T3000 series transformer general-purpose tester

user guide

Fourth Edition

Test science and technology

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1 Foreword

1.1 Product Overview

T3000 Automatic Transformer Test System is a new generation multi-functional automatic transformer integrated test equipment, On the basis of the previous generation of transformer comprehensive test equipment, with a series of problems encountered in electronic transformer industry, using the most cutting-edge electronics and measurement techniques build out the new concept testing instrument. In terms of speed, accuracy and operation than the previous generation has been a qualitative leap. It provides a new solution for the electronic transformer industry to improve the efficiency and improve the quality of products.

This test instrument contains the test function has: **inductance** (Lx), **capacitance** (Cx), **AC resistance** (ACR), **impedance** (| Z |), **DC resistance** (DCR), **the transformer phase** (PH), **turns ratio** (Turn- Ratio), **leakage inductance** (Lk), **short-circuit pin** (PS), **balance** (Balance), etc. for production lines and quality control QC provides comprehensive testing capabilities.

This instrument provides:

- **Personalized test conditions set**: Any set independently pin voltage, frequency, short-circuit the corresponding pin;
- **Tiled interface:** Test parameter setting operation more simple, convenient and fast;
- **Powerful page copy function:** Set full-page copy parameters, repeatability parameter settings easy to get;
- **Large color LED display panel**: test results show clear;
- **Independent fixture errors deduction features**: each group has a separate pin open / short-zero function;
- **Multi-functional interface (HANDLE)**: connect automated test equipment more flexible.

T3000 series general-purpose tester comes standard with automatic test 24Pin scanning fixture, test fixture is compatible with the previous generation 20Pin; also optional 48Pin automatic test fixture scan for network adapter built bias source (DC BIAS); internal memory can store 30 groups test data, but also by external USB interface to expand the storage space (packet data storage, can be stored in the PC mass), in today's era of rapid development of electronic information, due to the scarcity of labor, industrial automation is an inevitable trend, T3000 series tester provides up independent interface control signals HANDLE five groups (single / multi-group modes), to meet customer demand for automation control.

1.2 Specifications Summary

- **Test parameters:** the first parameter --L, C, R, Δ, Δ%, | Z |, DCR,
  Turn-Ratio second parameter --Q, D, R
- **Basic accuracy:** Basic 0.1% (1kHz / 1Vrms)
- **Test range**

Test range	--	0.01nH	to	9.999kH
C	--	0.001pF	to	999.99mF
R	--	0.01mΩ	to	999.99MΩ
|Z|	--	0.01mΩ	to	999.99MΩ
D	--	0.0001	to	99999
Q	--	0.0001	to	99999
DCR	--	0.001mΩ	to	99.999kΩ
Np	--	0.01T	to	999.99T
Ns	--	0.01T	to	999.99T(+/-)

- **Test frequency:** 20Hz---1MHz(T3000SOnly)
- **Test voltage:** 10mV--2.5V
- **Zero Correction:** open circuit, short circuit
- **Turns ratio:** Frequency 1kHz - 1MHz (T3000S Only), test voltage 0.1V - 10V

1.3 Enclosure Notation

(1) Instrument factory annex table

Serial Number	Name	Number	Remark
1	T3000A/B/C/S automatic transformer tester	1	standard configuration
2	T3000B1/B2 scanning test fixture	1	selective purchasing
3	T3000 User guide	1	Standard configuration
4	power line	1	Standard configuration
5	1.0A/250V protective tube	1	Standard configuration
6	Test line (4-Terminal)	1	Standard configuration
7	36Pin data line	1	Standard configuration
8	RS-232C connection line	----	selective purchasing
9	USB flash drive	----	selective purchasing

Note: after receiving the instrument user ， Check out of the box to check the above content， if uncollected, please contact with our business department immediately.

(2) Instrument packaging

- Measuring instruments are generally used in plastic bags together with accessories, accessories, manuals and product certification, such as installed in the dust proof, shock proof and moisture proof of the solid packaging box.

(3) Instrument transport

- Measuring instruments should be handled with care, moisture proof, and rain proof during transport.

(4) Instrument storage

- The measuring instrument is stored in the indoor air temperature of 5 degrees Celsius to 40 degrees Celsius, the relative humidity is not more than 85% of the ventilation room, air should not contain harmful impurities to corrode the measuring instrument.

(5) instrument warranty

warranty period:

- User purchase the equipment from the company, since the company calculated the date of shipment, the warranty period is one year;
- during the warranty period, due to improper operation and damage to the instrument by the user, maintenance costs borne by the user;
- Without the warranty period, the maintenance cost is borne by the user;
- Instrument maintenance is performed by the company's professional and technical personnel
- Due to the user's blindness maintenance, replacement of equipment components caused damage to the instrument is not the scope of warranty, the user should bear the cost of maintenance;

- After the instrument maintenance, calibration shall be re-measured, so as not to affect test accuracy.

2 Specifications (15 ℃ ~ 35 ℃ RH≦ 75%)

2.1 Measurement Functions

(1) Measurement parameters

|Z|	:	The absolute value of the impedance
L	:	Inductance value
C	:	electric capacity
R	:	AC resistance
D	:	Loss factor
Q	:	Quality factor
△	:	L/C/R/|Z|Deviation value
△%	:	L/C/R/|Z|deviation Percentage
DCR	:	DC resistance
Np/Ns	:	Turns ratio
Vp/Vs	:	Voltage ratio
Ns	:	Secondary coil
Vs	:	Secondary voltage

(2) Parameter combination

L,C	R
D,Q,R	Q

(3) Error-correction compensation(Deviation):

- When external fixture leads to machine measurement and the actual value error can be set actual value in the test conditions, adjust the measurement value to actual value, the fixture caused by error will be reduce to a minimum.

(4) Tap positions: automatic, maintained.

(5) Trigger Mode: Trigger analytes, internal trigger, manual trigger, external trigger.

(6) measurement terminals: inductance, capacitance, impedance, DC resistance test terminal 4, the turns ratio of 6-side testing.

(7) Testing time: Fast (15mS), medium speed (50mS), low speed(200mS).

2.2 Measurement signal

(1) Frequency range: 20Hz ~ 1MHz (T3000S Only).

(2) frequency accuracy: ± (0.02% ± 0.01Hz).

(3) Signal standard

Mode	Range	Setting Accuracy
Voltage	10mVrms to2.5Vrms	±10%+1mVrms

(4) Output Impedance: 10/30/50 / 100Ω, ± 3%

When the measured impedance is less than the corresponding output impedance (10/30/50 / 100Ω), The test signal standard should be combined with the accuracy of the impedance measurement, the reference (Table 3-1).

2.3 Measuring range

Parameter	Range		
Impedance magnitude, AC impedance, reactance	0.01mΩ	to	999.99MΩ
capacitance	0.001pF	to	999.99mF
inductance	0.01nH	to	9.999kH
Loss factor	0.0001	to	99999
Quality factor	0.0001	to	99999
Deviation Percentage	-100.00%	to	100.00%
DC resistance	0.001mΩ	to	99.999MΩ
Turns ratio	100：1		
Secondary voltage	10V max		

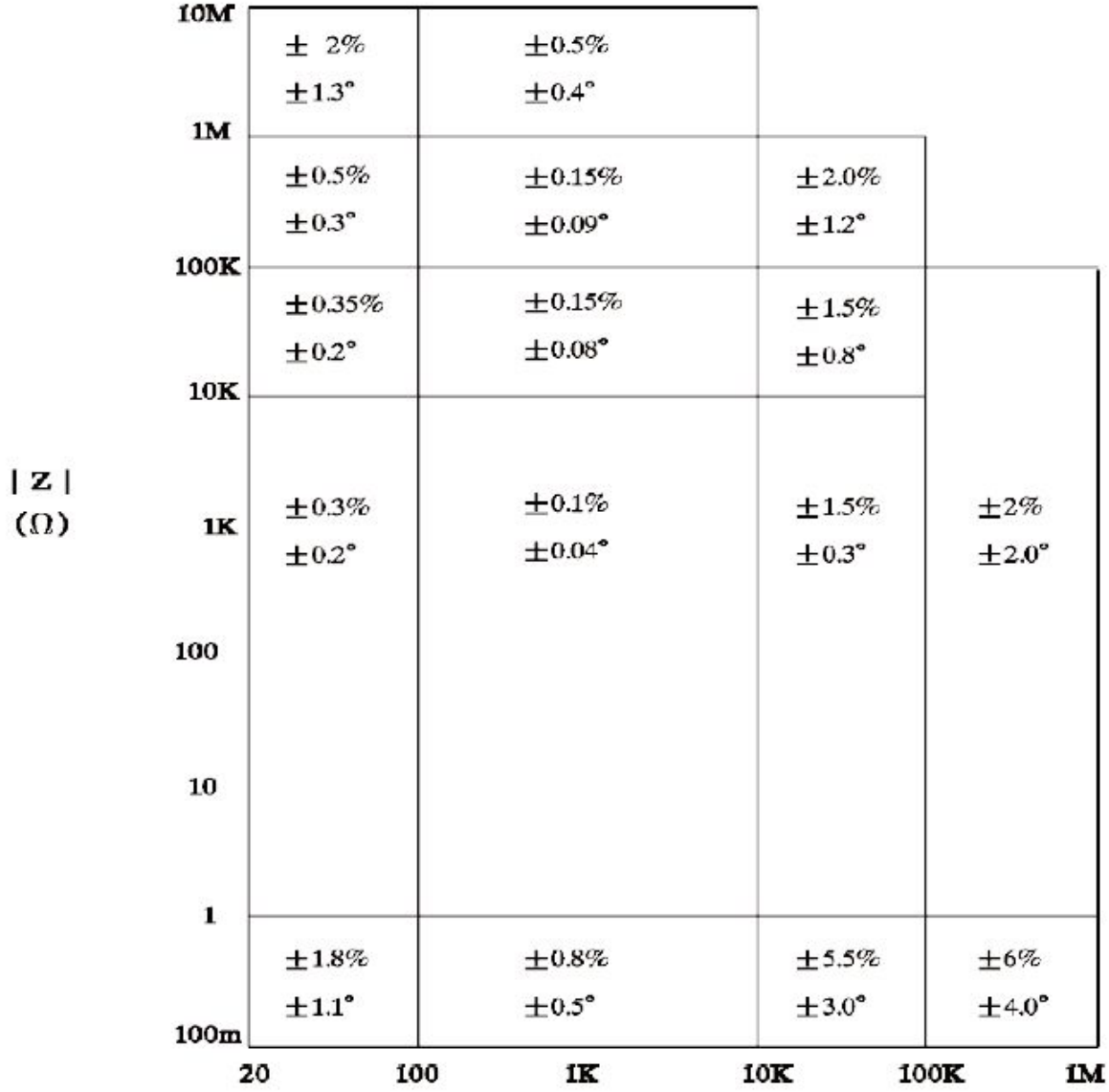
2.4 Preparation for measurement

The measurement accuracy could be ensured effectively When complying with the following conditions:
(1) heat-up time: ≥20 minutes.
(2) After open circuit correctly and Short circuit zero calibration

2.5 Measurement Accuracy

(1) correction within 1 year in factory.
(2) temperature: 23 ℃ + / - 5 ℃.
(3) the relative humidity: 80% Maximum.
(4) heat engine: at least 20 minutes.
(5)Do zero calibration in the above conditions.
(6)impedance level- Phase Accuracy
Basic accuracy such as table 3-1, 2 times in a quick measurement accuracy.
(7) inductance, capacitance, AC impedance accuracy, quality factor ≥10 (loss factor ≤0.1), relative to the Impedance size precision, where in the inductive reactance = | 2πfL |
Capacitance = | 1 / (2πfC) |
According to Figure 3-1 L, C and Z size conversion table.
When the quality factor <10 (loss factor 0.1), multiplied by the accuracy of inductance (1 + 1 / Q) multiplied by the capacitance accuracy (1 + D).
(8) loss factor, quality factor, AC impedance accuracy loss factor
Loss factor accuracy = ± [tanθe × (1 + D2)] / [1-D × tanθe] quality factor ≥10 quality factor accuracy = ± [tanθe × (1 + Q2)] / [1-Q × tanθe] quality factor <10, multiplied by the accuracy of the quality factor (1 + 1 / Q)
<θe: phase error>

Table 3-1 impedance level - Phase Accuracy



Note: In the realm of online specifications to better apply

(9) DC Resistance Accuracy:
± (0.2% + 0.1mΩ)> 10mΩ
± (0.5% + 0.2mΩ) <10mΩ
(10) turns Accuracy: ± (0.3% + 0.1T)

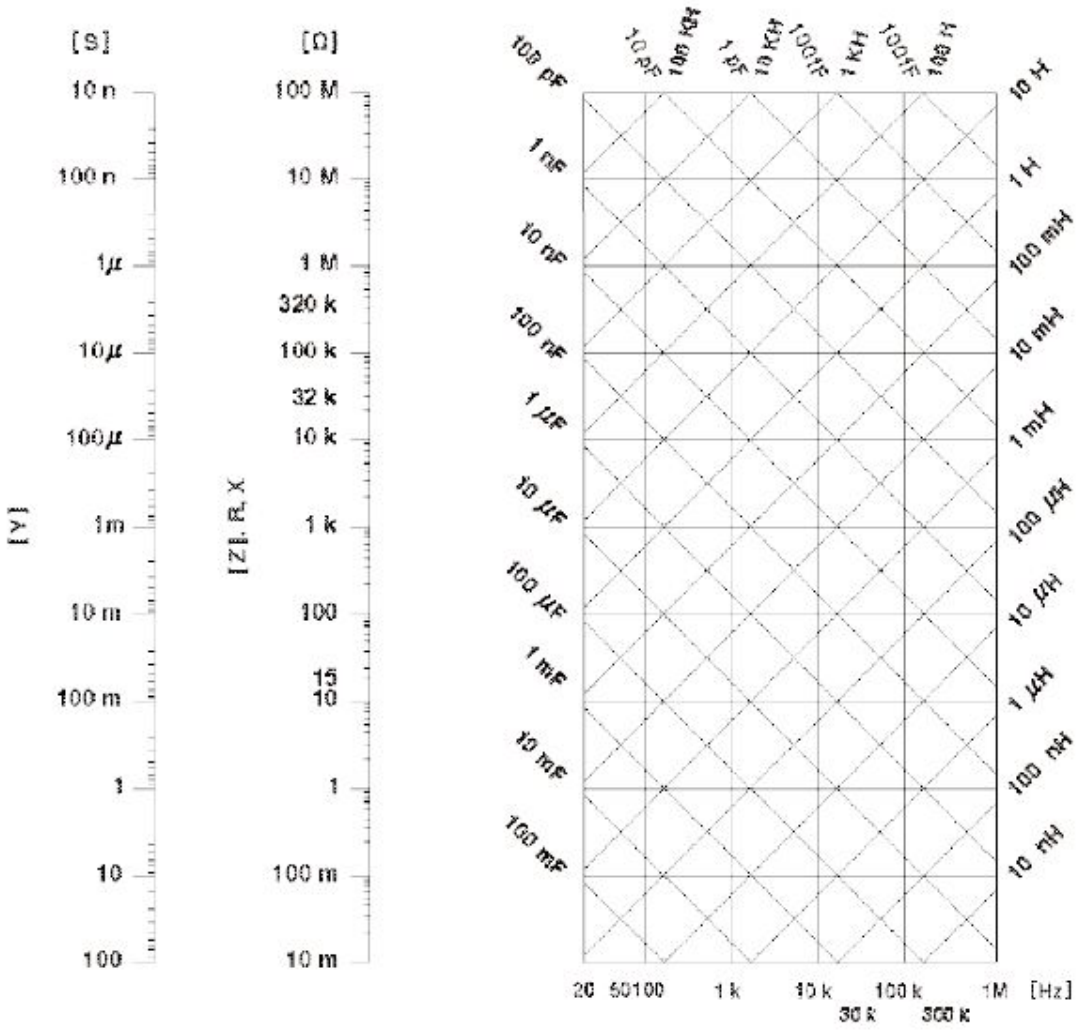


Figure 3-1 L / C / Z conversion

2.6 Calibration function

(1) open circuit to zero

Remove measurement error caused by open circuit test fixture stray impedance

(2) short-circuited to zero

Remove measurement error caused by the test fixture which leading to a short-circuit impedance of the residual.

3 Installed

This chapter describes some of the tests that must be carried out after you have received the instrument, and the conditions must be made before the installation and use of the instrument must be carried out.

3.1 Unpacking Check

- Thank you for purchasing and using our products, Before you use this instrument according to the instructions please first confirm the final chapter "into the sleeve and warranty" matter, if discrepancies please contact us as soon as possible to protect your rights.

3.2 Power connection

(1) Power supply voltage range: 110 / 220V (± 10%)

(2) Power Frequency range: 45Hz ~ 70Hz.

(3) Power supply range: not less than 80VA.

(4) Power input phase line L, the zero line N, ground E of the instrument should be the same as the power plug.

(5) The instrument has been carefully designed to reduce the interference caused by the input of the AC power supply side, but still should try to make it in low noise environment, if you can not avoid, please install the power filter

WARNING: to prevent the leakage of instrument or damage, the user must ensure that the power supply reliable ground wire from the earth.

3.3 Fuse

Instrument factory is equipped with a 1.0A fuse, the user should use the company with a fuse.

3.4 Environmental conditions

(1) (1) please do not use in multi - dust, multi - vibration, direct sunlight, corrosive gas.

(2) the normal operation of instrument should be at the temperature of 0 DEG C to 40 DEG C, relative humidity is less than or equal to 75%, so please try this condition using instrument, in order to ensure the measurement accuracy.

(3) The test instrument panel is equipped with a heat sink to prevent the internal temperature rises, in order to ensure adequate ventilation, never blocking the ventilation holes, to enable the instrument to maintain accuracy.

(4) If the instrument is not used for a long time, please put it in the original packing box or similar to the box in the reservoir is 5 to 40 DEG C temperature, relative humidity is not more than 85% RH of the indoor ventilation, air should not contain harmful impurity in corrosion measurement instrument and should avoid direct sunlight.

(5) the instrument, in particular, to connect the test wire of the test piece shall be far away from the strong electromagnetic field, so as not to interfere with the measurement.

3.5 Use Test Fixture

- Please use the test fixture equipped by company or test cable, user made or other company's test fixture or test cable may lead to incorrect measurement results. Instrument test fixture or test cable should be keep clean, the test device pins are keep clean, in order to ensure that the test device is in good contact with the fixture.
- The test fixture or test cable is connected to the Hcur, Hpot, Lcur and Lpot of the front panel of the instrument. With be measured shielded enclosure , Can put the shield connected to the instrument to "⊥". Note: without the installation of test fixtures or test cables, the instrument will display an unstable measurement result.

3.6 preheating and continuous working time

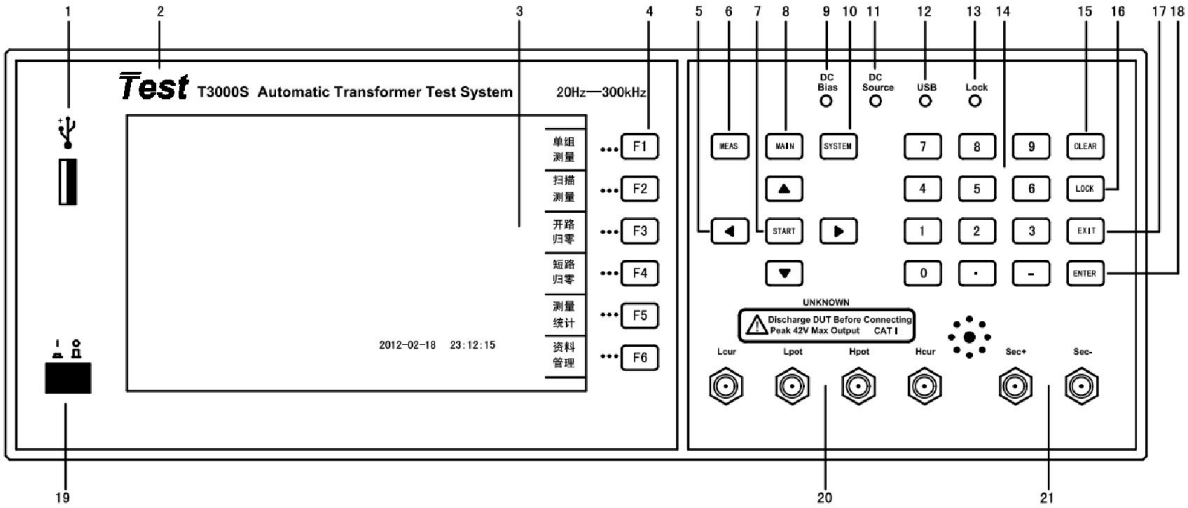
- In order to ensure the accurate measurement of the instrument, the heating time should be no less than 20 minutes, and the continuous working time should be no more than 24 hours
- Do not frequently switch instruments to cause internal data confusion.

3.7 other features of the instrument

- Power dissipation: power consumption≤40VA.
- External dimension (W*H*D): 380mm*136mm*328mm;
- Weight: about 7.0kg;

4 Panel description

4.1 Front panel description



(1) USB Interface

For connecting USB flash drive storage

(2) trademark and model

Instruments trademarks and models

(3) LED Color liquid crystal display screen

800 * 480 dot matrix LED color LCD display, display measurement results, measurement settings, etc..

(4) soft key

Six soft keys can be used to select and control and parameters, each left of the soft key have corresponding function definition. Key change with different display pages and definitions.

(5) cursor keys

Cursor keys are used to select the cursor between the domain and the domain of the LCD display page. When the cursor is moved to a region, the domain on the LCD monitor displayed in reverse.

(6) [Meas] menu key

Measurement menu key, enter the "measurement menu display" page.

(7) [Start] key

Trigger key, manual trigger instrument.

(8) [Main] menu key

Main menu key, enter "main measurement menu display" page.

(9) DC Bias indicator light

(10) [System] menu key system keys, enter the "system settings" page.

(11) DC Source indicator light.

(12) USB indicator light

(13) Lock indicator light.

(14) numerical keys

Numeric keys for inputting data into the instrument. Numeric keys are composed of the number keys [0] to [9],decimal point [.] and [-] key.

(15) [Clear] key

Clear key, delete the last digit of the input value.

(16) [Lock] key

Lock key, panel button lock function.

(17) [Exit] key

Exit key, exit the test status, or return to the last page.

(18) [Enter] key

Enter a key, used for terminal data entry, confirm and save the data displayed in the input line (LCD).

(19) power supply switch (POWER) power switch.

(20) the end of the test (UNKNOWN) four ends of the measurement. Used to connect the four ends of the test fixture or test cable, to be measured.

Hcur: high current drive (Hcur);

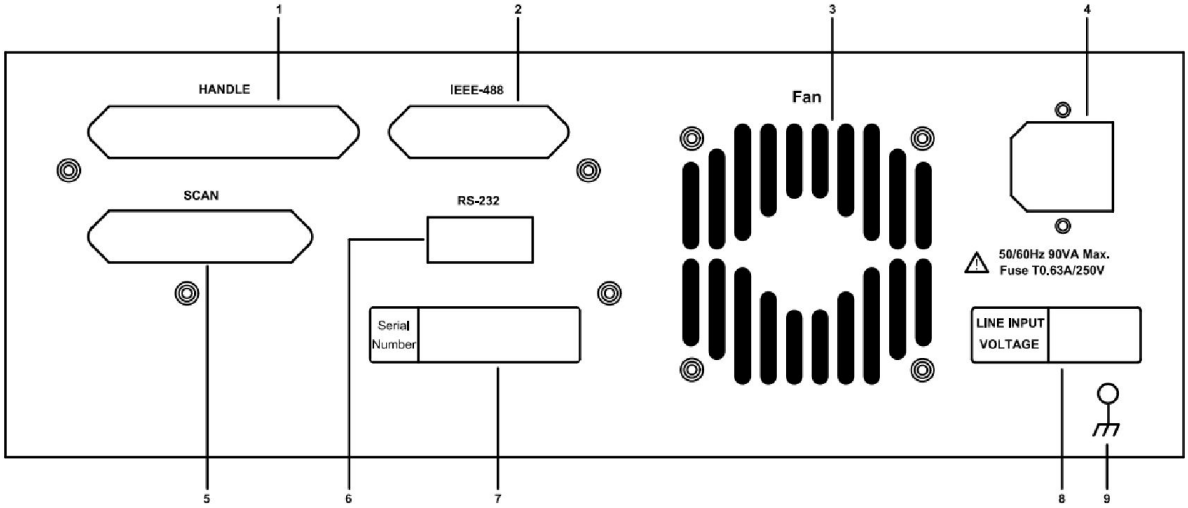
Hpot: high voltage sampling (Hpot);

Lpot: low voltage sampling (Lpot);

Lcur: low current drive (Lcur).

(21) test terminal (TURN) secondary turns measuring end. Sec (+): secondary-phase measurement end; Sec (-): Secondary inverting terminal measurement.

4.2 Back panel description



(1) automation control interface (HANDLE INTERFACE) for connecting the external automation control equipment

(2) GPIB interface (IEEE-488 INTERFACE)

Used to connect the GPIB control port.

(3) cooling fan (Fan)

(4) power input socket (AC Line)

The power outlet is in line with the 3 wire socket of the International Electronic Technology Committee. Please use the appropriate power lines such as SPH-386 Belden or similar power lines

(5) test kit connection interface (SCAN INTERFACE) scan test state, and connect external connection test fixture Scan-Box (T3000A1).

(6) serial port (INTERFACE RS-232)

Used for connecting serial communication ports.

(7) product serial number

(8) input voltage range

(9)Ground terminal (Ground), this ground directly connect to the test machine shell, connecting the terminal to the earth terminal to prevent outside interference and avoid causing the test machine into a floating connection phenomenon and affect the safety of the test machine.

5 Operation instructions

5.1 basic operations

The corresponding main menu key ([Meas] measurement display menu /[Main] measurement main menu, [System] system set menu, enter the corresponding display interface.

Use the direction key to move the cursor to the menu area you want to modify or control.

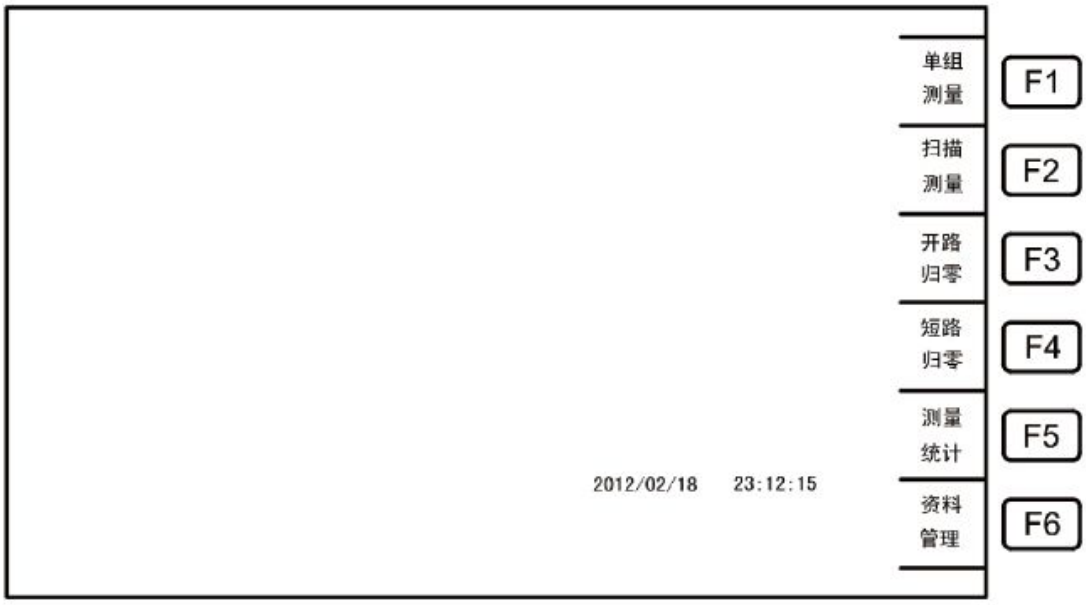
Use the selection key in the sub menu area to select the actions you need.

Parameter modification by the number of direct input, or you can follow the prompts to use the selection button to complete the modification of parameters.

[Lock] for the lock key in the scan test interface is valid, after the boot directly into the scan test interface.

startup picture

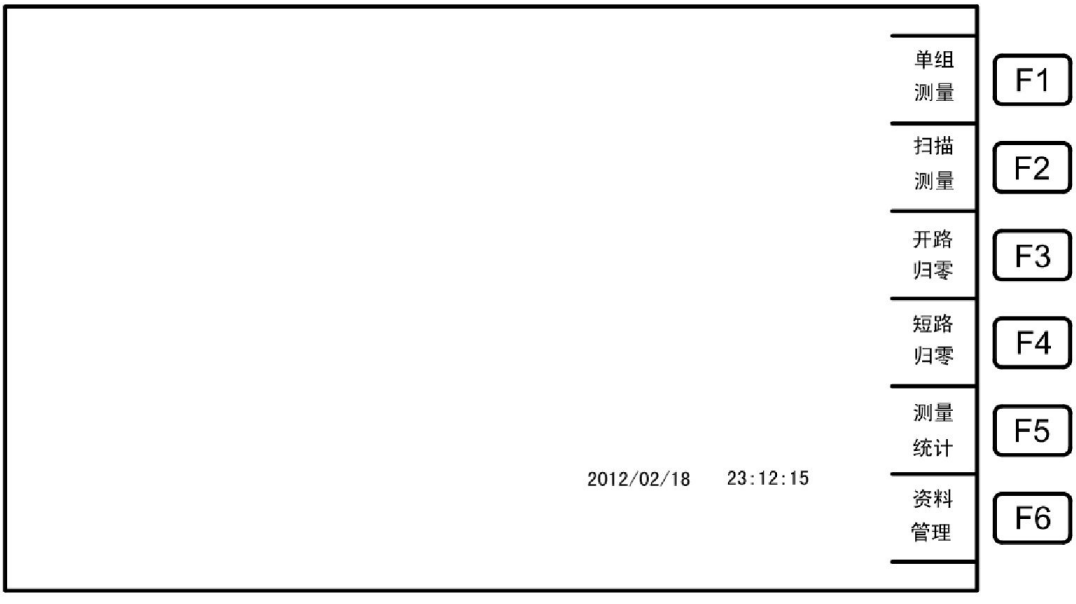
Press the [Main] main menu key or in the non locking state to boot the default into the measurement settings menu interface, as shown below:



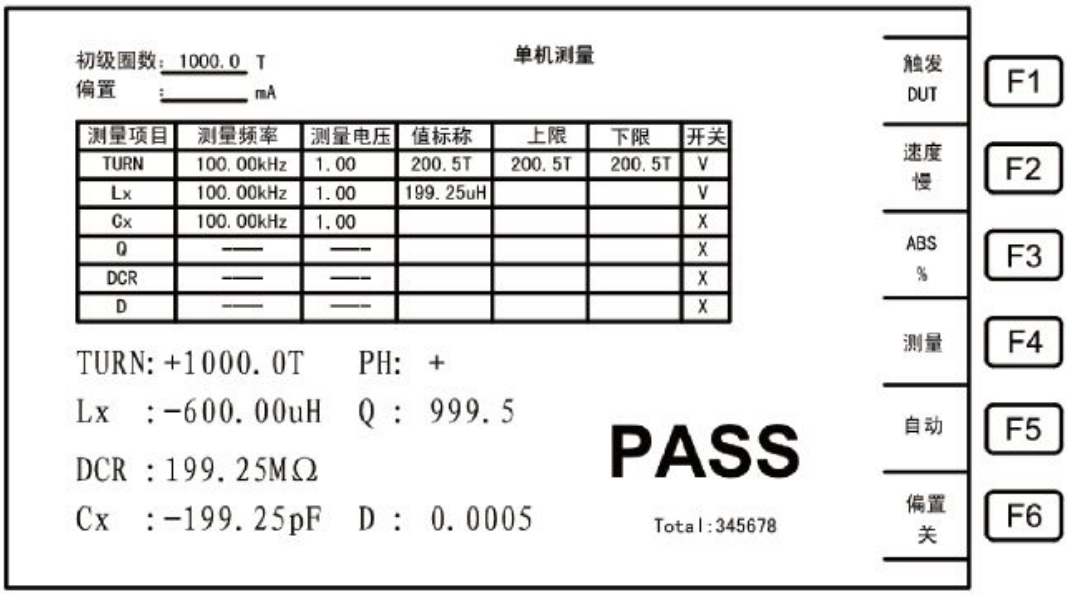
Description: F1: Into a single set of Settings/ measuring interface;
F2: enter the transformer scan test data set interface;
F3: enter the single frequency and multi frequency open circuit zero interface;
F4: enter the single frequency and multi frequency /DCR short-circuit return zero interface;
F5: enter the scanning measurement result statistics interface;
F6: enter transformer test data management interface.

5.2 single set measurement

Measurement Setup menu interface



Set and measure according to F1[single set of measurements], as shown in the following figure:



Description:

F1: hand off trigger mode DUT/MAN/INT/EXT;

F2: hand off measurement speed (fast / medium / slow);

F3: Choose the way to the deviation (ABS/%);

F4: switch setting / measuring interface;

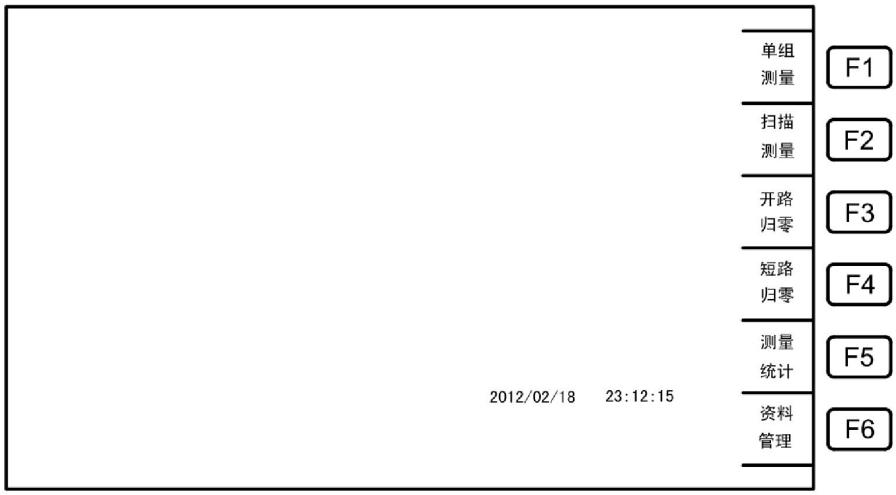
F5: range switching (auto / keep);

F6: bias current (DC bias) switch.

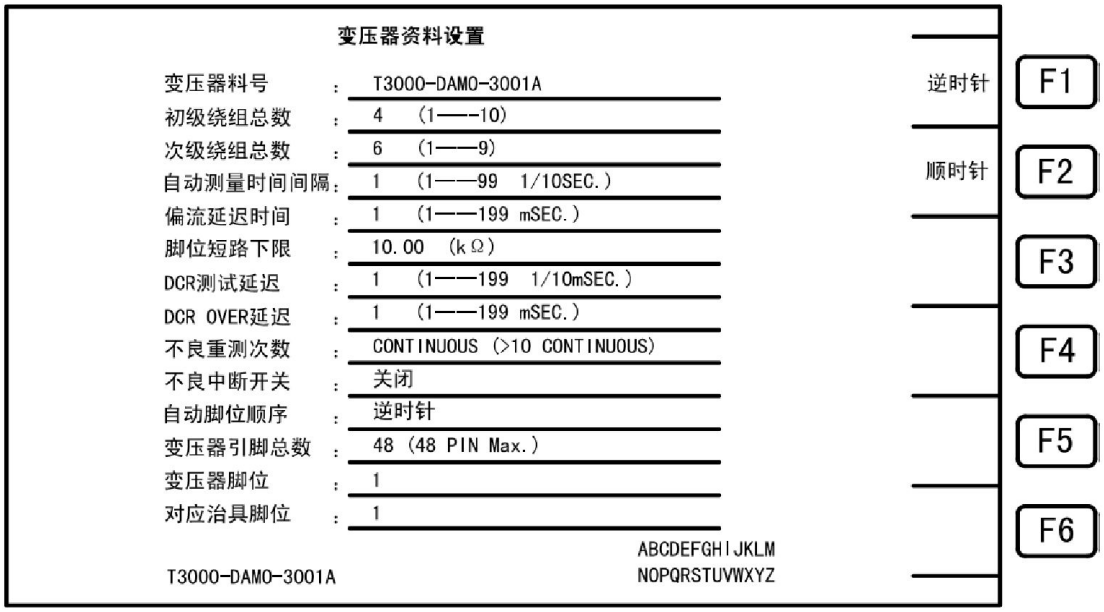
5.3 Scanning measurement

(1) Transformer material number setting

measurement setup MENU interface



According to F2[scan measurement, into the ID set the screen to set the test parameters, as shown below:



Description:

- Transformer material number: by capital letters / "-" / digital "0-9" (**up to 15 bits)**, capital letters to move around the cursor keys to the corresponding position by the Start key to choose, such as: T3000-DAMO-24PIN.
- The total number of transformer primary winding: up to 10 groups.
- The total number of transformer secondary windings: up to 9 groups.
- Automatic measurement time interval: 0-99 (1/10 seconds).
- Drift - delay time: 0-199 milliseconds (0 off bias source).
- Pin position short circuit lower limit: 0.01-999.99k.
- DCR test delay: 1-199 (1/10 MS).
- DCR OVER delay: 1-199 (MS).
- Bad measurement times: 0-11 (11 for continuous measurement).
- Bad interrupt switch: select whether to stop the measure the defective products.
- Automatically correspond to the order of the feet: the default is a counter clockwise,clockwise is optional.
- The total number of transformer pin: up to 48Pin.
- Transformer foot position: automatically on the foot position when the transformer starting position.
- The corresponding fixture pin: automatic pin fixture when the corresponding start pin.

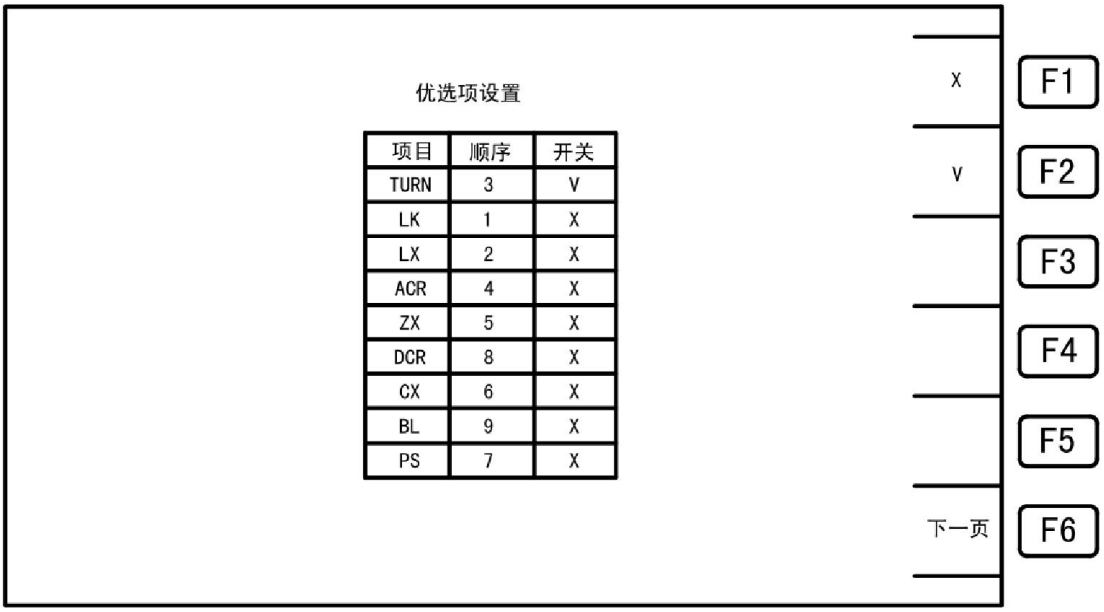
Note: 1.[The total number of transformer pin][Transformer pin][fixture feet]**parameters** for automatic corresponding pins, otherwise regarded as manual corresponding feet (**manual input pin**);

2. After set up the automatically on the foot position in the foot setting interface,behind all project pin setting **the transformer as the standard** (set range in the total number of pins);

3. After set up the manu-motive on the foot position in the foot setting interface, behind all project pin setting are **to fixture foot level prevail** (set in the range less than the total number of pins). Manually set foot position, **with a transformer feet corresponding to different fixture pin.**

(2) Preference Settings

Choose the project which need to measure , measuring order, as shown below:



Description: (a) switch: V (open), X (off);

(b) Order: from small to large arrangement (use in chronological order if the same)

(3) pin settings

corresponding to different primary transformer / fixture pin, as shown below:

Description: F1: select primary;

F5: clear the page;

F6: go to the next interface.

(4)Number of turns setup

Set the number of turns to measure the corresponding conditions,scope, as shown below:

Description: F1: choose primary;

F2: full page copy on a primary corresponding Settings (only nominal value, upper limit and lower limit);

F3: choose the display mode (TURN/VOLT/Ns: Np/Vs: Vp);

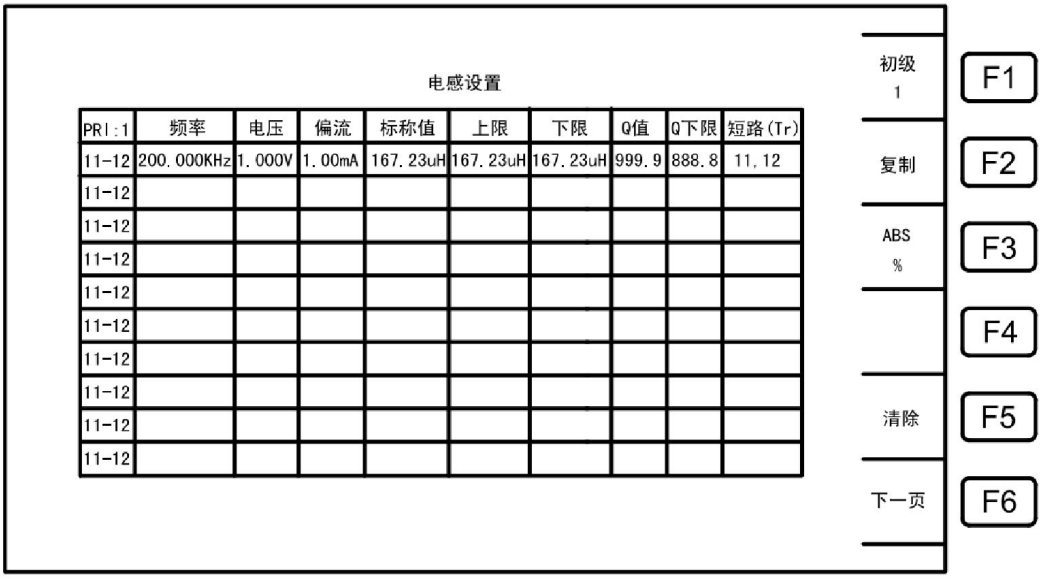
F4: select deviation method (ABS / %);

F5: remove page;

F6: turn to the next interface.

(5)Inductive setting

Setting the inductance measurement corresponding conditions, range, as shown below:



Description: F1: Select Primary;

F2: full page copy on a primary corresponding Settings (only nominal value, upper and lower limits);

F3: choose the display mode (TURN/VOLT/Ns: Np/Vs: Vp);

F5: select deviation method (ABS / %);

F6: remove page; F6: turn to the next interface

(6)leakage inductance setting

set leakage inductance measurement corresponding conditions, scope,as shown below:

漏电感设置

PRI:1	频率	电压	分类	标称值	上限	下限	PS(Tr)
11-12	200.000KHz	1.000V	10	167.23uH	167.23uH	167.23uH	11, 12, 13, 14, 15, 16, 17 11, 12, 13, 14, 15, 16, 17
11-12							
11-12							
11-12							
11-12							
11-12							
11-12							
11-12							
11-12							
11-12							

初级 1 F1
复制 F2
F3
BIN 5 F4
清除 F5
下一页 F6

Description: F1: select the primary;

F2: full page copy on a primary corresponding Settings (only nominal value, upper limit and lower limit);

F3: select the total number of categories (10 Max.)

F4: off classification function;

F5: selection bias mode (ABS/%);

F6: go to the next interface.

(7)stray capacitance setting

Set stray capacitance measurement of the corresponding conditions,scope, as shown below:

电容设置

PRI:1	频率	电压	标称值	上限	下限	Cx(+) (Tr)	Cx(-) (Tr)
01	10.000KHz	1.000V	167.23pF	167.23pF	167.23pF	11, 12, 13, 14, 15, 16	11, 12, 13, 14, 15, 16
02							
03							
04							
05							

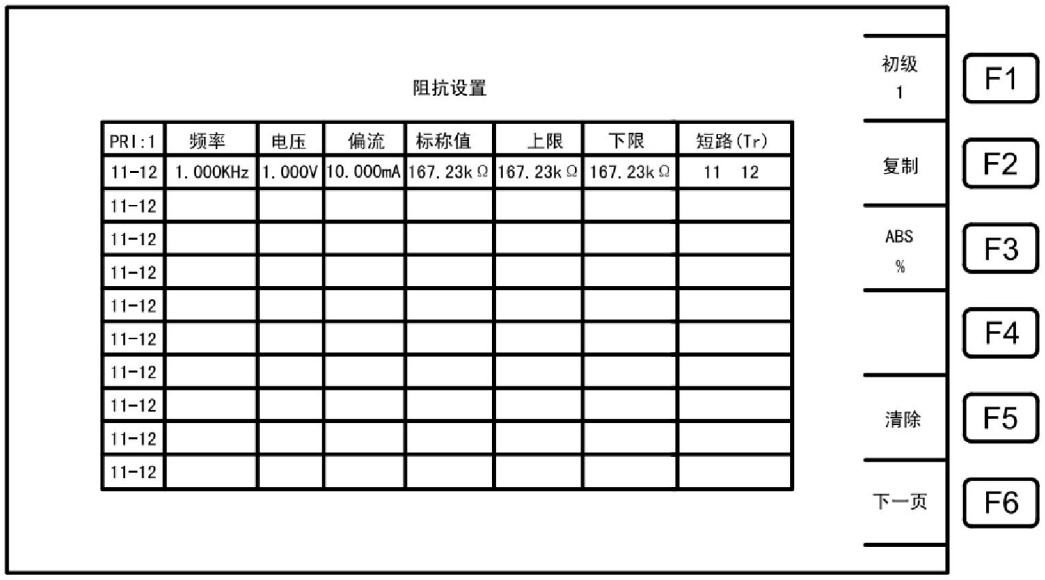
初级 1 F1
复制 F2
ABS % F3
F4
F5
下一页 F6

Description: F1: Selection Bias mode (ABS/%);

F6: go to the next screen.

(8) impedance setting

Set the corresponding condition and scope of the impedance measurement, as shown in the following figure:



Description： F1: choose primary;

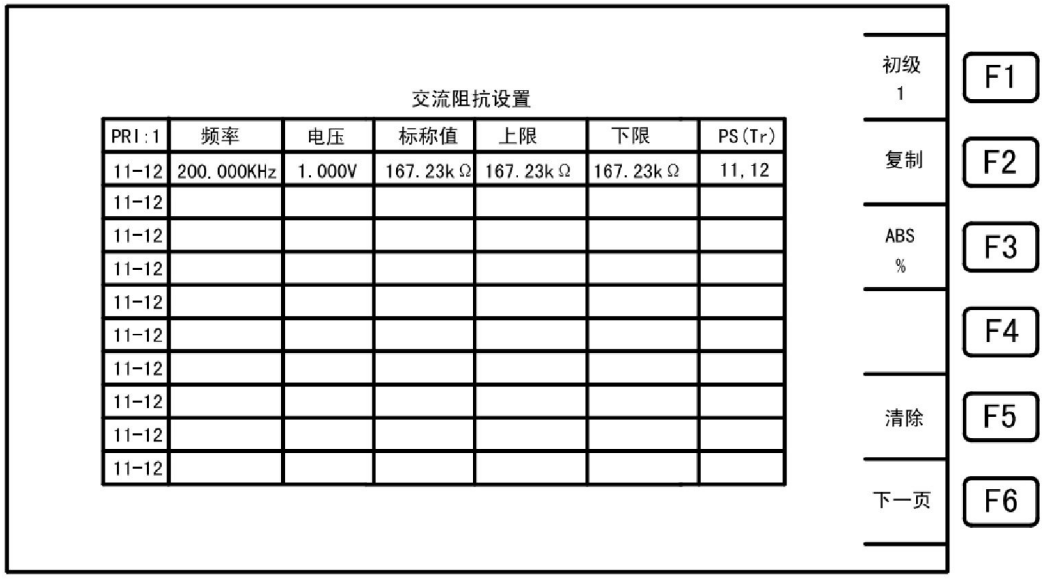
F2: full page copy on a primary corresponding Settings;

F3: select deviation method (ABS / %);

F6: turn to the next interface.

(9) AC resistance setting

Set the AC resistance measurements corresponding conditions, range, as shown below:



Description： F1: choose primary;

F2: full page copy on a primary corresponding Settings;

F3: select deviation method (ABS / %);

F5: remove page;

F6: turn to the next interface.

(10) DC resistance setting

Set the dc resistance measurement corresponding conditions, scope, etc., as shown in the figure below:

Description： F1: choose primary;

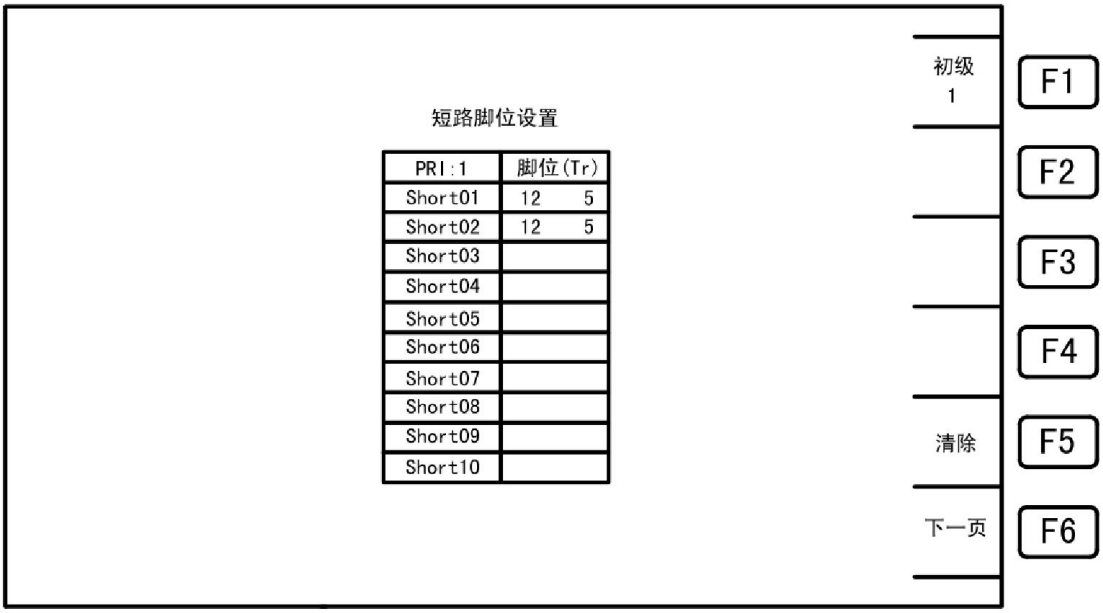
F2: full page copy on a primary corresponding Settings;

F3: select deviation method (ABS / %);

F6: turn to the next interface.

(11) Short circuit foot setting

Set the required measurement of the corresponding short circuit position, as shown below:



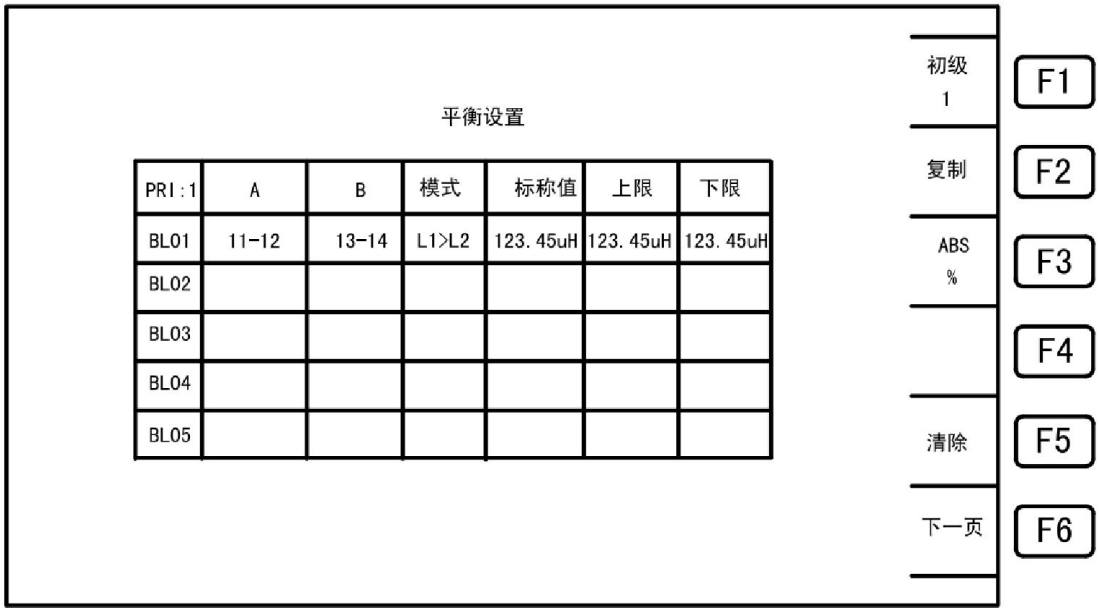
Description: F1: select primary;

F5: clear the page;

F6: go to the next interface.

(12)Balance setting

Setting the appropriate balance measurement conditions, scope, etc., as shown below:



Description： F1: choose primary;

F2: full page copy on a primary corresponding Settings;

F3: select deviation method (ABS / %);

F5: remove page;

F6: turn to the next interface

Parameter item:

- A (transformer/fixture) [0-9] : from the keyboard input (0: PRI; 1-9: SEC1 - SEC9).
- B. (transformer/fixture) [0-9] : from the keyboard input (0: PRI; 1-9: SEC1 - SEC9).
- Mode: choose from F1 - F6:

F1 (L) :measuring the value of L1 minus the measurement of the absolute value of L2 Less than the limit

F2(Lk):measuring the value of Lk1 minus the measurement of the absolute value of Lk2 Less than the limit

F3(DCR):measuring the value of DCR1 minus the measurement of the absolute value of DCR2 Less than the limit

F4(TURN):measuring the value of NA minus the measurement of the absolute value of NB Less than the limit

F5 (L1>L2): the measured value of L1 minus the absolute value of the measured value of L2 is greater than the lower limit of A and less than the upper limit of B

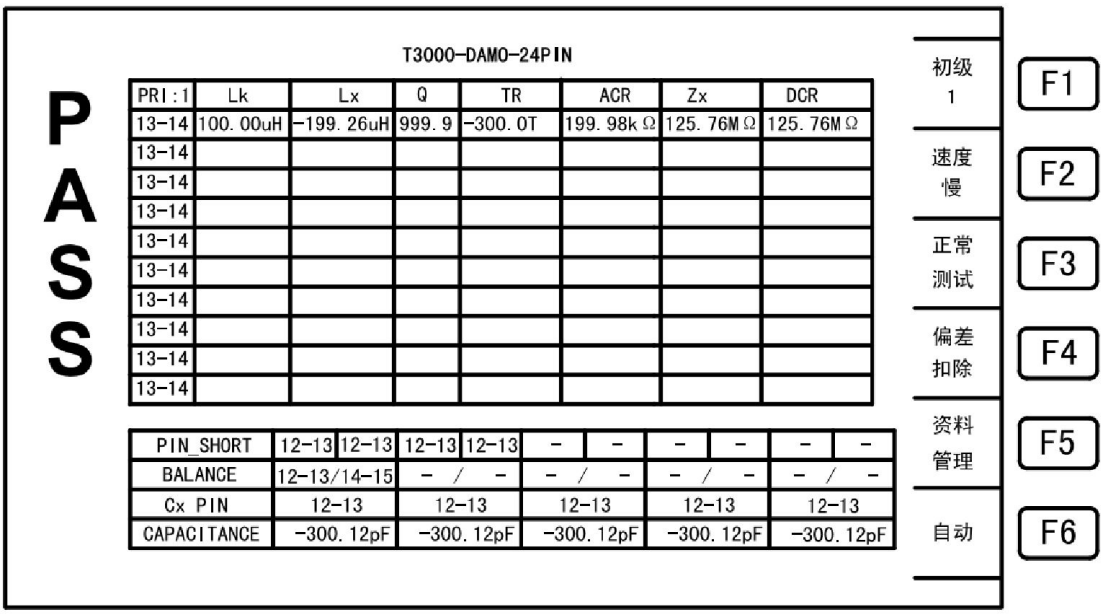
F6 (delta L): the error of measured value of the absolute value of delta L[ABS (L1-L2)] minus the nominal value of deviation of the absolute value of delta N[ABS (n1-n2)] reuptake absolute value [ABS (delta l delta n)]

- Nominal value: the upper and lower limits for the percentage mode reference value (the default is not measured balance).
- Ceiling: upper limit of balance.
- Lower limit of balance.

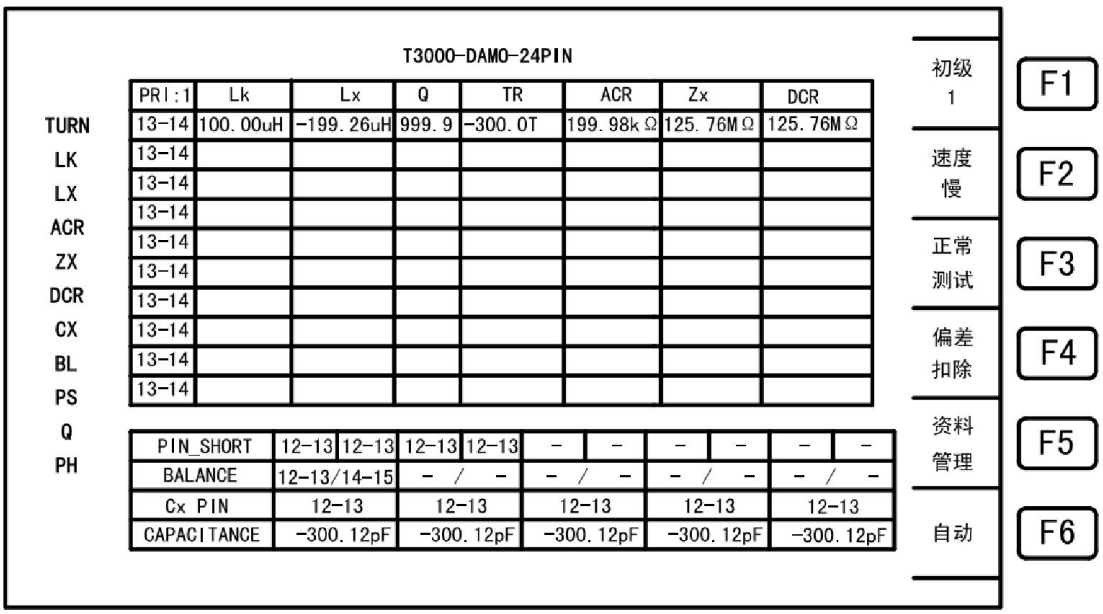
(13) transformer scanning measurement display

Display transformer measurement results and data, as shown below:

Results Screen



Data screen



Description: F1: switch between different primary corresponding measurement results;

F2: switching speed of different measurement;

F3: fixture return zero switch state selection (short-circuit return zero / open circuit zero / fixture deviation deduction / normal test);

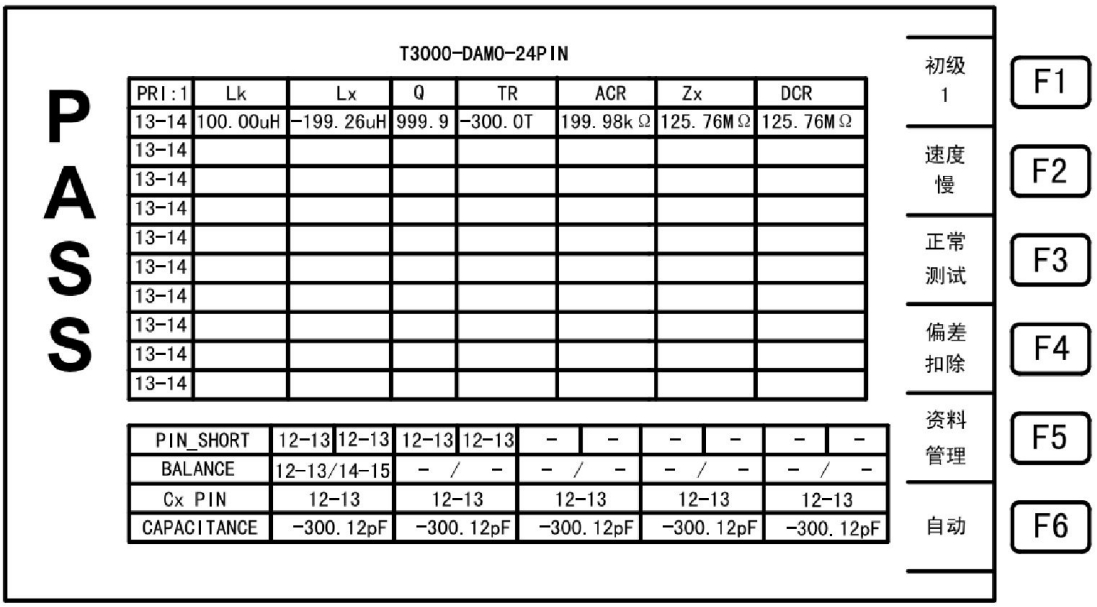
F4: enter the deviation after deducting interface;

F5: switching range (automatic / fixed);

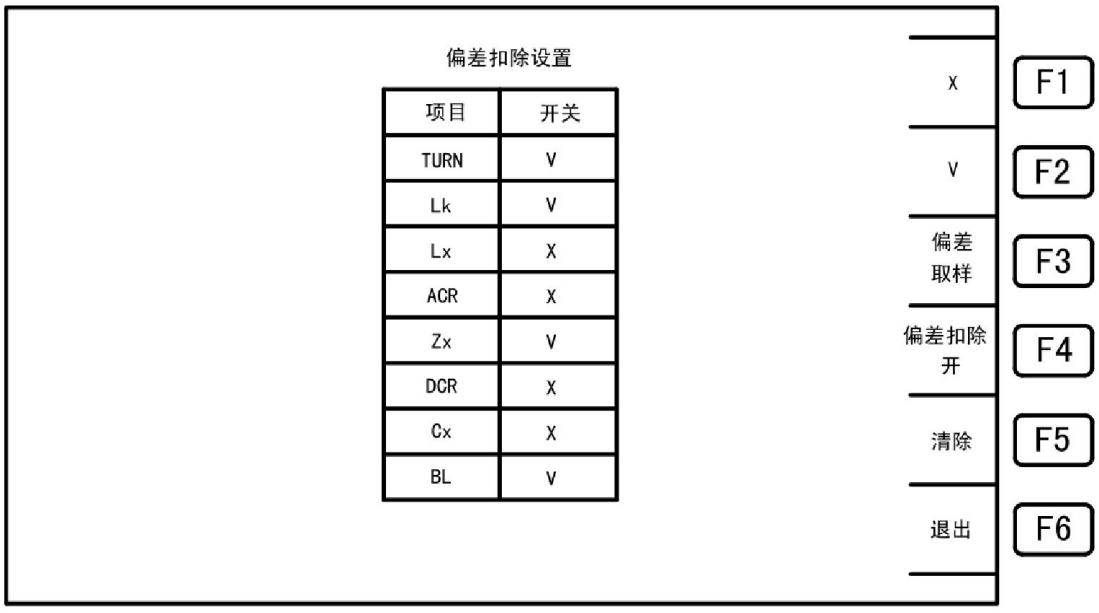
F6: access to data management interface.

(14)The standard error deduction of transformer

Transformer scanning measurement display:



Press F4 to enter deviation deduction interface:



Description: F1: Open deviation deduction option;

F2: Close deviation deduction option;

F3: sampling bias switch;

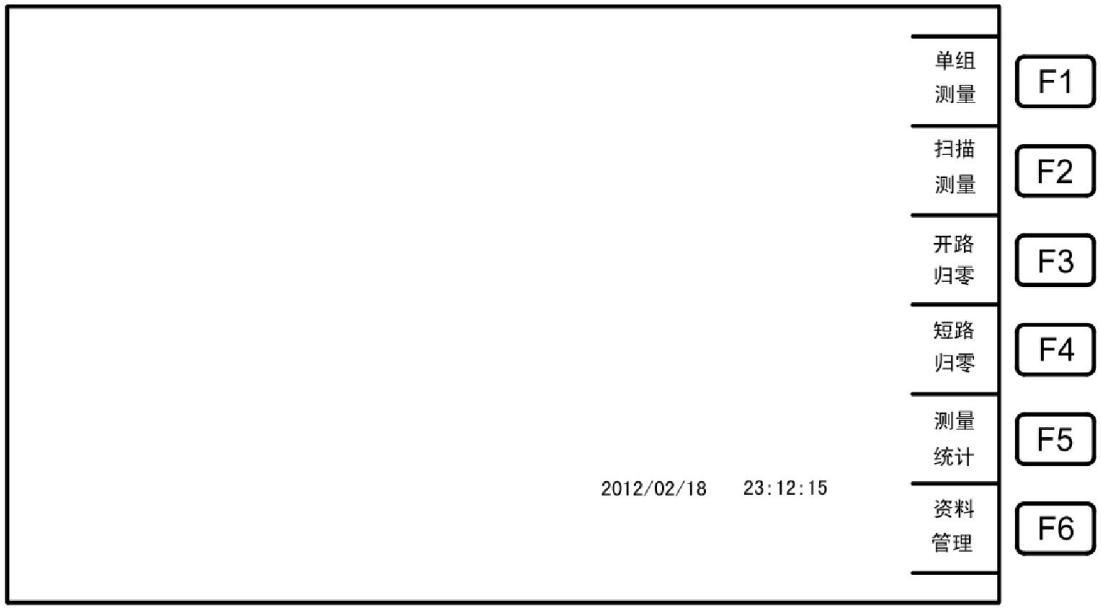
F4: on / off deviation deduction function ;

F5: Clear page;

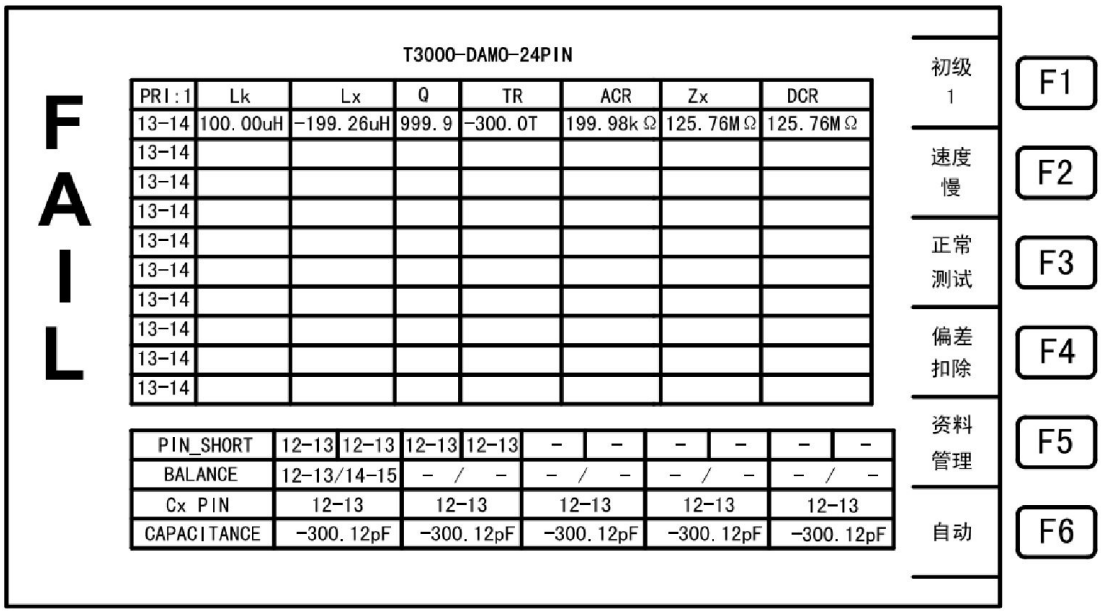
F6: Return transformer scanning measurement display interface.

(15)data management

Main menu interface:



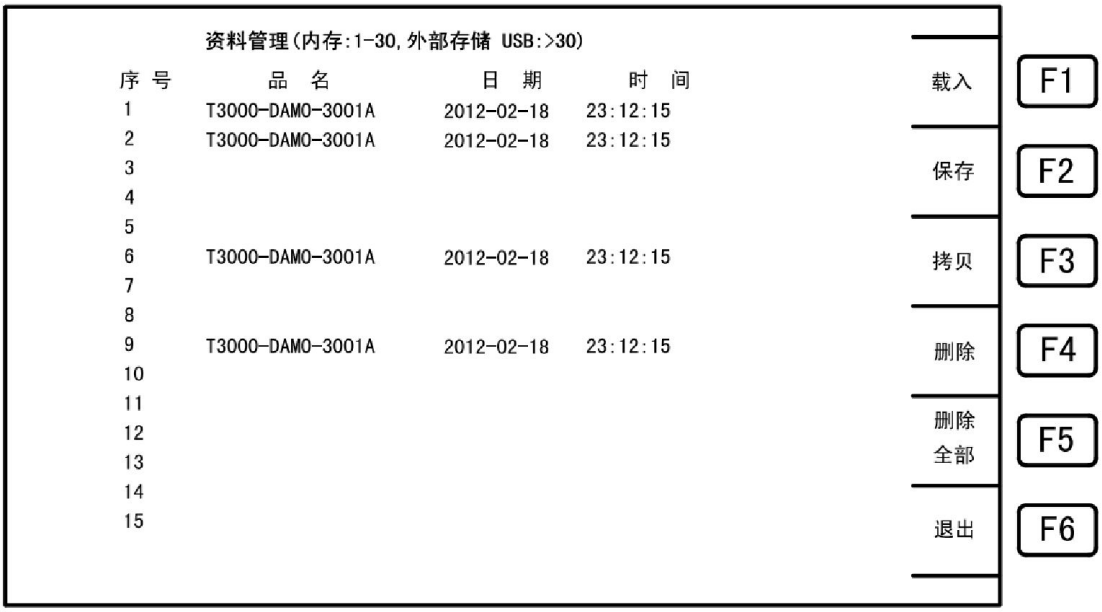
Press F6 [information management] or scanning measurement display:



PRI:1	Lk	Lx	Q	TR	ACR	Zx	DCR
13-14	100.00uH	-199.26uH	999.9	-300.0T	199.98kΩ	125.76MΩ	125.76MΩ
13-14							
13-14							
13-14							
13-14							
13-14							
13-14							
13-14							
13-14							
13-14							

PIN_SHORT	12-13	12-13	12-13	12-13	-	-	-	-	-	-
BALANCE	12-13/14-15		- / -		- / -		- / -		- / -	
Cx PIN	12-13		12-13		12-13		12-13		12-13	
CAPACITANCE	-300.12pF		-300.12pF		-300.12pF		-300.12pF		-300.12pF	

Press F4 [data management] to enter the data management interface for data transformer load, save, copy, delete, as shown below:



Description: F1: load data;

F2: save data;

F3: copy data;

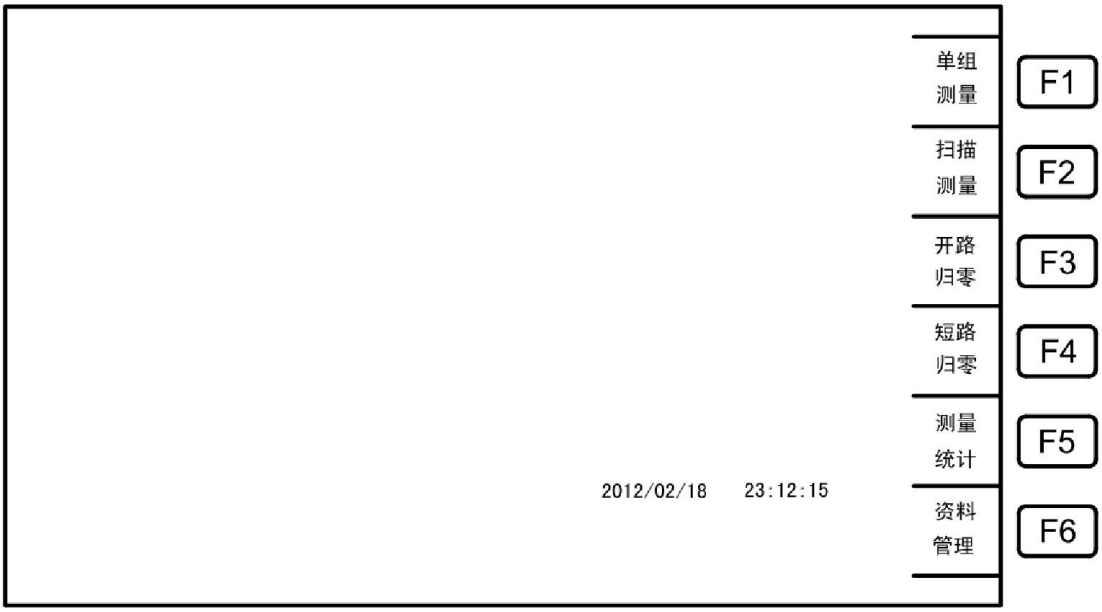
F4: delete a single data;

F5: delete all data;

F6: exit data management interface.

(16) transformer scanning measurement result statistics

Measurement Settings menu interface:

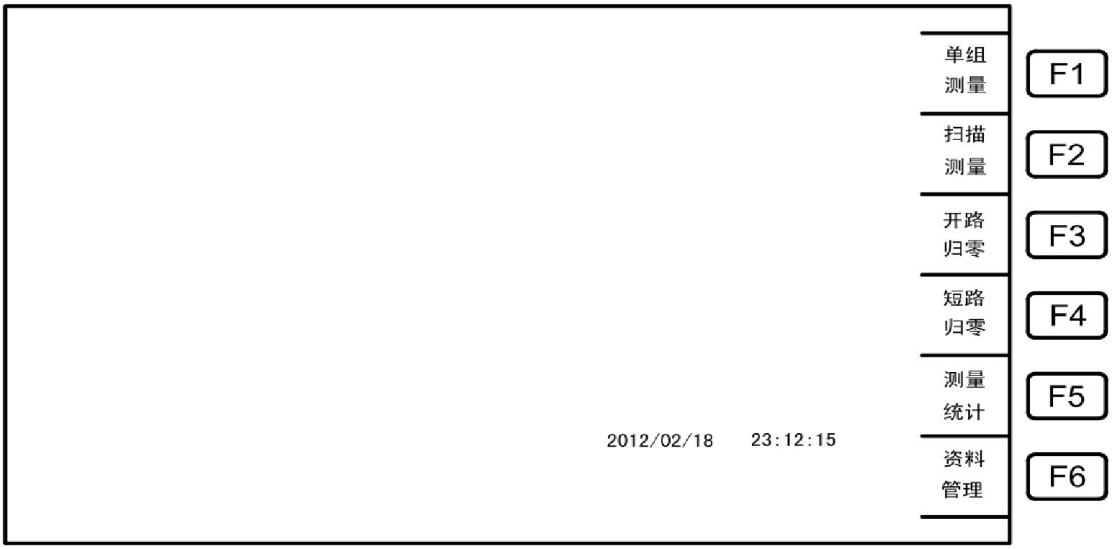


Press F5 [measurement statistics] into the scanning measurement result statistics interface:

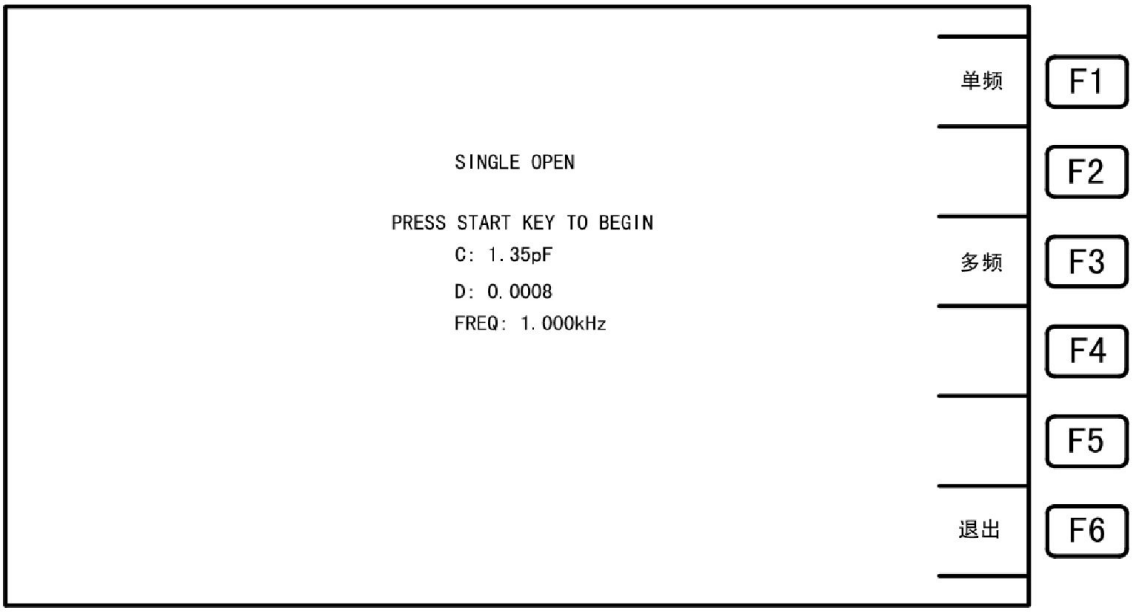
Description: F3: clear statistical results; F6: back to the main menu interface.

(17) Open circuit zero measurement

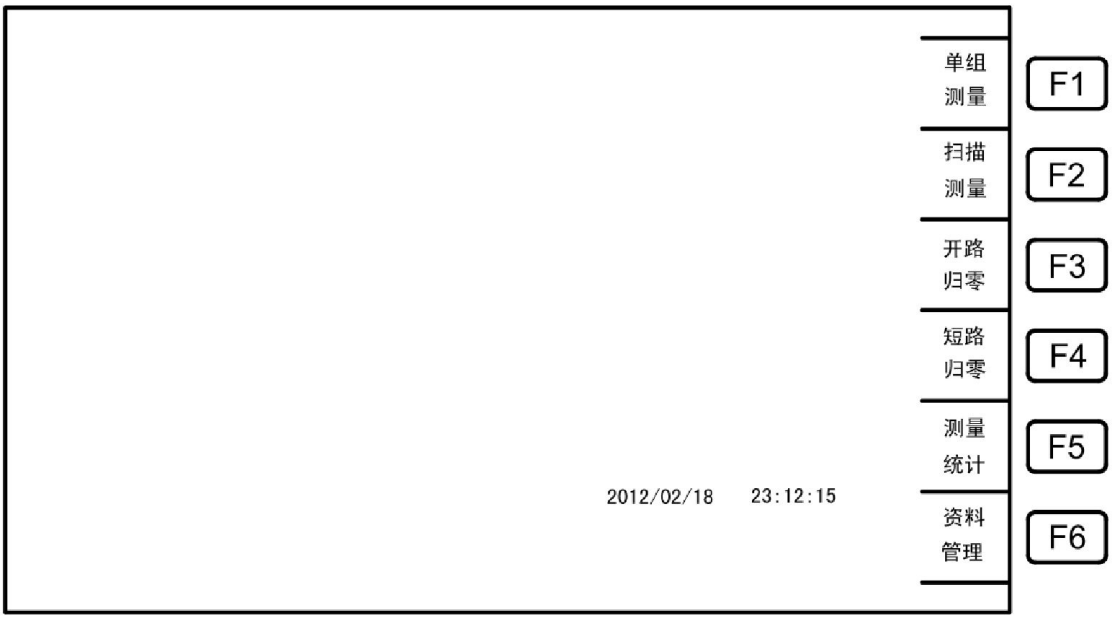
Measuring the Settings menu interface:



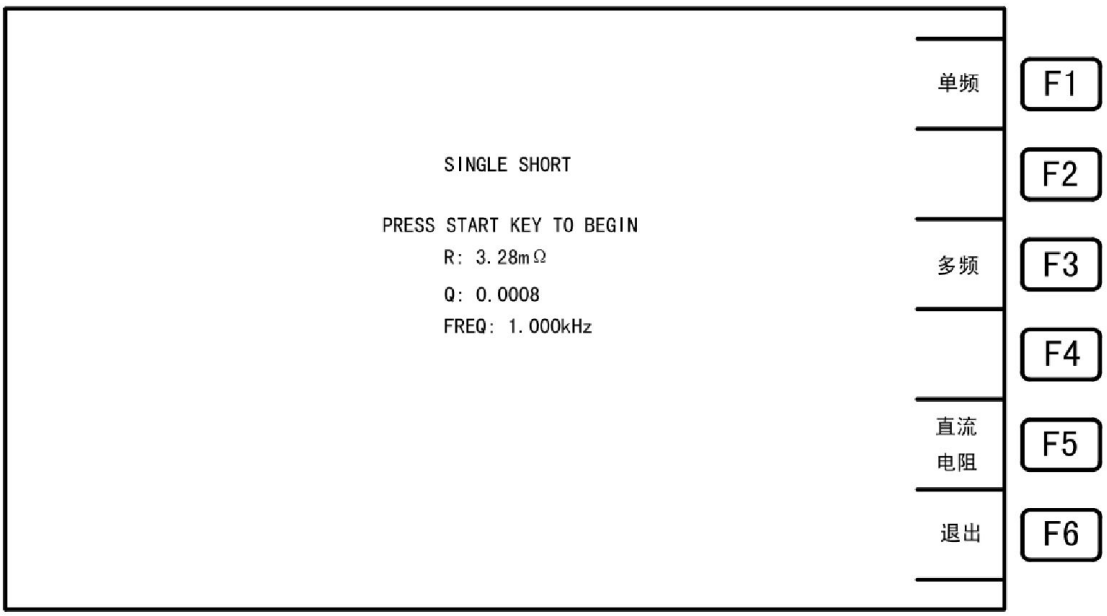
Press F3 to enter the open circuit zero measurement interface:



Description: F1: Select a single frequency to zero;
F3: select a single frequency to zero;
F6: back to the main menu interface.
(18) Short circuit zero measurement
Measuring the Settings menu interface:



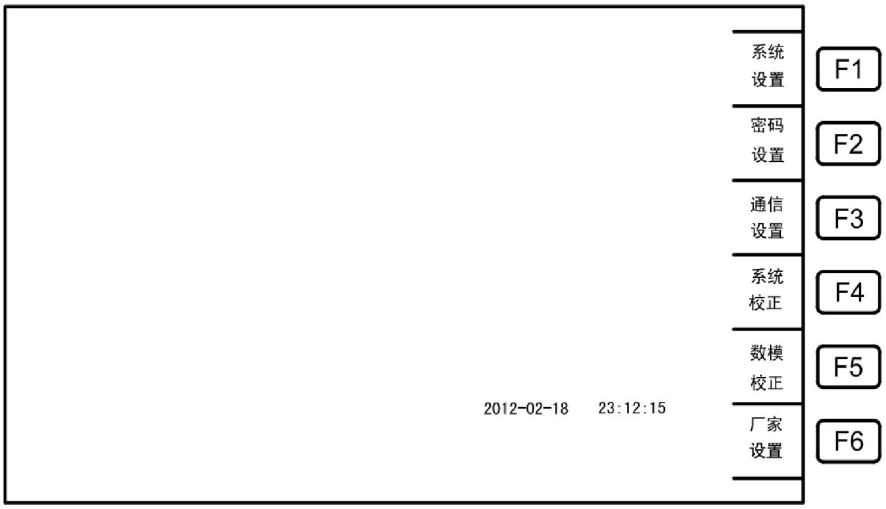
Press F4 to enter short circuit zero measuring interface:



Description: F1: select single frequency return to zero;
F3: select a single frequency return to zero;
F5: select DC resistance to zero;
F6: return to the main menu interface.

5.4 system settings

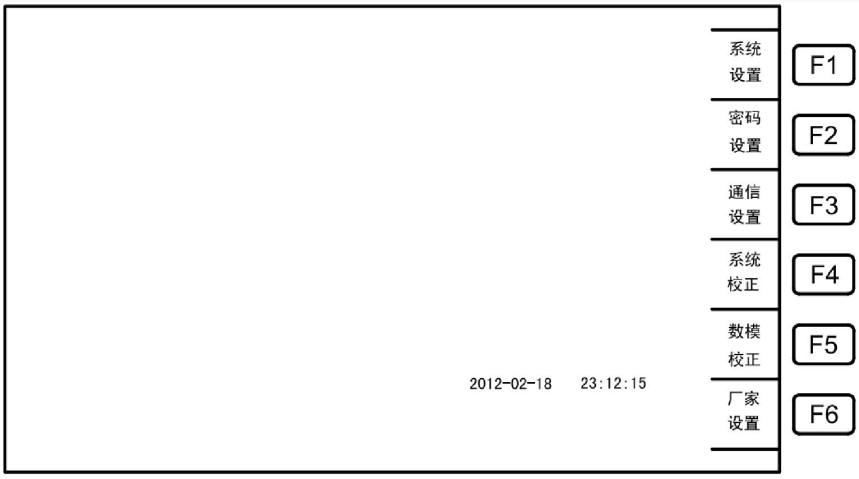
System Settings interface:



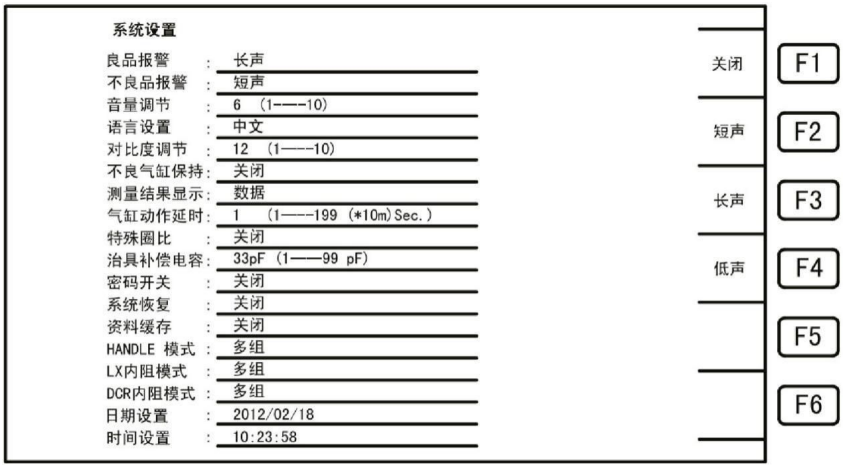
Description: F1: enter the system settings interface
F2: enter the password settings interface
F3: enter to the communication interface

(1) system settings

system settings interface:



Press F1 [System Settings] to enter the system setting interface, press the desired settings to configure system parameters, as follows:



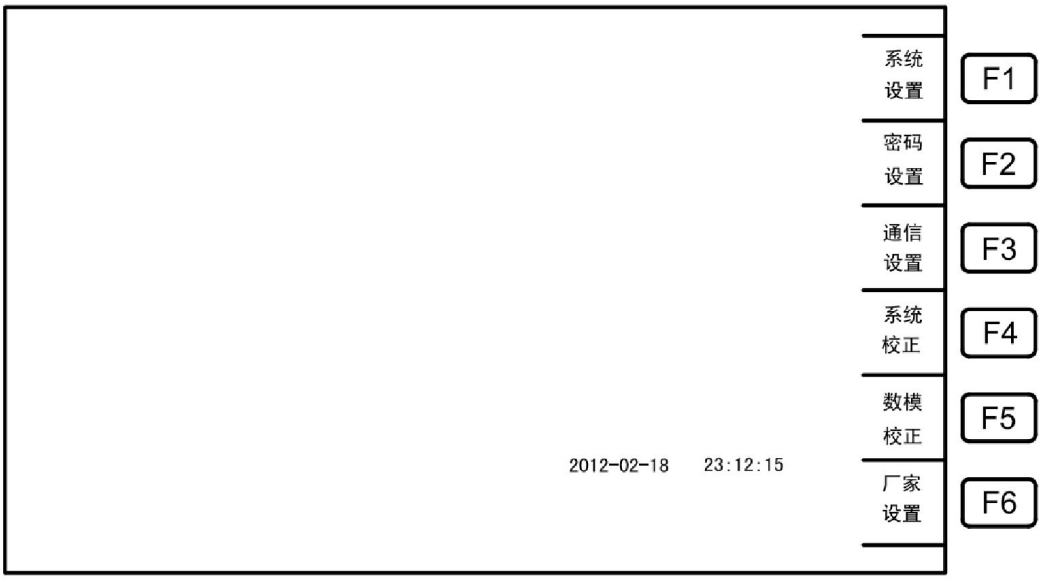
Description:

- Good Alarm: Set Good alarm sound (off / short sound / long sound / low voice).
- defective alarm: Set defective alarm sound (off / short sound / long sound / low voice).
- Volume control: Adjust the sound volume.
- Language settings: Select interface language (Chinese / English).
- Contrast adjustment: Adjusts the display contrast.
- Hold bad Cylinder : lock cylinder when test bad product .
- measurement results show: Choose the measurement results display mode (data / results).
- cylinder operation delay: How long after the cylinder operation starts to measure (cylinder does not default action).
- Special ring ratio: Open (calculate turns ratio according to the inductance), close (voltage ratio).
- Fixture compensation capacitor: deduction of distributed capacitance measuring fixture on the measurement results.
- Password switch: whether to enable the password.

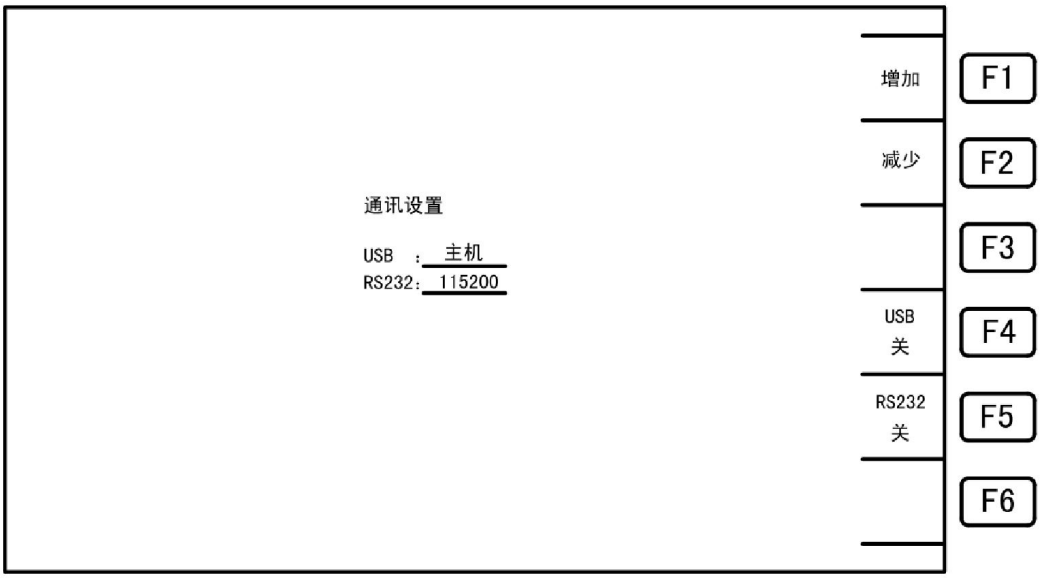
- System Restore:System Restore switch.
- Data cache: data cache switch.
- HANDLE mode: HANDLE signal output mode selection.
- LX models: LX mode selection signal output resistance.
- DCR mode: DCR mode selection signal output resistance.
- Date: Set the date.
- Time: Set the time.

(2) communication settings

System settings interface:



Press F3 [Communication Settings] to enter the communications interface, press the desired settings to configure communication parameters, as shown below:



Description: F1/F2: change the subordinate function of USB and RS232 baud rate;
F4:USB connection switch;
F5:RS-232 connection switch.

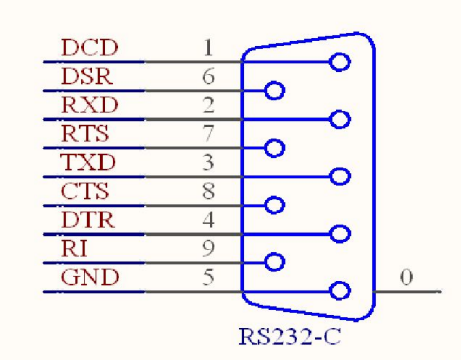
6 Interface Description

6.1 RS-232C interface specification

(1) RS-232C Overview

The instrument used in RS-232C communication interface for the American Electronics Industry Association set a standard interface, is widely used in microcomputer system now, you can transfer the data through this port.

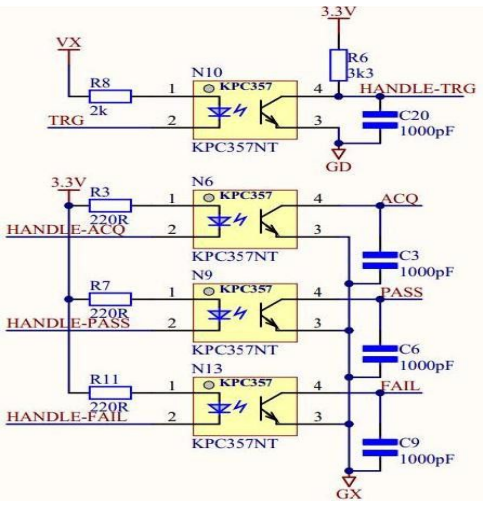
(2) RS-232C communications connector



(3) RS-232C communication connection interface signal table

Name	Pin	Instructions
GND	5	ground
/TxD	3	Transmit data
/RxD	2	Receiving data

6.2 Operation interface (HANDLE)



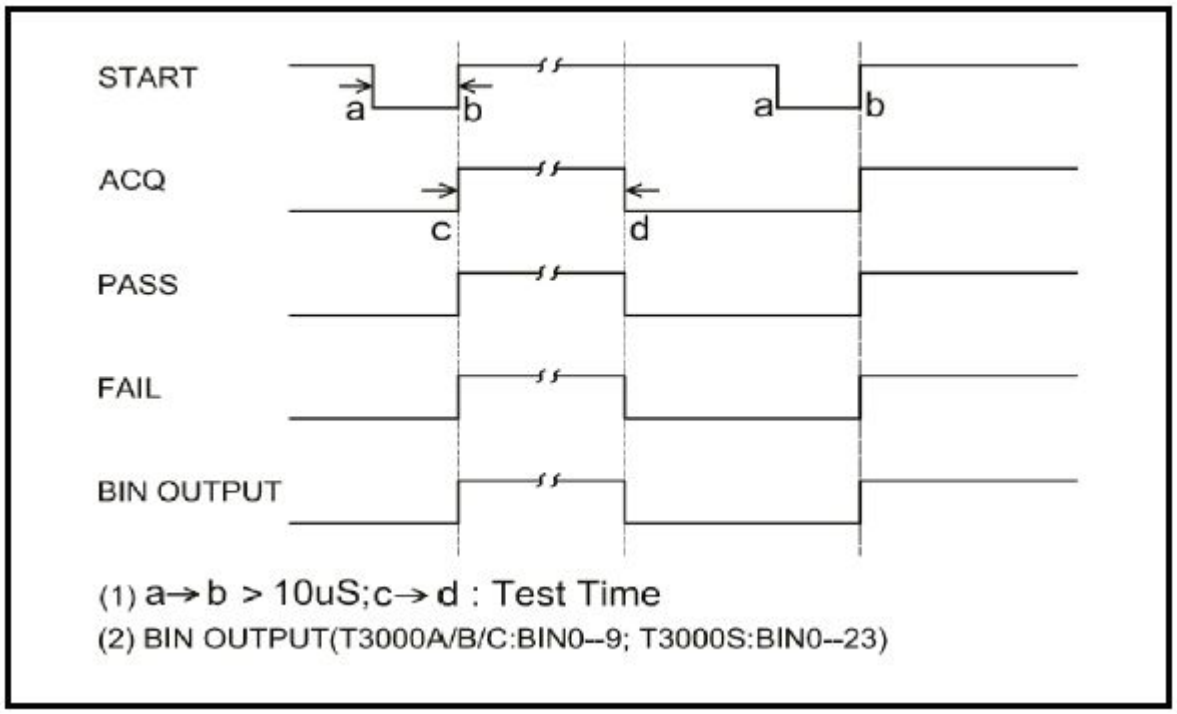
Operation interface connector illustration

(1) Operation interface

Operation interface connector using 50 pin (opto- isolator) standard connector , the connector signals are defined in the following table:

signal name	**Pin position**	**Function** (measurement display page &Handle signal output classification description)					
TRIG	**21**	Start test (external trigger)					
ACQ	**23**	A/D sampling end, DUT (mechanical hand) can be removed					
PASS	**24**	TOTAL PASS(Comprehensive good)					
FAIL	**25**	TOTAL FAIL(Comprehensive adverse)					
EXGND	**47,48 49,50**	External ground port					
VEXT	22	External power supply port (5-24 v)					
Handle model		**Single group**	**1 primary**	**2 primary**	**3 primary**	**4 primary**	**5 primary**
BIN0	**1**	The first line in the first page is good	The first page is good	The page 1-2 Is good	The page 1-3 Is good	The page 1-4 Is good	The page 1-5 Is good
BIN2	**2**	The first line in the first page is bad	The first page is bad	The Page 1-2 is bad	The page 1-3 Is bad	The page 1-4 Is bad	The page 1-5 Is bad
BIN0	**3**	The second line in the first page is good	The second page is good	The page 3-4 Is good	The page 4-6 Is good	The page 5-8 Is good	The page 6-10 Is good
BIN0	**4**	The second line in the first page is bad	The second page is bad	The Page 3-4 is bad	The page 4-6 Is bad	The page 5-8 Is bad	The page 6-10 Is bad
BIN0	**5**	The third line in the first page is good	The third page is good	The page 5-6 Is good	The page 7-9 Is good	The page 9-10 Is good	
BIN0	**6**	The third line in the first page is bad	The third page is bad	The Page 5-6 is bad	The page 7-9 Is bad	The page 9-10 Is bad	
BIN0	**7**	The forth line in the first page is good	The forth page is good	The page 7-8 Is good	The page 10 Is good		
BIN0	**8**	The forth line in the first page is bad	The forth page is bad	The Page 7-8 is bad	The page 10 Is bad		
BIN0	**9**	The fifth line in the first page is good	The fifth page is good	The page 9-10 is good			
BIN0	**10**	The fifth line in the first page is bad	The fifth page is good	The Page 9-10 is bad			
Note: Each primary corresponding to a display page, when all signal action, the corresponding OptoCoupler conduct with exterior							

Handle interface timing



Warning: photoelectric pair (opto-coupler), maximum load current 25mA

(2)Transformer test instruction (ASCII)

Instructions	Function	Remark
*IDN	Ask the type name	
I1	Open RS-232 connection feature	Command correctly returns RS232: ON
I0	Close the RS-232 connection feature	Command correctly returns RS232: OFF
T1	Start measurement	
T0	Stop measurement	

Note: each command must be ended with $ .if the command error returns CODE ERROR .

(3)Scanning measurement data output format

Byte	parameter values	Annotation
0~39	TR1~TR10	Number of turns and the phase test. Every 4 byte as a numeric value Data format is floating point number
40~79	LK1~LK10	The amount of leakage inductance. Every 4 byte as a numeric value , Data format is floating point number The unit is H.
80~119	LX1~LX10	Inductance value. Every 4 byte as a numeric value, Data format is floating point number, The unit is H.
120~159	ACR1~ACR10	Alternating current resistance Every 4 byte as a numeric value, Data format is floating point number, The unit is F.
160~199	ZX1~ZX10	Communication absolutely impedance values Every 4 byte as a numeric value, Data format is floating point number, The unit is Ω.
200~239	DCR1~DCR10	D C resistance Every 4 byte as a numeric value, Data format is floating point number,
240~259	CX1~CX10	Stray capacitance pin Every 4 byte as a numeric value, Data format is floating point number, The unit is Ω.
260~299	Q1~Q10	quality factor Every 4 byte as a numeric value, Data format is floating point number, The unit is Ω.
300~309	Number of turns and the phase of judgment	-1:LOW，0:HIGH, 1:GO
310~319	Leakage inductance	-1:LOW，0:HIGH, 1:GO
320~329	Inductance judgment	-1:LOW，0:HIGH, 1:GO
330~339	Alternating current Resistance judgment	-1:LOW，0:HIGH, 1:GO
340~349	Alternating current absolutely impedance judgment	-1:LOW，0:HIGH, 1:GO
350~359	direct current resistance value judgment	-1:LOW，0:HIGH, 1:GO
360~364	Stray capacitance judgment	-1:LOW，0:HIGH, 1:GO
365~369	Winding balance test judgment	-1:LOW，0:HIGH, 1:GO
370~379	short circuit pin judgment	-1:LOW， 1:GO
380~389	Quality factor judgment	-1:LOW，0:HIGH, 1:GO
390~393	epilog code	Test(ASCII)

Note:

1: The value and the result of the item which is not tested are zero. With a measurement of the project but the pin is not detected value is 0. The judgment result is 1 (use hex format)

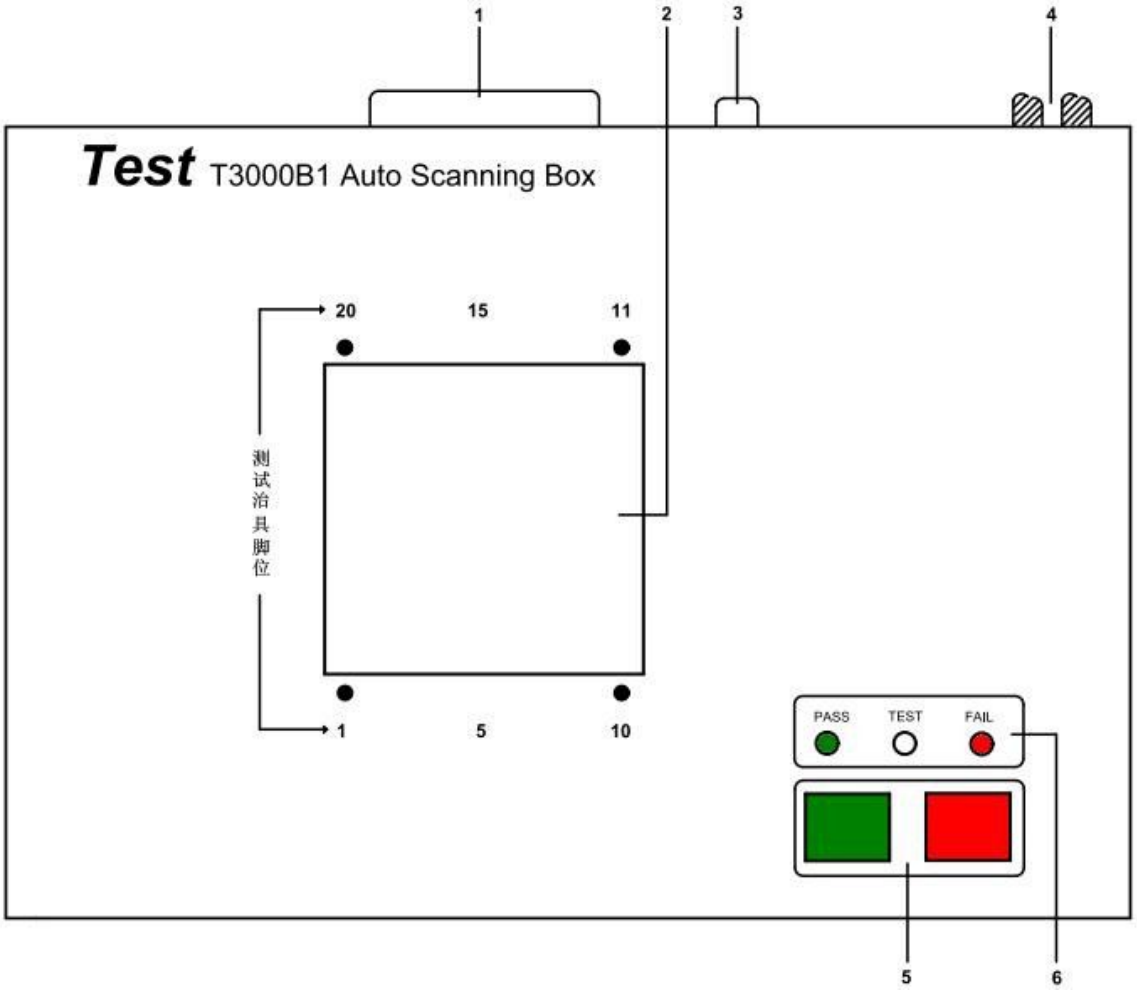
2: Send transmit low address bits before send floating point number.

6.3 scan test Interface box and test fixture Description

(1) Scan Test Interface Box

Transformer automatic scanning test interface: host and automatic scanning test fixture with 36 connecting pin cable, power supply and control signal share for a cable.

Figure 6-1 Scan Test Box



- Dimensions (W * H * D): 285mm * 65mm * 215mm;
- Weight: about 1.5kg

Description:

1. Data Line Interface
   - for connection to the host scanning probe T3000 control port.
2. Measure Fixture Interface
   - for installing measuring fixture.

3. Footrest Switch Interface
- for connecting the footrest switch.

4. The measurement signal port
- measuring signals for connecting T3000 host port.

5. Start / stop switch soft key
- for start / stop scanning measurement.

6. Status Indicator
- scan test box indicates the work status and measurement results.

(2) Scan function test measurements Overview
- Auto transformer scan test interface functions, you must first meet **T3000B1 (20 / 24Pin) / T3000B2 (48Pin)** Scan Box automatic scanning test fixture before it can automatically and quickly scan test function.
- The automatic transformer scan test functionality provided test items are: **inductance** (LX), **the amount of leakage inductance** (LK), **quality factor** (Q), **turns ratio** (TURN-RATIO), **voltage ratio** (VOLTAGE-RATIO), **phase** (PHASING), **stray capacitance** (CX), **DC resistance** (DCR), **inductance balance** (LX-bALANCE), **DC resistance balance**(DCR-BALANCE), **pin short-circuit test** (PS) and the like.
- There are functions in the transformer test fixture with pin pin automatic / manual conversion, automatic test time setting, multiple primary / test, multiple leakage inductance (classification) as the measurement offset compensation, a rule deviation deduction, Good and bad test results counter products, test parameters are stored in memory and call the function, repeat the test set of defective products, etc., because **T3000A (20Pin) / T3000B (24Pin) / T3000C (48Pin)** matched **T3000B1 (20 / 24Pin) / T3000B2 (48Pin)** that is able to exhibit powerful test capabilities to provide **fast, convenient and accurate** testing.

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