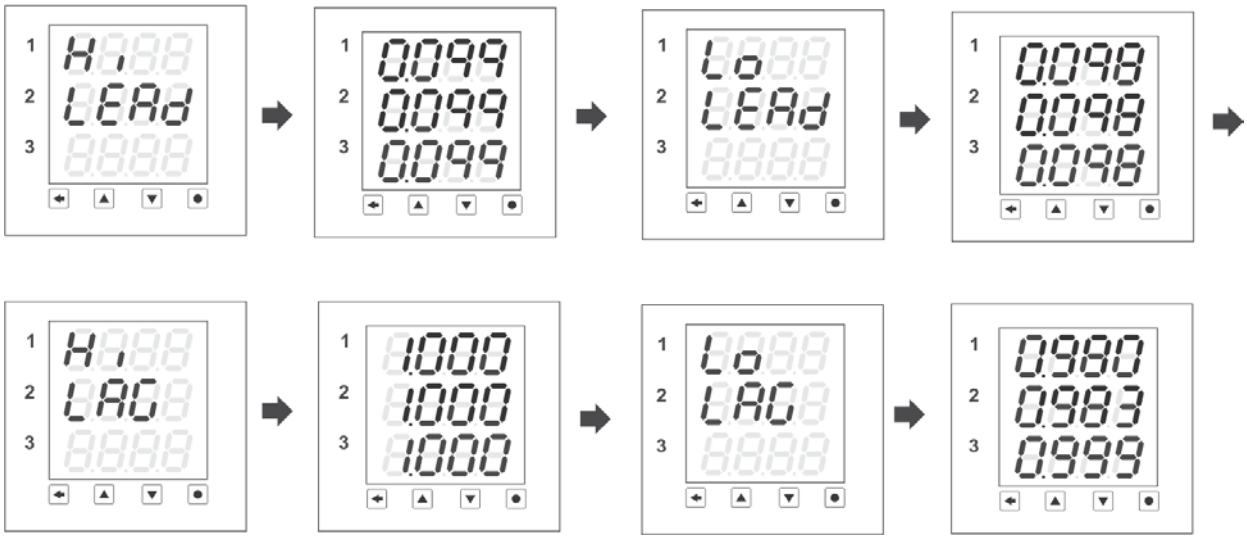
Power factor

The below given display will appear while meter is running in manual mode.



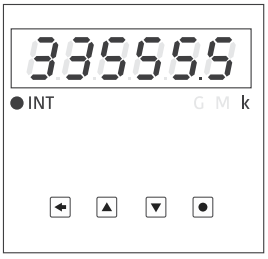
Power factor **Average Power factor**

On pressing key, the meter will display values of maximum and minimum values of power factor that is measured by the meter for all the phases as given below:

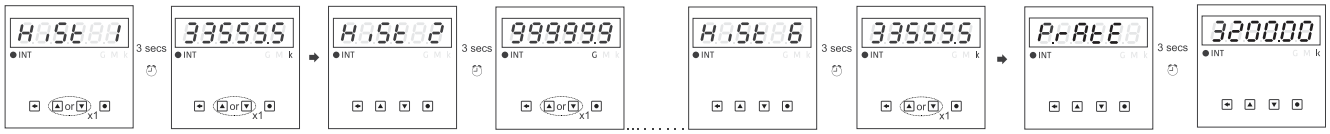


6.1.8 Energy meter (Single line) display

The below given display will appear while the meter is running in auto mode.



The below given cycle of displays will appear while meter is running in manual mode.



Notes: The display cycle will go through 6 energy histories in manual mode.

6.2 Using the setup mode

The Setup Mode can be used to configure the following parameters with the help of touch keys:

- o Setting the meter type
- o CT-PT commissioning
- o Setting Power demand and current demand time
- o Demand value reset
- o Alert setting
- o Display update time
- o Changing the password to access the Setup mode

The following figure gives the details of menu sequence in Setup mode.

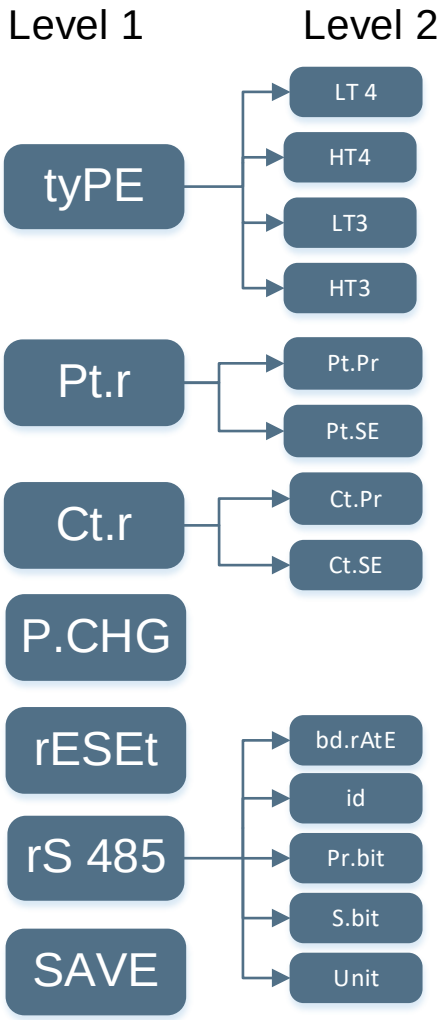


Figure 8: Menu sequence in Set-up mode (Energy meter)

Figure 9: Menu sequence in set up mode for LED meter range

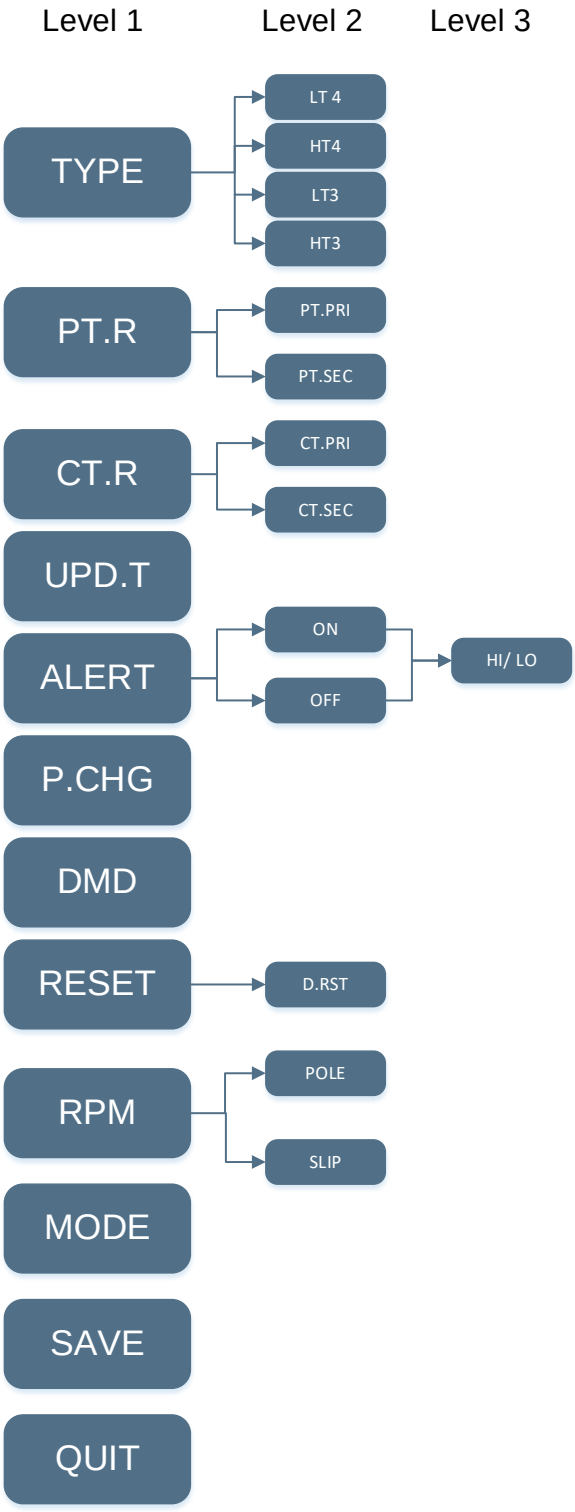
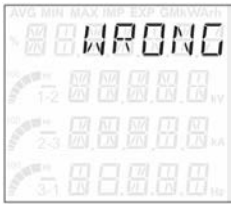


Figure 10: Menu sequence in Set-up mode for LCD meter range

6.2.1 Errors on display

While working in Set up mode, if the user enters the wrong value, an error message will be displayed on the screen. Below table gives the list of various error messages with their meaning.

Type	Description
	Incorrect password (For LED variant)
	Invalid value (For LED variant)
	Display limit out of range
	Incorrect password (For LCD variant)
	Invalid value (For LCD variant)

6.2.2 Password entry

6.2.2.1 For Single line LED display

The following steps will guide you to access the Setup Menu:

1. From the default display mode, simply press ▼ and ● key for 5 seconds to access the following Setup Mode.

2. Press ● key to confirm the selection of Password entry. This will give access to the following password entry prompt screen:

3. The first digit will start blinking. The user can change the value by pressing ▼ key and confirm the selection by pressing ● key. The second digit will start blinking now. The value for second digit, third and fourth digit is set by following the same process.

4. At the password prompt enter the 4-digit password (default password is '0000') using ▼ key. After completing the entry, press ● key to confirm. Correct password gives access to the 1st page of configuration mode, see figure (i). An incorrect password will display 'Err 1' message as shown in figure (ii).

(i) Display after correct password entry (ii) Display after incorrect password entry

In case you have entered incorrect password, the display will automatically return to the Setup Mode page or alternatively, press ● key to return to Setup Mode immediately.

6.2.2.2 For Three line LED display

The following steps will guide you to access the Setup Menu:

1. From the default display mode, simply press ▼ and ● key for 5 seconds to access the following Setup Mode.

2. Press ● key to confirm the selection of Password entry. This will give access to the following password entry prompt screen:

3. The first digit will start blinking. The user can change the value by pressing ▼ or ▲ key and confirm the selection by pressing ● key. The second digit will start blinking now. The value for second digit, third and fourth digit is set by following the same process. Please note that default password is '0000'.

4. Correct password gives access to the 1st page of configuration mode, see figure (i). An incorrect password will display ‘Err 1’ message as shown in figure (ii).

(i) Display after correct password entry (ii) Display after incorrect password entry

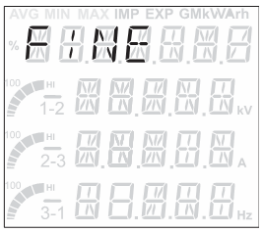
In case you have entered incorrect password, the display will automatically return to the Setup Mode page or alternatively, press ● key to return to Setup Mode immediately.

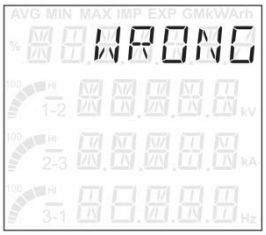
6.2.2.3 For Three line LCD display

The following steps will guide you to access the Setup Menu:

1. From the default display mode, simply press ▼ and ● key for 5 seconds to access the Setup Mode.
2. Press ● key to confirm the selection of Password entry. This will give access to the following password entry prompt screen:

3. The first digit will start blinking. The user can increase the value by pressing ▼ or ▲key and confirm the selection by pressing ● key. The second digit will start blinking now. The value for second digit, third and fourth digit is set by following the same process. Please note that default password is ‘0000’.
4. Correct password gives access to the 1st page of configuration mode, see figure (i). An incorrect password will display ‘WRONG’ message as shown in figure (ii).





(i) Display after correct password entry (ii) Display after incorrect password entry

In case you have entered incorrect password, the display will automatically return to the Setup Mode page or alternatively, press ● key to return to Setup Mode immediately.

6.2.3 Page navigation within the setup mode

The Setup Mode has the following sequence of configurable menus through which you can navigate using the touch keys:

S.No.	Configurable parameters	Description	Variants					
			Voltmeter	Ammeter	Active power meter	Reactive power meter	Power factor meter	VAF meter
1.)	tYPE	Meter type	✓	✓	✓	✓	✓	✓
2.)	PtrA	PT/ VT configuration	✓	×	✓	✓	×	✓
	CtrA	CT Configuration	×	✓	✓	✓	×	✓
3.)	Pd	Power demand	×	×	✓	✓	×	×
	Ad	Current demand	×	✓	×	×	×	✓
4.)	drSt	Demand value reset	×	✓	✓	✓	×	✓
5.)	POLE	Motor pole configuration	×	×	×	×	×	✓
6.)	SLiP	Motor slip configuration	×	×	×	×	×	✓
7.)	ALrt	Alert settings	✓	✓	✓	✓	✓	✓
8.)	UPdt	Display update time	✓	✓	✓	✓	✓	✓
9.)	PCHG	Password change	✓	✓	✓	✓	✓	✓
10.)	SAVE	Save	✓	✓	✓	✓	✓	✓

Table 7: Setup mode menu for LED meter range

S.No.	Configurable parameters	Description	Variants					
			V	I	W	R	PF	VAF
1.)	TYPE	Meter type	✓	✓	✓	✓	✓	✓
2.)	PTR	PT/ VT configuration	✓	×	✓	✓	×	✓
2.)	CTR	CT Configuration	×	✓	✓	✓	×	✓

3.)	UPDT	Display refresh time	✓	✓	✓	✓	✓	✓
4.)	ALERT	Alert settings	✓	✓	✓	✓	✓	✓
5.)	PCHG	Password change	✓	✓	✓	✓	✓	✓
6.)	DMD	Demand setting	×	✓	✓	✓	×	✓
7.)	RESET	Demand reset	×	✓	✓	✓	×	✓
8.)	RPM	Revolution per minute	×	×	×	×	×	✓
9.)	MODE	Mode Setting	×	×	×	×	×	✓
10.)	SAVE	Save settings	✓	✓	✓	✓	✓	✓
11.)	QUIT	Quit the menu	✓	✓	✓	✓	✓	✓

Table 8: Setup mode menu for LCD meter range

Use ▼ key for navigation through the above display sequence and ● key to select a configuration menu.

6.3 Configurations from the meter's setup menu

To configure available parameters from the Setup Menu, use the touch keys as specified below:

▼	To move the cursor to the right while entering a digit or value.
●	To select the option at the cursor position or confirm and save the entered value.

6.4 Editing set-up mode parameters

The following steps describe how to edit parameters in set-up mode:

1.) Press ▼ and ● key for 5 seconds to enter into set-up mode.

2.) Enter password. Default password is 0000.

3.) Press ▼ key to scroll through the list of parameters. The selected parameter will blink. Press ● to set the parameter.

4.) The selected parameter flashes digit, value, or decimal point that is required to be set. Increase the digit value and move the decimal point using ▼ key.

5.) Press ● key to set the decimal point and value selected.

Below example of PT configuration explains how to set a decimal point and values while editing in set-up mode

1.) After entering the default password, the user can scroll through the parameters using ▼ key. To edit the particular parameter, user will select the parameter by pressing ● key.

2.) When the user selects **Pt.r** and press ● key, the user can now start editing PT configuration by pressing ▼ key. The user will select Pt.Pr and Pt.SE one after the other and will set values for both.

3.) The user can freeze the type of PT configuration to be edited by pressing ● key.

4.) After entering the edit mode, the user will first set the decimal point and scaling factor by pressing ▼ key. Pressing ▼ key will move the decimal towards left direction. Once the decimal is set, it is set by pressing ● key.

5.) After decimal point adjustment, user will enter the values. The first digit will start blinking. Pressing ▼ key will result in scrolling of digits from 0 to 9. The user will set the desired value by pressing ● key and the cursor will move to the second digit. As a result, second digit starts blinking. Similarly the value of second digit and remaining digits is fixed and the overall value of the type of Pt.Pr is configured. Similarly the process is repeated for PT.SE.

Below example of CT configuration explains how to set a decimal point and values while editing in set-up mode

1.) After entering the default password, the user can scroll through the parameters using ▼ key. To edit the particular parameter, user will select the parameter by pressing ● key.

2.) When the user selects Ct.r and press ● key, the user can now start editing CT configuration by pressing ▼ key. The user will select Ct.Pr and Pt.SE one after the other and will set values for both.

3.) The user can set the type of CT configuration to be edited by pressing ● key.

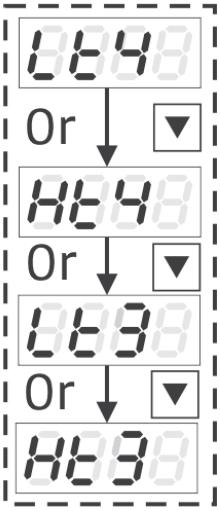
4.) After entering the edit mode, the user will first set the decimal point and scaling factor by pressing ▼ key. Pressing ▼ key will move the decimal towards left direction. Once the decimal is set, it is set by pressing ● key.

5.) After decimal point adjustment, user will enter the values. The first digit will start blinking. Pressing ▼ key will result in scrolling of digits from 0 to 9. The user will set the desired value by pressing ● key and the cursor will move to the second digit. As a result, second digit starts blinking. Similarly the value of second digit and remaining digits is fixed and the overall value of the type of Pt.Pr is configured. Similarly the process is repeated for PT.SE.

Note: All other parameters in setup mode are configured in the same way as PT/ CT configuration.

6.4.1 Configuration for Single-line LED meter range

6.4.1.1 Meter type

This option is used to set the wiring configuration of the meter. The commissioning option can be used to configure the meter type.	
	**Meter type configuration – Lt4, Ht4, Lt3, Ht3** To select it, press ●. The following display page will appear:
	With the help of ▼ key select the meter type and then press ● to confirm and save the selection. **Default meter type: Lt4**

6.4.1.2 CT-PT commissioning

This option is used to set VT/PT and CT Primary and Secondary configuration.	
	**Primary voltage configuration** To select this option, move the selection bar on ‘Pt Primary’ option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 100 V to 2000 kV** **Default value: 240 V**
	**Secondary voltage configuration** To select this option, move the selection bar on ‘Pt Secondary’ option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range for LT3: 395 V to 440 V** **Applicable range for LT4: 200 V to 250 V** **Applicable range for HT3 /HT4: 100 V to 130 V**

	**Primary current configuration** To select this option, move the selection bar on ‘Ct Primary’ option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 A to 15000 A** **Default value: 5 A**
	**Secondary current configuration** To select this option, move the selection bar on ‘Ct Secondary’ option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range: 1 A to 5 A in steps of 1** **Default value: 5 A**

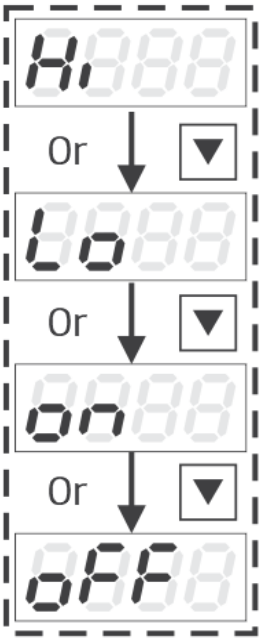
6.4.1.3 Power/ Current demand

This option is used to set the time interval of demand for current/power. To select this option, move selection bar on Current demand option and then press ● The following display will appear:	
	**Current demand Configuration** To select it, press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 to 30 minutes (Ammeter)** **Default value: 15 minutes**

6.4.1.4 Demand value reset

This option is used to reset the last value of the current/ power demand. It can be used to configure the Demand value reset	
	**Demand value reset Configuration** To select this option, move selection bar on ‘Demand value reset’ option and then press ●. The following display will appear: Select Yes or No using ▼ key and then press ● to confirm and save the selection.

6.4.1.5 Alert setting

The high and low threshold is set with this option to raise an alert whenever the value falls either below or above the set range.	
	**Alert Configuration** To select Alert configuration, press ●. The display page shown on the left appears.
	With the help of ▼ key select the alert type. Both High and Low alerts are to be configured. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range:** **For Voltage: 1 to 3000 k** **For Current: 0.010 to 22.50 k**

Note:

1.) Alerts will be displayed only when they are configured as 'ON'

2.) High and Low Alerts will be displayed continuously on screen till they are acknowledged by pressing any key. Once the key is pressed, it will show instantaneous value.

3.) Alerts will only be displayed if the event persistence time is ≥15 seconds.

4.) Alerts can be configured for Voltage and Current.

5.) User can manually turn on or off the alerts.

6.) Following high/ low threshold alerts will be displayed for each phase in sequential order. Examples consider the high threshold value was set at 110 and low threshold was set at 100.

6.4.1.6 Display refresh time

This option is used by the end user to change the update time of the display when the value keeps on changing frequently.	
	**Display refresh time Configuration** To select it, press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 to 5 seconds** **Default value: 5 seconds**

6.4.1.7 Password change

This option is used to configure Password change	
	**Password Change Configuration** To select it, press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 0000 to 9999**

6.4.1.8 Save

This option is used to save the configuration	
	Once all necessary configurations are updated, select the 'Save' option and press ●. This activates the new configuration in the meter. The 'Save done' message indicates that the activation is successful.

6.4.2 Configuration for Multi-line LED meter range

6.4.2.1 Meter type

This option is used to set the wiring configuration of the meter. It can be used to configure the meter type	
	**Meter type configuration – LT4, HT4, LT3, HT3** To select this option, press ●. The following display page will appear:

 	With the help of ▼ key select the meter type and then press ● to confirm and save the selection. **Default meter type: Lt4**

6.4.2.2 CT-VT commissioning

This option is used to set VT/PT and CT Primary and Secondary configuration.	
	**Primary voltage configuration** To select this option, move the selection bar on 'Pt Primary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 100 V to 2000 kV** **Default value: 240 V**
	**Secondary voltage configuration** To select this option, move the selection bar on 'Pt Secondary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range for LT3: 395 V to 440 V** **Applicable range for LT4: 200 V to 250 V** **Applicable range for HT3 /HT4: 100 V to 130 V**
	**Primary current configuration** To select this option, move the selection bar on 'Ct Primary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 A to 15000 A** **Default value: 5 A**

	**Secondary current configuration** To select this option, move the selection bar on ‘Ct Secondary’ option and then press. The display page shown on the left appears. Enter the desired value from the following permissible range and then press to confirm and save the selection. **Applicable range: 1 A to 5 A in steps of 1** **Default value: 5 A**

6.4.2.3 Power demand and Ampere demand

This option is used to set the time interval of demand for current and power. It can be used to configure the following parameter values:

a. Power demand

b. Ampere demand

To select this option, move selection bar on ‘Power/ Current demand’ option and then press The following display will appear:

	**Power demand Configuration** To select this option, press. The display page shown on the left appears. Enter the desired value from the following permissible range and then press to confirm and save the selection. **Applicable range : 1 to 60 minutes** **Default value: 15 minutes**
	**Ampere demand Configuration** To select this option, press. The display page shown on the left appears. Enter the desired value from the following permissible range and then press to confirm and save the selection. **Applicable range : 1 to 30 minutes (Ammeter)** **1 to 60 minutes (VAF)** **Default value: 15 minutes**

6.4.2.4 Demand value reset

This option is used to reset the last value of the current/ power demand. It can be used to configure the Demand value reset

	**Demand value reset Configuration** To select this option, move selection bar on ‘Demand value reset’ option and then press. The following display will appear: Select Yes or No using key and then press to confirm and save the selection.

6.4.2.5 Motor Pole Configuration

This option can be used to configure Motor Pole.	
 	**Motor Pole configuration** To select this option, move selection bar on 'Pole' option and then press. The following display will appear: Enter the desired value from the following permissible range and then press to confirm and save the selection. **Applicable range : 2, 4, 6, 8, 10, 12, 14, 16, 18** **Default value: 04**

6.4.2.6 Motor Slip Configuration

This option can be used to configure Motor slip.	
 	**Motor Slip Configuration** To select this option, move selection bar on 'Slip' option and then press. The following display will appear: Enter the desired value from the following permissible range and then press to confirm and save the selection. **Applicable range : 00.00 to 99.99%** **Default value: 04.00%**

6.4.2.7 Alert setting

The high and low threshold can be set with this option to raise an alert whenever the value falls either below or above the set range.	
	**Alert Configuration** To select Alert configuration, press ●. The display page shown on the left appears.
 	With the help of ▼ key select the alert type. Both High and Low alerts are to be configured. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range:** **For Voltage: 1 to 3000 k** **For Frequency: 45 to 65 Hz** **For Current: 0.010 to 22.50 k** **For PF: 0.100 to 1.000** **For Power: 1.000 to 9999 G** In the same way as given above, the user will configure Low alert values for voltage, current, frequency, power factor, active and reactive power. Once the High and Low values of Alerts is configured, the user can switch on or off the alerts

Note:

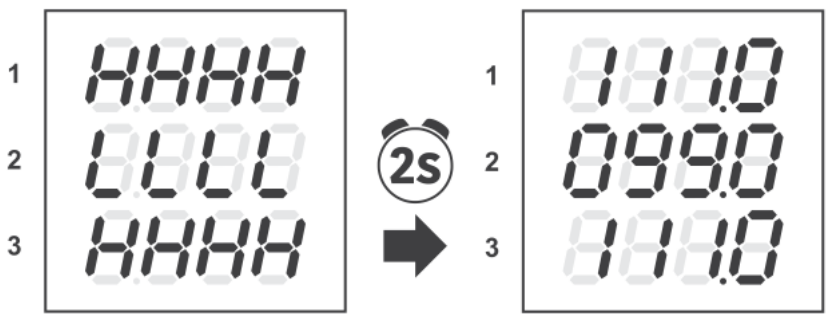
1.) Alerts will be displayed only when they are configured as 'ON'

2.) Alerts can be configured for Voltage, Frequency, Current, Power factor, Active/ Reactive/ Apparent Power.

3.) User can manually turn on or off the alerts.

4.) High and Low Alerts will be displayed continuously on screen till they are acknowledged by pressing ← key. Once the key is pressed, it will show instantaneous value.

5.) Following high/ low threshold alerts will be displayed for each phase in sequential order. Examples consider the high threshold value was set at 110 and low threshold was set at 100.



6.4.2.8 Display refresh time

This option can be used by the end user to change the update time of the display when the value keeps on changing frequently.	
 	**Display refresh time Configuration** To select this option, press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 to 5 seconds** **Default value: 5 seconds**

6.4.2.9 Password change

This option can be used to configure Password change	
 	**Password Change Configuration** To select this option, press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 0000 to 9999**

6.4.2.10 Save

This option is used to save the configuration	
	Once all necessary configurations are updated, select the ‘Save’ option and press ●. This activates the new configuration in the meter. The ‘Save done’ message indicates that the activation is successful.

6.4.3 Configuration for Single line Energy meter

All the configurations of single line energy meter are similar to the configuration of three line LED meter except for Modbus configuration and Meter Reset.

6.4.3.1 Meter type

	**Meter type configuration – LT4, HT4, LT3, HT3** To select this option, press ●. The following display page will appear:
	With the help of ▼ or ▲ key select the meter type and then press ● to confirm and save the selection. **Default meter type: Lt4**

6.4.3.2 PT commissioning

	This is used to set PT Primary and Secondary configuration.
	**Primary voltage configuration** To select this option, move the selection bar on 'Pt Primary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 100 V to 2000 kV** **Default value: 110 V**
	**Secondary voltage configuration** To select this option, move the selection bar on 'Pt Secondary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range for LT3: 395 V to 440 V** **Applicable range for LT4: 200 V to 250 V** **Applicable range for HT3 /HT4: 100 V to 130 V** **Default value: 110 V**

6.4.3.3 CT commissioning

	This option is used to set CT Primary and Secondary configuration.
	**Primary current configuration** To select this option, move the selection bar on 'Ct Primary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 A to 15000 A** **Default value: 5 A**
	**Secondary current configuration** To select this option, move the selection bar on 'Ct Secondary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range: 1 A to 5 A in steps of 1** **Default value: 5 A**

6.4.3.4 Password Change

This option can be used to configure Password change	
	**Password Change Configuration** To select this option, move selection bar on 'Password Change' option and then press ●. The following display will appear: Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 0000 to 9999** **Default value: 0000**

6.4.3.5 Reset configuration

. This option can be used to Reset the energy.	
	**Energy reset configuration** To select it, press ●. The display page shown on left will appear. Select Yes or No and press ● to confirm and save the selection. **Note:** Reset is done only once in Setup mode. If the user wants to again use the Reset option, they first need to exit from the Setup mode, enter Setup mode again and select Reset option.

Note: Pulse rate- 3200 impulse/ kWh for secondary commissioning can be viewed by pressing ▲ or ▼ key.

6.4.3.6 Modbus Configuration

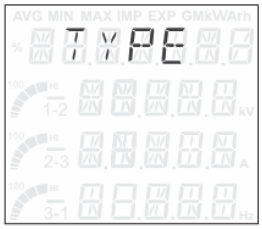
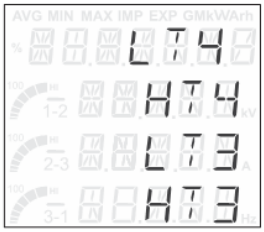
<table>
<tr><td colspan="2">This option can be used for energy meter Modbus configuration. Modbus configuration includes the following options:
1.) Baud rate
2.) Modbus ID
3.) Parity Bit
4.) Stop Bit
5.) Unit</td></tr>
<tr><td>  </td><td>Energy meter Modbus configuration
To select it, press ●. The display page shown on left will appear.</td></tr>
<tr><td>  </td><td>Baud rate configuration
With the help of ▼ key select the Modbus configuration and then press ● to confirm and save the selection.
Select the desired value from the following permissible range for Baud rate and then press ● to confirm and save the selection.
Applicable range: 1200 to 19200 bps
Default: 9600 bps</td></tr>
<tr><td>  </td><td>Modbus ID configuration
Select the desired value from the following permissible range for Modbus ID and then press ● to confirm and save the selection.
Applicable range: 1 to 247
Default ID: 1</td></tr>
<tr><td>  </td><td>Parity bit configuration
Select the desired value from the following permissible range for Parity bit and then press ● to confirm and save the selection.
Applicable range: None, Even, Odd</td></tr>
<tr><td>  </td><td>Stop bit configuration
Select the desired value from the following permissible range for Stop bit and then press ● to confirm and save the selection.
Applicable range: 1, 2</td></tr>
<tr><td>  </td><td>Unit configuration
Select the desired value from the following permissible range for Unit and then press ● to confirm and save the selection.
Applicable range: 0 (None), 1 (Kilo), 2 (Mega), 3 (Giga)</td></tr>
</table>

6.4.3.7 Save

This option can be used to Save the configuration settings.	
	**Save configuration** To select it, press ●. The display page shown on left will appear.
	Select Yes or No using with the help of ▼ or ▲ key and press ● to confirm and save the selection.

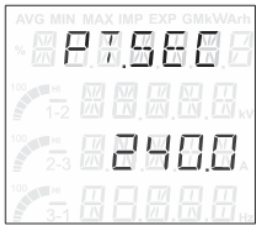
6.4.4 Configuration for LCD meter range

6.4.4.1 Meter type

. This option can be used to configure the meter type	
	**Meter type configuration – LT4, HT4, LT3, HT3** To select this option, press ●. The following display page will appear:
	With the help of ▼ key select the meter type and then press ● to confirm and save the selection. **Note:** Default meter type configuration is LT4

6.4.4.2 CT-PT commissioning

This option can be used to configure the CT/ PT	
	**Primary voltage configuration** To select it, move the selection bar on 'Pt Primary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 100 V to 2000 kV** **Default value: 240 V**
	**Primary current configuration** To select it, move the selection bar on 'Ct Primary' option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 A to 15000 A** **Default value: 5 A**

	**Secondary voltage configuration** To select it, move the selection bar on ‘Pt Secondary’ option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range for LT3: 395 V to 440 V** **Applicable range for LT4: 200 V to 250 V** **Applicable range for HT3 /HT4: 100 V to 130 V**
	**Secondary current configuration** To select it, move the selection bar on ‘Ct Secondary’ option and then press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range: 1 A to 5 A in steps of 1** **Default value: 5 A**

6.4.4.3 Display refresh time

This option can be used to configure Display refresh time.	
 	**Display refresh time Configuration** To select it, press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 to 5 seconds** **Default value: 1 second**

6.4.4.4 Alert setting

This option can be used to configure Alerts	
	**Alerts Configuration** To select it, press ●. The display page shown on the left appears. With the help of ▼ key select On or Off. If the user selects ‘On’, both High and Low alerts are to be configured. If the user selects ‘Off’, High and Low alerts are not to be configured.

	
	With the help of ▼ key select the High and Low values to be configured. Both High and Low alert ranges are to be configured. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range:** **For Voltage: 1 to 3000 k** **For Frequency: 45 to 65 Hz** **For Current: 0.010 to 22.50 k** **For PF: 0.100 to 1.000** **For Power: 1.000 to 9999 G** The user will configure High and Low alert values for voltage, current, frequency, power factor, active and reactive power. Once the High and Low values of Alerts are configured, the user can switch on or off the alerts.

Notes:

1.) Alerts will be displayed only when they are configured as 'ON'

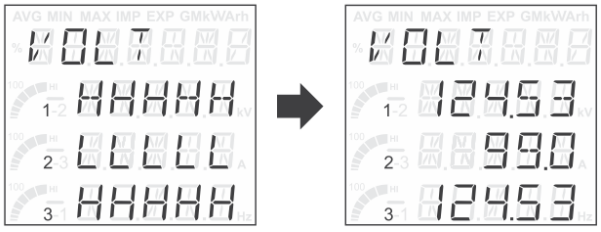
2.) Alerts will only be displayed if the event persistence time is ≥15 seconds.

3.) Alerts can be configured for Voltage, Frequency, Current, Power factor, Active/ Reactive/ Apparent Power.

4.) User can manually turn on or off the alerts.

5.) High and Low Alerts will be displayed continuously on screen till they are acknowledged by pressing ◄ key. Once the key is pressed, it will show instantaneous value.

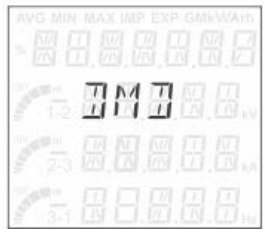
6.) Following high/ low threshold alerts will be displayed for each phase in sequential order. Examples consider the high threshold value was set at 110 and low threshold was set at 100.



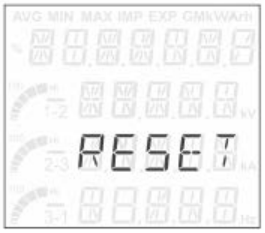
6.4.4.5 Password Change

This option can be used to configure Password change	
	**Password Change Configuration** To select this option, move selection bar on 'Password Change' option and then press ●. The following display will appear: Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 0000 to 9999** **Default value: 0000**

6.4.4.6 Demand time setting

This option can be used to configure Demand time settings.	
 	**Demand time setting Configuration** To select this option, press ●. The display page shown on the left appears. Enter the desired value from the following permissible range and then press ● to confirm and save the selection. **Applicable range : 1 to 60 min** **Default value: 15 min**

6.4.4.7 Demand reset

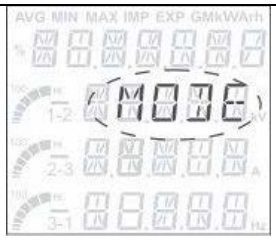
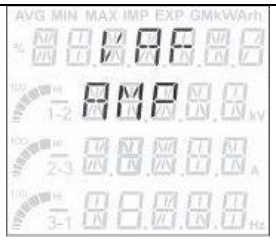
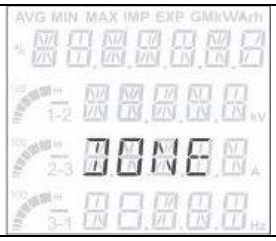
This option can be used to configure Demand reset	
 	**Demand reset Configuration** To select it, press ●. The display page shown on the left appears. With the help of ▼ key select the reset type and then press ● to confirm and save the selection.

6.4.4.8 Revolution per minute

. This option can be used to configure parameters for the calculation of RPM for motor.	
 	**Revolution per minute Configuration** To select this option, press ●. The display page shown on the left appears. With the help of ▼ key select the RPM type (Pole and Slip) and then press ● to confirm the selection. Enter the desired value from the following permissible range for each RPM type and then press ● to confirm and save the selection. **Applicable range (For Pole) : 2, 4, 6, 8,10, 12, 14, 16, 18** **Default value: 04** **For Slip: 00.00 to 99.99%** **Default value: 04.00%**

6.4.4.9 Mode setting configuration

This option lets you switch between the VAF and Ampere meter.	
	**Display Mode selection** To select it, press ●. The display page shown on the left appears.
	With the help of ▼ or ▲ key scroll through the available functions. Select the desired function. Press ● to confirm and save the selection.
	A confirmation appears as shown in the left.

6.4.4.10 Save

This option is used to save the configuration	
	Once all necessary configurations are updated, select the ‘Save’ option and press ●. This activates the new configuration in the meter. The ‘Save done’ message indicates that the activation is successful.

7 Technical specifications

Electrical	
Wiring configuration	3-phase 3-wire/ 3-phase 4-wire
Voltage range	
Measuring voltage range	20 V to 500 V AC (P to P) and 20 V to 300 V AC (P to N)
Nominal voltage range (U_n)	57.5 V to 240 V (P to N), 100 V to 415 V (P to P) (50/ 60 Hz)
Over voltage	150 % U_n continuous
Current range	
Measuring current range	50 mA to 6 A
Nominal current range (I_n)	1 A or 5 A
Over load	150 % I_n continuous
Short time over current	24 A for 1 sec for 1 A, 120 A for 1 sec for 5 A
Frequency range	45 to 65 Hz
Active Power/ Reactive Power/ VAF	Measuring voltage: 35 V to 500 V (P to P) Voltage (U_n): 57.5 V to 240 V (P to N); 100 V to 415 V (P to P) Measuring current range: 50 mA to 6 A Current (I_n): 1 A or 5 A
Energy (6 digit)	Measuring voltage: 40 V to 300 V (P to N) Voltage (U_n): 57.5 V to 240 V (P to N); 100 V to 415 V (P to P) Measuring current range: 50 mA to 6 A Current(I_n): 1 A or 5 A
Auxiliary supply range	40 to 300 V AC(50/ 60 Hz) / DC
Accuracy	
Voltage, Current, Active/ Reactive Power	± 0.5% Full scale
Frequency	± 0.1 Hz
Power factor	± 0.005
Energy	Class 1.0 (acc to IEC 62053-21)
Temperature coefficient	Voltage, current: 0.05% / degree Celsius
Burden	
Voltage circuit	< 0.2 VA / phase
Current circuit	1 A: < 0.1 VA / phase; 5 A: < 0.4 VA / phase
Auxiliary supply	< 2 VA (For Voltmeter/ Ammeter) < 3.5 VA (VAF/ Power/ PF/ Energy)
Compliance	
Safety and other Standards	CE, EN / IEC 61010-1; EN / IEC 61010-2-030, IEC 61326-1 Energy variant only: IEC/ EN 62053-21

Mechanical		
Dimensions	Meter Size	Dimensions with mounting clamps W X H X D (mm)
	96 x 48 mm	65.3 X 96 X 52
	96 x 96 mm	112.7 X 96 X 52
Weight	96 x 96 mm: 200±30 g (Voltmeter/ Ammeter); 250±30 g (Active/ Reactive Power/ VAF/ Power factor) 96 x 48 mm: 140±30 g (Voltmeter/ Ammeter)	
Torque (tightening screw)	0.5 Nm	
Recommended panel sheet thickness	1.8 mm to 3 mm	
Enclosure	Flame Retardant Polycarbonate (as per UL 94 V0)	
Terminals		
Voltage/auxiliary	Terminal block connectors up to 2.5 mm^2 cable	
Current	Pass-through connections: up to 4 mm^2 cable	
Parking terminal for CT termination	U-type / ring-type terminations: maximum up to 4 mm^2 cable	
Communication (Energy variant only)		
RS485	Modbus, half-duplex, floating point, refresh rate: 500 ms at 9600 baud rate	
Baud rate	1200 to 19200 bps, (default 9600 bps)	
Parity bit	None, even, odd	
Stop bit	1,2	
Mod ID	1 to 247	
Environmental		
Protection degree	Front fascia: IP 54 default, Terminal IP20	
Pollution Degree	2	
ESD	EN / IEC 61000-4-2 (compliance to international standard IEC/EN 61326)	
EFT	EN / IEC 61000-4-4 (compliance to international standard IEC/EN 61326)	
Insulation	CAT II, 4 kV RMS 50 Hz for 1 minute	
Impulse withstand	6.5 kV between all terminals and earth	
Temperature	-10 °C to +60 °C (operating), -25 °C to +80 °C (storage)	
Measurement/ Over voltage category	CAT III	
Humidity	95% non-condensing	
Impact energy level	1 J (IK06)	
Flame retardation	UL 94 V0	
ROHS and REACH	Yes	
Maximum altitude	2000 m	

8 Installation and commissioning

The meter should be installed by trained personnel. In addition to the safety precautions recommended in this manual, local best practice and regulatory stipulations should be always followed during the installation and commissioning process.

8.1 Connection diagram

By default, DPM meter is configured as a 3-phase 4-wire application.

Things to check for, when AC single phase meter is used as a 3-phase 3-wire/ 4-wire application:

1. Connection for 3-phase 3-wire/ 4-wire should be done as directed in Quick Start Guide.
2. Select appropriate Meter Type from meter's Setup Mode.

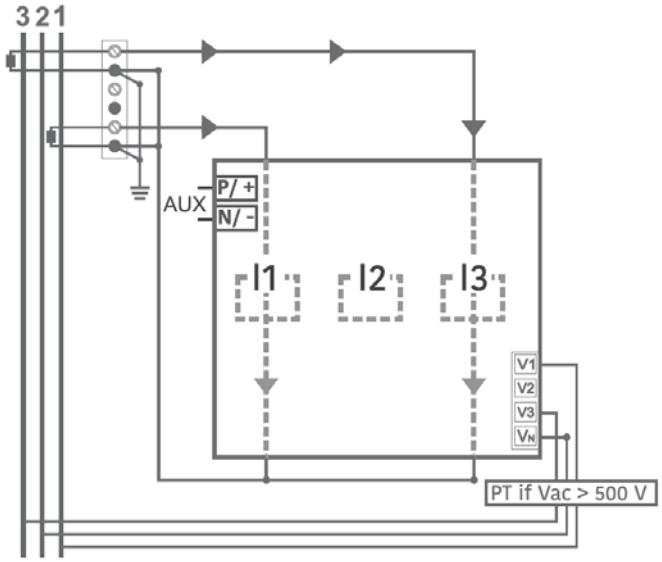


Figure 11: Making connections: 3 Phase 3 Wire connections

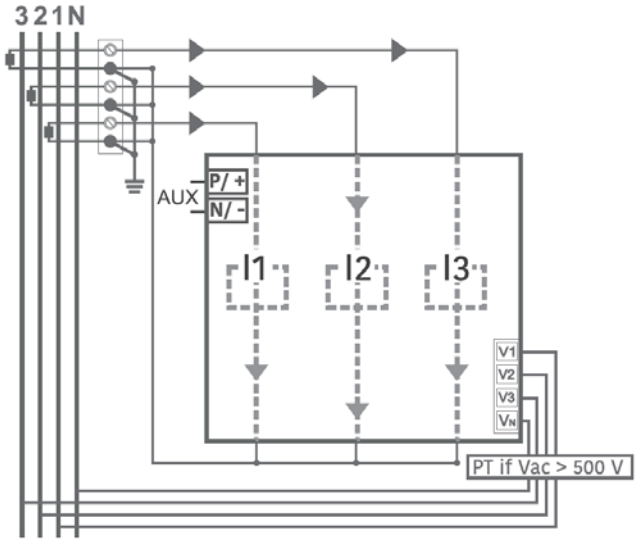


Figure 12: Making connections: 3 Phase 4 Wire connections

8.2 Mounting the meter on the panel

Prepare panel cut-out as per the recommended cut-out dimension and then insert the meter in the panel from outer side. After inserting the meter in the panel, mount the meter with mounting clamps from back side of the meter.

Note: Recommended panel sheet thickness is 1.8 mm to 3.0 mm.

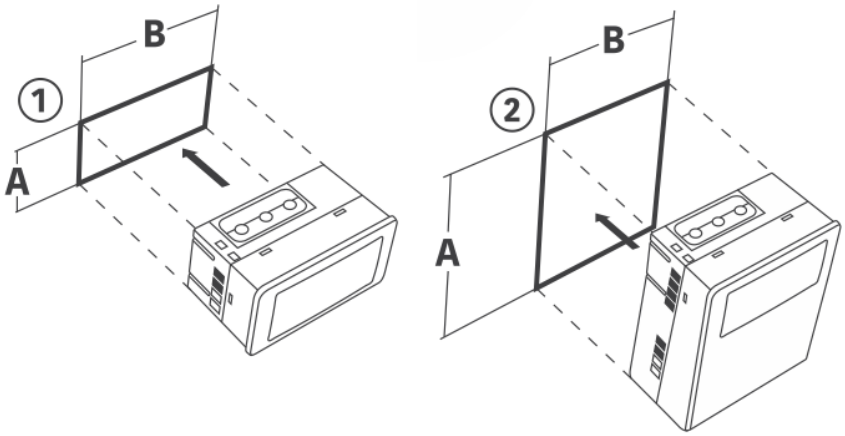


Figure 13: Inserting meter in the panel

S.No.	Meter Size (mm)	Cut-out dimensions (mm)		Meter dimensions W×H×D (mm)	
		A	B	Without parking terminal	With parking terminal
1	96×48	45 (+0.3)	92 (+0.5)	96×48×52	96×48×70.8
2	96×96	92 (+0.5)	92 (+0.5)	96×96×52	96×96×70.8

Table 9: Panel cut out and meter dimensions (With and without parking terminal)

The next step after inserting the meter in the panel is fitting of mounting clamps. Tilt the mounting clamp 1 and insert the leg 1 in meter hole 1 and leg 2 in meter hole 2 as shown in the below figure. Please note that Leg 1 should go first followed by Leg 2. Repeat the same process for mounting clamp 2. To ensure proper sealing, tighten the mounting clamps evenly at recommended torque upto 0.5 Nm.

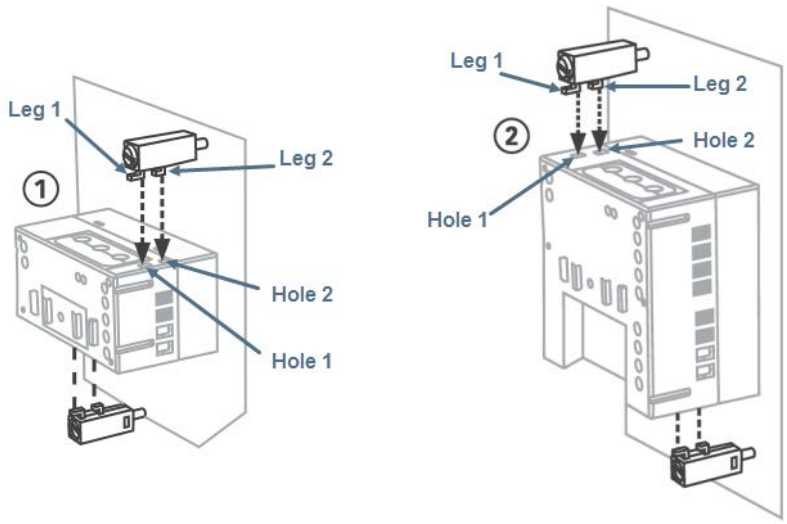


Figure 14: Mounting the meter with the clamps

S.No.	Meter size (mm)	Dimensions with mounting clamps W×H×D (mm)
1	96×48	96×65.3×52
2	96×96	96×112.7×52

Table 10: Dimensions with mounting clamps

9 Appendix I: CT Pass Through and Parking Terminal

CT Pass Through is provided with the meters for current connection between multiple panel meters. It connects multiple meters without terminating current supplying wires. However, when the user wants to replace the meter he is left with the only option of terminating the current supply by cutting the wire. Parking terminal is provided with the meter to connect the replaced meter with the current supplying wire. It connects the replaced meter with the rest of the meters through current supplying wire.

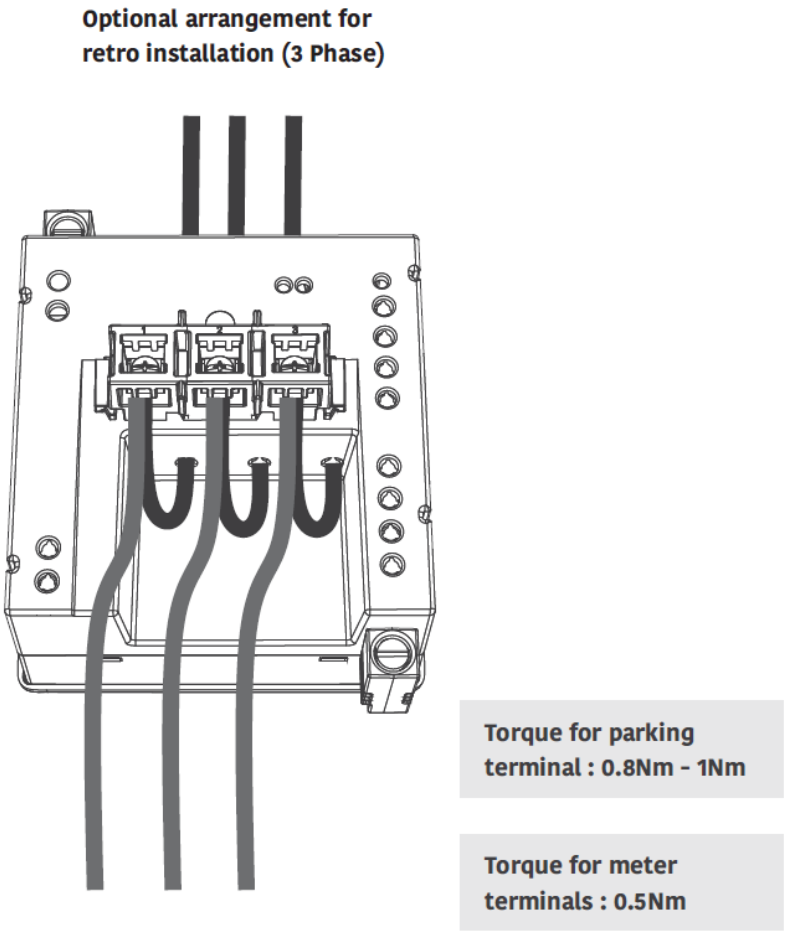


Figure 15: Parking terminal

9.1 Parking terminal installation

Insert parking terminal in meter guide. Ensure direction of terminal snap is towards meter guide as shown in below picture.

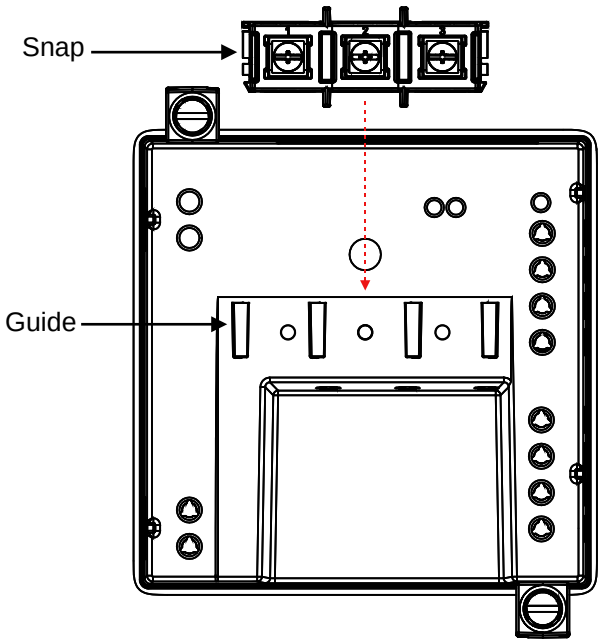
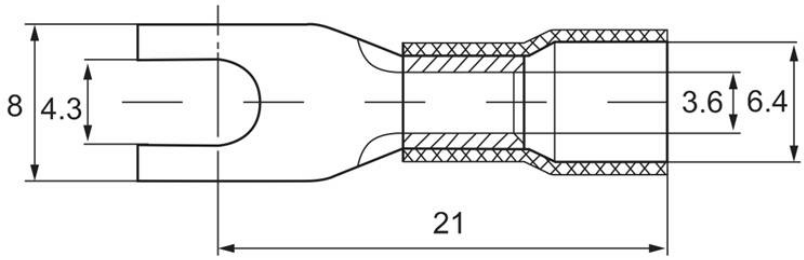


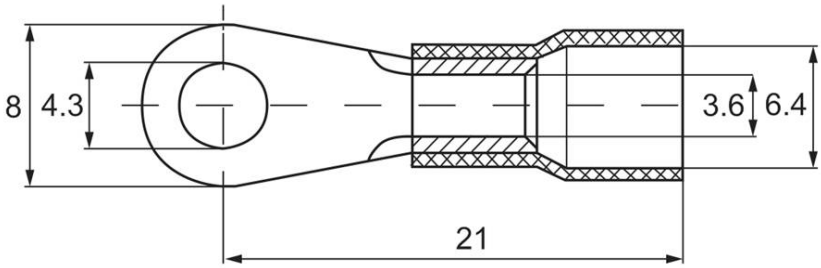
Figure 16: Parking terminal installation

Parking terminal design is suitable for two types of lug wire :

1.) U-lug



2.) Ring lug



Remove the terminal screw (integrated with washer) by applying torque of 0.5 Nm using driver. Insert the U-lug wire in Parking terminal as shown in below picture. Place the terminal screw in U-lug hole and tightened the screw by applying torque of 0.5 Nm.

Note: Recommended stripping of wire to fix it in lug wire is 8 mm

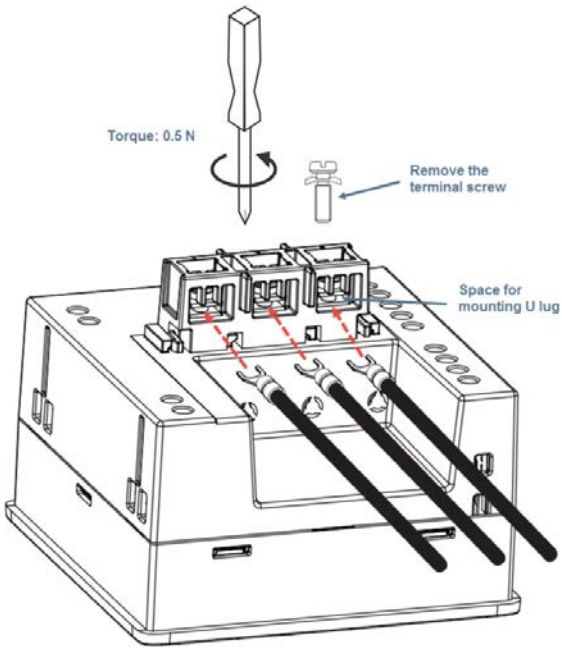


Figure 17: U-lug wire fitting in Parking terminal

Remove the terminal screw (integrated with washer) by applying torque of 0.5 Nm using driver. Insert the Ring-lug wire in Parking terminal as shown in below picture. Place the terminal screw in Ring-lug hole and tightened the screw by applying torque of 0.5 Nm.

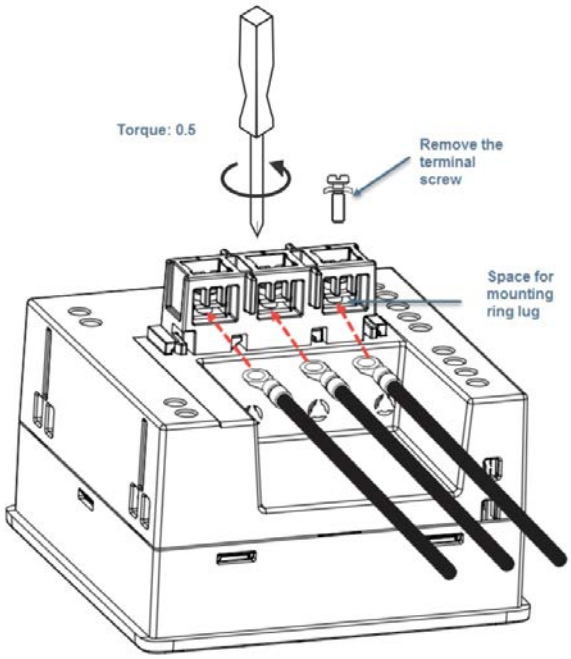


Figure 18: Ring-lug wire fitting in Parking terminal

9.2 Advantages of using Pass through Connection

1.) Cost reduction as no lugs are required. Wire cutting cost is also reduced
2.) Minimal burden
3.) No requirement of tightening of screws for connection
4.) No more risk of CT wire going open.

10 Appendix II: Energy meter display resolution

Energy Unit (none, k, M, G)	Energy Resolution (none, k, M, G)
Below 1000	0.001
1000 to 9999	0.01
10000 to 99999	0.1
100000 to 999999	Not applicable (Roll over after >99999.9 G)

11 Appendix III: MODBUS mapping of the meter

Please refer the below sheet for detailed information about MODBUS mapping of the meter.

1. Registers for General (Meter) information

HEX	MODBUS register		Parameter description	Format		R/W	Units	Remarks
0001	40001	40004	Meter Serial Number	HEX (8 bytes)	40001 (MSR) - 40004 (LSR)	R	NA	
0005	40005	40008	FirmWare Name	ASCII (8 bytes)	40005 (MSR) - 40008 (LSR)	R	NA	
0009	40009	40016	CAT CODE	ASCII (16 bytes)	40014 (MSR) - 40021 (LSR)	R		
0011	40017	40018	MODBUS ID (Start from 1 up to 247)	32 bit FP	40009 (LSR) - 40010 (MSR)	R/W	NA	
0013	40019	40019	Protocol Version (MS byte) and revision (LS Byte)	Unsigned 16 bits		R	NA	
0014	40020	40021	To change MODBUS Baud Rate write 0 = 1200, 1 = 2400, 02 = 4800, 03 = 9600, 04 = 19200	32 bit FP	40012(LSR) - 40013 (MSR)	R/W	NA	Change Baud Rate

2. Registers for Commissioning information

	MODBUS register		Parameter description	Format		R/W	Units
001E	40030	40031	Metre type: 3W/4Wire info, Lt4:0, HT4: 1, LT3: 2, HT3:3	32 bit FP	40030 (LSR) -40031 (MSR)	R/W	NA
0020	40032	40033	CT Primary	32 bit FP	40032 (LSR) -40033 (MSR)	R/W	NA
0022	40034	40035	Ct Secondary	32 bit FP	40034 (LSR) -40035 (MSR)	R/W	NA
0024	40036	40037	PT Primary	32 bit FP	40036 (LSR) -40037 (MSR)	R/W	NA
0026	40038	40039	PT Secondary	32 bit FP	40038 (LSR) -40039 (MSR)	R/W	NA

0028	40040	40041	RESERVED				
002A	40042	40043	RESERVED				
002C	40044	40045	RESERVED				
002E	40046	40047	Energy reset : 0x01	32 bit FP	40046 (LSR) -40047 (MSR)	W	NA
0030	40048	40049	RESERVED				
0032	40050	40051	RESERVED				
0034	40052	40053	RESERVED				
0036	40054	40055	RESERVED				
0038	40056	40057	RESERVED				
003A	40058	40059	RESERVED				
003C	40060	40061	RESERVED				
003E	40062	40063	RESERVED				
0040	40064	40065	RESERVED				
0042	40066	40067	RESERVED				
0044	40068	40069	RESERVED				
0046	40070	40071	RESERVED				
0048	40072	40073	RESERVED				
004A	40074	40075	RESERVED				
004C	40076	40077	RESERVED				
004E	40078	40079	RESERVED				
0050	40080	40081	RESERVED				
0052	40082	40083	Modbus Resolution 0: N; 1: K; 2:M; 3:G	32 bit FP	40082 (LSR) -40083 (MSR)	R/W	NA

3. Registers for Energy parameters1 in 4 bytes

	MODBUS Register		Parameter Description	Format		R/W	Units
00C8	40200	40201	RESERVED				
00CA	40202	40203	RESERVED				
00CC	40204	40205	RESERVED				
00CE	40206	40207	RESERVED				
00D0	40208	40209	RESERVED				
00D2	40210	40211	RESERVED				
00D4	40212	40213	RESERVED				
00D6	40214	40215	RESERVED				
00D8	40216	40217	RESERVED				
00DA	40218	40219	RESERVED				
00DC	40220	40221	RESERVED				
00DE	40222	40223	RESERVED				
00E0	40224	40225	kWh (ABS): Active - Forwarded	32 bit FP	40224 (LSR) -40225 (MSR)	R	Wh

00E2	40226	40227	RESERVED				
00E4	40228	40229	RESERVED				
00E6	40230	40231	RESERVED				
00E8	40232	40233	RESERVED				
00EA	40234	40235	RESERVED				
00EC	40236	40237	History register 1	32 bit FP	40236 (LSR) -40237 (MSR)	R	Wh
00EE	40238	40239	History register 2	32 bit FP	40238 (LSR) -40239 (MSR)	R	Wh
00F0	40240	40241	History register 3	32 bit FP	40240 (LSR) -40241 (MSR)	R	Wh
00F2	40242	40243	History register 4	32 bit FP	40242 (LSR) -40243 (MSR)	R	Wh
00F4	40244	40245	History register 5	32 bit FP	40244 (LSR) -40245 (MSR)	R	Wh
00F6	40246	40247	History register 6	32 bit FP	40246 (LSR) -40247 (MSR)	R	Wh

4. Registers for Energy parameters1 in 8 bytes

	MODBUS Register		Parameter Description	Format		R/W	Units
0258	40600	40603	RESERVED				
025C	40604	40607	RESERVED				
0260	40608	40611	RESERVED				
0264	40612	40615	RESERVED				
0268	40616	40619	RESERVED				
026C	40620	40623	RESERVED				
0270	40624	40627	RESERVED				
0274	40628	40631	kWh (ABS): Active - Forwarded	64 bit FP	40628 (LSR) -40631 (MSR)	R	Wh
0278	40632	40635	RESERVED				
027C	40636	40639	RESERVED				
0280	40640	40643	RESERVED				
0284	40644	40647	RESERVED				
0288	40648	40651	RESERVED				

12 Notes

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