

F-PM100

**Smart Power Meter
For Power Distribution System**

Datasheet

Version 1.0



1. Description

F-PM-100 Series Intelligent Power Meter is widely used in various industries of power supply and distribution system, industrial automation and intelligent network monitoring system. F-PM-100 Series is designed to meet the rapid development demand of smart grid system. With features of superior quality, strong stability, high precision.

F-PM-100 Series Intelligent Power Meter provides full power acquisition, switching value monitoring, relay output function, and has a strong extended function. The users can flexibly select 2~31 harmonic analysis, off-limit alarm, SOE recording, electrical degree pulse output, demand statistics, etc. realize dual network communication, support online upgrade, save the power-off data, stably and seamlessly connect with various background system, perfectly implement site level distributed intelligent control to smart substation and unattended station.

2. Product Features

- Apply to various voltage classes system under 110 kV, suit for a variety of power monitoring scenario.
- High-level anti-interference capability, advanced AC sampling and digital filtering.
- High precision and reliability, easy operation, cost effective.
- User-settable CT/PT ratio.
- High definition LCD screen display.
- Adopt self-locking panel mounting mechanism, can be fixed without screws.
- Provide 31 times voltage and current harmonic analysis.
- Adapt to a variety of voltage classes and different wiring modes.
- Standardized dimension and reasonable wiring design, easy to install and maintain.
- Configuration in accordance with DIN 96×96 standard, shell depth 90mm.
- Implement site realize distributed intelligent control, truly smart and unmanned operation substation.

3. Specifications

3.1 Main Technical Parameters

Operating Temperature	- 25℃—+55℃
Storage Temperature	- 40℃—+80℃
Humidity of work and storage	≤95%
Insulation Class	Conform to EN61010-1 Standard
Class of Pollution	2
Power Supply	85—265VAC/DC

Operating Frequency	50/60Hz
Product Life	≥10 years
Dimension	Display Panel: 96mm×96mm12mm (W×H×D)
	Main Unit: 96mm×96mm×75mm (W×H×D)
Weight	Approximately 400g
IP Degree	IP20
Input Characteristics	Current Measurement: 5A/1A (1A needs to specify when ordering)
	Voltage Measurement: 57.7V/220V (AC line-neutral effective value)
	Remote Communication Resolution: ≤1ms (SOE incident resolution)
Output Characteristics	Breaking Parameters: 5A@250VAC,5A@30VDC Resistive Load
Communication	Communication Interface: RS485
	Communication Protocol: MODBUS-RTU
	Communication Speed: 600/1200/2400/4800/9600/19200/38400bps
	Meter Address Range: 1-254

3.2 Electromagnetic Property

IEC61000-4-2 (EN61000-4-2)	Electrostatic Discharge Immunity Test	Class 3
IEC61000-4-3 (EN61000-4-3)	Radiated, Radio-Frequency, Electromagnetic Field Immunity Test	Class 3
IEC61000-4-4 (EN61000-4-4)	Electrical Fast Transient / Burst Immunity Test	Class 3
IEC61000-4-5 (EN61000-4-5)	Surge Immunity Test	Class 3
EN55022	Conduction Radio-Frequency Disturbance Test	Class B
EN55022	Radiation Radiofrequency Disturbance Test	Class B

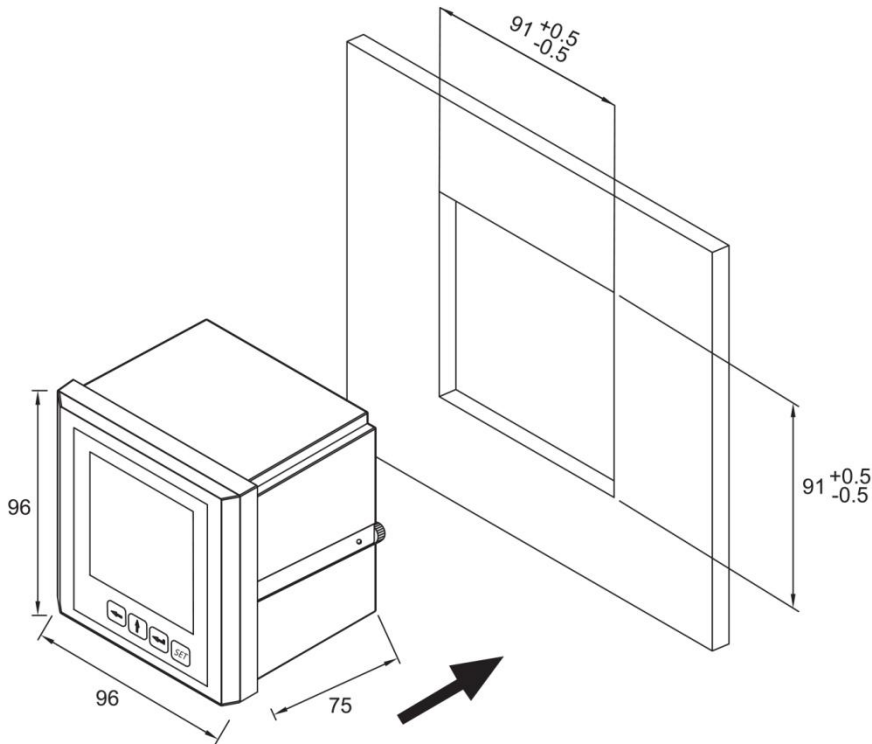
3.3 Measuring Technical Indicators

Parameters	Precision	Measurement Range
Voltage	0.2/0.5	0-999,999V
Current	0.2/0.5	0-49,999A
Power Factor	0.01	-1.0< CosΦ <+1.0
Active Power	0.5	Single Phase: 0-100MW; Total: 0-300MW
Reactive Power	0.5	Single Phase: 0-100Mvar; Total: 0-300Mvar
Apparent Power	0.5	Single Phase: 0-100MVA; Total: 0-300MVA
Electrical Degree	1.0	0-999,999,99KWh/kvarh
Frequency	0.05Hz	45-65Hz

4. Installation

4.1 Outline and Installation Dimensions

4.1.1 Outline Dimensions &(mm) Installation Dimensions



ACE700外形及安装开孔尺寸图（单位：毫米）

F-PM-100A Outline Dimensions

4.2 Terminal Wiring definition

1	Ia*	A phase current incoming line
2	Ia	A phase current outgoing line
3	Ib*	B phase current incoming line
4	Ib	B phase current outgoing line
5	Ic*	C phase current incoming line
6	Ic	C phase current outgoing line
7	Ua	A phase voltage
8	Ub	B phase voltage
9	Uc	C phase voltage
10	Un	Neutral line
11	A	RS485 communication positive
12	B	RS485 communication negative
13	COM	Public port for input
14	DI1	Input 1

15	DI2	Input 2
16	DI3	Input 3
17	R11	Relay 1 output
18	R12	Relay 1 output
19	R21	Relay 2 output
20	R22	Relay 2 output
21	N/-	Alternating power 220V neutral line or direct current 24V negative
22	L/+	Alternating power 220V live line or direct current 24V positive

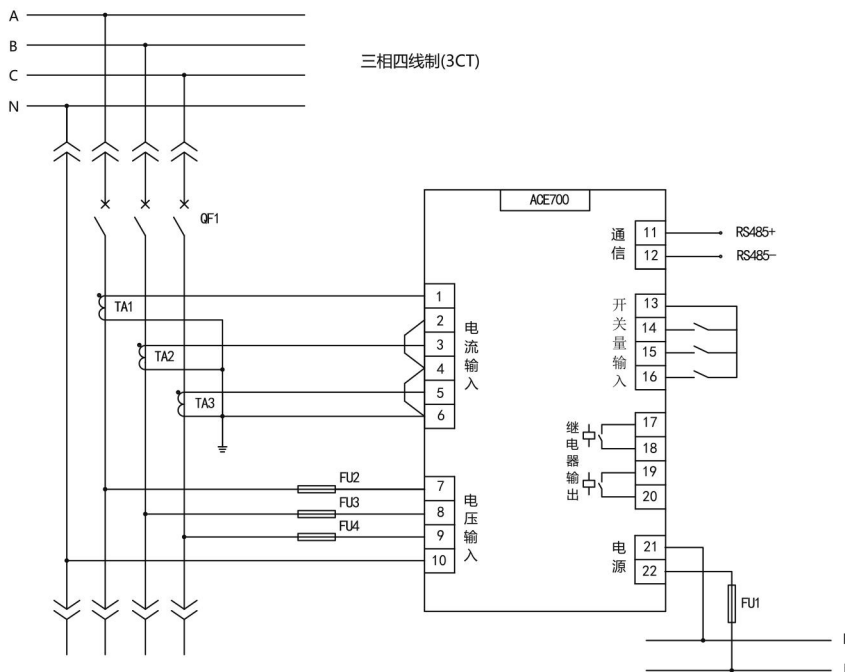
4.3 Electric Wiring Diagram

F-PM-100 series meter supports multiple measuring wiring mode, and is described respectively by graphic method as below.

4.3.1 When measuring voltage is less than 300V (phase) / 520V (line), three-phase four-wire system no need to use PT but direct measurement.

4.3.2 When measuring zero sequence current, the using secondary circuit current of zero sequence current transformer is 0.02-1A.

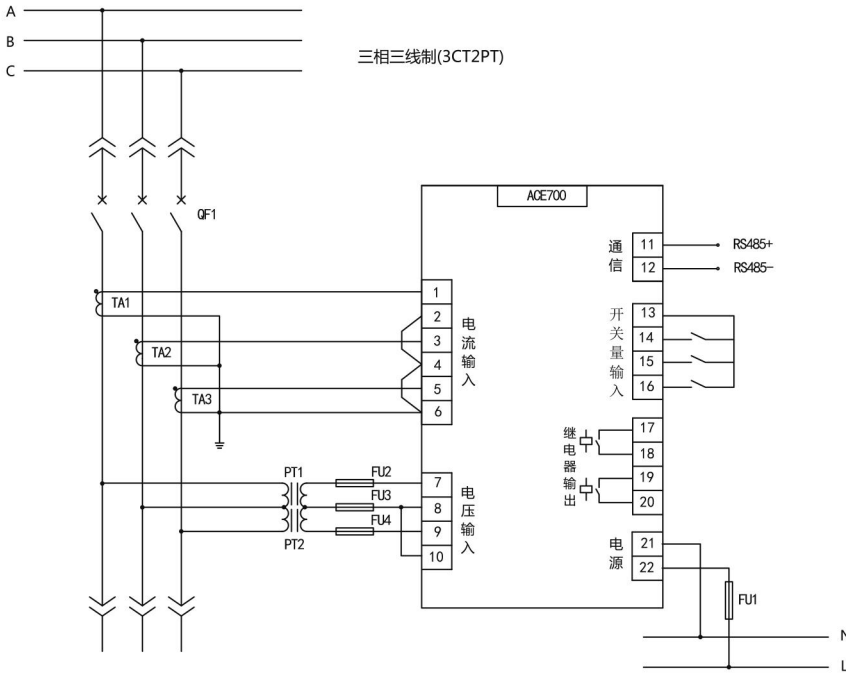
4.3.3 Three-Phase Four-Wire System 3CT



ACE700三相四线典型接线示意图

3P4W / 3CT Wiring Diagram

4.3.5 Three-Phase Three-Wire System 3CT



ACE700三相三线典型接线示意图

5. Communication

5.1 Communication Mode

Communication Interface	RS485
Communication Wiring Mode	Two-wire system (RS485+, RS485-), Shielded twisted pair
Communication Working Mode	half-duplex
Communication Rate	600/1200/2400/4800/9600/19200/38400bps
Node Capacity	32

5.2 Communication Wiring Reference Diagram

Wiring method refers to below, on the construction site, in order to prevent signal reflection, one resistor around 120 ohm is suggested in parallel wiring with RS-485 terminal for impedance matching.

5.2.1 The total length of the RS485 communication line shall not be more than 1200 meters

5.2.2 RS485 communication +, - must be properly connected, and shield must be well grounded

6. Order information

6.1 F-PM-100 Series Function Selection Table

Measuremen Function	Three-phase phase voltage (U_a, U_b, U_c)
	Three-phase line voltage (U_{ab}, U_{bc}, U_{ca})
	Three-phase current and zero sequence current (I_a, I_b, I_c, I_0)
	The mean value of three-phase voltage and three-phase current (Avg)

System Frequency	Three-phase power factor (PFa, PFb, PFc), system power factor (PF)
	Three-phase active power (Pa, Pb, Pc), total active power (P)
	Three-phase reactive power (Qa, Qb, Qc), total reactive power (Q)
	Three-phase apparent power (Sa, Sb, Sc), total apparent power (S)
	Three-phase active absolute energy (Wpa, Wpb, Wpc), total active energy (Wp)
	Three-phase reactive absolute energy (Wqa, Wqb, Wqc), total reactive energy (Wq)
Energy Metering	Energy Metering
	Three-phase active energy
	Total active energy
	Three-phase reactive energy
	Total reactive energy
Harmonics Measurement and Analysis	2-31 secondary voltage, current harmonics
Input / Output Function	Switch input: optical isolation input, dry contact
	Relay output: 5A / 250VAC or 5A / 30VDC
	Measurement accuracy: 0.2 / 0.5 degree
	Power input: 85V-265VAC/DC

6.2 The relevant standards need to identify

6.2.1 CT rated standard input: 5A, succession overload 2 times; optional input: 1A, succession overload 2 times

6.2.2 PT rated standard input: 220V or 100V

6.2.3 Normally, the precision of F-PM-100 Series Power Meter is 0.5 degree, if you need 0.2 degree please specify when ordering

6.2.4 F-PM-100 Series is only used in 380V low voltage system, thus CT secondary input is forced to 5A or 1A, please specify when ordering

6.3 F-PM-100 Series Order Form

Function model	F-PM-100A	F-PM-100B	F-PM-100C	F-PM-100D
Three-Phase Phase Voltage	■	■	■	■
Three-Phase Wire Voltage	■	■	■	■
Three-Phase Current	■	■	■	■
Zero Sequence Current	■	■	■	■
Power Factor	■	■	■	■
Frequency	■	■	■	■
Active/Reactive/Apparent Power	■	■	■	■
Active/Reactive Electrical Degree	■	■	■	■
Digit Inputs	3	3	3	

2 Relay Outputs		■	■	
Multi-rate			■	
31 Times Harmonic			■	
Demand Statistics			■	
SOE Recording			■	
Off-Limit Alarm			■	
Large Screen Liquid-Crystal Display	■	■	■	■
RS458Interface	■	■	■	■