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User's Manual

MULTIFUNCTION METER
MFM2160

Masibus Automation And Instrumentation Pvt. Ltd.
B/30, GIDC Electronics Estate,
Sector-25, Gandhinagar-382016, Gujarat, India
☎ +91 79 23287275-77 +91 79 23287281
Email: support@masibus.com
Web: www.masibus.com

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1. INTRODUCTION

Foreword

Thank you for purchasing the Multifunction Meter(MFM2160).
MFM (Multifunction Meter)

This manual describes the basic functions and operation methods. Please read through this user's manual carefully before using the product.

Notice

The contents of this manual are subject to change without notice because of continuous improvements to the instrument's performance and functions.

This manual describes the functions of this product. MASIBUS does not guarantee the application of these functions for any particular purpose.

Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please inform MASIBUS Sales office or sales representative. Under no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without our permission

Trademarks

Our product names or brand names mentioned in this manual are the trademarks or registered trademarks of Masibus Automation and Instrumentation (P) Ltd. (herein after referred to as *masibus*).

Adobe, Acrobat, and Postscript are either registered trademarks or trademarks of Adobe Systems Incorporated. All other product names mentioned in this user's manual are trademarks or registered trademarks of their respective companies.

Checking the Contents of the Package

Unpack the box and check the contents before using the product. If the product is different from which you have ordered, if any parts or accessories are missing, or if the product appears to be damaged, contact your sales representative.

Product overview

The MFM2160 Multifunction Meter is a device used in electrical systems to measure and monitor various electrical parameters (voltage, current, power, frequency, Energy etc.) Meters are widely used across commercial and industrial sectors, providing critical data for energy management and system optimization. Its multi-line backlit LCD display allows for the simultaneous display of four parameters.

MFM2160 provides RS485 port supporting Modbus-RTU protocol for communication with THD, Individual Harmonics measurements, Maximum Demand, RTC, Min-Max readings. More than basic metering, it optionally provides Energy pulse output and Data logging features.

Features

- Available in Accuracy Class 1.0 as per IEC 62053-21 and Class 0.5s as per IEC 62053-22
- True RMS measurement
- Four-line alphanumeric LCD display with 7 digits for energy and 5 digits for instantaneous parameters
- Field Programmable CT/PT Primary & Secondary
- Four Quadrant measurements with identification
- Isolated RS485 Modbus Communication (Modbus-RTU protocol)
- Available front Pulse LED for site calibration for selected type of energy
- THD measurement for voltage and current, up to 31st harmonics

- Current and power demand monitoring
- Display of minimum and maximum values
- 'OLD' register to store the previously cleared energy value
- Monitors Run hours & On hours
- Auto Scaling from Kilo to Mega to Giga
- Auto Scrolling feature for easy readability for all parameters
- Favorite page Store feature
- User programmable password protection for Configuration mode
- User Assignable Modbus registers for ease of integration
- Energy Pulse output & Data logging - optional

Product Ordering Code

Ordering Code:

Model	Accuracy		Power Supply		Data Logging		Pulse Output	
MFM2160	X		X		X		X	
	S	Class 1.0	U1	Aux. Powered 85-265VAC/ 100-300VDC	N	None	N	None
	1	Class 0.5s	U2	Aux. Powered 20-60VDC	Y	Required	Y	Required

The unit has a nameplate affixed to the back side of the enclosure. Check the model and suffix codes inscribed on the nameplate to confirm that the product received is that which was ordered.

List of Accessories

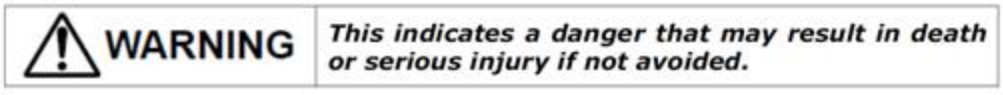
The product is provided with the following accessories according to the model and suffix codes (see the table below). Check that none of them are missing or damaged.

Sr. No.	Description of accessory	Quantity
1	Panel mount clamps	2
2	Quick User Guide	1

Safety Precautions

The product and the instruction manual describe important information to prevent possible harm to users and damage to the property and to use the product safely.

Understand the following description (signs and symbols), read the text and observe descriptions.



This indicates a danger that may result in minor or moderate injury or only a physical damage if not avoided.

2. SPECIFICATIONS

Type of Measurement	TRUE RMS
Sampling rate	82 Samples/Cycle
Connection type	3P4W / 3P3W (Site selectable)

Input Voltage	
Measuring Voltage range	20VL-N to 300VL-N (34VL-L to 520VL-L)
PT(VT) Primary	100 V to 1000 KV AC (L-L) (Programmable)
Nominal Voltage range (Un) (PT/VT Secondary)	57.5VL-N to 240VL-N (100VL-L to 415VL-L)
Burden	<0.2VA per phase
Over Voltage	120% of Un Continuous

Input Current	
Measuring Current range	5mA to 6A
CT Ratings Primary	1A/5A to 15000 A (Programmable)
Nominal Current range (In) (CT Secondary)	1A or 5A
Burden	1A: <0.1 VA per phase, 5A: <0.2VA per phase
Overload	150% of In Continuous
Short-time over current	20 x Imax for 1 sec., 10 x Imax for 3 sec., 7 x Imax for 10 sec

Frequency	45 to 65Hz

Auxiliary Power Supply	
Power Supply	Standard: 85-265VAC, 50/60Hz or 100-300VDC Optional: 20-60 VDC
Burden	< 3.5VA / <1.5W

Measurement Accuracy	
Voltage	±0.5%
Current	±0.5%
Frequency	±0.05%
Power Factor	±0.01 for Class 1.0 and ± 0.005 for Class 0.5s
Power	±1.0% for Class 1.0 and ± 0.5% for Class 0.5s
Active Energy	Class 1.0 as per IEC 62053-21 and Class 0.5s as per IEC 62053-22
Reactive Energy	Class 1.0 & Class 0.5s as per IEC 62053-24
Apparent Energy	Class 1.0 & Class 0.5s

Display	
LCD	Large multi-line backlit LCD Display 3 lines of 5 digits – Height: 9.10 x Width: 5.33 mm last line of 7 digits – Height: 7.00 x Width: 3.97mm

	Bar Graph for % Load for each phase
Keypad	3 buttons for navigation to performing configuration setup & Operation
Protection features	Password protected for set-up & clearing energy and Min / Max data
Green LED Indication	RS485 Communication Activity
Red LED Indication	Energy Pulse

Modbus Communication	
Interface & Protocol	RS485 Port and Modbus RTU: 2 Wires, Half-duplex
Baud rate	2400, 4800, 9600, 19200, 38400 bps (default 9600 bps)
Parity bit & Stop bit	None with 1 or 2 stop bit, Odd or Even with 1 or 2 stop bit
Firmware update	Firmware update through communication port

Energy Pulse Output - Optional	
Type	Wh / VARh / VAh
Rating	24VDC, 20mA
Pulse rate	Programmable from 100 to 60000 pulses per Energy
Pulse duration	20 msec ± 10%
Output Type	Open collector [External Excitation Required]

Environmental	
Operating temperature	-10°C to +60°C
Storage temperature	-25°C to +70°C
Relative humidity	Up to 95% non-condensing
IP degree of Protection	IP51 front side, IP30 meter body
Isolation	4 kV RMS for 1 minute
Impulse withstands	6 kV
Pollution Degree	2

Mechanical	
Mounting Type	Panel mount
Size	100(W) x 100(H) x 55(D) mm
Panel Cutout	92(W) x 92(H) mm
Material	ABS
Accessory	2 Panel mount clamps
Weight	0.4 kg (approx.)
Terminal & Cable Size	Barrier type terminal U-type / ring-type termination: maximum up to 4 mm^2 Cable

Demand Parameters	
Total Active Power Demand	Rising, Maximum and Maximum Demand Time Stamp
Total Reactive Power Demand	Rising, Maximum and Maximum Demand Time Stamp
Total Apparent Power Demand	Rising, Maximum and Maximum Demand Time Stamp
Average Current Demand	Rising, Maximum and Maximum Demand Time Stamp
Demand Intervals	Programmable from 1 to 60 minutes.
Demand Calculation Method	Block & Sliding
Demand Sync. Method	RTC based Sync

Min - Max Values	
Parameters	V, A, PF, Hz, KW, KVAR, KVA
Values can be reset through configuration mode.	

RPM & User assignable Modbus Registers	
RPM	Field Programmable pole (2-48) and slip (0.0 to 99.99%)
Modbus registers	User Assignable 60 Modbus addresses via software

Suppression Current
A minimum current detection threshold of 1 to 99 mA can be configured to ignore induced or insignificant current flowing in the circuit; 5 mA is the default.

Data Logging – Optional	
Method	Periodic Time based, Load Profile based
Time Interval	1min, 5min,10min,15min, 30min, 45min, 60min, 8h,12h, 24h.
Parameters (Programmable up to 34 Parameters)	Voltage, Current, Power Factor, Frequency, Total Power & Energy (Active, Reactive, Apparent) with Time stamp **Only Set through communication.**
No. of Records	524288 / ((No of Parameters +2) * 8)

Electromagnetic compatibility (as per IEC 61326-1)	
Electrostatic Discharge	IEC 61000-4-2
Immunity to Fast transient	IEC 61000-4-4
Immunity to surge waves	IEC 61000-4-5
Immunity to magnetic fields	IEC 61000-4-8
Immunity to voltage dips and interruptions	IEC 61000-4-11
Conducted emissions	CISPR 11
Radiated emissions	CISPR 11

3. TERMINAL DESCRIPTION

3.1 Terminal Details

Terminal Connections – Rear View of MFM2160

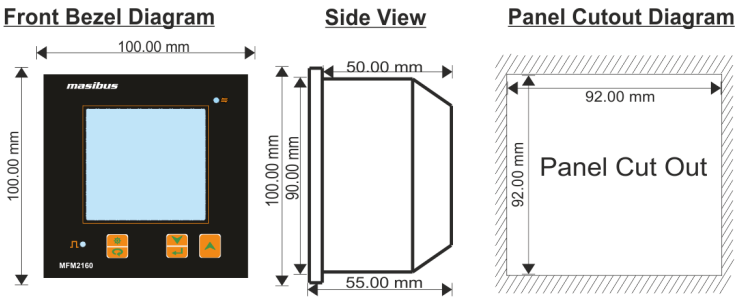
Terminal Tag	Description	
L/+	Line / + : Aux. Power Supply Input	**AUX Supply**
N/ –	Neutral / - : Aux. Power Supply Input	
OP+	Pulse output Positive Terminal	**Energy Pulse Output**
OP-	Pulse output Negative Terminal	
VR	R Phase voltage terminal	**AC Voltage Input**
VY	Y Phase voltage terminal	
VB	B Phase voltage terminal	
VN	Neutral voltage terminal	
D+	Data line Positive Terminal	**RS 485 Communication**
D-	Data line Negative Terminal	
IR (S1)	Current IN - R phase Terminal	**AC Current Input**
IR (S2)	Current OUT - R phase Terminal	
IY (S1)	Current IN - Y phase Terminal	
IY (S2)	Current OUT - Y phase Terminal	
IB (S1)	Current IN - B phase Terminal	
IB (S2)	Current OUT - B phase Terminal	

4.INSTALLATION AND SAFETY GUIDELINES

4.1 Mechanical Installation

For installing the meter: -

- Cut the panel according to the specified dimensions shown below.
- Insert the meter into the panel cutout and secure it by attaching clamps on the rear side. Ensure the clamps are placed diagonally opposite for a firm fit.
- Tighten the screws evenly with the appropriate torque to achieve proper sealing.



4.2 Safety/Warning Precautions

Safety Precautions

Dangerous voltages capable of causing death are sometimes present in this instrument. Before installation or beginning of any troubleshooting procedures the power to all equipment must be switched off and isolated. Units suspected of being faulty must be disconnected and removed first and brought to a properly equipped workshop for testing and repair. Component replacement and interval adjustments must be made by a company person only.

Warning Precautions

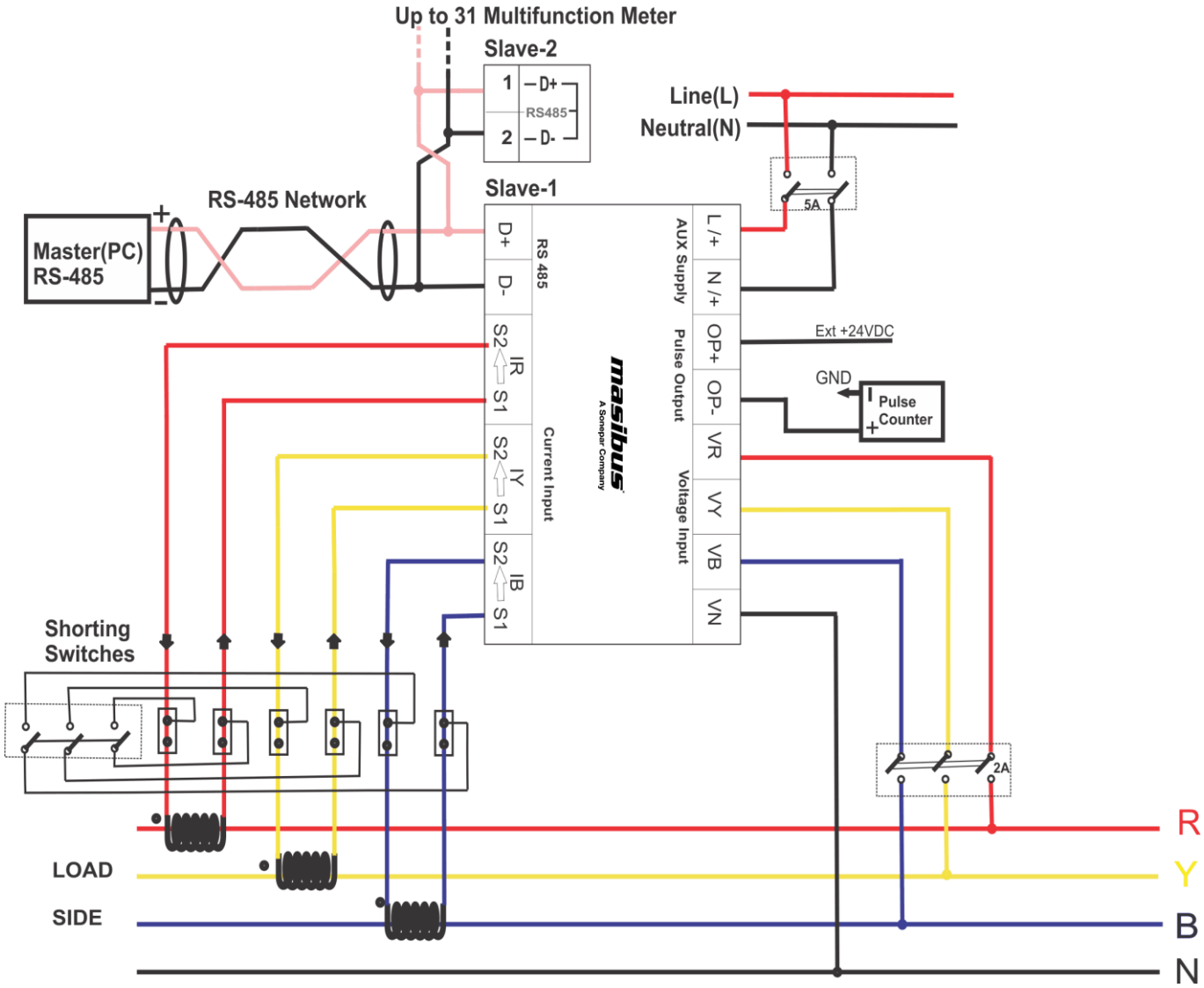
All wiring must confirm appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current, and temperature rating of the system.
Ensure that all incoming AC power and other power sources are turned OFF before performing any work on the instrument. Protect the measurement AC Inputs voltage (VR, VY, VB) with 2A external over current protection device and the power supply source inputs with 5A external over current protection device, located close to the equipment.
Before connecting the instrument to the power source, check the labels on the instrument to ensure that your instrument is equipped with the appropriate power supply voltage, input voltages and currents. Failure to do so may result in serious or even fatal injury and/or equipment damage.
Under no circumstances don't connect instrument a power source if it is damaged.
To prevent potential fire or shock hazard, do not expose the instrument to rain or moisture.
The secondary of an external current transformer must never be allowed to be open circuit when the primary is energized. An open circuit can cause high voltages, possibly resulting in equipment damage, fire and even serious or fatal injury. Ensure that the current transformer wiring is secured using an external strain relief to reduce mechanical strain on the screw terminals, if necessary.
Only qualified personnel familiar with the instrument and its associated electrical equipment must perform setup procedures.
Beware not to over-tighten the terminal screws.
Upon receipt of the shipment remove the unit from the carton and inspect the unit for shipping damage. If any damage due to transit, report and claim with the carrier. Write down the model number and serial number for future reference when corresponding with our Customer Support Division.
Do not use this instrument in areas such as excessive shock, vibration, dirt, moisture, corrosive gases or rain. The ambient temperature of the areas should not exceed the maximum rating specified

5. WIRING DETAILS

5.1 Common Wiring with RS-485 Connections

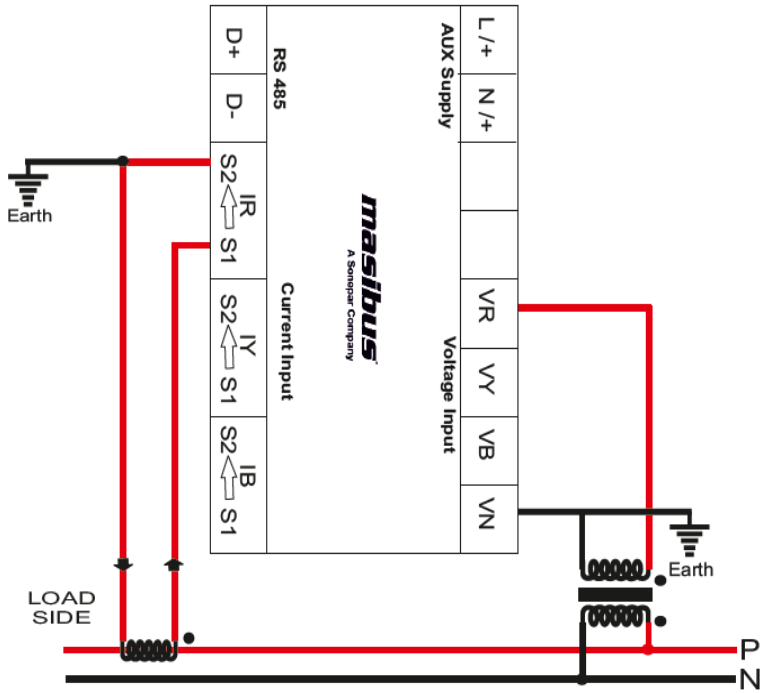
Recommended wiring for Aux Supply, Voltage input & Current Input along with RS-485 Connections

Also note correct polarity for Current Input & Phase wise Voltage & Current Input combination is essential



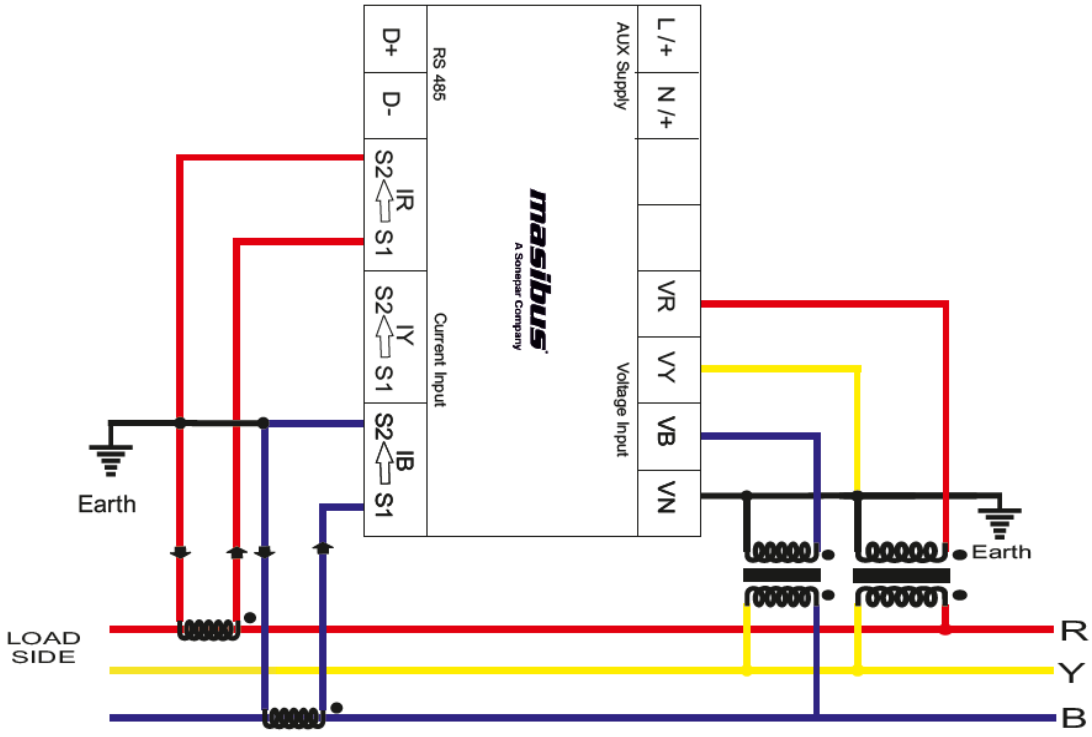
5.2 Wiring diagram

1) Single Phase Two Wire System

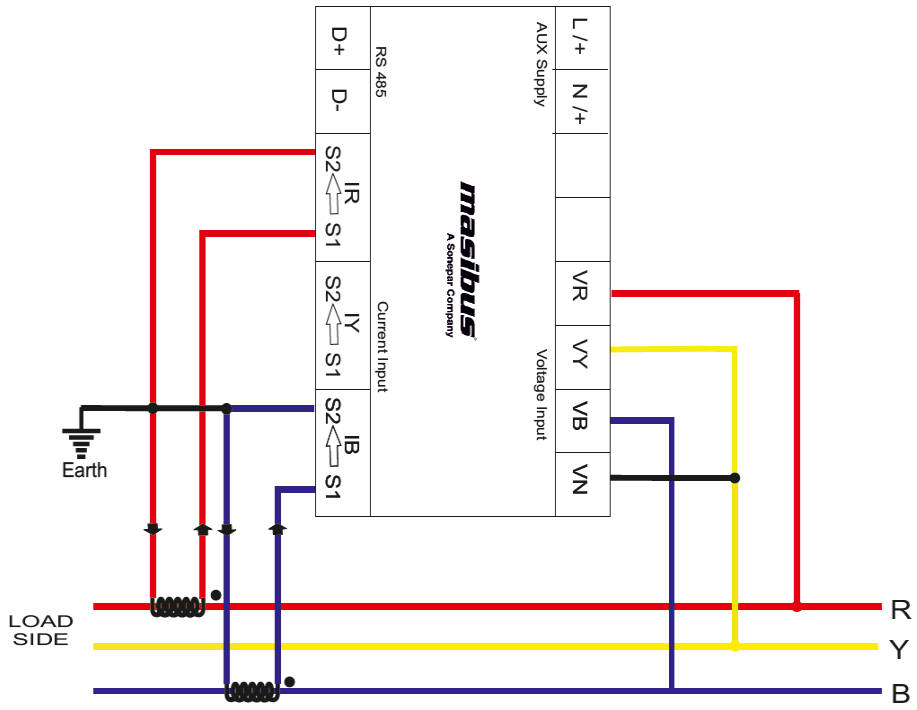


2) Three Phase Three Wire System

2A) 3-Wire 2- Element Open Delta Connection Using 2PTs, 2CTs

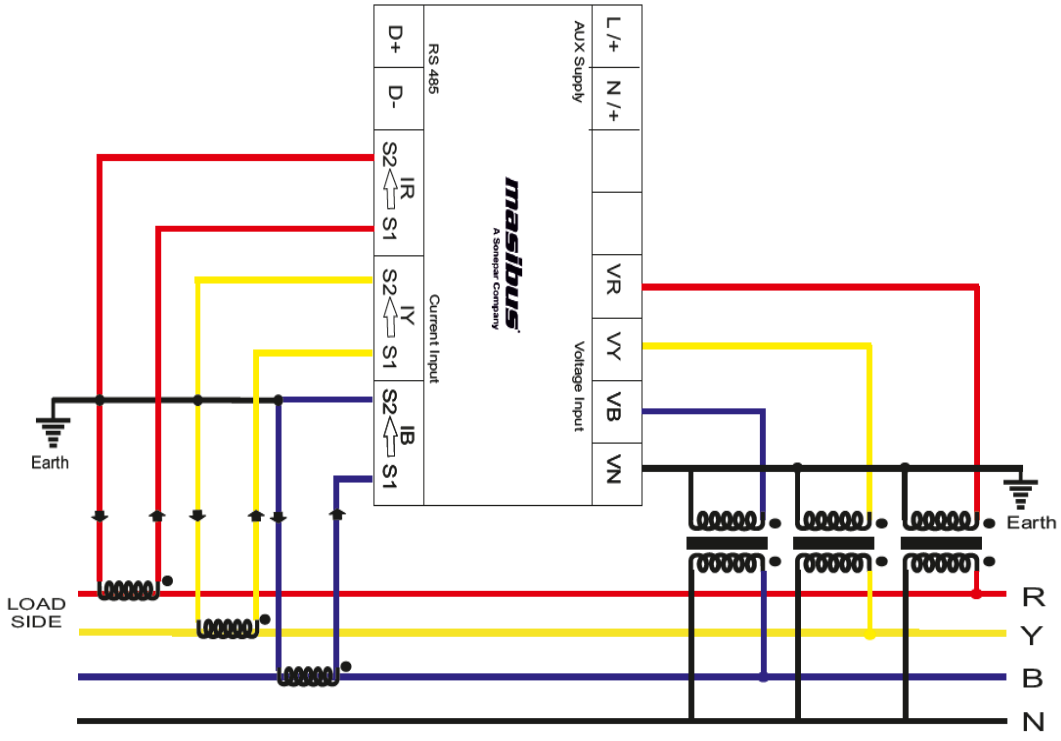


2B) 3-Wire 2- Element Direct Connection Using 2CTs

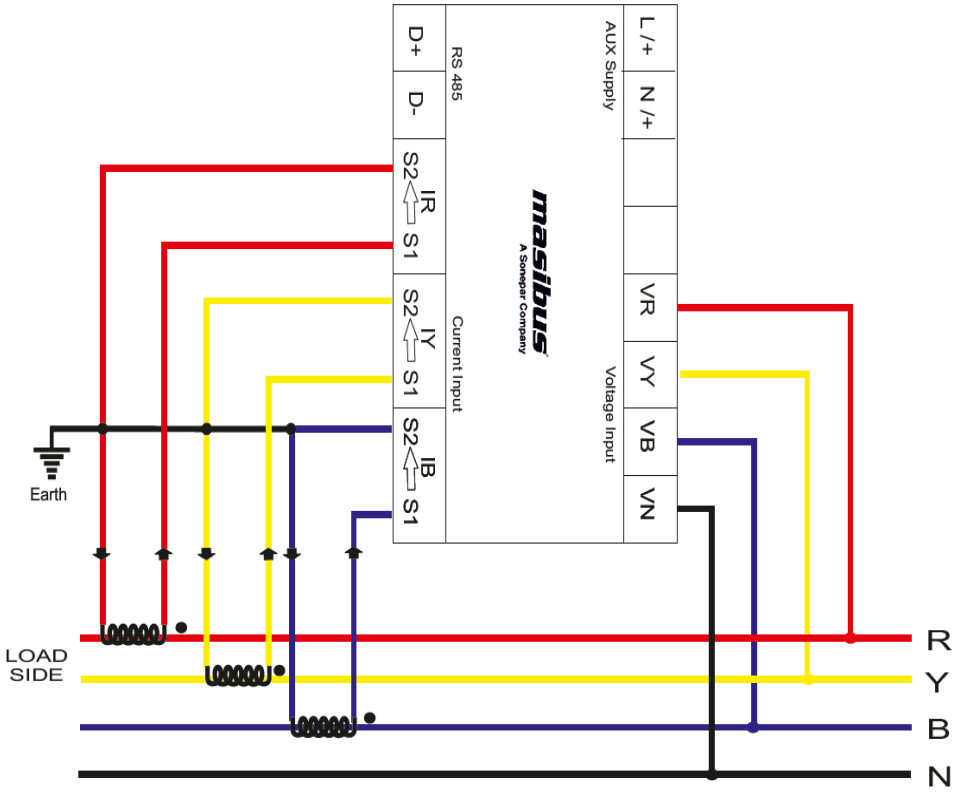


3) Three Phase Four Wire System

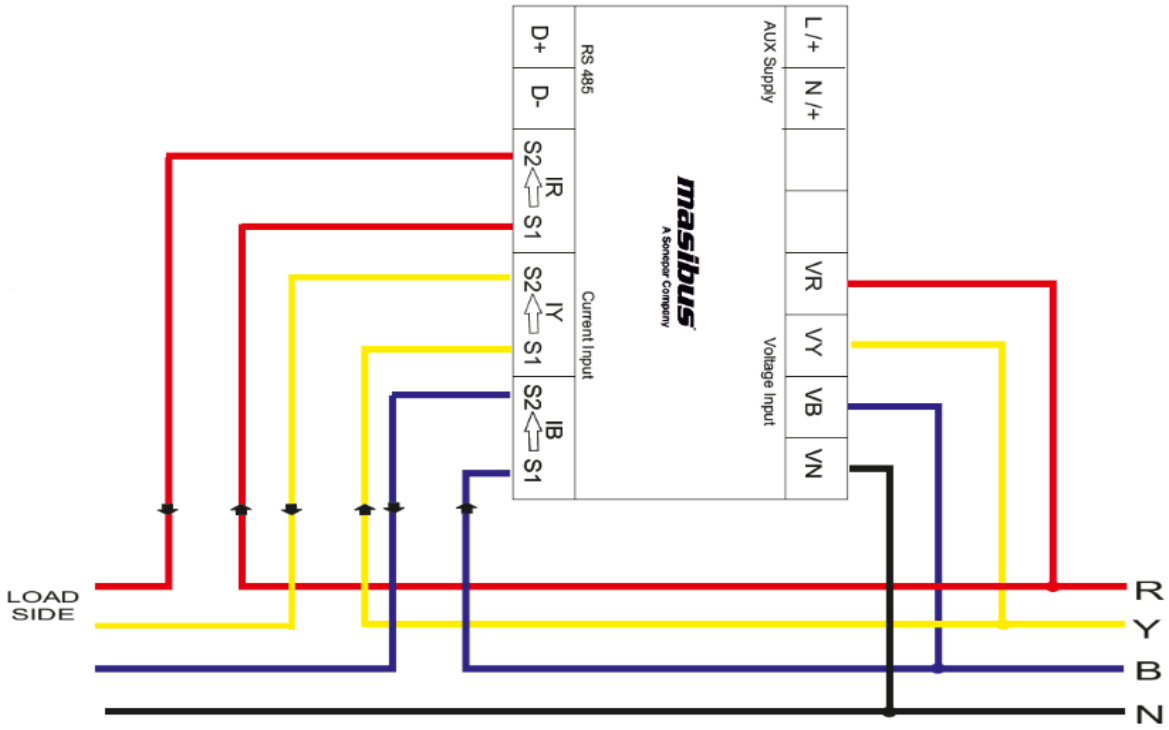
3A) 4-Wire Wye-3 Element Connection Using 3PTs, 3CTs



3B) 4-Wire Wye-3 Element Direct Connection Using 3CTs



3C) 4-Wire Direct Connection



Note: - For Single Phase Two Wire, system should be 3P4W and do not consider Average Voltage, Average Current & Average PF on the display or MODBUS.

5.3 PTs and CTs

Large electrical installations have high voltages and currents, which may exceed the direct connection rating of the meter. In this case, Potential Transformers (PTs) and Current Transformers (CTs) are used to precisely “step down” or reduce the voltage and current level to suit the meter rating. Potential Transformers usually have a full-scale output of 110V ac RMS line-line and Current Transformers, a full-scale output of 5A or sometimes 1A.

The PTs (Potential Transformers) and CTs (Current Transformers) must be planned, installed and tested by a qualified electrical contractor before wiring the meter. The accuracy of the measurement also depends on the accuracy and phase – angle error of the PTs and CTs. Instrument Class 0.5 or better PTs and CTs are recommended. Do not use protection class CTs to feed the Multifunction meter MFM2160 as they have poor accuracy and phase characteristics.

Ensure that the CT primary rating has been selected so that your normal load variation lies between 40% and 80% of its full scale. If your CT is over-rated, say if the load is always less than 10% of the CT primary rating, accuracy suffers.

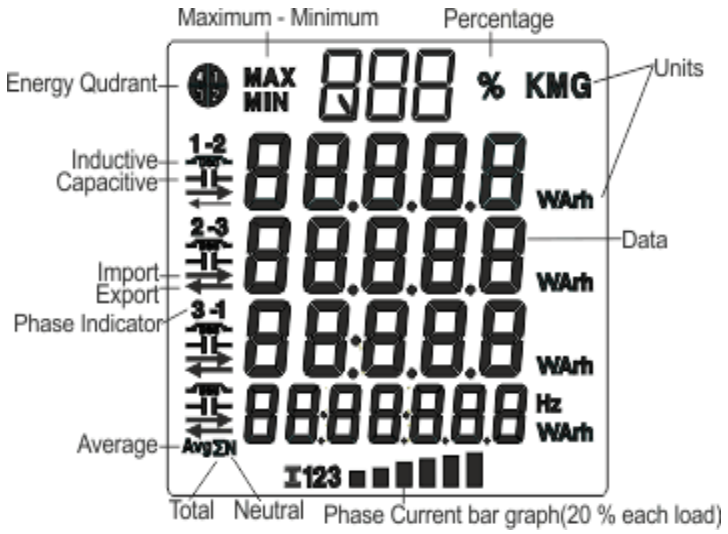
5.3.1 PT, CT Wiring

The PTs and CTs must have adequate VA rating to support the burden (loading) on the secondary. You may want to support the auxiliary supply burden from one of the PTs. CT wiring can impose additional burden (loading) on the CT. For example, if the CT has a 5A secondary and the wire resistance is 1.0 Ω, then the CT has to support an additional burden of 5VA. The wiring distance from the CT secondary to meter should be such that, VA of wire path between meter and CT along with VA of meter should not exceed the VA rating of CT, otherwise the CT could get over-burdened and give large errors.

Multifunction meter MFM2160 should be conveniently located for easy connections of voltage (PT) and Current (CT) signals.

6. FRONT PANEL DESCRIPTION

6.1 LCD Symbol Description



6.2 Key Functions

Enter Key

Run Mode:

- Press the key to enter into Configuration Mode.

Configuration Mode:

- Press the key to enter into edit mode, scroll mode, reset mode, run mode, backlight mode, data logging mode and for Quit from configuration mode.
- Press the key to save the final value entered by the user.

DEC Key

Run Mode:

- Press the key to move to the next page in the upward direction.
- Hold the key for 5 seconds to navigate to the Maximum-Minimum pages.
- If already in the Maximum-Minimum pages, holding the key for 5 seconds will return to Run Mode.

Configuration Mode:

- Press the key to move the selection bar to the next parameter in the upward direction.
- Press the key to Shift to the side digit in Edit Mode.
- Press the key to exit From Edit Mode and return to View Mode.

INC Key

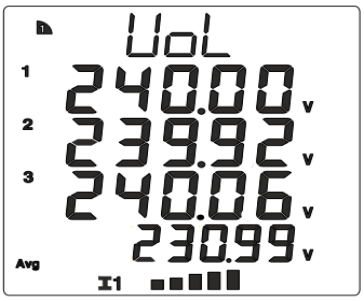
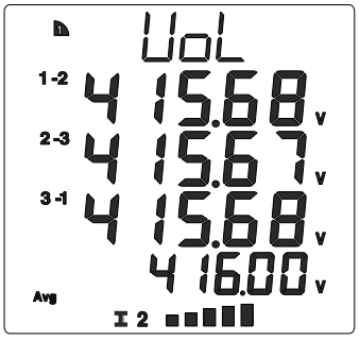
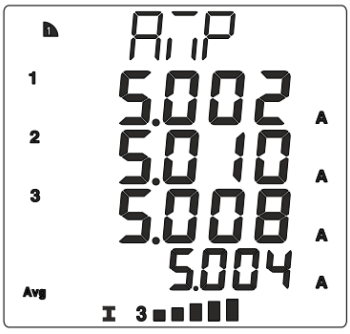
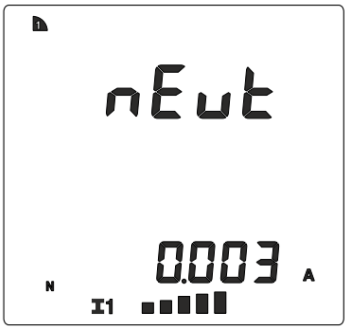
Run Mode:

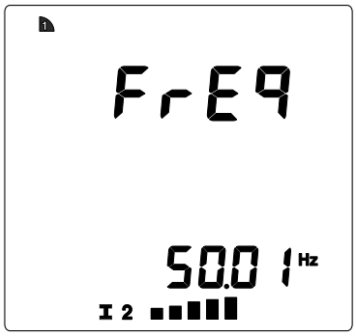
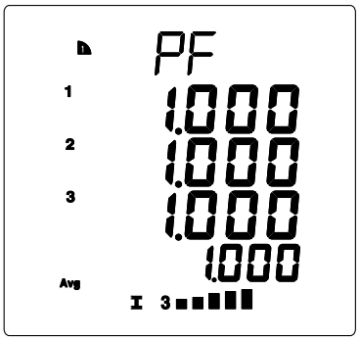
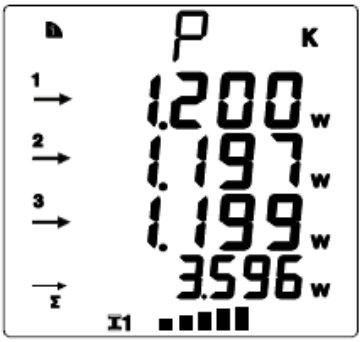
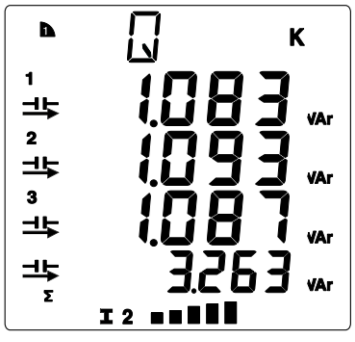
- Press the key to move to the next page in the downward direction.
- Hold the key for 5 seconds to navigate to the first page of Run Mode, which displays Voltage.

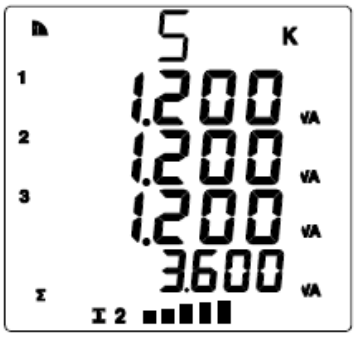
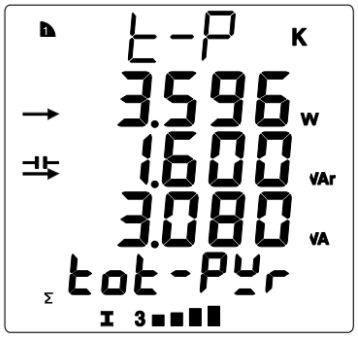
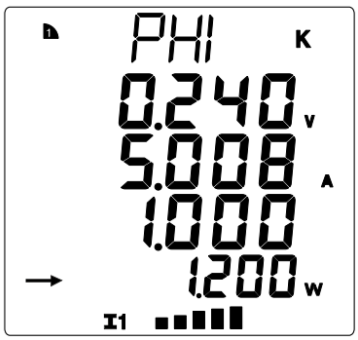
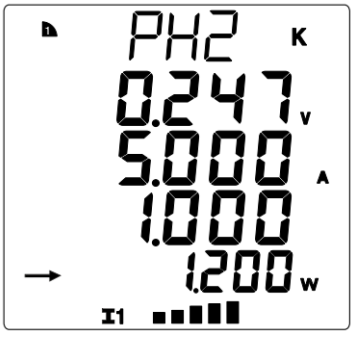
Configuration Mode:

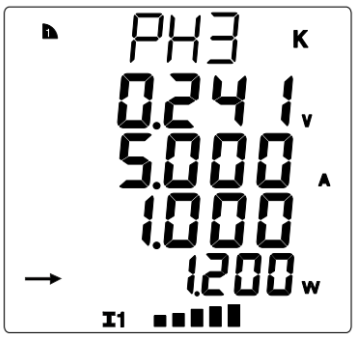
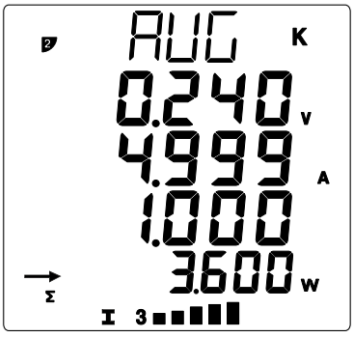
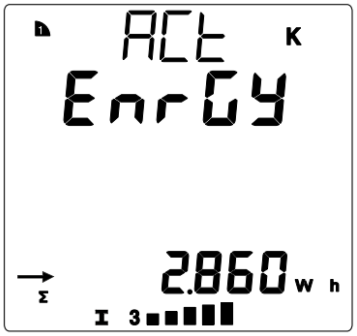
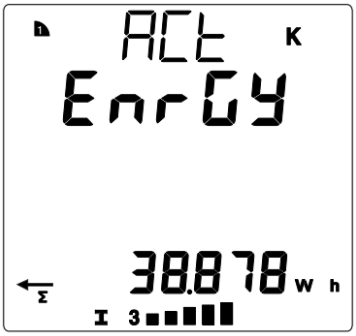
- Press the key to move the selection bar to the next parameter in the downward direction.
- Press the key to increment the value in Edit Mode

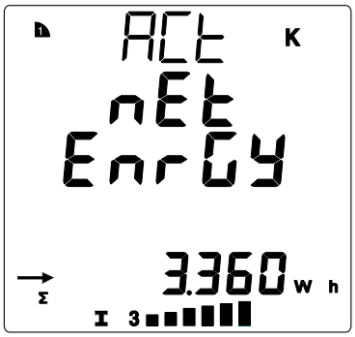
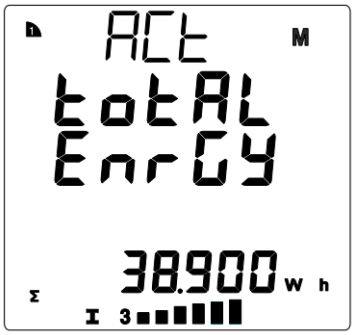
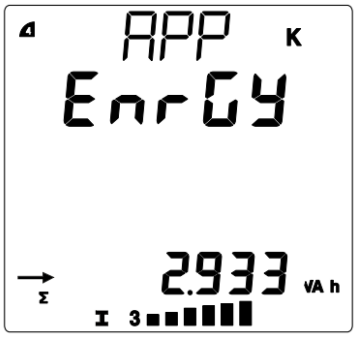
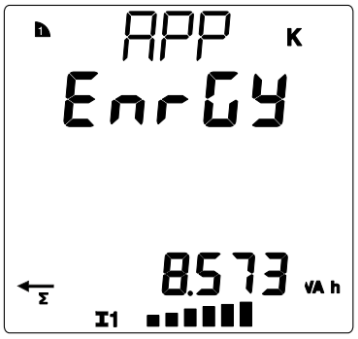
7.1 Run mode Display

Line to Neutral Voltage (VL-N)	
	Displays line to neutral Voltage of three phases and average.
Line to Line Voltage (VL- L)	
	Displays line to line voltage of three phases and average.
Line Current (Ampere)	
	Displays phase current of three phases and Average current.
Neutral Current	
	Displays neutral current.

Frequency	
	Displays system frequency.
Power Factor	
	Displays Power factor of Three phase and System Power factor.
Active Power(P)	
	Displays active power of three phases and total active power.
Reactive Power(Q)	
	Displays reactive power of three phases and total reactive power.

Apparent Power(S)	
	Displays apparent power of three phases and total apparent power.
P, Q, S Total power	
	Displays Total of Active power, Reactive power, Apparent power.
Phase 1 (V, A, PF, W)	
	Displays voltage, current, power factor and Active power of first phase(R).
Phase 2 (V, A, PF, W)	
	Displays voltage, current, power factor and Active power of Second phase(Y).

Phase 3 (V, A, PF, W)	
	Displays voltage, current, power factor and Active power of Third phase(B).
Average (V, A, PF, W)	
	Displays average value of voltage, current and power factor and Total Active power.
Active import energy (KWh)	
	Displays total import active energy (—>) of three phases.
Active export energy (KWh)	
	Displays total export active energy (<—) of three phases.

Active Net energy (KWh)	
	Displays total net active energy of three phases. **(Active Import energy – Active Export energy)**
Active Total energy (KWh)	
	Displays total active energy of three phases. **(Active Import energy + Active Export energy)**
Apparent import energy (KVAh)	
	Displays total import apparent energy (**—>**) of three phase.
Apparent export energy (KVAh)	
	Displays total export apparent energy (**<—**) of three phase.

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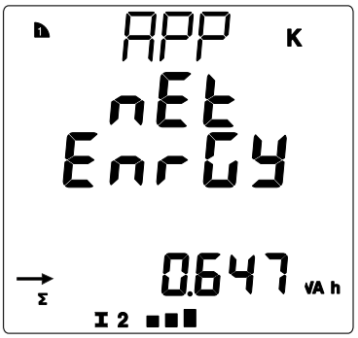
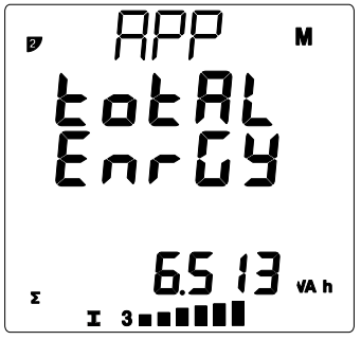
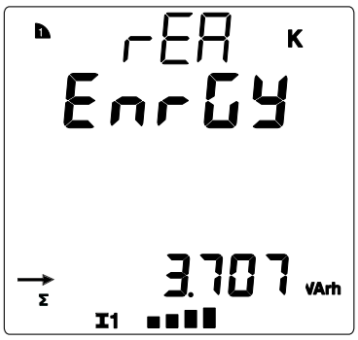
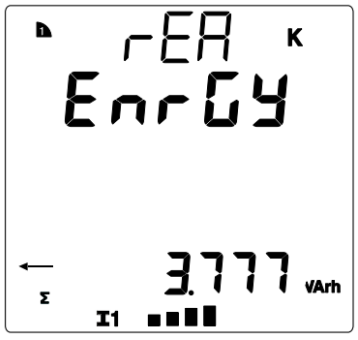
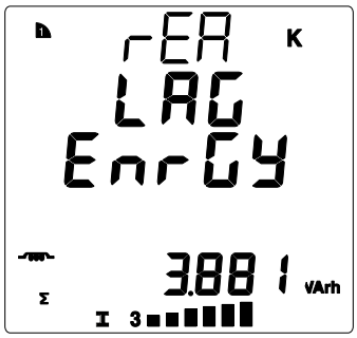
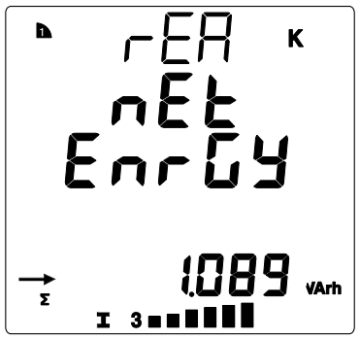
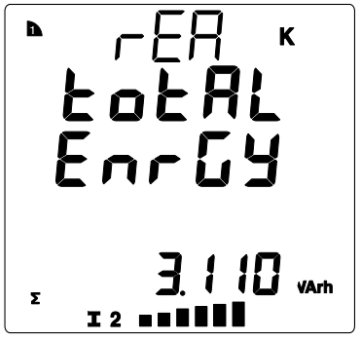
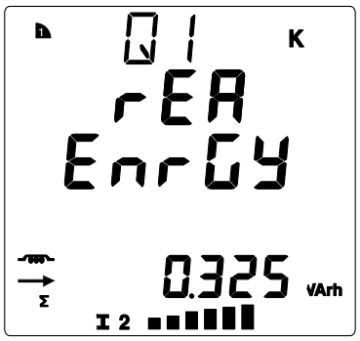
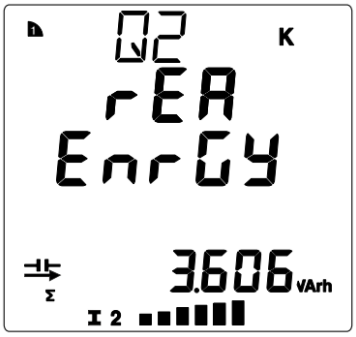
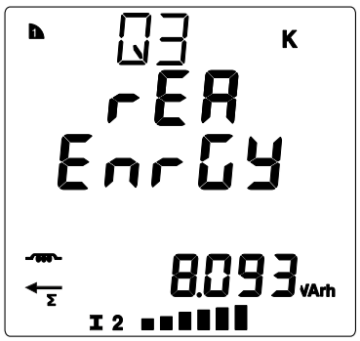
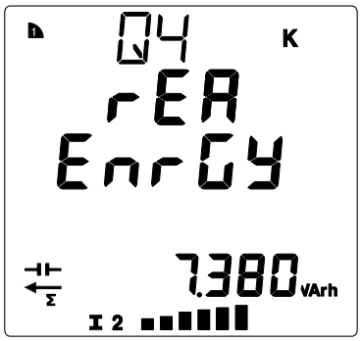
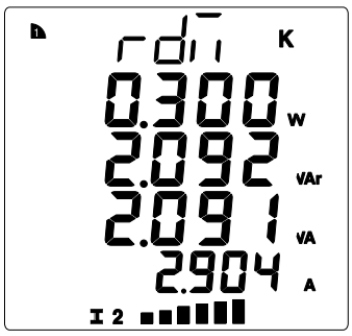
Apparent Net energy (KVAh)	
	Displays total net apparent energy of three phase. **(Apparent Import energy - Apparent Export energy)**
Apparent Total energy (KVAh)	
	Displays total apparent energy of three phase. **(Apparent Import energy + Apparent Export energy)**
Reactive import energy (KVArh)	
	Displays total import reactive energy (**—>**) of three phase.
Reactive export energy (KVArh)	
	Displays total export reactive energy (**<—**) of three phase.

Reactive Lag energy (KVArh)	
	Displays total Lag reactive energy ( ) of three phase.
Reactive Lead energy (KVArh)	
	Displays total Lead reactive energy ( ) of three phase.
Reactive Net energy (KVArh)	
	Displays total net reactive energy of three phase. **(Reactive Import energy - Reactive Export energy)**
Reactive Total energy (KVArh)	
	Displays total reactive energy of three phase. **(Reactive Import energy + Reactive Export energy)**

Reactive Energy Import (Q1) (Inductive)	
	Displays Total Inductive (Q1) Import reactive energy.
Reactive Energy Import (Q2) (Capacitive)	
	Displays Total Capacitive (Q2) Import reactive energy.
Reactive Energy Export (Q3) (Inductive)	
	Displays Total Inductive (Q3) Export reactive energy.
Reactive Energy Export (Q4) (Capacitive)	
	Displays Total Capacitive (Q4) Export reactive energy.

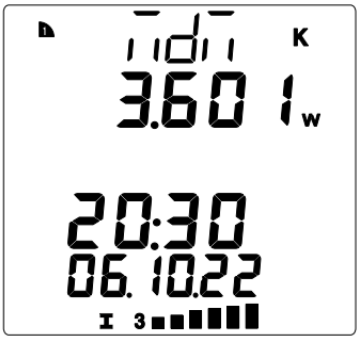
Rising Demand



Displays Rising Demand of total active power, total reactive power, total apparent power and average Current.

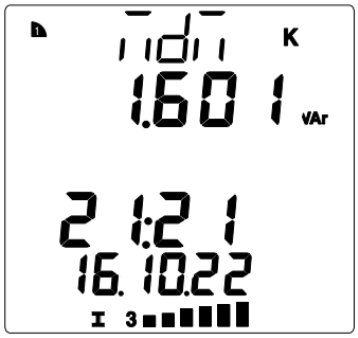
Note: Current always in Ampere.

Maximum Demand of Active Power



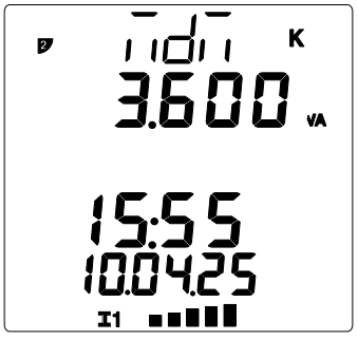
Displays Maximum Demand of Total Active Power with time and date stamp.

Maximum Demand of Reactive Power

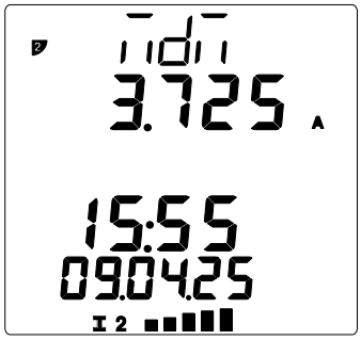
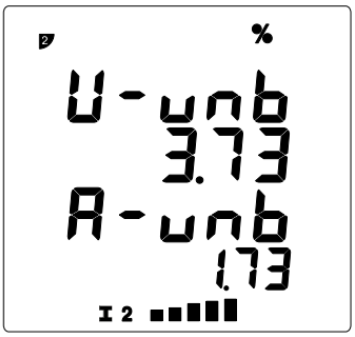
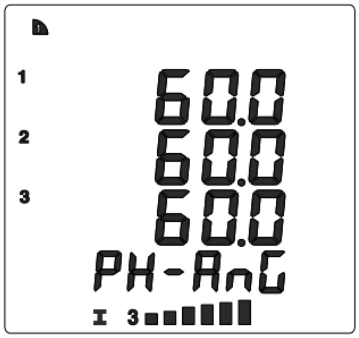
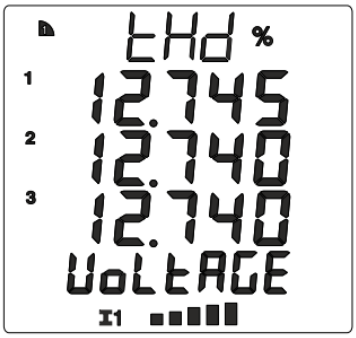


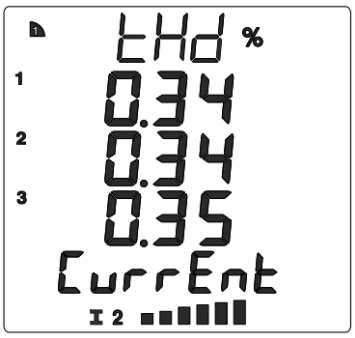
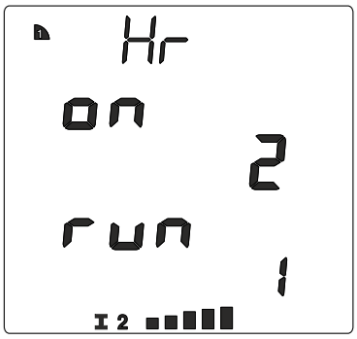
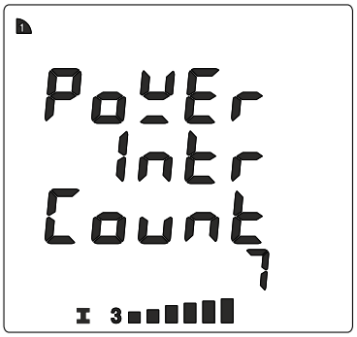
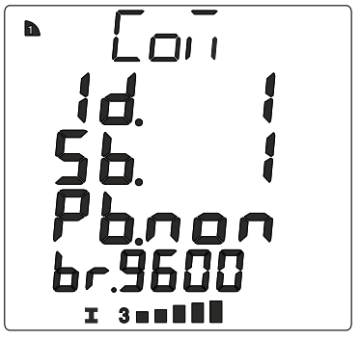
Displays Maximum Demand of Total Reactive Power with time and date stamp.

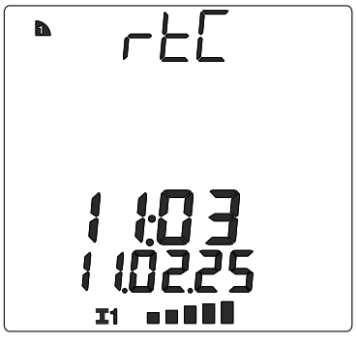
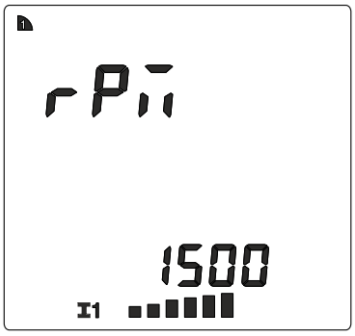
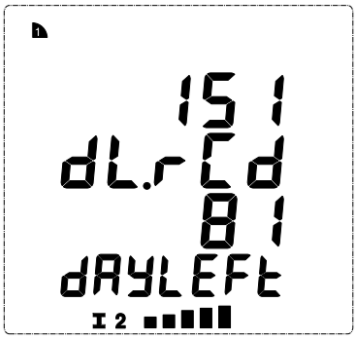
Maximum Demand of Apparent Power



Displays Maximum Demand of Total Apparent Power with time and date stamp.

Maximum Demand of Current	
	Displays Maximum Demand of Average Current with time and date stamp.
Voltage and Current Unbalance	
	Displays the percentage of Voltage and Current unbalance.
Phase Angle	
	Displays Phase angle between Voltage and current of Three phase.
THD (Voltage)	
	Displays the percentage of Total harmonics distortion of voltage of three phase.

THD (Current)	
	Displays the percentage of Total harmonics distortion of Current of three phases.
On hour & Run hour	
	Displays On hour and run hour.
Power interruption count	
	Displays power interruption Count
Communication Information	
	Displays Communication Information about slave id, Stop bit, Parity bit, Baud rate.

RTC	
	Displays Real time clock
RPM	
	Displays RPM which is based on System frequency & No. of Pole.
Data log	
 	Displays data log records and no. of days left to memory full. **OR** If Data logging memory is full, the display shows memory full message.

Percentage bar for phase-wise line current

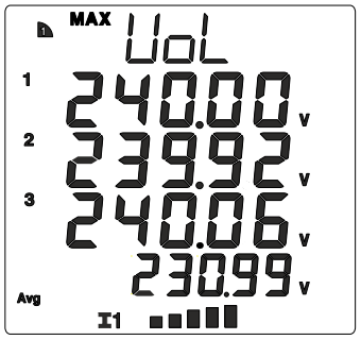
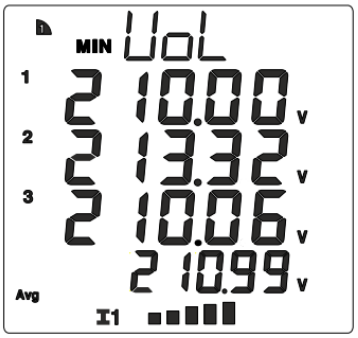
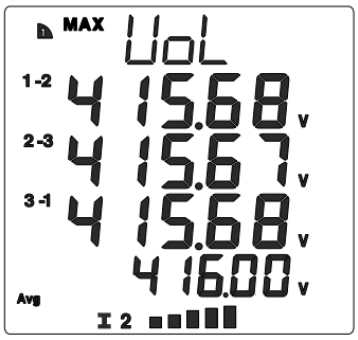
The percentage graph will always be displayed in the footer along with other displays, cycling through phase 1 line current, phase 2 line current, and phase 3 line current. **The bar represents 20%, 40%, 60%, 80%, 100%, and 120% of In (Nominal Current).**

Note:

- ✓ **Current always in ampere.**
- ✓ **Data log page only displays when you Start Data logging. Otherwise, it's not showing.**
- ✓ **Device run on 3P3W then Y phase current, Voltage(L-N), Phase 1((V, A, PF, W), Phase 2((V, A, PF, W), Phase 3((V, A, PF, W) will not show on display.**

Pages of Maximum – minimum value of instantaneous parameters: -

- ❖ Press and hold the DEC key for 5 seconds to display the parameter values.
- ❖ To exit, press and hold the DEC key again for 5 seconds.

Max Voltage (L-N)	
	Displays Maximum line to neutral Voltage of three phase and Maximum average line to neutral voltage. **Note: Displays only in 3p4w System Configuration.**
Min Voltage (L-N)	
	Displays Minimum line to neutral Voltage of three phases and Minimum average line to neutral voltage. **Note: Displays only in 3p4w System Configuration.**
Max Voltage (L-L)	
	Displays Maximum line to line voltage of three phases and Maximum average line to line voltage.

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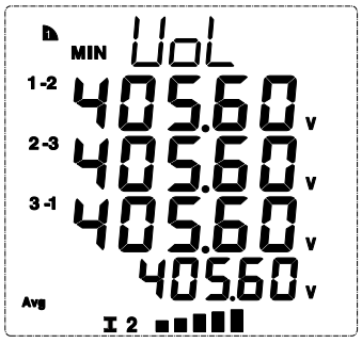
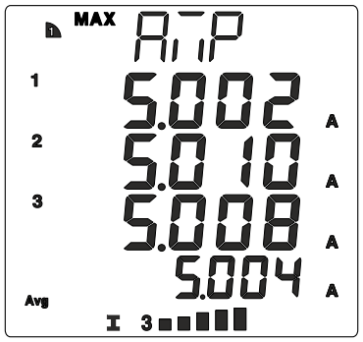
Min Voltage (L-L)



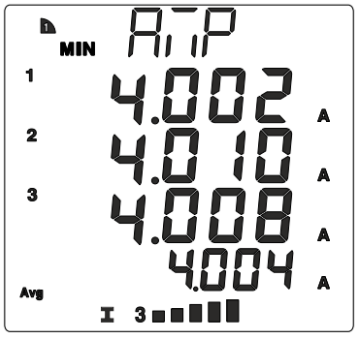
Displays Minimum line to line voltage of three phases and Minimum average line to line voltage.

Max Ampere



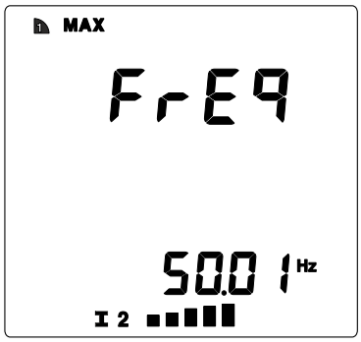
Displays Maximum phase current of three phases and Maximum Average current.

Min Ampere

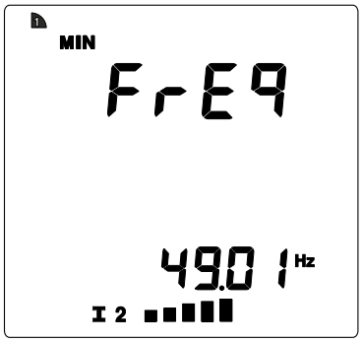
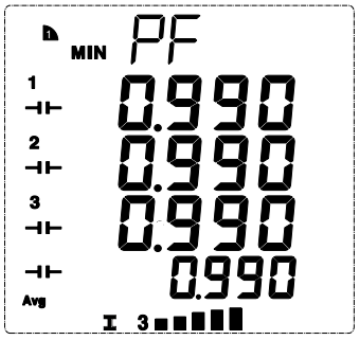
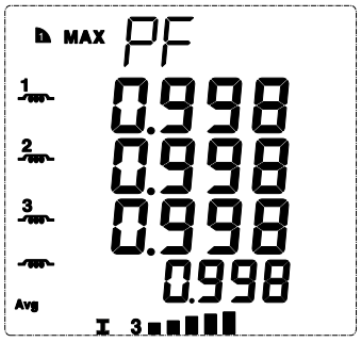


Displays Minimum phase current of three phases and Minimum Average current.

Max Frequency



Displays maximum system frequency.

Min Frequency	
	Displays Minimum System Frequency.
Max Capacitive Power factor	
	Displays Maximum Capacitive Power factor of Three phases and Maximum Capacitive average Power factor.
Min Capacitive Power factor	
	Displays Minimum Capacitive Power factor of Three phases and Minimum Inductive average Power factor.
Max Inductive Power factor	
	Displays Maximum Inductive Power factor of Three phases and Maximum Inductive average Power factor.

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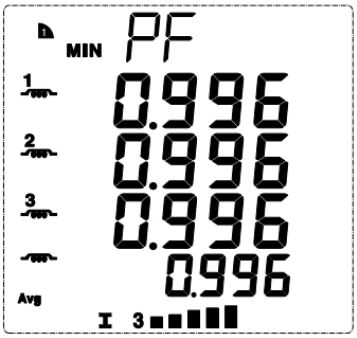
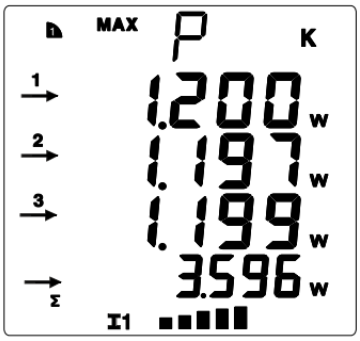
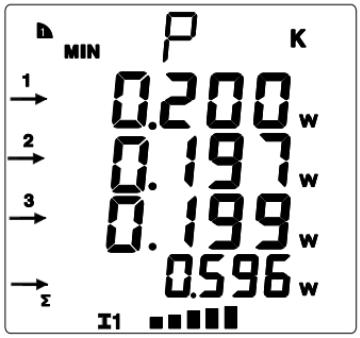
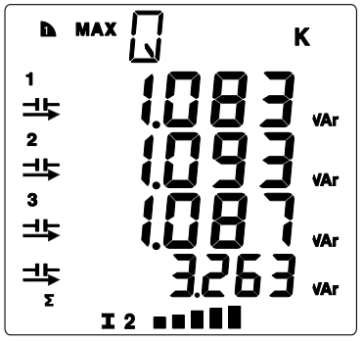
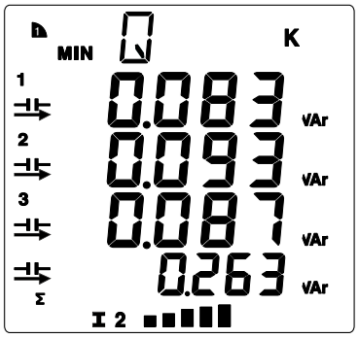
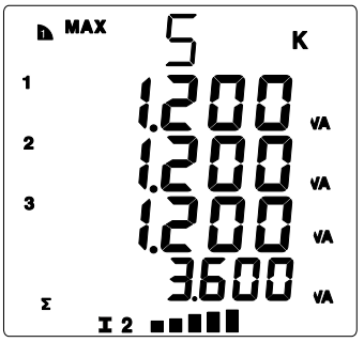
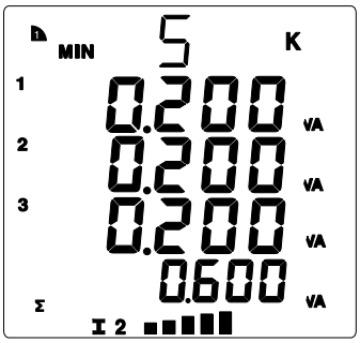
Min Inductive Power factor	
	Displays Minimum Inductive Power factor of Three phases and Minimum Inductive average Power factor.
Max Active Power(P)	
	Displays Maximum active power of three phases and Maximum total active power
Min Active Power(P)	
	Displays Minimum active power of three phases and Minimum total active power
Max Reactive Power(Q)	
	Displays Maximum reactive power of three phases and Maximum total reactive power.

Min Reactive Power(Q)	
	Displays Minimum reactive power of three phases and Minimum total reactive power.
Max Apparent Power(S)	
	Displays Maximum apparent power of three phases and total Maximum apparent power
Min Apparent Power(S)	
	Displays Minimum apparent power of three phases and total Minimum apparent power

7.2 Configuration Mode

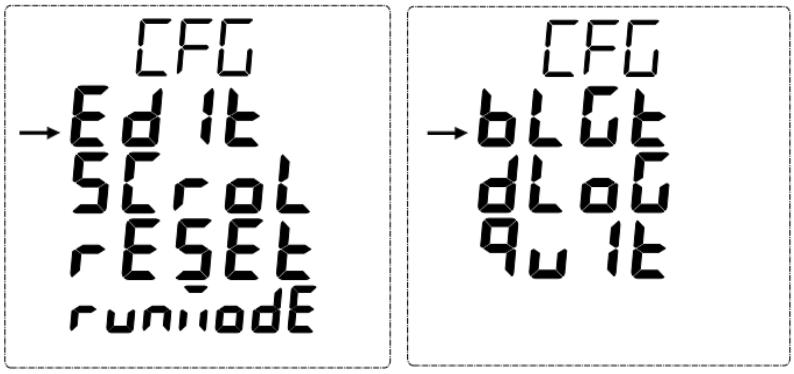
The Configuration Mode allows users to set up and personalize various meter parameters, such as transformer Primary & Secondary values, communication settings, Demand and data logging preferences. This section describes each setting in detail, with instructions for navigation and saving.

7.2.1 Password Entry

Press the **ENTER** key to enter Configuration Mode. The password screen will appear where you need to enter the password.
If the password is correct, you will gain access to Configuration Mode; otherwise, you cannot proceed.
Press **INC** key to Increment value, Press the **DEC** key to shift to the next digit and Press the **ENTER** key (Note If Password is correct True message will show before entering Configuration Mode, if incorrect False message will show)

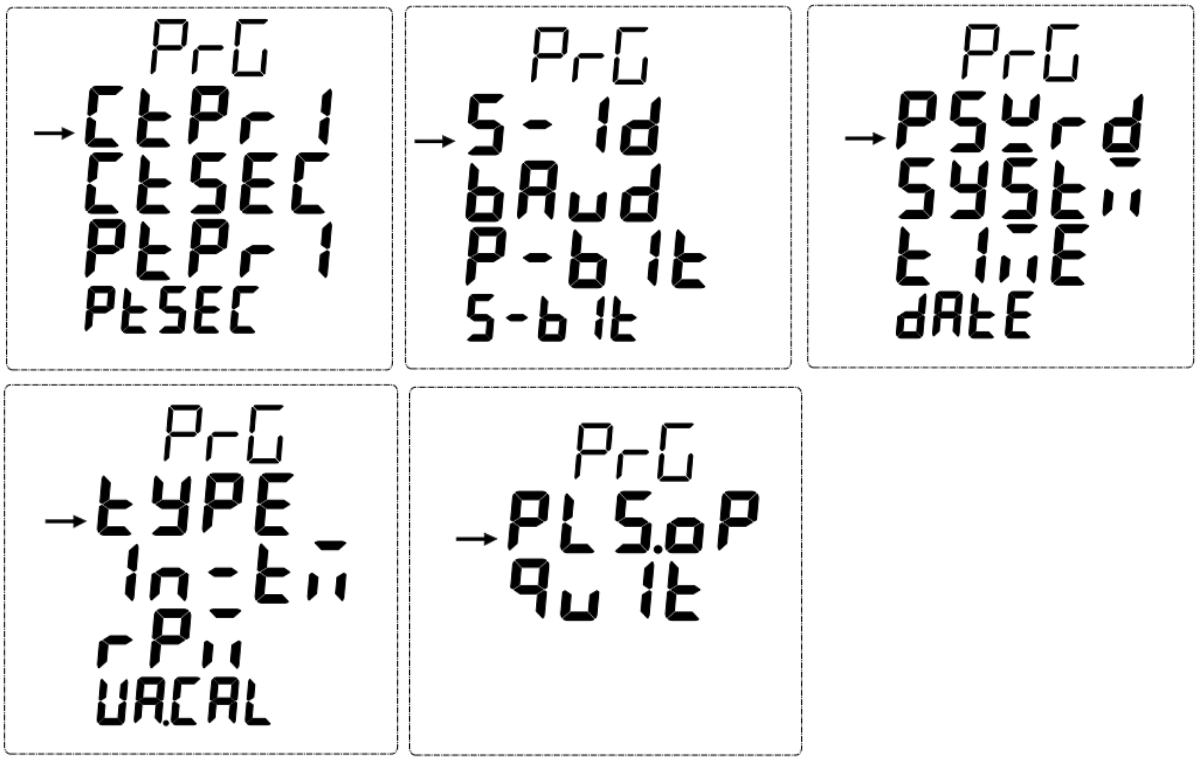
7.2.2 Navigate Configuration Mode

Upon entering Configuration Mode, a selection bar is displayed. Use the **INC** and **DEC** keys to navigate between modes. Press **ENTER** key to select a mode. To exit From Configuration Mode, select 'Quit' and press **ENTER** key. The meter returns to Run Mode.



7.3 Edit Mode

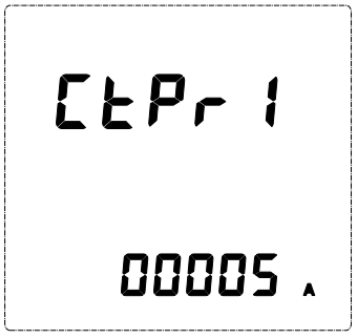
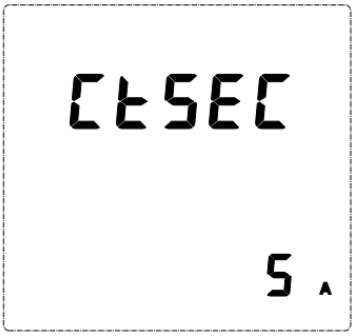
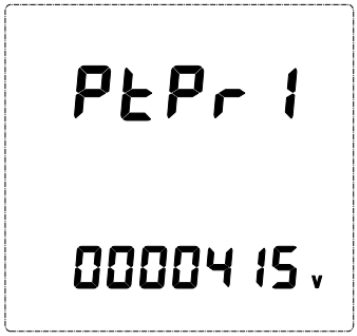
By Pressing **ENTER** key on EDIT, below screen will be shown.



7.3.1 Enter and Navigate Edit Mode

To enter and navigate Edit Mode:
1. Select Edit in Configuration Mode then press the **ENTER** key.
2. Use **INC** Key to scroll downward through the menu.
3. Use **DEC** Key to scroll upward / shift.
4. Press **ENTER** Key to select a menu item.
5. After changing the desired parameter, press the **DEC** key to return to the edit menu. Refer to section 7.3.2 for details on editing each parameter.

7.3.2 Parameters

CT Primary	
	**Applicable Range:** 1/5A to 15000A To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increment the value. Use the **DEC** key to shift the cursor to the next digit. Press the **ENTER** key again to save the value. Press the **DEC** key to return to edit menu.
CT Secondary	
	**Applicable Range:** 1/5A To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increase the value. Use the **DEC** key to decrease the value. Press the **ENTER** key again to save the value Press the **DEC** key to return to edit menu.
PT Primary	
	**Applicable Range:** 100V to 1000kV To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increase the value. Use the **DEC** key to move the cursor to the next digit. Press the **ENTER** key again to save the value. Press the **DEC** key to return to edit menu.

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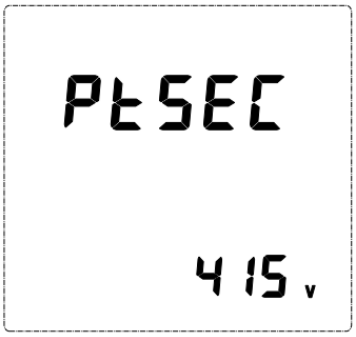
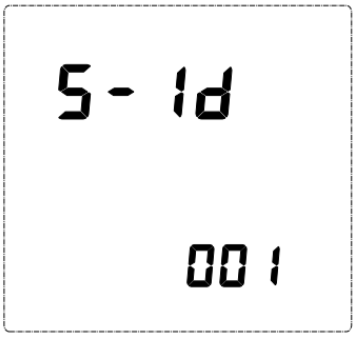
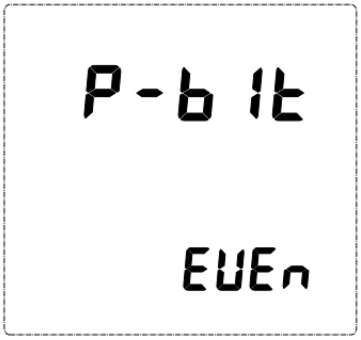
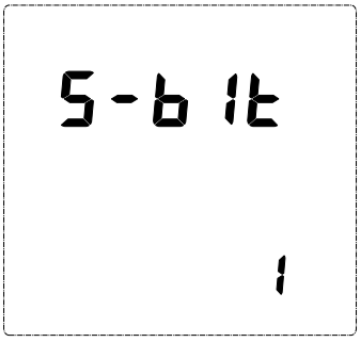
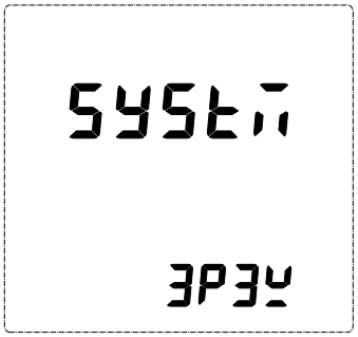
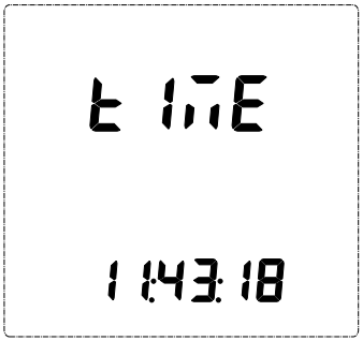
PT Secondary	
	**Applicable Range:** 100V to 415V To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increase the value. Use the **DEC** key to move the cursor to the next digit. Press the **ENTER** key again to save the value. Press the **DEC** key to return to edit menu.
Slave ID	
	**Applicable Range:** 1 to 247 To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increase the value. Use the **DEC** key to move the cursor to the next digit. Press the **ENTER** key again to save the value. Press the **DEC** key to return to edit menu.
Baud Rate	
	**Applicable Selections:** 2400, 4800, 9600, 19200, 38400 To edit the selection (indicated by blinking), press the **ENTER** key. Use the **INC** or **DEC** key to change the selection. Press the **ENTER** key again to save the selection. Press the **DEC** key to return to edit menu.
Parity Bit	
	**Applicable Selections:** None, Odd, Even To edit the selection (indicated by blinking), press the **ENTER** key. Use the **INC** or **DEC** key to change the selection. Press the **ENTER** key again to save the selection. Press the **DEC** key to return to edit menu.

Stop Bit	
	**Applicable Range:** 1 or 2 To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increase the value. Use the **DEC** key to decrease the value. Press the **ENTER** key again to save the value. Press the **DEC** key to return to edit menu.
Password	
	**Applicable Range:** 0001 to 9999 To Change password value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increase the digit value. Use the **DEC** key to move the cursor to the next digit. Press the **ENTER** key again to save the value. Press the **DEC** key to return to edit menu.
System Type	
	**Applicable Selections:** 3P3W, 3P4W To edit the selection (indicated by blinking), press the **ENTER** key. Use the **INC** or **DEC** key to change the selection. Press the **ENTER** key again to save the selection. Press the **DEC** key to return to edit menu.
Time	
	**Format:** HH:MM: SS To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** key to increment the value. Use the **DEC** key to move the cursor to the next digit. Press the **ENTER** key again to save the value. Press the **DEC** key to return to edit menu.

NOTE: While entering time & date take care of not entering wrong date & time, especially date.

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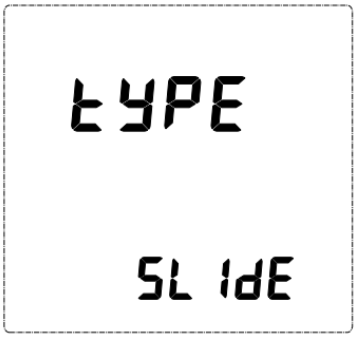
Date

Format: DD:MM: YY

To edit the value (indicated by blinking), press the **ENTER** key.
Use the **INC** key to increment the value.
Use the **DEC** key to move the cursor to the next digit.
Press the **ENTER** key again to save the value.
Press the **DEC** key to return to edit menu.

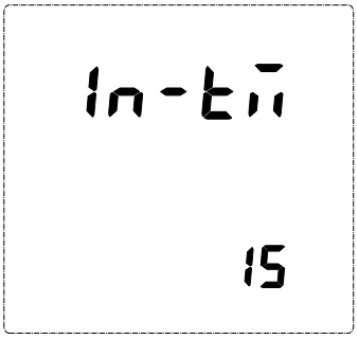
Demand Type



Applicable Selection: Block, Slide

To edit the selection (indicated by blinking), press the **ENTER** key.
Use the **INC** or **DEC** key to change the selection.
Press the **ENTER** key again to save the selection.
Press the **DEC** key to return to edit menu.

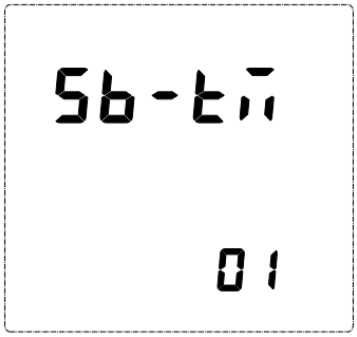
Interval Time



Applicable Range: 1–60 Min

To edit the value (indicated by blinking), press the **ENTER** key.
Use the **INC** key to increase the value.
Use the **DEC** key to move the cursor to the next digit.
Press the **ENTER** key again to save the value.
Press the **DEC** key to return to edit menu.

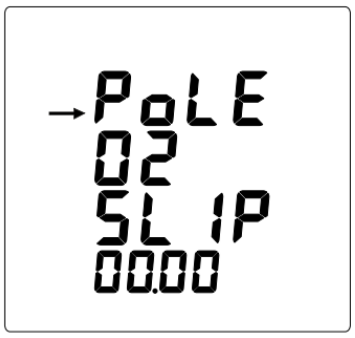
Sub Interval Time



Applicable Range: 1–60 Min

To edit the value (blinking), press the **ENTER** key.
Press the **INC** key to increment the value.
Press the **DEC** key to move to the next digit.
Press the **ENTER** key to save the value.
Press the **DEC** key to return to edit menu.

RPM Configuration



Applicable Range:

- Pole: 2 to 48
- Slip: 00.00 to 99.99

To edit the value (indicated by blinking), press the **ENTER** key.
Select either **Pole** or **Slip**, then press **ENTER** to edit the selected value.
Use the **INC** key to increment the value.
Use the **DEC** key to move the cursor to the next digit.
Press the **ENTER** key again to save the value.
Press the **DEC** key to return to edit menu.

VA Calculation Method

Applicable Selection: Arithmetic or Vector

To edit the selection (indicated by blinking), press the **ENTER** key.
Use the **INC** or **DEC** key to change the selection.
Press the **ENTER** key again to save the selection.
Press the **DEC** key to return to edit menu.

Pulse Output

Applicable Range:

- Pulse constant: 100 to 60000
- Unit selection: Wh / VARh / VAh

To edit the value (indicated by blinking), press the **ENTER** key.
Use the **INC** or **DEC** key to change the value.
Press the **ENTER** key again to save the value.
Press the **DEC** key to return to edit menu.

For Unit selection Follow this below table.

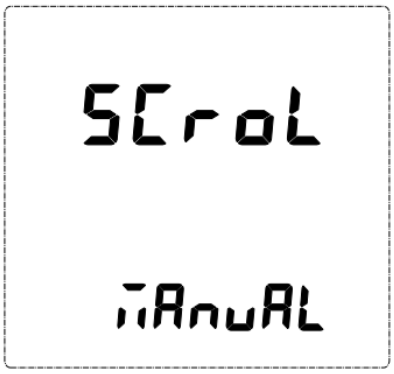
0	kWh – Import
1	kWh – Export
2	kVArh – Import
3	kVArh – Export
4	kVAh – Import
5	kVAh – Export
6	MWh – Import
7	MWh – Export
8	MVArh – Import
9	MVArh – Export
10	MVAh – Import
11	MVAh – Export

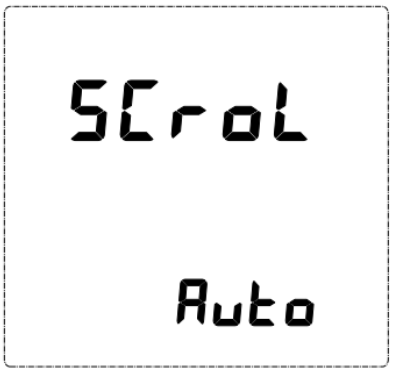
7.4 Scroll Mode

Applicable Selection: Auto Scroll or Manual Scroll
This setting controls how display pages scroll:

- **Auto Scroll:** Pages scroll automatically at 10-second intervals.
- **Manual Scroll:** Pages change only when the **INC** or **DEC** key is pressed. The last page will reappear when the device is turned off and then back on.

To edit the value (indicated by blinking), press the **ENTER** key.
Use the **INC** or **DEC** key to change the selection.
Press the **ENTER** key again to save the value.

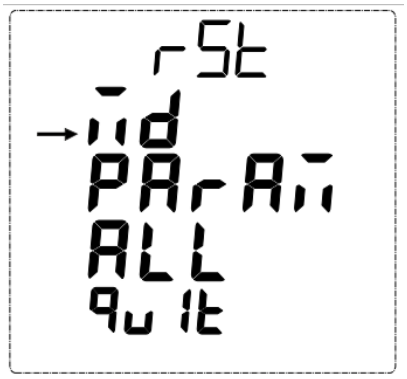




7.5 Reset Mode

Allows the user to reset individual or all stored data:
- Energy*, Hours, Max/Min, Power Interruptions, Max Demand, Configuration
Use **INC/DEC** to choose and press **ENTER** to confirm. Once **ENTER** key is pressed the meter prompts: '**Reset? YES/NO**'.

- If select yes, then parameter will be reset & if Select **NO** then parameter will be not reset.
- If yes, move the selection bar to **YES** and press ENTER key to reset.
- If no, move the selection bar to **NO** and press ENTER key.



"In Reset Mode, selecting **'All'** will reset Energy, Operating Hours, Power Interruption Count, and Maximum Demand."
"By selecting **'Enrgy'**, all Energy values will be reset and reflected on old energy modbus registers."
"By selecting **'Hour'**, ON & RUN hours values will be reset."
"By selecting **'PIntr'**, Power interruption count will be reset."
"By selecting **'MAX-MIN'**, Maximum-Minimum values of the instantaneous parameters will be reset."
"By selecting **'Md'**, Maximum Demand values will be reset."

"By selecting **'Param'**, all configured parameters will be reset, and default settings will be restored."

7.6 Run Mode

Run Mode resumes normal operation. Once selected, the meter exits Configuration Mode. Re-entry requires password authentication.

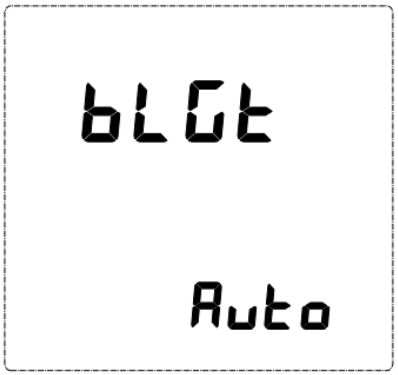
7.7 Backlight Mode

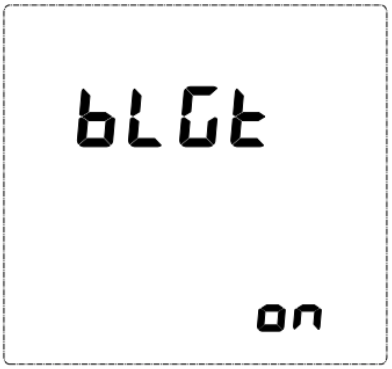
This setting determines how the backlight operates.

Applicable Selection: ON or **AUTO.**

- **ON**: Always on
- **AUTO**: Turns off after 1 minute of no activity; pressing any key turns it on again.

To edit the selection (indicated by blinking), press the **ENTER** key.
Use the **INC** or **DEC** key to change the selection.
Press the **ENTER** key again to save the selection.



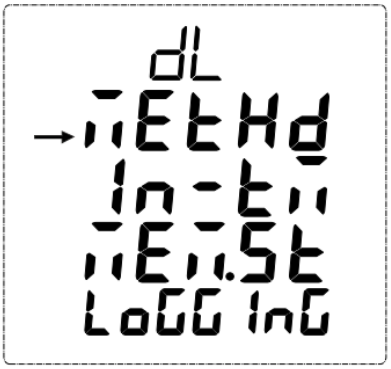


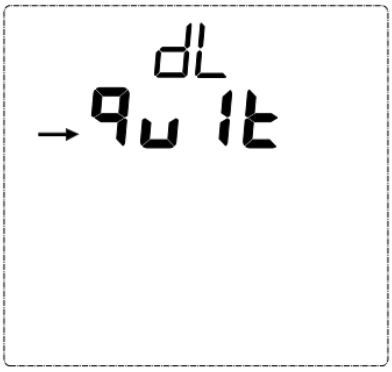
7.8 Data Logging Mode

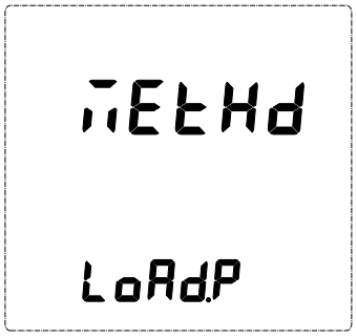
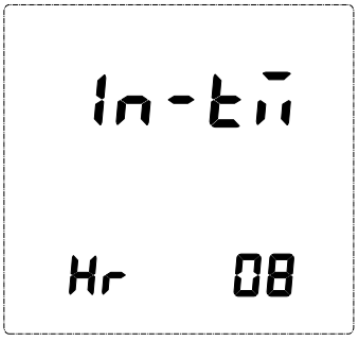
In Data Logging mode, **mLogiView** software allows you to choose the parameters to log, configure the logging interval and method, and retrieve the recorded data easily. For better understanding please refer our **mLogiView** Software.

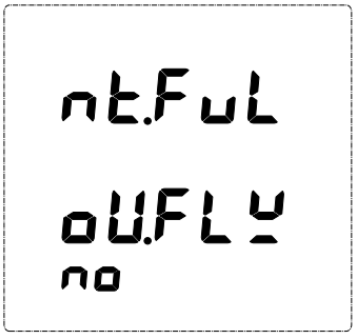
7.8.1 Enter and Navigate Data Logging Mode

To enter and navigate: Select Data Logging in Configuration Mode then press the **ENTER** key. Use **INC** to scroll downward through the menu. Use **DEC** to scroll upward. You can see the Data logging menu below





Method	
	**Applicable Selections:** Periodic, Load Profile To edit the selection (indicated by blinking), press the **ENTER** key. Use the **INC** or **DEC** key to change the selection. Press the **ENTER** key again to save the data logging method. Press the **DEC** key to return to Log menu.
Interval	
	**Applicable Selections:** • Minutes: 1, 5, 10, 15, 30, 45, 60 • Hours: 8, 12, 24 To edit the value (indicated by blinking), press the **ENTER** key. Use the **INC** or **DEC** key to change the selection. Press the **ENTER** key again to save the interval time. Press the **DEC** key to return to Log menu.

Memory Status	
	In Memory status, when logging memory is Not full Then cannot edit overwrite option*. In case When logging memory is full then you can select if you want to overwrite to memory or not. To overwrite press, **ENTER** key and use **INC** or **DEC** key to select **YES** then press **ENTER** key again. Press the **DEC** key to return to Log menu.
Logging	
	**Applicable Selections:** Start Logging, Stop Logging To edit the selection (indicated by blinking), press the **ENTER** key. Use the **INC** or **DEC** key to change the selection. Press the **ENTER** key again to save the selection. Press the **DEC** key to return to Log menu.

Note*: In Memory Status

When the logging memory is full, you can choose to enable the *Overwrite* option.

- If you select **Yes**, the oldest data will be overwritten by new data. Make sure to retrieve any important data **before** selecting Yes, as it cannot be recovered once overwritten.
- If you select **No**, logging will stop once the memory is full, preserving all previously logged data.

8. MODBUS DETAILS

RS – 485 interface is provided to communicate with the meter.

The protocol follows a master-slave model, enabling a single master to exchange data with multiple slaves over Modbus RTU.

Use only the following function codes for data read/write purpose

CODE	MEANING	ACTION
03	Read holding registers	Obtains current binary value in one or more holding registers.
04	Read Input registers	Obtains current binary value in one or more Input registers.
06	Preset single register	Place a specific binary value into a holding register.

8.1 Modbus Register Map for Read parameters

Function Code = 0X04
Data Format = Swapped Float

Data read Query = [0 x Slave Id], [0 x Fun. Code], [0 x ADD. High], [0 x ADD. Low], [0 x No. of data word, High], [0 x No. of data word. Low] [0 x CRC Low] [0 x CRC High]

Response = [0 x Slave Id], [0 x Fun. Code], [Byte count], [Data High], [Data Low] …... [Data. High], [Data. Low] [0 x CRC Low] [0 x CRC High]

	Registers for Instantaneous Parameters					
S. No.	Modbus Address	Parameters	Description	Unit	Words	Type
1	30001	V1 LN	R Phase to Neutral Voltage	Volt	2	R
2	30003	V2 LN	Y Phase to Neutral Voltage	Volt	2	R
3	30005	V3 L N	B Phase to Neutral Voltage	Volt	2	R
4	30007	VLN Avg	Average Voltage Phase to Neutral	Volt	2	R
5	30009	V12 LL	RY Voltage	Volt	2	R
6	30011	V23 LL	YB Voltage	Volt	2	R
7	30013	V31 LL	BR Voltage	Volt	2	R
8	30015	VLL Avg	Average Voltage Phase to phase	Volt	2	R
9	30017	I1	R Phase Line current	Ampere	2	R
10	30019	I2	Y Phase Line current	Ampere	2	R
11	30021	I3	B Phase Line current	Ampere	2	R
12	30023	I Avg	Average Line Current	Ampere	2	R
13	30025	In	Neutral Line current	Ampere	2	R
14	30027	Freq	Frequency	Hz	2	R
15	30029	PF1	R Phase Power factor	--	2	R
16	30031	PF2	Y Phase Power factor	--	2	R
17	30033	PF3	B Phase Power factor	--	2	R
18	30035	PF Avg	Average Power factor	--	2	R
19	30037	P1	R Phase Active Power	KW	2	R
20	30039	P2	Y Phase Active Power	KW	2	R
21	30041	P3	B Phase Active Power	KW	2	R
22	30043	P Tot	Total Active Power	KW	2	R
23	30045	Q1	R- Phase Reactive Power	KVAR	2	R
24	30047	Q2	Y- Phase Reactive Power	KVAR	2	R
26	30049	Q3	B- Phase Reactive Power	KVAR	2	R
26	30051	Q Tot	Total Reactive Power	KVAR	2	R
27	30053	S1	R- Phase Apparent Power	KVA	2	R
28	30055	S2	Y- Phase Apparent Power	KVA	2	R

29	30057	S3	B- Phase Apparent Power	KVA	2	R
30	30059	S Tot	Total Apparent Power	KVA	2	R
31	30061	A1	R Phase current to voltage Angle	Degree	2	R
32	30063	A2	Y Phase current to voltage Angle	Degree	2	R
33	30065	A3	B Phase current to voltage Angle	Degree	2	R
34	30067	V1 THD	R phase Voltage THD	%	2	R
35	30069	V2 THD	Y Phase Voltage THD	%	2	R
36	30071	V3 THD	B Phase Voltage THD	%	2	R
37	30073	Avg V THD	Average Voltage THD	%	2	R
38	30075	I1 THD	R Phase Current THD	%	2	R
39	30077	I2 THD	Y Phase Current THD	%	2	R
40	30079	I3 THD	B Phase Current THD	%	2	R
41	30081	Avg I THD	Average Current THD	%	2	R
42	30083	DPF1	R phase Displacement Power factor	--	2	R
43	30085	DPF2	Y phase Displacement Power factor	--	2	R
44	30087	DPF3	B phase Displacement Power factor	--	2	R
45	30089	DPF Avg	Average Displacement Power factor	--	2	R
46	30091	V.unbl	Voltage Unbalance	%	2	R
47	30093	I.unbl	Current Unbalance	%	2	R
48	30095	RPM	Rotation per minute	--	2	R
49	30097	IA1	R phase Active Current	Ampere	2	R
50	30099	IA2	Y phase Active Current	Ampere	2	R
51	30101	IA3	B phase Active Current	Ampere	2	R
52	30103	Iaavg	Average Active Line Current	Ampere	2	R
53	30105	IR1	R phase Reactive Current	Ampere	2	R
54	30107	IR2	Y phase Reactive Current	Ampere	2	R
55	30109	IR3	B phase Reactive Current	Ampere	2	R
56	30111	Iravg	Average Reactive line current	Ampere	2	R
57	30113	RTC_T	Real Time	--	2	R
58	30115	RTC_D	Real Date	--	2	R
	Registers for Energy Parameters					
1	30151	KWh (Im)	Active Energy Import	KWh	2	R
2	30153	KWh (Ex)	Active Energy Export	KWh	2	R
3	30155	KWh net	Active Energy Net (Import - Export)	KWh	2	R
4	30157	KWh Tot	Active Energy Total (Import + Export)	KWh	2	R
5	30159	KVAh (Im)	Apparent Energy Import	KVAh	2	R
6	30161	KVAh (Ex)	Apparent Energy Export	KVAh	2	R
7	30163	KVAh net	Apparent Energy Net (Import - Export)	KVAh	2	R
8	30165	KVAh Tot	Apparent Energy Total (Import + Export)	KVAh	2	R
9	30167	KVArh (Im)	Reactive Energy Import (Q1+Q2)	KVArh	2	R
10	30169	KVArh (Ex)	Reactive Energy Export (Q3+Q4)	KVArh	2	R
11	30171	KVArh net	Reactive Energy Net (Import - Export)	KVArh	2	R
12	30173	KVArh Tot	Reactive Energy Total (Import + Export)	KVArh	2	R
13	30175	KVArh (L-Im)	Reactive Energy – Inductive import (Q1)	KVArh	2	R
14	30177	KVArh (C-Im)	Reactive Energy – Capacitive import (Q2)	KVArh	2	R
15	30179	KVArh (L-Ex)	Reactive Energy - Inductive export (Q3)	KVArh	2	R
16	30181	KVArh (C-Ex)	Reactive Energy - Capacitive export (Q4)	KVArh	2	R
17	30183	KVArh (L-Tot)	Reactive Energy Lag Total	KVArh	2	R
18	30185	KVArh (C-Tot)	Reactive Energy Lead Total	KVArh	2	R
	Phase Wise Energy Registers					
1	30187	KWh1 (Im)	R Phase Active Energy Import	KWh	2	R
2	30189	KWh2 (Im)	Y Phase Active Energy Import	KWh	2	R
3	30191	KWh3 (Im)	B Phase Active Energy Import	KWh	2	R
4	30193		Total Active Energy Import	KWh	2	R
5	30195	KWh1 (Ex)	R Phase Active Energy Export	KWh	2	R
6	30197	KWh2 (Ex)	Y Phase Active Energy Export	KWh	2	R
7	30199	KWh3 (Ex)	B Phase Active Energy Export	KWh	2	R
8	30201		Total Active Energy export	KWh	2	R
9	30203	KWh1 net	R Phase Active Energy net	KWh	2	R
10	30205	KWh2 net	Y Phase Active Energy net	KWh	2	R
11	30207	KWh3 net	B Phase Active Energy net	KWh	2	R

12	30209		Total Active Energy net	KWh	2	R
13	30211	KWh1 Tot	R Phase Active Energy Total	KWh	2	R
14	30213	KWh2 Tot	Y Phase Active Energy Total	KWh	2	R
15	30215	KWh3 Tot	B Phase Active Energy Total	KWh	2	R
16	30217		Total Active Energy total	KWh	2	R
17	30219	KVAh1 (Im)	R Phase Apparent Energy Import	KVAh	2	R
18	30221	KVAh2 (Im)	Y Phase Apparent Energy Import	KVAh	2	R
19	30223	KVAh3 (Im)	B Phase Apparent Energy Import	KVAh	2	R
20	30225		Total Apparent Energy Import	KVAh	2	R
21	30227	KVAh1 (Ex)	R Phase Apparent Energy Export	KVAh	2	R
22	30229	KVAh2 (Ex)	Y Phase Apparent Energy Export	KVAh	2	R
23	30231	KVAh3 (Ex)	B Phase Apparent Energy Export	KVAh	2	R
24	30233		Total Apparent Energy export	KVAh	2	R
25	30235	KVAh1 net	R Phase Apparent Energy net	KVAh	2	R
26	30237	KVAh2 net	Y Phase Apparent Energy net	KVAh	2	R
27	30239	KVAh3 net	B Phase Apparent Energy net	KVAh	2	R
28	30241		Total Apparent Energy net	KVAh	2	R
29	30243	KVAh1 Tot	R Phase Apparent Energy Total	KVAh	2	R
30	30245	KVAh2 Tot	Y Phase Apparent Energy Total	KVAh	2	R
31	30247	KVAh3 Tot	B Phase Apparent Energy Total	KVAh	2	R
32	30249		Total Apparent Energy total	KVAh	2	R
33	30251	KVArh1 (Im)	R Phase Reactive Energy Import	KVArh	2	R
34	30253	KVArh2 (Im)	Y Phase Reactive Energy Import	KVArh	2	R
35	30255	KVArh3 (Im)	B Phase Reactive Energy Import	KVArh	2	R
36	30257		Total Reactive Energy Import	KVArh	2	R
37	30259	KVArh1 (Ex)	R Phase Reactive Energy Export	KVArh	2	R
38	30261	KVArh2 (Ex)	Y Phase Reactive Energy Export	KVArh	2	R
39	30263	KVArh3 (Ex)	B Phase Reactive Energy Export	KVArh	2	R
40	30265		Total Reactive Energy export	KVArh	2	R
41	30267	KVArh1 net	R Phase Reactive Energy net	KVArh	2	R
42	30269	KVArh2 net	Y Phase Reactive Energy net	KVArh	2	R
43	30271	KVArh3 net	B Phase Reactive Energy net	KVArh	2	R
44	30273		Total Reactive Energy net	KVArh	2	R
45	30275	KVArh1 Tot	R Phase Reactive Energy Total	KVArh	2	R
46	30277	KVArh2 Tot	Y Phase Reactive Energy Total	KVArh	2	R
47	30279	KVArh3 Tot	B Phase Reactive Energy Total	KVArh	2	R
48	30281		Total Reactive Energy total	KVArh	2	R
49	30283	KVArh1 lag	R Phase Reactive Energy Lag	KVArh	2	R
50	30285	KVArh2 lag	Y Phase Reactive Energy Lag	KVArh	2	R
51	30287	KVArh3 lag	B Phase Reactive Energy Lag	KVArh	2	R
52	30289		Total Reactive Energy Lag	KVArh	2	R
53	30291	KVArh1 lead	R Phase Reactive Energy Lead	KVArh	2	R
54	30293	KVArh2 lead	Y Phase Reactive Energy Lead	KVArh	2	R
55	30295	KVArh3 lead	B Phase Reactive Energy Lead	KVArh	2	R
56	30297		total Reactive Energy Lead	KVArh	2	R
	Registers for Current harmonics					
1	30301	3rd IrHar	3rd R-phase current harmonic		2	R
2	30303	5th IrHar	5th R-phase current harmonic		2	R
3	30305	7th IrHar	7th R-phase current harmonic		2	R
4	30307	9th IrHar	9th R-phase current harmonic		2	R
5	30309	11th IrHar	11th R-phase current harmonic		2	R
6	30311	13th IrHar	13th R-phase current harmonic		2	R
7	30313	15th IrHar	15th R-phase current harmonic		2	R
8	30315	17th IrHar	17th R-phase current harmonic		2	R
9	30317	19th IrHar	19th R-phase current harmonic		2	R
10	30319	21st IrHar	21st R-phase current harmonic		2	R
11	30321	23rd IrHar	23rd R-phase current harmonic		2	R
12	30323	25th IrHar	25th R-phase current harmonic		2	R
13	30325	27th IrHar	27th R-phase current harmonic		2	R
14	30327	29th IrHar	29th R-phase current harmonic		2	R
15	30329	31st IrHar	31st R-phase current harmonic		2	R

16	30331	3rd IyHar	3rd Y-phase current harmonic		2	R
17	30333	5th IyHar	5th Y-phase current harmonic		2	R
18	30335	7th IyHar	7th Y-phase current harmonic		2	R
19	30337	9th IyHar	9th Y-phase current harmonic		2	R
20	30339	11th IyHar	11th Y-phase current harmonic		2	R
21	30341	13th IyHar	13th Y-phase current harmonic		2	R
22	30343	15th IyHar	15th Y-phase current harmonic		2	R
23	30345	17th IyHar	17th Y-phase current harmonic		2	R
24	30347	19th IyHar	19th Y-phase current harmonic		2	R
25	30349	21st IyHar	21st Y-phase current harmonic		2	R
26	30351	23rd IyHar	23rd Y-phase current harmonic		2	R
27	30353	25th IyHar	25th Y-phase current harmonic		2	R
28	30355	27th IyHar	27th Y-phase current harmonic		2	R
29	30357	29th IyHar	29th Y-phase current harmonic		2	R
30	30359	31st IyHar	31st Y-phase current harmonic		2	R
31	30361	3rd IbHar	3rd B-phase current harmonic		2	R
32	30363	5th IbHar	5th B-phase current harmonic		2	R
33	30365	7th IbHar	7th B-phase current harmonic		2	R
34	30367	9th IbHar	9th B-phase current harmonic		2	R
35	30369	11th IbHar	11th B-phase current harmonic		2	R
36	30371	13th IbHar	13th B-phase current harmonic		2	R
37	30373	15th IbHar	15th B-phase current harmonic		2	R
38	30375	17th IbHar	17th B-phase current harmonic		2	R
39	30377	19th IbHar	19th B-phase current harmonic		2	R
40	30379	21st IbHar	21st B-phase current harmonic		2	R
41	30381	23rd IbHar	23rd B-phase current harmonic		2	R
42	30383	25th IbHar	25th B-phase current harmonic		2	R
43	30385	27th IbHar	27th B-phase current harmonic		2	R
44	30387	29th IbHar	29th B-phase current harmonic		2	R
45	30389	31st IbHar	31st B-phase current harmonic		2	R
46	30391	Total Irthd	R phase current Total harmonic distortion	%	2	R
47	30393	Total Iythd	Y phase current Total harmonic distortion	%	2	R
48	30395	Total Ibthd	B phase current Total harmonic distortion	%	2	R
49	30397	Avg. Ithd	Average current Total harmonic distortion	%	2	R
	Registers for Voltage harmonics					
1	30401	3rd VrHar	3rd R-phase voltage harmonic		2	R
2	30403	5th VrHar	5th R-phase voltage harmonic		2	R
3	30405	7th VrHar	7th R-phase voltage harmonic		2	R
4	30407	9th VrHar	9th R-phase voltage harmonic		2	R
5	30409	11th VrHar	11th R-phase voltage harmonic		2	R
6	30411	13th VrHar	13th R-phase voltage harmonic		2	R
7	30413	15th VrHar	15th R-phase voltage harmonic		2	R
8	30415	17th VrHar	17th R-phase voltage harmonic		2	R
9	30417	19th VrHar	19th R-phase voltage harmonic		2	R
10	30419	21st VrHar	21st R-phase voltage harmonic		2	R
11	30421	23rd VrHar	23rd R-phase voltage harmonic		2	R
12	30423	25th VrHar	25th R-phase voltage harmonic		2	R
13	30425	27th VrHar	27th R-phase voltage harmonic		2	R
14	30427	29th VrHar	29th R-phase voltage harmonic		2	R
15	30429	31st VrHar	31st R-phase voltage harmonic		2	R
16	30431	3rd VyHar	3rd Y-phase voltage harmonic		2	R
17	30433	5th VyHar	5th Y-phase voltage harmonic		2	R
18	30435	7th VyHar	7th Y-phase voltage harmonic		2	R
19	30437	9th VyHar	9th Y-phase voltage harmonic		2	R
20	30439	11th VyHar	11th Y-phase voltage harmonic		2	R
21	30441	13th VyHar	13th Y-phase voltage harmonic		2	R
22	30443	15th VyHar	15th Y-phase voltage harmonic		2	R

23	30445	17th VyHar	17th Y-phase voltage harmonic		2	R
24	30447	19th VyHar	19th Y-phase voltage harmonic		2	R
25	30449	21st VyHar	21st Y-phase voltage harmonic		2	R
26	30451	23rd VyHar	23rd Y-phase voltage harmonic		2	R
27	30453	25th VyHar	25th Y-phase voltage harmonic		2	R
28	30455	27th VyHar	27th Y-phase voltage harmonic		2	R
29	30457	29th VyHar	29th Y-phase voltage harmonic		2	R
30	30459	31st VyHar	31st Y-phase voltage harmonic		2	R
31	30461	3rd VbHar	3rd B-phase voltage harmonic		2	R
32	30463	5th VbHar	5th B-phase voltage harmonic		2	R
33	30465	7th VbHar	7th B-phase voltage harmonic		2	R
34	30467	9th VbHar	9th B-phase voltage harmonic		2	R
35	30469	11th VbHar	11th B-phase voltage harmonic		2	R
36	30471	13th VbHar	13th B-phase voltage harmonic		2	R
37	30473	15th VbHar	15th B-phase voltage harmonic		2	R
38	30475	17th VbHar	17th B-phase voltage harmonic		2	R
39	30477	19th VbHar	19th B-phase voltage harmonic		2	R
40	30479	21st VbHar	21st B-phase voltage harmonic		2	R
41	30481	23rd VbHar	23rd B-phase voltage harmonic		2	R
42	30483	25th VbHar	25th B-phase voltage harmonic		2	R
43	30485	27th VbHar	27th B-phase voltage harmonic		2	R
44	30487	29th VbHar	29th B-phase voltage harmonic		2	R
45	30489	31st VbHar	31st B-phase voltage harmonic		2	R
46	30491	Total Vrthd	R phase Voltage Total harmonic distortion	%	2	R
47	30493	Total Vythd	Y phase Voltage Total harmonic distortion	%	2	R
48	30495	Total Vbthd	B phase Voltage Total harmonic distortion	%	2	R
49	30497	Avg. Vthd	Average Voltage Total harmonic distortion	%	2	R
	Registers for Demand Parameters					
1	30601	RD_KWT	Rising/Present demand of Active Power Total	KW	2	R
2	30603	MD_KWT	Maximum/Peak demand of Active Power Total	KW	2	R
3	30605	MD_TIME_KWT	MD TIME of Active Power Total	--	2	R
4	30607	MD_DATE_KWT	MD DATE of Active Power Total	--	2	R
5	30609	RD_KVART	Rising/Present demand of Reactive Power Total	KVAR	2	R
6	30611	MD_KVART	Maximum/Peak demand of Reactive Power Total	KVAh	2	R
7	30613	MD_TIME_KVART	MD TIME of Reactive Power Total	--	2	R
8	30615	MD_DATE_KVART	MD DATE of Reactive Power Total	--	2	R
9	30617	RD_KVART	Rising/Present demand of Apparent Power Total	KVA	2	R
10	30619	MD_KVART	Maximum/Peak demand of Apparent Power Total	KVA	2	R
11	30621	MD_TIME_KVAT	MD TIME of Apparent Power Total	--	2	R
12	30623	MD_DATE_KVAT	MD DATE of Apparent Power Total	--	2	R
13	30625	RD_Iavg	Rising/Present demand of Average Current	Ampere	2	R
14	30627	MD_Iavg	Maximum/Peak demand of Average Current	Ampere	2	R
15	30629	MD_TIME_Iavg	MD TIME of Average Current	--	2	R
16	30631	MD_DATE_Iavg	MD DATE of Average Current	--	2	R
	Registers for Old Energy Parameters					
1	30651	Old_KWh (Im)	Old Active Energy Import	KWh	2	R
2	30653	Old_KWh (Ex)	Old Active Energy Export	KWh	2	R
3	30655	Old_KWh net	Old Active Energy Net (Import - Export)	KWh	2	R
4	30657	Old_KWh Tot	Old Active Energy Total (Import + Export)	KWh	2	R

5	30659	Old_KVAh (Im)	Old Apparent Energy Import	KVAh	2	R
6	30661	Old_KVAh (Ex)	Old Apparent Energy Export	KVAh	2	R
7	30663	Old_KVAh net	Old Apparent Energy Net (Import - Export)	KVAh	2	R
8	30665	Old_KVAh Tot	Old Apparent Energy Total (Import + Export)	KVAh	2	R
9	30667	Old_KVArh (Im)	Old Reactive Energy Import (Q1+Q2)	KVArh	2	R
10	30669	Old_KVArh (Ex)	Old Reactive Energy Export (Q3+Q4)	KVArh	2	R
11	30671	Old_KVArh net	Old Reactive Energy Net (Import - Export)	KVArh	2	R
12	30673	Old_KVArh Tot	Old Reactive Energy Total (Import + Export)	KVArh	2	R
13	30675	Old_KVArh (L-Im)	Old Reactive Energy - Inductive import (Q1)	KVArh	2	R
14	30677	Old_KVArh (C-Im)	Old Reactive Energy - Capacitive import (Q2)	KVArh	2	R
15	30679	Old_KVArh (L-Ex)	Old Reactive Energy - Inductive export (Q3)	KVArh	2	R
16	30681	Old_KVArh (C-Ex)	Old Reactive Energy - Capacitive export (Q4)	KVArh	2	R
17	30683	Old_KVArh (L-Tot)	Old Reactive Energy Lag Total	KVArh	2	R
18	30685	Old_KVArh (C-Tot)	Old Reactive Energy Lead Total	KVArh	2	R
	Registers for Min-Max Parameters - It will record the Min and Max values from the last reset.					
1	30701	V1 LN_Max	Maximum Voltage of R Phase	Volt	2	R
2	30703	V2 LN_Max	Maximum Voltage of Y Phase	Volt	2	R
3	30705	V3 LN_Max	Maximum Voltage of B Phase	Volt	2	R
4	30707	Vavg LN_Max	Maximum Voltage of Average LN	Volt	2	R
5	30709	V1 LN_Min	Minimum Voltage of R Phase	Volt	2	R
6	30711	V2 LN_Min	Minimum Voltage of Y Phase	Volt	2	R
7	30713	V3 LN_Min	Minimum Voltage of B Phase	Volt	2	R
8	30715	Vavg LN_Min	Minimum Voltage of Average LN	Volt	2	R
9	30717	V12 LL_Max	Maximum Voltage of RY Phase-Phase	Volt	2	R
10	30719	V23 LL_Max	Maximum Voltage of YB Phase-Phase	Volt	2	R
11	30721	V31 LL_Max	Maximum Voltage of BR Phase-Phase	Volt	2	R
12	30723	Vavg LL_Max	Maximum Voltage of Average LL	Volt	2	R
13	30725	V12 LL_Min	Minimum Voltage of RY Phase-Phase	Volt	2	R
14	30727	V23 LL_Min	Minimum Voltage of YB Phase-Phase	Volt	2	R
15	30729	V31 LL_Min	Minimum Voltage of BR Phase-Phase	Volt	2	R
16	30731	Vavg LL_Min	Minimum Voltage of Average LL	Volt	2	R
17	30733	I1_Max	Maximum Current of R Phase	Ampere	2	R
18	30735	I2_Max	Maximum Current of Y Phase	Ampere	2	R
19	30737	I3_Max	Maximum Current of B Phase	Ampere	2	R
20	30739	Iavg_Max	Maximum Current of Average	Ampere	2	R
21	30741	I1_Min	Minimum Current of R Phase	Ampere	2	R
22	30743	I2_Min	Minimum Current of Y Phase	Ampere	2	R
23	30745	I3_Min	Minimum Current of B Phase	Ampere	2	R
24	30747	Iavg_Min	Minimum Current of Average	Ampere	2	R
25	30749	Freq_Max	Maximum Frequency	Hz	2	R
26	30751	Freq_Min	Minimum Frequency	Hz	2	R
27	30753	P1_Max	Maximum Active power of R Phase	KW	2	R
28	30755	P2_Max	Maximum Active power of Y Phase	KW	2	R
29	30757	P3_Max	Maximum Active power of B Phase	KW	2	R
30	30759	Ptot_Max	Maximum Active power of Total	KW	2	R
31	30761	P1_Min	Minimum Active power of R Phase	KW	2	R
32	30763	P2_Min	Minimum Active power of Y Phase	KW	2	R
33	30765	P3_Min	Minimum Active power of B Phase	KW	2	R
34	30767	Ptot_Min	Minimum Active power of Total	KW	2	R
35	30769	Q1_Max	Maximum Reactive power of R Phase	KVAR	2	R
36	30771	Q2_Max	Maximum Reactive power of Y Phase	KVAR	2	R
37	30773	Q3_Max	Maximum Reactive power of B Phase	KVAR	2	R
38	30775	Qtot_Max	Maximum Reactive power of Total	KVAR	2	R

39	30777	Q1_Min	Minimum Reactive power of R Phase	KVAR	2	R
40	30779	Q2_Min	Minimum Reactive power of Y Phase	KVAR	2	R
41	30781	Q3_Min	Minimum Reactive power of B Phase	KVAR	2	R
42	30783	Qtot_Min	Minimum Reactive power of Total	KVAR	2	R
43	30785	S1_Max	Maximum Apparent power of R Phase	KVA	2	R
44	30787	S2_Max	Maximum Apparent power of Y Phase	KVA	2	R
45	30789	S3_Max	Maximum Apparent power of B Phase	KVA	2	R
46	30791	Stot_Max	Maximum Apparent power of Total	KVA	2	R
47	30793	S1_Min	Minimum Apparent power of R Phase	KVA	2	R
48	30795	S2_Min	Minimum Apparent power of Y Phase	KVA	2	R
49	30797	S3_Min	Minimum Apparent power of B Phase	KVA	2	R
50	30799	Stot_Min	Minimum Apparent power of Total	KVA	2	R
51	30801	PF1_L_Max	Maximum Lagging PF of R phase	--	2	R
52	30803	PF2_L_Max	Maximum Lagging PF of Y phase	--	2	R
53	30805	PF3_L_Max	Maximum Lagging PF of B phase	--	2	R
54	30807	PFavg_L_Max	Maximum Lagging PF of Average	--	2	R
55	30809	PF1_L_Min	Minimum Lagging PF of R phase	--	2	R
56	30811	PF2_L_Min	Minimum Lagging PF of Y phase	--	2	R
57	30813	PF3_L_Min	Minimum Lagging PF of B phase	--	2	R
58	30815	PFavg_L_Min	Minimum Lagging PF of Average	--	2	R
59	30817	PF1_C_Max	Maximum Leading PF of R phase	--	2	R
60	30819	PF2_C_Max	Maximum Leading PF of Y phase	--	2	R
61	30821	PF3_C_Max	Maximum Leading PF of B phase	--	2	R
62	30823	PFavg_C_Max	Maximum Leading PF of Average	--	2	R
63	30825	PF1_C_Min	Minimum Leading PF of R phase	--	2	R
64	30827	PF2_C_Min	Minimum Leading PF of Y phase	--	2	R
65	30829	PF3_C_Min	Minimum Leading PF of B phase	--	2	R
66	30831	PFavg_C_Min	Minimum Leading PF of Average	--	2	R
	Registers for Prev block energy					
1	30851	BLK_KWH_IMP	Previous block T. KWh-Import	KWh	2	R
2	30853	BLK_KVARH_IMP	Previous block T. KVarh-Import	KVarh	2	R
3	30855	BLK_KVAH_IMP	Previous block T. KVah-Import	KVah	2	R
4	30857	BLK_KWH_EXP	Previous block T. KWh-Export	KWh	2	R
5	30859	BLK_KVARH_EXP	Previous block T. KVarh-Export	KVarh	2	R
6	30861	BLK_KVAH_EXP	Previous block T. KVah-Export	KVah	2	R
7	30863	BLK_TIME_ENRGY	Time stamp of block energy	--	2	R
	Registers for Device Status					
1	30501	ON HOUR	ON HOUR	--	1	R
2	30502	ON MIN	ON MIN	--	1	R
3	30503	RUN HOUR	RUN HOUR	--	1	R
4	30504	RUN MIN	RUN MIN	--	1	R
5	30505	PWR INTR. COUNT	PWR INTR. COUNT	--	1	R

8.2 Modbus Register Map for configuration parameters

Read Holding Register

Data read Query = [0 x Slave Id], [0 x Fun. Code], [0 x ADD. High], [0 x ADD. Low], [0 x No. of data word, High], [0 x No. of data word. Low] [0 x CRC Low] [0 x CRC High]

Function Code = 0X03
Data Format = Decimal

Response = [0 x Slave Id], [0 x Fun. Code], [Byte count], [Data High], [Data Low] …... [Data. High], [Data. Low] [0 x CRC Low] [0 x CRC High]

Preset Single Holding Register

Data write Query = [0 x Slave Id], [0 x Fun. Code], [0 x ADD. High], [0 x ADD. Low], [0 x Data High], [0 x Data Low], [0 x CRC Low] [0 x CRC High]

Function Code = 0X06
Data Format = Decimal

Response = [0 x Slave Id], [0 x Fun. Code], [0 x ADD. High], [0 x ADD. Low], [0 x Data High], [0 x Data Low], [0 x CRC Low] [0 x CRC High]

Registers for Configuration parameters						
S.No.	**Address**	**Parameter**	**Minimum value**	**Maximum value**	**Words**	**Default value**
1	40104	PT Primary - HIGH BYTE #	0	15	1	0
2	40105	PT Primary - LOW BYTE #	100	65535	1	415
3	40106	PT Secondary	100	415	1	415
4	40107	CT Primary	1 / 5	15000	1	5
5	40108	CT Secondary	1	5	1	5
6	40109	Password	0001	9999	1	0001
7	40110	Slave address	1	247	1	1
8	40111	Baud rate (2400,4800,9600,19200,38400)	2400	38400	1	9600
9	40112	Parity bit (0-None, 1-Odd, 2-Even)	0	2	1	0
10	40113	Stop bit	1	2	1	1
11	40114	System type (0 – 3P4W, 1 – 3P3W)	0	1	1	0
12	40115	Apparent power calculation (0 – Arithmetic, 1 –Vector)	0	1	1	0
13	40116	Pulse constant	100	60000	1	3600
14	40117	Energy type (Refer table 1)	0	11	1	0
15	40118	Demand method (0 –Block, 1 –SLIDE)	0	1	1	0
16	40119	interval time	1	60	1	15
17	40120	sub interval time	1	60	1	1
18	40121	POLE	2	48	1	2
19	40122	SLIP	0000	9999	1	0000
20	40123	Previous block energy time (0 – 15 min, 1 – 60 min, 2 – 5 min)	0	2	1	0
21	40124	Real Sec & Min [SSMM]	0	5959	1	0000
22	40125	Real Hour & Date [HHDD]	1	2331	1	0001
23	40126	Real Month & Year [MMYY]	100	1299	1	0125
24	40127	Low Current noise Cut-off	1	99	1	5
25	40128	Reset ALL/ Individual Reg. (Refer table 2)	79	85	1	
26	40130	Firmware version (read only)			1	
Registers for Data logging configuration						
1	40137	Data logging method (0 – Periodic, 1 – Load Profile)	0	1	1	0
2	40138	Data logging Time interval (1 ,5,10,15,30,45,60) min (8,12,24) hr	1 min	24 hr	1	15 min
3	40139	DL_R Phase to Neutral Voltage (1 –Enable, 0 – Disable)	0	1	1	0
4	40140	DL_Y Phase to Neutral Voltage (1 –Enable, 0 – Disable)	0	1	1	0
5	40141	DL_B Phase to Neutral Voltage (1 –Enable, 0 – Disable)	0	1	1	0
6	40142	DL_ Average Voltage Phase to Neutral (1 –Enable, 0 – Disable)	0	1	1	1
7	40143	DL_RY Voltage (1 –Enable, 0 – Disable)	0	1	1	0
8	40144	DL_YB Voltage (1 –Enable, 0 – Disable)	0	1	1	0
9	40145	DL_BR Voltage (1 –Enable, 0 – Disable)	0	1	1	0

10	40146	DL_ Average Voltage Phase to phase (1 –Enable, 0 – Disable)	0	1	1	0
11	40147	DL_ R Phase Line current (1 –Enable, 0 – Disable)	0	1	1	0
12	40148	DL_ Y Phase Line current (1 –Enable, 0 – Disable)	0	1	1	0
13	40149	DL_ B Phase Line current (1 –Enable, 0 – Disable)	0	1	1	0
14	40150	DL_ Average Line Current (1 –Enable, 0 – Disable)	0	1	1	1
15	40151	DL_ Frequency (1 –Enable, 0 – Disable)	0	1	1	0
16	40152	DL_ R Phase Power factor (1 –Enable, 0 – Disable)	0	1	1	0
17	40153	DL_ Y Phase Power factor (1 –Enable, 0 – Disable)	0	1	1	0
18	40154	DL_ B Phase Power factor (1 –Enable, 0 – Disable)	0	1	1	0
19	40155	DL_ Average Power factor (1 –Enable, 0 – Disable)	0	1	1	1
20	40156	DL_ Total Active Power (1 –Enable, 0 – Disable)	0	1	1	1
21	40157	DL_ Total Reactive Power (1 –Enable, 0 – Disable)	0	1	1	1
22	40158	DL_ Total Apparent Power (1 –Enable, 0 – Disable)	0	1	1	1
23	40159	DL_ Active Energy Import (1 –Enable, 0 – Disable)	0	1	1	0
24	40160	DL_ Active Energy Export (1 –Enable, 0 – Disable)	0	1	1	0
25	40161	DL_ Active Energy Net (Import - Export) (1 –Enable, 0 – Disable)	0	1	1	0
26	40162	DL_ Active Energy Total (Import + Export) (1 –Enable, 0 – Disable)	0	1	1	0
27	40163	DL_ Apparent Energy Import (1 –Enable, 0 – Disable)	0	1	1	0
28	40164	DL_ Apparent Energy Export (1 –Enable, 0 – Disable)	0	1	1	0
29	40165	DL_ Apparent Energy Net (Import - Export) (1 –Enable, 0 – Disable)	0	1	1	0
30	40166	DL_ Apparent Energy Total (Import + Export) (1 –Enable, 0 – Disable)	0	1	1	0
31	40167	DL_ Reactive Energy Import (Q1+Q2) (1 –Enable, 0 – Disable)	0	1	1	0
32	40168	DL_ Reactive Energy Export (Q3+Q4) (1 –Enable, 0 – Disable)	0	1	1	0
33	40169	DL_ Reactive Energy Lag Total (1 –Enable, 0– Disable)	0	1	1	0
34	40170	DL_ Reactive Energy Lead Total (1 –Enable, 0 – Disable)	0	1	1	0
35	40171	DL_ Reactive Energy Net (Import - Export) (1 –Enable, 0 – Disable)	0	1	1	0
36	40172	DL_ Reactive Energy Total (Import + Export) (1 –Enable, 0 – Disable)	0	1	1	0
37	40173	Data logging (1 - Start log, 0 – Stop log)	0	1	1	0
40	40176	Data logging overwrite flag	0	1	1	0
41	40177	No. of Selected parameter for Data logging (read only)			1	
42	40178	Data log total days (read only) *			1	
43	40179	Logging records (read only)			1	

*Displays Total numbers of days left to memory full.

IF you Want to Enter Direct long Value of PT primary you can use this register.

Registers for PT primary					
Address	**Measured parameter**	**Default value**	**Minimum value**	**Maximum value**	**Data type**
40101	PT Primary	415	100	1000000	2 (Swapped Long)

For entering PT Primary into Modbus: -

Example:

For entering PT Primary value 220000, convert into hexadecimal i.e. 35B60
Now enter lower four byte (Hex value : 5B60 / Decimal Value : 23392) at 40105 and higher four byte (Hex Value : 0003 / Decimal Value : 3) at 40104 addresses respectively
High byte - 3, **Low byte** – 23392

Table 1:

Value	Energy type for Pulse Output
0	KWh Import
1	KWh Export
2	KVarh Import
3	KVarh Export
4	KVah Import
5	KVah Export
6	MWh Import
7	MWh Export
8	MVarh Import
9	MVarh Export
10	MVah Import
11	MVah Export

Table 2:

Value (write only)	Reset Energy Register
79	PREV block energy
80	All Energy
81	Hours Reset
82	MAX-MIN Reset
83	Power interruption count reset
84	Maximum demand reset
85	All

8.3 User Assignable Registers

The MFM2160 contains the 60 user assignable registers in the address range of 2001 to 2119 (see Table 8.3.1), any of which you can map to either register address accessible in the instrument. Registers that reside in different locations may be accessed by a single request by re-mapping them to adjacent addresses in the user assignable registers area.
The actual addresses of the assignable registers which are accessed via addresses 2001 to 2119 are specified in the user assignable register map (see Table 8.3.2). This map occupies addresses from 301 to 360, where map register 301 should contain the actual address of the register accessed via assignable register 2001, register 302 should contain the actual address of the register accessed via assignable register 2003, and so on.
To build your own register map, write to map registers (301 to 360) the actual addresses you want to read from via the assignable area (2001 to 2119).
By default, register address 1 to 115 is mapped to registers 301 to 360.

For example, if you want to read registers 27 (Frequency) and 95 (RPM) via registers 2001-2003, then do the following:
- write 27 to register 301
- write 95 to register 302

Reading from registers 2001-2003 will return the Frequency reading in registers 2001, and the RPM reading in register 2003.

Table 8.3.1 User Assignable Registers
Function Code = 0X04

Address – between 32001 to 32119
No. of data word ≤ 120 & in multiple of 2 as all data are of 4 Bytes [Swapped Float]. Enter only Even value (data word length).

Address	Register Contents	Type
32001	Assigned register #2001	Swapped Float
32003	Assigned register #2003	Swapped Float
32005	Assigned register #2005	Swapped Float
…	…	…
32119	Assigned register #2119	Swapped Float

Table 8-2 User Assignable Register Map
Function Code = 0X06
Address – Any Single Register between 40301 to 40360
Data = Data of 1 word, as all data are of 2 Bytes [Decimal].

Address	Register contents	Type	R/W	Range
40301	Mapped address for register #2001	Decimal	R/W	1 to 115, 151 to 185, 187 to 297, 651 to 685,851 to 863,301 to 397, 401 to 497, 601 to 631,701 to 831
40302	Mapped address for register #2003	Decimal	R/W	1 to 115, 151 to 185, 187 to 297, 651 to 685,851 to 863,301 to 397, 401 to 497, 601 to 631,701 to 831
40303	Mapped address for register #2005	Decimal	R/W	1 to 115, 151 to 185, 187 to 297, 651 to 685,851 to 863,301 to 397, 401 to 497, 601 to 631,701 to 831
…	…	…	…	…
40360	Mapped address for register #2119	Decimal	R/W	1 to 115, 151 to 185, 187 to 297, 651 to 685,851 to 863,301 to 397, 401 to 497, 601 to 631,701 to 831

8.4 Exception Responses

Exception response is a notification of an error. The exception response codes are listed in the table below. When a slave detects one of these errors, it sends a response to the master consisting of slave address, function code, error code and error check field.
To indicate that the response is a notification of an error, the high order bit of the function code is set to 1.

CODE	NAME	MEANING
02	Illegal Data Address	The address referenced in the data field is not an allowable address for the addressed slave location.
03	Illegal Data Value	The value referenced in the data field is not allowable in the addressed slave location.

Note:

If the value is an illegal data value, then the response message will be an exception response (Error Message). For the details of maximum and minimum values of any parameter refer to manual.

9. IMPORTANT NOTES

Before starting Installed Meter, Go through these notes:

- Confirm that all energy parameters, Hour parameters, MD parameters & Power Interruption counter are going to start from zero, if not, make them zero by **All** Reset.
- **ON Hour**: The period for which the meter (Aux. supply) is ON
- **RUN (LOAD) Hour**: Indicates the period the Load is ON and has run. This counter accumulates if the load is greater than the starting current (0.1% of the In) set.
- **Power Interruption Count**: Number of Supply Outages means the number of Auxiliary Supply interruptions. If the meter Auxiliary Supply is from a UPS, then the INTR (number of interruptions) will be zero (as long as the UPS stays ON), even if the Voltage Signals did die out from time to time.

Energy Pulse O/P Constant Setting:

- For Front Blinking LED, select energy type (i.e. KWh-import / KWh-export / KVARh-Import /KVARh-Export/KVAh-Import/KVAh-Export/MWh-Import/MWh-Export/MVARh-Import/MVARh-Export/MVAh-Import/MVAh-Export) as per your requirement using configuration mode from pulse Output and set the value of pulse constant. But here you can get maximum output pulse frequency (& LED Blinking rate) up to 50 msec. so whenever you are using this feature; you should set value of Meter-Constant such a way so it will not cross the limit of 50 ms pulse frequency.
- As pulse frequency is 50 msec, i.e. in one second maximum 20 pulses can be obtained, hence in one hour maximum 72000 pulses can be obtained.
  Total no of impulses/second can be calculated as below
  (CT Primary * PT Primary * Pulse Constant in Wh)/3600 <= 20.
  - Example: Meter specification CT Primary = 200 A and PT Primary = 11000 V
  - Above meter can consume maximum of 2.2MWatt.

  I.e. For 3600 pulses/KWh [3.6 pulses/Wh], it will generate 2200 pulses/sec as per above equation, [200*11000*3.6/3600 =2200] so it will not work for the meter as it is more than 20 pulses/sec
  I.e. For 2000 pulses/MWh [0.002 pulses/Wh], it will generate 2.666 pulses/sec as per above equation, [200*11000*0.002/3600 = 1.22] so it will work for the meter as it is less than 20 pulses/sec
  This is for single phase only, in case of three phases, energy will be multiplied by three in 3p4w and hence pulses should be calculated for three phase energy.

Energy Overflow:

- When the Total Apparent Energy (sum of Import and Export) exceeds the limit of **999,999,999.999 kVAh,** the meter will automatically reset all accumulated energy parameters. This automatic reset includes Total Active Energy (Import, Export, Net, and Total), Total Reactive Energy (Import, Export, Net, and Total), and Total Apparent Energy (Import, Export, Net, and Total).
- The values prior to the reset are stored in the Old Energy Registers, which can be accessed through the Modbus registers.

10. TROUBLESHOOTING TIPS

The information in Table 10– 1 describes potential problems and their possible causes. It also describes checks you can perform or possible solutions for each. After referring to this table, if you cannot resolve the problem, contact our sales representative.

Table 10– 1: Troubleshooting

Potential Problem	Possible Cause	Possible Solution
The display is blank with black light OFF after applying control power to the Multifunction Meter.	The Multifunction meter may not be receiving the necessary Power.	Verify that the Multifunction meter line (L) and neutral (N) terminals are Receiving the necessary power.
The data being displayed is inaccurate or not what you expect.	Incorrect setup values.	Check that the correct values have been entered for Multifunction meter setup parameters (CT and PT ratings, System Type).
	Incorrect voltage inputs.	Check Multifunction meter voltage input terminals to verify that adequate voltage is present.
	Multifunction meter is wired improperly.	Check that all CTs and PTs are connected correctly (proper polarity is observed) and that they are energized. Check shorting terminals.
Cannot communicate with Multifunction meter from a remote personal computer.	Multifunction meter address is incorrect.	Check to see that the Multifunction meter is correctly addressed.
	Multifunction meter baud rate & parity is incorrect.	Verify that the baud rate & Parity of the Multifunction meter matches the baud rate of all other devices on its communications link.
	Communications lines are improperly connected.	Verify the Multifunction meter communications connections interchange [D+] & [D-] lines

UNIT NOT TURNING ON

The problem can be bad connection / power of incorrect rating.
First check, power on terminal of the instrument itself if it is not present then the fault is in power chord.

⚠ **One must take care while dealing with Power wirings because it may create electrical shock.**

If these troubleshooting tips do not solve your problem, then, please contact technical support at either nearest area office or Main Head Office as given on the first page.