

3Ø POWER & ENERGY MULTIFUNCTION METER

MFM 93

Features

- ◆ 3 Phase True RMS (Voltage, Current)
- ◆ 3 Phase Power (Active, Apparent, Reactive)
- ◆ Energy (Active, Apparent, Reactive)
- ◆ Programmable CT & PT (Primary & Secondary)

TECHNICAL SPECIFICATION

Display

7 Segment LED Display, 3 row of 4 digit
Digit Height: 0.56 inch

LED Indication for all measuring parameters

Network : 3P4W

Rated Input Voltage

30 to 300V AC (L-N), 50 to 520V AC (L-L)

Rated Input Current

Nominal 5A (Min-50mA, Max-5A)

CT Primary: 5A to 6000A (Programmable for any value)

CT Secondary: 1A / 5A (Programmable)

PT Primary: 415V,440V,2.2KV,3.3KV,6.6KV,11KV,22KV,
33KV,66KV

PT Secondary: 110V / 415V AC

Frequency Range : 50/60 Hz

Display Scrolling: Auto or Manual (Programmable)

Display Update time: 1 Sec for all parameters

Aux Supply: 100 to 270V AC,50/60 Hz

Power Consumption: <4VA

Resolution

- 1) For Current, Voltage, Power & Energy resolution depends on CT and PT primary setting
- 2) For PF resolution is 0.001

Environmental Conditions

- Indoor use
- Altitude of upto 2000 meters
- Pollution degree II
- Temperature : Operating: 0° C to 55° C
Storage : 0° C to 75° C
- Humidity : Upto 85% RH

Protection Class : II

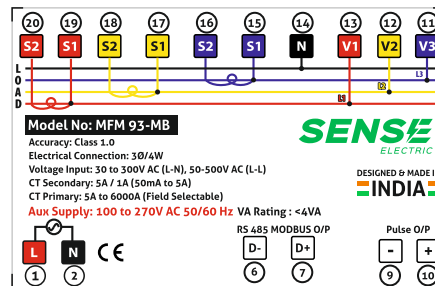
Mounting : Panel Mounting

Weight : 300 gms

PARAMETERS & ACCURACY

Parameters	Accuracy
Voltage L-N (L1,L2,L3)	±0.5% of Full Scale
Voltage L-L (L1L2,L2L3,L3L1)	±0.5% of Full Scale
Current (L1,L2,L3)	±0.5% of Full Scale
Frequency	±0.1%
Active Power (L1,L2,L3)	±0.5%
Apparent Power (L1,L2,L3)	±0.5%
Reactive Power (L1,L2,L3)	±0.5%
Power Factor (L1,L2,L3)	±0.5%
Active Energy	Class 1
Apparent Energy	Class 1
Reactive Energy	Class 1

TERMINAL DIAGRAM

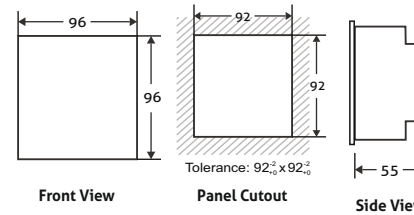


AUTO / MANUAL SCROLL MODE

Press the for 4 sec. to toggle between Auto and manual scroll mode.

By default instrument operates in auto mode. In auto scroll mode online pages would scroll automatically at the rate of 5 sec. per page. In automatic mode when any key is pressed, unit temporarily switches to manual mode and the appropriate page is displayed, also if no key is pressed for 5 sec., unit resumes automatic mode.

MECHANICAL DIMENSIONS



For installing the meter

1. Prepare the panel cutout with proper dimensions as shown above.
2. Push the meter into the panel cutout. Secure the meter in its place by fitting the clamp on the rear side. Fit the clamps on both the sides in diagonally opposite location for optimum fitting.
3. For proper sealing, tighten the screws evenly with required torque.

Terminal screw tightening torque:

0.68 Nm to 0.79 Nm (6.018In-Lb to 6.992 In-Lb)
Screw clamp tightening torque: 0.1N-m
(0.885 Lb-inch)

SAFETY PRECAUTIONS :

All safety related conditions, symbols and instruction 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 the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment.

- ◆ Do not use the equipment if there is any mechanical damage
- ◆ Ensure that the equipment is supplied with correct voltage

If there is physical damage to the unit then do not use it.

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

Wiring Guidelines:

CAUTION :

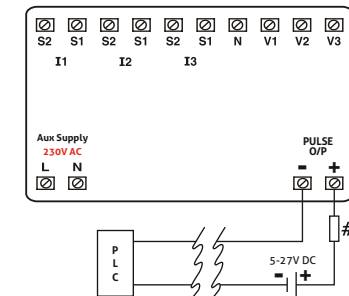


- 1) To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.
- 2) Wiring shall be done strictly accordingly to the terminal layout with the shortest connection. Confirm that all connections are correct.

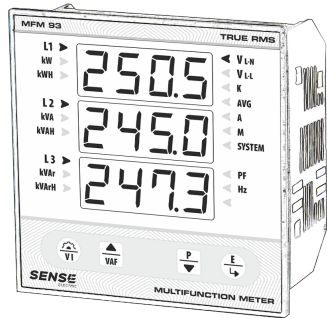
KEY PRESS	PAGE NO.	PAGE DESCRIPTION
	1	Voltage L-N (L1,L2,L3)
	2	Voltage L-L (L1L2,L2L3,L3L1)
	3	Current (L1,L2,L3)
	1	L1 - Voltage L-N, Current, Frequency
	2	L2 - Voltage L-N, Current, Frequency
	3	L3 - Voltage L-N, Current, Frequency
	4	L1 - Voltage L-L, Current, Frequency
	5	L2 - Voltage L-L, Current, Frequency
	6	L3 - Voltage L-L, Current, Frequency
	7	AVG - Voltage L-N, Current, PF
	8	AVG - Voltage L-L, Current, PF
	1	KW (L1,L2,L3)
	2	KVA (L1,L2,L3)
	3	KVAR (L1,L2,L3)
	4	PF (L1,L2,L3)
	5	System- KW, KVA, KVAR
	6	System- KW,KVA,PF
	1	Active Energy
	2	Apparent Energy
	3	Reactive Energy

APPLICATION OF PULSE OUTPUT

Note: # All fuse types:
0.5A class CC UL type
0.5A fast acting 600V



Pulse output from MFM 93 Meter can be interfaced into a process through a PLC for on line control of energy content in the process. If the PLC has a self excited digital input, external DC supply is not needed. The kWh pulse is also used to derive average kWh information the PLC.



***Note:** If the instruments stay in idle condition while inside the **Configuration Menu** for more than 60 seconds, then it will automatically exit the configuration menu.

***Installation Note:**

It is been advised that the settings should be done by a professional, after going through user operating manual and after having understood the application.

KEY OPERATION

Key	Funtion
	SET Key (Long Press to Enter Set Point Menu)
	UP Key (To increase the value/navigate in menu)
	Down Key (To decrease the value/navigate in menu)
	Enter Key (To Enter the Menu / Exit the menu)

CONFIGURATION MENU

Press key for 3 Seconds

PASS
word
0000

If Password is 12

CT
Pr1
0005

CT Primary
5A to 6000A

CT
SEC
0005

CT Secondary
5A/1A

PT
Pr1
415

PT Primary
415V,440V,2.2KV,
3.3KV,6.6KV,11KV,
22KV,33KV,66KV

PT
SEC
415

PT Socondary
415V/110V

PULS
Pr
0.01

Pulse Per KW
0.01, 0.1, 1, 10,
100, 1000

PULS
OT
0100

Pulse On Time
10 - 500 msec

Press key to Save & Exit

RESET MENU

Press key for 3 Seconds

rSt
KWh
no

Reset KWh
YES/NO

rSt
KVAh
no

Reset KVAh
YES/NO

rSt
KVArh
no

Reset KVArh
YES/NO

rSt
ALL
no

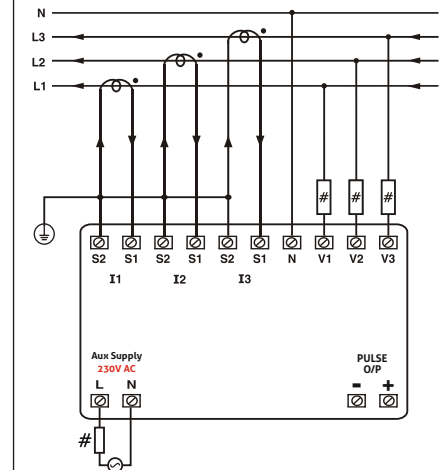
Reset All Energy
YES/NO

Press key Press key to Reset & Exit

TYPICAL WIRING

3 Phase - 4 Wire (Commonly Used)

3 Ø - 4 wire, 3 CT's
Network Selection : 3P4W



Designed & Manufactured in India

Product upgradation is a continuous process. Hence, data in this manual is subject to change without prior notice.

For latest information, please get in touch with our Sales Office



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MODBUS REGISTER ADDRESS LIST

DATA STRUCTURE : INTEGER, REGISTER LENGTH : 1				
SR. NO.	PARAMETER	MB ADD.	READ/ WRITE	NOTES
1	Voltage L-N (L1)	1	READ	
2	Voltage L-N (L2)	2		
3	Voltage L-N (L3)	3		
4	Voltage L-L (L1)	4		
5	Voltage L-L (L2)	5		
6	Voltage L-L (L3)	6		
7	Voltage L-N (AVG)	7		
8	Voltage L-L (AVG)	8		
9	Current L1	9		
10	Current L2	10		
11	Current L3	11		
12	Current (AVG)	12		
13	Frequency	13		
14	KW L1	14		
15	KW L2	15		
16	KW L3	16		
17	KVA L1	17		
18	KVA L2	18		
19	KVA L3	19		
20	KVAr L1	20		
21	KVAr L2	21		
22	KVAr L3	22		
23	PF L1	23		
24	PF L2	24		
25	PF L3	25		
26	System KW	26		
27	System KVA	27		
28	System KVAr	28		
29	System PF	29		
30	KWH Higher	30		
31	KWH Lower	31		
32	KVAh Higher	32		
33	KVAh Lower	33		
34	KVArh Higher	34		
35	KVArh Lower	35		
36	Voltage L-N DP (L1)	36		
37	Voltage L-N DP (L2)	37		
38	Voltage L-N DP (L3)	38		
39	Voltage L-L DP (L1)	39		
40	Voltage L-L DP (L2)	40		
41	Voltage L-L DP (L3)	41		
42	Voltage L-N DP (AVG)	42		
43	Voltage L-L DP (AVG)	43		
44	Current DP L1	44		
45	Current DP L2	45		
46	Current DP L3	46		
47	Current DP (AVG)	47		

DP	DIVIDE	UNIT
0	1	KILO
1	10	KILO
2	100	KILO
3	1000	KILO
4	1	MEGA
5	10	MEGA
6	100	MEGA
7	1000	MEGA

DIVIDE BY 100 FOR ACTUAL VALUE

DP	DIVIDE
0	1
1	10
2	100
3	1000

DIVIDE BY 1000 FOR ACTUAL VALUE

DP	DIVIDE
0	1
1	10
2	100
3	1000

DATA STRUCTURE : INTEGER, REGISTER LENGTH : 1				
SR. NO.	PARAMETER	MB ADD.	READ/ WRITE	NOTES
48	KW L1 DP	48	READ	
49	KW L2 DP	49		
50	KW L3 DP	50		
51	KVA L1 DP	51		
52	KVA L2 DP	52		
53	KVA L3 DP	53		
54	KVAr L1 DP	54		
55	KVAr L2 DP	55		
56	KVAr L3 DP	56		
57	System KW DP	57		
58	System KVA DP	58		
59	System KVAr DP	59		
60	KWH DP	60		
61	KVAh DP	61		
62	KVArh DP	62		
63	Pulse ON Time	71		
64	Pulse Per KW	72		
65	CT Primary	73		
66	CT Secondary	74		
67	PT Primary	75		
68	PT Secondary	76		
69	Address	77		
70	Baud Rate	78		
71	Parity	79		
72	Data Type	80		
73	Reset KWh	81	WRITE	
74	Reset KVAh	82		
75	Reset KVArh	83		

DP	DIVIDE	UNIT
0	1	KILO
1	10	KILO
2	100	KILO
3	1000	KILO
4	1	MEGA
5	10	MEGA
6	100	MEGA
7	1000	MEGA

VALUE	PULSE PER KW
1	0.01
2	0.1
3	1
4	10
5	100

VALUE	CT SECONDARY
1	1A
2	5A

VALUE	PT PRIMARY
0	415 V
1	440 V
2	2.2 KV
3	3.2 KV
4	6.6 KV
5	11 KV
6	22 KV
7	33 KV
8	66 KV

VALUE	PT SECONDARY
1	415 V
2	110 V

VALUE	BAUD RATE
1	4800 BPS
2	9600 BPS
3	19200 BPS
3	38400 BPS

VALUE	DATA TYPE
1	NONE
2	ODD
3	EVEN

VALUE	DATA TYPE
1	INTEGER
2	FLOAT

DATA STRUCTURE : FLOAT, REGISTER LENGTH : 2				
SR. NO.	PARAMETER	MB ADD.	READ/ WRITE	NOTES
1	Voltage L-N (L1)	2	READ	
2	Voltage L-N (L2)	4		
3	Voltage L-N (L3)	6		
4	Voltage L-L (L1)	8		
5	Voltage L-L (L2)	10		
6	Voltage L-L (L3)	12		
7	Voltage L-N (AVG)	14		
8	Voltage L-L (AVG)	16		
9	Current L1	18		
10	Current L2	20		
11	Current L3	22		
12	Current (AVG)	24		
13	Frequency	26		
14	KW L1	28		
15	KW L2	30		
16	KW L3	32		
17	KVA L1	34		
18	KVA L2	36		
19	KVA L3	38		
20	KVAr L1	40		
21	KVAr L2	42		
22	KVAr L3	44		
23	PF L1	46		
24	PF L2	48		
25	PF L3	50		
26	System KW	52		
27	System KVA	54		
28	System KVAr	56		
29	System PF	58		
30	KWH	60		
31	KVAh	62		
32	KVArh	64		
33	KWH Unit	66		
34	KVAh Unit	68		
35	KVArh Unit	70		
36	Pulse ON TIME	82		
37	Pulse Per KW	84		
38	CT Primary	86	READ	
39	CT Secondary	88		
40	PT Primary	90		
41	PT Secondary	92		
42	Address	94		
43	Baud Rate	96		

VALUE	PULSE PER KW
1	0.01
2	0.1
3	1
4	10
5	100

VALUE	CT SECONDARY
1	1A
2	5A

VALUE	PT PRIMARY
0	415 V
1	440 V
2	2.2 KV
3	3.2 KV
4	6.6 KV
5	11 KV
6	22 KV
7	33 KV
8	66 KV

VALUE	PT SECONDARY
1	415 V
2	110 V

VALUE	BAUD RATE
1	4800 BPS
2	9600 BPS
3	19200 BPS
3	38400 BPS

DATA STRUCTURE : FLOAT, REGISTER LENGTH : 2					
SR. NO.	PARAMETER	MB ADD.	READ/ WRITE	NOTES	
44	Parity	98	WRITE	VALUE DATA TYPE	
				1 NONE	
				2 ODD	
			3 EVEN		
45	Data Type	100	WRITE	VALUE DATA TYPE	
				1 INTEGER	
			2 FLOAT		
46	Reset KWh	102	WRITE	WRITE 50 TO RESET RESPECTIVE ENERGY	
47	Reset KVAh	104			
48	Reset KVArh	106			

