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English

Revision B3

FIRMWARE REVISIONS
This manual applies directly to instruments that have the firmware **Rev. B2.x**

AT811 LCR Meter

User's Manual

Safety Summary

 Warning  Dangerous：

When you notice any of the unusual conditions listed below, immediately terminate operation and disconnect the power cable.
Please Contact Applent Instruments Incorporation sales representative for repair of the instrument. If you continue to operate without repairing the instrument, there is a potential fire or shock hazard for operators.

Instrument operates abnormally.
Instrument emits abnormal noise, smell, smoke, or a spark-like light during the operation.
Instrument generates high temperature or electrical shock during operation.
Power cable, plug, or receptacle on instrument is damaged.
Foreign substance or liquid has fallen into the instrument.

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. In addition it violates safety standards of design, manufacture, and intended use of the instrument.

Disclaimer	Applent Instruments assumes no liability for the customer's failure to comply with these requirements.
Ground The Instrument	To avoid electric shock hazard, the instrument chassis and cabinet must be connected to a safety earth ground by the supplied power cable with earth blade.
DO NOT Operate In An Explosive Atmosphere	Do not operate the instrument in the presence of inflammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
Keep Away From Live Circuits	Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.
DO NOT Service Or Adjust Alone	Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
DO NOT Substitute Parts Or Modify Instrument	Because of the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to an Applent Instruments Sales and Service Office for service and repair to ensure that safety features are maintained.

CERTIFIACTION, LIMITED & LIMITATION OF UABILITY

Applent Instruments, Inc. （shortened form **Applent**）certifies that this product met its published specifications at the time of shipment from the factory. Applent further certifies that its calibration measurements are traceable to the People's Republic of China National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility or by the calibration facilities of other International Standards Organization members.

This Applent instrument product is warranted against defects in material and workmanship for a period corresponding to the individual warranty periods of its component products. **The warranty period is 1 year and begins on the date of shipment.** During the warranty period, Applent will, at its option, either repair or replace products that prove to be defective. This warranty extends only to the original buyer or end-user customer of a Applent authorized reseller, and does not apply to fuses, disposable batteries or to any product which, in Applent's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling.

For warranty service or repair, this product must be returned to a service facility designated by Applent. The buyer shall prepay shipping charges to Applent and Applent shall pay shipping charges to return the product to the Buyer. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Applent from another country.

Applent warrants that its software and firmware designated by Applent for use with an instrument will execute its programming instruction when properly installed on that instrument. Applent does not warrant that the operation of the instrument, or software, or firmware, will be uninterrupted or error free.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside the environmental specifications for the product, or improper site preparation or maintenance.

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Applent Instruments, Inc.
Changzhou,
Jiangsu,
The People's Republic of China.
Rev.A2 January, 2005

Contents

1 Unpacking and Inspection

This chapter provides the following information:

- Packing List
- Power Supply
- Setup Fuse
- Operating Environment
- Cleaning
- How to Remove the Handler

1.1 Packing List

After you receive the instrument, carry out checks during unpacking according to the following procedure.

1．Check that the packing box or shock-absorbing material used to package the instrument has not been damaged

2．Check all the packaged items supplied with the meter have been provided as pert the specified optioned.

If it is damaged or less accessories, pls contact Applent Sales or Distributors.

1.2 Power Supply

Confirm that the power supplied to the AT811 meets the following requirements

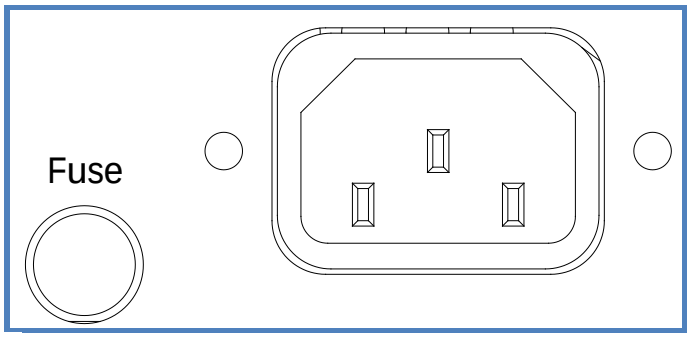
Voltage: 90V-260VAC
Frequency: 47-440Hz
Power: Max10VA

WARNING：

The ground wire should be earthed to avoid being electric shock.
If you change the power cord, make sure the ground wire earthed.

1.3 Setup Fuse

Figure 1-1 Fuse



Please use the following fuse type 250V,0.5A Slow-Blow

1.4 Operating Environment

Ensure that the operating environment meets the following requirements.

Temperature: 0°C ~ 55°C ,

Humidity: @40°C ≤95%RH

Technique Temperature: 23°C ±5°C

Technique Humidity: <70%RH

1.5 Cleaning

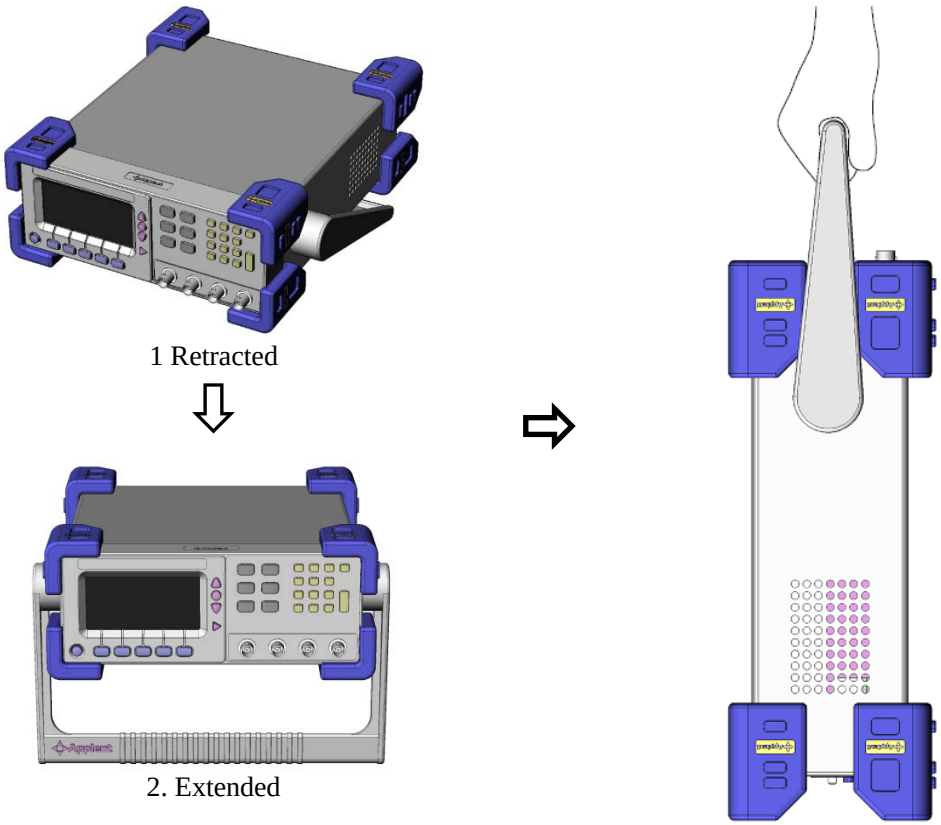
To prevent electrical shock, disconnect the AT811 power cable from the receptacle before cleaning.
Use a dry cloth or a cloth slightly dipped in water to clean the casing.
Do not attempt to clean the AT811 internally.

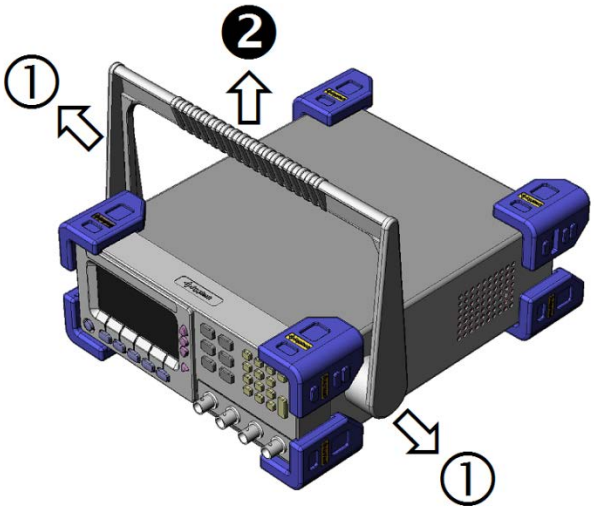
WARNING:
Don't Use Organic Solvents (such as alcohol or gasoline) to clean the Instrument

1.6 How to Remove the Handler

A handle kit is attached to AT811

Figure 1-2 Instrument Handle





Remove Handler (Lift the handle perpendicular to the unit while pulling it in the diredtion of 1)

2 General

This chapter provides the following information:

- Index
- Models Introduction
- Main Specification
- Feature Overview

2.1 Introduction

Thank you for purchasing AT811 LCR Meter.

The AT811 is a general-purpose LCR meter for incoming inspection of components, quality control, and laboratory use. The AT811 is used for evaluating LCR components, materials, and semiconductor devices.

The AT811 can output comparison/decision results for sorting components into 5 bins.

2.2 Main Specifications

AT811 specifications include all the basic technique data & range of testing. All these can be reached before put in market.

Complete technique parameters please reference addendum A

- Parameters: L, C, R, |Z| , D, Q
- Testing Frequency: 100Hz，120Hz，1kHz，10kHz Accuracy: ±0.02%
- Signal Level: 0.3V, 1.0V Accuracy: ±10%
- Testing Speed: Fast & Slow 5 times/second, 2 times/second
- Source Resistance: 30Ω &100Ω
- Range: 6 ranges, manual or automatic
- Equivalent: Serial & parallel
- Terminals: Five-terminal
- Accuracy: 0.25%

2.3 Main Function

- Display:
  LCD display, two parameters are displayed simutineously, mian parameters: 5 dgts; sub-parameters: 6 dgts

  Display A：L, C, R, Z

  Display B：Q, D

- Calibration Function:
  Short & Open sweep frequency for all ranges
  Short & Open zero-setting for each range

- Comparator (sorting) Function:
  5-bins sorting result: 3-bins GD、1-bin AUX & 1-bin UG

- Automatic Parameters Selection
  Selecting the Parameters automatically according to the DUT

3 Start-up

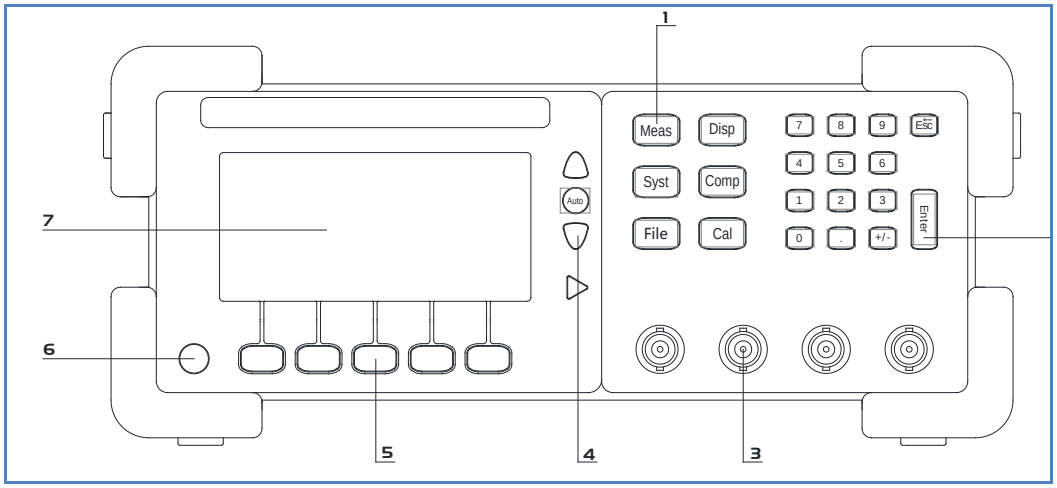
This chapter provides the following information:

- A tour of front panel——including key, VFD & Test terminal introduce
- A tour of rear panel—— power & interface introduce
- Power up—— Self-checking & preheated time introduce
- Information display——Concerning the tips appear during the start up & using
- Testing——Including how to connect to the test terminal, signal source, testing function, range setting, way of display & sorting system

3.1 A tour of front panel

3.1.1 Front Panel Overview

Figure 3-1 Front Panel Overview



1	Main Menu - To apply to switch 6 groups menu
2	Numeric Key - To apply to input numbers, ESC is used to return to the main menu
3	Unknown Terminal - To connect four-terminal test clip or Kelvin Clip
4	Range - Automatic /manual, manual range selection
5	Function Keys - Used to select menu item
6	Power Switch
7	Display Screen - Details please reference chapter "LCD"

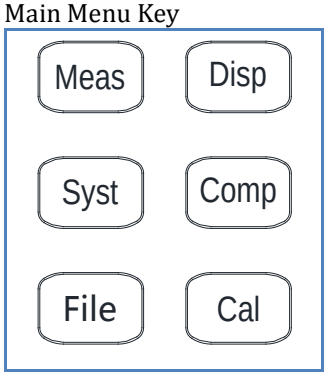
Please do not put DC voltage or current to the test terminal
Insure capacitor have been discharged totally before testing it.

Reference: Details please reference chapter "connection of test terminal"

Note:
The instruments can not be closed during the self-checking

3.1.2 Main Menu Key

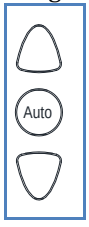
Figure 3-2 Main Menu Key



Key	Function
Meas	Test function menu. Including the following items: 1. FUNC Parameters Selection 2. EQU Equivalent Selection 3. DISP Δ% Display 4. FREQ Frequency Selection 5. LEVEL Level Seclection 6. RATE Testing Speed Selection 7. SRES Source Resistance Selection
Disp	To display the selected item on the bottom menu Note: Only useful to [Meas] Menu
Syst	System Setting. Include the following items: 1. BEEP Beep setting 2. COMP Comparator Switch 3. KEY-LED Function light switch 4. TONE Volume setting 5. ADMIN Menu Management（Password protection）
Comp	Comparator Setting
File	File management, include SAVE & ERASE Selection
Cal	Cal menu, including OPEN & SHORT sweep frequency zero-setting

3.1.3 Range Control key

Figure 3-3 Range Control Key

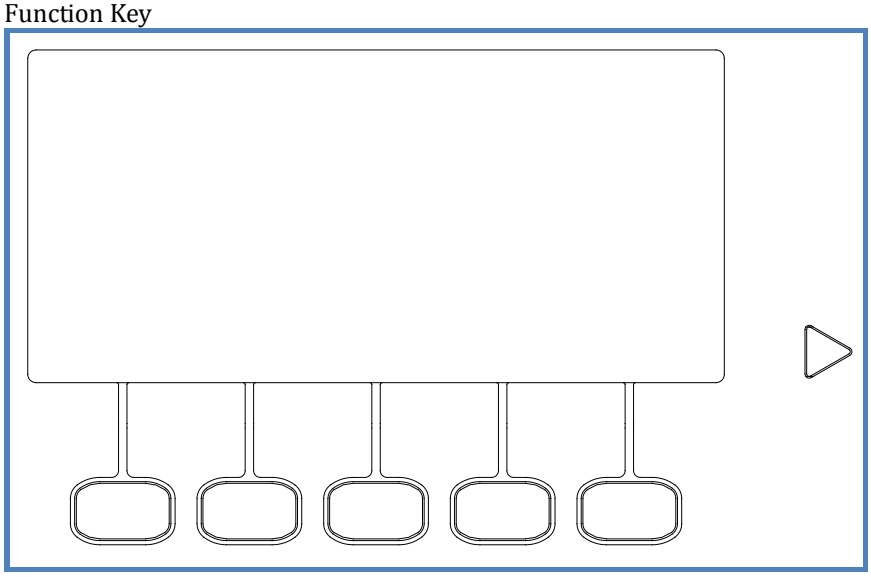


Menu	Function
Auto	Switch in both automatic & manual

	Up and Down key are used to select range

3.1.4 Function Key

Figure 3-4 Function Key

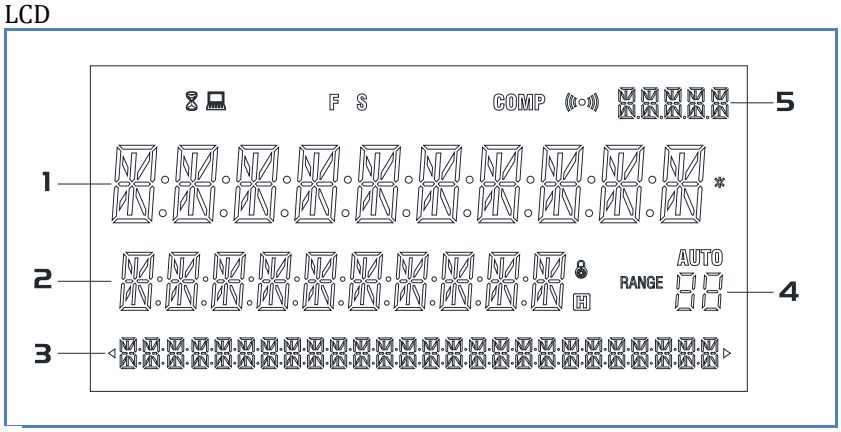


Function Key: Used to select menu items, and performed operation order.

 : Used to turn page

3.1.5 LCD

Figure 3-5 LCD

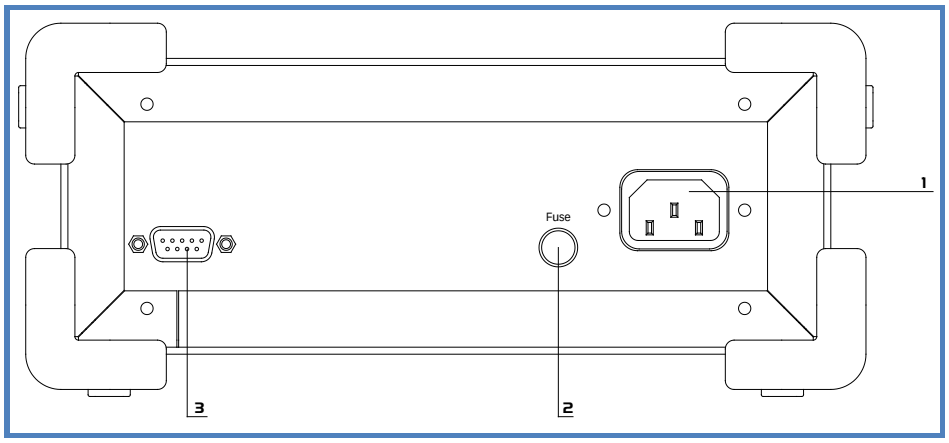


ID/No.	Function
	Remote Control
	Waiting, System busy
F S	Speed: **F**ast & **S**low
COMP	Comparator ON
	Beep ON
AUTO	Automatic Range
1	First Display Line
2	Second display line
3	Menu bar
4	Range Number

5	Comparator Resulte

3.1.6 Real Panel

Figure 3-6 Real Panel



No.	Function
1	Outlet 90VAC ~ 260VAC
2	Fuse Box
3	Not Connected

3.2 Power Up

3.2.1 Power-up Defaults

- The power-on default will be the last configuration you saved.
- Parameters
- Frequency
- Test Speed
- Equivalent Way；
- Source Resistance
- Test Level
- Comparator Setting
- Beep Setting

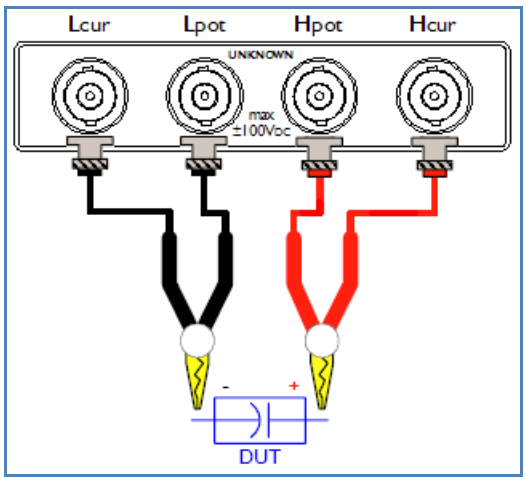
3.2.2 Warm-up Time

AT811 is ready to use as soon as the power-up sequence has completed. However, to achieve the accuracy rating, warm up the instrument for 30 minutes.

3.2.3 Connect to the Unknown Terminals

If you use the Kelvin Test Clip which together with the instruments to test, please according to the following steps to connect.

Figure 3-7 Unknown Terminals



Warning:
Do not apply DC voltage or current to the UNKNOWN terminal. Applying DC voltage or current may lead to device failure.
The capacitors should be discharged before connected to the terminals.

4 Configuration

This chapter provides the following information:

- How to configure the instruments.

4.1 Meas Key

Press Meas key, a measurement menu bar will be displayed, and Meas key is lighted.
The following settings are included:

【MEAS MENU】		
FUNC		Test Parameters
	L-Q	L-Q
	C-D	C-D
	R-Q	R-Q
	Z-D	Z-D
	Z-Q	Z-Q
	AUTO	Auto Parameter Select
EQU		Equivalent Mode
	SER	Serial
	PAL	Parallel
DISP		Display Mode
	DIR	Direct Display
	ABS	Absolute deviation (Δ)
	PER	Relative Deviation (Δ%)
FREQ		Frequency Select
	100	100Hz
	120	120Hz
	1KHZ	1kHz
	10KHZ	10kHz
LEVEL		Signal Level Select
	0.3V	0.3Vrms
	1.0V	1.0Vrms
RATE		Test Speed
	SLOW	Slow
	FAST	Fast
SRES		Source Resistance
	300	30Ω
	1000	100Ω

4.1.1 Testing Parameters【FUNC】

Testing parameters【FUNC】have the following:
L-Q, C-D, R-Q, Z-d, Z-Q, AUTO
AUTO item is automatic parameters selection
UNIT:

L	μH	mH	H
C	pF	nF	μF
R/Z	Ω	kΩ	MΩ

4.1.2 Equivalent Mode【EQU】

Equivalent way【EQU】includes two choices:

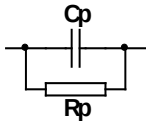
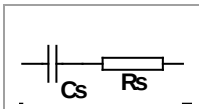
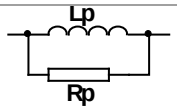
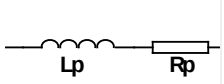
SER：Series Equivalent (Series abbr. SER)

PAL：Parallel Equivalent (Parallel abbr. PRL)

Actual capacitance, inductance and resistance are not the ideal purely reactive and purely resistive components, they are usually resistance and reactance components exist.
A real impedance component may be represented by ideal resistors and ideal reactors (inductors or capacitors) used to simulate the form of series or parallel.

AT811 can be used in the mathematical formula to convert, but the two forms are different. The inconsistency depends on the quality factor Q (or loss D)

Table 4-1 Transformational relation between series & parallel

Circuit Type		Loss Factor	Series & Paraller Transformation
C		$D=\frac{1}{2\pi f C_p R_P}=\frac{1}{Q}$	$C_S=(1+D^2)C_P$ $R_S=R_P D^2/(1+D^2)$
		$D=2\pi f R_S C_S=\frac{1}{Q}$	$C_P=1/(1+D^2)C_S$ $R_P=R_S(1+D^2)/D^2$
L		$D=\frac{2\pi f L_P}{R_P}=\frac{1}{Q}$	$L_S=1/(1+D^2)L_P$ $R_S=R_P D^2/(1+D^2)$
		$D=\frac{R_S}{2\pi f L_S}=\frac{1}{Q}$	$L_P=(1+D^2)L_S$ $R_P=R_S(1+D^2)/D^2$

Here: Subscript "s" is series form
Subscript "p" is parallel form

The above formula, should pay particular attention are: the conversion between serial and parallel relations with D^2 or Q^2 (Q=1/D)related. D^2 value directly affects the size of the size of its value, the following cases of capacitors description:

A capacitor, the series equivalent capacitance are Cs=0.1μF, and the loss were D1=0.0100, D2=0.1000, D3=1.0000, the formula under the table, parallel equivalent capacitance should be:
Cp1 = 0.09999 μF

Cp2 = 0.09901 μF
Cp3 = 0.05000 μF

Thus, when D< 0.01, Cs and Cp is basically the same, but >0.01, the difference will be obvious, such as D=0.1 hours, a difference of 1% D=1 when the difference between a times.

4.1.3 Display Mode【DISP】

Press 【DISP】to choose the main parameters display way:

DIR：Show, main parameters will display the actual value of DUT

ABS: Δ，absolute deviation of DUT will be displayed in the first line

$$\Delta = X_x - X_{std}$$

Xx： measured value

Xstd： nominal value

PER：Δ%，relative deviation of DUT will be displayed in the first line

$$\Delta\% = \frac{X_x - X_{std}}{X_{std}} \cdot 100\%$$

4.1.4 Frequency Select【FREQ】

Accuracy: ±0.02%
AT811provides 4-bin s test frequency:
100Hz，120Hz，1kHz，10kHz
In general, the higher frequency, the smaller capacitor value and inductor can be measured.

4.1.5 Signal Level【LEVEL】

Accuracy: ±10%
AT811 provides 2-bins test level:
0.3V &1.0V
If DUT does not have requirements about the test level, please setting1.0V

4.1.6 Test Speed【RATE】

AT811provides two speeds:
SLOW & FAST

4.1.7 Source Resistance【SRES】

AT811 provides two kinds source resistance:
30Ω & 100Ω

In general, 30Ω source resistance will be a better choice.

4.2 SYST Menu

Press Syst, **SYST** menu will be displayed in menu bar, **SYST** Key light is lit. Following settings are included in the system menu.

Table 4-2 [SYST] Menu list

【SYST MENU】		
BEEP		Beep Setting
	OFF	OFF
	P1	BIN1 GD
	P2	BIN2 GD
	P3	BIN3 GD
	AUX	AUX NG
	NG	NG
COMP		Comparator
	OFF	OFF
	ON	ON
AUX		AUX-BIN
	OFF	OFF
	ON	ON
TONE		BEEP TONE
	LOW	Low volume
	M1	Mid-1 volume
	M2	Mid-2 volume
	HIGH	High volume
LED		Key LED
	OFF	OFF
	ON	ON
RATE		Test Speed
	SLOW	Slow
	FAST	Fast
ADMIN		Administrator Menu (Password Protected)

4.2.1 Beep Setting

There have six choices for your reference:
OFF Beep OFF
P1 GD Bin-1 beep
P2 GD Bin-2 beep
P3 GD Bin-3 beep
AUX AUX (sub parameters NG) beep
OUT NG beep

4.2.2 Turn ON/OFF the comparator【COMP】

The build-in comparator can be turned off via COMP setting.
OFF Comparator OFF
ON Comparator ON
The mark of COMP displayed on the above of LCD screen means the comparator is turned on.

4.2.3 Turn on the AUX sorting【AUX】

AUX: AUX (sub-parameters) unqualified

OFF	Turn Off, displayed OUT while the sub parameters are unqualified.
ON	Turn On, displayed AUX while the sub parameters are unqualified.

4.2.4 Volume Control【TONE】

The volume of AT811 can be adjusted, there are four choices:

LOW	Low volume
M1	Middle volume 1
M2	Middle volume 2
HIGH	High volume

4.2.5 Turn off the function key-indicator light【LED】

Key light in the function key dynamically notes the position of every choice; you can set the light via these choices while it affects your vision.

OFF	Turn off the light
ON	Turn on the light

Note: Key light of the main function keys CANNOT be closed.

4.2.6 Administrator Menu【ADMIN】

The most important settings of the instruments are included in the administrator menu, and can only be used while the unusual, debugging, and calibration of the instruments.

Note: Password has been set for menu items to prevent error operation of the user, the password will not show in the User's Menu.
Please contact technology department if you have calibration aptitude.

4.3 COMP Menu

Press Comp key, comparator menu items will be diaplayed in menu bar, Comp light key is lit.
Comparator menu includes the following settings:

Table 4-3 [COMP] Menu list

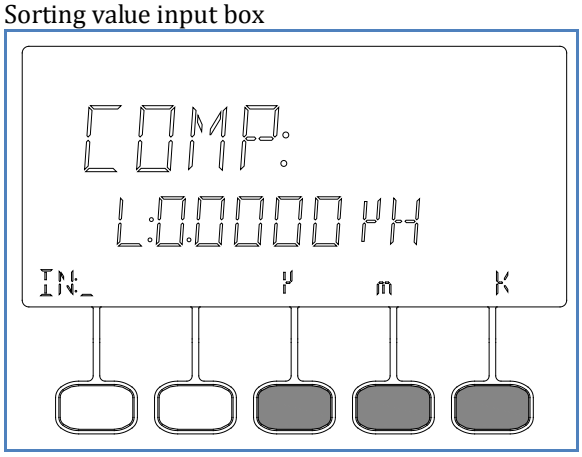
【COMP MENU】	
L:0.0000UH	Nominal Value of L
C:0.0000PF	Nominal Value of C
R:0.0000 Ω	Nominal Value of R
Z:0.0000 Ω	Nominal Value of |Z|
D~:0.0000	D: upper limit value
D_:0.0000	D: Low limit value
Q~:0.0000	Q: upper limit value

Q_:0.0000	Q: low limit value
P1~:0.0000	P1 upper limit value
P1_:0.0000	P1 low limit value
P2~:0.0000	P2 upper limit value
P2_:0.0000	P2 low limit value
P3~:0.0000	P3 upper limit value
P3_:0.0000	P3 low limit value

4.3.1 Input Value

Press the corresponding function key (the first or the fourth key of each page), enter input box.

Figure 4-1 Sorting value input box

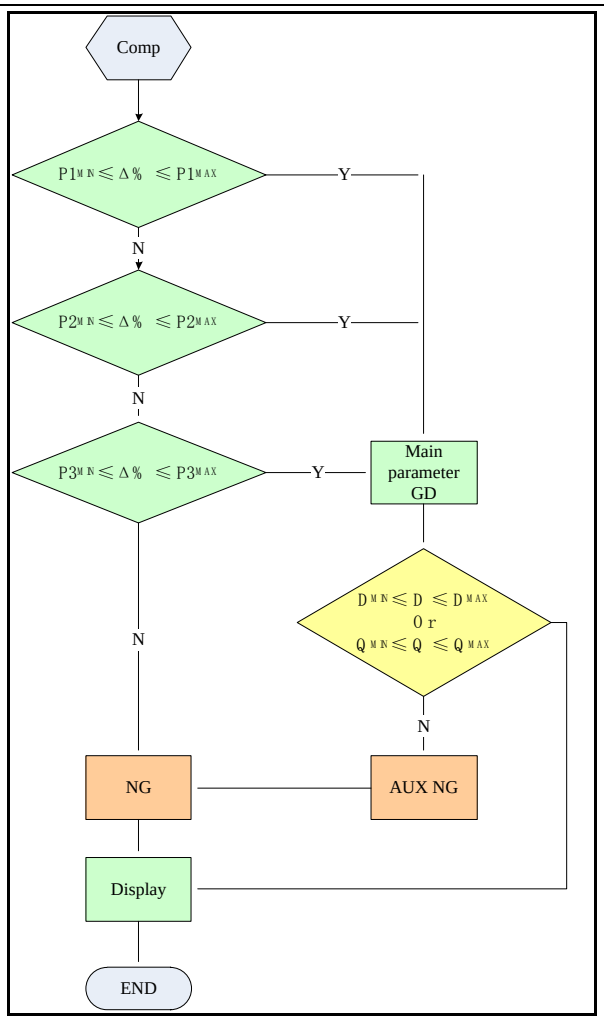


D,Q, P1, P2, P3 with no units, press Enter to complete the input.

4.3.2 Sorting Mechanism

Concerning the sorting mechanism of AT811, please reference the following pictures:

Figure 4-2 Sorting Flow Chart



AT811 Enhanced sorting judgment mechanism
P1, P2, P3 To indicate the NG/GD of main parameters, NG mark will be displayed in the sorting line while it is unqualified, after the sorting, if GD, P1-P3 will be displayed in the sorting line, continuously perform sub-parameters comparator.
To indicate GD/NG of sub-parameters, AUX will be displayed in the sorting line while it is unqualified.
NG will be displayed while one of them (sub & main parameters) is unqualified.

Several sorting indicators may appear:

P1	P2	P3	AUX	NG	
●	○	○	○	○	Main parameter P1 & sub parameter All GD
○	○	○	○	●	Main parameter NG
○	○	○	●	○	Main parameter P1 GD、Sub-parameter **NG**

4.4 [FILE] Menu

Press File key, File menu will be displayed in the menu bar，FILE key light is lit.

Table 4-4 [FILE] Menu list

FILE MENU	
SAVE	Save the setting
ERASE	Erase the setting, restore to default

File menu is used to save the amended data recently, and these settings can be saved while the next turn on.

Note:

Your settings will not be saved automatically, except the "file" menu perform "save" command, but zero-clearing value will be saved automatically after clearing.

4.5 CAL Menu

Press Cal key, Cal menu will be displayed in the menu bar , Cal key light is lit. Following settings are included in the calibration menu.

Table 4-5 [CAL] Menu list

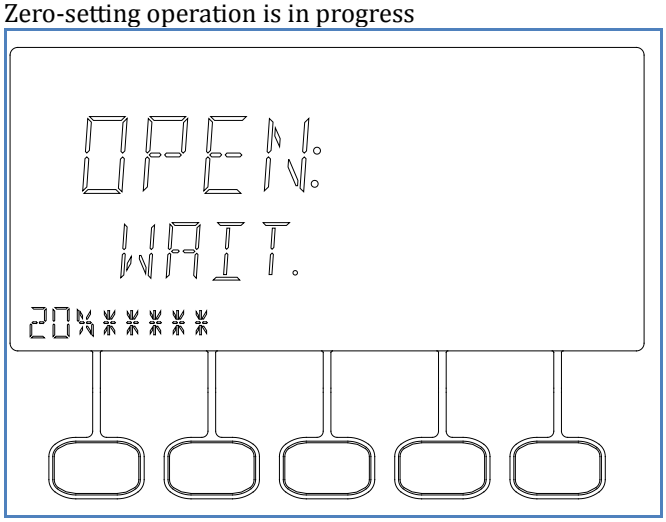
CAL MENU		Calibration Menu
	OPEN	Open sweep frequency clear-zero
	SHORT	Short sweep frequency clear-zero

Calibration menu is used to perform zero-setting, including open & short sweep frequency zero-setting.

Open sweep frequency clear-zero

Please keep the test terminal in open circuit, and then press OPEN -> OK to perform open-circuit clear-zero. Clear-Zero process is as follows:

Figure 4-3 Zero-setting operation is in progress

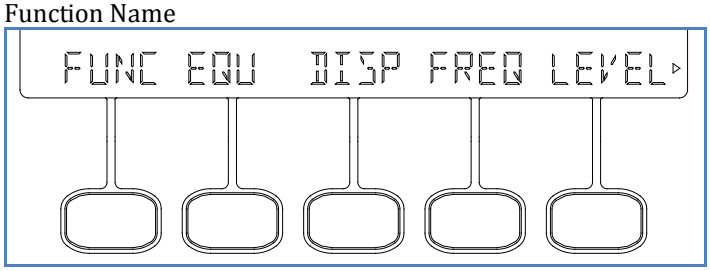


Short sweep frequency clear-zero:
Please connect the test terminal in short, press SHORT -> OK to perform short zero-setting.
Zero-setting value will be saved in file automatically.

4.6 DISP Key

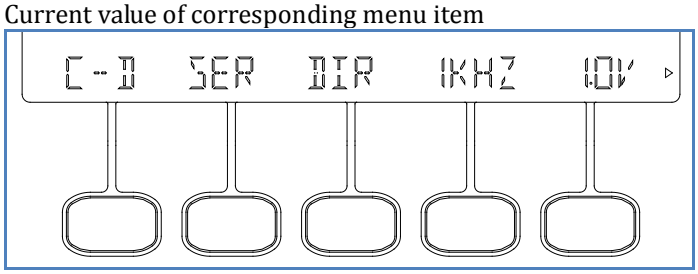
Display key is used to show the current setting value in the menu bar, not choice name, for example: In measuring menu, choice is displayed in name:

Figure 4-4 Function Name



Press **DISP**, key light is lit, current value of choice will be displayed in the corresponding position of the menu bar.

Figure 4-5 Current value of corresponding menu item



Note:

Not all the choices show the choice value, some command options can not been) show (such as OPEN , SHORT), others including ON/OFF options (BEEP, COMP, etc.) not been show, either.

4.7 Range Selection

There are six ranges:

Table 4-6 Ranges

Range NO.	Range Resistance
0	100kΩ
1	10kΩ
2	1kΩ
3	100Ω
4	31.6Ω
5	10Ω

Automatic range: AUTO indicator light is ON, meanwhile, AUTO displayed in the LCD means current range is automatic.
AT811will select the best range according to the impedance of DUT.
Manual range: select your desired range by up & down option key, indicator light key of AUTO key and AUTO in the LCD both in OFF means the instrument is in locked range state.
Test speed can be improved by manual range.

5 Specification

In Appendix A, you will learn the following content:

- Technique Data
- General Specifications
- Appearance & Dimension

5.1 Technique Data

The following accuracy can be reached while in the circumstances:
Temperature: 23℃±5℃
Humidity: ≤65% R.H.
Zero value adjustment: Open & Short circuit zero-setting before testing.
Warm-up time: >60 Mins
Calibration Time: 12 Monthes

Average accuracy of testing level: 10%
Average accuracy of testing frequency: 0.02%
Accuracy of test terminal: Basic accuracy: 0.25%

C: 0.25% (1+ Cx/Cmax+ Cmin/Cx)(1+Dx)(1+ks+kv+kf)
L: 0.25% (1+ Lx/Lmax+ Lmin/Lx)(1+1/Qx)(1+ks+kv+kf)
Z: 0.25% (1+ Zx/Zmax+ Zmin/Zx)(1+ks+kv+kf)
R: 0.25%(1+ Rx/Rmax+ Rmin/Rx)(1+Qx)(1+ks+kv+kf)
D: ±0.0020(1+ Zx/Zmax+ Zmin/Zx)(1+Dx+Dx^2)(1+ks+kv+kf)
Q: ±0.0025(1+ Zx/Zmax+ Zmin/Zx)(Qx+1/Qx)(1+ks+kv+kf)

Note

1. L/C/R/Z are relative error, D/Q are absolute error
2. Subscript “x” is measured value of the parameter, “max” is the maximum value, “min” is the minimal value.
3. ks is speed factor, kv voltage factor, kf is frequency factor

Following Max/Min value of the measurement parameters will affect the accuracy:

	100Hz	120Hz	1kHz	10kHz
Cmax	800μF	667μF	80μF	8μF
Cmin	1500pF	1250pF	150pF	15pF
Lmax	1590H	1325H	159H	15.9H
Lmin	3.2mH	2.6mH	0.32mH	0.032mH
Zmax/ Rmax	1MΩ			
Zmin/ Rmin	1.59Ω			

Test speed error factor ks:
ks=0
Test level error factor: kv
Test level, instrument set parameters’ signal level V (rms), measure unit: mV
1Vrms kv=0;
0.3Vrms kv=1;
Test frequency error factor kf:
f = 100Hz,120Hz ,1kHz: kf=0
f = 10kHz kf=0.5

5.1.1 General Specifications:

Screen: LCD display
Testing Parameters: L, C, R, Z, D, Q
Testing Level: 0.3Vrms, 1Vrms
Basic Accuracy: 0.25%

Measurement Range

L	100/120Hz 1kHz 10kHz	1μH – 9.999kH 0.1μH - 999.9H 0.01μH – 99.99H
C	100/120Hz 1kHz 10kHz	1p – 9.999mF 0.1p – 999.9μF 0.01p – 99.99μF
R、|Z|	1mΩ - 999.9MΩ	
D/Q	0.00001 – 99999	
Δ%	0.0001%~9999%	

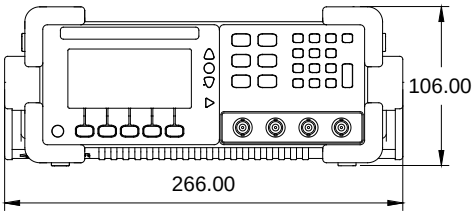
Display Digit: Main parameters: 5 dgt Sub Parameters: 6 dgt
Test Speed: Fast: 11 times/second, Slow: 5 times/second
Source Resistance: 100Ω & 30Ω
Max Reading: 33000
Range: Automatic & Manual
Equivalent Circuit: Series & Parallel
Correction: Open & Short sweep frequency zero-setting
Comparator: 5-bin P1, P2, P3, AUX, NG
Beep: P1, P2, P3, AUX, NG、OFF
Environment
Index: temperature 18℃~28℃ humidity ≤ 65% RH
Operation: temperature 10℃~40℃ humidity 10~80% RH

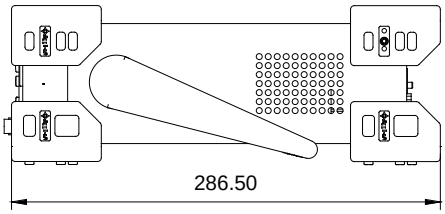
Power Supply: 90V ~ 260VAC 47Hz ~440Hz
Fuse: 250V 1A slow melt
Power: Max 10VA

Weight: about 2kg

Accessories: ATL501 Test Cable, AC Power Wire, Quality Assurance Certificate

5.1.2 Dimension





6 Model

In Appendix B, You will learn the difference of AT810 & AT811:

6.1.1 Model Comparation

	AT810	AT811
Parameters	L,C,R,Z,D,Q,θ(deg),θ(rad)	L,C,R,Z,D,Q
Basic Accuracy[Note]	0.l%	0.25%
Frequency	100Hz, 120Hz, 1kHz, 10kHz	100Hz, 120Hz, 1kHz, 10kHz
Level	0.1Vrms, 0.3Vrms, 1Vrms	0.3Vrms, 1Vrms
Speed	Fast: 15 times/second Middle: 5 times/second Slow: 2 times/second	Fast: 5 times/second Slow: 2 times/second
Display	VFD	LCD
Trigger Mode	Internal/Manual/External/Remote	Internal
Interface	RS232C HANDLER	None
Comparator	20 groups, 5-bin sortings	1 group, 5-bin sortings