ZXDJ-1 Single Phase Clamp type Phase Tester

Content

1. General Introduction

It is suitable to test various types single phase meters on site and can also be used to test alternating current parameters.

2. Main Characters

○ Current clamp and meter combined together, colorful and touch-screen display;
○ One AAA Li-battery can continuously working 4 hours;
○ Wide voltage, current measurement range, voltage range: 15-300V, current range: 0.05-100A;
○ Display all the measuring parameters in one screen;
○ Current clamp has automatic conpensation function, 0.2% class accuracy;
○ Current clamp has automatic calibration function;
○ Integration design of the meter and clamp;
○ 16bit high accuracy AD switch 32 bit ARM processor core.
○ Automatically record and save 999 groups calibrate data;
○ Micro-multifunction optic sampler

3. Application and Function

○ Manual/automatic test inductive single phase meters;
○ Manual/automatic test electric single phase meters;
○ Measure virtual value of alternating voltage (15~300Vrms);
○ Measure virtual value of alternating current (50mA~100Arms);
○ Test parameters: active power, phase angle of voltage and current, frequency and etc.
○ Automatic store testing data, and 999 group test results can be saved.

4. Specification

⑴ **Measure Scope**

Voltage: 15—300V（r.m.s）Current: 5mA—100A（r.m.s）
Phase angle: 0—359.99º Frequency: 45—65Hz

(2) Accuracy of measurement

Voltage & current: better than 0.2% Phase angle: better than 0.05 º
Frequency: better than 0.005 Hz   Active power: better than 0.5%
Active power energy: better than 0.5%

（3）**Working Environment**

Tempreture: -10℃—+55℃/5%－85%RHD Humidity: -25℃－+70℃/5%-95% RHD

(4) Dimension

215 ㎜（L）×60 ㎜（W）×30 ㎜（T Aperture of current clamp: 20 ㎜/φ16 ㎜

(5) Weight

Mains：0.25kg Appendix and bag: 0.3kg

(6) Batteries

AAA type, Li rechargable battery, 750mAh, 3.6V. and it can continuously work 4 hours.

5. Structure and Schematic

The instrument integrates the clamp and meter together, includes the clamp type transformer, voltage measurement circuit, data transfer and calculation, display and operation, and greatly improve its convenience of the operation and application.
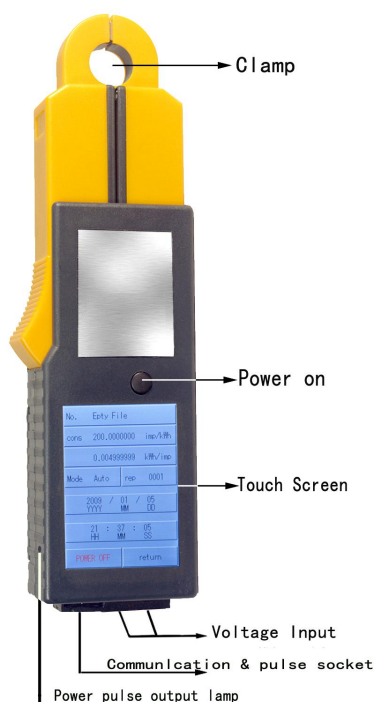
The current circuit adopt precision electromagnetism alloy as the core of the clamp transformer. Directly use the instrument to clip the current cable when measure the current, no need to cut the loop. The second winding of the clamp transformer induce the current signal and transfer it to the instrument where the signal will be enlarged or changed the level and then send it to the simulate/digital entrance.

The voltage circuit adopt precision resistance voltage-divider, and the voltage signal will be sent to the simulate/digital entrance after the voltage divide/ level change.

The instrument's data treatment and core controller adopt single chip analog-digital mixed processor, to realize the data treatment of the voltage and current, for example simulate/digital convert, AC sampling, calculate various AC parameters, data display and man-machine scan. The test results will be stored in the large capacity flash memory chip, and can save 999 group data which can be kept for 10 years if the instrument is powered off or no battery.

The man-machine of the instrument is the color touch screen (320×240 dot, and 26 thousand colors). There is touch induce layer on the surface of the screen, use finger or touchpen to touch it to realize relative operations. Except power on button, the instrument hasn't any other buttons, other operation are realized via the touch screen.
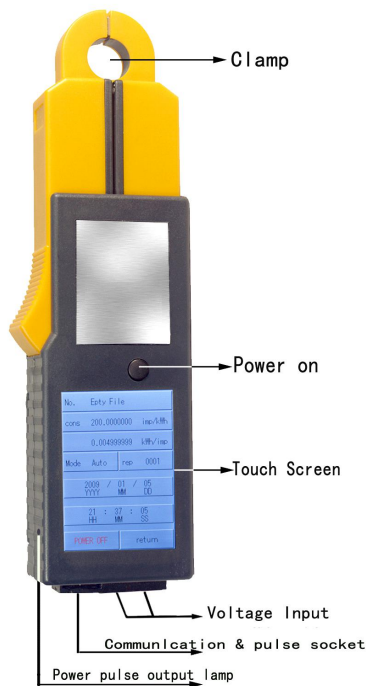
The power supply of the instrument is one rechargeable Li battery (output is 3.7V, 750mAh), can not be replaced by other batteries.

The current consumption when the instrument works is 50-100mA, one full charged battery can continuous work 4 or 5 hours.

6. Accessories

The set instrument includes below accessories:

1. Main instrument;

2. Voltage test cables which are used to connect tested voltage terminals;

3. Multifunction optic sampler which is used to receive the pulse of inductive and electric energy meter, and also can be used as manual switch;

4. Serial communication cable used to connect PC to realize the data transfer and upgrade firmware;

5. Pulse convert cable used to input pulse;

6. Two rechargeable batteries and charger;

7. Carry case.

7. Operation Instruction

7.1 Application

The instrument can be used to test various types single phase meters on site and can also be used to test alternating current parameters, includes virtual value of alternating voltage, virtual value of alternating voltage, active power, phase angle and frequency and etc. its measurement range are alternating frequency (45-65 Hz), voltage: 15-300V, current: 50mA-100A.

[Note]:

The instrument can not measure following AC signal whose frequency exceed the range of 45-65Hz, for example hi-frequency signal, current or voltage output from the Inverter , AC signal whose higher harmonics content is higher than 50%;

and the accuracy of the instrument will be worst if measure below signals: voltage higher than 400V (rms), current higher than 100A (rms);

and the instrument will be damaged if the input signal is two times higher than allowed value.

7.2 How to connect the input signal

Three types of signal can be input: Alternating voltage, alternating current, and energy pulse.

When testing voltage, connect one terminal of the two voltage cables to voltage input socket, and connect another terminals to the voltage terminals being tested.

[Note]Please connect the voltage cable to the instrument
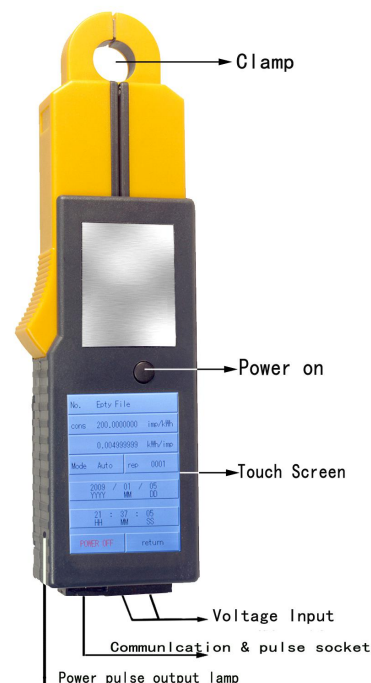
firstly, and operator need to select relative parts to connect the tested terminals.

If the instrument tests the current virtual value, then use the instrument to clip the cable. The diameter of the cable should be less thanΦ15 ㎜ and the clamp must be entirely closed otherwise it will bring big error.

When use the instrument measure the voltage and current, can get the frequency of the signal at the same time. When use the instrument test other AC parameters, need to input the voltage and current at the same time, and the connection position and direction must be correct:

Voltage—use the black to connect GND of the terminal tested, use yellow to connect the phase cable of the terminal tested;

Current—the direction of the current must be same as the direction marked in the clamp.

When calibrating single phase energy meter, operator must connect the voltage signal, current signal, as well as energy pluse signal. There are three methods to connect energy pluse:

① Pluse switch box;

② Optic sampler;

③ The operator count it and manually input the number to the instrument.

7.3 Power supply and battery

The instrument is powered by the inner Li-battery, the inner circuit of the instrument will be automatically powered on or powered off with the management of the CPU in order to reduce the power consumption. Fro example: the simulate circuit will be automatically powered off if the instrument is not in the measurement status, or the background illumination can be adjusted and it'll be automatically powered off if there are no operations in 5 minutes, or the instrument will be automatically powered off if there are no operation in 5 minutes. There are 2 unit batteries equipped and together with one battery charger which can be charge 2 batteries or 1 battery. Only one battery needed to power on the instrument, another battery is as the backup. Normally one battery can can power the instrument for 4 or 5 hours.

How to install the battery and the battery indicator: the operation of install or exchange the battery must be executed after power off the instrument. The battery box locates in the rear side of the battery.

Battery indicator locates in the top right corner of the screen, when its color is red then operator need to power off the instrument and change the battery.

Power on: press the only button on the instrument.

Power off: touch [power off] on the main menu screen.

7.4 Touch Screen

The instrument adopts touch screen display where integrate keyboard and display. Use finger to touch the display to realize the keyboard operation. The button's definition/function in the screen is various according to the display menu. Operator can operate the instrument according to the info displayed in the screen.

For example: in the main menu, the display is divided as 3 zones, touch top zone to save the data, touch mid zone to switch the display, touch below zone to enter the set/operate menu. Please goes to chapter 3 for detailed instruction.

7.5 Energy Pulse Output

In the right side of the instrument there is an indicator which indicate the energy pulse output. Energy constant is 10^5 pulse/kWh.

8. Operate Steps

8.1 General Steps

Please abide by the following steps to ensure the safety of the instrument:

① Connect the test cables before power on the instrument;

② Power in the instrument;

③ Set relative parameters;

④ Use the instrument to clip the tested current cable;

⑤ Save the data after the test;

⑥ Power off the instrument via touch screen.

8.2 Operate the touch screen

Except the operation of power on the instrument, all other operations are executed via touch screen.
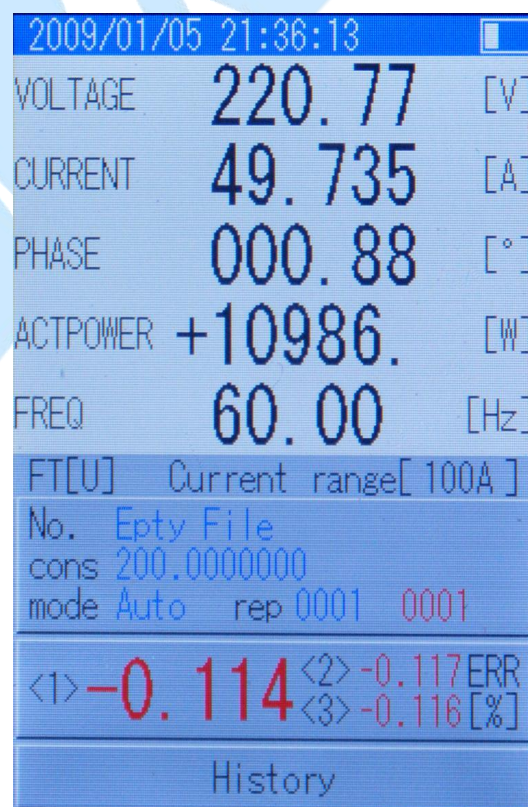The operate flow is as the below fig show, and the operation can considered 3 types:
① Set calibrating parameters.
② Save calibrate/test result.
③ Search saved data.

**Press this zone to set parameters�””

Press this zone to save data➡
Press this zone to search data➡

8.2.1 Main display and operation

The instrument will enter the main menu after powered on, the test data display in the main menu

(see above fig). and the real time operation are entered from this menu.

The main menu can be considered as 4 zones:

Top zone is used to display the test data, includes time, battery capacity, real time AC parameters

(voltage, current, phase angle, active power, frequency).

Below zone includes 3 button zones:

①　Set/display parameters: display the parameters which are need to be set when testing.

No— ID code of tested meter

cons— energy constant of tested meter

mode— calibrate mode (manual or automatic)

rep— pulses counting，press this zone to set above parameters

② Error — display 3 test errors in turn, press this zone to save present test/calibrate result

③History— search saved data, press this button to search

8.2.2 Set calibrate data

Press the zone <Set/display parameters> to enter right menu,

there are 7 items can be set in this menu:

No— ID code of tested meter, operator can input 10

numbers or English characters.

cons— energy constant of tested meter, this item is the

reciprocal of below item (Rep), operator can set

only one item and another item will be

automatically calculated and displayed.

mode— calibrate mode (manual or automatic), select auto mode when use optic sampler,

select manual mode when use the manual switch. The difference of the two mode is the

instrument will automatically count the cycles in the auto mode, but in the manual

mode, the operator must count the cycles and press the manual switch one times

according the value of the rep.

rep—pulses counting，count via automatic or manual method, get one error one times after pass

this number of cycles.

YY_MM_DD— set year, month and date.

HH_MM_SS— set time. Since the instrument has inner clock, so no need to set the data and

time frequently, only set it when the inner clock has great error.

[Power off]— Power off the instrument.

[Return]— Return the main menu.
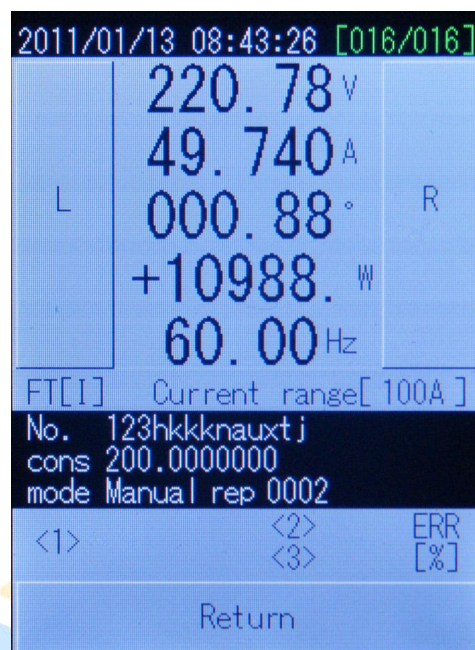
8.2.3 Save calibrate data

In the main menu, press <error display zone> to save present test error, and the other parameters

(U, I, ph, P, Freq) will be saved at the same time.

8.2.4 Search saved data

Press <History zone> to search the saved data. Press [Page Up], [Page Down], [Move Up], [Move

Down] to select the item and press [Detail] to see the record, and press [Delete] to delete the

selected item.
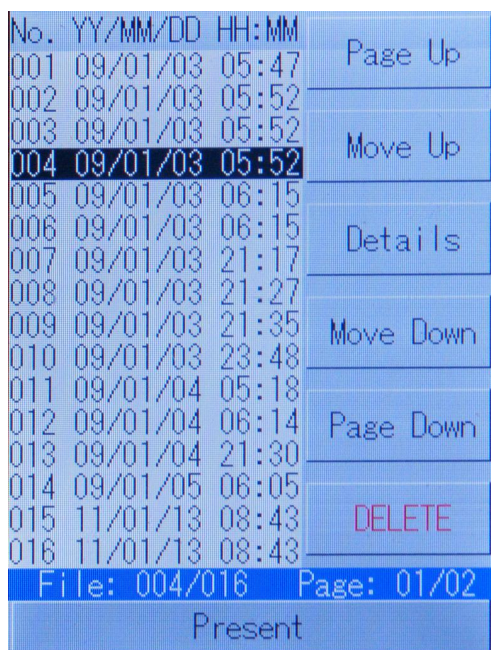
Search saved records menu

Search detailed saved data

8.2.5 System Configuration

[Set system] is used to set the parameters of the instrument. Even the instrument has this operation,

but do not suggest users operate it in order to avoid any wrong operation.

9. Optic Sampler

The instrument is equipped with a multifunction energy pulse sampler (named as 'sampler' below) which has below three functions:

① Scan the turnplate of the energy meter;

② Receive the LED energy pulse of the energy meter;

③ Manual input pulse (see the fig)

The sampler is equipped with a bracket where horizontally or vertically install the sampler, and there is one iron plate so the sampler with magnet can stick on it (see below left fig).

The operation of the sampler is as followings:

（1） Plug the terminal of the sampler to the socket [D] (locates in side), long-press function button to set the sampler as the status of function 1 or function 2.

（2） Install the bracket to the proper position of the energy meter, and stick the sampler to the

bracket.

（3） Carefully adjust the position of the iron plate so the sampler can aiming the sensitization head of the sampler to the turnplate or LED.

（4） Touch-press the button and let the sampler synchronization with the turnplate (at the moment, the pulse indicator of the sampler is

flashing synchronization with the colormark of the turnplate), and then begin the calibration.