OP334-V01

selec

MFM383/MFM383-C (96x96)
Operating Instructions

FEATURES

- 3 lines, 3 digits per line
- Bar graph for current indication
- Auto / manual page scrolling
- Universal auxiliary supply
- Measures all power parameters (RMS voltage, current, active power, apparent power, reactive power, power factor, frequency and energy)
- Programmable CT primary
- RS485 communication (MODBUS Protocol) (Applicable for MFM383-C Only)

SPECIFICATIONS

DISPLAY

Liquid crystal display with backlight

3 lines, 3 digits per line to show all parameters

4th line, 8 digits to show energy

Bar graph for current indication

DISPLAY UPDATE TIME

10 sec for energy

1 sec for remaining parameters

ELECTRICAL INPUT TYPE

3 phase 4 wire and single phase

RATED INPUT VOLTAGE

Line to Neutral : 350 VAC max (25 VAC min)

RATED INPUT CURRENT

Nominal 5A AC (0.1A min.)

AUXILIARY SUPPLY

90 to 270 VAC/DC, 50Hz

INPUT FREQUENCY

50Hz

BURDEN

0.5 VA max.@5A per phase

CT PRIMARY

Programmable from 5 to 5000

***Marked parameters/page display are applicable for MFM383-C**

RESOLUTION

Parameters	CT Primary	Resolution
Current	<=10	0.01A
	>10 and <=100	0.1A
	>100 and <=1000	1A
	>1000	0.01kA

Parameters	CT Primary	Resolution
kVA / kW	< = 10	0.01k
	> 10 and < = 400	0.1k
	> 400 and < = 2800	1k
	>2800	0.01M
*Total kVA / kW / kVAr	<=10	0.01k
	>10 and < = 90	0.1k
	>90 and < = 950	1k
	>950	0.01M

Parameter Measured / Calculated :

Parameters	Measured values	Unit
Voltage	$V_{1N}, V_{2N}, V_{3N}, V_{12}, V_{23}, V_{31}$, $V_{avg\ L-N}$, $V_{avg\ L-L}$.	V
Current	I_1, I_2, I_3, I_{avg}.	A
Active Power	kW_1, kW_2, kW_3 & *Total kW	W
Apparent Power	kVA_1, kVA_2, kVA_3 & *Total kVA	VA
Power Factor	Pf_1, Pf_2, Pf_3, Avg Pf.	-
Reactive* Power	$kVAr_1$, $kVAr_2$, $kVAr_3$ and Total kVAr	VAr
Frequency	Hz	Hz
Energy	kWh	kWh

Accuracy Table :

Measurement	Accuracy
Voltage V_{L-N}	±0.5% of F.S. + 1 digit
Voltage V_{L-L}	±1% of F.S. + 1 digit
Average Voltage $_{L-N}$	±0.5% of F.S. + 1 digit
Average Voltage $_{L-L}$	±1% of F.S. + 1 digit
Current	±1% of F.S. + 1 digit
Average current	±1% of F.S.+ 1 digit
Frequency	±0.1% ±0.1 Hz
Active Power	±1% of F.S. + 1 digit
Apparent power	±1% of F.S. + 1 digit
*Reactive Power	±1% of F. S. ±2 digits
Power factor & Avg Pf	±0.01 PF + 1 digit
Energy	Class 1

SERIAL COMMUNICATION (Applicable for MFM383-C Only)

Interface standard & protocol	RS485 & MODBUS RTU
Communication address	1 to 255
Transmission mode	Half duplex
Data types	Float and Integer
Transmission distance	500 m maximum
Transmission speed	300, 600,1200, 2400, 4800, 9600,19200 (in bps)
Parity	None, Odd, Even
Stop bits	1 or 2
Response time	100 ms (max and independent of baud rate)

TEMPERATURE

Operating: 0 to 50 °C ; Storage: -20 to 75 °C

HUMIDITY

85% non condensing

WEIGHT

223 gms

SAFETY PRECAUTIONS

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

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

CAUTION: Risk of electric shock.

WIRING GUIDELINES

WARNING:

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 according to the terminal layout. Confirm that all connections are correct.
3. Use lugged terminals.
4. To eliminate electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made.
5. Cable used for connection to power source, must have a cross section of 1.5mm^2.These wires shall have current carrying capacity of 5A.

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.

INSTALLATION GUIDELINES

CAUTION:

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. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. Before disconnecting the secondary of the external current transformer from the equipment, make sure that the current transformer is short circuited to avoid risk of electrical shock and injury.

CAUTION:

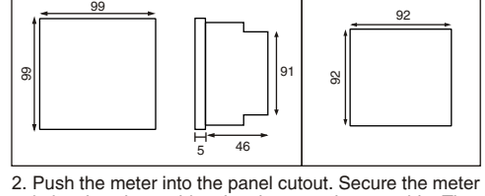
1. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
2. The equipment does not have a built-in-type fuse. Installation of external fuse of rating 275VAC/1A for electrical circuitry is highly recommended.
3. Thermal dissipation of equipment is met through ventilation holes provided on chassis of the equipment. such ventilation holes shall not be obstructed else it can lead to a safety

MECHANICAL INSTALLATION

For installing the meter

1. Prepare the panel cutout with proper dimensions as shown below :

Outline Dimensions (in mm)	Panel Cutout (in mm)



2. Push the meter into the panel cutout. Secure the meter in its place by pushing the clamp on the rear side. The screws of the panel of the clamp must be in the farthest forward slot.
3. For proper sealing, tighten the screws evenly with required torque.

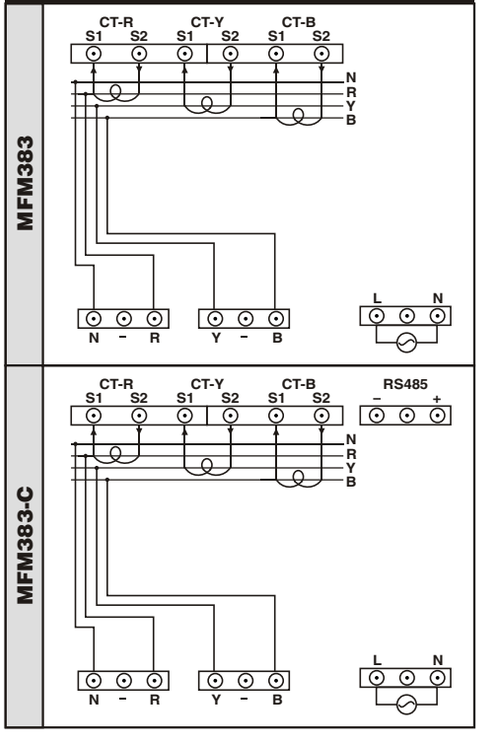
⚠ CAUTION:

The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process by products.

EMC Guidelines:

1. Use proper input power cables with shortest connections and twisted type.
2. Layout of connecting cables shall be away from any internal EMI source.

TERMINAL CONNECTIONS



FRONT PANEL DESCRIPTION

Bar Graph Indication

In MFM383-C/MFM383, the bar graph shows the percentage of current flowing through the load. The Bar graph shows 25, 50, 75, 100, 125 and 150% of rated input current.

KEYS DESCRIPTION

Sr No	Functions	Key press
1	To scroll through the pages in forward direction in manual mode.	⊙+▲ to next pages
2	To scroll through the pages in reverse direction in manual mode.	⊙+▼ to previous pages
3	To toggle between auto/manual scrolling.	▼ (A/M) for three seconds
4	To enter in configuration mode.	▼(A/M) + ▲ (PRG) for 3 seconds
5	To increase and decrease all Parameters	⊙ + ▲ Increase ⊙ + ▼ Decrease

NOTE :

1) Continuous operation of ⊙+▼/▲ makes update speed faster in 3 stage after 7 seconds.
2) CT updates in steps of 5 after CT setting has reached to 100, in steps of 10 after CT setting has reached 1000. Eg : After 1000, the display increments to 1.01 i.e.1010. Hence, to set CT primary as 1600, program CT as 1.60

CONFIGURATION SCHEME

1) Continuous pressing of ▼(A/M) + ▲ (PRG) for 3 seconds initiates the programming mode.
2) Program settings are as given below.
3) **Only 1 & 2 parameters in the undermentioned configuration scheme will be valid for MFM383.**

Key press	Display	Description
1. To configure CT primary		Default setting: 5
Press ⊙+▼/▲	CT 5	**CT Primary** Range: 5 to 5000 A
Display shows	CT 1.00	When CT is 1000
2. Press ▲ to reset Energy count		Default setting: no
Press ⊙+▼/▲	rSt no	**Reset** Reset NO
	rSt YES	Reset YES
NOTE: On selecting 'Reset YES', only energy (kWh) will be Reset.		
3. Press ▲ to enter Slave ID		Default setting: 1
Press ⊙+▼/▲	S.Id 1	**Slave ID** Range: 1 to 255

Key press	Display	Description
4. Press ▲ to select Baud Rate		Default setting: 9.6
		Baud Rate
Press ⊙+▼/▲	bUd 300	300
Press ⊙+▼/▲	bUd 600	600
Press ⊙+▼/▲	bUd 1.2	1200
Press ⊙+▼/▲	bUd 2.4	2400
Press ⊙+▼/▲	bUd 4.8	4800
Press ⊙+▼/▲	bUd 9.6	9600
Press ⊙+▼/▲	bUd 19.2	19200
5. Press ▲ to select Parity		Default setting: no
	PAr no	**Parity** NONE
Press ⊙+▼/▲	PAr EvE	EVEN
Press ⊙+▼/▲	PAr Odd	ODD
6. Press ▲ to select Stop Bit		Default setting: 1
	StP 1	**Stop Bit** Stop Bit 1
Press ⊙+▼/▲	StP 2	Stop Bit 2

NOTE :

1) Press ▼(A/M) + ▲ PRG key for 3 seconds to come out of programming.
2) The unit will auto exit program mode after 60 sec. of inactivity.

DISPLAY PARAMETER PAGE DESCRIPTION

There are two methods to scroll through different parameter pages on the display.

1) Auto mode.
2) Manual mode.

AUTO MODE :

In auto mode, it allows you to monitor all pages sequentially at an interval of 5 seconds without any key press. Each page contains 3 parameters.
NOTE : By default the unit works in auto mode.

MANUAL MODE :

In manual mode, using the ⊙+▼/▲ keys different parameter pages can be viewed. In the manual mode the displayed page is seen until you manually change the page.

The parameter pages are as shown below :

NOTE :

When meter turns to manual mode display shows man momentarily.
When meter turns to auto mode display shows Aut momentarily.

Error indications

Error	Description
Ctr	CT reverse

Ctr error occurs if

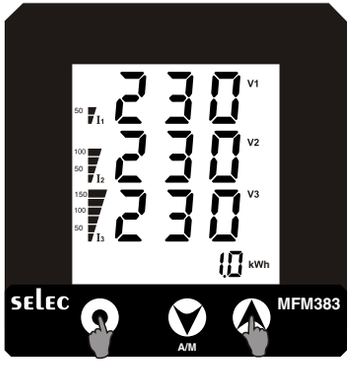
1. The CT secondary wires S1 & S2 are swapped in wiring.
2. The CT inputs are not connected to their respective phases i.e. CT1 to R phase, CT2 to Y phase and CT3 to B phase

NOTE :

Ctr error is displayed only on Active Power page and Power Factor page

PAGE DESCRIPTION

PAGE 1:



Display shows Line to Neutral Voltage & Energy.

1) $V_{1\text{-}N}$
2) $V_{2\text{-}N}$
3) $V_{3\text{-}N}$
4) kWh (Energy)
5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 7.5$ i.e. 150%

*The CT primary set at 5.

Press ● + ▲ to go in to next page

PAGE 2:

Display shows Line to Line Voltage (V_{L-L}) & Energy.

1) V12
2) V23
3) V31
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

PAGE 4:

Display shows Avg. V_{L-N}, Avg. I, Freq. & Energy

1) Average Voltage V_{L-N}
2) Average Current
3) Frequency
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

PAGE 6:

Display shows Active Power & Energy

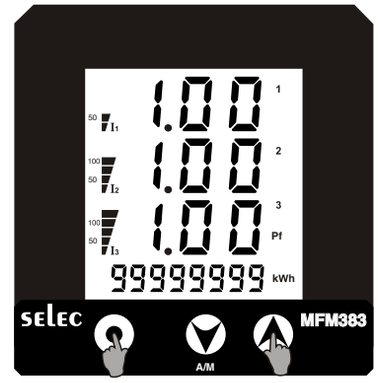
1) kW1
2) kW2
3) kW3
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

PAGE 8:



Display shows power factor of each Phase & Energy

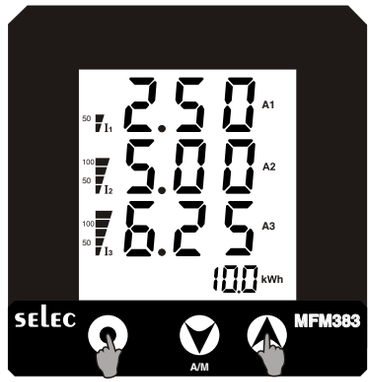
1) Pf1
2) Pf2
3) Pf3
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

PAGE 3:



Display shows Current of each Phase & Energy.

1) A1
2) A2
3) A3
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

PAGE 5:

Display shows Avg. V_{L-L}, Avg. I, APF & Energy

1) Average Voltage V_{L-L}
2) Average Current
3) Average Power factor
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

PAGE 7:

Display shows Apparent Power & Energy

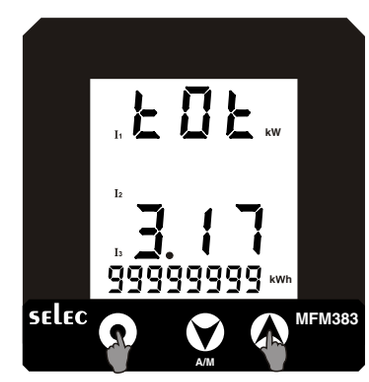
1) kVA 1
2) kVA 2
3) kVA 3
4) kWh (Energy)

*The CT primary set at 5.

5) $I_1 \approx 2.5$ i.e. 50%
6) $I_2 \approx 5$ i.e. 100%
7) $I_3 \approx 6.25$ i.e. 125%

Press ⊙ + ▲ to go in to next page

*PAGE 9:



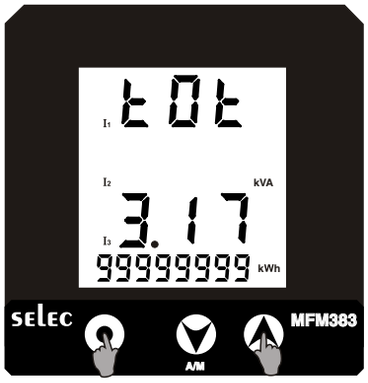
Display shows total Active Power & Energy

1) Total Active Power
2) kWh (Energy)

Press ⊙ + ▲ to go in to next page

***Marked parameters/page display are applicable for MFM383-C**

***PAGE 10:**

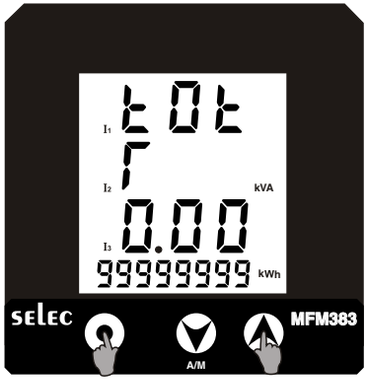


Display shows total Apparent Power & Energy

1) Total Apparent Power
2) kWh (Energy)

Press + to go in to next page

***PAGE 11:**



Display shows total Reactive Power & Energy

1) Total Reactive Power
2) kWh (Energy)

Press + to go in to first page

***Marked parameters/page display are applicable for MFM383-C**

MODBUS REGISTER ADDRESSES LIST (Applicable for MFM383-C Only)

Writable parameters from master

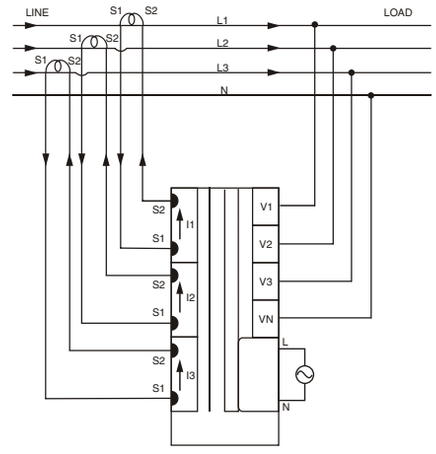
Address	Parameter	Range		Length (Register)	Data Structure
		Min value	Max value		
40001	CT primary	5	5000	1	Integer
40002	Reset kWh	0	1	1	Integer

Readable parameters from master

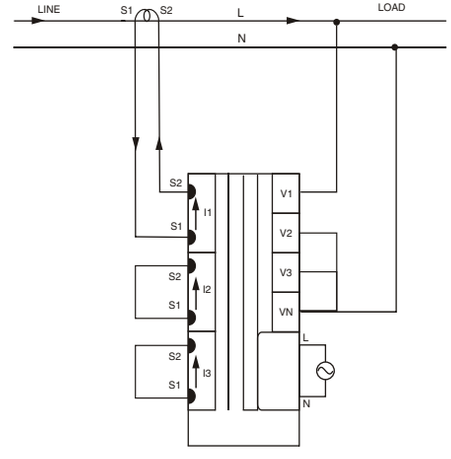
Address	Parameter	Range		Length (Register)	Data Structure
		Min value	Max value		
30001	Voltage V1N	0	350.0	2	Float
30003	Voltage V2N	0	350.0	2	Float
30005	Voltage V3N	0	350.0	2	Float
30007	Average Voltage LN	0	350.0	2	Float
30009	Voltage V12	0	607.0	2	Float
30011	Voltage V23	0	607.0	2	Float
30013	Voltage V31	0	607.0	2	Float
30015	Average Voltage LL	0	607.0	2	Float
30017	Current I1	0	5000.00	2	Float
30019	Current I2	0	5000.00	2	Float
30021	Current I3	0	5000.00	2	Float
30023	Average Current	0	5000.00	2	Float
30025	kW1	-1750.00	1750.00	2	Float
30027	kW2	-1750.00	1750.00	2	Float
30029	kW3	-1750.00	1750.00	2	Float
30031	kVA1	0	1750.00	2	Float
30033	kVA2	0	1750.00	2	Float
30035	kVA3	0	1750.00	2	Float
30037	PF1	-0.99	1.00	2	Float
30039	PF2	-0.99	1.00	2	Float
30041	PF3	-0.99	1.00	2	Float
30043	Average PF	-0.99	1.00	2	Float
30045	Frequency	0	65.0	2	Float
30047	kWh	0	99999999.9	2	Float
30049	kVAr1	-1750.00	1750.00	2	Float
30051	kVAr2	-1750.00	1750.00	2	Float
30053	kVAr3	-1750.00	1750.00	2	Float
30055	Total kW	-5250.00	5250.00	2	Float
30057	Total kVA	0	5250.00	2	Float
30059	Total kVAr	-5250.00	5250.00	2	Float
30061	Status Register	Value	Status	1	Integer
		0x0001	Phase 1 – CT Rev		
		0x0002	Phase 2 – CT Rev		
		0x0004	Phase 3 – CT Rev		

TYPICAL WIRING DIAGRAM

3 PHASE 4-WIRE



SINGLE PHASE



Selec Controls Pvt. Ltd.

(Specifications are subject to change, since development is a continuous process)

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