masibus®

Operator's Manual

EM 2140

Dual Source Energy Meter

Please read the manual carefully before Installation/Configuration

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INTRODUCTION

PRODUCT OVERVIEW

Masibus EM 2140 is an easy-to-use, low cost electrical Energy meter that offers all the basic measurement capabilities required for monitoring an electrical installation.

EM 2140 is available in flush panel mount enclosure having front panel keys for easy set up. EM 2140 has Class 1.0 accuracy as per IS 13779/IEC 62053-21.

The CT/PT ratio and installation type is site selectable, making the meter possible to be used in various types of three phase installations.

More than a basic metering, it optionally provides RS485 port with Modbus-RTU protocol & also Relay/ Pulse output.

EM2140 has EB/DG dual source energy measurement option for measurement of energy through Electricity Board or Diesel Generator.

EM 2140 provides energy measurement along with ON hour & RUN (Load) Hour, thus helping to measure and control energy cost.

Meter stores energy and programmed parameters into its non-volatile Permanent memory.

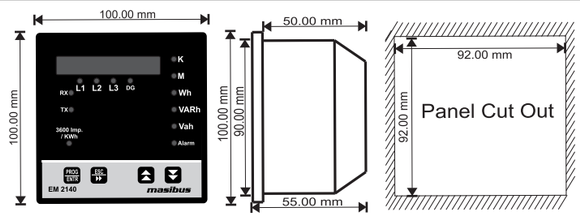
Ordering code

Model	Accuracy		Communication		Dual source		Output	
EM 2140	S	Class 1.0	N	None	N	None	N	None
			1	RS485 Modbus	1	DG	1	Pulse Output
							2	Relay Output

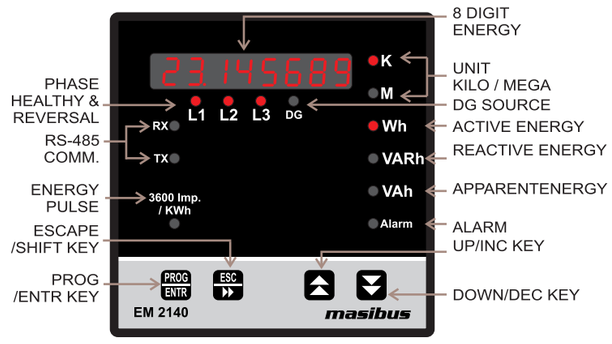
List Of Accessories

Sr. No.	Description	Quantity
1	Panel Mount Clamps	02
2	User Manual	01

MECHANICAL GUIDELINE



FRONT PANEL PICTURE



PROG/ENTR

RUN mode: If Key remain pressed for 4 Sec, goes into PROG mode
PROG mode: On key press - If in view mode goes into edit mode.
If in edit mode goes into view mode.

ESC/SHIFT

PROG mode: · In edit mode Shift Digit.
In view mode key press is used to exit from PROG mode to RUN mode.

INC/UP

RUN mode: Key press is used to display previous parameter.

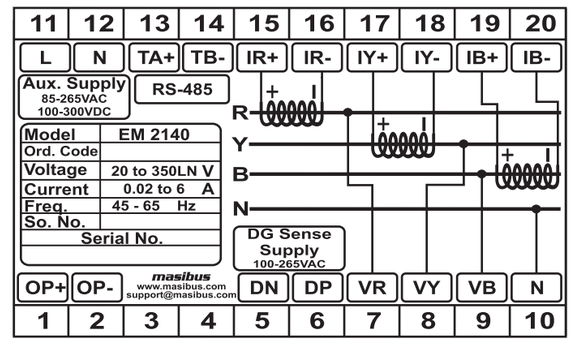
PROG mode: · Increment value in edit mode
· Display previous configuration parameter in view mode

DEC/DOWN

RUN mode: Key press is used to display next parameter.

PROG mode: Decrement value in edit mode
· Display next configuration parameter in view mode

REAR PANEL PICTURE



TERMINAL CONNECTION

1- OP+ = Relay/Pulse output Positive.
2- OP- = Relay/Pulse output Negative.
5- DN = DG Input Negative.
6- DP = DG Input Positive.

7- VR = R phase voltage connection.
8- VY = Y phase voltage connection.
9- VB = B phase voltage connection.
10- N = Neutral point for three phase four wire system.

11- L = AUX Supply Positive.
12- N = AUX Supply Negative.
13- TA+ = RS - 485 Positive Terminal.
14- TB- = RS - 485 Negative Terminal.

15- IR+ = Input terminal for R phase current connection.
16- IR- = Output terminal for R phase current connection.
17- IY+ = Input terminal for Y phase current connection.
18- IY- = Output terminal for Y phase current connection.
19- IB+ = Input terminal for B phase current connection.
20- IB- = Output terminal for B phase current connection.

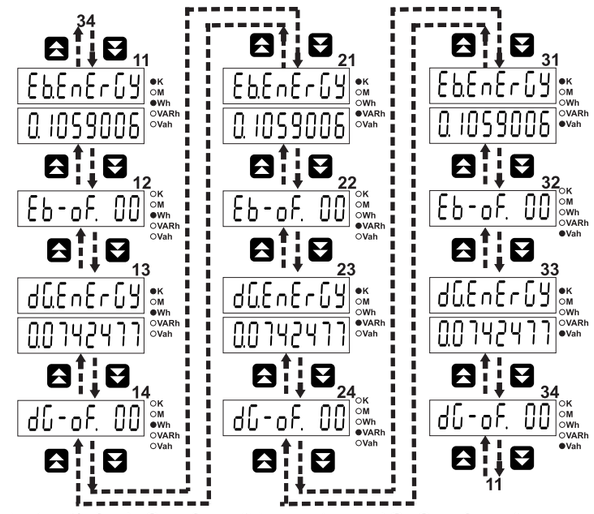
SPECIFICATION

Meter Type	
3Ph4W/ 3Ph3W (Site selectable)	
Input	
Voltage	
Direct Voltage	20V to 350V (L-N) or 34V to 620V (L-L) @ 240V Nominal Voltage
PT Secondary (Nominal Voltage)	63.5V L-N to 240V L-N Configurable for 3Ph3W or 3Ph4W system
Burden	0.5VA per phase
PT Ratio	1 to 9999 Programmable
Overload	1.2 x Nominal Voltage (Continuous) 1.5 x Nominal Voltage (3 sec)
Current	
Direct Current	0.02A to 6A
Secondary Current	1 to 5A
Burden	0.25VA per phase
CT Ratio	1 to 9999 Programmable
Overload	For 5A CT: 8A (Continuous) For 1A CT: 2A (Continuous) 50 A (3sec)
Starting Current	10mA
Frequency	45 to 65 Hz
DG Sense	100-265VAC (to select DG Energy)
Display & Keys	
Display	1 line 8 digit 0.36" [9.144 mm], 7-segment LED
Status LED Indication	Phase healthy & reversal indication Various energy parameters [Wh, VARh, VAh, DG] Kilo & Mega Indication Alarm and RS-485 communication Energy Pulse output
Keys	PROG/Enter, Esc/Shift, UP, Down
Calculated Parameters	
Over Display & Modbus	
Total Energy	Active Energy, Overflow Count
EB - Electricity Board	Reactive Energy, Overflow Count
DG -Diesel Generator	Apparent Energy, Overflow Count
Over Modbus only	
Voltage	L1-L2, L2-L3, L1-L3 and Average (3Ph3W & 3Ph4W) L1-N, L2-N, L3-N & average (1Ph & 3Ph4W)
Current	All phase currents & their average
PF	Phase wise and System PF
Frequency	System Frequency
Power (Phase wise & Total)	Active Power Reactive Power Apparent Power
Unbalance	Current Unbalance Voltage Unbalance
Special Features	
Over Modbus only	
ON Hour EB - Load Hour DG- Load Hour	up to 65000 hours Recording
PINTR Power Interruption count	up to 65000 PINTR counts
Accuracy	
Voltage	±0.5% of reading
Current	±0.5% of reading
Frequency	±0.5% of reading
Power Factor	±0.5% of FS
Active Power*(≥0.02 of Ib)	±1.0% of reading ± 0.01% of FS
Reactive Power*(≥0.02 of Ib)	±2.0% of reading ± 0.01% of FS
Apparent Power*(≥0.02 of Ib)	±2.0% of reading ± 0.02% of FS
Active Energy*	Class 1.0 as per IS 13779/ IEC 62053-21
Reactive Energy*	Class 2.0 as per IS 13779
Apparent Energy*	Class 2.0
(*PF 0.5 Lag-1.0 - 0.8 Lead Applicable for Power & Energy Parameter)	

Isolation (Withstanding voltage)
Between primary terminals* and secondary terminals**: At least 2000 V AC for 1 minute
Between primary terminals*: At least 2000 V AC for 1 minute
Between secondary terminals**: At least 2000 V AC for 1 minute
* Primary terminals indicate Aux Supply, voltage i/p, current i/p & EB/DG input
** Secondary terminals indicate Communication o/p and Pulse/Relay o/p
Insulation resistance: 20MΩ or more at 500 V DC between terminals

Auxiliary Power Supply	
Power Supply	85-265VAC,50/60Hz or 100-300VDC
Burden	<3VA
Output	
Communication Output RS485(Optional)	
Interface	RS485
Baud Rate	9600, 19200, 38400 (Selectable)
Parity	None, Odd, Even (Selectable)
Stop bit	1, 2 (Selectable)
Protocol	Modbus-RTU
Relay Output (Optional in lieu of pulse o/p)	
AC Rating	250V, 5A
DC Rating	±30V, 5A
Relay Set Point	High Side or Low Side Option
Relay O/P Parameters [Field Selectable]	Phase Volt / Avg. Volt / Phase Current / Avg. Current / Sys. Freq. / Phase Watt / Sys. Watt / Phase VAR / Sys. VAR / Phase VA / Sys. VA / Phase PF / Sys. PF
Relay Contact Type	SPNO [Factory Default] SPNC [Contact Factory Before Ordering]
Pulse Output (Optional in lieu of relay o/p)	
Type	WH
Pulse rate	3600 pulses per Energy
Pulse duration	40 mSec ± 10%
Output Type	Open collector [External Excitation Required]
Rating	24 VDC @ 20 mA
Environmental	
Operating temperature	0 to 55 °C
Storage temperature	-10 to 70°C
Relative Humidity	30 to 95% RH non-condensing
Warm up time	5 minutes
Physical	
Mounting Type	Panel mount
Size (in mm)	100 (H) x 100(W) x 55 (D)
Front Bezel (in mm)	100 (H) x 100(W)
Panel cutout (in mm)	92 (H) x 92(W)
Depth behind panel	50 mm
Material	ABS
Accessory	2 Panel mount clamps
Weight	0.3 Kg
Enclosure Protection	IP50 front fascia; Overall IP20
Terminal & Cable Size	Barrier Type terminal, Cable Size [3 mm^2]

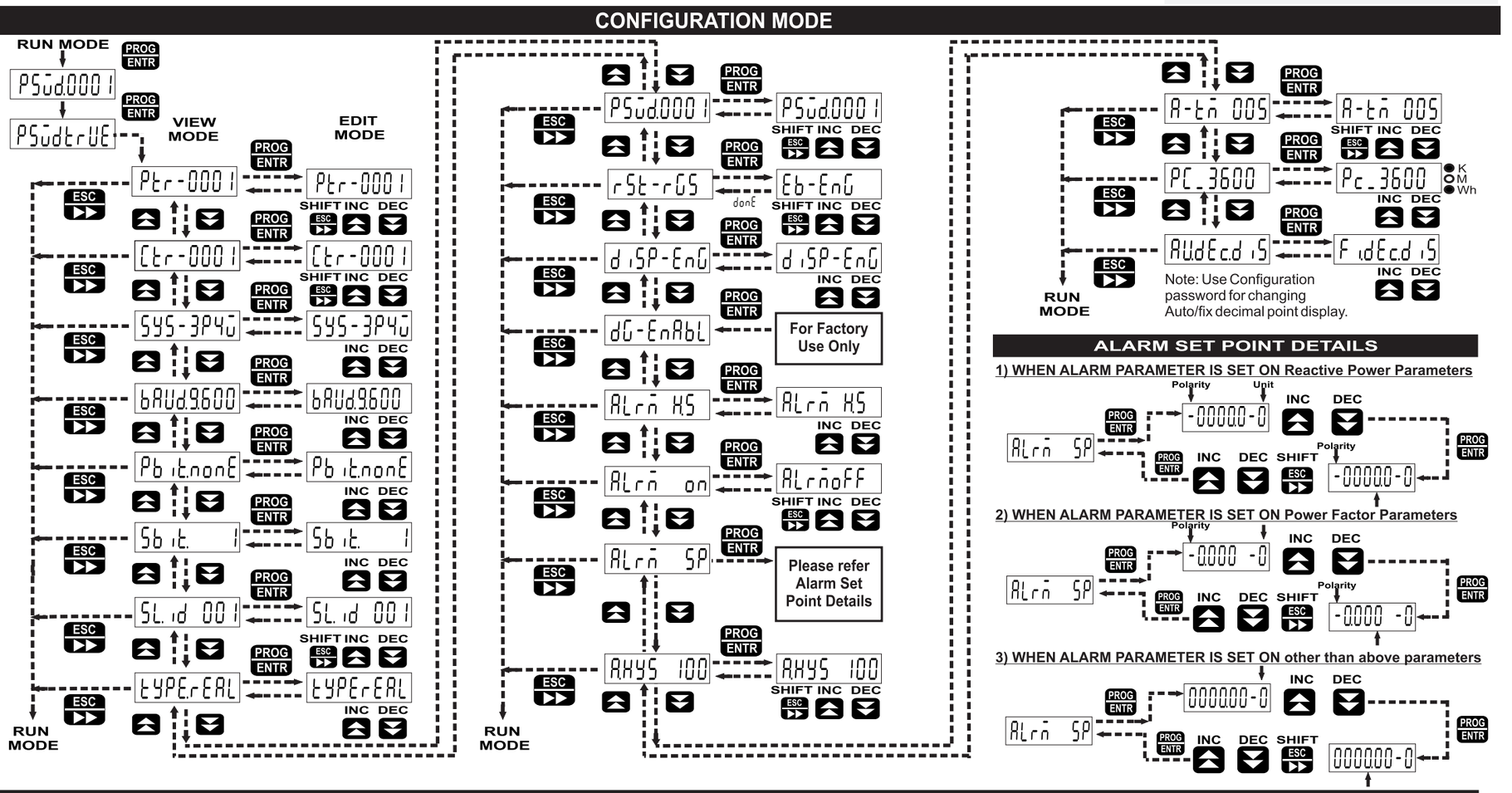
RUN MODE



Note: 1) If EB- Overflow KVah >= 1 and DG- Overflow Kvah >= 1, then all pages will be displayed as per RUN mode Page Matrix.
2) If EB- Overflow KVah = 0 and DG- Overflow Kvah = 0, then only 11,13,21,23,31,33 pages will be displayed.
3) If EB- Overflow KVah >= 1 and DG- Overflow Kvah = 0, then only 11,12,13,21,22,23,31,32,33 pages will be displayed.
4) If EB- Overflow KVah = 0 and DG- Overflow Kvah >= 1, then only 11,13,14,21,23,24,31,33,34 pages will be displayed.
5) If DG Enable option is enabled then both EB and DG related parameters will display, else only EB related parameter will be displayed.**(Without** EbEnErGy **Text)**

Note: The display can switch from auto to fix display only if the Kvah energy value < 999999.99 Kvah. If this energy value is more than the limit then Energy reset must be required.

CONFIGURATION MODE



ALARM SET POINT DETAILS

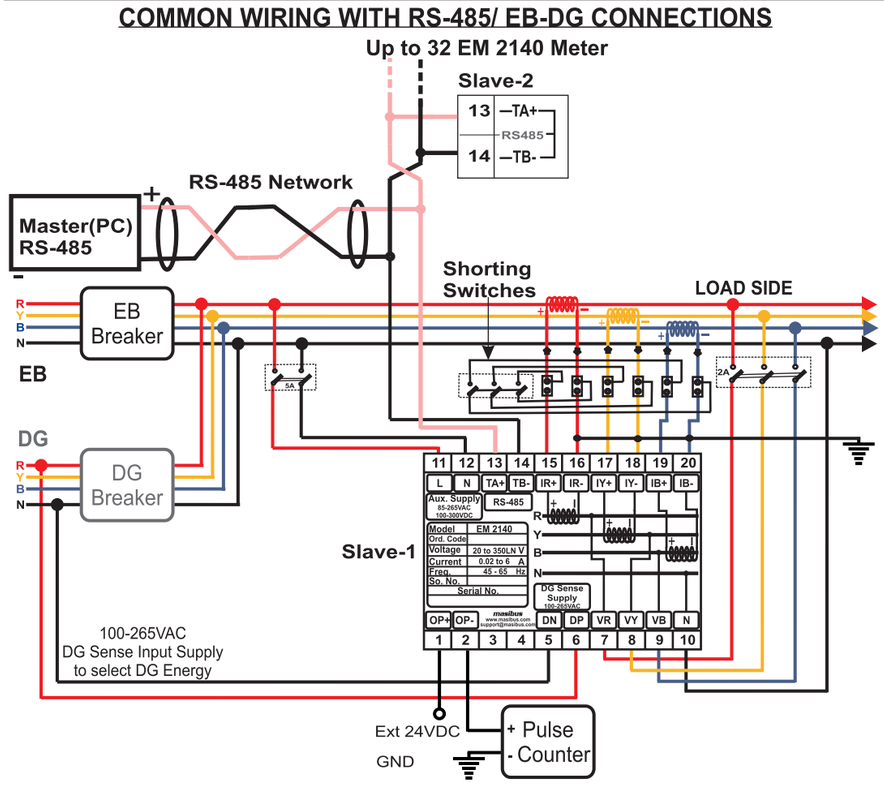
1) WHEN ALARM PARAMETER IS SET ON Reactive Power Parameters

2) WHEN ALARM PARAMETER IS SET ON Power Factor Parameters

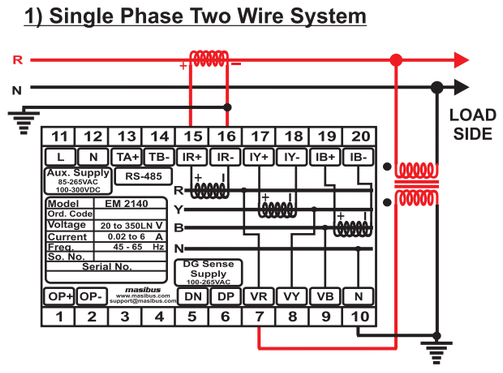
3) WHEN ALARM PARAMETER IS SET ON other than above parameters

WIRING DIAGRAMS

COMMON WIRING WITH RS-485/ EB-DG CONNECTIONS

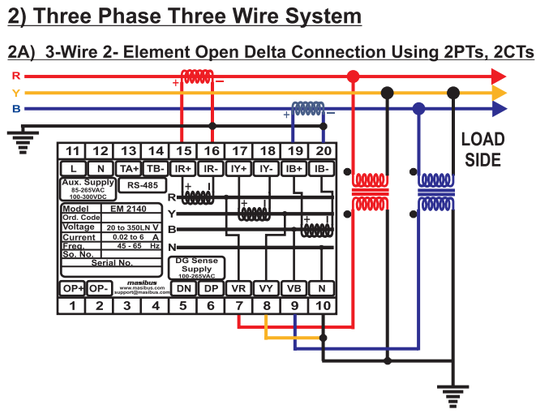


1) Single Phase Two Wire System

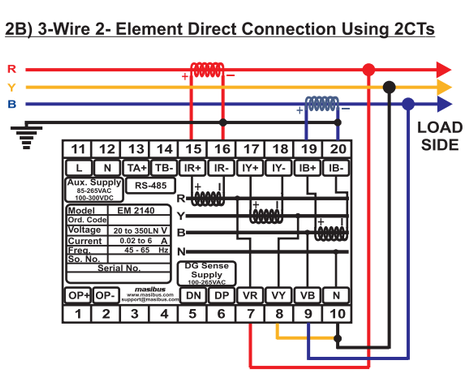


2) Three Phase Three Wire System

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

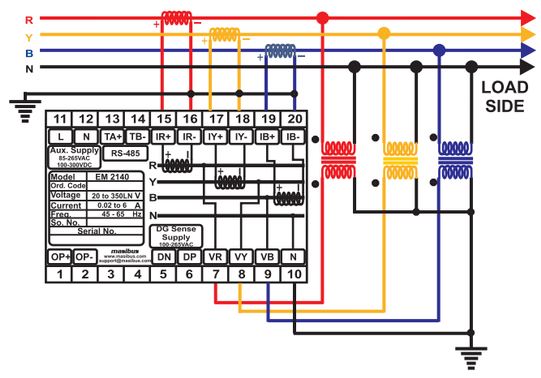


2B) 3-Wire 2- Element Direct Connection Using 2CTs

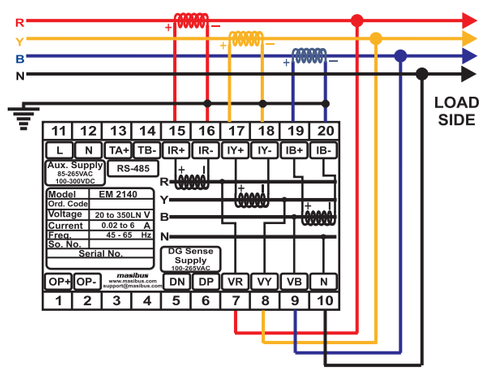


3) Three Phase Four Wire System

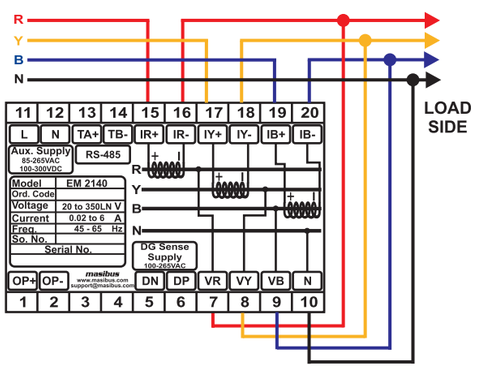
3A) 4-Wire Wye-3 Element Connection Using 3PTs, 3CTs



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



3C) 4-Wire Direct Connection



MODBUS DETAILS

1) Modbus Register Map for 3P4W AND 3P3W parameters

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 = 0X04
Address between 30001 to 30087
No. of data word ≤ 88 & in multiple of 2 as all data are of 4 Bytes [Long & Real]. Enter only Even value (data word length).

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]

[Data Format: Long & Real]

S. No.	Address	Measured parameter		words	Multiplication Factor (if data type is long)
		3P4W	3P3W		
1	30001	Frequency	Frequency	2	0.01
2	30003	1. PF	1_2. PF	2	0.001
3	30005	2. PF	Reserved	2	0.001
4	30007	3. PF	3_2. PF	2	0.001
5	30009	A. PF	A. PF	2	0.001
6	30011	1. Vrms	Vrms 1*2	2	0.1
7	30013	2. Vrms	Vrms 3*1	2	0.1
8	30015	3. Vrms	Vrms 2*3	2	0.1
9	30017	A. Vrms	A_Vrms	2	0.1
10	30019	Vrms 1*2	Reserved	2	0.1
11	30021	Vrms 2*3	Reserved	2	0.1
12	30023	Vrms 3*1	Reserved	2	0.1
13	30025	1. Irms	1. Irms	2	0.001
14	30027	2. Irms	Reserved	2	0.001
15	30029	3. Irms	3. Irms	2	0.001
16	30031	A. Irms	A. Irms	2	0.001
17	30033	Reserved	Reserved	-	-
18	30035	1. Watt	1_2. Watt	2	1
19	30037	2. Watt	Reserved	2	1
20	30039	3. Watt	3_2. Watt	2	1
21	30041	S. Watt	S. Watt	2	1
22	30043	1. Var	1_2. Var	2	1
23	30045	2. Var	Reserved	2	1
24	30047	3. Var	3_2. Var	2	1
25	30049	S. Var	S. Var	2	1
26	30051	1. VA	1_2. VA	2	1
27	30053	2. VA	Reserved	2	1
28	30055	3. VA	3_2. VA	2	1
29	30057	S. VA	S. VA	2	1
30	30059	1. phase rev. indication	1. phase rev. indication	2	1
31	30061	2. phase rev. indication	Reserved	2	1
32	30063	3. phase rev. indication	3. phase rev. indication	2	1
33	30065	T. KWh-EB	T. KWh-EB	2	0.1
34	30067	T. KWh-DG	T. KWh-DG	2	0.1
35	30069	T. KVarh-EB	T. KVarh-EB	2	0.1
36	30071	T. KVarh-DG	T. KVarh-DG	2	0.1
37	30073	T. KVah-EB	T. KVah-EB	2	0.1
38	30075	T. KVah-DG	T. KVah-DG	2	0.1
39	30077	1. Phase Angle	1_2. Phase Angle	2	0.01
40	30079	2. Phase Angle	Reserved	2	0.01
41	30081	3. Phase Angle	3_2. Phase Angle	2	0.01
42	30083	V. Unbalance	V. Unbalance	2	0.01
43	30085	I. Unbalance	I. Unbalance	2	0.01
44	30087	EB/DG Running Status (0-EB Running , 1-DG Running)		2	1

2) Energy Overflow Count:

Function Code = 0X04
Address between 30150 to 30155
No. of data word ≤ 6 & in multiple of 1 as all data are of 2 Bytes [Decimal].
[Data Format: Only in Decimal]

S. No.	Address	Measured parameter	words
1	30150	Wh_EB -ovcnt	1
2	30151	Wh_DG-ovcnt	1
3	30152	VARh_EB-ovcnt	1
4	30153	VARh_DG-ovcnt	1
5	30154	Vah_EB -ovcnt	1
6	30155	Vah_DG -ovcnt	1

3) ON Hour / LOAD Hour / Power Interruption Count:

Function Code = 0X04
Address between 30301 to 30307
No. of data word ≤ 7 & in multiple of 1 as all data are of 2 Bytes [Decimal].
[Data Format: Only in Decimal]

S. No.	Address	Measured parameter	words
1	30301	ON HOUR	1
2	30302	ON MIN	1
3	30303	EB RUN HOUR	1
4	30304	EB RUN MIN	1
5	30305	DG RUN HOUR	1
6	30306	DG RUN MIN	1
7	30307	PWR INTR. COUNT	1

4) Modbus Register Map for configuration parameters

A) 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
Address between 40101 to 40118
No. of data word ≤ 18 & in multiple of 1 as all data are of 2 Bytes [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]

B) 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
Address Any Single Register between 40101 to 40118
Data = Data of 1 word, as all data are of 2 Bytes [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]

C) Preset Multiple Register

Data write Query = [0 x Slave Id], [0 x Fun. Code], [0 x ADD. High], [0 x ADD. Low], [0 x No.of Reg.High], [0 x No.of Reg.Low], [0 x No.of Byte], [0 x Data High], [0 x Data Low], [0 x CRC Low] [0 x CRC High]

Function Code = 0X16
Address Multiple Register 40001.
Data = Data of 2 word, as all data are of 4 Bytes [Swapped Float].

Response = [0 x Slave Id], [0 x Fun. Code], [0 x ADD. High], [0 x ADD. Low], [0 x No.of Reg.High], [0 x No.of Reg.Low], [0 x CRC Low] [0 x CRC High]
[Data Format: only in Decimal]

S. No.	Address	Measured parameter		words	Min. value	Max. value
		Parameter	Description			
1	40001	ALr1 SP	Alarm Setpoint	2	Refer Table 1	
2	40101	PSWd.	Password	1	1	9999
3	40102	SL.id	Slave address	1	1	247
4	40103	bAUd.	Baud rate (9600, 19200, 38400)	1	9600	38400
5	40104	Pb it.	Parity bit (0-none,1-odd,2-even)	1	0	2
6	40105	Sb it.	Stop bit	1	1	2
7	40106	SYS-	System type (0 – 3P4W, 1 – 3P3W)	1	0	1
8	40107	Ctr-	CT Ratio	1	1	9999
9	40108	Ptr-	PT Ratio	1	1	9999
10	40109	tYPE.	Data type (0-Real,1-Long)	1	0	1
11	40110	d.SP-	Energy Display type*1	1	0	3
12	40111	ALr1 on	Alarm Parameter Selection*2	1	0	25
13	40112	A-tm	Alarm Time	1	0	100
14	40113	PC_3600	Pulse constant unit*3	1	0	2
15	40114	A.HYS	Hysteresis	1	0	100
16	40115	ALr1 H.S	Alarm type	1	0	1
17	40117	rSt-rGS	Reset Individual Reg.*4 (Write only)	1	78	84
18	40118	ALL-rSt	Reset all(Write only)*5	1	85	85

***2 Alarm Parameters (40111)**

Value	Parameter	Description
0	ALr1oFF	Relay OFF
1	r-PHvolt	R-Phase Voltage
2	Y-PHvolt	Y-Phase Voltage
3	b-PHvolt	B-Phase Voltage
4	AvG volt	Average Voltage
5	r-PHCurr	R-Phase Current
6	Y-PHCurr	Y-Phase Current
7	b-PHCurr	B-Phase Current
8	AvG CUrr	Average Current
9	SYS FrEQ	System Frequency
10	r-PHACt	R-Phase Power
11	Y-PHACt	Y-Phase Power
12	b-PHACt	B-Phase Power
13	SYS ACt	System Power
14	r-PHr ACt	R-Phase Reactive Power
15	Y-PHr ACt	Y-Phase Reactive Power
16	b-PHr ACt	B-Phase Reactive Power
17	SYS r ACt	System Reactive power
18	r-PHAPP	R-Phase Apparent Power
19	Y-PHAPP	Y-Phase Apparent Power
20	b-PHAPP	B-Phase Apparent Power
21	SYS APP	System Apparent Power
22	r-PH PF	R-Phase Power Factor
23	Y-PH PF	Y-Phase Power Factor
24	b-PH PF	B-Phase Power Factor
25	SYS PF	System Power Factor

Note: 1) If data type is long in Energy meter then set Swapped long in Modbus master. If data type is Real in Energy meter then set Swapped Float in Modbus master.
2) Energy will be in Kilo for Real data type and for Long data type multiply with constant stated to get energy in Kilo unit.
3) Ignore address which are not mentioned in the memory map as they are useful in 3P4W Mode.
4) Ignore value for Reserved in Modbus Memory Map.
5) As per standard condition, negative sign of PF indicates lead and positive sign of PF indicates Lag on Modbus.

***1) ENERGY DISPLAY TYPE**
0-KWH
1-KVARH
2-KVAH
3-KWH,KVARH,KVAH

***3) PULSE CONSTANT UNIT**
0-KILO
1-MEGA
2-GIGA

***4) RESET INDIVIDUAL REG.**
78-EB ENERGY
79-DG ENERGY
80-ALL ENERGY
81-EB HOURS
82-DG HOURS
83-ALL HOURS
84-PINTR COUNT

***5) RESET ALL**
85-ALL REGISTER RST

Table 1:
Alarm SP Parameter Range

Parameter	Min Value	Max Value
Frequency	45	65
Power Factor	-1.0	1.0
Voltage	0	1000000
Current	0	10000
Active Power	0	2000000000
Reactive Power	-2000000000	2000000000
Apparent Power	0	2000000000

IMPORTANT NOTES

General Setting & Condition for CT, PT ratio

Confirm the connection as per configuration

Confirm that all energy parameters, Hour parameters & Power Interruption counter are going to start from zero, if not, make them zero by All Rst.

Apply proper CT/PT Ratio as per requirement, which must pass the below mathematical conditions for 3P3W and 3P4W.

For 3P4W
3x1.2xPT Sec. x1.2xCT Sec. x CT Ratio x PT Ratio < 2,000,000,000

For 3P3W
2x1.2x√3xVratedx1.2xIratedx CT Ratio x PT Ratio < 2,000,000,000

For Serial communication, MODBUS-RTU, RS485, you will get real/long data from measurement.

Factory set Password to access the Program mode is 0001.

Some parameters in configuration are only for factory purposes so please don't disturb these parameters like DG Enable & System.

For modbus communication, follow the address map for 3p3w/3p4w Program mode will be same.

ON Hour, LOAD Hour & Power Interruption Count

ON Hour: The period for which the meter (supply) is ON

LOAD Hour: Indicates the period the Load is ON and has run. This counter accumulates as long as the average load is greater than the starting current 10mA set.

(ON, LOAD provides two quantity Hours and Minute on Modbus)

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 +nterruptions) will be zero (as long as the UPS stays ON), even if the Voltage Signals did die out from time to time.

Phase Healthy/Reversal Indication

For Phase Healthy Indication L1,L2,L3 LED will be ON respectively based on voltage/phase value>15V.

For not in connection, Phase non availability or Phase unhealthy[<15V] Indication respective LED will stay OFF.

Blinking of LEDs[L1/L2/L3] indicates CT reversal of that particular Phase or Phase interchange with some other Phase. In such cases please check wiring and phase connections properly.

However in some of the cases two or more wrong conditions will not let LED BLINK, So It is always recommended to check against standard Wiring Diagram for proper functionality.

Phase Healthy(Value 1) / Reversal(Value -1) Indication are also available on Modbus address (30059,30061,30063).

ENERGY OVERFLOW RESET

For Auto Decimal Display, when the energy greater than 999000.00 Mega, the overflow count will increment & energy register will reset.

For Fix Decimal Display, when the energy greater than 999999.99 Kilo, the overflow count will increment & energy register will reset.

For Auto Decimal Display:
Automatic reset Active [EB] register when the Active [EB] > 999000.00M and at that time WH_EB Ov.count increment one time. Then after Active [EB] energy started from zero. When WH_EB Ov.count> 99 then WH_EB Ov.count become zero.

As above Active[EB] same as Active[DG] , Reactive[EB] , Reactive[DG] , Apparent[EB], Apparent[DG] Energy and that Overflow Count are increment and reset.
But when Apparent[EB] Energy Count VA_EB Ov.count> 99 then all three EB energy registers with Ov.counts are reset and same as also DG Energy Reset.

Energy Overflow Time Calculation

Example:
For 110V PT Sec, and 1 A CT Sec.Energy meter is set for 100A and 66KV line with CT Ratio of 100 and PT Ratio of 600.

PT Primary = 66KV, PT Secondary = 110V Therefore PTR = 66KV/110V=600 select.
CT Primary=100A, CT Secondary=1A Therefore CTR = 100A/1A=100 select in meter.

EB Energy consumed per hour will be 66kV X 100Amps = 6600KVAHr.

Time to overflow in Hr. = 999000.00MVAhr / 6600KvaHr = 151363 Hr

Days = 151363/24 = 6306 Days
Years = 6306 / 365 = 17.27 Years / Total of Three Phase.

But our Apparent Energy Overflow Count Range are 1 to 99, therefore
Total Time to overflow in Years = 17.27*99 = 1709.73 Years / Total of Three Phase.

User has to manually reset All Rst, when installing the meter first time.

Energy Calculation

Below formula used for finding the Total Active EB Energy for auto decimal display,

Total Active Energy = [Running Active EB Energy + (WH_EB Ov.cnt * 999000.00M)]

Example:
Let's WH_EB Ov.cnt = 5, Running Active EB Energy = 203268.12 MWh then

Actually measured Total Active EB Energy = [203268.12 M + (5 * 999000.00M)] = 5198268.12 MWh

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

Energy Pulse O/P Constant Setting

For Front Blinking LED, select energy unit (i.e.-KWh/MWh/GWh) as per your requirement using Program mode. 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
(Vrate * Irate * CTR * PTR * Pulse Constant in Wh)/3600 <= 20.

Example: Meter specification
V rated = 240V, I rated = 5A, CT ratio = 40 and PT ratio = 100,
Above meter can consume maximum of 4.8MWatt.
I.e. For 3600 pulses/KWh [3.6 pulses/Wh], it will generate 4800 pulses/sec as per above equation, [240*5*40*100*3.6/3600 = 4800] so it will not work for the meter as it is more than 20 pulses/sec
I.e. For 3600 pulses/MWh [0.0036 pulses/Wh], it will generate 4.8 pulses/sec as per above equation, [240*5*40*100*0.0036/3600 = 4.8] 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 Resolution on Modbus

Resolution of the energy parameter on the Modbus when data is transmitted in LONG format is 0.1KVAh/KWh/KVARh rather than 1VAh/Wh/VARh, which is possible when FLOAT data type is used. Because of the limitation of the Long Data type and to avoid frequent reset, Data is transmitted in with above-mentioned resolution.

Due to this resolution on display of the Meter will not be same as ON ModBus data, when data is transmitted in LONG format. Multiplication factor given on master side is 0.0001.

Example:
Lets say on modbus data transmitted is 20098798 then on the master side it will be
20098798 * 0.0001 = 2009.8798 MWh/MVAh/MVARh.
Which gives the resolution of the 0.1KWh/KVAh/KVARh as described above.

Sys. Energy Resolution on display (Auto Dec. Display)

Display		Energy		
7 Segment	Unit	From	To	Resolution
X.XXXXXXX	K	0 KWh	9.9999999 KWh	1mwh
XX.XXXXXX	K	10 KWh	99.999999 KWh	10mwh
XXX.XXXXX	K	100 KWh	999.99999 KWh	100mwh
X.XXXXXXX	M	1000 KWh	9.9999999 MWh	1wh
XX.XXXXXX	M	10 Mwh	99.999999 MWh	1wh
XXX.XXXXX	M	100 Mwh	999.99999 MWh	100wh
XXXX.XXXX	M	1000 Mwh	9999.9999 MWh	1Kwh
XXXXX.XXX	M	10000 Mwh	99999.999 MWh	1Kwh
XXXXXX.XX	M	100000 Mwh	999000.00 MWh	10Kwh

Sys. Energy Resolution on display (Fix Dec. Display)

Display		Energy		
7 Segment	Unit	From	To	Resolution
X.XX	K	0 KWh	9.99 KWh	10 Wh
XX.XX	K	10 KWh	99.99 KWh	10 Wh
XXX.XX	K	100 KWh	999.99 KWh	10 Wh
XXXX.XX	K	1000 KWh	9999.99 KWh	10 Wh
XXXXX.XX	K	10000 KWh	99999.99 KWh	10 Wh
XXXXXX.XX	K	100000 KWh	999999.99 KWh	10 Wh

TROUBLESHOOTING TIPS

Potential Problem	Possible Cause	Possible Solution
The display is OFF after applying control Power to the Energy Meter.	The Energy meter may not be Receiving the necessary Power.	Verify that the Energy 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 Energy meter setup parameters (CT and PT ratings, System Type).
	Incorrect voltage inputs.	Check Energy meter voltage input terminals to verify that adequate voltage is present.
Cannot communicate with Energy meter from A remote personal computer.	Energy meter address is incorrect.	Check to see that the Energy meter is correctly addressed.
	Energy meter baud rate (parity, stop bit) is incorrect.	Verify that the baud rate (parity, stop bit) of the Energy meter matches the baud rate (parity, stop bit) of all other devices on its communications link.
	Communications lines are improperly connected.	Verify the Energy meter communications connections interchange [A+] & [B-] lines
EB/DG ENERGY LOGGING	Improper DG connection	Connect properly as per diagram (COMMON WIRING WITH RS-485/ EB-DG CONNECTIONS)

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

- Before wiring, verify the label for correct model number and options.
- Wiring must be carried out by personnel, who have basic electrical knowledge and practical experience.
- All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current, and temperature rating of the system.
- Beware not to over-tighten the terminal screws.
- Verify that the ratings of the output devices and the inputs as specified in this manual are not exceeded.
- 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.

WARRANTY

Warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification.
Masibus is not liable for special, indirect or consequential damages or for loss of profit or for expenses sustained as a result of a device malfunction, incorrect application or adjustment

Masibus' total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied