

masibus®

ANNEXURE-A2

DISPLAY DETAILS FOR SEVEN SEGMENT LED DISPLAY BASED PM2160-A



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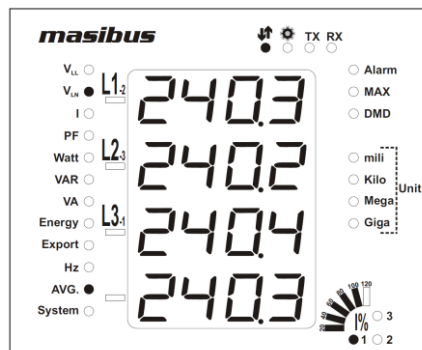
MODES OF OPERATION

Power Indicator has four mode of operation:

- Run Mode
- PGM Mode (Edit Mode)
- AUTO/MANUAL SCROLL
- Reset Registers

RUN MODE DETAIL

At power ON, the unit by default goes into RUN Mode. The following frame (if 3p4w) is displayed in AUTO SCROLL.



In Manual Scroll it will display stored page, if it is programmed in PGM Mode.

AUTO SCROLL

To Freeze particular screen on display for 2 minute, press any one **ESC** **Up** **Down** key. After 2 minute it will automatically switches into auto scroll.

In Auto scroll mode, display screen will automatically scroll as per manual scroll menu & scroll time is 8 seconds.

MANUAL SCROLL

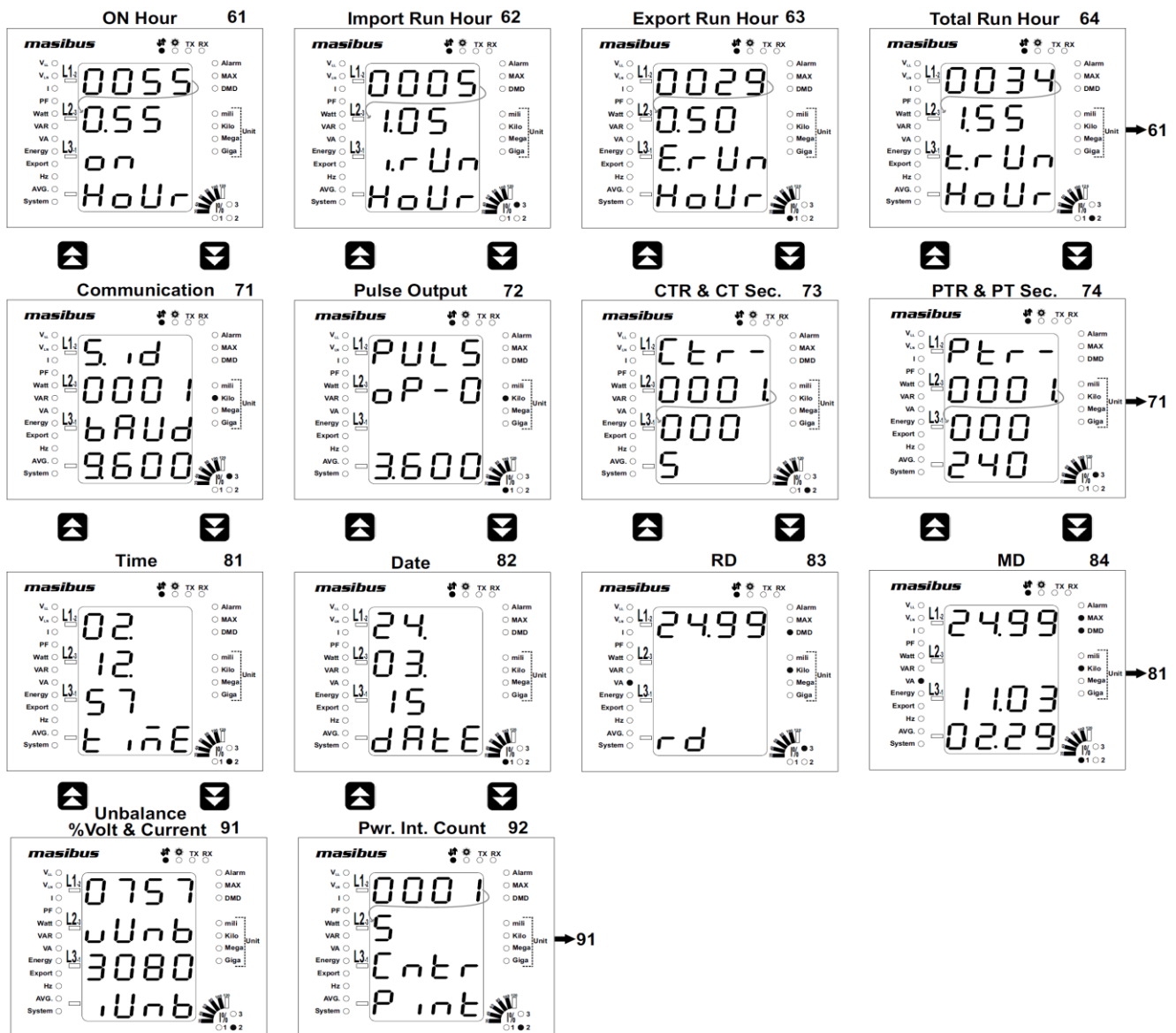
For horizontal movement of frame to frame, press **ESC** **Right** key and it will be in loop Similarly for Vertical movement of frames, use **Up** or **Down** key.

The sequence of frames, which can be observed in RUN Mode, is shown in below fig.

For 3-Display Page matrix for LED display



Run Mode Display Matrix



Run Mode Display Matrix

For 3-phase 3-wire system above page matrix are display as per below note1

Note1:-

- In Page number 12, 53 and 54 will not displayed line-2 and Page number 21 only frequency will come.
- In Page number 13, 14, 22, 23, 24, 31, 32, 33, 34 and 51 line-3 will not displayed.

Note2:-

- Above screens are only for information of RUN MODE pages, values inside the screens are not actual.
- In Page number 13(PF page) minus sign indicated lead not PF Value, when PF value become minus it display on Modbus only and observed the KVAR sign for lag-lead in Modbus.
- When ordering code is w/o MD/RTC then screen page number 81, 82, 83 and 84 will not displayed & next page will come in page matrix.
- When ordering code is w/o THD then screen page number 53 and 54 will not displayed & next page will come in page matrix.
- When ordering code is w/o MD/RTC & THD then screen page number 53, 54, 81, 82, 83 and 84 will not displayed & next page will come in page matrix.
- Page 84 Max Demand page, line-3 shows maximum demand date (DD.MM) and last raw shows maximum demand Time (HH.MM)
- When ordering code is with THD then timeout in Modbus communication may be more & time display may get update delay because of Harmonics & THD processing time.

Note3:-

- In Page 41,42,43,44 & 52 the energy displays on both line 1 and line 2 combinedly.(i.e. In page 41,the system Active import energy is 23.702700 Mwh). The same is applicable on page 61,62,63,64,73,74 & 92.also,Where the data displays on two line combinedly.



When this led is ON, it shows the Scrolling in MANUAL MODE.



When this led is ON, it shows the PGM MODE (EDIT MODE).



It shows the Percentage value of current for individual phase in terms of %
 It will indicate LED for 1, 2, 3 for indicating 3 phases, In RUN Mode it will scroll every 8 second for all phases, regardless of Manual Scroll or Auto Scroll.

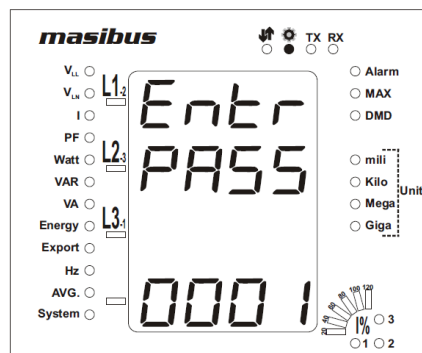
For Example this Image shows 100% Load for 1st Phase.

Percentage Load Bar Display Table

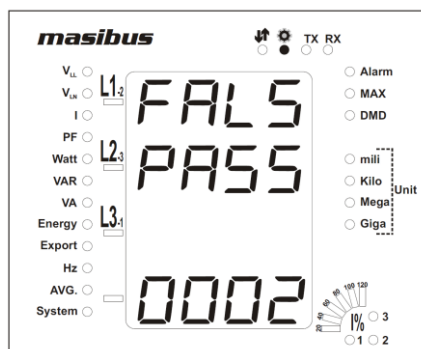
Percentage of Irated	Percentage Load Bar	Led Color
1.5% to 30% of Irated	20% Load	Green
30% to 50% of Irated	40% Load	Green
50% to 70% of Irated	60% Load	Yellow
70% to 90% of Irated	80% Load	Yellow
90% to 110% of Irated	100% Load	Red
More than 110% of Irated	120% Load	Red

PROGRAM MODE DETAIL

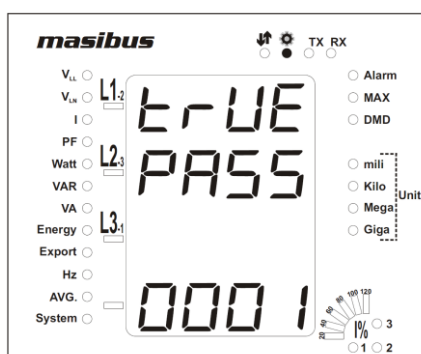
The PROGRAM Mode can be entered by pressing the PGM key. Once the key is pressed, the unit prompts for four digit password & Setting LED ON as shown below.



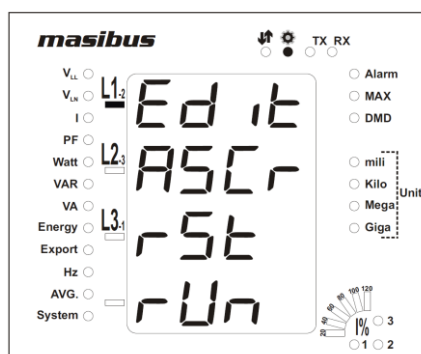
Factory default password is 0001.If you have configured this password as per your choice then apply that password by setting blinking cursor position using three keys: RIGHT SHIFT (ESC) key to shift cursor position, UP & DOWN to change the digit value. After password is set press the PGM key to enter in to programming mode. If applied password is false, it will show false password message as shown in below screen and automatically comes out from program mode to normal mode.



If the entered password is true, it will flash as below:



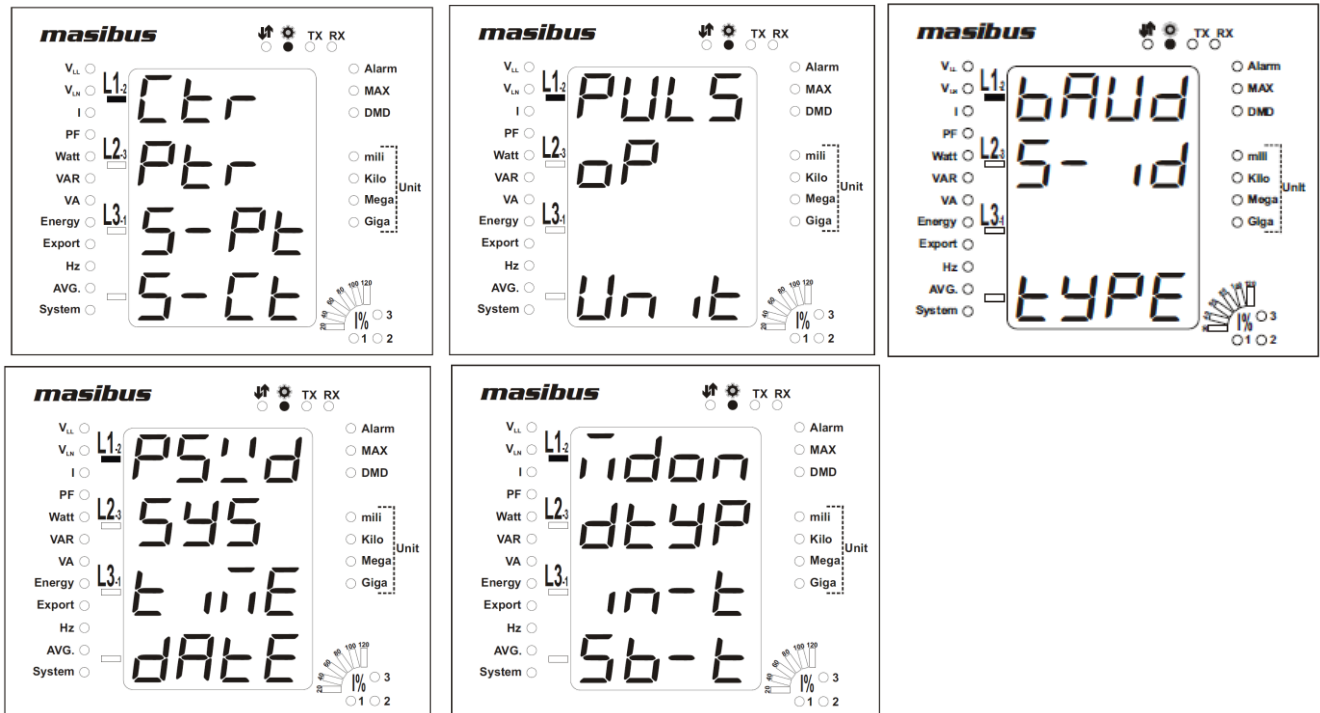
And then the following screen is displayed:



Here arrow is a pointer at default position. By moving the pointer you can select the mode. By using UP or DOWN key, you can set arrow position and hence selection is made upon pressing PGM key. To get back to the previous menu press RIGHT SHIFT key, as it is now functioning as ESCAPE key. Before starting this, see the flow diagram so you will have whole idea for where you want to go and which parameter you want to update or see. In PROGRAM mode you can enter from anywhere by pressing PGM key and you can escape from anywhere of PROGRAM mode by pressing RIGHT SHIFT key for one step back at each pressing time.

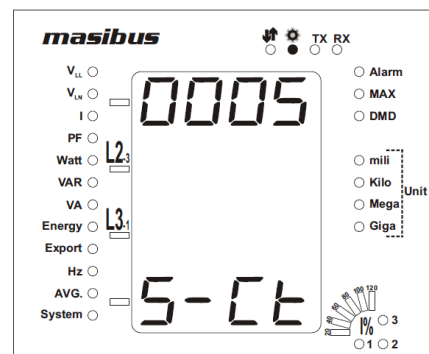
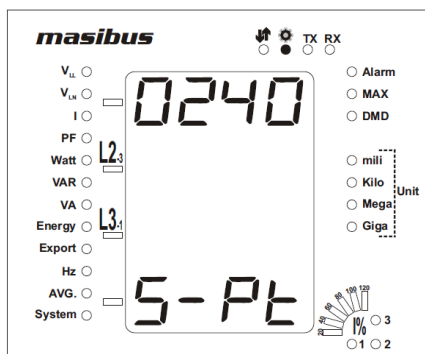
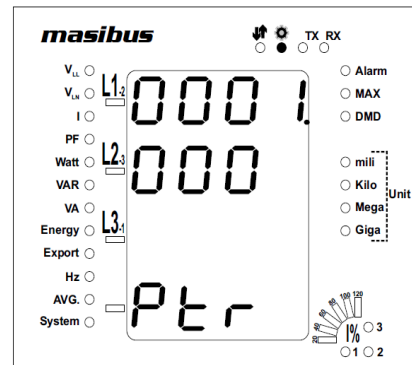
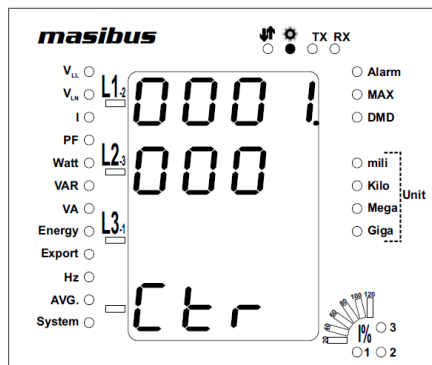
EDIT MODE DETAIL

By Pressing PGM key on EDIT MODE, below screen will be shown:



To enter in to any option you have to apply same procedure as applied as at EDIT MODE i.e. set the arrow position and press PGM key it shows the value w/o blinking. If you are pressing RIGHT SHIFT key, you will come back one step and position of arrow will be at where you entered.

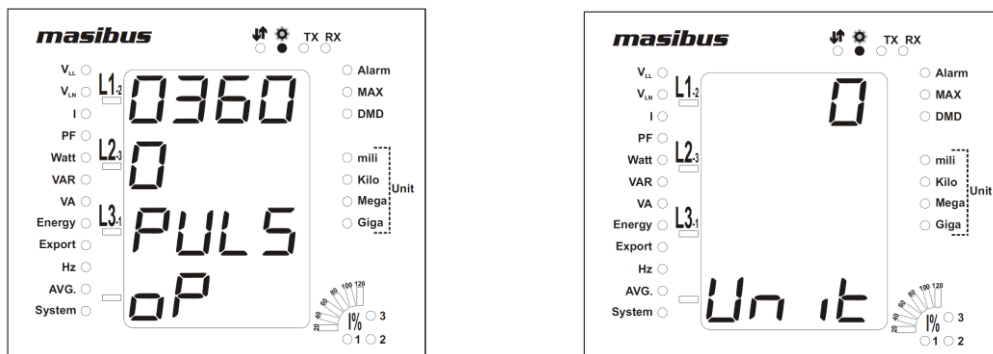
A.C.INPUTS



Now here four parameters are available: Ctr (CT ratio), Ptr (PT ratio), S-Pt (Secondary Voltage) and S-Ct (Secondary Current). To change any parameter, set arrow and press PGM key, so blinking cursor will be on right most digits. Use RIGHT SHIFT key to change position of blinking cursor digit by digit and update the digit by UP and DOWN keys. Select the required value and save it by pressing PGM key. Now you will come out from that stage so blinking cursor will be removed. **If required, go for other and change the value. If you change Vrate and Irate parameters confirm that input to device is not more than 120% of Vrate or Irate. if it is above 120% of set value device may get damaged or malfunction.** Finally press the RIGHT SHIFT key to get escape from this screen and come back one step. Here arrow will be at where you entered.

PLS OUTPUT

For this, screen will be shown like below:



Suppose you have set 3600 with its unit KWh-I, so it means that for 1 KWh consumption of Active-Import Energy by load, it will generate 3600 pulses in 1 hour. Here in unit many options are available like: KWh-I(Active-Import), KWh-E(Active-Export), KVAhI(Reactive-Import), KVAhE(Reactive-Export) & KVAh(Apparent). These all are for kilo unit, and for mega unit: MWh-I, MWh-E, MVAhI, MVAhE & MVAh. Now to set the value and its unit, set the arrow position and press PGM key, cursor will be shown on right most digit of value. Now set the value as per previous explanation and press PGM again so blinking cursor will go for unit, set the unit by UP and DOWN key and press the PGM key so they will be saved in to EEPROM.

Finally press the RIGHT SHIFT key to get escape from this screen and come back one step. Here arrow will be at where you entered.

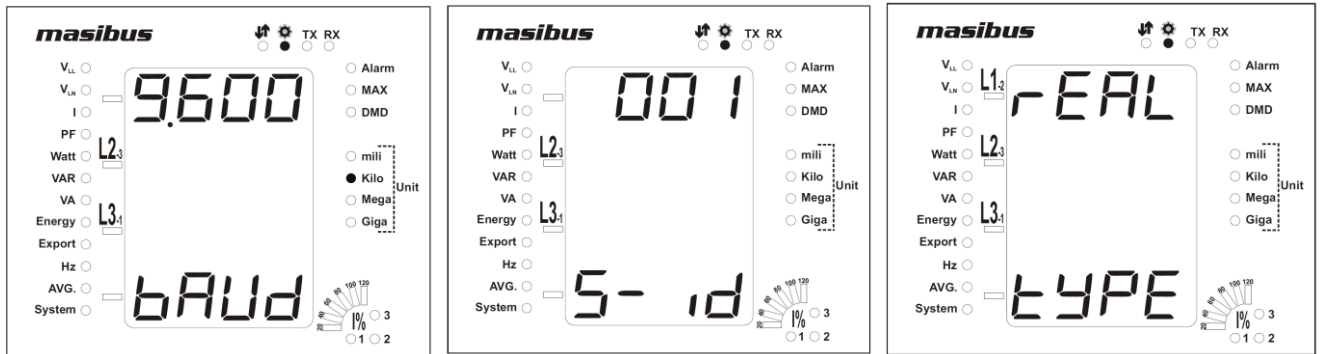
Note1: Energy Pulse output must be between 100 to 60000 and in multiple of 100.

Note2: For seven segment LED, Unit display as per below.

- 0 – KWh-I (Active-Import)
- 1 – KWh-E (Active-Export)
- 2 – KVAhI (Reactive-Import)
- 3 – KVAhE (Reactive-Export)
- 4 – KVAh (Apparent)
- 5 – MWh-I
- 6 – MWh-E
- 7 – MVAhI
- 8 – MVAhE
- 9 – MVAh

SERIAL COMMUNICATION

For this, screen will be shown like below:

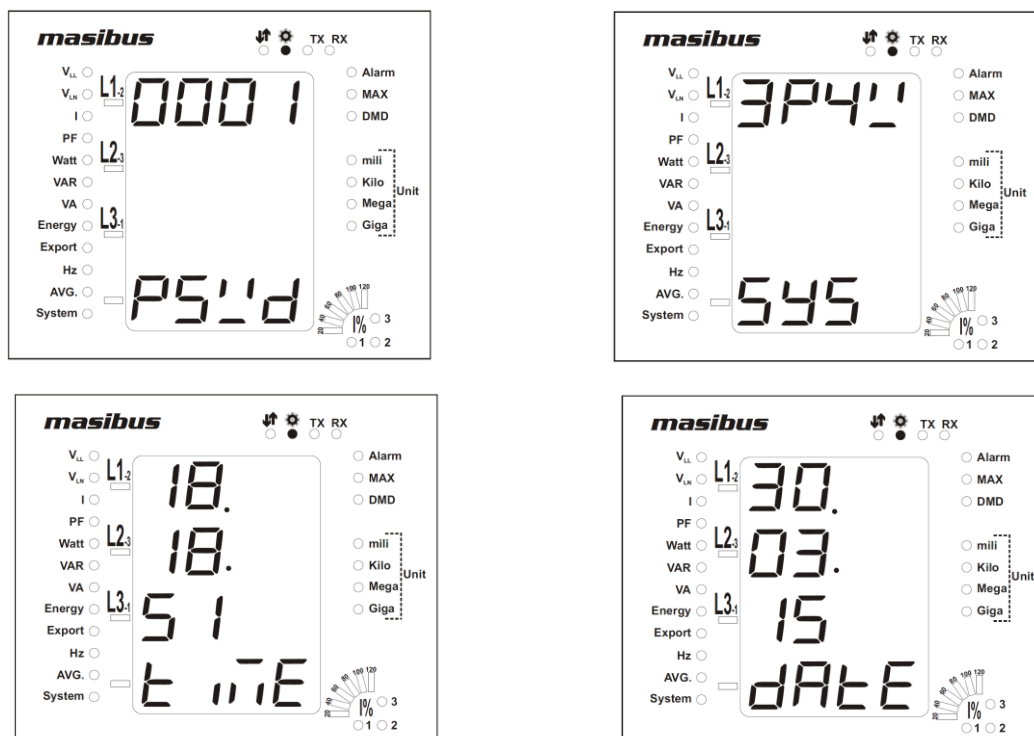


Here three parameters are available: BAUD, SLV ID and DATA TYPE. BAUD is for Baud-Rate and SLV ID is for Slave Address of Meter for Modbus-RTU (Master-Slave) communication while DATA TYPE decides the data type in which the meter sends data on RS-485 line. BAUD has three options like 09600, 19200 and 38400, SLV ID should be between 1 and 247 and DATA TYPE has two options REAL and LONG. To change the value of BAUD, set the arrow and press PGM key, it will show a blinking cursor before the left most digit of the present value of BAUD. Now just press UP or DOWN key to set the required value and press PGM key to store this value in to EEPROM. For SLV ID, the blinking cursor will be at the right most digit of the value, set the value as per previous explanation and save it. For DATA TYPE using UP or DOWN key select the required data type and press PGM key to store this value in to EEPROM. Finally press the RIGHT SHIFT key to get escape from this screen and come back one step. Here the arrow will be at where you entered.

Note: For seven segment LED, BAUD value display in Kilo.

SYSTEM SETTING

For this, the screen will be shown like below:



Here four parameters are available like: PSWRD, SYSTEM & REAL TIME CLOCK. Setting PSWRD is for four digit password for security purpose. SYSTEM is used to whether the meter is for 3 phase 4 wire AC Power supply or for 3 phase 3 wire AC power supply.

Note: Wiring for 3P4W and 3P3W are different so, change/check the wiring also if you are changing this parameter in installed device.

To change PSWRD value, apply same procedure as applied as in previous and save it. Finally press the RIGHT SHIFT key to get escape from this screen and come back one step. Here arrow will be at where you entered.

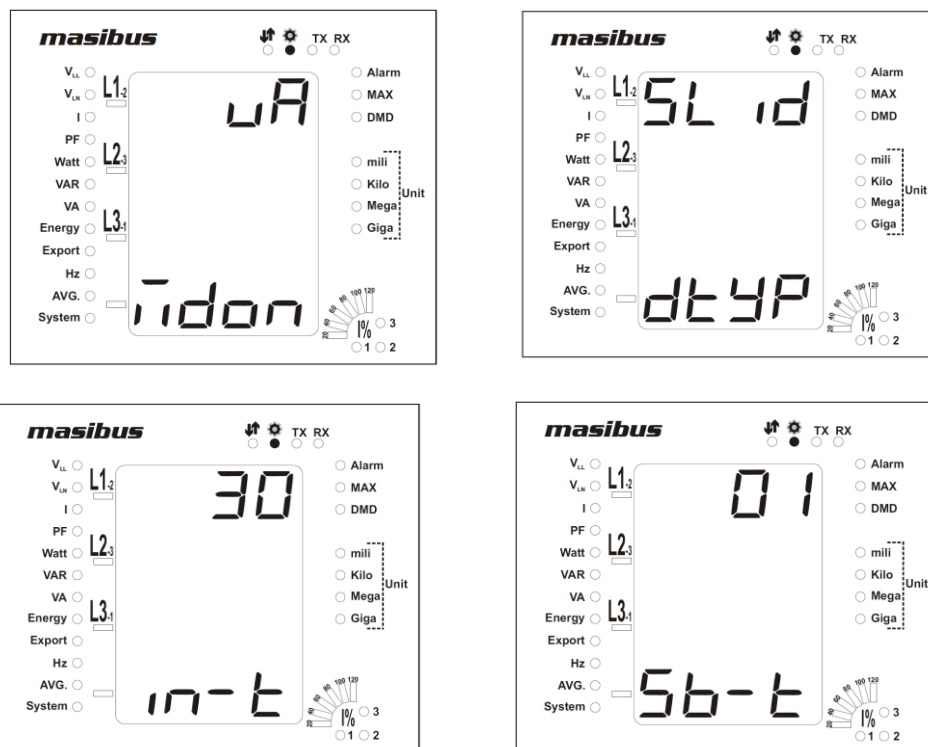
To program/update Real Time & Real Date, apply same procedure as applied as in previous and save it. Finally press the RIGHT SHIFT key to get escape from this screen and come back one step. Here arrow will be at where you entered.

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

For Block based MD calculation, regularly check time synchronize with Electricity meter at least once in a month and update if required.

MAXIMUM DEMAND [MD]

For this, screen will be shown like below:



Here Max Demand parameters are available like: Max Demand ON, Demand calculation method, Interval Time [In. Time] and Sub Interval Time [Sb. Time].

MD is calculated on: for KW / KVA.

MD calculation method / Demand type(dtyp): BLOCK / SLIDE.

Interval time for MD calculation: 15 / 30 minutes.

When MD calculation method is SLIDE than need to select Sub Interval time (Sb. Time) for MD calculation, so in SLIDE method every selected Sb. Time, Unit will calculate MD with consideration of previous demands up to In. Time.

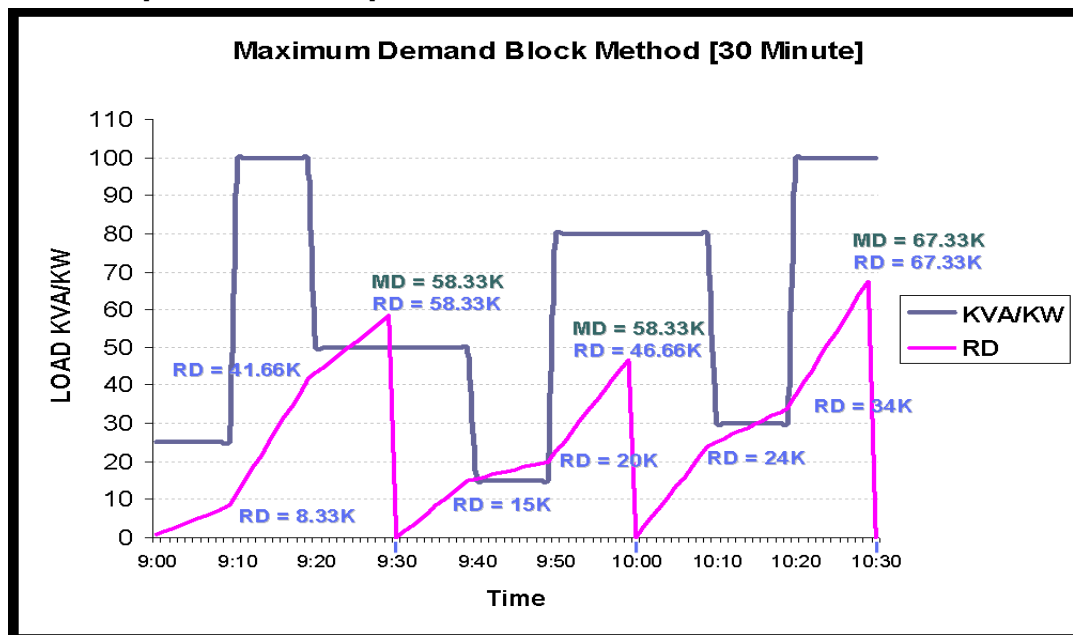
Enter in it using PGM key and use UP or DOWN keys to select the options and after that use PGM key to store that option.

In **BLOCK WINDOW**, Say if the integration time is 15 minutes then value of max demand will be updated at every 15 minutes. Demand is calculated by accumulating power every second. That is called Rising Demand. Rising Demand is calculated at every second and stored to FRAM, Maximum Demand is calculated every 15 minutes in sync with Real Time, If power fails and at the next power ON, if 15 min window has changed than it will calculate Max Demand.

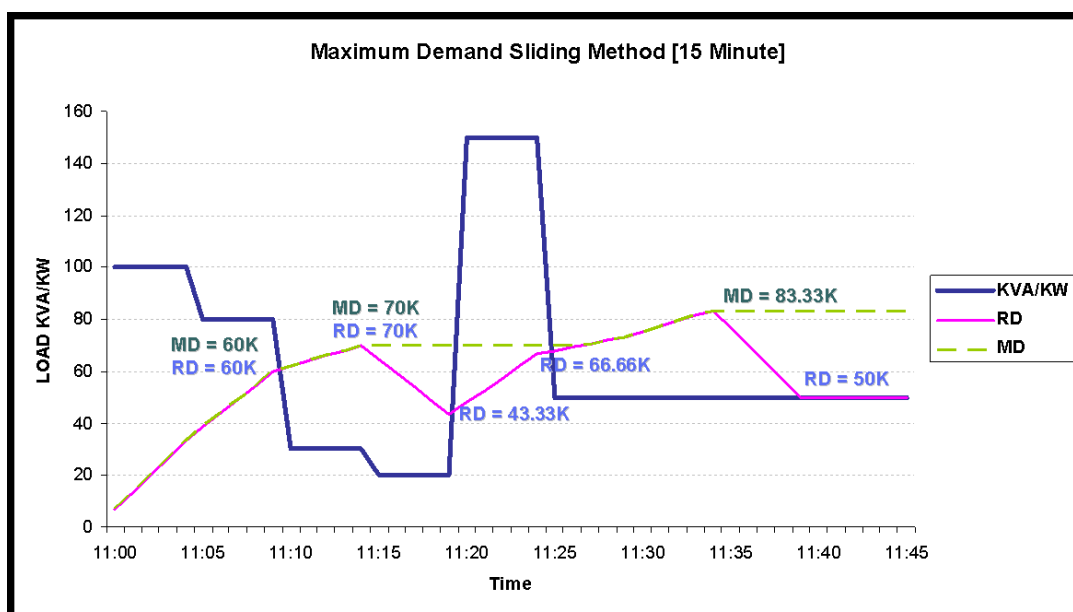
In **SLIDING WINDOW**, Say if the interval time is 30 minutes and Sb. Time is 2 min, then value of max demand will be updated at every 2 minutes. Demand is calculated by accumulating power every 2 minutes.. Power for Demand will be averaged based on Sb.Time it means it will be averaged for 120 seconds and than it will be taken in to demand array. Rising Demand is calculated at every 2 minutes averaging last 15 values from Demand array and stored to FRAM. If power fails and at the next power ON, It will start from initial values so Rising Demand will stabilize after 30 minutes in this case.

E.g.

1. Block Method [30 Minute Window]



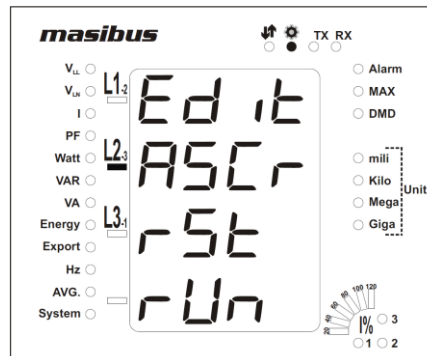
2. Sliding Method [15 Minute Window]



For Constant KVA, RD will get stable after 15 minutes.

AUTO/MANUAL SCROLL

AUTO/MANUAL SCROLL change can be done as mentioned below,



AUTO SCROLL

- From flow diagram you can see, the screens are in ROW and COLUMN. It will automatically scroll the page every 8 seconds; for [3P4W and 3P3W] it will increment 11 to 14.....81 to 84 and again rollover to 11 in case of with RTC/MD(Time & Date) and THD(Harmonics).
- When ordering code is w/o MD/RTC then screen page number 81 to 84 will not displayed & next page will come in page matrix.
- When ordering code is w/o THD then screen page number 53 and 54 will not displayed & next page will come in page matrix.
- When ordering code is w/o MD/RTC & THD then screen page number 81 to 84, 53 and 54 will not displayed & next page will come in page matrix.
- To Freeze any particular page for 2 min. from AUTO SCROLL, press any keys from RIGHT SHIFT, UP or DOWN, after 2 min the auto scroll resumes as per shown in the display matrix (Run mode).
- To program MANUAL SCROLL and freeze particular page every time it get Power ON, first let that page come in AUTO SCROLL or go to that particular page using temporary MANUAL SCROLL than press PGM key to enter in to Program mode.
- In second line of display change it from AUTO SCROLL to MANUAL SCROLL by pressing PGM key again.
- If it is showing MANUAL SCROLL than change it to AUTO and then make it MANUAL SCROLL.

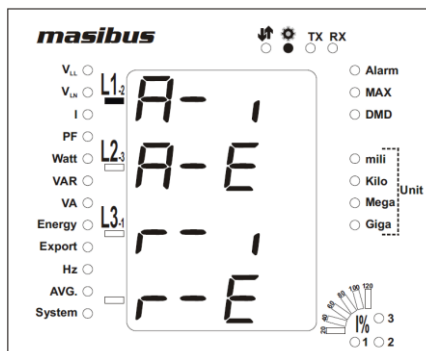
MANUAL SCROLL

- In MANUAL SCROLL RIGHT SHIFT, UP or DOWN Key will work as mentioned on page no. 3
- To enter in to AUTO SCROLL go into the Programming mode and then change the selection from MANUAL SCROLL to AUTO SCROLL.
- If particular page is fixed then after manual scrolling of the pages, the page which is kept fixed will be appear after 2 min.

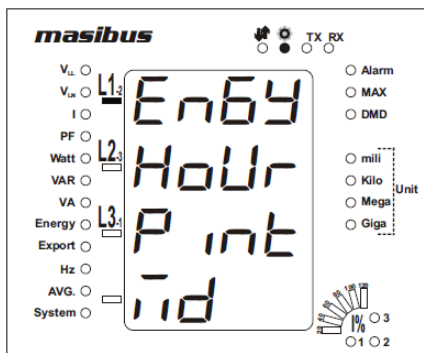
RESET REGS

MANUAL RESET

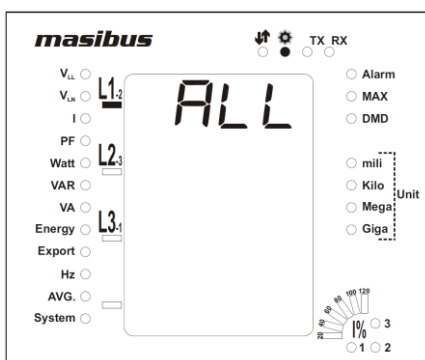
In this mode you can reset energy registers and Overflow Count of that particular energy register. There are five types of registers reset for Energy, common reset for all Hours and reset for MD like,
A-I for Active Import Energy and WH-I Ov.count reset,
A-E for Active Export Energy and WH-E Ov.count reset,
r-I for Reactive Import Energy and VARH-I Ov.count reset,
r-E for Reactive Export Energy and VARH-E Ov.count reset,
Engy for Apparent Energy and VAH Ov.count Including all above 4 type of Energy.
Hour for ON Hour, LOAD Hour and IDLE Hour register reset.
PInt for power interruption count.
Md for Maximum Demand reset.
All for all above registers reset at the same time.
 It is indicated as



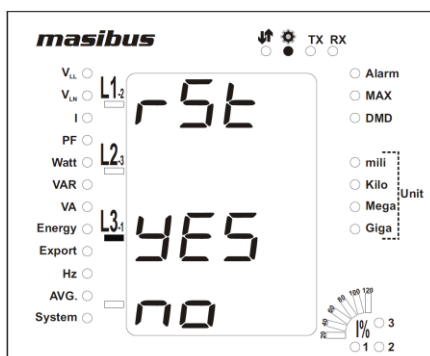
At a same time only four registers can be shown. so you can set arrow by using UP and DOWN key. In above screen first four registers are shown, Now suppose you are pressing DOWN key up to arrow is for r-E. Now press DOWN key only once, screen will be shown like below



Now suppose you are pressing DOWN key up to arrow is for Md. Now press DOWN key only once, screen will be shown like below:



So you can set arrow as per this and press PGM key to enter where screen shows like below:



Here is the confirmation that whether you are sure or not to erase energy and Overflow count data to reset it. If you set arrow before YES and pressed PGM, all registers (phase wise plus total) of this kind energy and Overflow count started from zero and you will come back one step where you entered, so you can go for another. If you set arrow before NO and pressed PGM key, you will come back one step where you entered without any reset. By this way you can reset any register.

AUTOMATIC RESET

- In Automatic software reset all five register are reset when the energy greater than 400 Giga.
- Automatic reset Active [Im] register when the Active [Im] > 400G and at that time WH-I Ov.count increment one time. Then after Active [Im] energy started from zero. When WH-I Ov.count> 99 then WH-I Ov.count become zero.
- As above Active[Im] same as Active[Ex] , Reactive[Im] , Reactive[Ex] , Apparent Energy and that Overflow Count are increment and reset.
- But when Apparent Energy Count VA Ov.count> 99 then all five energy registers with Ov.counts are reset.

ENERGY CALCULATION

Below formula used for finding the Total Active Energy Import.

**Total Active Energy = [Running Active Energy (Import) + (WH-I Ov.count * 400G)]
(Import)**

- Running Active Energy (Import) is an Active [Im] register Value, which is displaying in LCD or Modbus.
- WH-I Ov.count is an overflow count of Active [Im], which increments every time when Active [Im]>400G.
- Total Active Energy (Import) is an Addition of Running Active Energy (Import) and No of time it overflows exceeding 400G.

Above calculation is same for other energy (Active Export, Reactive Import, Reactive Export, and Apparent Energy) can be find out using respective Ov.count and running energy.