ЭНЕРГОМЕТРИКА
www.energometrika.ru

CATALOG V9.0

Power Meter & Energy Meter

Motor Protection Controller

Multi-Channel Power Meter

Smart Gateway

Current Transformer

Basic Function

- Real-time measure one circuit DC voltage, current, power , kWh
- High accuracy: Class 0.5
- One LED indicate pulse output
- RS485 port, MODBUS-RTU or DL/T645 protocol (optional)
- 35mm DIN rail installing, standard DIN ED5002
- Shunt: 100A, 200A, 300A, 400A

Technical Specification

Power supply	9~36VDC
Rated Voltage DC	0~1000VDC
Rated Current DC	100A, 200A, 300A, 400A
Shunt	Rated voltage: 75mV
	Accuracy: Class 0.2
Starting Current	0.002Ib
Pulse output	1 channels, pulse constant: 1000imp/kWh
Power loss	<1W
Communication	RS485 port MODBUS-RTU or DL/T645-2007 (Settable)
	Address: 1~247
	Baud rate: 1200, 2400, 4800, 9600, 19200bps
IP index	IP20

Dimension (L*W*H)	100*36*65mm (2 moudule)
Power frequency withstand voltage	3000VAC
Insulation resistance	≧100mΩ
Impulse voltage	6000V
Environment	Operating temperature: -20℃~ +55 ℃ Limit Temperature: -25℃~ +75 ℃ Storage temperature: -30℃~ +80 ℃ Humidity: < 95%
EMC Standard	Electrostatic Discharge Immunity Test IEC61000-4-2:2001 RF Electromagnetic Field Immunity testing IEC61000-4-3:2002 Electrical fast transient immunity test IEC61000-4-4:2004 Surge immunity test IEC61000-4-5:2005 Injected Current Immunity Test IEC61000-4-6:2006 Electromagnetic emission limit Passed Voltage sag and short-time interruption Immunity testing Passed

Parameter	Measurement Range	Accuracy
Voltage	0-1000VDC	0.2%
Current	1% ~ 120% of rated	0.2%
Power	0~300kW	0.5%
Energy	0~999999.99kWh	Class 0.5

Order Information

SPM90--①--②

1	100A Shunt
2	200A Shunt
3	300A Shunt
4	400A Shunt

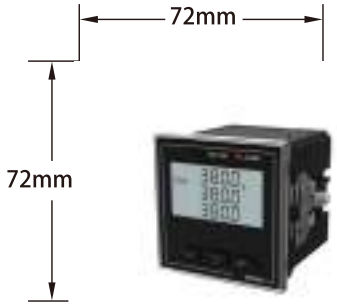
P	Pulse Output

Example: Model No. SPM900-1-P, which indicate the device provides with basic function and pulse output,100A shunt , MODBUS-RTU communication protocol .

Note: Default Pulse output function, MODBUS-RTU protocol, baudrate 9600bps, settable for DL/T645-2007 protocl

Feature

- Suitable for distribution system under 650kV
- True RMS measuring parameters
- Setpoint alarm for over/ under limit
- PT and CT (1A/ 5A) programmable
- Optional digital input & relay output
- High accuracy, class 0.5s for kWh
- Small size: 72* 72mm
- One RS485, support Modbus-RTU protocol



SPM32 Upgrade version

Basic Function

Measuring real-time parameters:

- Voltage--Ua, Ub, Uc, Uab, Ubc, Uca, phase angle
- Current—Ia, Ib, Ic, I0, phase angel
- Active Power—Pa, Pb, Pc, ∑P
- Reactive Power—Qa, Qb, Qc, ∑Q
- Apparent Power—Sa, Sb, Sc, ∑S
- Power Factor-- PFa, PFb, PFc, ∑PF
- Frequency—F
- Energy—Total kWh, Total kvarh
- Demand—Dmd for I, Dmd for P
- Setpoint alarm info—over voltage, under voltage, over current, under current, over frequency, under frequency, over load, over demand power, phase loss, DI status
- *Harmonic — THDi, THDu, 2~63rd harmonic
- *Apparent Energy—kVAh,
- *Unbalance rate — Iunbal , Uunbal
- *Device power on hour—DOH,
- *Load on/ run hour—LOH, LRH
- *Load impedance

Note: The data marked * is can read only by RS485

Optional Function

- 2 digital input
- 2 relay output
- 2 pulse output

Technical Specification

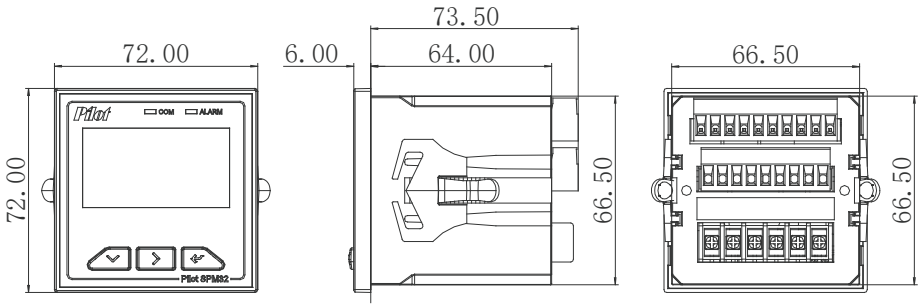
Connection Mode	3 phase 3 wires, 3 phase 4 wires
Metering	True RMS, 1 sec refresh time
Input	Rated current: 5A or 1A Rated voltage: 57V ~300V(ph-N), 35Hz~65Hz
Status Input (optional)	Rated voltage 220V, 2 channel active status input. Lower than 60V is open, higher than 178V is closed. Max. input is 300V
Relay Output (optional)	Rated contact capacity: 250VAC/5A or 30VDC/5A
Power Supply	85~265VAC or 100~300VDC
Power Loss	<4VA
Power Frequency Withstand Voltage	AC 2KV/minute
Insulation Resistance	≥ 100MΩ
Impulse Withstand Voltage	6KV

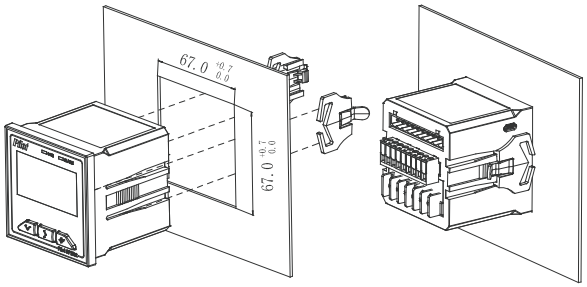
Communication	RS485 serial, Modbus-RTU, Address: 1~247 Baudrate: 4800, 9600, 19200bps
Dimension (L x W x H)	Panel: 72 x 72 x 6 mm Cut-out: 66.5 x 66.5 x 73.5 mm (+0.5mm)
IP Index	IP52 (front panel) and IP20 (case)
Environment	Operating temperature: -10℃～+55℃ Limit operating temperature: -25℃～+55℃ Storage temperature: -40℃～+70℃ Humidity: 5%～95% RH, non-condensing
Standard (EMC)	Electrostatic discharge immunity test IEC 61000-4-2,Level 4 Radiated immunity test IEC 61000-4-3,Level 4 Electrical fast transient/burst immunity test IEC 61000-4-4,Level 4 Surge immunity test (1, 2/50μs～8/20μs) IEC 61000-4-5,Level 4 RF field immunity induced mass IEC61000-4-6, Level 3

Measurement Parameter	Accuracy	Measuring Range
Voltage	0.2%	Direct input line - line 10 ~ 500V, Line – neutral: 10 ~ 400V PT primary: 650KV, PT secondary: 100-400V
Current	0.2%	CT primary: 9,999A, CT secondary: 5mA~6.5A
Power factor	0.5%	-1.0000~1.0000
Active power	0.5%	0 ~ ±9,999MW
Reactive power	1.0%	0 ~ ±9,999Mvar
Apparent power	1.0%	0 ~ 9,999MVA
Active energy	0.5%	0~ 99,999,999.9 kWh
Reactive energy	2.0%	0~99,999,999.9 kvarh
Apparent energy	2.0%	0~99,999,999.9 kVAh
Voltage or current unbalance	1.0%	0%~100%
Harmonic	class B	0%~100%

Dimension & Installation

Unit: mm





Order Information

SPM32 - E - ①

S	2 digital input (wet contact)
SR	2 digital input (wet contact) + 2 relay output
EP	2 pulse output

Example:

Model No. SPM32-SR, it means the device provides basic measuring function, one RS485 port, 2 digital input, 2 relay output.

SPM33 Upgrade version

Feature

- Suit for distribution system below AC 650kV
- CT input 1A or 5A settable
- PT and CT settable
- Setpoint alarm function
- Up to 63rd harmonic analysis, THD
- Wiring mode 1P2W, 3P3W, 3P4W
- RS485/Modbus-RTU communication protocol
- Energy accuracy Class 0.5s

Basic Function

Measuring real-time parameters:

- Voltage--Ua, Ub, Uc, Uab, Ubc, Uca, phase angle
- Current—Ia, Ib, Ic, In, phase angel
- Active Power—Pa, Pb, Pc, ∑P
- Reactive Power—Qa, Qb, Qc, ∑Q
- Apparent Power—Sa, Sb, Sc, ∑S
- Power Factor-- PFa, PFb, PFc, ∑PF
- Frequency—F
- Energy—kWh, kvarh (total, imp. and exp.)
- Demand—Dmd for I, P, Q, S
- THD — THDi, THDu,
- *2~63rd harmonic
- *Apparent Energy—kVAh,
- *Unbalance rate — Iunbal , Uunbal
- *Device power on hour—DOH,
- *Load on/ run hour—LOH, LRH
- Setpoint alarm info—over voltage, under voltage, over current, under current, over frequency, under frequency, over load, phase loss, DI status
- 2 DI (wet contact), RS485

Optional Function

- 2 relay output
- 4DI + 2 relay output
- LAN port (Modbus-TCP protocol)
- *Multi-tariff energy, *SOE event log, *Four-quadrant energy, *Max.& Min. data, *History data record, *Forecast demand, *Monthly peak demand, *Current K factor, *Voltage crest factor, *Current TDD, *Displacement power factor

Note: The data marked * can be read only from communication.

Technical Specification

Connection Mode	1 phase 2 wires, 3 phase 3 wires, 3 phase 4 wires
Metering	True RMS, 1 sec refresh time
Input	Rated current: 5A or 1A Rated voltage: 220/380V, 35Hz~65Hz
Overload	Current: 120% of rated, continuously Instantaneous current: 10 times/
	Low voltage system: Up to 400V(L-N) / 650V (L-L) High voltage system: Up to 650kV

Power Supply	85~265VAC or 100~300VDC
Power loss	<5VA
Communication	RS485 serial, support Modbus-RTU Baudrate: 4800, 9600, 19200 bps Address: 1~247 Optional RJ45, support Modbus-TCP
Dimension (L x W x H)	Panel: 96 x 96 x 18 mm Cut-out: 89.5 x 89.5 x 69.8 mm (+0.5mm)
IP index	IP54 (front panel) and IP20 (case)
Weight	Approx. 500gr.

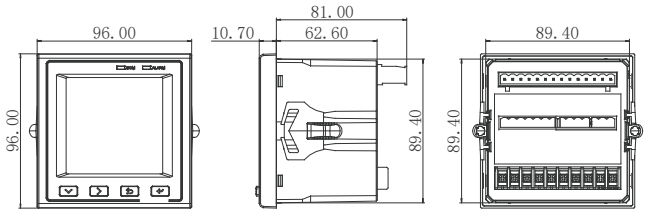
Status input (optional)	≤6 channels, Wet contact (active status input): voltage less than 60V is open,more than 140V is closed,the maximum input is 300V Optional dry contact output: DC30V
Relay output (optional)	≤4 channels, Node capacity: 250Vac/5A
Power frequency withstand voltage	AC 4KV/minute
Insulation resistance	≥ 100MΩ
Impulse withstand voltage	6kV (peak), 1.2/50uS

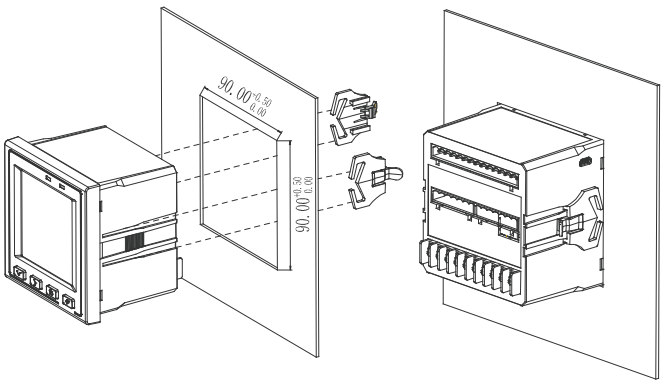
Environment	Normal operating temperature: -10℃～+55℃ Operating temperature: -25℃～+55℃ Storage temperature: -40℃～+70℃ Humidity: 5%~95% non-condensing
Standard (EMC)	Electrostatic discharge immunity test IEC 61000-4-2,Level 4 Radiated immunity test IEC 61000-4-3,Level 4 Electrical fast transient/burst immunity test IEC 61000-4-4,Level 4 Surge immunity test (1, 2/50μs～8/20μs) IEC 61000-4-5,Level 4

Parameter	Accuracy	Measuring Range
Voltage	0.2%	Direct input line - line 10 ~ 500V, Line – neutral: 10 ~ 400V PT primary: 650KV, PT secondary: 100-400V
Current	0.2%	CT primary: 50,000A, CT secondary: 5mA~6.5A
Power factor	1.0%	-1.0000~1.0000
Active power	0.5%	0 ~ ±9999MW
Reactive power	1.0%	0 ~ ±9999Mvar
Apparent power	1.0%	0 ~ 9999MVA
Active energy	0.5%	0~ 99,999,999.9 kWh
Reactive energy	2.0%	0~ 99,999,999.9 kvarh
Apparent energy	2.0%	0~ 99,999,999.9 kVAh
Voltage or current unbalance	1.0%	0%~100%
Harmonic	Class B	0%~100%

Dimension & Installation

Unit: mm





Order Information

SPM33–①–②

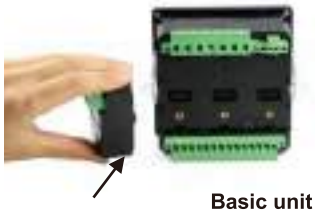
R	Two relay output
T	SOE event log, Multi-tariff energy, Four-quadrant energy, Max.& Min. data, History data record, Forecast demand, Monthly peak demand, current K factor, voltage crest factor, current TDD, Displacement power factor
E1	4 status input (wet contact) + 2 relay output
E4	4 status input (dry contact) + 2 relay output
LAN	One LAN port, support Modbus-TCP protocol

Example: Model No. SPM33-R, it means the device provides basic measuring function, one RS485 port, 2 digital input, 2 relay output.

Different Installation Method

- PMAC770 : Panel Mount
- PMAC770 -DR : 35mm DIN Rail Mount

Front View



Back View

Front View

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*)**

- **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

- **CO2 (carbon dioxide) calculation for kWh**

- **Multiple Communication**

  BACnet MS/TP Protocol (RS485 port)

  MODBUS-RTU Protocol (RS485 Port)

  MODBUS-TCP/IP Protocol (Ethernet port)

BACnet Ethernet MODBUS

- **DI / DO**

- **High accuracy**

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

  Reactive energy: according to IEC62053-23, class 2

Basic Function （For both PMAC770 & PMAC770-DR ）		
Real time metering	Voltage	Ua, Ub, Uc, Uab, Ubc, Uca, UL-L avg, UL-N avg
	Current	Ia, Ib, Ic, In, Iavg
	Power	Pa, Pb, Pc, ∑P, Qa, Qb, Qc, ∑Q, Sa, Sb,Sc, ∑S
	Power factor	PFa, PFb, PFc, ∑PF
	Energy	kWh, kvarh, kVAh *
	CO2 (carbon dioxide)	kWh(import /export)
	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 *	
	Phase angle *	
Power quality analysis	Unbalance	U_unbl*, I_unbl*
	Harmonic (31^{st})	THDu, THDi, TOHDu, TOHDi, TEHDu, TEHDi, HRU*, RHI*
	Harmonic RMS ($0-31^{st}$)	Harmonic RMS-U*, Harmonic RMS-I*, Harmonic RMS-P *
	Harmonic energy ($1^{st}-13^{th}$)	
	Voltage crest factor, current K factor, Load rate, Voltage deviation, Frequency deviation Running time record for power-on period and qualified voltage & current *	
Setpoint alarm	Over / under limit alarm	
3DI +2 DO	3 status inputs (wet contact) + 2 relay outputs	
RS485	Modbus-RTU protocol	
Record function	SOE (event log), Real-time clock (yyyy-mm-dd hh:mm:ss)*	
	Voltage / frequency deviation, Voltage unbalance record	

Optional Module (Only for PMAC770)

SW	4 status input (Wet contact)	LAN	64M bit memory + Ethernet TCP/IP
SD	4 status input (Dry contact)	AI	2 analog input (4-20mA)
C*	The 2^{nd} RS485	AO	2 analog output (4-20mA)
Ep*	2 pulse output	BA	BACnet MS/TP protocol
R	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
			PT primary: 0.001kV~65kV (settable) PT secondary: 1~398V (settable)
Current	0.2%	0.001A	CT primary: 0 ~ 9,999A CT secondary: 1 A or 5A
Power	0.5%	0.1W / var / VA	each phase: 0 ~ 649.9MW / Mvar / MVA
			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

Connection mode	3-phase 3-wire, 3-phase 4-wire, 1-phase 2-wire
Metering	True RMS, 1 sec refresh time
Input	Rate current: 1A or 5A Rate voltage: Direct 120V, 220V, 240V, 277V, 398Vph-N (optional) PT secondary: 1~398V (settable) Frequency: 50/ 60Hz
Overload	120% of rated, continuously Instantaneous current: 10 times/ sec Instantaneous voltage: 2 times/ sec
Status input	Wet contact, external power supply
Relay output	Node capacity: 250VAC/5A
Pulse output	Pulse constant: 1000~9999 programmable Pulse width: 60~100ms programmable Formula: 1 pulse = (1 ÷ pulse constant × PT × CT) kWh
Power supply	85 ~265VAC，85~265VDC (When select P1) 100~420VAC, 100~400VDC (When select P2)
Power loss	＜5VA
IP index	IP52 (front panel) and IP30 (case)
Power frequency withstand voltage	AC 2KV/minute
Insulation resistance	≥50MΩ
Impulse withstand voltage	4kV (peak), 1.2/50*uS*

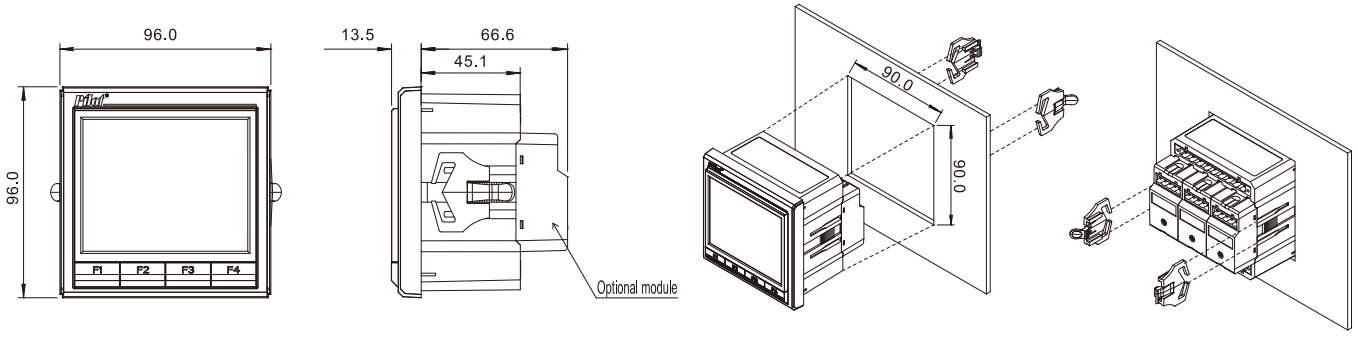
Communication	Modbus-RTU Protocol	RS485 serial Baud rate: 2400, 4800, 9600, 19200, 38400bps Address: 1~247
	Modbus-TCP/ IP	Ethernet communication port Support connect 10M/100M ethernet, Modbus TCP/IP, Web, FTP
	BACnet MS/TP protocol	RS485 serial Baud rate: 2400, 4800, 9600, 19200, 38400, 57600, 76800bps Address: 1…127, excluding 99
Dimension (L x W x H)	**PMAC770:** Panel: 96 x 96 x 13.5 mm Cut-out: 90 x 90 x 58.6 mm (basic) 90 x 90 x 80.1 mm (optional module) **PMAC770-DR**: Panel: 96 x 96 x 12 mm Cut-out: 90 x 90 x 58.6 mm (basic)	
Weight	Basic unit: approx 550gr. Optional module: 50gr.	
Environment	Main Module & and other Modules	Operating temperature: -10℃~+55 ℃ Storage temperature: -40℃~+70 ℃ Humidity: 5%~95% non-condensing
	BACnet Module	Operating temperature: 0℃~+50 ℃ Storage temperature: -5℃~+75 ℃ Humidity: 10%~95% non-condensing

Standard (EMC)			
Electrostatic discharge immunity test	IEC 61000-4-2,Level 4	Surge immunity test (1, 2/50μs～8/20μs)	IEC 61000-4-5,Level 3
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

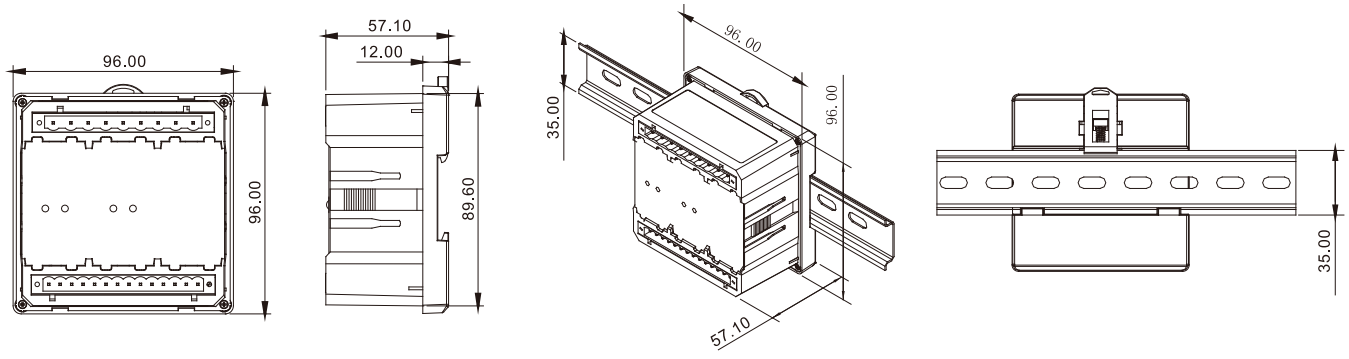
Dimension & Installation

Unit: mm

PMAC770 : Panel Mount

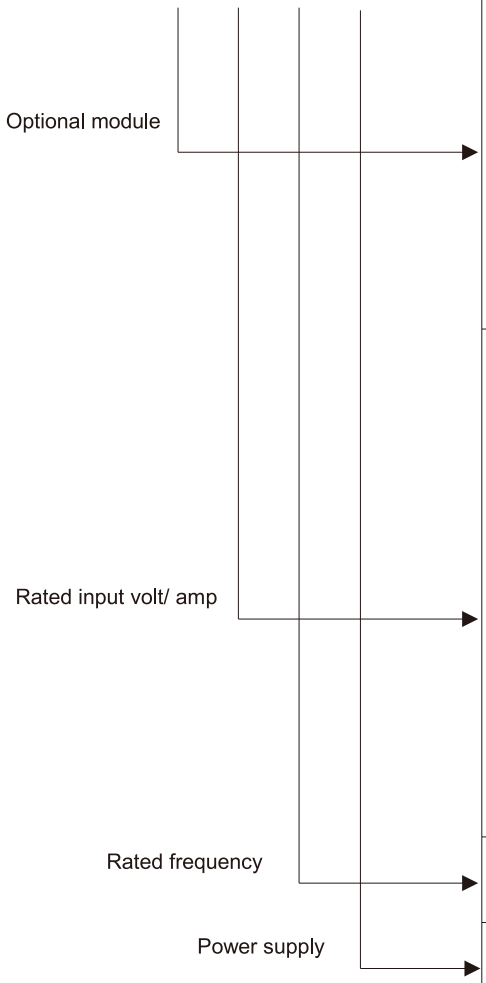


PMAC770 - DR : DIN Rail Mount



Order Information

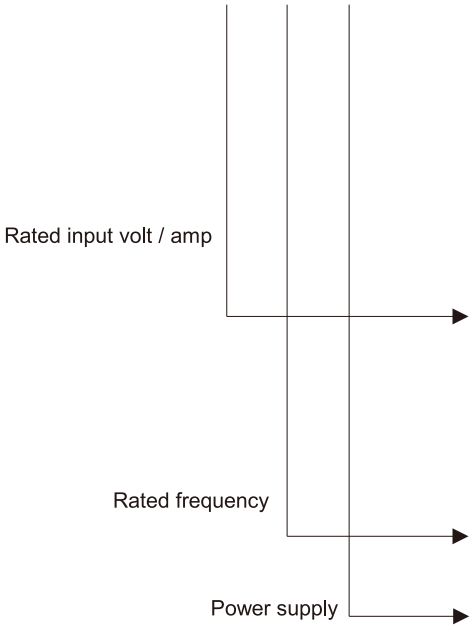
PMAC770 - E -- ① -- ② -- ③ -- ④



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

Note: 1. PMAC770 supports Max. 3 optional module
2. PMAC770 supports Max. 2 **S** optional module, others optional function can only by chosen once.
3. **AI & AO** module can only be select once.
4. **64M** bit memory data can only be read by MODBUS TCP/IP.
5. **BA** module and **LAN** module can't be select together

PMAC770 - DR - E -- ① -- ② -- ③



V1	57.7 / 100V (via PT), 5A
V2	57.7 / 100V (via PT), 1A
V3	220 / 380V (direct), 5A
V4	220 / 380V (direct), 1A
V5	120 / 208V (direct), 5A
V6	240 / 415V (direct), 5A
V7	277 / 480V (direct), 5A
V8	63.5 / 110V (via PT), 5A
V9	120 / 208V (direct), 1A
V10	240 / 415V (direct), 1A
V11	277 / 480V (direct), 1A
V12	63.5 / 110V (via PT), 1A
V13	398 / 690V (direct), 5A
F1	50Hz
F2	60Hz
P1	85 ~ 265VAC, or 85 ~ 265 VDC, 45 ~ 65Hz
P2	100 ~ 420VAC, or 100 ~ 400VDC, 45 ~ 60Hz

Application

- Lower Voltage MCC
- Integrated process and electrical control

Features

- Suit for motors rated voltage 380V AC or 660V AC
- Small Size compact design with LCD display
- Integrated measurement, protection and control functions
- Main module provide 9 DIs (digital input) and 5 DOs (digital output)
- Optional 1 analog (4~20mA) input or 1 leakage current protection
- Small size and configuration.
- Easy installation. Proper for 35mm DIN rail.
- 35mm DIN rail mounting
- Safety, Excellent quality and multifunction

Function

- Full Protection Function

  Pre-start: Wiring checking, fault treatment and confirmation

  Starting Process: Monitor the starting time period and current

  Running Process: 18 protections, like Overload protection, TE time protection, Over-current protection, Phase failure protection...

- Motor Life Cycle Management

  Running Management

  Event Record: 32 event record with timescale, full range record for motor operation, fault record and so on

- Full Protection Function

  Starting Control: 32 event record support protection mode, direct start mode, star/delta start mode, autotransformer start mode

  Re-star Control: Anti sway electric , under-voltage re-start, auto re-start etc. function

  Operation Control: Support locan control, DCS control, communication control

- Other Function

  Multiple Control: Modbus-RTU / Profibus-DP
  Time management and authority management

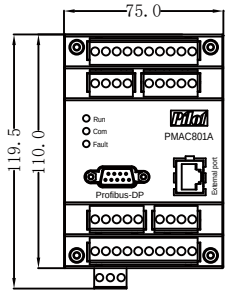
Function Configuration

Protection	Start Overtime	Yes
	Start Over-current	Yes
	Overcurrent	Yes
	Current unbalance	Yes
	Overload	Yes
	Underload	Yes
	Underload	Yes
	Short circuit	Yes
	Earth Fault	Yes
	Eex e overload (tE)	Yes
	External fault	Yes
	Overvoltage	Yes
	Under voltage	Yes
	Under power	Yes
	Phase Sequence error	Yes
	TV open circuit	Yes
	Wiring Checking	Yes
	Overflow fault	Yes
	Temperature (PTC/NTC)	Optional
	Leakage current	Optional
	Analog Input	Optional

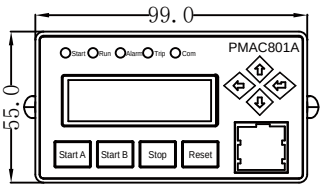
Measure	I, In, I_avg., I_unbal.	Yes
	U, P, Q, PF, F, kwh, I△n	Yes
Control	Starting Control	Yes
	Re-start Control	Yes
	Self-start control	Yes
DI	9 DI in main module	Standard
DO	5 DO in main module	Standard
COM	MODBUS-RTU	Standard
	Profibus – DP or another MODBUS-RTU	Optional
AO	One 4~20mA DC analog output	Standard
AI	One 4~20mA DC analog input	Standard
SOE	Latest 32 event records	Standard
SOE	Total running time period	Standard
	Present running time	Standard
	Total stop operation time	Standard
	Present stop operation time	Standard
	Total stop operation time	Standard
	Total trip times	Standard
	Longest starting time	Standard
	Max. starting current	Standard

PMAC801A Included

PMAC801A Main Moudle



Display Module (LCD)

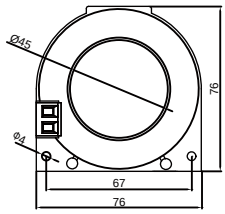


Current Transformer
(for <100A)

Current Transformer
(for 250A， 400A)

Current Transformer
(for 500A， 820A)

Optional Leakage CT



Leakage Current Transformer
(for 100A~800A)

PMAC801A Includes

PMAC801A – ① -- ② -- ③ -- ④

2	2A (For motor: 0.1 – 1.1 kW)
6.3	6.3A (For motor: 1.1 – 3.1 kW)
10	10A (For motor: 3.1 – 5.3 kW)
25	25A (For motor: 5.3 – 11 kW)
50	50A (For motor: 11 – 22 kW)
100	100A (For motor: 22 – 45 kW)
250	250A (For motor: 45 – 132 kW)
400	400A (For motor: 132 – 211 kW)
500	500A (For motor: 211 – 264 kW)
820	820A (For motor: > 264kW)
P	Profibus-DP
F	Dual Modbus_RTU
C	Leakage current protection
A	One 4~20mA Analog Input
	C & A can't not select at the same time
T	1 Temperature input
	Can not select together with F (dual Modbus-RTU)

Notes:

1. Standard PMAC801A including main module, display module, current transformer, 1 RS485, 1 Analog output
2. If customer need leakage current protection, please select leakage current transformer
3. Standard wire for current transfomer is 1.5m
4. Main module and display module connect with a standard wire (1m), please mention before place the order if you need longer wire (3.5m),
5. Standard main module has protection functions: start overtime, start overcurrent, overload, overcurrent, Eex e overload (tE), phase failure, current unbalance, short circuit, earth fault, underload, undervoltage, underpower, external fault, phase sequence error, TV open circuit, overflow fault

Application

- Hotel, Hospital, Dormitory
- Commercial Building, Office
- Residential Building
- Reconstruction Project

Feature

- **Small Size –** Can be installed at the closest point, integrate in existing space-constrained installations.
- **Ultra-compact Design** - Consists of control unit and current sensors (with RJ12 port, optional solid core or split core)
- **Wide Measurement Range** - Max. Support 63A
- **Multi Circuit** - Support 30 single phase circuit or 10 three phase circuit AC measuring
- **High Accuracy** –Voltage & Current class 0.5 , kWh class 1.0
- **Multi Network Type** - 1 phase 2 wires, 3 phase 4 wire

Main Function

Real-time Measurement

- Voltage, Current, Active power , Reactive power, Apparent Power, Power Factor, Frequency

Energy Consumption

- Active energy, Reactive energy

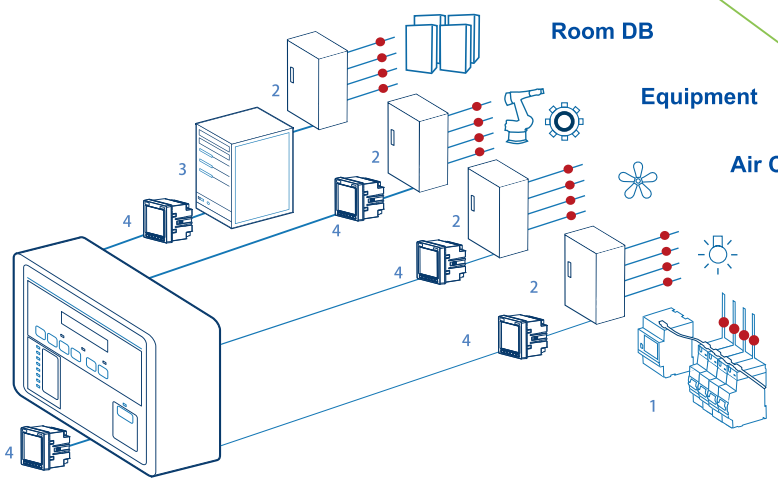
Alarm Function

- Overload, Under load, Over current, Sensor fault

Communication

- 1 RS485 port, MODBUS-RTU protocol

Typical Connection



Compare With Traditional Din-rail Energy Meter

- **Saving 50% Installation Space**
- **Saving 50% Installation Hour**
- **Saving 50% System Debug Time**

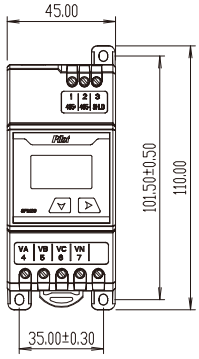
Description

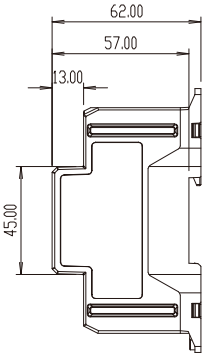
1. SPM20 (● measurement point)
2. Branching Cabinet
3. UPS
4. Pilot Energy Meter

SPM20 & Accessories

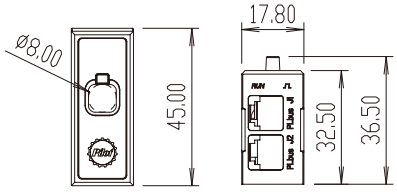
❖ SPM20-M: Main Module

Connection Mode	1 phase 2 wires, 3 phase 4 wires	
Power Supply	Self-supply, by A phase	
Voltage Input	1 phase 2 wires	220V Range: 40%-150%
	3 phase 4 wires	3×220/380V Range: 40%-150%
Frequency	45 ~ 65Hz	
Power Loss	Power supply circuit: ≤ 10W	
Communication	RS485 serial, support Modbus-RTU Baudrate: 4800, 9600, 19200bps Address: 1~247	

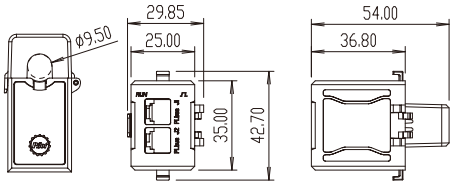




❖ SPM20-C: Solid Core Sensor



❖ SPM20-O: Split Core Sensor



Connection Mode	Bus connection (2 x RJ12 Port)
Rated Current Input	5(63) A
Installation	Solid core
Open hole	Φ8 mm
Sampling Rate	28k Hz

Connection Mode	Bus connection (2 x RJ12 Port)
Rated Current Input	10(50) A
Installation	Split Core
Open hole	Φ9.5 mm
Sampling Rate	28k Hz

Parameter		**Accuracy**	**Measuring Range**
Voltage		0.5%	40%~120%
Current	**Solid Core Sensor (C)**	0.5%	0-63A, 1%~120%
	Split Core Sensor (O)	1.0%	0-50A, 1%~120%
Power factor		1.0%	-1~1
Active power		1.0%	Single phase: 0~±14kW/var/VA Total: 0~±42kW/var/VA
Reactive power		2.0%	
Apparent power		2.0%	
Active energy	**Solid Core Sensor (C)**	1.0%	0~99,999,999.9 kWh
	Split Core Sensor (O)	2.0%	0~99,999,999.9 kWh
Reactive energy		2.0%	0~99,999,999.9 kVarh
Frequency		0.01	45 ~ 65Hz

Environment & Standard

Power frequency withstand voltage	2000V AC
Insulation resistance	≥ 100MΩ
Impulse withstand voltage	6kV (peak)
IP index	IP52 (front panel)

Environment	Normal operating temperature: -20℃～+55℃ Operating temperature: -20℃～+50℃ Storage temperature: -30℃～+80℃ Humidity: <95% non-condensing

Standard (EMC)	
• Electrostatic discharge immunity test IEC 61000-4-2,Level 4 • Radiated radio-frequency electromagnetic field immunity (RFEMS) IEC61000-4-3, Level 4 • Electrical fast transient test IEC61000-4-4, Level 4 • Surge immunity test (1,2/50μs～8/20μ) IEC61000-4-5, Level 4	• Conduction disturbance rejection of radio frequency field induction IEC61000-4-6, Level 3 • Electromagnetic emission limits CISPR22: 2006, Pass • Voltage sag and short time interrupt immunity IEC61000-4-11, Pass • Power frequency withstand voltage IEC 62052-11 2003

Solution

SPM20 Sensor | **SPM20 Controller** | **Concentrator** | **System**

SPM20-O
Split Core Sensor

SPM20-C
Solid Core Sensor

+

SPM20-M
Main Module

+

xGate6

SPM21 Zigbee

Or

SPM21 LoRa

+

- Building Automation
- Energy Management
- Energy Billing system

BMS/EMS/ BILLING

APP

Order Information

Module	Order code	Description
Main Module	**SPM20-CTRL**	Suitable for 1P/2W & 3P/4W
Measure Sensor	**SPM20-CTC**	Solid Core Sensor: 5 (63)A, Φ8.0 mm, Class 1.0
	SPM20-CTO	Split Core Sensor: 10(50)A, Φ9.5 mm, Class 2.0

Description

SPM20-D is specially design for telecommunication base station application to calculating power consumption, measuring DC device electricity.

It is the smallest DC multi-channel Energy Meter with compac

for simplize the installation at size.

Application

- Telecommunication BTS Billing System
- DC Load Management

Feature

- **Small Size** - Can be install at the closest point, integrate i
- **Easy Installation** - Consist of main module and measur module, connected by PLbus Daisy chain bus topology and RJ12 port, measure module straight insert into the circuit breaker
- **High Accuracy** - Voltage & Current class 0.5, kWh class 1.0
- **- 48VDC Power Supply** - Special design for Telecom BTS application
- **Wide Measurement Range** - Max. support 63A direct connect, no need for extra Hall Sensor or Shunt
- **Multi Circuit** - Support 12 single phase circuit

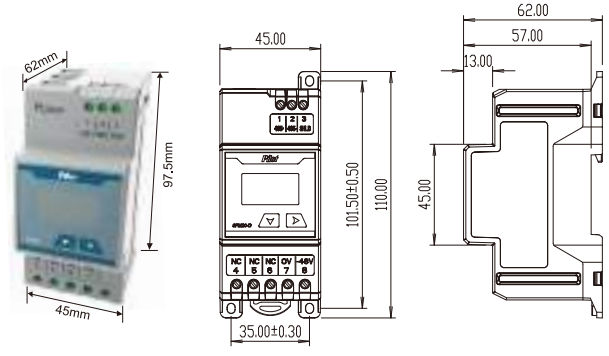
Function

- **Measure** -- Voltage, Current, Power, Energy (input / output / total)
- **Alarm** - Voltage limit alarm (high limit/ low limit), Current limit alarm (high limit), Communication failure alarm
- **Communication** - Modbus-RTU protocol, RS485 port

Technical Specification

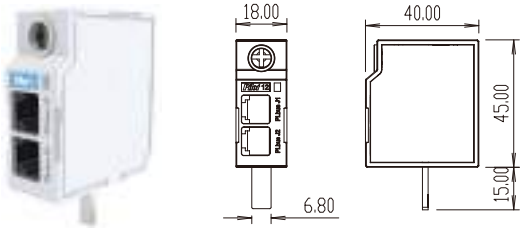
SPM20-D-M: Main Module

Connection Mode	1 phase 2 wires
Power Supply	-48VDC, range: 50%~125%
Rated Voltage Input	-48VDC, range: 50%~125%
Power Consumption	≤ 15W
Communication	RS485 port, Modbus-RTU protocol Baud Rate: 4800, 9600, 19200bps Address: 1~247
Installation	DIN35 DIN Rail or back screw fixed



SPM20-D-C: Measure Module

Connect ion Mode	Daisy chain bus topology and RJ12 port
Measuring Current	10(63) A
Parameter	Voltage, Current, Power, Energy
Installation	Solid Core



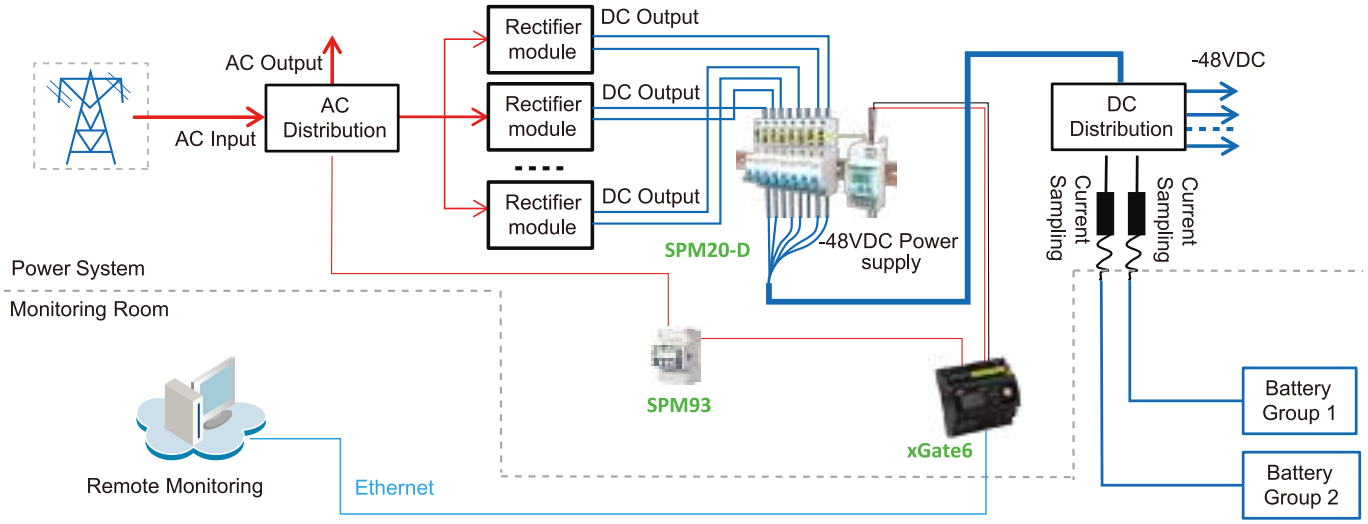
Accuracy

	Parameter	Range	Accuracy
Parameter Accuracy	Voltage	-38V~-58V	0.5%
	Current	1~63A	0.5%
	Power	Single phase: 0 ~ ±5kW	1.0%
	Energy	0~99999999.9	1.0%

Environment & Temperature

Environment & Temperature	Working Temperature	Normal	-20℃～+60℃
		Limit	-25℃～+75℃
	Storage Temperature	-30℃～+80℃	
	Humidity	< 95%	
	IP Degree	IP20	

Typical Connection



Order Information

Module	Order Code		Description
Main Module	**SPM20-D**	**- M**	-48VDC Power Supply, DIN Rail Installation, Modbus-RTU protocol, RS485 port
Measure Module	**SPM20-D**	**- S**	Depends on requiremnt, optional from 1 ~ 12 circuit, solid core

Note:
1. Measure Module connect via RJ12 daisy chain bus topology
2. Standard 30cm RJ12 line (from main module to measure module) and 6cm RJ12 line (for connect each measure module), please mention for special requirement. Max. length from Main module to the end measure module is 3m.

Example: 1pcs SPM20-D-M + 12pcs SPM20-D-S indicate 1pcs SPM20-D main module and 12 SPM20-D-S solid core measure module for 12 DC Circuit measuring, power supply -48VDC.

Application

- Sub Metering In Commercial Building
- Branch Circuit Monitoring
- Utility Application

Feature

- Suit for 3 phase 4 wire connection mode
- Used for 4x3 phase AC measuring,12x1 phase AC measuring
- LCD display U, I, P, Q, S, PF, F, kWh, kvarh
- Over & Under limit alarm, up to 500 alarm records
- Max. measure current up to 600A
- 33.3mA & 100mA rated current input (optional)
- LED light indicates alarm & communication status
- Standard 35mm DIN Rail Mount

Main Function

Real-time Measurement

- Voltage, Current, Active Power , Reactive Power, Apparent Power, Power Factor, Frequency, Active Energy, Reactive Energy

Communication

- 1 RS485 port, MODBUS-RTU protocol

Over & Under Limit Alarm & Record Function

- Over voltage, Under voltage, Over current

Technical Specification

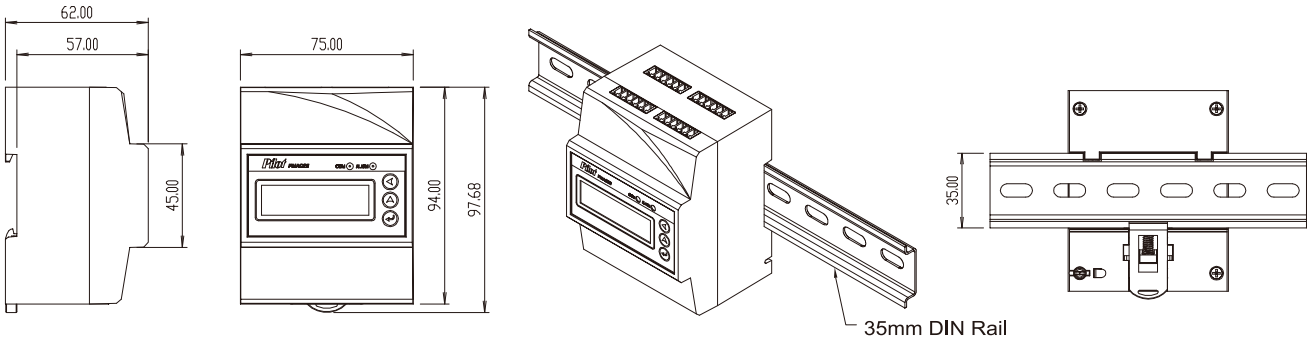
Connection Mode	3 phase 4 wires
Rated Current Input	100 mA & 33.3mA (Optional)
Rated Voltage Input	3*220/380V, 45Hz ~ 65Hz
Power Supply	AC 85 ~ 265V, DC 100~300V
Power Loss	≤2W
Communication	RS485 serial, support Modbus-RTU Baud rate: 4800, 9600 bps Address: 1~247
IP Index	IP52 (front panel), IP20 (whole device)
Dimension (L x W x H)	94*75*62mm
Environment	Operating temperature: -10℃~+55 ℃ Storage temperature: -40℃~+70 ℃ Humidity: 5%~95% non-condensing

Parameter	Accuracy	Resolution	Measuring Range
Voltage	0.5%	0.1V	AC 0~300V
Current	0.5%	0.1A	AC 0~600A
Active Power	1.0%	0.1W	each phase: 0~216kW
Reactive Power	2.0%	0.1var	each phase: 0~216kVar
Power Factor	1.0%	0.001	-1.000~+1.000
Frequency	0.5%	0.01Hz	45~65 Hz
Active Energy	1.0%	--	0~99,999,999.9 kWh
Reactive Energy	2.0%	--	0~99,999,999.9 kWh

Standard (EMC)	
Electrostatic discharge immunity test	IEC 61000-4-2: 2001
Radiated immunity test	IEC 61000-4-3: 2002
Electrical fast transient/burst immunity test	IEC 61000-4-4: 2006
Surge immunity test (1, 2/50μs～8/20μs)	IEC 61000-4-5, 2005
Radio frequency immunity	IEC 61000-4-6: 2006
Electromagnetic emission limit	CISPR22: 2006 pass

Dimension

Unit: mm



Current Transformer

LACT-100C1

LACT-100K1

CTSA

CTSB

Order Information

	Order Code		Description
Main Module	PMAC211–4	-A -B	For 100mA Secondary For 33.3mA Secondary
CT Accessory	CT for –A (100mA Secondary)	LACT-100C1 CTSA016 CTSA024 CTSB0203 CTSB0508	Solid Core CT: Φ12mm, 100A/100mA, Class 0.5 Split Core CT: Φ16mm, 100A/100mA, Class 0.5 Split Core CT: Φ24mm, 200A/100mA, Class 0.5 Split Core CT: 20*30mm, 400A/100mA, Class 0.5 Split Core CT: 50*80mm, 600A/100mA, Class 0.5
	CT for –B (33.3mA Secondary)	LACT-100K1	Split Core CT: Φ16.2mm, 100A/33.3mA, Class 0.5

Traditional Energy Meter

SPM211 Multi-Circuit Energy Meter

Before

After

All in One, Cost Saving, Space Saving

Feature

➢ Powerful Data Collecting & Forwarding Function

Automation collection and multi transmit mode, support Modbus_TCP, JSON, XML, HTTP(s), can connect to various cloud software and system.

➢ Effective and Reliable Data Storage and Management

Build-in SQL, Two-way communication and packet verification, support JSON & XML data packet continue transferring from breakpoint.

➢ Convenient Batch Configuration, Debugging & Update

To suit distributed deployment &Ethernet management in IoT system, especially large scale system with cloud management.

Function

Data Collect Function

- Support Modbus_RTU, Modbus_TCP, DLT645, IEC103, CJT188 device
- Max. 1,000 data points, Max. 64 devices
- Max.2 RS485 ports, each port support ≦32 slave devices

Data Transmit Function

- 4G wireless data transmit
- Max. 1,000 data points, Max. 64 devices
- Support HTTP(s) XML and JSON forwarding format

Other Functions

- Online system update, Authority management
- Build-in clock, NTP for timing synchronization

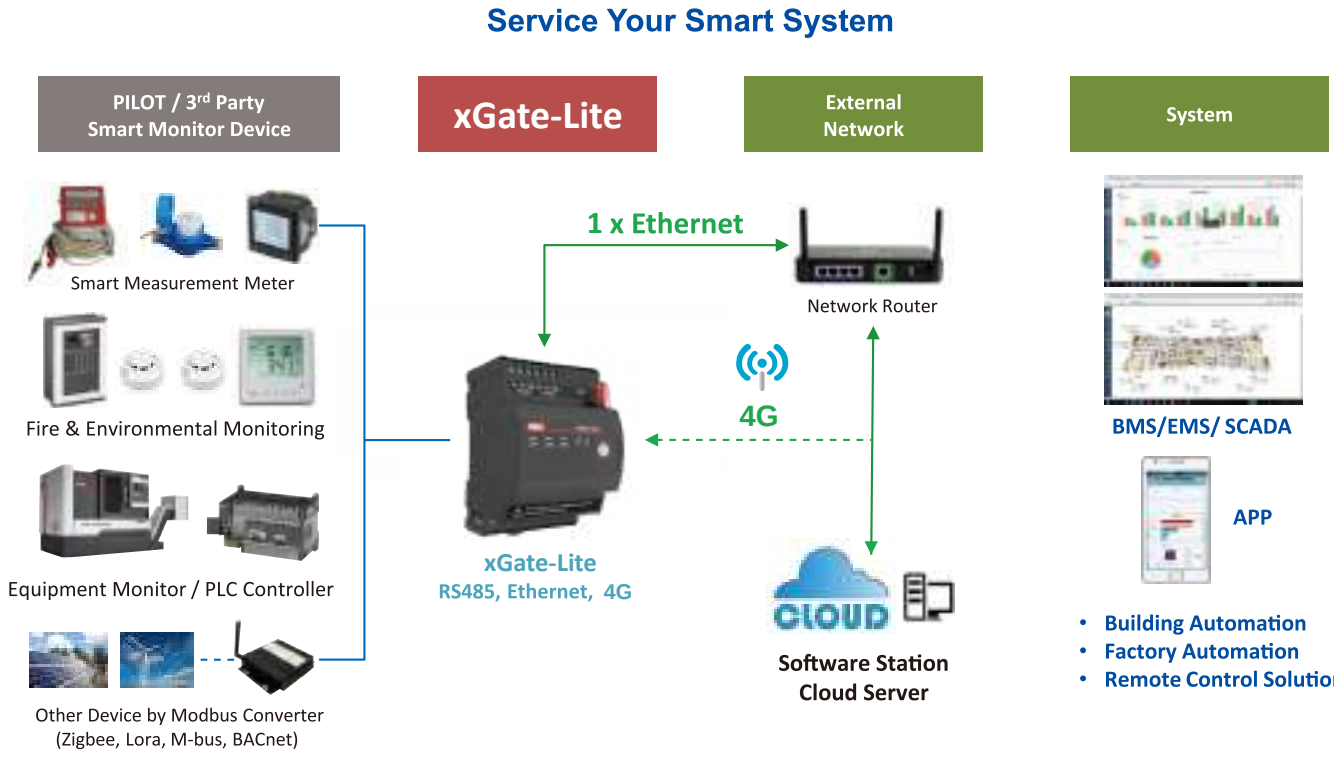
Data Logging & Storage

- Build-in SQL data base
- Max. 12 months Historical data & alarm records storage (hh:mm:ss)
- SMS Message Record
- Standard 8GB TF card (Max 32GB Micro -SD TF card)

Alarm Funtion

- SMS Alarm
- Multiple alarm setting for each device
  Real-time alarm data transmit

System Structure



Technical specification

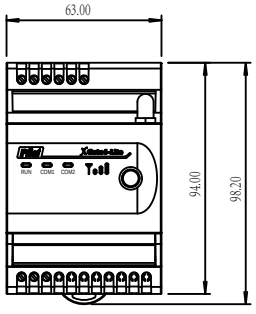
Item	Parameter	Description
COM Port	Port No. / Port Type	R2 RS485 Port, Support Modbus_RTU, Modbus_TCP, DLT645, IEC103, CJT188 protocol
	Baud rate	1200bps ~ 115200bps (Optional)
	Data Transmit Mode	Master Mode
	Support Connect IED Quantity	≤32pcs (2x RS485, Max 64 Slave device)
TF Port (Standard)	Port No. / Port Type	1 Port, Standard 8G (Max. 32GB Micro-SD TF card)
Ethernet Port (Standard)	Port No. / Port Type	1 Ports, 10/100M
SIM Port	Port No. / Port Type	1 Port, 4G SIM card (Dimension 15mmX25mm)
	Network	• LTE FDD Band 1,3,5,8 • LTE TDD Band 34,38,39,40 • WCDMA Band 1,8 • GSM 900/1800MHZ

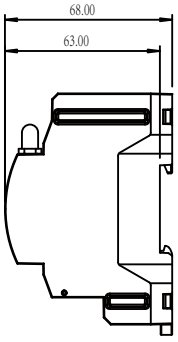
Hardware	CPU: Mipsel 580MHz	Structure	Color: Black	
	Memory: DDR 128MB		4 Indicate Light: indicate Run, COM1, COM2,	
	Flash: Nor flash 32MB		Installation: DIN Rail Mounting	
	MTBF: >=50,000 hours		Size(L*W*H): 98.2*63*68mm	
Power supply	Input: AC85-265V or DC80-300V	Environment	Working Temperature	-15℃ ～ +55℃
	Consumption: < 5W		Storage	-25℃ ～+ 70℃, 5～95%@non-condensing

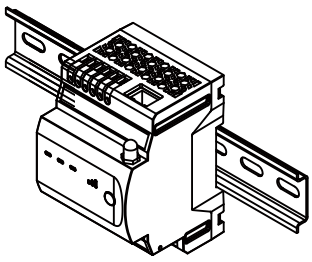
EMC	Oscillatory waves immunity test	IEC61000-4-12:1995, Level 3
	Electrostatic discharge immunity test	IEC61000-4-2:2001 , Level 3
	Radiated radio-frequency electromagnetic field immunity (RFEMS)	IEC61000-4-3:1998 , Level 4
	Testing and measurement techniques - Electrical fast transient/burst immunity test	IEC61000-4-4:1998, Level 3
	Surge immunity test	IEC61000-4-5:2005, Level 3
	Radio frequency interference immunity	IEC61000-4-6:1998, Level 3
	Power frequency magnetic field immunity test	IEC61000-4-6:2001, Level 3
	Electromagnetic emission limits	IEC60255-25:2000, Pass
	Power frequency immunity	IEC61000-4-8:2001, A

Dimension & Installation

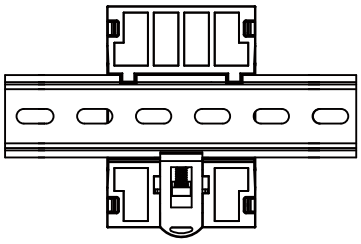
Unit: mm







DIN Rail 35mm



Order Information

xGate6 -Lite -- ①

2CL	2 RS485, Cellular Network (Support 4G), 1 Ethernet Port

For example: Customer order xGate6-Lite-2CL, it means the device has standard 1 8GB TF port, 1 10/100M Ethernet ports, Cellular Network(Support 4G) and other basic function.

JSON

XML

GPRS

Ethernet

Modbus

Feature

- Online Visual Web with User-friendly Interface
- Powerful Data Collecting & Forwarding Function

Automation collection and multi transmit mode, support Modbus_TCP, JSON and XML, can connect to various cloud software and system.

- Effective and Reliable Data Storage and Management

Build-in SQL, Two-way communication and packet verification, support JSON & XML data packet continue transferring from breakpoint.

- Convenient Batch Configuration, Debugging & Update

To suit distributed deployment &Ethernet management in IoT system, especially large scale system with cloud management.

Function

Data Collect Function
- Support Modbus_RTU, Modbus_TCP device
- Max. 40,000 data points, per device over 200points
- Max.4 RS485 ports, each port support 60 slave devices
- 2AI, 4DI, 1DO Port as optional

Data Transmit Function
- 2 Ethernet ports, 1 GPRS for data transmit,
- Support Modbus_TCP protocol
- Support HTTP(s) XML and JSON forwarding format

Alarm Function
- Multiple alarm setting for each device
- Real-time alarm data transmit
- SMS alarm notice

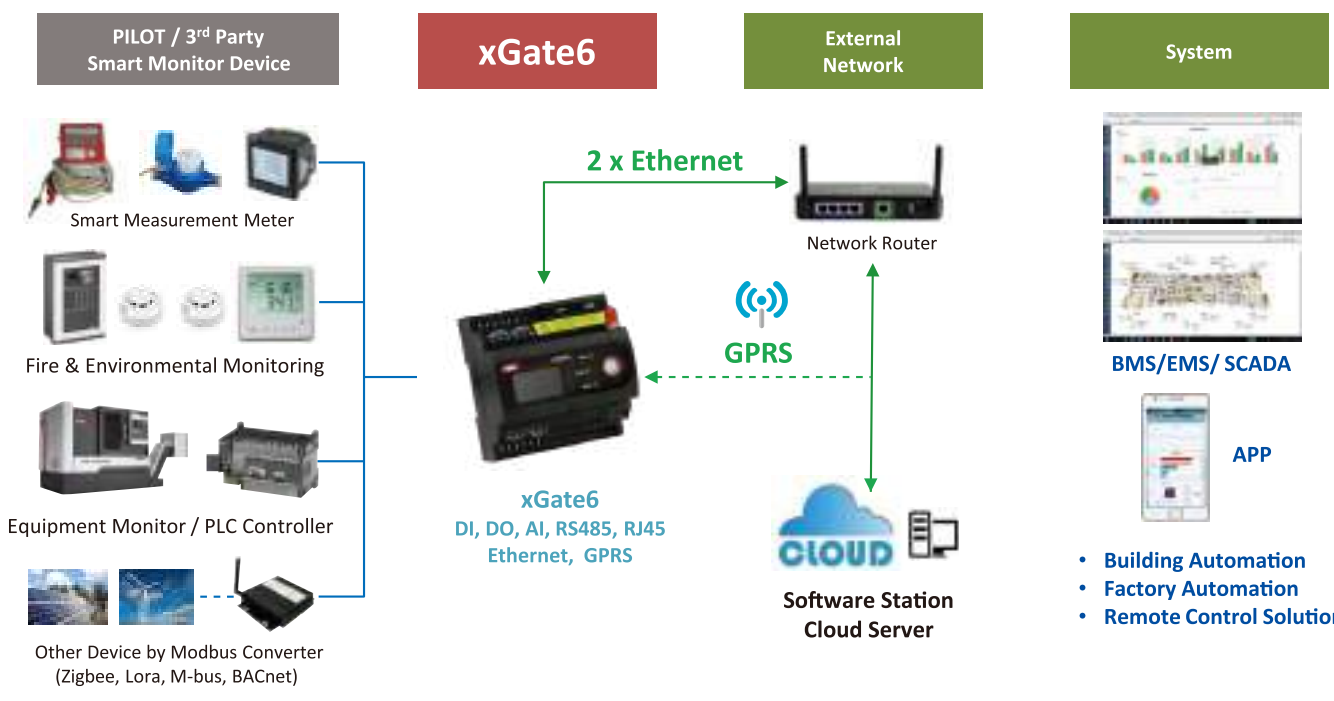
Embedded Web Server
- Embedded HTTP web for configuration
- Provide Real-time data view, Cloud service Logs
- Support remote configuration and debugging
- Support remote config file update

Data Logging & Storage
- Build-in SQL data base,
- Historical data & alarm records storage
- Standard 8GB TF card (Max Support 32 GB)

Other Functions
- Online system update, Authority management
- Build-in clock, NTP for timing synchronization

System Structure

Service Your Smart System



Web Interface

xGate6 Information

Real-time Data Inquiry (U, I, P, kWh, Harmonic, Temperature etc.)

Historical Data Inquiry

Setting (LAN, GPRS, NTP)

System Diary & Security (User Authority Setting)

Project Configuration (Alarm Setting, Data Point setting)

Pilot Cloud (Support Data Analysis)

Remote Update the System

Technical Specification

Item	Parameter	Description
COM Port	Port No.	2 Ports / 4 Ports (Optional)
	Port Type	RS485 (Support Modbus_RTU, DLT645 and other customizable protocol)
	Baud rate	1200bps ~ 115200bps (Optional)
	Data Transmit Mode	Master Mode
	Support Connect IED quantity	≤60pcs (4 x RS485, Max 240 Slave device)
USB Port (Standard)	Port No.	1 Port
	Port Type	USB2.0
TF Port (Standard)	Port No.	1 Port
	Port Type	Standard 8G (Max. 32GB) Micro-SD TF card,
Ethernet Port (Standard)	Port No.	2 Ports
	Port Type	10/100M
Wireless Communication Port	xGate6-2ZL xGate6-4CL	• TDD-LTE B38/B39/B40/B41 * • FDD-LTE B1/B3/B8 • TD-SCDMA B34/B39 • UMTS/HSDPA/HSPA+ B1/B8 • GSM/GPRS/EDGE 900/1800 MHz • 1 SIM Port, SIM card (Dimension 15mmX25mm)
AI	Port No. / Type	2 Ports (optional) / DC 4-20mA
DI	Port No. / Type	4 Ports (optional) / Dry Contact
DO	Port No. / Type	1 Port (optional) / AC220V/5A DC30V/5A
Power Supply	Input	DC 18~36 V / AC85~265V or DC100~300V (Optional)
	Consumption	< 5W
Hardware	CPU	ARM cortex-A8 800MHz
	Memory	DDR3 512MB
	Flash	Nand flash 512MB
	MTBF	>=50,000 hours
Structure	Frame	1.3 inch OLED display
	3 LED Light	indicate Run, Fault & Alarm
	Installation	DIN Rail Mounting
	Size	90*94*68mm
Environment	Working Temperature	-15℃ ～ +55℃
	Storage	-25℃ ～+ 70℃, 5～95%@non-condensing
EMC	Oscillatory waves immunity test	IEC61000-4-12:1995, Level 3
	Electrostatic discharge immunity test	IEC61000-4-2:2001 , Level 3
	Radiated radio-frequency electromagnetic field immunity (RFEMS)	IEC61000-4-3:1998 , Level 4
	Testing and measurement techniques - Electrical fast transient/burst immunity test	IEC61000-4-4:1998, Level 3
	Surge immunity test	IEC61000-4-5:2005, Level 3
	Radio frequency interference immunity	IEC61000-4-6:1998, Level 3
	Power frequency magnetic field immunity test	IEC61000-4-6:2001, Level 3
	Electromagnetic emission limits	IEC60255-25:2000, Pass
	Power frequency immunity	IEC61000-4-8:2001, A

*** Notice :** Customer need to double check with local operator to see if the GPRS frequency selection is support or not.

LCD display

Time

Ethernet Port Information

RS485 Port Information

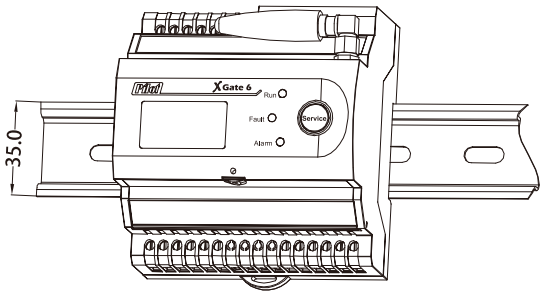
DI Status

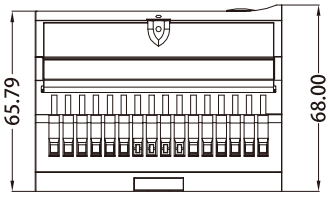
TF Card Information

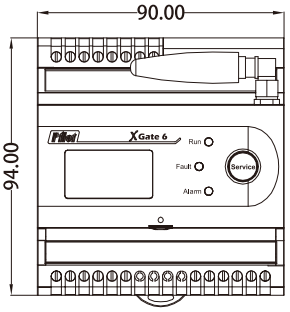
Version Number

Dimension & Installation

Unit: mm







Order Information

xGate6 -- ① -- ②

2ZL **4CL**	2 RS485, 4 DI, 2 AI, 1 DO, Cellular Network (Support 2G / 3G / 4G) 4 RS485, Cellular Network (Support 2G / 3G / 4G)
P1 **P2**	AC 85 ~265V or DC 100~300V DC18~36V

For example:

Customer order xGate6-2ZL-P2, it means the device has standard 1 USB 2.0 port, 1 8GB TF port, 2 10/100M Ethernet ports, with optional function 2 RS485 ports, 4 DI (Dry contact), 2 AI (4~20mA), 1 DO and Cellular Network (Support 4G), power supply DC18~36V.