MULTISPAN

MULTI FUNCTION METER
MFM 13-M1

TECHNICAL SPECIFICATION

PARAMETER SPECIFICATION

Input Signal	3Ø 3 Wire / 3Ø 4Wire / 1Ø 2Wire
CT Primary	up to 6000A (Programmable)
CT Secondary	5 Amp/1 Amp selectable
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 kW
kW Per Phase	0.000 - 9999 kW
kVA Total	0.000 - 9999 kVA
kVA Per Phase	0.000 - 9999 kVA
kVAr Total	0.000 - 9999 kVAr
kVAr Per Phase	0.000 - 9999 kVAr
ENERGY	
kWH Total	000.000 - 999999999.999 kWh
kVAh Total	000.000 - 999999999.999 kVAh
kVArh Total	000.000 - 999999999.999 kVArh

DISPLAY & KEY :

Display	4 Digit,3 Line 0.57" RED
Key	SET/ENT,VAF,P/E, INC, DEC

DIMENSION :

Size	96 (H) x 96 (W) x 54 (D) mm
Panel Cutout	92 (H) x 92 (W) mm

AUXILIARY SUPPLY :

Supply voltage	100 to 270V AC, 50/60Hz
Power consumption (VA RATING)	Approx 4 VA @ 230V AC MAX

COMMUNICATION:-

RS-485 MODBUS

ACCURACY:

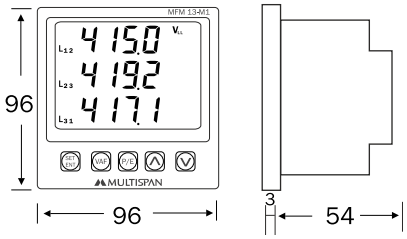
Class 0.5 (Standard)

ENVIRONMENT CONDITION:

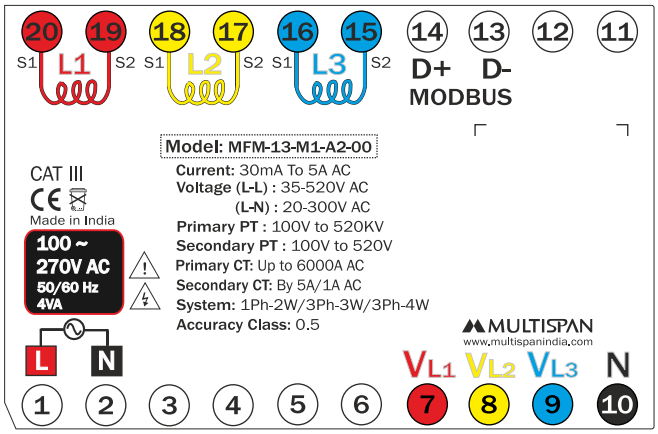
Operating Temp.	0°C to 55°C
Relative Humidity	UP to 95% RH (non-condensing)
Protection Level (AS Per Request)	IP-65 (Front side) As per IS/IEC 60529 : 2001

MECHANICAL INSTALLATION

Outline Dimension (mm)	Panel Cutout Dimension (mm)



TERMINAL CONNECTION



KEY OPERATION

FUNCTION	PRESS KEY
OPERATOR MODE	
To view VAF Pages	VAF
To view Power & Energy Pages	P/E
To scroll & hold pages	Press ∧ + ∨ For 5Sec
PARAMETER SETTING MODE	
To Set Parameter Value	Press SET ENT For 5 Sec
To Increment parameter value	∧
To Decrement parameter value	∨
To Exit from parameter setting	SET ENT

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 1.2 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 electro magnetic 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 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

Long Press SET ENT key

Enter Password 10

PASS 10

PRG

nEtP — Network Selection

3P3U / 3P4U / 1P2U

PRG

Ct PrIn 5000 — CT Primary

(5 Amp to 6000 Amp selectable)

PRG

Ct SECd 1 A / 5 A — CT Secondary

(5 Amp/1 Amp selectable)

PRG

Pt PrIn 300 — PT Primary

(100V to 500kV selectable)

PRG

Pt SECd 330 — PT Secondary

(100V to 520V selectable)

PRG

MOdE bASE / Adun — Mode selection

(Basic / Advance)

Press PRG key to save & exit from parameter setting

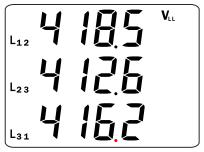
BASIC MODE PAGES

VAF Pages :

Press VAF key to change page

1) Voltage L-N

2) Voltage L-L

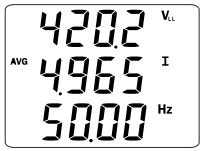


3) Current

4) System Frequency

5) AVG V(L-N)-A-F

6) AVG V(L-L)-A-F



7) PF L1L2L3

8) System PF

9) AVG V(L-N)-A-PF

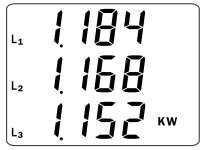
10) AVG V(L-L)-A-PF

Note : In 3P-3W Page 2,3,4,6,8,10 will display

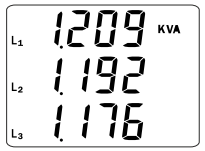
POWER & ENERGY Pages :

Press P/E key to change page

1) kW PER PHASE

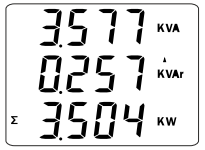


2) kVA PER PHASE

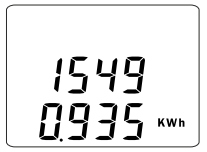


3) kvar PER PHASE

4) TOTAL kVA,kvar,kW

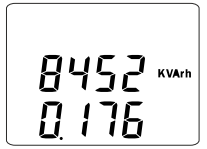


5) kWh Total



6) kvah Total

7) kvah Total

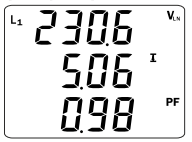


Note : In 3P-3W Page 4,5,6,7 will display

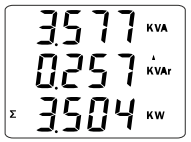
1Phase 2 wire Pages

1) V(L-N)-A-F

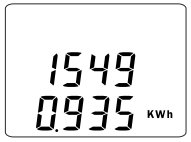
2) V(L-N)-A-PF



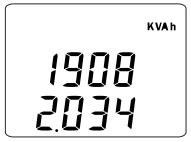
3) TOTAL kVA,kvar,kW



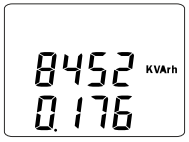
4) kWh Total



5) kvah Total



6) kvarh Total



ADVANCE MODE PAGES

VAF Pages :

Press VAF key to change page

1) Voltage L-N

2) Voltage L-L

3) Current

4) System Frequency

5) Line 1 V(L-N)-A-F

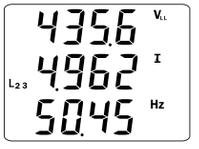
6) Line 2 V(L-N)-A-F

7) Line 3 V(L-N)-A-F

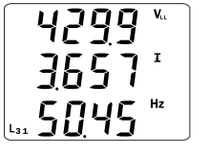
8) AVG V(L-N)-A-F

9) Line 12 V(L-L)-A-F

10) Line 23 V(L-L)-A-F



11) Line 31 V(L-L)-A-F



12) AVG V(L-L)-A-F

13) PF L1 L2 L3

14) System PF

15) Line 1 V(LN)-A-PF

16) Line 2 V(LN)-A-PF

17) Line 3 V(LN)-A-PF

18) AVG V(LN)-A-PF

19) Line12 V(LL)-A-PF

20) Line23 V(LL)-A-PF

21) Line31 V(LL)-A-PF

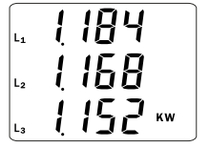
22) AVG V(LL)-A-PF

Note : In 3P-3W Page 2,3,4,9,10,11,12,14, 22 will display

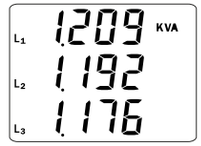
POWER & ENERGY Pages :

Press P/E key to change page

1) kW PER PHASE

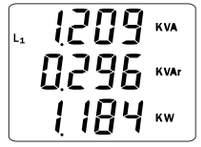


2) kVA PER PHASE

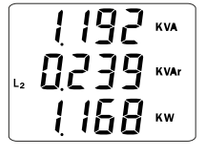


3) kvar PER PHASE

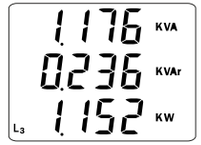
4) Line 1 kVA,kvar,kW



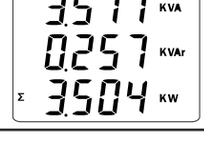
5) Line 2 kVA,kvar,kW



6) Line 3 kVA,kvar,kW

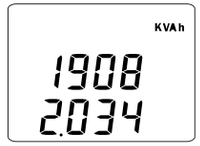


7) TOTAL kVA,kvar,kW

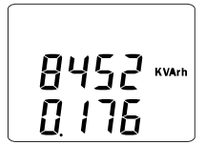


8) kWh Total

9) kvah Total



10) kvarh Total



11) Load Hour

12) No Load Hour

13) RPM

Note :
In 3P-3W
Page 7,8,9,10,11,12, 13 will display

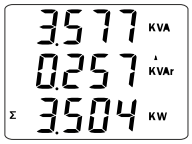
ADVANCE MODE PAGES

1Phase 2 wire Pages

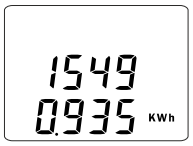
1) V(L-N)-A-F

2) V(L-N)-A-PF

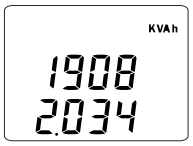
3) TOTAL kVA,kvar,kW



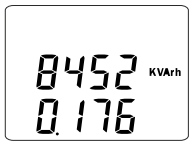
4) kWh Total



5) kvah Total

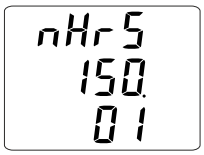


6) kvarh Total



7) Load Hour

8) No Load Hour

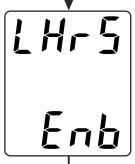


9) RPM

LOAD HOUR & RPM

Enter Password 25

PRG



Load Hour

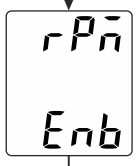
Enable / Disable

PRG

Load Hour Percentage

(5 to 50%)

PRG



RPM

Enable / Disable

PRG

Pole

(1 to 128)

Press PRG key to save & exit from parameter setting

RESET SETTINGS

Enter Password 15

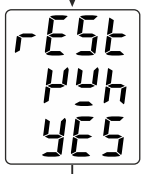
PRG

Reset

All Parameter

(Yes/No)

PRG



Reset

kWh

(Yes/No)

PRG

Reset

kVAh

(Yes/No)

PRG

Reset

kVArh

(Yes/No)

PRG

Reset

Load Hour

(Yes/No)

Reset

No Load Hour

(Yes/No)

Press PRG key to save & exit from parameter setting

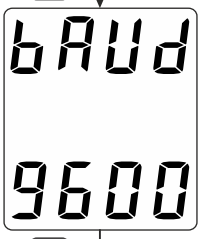
MODBUS

Enter Password 69

SET ENT

Address

SET ENT



(4800/9600/19200/38400)

SET ENT

(None/Even/Odd)

SET ENT

(Float/Long)

Press SET ENT key to save & exit from menu

MODBUS (MFM 13-M1)

Slave Address :	1 to 125
Baudrate :	9600,4800,19200,38400bps
Parity :	None,Even,Odd
Datatype :	Float,Long
Read Function Register :	0x03 and 0x04
Write Function Register :	0x06 and 0x10

Sr.No	Access Type	Parameter	Register Data Type Float/Long
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/Long
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	R	System Power Factor	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
40	R	Total kW	84
41	R	Total kW Unit Selection: Value kW: 1 MW: 2	86

Sr.No	Access Type	Parameter	Register Data Type Float/Long
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
63	R/W	Network Selection Selection: Value 3P-3W: 0 3P-4W: 1 1P-2W: 2	130

Sr.No	Access Type	Parameter	Register Data Type Float/Long
64	R/W	CT Primary Value	132
65	R/W	CT Secondary Value	134
66	R/W	PT Primary Value	136
67	R/W	PT Secondary Value	138
68	R/W	Mode Selection Selection: Value Basic Mode: 0 Advance Mode: 1	140

Note :- To Reset Below Parameter Enter 15 Value

69	R/W	Reset All Parameter	142
70	R/W	Reset kWh	144
71	R/W	Reset kVAh	146
72	R/W	Reset kvarh	148
73	R/W	Reset Load Hour	150
74	R/W	Reset No Load Hour	152

75	R/W	Address	154
76	R/W	Baudrate Selection: Value 4800: 0 9600: 1 19200: 2 38400: 3	156
77	R/W	Parity Selection: Value None: 0 Even: 1 Odd: 2	158
78	R/W	Data Type Selection: Value Float: 0 Long: 1	160
79	R/W	Load Hour Selection: Value Disable: 0 Enable: 1	162
80	R/W	Load Hour Percentage	164
81	R/W	RPM Selection: Value Disable: 0 Enable: 1	166
82	R/W	Pole	168

Product improvement and upgrade is a constant procedure.
So for more updated operating information & support,
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