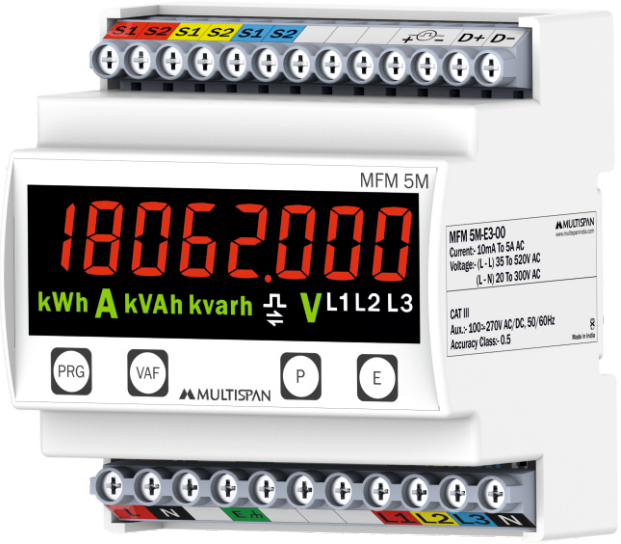
MULTISPAN

MULTI FUNCTION METER
MFM-5M



AUXILIARY SUPPLY :

Supply voltage	100 to 270V AC/DC, 50/60Hz
Power consumption (VA RATING)	Approx 3 VA @ 230V AC MAX

COMMUNICATION:

RS-485 MODBUS

ACCURACY:

Class : 0.5

Sampling Rate	**164 Sample / Cycle**

ENVIRONMENT CONDITION:

Operating Temp.	0°C to 55°C
Relative Humidity	UP to 95% RH (non-condensing)
Protection Level (AS Per Request)	IP-65 (Front side) As per IS/IEC 60529 : 2001

TECHNICAL SPECIFICATION

PARAMETER SPECIFICATION

Input Signal	3Ø 3 Wire / 3Ø 4Wire / 1Ø 2Wire
CT Primary	up to 9999A (Programmable)
CT Secondary	5 Amp/1 Amp selectable
Current Input	10mA To 5 Amp AC
PT Primary	100V to 520kV (Programmable)
PT Secondary	100V to 520V (L-L) (Programmable)
PF Avg. & Per Phase	0.100 - 1.000
Frequency (Hz)	45.00 - 60.00 Hz
Load hours	9999.59 Hrs/Min.
No load hours	9999.59 Hrs/Min.
RPM	3600 RPM @ 60 Hz & 2 pole
POWER	
kW Total	0.000 - 9999 MW
kW Per Phase	0.000 - 9999 MW
kVA Total	0.000 - 9999 MVA
kVA Per Phase	0.000 - 9999 MVA
kVAr Total	0.000 - 9999 MVAr
kVAr Per Phase	0.000 - 9999 MVAr
ENERGY	
kWh Total	000.000 - 99999999 kWh
kVAh Total	000.000 - 99999999 kVAh
kVArh Total	000.000 - 99999999 kVArh

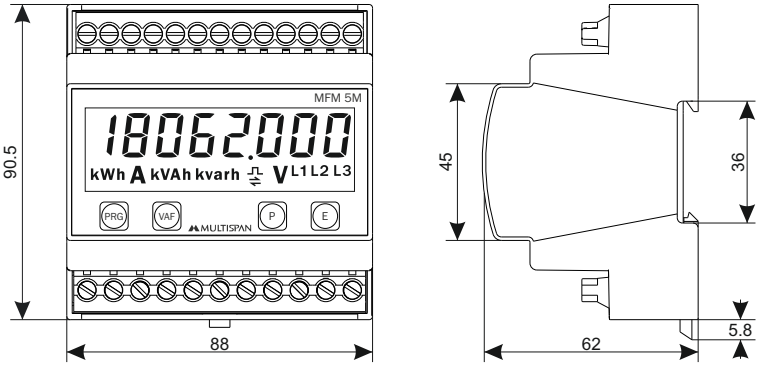
DISPLAY & KEY :

Display	8 Digit,7 Segment 0.5" RED
Key	PRG, VAF, P, E

DIMENSION :

Size	90.5 (H) x 88 (W) x 62 (D) mm

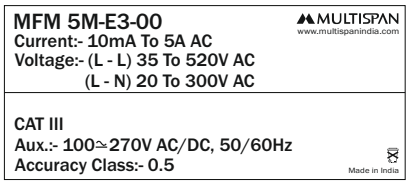
MECHANICAL DIMENSION

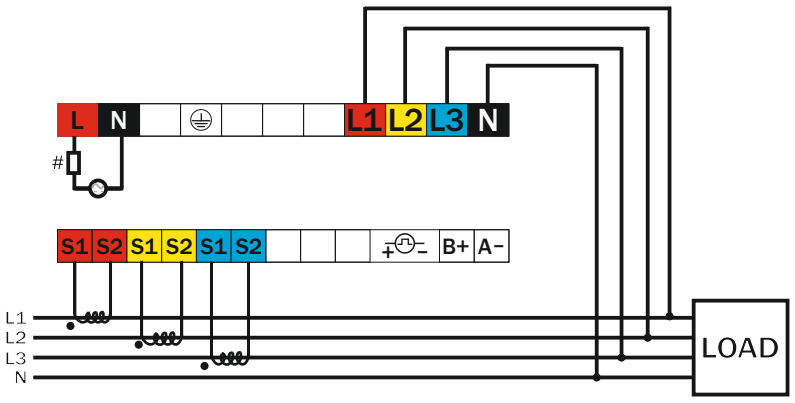


FRONT VIEW **RIGHT SIDE VIEW**

All dimensions are in mm

TERMINAL CONNECTION





KEY OPERATION

PARAMETER SETTING MODE	
To Set Parameter Value	Press PRG For 5 Sec
To view VAF Pages	VAF
To View Power Pages	P
To View Energy	E
To scroll & hold pages	Press P+E For 5Sec
PARAMETER SETTING MODE	
To Set Parameter Value	PRG
To Increment parameter value	P
To Decrement parameter value	E
To Exit from parameter setting	PRG

RESOLUTION

Resolution	
PT Ratio x CT Ratio	**Pulse/kWh**
<15	0.01kWh
<150	0.1kWh
<1500	1kWh
<15000	10kWh
<150000	100kWh
⩾150000	1000kWh

INSTALLATION GUIDELINES

1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
2. Do not allow pieces of metal, wire clippings, or fine metallic fillings from installation to enter the product or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. Circuit breaker or mains switch must be installed between power source and supply terminal to facilitate power 'ON' or 'OFF' function. However this mains switch or circuit breaker must be installed at convenient place normally accessible to the operator.
4. Use and store the instrument within the specified ambient temperature and humidity ranges as mentioned in this manual.

MECHANICAL INSTALLATION GUIDELINES

1. Prepare the panel cutout with proper dimensions as shown above.
2. Fit the unit into the panel with the help of clamp given.
3. The equipment in its installed state must not come in close proximity to any heating source, caustic vapors, oils steam, or other unwanted process byproducts.
4. Use the specified size of crimp terminal (M3.5 screws) to wire the terminal block. Tightening the screws on the terminal block using the tightening torque of the range of 0.5 N.m.
5. Do not connect anything to unused terminals.

MAINTENANCE

1. The equipment should be cleaned regularly to avoid blockage of ventilating parts.
2. Clean the equipment with a clean soft cloth. Do not use isopropyl alcohol or any other cleaning agent.
3. Fusible resistor must not be replaced by operator.

SAFETY PRECAUTION

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If all the equipment is not handled in a manner specified by the manufacturer, it might impair the protection provided by the equipment.

Read complete instructions prior to installation and operation of the unit.

WARNING : Risk of electric shock.

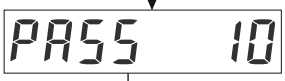
WARNING GUIDELINES

WARNING : Risk of electric shock.

1. To prevent the risk of electric shock, power supply to the equipment must be kept OFF while doing the wiring arrangement. Do not touch the terminals while power is being supplied.
2. To reduce electromagnetic interference, use wire with adequate rating and twists of the same of equal size shall be made with shortest connection.
3. Cable used for connection to power source, must have a cross section of $1mm^2$ or greater. These wires should have insulations capacity made of at least 1.5kV.
4. A better anti-noise effect can be expected by using standard power supply cable for the instrument.

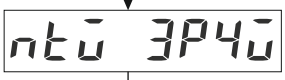
PARAMETER SETTING:

Press PRG key For 5 Sec



(Enter Password)
(10) Change by P & E Key

Press PRG key



Network Selection
3Ø 4Wire / 3Ø 3Wire / 1Ø 2Wire
Change by P & E Key

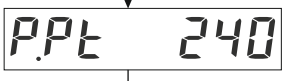
Press PRG key

(Primary CT Ratio)
(5 to 9999Amp Selectable)
Change by P & E Key

Press PRG key

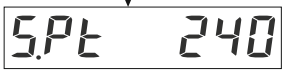
(Secondary CT)
5A / 1Amp Selectable
Change by P & E Key

Press PRG key



(PT Primary)
100V To 520 KV (Selectable)
Change by P & E Key

Press PRG key

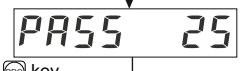


(PT Secondary)
100V To 520 V (Selectable)
Change by P & E Key

Press PRG key For Save & Exit

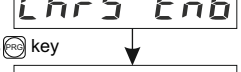
Load Hour , No Load Hour & RPM SETTINGS

Press PRG key For 5 Sec



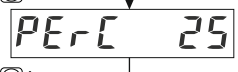
(Enter Password)
(25) Change by P & E Key

Press PRG key



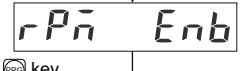
Load Hour Enable / Disable
Change by P & E Key

Press PRG key



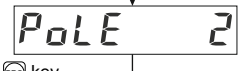
Load Hour Percentage
5 To 50%
Change by P & E Key

Press PRG key



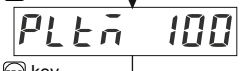
RPM Enable / Disable
Change by P & E Key

Press PRG key



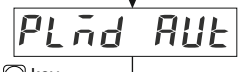
Pole
2 To 128 Change by P & E Key

Press PRG key



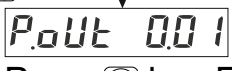
Pulse On Time
10 To 500mS Change by P & E Key

Press PRG key



Pulse Mode
Auto / Manual Change by P & E Key

Press PRG key

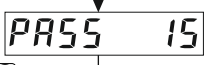


Pulse Out
0.01, 0.1, 1, 10, 100, 1000

Press PRG key For Save & Exit

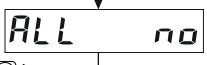
LOAD HOUR & RPM

Press PRG key For 5 Sec



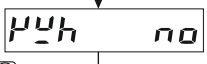
(Enter Password)
(15) Change by P & E Key

Press PRG key



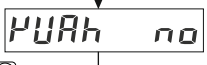
Reset All
Change by P & E Key

Press PRG key



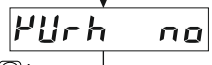
Reset kWh (Yes / No)
Change by P & E Key

Press PRG key



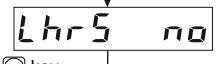
Reset kVAh (Yes / No)
Change by P & E Key

Press PRG key



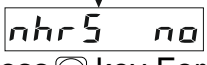
Reset kVArh (Yes / No)
Change by P & E Key

Press PRG key



Reset Load Hour (Yes / No)
Change by P & E Key

Press PRG key

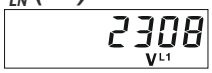


Reset No Load Hour (Yes / No)

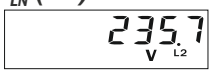
Press PRG key For Save & Exit

VAF PAGES

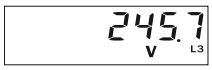
1) V_{LN} (L1)



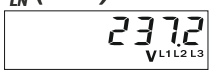
2) V_{LN} (L2)



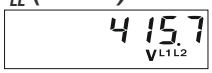
3) V_{LN} (L3)



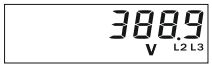
4) V_{LN} (AVG)



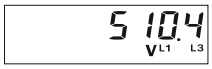
5) V_{LL} (L1-L2)



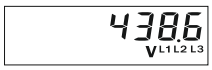
6) V_{LL} (L2-L3)



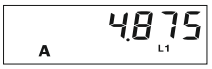
7) V_{LL} (L1-L3)



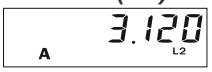
8) V_{LL} (AVG)



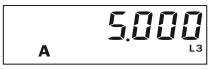
9) Current (L1)



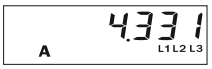
10) Current (L2)



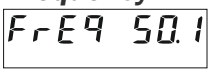
11) Current (L3)



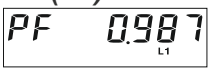
12) Current (AVG)



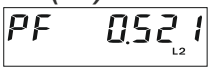
13) Frequency



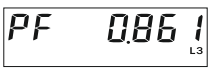
14) PF (L1)



15) PF (L2)



16) PF (L3)

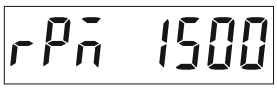


17) PF (AVG)

18) Load hour

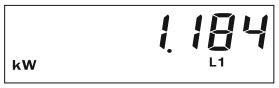
19) No Load hour

20) RPM

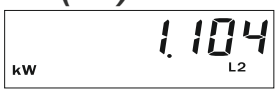


POWER (P) PAGES

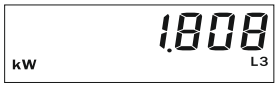
1) kW (L1)



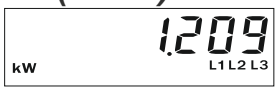
2) kW (L2)



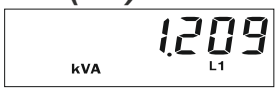
3) kW (L3)



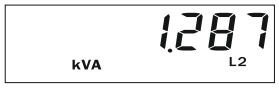
4) kW (Total)



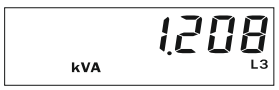
5) kVA (L1)



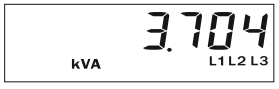
6) kVA (L2)



7) kVA (L3)



8) kVA (Total)



9) kVAr (L1)

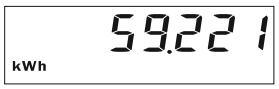
10) kVAr (L2)

11) kVAr (L3)

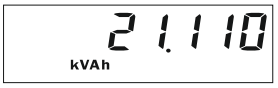
12) kVAr (Total)

ENERGY (E) PAGES

1) kWh

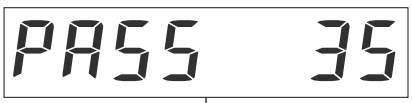


2) kVAh



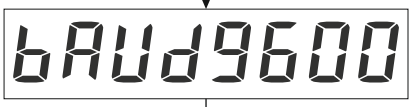
3) kVArh

MODBUS SETTING:

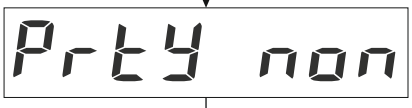


(Enter Password)
(35) Change by (P) & (E) Key

(Address)
(1 To 125)
Change by (P) & (E) Key



(Baudrate)
(4800,9600,19200, 38400)
Change by (P) & (E) Key



(Parity)
(None,Even,Odd)
Change by (P) & (E) Key

Press (PRG) key For Save & Exit

MODBUS (MFM 5M)

Slave Address :	1 to 125
Baudrate :	4800,9600,19200,38400bps
Parity :	None,Even,Odd
Datatype :	Float (32 Bit Little Endian Byte Swap)
Read Function Register :	0x03 and 0x04
Write Function Register :	0x06 and 0x10

Sr.No	Access Type	Parameter	Register Data Type Float
1	R	kWh Value *N1	0
			2
2	R	kVAh Value * N1	4
			6
3	R	kVArh Value *N1	8
			10

*Note 1 :- In Above Energy Parameter, Energy Value Representation shown as per below.

Example :- Actual Value = 320126789.321

Above Register Address 1 = 320126789

Below Register Address 2 = 0.321

4	R	Voltage L1-N Value	12
5	R	V L1-N Unit Selection: Value Volt: 0 Kilo Volt: 1	14
6	R	Voltage L2-N Value	16
7	R	V L2-N Unit Selection: Value Volt: 0 Kilo Volt: 1	18
8	R	Voltage L3-N Value	20
9	R	V L3-N Unit Selection: Value Volt: 0 Kilo Volt: 1	22
10	R	AVG VLN Value	24
11	R	AVG VLN Unit Selection: Value Volt: 0 Kilo Volt: 1	26
12	R	Voltage L12 Value	28
13	R	V L12 Unit Selection: Value Volt: 0 Kilo Volt: 1	30
14	R	Voltage L23 Value	32
15	R	V L23 Unit Selection: Value Volt: 0 Kilo Volt: 1	34

Sr.No	Access Type	Parameter	Register Data Type Float
16	R	Voltage L31 Value	36
17	R	V L31 Unit Selection: Value Volt: 0 Kilo Volt: 1	38
18	R	AVG VLL Value	40
19	R	AVG VLL Unit Selection: Value Volt: 0 Kilo Volt: 1	42
20	R	Current L1 Value	44
21	R	Current L1 Unit Selection: Value Ampere: 0	46
22	R	Current L2 Value	48
23	R	Current L2 Unit Selection: Value Ampere: 0	50
24	R	Current L3 Value	52
25	R	Current L3 Unit Selection: Value Ampere: 0	54
26	R	AVG Current Value	56
27	R	AVG Current Unit Selection: Value Ampere: 0	58
28	R	Line 1 Power Factor	60
29	R	Line 2 Power Factor	62
30	R	Line 3 Power Factor	64
31	—	NA	66
32	R	Average Power Factor	68
33	R	System Frequency	70
34	R	Line 1 kW value	72
35	R	Line 1 kW Unit Selection: Value kW: 1 MW: 2	74
36	R	Line 2 kW value	76
37	R	Line 2 kW Unit Selection: Value kW: 1 MW: 2	78
38	R	Line 3 kW value	80
39	R	Line 3 kW Unit Selection: Value kW: 1 MW: 2	82

Sr.No	Access Type	Parameter	Register Data Type Float
40	R	Total kW	84
41	R	Total kW Unit Selection: Value kW: 1 MW: 2	86
42	R	Line 1 kVA value	88
43	R	Line 1 kVA Unit Selection: Value kVA: 1 MVA: 2	90
44	R	Line 2 kVA value	92
45	R	Line 2 kVA Unit Selection: Value kVA: 1 MVA: 2	94
46	R	Line 3 kVA value	96
47	R	Line 3 kVA Unit Selection: Value kVA: 1 MVA: 2	98
48	R	Total kVA value	100
49	R	Total kVA Unit Selection: Value kVA: 1 MVA: 2	102
50	R	Line 1 kVAr value	104
51	R	Line 1 kVAr Unit Selection: Value kVAr: 1 MVAr: 2	106
52	R	Line 2 kVAr value	108
53	R	Line 2 kVAr Unit Selection: Value kVAr: 1 MVAr: 2	110
54	R	Line 3 kVAr value	112
55	R	Line 3 kVAr Unit Selection: Value kVAr: 1 MVAr: 2	114
56	R	Total kVAr value	116
57	R	Total kVAr Unit Selection: Value kVAr: 1 kVAr: 2	118
58	R	Load Hour Value (In Hour)	120
59	R	Load Hour Minute (In Min.)	122
60	R	No Load Hour Value (In Hour)	124
61	R	No Load Hour Minute (In Min.)	126
62	R	RPM	128

Sr.No	Access Type	Parameter	Register Data Type Float
63	R	Max kW Value	130
64	R	Max kW Unit Selection: Value kW: 1 MW: 2	132
65	R	Max kVA Value	134
66	R	Max kVA Unit Selection: Value kVA: 1 MVA: 2	136
67	R	Max kVAr Value	138
68	R	Max kVAr Unit Selection: Value kVAr: 1 MVAr: 2	140
69	R	Max V-LN Value	142
70	R	Max V-LN Unit Selection: Value Volt: 0 Kilo Volt: 1	144
71	R	Max V-LL Value	146
72	R	Max V-LL Unit Selection: Value Volt: 0 Kilo Volt: 1	148
73	R	Min V-LN Value	150
74	R	Min V-LN Unit Selection: Value Volt: 0 Kilo Volt: 1	152
75	R	Min V-LL Value	154
76	R	Min V-LL Unit Selection: Value Volt: 0 Kilo Volt: 1	156
77	R/W	Network Selection Selection: Value 3P-3W: 0 3P-4W: 1 1P-2W: 2	158
78	R/W	CT Primary Value	160
79	R/W	CT Secondary Value	162
80	R/W	PT Primary Value	164
81	R/W	PT Secondary Value	166
82	—	NA	168

Note :- To Reset Below Parameter Enter 15 Value

83	R/W	Reset All Parameter	170
84	R/W	Reset kWh	172
85	R/W	Reset kVAh	174
86	R/W	Reset kVArh	176
87	R/W	Reset Max kW	178
88	R/W	Reset Max kVA	180
89	R/W	Reset Max kVAr	182
90	R/W	Reset Max Volt	184
91	R/W	Reset Min Volt	186
92	R/W	Reset Load Hour	188
93	R/W	Reset No Load Hour	190

94	R/W	Address	192
95	R/W	Baudrate Selection: 4800 = 0; 9600 = 1; 19200 = 2; 38400 = 3	194
96	R/W	Parity Selection: None = 0; Even = 1; Odd = 2	196
97	—	NA	198
98	R/W	Load Hour Selection: Disable = 0; Enable = 1	200
99	R/W	Load Hour Percentage	202
100	R/W	RPM Selection: Disable = 0; Enable = 1	204
101	R/W	Pole	206