1. General instructions:

Thank you for purchasing a MS5308 LCR digital bridge meter. The MS5308 LCR digital bridge meter is a professional instrument for measuring inductance, capacitance and resistance. It has many features, such as automatic identification, automatic measurement range, high measurement accuracy and speed, wide measuring range and so on.

An ordinary multimeter only provides DC mode for resistance measurement, while the MS5308 provides both AC and DC measurement modes. A variety of test frequencies up to 100Khz can be provided for inductance, capacitance and resistance in AC mode to meet the actual needs better.

Correct usage can ensure that the instrument will work precisely for a long time. Please read the instructions carefully before using and operate the instrument strictly in accordance with the instructions .

1.1. Panel description

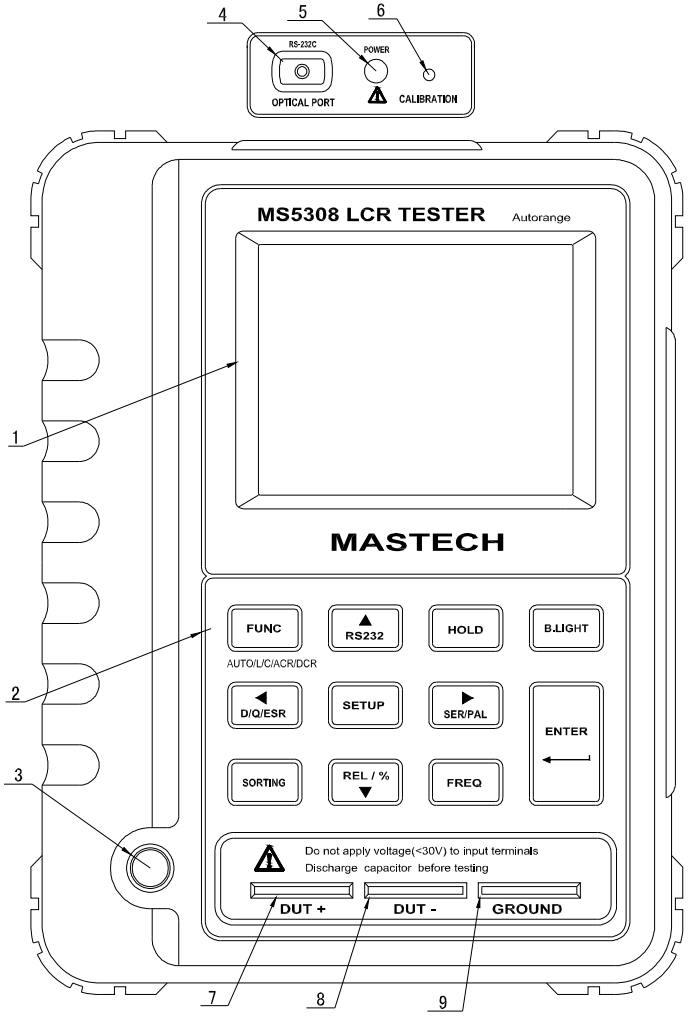
1 **Display**
2 **Functional buttons area**
3 **Power switch**
4 **IR Port**
5 **External power port**
6 **Calibration button port**
7 **DUT + jack**
8 **DUT - jack**
9 **Shielding grounding jack**

1.2. Inspection

When you get a new LCR meter, please check the instrument and its accessories. If something is damaged or missed, please contact the store you bought the instrument from for adjustment or replacement.

1.3 Accessories

MS5308 LCR digital bridge meter	Kelvin test clip (one pair)
SMD test probe	IR data line
Upper computer program CD	External power supply



MS5308 panel

2. Safety instructions:

Operating environment and condition:

- Elevation ＜2000 m
- Relative humidity (RH) ≦ 80%RH
- Operating temperature 0 – 40°C

Note: DO NOT input voltage at the measurement port. When measuring capacitance, please discharge first then measure, otherwise, the meter will be damaged.

Storage and maintenance: Do not use alcohol or other solvents to clean the meter. If it will not be used for long time, please remove battery and put the meter in a dry and clean environment.

3. Description:

3.1 Definition Description

APO: Auto power off

LCR: This character showing on the LCD means that the tester works in automatic identification mode

$L_{P:}$ Inductance parallel connection measurement mode

$L_{s:}$ Inductance series connection measurement mode

$C_{P:}$ Capacitance parallel connection measurement mode

$C_{s:}$ Capacitance series connection measurement mode

$R_{P:}$ Resistance parallel connection measurement mode

$R_{s:}$ Resistance series connection measurement mode

DCR: Resistance DC measurement mode

D: Wastage factor

Q: Quality factor

θ: Phase angle value

ESR: Equivalent resistance

DUT: Object for measuring

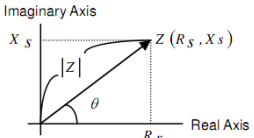
3.1 Impedance parameter description (see Figure Ⅰ)

$Z= R_s+jX_s=|Z|\angle\theta \quad R_{s-}=|Z|Cos\theta \quad X_s= |Z|Sin\theta$

$X_s /R_s=Tan\theta \quad \theta=Tan^{-1} (X_s /R_s)$

If $\theta > 0$, it means that the measured object is resistant, if $\theta < 0$, it

means that that the measured object is capacitive.



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3.2 Series-parallel connection mode description

This meter has series and parallel measurement modes. When the capacitance value of the measured object is large or inductance value is small, use the series mode for more accurate results. When the capacitance value of the measured object is small or inductance value is large, use the parallel mode for more accurate results. This meter can select the measurement mode automatically according to the measured object.

4. Functional characteristics description:

1. 19,999 (main)/1,999 (secondary) dual LCD display

2. LCR measures with automatic identification and automatic measurement range

3. L\C\R single measurement selection

4. Resistance measurement in DCR mode

5. D/Q/θ/ESR display on the secondary display

6. Series or parallel measurement modes are selectable

7. Comparison function under single measurement

8. Test frequency 100/120/1k/10k/100k is selectable in AC mode

9. The selection feature for measured components with the same series

10. Battery power display, auto power off if meter is not operated for 5 minutes.

11. With infrared transmission interface, the meter is secure (supporting hot plug). With special software, the meter is easily managed.

12. See table 1-3 for measurement accuracy and scope

Remarks: This accuracy is the measurement standard. In DUT jack, the meter-specific probe should be used if required. Measurement with probe may be influenced by external environment. To avoid inaccurate measurements, please keep away from strong magnetic sources.

Table 1 Resistance measurement scope

Measurem	Measurement	Measureme	Resolutio	Accuracy
	100Hz/120	200.00Ω	0.01Ω	1.0%+5d
	100Hz/120	2.0000KΩ	0.1Ω	0.3%+5d
	100Hz/120	20.000KΩ	1Ω	0.3%+5d
	100Hz/120	200.00KΩ	0.01kΩ	0.5%+5d
	100Hz/120	2.0000MΩ	0.1kΩ	1.0%+5d
	100Hz/120	20.000MΩ	1kΩ	1.0%+5d
	100Hz/120	200.00MΩ	0.1MΩ	2.0%+5d
	1kHz	20.000Ω	0.001Ω	1.0%+5d
	1kHz	200.00Ω	0.01Ω	0.3%+5d
	1kHz	2.0000KΩ	0.1Ω	0.3%+5d
	1kHz	20.000KΩ	1Ω	0.3%+5d
	1kHz	200.00KΩ	0.01kΩ	0.5%+5d
	1kHz	2.0000MΩ	0.1kΩ	1.0%+5d
R_S/R_P	1kHz	20.000MΩ	1kΩ	2.0%+5d
	1kHz	200.0MΩ	0.1MΩ	5.0%+5d
	10kHz	20.000Ω	0.001Ω	1.0%+5d
	10kHz	200.00Ω	0.01Ω	0.5%+5d
	10kHz	2.0000KΩ	0.1Ω	0.3%+5d
	10kHz	20.000KΩ	1Ω	0.5%+5d
	10kHz	200.00KΩ	0.01kΩ	1.0%+5d
	100kHz	20.000Ω	0.001Ω	1.0%+5d
	100kHz	200.00Ω	0.01Ω	1.0%+5d
	100kHz	2.0000KΩ	0.1Ω	1.0%+5d
	100kHz	20.000KΩ	1Ω	2.0%+5d

Note: This accuracy is the measurement standard when D <0.1, if D> 0.1, it should be multiplied by the extraction of a root of 1 + D^2

Table 2 Capacitance measurement scope

Measurem	Measurement	Measure	Resoluti	Accuracy
C_S/C_P	100Hz/120	20.000nF	1pF	1.0%+5d
	100Hz/120	200.00nF	0.01nF	0.5%+5d
	100Hz/120	2000.0nF	0.1nF	0.5%+5d
	100Hz/120	20.000uF	1nF	0.5%+5d
	100Hz/120	200.00uF	0.01uF	1.0%+5d
	100Hz/120	2000.0uF	0.1uF	2.0%+5d
	100Hz/120	20.00mF	0.1mF	2.0%+5d
	1kHz	2000.0pF	0.1pF	1.0%+5d
	1kHz	20.000nF	1pF	1.0%+5d
	1kHz	200.00nF	0.01nF	0.5%+5d
	1kHz	2000.0nF	0.1nF	0.5%+5d
	1kHz	20.000uF	1nF	0.5%+5d
	1kHz	200.00uF	0.01uF	1.0%+5d
	1kHz	2000.0uF	0.1uF	1.0%+5d
	10kHz	200.00	0.01pF	1.0%+5d
	10kHz	2000.0pF	0.1pF	1.0%+5d
	10kHz	20.000nF	1pF	1.0%+5d
	10kHz	200.00nF	0.01nF	1.5%+5d
	10kHz	2000.0nF	0.1nF	2.0%+5d
	100kHz	200.00	0.01pF	2.0%+5d
	100kHz	2000.0pF	0.1pF	1.0%+5d
	100kHz	20.000nF	1pF	2.0%+5d
	100kHz	200.00nF	0.01nF	5.0%+5d

Note: This accuracy is the measurement standard. When D <0.1, if D> 0.1, it should be multiplied by the extraction of a root of $1 + D^2$

Table 3. Inductance measurement scope

Measurem	Measurement	Measureme	Resoluti	Accuracy
L_S/L_P	100Hz/120	20.000mH	1uH	1.0%+5d
	100Hz/120	200.00mH	0.01mH	0.5%+5d
	100Hz/120	2000.0mH	0.1mH	0.5%+5d
	100Hz/120	20.000H	1mH	0.5%+5d
	100Hz/120	200.00H	0.01H	1.0%+5d
	100Hz/120	2000.0H	0.1H	1.0%+5d
	100Hz/120	20.000kH	1H	2.0%+5d
	1kHz	2000.0uH	0.1uH	1.0%+5d
	1kHz	20.000mH	1uH	0.5%+5d
	1kHz	200.00mH	0.01mH	0.5%+5d
	1kHz	2000.0mH	0.1mH	1.0%+5d
	1kHz	20.000H	1mH	1.0%+5d
	1kHz	200.00H	0.01H	2.0%+5d
	1kHz	2000.0H	0.1H	5.0%+5d
	10kHz	200.00 uH	0.01uH	1.0%+5d
	10kHz	2000.0uH	0.1uH	0.5%+5d
	10kHz	20.000mH	1uH	0.5%+5d
	10kHz	200.00mH	0.01mH	1.5%+5d
	10kHz	2000.0mH	0.1mH	2.0%+5d
	10kHz	20.000H	0.001H	5.0%+5d
	100kHz	20.000 uH	0.001uH	1.0%+5d
	100kHz	200.00 uH	0.01uH	2.0%+5d
	100kHz	2000.0uH	0.1uH	2.0%+5d
	100kHz	20.000mH	1uH	2.0%+5d
	100kHz	200.00mH	0.01mH	5.0%+5d

Note: This accuracy is the measurement standard. When D <0.1, if D> 0.1, it should be multiplied by the extraction

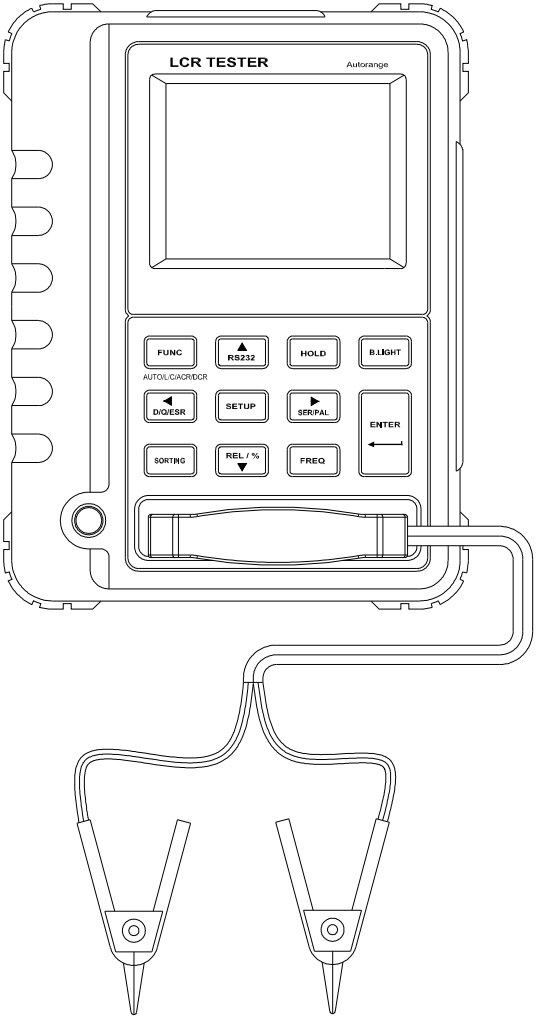
of a root of $1 + D^2$

5. Meter probe measurement

Use Kelvin clip or SMD clamp to connect according to the following diagram:

Schematic diagram for using SMD clamp to measure

Remarks: insert the plug correctly according to the diagram. Measurement can't be done if inserted incorrectly



Schematic diagram for using Kelvin clip to measure

Remarks: insert the plug correctly according to the diagram. Measurement can't be done if inserted incorrectly.

6 Measurement operation description:

6.1. Automatic measurement:

When the instrument is turned on, the instrument will enter automatic identification mode by default. At this time, insert the object to be measured to the measurement side. The instrument will automatically recognize that the object to be measured is capacitive resistance or inductor and display the measurement value in the main display, and display a corresponding D/Q/θ/value in the secondary display. In this mode, you can change measurement frequency by operating **Frequency**.

6.2. Single measurement

When the instrument is turned on, the instrument will enter automatic identification mode by default. At this time, you can select L, C, R, DCR and other single measurement modes by operating **Function** button. Read the measurement value on the LCD display after inserting the object to be measured and selecting the proper mode. In L, C, R mode, you can change the measurement frequency by operating **Frequency** button, and you also can operate **Series/Parallel** buttons to select parallel connection measurement or series connection measurement.

6.3. Comparison and selection

When the instrument is turned on, the instrument will be switched to single measurement mode for the objects to be selected. Connect the sample objects to be selected at measurement port. At this time, you can operate **Comparison** button to enter comparison and selection mode. PASS or FAIL, will display on the main display and the measurement value of current object will display on the secondary display. In this state, press **Setup** button

to select parameters, and the sample value and error will display on the LCD. You can modify sample value and error by operating direction arrows. Select the modification item by operating Ok button, and confirm the settings. Press **Comparison** button again to quit selection mode.

6.4. Deviation proportion measurement

When the instrument is turned on, the instrument will switch to single measurement mode for the objects to be tested. Insert reference object in measurement port, press **Relevant Measurement** button to save the current vale (D_{CUR}) as reference value (D_{REF}). At this time, **REL** will display on the LCD. Insert the object for measuring in the measurement port and press **Relevant Measurement** button again. At this time, **REL** will flash on the LCD the reference value will display on the main display, and the deviation proportion REL% will display on the secondary display, $REL\%=(D_{CUR}-D_{REF})/D_{REF}*100\%$. When D_{CUR} is more than two times of D_{REF}, OL% will display on the secondary display. Press **Relevant Measurement** button for more than 2 seconds to quit the measurement state.

6.5 Data Hold function: press **Hold** button to stop reading measurement value and show the current measurement value on the main display continuously. At this time, only **Communication** and **Backlight** keys are available. Press the **Hold** key again to return normal measurement mode.

7. Additional functions

7.1 Auto power off function: To prolong battery life, when the external power supply is not used, APO will display on the LCD, which means that auto power off is available. The instrument will automatically power off without any operation for 5 minutes.

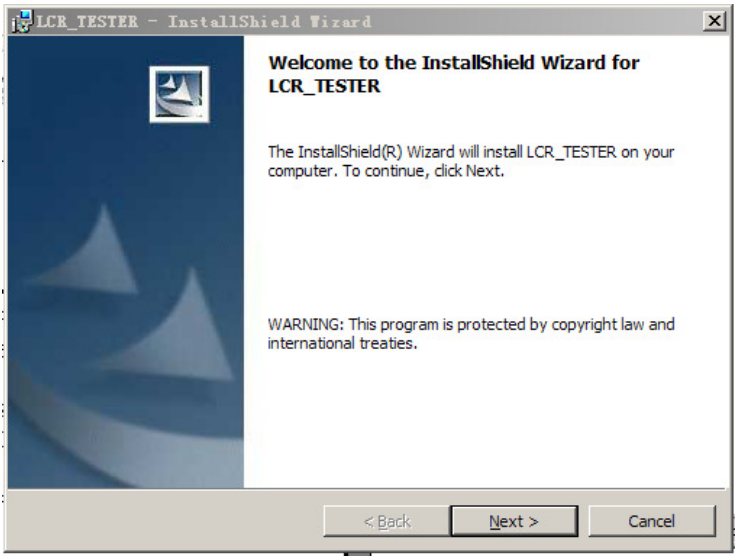
7.2 Backlight function: backlight will be enabled when you press **Backlight** button. Press **Backlight** button again to turn off the backlight. The backlight will turn off automatically after it is on for 60 seconds.

7.3 Battery power detection function: The meter has a battery power detection function. Battery power includes four levels and displays on the LCD screen. When  displays for battery, please replace battery. This meter uses 8 × 1.5V SIZEAA battery. Batteries with the same model should be used for battery replacement. Please remember that you can't use the meter until the rear cover is tightened.

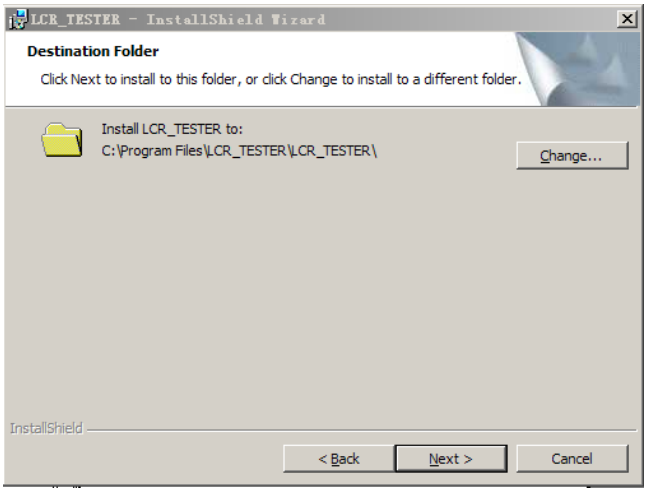
8 Upper computer software installation:

Open CD

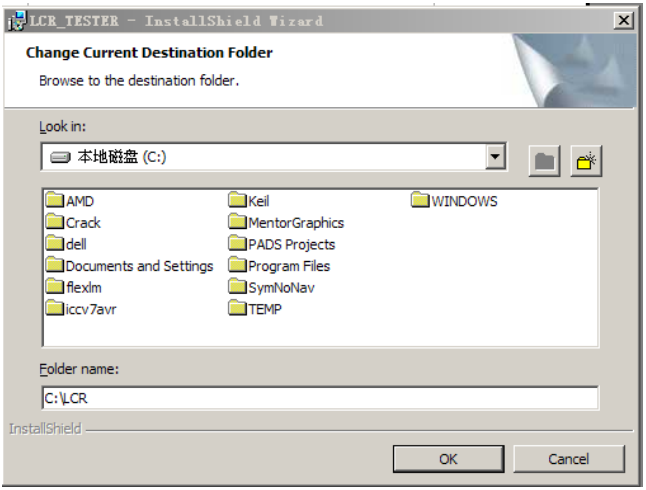
Click LCR_TERSTER.MSI to enter the following screen based on the diagram



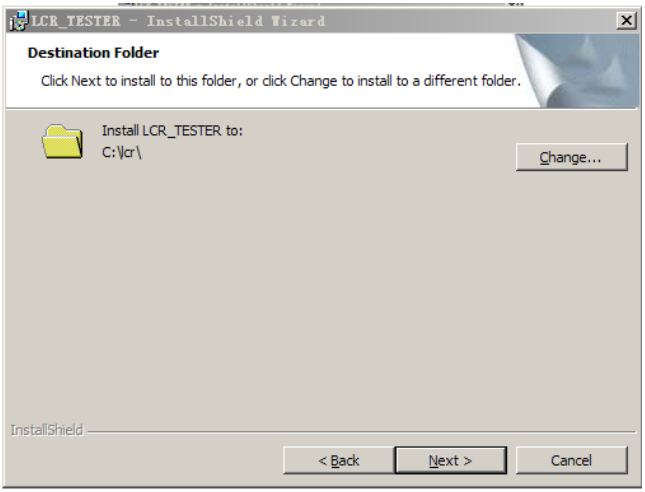
Click NEXT to enter the next screen



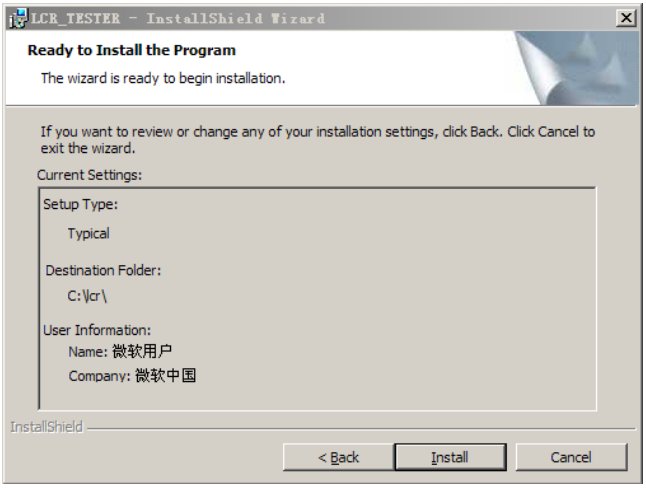
Click change to select the position to be changed



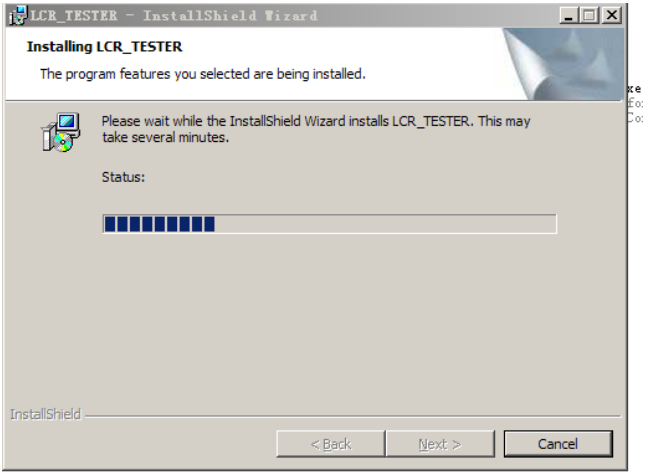
Click OK to enter the next screen based on the diagram

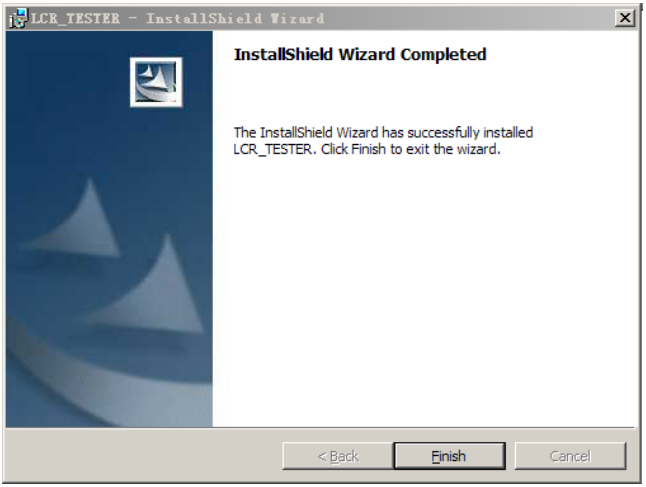


Click NEXT



Click INSTALL and start installing



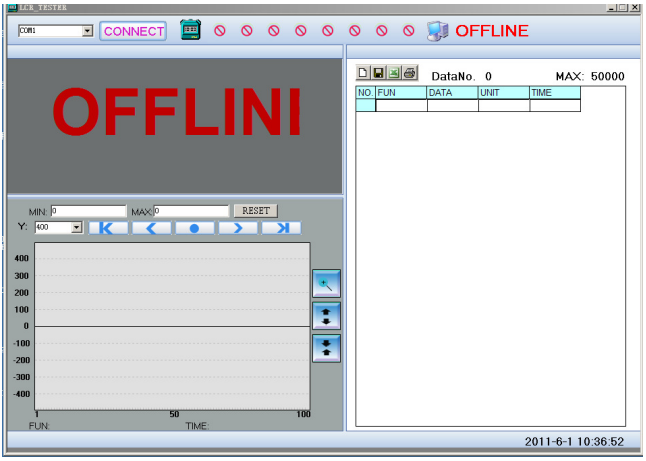


Click finish, and the following icon will show on the desk

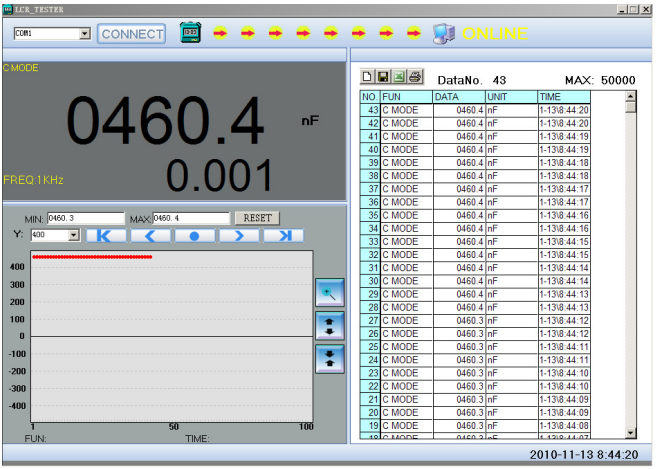
Installation complete

9 Data transmission:

Press **Communication** button. The RS232 symbol will show on the LCD display. At this time, you can send data via infrared port. Connect the infrared communication line between computer and MS5308. When the software is opened on the computer, the screen is shown as following Figure Ⅰ. Click CONNECT in the screen, the screen will be shown as following Figure Ⅱ, and start receiving data. The number of data recording groups can be up to 50000. Click the storage mark on the screen to save the recordings in the format of EXCEL or text.



Screen Ⅰ



Screen Ⅱ