Multifunction Power Meter
Model: SPM33 (2020)
Installation & Operation Manual
V3.1

Zhuhai Pilot Technology Co., Ltd.

Danger and warning!

This device can be installed only by professionals.

The manufacturer shall not be held responsible for any accident caused by the failure to comply with the instructions in this manual.

Risks of electric shocks, burning, or explosion

- This device can be installed and maintained only by qualified people.
- Before operating the device, isolate the voltage input and power supply and short-circuit the secondary windings of all current transformers.
- Put all mechanical parts, doors, or covers in their original positions before energizing the device.
- Always supply the device with the correct working voltage during its operation.

Failure to take these preventive measures could cause damage to equipment or injuries to people

CONTENTS

1. General Information

SPM33 Three Phase Multifunction Power Meter is designed for monitoring and displaying all kinds of electricity parameters in voltage system below AC 650KV (ph-N). It has one RS485 port and support Modbus-RTU communication protocol. .

SPM33 provides the main measuring function as below:

- Real-time measuring data include:
  Three phase voltage, current, active power, reactive power, apparent power, power factor, frequency, phase angle.
  (Optional: Displacement power factor)
- Energy data:
  Imp. & Exp. Energy ,
  (Optional: Multi-tariff energy, four-quadrant energy)
- Demand data:
  Demand and peak demand for 3 phase current, 3 phase active power, total active power.
  (Optional: Forecast demand, monthly peak demand)
- Power quality data:
  Up to 63rd harmonic, harmonic ratio (HRU, HRI), THD, Unbalance.
  (Optional: current K factor, voltage crest factor, current TDD)
- Optional History Data record: Last 12 monthly energy, and last 10 yearly energy.
- Optional SOE event log: 64pcs of event log, 10pcs of operation log.
- Alarm function: Alarm for over-voltage, under-voltage, over-current, under-current, phase lost, over-frequency, under-frequency, over power, phase error, DI 1, DI 2 status change.
- 2 digital input (wet contact)
- Optional 4 DI (wet or dry)
- Optional 4 relay output
- One RS485, Modbus-RTU protocol
- Rated input 1A or 5A settable.
- 1 phase or 3 phase settable

2. Order Information

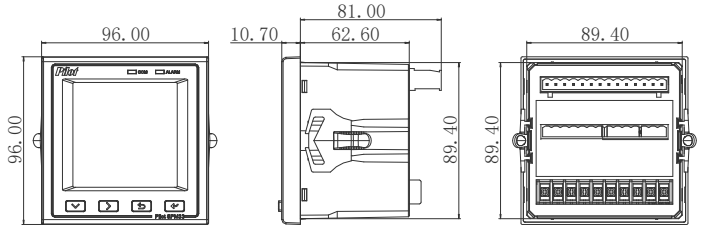
SPM33 - □ - □ ① ②	
①: Optional function (multiple choice)	
R	2 Relay alarm output
T	SOE event log, Multi-tariff energy, Four-quadrant energy, Max.& Min. data, History data record, Forecast demand, Monthly peak demand, current K factor, voltage crest factor, current TDD, Displacement power factor
②: Optional DI/ DO (single choice)	
E1	4 status input (wet contact) + 2 relay out
E4	4 status input (dry contact) + 2 relay out

Example: SPM33-R, it means the device provides basic measuring function, one RS485 port, 2 digital input, 2 relay output.

3. Dimension and Installation

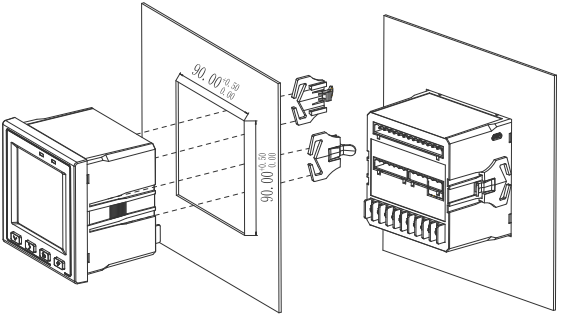
3.1 Dimension

unit：mm



3.2 Installation

unit：mm



4. Display and Keys-press Operation

4.1 Display instruction

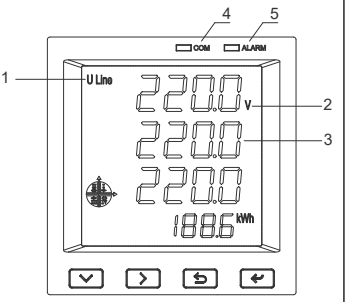
1: Prompt of the currently displayed page.

2: Unit.

3: Data display area..

4: Communication indicate LED

5: Alarm indicate LED.



Remark:

If there is no key operation within 60s, the backlight automatically turns off, when the backlight is lit until the button operation again.

LED indicator

LED	Description
COM	Always light on when the device is power on. Flashes once per second when communication is OK. Light off when the device is power off.
ALARM	Flashes when there is an alarm, Light off when no alarm

4.2 Keys

Note: In a different interface, the same keys have different functions.

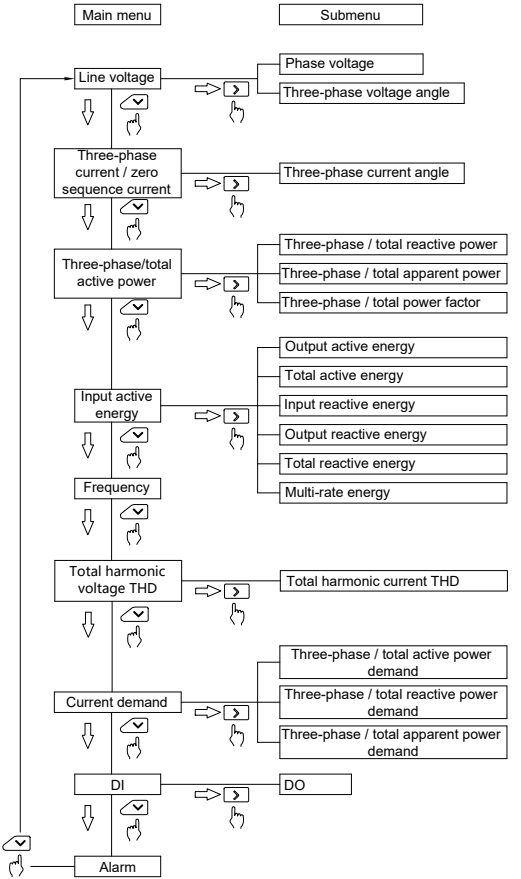
Sibling menu switch/ Modify data

Switching sibling menu to submenu / Move the cursor to the left

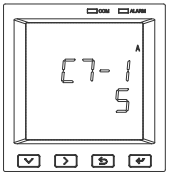
Exit

Enter the menu / Confirm

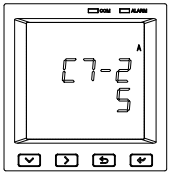
4.3 Real-time data display procedure



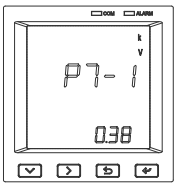
4.4 Setting menu and procedure



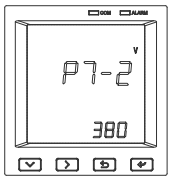
1. CT primary



2. CT secondary (view only)

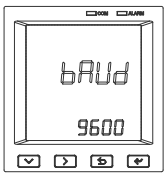


3 PT. primary

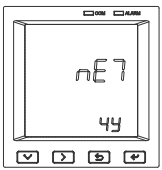


4. PT. secondary

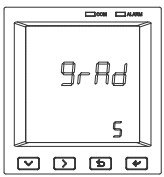
5. Comm add



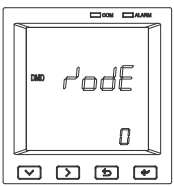
6. Baudrate



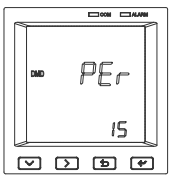
7. Wiring mode



8. Current input grade

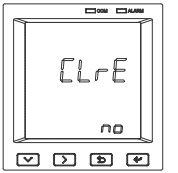


9.Demand mode

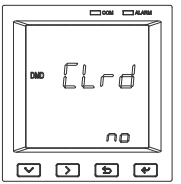


10. Demand interval (period)

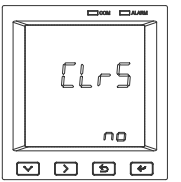
11.Demand sub-interval (slip)



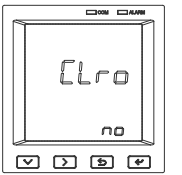
12. Clear energy



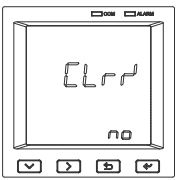
13. Clear demand



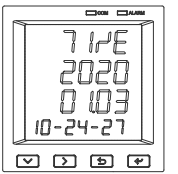
14. Clear SOE



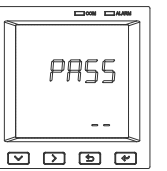
15. Clear operation record



16. Clear Max./Min. data

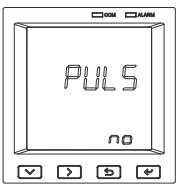


17. Time setting

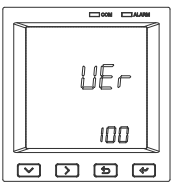


18. Password

19. DEMO

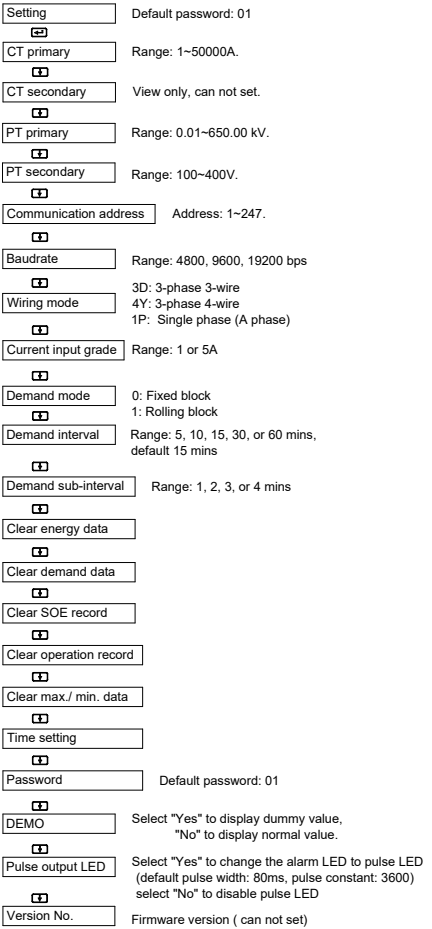


20. Pulse output LED



21. Version (view only)

Setting procedure as below:



Remark

1. Input super password “33”, the device will display the original password.
2. In 3-phase 3-wire mode, the device displays total power only (total P, total Q, total PF). Per phase power value will be 0.
3. If the devices don’t have optional relay function, there is no setting relay menu
4. In case the programmed data is invalid, the setting is not successful. The device restores the original parameters.
5. There is no description in this manual for other customized function.

5. Measuring Capability

5.1 Real-time basic electrical parameters

5.1.1 Voltage

SPM33 maximum direct input phase voltage is 400V (ph-N), and line voltage is 500V (ph-ph). Users should be noted this to prevent internal measuring circuit saturation, avoid inaccurate measurements.
For high voltage (>500V) measurement, Users need to connect with PT.
The power meter can be set PT primary and secondary. Max. measure voltage to 650KV.

The device support 3 types of wiring mode: 3-phase 3-wire, 3-phase 4-wire, and 1-phase 2-wire (phase A). Users can set the Wiring Mode by keys or communication.

Note: After change the wiring mode, the device will be clear energy value to 0.

5.1.2 Current

SPM33 must be connected by CT to measure current. CT secondary rated output required to meet the input requirements of SPM33 rated current (5A or 1A). When using an external CT, wiring should prevent open, otherwise it will generate a higher voltage in the secondary role. In the primary excitation effect, causing no casualties or damage to equipment.

Overload: 120% of the rated input.

Measuring range: 0 ~ 50kA.

Users should be noted above range to prevent internal measuring circuit saturation, avoid inaccurate measurements.

5.1.3 Frequency

In different wiring mode, the device measures the frequency from different channel.

In 3-phase 3-wire, it measures frequency signal from Line 1-2

In 3-phase 4-wire, it measures frequency signal from Line 1 voltage input. In case Line 1 voltage loss, it measures from Line 3 voltage input. In case both Line 1 & 3 loss, it measures from Line 2 voltage input.

5.2 Demand value

5.2.1 Real-time demand

Demand value is accumulated value during a specified period divided by the length of that period. SPM33 adopts 2 modes to calculate the demand:

Fixed Block and Rolling Block.

Users can set demand interval as 5min, 10min, 15min, 30min or 60min.

In Fixed Block mode, users just need to set the interval.

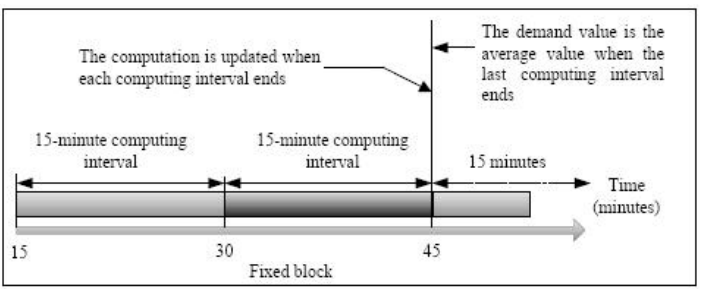
In Rolling Block mode, users should set interval and sub-interval.

Below is the setting range for the 2 intervals.

Optional Demand Interval (period), unit: mins	Programmable Sub-interval (slip), unit: mins
5	1
10	1 or 2
15	1 or 3
30	1 or 2 or 3
60	1 or 2 or 3 or 4

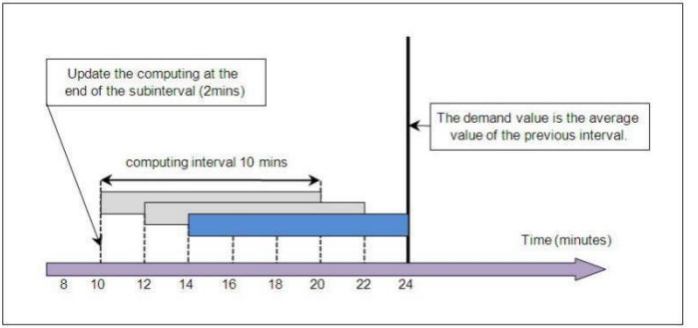
SPM33 provides real-time demand data and peak demand for current (per phase) / active power/ reactive power/ apparent power (per phase and total). User can read the demand from LCD and communication, and can clear demand data to 0.

Below figure is explain for Fixed Block mode:



Below figure is one example of Rolling Block mode:

(Demand intervals is 10 mins, subintervals is 2 mins.)



5.2.2 Forecast demand

SPM33 provides data of forecast demand. The data need to be read by RS485 communication.

5.2.3 Monthly peak demand.

SPM33 has record for peak demand of every month. The record data need to be read by communication. Once the time spans across months, the monthly peak demand data of previous month will be cleared to 0.

5.3 Energy (kWh, kvarh)

SPM33 accumulates energy parameters: imp. kWh, exp. kWh, imp. kvarh, exp. kvarh. If the value reaches to maximum (99,999,999.9 kWh), it will

automatically turn over, and re-start accumulate from 0.

5.4 Multi-tariff Energy

For Multi-tariff Energy setting, user need to set via RS485 communication.

Setting items include: Date period, Special date, Day type, Timetable, Time, Tariff.

Date period: in one year (total 365 days), user can set 1~12 Date periods. The first date period must be starting from January 1st.

Special date: user can set max. 90 special dates.

Day type: except the Special date, other normal date can be set to 4 types (Day type 1~ type 4)

Timetable: user can set 20 kinds of timetable. Each Day type needs to choose one kind of timetable.

Time: in one day, user can set 1~12 periods of time (each step is 15 mins).

Tariff (rate): there are 4 rates, in every period of time, user need to set rate.

5.5 History Energy Data

SPM33 record the history active energy data (total kWh) ：

（1） Monthly total kWh in last 12 months.

（2） Yearly total kWh in last 10 years.

5.6 Harmonic parameters

SPM33 measures voltage and current harmonic up to 63rd , and THD.

The data of harmonics are given according to the percentage of fundamental harmonics and have one digit after the decimal point. That is to say, when the value of the fundamental harmonic is fixed at 1000, it is 100.0% of the effective value of the fundamental harmonic; others are by analogy.

THD refers to the total of higher harmonics except fundamental harmonics, and it is calculated according to the following formula:

$$THD = \sqrt{\sum_{i=2}^{i=n} X_i^2}$$

i : Harmonic order.

X_i : Percentage of the effective value of each harmonic to that of the fundamental harmonic.

n : Highest harmonic order, which should be 63 here.

【Attention】:

THD can be read through LCD display and RS485 communication.

Each individual harmonic just can be read by RS485 communication.

5.7 Unbalance parameters

SPM33 measures current and voltage negative sequence, positive sequence and zero sequence component, and calculates the voltage unbalance and current unbalance, the formula as below:

$$U\ unbal = \frac{\text{Voltage negative sequence component}}{\text{Voltage positive sequence component}} \times 100\%$$

$$I\ unbal = \frac{\text{Current negative sequence component}}{\text{Current positive sequence component}} \times 100\%$$

5.8 Alarm setpoint

SPM33 with user definable valued system which can monitor the electrical parameters of the instrument and set the action. When an alarm event occurs, the instrument panel ALARM LED will flash, meanwhile, the display can be switched to the alarm interface to see the type of alarm events, or read the type of alarm through communication, after the elimination of alarm events , ALARM LED will destroy , warning interface will appear as "no."

The object of the alarm type as below:

Object	Alarm triggered	remark
The upper limit of voltage	Max. voltage > Upper limit In 3P4W, the value is voltage ph-N In 3P3W, the values is voltage ph-ph	Setting value to 0 means unable alarm.
The lower limit of voltage	110V <Min. voltage < Lower limit In 3P4W, the value is voltage ph-N In 3P3W, the values is voltage ph-ph	
The upper limit of current	Max. primary current > Upper limit	Setting value to 0 means unable

The lower limit of current	Min. primary current (≠0) < Lower limit	alarm.
The upper limit of frequency	Frequency >Upper limit	Setting value to 0 means unable alarm.
The lower limit of frequency	Frequency (≠0) < Lower limit	
The upper limit of power	Total active power (primary) > Upper limit	Setting value to 0 means unable alarm.
Voltage phase loss	In 3P4W, any one phase or 2 phase voltage <110V In 3P3W, any one phase or 2 phase voltage < 190V	Select ON/OFF (invalid for 1-phase 2-wire connection)
DI 1 switch off	When DI 1 position status is change from ON to OFF, then alarm	Select ON/OFF
Phase error	3 phase voltage >= 80% of rated input, meanwhile the absolute value of three phase voltage angle difference > 10°	Setting value to 0 means unable alarm.
DI 2 switch off	When DI 2 position status is change from ON to OFF, then alarm	Select ON/OFF

5.8.1 Alarm trigger condition

When the setting object meets the trigger condition, and meanwhile it also meets the time requirements, then it will trigger alarm.

Throughout the delay time, if the setting object restore within limits, then the alarm setpoint is not activated. If the delay time is 0, it means that once the monitoring object exceeds the limit, it will alarm immediately.

The trigger delay time unit is second, setting range: 0~120s

For example:

Users want to set alarm for over-current and over-voltage, trigger condition: voltage is higher than 240V for 80s or current is higher than 200A for 10s, then Relay 1 trigger alarm.

The correct setting as below:

Setting alarm object	Setting value
Voltage upper limit	240V
Over-voltage delay time	80s
Current upper limit	200A
Over-current delay time	10s
Relay 1 mode	Alarm
Relay 1 object	All

5.8.2 Alarm output

When the alarm event occurs, users can check the alarm event from LCD or communication. If the alarm associated one relay, the relay will trigger. Once the alarm disappears, the ALARM LED will be off, and the associated relay will restore.

Note: If no require for alarm function, users can keep all setpoint value to be 0,

5.8.3 Alarm information on LCD

When the alarm event occurs, the ALARM LED will flash. Users can press the keys to check the alarm information on LCD. The alarm information is displayed as a four-digit hexadecimal value, users need to convert the hexadecimal value to binary. Each binary bit represents an alarm type.

If value is 1, it means alarm. If value is 0, it means no alarm.

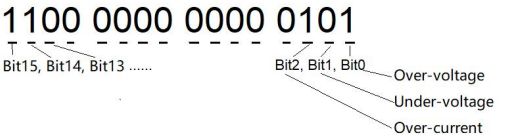
Digit place	Binary digit	Alarm parameter
---X	Bit0	Over-voltage
	Bit1	Under-voltage
	Bit2	Over-current
	Bit3	Under-current
--X-	Bit4	Over-frequency
	Bit5	Under-frequency
	Bit6	Over-power
	Bit7	Phase loss

-X--	Bit8	DI 1 switch off
	Bit9	reserved
	Bit10	reserved
	Bit11	reserved
X---	Bit12	reserved
	Bit13	reserved
	Bit14	Phase error
	Bit15	DI 2 switch off

For example:

On SPM33 LCD, it shows alarm information: C005,

then, convert it to binary is “1100 0000 0000 0101”, it means there are 4 alarm events: Over-voltage, Over-current, Phase error, DI2 switch off.



If the alarm associated one relay, the relay will trigger. Once the alarm disappears, the ALARM LED will be off, and the associated relay will restore. On the LCD, it shows alarm information “0000”.

5.9 SOE event log

SPM33 supports to record 64 pieces of SOE event log, user can read the event log by RS485 communication.

The time for event is using UNIX format, resolution is 1ms.

UNIX time is the number of seconds that have elapsed since 00:00:00 UTC on 1 January 1970

If users use the SPM33 testing software to read the event log, it shows the information as below:

No.	Event type	Time
1	Relay 1 ON	2011-7-28 09:31:34 792ms

5.10 Max. & Min. data

SPM33 can record the max. & min. data of 3- phase voltage/ line voltage/ current/ active power/ reactive power/ apparent power/ frequency, with time stamp.

5.11 Load run statistics

SPM33 supports accumulate the Load power on hour (LOH), Load run hour (LRH) and Load run counts (LRC).

Load power on hour (LOH) is counted when total active power (P) >0.
Load run hour (LRH) is counted when total active power (P) > setpoint.
Load run counts (LRC) is the counted num. when total active power (P)> setpoint.

5.12 Load impedance

SPM33 measures 3 phase load impedance and total load impedance. The load impedance is judged by the active power (P) and reactive power (Q).

When P=0, Q=0, it is resistive impedance

when P>0 and Q>0, it is inductive impedance;

when P<0 and Q<0, it is inductive impedance;

when P<0 and Q>0, it is capacitive impedance;

When P>0 and Q<0, it is capacitive impedance.

5.13 Current K factor

Among the technical indicators of power quality, the K factor mainly reflects the influence of the frequency of harmonics caused by nonlinear loads on transformer losses. The definition of K factor mainly assumes that the transformer eddy current loss caused by the harmonic current is proportional to the square of the harmonic order. The calculation formula is:

$$K = \frac{\sum_{h=1}^{\infty} I_h^2 h^2}{\sum_{h=1}^{\infty} I_h^2} = \frac{\sum_{h=1}^{h=h_{\max}} I_h^2 h^2}{\sum_{h=1}^{h=h_{\max}} I_h^2}$$

In the formula, h is the harmonic order number, I_h is the effective value of the order num. h harmonic current, $h_{\max}$ is the highest order of

harmonic current to be considered.

5.14 Voltage crest factor

SPM33 provides voltage crest factor, which can be viewed by RS485 only. The crest factor is the ratio of the peak voltage of the load to the RMS voltage (RMS: root mean square value, or average). The crest factor of most electronic devices is 1.4 (1.4 is the ratio of the peak value of the sine wave to the average value).

5.15 Current TDD

SPM33 provides three-phase current TDD, which users can view through communication. Current TDD is the distortion rate of harmonic demand. The current TDD is equal to the ratio of the 0.5th power of the sum of squares of the effective value of the harmonic current to the rated current.

5.16 Operation record

SPM33 records the last 10 operation events. The time for event is using UNIX format, resolution is 1ms.

UNIX time is the number of seconds that have elapsed since 00:00:00 UTC on 1 January 1970

If users use the SPM33 testing software to read the event log, it shows the information as below:

No.	Events
1	2011-7-28 09:31:34 792ms: set CT primary

5.17 Four-quadrant Energy

SPM33 accumulate the four quadrant energy data, user can read these data from RS485.

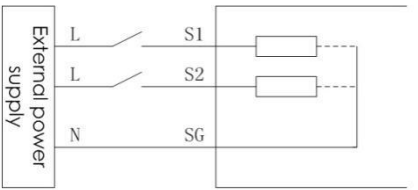
6. Input/output Characteristics

6.1 Digital input

SPM33 provides 2 digital input (wet contact) which can be applied to monitoring circuit breaker position signal, switch position signals and other status information.

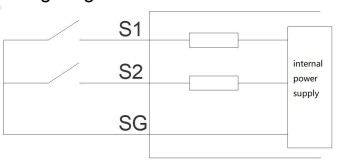
SPM33 can provide optional 4 digital input (wet contact or dry contact) .
The wet contact type DI require the external power source (AC220V). Below is the example to introduce this wiring mode.

◇Wet contact DI wiring diagram is shown as below:



In general, when the external node is closed on, SPM33 LCD corresponding status input channel is ON, internal set to 1.
When the external node is turned off, SPM33 LCD corresponding status input channel is OFF, internal set to 0.

◇For dry contact DI, SPM33 has internal power 30VDC for the DI. The wiring diagram is shown as below:



6.2 Relay output

SPM33 provides optional four relay outputs, relay specification is 250Vac/5A. It can be used with the instrument's alarm setpoint system, to monitor relative electrical parameters whether there is exceed limit, and thus output breaker reasonable action (Please refer to the chapter of the alarm setpoint for more details).

Or, the relay can be set to remote control mode. Users can remote control the relay according to project requirement.

SPM33 provides two relay operation modes. The action of relay is different in these two modes. The default control mode of this product is remote control. Users can modify to alarm control through panel relay setting or through communication.

- Remote control (external) - The relay is controlled by a PC or PLC by using commands through communication.
- Alarm Control (internal) - If there is an alarm generated, the relay on the action, you can refer to specific alarm setpoint alarm.
- When setting as Alarm mode, for more details of Alarm Subjects, please refer to ***"5.8 Alarm Setpoint"***

Once the relay has been in the remote control mode, even if the alarms generated, it will not trigger, the relay mode must be set to alarm mode, then can operate the alarm action.

Reset (effective only under remote mode): When the relay trigger, it can return to the state after N times (N is set reset time, can be set by the panel and communications, when set N = 0, the relay can't reset, that is, relay will not restore to original state).

7. Technical Specification

Aux. power supply	AC 85~265V or DC 100~300V	
Rated input current	5A or 1A	
Rated input voltage	3×220Vph-N/380Vph-ph, 3x 57.7Vph-N/ 100Vph-ph via PT, 40Hz~70Hz	
Digital input	Wet contact type: Rated voltage 220VAC. If power <60V, DI is OFF, if power > 140V, DI is ON. Max. input 300V. Dry contact type: internal power 30VDC	
Relay output	Rated contact capacity: AC 250V/5A or DC 30V/5A	
Power Consumption	≤ 2W/5VA	
Operating environment	Operating temperature: -10℃ ~ +55℃ Limit operating temperature: -25℃ ~ +55℃ Storage temperature: -40℃ ~ +70℃ Humidity: 5% ~ 95% RH, non-condensing	
Power frequency withstand voltage	4KVAC	
Insulation resistance	≥ 100MΩ	
Impulse voltage	6KV	
IP index	Front panel: IP52, case: IP20	
Certificate	CE, Standard IEC61010-1: 2010	
Parameter	**Range**	**Accuracy**
Voltage	10V~400Vph-N 10V~500Vph-ph	0.2%

	PT primary max. 650kV	
Current	5mA ~6.5A CT primary max. 50,000A	0.2%
Frequency	40~70Hz	0.1%
Power factor	-1.000~1.000	1.0%
Active energy	0~99999999.9 kWh	0.5%
Reactive energy	0~99999999.9 kvarh	2.0%
Active power	Per phase: 0 ~ ± 9999MW Total: 0 ~ ± 9999MW	0.5%
Reactive power	Per phase: 0 ~ ± 9999Mva Total: 0 ~ ± 9999Mvar	1.0%
Unbalance	0%~100%	1.0%
Harmonic	0%~100%	Class B
Standard		
Electrostatic Discharge Immunity Test	IEC61000-4-2:2001 (GB/T17626.2-2006)	Level 4
Radiated immunity test	IEC61000-4-3:2002 (GB/T17626.3-2006)	Level 4
Electrical fast transient/burst immunity test	IEC61000-4-4:2006 (GB/T17626.4-2008)	Level 4
Surge immunity test	IEC61000-4-5:2005 (GB/T17626.5-2008)	Level 4
RF field immunity induced mass	IEC61000-4-6:2006 (GB/T17626.6-2008)	Level 3
Radiated emissions limit	CISPR22：2006 (GB 9254-2008)	Pass

Voltage dips, short interruptions immunity test	IEC61000-4-11:2004 (GB/T17626.11-2008)	Pass
Power frequency withstand voltage	IEC62052-11: 2003 (GB/T 17215.211-2006)	Rated insulation voltage≤300V，The test voltage 2000V。Rated insulation voltage≤60V，The test voltage 1000V。Leakage current ≦10mA。

8. Maintenance and Trouble Shooting

Possible problem	Possible cause	Possible solution
There is no display on device after impose power supply.	The power supply fails to be imposed on the meter.	Check if the correct working voltage has been imposed on the L/+ and N/- terminals of the meter. Check if the fuse for the control power supply has been burnt down.
The measured value is not correct or does not conform to the expectation.	The voltage measurement is not correct.	Check if the neutral point has been connected reliably. Check if the measured voltage matches the rated parameter of the meter. Check if the PT ratio has been set correctly.
	The current measurement is not correct.	Check if the measured current matches the rated parameter of the meter. Check if the CT ratio has been set correctly.
	The power measurement is not correct.	Check if the measurement mode has been set correctly. Check if the phase sequence corresponding to the voltage and the current is correct.

		Check if the current terminals of the same name are wrong.
The digital input status no changing.	The voltage relating to digital input is not correct.	Check if the types of external nodes match the rated parameters of the meter. Check if the external connection is correct.
The relay output status no changing.	The relay does not receive the control command.	Check if the communication link is correct.
	The control mode of relay is not correct.	Check if the current relay is under the correct mode.
There is no communication between the upper end device and the meter	The communication baud rate of the meter is not correct.	Check if the communication baud rate of the meter is consistent with its definition.
	The communication link has not been connected to the terminal resistor.	Check if the 120-Ohm resistor has been connected.
	The communication link suffers interference.	Check if the communication-shielding layer has been earthed effectively.
	The communication line is interrupted.	Check if the communication cable has been disconnected.
	The communication baud rate of the meter is not correct.	Check if the communication baud rate of the meter is consistent with its definition.

9. Terminals Definition

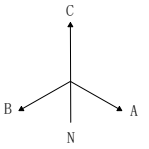
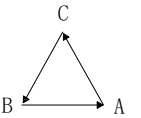
No.	Def.	Instruction	No.	Def.	Instruction
1	L/+	Positive pole of power supply	**13**	485+	RS485 positive pole
2	NC	Null	**14**	SHLD	RS485 shield
3	N/-	Negative pole of power supply	**15**	VA	Phase A voltage
4	NC	Null	**16**	VB	Phase B voltage
5	S1	Status input 1	**17**	VC	Phase C voltage
6	S2	Status input 2	**18**	VN	Neutral line
7	SG	Status input public GND	**19**	I11	Phase A current incoming line
8	RL1	Relay 1 output 1	**20**	I12	Phase A current outgoing line
9	RLN1	Relay 1 Output 2	**21**	I21	Phase B current incoming line
10	RL2	Relay 2 Output 1	**22**	I22	Phase B current outgoing line
11	RLN2	Relay 2 Output 2	**23**	I31	Phase C current incoming line
12	485-	RS485 negative pole	**24**	I32	Phase C current outgoing line

Optional E1 and E4 terminals

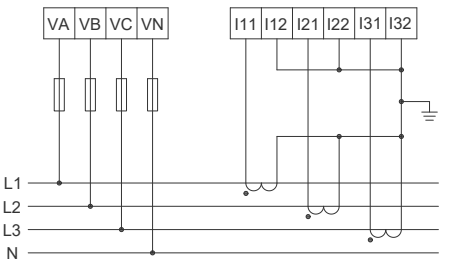
No.	Def.	Instruction	No.	Def.	Instruction
25	S3	Status input 3	**32**	RL3	Relay 3 output 1
26	S4	Status input 4	**33**	RL3N	Relay 3 Output 2
27	S5	Status input 5	**34**	RL4	Relay 4 output 1
28	S6	Status input 6	**35**	RL4N	Relay 4 Output 2
29	SG2	Status input public GND	36	NC	Null
30	NC	Null	37	NC	Null
31	NC	Null	38	NC	Null

10. Typical Connection

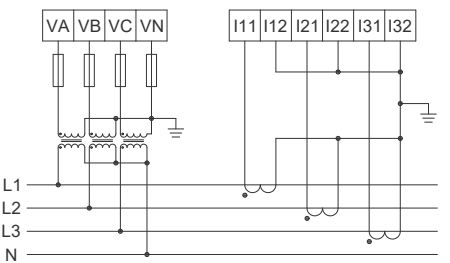
SPM33 supports multiple connection modes of measurement, the following methods were used icons explained.

	
3-phase 4-wire system	3-phase 3-wire system

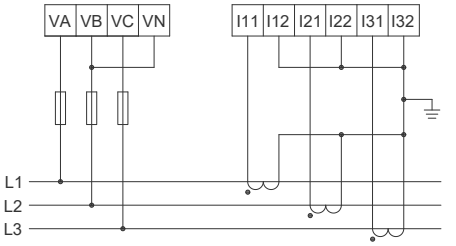
■ 3-phase 4-wire system, 3CT



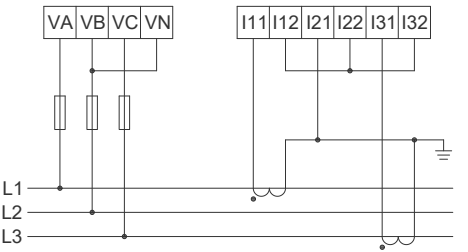
■ 3-phase 4-wire system, 3PT, 3CT



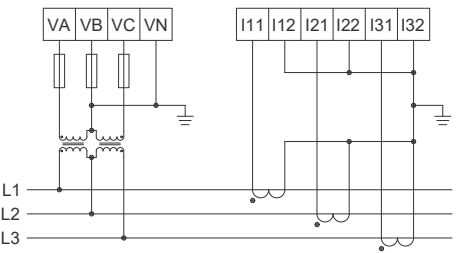
■ 3-phase 3-wire system, 3CT



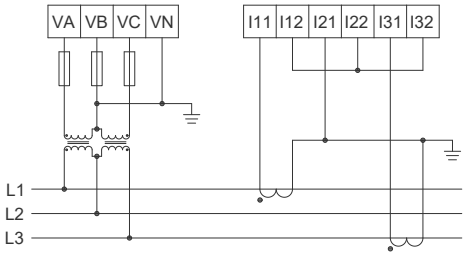
■ 3-phase 3-wire system, 2CT



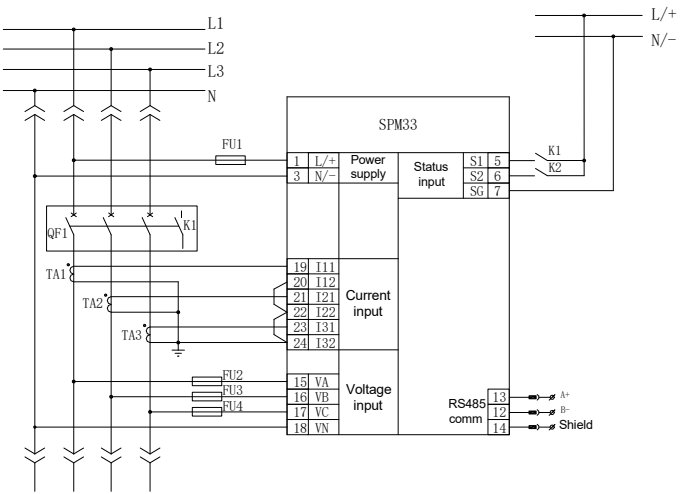
■ 3-phase 3-wire system, 2PT, 3CT



■ 3-phase 3-wire system, 2PT, 2CT



SPM33 typical wiring diagrams, comprehensive electrical parameters measuring under 3-phase 4-wire mode, with digital status inputs and one RS485 communication function:



Notice:

PILOT reserves the right to modify this manual without prior notice in view of continued improvement

Contact email: pilot166@pmac.com.cn

Zhuhai Pilot Technology Co., Ltd.

Add:No.15,keji6Road,Chuangxin Haian,Tangjia High-tech Zone,Zhuhai,Guangdong,519085 China

Tel: +86-756-3629687/3629688

Fax: +86-756-3629600/3629670

http://www.pmac.com.cn