MX443-TX

Instruction Manual

sub-Zero® Precision Control, always

Introduction

The MFM is a panel mounted 96 x 96mm Digital Panel Meter for the measurement of important electrical parameters like AC Voltage, AC Current, Energy, Power, Frequency and Power Factor.
MFM can be configured and Programmed On site for the following :
PT Primary, PT Secondary, CT Primary, CT Secondary (5A) and System Type 3 phase 3W or 4W or single phase system. The front panel has Four keys using which the user can scroll through different screens and configure the product.

Caution for your Safety

WIRING: The probe and its corresponding wires should never be installed in a conduit next to control or power supply lines. The electrical wiring should be done as shown in the diagram. The power supply circuit should be connected to a protection switch. The terminals admit wires of upto 2.5sq mm.

WARNING: Improper wiring may cause irreparable damage and personal injury. Kindly ensure that wiring is done by qualified personnel only.

Maintenance: Cleaning: Clean the surface of the controller with a soft moist cloth. Do not use abrasive detergents, petrol, alcohol or solvents.

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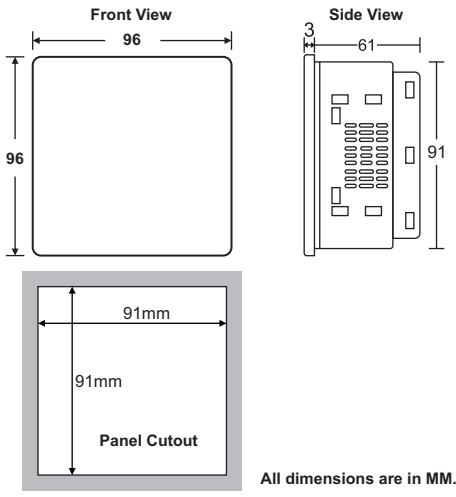
Controller :Controller should be installed in a place protected by vibration, water and corrosive gasses and where ambient temperature does not exceed the values specified in the technical data.

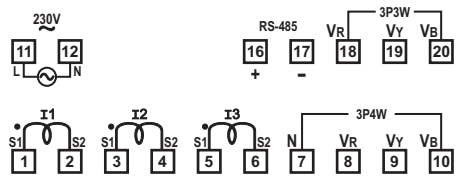
Probe : To give a correct reading, the probe must be installed in a place protected from thermal influences, which may affect the temperature to be controlled.

Dimensions & Panel Cutout



All dimensions are in MM.

Connection Diagram



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5	Ct.S	Select CT secondary ratio.
6	Ct.P	Select CT primary ratio.
7	Pt.S	Select PT secondary ratio.
8	Pt.P	Select PT primary ratio.
9	r-Hr	Run Hour Selection
10	Id	Slave ID
11	bAUd	Baud Rate
12	Prt	Sets the parity check.
13	rSt FCt	Factory Reset
14	rSt EnrG	Reset Energy
15	ErSt PASS	Energy Reset Password
16	rSt P_iH	Reset Active Energy
17	rSt PUAH	Reset Apparent Energy
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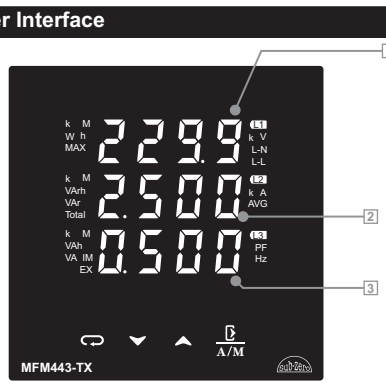
Technical Specification

Housing	: Front Cover: Polycarbonate Plastic Back Cover: ABS Plastic
Dimensions	: Frontal : 96 X 96mm, Depth : 61mm
Panel Cutout	: 91 X 91mm
Mounting	: Flush panel mounting with Fasteners
Protection	: IP65 Front
Connections	: Terminal connectors. ≤ 2.5sq mm terminal only with U-type lugs.
Display	: Customized Display
Data storage	: Non-volatile flash memory
Operating temp.	: 0°C to 60°C (non-condensing)
Operating humidity	: 20% to 85% (non-condensing)
Storage temp	: -25°C to 60°C (non-condensing)
Supply Voltage	: 240 Vac ±20 % , 50/60Hz Standard.
Wiring Input	: 3ø-4W, 3ø-3W system.
Measuring Range	
Input Rated Voltage	: 11 to 500 V AC (L-N) : 19 to 866 V AC (L-L)
Input Rated Current	: Nominal 5A AC
CT Primary	: 5 A to 10 kA
CT Secondary	: 5 A
PT Primary	: 100 V to 500 kV
PT Secondary	: 100 to 500 V AC (L-L)
Electrical Connection	: 3ø-4W, 3ø-3W, 2ø-3W, 1ø-2W.
Resolution	
Energy	: 0.01k, 0.1k, 0.01M, .01M, 1M (Depending upon CT ratio and PT ratio)
Current / Voltage / Power	: Auto Resolution
Power Factor	: 0.001
Measuring Parameter Accuracy	
Voltage, Current & AVG	: ± 0.5% of Full Scale
Frequency	: ± 0.1Hz ± 1 digit
Run Hours	: ± 1%
Active Power	: 1%
Reactive Power	: 1%
Apparent Power	: 1%
Active Energy Class	: 1
Reactive Energy Class	: 1
Apparent Energy Class	: 1 :
Power Factor	: ±0.5% of Unity
Display Scrolling	: Automatic or Manual (Programmable)
Power Consumption	: 1.5VA Max
Frequency	: 45-65 Hz
Run Hours	: 0 to 99999.9 Hrs
Burden	: 0.5VA @5A per phase

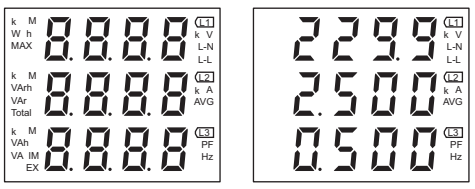
User Interface



Sr. No.		Description
1 2 3		Electrical parameters like AC Voltage, AC Current, Frequency and Power Factor will be seen as Per screen no and auto or manual mode. Kindly refer Home Page Description.
4	**k**	Kilo
5	**V**	Unit Volts
6	**L-N**	Line to Neutral of corresponding phase
7	**L-L**	Line to Line of corresponding phase
8	**A**	Ampere
9	**AVG**	Average value of corresponding parameter
10	**PF**	Power Factor
11	**Hz**	Frequency
12	**M**	Mega
13	**Wh**	Active Energy
14	**MAX**	Max Value of corresponding parameter
15	**VArh**	Reactive Energy
16	**VAr**	Reactive Power
17	**Total**	Total Value
18	**VAh**	Apparent Energy
19	**VA**	Apparent Power
20	**IM**	Import Energy
21	**EX**	Export Energy
22	⮌	**Next key :** **In Manual Mode:** To scroll for Next Screen. **In Program Mode:** To scroll to Next Parameter. **Note:** Kindly refer 'Home Page Screen Description' for further details.
23	⮟	**Down key:** **In Normal Mode (Auto/Manual):**To scroll through screens one by one in a particular page. **In Program Mode:** To decrease Parameter value.
24	⮝	**Up key :** **In Normal Mode (Auto/Manual):**To scroll through screens one by one in a particular page **In Program Mode:** To increase Parameter value.
25	⮚ A/M	**Exit key :** **In Normal Mode:** Press this key for 6 seconds to toggle between Automatic/Manual Mode. **In Program Mode:** To save the changed Parameter and exit to Normal mode. **Note:** Kindly refer 'Home Page Screen Description' for further details.

Initial Display when Power is ON

When power is On, entire display part will be On for 5 sec, MFM will be displayed for 3 sec and then enter in to RUN mode.



1. Entire display Part 2. Run Mode

Mode

There are two methods to read different parameter Screens on the display.
1) Auto mode.
2) Manual mode.
Press Exit key for 6 Sec to select Automatic or Manual Mode

Type	Description
Auto Mode	In Auto mode, it allows you to monitor screens of different page at an interval of 5 seconds without any key press **NOTE :** By default the unit works in auto mode.
Manual Mode	In Manual mode, using the Enter key different parameter Screens can be viewed. The displayed Screen is seen until you manually change the Screen. It allows you to monitor screens of different page.

Home Page Screen Description

Automatic Mode / Manual Mode Settings :

Press A/M mode for 6 seconds to toggle between Automatic / Manual Mode.
Note : By Default unit operates in automatic mode. In automatic mode online pages scroll automatically at the rate of 5 sec per page. In automatic mode if any key is pressed, unit temporarily switched to manual mode and the appropriate page is displayed.

● For 3Ø – 4W :

PAGE 1

Display Line to Neutral Voltage of Three Phases.
Display Line to Line Voltage of Three Phases
Display Instantaneous Line to Neutral Voltage of Three Phases.
Display Instantaneous Line to Line Voltage of Three Phases.

PAGE 2

Display Phase Current of Three Phases.
Displays Active, Reactive and Apparent Power First Phases.
Displays Active, Reactive and Apparent Power Second Phases.
Displays Active, Reactive and Apparent Power Third Phases.
Displays Total Active, Reactive and Apparent Three Phases.

PAGE 3

Display Instantaneous Current of Three Phases.
Display Power Factor of Three Phases.
Display Average Line to Neutral Voltage, Current of Three Phases and Power Factor.
Display Average Line to Line Voltage, Current of Three Phases and Frequency.

PAGE 4

Displays Import Active Energy.
Displays Export Active Energy.
Displays Total Active Energy.
Displays Import Reactive Energy.
Displays Export Reactive Energy.
Displays Total Reactive Energy.
Displays Total Apparent Energy.
Displays Run Hour.

● For 3Ø – 3W :

PAGE 1

Display Line to Line Voltage of Three Phases.
Display Instantaneous Line to Line Voltage of Three Phases.

PAGE 2

Display Phase Current of Three Phases.
Displays Total Active, Reactive and Apparent Power Three Phases.

PAGE 3

Display Instantaneous Current of Three Phases.
Display Average Power Factor of Three Phases.
Display Average Line to Line Voltage, Current of Three Phases and Frequency.

PAGE 4

Displays Import Active Energy.
Displays Export Active Energy.
Displays Total Active Energy.
Displays Import Reactive Energy.
Displays Export Reactive Energy.
Displays Total Reactive Energy.
Displays Total Apparent Energy.
Displays Run Hour.

Parameter Setting Mode

Display will show PASS . Press **UP/DOWN** keys to modify the set value and to go to the next parameter by pressing ⮌ key. Press the ⮚ key to save the set value and to come out of parameter setting after changing the set value.

1 PASS — Function: To set password.

This parameter is used to set the password.

Min	Max	Fac.
0	9998	11

2 CHnG PASS — Function: To change the password.

This parameter is used to change the password.

Min	Max	Fac.
no	YES	no

3 nEW PASS — Function: To set new password.

This parameter is used to set the new password.

Min	Max	Fac.
0	9998	0

4 SYS — Function: Network selection.

Network selection ie, either 3 Phase 3 wire or 3 Phase 4 wire.

Min	Max	Fac.
3P4	3P3	3P4

5 Ct-S — Function: To select CT Secondary ratio.

To select CT Secondary ratio.
Fixed Value 5A.

Min	Max	Fac.
5 A	10 kA	5 A

6 Ct-P — Function: To select CT Primary ratio.

To select CT Primary ratio.

Min	Max	Fac.
5 A	10 kA	5 A

Pt-S — Function: To select PT Secondary ratio.

PT Secondary: To select PT Secondary ratio.

Min	Max	Fac.
100V	500kV	350V

7 Pt-P — Function: To select PT Primary ratio.

PT Secondary: To select PT Primary ratio.

Min	Max	Fac.
100V	500kV	350V

8 r-Hr — Function: Run Hours selection.

To Select Run Hours.

Min	Max	Fac.
0	10	0

9 Id — Function: To set device Id.

To communicate properly controller side and PC side Id should match.

Min	Max	Fac.
1	255	1

10 bAUd — Function: To set baud rate for communication.

To communicate properly controller side and PC side baud rate should match.
Range: 2400,4800,9600,19200.

Min	Max	Fac.
2400	19200	9600

11 Prt — Function: Sets the parity check.

To communicate properly controller side and PC side Parity should match.
Range: nonE , EUEn , odd .

Min	Max	Fac.
nonE	odd	nonE

12 rSt FCt — Function : To restore default settings of the controller.

When set to YES all parameters are programmed to factory values.
Useful to debug setting related problems.

Min	Max	Fac.
no	YES	no

13 rSt EnrG — Function : To reset Energy.

This parameter used to Reset Energy, Run Hour and MAX values.

Min	Max	Fac.
no	YES	no

13.1 ErSt PASS — Function : To reset the Password.

To reset energy, Run hour and MAX values user need to enter password.
By entering correct password in this parameter user will be able to reset all energy parameter, Run Hour, MAX values.
This password will be value greater than parameter mode password by 1.

Min	Max	Fac.
0	9999	0

13.2 rSt P_iH — Function : To reset Active Energy.

If selected **yes** Active Energy will be Reset.

Min	Max	Fac.
no	YES	no

13.3 rSt UAr H — Function : To reset Apparent Energy.

If selected **yes** Apparent Energy will be Reset.

Min	Max	Fac.
no	YES	no

13.4 rSt PUAR H — Function : To reset Reactive Energy.

If selected **yes** Reactive Energy will be Reset.

Min	Max	Fac.
no	YES	no

13.5 rSt H-n — Function : To reset Run Hours.

If selected **yes** Run Hours will be Reset.

Min	Max	Fac.
no	YES	no

13.6 rSt nAX — Function : To reset Max.

If selected YES reset MAX values.

Min	Max	Fac.
no	YES	no

⊙ Error Messages

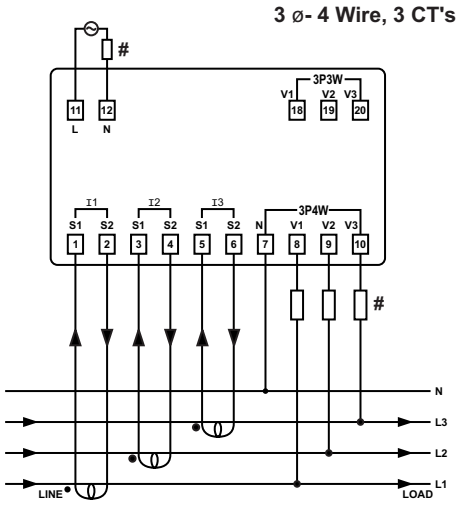
Message	Description
- - -	Power factor of corresponding phase shows this error message when input of corresponding is open.

⊙ Typical Wiring Diagram

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

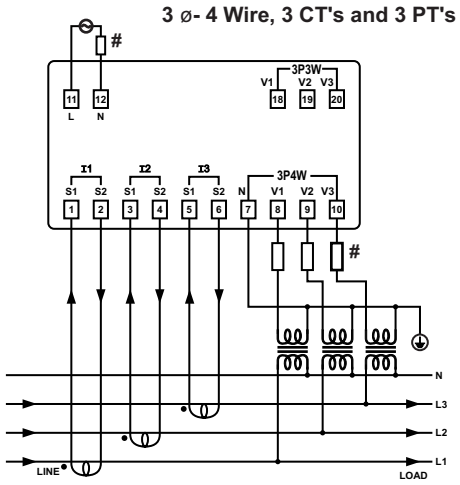
3 Phase - 4 Wire

3 ø- 4 Wire, 3 CT's



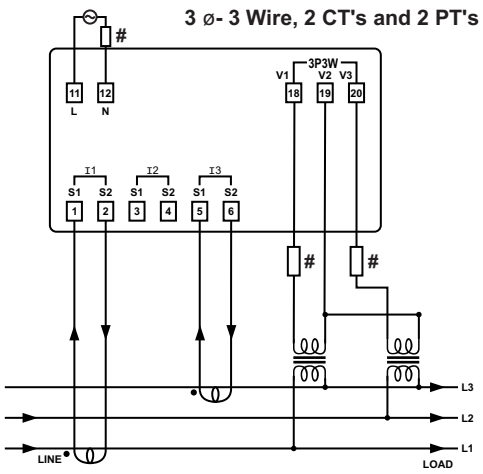
3 Phase - 4 Wire

3 ø- 4 Wire, 3 CT's and 3 PT's



3 Phase - 3 Wire

3 ø- 3 Wire, 2 CT's and 2 PT's

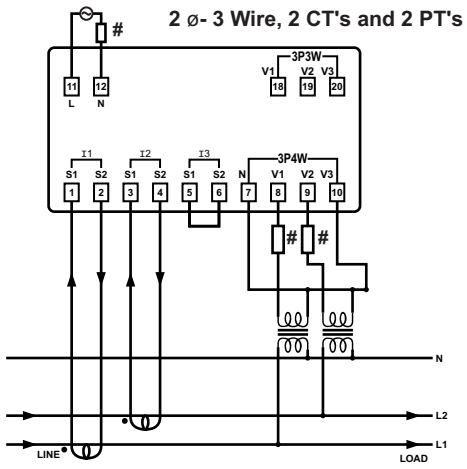


Note : Do not use 7,8 , 9 & 10 connector for 3P 3W.

⊙ Typical Wiring Diagram

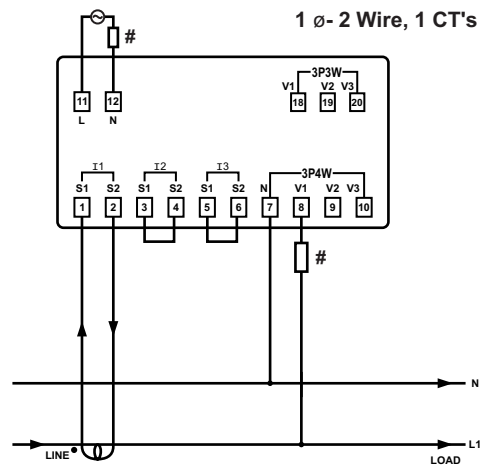
2 Phase - 3 Wire

2 ø- 3 Wire, 2 CT's and 2 PT's



1 Phase - 2 Wire

1 ø- 2 Wire, 1 CT's



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OUR OTHER PRODUCTS

sub-Zero

Precision Control, always

- Digital Panel Meter
- Power Analyzer
- Timer
- PLC
- HMI
- Data Logger

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