

## Installation Method

### ➤ F-MPM110 : Panel Mount



Front View



Optional module

Basic unit

Back View

## Feature

### ➤ Suit for LV/ HV voltage system

For low voltage system, direct connect up to 690 V (L-L) AC

For high voltage system, support connect up to 65kV

### ➤ True-RMS measuring parameter

True-RMS measuring parameters includes:

U, I, P, Q, S, PF, F, kWh, kvarh, kVAh



### ➤ Demand calculation

2 kinds of demand modes: fixed block and rolling block

### ➤ Power quality analysis

31st Harmonic analysis, K factor, unbalance etc.



### ➤ \* TOU (Multi-tariff billing), historical data of 31 days and 12 months

TOU, 4 tariffs, 8 time period in 24 hours



### ➤ Max./ Min. Record (U, I, P, Q\*, S\*)

### ➤ Under/ over limit alarm



### ➤ 64M bit Memory, Build-in Web

Real-time data inquiry by Web

Save monitoring data (Time interval settable 1min, 5 min, 10min, 15min, 30min)

Support FTP for download memory data



### ➤ CO<sub>2</sub> (carbon dioxide) calculation for kWh



### ➤ Multiple Communication

BACnet MS/TP Protocol (RS485 port)

MODBUS-RTU Protocol (RS485 Port)

MODBUS-TCP/IP Protocol (Ethernet port )



### ➤ DI / DO

### ➤ High accuracy

Active energy: according to IEC62053-22, class 0.5s

Reactive energy: according to IEC62053-23, class 2

## Basic Function

|                               |  |  |
|-------------------------------|--|--|
| <b>Real time metering</b>     | Voltage  | Ua, Ub, Uc, Uab, Ubc, Uca, UL-L avg, UL-N avg                      |
|                               | Current  | Ia, Ib, Ic, In, Iavg   |
|                               | Power  | Pa, Pb, Pc, $\sum P$ , Qa, Qb, Qc, $\sum Q$ , Sa, Sb, Sc, $\sum S$ |
|                               | Power factor   | PFa, PFb, PFc, $\sum PF$   |
|                               | Energy   | kWh, kvarh, kVAh *   |
|                               | CO2 (Carbon dioxide)   |  |
|                               | Frequency  | F  |
|                               | Demand & Max. demand   | Dmd_I, Dmd_P, Dmd_Q, Dmd_S   |
|                               | Max./ min. value   | Max./ min. (U, I, P, Q*, S*)                                       |
|                               | Multi-tariff energy *  |  |
| <b>Power quality analysis</b> | Unbalance  | U_unbl *, I_unbl *   |
|                               | Harmonic (31 <sup>st</sup> )   | THDu, THDi, TOHDu, TOHDi, TEHDu, TEHdi, HRU *, RHI *               |
|                               | Harmonic RMS (0-31 <sup>st</sup> )   | Harmonic RMS-U *, Harmonic RMS-I *, Harmonic RMS-P *               |
|                               | Harmonic energy (1 <sup>st</sup> -13 <sup>th</sup> )   |  |
|                               | Voltage crest factor, current K factor, Load rate, Voltage deviation, Frequency deviation<br>Running time record for power-on period and qualified voltage & current * |  |
| <b>Setpoint alarm</b>         | Over/ under limit alarm  |  |
| <b>3DI +2 DO</b>              | 3 status input + 2 relay output  |  |
| <b>RS485</b>                  | Modbus-RTU protocol  |  |
| <b>Record function</b>        | SOE (event log), Real-time clock ( yyyy-mm-dd hh:mm:ss) *  |  |
|                               | Voltage/ frequency deviation, Voltage unbalance record   |  |

## Optional Module



|             |                              |            |                                  |
|-------------|------------------------------|------------|----------------------------------|
| <b>SW</b>   | 4 status input (wet contact) | <b>LAN</b> | 64M bit memory + Ethernet TCP/IP |
| <b>SD</b>   | 4 status input (dry contact) | <b>AI</b>  | 2 analog input (4-20mA)          |
| <b>C *</b>  | The 2 <sup>nd</sup> RS485    | <b>AO</b>  | 2 analog output (4-20mA)         |
| <b>Ep *</b> | 2 pulse output               | <b>BA</b>  | BACnet MS/TP protocol            |
| <b>R</b>    | 2 relay output               |            |                                  |

\* means some of function can't be read through BACnet communication port

| Parameter           | Accuracy | Resolution   | Measuring Range   |
|---------------------|----------|--------------|---|
| Voltage             | 0.2%     | 0.01V        | Direct: 690Vph-ph<br>PT primary: 0.001kV~65kV (settable)<br>PT secondary: 1~398V (settable) |
| Current             | 0.2%     | 0.001A       | CT primary: 1~9,999A (settable)<br>CT secondary: 1 A or 5A                                  |
| Power               | 0.5%     | 0.1W/var/ VA | each phase: 0~649.9MW/ Mvar/ MVA<br>Total: 0~1949.8MW/ Mvar/ MVA                            |
| Power factor        | 0.5%     | 0.001        | -1.000~+1.000   |
| Frequency           | 0.01     | 0.01Hz       | 45~ 65 Hz   |
| Active energy       | 0.5%     | 0.1kWh       | 0~ 99,999,999.9 kWh   |
| Reactive energy     | 2.0%     | 0.1kvarh     | 0~ 99,999,999.9 kvarh   |
| Apparent energy     | 1.0%     | 0.1kVAh      | 0~ 99,999,999.9 kVAh  |
| THD                 | 1.0%     | 0.001        | 0~100.0%  |
| Individual harmonic | 1.0%     | 0.001        | 0~100.0%  |
| Un-balance          | 1.0%     | 0.001        | 0~100.0%  |

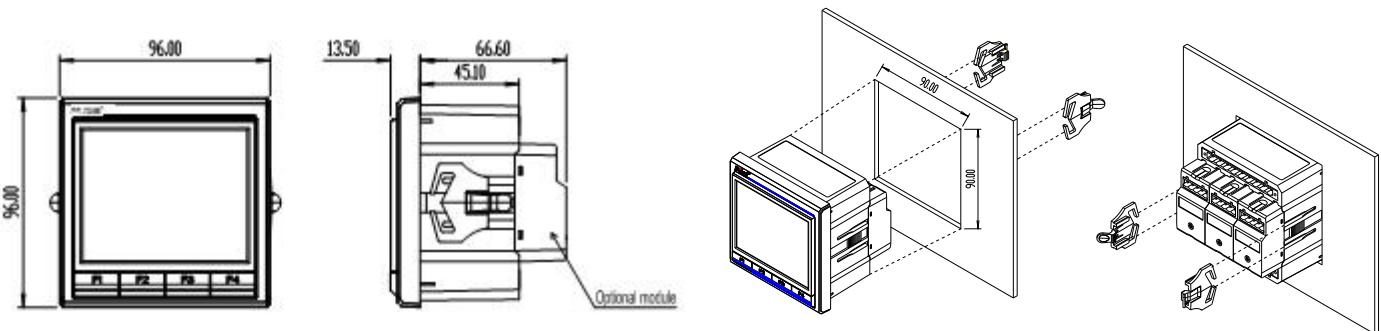
## Technical Specification

|  |  |   |   |  |  |                       |
|--|--|---|---|--|--|-----------------------|
| <b>Connection mode</b>                   | 3-phase 3-wire, 3-phase 4-wire, 1-phase 2-wire   | <b>Communication</b>  | Modbus-RTU Protocol                           | RS485 serial<br>Baud rate: 2400, 4800, 9600, 19200, 38400bps<br>Address: 1~247                               |  |                       |
| <b>Metering</b>                          | True RMS, 1 sec refresh time   |   | Modbus-TCP/ IP                                | Ethernet communication port<br>Support connect 10M/100M ethernet, Modbus TCP/IP, Web, FTP                    |  |                       |
| <b>Input</b>                             | Rate current: 1A or 5A<br>Rate voltage:<br>Direct 120, 220V, 240V, 277V, 398Vph-N (optional)<br>PT secondary: 1~398V (settable)<br>Frequency: 50/ 60Hz |   | BACnet MS/TP protocol                         | RS485 serial<br>Baud rate: 2400, 4800, 9600, 19200, 38400, 57600, 76800bps<br>Address: 1...127, excluding 99 |  |                       |
| <b>Overload</b>                          | 120% of rated, continuously<br>Instantaneous current: 10 times/ sec<br>Instantaneous voltage: 2 times/ sec   |   | <b>Dimension (L x W x H)</b>                  |  |  |                       |
| <b>Status input</b>                      | Wet contact, external power supply   | <b>F-MPM110:</b><br>Panel: 96 x 96 x 13.5 mm<br>Cut-out: 90 x 90 x 58.6 mm (basic)<br>90 x 90 x 80.1 mm (optional module) |   |  |  |                       |
| <b>Relay output</b>                      | Node capacity: 250VAC/5A   | <b>F-MPM110-DR:</b><br>Panel: 96 x 96 x 12 mm<br>Cut-out: 90 x 90 x 58.6 mm (basic)                                       |   |  |  |                       |
| <b>Pulse output</b>                      | Pulse constant: 1000~9999 programmable<br>Pulse width: 60~100ms programmable<br>Formula: 1 pulse = (1 ÷ pulse constant × PT × CT) kWh                  | <b>Weight</b>   |   |  |  |                       |
| <b>Power supply</b>                      | 85 ~265VAC, 85~265VDC (When select P1)<br>100~420VAC, 100~400VDC (When select P2)  | Basic unit: approx 550gr.<br>Optional module: 50gr.   |   |  |  |                       |
| <b>Power loss</b>                        | <5VA   | <b>Environment</b>  | Main Module & other Modules                   | Operating temperature: -10℃~ +55℃<br>Storage temperature: -40℃~ +70℃<br>Humidity: 5%~95% non-condensing      |  |                       |
| <b>IP index</b>                          | IP52 (front panel) and IP30 (case)   |   | BACnet Module                                 | Operating temperature: 0℃~ +50℃<br>Storage temperature: -5℃~ +75℃<br>Humidity: 10%~95% non-condensing        |  |                       |
| <b>Power frequency withstand voltage</b> | AC 2KV/minute  |   | <b>Standard (EMC)</b>                         |  |  |                       |
| <b>Insulation resistance</b>             | ≥50MΩ  |   | Electrostatic discharge immunity test         | IEC 61000-4-2,Level 4  | Surge immunity test (1, 2/50μs~8/20μs) | IEC 61000-4-5,Level 3 |
| <b>Impulse withstand voltage</b>         | 4kV (peak), 1.2/50μS   | Radiated immunity test  | IEC 61000-4-3,Level 3                         | Conducted emissions  | EN 55022,Class B                       |                       |
|  |  |   | Electrical fast transient/burst immunity test | IEC 61000-4-4,Level 4  | Radiated emissions                     | EN 55022,Class B      |

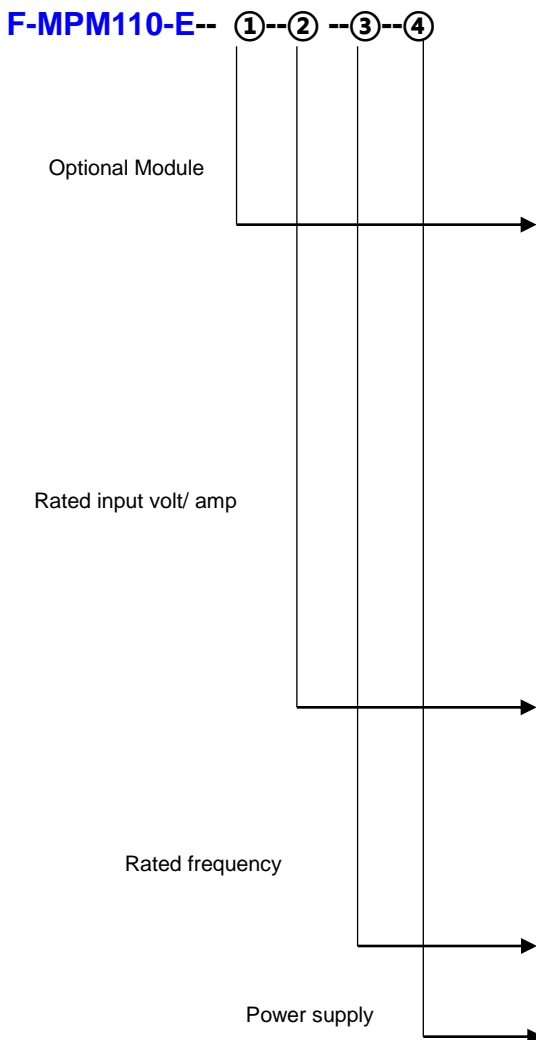
## Dimension & Installation

**F-MPM110** : Panel Mount

Unit: mm



## Order Information



|            |   |
|------------|---|
| <b>SW</b>  | DI Module: 4 Status Input (wet contact) |
| <b>SD</b>  | DI Module: 4 Status Input (Wet contact) |
| <b>R</b>   | DO Module: 2 Relay Output               |
| <b>C</b>   | RS485 Module: The 2nd RS485 comm        |
| <b>LAN</b> | 64M bits memory + Ethernet TCP/IP       |
| <b>AO</b>  | AO Module: 2 Analog output (4~20mA)     |
| <b>AI</b>  | AI Module: 2 Analog input (4~20mA)      |
| <b>Ep</b>  | PO Module: 2 Pulse Output               |
| <b>BA</b>  | BACnet Module: BACnet protocol          |
| <b>V1</b>  | 57.7/ 100V (via PT), 5A                 |
| <b>V2</b>  | 57.7/ 100V (via PT), 1A                 |
| <b>V3</b>  | 220/ 380V (direct), 5A                  |
| <b>V4</b>  | 220/ 380V (direct), 1A                  |
| <b>V5</b>  | 120/ 208V (direct), 5A                  |
| <b>V6</b>  | 240/ 415V (direct), 5A                  |
| <b>V7</b>  | 277/ 480V (direct), 5A                  |
| <b>V8</b>  | 63.5/ 110V (via PT), 5A                 |
| <b>V9</b>  | 120/ 208V (direct), 1A                  |
| <b>V10</b> | 240/ 415V (direct), 1A                  |
| <b>V11</b> | 277/ 480V (direct), 1A                  |
| <b>V12</b> | 63.5/ 110V (via PT), 1A                 |
| <b>V13</b> | 398/690V (direct), 5A                   |
| <b>F1</b>  | 50Hz                                    |
| <b>F2</b>  | 60Hz                                    |
| <b>P1</b>  | 85~265Vac, or 85 ~ 265Vdc, 45-65Hz      |
| <b>P2</b>  | 100 ~ 420Vac , or 100 ~ 400Vdc, 45~60Hz |

- Note:**
1. F-MPM110 supports Max. 3 optional module
  2. F-MPM110 supports Max. 2 **S** optional module, others optional function can only be chosen once.
  3. **AI** & **AO** module can only be selected once
  4. **64M** bit memory data can only be read by MODBUS TCP/IP
  5. **BA** & **LAN** module can not be selected together