OPERATION MANUAL

JK9306

Digital Power Meter

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Chapter 1 Overview

Thank you for purchasing and using our products. Before you use this instrument, please confirm it according to the "Setting and Warranty" section at the end of the manual. If there is any discrepancy, please contact our company as soon as possible to protect your rights.

1.1 Instrument Introduction

JK9306 series single-phase digital power analyzer (digital power meter) uses a high-speed 32-bit processor and a professional DSP digital signal processor. It has fast speed, frequency bandwidth, full-featured, compact structure, stable testing, simple operation and good performance. The human-machine interface is a new generation of digital power analyzer. The main parameters that can be measured are: RMS value of voltage and current, AC component of voltage and current, DC component of voltage and current, active power, reactive power, apparent power, electrical energy timing, power factor, frequency, peak factor of voltage and current, peak value of voltage and current etc. electric parameters, depending on the model of the instrument, some instruments do not have a harmonic analysis function.

This manual covers the JK9306 single-phase power analyzer. It covers most of the power supplies on the market with the advantages of a large input bandwidth (45 ~ 400Hz). In addition to the basic electrical parameter measurement, the four instruments also provide intuitive comparison functions. Input waveform display, meanwhile, the HANDLER interface, RS232C / RS485 interface and USBTMC, USBCDC interface provided by the instrument provide conditions for the instrument to be used in automatic sorting system and computer remote operation; the difference between different models is mainly the current measurement range and Whether it has the function of harmonic analysis, the maximum test current is 40A, and the measurement accuracy is stable. The specific differences can be found in the following instrument model comparison table.

The main features of the instrument:

4.3 inch LCD liquid crystal display;
Soft power switch;
Chinese and English optional operation interface;
Input frequency range (45 ~ 400Hz);
The range can be controlled automatically / manually;
The maximum test current is 40A (depending on the model), and the minimum current can be 1uA (depending on the model);
Controllable synchronization trigger source;
Provide 5kHz line filter switch;
Flexible energy integration control;
Parameter comparison and Handle controllable output function;
Parameter file selection function;
Harmonic analysis function (related to specific models);
Waveform display function;
Support U disk file storage, instrument programs can be upgraded through U disk;

Serial interface: RS-232C provides great convenience for serial communication between the instrument and peripherals. Peripherals can set various functions and parameters of the

instrument through this interface, which can basically replace the functions of the panel keyboard.

1.2 Unpacking inspection

After opening the box, you should first check whether the instrument is damaged due to transportation. We do not recommend that you power on the instrument when the appearance is damaged.

The front panel of the instrument is marked with the specific model of the instrument and the main measurement range. Check that it is the same as the model you ordered, and confirm it according to the packing list. If there is any discrepancy, please contact our company or the distributor as soon as possible to protect your rights. .

The comparison between the instrument model and basic functions is shown in Table 1-1:

Note: It is best to keep the packing box of the instrument properly after unpacking, so as to avoid unnecessary damage to the instrument due to the unmatched packing box during later transportation.

1.3 Conditions of use

1.3.1 Power connection

Power supply voltage: 200 to 240 VAC

Power frequency: 47 to 63 Hz

Power supply range: no less than 30 VA.

The power input phase line L, neutral line N, and ground line E should be the same as the power plug of the instrument.

This instrument has been carefully designed to reduce the clutter interference caused by the AC power input. However, it should still be used in a low noise environment as much as possible. If it cannot be avoided, please install a power filter.

Warning: In order to prevent leakage to the instrument or people, the user must ensure that the ground wire of the power supply is reliably connected to the ground.

1.3.2 Fuses

The instrument is equipped with a fuse at the factory. Users should use the fuse provided by our company.

Model difference and function description

JK9306 conventional type, 600V / 2A, without harmonic analysis function

1.3.3 Environment

Normal working temperature: 0 ℃ ～ 40 ℃, humidity: 20 ～ 80% RH

Reference working temperature: 20 ℃ ± 8 ℃, humidity: <80% RH

Transportation environment temperature: 0 ℃ ～ 55 ℃, humidity: 93% RH

Please do not use it in dust, vibration, direct sunlight or corrosive gas.

In order to ensure good ventilation of this test instrument, do not block the left ventilation hole to maintain the accuracy of the instrument.

This instrument has been carefully designed to reduce the clutter interference caused by the AC power input. However, it should still be used in a low noise environment as much as possible. If it cannot be avoided, please install a power filter.

If the instrument is not used for a long time, please store it in the original box or similar box in a

ventilated room with a temperature of 5 ℃ ～ 40 ℃ and a relative humidity of not more than 85% RH. The air should not contain harmful impurities that corrode the measuring instrument. Avoid direct sunlight.

1.3.4 warm up

In order to ensure the accurate measurement of the instrument, the warm-up time should be no less than 30 minutes.

Do not turn the instrument on and off frequently as this may cause internal data confusion.

1.4 Instrument and other features

Power consumption: The power consumption is about 16 VA.

Shelf size (W * H * D): 215 * 88 * 335.

Overall dimensions (W * H * D): 235mm * 105mm * 360mm; this size includes the size of the jacket.

Weight: about 3.85kg;

Chapter 2 Front and Rear Panel Instructions and Getting Started

This chapter describes the basic operation steps of JK9306 series instruments. Before using JK9306 series instruments, please read this chapter in detail so that you can quickly familiarize yourself with the operation of JK9306 series instruments.

2.1 Front panel description

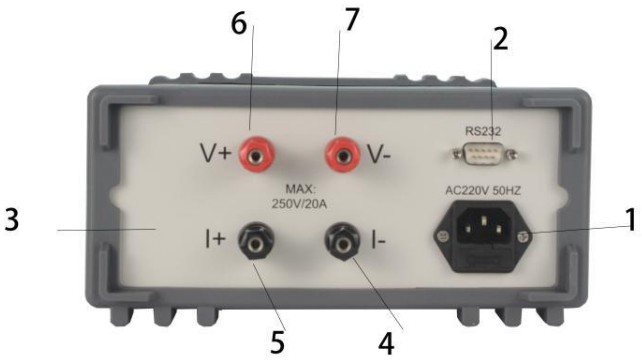
Figure 2-1 briefly describes the front panel of the JK9306 series.

1	USB HOST	The USB HOST interface is used for USB flash disk storage and upgrade.
2	Trademarks and models	Instrument trademarks and models
3	LCD liquid crystal display	480 × 272 dot matrix liquid crystal display for human-computer interactive display
4	LCD liquid crystal display	To be used to enter the “Measurement Display” page
5	Universal direction key (CURSOR)	Up, down, left and right direction keys and confirm key.
6	Setup function key SETUP	To be used to enter the “System Setup” page.
7	Comparison PASS / FAIL display	In the file or comparison display interface, the comparison result will be displayed by PASS / FAIL (green / red).
8	ENTER	After moving the cursor position, the soft key area corresponds to different functions. Press to modify the corresponding

		parameter value.
9	Power switch (POWER)	Power switch. The key is green when the instrument is turned on, and the key is red when the instrument is turned off.
Table 2-1 Front panel description		

2.2 Rear panel description

Figure 2-2 briefly describes the rear panel of the JK9306 series.



1	Power socket	For inputting AC power.
2	RS232C interface	Realize serial communication with computer.
3	Label	Used to indicate the specific S / N number of the instrument.
4	Current measurement input negative terminal (I-) (I- load negative terminal)	
5	Positive terminal of current measurement input terminal (I +) (positive terminal of I + load)	
6	Positive terminal of voltage measurement input terminal (V +)	
7	Negative terminal (V-) of voltage measurement input terminal	
Table 2-2 Rear panel description		

Chapter 3 Basic Operation Instructions

The basic operation description of JK9306 series keys:

1) Use the menu buttons (DISP, SETUP) and soft keys to select the page you want to display.

2) Use the arrow keys (←, ↑, →, ↓) to move the cursor to the settable parameter area, and the corresponding area will change to the cursor color (blue).

3) The soft key functions corresponding to the parameters in the current cursor area will be displayed in the "soft key area". Use the common soft keys under the LCD to perform corresponding operations or press ENTER to quickly modify the enumeration status of the selected parameter.

3.1 boot

Plug in the three-wire power plug to ensure a reliable connection to the power ground. Press the power switch in the lower left corner of the front panel of the instrument to turn it on and display the startup screen.

Figure 3-1 shows the startup screen of JK9306. The startup screen includes some product

information such as the trademark, instrument model, version number of Tonghui Company.

3.2 Display area definition

The JK9306 series uses a 24-bit color 4.3-inch color LCD screen with a resolution of 480 × 272. The content displayed on the screen is divided into the following display areas. Take the <Measurement Display A> page as an example.

3-2. The meaning of each area is shown in Table 3-1.

(Figure 3-1 JK9306 startup screen)

1 Main menu area This area indicates the name of the current page.
2 Test condition area This area is used to display and quickly modify the common conditions of the test.
3 Message prompt area This area is used to display various prompt information during testing and setup.
4 Icon prompt area This area is used to display the U disk, keyboard lock and test speed icon indication.
5 Measurement result display area This area displays the test parameter results. The current page is divided into 4 windows to set different measurement parameters.
Table 3-1 Meaning of each area
Remarks: Due to the different layouts of different pages, the display information (2, 3, 5) of different pages may not be the same as the area division location. It is for reference only, and you can see the details of each display page.

3.3 Display interface switching

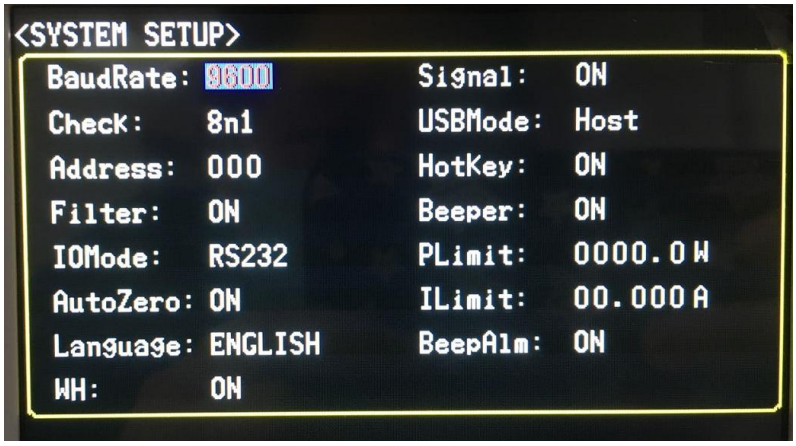
The DISP key and the SETUP key are the two keys most frequently used in the page switching process, which are the entrances to test-related pages and setup-related pages, respectively.

3.3.1 Measurement display button DISP

Press the DISP key to enter the measurement display home page

3.3.2 Measurement setup button SETUP

Press the SETUP key to enter the system setting page.



Chapter 4 Basic Page Display and Parameter Setting

The general setting method of JK9306 series instruments is as follows:

1) Use the arrow keys to move the cursor to the position of the parameter to be modified;

2) For enumerated parameters, according to the function prompts of the LCD soft keys, press the corresponding soft key to complete the modification of the parameter value or press ENTER to cyclically modify the enumerated parameter value;

3) For numerical parameter values,

a. According to the function prompts of the soft keys, press the corresponding soft key to achieve fine adjustment (increase or decrease) of the value;

4.1 <Measurement display> interface

Press the DISP key, and the <Measurement Display> page will be displayed on the screen.

(Figure 4-1 Measurement display interface)

4.1.1 Test mode

The measurement mode of JK9306 is: True RMS measurement mode (RMS).

(Figure 4-3 Measurement display interface setting measurement mode)

Note: As shown in Figure 4-3 below, after the cursor is moved to the corresponding parameter, the corresponding function changes and selection operations of the soft key zone parameters are only described in detail on this page. The other pages are basically the same as this operation, so For the modification of other page parameter values, please refer to the screenshot description here.

Setting operation steps:

4.1.2 Test range

JK9306 has 4 voltage test ranges: 75V, 150V, 300V, 600V, U-Auto;

JK9306 has 7 current test ranges: 1mA, 3mA, 10mA, 40mA, 150mA, 500mA, 2A, I-Auto.

Factory default settings:

The voltage is in the automatic voltage range (U-Auto);

The current is in the automatic current range (I-Auto).

Setting operation steps:

1) Move the cursor to the range V / I area, the following soft keys will be displayed in the soft key area of the screen

■ Auto / AUTO: Used to set the range to automatic mode.

■ ↓ (-): Used to select the small range down.

■ ↑ (+): Used to select a large number of ranges up.

2) Press the corresponding soft key or press ENTER to complete the corresponding setting.

4.1.3 Measurement parameters

Measurement parameter settings under the measurement display page (display 5 measurement parameters),

Factory default settings: voltage (U), current (I), power (P), power factor (PF), frequency (Hz)

Press once to switch once (switch between auto and power);

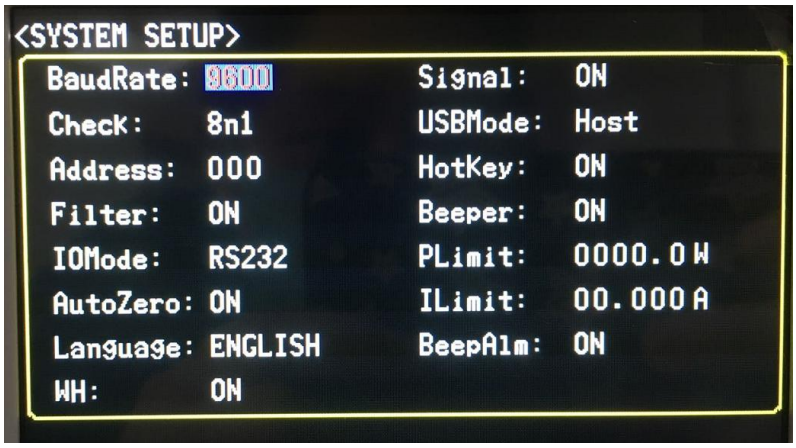
For instructions and suggestions on the use of the synchronization function, see the section on the synchronization signal on the <Measurement Settings> page.

4.1.4 Comparison description

The instrument can set the upper limit of power and current. If it exceeds the set upper limit, the instrument will issue an alarm.

Chapter 5 System Settings

Press SETUP to enter the system setting interface, as shown in the figure:



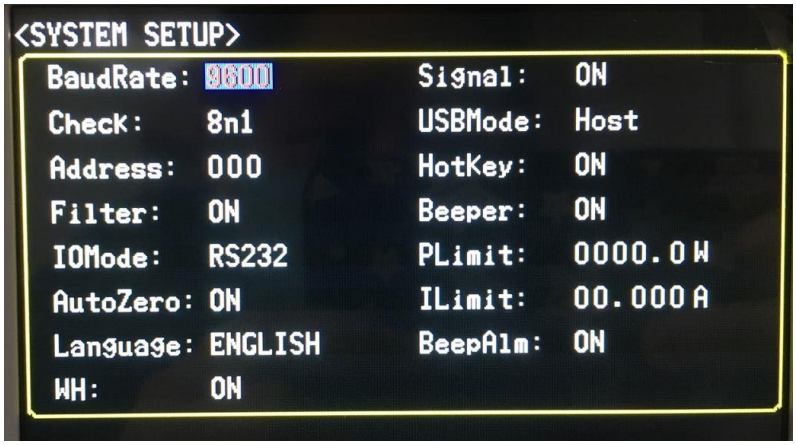
Parameter setting interface, you can set the baud rate, check mode, address, filter, interface mode, etc.

5.1 Baud rate setting:

The instrument supports 8 baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200. Users can set according to their needs. The setting steps are as follows:

Use the cursor keys to move the cursor to the baud rate area, press [ENTER], then press the up and down keys to select, ↑ to increase the value, ↓ to decrease the value. After selection, press [ENTER] to complete the setting.

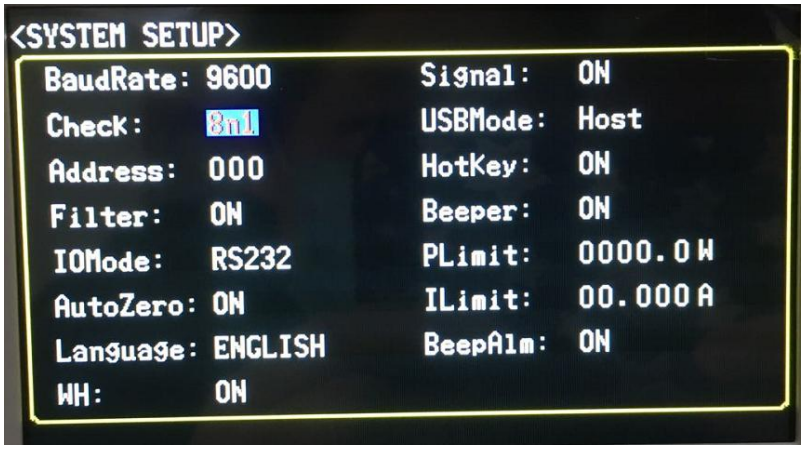
as the picture shows:



5.2 Calibration mode setting:

The instrument supports 4 kinds of calibration methods, which are 8n0, 8n1, 8e1, 8o1. Users can set according to their needs. The setting steps are as follows:

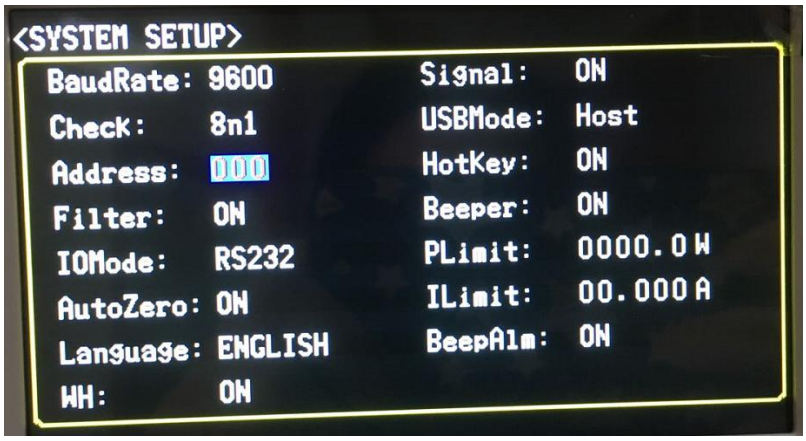
Use the cursor keys to move the cursor to the calibration mode area, press the [ENTER] key, and then press the up and down keys to select. After the selection is completed, press [ENTER] to complete the setting.



5.3 Address setting:

The instrument address supports two types, 000,001, and users can set it according to their needs. The setting steps are as follows:

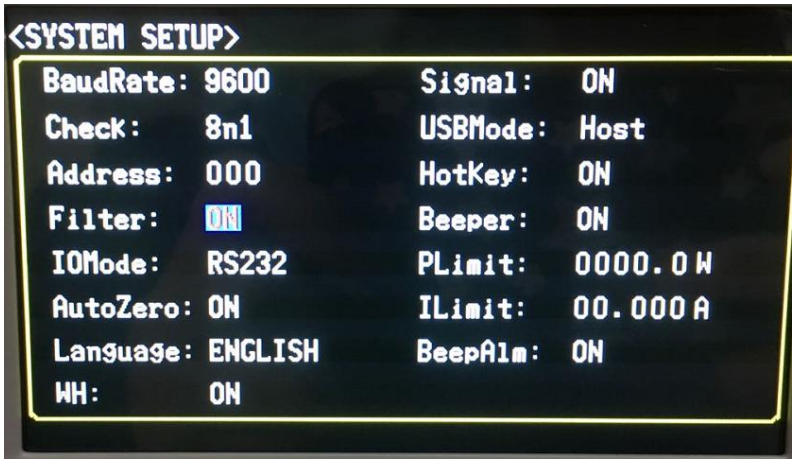
Use the cursor keys to move the cursor to the address area, press the [ENTER] key, and then press the up and down keys to select. After the selection is completed, press [ENTER] again to complete the setting.



5.4 Filter settings

The instrument can set the filter on and off. Users can set it according to their needs. The setting steps are as follows:

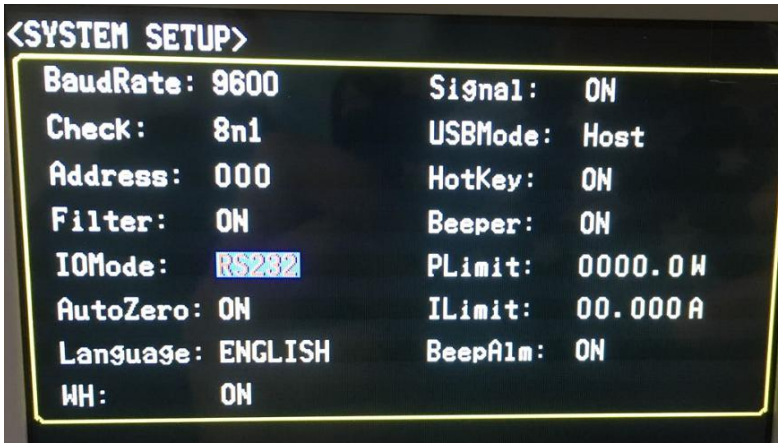
Use the cursor keys to move the cursor to the filter area, press [ENTER], then press the up and down keys to select, “On” and “Off”. After the selection is completed, press [ENTER] to complete the setting.



5.5 Interface Mode

The instrument supports 2 interfaces, namely USB and RS232. Users can set it according to their needs. The setting steps are as follows:

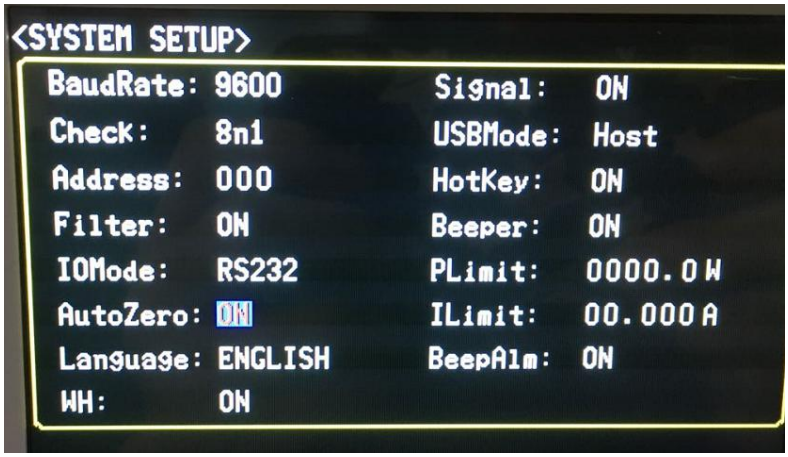
Use the cursor keys to move the cursor to the interface mode area, press the [ENTER] key, and then press the up and down keys to select. After the selection is completed, press [ENTER] to complete the setting.



5.6 Zero-setting:

The instrument can be set to zero setting on and off. Users can set it according to their needs. The setting steps are as follows:

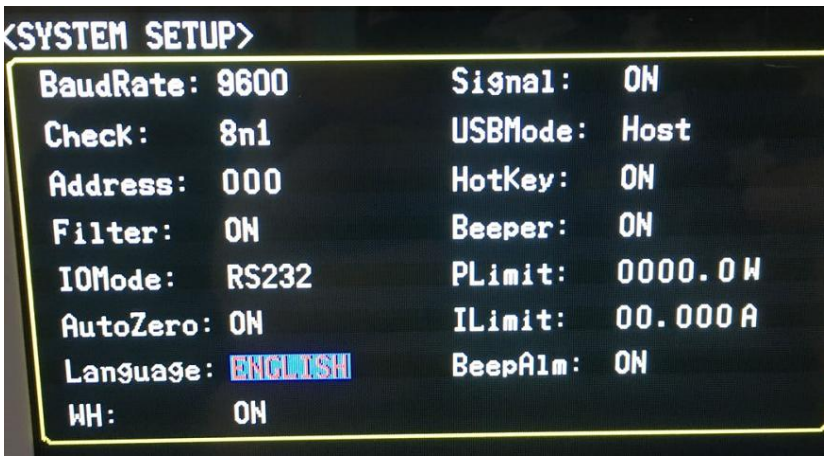
Use the cursor keys to move the cursor to the zero return area, press the [ENTER] key, then press the up and down keys to select, "On" and "Off". After the selection is completed, press [ENTER] to complete the setting.



5.7 Language settings

The instrument supports 2 languages, Chinese and English. The setting steps are as follows:

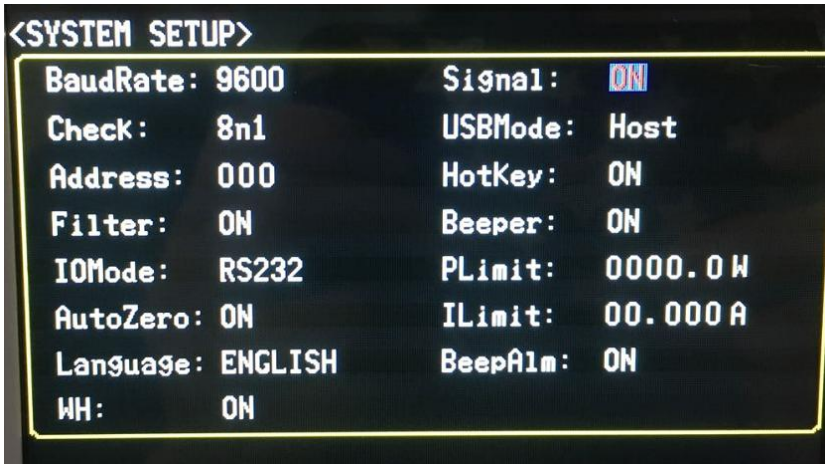
Use the cursor keys to move the cursor to the language area, press the [ENTER] key, and then press the up and down keys to select. After selecting, press the [ENTER] key to complete the setting.



5.8 Measurement source settings

The instrument can set the measurement source settings on and off. Users can set according to their needs. The setting steps are as follows:

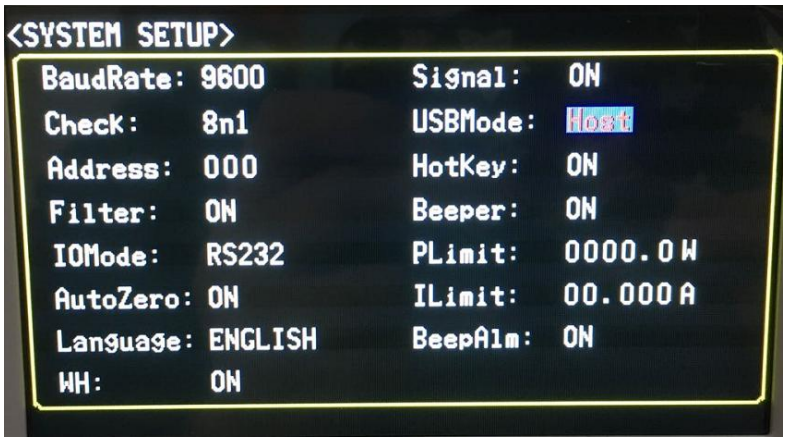
Use the cursor keys to move the cursor to the measurement source area, press the [ENTER] key, then press the up and down keys to select, "On" and "Off". After the selection is completed, press [ENTER] to complete the setting.



5.9 Flash Mode Setting

The instrument supports 2 flash memory modes, host and device. Users can set according to their needs. The setting steps are as follows:

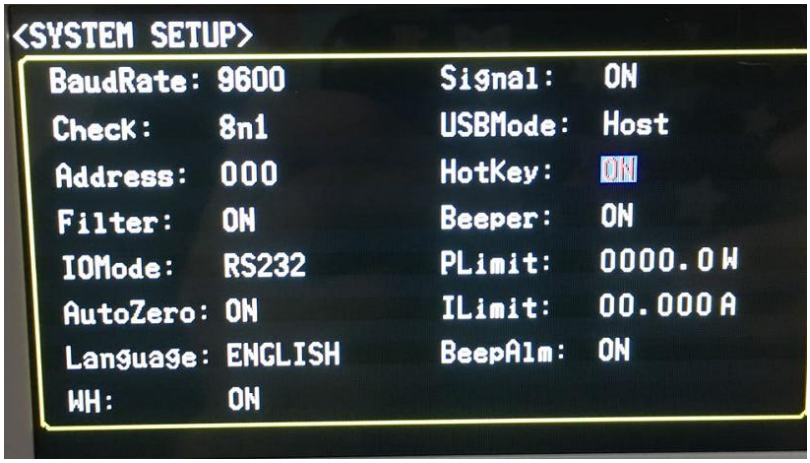
Use the cursor keys to move the cursor to the flash mode area, press the [ENTER] key, and then press the up and down keys to select. After selecting, press the [ENTER] key to complete the setting.



5.10 Shortcut Settings

The instrument can be set with shortcut keys on and off. Users can set it according to their needs. The setting steps are as follows:

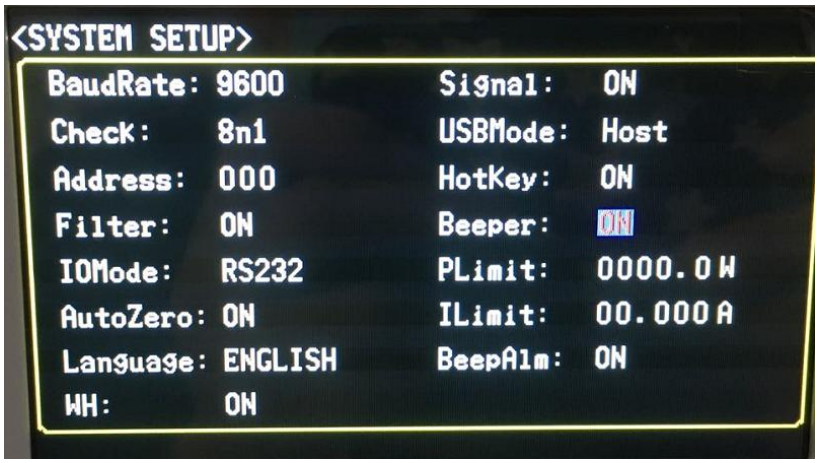
Use the cursor keys to move the cursor to the shortcut key area, press the [ENTER] key, then press the up and down keys to select, "On" and "Off". After the selection is completed, press [ENTER] to complete the setting.



5.11 Button sound settings

The instrument can be set to switch on and off. Users can set according to their needs. The setting steps are as follows:

Use the cursor keys to move the cursor to the key sound area, press the [ENTER] key, then press the up and down keys to select, "On" and "Off". After the selection is completed, press [ENTER] to complete the setting.

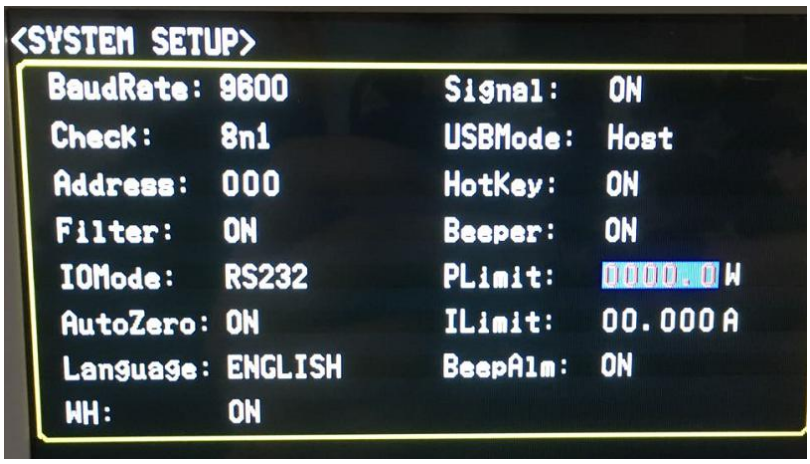


5.12 Power Cap

The instrument supports setting the upper power limit. The setting range is 0000.0 ~ 9999.9W. The setting steps are as follows:

Use the cursor keys to move the cursor to the power upper limit area, press the [ENTER] key, and then press the up and down keys to select. The ↑ key increases the value, the ↓ decreases the value, ← moves the setting number to the left, → moves to the setting number of the right.

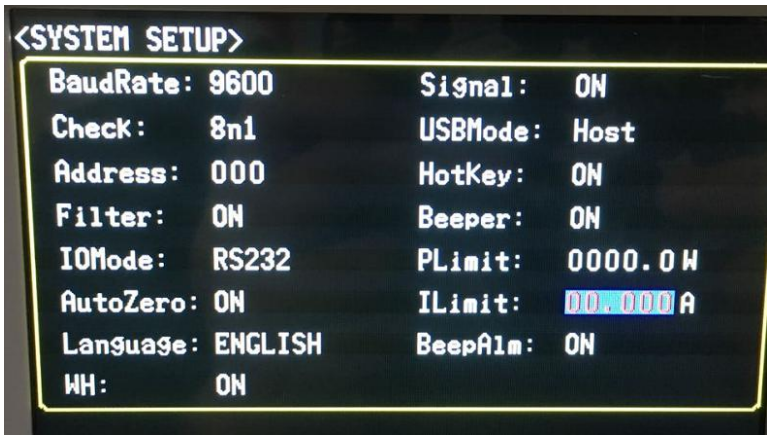
After setting press [enter] again to complete the setting.



5.13 Current upper limit setting

The instrument supports setting the current upper limit, the setting range is 00.000 ~ 50.000A, the setting steps are as follows:

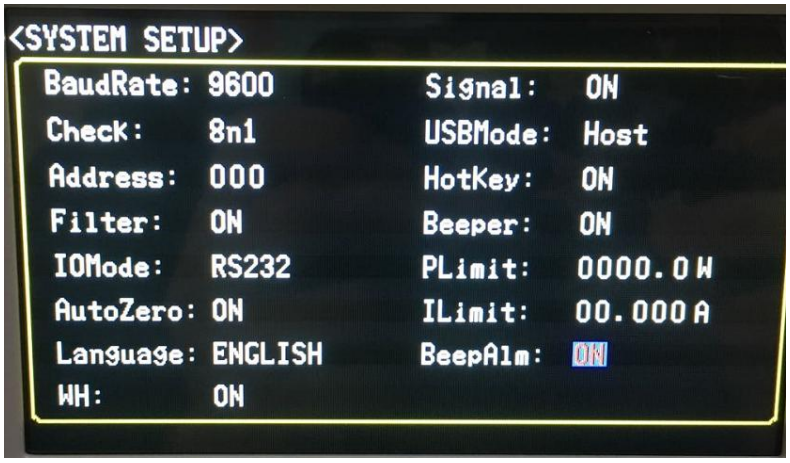
Use the cursor keys to move the cursor to the current upper limit area, press [ENTER], and then press the up and down keys to select. The ↑ key increases the value, the ↓ decreases the value, ← moves the setting digits to the left, → moves to the right setting the digits. After setting, press the [ENTER] key to complete the setting



5.14 Alarm sound setting

The instrument can set the alarm sound on and off. Users can set it according to their needs. The setting steps are as follows:

Use the cursor keys to move the cursor to the alarm sound area, press the [ENTER] key, then press the up and down keys to select, "On" and "Off". After the selection is completed, press [ENTER] to complete the setting.



Chapter 6 Proper Measurement

6.1 Wiring method

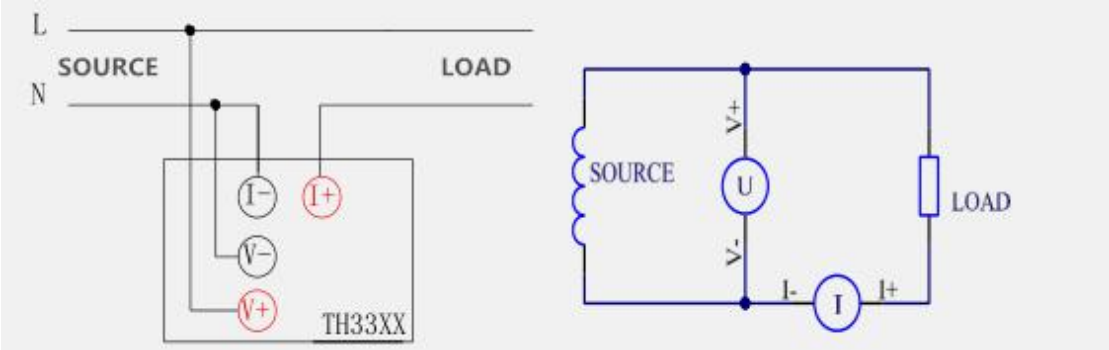
JK9306 series instruments provide four test wiring input terminals, namely high voltage end, low voltage end, high current end, and low current end.

Because the voltage and current are floating inputs, there can be multiple combinations of test wiring methods, and different applications can be connected to the corresponding test circuit. Here are two recommended wiring methods for the measurement circuit.

Tip: Considering that the presence of distributed capacitance may affect the test, in order to reduce the impact of distributed capacitance on the test circuit, it is recommended to make the current test terminal as close as possible to the ground of the input source, that is, the current terminal is connected to the Low-end.

6.1.1 Current terminal internal connection

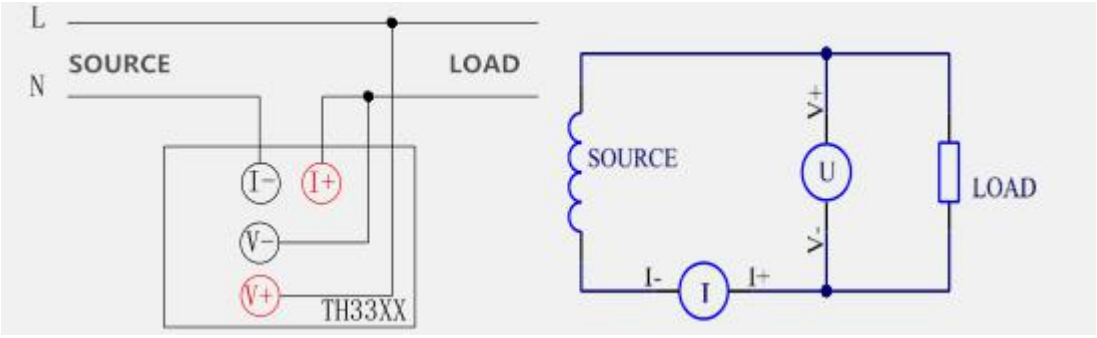
This method is suitable for low-power testing, that is, the test current is relatively small. It is recommended to use it to make the current test more accurate, and the voltage measurement will cause small errors due to the voltage drop caused by the current on the ammeter
(This error can be ignored). The wiring method and brief principle are shown in Figure 6-1:



(Figure 6-1 Ammeter connection method-suitable for small current connection method)

6.1.2 External current terminal

This method is suitable for high-power load testing, that is, the test current is relatively large. It is recommended to make the voltage test more accurate, and the current measurement will cause a small error due to the shunting of the voltmeter (this error can be ignored). The wiring method and brief principle are shown in Figure 6-2:



(Figure 6-2 Ammeter external method-suitable for high current connection method)

Recommended process for connecting test lines:

1) Connect the positive and negative ends of the current in series with the load (connected into a loop, the negative end of the current is connected to the neutral line);

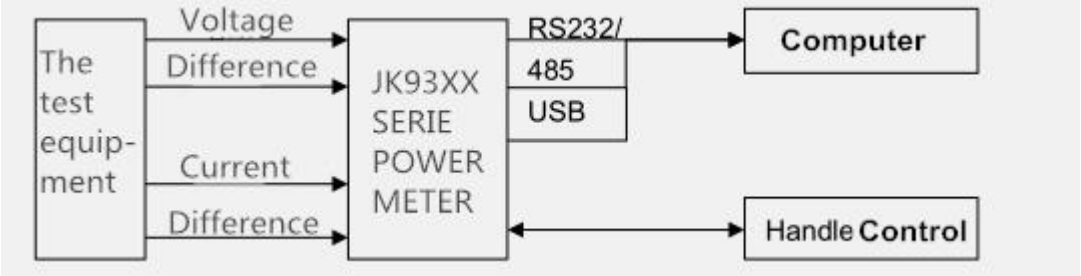
2) Connect the positive and negative voltage ends to the load or the input source according to the requirements (that is, the positive voltage end is connected to the live wire, and the negative voltage end is connected to the current positive end or current negative end);

3) Confirm again that the live wire of the input source is connected to the positive terminal of the voltage, and the neutral wire of the input source is connected to the negative terminal of the current.

Chapter 7 Basic Principles and Technical Specifications

7.1 Basic principles

System principle and functional block diagram, as shown in Figure 7-1:



(Figure 7-1 System Structure)

The main structure of the JK9306 series single-phase power meter is to input the voltage and current of the equipment under test through the instrument to the instrument through differential input. Through the instrument's internal amplification, filtering, sampling, and AD conversion, the analog signals of voltage and current are synchronized and sampled. It is converted into digital quantities Ui and Ii, and then the CPU uses discrete integration to obtain the voltage effective value, current effective value, active power, and power factor according to the following formula and sends them to the liquid crystal display. Because the calculation of the effective value includes the AC component And DC components, and the AC waveform may become a non-standard waveform due to partial distortion, so the rms calculations here are true rms values, that is, true rms values. The calculated power also includes the AC and DC components of the voltage and current. Therefore, the power calculation belongs to the average power and is also the real power value, that is, the active power. The sign of the power represents the flow of power (respectively whether the power provided by the power supply to the load or The energy provided by the load to the power supply). The power factor is the ratio of the active power to the apparent power (total power). Theoretically, there is no sign of the power factor. However, in the application of the power meter, the sign of the phase relationship between voltage and current is determined by the sign of -1. Between ~ + 1, a positive value represents the voltage leading current and a negative sign represents the voltage lagging current.

In addition to the RMS test mode, this series of instruments also provide AC and DC test modes. If the input source includes AC and DC components, you can switch modes to view the corresponding AC and DC components, respectively.

For harmonics, some instrument models do not have a harmonic analysis function, and instruments with a harmonic analysis function are for power frequency power signals (50 / 60Hz), and for harmonic results of non-power frequency signals, this series of instruments can View but no precision indicator. This series of instruments provide optional opening of the 5kHz filter. This filter is not suitable for non-power frequency power supply and needs to be manually turned off (optional in the measurement settings). The harmonic order that can be analyzed and viewed is 2 ~ 50 times.

7.1.1 Measurement parameters and symbols

U RMS: True RMS value of voltage I RMS: True RMS value of current

U AC: RMS value of voltage AC component I AC: RMS value of current AC component

U DC: DC component of voltage I DC: DC component of current

Freq: frequency of input source PF: power factor

CFu: voltage peak factor P: active power

CFi: current peak factor VA: total power

Up-p: peak-to-peak voltage VAR: virtual power

Ip-p: peak-to-peak current E: electrical energy

Upk + / Upk-: positive voltage peak and negative voltage peak

Ipk + / Ipk-: positive current peak and negative current peak

U thd / I thd: total harmonic size of voltage / current (%)

U h_n / I h_n: each harmonic of voltage / current, n value is 2 ~ 50

7.1.2 Calculation formula

Measurement parameters	Calculation formula / calculation method
U_{RMS}	$\sqrt{\frac{1}{T}\int_0^T u^2(t)dt}$
I_{RMS}	$\sqrt{\frac{1}{T}\int_0^T i^2(t)dt}$
P	$\frac{1}{T}\int_0^T u(t)i(t)dt$
VA	$U_{RMS} * I_{RMS}$
VAR	$\sqrt{VA^2 - P^2}$
PF	$\frac{P}{VA}$
U_{DC}	$\frac{1}{T}\int_0^T u(t)dt$
I_{DC}	$\frac{1}{T}\int_0^T i(t)dt$
U_{AC}	$\sqrt{U_{RMS}^2 - U_{DC}^2}$
I_{AC}	$\sqrt{I_{RMS}^2 - I_{DC}^2}$
U_{PK+}	The maximum value of u (t) in one sampling period
U_{PK-}	The minimum value of u (t) in one sampling period
I_{PK+}	Maximum value of i (t) in one sampling period
I_{PK-}	Minimum value in one sampling period i (t)

CFi	The ratio of the absolute value of the sampling point with the largest absolute value to the effective value of the current in a sampling period
THDu /THD i	The calculation of voltage and current total harmonics provides two calculation standards, namely the IEC standard and the CSA standard. For details, please see the notes below the table.
Energy	$\int_0^T u(t)i(t)dt$ Here T is the integration time set by the user
Freq	Result of zero crossing detection

The calculation of total harmonics is based on the difference between the International Electro technical Commission (IEC standard) and the Canadian Standards Association (CSA standard). There are two corresponding calculation methods (optional on the harmonic settings page), as follows:

IEC Standard: Calculate the ratio (%) of the root mean square of the effective value of the 2nd to 50th harmonic components to the effective value of the fundamental wave (that is, the first harmonic). The calculation formula is as follows:

$\mathrm{THD} = \sqrt{\sum_{k=2}^{N}(C_k)^2}/C_1$ ----Total harmonic calculation

$C_k\% = {}^{C_k}/_{C_1} * 100\%$ ------k Sub-harmonic percentage calculation

CSA standard: Calculate the ratio (%) of the root mean square of the effective value of the 2nd to 50th harmonic components to the root mean square of the 1st to 50th effective values. The calculation formula is as follows:

$\mathrm{THD} = \sqrt{\sum_{k=2}^{N}(C_k)^2}/\sqrt{\sum_{k=1}^{N}(C_k)^2}$ ----Total harmonic calculation

$C_k\% = {}^{C_k}\Big/\sqrt{\sum_{k=1}^{N}(C_k)^2} * 100\%$ ------k Sub-harmonic percentage calculation

Explanation of the meaning of the characters used in the above two formulas:

C 1: the effective value of the fundamental wave (that is, the first harmonic) of U (voltage) or I (current);

C k: effective value of k sub-harmonic of U (voltage) or I (current);

k: harmonic order index, 2 ~ 50

N: maximum harmonic coefficient, that is, 50.

C k%: Calculation result of the percentage component of the k sub-harmonic of voltage or current.

7.1.3 Hardware range

Voltage range and current range can be controlled in two ranges, modes: automatic, manual (hold, increase, decrease)

There are 4 voltage ranges, as detailed in the table below:

JK9306 voltage range					
Range number	0	1	2	3	4
Voltage range	75V	150V	300V	600V	U-Auto

The current range is divided into 7 according to the specific model, see the following table for details:

Range number	0	1	2	3	4	5	6	7
Range	1mA	3mA	10mA	40mA	150mA	500mA	2A	I-Auto

Note: If you are measuring at a fixed range, you must choose a suitable range, otherwise the measurement accuracy will be affected.

7.2 Instrument parameters

7.2.1 Overview of overall parameters:

Wiring method	single phase
Display	LED digital screen display
Measurement items	Voltage V, current A, active power W, power factor PF, frequency Hz
Measurement form	True rms
Voltage range	2V ~ 600V AC (automatic range switching), peak voltage: 700V AC
Current range	0.05mA ~ 10A AC (automatic range switching), peak current: 12A AC
Power range	0.001W~6kW
Power factor range	0.001~1.000
	Calculation method: Watt (W) ÷ [Voltage (V) * Current (A)] = Power Factor (PF
Frequency range	40~400Hz
Basic accuracy	± (0.4% of reading + 0.1 range)
Measurement speed:	0.1S,0.25S,0.5S,1S,2S,5S
Input impedance	About 2MΩ (all voltage levels)
Power supply	100~240V AC 45-440Hz，100-300V DC
Volume and weight	Instrument size： 355mm*225mm*112mm,length * width * height Opening size： 225mm*99mm,width * height, weight about 1.7Kg
Communication interface	Standard RS232 or RS485, optional relay output function
Accessories	Power cord, warranty card, instruction manual, communication cable, software CD

Chapter 8 JINKO Power Meter Module

Communication Instructions V1.0

I. Communication byte format:

115200 (default) 8-bit data, 1 stop bit, no parity

II. Communication frame format:

PC sends:

55 (h) -Addr-Command-CS

Explanation:

1. The upper computer sends a total of 4 bytes, all of the above data is hexadecimal, single-byte data.

2, 55 is a fixed header, Addr is the address of the meter, Command is the command, CS is the checksum of the first three bytes

Modulus of 256, ie CS = (55 + Addr + Command) & 0x0ff. For example: the host sends: 55, 01, 10, 66, of which

55 is a fixed head, 01 is the instrument address, 10 is the command, 66 is CS = (55 + 01 + 10) & 0x0ff = (66) &

0x0ff = 0x66.

3. Addr is the instrument address. It can be set in the instrument at will. In this example, the instrument address is set to 1. Therefore, the number sent

Data are: 55,01,10,66 (the data are all in hexadecimal)

Instrument return:

aa-Addr-10-V0-V1-V2-V3-I0-I1-I2-I3-P0-P1-P2-P3--Pf0-Pf1-Pf2-Pf3- Hz0-Hz1- Hz2-Hz3-CS

Explanation:

1. The above data are all in hexadecimal.

2. Voltage, current, power, frequency and power factor are all floating point numbers, which are converted into four single-byte data (low

Byte first, high byte after), when the host receives the data, it will be converted to a floating point number.

3. aah is a fixed head, Addr is a meter address, and 10h is a fixed command.

V0-V1-V2-V3 are voltage (floating point) converted into four-byte data, V0 is the low byte, and V3 is the high byte.

Similarly, I0 ~ I3 are currents,

P0 ~ P3 are power,

Hz0 ~ Hz is the frequency,

Pf0 ~ Pf3 are power factors.

CS is the 256 modulus of the sum of the fixed heads aa ~ Pf3: CS = (aa + Addr + 30 + V0 + .. + Hz0 + Hz1 + Hz2 + Hz3) & 0x0ff

4. Examples of voltage, current, power, frequency, and power factor data conversion:

Example voltage = 123.56V, sending format is V0-V1-V2-V3 = b8-1e-f7-42

Example current = 13.34A, sending format is I0-I1-I2-I3 = A4-70-55-41

Example frequency = 50.15hz, sending format is Hz0-Hz1-Hz2-Hz3 = 9a-99-48-42

The format of power and power factor conversion is the same, that is, the floating point number is converted into four bytes of data.
Convert this four bytes to a floating point number

III. Communication commands and return data

1.Common commands

10H power take command code

Echo AAH + address 1 + 10H + voltage 4 + current 4 + power 4 + frequency 4 + power factor 4 + check 1 = 24byte)

2. Host computer control current shift command

26H Switch to fixed low gear mode

Return: AAH + address 1 + 26H + check 1 = 4Byte
Set the meter's current range switching mode to manual fixed low range.
When switching to the manual fixed low position, if the current is greater than 200mA, the meter is forced to switch to the high current to protect
Low-level measurement circuit, when the current is less than 100mA, switch to low-level mode again.

27H Switch to fixed high-end mode

Return: AAH + address 1 + 27H + check 1 = 4Byte
Set the meter current level switching mode to manual fixed high.

28H switch automatic shift mode

Return: AAH + address 1 + 28H + check 1 = 4Byte
Set the meter's current range switching mode to automatic mode. The meter shifts automatically according to the shift point (200mA, 100mA).

29H Read the current shift mode

Return: AAH + address 1 + 29H + current shift mode value 1 + check 1 = 5Byte
The meter returns the current gear mode switching mode value I_MODE.
I_MODE: 0x00——Manually fix low gear
0x01-Manually fixed high-end
0x02-automatic

3. Host computer control instrument measurement mode command

2AH Switch measurement mode to AC

Return: AAH + address 1 + 2AH + check 1 = 4Byte
Set the meter measurement mode to AC AC mode.

2DH read current measurement mode

Return: AAH + address 1 + 2DH + check 1 = 4Byte
Read the meter measurement mode.
MEAS_MODE: 0x00-current AC measurement mode

4. Baud rate setting (power off and restart after setting)

80H Set the serial port baud rate to 115200

81H Set serial baud rate to 9600

Return: AAH + address 1+ command code + check 1 = 4Byte

5.Status code

90H Read module status information

Return: AAH + address 1+ command code + code + check 1 = 5Byte

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Initialization completed							过流

Bit is set to 1 after the initialization is completed, and other bits are set to 0 by default. If there is an error, the bit is set to 1.

Chapter 9 Package and Warranty

9.1 Complete

The instrument should have the following items when it leaves the factory:

No.	Name	Quantity
1	JK9306 instrument	1 set
2	Three-wire power cord	1 piece
3	Fuse	1 piece
4	CD	1 piece
5	Warranty card	1 piece
6	Product certificate	1 piece
7	Test Report	1 piece

After the user receives the instrument, the above contents should be checked out of the box for inspection. If any defects occur, please contact the company or the operating department immediately.

9 .2 Logo

The following symbols appear on the panel or nameplate of each instrument.

1) Manufacturer's name or trademark;

2) Product name and model;

3) Product number and manufacturing date;

4) License mark and number for manufacturing measuring instruments;

5) Test terminal flag;

9.3 Packaging

The measuring instrument is usually packed in a dust-proof, shock-proof and moisture-proof rugged box with plastic bags along with accessories, spare parts, instruction manuals and product certifications.

9.4 Transport

The meter should be handled carefully during transportation, protected from moisture and rain.

9.5 Storage

The measuring instrument should be stored in a ventilated room where the ambient temperature is 5 ℃ ～ 40 ℃ and the relative humidity is not more than 85%. The air should not contain harmful impurities that corrode the measuring instrument.

9.6 Warranty

Warranty period: If the user purchases the instrument from the company, it will be calculated from the company's shipping date, and from the operating department's buyer, it will be calculated from the operating department's shipping date. The warranty period is two years. The warranty card should be issued for the instrument. During the warranty period, if the instrument is damaged due to improper user operation, the maintenance cost shall be borne by the user. The instrument is maintained by our company for life.

This instrument must be repaired by professional technicians. Please do not replace the internal components of the instrument during maintenance. After repairing the instrument, you must re-measure and calibrate to avoid affecting the test accuracy. Due to the user's blind maintenance, damage to the instrument caused by replacement of instrument parts is not covered by the warranty, and the user should bear the maintenance costs.