Operating Manual

RISH DMC*i*

CONTENT

Touch Screen Demand Controller with TOD
Installation & Operating Instructions

DMAN-00IM-0577 REV A 09/16

1. Introduction

This Instrument is a panel mounted 96 x 96mm DIN Quadratic Demand controller. It measures important electrical parameters like AC voltage, AC Current, Frequency, Power,Phase Angle, Power Factor, Demand and Energy(Active / Reactive / Apparent).The instrument integrates accurate measurement of technology (All Voltage & Current measurements are True RMS upto 56th Harmonic) with 320x240 Pixels touch screen TFTLCD display.

This Instrument provides controlling action on 6 types of demands measured,It controls the power demanded by a System(or part of it) based on disconnecting non-priority loads before the power exceeds Contracted Demand Limit.This prevents the consumption of excess power or peaks,which generally result in high penalties.This instrument provides detailed Demand Control Status of the system which explains the loads tripping and relay actions.It also provides the simulation feature which allows user to enter the load values and verify the system conditions prior to installation.

This instrument can be configured and programmed at site for the following:PTPrimary, PTSecondary, CTPrimary, CTSecondary (5Aor1A), 3 phase 3W or 3phase 4W system , Time Of Day metering, Demand Parameter.

measurement readings & configration can be also accessed via Modbus Interface and front panel touch screen.

Main Menu is divided into 8 submenus.Every submenu contains list of options. By touching the icons on the main menu ,submenus can be accessed.

System,Voltage and current menu,Power / Demand submenu contains measurement of basic electrical parameters. In Power/Demand submenu DM control status option shows actual status of the system.

Power quality submenu can be used to access harmonics. Energy & TOD option shows total energy (Active / Reactive / Apparent). It also gives running TOD data, TOD energy, cost as well as demand.Setup Option can be used for complete meter settings.

TABLE 1:

Measured Parameters	Units of Measurement
System Voltage	Volts
System Current	Amps
Voltage VL1-N(4wire only)	Volts
Voltage VL2-N(4wire only)#	Volts
Voltage VL3-N(4wire only)#	Volts
Voltage VL1-L2 #	Volts
Voltage VL2-L3#	Volts
Voltage VL3-L1#	Volts
Current L1	Amps
Current L2 #	Amps
Current L3 #	Amps
Neutral Current (4 wire only)	Amps
Frequency	Hz
Active Power (System / Phase (4 wire only))	KW
Reactive Power (System / Phase (4 wire only))	KVAr
Apparent Power (System / Phase (4 wire only))	KVA
Power Factor (System / Phase (4 wire only))	——
Phase Angle (Phase(4 wire only))	Degree
Active Import Energy (up to 14 Digit resolution)	KWh
Active Export Energy (up to 14 Digit resolution)	KWh
Reactive Import Energy (up to 14 Digit resolution)	KVArh
Reactive Export Energy (up to 14 Digit resolution)	KVArh
Apparent Energy (up to 14 Digit resolution)	KVAh

 # Note : These parameters are not measured in 1 phase 2 wire network.

TABLE 1(continued):

Measured Parameters	Units of Measurement
Current Demand	Amps
KVA Demand	KVA
KW Demand(Import/Export)	KW
KVAr Demand(Import/Export)	KVAr
Max Current Demand	Amps
Max KVA Demand	KVA
Max KW Demand(Import/Export)	KW
Max KVAr Demand(Import/Export)	KVAr
Run Hour	Hours
On Hour	Hours
Number of Interruptions	Counts
Phase Sequence (4 wire only)	——
V1 THD*	%
V2 THD*#	%
V3 THD*#	%
I1 THD	%
I2 THD #	%
I3 THD #	%
System Voltage THD	%
System Current THD	%
True representation of Phasor Diagram (4 wire &1P2W)	——
True representation of Voltage Waveform	——
True representation of Current Waveform	——

***Note : THD Parameters are L-N in case of 3P 4W & L-L in case of 3P 3W .**
#Note : These parameters are not measured in 1 phase 2 wire network.

TABLE 1(continued):

Measured Parameters	Units of Measurement
Fundamental Voltage V1, V2, V3 #	Volts
Fundamental Current I1, I2, I3 *#	Amps
Fundamental Active Power L1, L2, L3 (4wire only/1P2W#)	KW
Fundamental Reactive Power L1, L2, L3 (4wire only/1P2W#)	KVAr
Fundamental Apparent Power L1, L2, L3 (4wire only/1P2W#)	KVA
Fundamental Power Factor L1, L2, L3 (4wire only/1P2W#)	——
RMS Voltage of Harmonic N of phase L1, L2, L3#	Volts
Voltage Harmonic Distortion of Harmonic N of L1, L2, L3#	%
RMS current of Harmonic N of L1, L2, L3 *#	Amps
Current Harmonic Distortion of Harmonic N of L1, L2, L3 *#	%
Harmonic N Active Power L1, L2, L3 (4wire only/1P2W#)	KW
Harmonic N Reactive Power L1, L2, L3 (4wire only/1P2W#)	KVAr
Harmonic N Apparent Power L1, L2, L3 (4wire only/1P2W#)	KVA
Harmonic N Power Factor L1, L2, L3 (4wire only/1P2W#)	——
Active Energy import per zone of current date	KWh
Active Energy import cost per zone of current date	——
Active Energy export per zone of current date	KWh
Active Energy export cost per zone of current date	——
Reactive Energy import per zone of current date	KVArh
Reactive Energy import cost per zone of current date	——
Reactive Energy export per zone of current date	KVArh

NOTE:
N is the harmonic no of selected harmonic.
*** These parameters are not measured for L2 in 3 phase 3 wire network.**
 # These parameters are not measured for L2 & L3 in 1 phase 2 wire network.

TABLE 1(continued):

Measured Parameters	Units of Measurement
Reactive Energy export cost per zone of current date	——
Apparent Energy per zone of current date	KVAh
Apparent Energy cost per zone of current date	——
Active Energy import per date up to last 31 days	KWh
Active Energy import cost per date up to last 31 days	——
Active Energy export per date up to last 31 days	KWh
Active Energy export cost per date up to last 31 days	——
Reactive Energy import per date up to last 31 days	KVArh
Reactive Energy import cost per date up to last 31 days	——
Reactive Energy export per date up to last 31 days	KVArh
Reactive Energy export cost per date up to last 31 days	——
Apparent Energy per date up to last 31 days	KVAh
Apparent Energy cost per date up to last 31 days	——
Active Energy import per month up to last 12 months	KWh
Active Energy import cost per month up to last 12 months	——
Active Energy export per month up to last 12 months	KWh
Active Energy export cost per month up to last 12 months	——
Reactive Energy import per month up to last 12 months	KVArh
Reactive Energy import cost per month up to last 12 months	——
Reactive Energy export per month up to last 12 months	KVArh
Reactive Energy export cost per month up to last 12 months	——
Apparent Energy per month up to last 12 months	KVAh
Apparent Energy cost per month up to last 12 months	——

TABLE 1(continued):

Measured Parameters	Units of Measurement
Active Demand import per zone of current date	KW
Active Demand export per zone of current date	KW
Reactive Demand import per zone of current date	KVAr
Reactive Demand export per zone of current date	KVAr
Apparent Demand per zone of current date	KVA
Current Demand per zone of current date	KA
Active Demand import per date up to last 31 days	KW
Active Demand export per date up to last 31 days	KW
Reactive Demand import per date up to last 31 days	KVAr
Reactive Demand export per date up to last 31 days	KVAr
Apparent Demand per date up to last 31 days	KVA
Current Demand per date up to last 31 days	KA
Active Demand import per month up to last 12 months	KW
Active Demand export per month up to last 12 months	KW
Reactive Demand import per month up to last 12 months	KVAr
Reactive Demand export per month up to last 12 months	KVAr
Apparent energy per month up to last 12 months	KVA
Current Demand per month up to last 12 months	KA
Old Active Demand (Import/Export)	KW
Old Reactive Demand(Import/Export)	KVAr
Old Apparent Demand	KVA
Old Current Demand	KA

2.Measurement Reading Screens

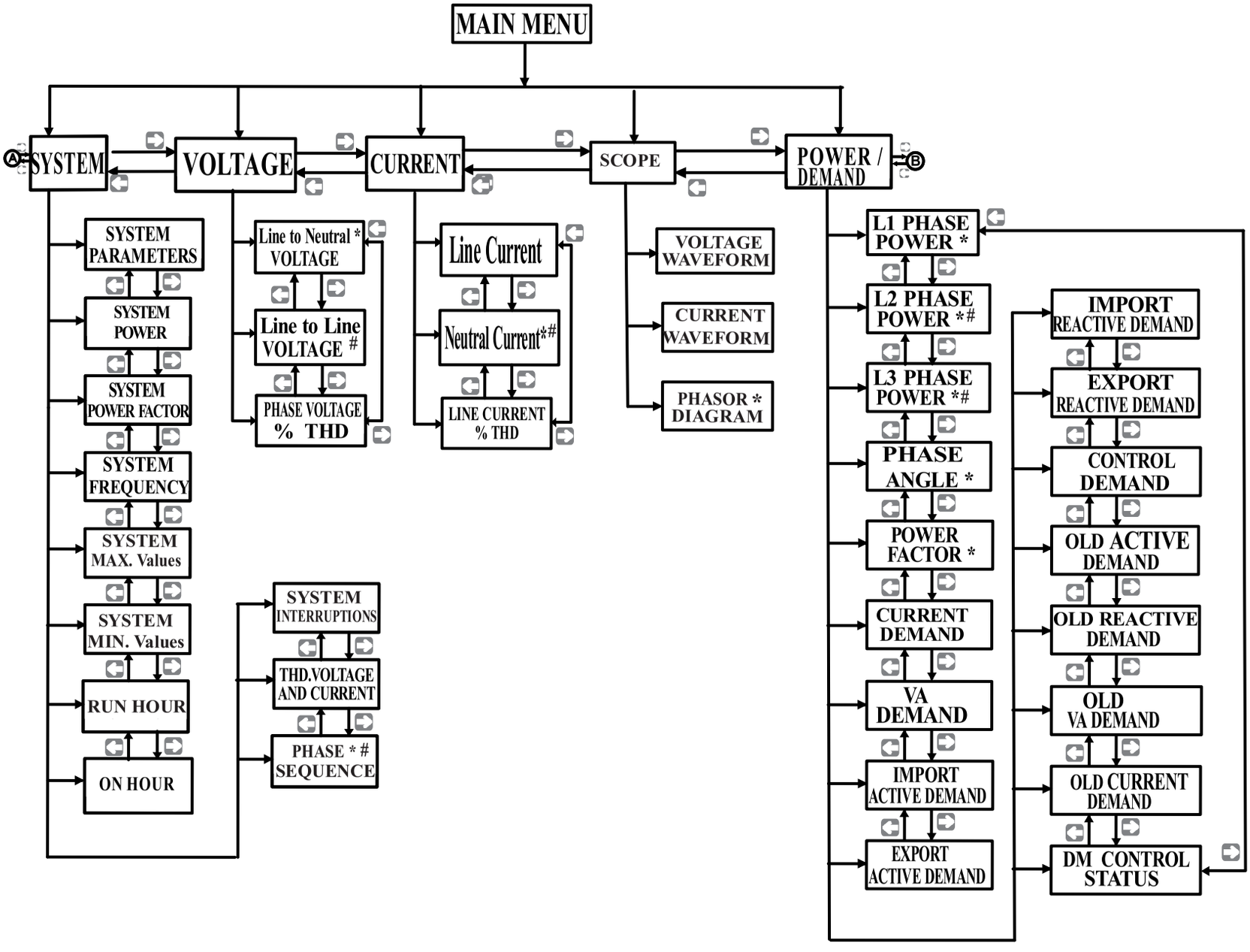
In normal operation the user is presented with one of the measurement reading screens out of several screens. These screens from particular submenu may be scrolled through one at time in incremental order by touching the " ➡ key" and in decremental order by touching " ⬅ key" on that screen.

Control Demand: When this option is selected from Power/Demand menu,meter shows the Demand selected in Setup ->Demand Parameter ->Demand Control Parameter. It also shows Predictive demand & time left to reach Demand Integration Period(fixed mode only).

Old Parameters:

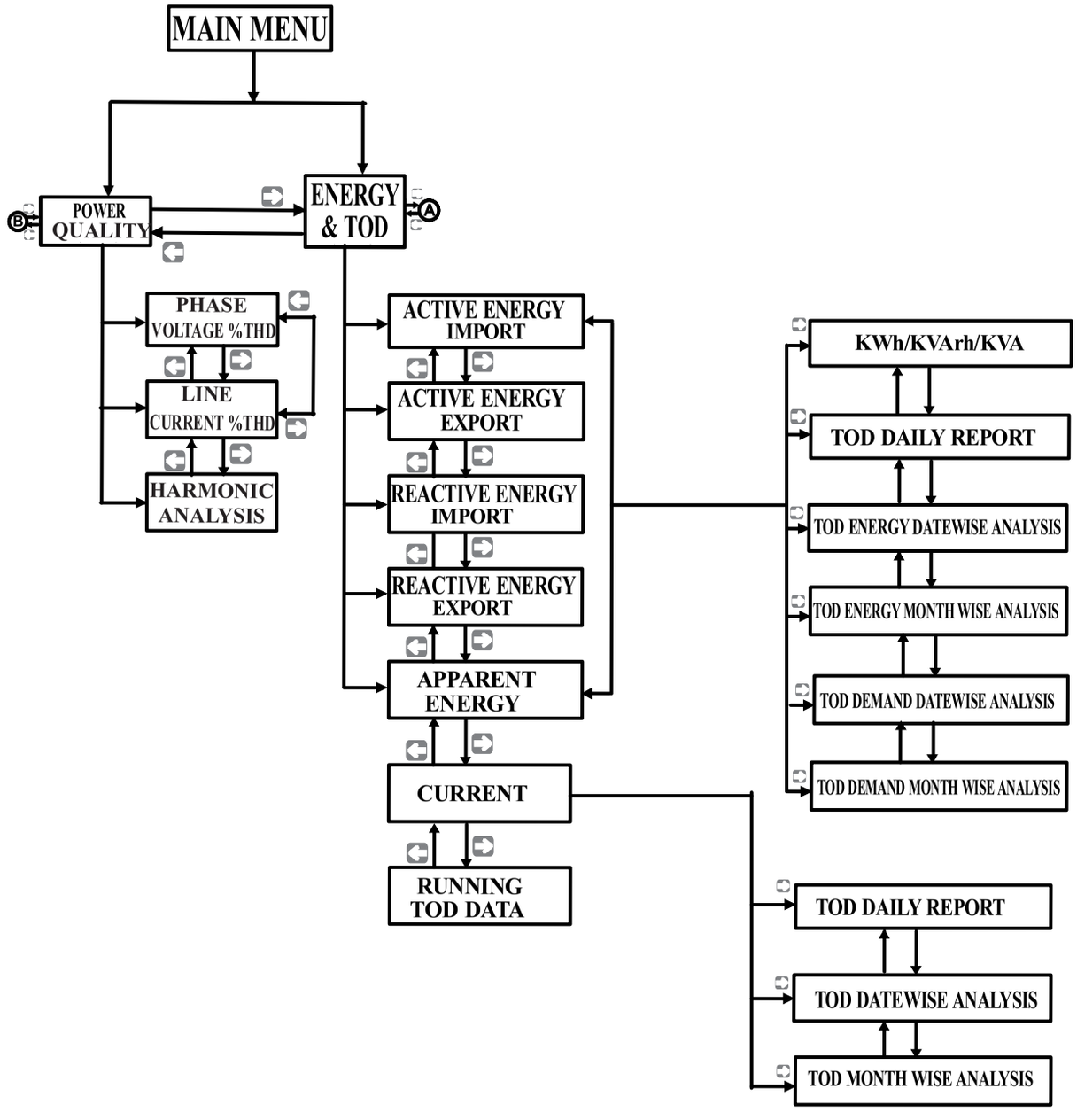
The Old Parameters screen shows Old Active Demand(Import&Export), Old Reactive Demand(Import &Export), Old VA demand, Old Current Demand. Previous values are not lost, when user resets parameters manually, all the Min-Max values of particular reset parameter are stored in Old Parameters. Previous values will be overwritten when user reset the parameter next time.

MeasurementParameter Screens



NOTE: SCREENS MARKED WITH * ARE AVAILABLE
ONLY IN 4W SYSTEM (NOT IN 3 WIRE SYSTEM)

SCREEN MARKED WITH # ARE NOT AVAILABLE IN 1PHASE 2 WIRE SYSTEM


MAIN MENU
POWER QUALITY
ENERGY & TOD
PHASE VOLTAGE %THD
LINE CURRENT %THD
HARMONIC ANALYSIS
ACTIVE ENERGY IMPORT
ACTIVE ENERGY EXPORT
REACTIVE ENERGY IMPORT
REACTIVE ENERGY EXPORT
APPARENT ENERGY
CURRENT
RUNNING TOD DATA
KWh/KVArh/KVA
TOD DAILY REPORT
TOD ENERGY DATEWISE ANALYSIS
TOD ENERGY MONTH WISE ANALYSIS
TOD DEMAND DATEWISE ANALYSIS
TOD DEMAND MONTH WISE ANALYSIS
TOD DAILY REPORT
TOD DATEWISE ANALYSIS
TOD MONTH WISE ANALYSIS

Harmonic Analysis : When this option is selected from Power Quality menu, meter shows the graphical analysis of the harmonics selected in Setup -> Power Quality Setup -> Harmonic Setup L1/L2/L3. Harmonics are plotted considering fundamental as 100 %. When particular bar is touched, further details of that particular harmonic / fundamental are shown. User can view RMS values of voltage and current , voltage & current harmonic distortion % , kW / kVAR / k VA / PF (in 3p 4w only) of that selected harmonic by using side arrow keys.

Energy and TOD :

Energy TOD:

Running TOD data: This screen shows running season, day type, day of week, running zone, running Tarrif.

Daily report: This screens shows the zone wise energy , its applicable tariff rate cost & demand of that zone in table format. The total energy accumulated for current day and related cost is also shown.

Daily Analysis : This screen shows the graphical trend of per date energy. Up to last 30 days data is shown. By touching on the bar , energy and cost of that date can be seen.

Monthly Analysis : This screen shows the graphical trend of per month energy. Up to last 12 months data is shown. By touching on the bar in graph, energy and cost of that month can be seen.

Demand TOD:

Daily Analysis : This screen shows the graphical trend of per date Demand. Up to last 30 days data is shown. By touching on the bar, Demand of that date can be seen.

Monthly Analysis : This screen shows the graphical trend of per month Demand. Up to last 12 months data is shown. By touching on the bar in graph, Demand of that month can be seen.

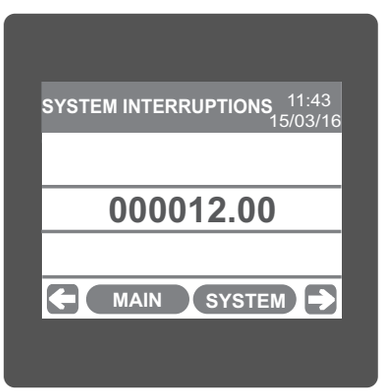
2.1. Run Hour

This Screen shows the total no. of hours the load is connected Even if the Auxiliary supply is interrupted count of Run hour will be maintained in internal memory & displayed in the format "hours. min". For example if Displayed count is 000001.19 hrs it indicates 1 hours & 19 minutes.After 999999.59 run hours display will restart from zero.To reset run hour manually see section Resetting Parameter 3.2.5.1

2.2 On Hour

This Screen shows the total no. of hours the Auxiliary Supply is ON. Even if the Auxiliary supply is interrupted count of On hour will be maintained in internal memory & displayed in the format "hours. min". For example if Displayed count is 000005.18 hrs it indicates 5 hours & 18 minutes.After 999999.59 On hours display will restart from zero. To reset On hour manually see section Resetting Parameter 3.2.5.1

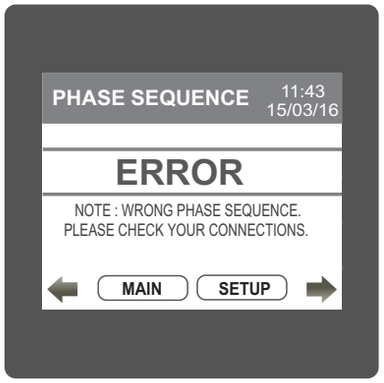
2.3 Number of Interruption



This Screen Displays the total no. of times the Auxiliary Supply was Interrupted. Even if the Auxiliary supply is interrupted count will be maintained in internal memory

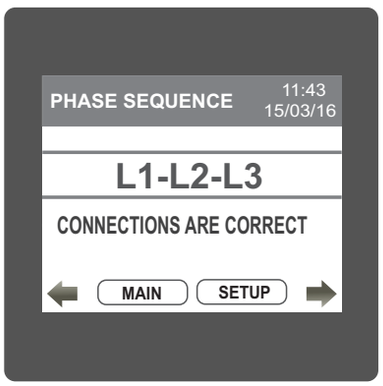
To reset No of Interruption manually see section Resetting Parameter 3.2.5.1

2.4. Phase Sequence



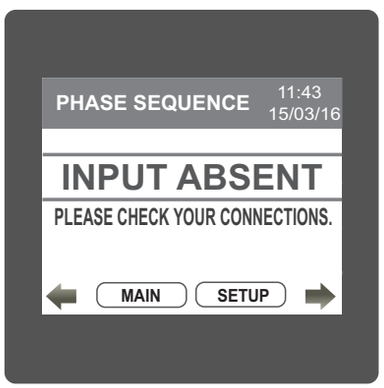
Phase Rotation Error screen

Meter shows phase rotation error if the phase sequence R-Y-B (L1-L2-L3) is not maintained This screen indicates that Phase sequence is incorrect. User must check this screen in order to get correct readings when meter is connected.



Correct Phase sequence

This Screen indicates the phase sequence connected to meter is correct.



This Screen indicates that either of the phases or all three phases (Voltages) are absent.

2.5 DM Control Status

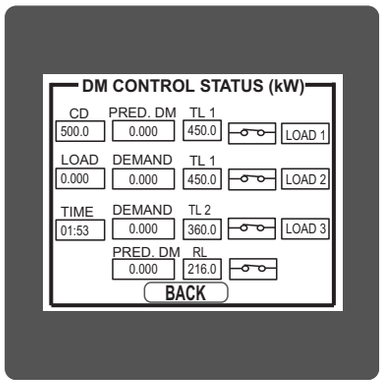


Fig1. Basic Mode Screen

DM Control Status screen shows all values such as Contract demand(CD), Equivalent load(Load), Threshold of relays, Predictive demand (PRED. DM)and demand(DEMAND).
This screen shows actual status of the system.
If value shown under LOAD is below contract demand ,then system is in healthy state. Healthy state of each relay is defined by it's individual threshold.
Tripping actions are taken according to demand control parameter which is selected by user in section 3.2.2.3.In basic mode Relay function is fixed, as Predictive demand, Demand, Demand and Restore, the thresholds are TL1,TL1,TL2 & RL for Relay's 1, 2, 3 & 4 respectively as shown in fig 1.

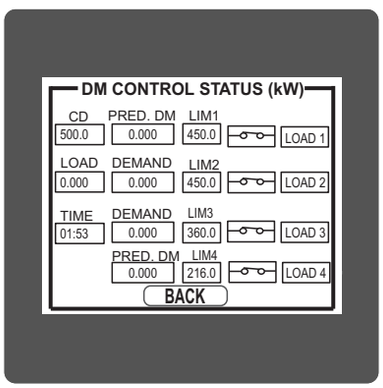
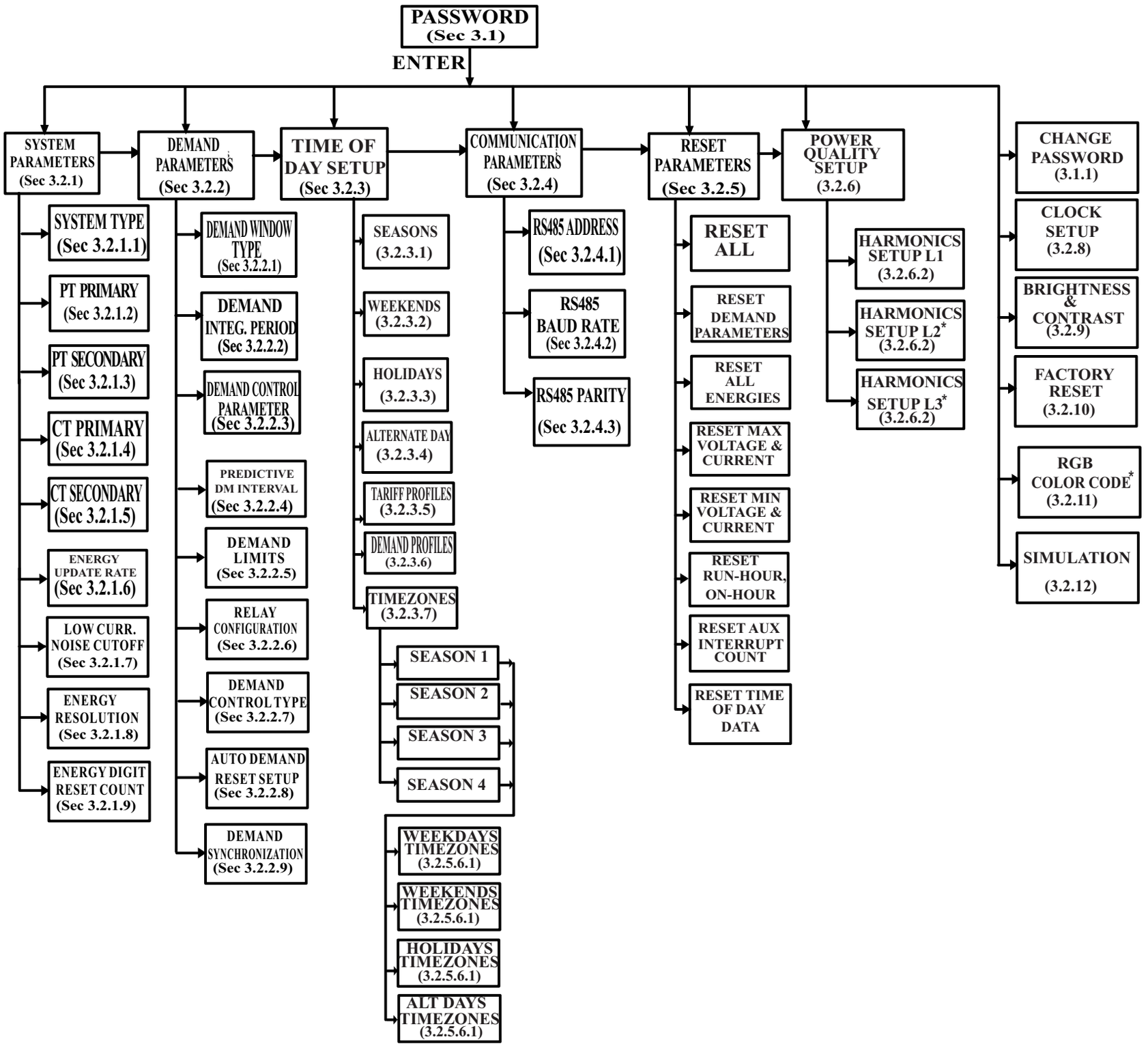


Fig 2.Advance Mode Screen

In Advance mode user can configure Relay function.the limits are LIM1, LIM2, LIM3, LIM4 for Relay's 1, 2, 3, 4 respectively as shown in fig 2.
When Demand increases above threshold,Relay trips,trippping action of that Relay is shown in meter & Load turns to Red from Green(Indicates load is off) When Demand assigned to that Relay is below thershold,Relay resets and Load turns to Green from Red.

Setup Parameter Screens



NOTE:SCREEN MARKED WITH * ARE NOT AVAILABLE IN 1PHASE 2 WIRE SYSTEM

3. Programming

The following sections comprise step by step procedures for configuring the instrument for individual user requirements.

To access the set-up screens touch on the “ SETUP ” icon in Main Menu. This will take the User into the Password Protection Entry Stage(Section 3.1).

3.1. Password Protection

Password protection can be enabled to prevent unauthorised access to set-up screens, by default password is “0000”.

Password protection is enabled by selecting any four digit number.

After touching “ SETUP” icon Password protection screen is displayed. Screen consists of 0 to 9 digit input keypad for entering the password very similar to any calculator in touchscreen mobile. “Enter Password” is displayed on screen at start so that user can enter password using displayed keypad.

Touching “ 1 key” will display 1 in display area, similarly user can enter remaining 3 digits.

For deleting any digit while entering password, user can touch “ DEL key”.

After entering the complete password user needs to confirm password by touching “ ENTER key”.

Password confirmed.

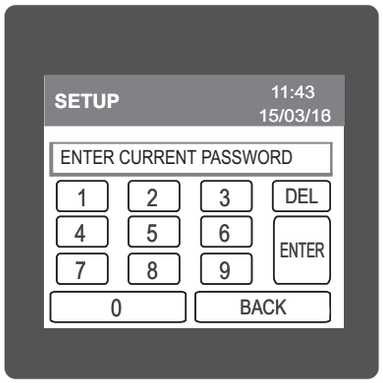
If Entered password is correct then “Password Accepted” is displayed & user will enter into setup menu.

Password Incorrect.

If Entered password is wrong then “Password Rejected” is displayed & user need to re-enter the password.

After wrong password is entered, user needs to touch “ ENTER key” for trying another password.

3.1.1 Change Password



Change Password Option is the 7th option in list of “SETUP” submenu, so can be accessed by a simple touch anywhere in “ Change Password” row.
In this screen user first needs to enter the current password.

After input of correct password,“PASSWORD ACCEPTED”is displayed & now user can enter the new 4 digit password.

New Password confirmed.

After entering new password user needs to touch “ ENTER key” to confirm.

After confirming “PASSWORD CHANGED” is displayed on screen, which ensures successful changing of the password.

3.2 Menu selection.

After entering in the SUBMENU 8 - SETUP, user will be asked to enter password & after input of correct password list of following parameters will be displayed on screen :-

3.2.1 SYSTEM PARAMETERS

3.2.2 DEMAND PARAMETERS

3.2.3 TIME OF DAY SETUP
3.2.4 COMMUNICATION PARAMETER
3.2.5 RESET PARAMETER
3.2.6 POWER QUALITY SETUP
3.2.7 CHANGE PASSWORD
3.2.8 CLOCK SETUP
3.2.9 BRIGHTNESS & CONTRAST
3.2.10 FACTORY RESET
3.2.11 RGB COLOR CODE
3.2.12 SIMULATION

Touching on SYSTEM PARAMETER will open the system parameters list screen.Then these screens from particular parameter may be scrolled through one at a time in incremental order by touching the "➡ key" and in decremental order by touching "⬅ key" on given touch screen.

3.2.1 System Parameters Selection

After entering in the "SYSTEM PARAMETERS", List of following parameters will be displayed :-

3.2.1.1 SYSTEM TYPE
3.2.1.2 PT PRIMARY(L-L)
3.2.1.3 PT SECONDARY(L-L)
3.2.1.4 CT PRIMARY
3.2.1.5 CT SECONDARY
3.2.1.6 ENERGY UPDATE RATE
3.2.1.7 LOW CURRENT NOISE CUTOFF
3.2.1.8 ENERGY RESOLUTION
3.2.1.9 ENERGY DIGIT RESET COUNT

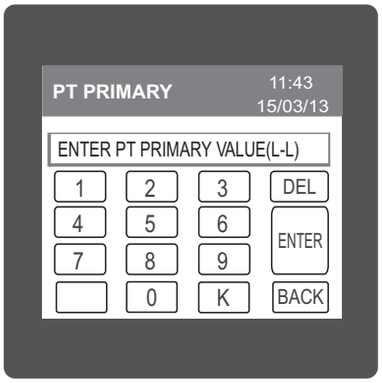
3.2.1.1 System Type

This screen is used to set the system type . Two types: 3 phase 3 wire & 3 phase 4 wire system are displayed on screen. Touching radio button in front of particular type will select that type. Touch on " OK key" will confirm the system type. Touching the " BACK key" will keep the old selected setting and will return to previous menu.

Note :In case of 1 Phase 2 Wire, User cannot change the System type.

3.2.1.2 Potential Transformer Primary Value

The nominal full scale voltage will be displayed as Line to Line Voltages for all system types.



This screen can be accessed only from system parameters list menu. Here again 0 to 9 digit input keypad is provided to set value of PT Primary, & user can confirm this value with a simple touch " ENTER key". " K key" is used to multiply value by 1000.

In case presently displayed Potential Transformer Primary value together with the Current Transformer Primary value, previously set, would result in a maximum power of greater than 666.6 MVA per phase,"Invalid value" will be displayed. Then the valid range will be displayed.

Valid range of PT primary setting value is from **100 VL-L to 692.8 KVL-L.** If value outside the range is entered, It will display "INVALID VALUE" followed by correct range of parameter.

Note : Setting PT primary value will reset all TOD data & all energies.

While setting PT primary value if auxiliary supply gets off, reset TOD data after auxiliary supply gets on from reset parameter menu. Same is applicable for CT primary value also.

3.2.1.3 Potential Transformer secondary Value

The value must be set to the nominal full scale secondary voltage which will be obtained from the the Transformer when the potential transformer(PT)primary is supplied with the voltage defined in 3.2.1.2 potential transformer primary voltage. The ratio of full scale primary to full scale secondary is defined as the transformer ratio.

This screen can be accessed only from system parameters list menu. Here again 0 to 9 digit input keypad is provided to set value of PT Secondary, & user can confirm this value with a simple touch on" ENTER key".

Valid range of PT secondary setting value is from 100 to 500.0 VL-L. If value outside the range is entered, It will display "INVALID VALUE" followed by correct range of parameter.

Note : Setting PT secondary value will reset all main energy counter.

3.2.1.4 Current Transformer Primary Value

The nominal Full Scale Current that will be displayed as the Line currents. This screen enables the user to display the Line currents inclusive of any transformer ratios, the values displayed represent the Current in Amps.

In case presently displayed Current Transformer Primary Value together with the Potential Transformer Primary Value results in a maximum power of greater than 666.6 MVA,

"INVALID VALUE" will be displayed. Example:

If primary value of PT is set as 692.8kV L-L (max value) then primary value of Current is restricted to 1157A.

The "Maximum Power" restriction of 666.6 MVA refers to 120% of nominal current and 120% of nominal voltage, i.e, 462.96 MVA nominal power per phase. Valid range of CT primary setting value is from 1 to 9999. If value outside the range is entered, It will display "INVALID VALUE" followed by correct range of parameter.

Note : Setting CT primary value will reset all TOD data & all energies.

3.2.1.5 Current Transformer Secondary Value

This screen is used to set the secondary value for Current Transformer.

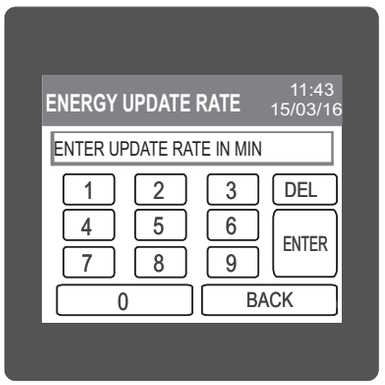
Two options: 1 AMPERE & 5 AMPERE are displayed on screen.

Touching radio button in front of particular option will select that option.

Touch on " OK key" will confirm the setting. Touching the " BACK key" will keep the old selected setting and will return to previous menu.

Note : Setting CT secondary value will reset all main energy counters.

3.2.1.6 Energy Update Rate



This screen allows user to enter energy update rate in min.

After entering particular value in min. the energy will be updated on modbus location from 30145 to 30153 of 3X register as per value that user has entered.

User can set value from 1 min to 60 min. If user enters value more than 60 min. then “INVALID VALUE” will be displayed and valid band will be shown.

Touching the “ BACK key” will keep the old selected setting and will return to previous menu.

For example user has entered 2 min as energy update rate. then after every 2 min, energy counts will be updated on modbus.

Note:If update rate is changed then Modbus energy will be reset.

3.2.1.7 Low Current Noise Cutoff.

This screen allows the user to set Low noise current cutoff in mA.

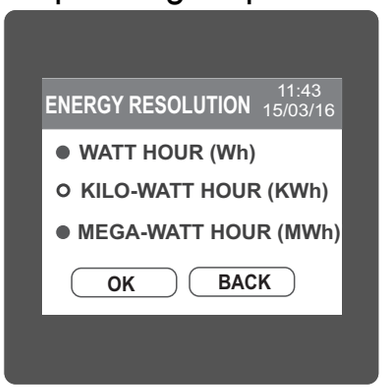
Two options, 0 MILLI-AMPERE & 30 MILLI-AMPERE are displayed on screen. Touching radio button in front of particular option will select that option.

Touch on “ OK key” will confirm the setting.

Touching the “ BACK key” will keep the old selected setting and will return to previous menu.

3.2.1.8 Energy Resolution:

This screen enable user to set energy resolution in terms of Wh / kWh / MWh depending as per the user's requirement .This setting is applicable for all types of energy.

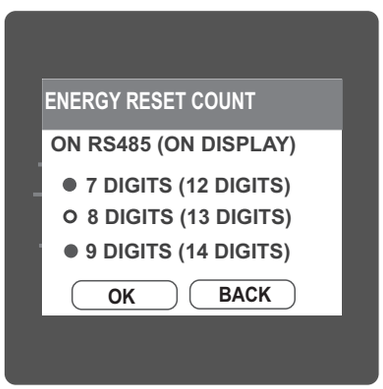


Three options: WATT HOUR, KILO-WATT HOUR & MEGA-WATT HOUR are displayed on screen. Touching radio button in front of particular option will select that option. If (PT primary * CT primary * Root3) > 30000 KW then two options: KILO-WATT HOUR & MEGA-WATT HOUR are displayed on screen.

Note : Default value is set to 'WATT HOUR' i.e. Energy resolution will be in terms of Wh / VArh / Vah respectively .

If energy resolution is changed then energy counter will be reset to zero.

3.2.1.10 Energy Digit Reset Count(Rollover Count)



This screen enables the user for setting maximum energy count after which energy will roll over to zero.This setting is applicable for all types of energy in 3X register on MODBUS will roll over to zero.The roll over count in 3X register on MODBUS is 5 digts.The values inside the brackets show rollover count for energy on display.

Note:If Energy Reset count is changed then energy counter will be reset to zero.

3.2.2 Demand Parameter Selection

After entering in the “DEMAND PARAMETERS” list of following parameters will be displayed.

3.2.2.1 Demand Window Type
3.2.2.2 DM Integration Period
3.2.2.3 Demand control parameter
3.2.2.4 Predictive Demand Interval
3.2.2.5 Demand Limits
3.2.2.6 Relay Configuration
3.2.2.7 Demand control type
3.2.2.8 Auto Demand Reset Setup
3.2.2.9 Demand Synchronization

3.2.2.1 Demand Window Type

This screen allows the user to set Demand window type.
Two option:Fixed window,Sliding window are displayed on screen.
Touching radio button in front of particular option will select that option Touching on “ OK key” will confirm the setting.

Touching the “ BACK key” will keep the old selected setting and will return to previous menu.

3.2.2.2 Demand Integration Period

This screen allows the user to set Demand integration period in minutes.Here a 0 to 9 digit input keypad is provided to set value of Demand integration period.

& user can confirm this value with a simple touch on “ ENTER key”.

“ BACK key” is used to go back to previous menu.

The allowable range is from 1 min. to 60 min.If value outside this range is entered,it will display “INVALID VALUE”. followed by correct range parameter.

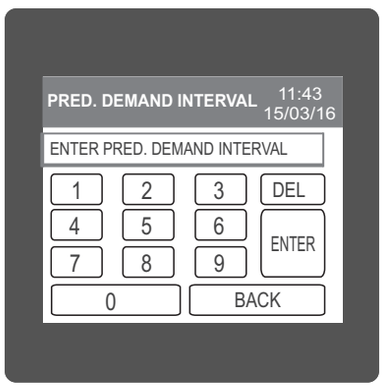
3.2.2.3 Demand Control Parameter

This screen allows the user to set Demand Control Parameter. Six option:Import Active Demand,Export Active Demand,Import Reactive Demand, Export Reactive Demand, VA Demand, Current Demand are displayed on screen.

Touching radio button in front of particular option will select that option Touch on "OK key" will confirm the setting.

Touching the "BACK key" will keep the old selected setting and will return to previous menu.

3.2.2.4 Predictive Demand Interval



This screen allows the user to set Predictive Demand Interval in seconds.Here a 0 to 9 digit input keypad is provided to set value of Demand integration period.

user can confirm this value with a simple touch on "ENTER key".

" BACK key" is used to go back to previous menu.

The allowable range is from 15 sec. to 50% of demand integration period.If value outside this range is entered,it will display "INVALID VALUE". followed by correct range parameter.

Note: Predictive demand interval is always entered in seconds.

3.2.2.5 Demand Limits Selection Menu

After entering in the “DEMAND LIMITS”, List of following parameters will be displayed :-

3.2.2.5.1 CONTRACT DM

3.2.2.5.2 TRIP LIMIT 1(TL1)

3.2.2.5.3 TRIP LIMIT 2 (TL2)

3.2.2.5.4 RESET LIMIT(RL)

3.2.2.5.1 Contract Demand Selection

This screen applies to the Contract demand selection.

This screen allows the user to set Contract Demand

Here a 0 to 9 digit input keypad is provided to set value of CD,

& user can confirm this value with a simple touch on “ ENTER key.”

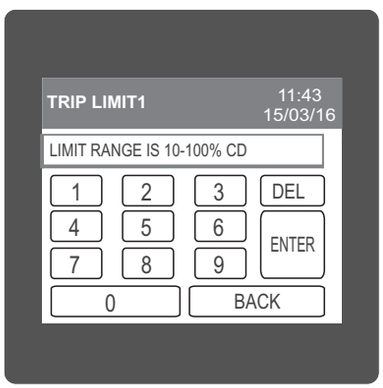
“ BACK key” is used to go back to Demand limit list menu.

Allowable range of Contract Demand is 5-120% of full-scale Power.

If value outside this range is entered, it will display “INVALID VALUE” followed by correct range of parameter.

3.2.2.5.2 Trip Limit 1 selection

This screen applies to the Trip limit 1 selection.



This screen allows the user to set Trip limit 1

Here a 0 to 9 digit input keypad is provided to set value of Trip limit 1,

& user can confirm this value with a simple touch on “ ENTER key.”

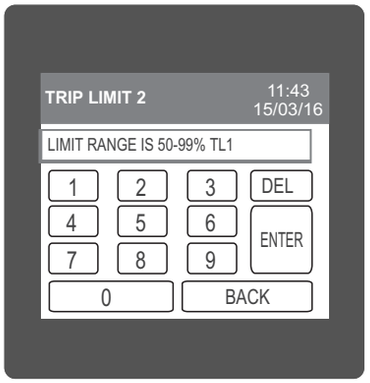
“ BACK key” is used to go back to Demand limit list menu.

The allowable range is from **10-100% of Contract demand**.

If value outside this range is entered, it will display “INVALID VALUE” followed by correct range of parameter.

3.2.2.5.3 Trip Limit 2 selection

This screen applies to the Trip limit 2 selection.



This screen allows the user to set Trip limit 2

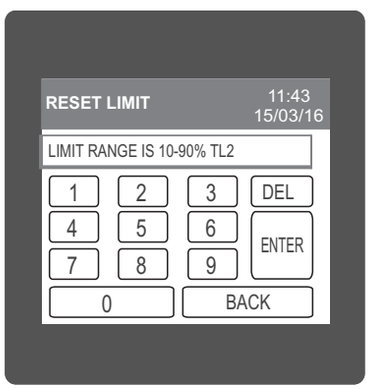
Here a 0 to 9 digit input keypad is provided to set value of Trip limit 2, & user can confirm this value with a simple touch on " ENTER key."

" BACK key" is used to go back to Demand limit list menu.

The allowable range is from **50-90% of Trip limit1**. If value is outside this range is entered, it will display "INVALID VALUE" followed by correct range of parameter.

3.2.2.5.5 Reset Limit selection

This screen applies to the Reset limit selection.



This screen allows the user to set Reset limit

Here a 0 to 9 digit input keypad is provided to set value of Reset limit, & user can confirm this value with a simple touch on " ENTER key."

" BACK key" is used to go back to Demand limit list menu.

The allowable range is from **10-99% of Trip limit 2**.
If value outside this range is entered, it will display "INVALID VALUE" followed by correct range of parameter.

3.2.2.6 Relay Configuration

After entering in the “Relay configuration”, List of following parameters will be displayed :-

3.2.2.6.1 RELAY 1

3.2.2.6.2 RELAY 2

3.2.2.6.3 RELAY 3

3.2.2.6.4 RELAY 4

3.2.2.6.1 Relay 1 Configuration Selection

This screen allows the user to set Relay configuration.
Two option:Energized Relay, De-Energized Relay are displayed on Screen.Touching radio button in front of particular option will select that option Touch on “ OK key” will confirm the setting.

Touching the “ BACK key” will keep the old selected setting and will return to previous menu. By default Relay 1,2,3 are configured as De-energized and Relay 4 is configured as Energized.

3.2.2.6.2 Relay 2 Configuration Selection

Configuration of Relay 2 for energized or De energized is same as Relay 1 mentioned in section 3.2.2.6.1.

3.2.2.6.3 Relay 3 Configuration Selection

Configuration of Relay 3 energized or De energized is same as Relay 1 mentioned in section 3.2.2.6.1.

3.2.2.6.4 Relay 4 Configuration Selection

Configuration of Relay 4 energized or De energized is same as Relay 1mentioned in section 3.2.2.6.1.

3.2.2.7 Demand Control Type Selection

This screen allows the user to set Demand Control Type.
Five Option:None, Basic DM Control,Basic DM control With TOD, Advance DM Control,Advance DM Control with TOD are displayed on Screen.Touching radio button in front of particular option will select that option Touch on "OK key" will confirm the setting.

Touching the "BACK key" will keep the old selected setting and will return to previous menu.

3.2.2.7.1 Advance DM Setup

After selecting Advance DM Control or Advance DM Control With TOD user enters in the "Advance DM setup", then List of following parameters will be displayed :-

3.2.2.7.1.1 RELAY 1
3.2.2.7.1.2 RELAY 2
3.2.2.7.1.3 RELAY 3
3.2.2.7.1.4 RELAY 4

3.2.2.7.1.1 Relay 1

After entering in the "Relay 1", List of following parameters will be displayed :-

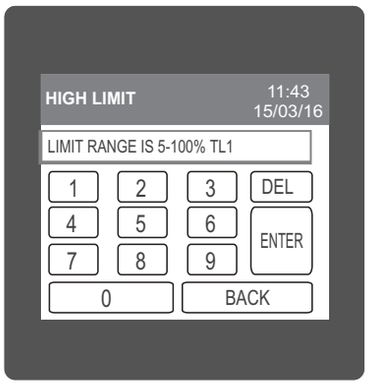
3.2.2.7.1.1.1 RELAY FUNCTION
3.2.2.7.1.1.2 RELAY LIMIT

3.2.2.7.1.1.1 Relay Function Selection

This screen allows the user to set Relay Function.
Three Option:Predictive Demand,Demand,Restore are displayed on Screen.Touching radio button in front of particular option will select that option Touching on "OK key" will confirm the setting.

Touching the "BACK key" will keep the old selected setting and will return to previous menu.

3.2.2.7.1.1.2 Relay Limit Selection



This screen allows the user to set Relay Threshold on which the tripping actions are dependent.

Here a 0 to 9 digit input keypad is provided to set value of Relay limit, & user can confirm this value with a simple touch on " ENTER key."

" BACK key" is used to go back to previous list menu.

The allowable range is from 5-100% of Trip limit1. If value is outside this range is entered, it will display "INVALID VALUE" followed by correct range of parameter.

3.2.2.7.1.2 Relay 2

Configuration of Relay 2 for function & limit is same as Relay 1 mentioned in section 3.2.2.7.1.1.

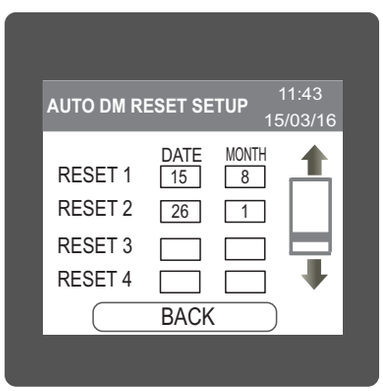
3.2.2.7.1.3 Relay 3

Configuration of Relay 3 for function & limit is same as Relay 1mentioned in section 3.2.2.7.1.1.

3.2.2.7.1.4 Relay 4

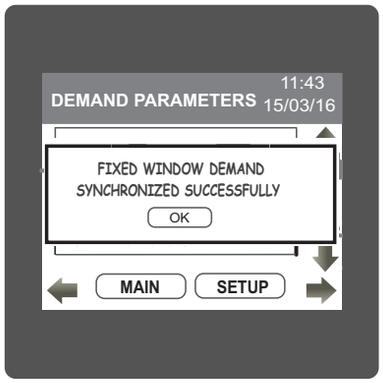
Configuration of Relay 4 for function & limit is same as Relay 1 mentioned in section 3.2.2.7.1.1.

3.2.2.8 Auto Demand Reset Setup



This is used to set date on which all demand parameters will reset. Maximum 12 days can be selected. To set day touch on box to enter date and month.

3.2.2.9 Demand Synchronization

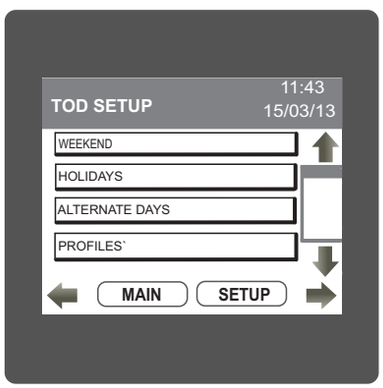


Demand synchronization is used to synchronize RTC of the meter with other meter. Every time when this option is selected it will pop up a message demand is synchronized.Demand synchronization is available only for fixed window.

3.2.3 Time Of Day Setup

Time Of Day Setup options allows easy configuration of TOD module Every time when this option is selected it will pop up a message to ask user to verify date & time. It will ask user if he wants to set date & time. When pressed yes user will be directed to clock setup. Pressing no will continue to Time Of Day setup.

Time Of Day :



Time-of-day metering is a rate option that is offered by many utilities. When elected by the customer, a meter that records time, and energy usage is installed in place of the existing electrical meter. The metering option benefits utility companies by decreasing the required capacity and customers by providing reduced demand and usage rates during off-peak times, which gives customers a chance to reduce their utility bill. The meter offers a flexible tariff structure. This feature provides a useful way of following different tariff structures during different times of the day for different seasons.

The Time of Day module compares meter's internal clock with the season ,day and time of day settings in these registers and determines applicable rate.

Seasons, Profiles, Timezone, Type of day

Seasons:

A year can be programmed for max. of 4 seasons. Each day of season can be assigned different profiles. start date of the season is to be entered. This will be active until next season starts.

Type of Day: it defines the day types used in module

Type are Weekdays, Weekends, Holidays,Alternate days.

Weekdays :

This register defines the days of the week for all seasons. The tariff profile & demand profile in the seasons (1,2,3,4) weekday timezone setup registers are used on these days.

Weekend:

This register defines the weekend days for all seasons. The tariff profile & demand profile in the seasons (1,2,3,4) weekends timezone setup registers are used on these days.

Holidays :

Holidays have higher priority than other day types. A max. of 30 holidays can be selected. the rates defined in the season(1,2,3,4) holiday timezone set up registers are used on these days.

Alternate days :

these days generally have different rates from weekdays, weekends, holidays.alternate day can be assigned a separate profile. maximum 30 alternate days can be selected.

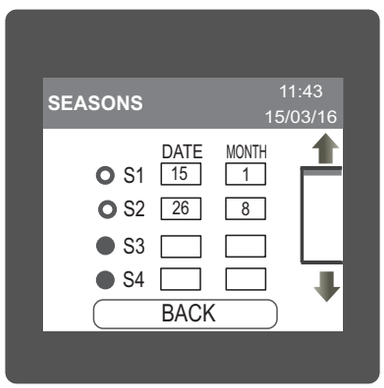
Tariff Profiles:

Tariff profile contains the tariff for particular zones, maximum 4 tariffs can be programmed.

Demand profile:
Demand profile contains the demand threshold for particular zones, maximum 8 Demand profile can be programmed.

Timezones:
A day can be divided into maximum 6 timezones as per tariff rate.The number and timing of these TOD timezones are programmable.

3.2.3.1 Seasons

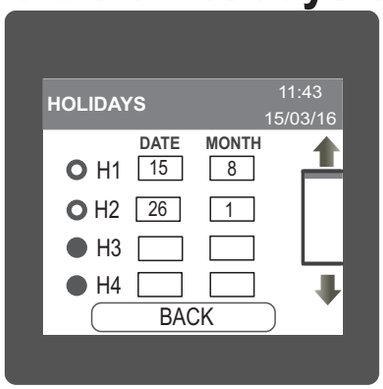


In seasons, user can define maximum 4 season for 12 months. By selecting radio button and entering valid date and month, seasons can be define. All the seasons must be in sequential order. Start date of the season is to be entered. Selected season will be active until the next season starts. At least 1 season must be selected for functioning of TOD module. for example season 1 is configured to date 15 and month 1.

3.2.3.2 Weekends selection

Select weekend by selecting the radio button(dark circle) in front of the day. These days will be considered as weekends for all seasons for example, touching radio button in front of Monday , Monday will be configured as weekend.

3.2.3.3 Holidays selection

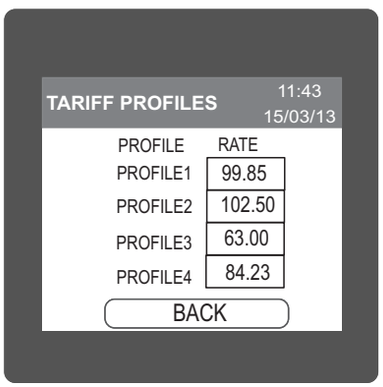


Any day can be assigned as a holiday. Holidays can have separate profile structure than other type of days. Maximum 30 holidays can be selected. To select holiday first activate holiday by touching radio button. Then touch on box to enter date and month.

3.2.3.4 Alternate days selection

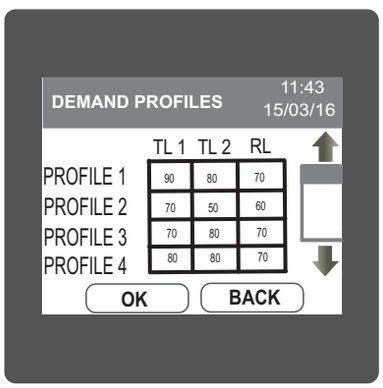
Any day can be assigned as a Alternate day. Alternate days can have separate profile structure than other type of days. Maximum 30 Alternate days can be selected.

3.2.3.5 Tariff Profiles



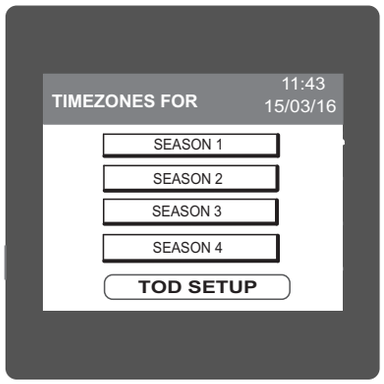
Profile contain a tariff that can be assign to particular timezone. Max 4 profile rate can be assign. User can assign profile rate for P1, P2, P3 & P4 valid range is 0.001 to 299.0.

3.2.3.6 Demand Profiles



Profile contain a trip limit 1,trip limit 2,reset limit that can be assign to particular timezone.Max 8 Demand profile can be assigned.User can assign trip limit 1 between 10 to100% of contract demand.trip limit2 between 50 to 99% of trip limit1,reset limit between 10 to 99% of trip limit 2.Default value of trip limit1 is 90%,trip limit 2 is 80% & reset limit is 60%.first profile always shows the values entered at DM limit.

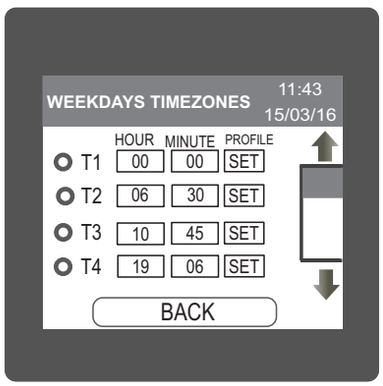
3.2.3.7 Timezones



Time zone window shows the seasons which are selected. In time zone user can assign a time zone period at which different tariff profile & Demand profile are applicable.

3.2.3.7.1 Weekdays / Weekends / Holidays / Alternate days Timezones

User can assign different timezone, tariff profile & demand profile for different day types in each season. User can enter time zones for 4 types of day
Weekdays
Weekends
Holidays
Alternate days



User should ensure that time zones and profile(tariff & Demand) are assigned to all selected seasons and day types. The timezones for the day must be in sequential order and must not overlap. Minium 1 and maximum 6 time zones can be configured. For timezone1 the default time is assigned as 00:00. By touching SET box, user can set tariff profile as well as demand profile.

Note: When using TOD module it is recommended to set energy resolution in KWh.

3.2.4 Communication Parameter Selection :

After entering in the “COMMUNICATION PARAMETERS” list of following parameters will be displayed

3.2.2.1 RS485 ADDRESS
3.2.2.2 Rs485 BAUD RATE
3.2.2.3 Rs485 PARITY

3.2.4.1 RS485 Address Setting

This screen applies to the RS 485 output only. This screen allows the user to set RS485 address parameter for the instrument. This screen can be accessed only from Communication Parameters List menu.

The range of allowable address is 1 to 247.

If value outside the range is entered, it will display “INVALID VALUE” followed by the correct range of parameter.

3.2.4.2 RS 485 Baud Rate

RS485 Baud Rate option allows the user to set Baud Rate of RS 485 port. Four options: 4800, 9600, 19200, 38400 Bauds are displayed on screen. Touching radio button in front of particular option will select that option.

3.2.4.3 RS 485 Parity & Stop bit Selection

RS 485 Parity & Stop bit selection option allows the user to set Parity & number of stop bits. Four options: ODD PARITY WITH ONE STOP BIT, NO PARITY WITH ONE STOP BIT, NO PARITY WITH TWO STOP BITS, EVEN PARITY WITH ONE STOP BIT are displayed on screen.Touching radio button in front of particular option will select that option.

3.2.5 Reset Parameter Selection

After entering in the “RESET PARAMETERS”, List of following parameters will be displayed :-

RESET ALL

RESET DEMAND PARAMETERS

RESET ALL ENERGIES

RESET MAX VOLTAGE AND CURRENT

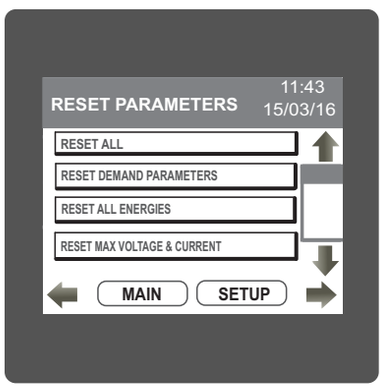
RESET MIN VOLTAGE AND CURRENT

RESET RUN-HOUR, ON-HOUR

RESET AUX INTERRUPT COUNT

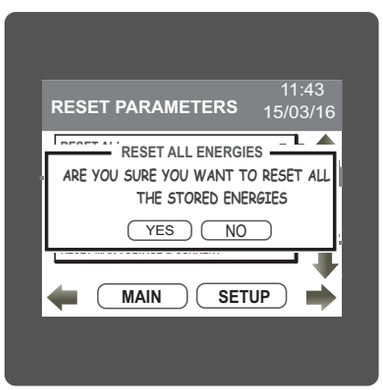
RESET TIME OF DAY DATA

3.2.5.1 Resetting Parameter



These screens allow the users to reset all the parameters eg:- Energy, Min, Max, Demand, Run hour, On hour, No. of Interrupts, TOD Data. Touching “ down” key scrolls list in upward direction.

For resetting specific parameter user can touch on that parameter.



Touching on any parameter will display the confirmation dialog, now a touch on “ YES key” will confirm the resetting of that particular Parameter.

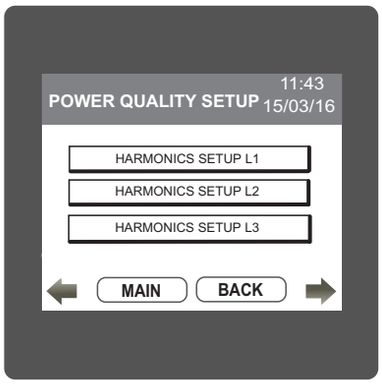
Touching on “NO key” will move back to Reset parameters menu

For example resetting All Energies will display a confirmation dialog as shown in the screen beside.

User can reset other parameters in similar manner.

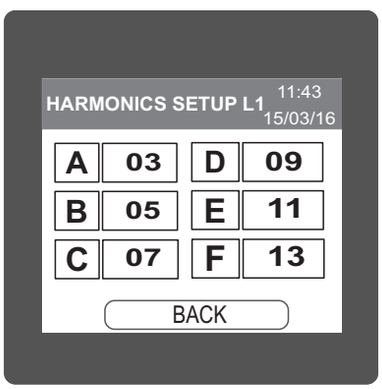
*****Note: While resetting any parameter if auxiliary supply gets off, reset that parameter again after auxiliary supply gets on.**

3.2.6 Power Quality Setup



In power quality setup, user can enter the harmonic no which user want to observe for each phase.

3.2.6.1 Harmonics Setup

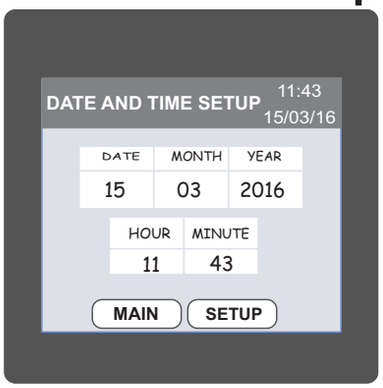


In harmonic setup, user can define the order of harmonics that user want to observe for each phase. Maximum 6 different harmonics number can be configured at a time. For setting of harmonic, touch on the rectangle and enter the number. Valid range for harmonic no is from 2 to 56. If value outside this range is entered it will display “INVALID VALUE” and will show the valid range.

3.2.7 Change Password

User can change password using change password option,for this refer section 3.1.1.

3.2.8 Clock Setup



User can set the date and time through this window. By touching the on date, month, year, hour and minute, keypad will pop up and user can enter the date and time through it.

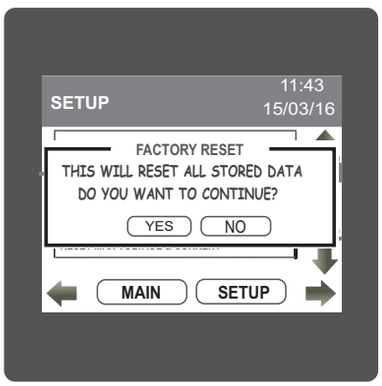
Note: Changing Date, Month, Year will reset all TOD data.

3.2.9 Brightness & Contrast

The brightness & contrast of the TFT LCD screen can be varied by the user by sliding the sliders. Touching the " OK key" will confirm the current brightness contrast setting.

Touching the DEFAULT key will set brightness and contrast as per factory settings. Touching the BACK key will move back to the setup menu without making any changes.

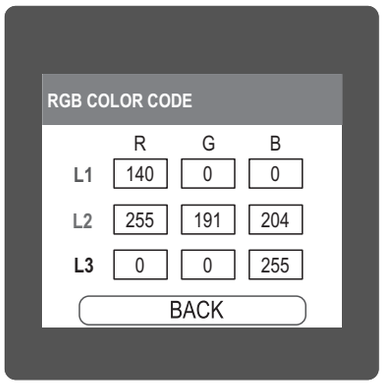
3.2.10 Factory Reset



Factory reset option resets all the stored data to its default value. After factory reset meter will restart automatically with default setup values.

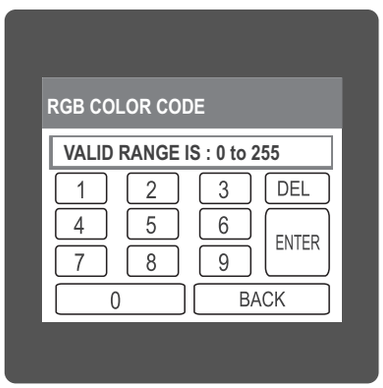
Note: Do not interrupt auxiliary supply while factory reset is in process. If auxiliary supply gets interrupted when factory reset is in process, do the factory reset again when auxiliary supply gets ON.

3.2.11 RGB Color Code



This screen allows user to set the values of Red, Green and Blue components of colors used to display the parameters of all three phases. Different colors can be assigned to each phase using combination of Red, Green and Blue component values. L1,L2,L3 will be set to the assigned color.

To set these values, touch the corresponding rectangular section, 0 to 9 digit input keypad will appear. After entering the value using this keypad, user can confirm this value with a simple touch on " ENTER key".



" BACK key" is used to go back to previous screen.

The allowable range for these values is 0 to 255. If a value outside this range is entered, it will display "VALID RANGE IS : 0 to 255".

Note : Colors similar to background color are not recommended.

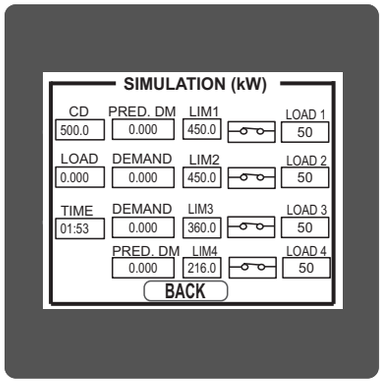
TABLE 2 : Standard color combinations

COLOR	R	G	B
Black	0	0	0
Blue	0	0	255
Brass	181	166	66
Bronze	204	128	51
Brown	166	41	41
Copper	184	115	51
Dark Blue	0	0	140
Dark Brown	102	66	33
Dark Green	0	51	33

COLOR	R	G	B
Dark Pink	232	84	128
Dark Purple	48	26	51
Dark Red	140	0	0
Dark Violet	148	0	212
Dark Yellow	156	135	13
Gold	212	176	56
Gray	128	128	128
Green	0	255	0
Indigo	74	0	130

COLOR	R	G	B
Light Blue	173	217	230
Maroon	176	48	97
Pink	255	191	204
Purple	161	33	240
Red	255	0	0
Silver	191	191	191
Violet	143	0	255
White	255	255	255
Yellow	255	255	0

3.2.12 Simulation



This screen allows user to simulate the actual system conditions by entering load values and verify the conditions prior to installation.

Simulation can be performed for Basic mode and Advance mode.

User has to set load value, whenever Demand values exceeds the trip limit relay trips. Tripping actions are taken according to trip limit for demand control parameter selected by user.

When tripping is performed load values shown in Green turns to Red, after tripping load is subtracted from equivalent load.

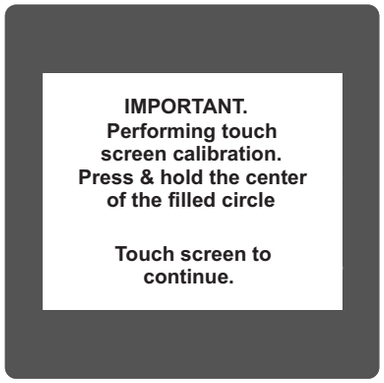
when all relays are below threshold all loads are turned ON and load value turns to Green.

For Basic Mode when all relays are in healthy state i.e.,below threshold limit and Predictive Demand is below restore then all loads are turned ON and load values are turned to Green.

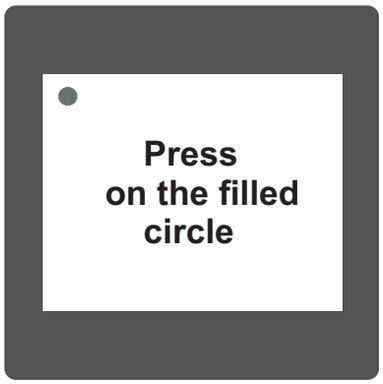
Note : Simulation should not be used while inputs are ON, which may cause loss of data.

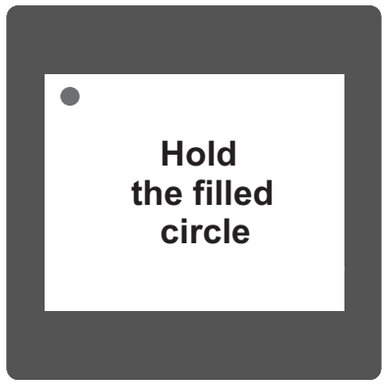
4. Touch screen calibration

This instrument is able to perform calibration to ensure the proper operation of the units touch screen functionalities. The calibration procedure will correct the problem of out of tolerance touch screen malfunction. Note that errors corrected by this calibration procedure are specific only to touch screen operation.

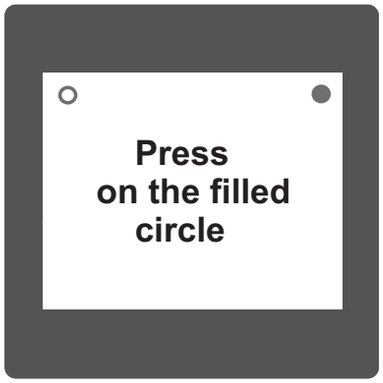


For starting touch screen calibration, touch the screen any where for 1 sec at system reset. After that touch screen calibration will start & the message shown besides will be displayed. Touch the screen to continue.

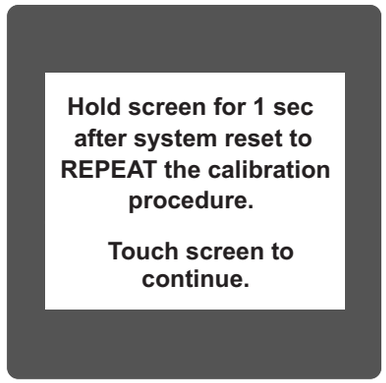




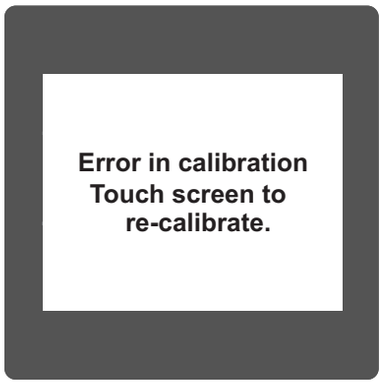
Follow the instructions displayed. Press & hold the center of the filled red circle for at least 2 seconds. Release when message for release is being displayed. For accurate results try to touch the center of the filled circle.



Repeat the same procedure for the remaining 3 corner circles.



After successful calibration, the message shown besides would be displayed. Touch the screen to continue.



If the touch screen was not calibrated properly, “Error in calibration”message would be shown & the user will be asked to recalibrate the touch screen. In such case the meter will retain the previously stored touch - screen calibration values unless a successful calibration is being performed.

5.Demand Control Parameter

Tripping actions of relay will be taken on the basis of Demand control parameter Demand control parameter can be configured to any of the following parameter through setup parameter screen

1) Active Demand (Import)
2) Active Demand (Export)
3)Reactive Demand (Import)
4)Reactive Demand (Export)
5)Apparent Demand
6)Current Demand

6.Demand Control type

Demand Control type is used set Demand control mode on basis of which demand controlling actions will takes place.
Demand control type can be configured in one of the five mode given below:-
6.1 None.
6.2 Basic DM control
6.3 Basic DM control with TOD
6.4 Advance DM control
6.5 Advance DM Control with TOD

6.1 None:

In this mode Demand controlling action will not take place.

6.2 Basic DM Control:

In this mode demand controlling actions will takes place on the basis of Demand profile1 set by user in Demand limit as mentioned in section 3.2.2.5. in the basic mode function of relay is fixed.
Relay functions are as follows-
Relay1- Predictive Demand
Relay2- Demand
Relay3- Demand
Relay4- Restore

6.3 Basic DM Control With TOD:

In this mode demand controlling actions will takes place on the basis of profiles set in Demand profile.
User can set different Demand profile for different timezone,so tripping actions will also vary timezonewise.
Relay functions are fixed and same as mentioned in Basic DM Control mode.

6.4 Advance DM Control:

In this mode demand controlling actions will takes place on the basis of Demand profile1 set by user in Demand limit as mentioned in section 3.2.2.5.In the Advance mode user can set relay functions and trip limit for relay which is 5-100% of Trip limit 1.
Relay functions are as follows:
Predictive Demand
Demand
Restore

6.5 Advance DM Control With TOD:

In this mode demand controlling actions will takes place on the basis of profiles set in demand profile.
User can set different demand profile for different timezone,so tripping actions will also vary timezonewise.
In the Advance mode user can set relay functions and trip limit which 5-100% of trip limit 1.
Relay functions are as follows:
Predictive demand
Demand
Restore

7.Demand Window Type

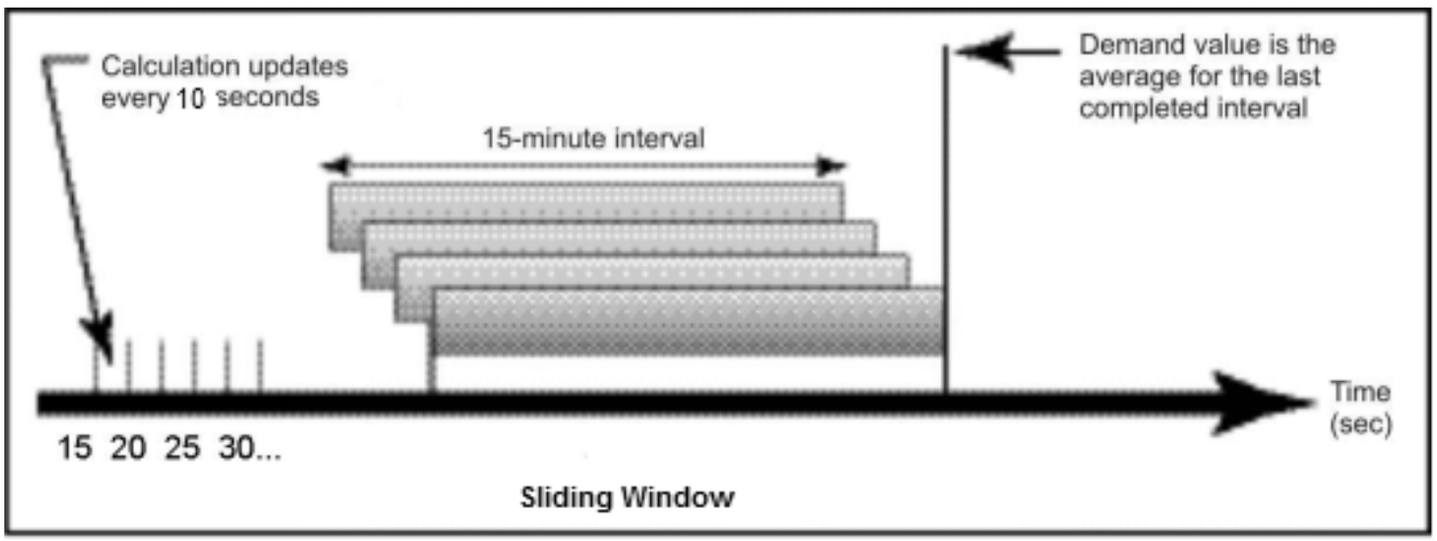
Demand window type is used set Demand calculation method
Demand window can be configured in one of the two mode given below:-
7.1 Fixed Window.
7.2 Sliding Window.

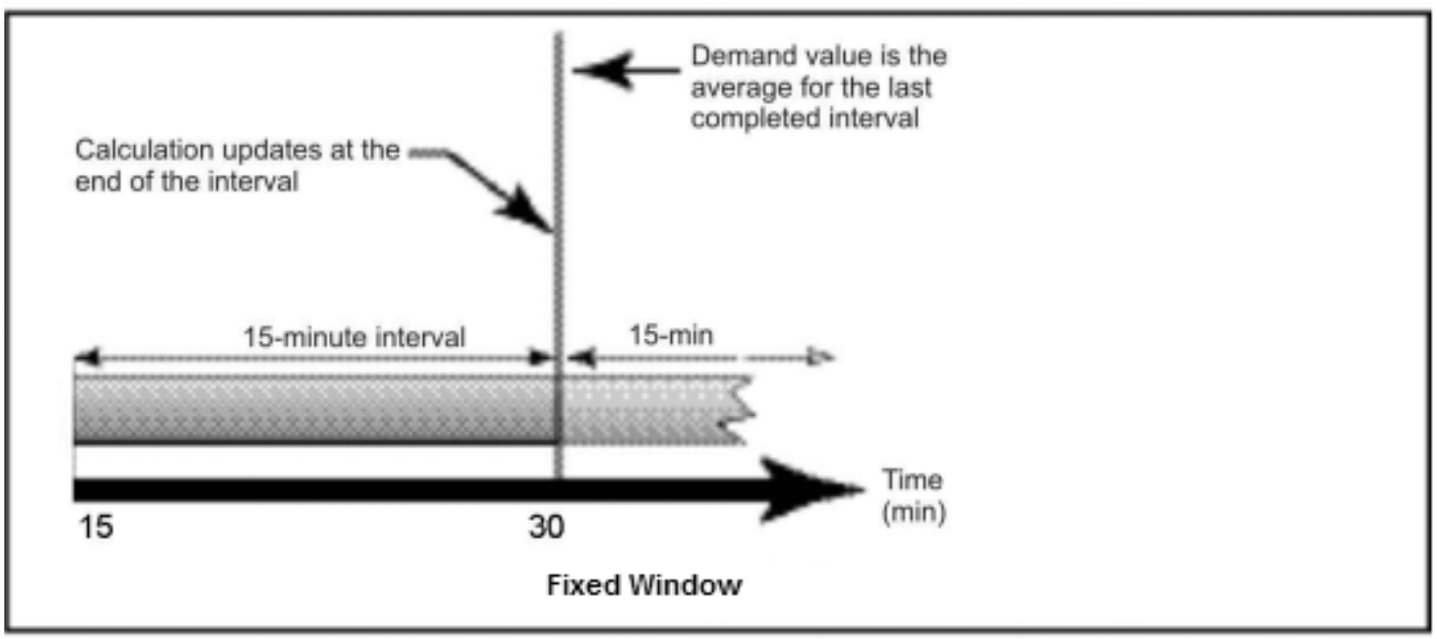
7.1 Fixed Window:

User can select demand interval time from 1 to 60 minutes,demand controller calculates and updates the demand at the end of each interval.It starts counting demand from zero at start of each interval.

7.2 Sliding Window:

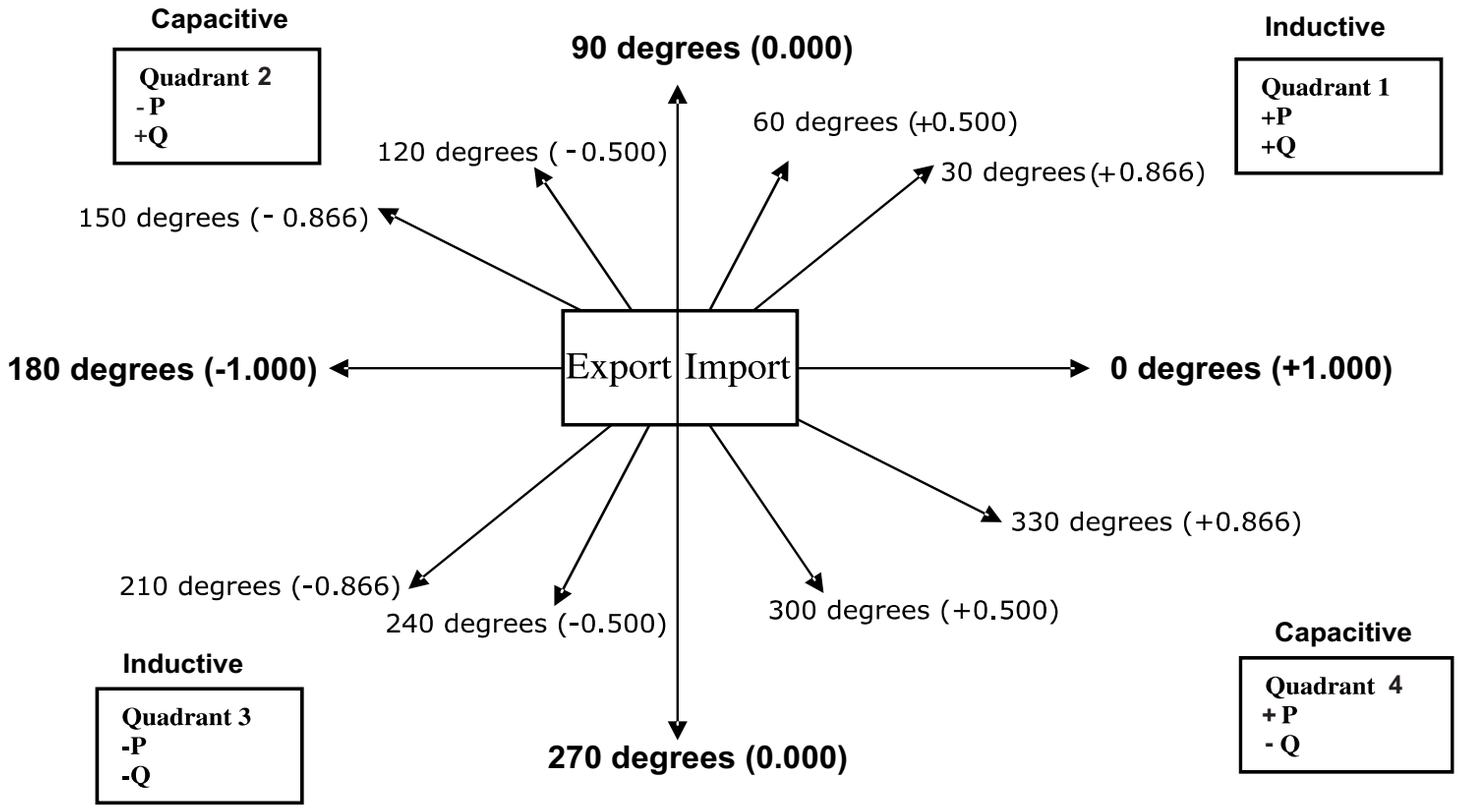
User can select demand interval time from 1 to 60 minutes,the value is updated per 10 seconds. Demand controller displays demand value for the last completed interval.





8.Phasor Diagram :

Quadrant 1: 0° to 90°
Quadrant 2: 90° to 180°
Quadrant 3: 180° to 270°
Quadrant 4: 270° to 360°



Connections	Quadrant	Sign of Active Power (P)	Sign of Reactive Power (Q)	Sign of Power Factor (PF)	Inductive / Capacitive
Import	1	+ P	+ Q	+	L
Import	4	+ P	- Q	+	C
Export	2	- P	+ Q	-	C
Export	3	- P	- Q	-	L

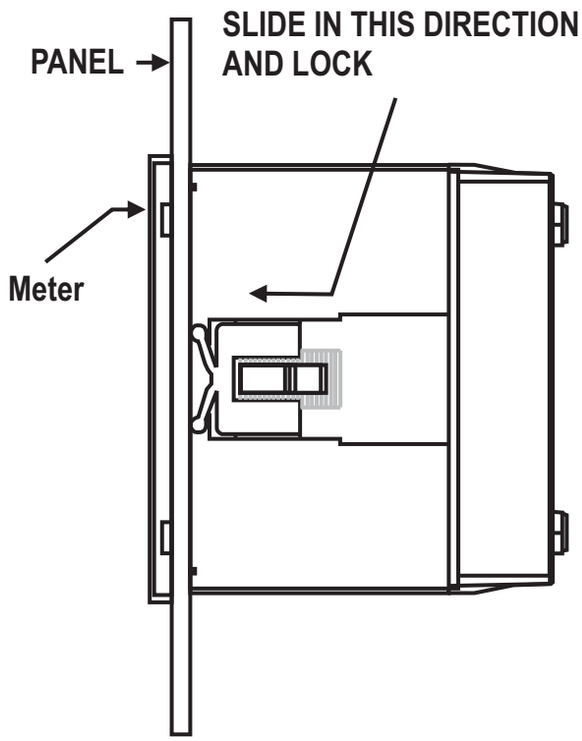
Inductive means Current lags Voltage
Capacitive means Current leads Voltage

When the instrument displays Active power (P)with " + " (positive sign) , the connection is " **Import** " .

When the instrument displays Active power (P)with " - " (negative sign) , the connection is " **Export** " .

9.Installation

Mounting is by four side clamps, slide the side clamps through side slot till side clamp gets firmly locked in a groove (Refer fig.) Consideration should be given to the space required behind the instrument to allow for bends in the connection cables.



As the front of the enclosure conforms to IP54 it is protected from water spray from all directions, additional protection to the panel may be obtained by the use of an optional panel gasket. The terminals at the rear of the product should be protected from liquids.

The instrument should be mounted in a reasonably stable ambient temperature and where the operating temperature is within the range -10 to 55 ^{0}C . Vibration should be kept to a minimum and the product should not be mounted where it will be subjected to excessive direct sunlight.

Caution

1. **In the interest of safety and functionality this product must be installed by a qualified engineer, abiding by any local regulations.**
2. **Voltages dangerous to human life are present at some of the terminal connections of this unit. Ensure that all supplies are de-energised before attempting any connection or disconnection.**
3. **These products do not have internal fuses therefore external fuses must be used to ensure safety under fault conditions.**

9.1 EMC Installation Requirements

This product has been designed to meet the certification of the EU directives when installed to a good code of practice for EMC in industrial environments, e.g.

1. Screened output and low signal input leads or have provision for fitting RF suppression components, such as ferrite absorbers, line filters etc., in the event that RF fields cause problems.

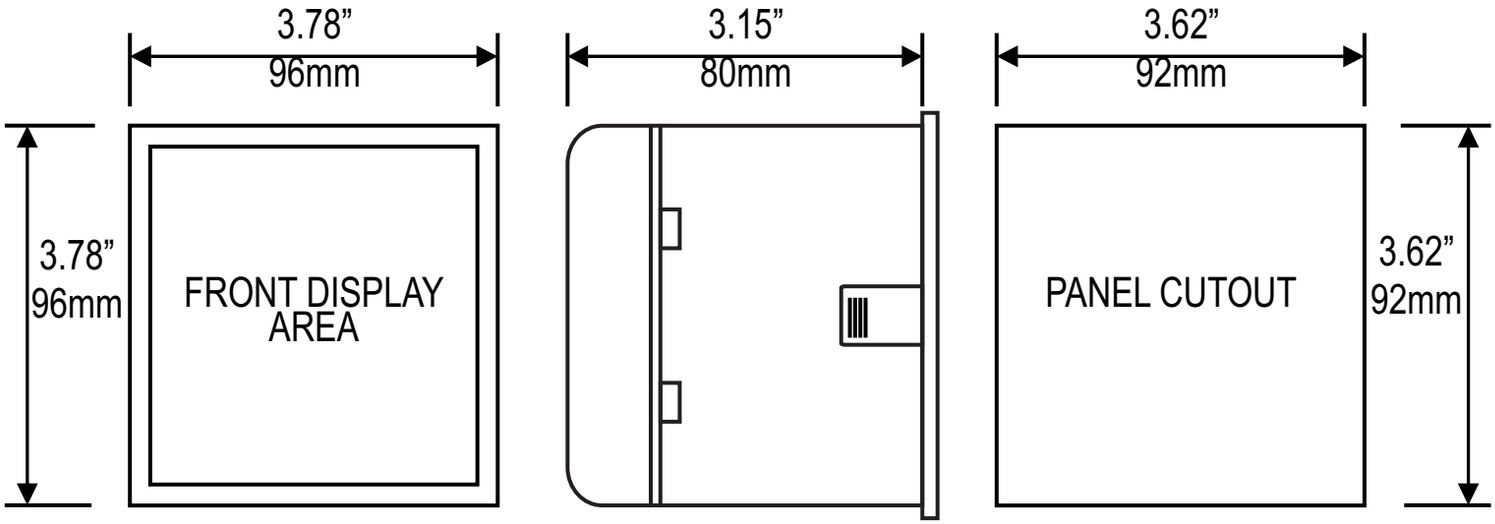
Note: It is good practice to install sensitive electronic instruments that are performing critical functions, in EMC enclosures that protect against electrical interference which could cause a disturbance in function.

2. Avoid routing leads alongside cables and products that are, or could be, a source of interference.
3. To protect the product against permanent damage, surge transients must be limited to 2kV pk. It is good EMC practice to suppress differential surges to 2kV at the source. The unit has been designed to automatically recover in the event of a high level of transients. In extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.

   The Current inputs of these products are designed for connection in to systems via Current Transformers only, where one side is grounded.

4. ESD precautions must be taken at all times when handling this product.

9.2 Case Dimension and Panel Cut Out



MAX PANEL THICKNESS 0.18”,5mm

9.3 Wiring

Input connections are made directly to screw-type terminals with indirect wire pressure. Numbering is clearly marked in the plastic moulding. Choice of cable should meet local regulations. Terminal for both Current and Voltage inputs will accept upto $3mm^2$ x 2 diameter cables.

Note : It is recommended to use wire with lug for connection with meter.

9.4 Auxiliary Supply

The instrument should ideally be powered from a dedicated supply, however it may be powered from the signal source, provided the source remains within the limits of the chosen auxiliary voltage.

9.5 Fusing

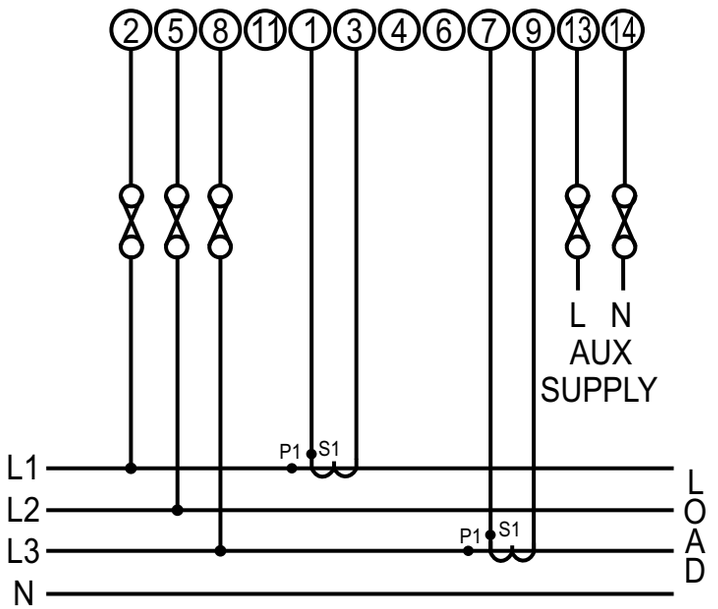
It is recommended that all voltage lines are fitted with 1 amp HRC fuses.

9.6 Earth/Ground Connections

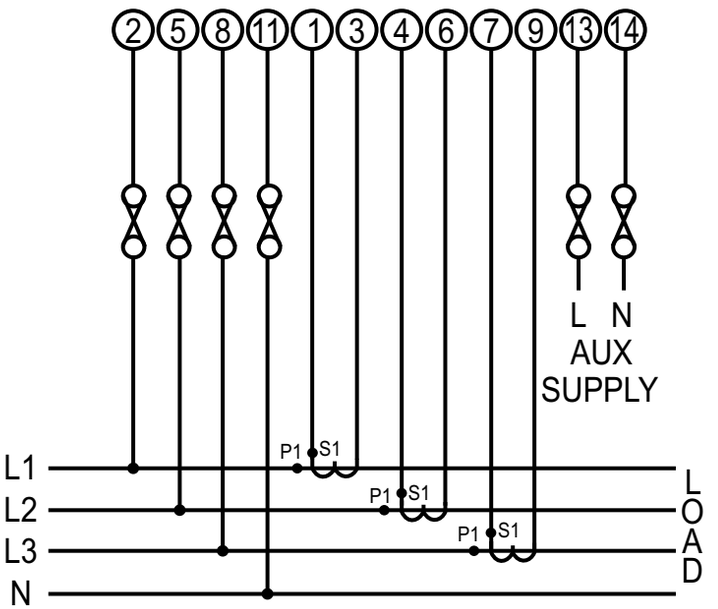
For safety reasons, CT secondary connections should be grounded in accordance with local regulations.

10.Connection Diagrams

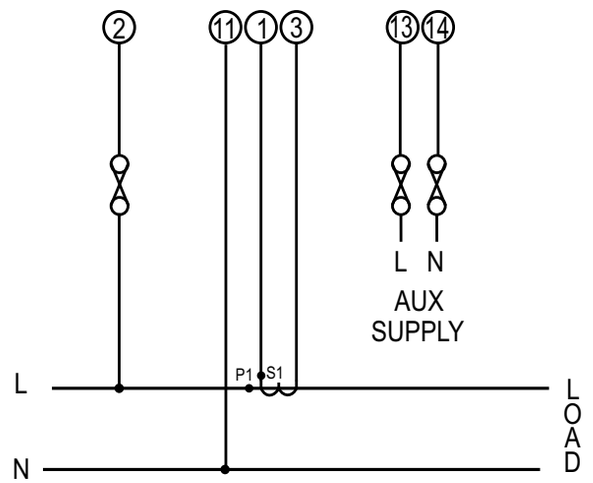
3-PHASE 3-WIRE UNBALANCED LOAD
DIGITAL METERING SYSTEM



3-PHASE 4-WIRE UNBALANCED LOAD
DIGITAL METERING SYSTEM



SINGLE PHASE 2-WIRE
DIGITAL METERING SYSTEM



11.Specification :

System

3 Phase 3 Wire / 4 Wire programmable at site,1 Phase 2 Wire on order.

Inputs

Nominal input voltage (AC RMS) (Three wire and Four wire)	Line-Neutral 57.73...288.675 V_{L-N} Line-Line 100... 500 V_{L-L}
Max continuous input voltage	347 V_{L-N}, (600 V_{L-L})
Max short duration input voltage	2 x Nominal Value (1s application repeated 10 times at 10s intervals)
Nominal input voltage burden	0.2VA approx. per phase
Nominal input current	1A / 5A AC rms
Max continuous input current	120% of Nominal Value
Nominal input current burden	0.2VA approx. per phase
Max short duration current input	20 x Nominal Value (1s application repeated 5 times at 5 min. intervals)
System CT primary values	Std. Values from 1 to 9999A (1 or 5 Amp secondary)

Auxiliary

Standard nominal Auxillary supply voltages & Frequency	60 - 300V AC- DC (45-66Hz),
a.c. supply voltage tolerance	+5 % / -5 % of Rated Value
a.c. supply frequency range	45 to 66 Hz
a.c. supply burden	<6.5VA

Operating Measuring Ranges

Voltage	5 V_{LN}.... 347 V_{LN}, 9 V_{LL}.... 600 V_{LL}.
Current	5 .. 120 % of Nominal Value
Frequency	45 .. 66 Hz

Accuracy

Voltage	± 0.2 % of Nominal value
Current	± 0.2 % of Nominal value
Frequency	±0.1% of mid frequency
Active Power	± 0.2 % of Nominal value
Re- Active Power	± 0.2 % of Nominal value
Apparent Power	± 0.2 % of Nominal value
Active Energy	Class 0.5S as per IEC 62053 - 22
Apparant Energy	Class 0.5S as per IEC 62053 - 22
Re - Active Energy	Class 2 as per IEC 62053 - 23
Power Factor / Phase angle	± 2 degree
Harmonics	± 1 %
Total Harmonic Distortion	± 1 %

Reference conditions (As per IEC / EN 60688) :

	Ambient 23 ^{0}C ± 1 ^{0}C
	Sinusoidal (distortion factor 0.005), 50 / 60 Hz
Current Range	5... 120% of Nominal Value.
Starting Current for energy as per IEC 62053 - 22 0.5S	1 mA for 1A range 5 mA for 5A range

Display

TFT LCD	3.5” Graphical LCD, resolution 320x240 pixels
Update	Approx. 1 seconds

Controls

User Interface	Resistive Touch screen

Real Time Clock (RTC) :

Uncertainty	+/- 2 minutes / months (23 ^{0}C ± 1 ^{0}C) (trimmable through display or MODBUS)

Standards

EMC	IEC 61326
Immunity	10V/m min-Level 3 industrial low level electromagnetic radiation environment IEC 61000-4-3.
Safety	IEC 61010-1 , Year 2001
IP for water & dust	IEC 60529

Isolation

Dielectric voltage withstand test between circuits and accessible surfaces	5.23 kV DC for 1 minute between all electrical circuits

Environmental

Operating temperature	-10 to 55 ^{0}C
Storage temperature	-20 to +65 ^{0}C
Relative humidity	0 .. 90 % RH
Warm up time	3 minute (minimum)
Shock	15g in 3 planes
Vibration	10 .. 150 .. 10 Hz, 0.75mm amplitude
Enclosure (front only)	IP 54 as per IEC 60529
Temperature Coefficient	0.05%/°C

Enclosure

Style	96mm x 96mm DIN Quadratic
Material	Polycarbonate Housing ,
Terminals	Self extinguish & non dripping as per UL 94 V-0 Screw-type terminals
Depth	< 80 mm
Weight	0.600 kg Approx.

ModBus (RS 485) Option :

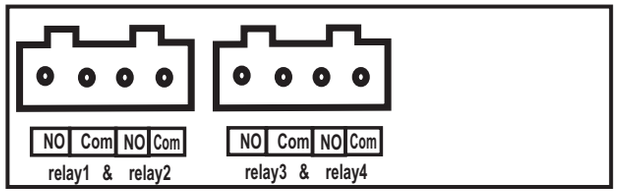
Protocol	ModBus (RS 485)
Baud Rate	38400, 19200 , 9600 , 4800 (Programmable)
Parity	Odd or Even, with 1 stop bit, Or None with 1 or 2 stop bits

Impulse Output :

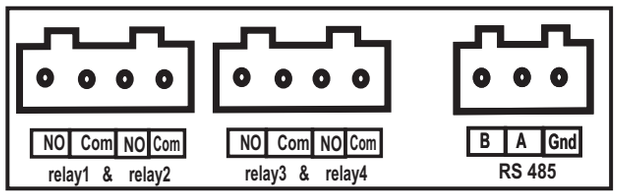
Impulse Constant	4000 impulses / KWh

12.Connection for Relay And Optional Rs485 Output (rear view of instrument):

1. Relay1& Relay 2 Output+Relay 3 & Relay 4 Output



2. Relay1& Relay 2 Output+Relay 3 & Relay 4 Output+RS485 Output



The Information contained in these installation instructions is for use only by installers trained to make electrical power installations and is intended to describe the correct method of installation for this product.

It is the user's responsibility to determine the suitability of the installation method in the user’s field conditions.

RISH DMC*i*

Demand Controller