JINKO 金科

OPERATION MANUAL

User's Guide

JK2817N

LCR METER

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Catalog

Chapter one Unbox installation

This chapter describes some of the checks that must be done when you receive the instrument, and the conditions that must be understood and met before installing and using the instrument.

1.1 Open box examination

Thank you for purchasing and using our products. After opening the case, you should check whether the instrument is damaged due to transportation. We do not recommend that you power the instrument in case of damaged appearance.

Then confirm according to packing list, if there is any discrepancy, you can contact our company or distributor as soon as possible to protect your rights and interests.

1.2 Power connection

(1)Power supply voltage range: 198 ～ 242 Vac.

(2)Power supply frequency range: 47 ～ 63 Hz.

(3)Power supply range: no less than 80 VA.

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

(5)This instrument has been carefully designed to reduce the clutter interference caused by AC power input. However, it should be used in low noise environment as far as possible. If unavoidable, install power filter.

_____

Warning: In order to prevent leakage of electricity to the instrument or human damage, users must ensure that the power supply to the ground reliable connection.

_____

1.3 Fuse

The instrument has been equipped with fuses, and users should use the fuse provided by our company.

_____

Warning: before the power up, you should pay attention to whether your fuse position is in line with the supply voltage range.

_____

1.4 Environment

(1)Please do not use instruments in dusty, vibrant, direct sunlight and corrosive gases.

(2)The normal working temperature of the instrument should be between0℃ ～ 40℃, relative humidity≤75% environment, so please try to use the instrument in this condition to ensure the accuracy of measurement.

(3)The rear panel of the instrument is equipped with a heat dissipation device to avoid internal temperature rise. In order to ensure good ventilation, do not block the left and right vents, so as to maintain the accuracy of the instrument.

(4)This instrument has been carefully designed to reduce the clutter interference caused by AC

power input. However, it should be used in low noise environment as far as possible. If unavoidable, install power filter.

(5)If the instrument is not used for a long time, please put it in the original packing box or similar box and store it in the ventilation room with the temperature of 5℃ ~ 40℃ and the relative humidity of not more than 85% RH. Air should not contain harmful impurities in the corrosion gauge, and direct sunlight should be avoided.

(6)Instruments, especially those connected with the tested parts, should be far away from strong electromagnetic fields, so as to avoid interference with measurement.

1.5 Use test fixture

Please use the test fixtures or cables provided by our company, user-made or other company's test fixtures or test cables may result in incorrect measurement results.The instrument test fixture or test cable should be kept clean, and the pins of the device under test should be kept clean to ensure good contact between the device under test and the fixture.Connect the test fixture or cable to Hcur, Hpot, Lcur and Lpot of the front panel of the instrument.For the tested parts with shielding shell,The shielding layer can be connected to"⊥"of the instrument.

Note: when the test fixture or test cable is not installed, the instrument will display an unstable measurement result.

1.6 Preheat

(1)To ensure accurate measurement of the instrument, the warm-up time should be no less than 15 minutes.

(2)Please do not switch the instrument frequently, so as to avoid the confusion of internal data.

1.7 Other characteristics of instrument

(1)Power consumption: power consumption≤80VA.

(2)Size (W*H*D):235(w)*105(H) *360(D)；

(3)Upper frame size(W*H*D):215(w)*88(H)*335(D)；

(4)Weight:about　3.6kg；

Chapter two Summary

This chapter describes the basic operation characteristics of JK2817N/2811B series instruments.Read this chapter carefully before using the JK2817N/2811B series of instruments so that you can quickly learn how to operate JK2817N/2811B

2.1 Front panel specification

Figure 2-1 gives a brief description of the JK2817N/2811B front panel.
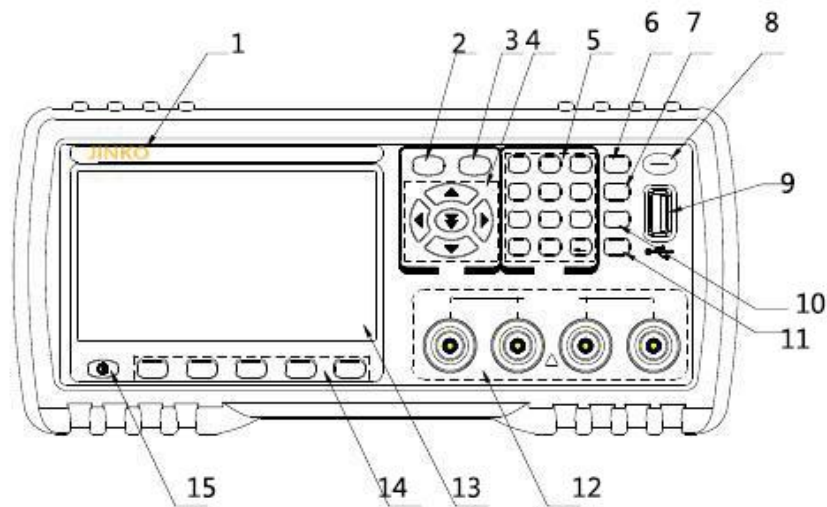
Fig 2-1. Front panel specification

⑴Trademarks and modes: instrument trademarks and modes

⑵[DISP] Menu key : Press [DISP] key to enter the corresponding test display page.

⑶[SETUP] Menu key : Press the [SETUP] key to enter the test setup page and system setup interface of the instrument function(LCR Meter, transformer measurement, transformer scanning) alternately.

⑷Direction key (CURSOR)

The direction keys are used to move cursors between the domain and domain of the LCD display page.When the cursor moves to a certain domain, the domain is highlighted on the LCD screen.Fast down arrow keys can jump to a certain area.

⑸Numeric key

Numeric keys are used to input data to instruments. Numeric keys consist of numeric keys [0] to [9], decimal points [.] and [+ / -] (bond) keys.

Press the [+/-]() key, If it is in the input data is the first sign selection, otherwise it is equivalent to BACKSPACE, delete the last number function.(Note: long pressing the decimal point [.] key is equivalent to the function of copying screen.

⑹ [KEYLOCK] key

Press [KEYLOCK] key，The [KEYLOCK] button will be lit to indicate that the current panel key function is locked.Press the [KEYLOCK] button again, and the [KEYLOCK] button will go out, which means that the keyboard is released.If the command function is set to ON, enter the correct command when unlocking the keyboard, otherwise the keyboard can not be unlocked.When the instrument is controlled by RS232, the [KEYLOCK] button will be lit. Press the [KEYLOCK] button again, and the [KEYLOCK] button will go out, which means that the keyboard will be released to the local state.

⑺ [BIAS]key

[BIAS] key is used to allow or prohibit 0-50mA/5V DC bias power output.Press the [BIAS] key and the [BIAS] button will be lighted to indicate that the DC bias output is allowed.Press the [BIAS] button again, and the [BIAS] button will go out, which means that the DC bias output is prohibited.There are some non test screens that can not be added to DC BIAS. Press this button

will not respond.(JK2817N and JK2832A no this function).When the measurement function is DCR, Lp-Rd and Ls-Rd, the function is invalid.

⑻PASS Indicator light，FAIL Indicator light

Test qualified PASS LED Instructions，Test failed FAIL LED Instructions

(9) USB HOST Interface
It is used to connect U disk memory, save and invoke files, copy and save data and so on.
⑽[RESET] key
Press[RESET] key ,When the transformer is scanned automatically, the scan will be terminated. Other page devices will not perform any operation.
⑾[TRIGGER] key
When the trigger mode is set to MAN (manual) mode, the instrument can be triggered manually.
⑿test terminal(UNKNOWN)
The four terminal test terminal is used to connect the four end test fixture or test cable to measure the measured parts.

Current Motivating   high end(Hcur)；

Voltage sampling high end(Hpot)；

Voltage sampling low end(Lpot)；

Current Motivating   low end(Lcur).
⒀LCD liquid crystal display
480x272 Color TFT LCD display, display measurement results, measurement conditions, etc.
⒁softkey
Five soft keys can be used to select control and parameters. Each soft key has a corresponding function definition at the top. The definition of soft key varies with the display page.
⒂POWER(POWER)
Power switch

2.2 Description of rear panel

Figure 2-2 gives a brief description of the JK2817N rear panel.
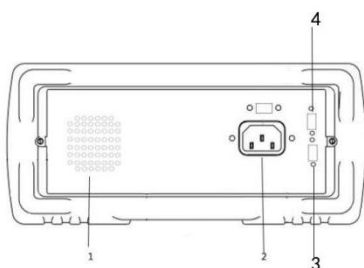
Figure 2-2. shows the rear panel
1.blowhole
2.Power socket (without fuse, fuse in instrument).

3.PLC Interface

4.RS232 Interface

Warning: before the power up, you should pay attention to whether your fuse position is in line with the supply voltage range.

2.3 display area definition

JK2817N/2811B uses a 65K color 4.3 inch wide screen TFT display. The display contents are divided into the following display areas, as shown in Figure 2-3.
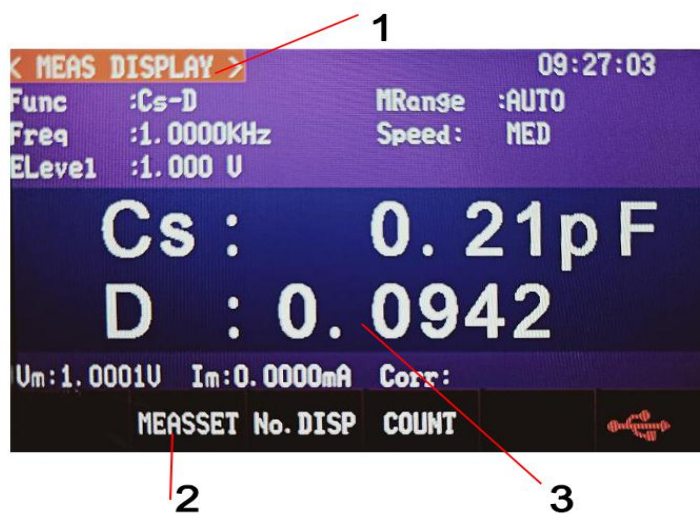
Figure 2-3. display area definition

1) Display page area

This area indicates the name of the current page.

2) Soft key area

This area is used to display the functional definition of soft keys. The definition of a soft key has different functions as the location of the cursor is different.

3) Measurement result / condition display area

This area displays test results and current test conditions.

2.4 Main menu key and corresponding display page

2.4.1 Display main menu key [DISP]

When the function of the LCR Meter is used, it is used to enter the component measurement display page. The start button of the menu of capacitance, resistance, inductance and impedance measurement function is mainly concerned.

This part of the function page has (using the "soft key" to select the following page functions, the same below):

< measurement display>

< BIN number display >

< BIN count display >

< data preservation >

Note: The data storage software is valid in the measurement display interface and the list scan display interface. After inserting the U disk, press the data to save and the state becomes ON. The data is saved to the CSV directory of the U disk. CSV format. When the data storage software is pressed again, the state becomes OFF and the data is save finished.

This key automatically records the test data after inserting the U disk at the MEAS interface, and saves the system settings in SYSTEM.

2.4.2 Parameter set the main menu button[SETUP]

When the function of the LCR Meter is used, it is used to enter the settings of each component test. The functional pages of this part include:

< component test Settings >

< user correction >

< limit Settings >

< list Settings >

< System Settings >

2.4.3 System setup main menu button[SETUP]

For entering the system settings home page. Mainly on the system settings, file list function menu start button. The functional pages of this part include:

< System Settings >

< System Settings >

< Default Settings >

< system reset >

2.5 basic operation

The basic operation of JK2817N is as follows:

   Use menu key ([DISP], [SETUP]) and soft key to select the page you want to display.

   Use cursor keys ([□][□] [□] [□]) to move the cursor to the domain you want to set.When the cursor moves to a certain domain, the domain will be highlighted and displayed. The domain is the cursor area that can be set.

   The corresponding soft key function in the current cursor area will be displayed in the "soft key area". Select and press the required soft keys, [←] keys, and data for data entry.

When a numeric key is pressed, the soft key area will display the unit soft key that can be used. You can end the data entry by the unit soft key.

Chapter three [DISP] Menu key description

3.1 < element measurement display> page

When the instrument is in the bridge function, press the [DISP] menu button and the < Element Measurement Display > page will be displayed on the screen.

Figure:

On this page, the test results will be displayed in large characters. The following measurement control parameters can be set on this page.

● Test function (function)
● Test frequency (frequency)
● Test level (level)
● Test range (range)
● Test speed (speed)

This display page has 5 domains: function, frequency, level, range, speed . Each control function domain will be explained in detail in the following paragraphs.

The test results / condition display area on this display page shows the following test condition information. These conditions can be set on the < measurement Settings > page or < user correction > page.

●Signal source voltage / current monitoring(Vm,Im)
●Open circuit, short circuit, load correction ON/OFF setting status (correction)

3.1.1 Test function

JK2817N can simultaneously measure two parameters of impedance element in one measurement cycle: one main parameter and one secondary parameter. The measurable parameters are as follows:

Main parameter

● |Z| (impedance mode)
● |Y| (admittance module)
● L   (inductor)
● C   (capacitance)

- R   (resistance)
- G   (conductance)
- DCR   (DC Resistance)

Secondary parameters:
- D   (Loss factor)
- Q   (quality factor)
- Rs   (Equivalent series resistance ESR)
- Rp   (equivalent parallel resistance EPR)
- Rd   (DC resistance)
- X   (Reactance)
- B   (electrical susceptance)
- Ɵ   (phase angle)

The test results of the main parameters and the auxiliary parameters are displayed in two lines of large characters. The main parameter is displayed on the top row, and the secondary parameters are displayed under the main parameter.

Measure function settings steps:

1) use cursor keys to move the cursor to the function domain, and the following soft keys will be displayed.
- Cp-…□
- Cs-…□
- Lp-…□
- Ls-…□
- more □

1/3

2) Press Cp-…□ Soft key,The following parameters will be selected:
- Cp-D
- Cp-Q
- Cp-G
- Cp-Rp
- Return□
- Press the corresponding soft key, select the required parameters, press the return soft key, return to previous soft key menu

3)press   Cs-…□   Soft key,The following parameters will be selected:
- Cs-D
- Cs-Q
- Cs-Rs

- Return □

- Press the corresponding soft key, select the required parameters, press the return soft key, return

to previous soft key menu

4)press　Lp-…☐　　Soft key,The following parameters will be selected:

●Lp-Q
●Lp—Rp
●Lp—Rd
●more ☐
1/2
●Return☐
●Press the corresponding soft key, select the required parameters, press the return soft key, return to previous soft key menu

5)press more ☐ Soft key，Select the next group of soft keys:

- Lp-D
- Lp-G
- more
- 2/2
- Return

Press the corresponding soft key, select the required parameters, press the return soft key, return to previous soft key menu,Press more soft keys to Select the previous group of soft keys.

6) Press　Ls-…☐　　Soft key，The following parameters will be selected:

●Ls-D
●Ls-Q
●Ls-Rs
●Ls-Rd

●Return ☐

Press the corresponding soft key, select the required parameters, press the return soft key, return to previous soft key menu

7)　Press more ☐ Soft key，Select the next group of soft keys:

●Z-…☐
●Y-…☐
● R-…☐
● G-B
●More ☐
2/3

8) Press　Z-…☐　Soft key，The following parameters will be selected:

●Z-d

●Z-r

●Return

Press the corresponding soft key, select the required parameters, press the return soft key, return to previous soft key menu

9) Press Y-...□ Soft key，The following parameters will be selected:

●Y-d

●Y-r

●Return□

Press the corresponding soft key, select the required parameters, press the return soft key, return to previous soft key menu

10) Press R-...□ Soft key，The following parameters will be selected:

●R-X

●Rp-Q

●Rs-Q

●Return

Press the corresponding soft key, select the required parameters, press the return soft key, return to previous soft key menu

11) Press more □ Soft key，The following parameters will be selected:

●DCR

●more□

3/3

Press DCR Soft key，select the required parameters, press the return soft key, return to previous

soft key menu

3.1.2 Test range

The test range is selected according to the impedance value of the tested LCR element.

JK2817N has 11 AC test ranges:1Ω, 3Ω, 10Ω, 30Ω, 100Ω, 300Ω, 1kΩ, 3kΩ, 10kΩ,30kΩ,100kΩ.

Test range setting Operation steps:

1)Use cursor keys to move cursors to range fields. The screen will display the following soft keys

● automatic   The soft key is used to set the range to AUTO (automatic) mode.

● HOLD   The soft key is used to switch the range from the AUTO (automatic) mode to the HOLD (hold) mode. When the range is set to HOLD (hold) mode, the range will be locked in the current test range. The current test range will be displayed in the range of the screen..

● plus +   The soft key is used to increase the range in the range lock (HOLD) mode.

● minus -   The soft key is used to decrease the range in the range lock (HOLD) mode..

2)Use the soft key to set the test range.

3.1.3 Test frequency

JK2817N test frequency range from 50 Hz to 100 kHz, resolution 0.01 Hz, The specific frequency range and see the following table.When the test function is set to DCR, the frequency domain shows "----".

Model	frequency range	Point number
JK2817N	50Hz-100kHz	34
JK2811B	100Hz-10kHz	4
JK2831	50Hz-200kHz	37
JK2832	20Hz-200kHz	15025

Test frequency setting steps:

JK2817N/JK2811B have two ways to test frequency settings.One is to use soft keys, the other is to use numeric keys to input directly.

1) use cursor keys to move the cursor to the frequency domain. The screen soft key area displays the following soft keys.

　　plus ++

The soft key is frequency increase coarse adjustment key. Each time the key is pressed, the frequency increases in the six typical frequency points of the following table.

The frequency points that can be set with this soft key are as follows:

Model	frequency points
JK2817N	50Hz， 60Hz，75Hz，100Hz， 120Hz，150Hz，200Hz， 250Hz，300Hz， 400Hz ，500Hz，600Hz，750Hz，1 kHz，1.2kHz，1.5kHz，2kHz， 2.5kHz， 3kHz， 4kHz，5kHz，6kHz，7.5kHz，10kHz，12kHz，15kHz，20kHz， 25kHz， 30kHz，40kHz，50kHz，60kHz， 75kHz，100kHz，
JK2811B	100Hz,120Hz,1kHz,10kHz
JK2831	50Hz，100Hz，1kHz，10kHz，100kHz，200kHz
JK2832	20Hz，100Hz，1kHz，10kHz，100kHz，200kHz

■plus +

The soft key is frequency increasing fine adjustment key. Each time the key is pressed, the frequency increases to the next higher frequency point. The frequency points that can be set with this soft key are as follows:

20Hz ,25Hz ,30Hz ，40Hz ,50Hz， 60Hz ,75Hz ,100Hz， 120Hz ,150Hz ,200Hz， 250Hz ，

300Hz，400Hz，500Hz，600Hz，750Hz，1 kHz，1.2kHz，1.5kHz，2kHz，2.5kHz，3kHz，4kHz

，5kHz，6kHz，7.5kHz，10kHz，12kHz，15kHz，20kHz，25kHz，30kHz，40kHz，50kHz，

60kHz，75kHz，100kHz，120kHz 150kHz，200kHz

JK2817N/JK2831/JK2832 Three different types of instruments with different frequency ranges in the above range according to the minimum frequency and maximum frequency automatically determine the range.

■ minus -

The soft key is a frequency reduced fine adjustment key. Each time the key is pressed, the frequency is reduced to the next lower frequency point. Use the soft key to set the frequency point plus+

■ minus --

The soft key is frequency reduction coarse adjustment key. Each time the key is pressed, the frequency decreases in the six typical frequency points of the following table. Use the soft key to set the frequency point plus plus + +.

2)

Choose or set the test frequency using soft keys or numeric input keys. Soft keys display the currently available frequency units (Hz, kHz, MHz) when the required frequency values are entered with a digital key. You can use these unit soft keys to input units and data.

Note: If the input frequency is not the frequency supported by JK2817N/JK2811B, it is automatically corrected above the frequency point nearest to the input frequency.

3.1.4 Test level

The test level of JK2817N /JK2811B is set according to the valid value of the sine wave signal.The frequency of the sine wave is the test frequency, and is generated by the internal oscillator of the instrument.You can set the test voltage value.can also set test current value.The output impedance of the JK2817N/JK2811B signal source can be chosen as 30 Ω or 100 Ω. test

level:0.1V ,0.3V，1V，When the current input mode is used, the maximum current is equal to the

maximum level divided by the internal resistance of the source.

Note: the test current set by JK2817N/JK2811B is the output current value when the terminal is short circuited.The test voltage set is the output voltage value when the terminal is open.

JK2817N/JK2811B's automatic level control function enables constant voltage or current measurement.The automatic level control function (constant level domain) can be set from < measurement Settings > page to ON.When the automatic level control function is turned on, a "*" number is displayed after the current level value is displayed. For more information, please refer to the < measurement Settings > page.

Test level setting operation steps:

JK2817N/JK2811B has two ways to set the test signal source level. One is the use of soft keys, the other is the use of numeric input keys.

1) Use cursor keys to move cursor to level domain. The soft key in the screen will display the following soft keys.

● plus ＋

The output level of the signal source is increased by this soft key.

● minus -

The output level of the signal source is reduced by this soft key.

2) Select or set the test level using soft keys or numeric input keys.When the required level value is entered with a digital key, the soft key area displays the currently available level units (mV, V, A, m A, and A).You can use these unit soft keys to input units and data.

Note: When you need to switch the test level between current and voltage, you must use the numeric input key and the unit soft key.

Press the front panel [BIAS] key to allow the set of DC bias output.When DC offset is allowed to output, the [BIAS] button will be lit.

3.1.5 Test speed

JK2817N/JK2811B test speed is mainly determined by the following factors:

Integration time (A/D conversion)

Average times (average number of measurements per time)

Measurement delay (from start-up to start testing time)

Measurement results show time.

Generally speaking, when testing slowly, the test results are more stable and accurate. You can choose 3 test speeds: FAST (fast), MED (medium speed) and SLOW (slow).

1)Test speed setting Operation steps:

Use cursor keys to move the cursor to the speed domain. The soft key area in the screen will display the following soft keys.

●fast speed

●Medium speed

●Slow speed

1) select the soft key, set the test speed FAST (fast), MED (medium speed), SLOW (slow).

3.1.6 Other tools

The JK2817N/JK2811B test result data is displayed by the 5 digit number floating at the decimal point.The decimal point locking function enables JK2817N to output test results in a fixed decimal point position. This function can also be used to change the display digits of test results.

Tools Operation steps:

Set the fixed display mode of decimal points according to the following steps.

1) Move the cursor to the main parameter or sub-parameter of the display area of the measurement

result. The soft key area of the screen will display the following soft keys.

●Decimal automatic

●Decimal lock

●Small print location plus +

●Small print location Minus-

2) Press the soft key decimal automatically to restore the position of the decimal point of the test result of the primary or secondary parameters at the corresponding cursor to the default decimal point position.

3)Lock by the soft key decimal, lock the main parameter or the side parameter test result's decimal point position.

4)Press the soft key decimal position plus + ,For each click, the last digit will be added. The number of display bits will be increased by one digit.

5)Press the soft key decimal position minus - ,For each click, the last digit will be reduced. The number of display bits will be decreased by one digit.

Note: The decimal point position locking function will automatically cancel and return to floating decimal point display in the following cases.

●Test function change.

●In the bias test, the deviation test method (ABS,%, OFF) was changed.

3.2 < BIN number display > page

Press the menu key [DISP], then press the soft key [No.DISP] and enter the <BIN number display > page.The < BIN number display > page number is displayed in large characters, and the current test results are displayed in normal small characters.

Figure:
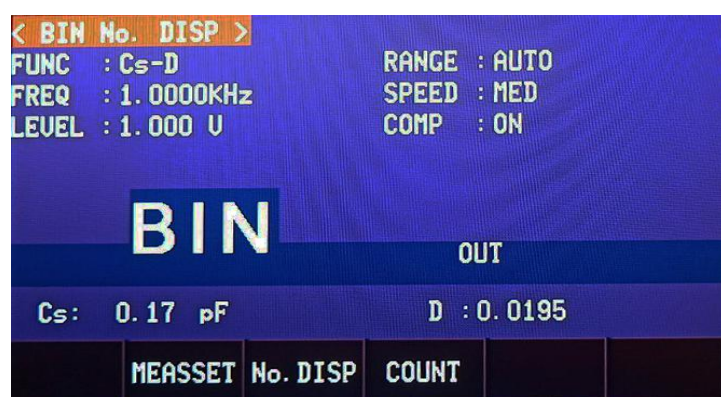
The following measurement control parameters can be set in < BIN number display > page.

Comparative function ON/OFF (comparison)

There are two domains in this display page. They are: BIN number display, comparison. Each control domain will be described in detail in the following paragraphs.

The test results / condition display area on this display page shows the following test condition information.These monitoring domains look very similar to the set fields, but these monitoring domains can not be set on this display page.These fields can be set on the< Measurement Settings> page, <Component Measurement> Display page, or <User Correction> page.

●Test function (function A)

●Test frequency (frequency)

●Test level (level)

●Test range (range)

●Test speed (speed)

3.2.1 Comparator function

JK2817N/JK2811B built-in comparison function can divide the tested components into up to 10 BINS.(BIN1 to BIN9 and BIN OUT).can set 9 pairs of main parameter BIN limits and a pair of Auxiliary parameters BIN limits.If the main parameter of the part under test is within the BIN limit, but the Auxiliary parameters is not within the BIN limit,The tested parts are sorted into the auxiliary BIN.When JK2817N/JK2811B installs the HANDLER interface attachment, the comparison test results can be output to the automatic test system for automatic sorting test. These limit settings can only be set on the <Limit List Settings> page. The comparison field allows you to set the comparison function ON or OFF.

Comparative function Operation steps:

1）Move the cursor to the comparison domain. The soft key area of the screen displays the following soft keys.

●ON

●OFF

2)Use the soft key to set the comparison function to ON (open) or OFF (close).

3.2 < BIN count display > page

Press the menu key [DISP], then press the soft key [count[, enter the < BIN count display > page. Display the count value of each file in the < BIN count display > page.

Figure:
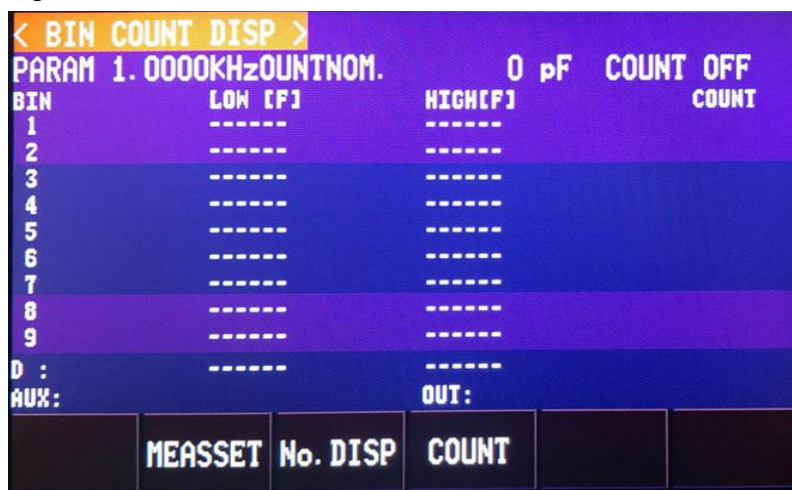
The following measurement control parameters can be set in <BIN count display > page.

●Counting function ON/OFF (count)

This display page has two fields, they are: BIN count display, count. Each control function field will be described in detail in the following paragraphs.

The test results / condition display area on this display page shows the following test condition information.These surveillance domains look like settings, but they cannot be set on this display

page. These surveillance domains can be set on the <Limit List Settings >page.

●Test parameters (parameters)

●Nominal value (nominal)

●BIN Limit value (upper / lower limit).

3.2.1 parameter

The parameter area monitors the "function" parameters currently measured by the user.If the user chooses the primary and secondary parameter pair comparison mode, its parameters will be displayed as the current "function" parameter pair adjustment.for example,"Cp-D" is displayed as "D-Cp",Represents the comparison of D as the main parameter at present.Cp is used as a Auxiliary parameter.

3.2.2 nominal

Nominal parameters monitor the nominal value of BIN comparison.

3.2.3 BIN

It shows the BIN number of the limit list below. "2nd" indicates the limit of auxiliary parameters.

3.2.4 Upper and lower limits

The upper and lower limits of the limit list are monitored at the bottom of this area.

3.2.5 count

The value of present measured BIN values is shown below the area.

3.2.6 Auxiliary(AUX)

This area shows the BIN value of the current ancillary BIN..

3.2.7 Super difference (OUT)

This area shows the present BIN Count value of the Differential BIN

BIN counting function operation steps

Perform the following operations.Set the BIN counting function ON/OFF on the < bin count display > page.

1)In the < BIN count display > page, move the cursor to the counting field. The soft key in the screen will display the following soft keys.

    ●ON

    ●OFF

    ●Resetcount

2)Press the soft key ON ,open the counting function ON.

3)Press the soft key OFF close the counting function OFF.

4)Press   the soft key reset count, the screen assistant displays: "reset count confirmation?". The soft key area will display the following soft keys.

    ● yes

    ● no

5)All BIN count is reset to 0 by pressing the "YES"soft key,

6) Cancel the file count reset operation by "NO"soft key.

3.3< measurement Settings > page

Press the menu key [SETUP], and go to the < Measurement Settings > page. Note [SETUP] key is < Measurement Settings > interface and < System Settings > interface public key. Press the [SETUP] key to switch back and forth between the two interfaces.
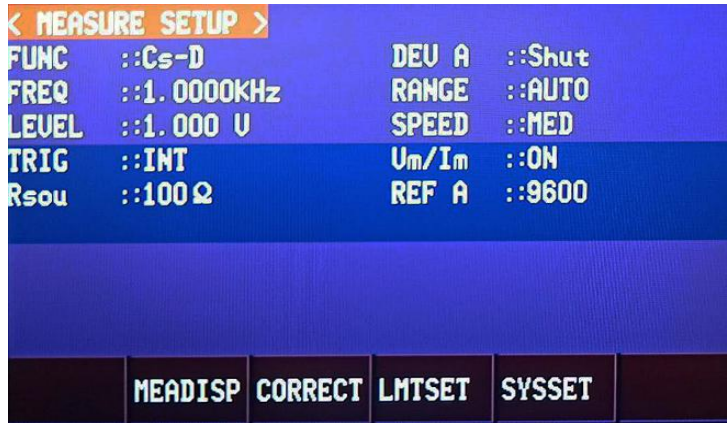
In the < measurement Settings > page, the following measurement control parameters can be set.(brackets are set fields)

- Test function (function)
- Test frequency (frequency)
- Test level (level)
- Test range (range)
- Test speed (speed)
- Trigger mode (trigger)
- Output resistance (internal resistance)
- Voltage and current monitoring ON/OFF (V/I monitoring)
- DC resistance polarity (DCR polarity)
- Trigger delay (trigger delay)
- Step delay (step delay)
- DC resistance range (DC range)
- DC resistance level (DC level)
- Deviation test A mode (deviation A)
- Deviation test B mode (deviation B)
- Deviation test A reference value (reference A)
- Deviation test B reference value (reference B)

Some of the settings in the < Measurement Settings > page are the same as those in the

<Component Measurement Display >page, The settings are listed below. These settings were explained earlier and are not explained in this section.The other settings in the page will be described in detail in the following paragraphs.

- Test function(Function)
- Test frequency (frequency)
- Test level (level)
- Test range (range)
- Test speed (speed)

3.3.1 Trigger mode
JK2817N has the following 4 trigger modes: INT (internal trigger), MAN (manual trigger), EXT

(external trigger) and BUS

When the trigger mode is set to INT mode, JK2817N will repeat the test continuously.

When the trigger mode is set to MAN mode, ach time you press the [TRIGGER] key on the front panel, JK2817N performs a test.

When the trigger mode is set to EXT mode, the HANDLER interface receives a positive pulse signal every time，JK2817N performs a test.

When the trigger mode is set to BUS mode, the IEEE488 interface receives the "TRIGGER" command once every time,JK2817N performs a test.BUS trigger mode can not be set in the front panel of the instrument.

Note:When JK2817N/JK2811B is being tested, a trigger signal is received and the trigger signal is ignored. Therefore, it is necessary to send the trigger signal when the JK2817N/JK2811B test is completed.

Set the trigger mode to EXT mode when you need to trigger JK2817N/JK2811B from the selected HANDER interface.

1）move the cursor key to the trigger domain. The soft key display area of the screen will display the following soft keys.

- internal
- Manual
- external

1) use the soft key to set the trigger mode of INT (internal), MAN (manual), EXT (external).

3.3.2 Automatic level control function

The automatic level control function can adjust the actual test level (the voltage at both ends of the test piece or the current flowing through the test piece) to the value of the test level you set.

Using this function, the test voltage or current at both ends of the tested part can be kept constant.

When the automatic level control function is adopted, the test level can be set as follows:

Constant voltage setting range:10 mVrms to 1Vrms

Constant current setting range:100 μArms to 10 mArms

Note: When the constant level function is valid, if the level setting exceeds the above range, the constant level function will be automatically set to OFF.The current level is generally used as a non constant level value.

Automatic level control function setting operation steps

Perform the following steps to set the constant level function to ON or OFF..

1) move the cursor to the constant level domain. The soft key area of the screen displays the following soft keys.

- ON
- OFF

2) press the ON soft key and turn on the automatic level control function ON.

2) press the OFF soft key and turn off the automatic level control function OFF.

3.3.3 Output resistance

JK2817N /JK2811B offers two kinds of output resistance to choose from:100 Ω，30 Ω.

When testing inductance, the same value of output resistance must be guaranteed for data comparison with other types of testers.

Note: when using bias output, the default is100 Ω.
Output resistance setting operation steps
Perform the following steps to set the output resistance of the instrument.

1）move the cursor to the internal resistance area. The soft key area of the screen displays the following soft keys.
● 100 Ω
● 30 Ω

1）Press soft key 100 Ω, choose 100 Ω output resistance.
    Press soft key 30 Ω choose 30 Ω output resistance.

3.3.4 DC resistance polarity

JK2817N/JK2811B can provide two DC resistance test modes:ALT，FIX.At present, only ALT

mode is allowed. ALT mode is positive, negative DC voltage measurement, FIX is locked positive voltage measurement.The ALT mode is conducive to degaussing when measuring the DC resistance of the inductor , and the measuring value is more accurate.
Perform the following steps to set the polarity of DC resistance measurement.

1）move the cursor to the DCR polar domain. The soft key area of the screen displays the following soft keys:
● ALT
● FIX

Press the soft key ALT to select alternate mode. Press the soft key FIX to select the lock positive level mode. Currently only the ALT mode is available.

3.3.5 DC resistance range
JK2817N/JK2811B can set the DC resistance range separately. The specific range is the same as that of LCR. See 3.1.2 for the specific range and operation method.

3.3.6 DC level

The DC level of JK2817N and JK2831 is fixed to 0.1V，0.3V,1V.JK2832 DC level range is

50mV-2V，

resolution 0.5mV.
DC level function setting operation steps

Perform the following steps to set the DC level value.

Move cursor to DC level domain.

1)Use the numeric key to input the level. After pressing a numeric key, the screen soft key area displays the following unit soft key.

● mV

● V

input numbers, automatically convert to the final level value according to the unit soft key mV or V.

3.3.7 Deviation test function

The deviation test function can replace the actual test value with the deviation value and display it directly on the screen.The deviation value is equal to the current actual test value minus the preset reference value.Using this function, it is convenient to observe the variation of the parameters of the tested components with temperature, frequency and bias.The deviation testing function can be used for the main or secondary parameters, or for the main and secondary parameters at the same time.The instrument provides two kinds of deviation test methods as follows:

ΔABS mode (absolute deviation mode)

The current display deviation is the difference between the test value of the tested part and the set reference value. Formula for calculating the deviation of ΔABS

As below

● $\Delta ABS = X - Y$

Here , X:The measured values of the current measured parts.

Y: Preset reference values.

●Δ% mode (percentage deviation)

The deviation currently displayed is the percentage error obtained by dividing the difference between the test value and the reference value set by the reference value. The formula for calculating the deviation of_% is as follows:

$\Delta\% = (X - Y)/Y \times 100\ [\%]$

Here , X:The measured values of the current measured parts.

Y: Preset reference values.

Deviation test function operation steps

Perform the following procedure to set up the deviation test function of the instrument.

1)Move the cursor to the reference A domain to enter the reference value of the main parameter.The soft key area of the screen displays the following soft keys.

●measurement

When the reference element is connected to the tested end, press the soft key to measure.JK2817N/JK2811B tests the reference components, and the test results are automatically entered as reference A values.

2)Use soft keys to measure or use numeric keys to enter reference values of main parameters.
3)The reference value of the mobile cursor to enter the sub parameters in the reference B domain. The soft key area of the screen displays the following soft keys.
●measurement
When the reference element is connected to the tested end, press the soft key to measure.JK2817N/JK2811B tests the reference components, and the test results are automatically entered as reference B values.
4)Use soft keys to measure or use numeric keys to input reference values of secondary parameters.This step can be skipped if the reference values of the primary and secondary parameters have been set in step 2 using the measurement soft key.
5)Move the cursor to the deviation A field. The soft key area of the screen displays the following soft keys
●ABS
●%
●OFF
6)Use the above soft key to set the deviation of main parameters.
7)Move the cursor to the deviation B field. The soft key area of the screen displays the following soft keys.
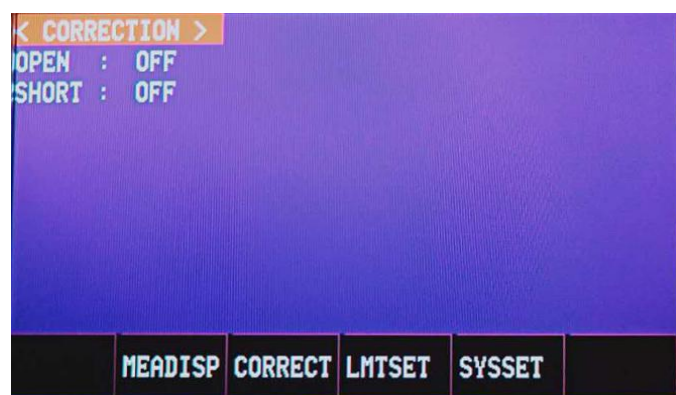●ABS
●%
●OFF
8)Use the above soft key to set the deviation of auxiliary parameters.

3.4 < user correction > page
Press menu key [SETP], then press soft key user correction, enter user correction > page.
Figure:

The Open, Short Circuit, and Load Correction functions of the <User Correction> page can be used to eliminate distributed capacitance, parasitic impedance, and other measurement

errors.JK2817N/JK2811B provides two calibration methods.One is to use insertion method to open circuit and short circuit correction for all frequency points, the other is to open circuit, short circuit and load correction for current set frequency points.The setting area of the following measurement control parameters can be set on the < user correction > page.

●Open circuit correction (open circuit)

●Short circuit correction (short circuit)

This display page has two domains, they are: user correction, open circuit, short circuit,each control function domain will be described in detail in the following paragraphs.each control function domain will be described in detail in the following paragraphs.

In addition to the above settings, the <User Correction >page also displays the following surveillance domains. The surveillance domain is similar to the settings domain, but the surveillance domain only provides information display and cannot be set.

●Actual test results of load correction. (measurement A, measurement B)

●Multi channel correction mode, the current channel number (channel)

The actual test results of load correction can be tested in the frequency 1 and frequency 2 setting domain.

3.4.1 Open circuit correction

The open-circuit correction function of JK2817N/JK2811 B can eliminate the error caused by the stray admittance (G, B) in parallel with the measured element, as shown in Figure 3-1.

Fig. 3-1 spurious admittance
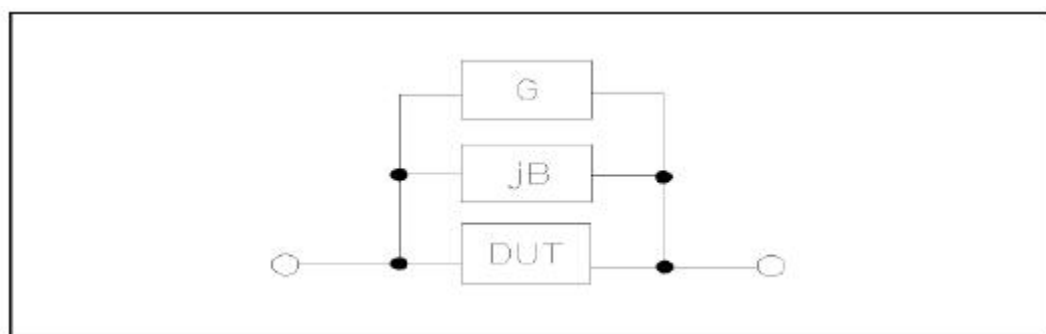
JK2817N /JK2811B adopts the following two open circuit correction data.

JK2817N performs open-circuit calibration tests on 34 fixed frequencies in the range of 50Hz to 100kHz, regardless of your current set frequency.Mobile cursor to open area, use soft key open circuit full frequency cleared to perform full frequency open zero.

Note: JK2831 is an open circuit correction test for 37 fixed frequency points in the range of 50Hz -200kHz.JK2832 is an open circuit correction test for 41 fixed frequency points in the range of 20Hz- 200kHzIn addition to 41 frequency points, the open-circuit correction data of other frequency points will be calculated by insertion calculation method, and the open-circuit correction data of different test frequencies in different ranges will be calculated.

●JK2817N can set two open-circuit correction frequencies in the frequency domain of User Correction page: Frequency 1, Frequency 2. Move the cursor to Frequency 1, Frequency 2 uses soft-key open-circuit single-frequency zero clearing to open-circuit correct the two set frequencies

respectively.

Open circuit correction function operation steps
Open-circuit correction includes full-frequency open-circuit correction using insertion calculation method and single-frequency open-circuit correction for two set frequency points.Perform the following steps to perform open-circuit correction at all frequencies using insertion calculation. For single-frequency open-circuit correction, see "Load Correction" operation instructions.
1) move the cursor to the open setting area, and the soft key area of the screen displays the following soft keys.
● ON
● OFF
● Open circuit full frequency clearing
● DCR Open circuit
2)Connect the test fixture to the instrument test end. The fixture is open circuit without connection to any of the tested components.

3)Press the soft key Open circuit full frequency clearing，JK2817N will measure the open circuit admittance (capacitance and inductance) of 34 frequency points.
The open circuit full frequency correction takes about 50 seconds. During the open circuit full frequency correction, the following soft key is displayed.
●stop
The soft key can stop the current open circuit correction test operation and retain the original open circuit correction data.
4)press the soft key DCR open circuit, JK2817N will conduct   open circuit resistance measurement under DC resistance function .
5)Press the soft key ON to make the open circuit correction effective.JK2817N will conduct open circuit correction in the subsequent testing process.If the frequency 1 and the frequency 2 are set to OFF, the open-circuit correction calculation uses the open-circuit correction data of the current frequency calculated by the insertion method.If frequency 1 and frequency 2 are set to ON and the current test frequency is equal to frequency 1 and frequency 2, the open-circuit correction data of frequency 1 and frequency 2 will be used for the calculation of open-circuit correction.

6)Press the soft key OFF ，close the open circuit correction function . The open circuit correction will not be calculated in the future measurement process.

3.4.2 Short circuit correction
The short circuit correction function of JK2817N eliminates the error caused by the parasitic impedance (R, X) in series with the component under test, as shown in Figure 3-2.
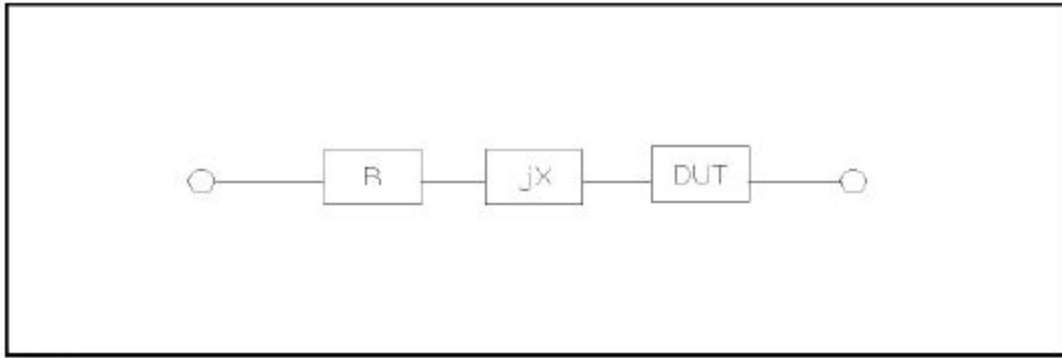
Fig. 3-2 parasitic impedance

JK2817N adopts the following two short-circuit correction data.

No matter how many frequencies you currently set, JK2817N performs a short circuit correction test on 34 fixed frequencies in the range of 50Hz to 100kHz.Moving the cursor to the short-circuit region, the soft key short-circuit full-frequency zero-clearing is used to perform full-frequency short-circuit zero-clearing. 34 fixed frequency points are the same as the open-circuit correction.

Note: JK2831 is a short-circuit correction test for 37 fixed frequency points in the range of 50Hz-200kHz. JK2832 is a short-circuit correction test for 41 fixed frequency points in the range of 20Hz-200kHz.In addition to 41 frequency points, The short-circuit correction data of other frequency points will be calculated by insertion calculation method,The short-circuit correction data of different test frequencies under different ranges are calculated.

JK2817N can set two short-circuit correction frequency points in the frequency domain of <User Correction >page: frequency 1, frequency 2. Move the cursor to frequency 1, frequency 2. Use soft-key short-circuit single-frequency zero-clearing to correct the two set frequencies respectively.

Short circuit correction function operation steps

Short-circuit correction includes full-frequency short-circuit correction with insertion calculation method and single-frequency short-circuit correction with two set frequency points.Perform the following steps are taken to carry out short circuit correction for all frequencies by inserting calculation method.For single frequency short circuit correction, please refer to "load correction" operation instructions.

1)Move the cursor to the short setup domain, and the soft key area of the screen displays the following soft keys

●ON

●OFF

●Short circuit full frequency clear

●DCR Short circuit

2)Connect test fixture to instrument test end. Short circuit test piece is short circuited.

3)Clear the whole frequency by pressing the soft key.JK2817N will measure short-circuit parasitic resistance (resistance and reactance) of 34 frequency points.Short-circuit full-frequency correction takes about 50 seconds. In short-circuit full-frequency correction process, the screen displays the soft key below.

●stop

The soft key can stop the current short-circuit correction test operation, and keep the original short circuit correction data unchanged.

4)press to the short DCR of the soft key, JK2817N will measure the short circuit resistance of the DC resistance function.

5)Press soft key ON , The short circuit correction is effective, and JK2817N will make short circuit Correction calculation in the later test process.If frequency 1 and frequency 2 are set to OFF, the short-circuit correction calculation uses the present frequency correction data calculated by insertion method.If frequency 1 and frequency 2 are set to ON and the current test frequency equals frequency 1 and frequency 2, the short-circuit correction data of frequency 1 and frequency 2 will be used for short-circuit correction calculation.

6)Press soft key OFF , Turn off the short-circuit correction function. No more short-circuit correction calculation will be carried out in the future measurement process.

3.6 < limit table setting > page

Press menu key [SETP] and press the soft key [LMTSET] to enter the < limit table setting > page.

Figure:
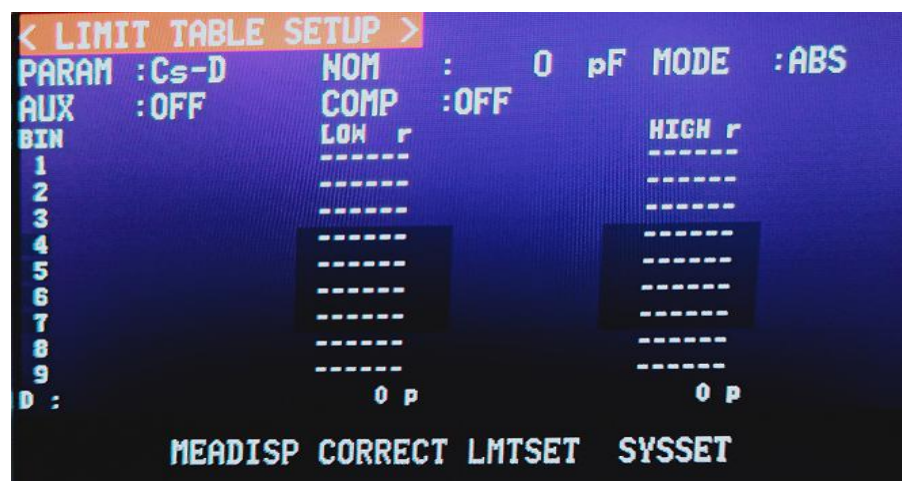
In this page, you can set the function of the instrument comparator. JK2817N can set the BIN limit of 9 main parameters and the BIN limit value of a auxiliary parameter.The test results can be sorted into up to 10 BIN (BIN1 to BIN9 and BIN OUT).If the principal parameters of the measured part are within the limits of BIN1 to BIN9, but the auxiliary parameters are not within the limits, then the measured part is sorted into the accessory BIN.The comparison function is particularly useful when JK2817N installs the HANDLER interface and is used in the automatic test sorting system.The limit parameters of the following comparison functions can only be set in < limit list setting > page.

●Test parameters (parameters)
●Comparative functional limit mode(mode)
●Nominal value (nominal)
●Auxiliary BIN ON/OFF (affiliate)

●Comparative function ON/OFF (comparison)

●Limit values for each BIN (LOW)

●Limit values on each BIN (HIGH)

3.5.1 exchange parameter

The function of exchange parameter can exchange the main parameters and the auxiliary parameters in the parameter setting field.For example, when the test parameter is: Cp-D, the parameter interchange function changes the test parameter to: D-Cp.At this point, D can set 9 pairs of comparative limits, while Cp can set 1 pairs of comparative limits.

exchange parameter function operation steps

Perform the following procedures to exchange main parameters and auxiliary parameters.

1)Move the cursor to the parameter set field, and the soft key area will display the following soft keys.

●exchange parameter

2)The main parameters and the auxiliary parameters are interchanged according to the soft key exchange parameters.

3)Then, according to the soft key adjustment parameters, the main parameters and the auxiliary parameters are interchanged and restored to the original settings.

3.5.2 Comparative functional limit mode

The comparison function provides the following two main parameter limit setting modes, as shown in Figure 3-3.

Fig. 3-3 tolerance mode and continuous mode
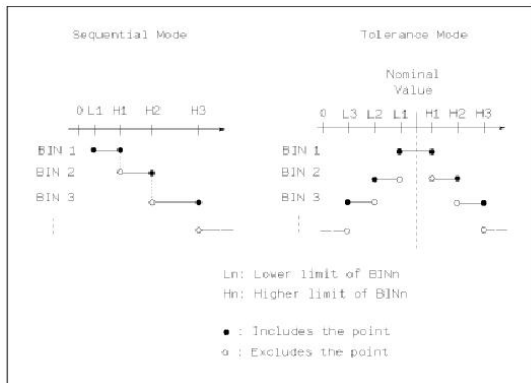
●Tolerance mode

In the tolerance mode, the deviation value from the nominal value (nominal value in the nominal domain setting) is set to a comparative limit value.

There are two ways of deviation: one is percentage deviation, the other is absolute deviation.

●Continuous mode

In continuous mode, the range of test values is taken as the comparison limit value. The comparison limit value must be set in order from small to large.

Note: when setting the limit value of tolerance mode, the error range must be set from small to large.If the error margin set by BIN1 is the largest, all the tested parts will be sorted into the BIN1 BIN.Under the tolerance mode, the lower limit is not necessarily less than the nominal value, and

the upper limit is not necessarily greater than the nominal value.The BIN limit ranges can be discontinuous,can also have overlapping areas.

Comparison of functional limit mode setup steps
1)Move the cursor to the mode setting area, and the soft key area of the screen displays the following soft keys.
●% TOL
The soft key is used to set the limit mode as follows: tolerance way of percentage deviation.
●ABS TOL
The soft key is used to set the limit mode as: absolute deviation tolerance mode.
●SEQ MODE
The soft key is used to set the limit mode: continuous mode.
●TWO ABS

2)Select the soft key and set the limit mode.

3.5.3 Tolerance mode nominal value setting

When the tolerance mode is chosen as the limit mode of the main parameter，need to set the

nominal value.The nominal value can be set arbitrarily in the display range of the instrument.
When the continuous mode is chosen as the limit mode of the main parameter,can set the nominal value.but it is not necessary to use the nominal value in continuous mode.

Nominal value setting operation steps
1)Move the cursor to the nominal set field.
2)Enter the nominal value with the numeric key. When the data is entered, the nominal value can be entered with the soft key subscript (p, n,, m, k, M, *1).When entering the nominal value according to the soft key *1, the nominal value selects F, H or Ω according to the main parameter as the default unit.

3.5.4 Comparator function ON/OFF
JK2817N can set the BIN limit of 9 main parameters and the BIN limit value of a pair of parameters.The test results can be sorted into up to 10 BIN (BIN1 to BIN9 and BIN OUT).If the principal parameters of the measured part are within the limits of BIN1 to BIN9, but the auxiliary parameters are not within the limits, then the measured part is sorted into the accessory BIN.The comparison function is particularly useful when JK2817N installs the HANDLER interface and is used in the automatic test sorting system,Comparative functions are particularly useful.

The comparator function ON/OFF sets the operation steps.
1)Move the cursor to the comparison setting area. The soft key area of the screen displays the following soft keys.
ON
OFF
Use the soft key to set the comparison function to ON (ON) or OFF (OFF).

3.5.5 Auxiliary Bin ON/OFF

When the auxiliary parameters need to be sorted, the limit values of the auxiliary parameters can be set in the upper and lower limits of 2nd.

For the separation of auxiliary parameters, there are three cases described as follows:

●In the < limit list setting > page, no upper and lower limit values of the auxiliary parameters are set.

●In the < limit list setting >page, The upper and lower limit values of the auxiliary parameters have been set. However, the auxiliary BIN function is set to OFF,At this point, only the devices with qualified parameters are qualified,The main parameters can be sorted according to the sorting limit.If the secondary parameter is not qualified, all the primary parameters are sorted into the BIN OUT file even if the main parameters are within the limits set.

●In the < limit list setting >page,The upper and lower limit values of the auxiliary parameters have been set. At the same time, the auxiliary BIN function is set to ON.If the main parameter is not within the limit set, it is sorted into the BIN OUT file.If the principal parameters of the part under test are within the limit range, but the auxiliary parameters are not within the limit range, the part under test will be sorted into the auxiliary file.

Note: When the auxiliary parameters only set the lower limit value, the auxiliary BIN is set to ON. If the main parameters of the part under test are within the limit setting range, and the   auxiliary parameters are less than or equal to the lower limit value of the auxiliary parameters, the part under test is sorted into the auxiliary BIN.Similarly, when the auxiliary parameters only sets the upper limit value and the auxiliary file is set to ON, if the main parameter of the measured part is within the limit setting range, and the auxiliary parameters value is greater than or equal to the upper limit value of the auxiliary parameters, the measured part is sorted into the auxiliary file.

Auxiliary BIN function ON/OFF set operation steps

1)Move the cursor to the attached settings domain. The soft key area of the screen displays the following soft keys.

ON

OFF

2) Use the above soft key to set the ancillary function to ON(ON)or OFF(OFF)

3.5.6 Upper and lower limits

JK2817N can set the bin limit of 9 main parameters and the bin limit value of a auxiliary parameters.The test results can be sorted into up to 10 BINS (BIN1 to BIN9 and BIN OUT).The upper and lower limits of these master parameters can be set in the upper and lower limit setting ranges from BIN1 to BIN9.The upper and lower limits of the auxiliary parameters can be set in the upper and lower limit setting ranges of 2nd.

Upper and lower limit setting operation steps

Perform the following steps to set the limit of sorting.

1)First, set the test parameters of the comparison function, nominal value and the limit way of the

main parameter and the limit mode of the main parameter.

2)Move the cursor to the lower limit setting area of BIN 1. If you choose the tolerance mode to execute steps 3 to 6, if you choose the continuous mode to execute steps 7 to 11.

3) Use the numeric key to enter the lower limit of BIN1 in the lower limit setting field of BIN1. When data is entered, you can use the subscript soft key to determine the input data(p, n, μ, m, k, M, *1)to determine the input data.When the soft key *1 is used, the limit value is F, H or Ω as the default unit.After the limit value of the BIN1 is entered in the lower limit of BIN1,The lower limit of BIN1 is automatically set to - (absolute limit),The upper limit of BIN1 is automatically set to + (absolute limit).

4) The cursor automatically jumps to the lower limit setting area of BIN2.Repeat step 4 until the limit value of input BIN9.The cursor automatically jumps to the lower limit setting area of 2nd.

5)After input the lower value limit of auxiliary parameters, the cursor will automatically jump to the upper limit set area of 2nd.

6) Input the upper limit of the auxiliary parameters.

7)　Use the numeric key to enter the lower limit of BIN1 in the lower limit setting field of BIN1. When data is entered, you can use the subscript soft key to determine the input data(p, n, μ, m, k, M, *1)to determine the input data.When the soft key *1 is used,the limit value is F, H or Ω as the default unit.

8) After input the lower value limit of BIN1,The cursor will automatically jump to the upper limit setting area of BIN1 .Input the upper limit value of BIN1.

9)The cursor will automatically jump to the upper limit setting area of BIN2.For continuous mode, the lower limit of BIN2 is equal to the upper limit of BIN1.Input the upper limit value of BIN2.

10) Repeat step 9 until the　upper limit value of input BIN9.The cursor automatically jumps to the lower limit setting area of 2nd.Input the lower limit value of auxiliary parameters

11) , the cursor will automatically jump to the upper limit set area of 2nd.Input the upper limit value of auxiliary parameters

Chapter four [SYSTEM] Menu key description and file management

4.1 < System Settings > page

Press menu key [SETUP] and press [SYSSET]to enter system Settings > page.

Figure:
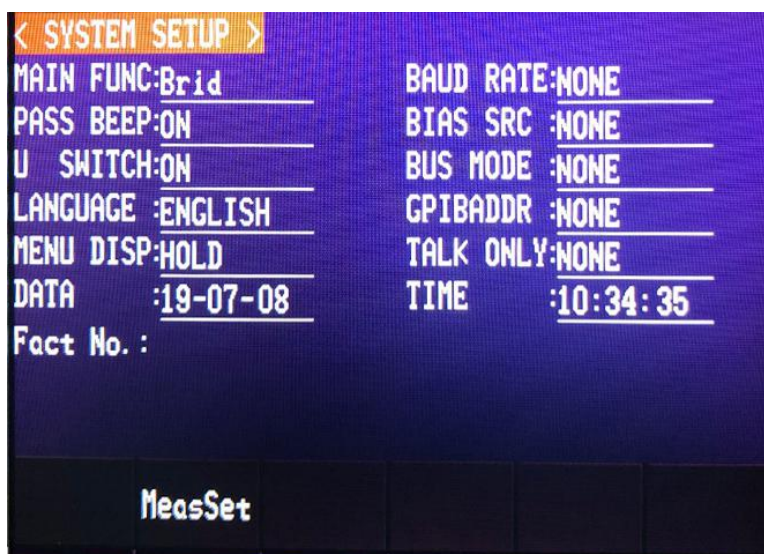
This feature page displays most of the system settings menus, including instrumentation features, sound on, qualified BEEP, unqualified BEEP, system language, command settings, bus mode, GPIB address, talk only, bais source, baud rate, time, etc.

Note: when all menu options are set up under the interface, save the settings automatically.

4.1.1 Instrument function

This option is reserved function, and is not optional for other transformer options of JK2817N LCR series.

4.1.2 Keystroke sound

This area is used to control and display the operation button sound of the current instrument.

settings operation steps:

1)Move the cursor to the keypad sound field.The soft key area of the screen displays the following soft keys.

■ON

■OFF

2）press "ON" Turn on the button sound function.press"OFF"Turn off the button sound function.

4.1.3　U disk switch

This area is used to control and display the current instrument U switch.

settings operation steps:

1)Move the cursor to the key U disk switch.The soft key area of the screen displays the following soft keys.

■ON

■OFF

2）Press"ON" Turn on the function of U disk switch.press"OFF"Turn off the function of U disk switch.

4.1.4 Display language

This area is used to control and display the operation language mode of the current instrument.

Language settings operation steps:

1)Move the cursor to the display language domain. The soft key area of the screen displays the following soft keys.

●English

The soft key is used to select the English operation language.

●Chinese

The soft key is used to select the Chinese operation language.

4.1.5 Menu disping

The soft key area of JK2817N products can be set to HOLD, or fixed time.When it is HOLD, the soft-key menu is always displayed, and when it is set to a certain time, the soft-key menu is

automatically hidden when it is kept to the set time. When any key in the operation panel triggers the soft-key menu display, and then re-timing.

Menu keep settings operation steps:

2)Move the cursor to the menu hold area. The soft key area of the screen displays the following soft keys.

●plus +

This soft key is used to increase menu holding time.

●minus -

This soft key is used to decrease menu holding time.

4.1.6 time

When the cursor moves to the time zone, the system time can be modified, including year, month, day, hour, minute, and second.

Chapter five   performs LCR measurement operation and some examples.

5.1 "Zero clearing" correction operation

To perform zero clearing operations,(In order to prevent stray impedance from affecting the measurement accuracy, an open/short circuit correction is required)Users can use either of the following two methods.

5.1.1 Full frequency reset:

a)Press the menu key[SETUP]，Then press the soft key "user correction", the instrument will be displayed as < user correction > page.

b)Move the cursor to the open circuit area,"ON","OFF" and "open circuit full frequency clearing"will be displayed in the soft key area.

c)Keep the test fixture open circuit，press "open-circuit full-frequency zero-clearing" to perform open-circuit correction, until the status information prompt area shows open-circuit correction is completed.

d)Press"ON"，Open the calibration function of the instrument.

e)Insert short circuit chip (JK26010) into the test fixture.

f)Moving cursor to short circuited area,"ON,"OFF"and"Short circuit full frequency clearing" will be displayed in the soft key area.

g)Press"Short circuit full frequency clearing"to perform short-circuit correction,until the status information prompt area shows that the short circuit correction is completed.

h)Press"ON",turn on the short circuit correction function of the instrument.

i)Move the cursor to the load area."ON", "OFF"will be displayed in the soft key area.

j)Press"OFF"，Turn off the load correction function of the instrument.

k)Move the cursor to the frequency 1 area."ON"， "OFF"，"Open circuit single frequency clearing"，"Short circuit single frequency clearing" and "load correction"will be displayed in the

soft key area.

l)Press "OFF" ，Turn off frequency 1 point frequency clearing function.

m) Move the cursor to the frequency 2 area."ON","OFF","Open circuit single frequency clearing"，"Short circuit single frequency clearing "and" load correction"will be displayed in the soft key area.

n)Press "OFF" ，Turn off frequency 2 point frequency clear function.

5.1.2 Point frequency zero(for better use of single frequency test):
Suppose the user now uses the test frequency of 5kHz.

a) Press the menu key[SETUP]，Then press the soft key "user correction", the instrument will be displayed as < user correction > page.

b)Move the cursor to the open circuit area,"ON","OFF" and "open circuit full frequency clearing"will be displayed in the soft key area.

c) Press"ON" , turn on the open circuit correction function of the instrument.

d) Moving cursor to short circuited area,"ON,"OFF"and"Short circuit full frequency clearing" will be displayed in the soft key area.

e) Press"ON",turn on the short circuit correction function of the instrument.

f)Moving cursor to load area."ON" , "OFF" will be displayed in the soft key area.

g) Press "OFF" ,turn off the load correction function of the instrument.

h) Moving cursor to frequency 1 area."ON", "OFF","Open circuit single frequency clearing" ，

"Short circuit single frequency clearing" and "load correction" will be displayed in the soft key area

i)Press "ON" ，Turn on frequency 1 point frequency clearing function.

j)Press[5]，5 will display the cursor area in the screen, and the software area will display the available units(Hz,kHz,and MHz).press "kHz",The frequency 1 area will be changed to 5.0000kHz (the same as the test frequency)

k) Keep the test fixture open circuit，press "open-circuit single-frequency zero-clearing" to perform open-circuit correction,
l)Insert short circuit chip (JK26010) into the test fixture.
m) Short circuit correction is performed according to soft key short circuit single frequency clearing.

5.2 The correct connection of the tested components

The instrument has four pairs of test terminals: HCUR (current sampling high-end Hc), LCUR (current sampling low-end Lc), HPOT (voltage sampling high-end Hp), LPOT (voltage sampling

low-end Lp) and shielding terminal corresponding to each test terminal.The purpose of shielding ends is to reduce the influence of stray capacitance on the ground and reduce electromagnetic interference.Hc, Hp, Lc and Lp should be connected on the lead of the component under test to form a complete four-terminal measurement to reduce the influence of the lead and connection point on the test results (especially loss measurement).Especially when the low impedance component is tested, the voltage sampling terminal Hp and Lp should be connected to the lead end of the component to prevent the lead resistance from being added to the measured impedance. The connecting principle is Hp, and the voltage detected by Lp should be the actual voltage on the tested component.In other words, it is better not to connect Hc, Hp and Lp, Lc with the tested component lead after connecting, otherwise it will increase the test error.

If the contact point and lead resistance Rlead are much smaller than the measured impedance (for example: Rlead<Zx/1000, The requirement error is less than 0.1%.),Hc, Hp and Lp, Lc can be connected together and then connected to the two ends of the tested element (measured at both ends).It is much better to use a measuring fixture than to use a measuring wire (Kelvin fixture attached to the instrument) for some high precision measurements.When Kelvin test line is tested at 10 kHz frequency, good results can be obtained, but when the frequency exceeds 10 kHz, Kelvin test line is difficult to meet the test requirements.Because at high frequencies, the change of the gap between the wires directly changes the stray capacitance and inductance of the test terminal, and the test wire is always difficult to fix.Therefore, the test fixture should be used as much as possible when measuring at higher frequencies. If the test fixture can not be used because of the limited conditions, the state of the test line should be as consistent as possible when the instrument is cleared.Whether you use a test fixture provided by the instrument or a Kelvin test cable or a user-made fixture, you should meet the following requirements.

1. The distribution impedance must be minimized, especially when measuring high impedance components.

2. Contact resistance must be minimized.

3. The contact points must be short circuited and open circuited.Short circuit and open circuit "0" can easily reduce the influence of test fixture distribution impedance on measurement.for open circuit "0" ，The test terminal should be the same as the tested part ，separated at the same distance.For short circuit clear "0" ，Low impedance short circuit board should be connected between the test end, or make Hc, Lc direct connection, Hp, Lp direct connection, and then connect the two together.

Note: When the device under test is polar, attention should be paid to "high potential terminal" before testing, please connect to the front panel marked +"or Hc, Hp terminal, and"low potential terminal"to the front panel marked"-"or Lc, LP terminal.

Warning: please discharge when measuring polar components, so as to avoid damaging the instrument.

5.3 Eliminating the influence of stray impedance
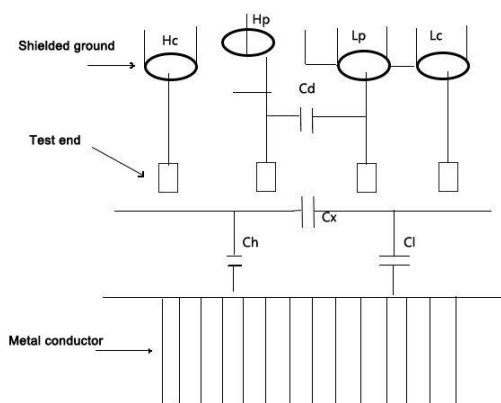
Fig. 5-1 schematic diagram of the influence of stray capacitance
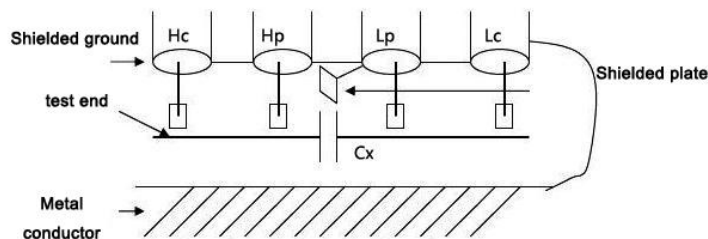
Fig. 5-2 schematic diagram of eliminating the influence of stray capacitance

The effect of stray capacitance can not be ignored when the measured part is of high impedance (such as small capacitance). Fig. 5-1 shows an example of measuring the measured part with four terminals.In the picture, Cd is parallel to Cx, when the conductor plate is under the tested part.The capacitor Ch is connected with Cl in series and is parallel to Cx.This will result in errors in the measurement results.Placing a grounding conductor between the high and low ends of the test, Cd can be minimized.At the same time, if the grounding terminal is connected to the lower conductor plate, the influence of Ch and Cl will be eliminated.

When the measured part is low impedance (such as small inductance, large capacitance), Due to the large current flowing through the measuring line Hc and Lc, besides the influence of the contact resistance at the testing end, the electromagnetic coupling between the measuring lines becomes the main source of the measurement error. Without eliminating the coupling, the unexpected influence on the test results will be produced.Generally speaking, the contact resistance affects the resistance part of the test impedance, while the electromagnetic coupling affects the reactance part of the test impedance.The test end can adopt four-terminal-pair connection method to make the current flowing through Hc and Lc and the current flowing through each shielding end equal in magnitude but opposite in direction, so that the magnetic field produced by Hc and Lc can cancel each other and eliminate the influence of mutual inductance

coupling on the test results.

5.4 An example of fast operation of inductance testing with JK2817N/JK2811B
The test conditions are as follows:
Function:Ls-Q
Frequency :5kHz
Level :1.0Vrms
Internal resistance :100Ω
The steps are as follows:

1．Open the machine,Refer to the "boot" section of the chapter "panel instruction and entry operation".

2．Basic parameter setting.

a) Press menu key [DISP], JK2817N display < component measurement display > page.
b) Use the encoder knob to move the cursor to the functional area.The current area is displayed as

Cp-D ,at this time Cp-…☐ ,Cs-…☐ ,Lp-…☐ ,Ls-…☐ ,more will display on the right side

of the screen.
c) Key Ls-... .Ls-D, Ls-Q, Ls-Rs, Ls-Rd will display.
d) Key Ls-Q ,Select the Ls-Q test function.
e) Moving cursor to frequency region.The current area is displayed as 1.0000kHz.

f) Key [5]，5 displays the cursor area on the screen，and the soft key area displays the available

units(Hz，kHz，and MHz).press kHz, will change the frequency area to 5.000kHz.

g) Move the cursor to the level area. The current area is displayed as1.000V.

h) Key[1][.][5].1.5 displays the cursor area on the screen，and the soft key area displays the

available units(mV，V，uA，mA and A)，press V, the level area will be changed to 1.5V.

i) Press menu key [SETUP] enter the < measurement Settings > page.
j) Move the cursor to the internal resistance area. At this time,100Ω，30Ω will appear in the soft key area on the right side of the screen.
k) Key 100Ω ,Select the 100Ω internal resistance of the signal source.

3．Install test fixture (JK26005) to the test end of JK2817N.

4．Perform zeroing operation(To prevent stray impedance from affecting measurement accuracy,

open-circuit/short-circuit correction is required). (See Chapter 5.1.2 "Point Frequency Clearance").

5．Insert the inductance into the test fixture.

6．Perform measurement operations

Press menu key [DISP],

JK2817N is displayed to < component measurement display > page.The instrument will be tested continuously and the test results will be displayed in the center of the page.

7．If the test results are obviously wrong, please:

a)check whether the inductance is reliably connected with the test fixture.
b)check whether the test fixture is reliably connected with the test end of the instrument.
c) re open reliable open circuit / short circuit correction.

Note: When the user is using sweep open/short circuit correction, the point frequency correction function must be selected as OFF, referring to the "zero-clearing correction operation" in this chapter.

5.5 An example of fast operation of capacitance test with multi frequency list scanning using JK2817N

The test conditions are as follows:

Function: Cp-D

Level : 1Vrms

Other parameters are as follows:

Frequency	Comparison parameters	Low	High
1kHz	Cp(capacity)	325.0nF	333.0nF
10kHz	D(loss)	0.0001	0.0003
100kHz	D(loss)	0.0060	0.0100

BEEP : HIGH LONG(High Long voice)

Alarm mode: OUT (ultra time)

The steps are as follows:

1. starting up, refer to the "starting up" section of the chapter "panel instruction and entry operation".

2. basic parameter setting.

a) Key [DISP]，JK2817N is displayed to < component measurement display > page.

b) The current function area is Cp-D, and the level area is 1 V.

c) Key [SETUP]，Make the instrument display to the <Measurement Settings> page, where the

"measurement settings"," user correction", "limit settings", "list settings" and "file management" will be displayed in the soft key area.

d) Key " list settings"，JK2817N is displayed to < list scan settings > page.

e) Move cursor to scan parameter area. The current area is displayed as frequency [Hz].

f) Press the knob key to move the cursor to the parameter area of scan point 1. The current area is displayed as -.

g) Key [1]，1 displays the cursor area on the screen, and the soft key area displays the available units (Hz, kHz, and MHz). Keyboard kHz. This area is changed to 1.0000k.

h) Key [ ]，Move the cursor to the LMT area of Scanning Point 1, which is currently displayed as -

- at this point "limit data A," limit data B" and "OFF" will be displayed in the soft key area.
i) Key "Limit data A", select Compare the main parameter CP function, this area will be displayed as A, and the cursor automatically moved to the lower bound area of scan point 1.

j) Key [3][2][5]，325 will display the cursor area in the screen.，nd the soft key area displays the

available units(p，n，μ，m，k).press n .This area is changed to 325.000n.And the cursor is automatically moved to the upper limit of scanning point 1.

k) Key [3][3][3]，333 will display the cursor area in the screen.，nd the soft key area displays the

available units(p，n，μ，m，k).press n .This area is changed to 333.000n.And the cursor is automatically moved to the parameter area of scan point 2.

l) Key [10]，10 will display the cursor area in the screen.nd the soft key area displays the available

units(Hz，kHz，and MHz). press kHz.This area is changed to 10.0000k.

m) Key [ ]，Move the cursor to the LMT area of scanning point 2, showing the current area as

--- .At this time,"Limit data A"，"Limit data B" and "OFF" will be displayed in the soft key area.

n) Key "Limit data B"，Select Compare auxiliary parameters D function, this area will be displayed as B, and the cursor will automatically move to the lower bound of Scanning Point 2.

o) Key [0][.][0][0][0][1]，0.0001 will display the cursor area in the screen.，nd the soft key area

displays the available units(p ,n ,μ ,m ,k ,M ,*1) ,press*1.This area is changed to 100.000μ.And the cursor is automatically moved to the upper limit of scanning point 2.

p) Key [0][.][0][0][0][3]，0.0003 will display the cursor area in the screen.nd the soft key area

displays the available units (p ,n ,μ ,m ,k ,M ,*1) ,press *1.This area is changed to 300.000μ.And

the cursor is automatically moved to the parameter area of scan point 3.
q) According to the above L - P steps, input 100kHz, B, 0.0060 and 0.0100. of third scanning points in turn.

3．Alarm setting

a)press [SYSTEM]，JK2817N is displayed to < System Settings > page.

b)Move cursor to unqualified beep area. At present, this area is displayed as HIGH LONG.

4．Install test fixture (JK26005) to the test end of JK2817N.

5．Perform zeroing operation ,to prevent stray impedance from affecting measurement accuracy, an open/short circuit correction is required (see Chapter 5.1.1 "Sweep Frequency Zero Clearance").

6．Insert the measured capacitance onto the test fixture.

7．Perform measurement operations

Press[DISP]，Then press the key list to scan, so that JK2817N can be displayed to < list scan display > page.The instrument continuously scans the test and displays the test and comparison results on the page, and gives an alarm when the comparison results are H (up) or L (down).

8．If the test results are obviously wrong, please:

a)Check whether the tested device is reliably connected with the test fixture.
b)Check whether the test fixture is reliably connected with the test end of the instrument.
c)Re open reliable open circuit / short circuit correction.

Note: When the user is using sweep open/short circuit correction, the point frequency correction function must be selected as OFF, referring to the "zero-clearing correction operation" in this chapter.

5.6 Comparator setup instance
JK2817N provides a more complete comparator function to facilitate the measurement and identification of production line components and incoming and outgoing inspection.The standard configuration of the HANDER interface makes it suitable for automatic sorting measurement systems. The concept and operation of the comparator are described in detail in the previous chapter. Here are two examples of settings.
5.6.1 Capacitor sorting
Capacitance model:0805CG271
Basic requirements: capacity is divided into two stalls, BIN J and BIN K .the capacity is qualified and the loss is not qualified, file it separately.
Measurement parameters: frequency 100kHz, level 1Vrms, slow, unqualified alarm, external trigger.

Sorting parameters :BIN J -4.6%～ +4.8%，BIN K-9%～ +10%，loss tg ＜0.15%

This example needs to set the following parameters:

Main parameter(FUN1)	Cp
Auxiliary parameters(FUN2)	D
Frequency (FRQ)	100kHz
Level (LEV)	1V
Speed (SPEED)	SLOW(SLOW)
Auxiliary BIN switch(AUX)	ON
Main parameter tolerance mode(MODE)	%TOL(Percentage tolerance method)
Nominal value(NOMINAL)	270pF
BIN1 LOW (BIN1 LOW)	-4.6%
(BIN1 HIGH (BIN1 HIGH)	4.8%
BIN2 LOW (BIN2 LOW)	-9%
BIN2 HIGH(BIN2 HIGH)	10%
Auxiliary parameters LOW (2nd LOW)	0.0000
auxiliary parameters LOW(2nd LOW)	0.0015
TRIGGER MODE(TRIG)	EXT(external)
ALARM MODE(CMP ALARM)	Unqualified beep(Heigh long)

Explain 1:Because it is a small capacitance, its 100kHz impedance is greater than 1kΩ so we choose the parallel equivalent mode

Explain 2:Capacity of any BIN qualified But when the loss is not qualified,Another BIN

processing. , So open the attachment BIN and classify it as an AUX BIN. If AUX is turned

off,When the loss is not qualified, the whole is judged to be unqualified.

Explain 3::Since the given upper and lower bounds are based on the percentage deviation of the nominal 270pF value, the% TOL percentage mode is chosen as the main parameter.

Specific settings:

1) In component measurement display page (Meas), select Cp-D, set frequency, level, speed and so on.

2) Press the SETUP menu key to enter the Meas Setup page and change the trigger mode to EXT (external trigger).

3) Press SETUP-LIMIT to enter the limit list settings page(Limit Table), set nominal values, main parameter tolerance mode, upper/lower limit parameters, comparator switch, auxiliary BIN switch:

4) Press the SYSTEM menu key to enter the system settings page.(System Config) , Find the

unqualified beep item, set it to high long.

5) Return to component measurement display page after setup is completed.(Meas)

5.6.2Load calibration operation example

1 Operation steps:

Suppose that the test conditions that users are using now are as follows:

Frequency: 100kHz   Cp standard value: 11nF   D standard value:0.0005

a) press key [SETUP] ，Measurement settings, user correction, limit settings, list settings, file management and tools are displayed in the soft key area.

b) press key"user correction".The instrument will be displayed as < user correction > page.

c) Move the cursor to the open circuit."ON","OFF"and "ON""Open circuit full frequency clearing" will be displayed in the soft key area.

d) press key "ON" ，Turn on the Open circuit calibration function of the instrument.

e) Move cursor to short circuit area.. "ON","OFF"and"Short circuit full frequency clearing"will be displayed in the soft key area.

f)press key"ON"，Turn on the short circuit correction function of the instrument.

g) Move the cursor to the load area."ON"， "OFF" will be displayed in the soft key area.

h)press key "ON"，Turn on the load correction function of the instrument.

i)Move the cursor to the functional area. The current area is displayed as Cp-D ，At this point,Cp-… ，Cs-… ，Lp-… ，Ls-… ，Z-… ，More will be displayed in the soft key area on the right side of the screen.

j)press key Cp-D select Cp-D parameter .k) Move the cursor to the frequency 1 area."ON" ， "OFF" ，"Open circuit single frequency clearing", "short circuit single frequency clearing" and "load correction"will be displayed in the soft key area.

l)press ON key ，Open the point frequency correction function of frequency 1.

m) press [1][0][0]，100 displayed on the screen, and the software area displays the available units (Hz, kHz, and MHz).(Hz ，kHz ，and MHz).press kHz. frequency 1 area will be changed to 100.000kHz (the same as the test frequency).

n) Move the cursor to the reference A: area of frequency 1. Button [1][1] and 11 will be displayed in the cursor area of the screen.And the software area will display the available units (p, n, mu, m, k). The key n. The area will be changed to 11.0000nF.

o) Move the cursor to the reference B: area of frequency 1. Button[0][.][0][0][0][5] ,0.0005 will be displayed in the cursor area of the screen.And the software area will display the available units(p ，n ，μ ，m ，k).press [ENTER].The area will be changed to 0.00050.

p) Move the cursor to Frequency 1. ON, OFF, open circuit single-frequency zero-clearing, short-circuit single-frequency zero-clearing and load correction will be displayed in the soft-key area.

q)Keep the test fixture open circuit，Keep the hand or other source of interference away from the test fixture. Use the soft key to turn on the single frequency to clear the zero and perform the open circuit correction.

r)Insert short circuited sheet (JK26010) into the test fixture to make the short circuit contact reliably with the reed of the test fixture.

s) Short circuit correction is performed according to soft key short circuit single frequency clearing.

t)The user's standard capacitance is inserted into the test fixture so that the lead pin of the standard capacitance can reliably contact the spring of the test fixture.

u) Load correction is performed according to soft key load correction.

2.Matters needing attention

a)Because the software version of the instrument may not be consistent, the soft key information and status information displayed by the instrument will not be consistent with the book, but should not affect the user's understanding.

b)Load correction is only valid for devices of the same specification, and load correction must be repeated after changing specifications.

Chapter six   performance and testing

6.1 Measurement function

6.1.1 Measurement parameters and symbols

C: capacitor   L: inductance   R: resistor

X: reactance   D: loss   Z: impedance

B:electrical susceptance   :phase angle   Y: admittance

G: conductance   Q: quality factor   DCR: DC resistance

Measurement combination
Eleven measuring parameters and the following combinations

Main parameter	Z，Y	L，C	R	G
Secondary parameters	(deg angle)， (rad radian)	D，Q，RS，RP，G，Rd	X	B

DCR No combination of measurements.
Mathematical operation

The measured value is calculated for the absolute value deviation ΔABS of a programmable nominal value and the percentage deviation of delta Δ%.

6.1.2 Equivalent method

Series and parallel connection

6.1.3 range

Automatic and manual (keep, increase or decrease)

6.1.4 trigger

Internal, external, manual

Internal: continuously measuring the measured parts and displaying the results.

Manual: press the panel "TRIGGER" key instrument for a measurement and output the results show that normally in a waiting state.

External: The instrument HANDLER interface receives the "start" signal from the outside, makes a measurement and outputs the measurement results, and then enters the waiting state again.

6.1.5 Trigger delay

Delay time: measure the time from trigger to start measurement.0 - 60 seconds, 1ms step programmable

6.1.6 Test end connection mode

Four terminal measurement method is adopted.

Hcur: Current sampling high end

Lcur:Current sampling low end

Hpot:Voltage sampling high end

Lpot:Voltage sampling low end

6.1.7 Measuring speed (frequency >=10kHz)

Fast speed: about 30 times / sec (13ms/ times).

Medium speed: about 11 times / sec (90ms/ times).

Slow speed : about 2.7 times / sec (370ms/ times).

Medium speed and fast speed will decrease when the frequency is less than 10kHz.

6.1.8 Average

1 to 255 programmable.

6.1.9 Display digits

6 digits, maximum display number 999999

Test signal

6.1.10 Test signal frequency

The test signal is sine wave.Frequency accuracy:0.01％

Test frequency range:

50Hz～100kHz(JK2817N)

20Hz～100kHz(JK2831)

20Hz～200kHz(JK2832)

Minimum resolution:0.01Hz

6.1.11 Signal mode

Normal: Set the test voltage on the measurement display page, and the voltage at the measurement end may be smaller than the set voltage according to the impedance of the measured part.

Constant level: automatic adjustment of internal level makes the voltage on the tested part consistent with the set voltage.

6.1.12 Test signal level

	Mode	Range	Accuracy	Step
Voltage	Normal constant pressure	5mVRMS—2VRMS 10mVRMS—5VRMS	±(10%×Set value+2mV) ±(6%×Set value+2mV)	100μV
Current	Normal constant current	5OμARMS —100mARMS 100μARMS —50mARMS	±(10%×Set value+10μARMS) ±(6%×Set value+10μARMS)	1μA

6.1.13 Output impedance

30Ω,100Ω±2% Optional

6.1.14 Test signal level monitor

Mode	Range	Accuracy
Voltage	5mVRMS—2VRMS 0.01mVRMS—5mVRMS	±(3%×Reading+0.5mV) ±(12%×Reading+0.1mV)
Current	50μARMS—20mARMS 0.001μARMS—50μARMS	±(3%×Reading+5μA) ±(12%×Reading+1μA)

6.1.15 Measurement shows maximum range.

Parameter	Measurement display range
L,Lk	0.0001μH ～ 99.999kH
C	0.0001pF ～ 9.9999F
Z,R,X,DCR	0.0001Ω～ 99.999MΩ
Y,B,G	0.0001μs ～ 99.999S
θ	Deg -179.999° ～ 179.999° Rad -3.14159 ～ 3.14159
D	0.0001 — 9.9999
Q	0.0001 — 9999.9

6.1.16 DC bias voltage source

100Ω Internal resistance: 0V— ±5V   Minimum resolution:0.5mV, Accuracy:1%x Set voltage+5mV

0mA—±50mA， Minimum resolution:5μA

30ΩInternal resistance: 0V— ±3V Minimum resolution:0.5mV, Accuracy:1%x Set voltage+5mV

0mA—±100mA， Minimum resolution:5μA

Accuracy of measurement

Measurement accuracy includes measurement stability, temperature coefficient, linearity, repeatability and calibration interpolation error.

Examination of the accuracy of the instrument must be carried out under the following conditions:

a．Warm-up time: more than 30 minutes.

b．Warm-up time: more than 30 minutes.

c．Test cable length: 0m, 1M

d．Open circuit correctly and short circuit "0".after Preheating

e．The DC bias is in the "OFF" position, and the instrument range is at "AUTO" to select the correct measurement range..

6.1.17 │Z│,│Y│,L,C,R,X,G,B accuracy

Ae is the accuracy of │Z│，│Y│，L，C，R，X，G，B expressed in the following way:

$Ae = ±[A+(Ka+Kb+Kc)×100+ Kd +Kf]×Ke$ [%]
A:Basic measurement accuracy (see figure A)
Ka:Impedance scaling factor (see table A)
Kb:Impedance scaling factor (see table A)
Kc:Calibration interpolation factor (see table B)
Kd:Cable length factor (see table D)
Ke:Temperature factor (see table E)
Kf:Correction factor for scanning fixture(Not added:Kf = 0,added :Kf = 0.2)

L，C，X，B accuracy used condition: Dx (D measurement value) is≤0.1

R，G accuracy used condition:Qx(Q measurement value)≤0.1

When Dx≥0.1,four L，C，X，B the accuracy factor Ae should be multiplied by Root number1+Dx^2

When Qx≥0.1，For L, C, X, B, the accuracy factor Ae should be multiplied by Root number

$1+Q_x^2$

The accuracy of G can only be used when measuring combinations in G-B.

6.1.18 D accuracy
D accuracy De is given by the following

$$De = \pm 100 \frac{Ae}{}$$

The upper form is used only when Dx is ≤ 0.1.
When Dx>0.1, De should be multiplied by (1+Dx).

6.1.19 Q accuracy
Q accuracy is given by the following

$$Qe = \pm \frac{Qx*De}{1 \mu Qx*De}$$

Here,Qx is the value of the measured Q.
De is the accuracy of D.
Upper conditions of use Qx*De<1

6.1.20 θ accuracy
Θ accuracy is given by the following:
θe =(180divided by π) multiply by (Aedivided by100)   [deg]

6.1.21 G accuracy
When Dx (measured D value) ≤0.1
G   accuracy is given by the following:
    Ge = Bx* De   [S]
    Bx = 2πfCx =1divided by2πfLx

Here,Bx is the value of the measured B [S].
Cx is the value of the measured C [F].
Lx is the value of the measured L [H].
De is the accuracy of D.
F is test frequency
The above G accuracy is used only in the combination of Cp-G and Lp-G.

6.1.22 Rp Accuracy
When Dx (measured D value) ≤0.1
Rp accuracy is given by the following:Rp =(Rpx* De) divided by(Dx*De)   [Ω]

Here,Rpx is the value of the measured Rp [S].

Dx is the value of D measured[F].

De is the accuracy of D.

6.1.23 Rs Accuracy

When Dx (measured D value) ≤ 0.1

Rs accuracy is given by the following:

Rse = Xx*De   [Ω]

Xx = $2\pi f Lx$ = 1 divided by $2\pi f Cx$

Here, Xx is the value of the measured X.   [S].
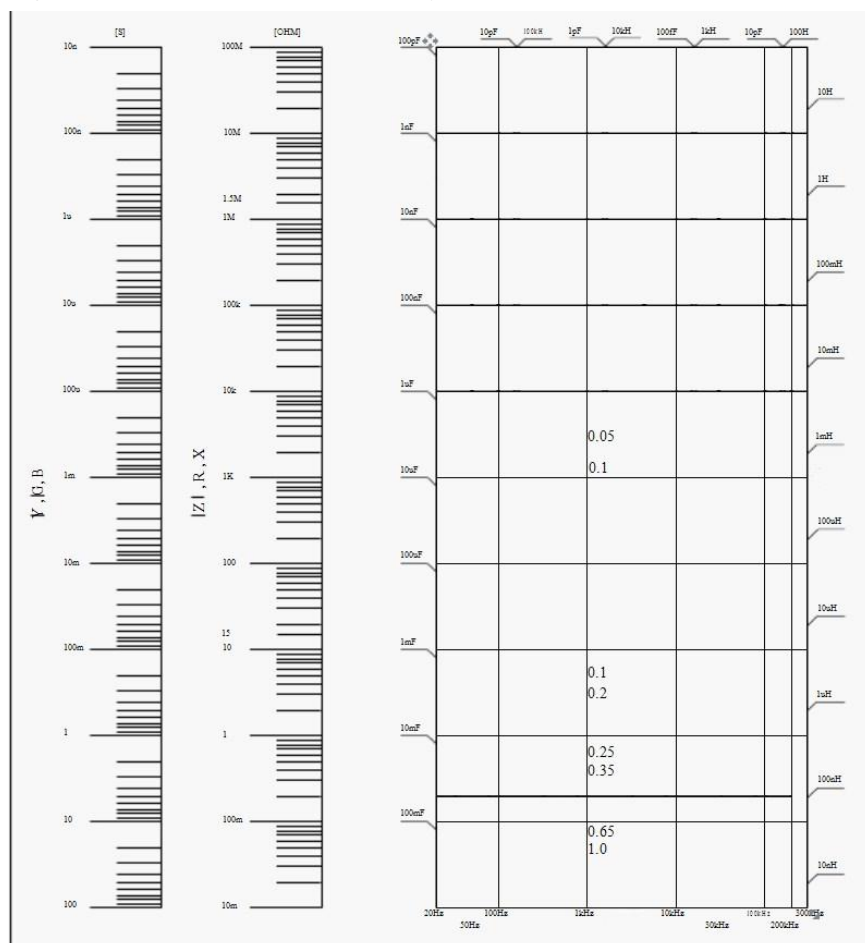

Cx is the value of the measured C [F].

Lx is the value of L measured[H].

De is the accuracy of D.

F is test frequency

6.1.24 Accuracy factor

Figure A, basic measurement accuracy A

In figure A, a smaller value is selected on the boundary line.

In figure A, the basic accuracy A value selection method is as follows:

0.1 ----when   0.4Vrms≤Vs≤1.2Vrms ,The measurement speed is medium speed, slow speed and

fast A value.

0.1 ---- when   0.4Vrms≤Vs≤1.2Vrms , The measured speed is A value.

when Vs<0.4Vrms or Vs>1.2VrmsA value calculation method is: according to the current measurement speed selection A, according to the current test signal voltage selection accuracy correction coefficient A (see figure B) A multiplied by Ar to get the current basic measurement accuracy A. Here,

Vs is the test signal voltage.

Figure B basic accuracy correction curve test signal voltage
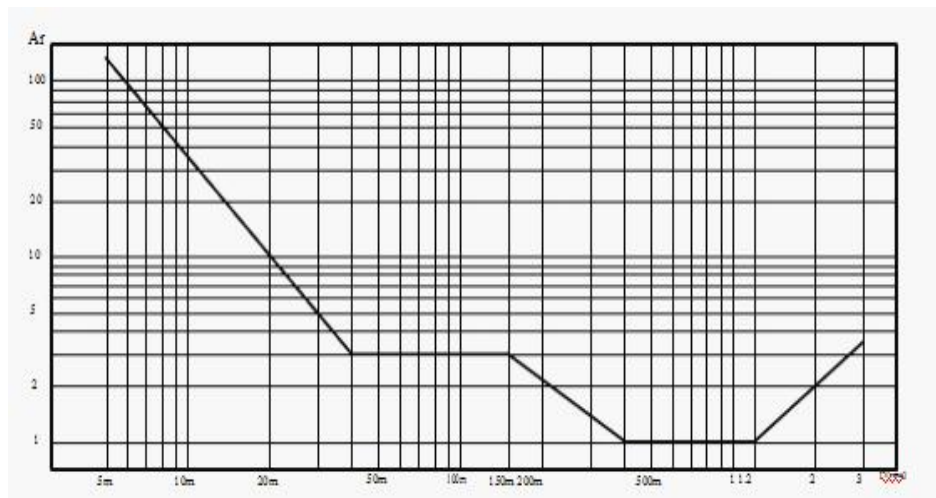
Table A impedance scaling factor   Ka,Kb

Speed	Frequency	Ka	Kb
Medium speed, slow speed	fm<100Hz	$1*10^{-3} \dfrac{200 \quad 100}{(Z_m)(1+V_s)(1+f_m)}$	$\dfrac{70}{100 \; Z_m*(1*10)^{-9}(1+V_s)(1+fm)}$
	100Hz≤fm≤100kHz	$1*10^{-3} \dfrac{200}{(Z_m)(1+V_s)}$	$\dfrac{70}{Z_m*(1*10)^{-9} \quad (1+V_s)}$
	100kHz<fm≤200kHz	$1*10^{-3} \dfrac{200}{(Z_m)\;(2+V_s)}$	$\dfrac{70}{Z_m*(3*10)^{-9}(1+V_s)}$
Fast speed	fm<100Hz	$2.5*10^{-3} \dfrac{400 \quad 100}{(Z_m)(1+V_s)(1+fm)}$	$\dfrac{100 \quad 100}{Z_m*(2*10)^{-9}(1+V_s)(1+fm)}$
	100Hz<fm≤100kHz	$2.5*10^{-3} \dfrac{400}{}$	$\dfrac{100}{}$

		$(Z_m\quad)\ (1+V_s)$	$Z_m*(2*10)^{-9}(1+V_s)$
	100kHz<fm≤200kHz	$\dfrac{(2.5*10^{-3})}{lZ_ml}\ (2+\dfrac{400}{V_s})$	$lZ_ml\ (6*10_{-9})(1+\dfrac{100}{V_s})$

fm:Test frequency[Hz]

Impedance of measured parts[Ω]

Test signal voltage[mVrms]

When the impedance is less than 500Ω,, the use of Ka and Kb is invalid.

When impedance is greater than 500Ω, the use of Kb and Ka is invalid.

Table B calibration interpolation factor Kc

Test frequency	Kc
Direct calibration frequency	0
Other frequencies	0.003

Table C direct calibration frequency

			20	25	30	40	50	60	80	[Hz]
100	120	150	200	250	300	400	500	600	800	[Hz]
1	1.2	1.5	2	2.5	3	4	5	6	8	[kHz]
10	12	15	20	25	30	40	50	60	80	[kHz]
100	120	150	200							[kHz]

Table D cable length factor Kd

Test signal level	cable length		
	0m	1m	2m
≤1.5Vrms	0	$2.5\times10^{-4}(1+50\times fm)$	$5\times10^{-4}(1+50\times fm)$
>1.5Vrms	0	$2.5\times10^{-3}(1+16\times fm)$	$5\times10^{-3}(1+50\times fm)$

Correction factor when Kd takes 2m when using scanning fixture

Table E temperature factor Ke

Temperature (℃)	5		8	18	28	38
Ke	6	4	2	1	2	4

6.1.25 DC resistance DCR accuracy

$A(1+Rx/5M\Omega+16m\Omega/Rx)[\%]\ \pm0.2m\Omega$

Medium speed, slow speed，A=0.1

Fast speed，   A=0.25

Rx is the measured resistance.

6.1.26 Leakage inductance Lk accuracy

Inductance L accuracy+0.2%

6.2safety requirements

The measuring instrument is type I safety instrument.

6.2.1 insulation resistance

Under the reference working condition, the insulation resistance between the power terminal and the housing should not be less than50MΩ.

Under the condition of hot and humid transportation,The insulation resistance between the voltage terminal and the housing should not be less than 2 MΩ.

6.2.2 Insulation strength

Under the reference operating conditions, the power terminal and the housing should be able to withstand a frequency of 50 Hz, rated voltage of 1.5 kV AC voltage, timing 1 minute. No breakdown and arcing phenomena should be observed.

6.2.3 leakage current

The leakage current should not be greater than 3.5mA (AC effective value).

6.3 EMC requirements

The transient sensitivity of the measuring instrument is according to the requirements of GB6833.4.

The conduction sensitivity of the meter is according to the requirements of GB6833.6.

The radiation interference of the measuring instrument is according to the requirements of GB6833.10.

6.4 performance testing

6.4.1 Working conditions

All tests should be carried out under the first chapter reference working conditions.This test is only included in the test of the main parts of the instrument.Other parts are not included such as transformer parameters testing, users can test under the specified conditions according to the indicators listed in this manual. Performance testing should be done in the first chapter under preheating conditions.

6.4.2 Test instruments and equipment are shown in the table below.

Serial number	Name of equipment		Technical requirement
	Standard capacitor	100pF	0.02%
		1000pF	
		10000pF	

1		10nF	Loss D known
		0.1uF	
		1uF	
2	AC Standard resistor	10Ω	0.02%
		100Ω	
		1kΩ	
		10kΩ	
		100kΩ	
3	DC Standard resistor	0.1Ω	0.02%
		1Ω	
		10Ω	
		100Ω	
		1kΩ	
		10kΩ	
		100kΩ	
4	Standard inductor	100μH	0.02%
		1mH	
		10mH	
		100mH	
5	Frequency meter		$(0 \sim 1000)\text{MHz}$
6	Digital multimeter		0.5%
7	Insulation resistance meter		500V 10 level
8	Withstand voltage leakage tester		$0.25\text{kW}(0 \sim 500)\text{V}$

6.4.3 Functional check
The function keys, monitors and terminals of the instrument should be able to function properly and correctly.

6.4.4 Test signal level
A digital multimeter is placed in the AC voltage range, with one test bar connected to the HCUR end of the meter and the other test bar to the ground end. The change level is:10mV,20mV,100mV,200mV,1V,2V，The reading value should conform to the requirements of the test signal level in this chapter.

6.4.5 Frequency
The ground terminal of the frequency meter is connected with the grounding end of the instrument.The terminal of the frequency meter is connected with the HCUR end of the capacitance tester.Changing the frequency:20Hz,100Hz,1kHz,10kHz,100kHz(JK2817N is 100kHz).The readings of the frequency meter should meet the requirements of the frequency of the test signal in this chapter.

6.4.6 Accuracy of measurement

The measuring instrument has many measuring parameters, and the basic measuring parameters

are R,L,C,D，The rest of the parameters can be measured everywhere from the above parameters,

so the accuracy measurement mainly on R, L, C, D measurement.

6.4.7 Capacitance C, loss D accuracy

Function   Cp-D
Test frequency   100Hz   1kHz   10kHz   100kHz Separate test
Level   1V
Range   AUTO
Bias   0V
Speed   Slow

Short circuit and open circuit should be cleared before testing. Access standard capacitor

100pF,1000pF,10nF,0.1uF,1uF，Changing the frequency，The error capacitance C between

instrument reading and standard value shall be within the allowable error range stipulated in this
chapter for C accuracy, and the loss D shall be within the allowable error range stipulated in this
chapter for D accuracy.

6.4.8 Inductance L accuracy

Test conditions:
Function   Ls-Q
Test frequency   100Hz   1kHz   Separate test
Level   1V
Range   AUTO
Bias   0V
Speed   Slow

Short circuit and open circuit should be cleared before testing. Access standard inductor

100μH,1mH,10mH,100mH，Changing the frequency,The error between the instrument reading

and the standard value shall be within the allowable error range stipulated in this chapter for L
accuracy.

6.4.9 Impedance Z accuracy

Test conditions:
Function   Z-θ

Test frequency   100Hz，1kHz，10kHz，100kHz Separate test

Level   1V

Range   AUTO
Bias   0V
Speed   Slow

Short circuit and open circuit should be cleared before testing. Access to AC standard resistor 10Ω,100Ω,1kΩ,10kΩ,100kΩ，Changing the frequency,The error between the instrument reading and the standard value shall be within the allowable error range specified in this chapter with respect to the accuracy of $|Z|$.

6.4.10 DC resistance DCR accuracy

Test conditions:
Function   DCR
Test frequency   -----
Level   -----
Range   AUTO
Bias   -----
Speed   Slow

Short circuit shall be cleared before testing. Access DC standard resistor 0.1Ω,1Ω,10Ω,100Ω,1kΩ,10kΩ,100kΩ，The error between instrument readings and standard values shall be within the allowable error range specified in this chapter for DCR accuracy.