User Manual

Smart Digital Power Meter

Part Number: MP701125

Newark.com/multicomp-pro
Farnell.com/multicomp-pro
sg.element14.com/b/multicomp-pro

Product Introduction

The smart digital power meter is an economical and portable measuring instrument. It is a multi-functional measuring instrument which integrating voltage, current, power, power factor, frequency. The product is widely used in production, testing, evaluation and scientific research and multi-field.

MP701125 adopts a high speed CPU for data processing, the sampling resistance of voltage and current are all use low temperature drift resistor, therefore, the stability and accuracy of measurement data are guaranteed.

MP701125 has true RMS measurement; it can adjust to the electric parameter measurement of various occasions such as full wave, half wave (AC/DC type) and irregular waveform. This instrument can measure voltage (V), current (A), active power (W), apparent power (VA), voltage peak (Vpk), current peak (Apk), power factor (PF), frequency (Hz) and wave crest ratio. It has perfect functions, superior performance and simple operation.

The instrument can meet the needs of high-speed measurement in production sites, as well as laboratory and R&D measurements. It is widely used in in the fields of lighting appliances, power tools, household appliances, electric motors and electric heating appliances of production lines, laboratories and quality inspection departments.

Characteristics

- The screen display reading is intuitive, it adopts high speed A/D transformer and 32-bit MCU operation.
- Multi-window simultaneous display of voltage, current, power, power factor/frequency.
- The range of voltage and current has manual range and automatic range.
- AC, DC, AC+DC (T-RMS) modes.
- Average function can make the reading more stable and it suitable for measuring the load or power with large variations.
- Data upgrade period can be set. User can select a faster upgrade period according to the test needs, in order to improve the test efficiency.
- Communication interface supports RS-232 and RS-485. Communication protocol supports SCPI and Modbus for communicating with computer and PLC.
- It can freely set the upper and lower limit of current and power, the digital power meter will automatically judge whether the test value is exceeded.
- Sound and light alarm indication, convenient for batch detection to improve the measurement efficiency.

Specifications

Display	VA broken code display, 5 digits, four windows
Display Update Rate	0.1S, 0.25S, 0.5S, 1S, 2S, 6S
Measuring Object	V,A,W,PF/Hz
Measuring Mode	AC/DC/AC+DC(T-RMS)
Measuring Range of Voltage	3V-600V
Voltage Range	75V/150V/300V/600V
Accuracy of Voltage (1%-100% of range)	DC ±(0.4% reading+ 0.1% range+1 character) 40Hz≤f≤66Hz: ±(0.4% reading +0.1% range+1 range+1 character) 66Hz<f≤400Hz: ±(0.3% reading 0.2% range+1 character)
Voltage Resolution	0.1V/0.1V
Measuring Range of Current	0.5mA-20A
Current Range	500mA/2A/8A/20A
Accuracy of Current (1%-100% of range)	DC ±(0.4% reading+ 0.1% range+1 character) 40Hz≤f≤66Hz: ±(0.4% reading +0.1% range+1 range+1 character) 66Hz<f≤400Hz: ±(0.3% reading 0.2% range+1 character)
Current Resolution	0.1mA/1mA

Switching Range	Auto/Manual	
Power Range	1W-12kW	
Accuracy of Power (PF1)	DC ±(0.4% reading+ 0.1% range+1 character) 40Hz≤f≤66Hz: ±(0.4% reading +0.1% range+1 range+1 character) 66Hz<f≤400Hz: ±(0.3% reading 0.2% range+1 character)	
Power Resolution	0.001W/0.01W/0.1W/1W	
Power Factor Range	-1.000~1.000	
Accuracy of Power Factor	±(0.004+0.001* reading +1 character)	
Frequency Range	DC, 40Hz-400Hz (voltage>10% of range)	
Accuracy of Frequency	±(0.1% reading +1 Character)	
Auto Range	Voltage Range Increasing	Urms exceeds the measuring range about 110% (CF<2)
	Voltage Range Decreasing	Urms is less than the lower part range about 80% (CF<2)
	Current Range Increasing	Irms exceeds the measuring range about 110% (CF<2)
	Current Range Decreasing	Irms is less than the lower part range about 60% (CF<2)
Pre-heating Time	>30 min	
Current Peak	The maximum display 24A	
Maximum of Allowed Input for Continuous	Voltage 700V, Current 24A	
Maximum of Allowed input for Instant	1000V. 40A (1 min)	
Input Impedance	Voltage about 2 MΩ, Current is less than 0.02Ω	
Upper/Lower Limit	Four settings for the upper/lower limit of power and current	
	P Hi (Power high) P Lo(Power low) A Hi (Current high) A Lo (Current low)	
Average Function	√	
Harmonic Analysis	-	
Peak Measurement	-	
Display Hold	√	
Mute Alarm	√	
Mute Key	-	
Lock Key	√	
Interface	RS232 (DB9 2-pin: TX, 3-pin: RX, 5-pin: GND)	
	RS485 (DB9; 8-pin: A. 9-pin: B)	
Baud Rate	4800, 9600, 19.2K, 38.4K , 57.6K, 115.2K, default 9600, It follows communication protocol of standard SCPI and Modbus RTU.	
Power Source	Input power: AC 100V-240V Frequency 50/60Hz	
Precision Environment	18°C~28°C, 30%~75%RH (28°C < operating temperature < 18°C (when in 18°C, it needs to add temperature coefficient), reading of 0.05%C)	

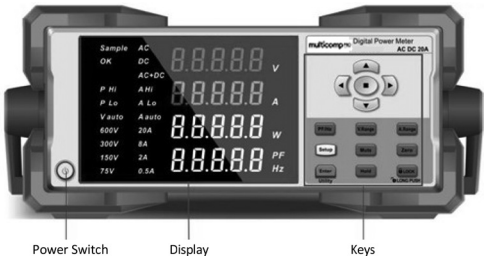
Storage Temperature	-10°C-50°C, non-condensing below 80% RH
Operating Altitude	≤2000 meters

General Characteristic

Colour	Grey
Weight	3.3kg
Size	214mm×80mm×340mm
Standard Accessories	Specialized power cable ×1; RS232 serial port line ×1

Front Panel

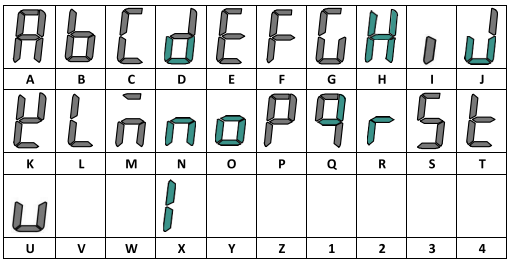
Front Panel and Keys

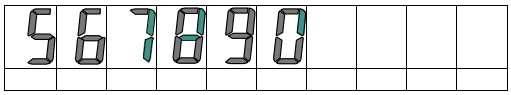


Key Function	Symbol	Description
Power Switch	⏻	Press one time to turn “ON”, the power source is enabled, press it again to turn “OFF”, the power source is disabled.
Left, Right Key	◀ ▶	Switch sub-menu: Use left, right key to select the sub-menu that need to be edited. Number editing: Use left, right key to select the data bit that need to be edited.
Up, Down Key	▼ ▲	Menu editing: Use up, down key to select function item. Number editing: Use up, down key to increase or decrease the numerical value.
Decimal Point Key	■	Number editing: To move decimal point
Display Hold	**Hold**	Data hold key, when the key is activated, it will keep display the current data.
PF/Hz	**PF/Hz**	To select the fourth line to display power factor or frequency.
Voltage Range	**V.Range**	To select fixed range or auto range. V auto is auto range.
Current Range	**A.Range**	To select fixed range or auto range. A auto is auto range.
Setup Key	**Setup**	Enter Setup menu, this menu is to editing the configuration data of measurement, alarm and communication.
Mute Key	**Mute**	The beeper can be mute when over the limit (mute alarm). Press the key to activate mute key and the indicator will be illuminated; press it again to relieve the mute and the indicator will be extinguished.
Zero (Clear)	**Zero**	Press this key to enter zero correction state. Zero function is to recalibrate zero bit value of voltage and current channel.
Enter or Utility Key	**Enter** **Utility**	Enter Key: Short press is to activate confirm key to save the currently edited data. Utility Key: Long press is to activate Utility key to enter Utility menu.
Lock Key	**LOCK**	Press this key and the indicator will be illuminated. Long press to unlock the key and the indicator will be extinguished.

Digital and Character Display

The data display format of data display window is nixie tube. Due to the limitation of the format, special symbols are needed to represent each character, as shown in the following figure.





Display and Symbols

Display and Symbol	Description
	Four display windows; Display measurement data: The display screen can display V (voltage), A (current), W (power), PF (power factor)/Hz (frequency) at the same time. Menu editing: Display menu
Sample	An upgrade symbol of measurement data.
OK A Hi A Lo P Hi P Lo	Alarm Symbol OK: Measurement value of the current and power within the upper/lower limit. A Hi: Measurement value of current is higher than the upper limit. A Lo: Measurement value of current is lower than the upper limit. P Hi: Measurement value of power is higher than the upper limit. P Lo: Measurement value of power is lower than the upper limit.
AC DC AC+DC	Measuring mode
V auto 600V 300V 150V 75V	The currently voltage range, when it displays V auto, it is auto range.
A auto 20A 8A 2A 0.5A	The currently current range, when it displays A auto, it is auto range.

Rear Panel

No.	Picture of parts	Description
1		Under test load/LOAD terminal, it usually used to connect to the input port of the product to be test.
2		Under test input terminal /SOURCE terminal, it usually used to connect to the output port of AC power.
3		Three-wire power socket and fuse
4		Ground terminal
5		RS232/RS485 communication interface

Operating Preparation and Measurement Display

Operating Preparation

Connecting Power Cable

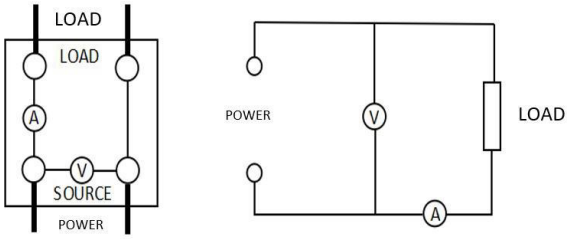
The operating voltage of the instrument is 100V~240V (50/60Hz), please make sure the power supply is within the rated voltage of this instrument, and make sure the instrument is well grounded.

Warning: Please make sure that the power supply voltage matches the supply voltage before turning on the power supply, otherwise the instrument will be burned out.

Notes: The instrument should be used under the recommended working conditions. Never use the instrument in a place where have flammable or explosive materials, it may cause safety injuries.

Connecting Test Circuit

Please follow the following figure to connect the power and load, and make sure voltage and current is within the measurement range of the instrument.



Warnings:

1. The load current flows along the thick wire in the above diagram, so these wires should have a large enough safe load capacity.
2. The power supply of the load and the power supply of the instrument should be turned off when wiring at the load end.

Notes:

1. When measuring large current/voltage or the current includes high frequency, it should pay attention to possible mutual interference and noise problems when wiring.
2. The lead wire should as short as possible.
3. Use heavy gauge wire as can as possible when measuring current.
4. To reduce the distributed capacitance to ground, the wire and grounding wire should be as far away from the instrument housing as possible.

Turn ON/OFF Power Supply

Turn on: Start self-check program when the instrument is enabled, the instrument will enter the measuring state if the check result is correct.

Turn off: The upper/lower limit of current and power will be saved when the power has been turned off.

Notes: After turning off the power, wait for 5 seconds to turn on again, otherwise the instrument may abnormally display.

Power-on Measurement

Firstly, plug in the power socket on the rear panel, and use the specified voltage, the power socket should be with a ground wire. After checking the wiring is connected rightly, turn on the instrument switch located at the front panel, and the instrument will enter the measurement state. Apply power to the load and read out the required measurement value from the display on the front panel of the instrument after the load has been working stably.

Notes: The instrument should be preheated for 30 minutes before entering the stable state. After cutting off the instrument power, it should wait for more than 5 seconds before powering it on again. It is strictly forbidden to switch the power on and off repeatedly within a short period of time, which will cause the instrument life to shorten and may cause instrument failure. When the measurement is finished, turn off the instrument power and unplug it to prevent possible damage to the instrument caused by lightning strikes.

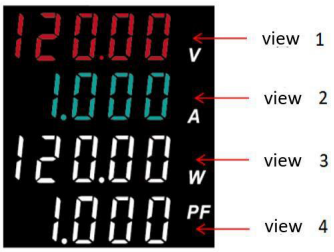
Measurement Display

Window Display

MP701125 has four display windows, it can display different measurement value at the same time, as shown in the following table.

No.	Window Display	Name	Measurement Range
1	V	Voltage (volt)	U: 3.0V ~ 600V
2	A	Current (Ampere/milliampere)	I: 0.0005A ~ 20A
3	W	Active power (Watt)	P: 0.001W ~ 12kW
4	PF	Power factor	PF: -1.000~1.000
	Hz	Frequency (Hertz)	Hz: 40Hz ~ 400Hz (UTE9802+)

The four windows are as shown in the following figure.



Alarm for Over Range

These situations will be regarded as over range.

1. The measured value of voltage and current exceeds 120% of the rated range.
2. The peak value of voltage and current exceeds 170% of the rated range.

"--OL-" will be appear when the range is exceeded.

Alarm for Lower Measured Value

The alarm will be appear if the measured value of voltage is less than 3V or the measured value of current is less than rated value 0.1%.

1. Voltage, current, power displays "0".
2. Power factor displays " ---- ".

Alarm for Break Off

When switch measurement range and function, " ----- "will be appear for a period.

Hold (Data-Hold)

Press Hold key and the indicator will be illuminated, the measurement value will keep display and the data will not refresh. Press it again, the indicator will be extinguished and the data will be update.

Lock (Lock Key)

To prevent from error operating during measurement, lock key function can set other key be invalid (Lock state). Press Lock key and the indicator light will be illuminated. This key will be no response. It need to long press Lock key for 1s and the indicator light will be extinguished. After that, the key will turn to enable state.

Measurement

Measurement Range

Voltage Range

·Step

Press [V.Range] key to switch to voltage range.

·Explanation

The range can set to Auto, 600V, 300V, 150V or 75V.

The display interface will synchronous display the current selected voltage range.

Current Range

Step

Press [A.Range] key to switch to current range.

Explanation

The range can set to Auto, 20A, 8A, 2A or 0.5A.

The display interface will synchronous display the current selected current range.

Manual/Auto Range

Manual Range

If the measurement range is set to manual range, the selected range will not be change even if the size of input signals changes.

The manual range can select from the following options. Voltage range: 600V, 300V, 150V, 75V.

Current range: 20A, 8A, 2A, 0.5A.

Auto Range

If the measurement range is set to auto range, the instrument will synchronous switch range according to the size of input signal.

Voltage Range Increasing

The voltage range will increase when any one of the following condition is met. Urms exceeds measurement range about 110%.

Upk exceeds measurement range about 170%.

Voltage Range Decreasing

The voltage range will decrease when any one of the following condition is met. Urms is less than the lower part range about 80%.

Upk is less than the lower part range about 170%.

Current Range Increasing

The current range will increase when any one of the following condition is met.

Irms exceeds measurement range about 110%. Ipk exceeds measurement range about 170%.

Current Range

Current Range Decreasing

The current range will decrease when any one of the following condition is met. Irms is less than the lower part range about 60%. Ipk is less than the lower part range about 170%.

Measurement Mode

Steps

1. Press [SETUP] key to enter SETUP menu, the current submenu is “MODE”, as shown in the following figure
2. Press [ENTER] key to enter the next option, and then press [▲] or [▼] key to select ACDC, AC or DC
3. Press [ENTER] key to select the current selected option and save it
2. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit SETUP menu

Explanation

Measurement Mode

Measurement Mode	Voltage	Current
ACDC (AC+DC)	TRMS	TRMS
AC	AC component	AC component
DC	Simple average	Simple average

Theoretical Equation

ACDC (AC+DC): Select this mode to display the TRMS value of the voltage and current.

$$\sqrt{\frac{1}{T}\int_0^T f(t)^2 dt}$$

f(t): input signal
T: a period of input

DC:This mode is for inputting DC voltage and current, it will execute simple average for input signal.

$$\frac{1}{T}\int_0^T f(t)dt$$

f(t): input signal
T: a period of input

AC: Display the AC component of voltage or current.

$$U_{ac} = \sqrt{U_{rms}^2 - U_{dc}^2} \quad 或 \quad I_{ac} = \sqrt{I_{rms}^2 - I_{dc}^2}$$

Urms, Irms: TRMS of voltage and current
Udc, Idc: Simple average of voltage and current

Average

Average

Steps

1. Press [SETUP] key to enter SETUP menu, press [◄] or [►] key to select submenu“AVG”as shown in the following figure;
2. Press [ENTER] key to enter the next option, and the press [▲] or [▼] key to select OFF, 8, 16, 32 or 64;
3. Press [ENTER] key to select the current selected option and save it;
4. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit SETUP menu.

Explanation

OFF represents the average function is disabled. 8, 16, 32, 64 represents the average function is enabled and the number of average.

Data Update Cycle

Steps

1. Press [SETUP] key to enter SETUP menu, press [◄] or [►] key to select submenu“u.rate”as shown in the following figure;
2. Press [ENTER]/[OK] key to enter the next option, and the press [▲] or [▼] key to switch 0.1, 0.25, 0.5, 1, 2, 5;
3. Press [ENTER]/[OK] key to select the currently selected option and save the setting;
4. Press [SETUP] key to exit SETUP menu.

Explanation

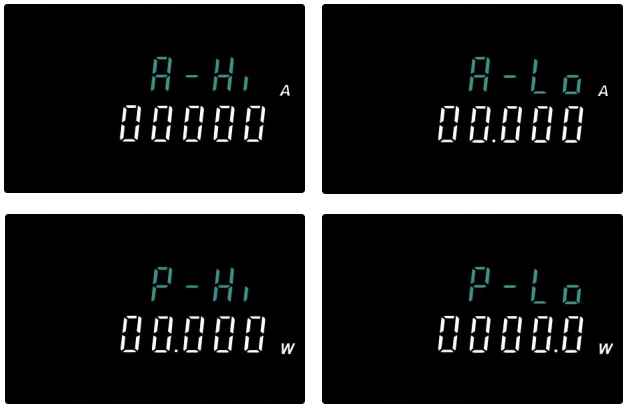
The data update cycle is the update interval of the sampled data of the measurement function. The data update cycle can set to 0.1s, 0.25s, 0.5s, 1s, 2s or 5s. The default is 0.25s.

Alarm

Upper/Lower Limit of Current and Power

Steps

1. Press [SETUP] key to enter SETUP menu,press [◄] or [►] key to select one of submenu“A-Hi”,“A-Lo” , “P-Hi” or“P-Lo” as shown in the following figure;
2. Press [ENTER] key to enter numerical value editing state, press [▲] [▼] [◄] [►] [⊙] key to edit the numerical value;
3. Press [ENTER] key save the setting;
4. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit SETUP menu.



Explanation

“A-Hi”represents the upper limit of current.“A-Lo” represents the lower limit of current. “P-Hi” represents the upper limit of power. “P-Lo” represents the lower limit of power.

*Notes: when editing the numerical value, the lower limit cannot greater than the upper limit.

Otherwise it will prompt “--oF-”and the setting cannot be saved when press [Enter] key.

Alarm Delay

Steps

1. Press [SETUP] key to enter SETUP menu, press [◄] or [►] key to select submenu “tiME” as shown in the following figure;
2. Press [ENTER] key to enter numerical value editing state, press [▲] [▼] [◄] [►] key to edit the numerical value;
3. Press [ENTER] key save the setting;
4. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit SETUP menu.

Explanation

The unit of alarm delay is S, the range can set to 0~99.9.

Alarm Function

Turn on/off Alarm Function

When the upper/lower limit is different but as “0”, it represents the alarm function is enabled. When the upper/lower limit is “0”at the same time, it represents the alarm function is forbidden.

Alarm Function

After the alarm function is enabled, the system waits to connect the load. When the system detects the voltage and current are both greater than “0”, it will recognize the load is connected and start to count the time. After the alarm delay, the system will compare the measured value with the upper/lower limit, if the measured value is within the upper/lower limit, the interface displays “OK”; if the measured value is higher than the upper limit, the interface displays “Hi”, and the beeper will alarm; if the

measured value is lower than the lower limit, the interface displays “Lo”, and the beeper will alarm. When the load is removed, the system waits for load access again, the alarm sign is eliminated, and the beeper is turned off.

Communication

Communication Command

Communication Command Setting

Steps

1. Press [SETUP] key to enter SETUP menu, press [◄] or [►] key to select submenu “CoMAd”as shown in the following figure;
2. Press [ENTER] key to enter the next option, and the press [▲] or [▼]key to select “SCPI” or “Modbus”;
3. Press [ENTER] key to select the current selected option and save the setting;
4. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit SETUP menu.

Explanation

MP701125 supports SCPI and Modbus communication command. “Modbus” or “Modb” represents “Modbus” communication command. Modbus is only support RTU mode.

The detailed command can refer to **MP701125 Series Smart Digital Power Meter – Programming Manual**

Baud Rate and Modbus Communication Address

Baud Rate Setting

Steps

1. Press [SETUP] key to enter SETUP menu, press [◄] or [►] key to select submenu“bAud” as shown in the following figure;
2. Press [ENTER] key to enter the next option, and the press [▲] or [▼] key to select 4800, 9600, 19200, 38400, 57600 or 115200;
3. Press [ENTER] key to select the current selected option and save the setting;
4. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit SETUP menu.

Explanation

MP701125 supports RS232 and RS485 interface, both interfaces have the same baud rate, so it can be set by the method in this section.

Modbus Communication Address Setting

Steps

1. Press [SETUP] key to enter SETUP menu, press [◄] or [►] key to select submenu“Addr” as shown in the following figure;
2. Press [ENTER] key to enter numerical value editing state, press [▲] [▼] [◄] [►] key to editing numerical value;
3. Press [ENTER] key to save the setting;
   Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit SETUP menu.

Explanation

Only when the communication command sets to Modbus, submenu“Addr” can display. The setting method of communication command can refer to section 6.1

The Modbus communication address range is 1-99.

System Function

Initialization

Initialization Setting

Steps

1. Long press [ENTER] (Utility) key to enter Utility menu, and the submenu is “init” as shown in the following figure;
2. Press [ENTER] key to enter the next option, and the press [▲] or [▼] key to select NO or YES;
3. Press [ENTER] key to select the current option;
4. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit Utility menu.

Explanation

The setting parameter can be initializing and restore it to the factory setting. This function is very useful for cancelling all the setting or re-executing the measurement function. The factory setting is as shown in the following table.

Item	Default Setting
Display Window 4	Display function: PF
Date Update Cycle	0.25s
Measurement Range	Auto range
Measurement Mode	AC+DC
Average	Average function: OFF
Upper/lower limit of current and power	“0”
Alarm Delay	“0”

*Notes: Other communication settings cannot be restored to the factory setting: communication command, baud rate, Modbus communication address.

View Software Information

Software Information

Steps

1. Long press [ENTER] (Utility) key to enter Utility menu, press [◄] or [►] key to select submenu“Ver” as shown in the following figure;
2. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit Utility menu.

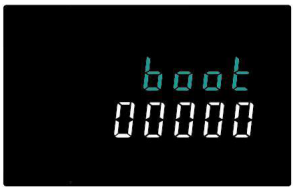
Explanation

"F - 1.03"represents firmware version, "H - 1.01" represents hardware version.

Firmware Update

Steps

1. Long press [ENTER] (Utility) key to enter Utility menu, press [◄] or [►] key to select submenu"boot"as shown in the following figure;
2. Press [ENTER] key to enter secret code editing, press [▲] [▼] [◄] [►] key to edit secret code;
3. Press [ENTER] key to confirm the setting, if the secret code is correct, then it can enter firmware update interface;
4. Press [◄] or [►] key to select other submenu, or press [SETUP] key to exit Utility menu.



Calibration

Calibration

Steps

1. Long press [ENTER] (Utility) key to enter Utility menu, press [◄] or [►] key to select submenu "CALib" as shown in the following figure;
2. Press [ENTER] key to enter secret code editing, press [▲] [▼] [◄] [►] key to edit secret code;
3. Press [ENTER] key to confirm the setting, if the secret code is correct, then it can enter calibration interface;
4. Press [◄] or [►]key to select other submenu, or press [SETUP] key to exit Utility menu.
   Restart the instrument to exit the calibration interface.

Note:

Do not operate this function without due caution, otherwise the calibration data will be lost, resulting in abnormal instrument measurement.

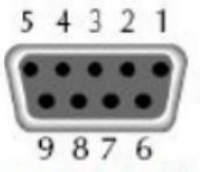
Communication Interface

RS232 and RS485 Interface

MP701125 series has standard RS232 and RS485 communication interface, PC or PLC can remote control MP701125 series via SCPI or Modbus command.

The Definition of Pin

MP701125 series communication interface is DB9 female head, the definition of pin as shown in the following figure.



1	NC
2	TXD (RS232)
3	RXD (RS232)
4	NC
5	GND (RS232)
6	NC
7	NC
8	A (RS485)
9	B (RS485)

Communication Setting

Before operating communication, MP701125 series should match with the following parameters of the control host.

(1) Baud Rate:

4800, 9600, 19200, 38400, 57600, 115200.

The setting method of baud rate can refer to section 6.2.

(2) Check bit: NONE (fixed value)

(3) Data bit: 8 (fixed value)

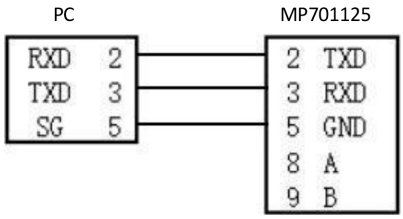
(4) Stop bit: 1 (fixed value)

Connecting Example

PC connect to MP701125 series via RS232

- The number in block diagram represents the pin number of DB9 interface.
- Use direct serial port line to connect to a PC.
- This connecting method supports SCPI and Modbus instruction.

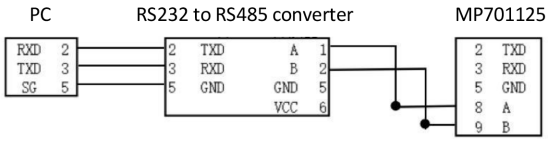
As shown in the following figure.



PC connect to a single MP701125 series via RS48

- The number in block diagram represents the pin number of DB9 interface.
- Use direct serial port line to connect PC and the RS232 to RS485 convertor.

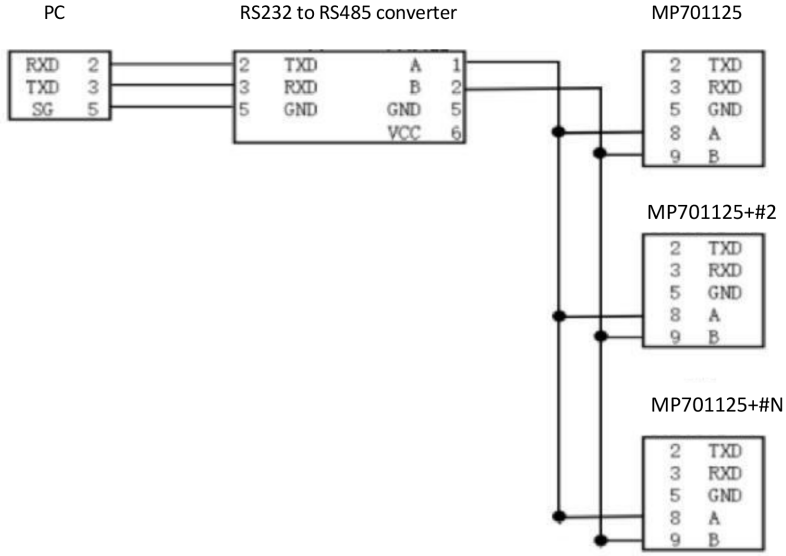
This connecting method is only support Modbus instruction. As shown in the following figure.



PC connect to multiple MP701125 series via RS485

- The number in block diagram represents the pin number of DB9 interface.
- Use direct serial port line to connect PC and the RS232 to RS485 convertor.
- A , B port of the RS232 to RS485 convertor parallel connect to A , B port of multiple MP701125 series.
- This connecting method is only support Modbus instruction. The baud rate of the PC must be the same as that of each MP701125 series, and the IP address of each MP701125 series must be different.

As shown in the following figure, connect to PC by using multiple MP701125.



Storage and Calibration

Notice Matters for Storage

The instrument should be stored in an environment which is specified in this user manual.

Do not store the instrument in a place with high temperature, high humidity, or high condensation. The recommended storage environment is dry and at a temperature of about 20°C.

Keep product's packaging materials for later transporting of instruments. Using packaging materials to transport instruments can protect them from sudden temperature changes, shocks and vibrations, and protect them from damage.

Do not store the instrument in an environment with dust, fumes or chemical gases.

Avoid long exposure to direct sunlight.

Troubleshooting

No.	Problem	Solution
1	No widow display when enable the instrument	1. Make sure the power cable is well connecting. 2. Make sure the supply power is within the allowed power range.

No.	Problem	Solution
2	Displayed measurement value is incorrect	1. Make sure the operating temperature and humidity within the allowed range. 2. Make sure the display is away from noise interference. 3. Check whether the test wire is well connected. 4. Check if the wire is connected correctly. 5. Check whether the data display in on lock state. 6. Reboot the instrument
3	Key function failure	1. Check whether key is stuck.
4	Communication failure	1. Check whether communication cable is well connecting, (T X / R X or A / B signal is connect correctly). 2. Check whether the instrument address, communication mode and baud rate is match with the upper computer
Other situations refer to Notes in each chapter.		

Information about Calibration

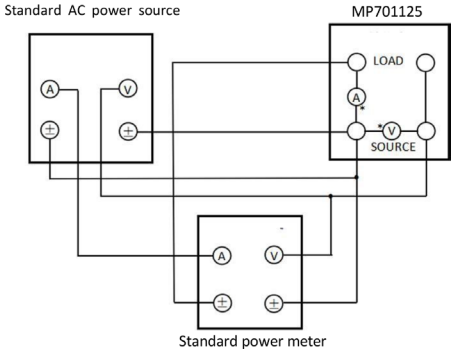
Verification and Calibration

The instrument should be powered on 15 minutes to warm up and wait it for it to stabilize, and then slowly adjust the output voltage or current of the standard AC source. Observing the output reading compared to the standard meter, record the data of the standard meter and the measured meter after the data is stable, then calculating the measured error value to judge whether the instrument is within the allowed error range. The requirements of environment temperature of verification and calibration are as the following table.

Item	Reference Value or Range	Reference Value or Range
Environment temperature °C	23	±5
Environment humidity % RH	45 ~ 75	
Barometric pressure KPa	86 ~ 106	
AC power supply voltage V	100 ~ 240	±2%
AC power supply frequency Hz	50	±1%
Ac power supply waveform	Sine	ß= 0.05
External electromagnetic field interference	Avoid	
Ventilation	Ensure adequate	
Sunlight	Avoid direct contact	

Notes: The inspect equipment should meet the specifications of the regular metrological verification, measurement period is one year.

Wiring scheme of verification and calibration is as shown in the following figure.



Options and Fuse

Optional Testing Wire

Multicomp-pro provides optional testing wire, there are three model UTE-L16A, UTE-L10A, UTE-L16C, as shown in the following figure. User can purchase one or multiple testing wires as required.

The following table is for reference. Please note the specifications and the maximum current and voltage in the table.

UTE-L16A UTE-L10A UTE-L16C

Notes: The above figure is optional testing wire, not equipped with the instrument. It should purchase by your own.

Match Solution of Testing Wire

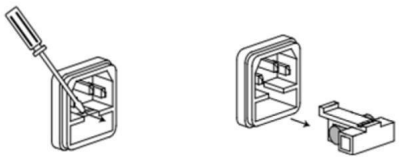
Match Solution	Name	Component and Name	Specification of Voltage/Current	Length	Recommended Appliance
Solution 1	10A testing wire and accessories	UTE-L10A 10A three-pronged plug convert banana head connect wire	250V/10A	1.2m	Small appliances, such as fan, hair dryer, rice cooker and other appliances with a current not exceeding 10A
		UTE-L16C 16A connect wire with alligator clip	220V/16A		
Solution 2	16A testing wire and accessories	UTE-L16A 16A three-pronged convert banana head connect wire	250V/16A	1.2m	High power appliances, such as air conditioner, electric water heater and other appliances with a current not exceeding 16A
		UTE-L16C 16A connect wire with alligator clip	220V/16A		

Connect scheme of testing wire as shown in the following figure.

Warning: Before connecting with circuit, please make sure the mains power is off to prevent electric shock.

Specification of Fuse

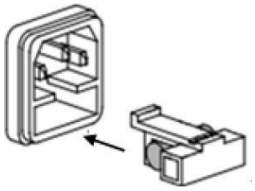
This instrument has 1 spare fuse stored in the fuse box. If the fuse was burned out, replace the fuse as follows:.
Disconnect the power cable, use small screwdriver to take out the fuse holder, as shown in the following figure.



If the fuse was burned out, please replace the same specification fuse with the instrument. The specification fuse with the instrument, see the following table.

Model	Specification of Fuse
MP701125	AC250V F0.5A

After the replacement, please replace the fuse holder as shown in the following figure.



Appendix 1 Symbol and Formula of Measurement

Measurement Function [Unit]	Operation Formula	Explanation
Voltage TRMS [V]	$\mathrm{Urms}=\sqrt{\frac{1}{N}\cdot\sum_{n=1}^{N}u(n)^2}$	u(n) represents instantaneous value of voltage; i(n) represents instantaneous value of current; N represents ADC sampling time within the measurement range.
Voltage DC Component [V]	$\mathrm{Udc}=\frac{1}{N}\cdot\sum_{n=1}^{N}u(n)$	
Voltage AC Component [V]	$\mathrm{Uac}=\sqrt{\mathrm{Urms}^2-\mathrm{Udc}^2}$	
RMS current [A]	$\mathrm{Irms}=\sqrt{\frac{1}{N}\cdot\sum_{n=1}^{N}i(n)^2}$	
Current DC Component [A]	$\mathrm{Iac}=\sqrt{\mathrm{Irms}^2-\mathrm{Idc}^2}$	
Current AC Component [A]	$P=\frac{1}{N}\cdot\sum_{n=1}^{N}[u(n)*i(n)]$	
Active power P [W]	$P=\frac{1}{N}\cdot\sum_{n=1}^{N}[u(n)*i(n)]$	
Power Factor [PF]	$\frac{P}{\mathrm{Urms}\cdot\mathrm{Irms}}$	

Safety Information

Read these instructions carefully before use and retain for future reference.

Check if the voltage indicated on the rating plate of the appliance corresponds to the local mains voltage before you connect the appliance.

Do not operate this appliance with a damaged plug or cord, after a malfunction or after being dropped or damaged in any way.

There are no user-serviceable parts in this product. Refer servicing to qualified personnel.

The instrument is equipped with three core power cord, only use the power cord provided by the manufacturer to avoid accidental injury, this equipment must be earthed through the mains cord.

This appliance is designed for indoor use only.

Avoid exposed circuits, do not touch exposed connectors and components after the power is turned on.

Use the appropriate fuse, only with the fuse type and rating indicator specified for this product.

Unplug the power cord from the power outlet if the instrument is not to be used for a long time.

Do not pull the power cord to unplug it; if the instrument needs to move, please make sure the power line and other connecting line is pulled out and use the carrying handle on the side of the instrument.

Environmental Condition

MP701125 digital power meter can only be used indoors in non-condensing area, the general environmental requirements shown as below table.

Environmental Condition	
Operating Environment	5°C ~ 40°C, 20% ~ 80%RH (non-condensing)
Accuracy guaranteed temperature and humidity temperature	23°C ±5°C 30% ~ 75% R.H.
Storage temperature	-10°C ~ +50°C , non-condensing below 80% R.H.
Operating altitude	≤2000 meters

NOTE: In order to ensure the measurement accuracy, it is recommended to allow 30 minutes warm up time before use.

Inspection and Instalment

Packing List

Check with packing list to confirm that accessories are correct.

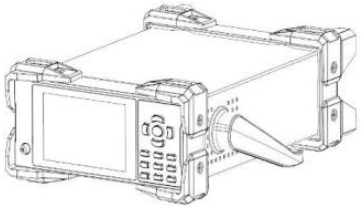
No.	Components	Quantity
1	Digital power meter	1
2	Power cable	1
3	RS232 communication line	1
4	User manual, software download guide	1

NOTE: After confirming that the contents of the package are correct and there are no problems, please keep the box and related contents safely to re-use for returns to the supplier for service.

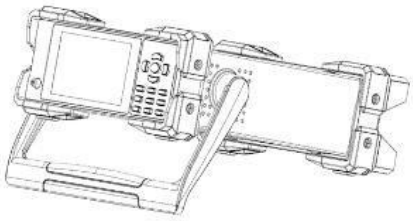
Stand

The stand can be adjusted. Hold the stand in both hands and then pull out two side pivots to adjust it; it can be adjusted to four positions shown as the following Figure.

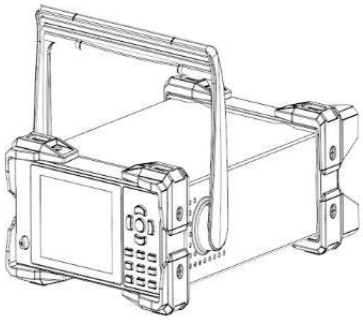
1. Original Position (Factory Setting)



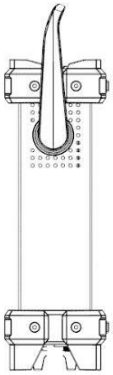
2. Testing Position



3. Removal of the Stand



4. Carrying Position



INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT.

When this product has reached the end of its life it must be treated as Waste Electrical & Electronics Equipment (WEEE). Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Contact your local authority for details of recycling schemes in your area.