User's Guide

RIGOL

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DM3058 Digital Multimeter

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Safety Notices

Review the following safety precautions carefully before operating the instrument to avoid any personal injuries or damages to the instrument and any products connected to it. To avoid potential hazards use the instrument as specified by this user's guide only.

The instrument should be serviced by qualified personnel only.

Avoid Fire or Personal Injury.

Use Proper Power Cord.

Only the power cord designed for the instrument as authorized in your country could be used.

Ground The Instrument.

The instrument is grounded through the grounding conductor of the power cord. To avoid electric shock the instrument grounding conductor(s) must be grounded properly before making connections to the input or output terminals of the instrument.

Observe All Terminal Ratings.

To avoid fire or shock hazard, observe all ratings and marks on the instrument. Follow the user's guide for further ratings information before making connections to the instrument.

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels **removed**.

Use Proper Fuse.

Please use the fuse that its voltage and current ratings as specified for the instrument.

Avoid Circuit or Wire Exposure.

Do not touch exposed connections and components when power is on.

Do Not Operate With Suspected Failures.

If suspected damage occurs with the instrument, have it inspected by qualified service personnel before further operations.

Keep Well Ventilated.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive atmosphere.

Keep Product Surfaces Clean and Dry.

The disturbance test of all the models meet the P/F values of A in the standard of EN 61326: 1997+A1+A2+A3, but can't meet the P/F values of B.

Input Terminal Protection Limitation

Protection limitation is defined for the input terminal:

1. **Main input (HI and LO) terminal**

   HI and **LO** terminals are used for Voltage, Resistance, Capacitance, Continuity, Frequency and Diodes measurement. Two protection limitations are defined:

   1) **HI-LO** protection limitation: 1000 VDC or 750 VAC. It is the maximum measurable voltage. The limitation can be expressed as 1000 Vpk.

   2) **LO**-ground protection limitation. **LO** terminal can safely "float" 500 Vpk relative to the ground.

   The maximum protection limitation of HI terminal relative to the ground is 1000 Vpk. Therefore, the sum of the "float" voltage and the measured voltage cannot exceed 1000 Vpk.

2. **Sampling (HI Sense and LO Sense) terminal**

   HI Sense and **LO Sense** are used for 4-Wire Resistance Measurement. Two protection limitations are defined:

   1) **HI Sense**-**LO Sense** protection limitation: 200Vpk.

   2) **LO Sense**-**LO** protection limitation: 2Vpk.

3. **Current input (I) terminal**

   I and **LO** terminal are used for current measurement. The maximum current which go through the **I** terminal is limited to 10A by the fuse on the rear panel.

NOTE: Voltage on the current input terminal corresponds to voltage on **LO** terminal. To obtain favorable protection, specified fuse should be used.

IEC Measurement Category II Overvoltage Protection

To protect against the danger of electric shock, DM3058 provides overvoltage protection for line-voltage mains connections meeting both of the following conditions:

1. The HI and LO input terminals are connected to the mains under Measurement Category II conditions, defined below.

2. The mains are limited to a maximum line voltage of 600 VAC.

WARNING: IEC Measurement Category II includes electrical devices connected to mains at an outlet on a branch circuit. Such devices include most small appliances, test equipment, and other devices that plug into a branch outlet or socket.

DM3058 may be used to make measurements with the HI and LO inputs connected

to mains in such devices (up to 600 VAC), or to the branch outlet itself. However, DM3058 may not be used with its HI and LO inputs connected to mains in permanently installed electrical devices such as the main circuit-breaker panel, sub-panel disconnected boxes, or permanently wired motors. Such devices and circuits are subject to overvoltage that may exceed the protection limits of DM3058.

NOTE：Voltages above 600 VAC may be measured only in circuits that are isolated from mains. However, transient overvoltage is also present on circuits that are isolated from mains. DM3058 is designed to safely withstand occasional transient overvoltage up to 4000Vpk. Do not use this equipment to measure circuits where transient overvoltage could exceed this level.

Safety Terms and Symbols

Terms in this Guide. These terms may appear in this manual:

⚠ **WARNING:** Warning statements indicate the conditions or practices that could result in injury or loss of life.

⚠ **CAUTION:** Caution statements indicate the conditions or practices that could result in damage to this product or other property.

⚠ **CAT I (1000V)** IEC Measurement Category II. The maximum voltage can be measured by HI-LO terminal is 1000Vpk.

⚠ **CAT II (600V):** IEC Measurement Category II. Inputs may be connected to mains (up to 600 VAC) under Category II over voltage conditions.

Terms on the Product. These terms may appear in this manual:

DANGER indicates an injury or hazard that may immediately happen.
DANGER indicates an injury or hazard that may immediately happen.
CAUTION indicates that a potential damage to the instrument or other property might occur.

Terms on the Product. These terms may appear in this manual:

Hazardous Voltage	**Refer to Instructions**	**Protective Earth Terminal**	**Chassis Ground**	**Test Ground**

DM3058 Digital Multimeter Overview

RIGOL DM3058 is an instrument especially designed for high-precision, multifunction, and automation measurements. It realized a combination of basic measurement function and multifold math functions as well as Random Sensor measurement function.

The DM3058 holds a high-resolution monochrome LCD display system with clear keyboard layout and operation hints to make it easier and agility to use. Besides, it can support multi-interface such as RS-232, USB, LAN and GPIB also for U-disk. Meanwhile, you can also operate it at will via Virtual Terminal Display and Control as well as Remote Network Access.

From the performance and characteristics given below, you will understand how a DM3058 satisfy your measurement requirements.

- Rear 5 ½ digits resolution.
- Measurement speed: 2.5, 20 and 120 reading/s.
- Double Display function enables to display two types of characteristic for one signal synchronously.
- Preset and Ordinary dual mode directly switch. Preset mode enable to stored configuration quickly.
- Three types of way for setting Power Supply: Power on, Default, Switch.
- Measuring Speed: 2.5reading/s, 20reading/s and 120reading/s.
- DC Voltage Range between 200mV and 1000V.
- DC Current Range between 200uA and 10A.
- True-RMS, AC Voltage Range between 200mV and 750V.
- True-RMS, AC Voltage Current between20mA and 10A.
- Resistance Range between 200Ω and 100MΩ, 2, 4 Wire Resistance Measurement.
- Capacitance Range between 2nF and 10000uF.
- Frequency Range between 20Hz and 1MHz.
- Continuity and Diode Test.
- Random Sensor Measurement function，Built-in Thermocouple compensate in Cold Terminal.
- Abundant Math operations：Max, Min, Average, P/F, dBm, dB, Relative Measurement, Standard Deviation and Vertical chart.

- Support USB, GPIB, RS-232 and LAN remote control as well as USB-TMC 488.2 Basic, LXI-C Criterion and SCPI Language.
- In possession of compatible Commands with both Agilent 34401A and Fluke 45.
- Three kinds of management for Power Supply include PwrOn, Default and Power.
- Built-in 10 groups of Save Configuration could be easily Save or Recall and Config by Remote Control System.
- Configuration clone for backup all the configuration within instrument into other DM3058 via U-disc or Clone.
- Chinese and English Menu and Help System Online.
- Provides with Control Software on PC and Edit Software for Random Sensor

Structure of this Document

Chapt 1 Quick Start

Guide you to prepare your DM3058 and know about the Front/Real Panel and User interface.

Chapt 2 Panel Operation

Introduce you how to operate DM3058 via Front Panel.

Chapt 3 Application Examples

Introduce you how to use strong measurement functions of this instrument easily through examples.

Chapt 4 Troubleshooting

Provide you some general Troubleshooting.

Chapt 5 Characteristics

List common specifications and characteristics from DM3058.

Chapt 6 Appendix

Information about accessories, warranties, services and supports and the like.

Contents

Chapter 1   Quick Start

- General Inspection

- Handle Adjustment

- The Front Panel

- The Rear Panel

- User Interface

General Inspection

Please inspect you new DM3058 Digital Multimeter according to the following steps:

1. **Inspect the shipping container for damage.**
   Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically.

2. **Check the accessories.**
   Accessories supplied with the instrument are listed in "DM3058 Accessories" at Appendix A of this guide.
   If the contents are incomplete or damaged, please notify the **RIGOL** Sales Representative.

3. **Inspect the instrument.**
   In case of any damage, or defect, or failure, notify the **RIGOL** Sales Representative.
   If the shipping container is damaged, or the protective material shows signs of stress, notify the carrier as well as your **RIGOL** sales office. Keep the shipping materials for the carrier's inspection.

   RIGOL offices will arrange reparation or replacement at **RIGOL**'s option without waiting for claim settlement.

Handle Adjustment

In order to adjust the handle position of DM3058 Digital Multimeter, please grip the handle in both sides and pull it outward. Then, rotate the handle to the desired position as shown in Figure 1-1.
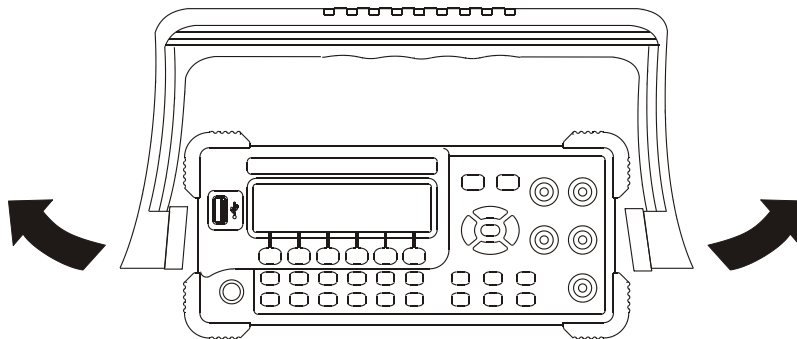

Figure 1-2 Adjust Handle

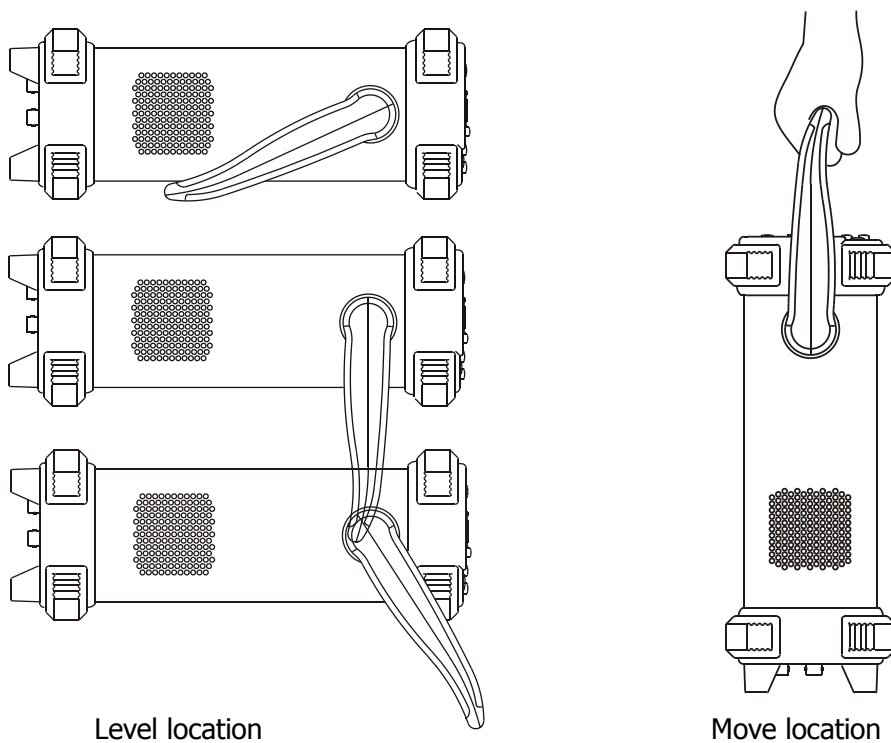Level location   Move location

Figure 1-3 Adjustable location of Handle

The Front Panel

It is very important to get familiar with the front panel of a new DM3058. This section gives an introduction of operation and function of the Front Panel.

The front panel of the DM3058 (as shown in Figure 1-4) consists of multi-function keys such as 6 Menu Keys under the screen, 12 Function keys and Directive keys, which can help you enter into different Function Menu or apply specific Function easily.
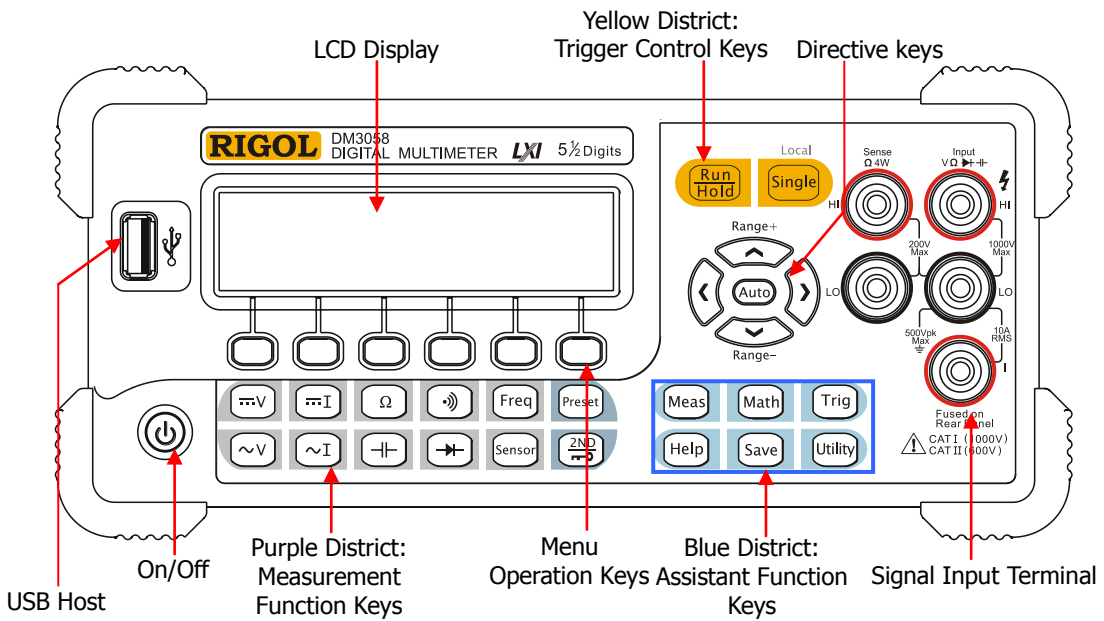
Figure 1-5 The Front Panel

The Rear Panel

Equipped with multifold communication interface for DM3058, it can meet user's requirements for the interface.
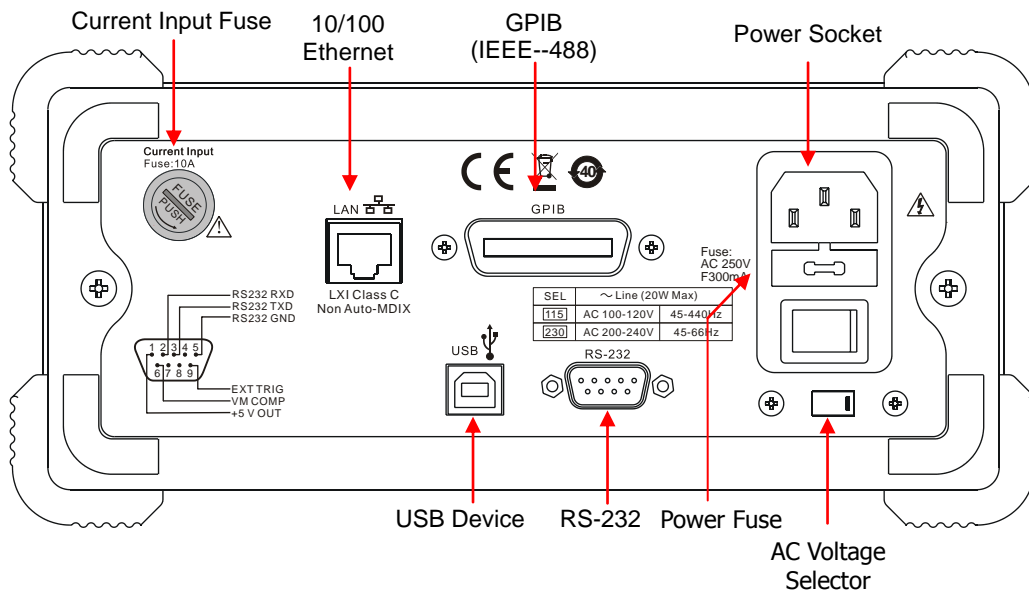
Figure 1-6 The Rear Panel

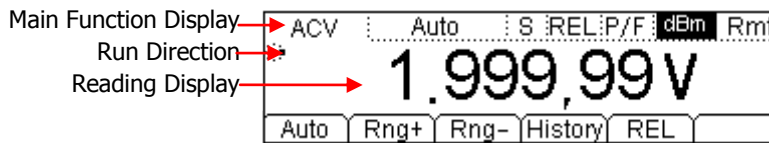# User Interface

Double Display
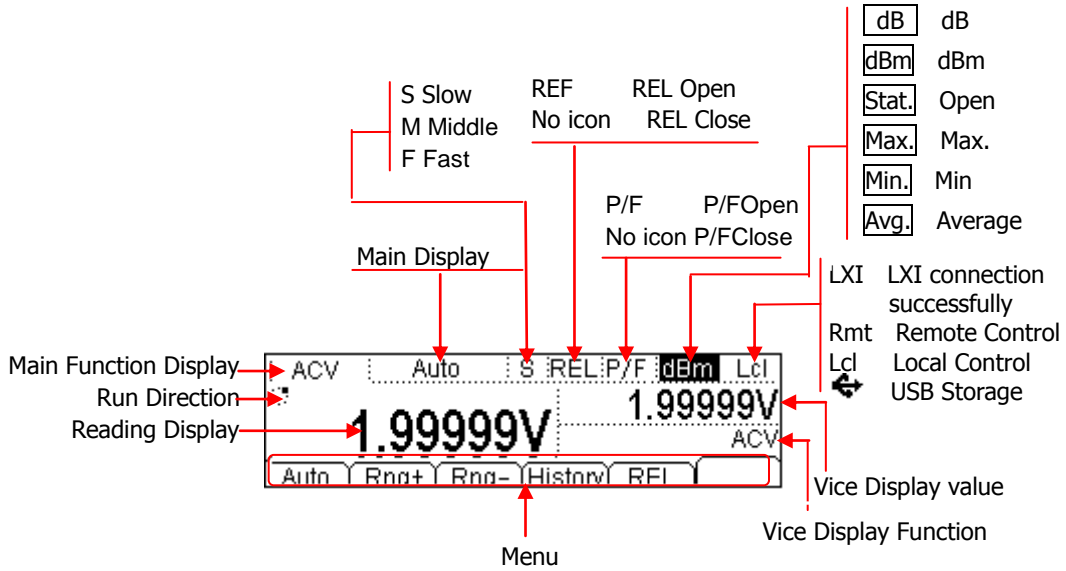
Single Display

Figure 1-5 User Interface

Chapter 2   Front Panel Operation

- To Select Range
- To Select Measurement Rate
- To Measure DC Voltage
- To Measure AC Voltage
- To Measure DC Current
- To Measure AC Current
- To Measure Resistance
- To Measure Capacitance
- To Test Continuity
- To Check Diodes
- To Measure Frequency and Period
- To Measure Sensor
- Preset Mode
- Secondly Function
- To Control Trigger Options
- To Set up Measurement Parameters
- Math Functions
- To Set Up Trigger Parameters
- Store and Recall
- To Set Up the Utility
- How to Use the Built-in Help System

To Select Range

For DM3058, appropriate Range could be selected according to the signals input by "Automatic" or "Manual". In Manual mode, you can obtain higher Reading precision via Range select key on the right side of the Front Panel. Please refer to the following figure.
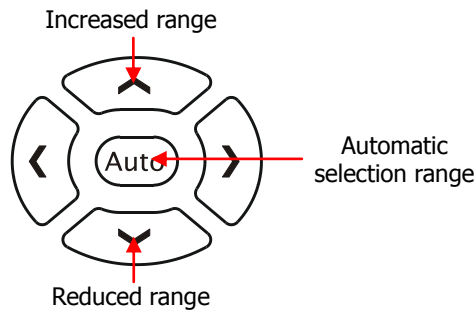
Figure 2-1 Range select keys

Select Methods 1::
Via Function keys on the Front Panel
Auto Range: Press (Auto) to start Auto Range, meanwhile Manual function is forbidden.
Manual Range: Press Up or Down directive keys to increase or reduce ranges gradually, at this moment, Auto Range is forbidden.

Select Methods 2:
Via soft keys on the Measurement main interface shown in Fig 2-2
Auto Range: Press Auto to start Auto Range, meanwhile Manual function is forbidden.
Manual Range: Press Rng$^+$ or Rng$^-$ to choose required range manual, at this moment, Auto Range is forbidden.
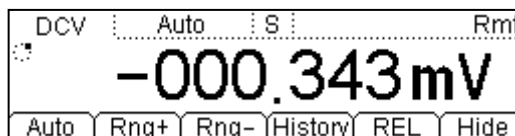
Figure 2-2 Choice Range Options Menu

Explanations：

● When the input signal is beyond the current scope of the measurement range, the multimeter will show "OVER RANGE".

● After restarting and Remote being replacement, range options will turn back to default "Automatic".

● You are suggested to select Auto Range so as to protect the instrument against damage and get exact datum as much as possible when it is hard to predict the range of measurement.

● The range is fixed during testing the Continuity and checking the Diodes, The range of Continuity is selected as 2KΩ while the Diodes are 2V$_{DC}$.

NOTE
Other functions of the directive keys:

● In the Save interface, Up and Down keys are used to select address for saving files.

● During inputting data, Up and Down keys are used to change the selected value. Each press for up key, value will be increased 1, vice versa.

● At the input interface of data, Left and Right keys are used to switch the number of a numerical value. Each press for Left key, former number will be selected, vice versa.

To Select Measurement Rate

DM3058 Multimeter provides three types of Measurement Rate: 2.5reading/s, 20reading/s and 120reading/s.

2.5 Reading/s belongs to Slow Rate; the mark of Status Bar is "S" and the rate of refurbishing shows 2.5Hz.

20 Reading/s belongs to Middle Rate, the mark of Status Bar is "M" and the rate of refurbishing shows 20Hz.

120 Reading/s belongs to Fast Rate, the mark of Status Bar is "F" and the rate of refurbishing shows 50Hz.

Measurement Rate could be controlled by Left and Right direction key. Each press for Left key, one level will be increased for rate, vice versa.
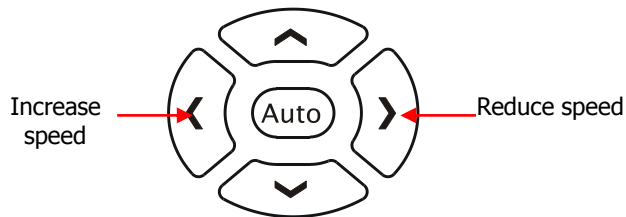
Figure 2-3 Keys for choosing Measurement Rate

Explanations

1. Three Reading rates are available for DCV、ACV、DCI、AC and Ohm

2. To set as linkage for both Reading resolution and Reading (measurement) rate. 2.5 Reading/s belongs to 5.5 digits resolution.

- Both 20 Reading/s and 120 Reading/s belong to 4.5 digits resolution.
- Sensor shows 5.5 digits as a fixation, both "M" and "S" Rate can be chosen.
- Both Diode and Continuity are fixed as 4.5 digits resolution and "Fast" Rate to show or select.
- Freq function is fixed as 5.5 digits resolution to show, "Slow" Rage.
- Cap function is fixed to 3.5 digits resolution to show, "Slow" Rage.

Basic Measurement Functions

DM3058 contains following basic functions:

- To Measure DC Voltage

- To Measure AC Voltage

- To Measure DC Current

- To Measure AC Current

- To Measure Resistance

- To Measure Capacitance

- To Test Continuity

- To Check Diodes

- To Measure Frequency and Period

- To Measure Sensor

To Measure DC Voltage

DM3058 Multimeter enables to measure DC Voltage up to 1000V. For the details about how to connect and measure please refer to the following steps.

Operating Steps:

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO as shown in Figure 2-4.

Figure 2-4 Sketch map for connecting

2. Press ⌷ on the Front Panel to enter into the DC Voltage Measurement interface.

Figure 2-5 DC Voltage Measurement Interface

3. Choose a proper Voltage range according to the measured circuit

Table 2-1 Measurement Characteristics of DC Voltage

Ranges*	200mV, 2V, 20V, 200V, 1000V
Input Protection	1000V on all ranges (HI Terminal)
Configurable Parameters	Range, DC input impedance, Null value

NOTE*: All the ranges enable to obtain 20% value higher than original except 1000V, besides, both Manual and Auto are available for setting every range. When inputting range is higher than 1000V at 1000V Level, "Over range" will be shown on the screen. 1000V input protection exists in every range.

4. Set the DC input impedance

   Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

5. Set Relative Value (Optional)

   Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

6. Select required measurement ratio by using Left or Right direction keys and read the measurement result.

7. View Historical Measurement data

   Press History to enter into the following interface and check the data getting from this measurement and saved.

Measurement	DCV
Range	200mV
Records	259
Info	List	HistoG	Update	Save	←
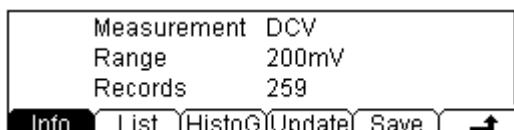
Figure 2-6   View Interface of History data

There are three types of way for viewing historical date: "Info"," List" and HistoG. Press Save after checking, by pressing Update, the History information will be refreshed to be current newest information.

To Measure AC Voltage

DM3058 Multimeter enables to measure AC Voltage up to 750V. For the details about how to connect and measure please refer to the following steps.

Operating Steps:

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO as shown in Figure 2-7.
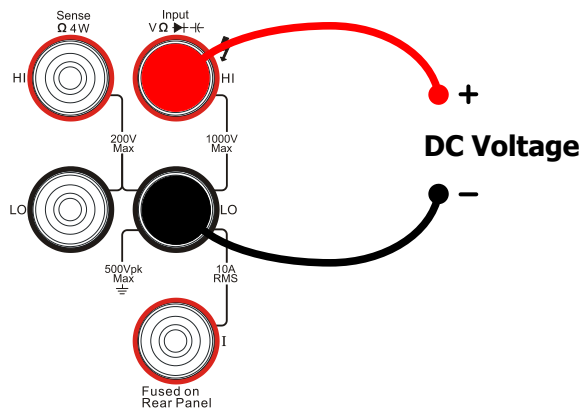

Figure 2-7 Sketch map for connecting

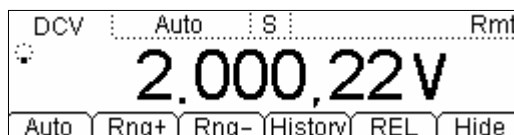2. Press 〜V to enter into the AC Voltage Measurement interface.

Figure 2-8 AC Voltage Measurement Interface

3. Choose a proper Voltage range according to the measured circuit

Table 2-2 Measurement Characteristics of AC Voltage

Ranges*	200mV, 2V, 20V, 200V, 750V
Input Protection	750V$_{RMS}$ on all ranges (HI Terminal)
Configurable Parameters	Range, DC impedance, Null value

NOTE*: All the ranges can obtain 20% value higher than original except 750V,.
Besides, both Manual and Auto are available for setting every range. When inputting range is higher than 750V at 750V Level, it will indicate "Over range".
1400V input protection exists in every range.

4.   Set Relative Value (Optional)
     Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

5.   Select required measurement ratio by using Left or Right direction keys and read the measurement result. Then, press 2ND and Freq to get the frequency value measured form AC signal.
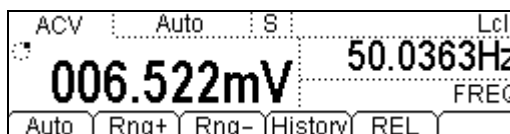
Figure 2-9
Double interface of AC signal measurement

6.   View Historical Measurement data
   Press History to enter into the following interface and check the data getting from this measurement and save.

Figure 2-10
View interface of history information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking. By pressing Update, the History information will be refreshed to be current newest information.

To Measure DC Current

DM3058 Multimeter enables to measure DC Current up to 10A. For the details about how to connect and measure please refer to the following steps.

Operating Steps:

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO as shown in Figure 2-11.
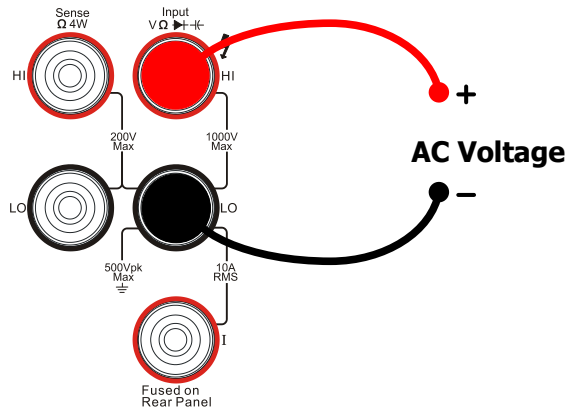

Figure 2-11 Sketch map for connecting

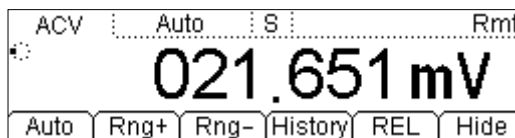2. Press ⌷ to enter into the DC Current Measurement interface.

Figure 2-12 DC Current Measurement Interface

3. Choose a proper Current range according to the measured circuit.

Table 2-3 Measurement Characteristics of DC Current

Ranges*	200µA, 2mA, 20mA, 200mA, 2A, 10A
Input Protection	10nA(Real Panel), 250V(Fuse),12A(Inside the instrument)
Configurable Parameters	Range, Null value

NOTE*: All the ranges enable to obtain 20% value higher than original except 10A. besides, both Manual and Auto are available for setting every range.

4. Set Relative Value (Optional)

    Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

5. Select required measurement ratio by using Left or Right direction keys and read the measurement result. Then, press $\boxed{\frac{2ND}{\leftrightarrow}}$ and $\boxed{Freq}$ to get the frequency value measured form AC signal.

6. View History data

    Press History to enter into the following interface and check the data getting from this measurement and save.

Measurement	DCI
Range	200uA
Records	187

Info	List	HistoG	Update	Save	⬏

Figure 2-13

View Interface of History Information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking. By pressing Update, the History information will be refreshed to be current newest information.

To Measure AC Current

DM3058 Multimeter enables to measure AC Current up to 10A. For the details about how to connect and measure please refer to the following steps.

Operating Steps:

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO as shown in Figure2-14.
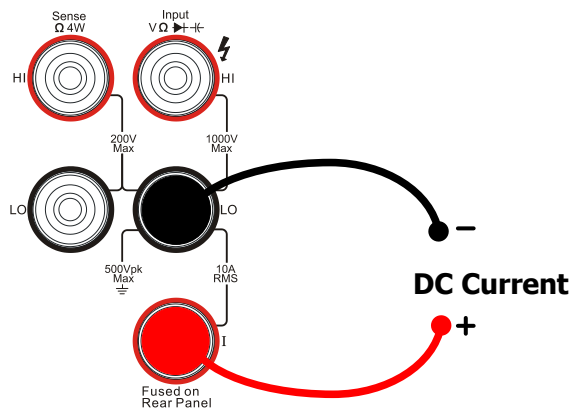

Figure 2-14 Sketch map for connecting

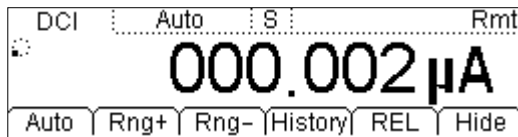2. Press ⌐~I⌐ to enter into AC Current Measurement interface.
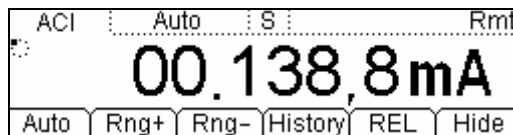
Figure 2-15 AC Current Measurement Interface

3. Choose a proper Current range according to the measured circuit

Table 2-4 Measurement Characteristics of AC Current

Ranges*	20mA, 200mA, 2A, 10A
Input Protection	10A(Real Panel), 250V(Fuse), 12A(Inside the instrument)
Configurable Parameters	Range, Null value

NOTE*: All the ranges enable to obtain 20% value higher than original except 10A. besides, both Manual and Auto are available for setting every range.

4. Set Relative Value (Optional)
    Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

5. Select required measurement ratio by using Left or Right direction keys and read the measurement result.

6. View measured history data
    Press History to enter into the following interface to check the data getting from this measurement and save.


```
Measurement  ACI
Range        20mA
Records      107
Info   List  HistoG Update  Save    ⬆
```
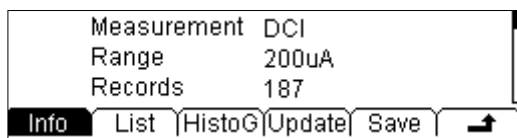
Figure 2-16 View interface of history information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking, by pressing Update, the History information will be refreshed to be current newest information.

To Measure Resistance

The following shows the system connections and selection of measurement functions. The practice provides a guide for getting familiar with the Resistance measurement technique. Resistance measurement methods include **2-Wire Resistance Measurement and 4-Wire Resistance Measurement**, and will be introduced separately.

2-Wire Resistance Measurement

Operating Steps：
1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO as shown in Figure 2-17.
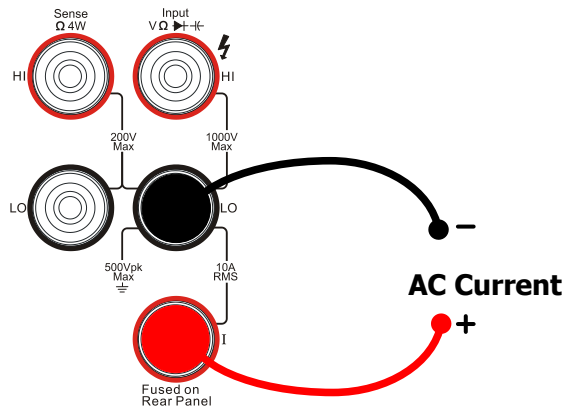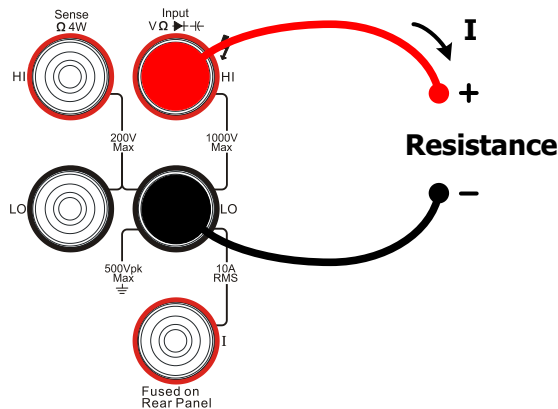

Figure 2-17 Sketch map for connecting

2. Press $\boxed{\Omega}$ and select 2-Wire Resistance Measurement Mode to enter following interface.
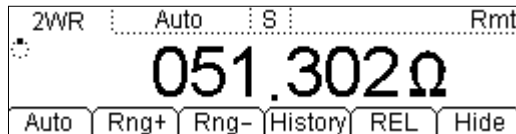
Figure 2-18
2-Wire Resistance Measurement Interface

3. Choose a proper Resistance range according to its scope.

Table 2-5 Measurement Characteristics of Resistance

Ranges*	200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 10MΩ, 100MΩ
Open-circuit Voltage	<8V
Input Protection	1000V on every range (HI Terminal)
Configurable Parameters	Range, Null value

NOTE*: All the ranges enable to obtain 20% ranges higher than original; besides Both Manual and Auto are available for setting every range.

4. Set Relative Value (Optional)

Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

5. Select required measurement ratio by using Left or Right direction keys and read the measurement result.

6. View measured history data

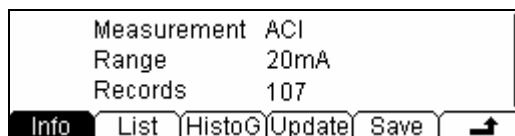Press History to enter into the following interface to check the data getting from this measurement and save.

```
Measurement  2WR
Range        200Ω
Records      1
Info   List  HistoG Update  Save    ↲
```

Figure 2-19

View interface of history information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking, by pressing Update, the History information will be refreshed to be current newest information.

> **NOTE**
> You are suggested to make use of Relative function when measuring small resistance to reduce or escape impedance error from Test leads.

4-Wire Resistance Measurement

When the measured resistance is smaller than 100kΩ, if both the resistance of Test leads and the contact resistance between probe and testing point are too big to be ignored as comparing with measured resistance, the error will be increased provided that you insist on measuring by via 2-Wire Resistance. So please change it to 4-Wire.

Operating Steps:
1. Connecting the red leads (Test leads) to Terminal Input-HI and HI Sense and black leads to Terminal Input-LO and LO Sense as shown in Figure2-20. That is connecting the Test leads to both side of the measured resistance.
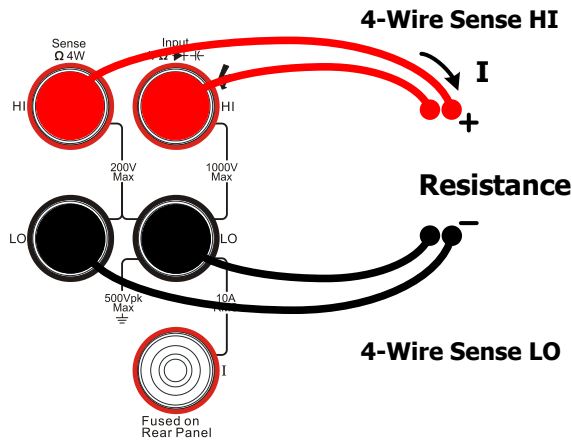
Figure 2-20 Sketch map for connecting

2. Press ⟨ Ω ⟩ twice to switch to 4-Wire Resistance Mode.
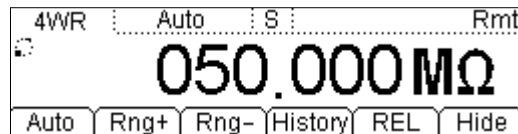
Figure 2-21 Measurement Interface

3. Choose an appropriate resistance range according to its scope.

Table 2-6 Measurement Characteristics of 4-Wire Resistance

Ranges*	200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 10MΩ, 100MΩ
Open-circuit Voltage	<8V
Import Protection	(1). 1000V on each range (HI Terminal) (2). 200V on each range (HI Sense, LO Sense)
Configurable Parameters	Range, Null value

NOTE*: All the ranges enable to obtain 20% ranges higher than original; besides, Both Manual and Auto are available for setting every range.

4. Set Relative Value (Optional)
    Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

5. Select required measurement ratio by using Left or Right direction keys and read the measurement result.

6. View History data

7. Use history function.
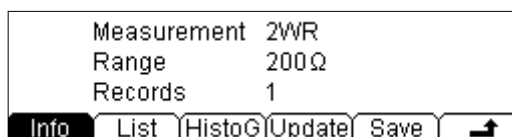   Press History to enter into the following interface and check the data getting from this measurement and save.

Figure 2-22 History Information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking. By pressing Update, the History information will be refreshed to be current newest information.

NOTE

Please do not put the terminals of the resistance on the electric table or in your hand to avoid error.
The smaller of the resistance, the more affection it will be brought.

To Measure Capacitance

The DM3058 Digital Multimeter has the ability to test Capacitance up to 10000μF. Following practice provides you a guide to get familiar with the Capacitance measurement technique.

Operating Steps:
1. Connecting red lead to both Terminal Input-HI and anode of the capacitance and black lead to both Terminal Input-LO and cathode of the capacitance as shown in Figure 2-23.
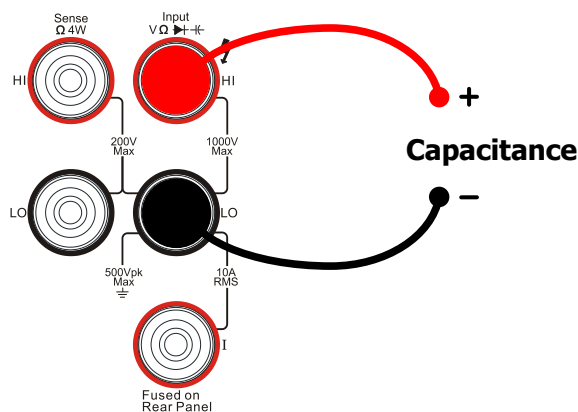
Figure 2-23 Sketch map for connecting

2. Press ⊞ to enter into Capacitance measurement interface.
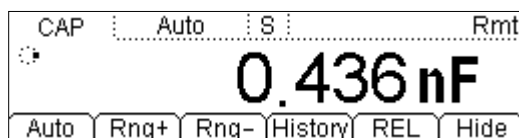
Figure 2-24

Capacitance Measurement Interface

3. Choose an appropriate measurement range according to its scope.

Table 2-7 Capacitance Measurement Characteristics

Ranges*	2nF, 20nF, 200nF, 2µF, 200µF、10000µF
Input Protection	1000V on all ranges (HI Terminal)
Configurable Parameters	Range, Null value

NOTE*: All the ranges enable to obtain 20% ranges higher than original;

Besides, both Manual and Auto are available for setting every range.

4. Set Relative Value (Optional)
    Press REL to open or close Relative math function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

5. View History data.

6. View History data
    Press History to enter into the following interface and check the data getting from this measurement and save.

```
     Measurement  CAP
     Range        2nF
     Records      1
 Info   List  HistoG Update  Save    ⬏
```

Figure 2-25 View interface of History information
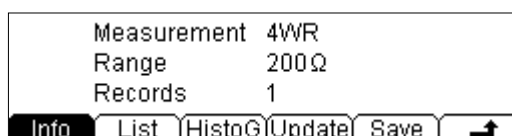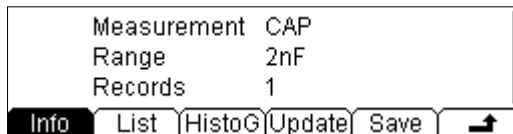
There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking. By pressing Update, the History information will be refreshed to be current newest information.

NOTE
Before measuring the electrolytic capacitance, you should make the two legs of the electrolytic capacitance short circuit and let it be discharged.

To Test Continuity

When the measured resistance in circuit is lower than selected one, it is considered being connected by instrument. Next, we will introduce you how to test continuity for circuit by using DM3058 step by step to make you familiar with this technique.

Operating Steps:
1. Connect test leads as shown in figure 2-26. Red lead connects with HI Terminal; Black lead connects with LO Terminal.
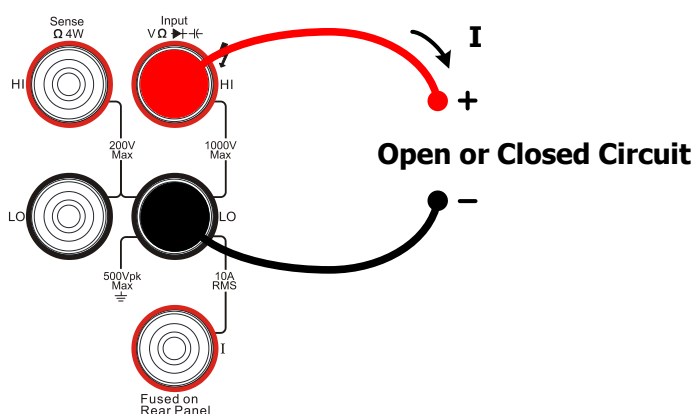
Figure 2-26 Sketch map for testing

2. Press ⟨◍⟩ to enter into the following interface.

Figure 2-27 Continuity Testing Interface

3. Set the Short-circuit resistance.
   Press set to set up the resistance of short-circuit. The default value is set as 10Ω when leaving factory. Users may carry on the Continuity measurement directly without modification.

Table 2-8 Continuity Measurement Characteristics

Test Current	1mA
Range	2KΩ immovable
Open-circuit Voltage	<8V
Input Protection	1000V (HI Terminal)
Beep Condition	0≤$R_{testing}$≤Short-circuit impedance; 1Ω≤Short-circuit impedance≤2kΩ

To Check Diodes

Operating Steps:

1. Connect test leads as shown in Figure2-28, red lead connects with Terminal HI, black lead connects with Terminal LO.

Figure 2-28 Sketch map for connecting

2. Press ⟨⊣⊦⟩ to enter into the following interface.

Figure 2-29 Testing interface of Diodes

3. Check the connection state of Diodes.
    When connecting, the instrument will beep one time (If Sound is open, refer to "System Settings").

Table 2-9 Check Diodes Characteristics

Test Current	1mA
Range	2.0V immovable
Open-circuit Voltage	<8V
Input Protection	1000V (HI Terminal)
Beep Condition	$0.1V \leq V_{measured} \leq 2.0V$

To Measure Frequency and Period

The Frequency or Period of a signal could be obtained by Secondary Function during testing its Voltage or Current or by Function button $\boxed{\text{Freq}}$. The following practice provides a guide to get familiar with the Frequency and Period Measurement technique.

To Measure Frequency

Operating Steps:
1. Connect test leads as shown in figure 2-30. Red test lead connects with Terminal HI; Black test lead connects with Terminal LO.
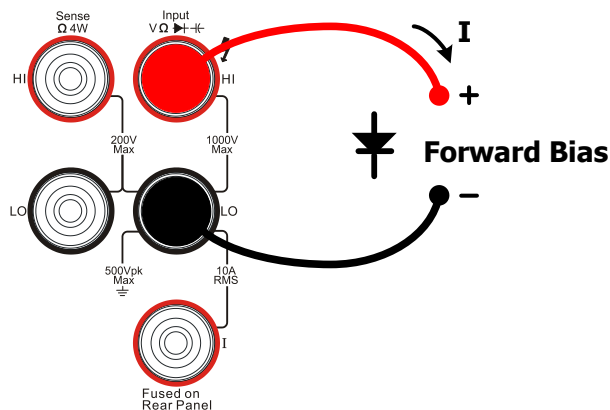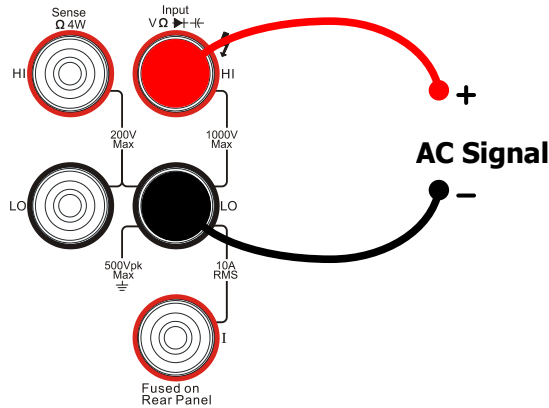

Figure 2-30 Sketch map for connecting

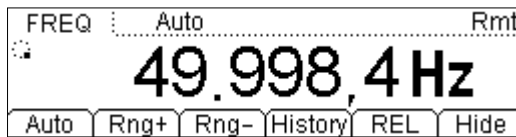2. Press $\boxed{\text{Freq}}$ to enter into the following interface.

Figure 2-31 Frequency Measurement Interface

Table 2-10 Frequency Test Characteristics

Ranges	200mV, 2V, 20V, 200V, 750V
Input Signal Range	20Hz ~ 1MHz
Input Protection	750V$_{RMS}$ on all ranges (HI Terminal)
Configurable Parameters	Null value

3. Set the relative value (Optional).
   Press REL to open or close Relative operation function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

4. Read measurement value
   Freq Function is set as" Slow", 5.5 digits resolution.

5. View History data
   Press History to enter into the following interface and check the data getting from this measurement and saved.

```
Measurement  FREQ
Range        200mV
Records      1
 Info   List  HistoG Update  Save    ↰
```

Figure 2-32 View interface of History information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking. By pressing Update, the History information will be refreshed to be current newest information.

To Measure Period

Operating Steps:

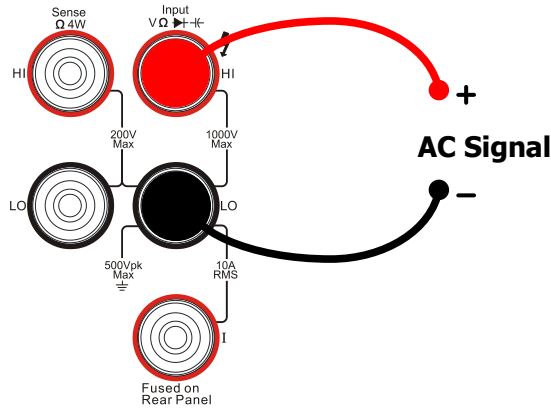1. Connecting the red lead (Test leads) to Terminal-HI and black lead to Terminal LO as shown in Figure2-33.

Figure 2-33 Sketch map for connecting

2. Press $\boxed{\text{Freq}}$ until enter into the following interface.
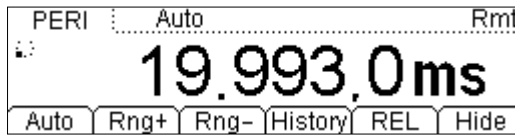
Figure 2-34 Period Measurement Interface

Table 2-11 Period Characteristic

Ranges	200mV、2V、20V、200V、750V
Measurement Range	1μs～0.05s
Input Protect	750VRMS（HI）
Configurable parameter	Preset value

3. Set the relative value (Optional)

Press REL to open or close Relative operation function. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes

from the result of Actual measurement vale reduces selected value. (For the details about how to set, please refer to" Math" in Chapterer2.)

4.   Read the measurement value
  Freq Function is set as "Slow", 5.5digits resolution.

5.   View History data
    Press History to enter into the following interface and check the data getting from this measurement and save.

```
Measurement  PERI
Range        200mV
Records      1
 Info    List  HistoG Update  Save    ⬆
```
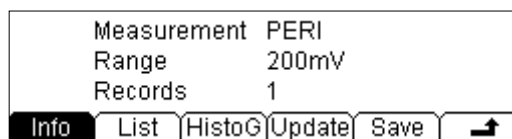
Figure 2-35
View Interface of History Information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking. By pressing Update, the History information will be refreshed to be current newest information.

To Measure Sensor

Random Sensor measurement is a new conception being forward to meet user's requirements. By using this particular function, you can connect Pressure Sensor or Flux Sensor or Temperature Sensor easily. Its principle is that transmit measured physical quantity to a facile measured one such as Voltage, Resistance and Current by these steps. First, pre-input the needed data; secondly, transform or modify it according to the interior arithmetic of Multimeter. Afterward, a measured physical quantity of Sensor is shown on the screen directly and you can edit or modify its display unit at will.

DM3058 supports DCV, DCI, and Freq, 2WR, 4WR and Thermocouple TC 6 kinds of Sensor in all. Meanwhile, there are 10 groups of basic Sensor preset within the instrument.

Connection

Different Sensor has different connecting ways. As the Current Sensor, Resistance Sensor, Thermocouple Sensor and Frequency Sensor, please Connect the red lead (Test leads) to Terminal Input-HI and black lead to Terminal Input-LO as shown in Figure 2-36.
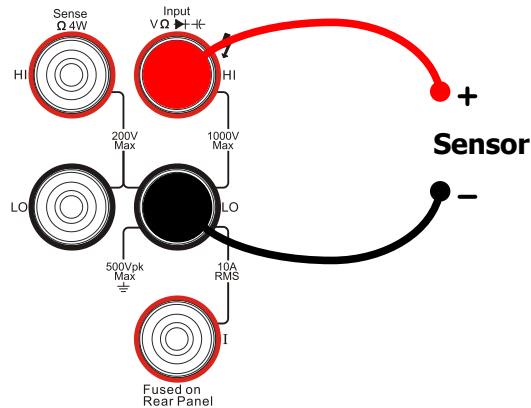

Figure 2-36 Sketch map for connecting

As the Current Sensor, please connect the red lead (Test leads) to Terminal Input-HI (the jack marked "I") and black lead to Terminal Input-LO as shown in Figure2-37.
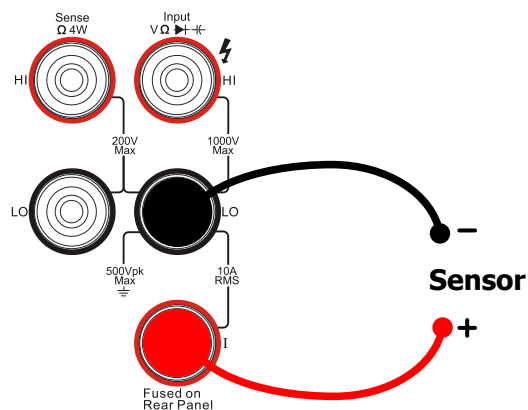

Figure 2-37 Current Sensor Connecting

Basic measurement method

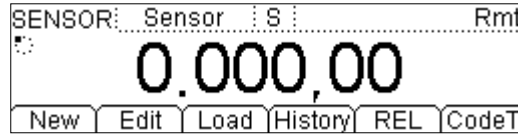Press ^{Sensor} to enter into the following interface.

Figure 2-38
Measurement Interface of Sensor

Table 2-12 Characteristics of Sensor

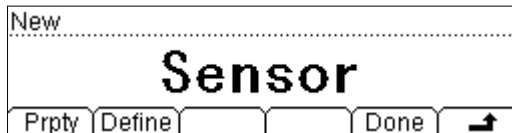| Function	Description
New	Built a new configuration files of Random Sensor
Edit	Edit an existing configuration files
Load	Load an existing configuration files
History	Check newest 1000 measurement datum
REL	Open/Close Relative Operation
CodeT	Set the display mode for measurement parameters of Random Sensor.

1. Press New to create a new Sensor.

Figure 2-39 New interface

(1) Press Prpty to enter into the input interface
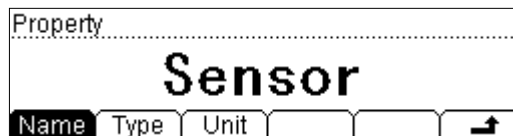

Figure 2-40 Property Interface

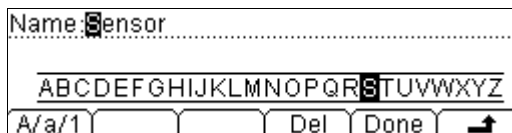● Press Name to create an appropriate name for the new sensor.

Name:Sensor

ABCDEFGHIJKLMNOPQRSTUVWXYZ

A/a/1   Del Done   ➞

Figure 2-41 Name edit interface

Explanation:

Switch to Edit area by pressing ⌄ and choose letter that you want to edit by

using ❰ ❱.

Switch to Selection area of letter by pressing ⌄ and choose required letter by

using ❰ ❱.

Press Del to delete current letter under editing

Press ➞ to go back to Prpty interface

● Press Type to select the type of facile physical quantity has been transformed
by Sensor via corresponding button. And then, press ➞ to back to Prpty
interface.

Type

2WR

DCV DCI 2WR 4WR FREQ ➡

Figure 2-42 Type selection interface

● Press Unit button to select the unit for measured physical quantity, for
example: ℃, Pa, %, °, and F. Furthermore, you can define required unit by
USER function.

Unit

°C

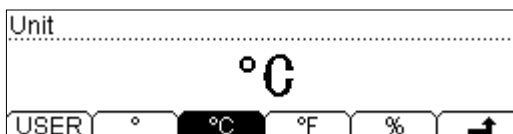USER   °   °C   °F   %   ➞

Figure 2-43 Unit selection interface

Explanations：

Default unit is limited within two characters.

Switch to the character which needs to be edited by using ⟨ ⟩.

Select re required characters by using ⌃⌄ from A to Z and a to z.
Then, press ⏎ to go back to New interface and do next step.

(2) Corrsp to input corresponding data. Different kind of Sensor has different
    relationship of corresponding data. It is not necessary to input plenty reference
    value if the corresponding relationship has more smoothness and good
    linearity curve. Then press Add to input reference data.

● Press Meas to input the data measured from Random Sensor by Directive keys.
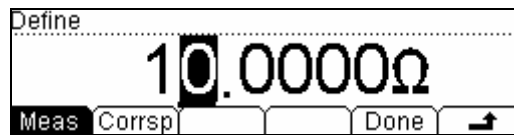
Figure 2-44 Input data

● Press Corrsp to input the data measured from Random Sensor by Directive
  keys.
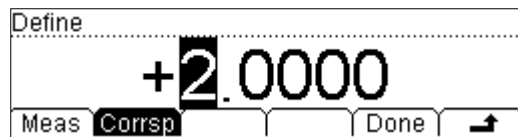
Figure 2-45 Input data

● Press Done to finish the input for first group of data and go back to View
  Interface of Reference value. Please pay attention that ⌐ indicates the
  approximate arithmetic of datum between this data and next one. The
  arithmetic of first data sect is default as "Line" which can be modified by
  clicking Edit.

●
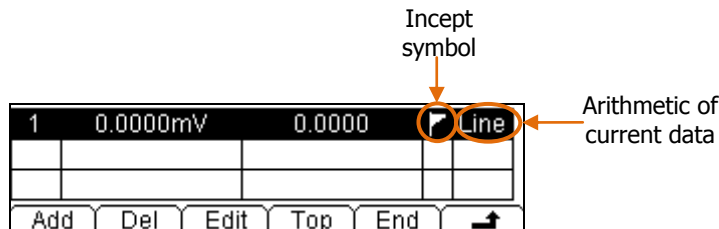
Figure 2-46 View interface of Reference data

- Repress Add to input second group of data. From this group you can press SEG →"Open"→ Arith and select arithmetic。

Define
ON
Meas Corrsp SEG Arith Done ◢

Figure 2-47 On/Off section interface of Arithmetic

(3) Press Done it will appear Save and Apply options.

New
Save Apply ◢
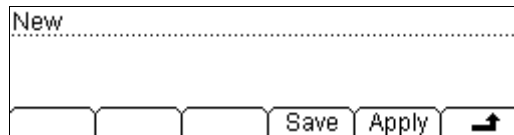
Figure 2-48 Finishing interface

- Press Done and input needed File Name.

FileName: Sensor
a b c d e f g h i j k l m n o p q r s t u v w x y z
A/a/1 Del Done ◢
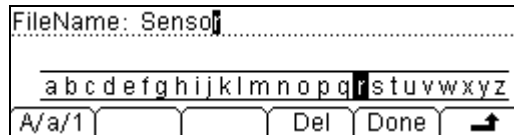
Figure 2-49 Finishing interface

- Press Save and storage the parameter of Sensor as appointed name for future using.

▶ C:\ Sensor File1: Sensor
File2:
File3:
Disk Type Save Erase ◢
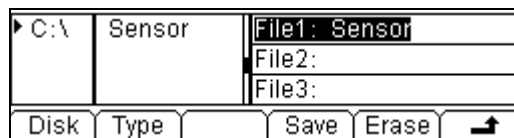
Figure 2-50 Save Interface

Then, Press ◢ and go bake to New Interface.

- Press Apply as shown in figure 2-48 and load settings into current Sensor and use it directly.

SENSOR: Sensor S REL Lcl
00.000.0 MΩ
New Edit Load History REL Disp

Figure 2-51 Apply new Sensor

After application, the data appearing in the interface is unavailable by "!".

2. If you found there are some problems existing please press Edit to modify.

```
Edit
           Sensor
 Prpty  Define              Done      ↰
```

Figure 2-52 Edit configuration file of Sensor

3. Press Load to recall configuration file within Sensor.
4. Press History to enter into the following interface to check the data getting from this measurement and save.

```
       Sensor       Sensor
       Type         DCV
       Records      100
 Info   List        Update  Save      ↰
```

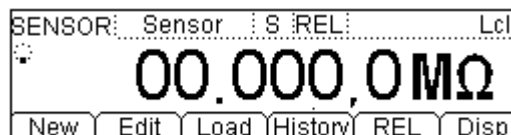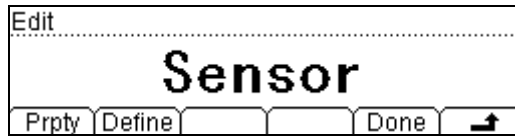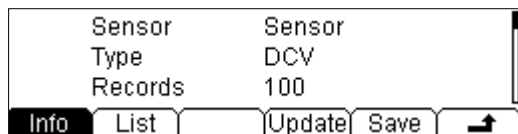Figure 2-53 View interface of History Information

There are three types of way for viewing historical date: "Info"," List" and "HistoG". Press Save after checking, by pressing Update, the History information will be refreshed to be current newest information.

5. To set Relative Value.（optional）

    Press REL to open of close Relative operation. When it is open, "REL" is shown over the screen and the reading displayed is a relative value which comes from the result of Actual measurement vale reduces selected value.   (For the details about how to set, please refer to" Math" in Chapterer2.)

6. Measurement Value Display. Press Disp, to select showing mode for the measurement result.

```
Display Mode
          Correspond
 Meas  Corrsp  All                    ↰
```

Figure 2-54 Display mode

```
SENSOR: Sensor  S              LXI
       1799999 °C
 New   Edit  Load  History  REL  Disp
```

Figure 2-55 Display the value

Preset

Preset Mode is provided to avoid error operation via testing product line in DM3058. In random operation mode, please press $\boxed{\text{Preset}}$ to enter into following menu.
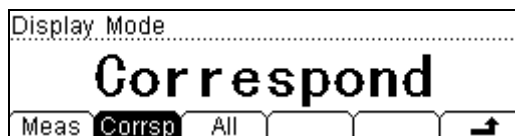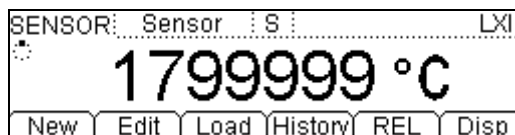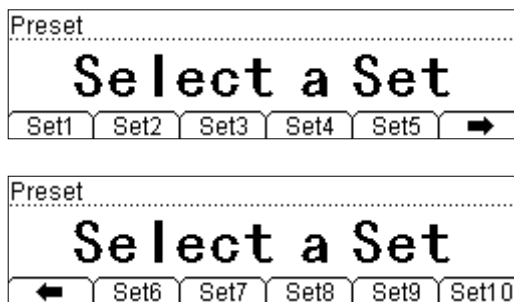

Figure 2-56 Interface of Preset (two pages in all)

Ten preset keys existing in Preset Mode and all of them are corresponding with the 10 configuration files in Configuration memorizer respectively.

Press Setn （n=1~10） for recalling its corresponding settings and exit Preset menu.

Explanations:
- A click will be emitted (about 1.5s) by instrument after you press any Preset configuration key if an effective configuration is existing in its Location of corresponding key, meanwhile, current measurement configuration will be refreshed to the one has been stored. If the selective Configuration Location is empty, the instrument will emit "click (about 0.3s) → pause (about 0.3s)→ click (about 0.3s)" and then go back to primary testing state.

- Enter into Preset menu in Ordinary Measurement Mode and press $\boxed{\text{2ND}}$ and Random configuration key one by one, and then current measurement configuration would be saved into corresponding Location and named "Setn" as a default.

- Besides, you can also recall or save Preset configuration by using $\boxed{\text{Save}}$ key.

Secondly Function

$\boxed{\tiny\text{2ND}}$ is used to open Double Display function and enter into save mode of configuration or parts of shortcut keys. After pressing$\boxed{\tiny\text{2ND}}$, this button will shine and the instrument is going to wait for the secondly operation.

Double Display can show two properties for one signal. Stat. function can be used in Main Display.

Auto Range function is adopted by Vice Display. If the same range is used by both Main and Vice Display, Stat. function will be unavailable for Vice Display, meanwhile the relative measurement, db, dBm and data cannot be saved into "History".

Press $\boxed{\tiny\text{2ND}}$ and Measure one by one.

Table 2-13   Available Main/Vice Function Combination

		Main Display Function								
		DCV	DCI	ACV	ACI	FREQ	PERIOD	2WR	4WR	Cap
Vice Display Function	DCV	√	√	√	√					
	DCI	√	√	√	√					
	ACV	√	√	√	√	√	√			
	ACI	√	√	√	√					
	FREQ			√	√	√	√			
	PERIOD			√	√	√	√			
	2WR							√		
	4WR								√	
	Cap									√

Explanations:
- If the same measurement function is used by both Main and Vice Display, then it will measure only one time and update the display.
- If Math function is used in Main Display, the result will be shown in Main Display and the measurement value before math is shown in Vice Display.
- If Sensor is used in Main Display, and both of Display has same type, then the result will be shown in Main Display and the measurement value is shown in Vice Display.
- If different measurement function is used, the results will be shown in corresponding display.

To Control Trigger Options

(Run Hold) or (Single) could be used to trig multimeter. Auto trigger is considered as a default when the power is on. Then (Run Hold) key will be lightening which indicates this function has been started.

Optional trigger modes of DM3058 contain Auto Trigger, Single Trigger and Hold Trigger.

Auto Trigger
Once you press (Run Hold) one time, Auto Trigger will be started to capture continuous readings automatically.

Single Trigger
Press (Single) on the Front Panel, Single Trigger will be started one time and generate an effective reading.

Holding Trigger
Press (Run Hold) key, it allows capturing and holding a stable reading on the front panel display.

> **NOTE**
> Press (Single) in Remote Mode to switch back to the local mode.

To Set up Measurement Parameters

Press (Meas) to set measurement parameters for DC Voltage, DC Current and Continuity via its Operation menu.

The parameters have been configured when the multimeter leaving factory. So you can either measure directly or edit them to meet your requirements. The Measurement parameters Menu includes: Conti, Filter, Rel, Null, and Ratio.

AC Filter

AC Filter is applicable for measuring DC Voltage and DC Current.

While either DC Voltage or DC Current Function is selected, press (Meas) → Filter, enter the menu shown below. If AC hefts existing in measured DC signal, you can strain them off by AC Filter so as to make the data more exactly.
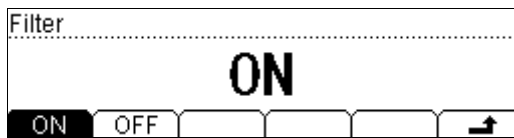
Figure 2-57 Open/Close AC Filter

DC Input Impedance

DC input impedances adapts to DC voltage measure.

Press (Meas) → Imped enter the menu shown below when select DC voltage measure function.
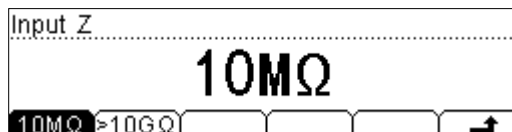
Figure 2-58 Choose DC Impedance

Table 2-14   DC Input Resistance Menu Description

Function Menu	Description
10MΩ	Set up the DC Input Impedance to 10MΩ.
>10GΩ	Set up the DC Input Impedance to >10GΩ.
◢	Save all changes, back to a higher level menu.

The options of input resistance for DC value measurements are 10MΩ and >10GΩ. For 200mV, 2V, 20V measuring ranges, choose >10MΩ for better result.

DC input resistance selection:

- While the DC input resistance is selected to 10MΩ, the input resistance of all measurement range is 10MΩ;

- While the DC input resistance is selected to >10GΩ, the input resistance for 200mV, 2V and 20V measurement range is >10GΩ; for 200V and 1000V measurement range is kept at 10MΩ.

- The DC input impedance default is 10 MΩ; settings of DC input impedance are stored in the volatile storage.

Continue Resistance

Set up the continue resistance value in the short test menu. When the measured resistance is below P/F, the DM3058 will beep to indicate the circuit continuation. The continue resistance is only using at Continue Test.

Press $\boxed{\text{Meas}}$ → Conti, enter the menu shown below:
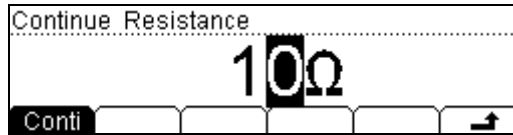
Figure 2-59 Set up the continue resistance

Use directive keys to change the parameter values:

Press left and right directional keys to choose different digits. Press up and down keys to change the current digit value.

Continue Resistance

- The range of continue resistance is 1Ω~2000Ω. The default value is 10Ω.
- The continue resistance value stored in the nonvolatile memory, the resistance still keep when the power is off.

Math Functions

The DM3058 provides five math functions: Null, statistic, dB, dBm and P/F testing. Only one of these math functions can be enabled at a time, and remains in effect until change.

Press (Math) key, the display shows:

Measure Current
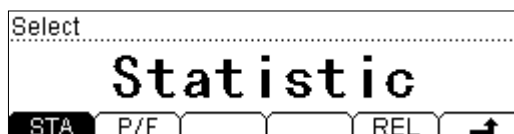
Figure 2-60 Math function

Table 2-15 Math Function Menu Description

Function Menu	Settings	Description
STA		Reading statistic functions, including: Max, Min, Average, and number of measurement.
P/F		The P/F test function performs pass/fail testing with upper and lower P/Fs that you specify.
dBm		The dBm function is logarithmic, and is based on a calculation of power delivered to reference impedance.
dB		The dB measurement is the difference between the input signal and a stored relative value.
REL	ON OFF	Turn on /Turn off the REL function.
↵		Save all changes, back to a higher level menu.

Statistic Measurement

The Statistic function is for DC voltage, AC voltage, DC current, AC current, resistance, frequency/period, and capacitance measurement.

The front panel can display the statistical data for any set of readings: average (Ave), maximum (Max), minimum (Min), and which can read with All function and the number of samples taken (Total).

Press (Math) → Statistic, the display shows:
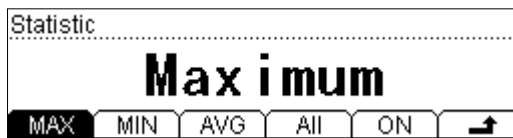
Figure 2-61 Stat. Math

Table 2-16   Statistic Measurement Menu Function Description

Function Menu	Settings	Description
MAX (Maximum)		Maximum value from a set of measurements.
MIN (Minimum)		Statistical measurement all reading Min value.
AVG (Average)		Statistical measurement all reading Average value.
All		The complete a set of measurement.
ON		Open the selected statistic measurement
↵		Save all changes, back to a higher level menu.

P/F Measurement

Use the P/F test function to perform pass/fail testing with respect to specified upper and lower P/Fs. The P/Fs can be set to any value between 0 and ±120% of the highest range of the current function. The upper P/F must be positive than the lower P/F.

Press (Math) → P/F, the display shows:

```
P/F Setting
        +1.0000A
 High   Low             ON        ⬏
```
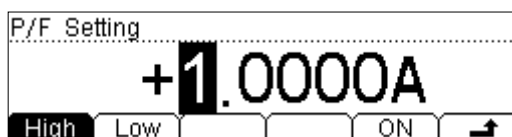
Figure 2-62 P/F Setting

Table 2-17 P/F Measurement Menu Function Description

Function Menu	Settings	Description
High		Set the desired Upper P/F.
Low		Set the desired Lower P/F.
ON		Open P/F Measurement，Status bar shows "/F".
⬏		Save all changes, back to a higher level menu.

1. **Set P/F**
   Select High or Low, and then switch to the needed digit by Left or Right Directive keys and input numerical value by Up and Down Directive keys. Use Left key to pitch on symbol on the left side when setting Positive or Negative and switch them by Up and Down Directive keys.

2. **Unit**
   The unit of P/F is decided by the current measurement function.

3. **Over P/F hint**
   When the readings exceed selected upper P/F, the vice-scream will show "HI FAIL"

When the readings exceed selected lower P/F, the vice-scream will show "L FAIL

When the readings exceed both upper and lower P/F, buzzer will alive an alarm by sound (when the sound is open)

The range of P/F function:

● The P/F value scope is -120%~+120% of the current measurement range.
● The upper P/F value should be always bigger than the lower P/F value.
● The upper and lower values are stored in volatile storage. They will be set to defaults when power on.

---

dBm Measurement

This function applies to AC voltage and DC voltage measurements only.
The dBm function is logarithmic, and is based on a calculation of power delivered to a reference resistance, relative to 1 mill watt.

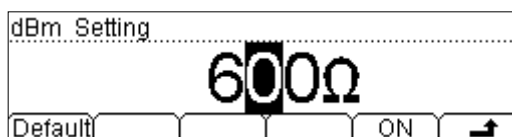Press $\boxed{\text{Math}}$ → dBm, the display shows:

Figure 2-63 dBm setting

Table 2-18 dB Measurement Function Menu Function Description

Function Menu	Settings	Description
Default		Use the default value. The range of parameter is 2Ω ~ 8000Ω.
ON		Open dBm Measurement，Status bar shows "dBm".
◢		Save all changes, back to a higher level menu.

The computation method of the dBm:

dBm = 10 x Log_{10} [(Reading^2 / R$_{\text{REF}}$) / 0.001W]

dB Measurement

The dB function applies to AC voltage and DC voltage measurements only. Each dB measurement is different between the input signal and a stored relative value, with both values converted to dBm.

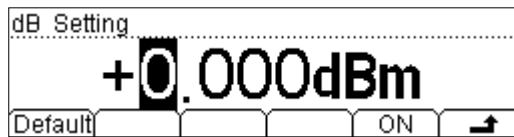Press $\boxed{\text{Math}}$ → dB, enter the menu shown below:


```
dB Setting
        +0.000dBm
Default              ON    ┘
```

Figure 2-64 dB Setting

Table 2-19 dB Measurement Function Menu Function Description

Function Menu	Settings	Description
Default		The default value is dBm.
ON		Open dB Measurement，Status bar shows "dB".
┘		Save all changes, back to a higher level menu.

The computation method of the dB:

dB $=10\text{x}\text{Log}_{10} [(\text{Reading}^2 / \text{R}_{REF}) / 0.001\text{W}] - (\text{dB setting value})$

R_{REF} expressed measuring the resistance value in the actual electric circuit. Range of the dB setting value: -120 dBm $\sim$ +120 dBm. The default is 0 dBm.

NOTE:

- You can either let the instrument automatically measure this value, or you can enter a specified value.
- Settings of dB value are stored in volatile storage.

Relative Operation

Relative operation is used for relative measurement. Actual measurement reading is the depression between measurement value and reselected value.

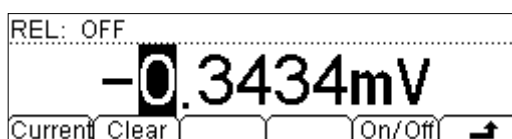Press $\boxed{\text{Meas}}$ → REL to enter into the following interface.

Figure 2-65 Relative operation setting interface

Table 2-20 Null operation function menu

Function Menu	Settings	Explanation
Current		To select current measurement value as preset value.
Clear		Reposition the reselected value to 0.
On/Off		Open/Close this function. When opening, "REL" will be shown.
⤶		Save all the changes and go back to last menu.

Main display = Measurement value –preset value

The Multimeter allows operating for following parameters: DC Voltage, AC Voltage, DC Current, AC Current, Resistance, Frequency/Period and Capacitance.

Set Preset value

- Press REL on the operating interface directly to enter into the "Preset Value" setting interface.

- Select Default and Press On/Off to start Null operation, then the readings in current set will be a reference to save for Multimeter and the screen shows 0.

- Users can input needed preset value by directive keys in the corresponding setting interface.

To Set Up Trigger Parameters

The optional Trigger methods of DM3058 include Manual Trigger, Single Trigger and Exterior Trigger. The default trigger mode is Auto.

Press (Run/Hold) to capture continuous readings automatically. If you repress it once more, a stable reading will be captured and hold.

Press(Single), Single Trigger will be generated on time, and an effective reading will be captured.

Press (Trig) to set parameters for every trigger. In the following interface of Parameter setting, after you select Auto 、 Singe 、 Hold or VMC on the menu, the current trigger mode shown in the parameter area will be changed accordingly and display relative parameter for current trigger.
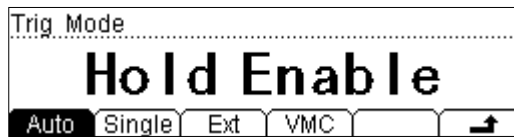

Figure 2-66 Interface of triggering parameter

Table 2-21 Function Menu of triggering parameter

Function Menu	Settings	Description
Auto		Setting system Auto trigger and reading Hold meter reading measurement schemes.
Single		Setting Single manual trigger parameter.
Ext		Setting external triggering.
VMC		Setting the output signal pulse width at sampling ending output signal.
⏎		Save all changes, back to a higher level menu.

Auto Triggering

Auto triggering takes continuous measurement at the highest sample rate for the specified measurement configuration (function, range, resolution, and so forth). Auto trigger is the default trigger mode at system power up.

Press $\boxed{Trig}$ → Auto, the display shows:

Figure 2-67 Setting interface of Auto Trigger

Table 2-22 Auto Trigger Function Menu Description

Function Menu	Settings	Description
Interval		Set interval time in 400~2000ms.
Hold	ON/OFF	Set turn the Reading Hold function ON or OFF.
⬏		Save all changes, back to a higher level menu.

1. Interval

● The interval means the waiting time before sampling since trigger signal has been sent. The interval is different under different measure speed.
  Fast: the interval default is 8ms, setting range is 8ms~2000ms.
  Middle: the interval default is 50ms, setting range is 50ms~2000ms.
  Slow: the interval default is 400ms, setting range is 400ms~2000ms.
  The default measure speed is slow, so the default interval is 400ms.

● The interval is stored in volatile storage.

2. Reading Hold
● The reading hold mode captures and holds a reading on the front panel display when a stable reading is detected. The system Hold ranges are 0.01%, 0.1%, 1%, and 10%.

● Press $\boxed{\frac{Run}{Hold}}$ two times until this button is glittery, then a trigger will be hold

and a stable reading will be captured and hold on the screen.

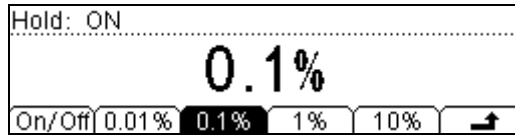Press $\boxed{Trig}$ → Auto → Hold, the display shows:

Figure 2-68 Manu interface of Reading Hold

Table 2-23 Reading Hold Function Menu Description

Function Menu	Settings	Description
On/Off		Turn on/off the reading hold function.
0.01％		Set the hold scope is 0.01％.
0.1％		Set the hold scope is 0.1％.
1%		Set the hold scope is 1％.
10%		Set the hold scope is 10％.
⏎		Save all changes, back to a higher level menu.

Reading Hold Function
Start the Reading Hold Function, the hold measurement use the following rules
judge the reading count:

When Max () - Min () ≤ hold range x Readings, the multimeter hold Reading on the
display.
The display update a new reading basing on the current value and the three
preceding measurements before the reading was hold:
Max (Reading, ReadingN-1, ReadingN-2, ReadingN-3)
Min (Reading, ReadingN-1, ReadingN-2, ReadingN-3)

NOTE:
When Reading Hold started, the input resistance was set to 10MΩ for all DC
voltage range to reduce noise arising from the open-loop testing.

Single Triggering

The multimeter takes one reading, or a number of readings specified by a sample count you enter, each time $\boxed{\text{Trig}}$ press.

Press$\boxed{\text{Trig}}\rightarrow$ Single to enter into the following interface. Then Input needed sample counts by Directive keys. After setting please press Done to open Single Trigger, at this time Done is hiding and $\boxed{\text{Single}}$ is lighten.
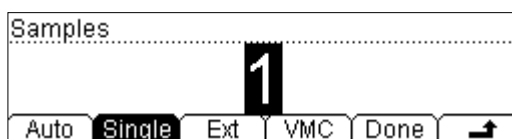

Figure 2-69 Parameter settings of Single Trigger

Sample Count

- Sample Count indicates the count of point have been sampled while the instrument get a signal of Single Trigger.
- The range of sampling point should be between 1 and 1000.
- The default of Sample Count is 1.

External Triggering

$(Trig)$ is used to set the parameter which initiates the trigger function. It requires setting the following parameter: the Rise edge, the Fall edge, HiLev (high level) and LoLev (low level). Press Done to start the external triggering, the keys $\left(\frac{Run}{Hold}\right)$ and $(Single)$ on the front panel will be off to indicate the instrument using external triggering mode.
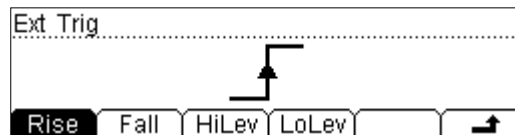
Press $(Trig)$ → Ext, the display shows:

Figure 2-70 The Interface of the External Triggering

Table 2-24 Function Menu of External Triggering

Function Menu	Settings	Explanation
Rise		Set the External Trigger Mode as Rising Edge.
Fall		Set the External Trigger Mode as Falling Edge.
Hi Lev		Set the External Trigger Mode as High Level.
Lo Lev		Set the External Trigger Mode as Low Level.
↰		Save all the changes and go back to last menu.

1. To run External Trigger

After setting the parameter, press ↰ to go back to last Manu and run External Trigger by pressing Done . Now, $\left(\frac{Run}{Hold}\right)$ and $(Single)$ on the Front Panel will be crushed out, the instrument enter into the External Trigger Mode.

2. To set Output

In External Trigger Mode, the instrument could output a pulse signal through the six pin of RS232 interface on the Real Panel after finishing sampling data. By the way, the polarity and output pulse width of this signal could be adjusted.
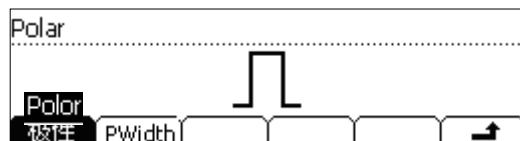
Press $\boxed{\text{Trig}}$ → VMC, the display shows:

Figure 2-71 Set Parameter of Output Pulse Trigger

Table 2-25 The Explanation of the External Triggering (polarity: positive)

Function Menu	Settings	Explanation
Polar	Pos Neg	Setting the pulse signal's polarity.
Width		Setting the pulse width.
⬑		Store the changing and back to the higher menu.

The VMC function output

- At external triggering mode, when the data sampling is over, the instrument will output a pulse signal to indicate operation completed.

- At external triggering mode, when operating math P/Fed value, the instrument will export a pulse signal to indicate out of P/Fs detected.

Store and Recall

To Storage and Recall function enable save, load, and delete the measurement data, parameters and sensor files in the local storage as well as in USB storage.
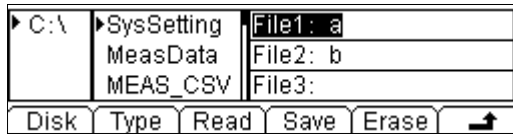
Press $\boxed{\text{Save}}$ key, the display shows:

Figure 2-72 Store and Recall Interface

Table 2-26 Storage and Recall Function Menu Description

Function Menu	Settings	Description
Disk	C:\ (Local) A:\ (U-Disk)	Choose Local or U-Disk storage.
Type	Sys Setting/ Meas Data/ MEAS_CSV/ Sensor/ Sensor Data/ MIRR_CFG	Choose the type of the files shown.
Read		Load the selected file.
Save		Save the file to the specified location.
Erase		Delete the selected file.
⬏		Save all changes, back to a higher level menu.

1. Local/U-Disk Storage

Local storage block is built-in the multimeter. The U-Disk storage will be a USB flash disk.

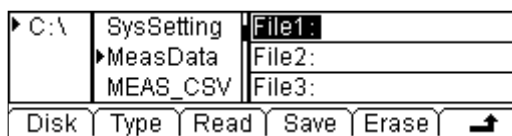Press ⌈Save⌋ key, enter the menu shown below:

Figure 2-73 The U-Disk Storage Interface

⚠ **NOTE:** When storage the files to A-Disc, Please do not remove U-Disk.

2. Choose the storage type of the files

Press ⌈Save⌋ → Type; choose the type "MeasData" of the files, into the menu shown below:

Figure 2-74 Select File type

Press Type to switch file type to read or save corresponding files.

3. Document Operation

Use the up and down buttons to select the file, then presses Read, Save and Erase soft keys to do the corresponding operation.
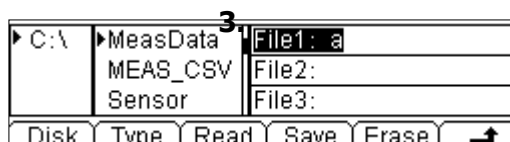

Figure 2-75 File operation Interface

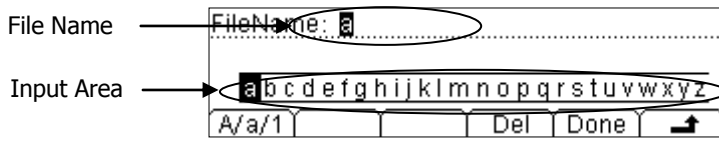To save the file, name the file with letters and/or numbers.

Figure 2-76 Input File Name

Input Method:

1. Press A/a/1 button to select the Capital letter, Lowercase letter or Numbers.
2. Use the up/down button to close or open the number/letter selection area display.
3. Use the left/right button to move cursor in Filename or number/letter selection area.
4. The Del function can only delete the letter on which the cursor taking place.
5. Press Done to save current file.

To Set Up the Utility

The Utility function establishes system parameters, interface parameters, and calibration.

Figure 2-77 Setting Interface

Table 2-27   Utility Function Menu Description

Function Menu	Settings	Function Menu
Cmd		To choose the commands
I/O		To set up I/O and LAN parameters.
System		To set up system information configuration.
T/C		Test and calibration function.
Print		Open/Close pint function.
⬑		Save all the changes to end current operation

Commands

DM3058 compacts three types of commands which are：Rigol DM3058 commands、
Agilent34401A Commands and Fluck45 Commands.
Rigol Commands is the default.

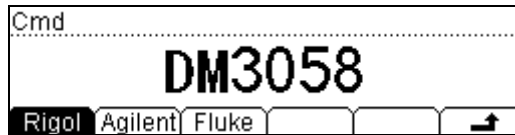Press ⏻ → Cmd to enter the following interface to choose needed Commands.

Figure 2-78 Selection Interface

I/O Settings

Each device on the GPIB (IEEE-488) interface must have a unique address between 0 and 30. The factory set is "1" when shipped.
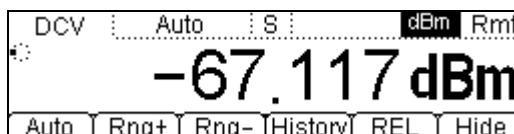
Press (Utility) → I/O, the display shows:

Figure 2-79 Interface Setting

Table 2-28   I/O Setting Function Menu Description

Function Menu	Settings	Description
LAN		Set up LAN interface.
GPIB		Set up GPIB I/O interface. The bound of value is 0~30.
USB		Check USB interface ID.
RS232		Set up RS-232 I/O interface.
↵		Save all changes, back to a higher level menu.

Operation introduction:

Remote control through LAN, GPIB (IEEE-488), USB and RS-232 interface can be configured. The I/O interface of GPIB, USB and RS-232 only one could be used at the same time.

1. Set Up LAN I/O Parameter

LAN Parameters

Follow the procedures to set up a LAN configuration and remote interface from the Front Panel.
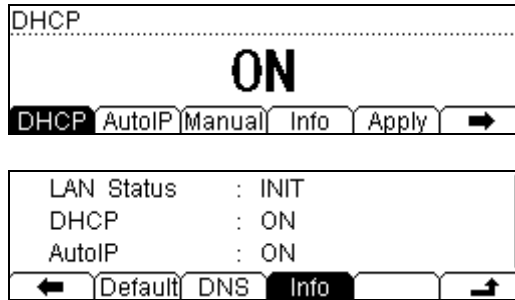
Press (Utility) → I/O → LAN, the display shows:

Figure 2-80 LAN Settings

Table 2-29   LAN Parameter Function Menu Description

Function Menu	Settings	Description
DHCP		Open/Close DHCP
Auto IP		Set IP address automatically
Manual IP		Set IP address manually
Info		View MAC address and other parameters.
Apply		Apply current LAN settings.
Default		Resume default settings.
DNS	Host Name/ Domain Name/ DNS address	Set the host name. Set the domain name. Set DNS address.
⏎		Save all changes, back to a higher level menu.

IP Settings

Press $\boxed{\text{Utility}}$ → I/O → LAN → IP, the display shows:
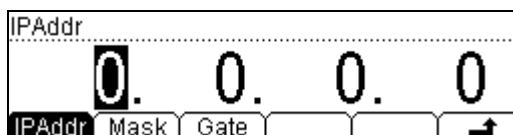
Figure 2-81 Manual IP Setting

Table 2-30   IP Setting Menu Description

Function Menu	Settings	Description
IPAddr		Setup IP address.
Mask		Setup Hide code for subnet.
Gate		Setup default Gateway.
◢		Save all the changes and go back to last Manu.

IP address:
Suggest you ask you network administrator for a unique IP address .**IP** address can be saved in non-violet memory.

Subnet mask:
Suggest you ask you network administrator for available subnet mask. **Subnet mask** can be saved in non-violet memory.

Gateway:
Suggest you ask you network administrator for an available gateway. **Gateway** can be saved in non-violet memory.

2. Set Up GPIB I/O Parameter

Each device on the GPIB (IEEE–488) interface must have a unique address. You can set the address of multimeter to any integral value between 0 and 30. The default address is "1" when the instrument is shipped from the factory.

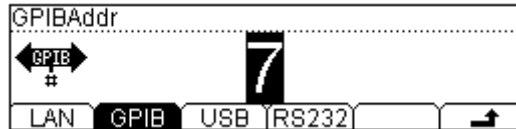Press [Utility] → I/O → GPIB, enter the menu shown below:

Figure 2-82 GPIB Setting

3. Set Up RS-232 I/O Parameters

Choose RS-232 (serial data interface) interface. Proper configure the baud rate and parity to make parameters the same as that settled in your computer. Make sure the connection line is unbroken. The configuration is saved in inviolate memory and shown in according menu.

Press ⓤᵗⁱˡⁱᵗʸ → I/O → RS232, enter the menu shown below:
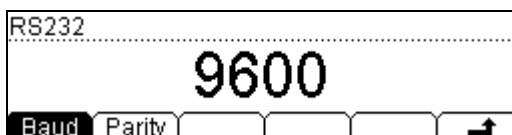
Figure 2-83 RS-232

Table 2-31   RS-232 Parameter Function Menu Explanation

Function Menu	Settings	Explanation
Baud	1200 2400 4800 9600 19200 38400 57600 115200	Set RS-232 band rate
Parity	None Odd Even	The parity check include: None, Odd check, and Even check.
⬐		Save all changes, back to a higher level menu.

Baud rate:
Proper configure the baud rate and parity to make parameters the same as that settled in your computer.
Available baud rate values are 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200. The default value is 9600.

Parity:
Proper configure the parity to make it same as that settled in your computer. There are three parameters: None、Odd、Even, the default is "None". The current choice is stored in nonvolatile storage.

System Settings

Press (Utility) → System, enter the menu shown below:

Figure 2-84 The Interface of Setting the System Function

Table 2-32   System Settings Function Menu Explanation

Function Menu	Settings	Explanation
Lang	中文简 English	Select the display interface languages.
Disp	Bright Contr Invert	Set up the display.
Sound		Switch beeper sound On/Off.
Format	Deciml Separte	Set up digit display format.
Cfg	PwrOn Default Switch	Set up the power on setting. Set up the DM3058 to factory setting. Enable or Disable the front power switch.

NOTE:

● **Power on**

Select the configuration when power on.
Select default or last setting. It's effective when restart the instrument.

● **Sound**

Turn on /Turn off the sound of button and information cue, the sound in short circuit measure can be closed. The current choice is saved in nonvolatile storage.

1. Select languages

DM3058 supports two kinds of languages for users.
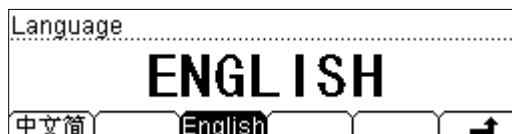
Press ⌨(Utility) → Sys → Lang, enter the menu shown below:

Figure 2-85 choose Language

2. Set Up the Display
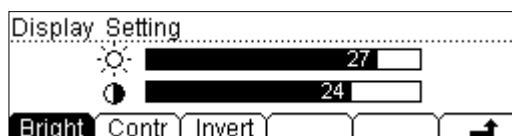
Press ⌨(Utility) → Sys → Disp, enter the menu shown below:

Figure 2-86 Display settings

Table 2-33   Display Settings Function Menu Explanation

Function Menu	Settings	Explanation
Bright		Increase or decrease the display light with left and right keys.
Contr		Increase or decrease the display contrast with left and right keys.
Invert		Set to invert display mode.
⌐		Save all changes, back to a higher level menu.

NOTE*：The configuration of Bright and Contrast are saving in Nonvolatile Storage.

3. Beeper On/Off

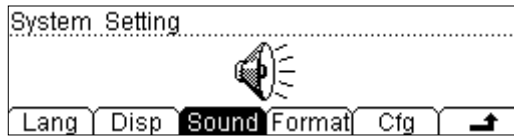Press (Utility) → Sys → Sound, enter the menu shown below:

Figure 2-87 Sound settings

4. Set Number Format

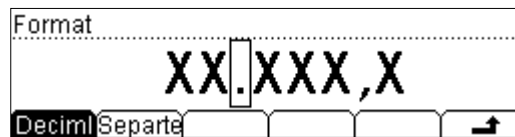Press (Utility) → System → Format to enter into following Manu to setup.

Figure 2-88 Set Number Format

Table 2-34   Function Menu for setting **Number Format**

Function Menu	Setting	Explanation
Decimi	• ͺ	Expresses radix point with • or ͺ.
Separate	ͺ No Space	Expresses separator with ͺ, space or none.
⬑		Save all the changes and go back to last Manu

Take a parameter of AC Current as example, if you select **Decimal** as "•"and **List Separator** as "ͺ", then it will shown according to the following format.
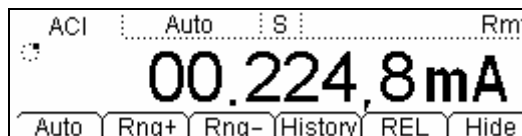

Figure 2-89 Date format

Decimal and **Separator** cannot be selected as the same format, that is if the **Decimal is ͺ**, then the **Separator can only be selected as** "No" or "Space". So there are five different types of way totally to show Number Format by DM3058.

5. Restore to factory defaults

Press $\text{\small Utility}$ → System → Cfg → Default→ Done, and then restart the system to factory default state. The Parameter shown below:

Table 2-35   Parameter Lists of Factory Defaults:

Measurement Parameter	Factory Defaults Setting
* Continue Resistance	10Ω
Filter	S
DC Resistance	10MΩ
Digit Resolution	5 ½
Measurement Function	DCV
range	Auto

Math Function	Factory Defaults Setting
Math Stats	Close
Math	Statistic
Math Register	All registers cleared
* dBm Resistance	*600Ω

Trigger Parameter	Factory Defaults Setting
Interval	400ms
Samples	1
Hold	0.1％
Trigger Sources	Auto Trigger

System Operations	Factor Defaults Setting
* Sound	* Open
* Separate	* Open

Language	Chinese
Display	Natural model
Clock	Time in main interface
Error queue	Errors cleared
Instrument parameter and data	No Trigger

Interface	Factor Defaults Setting
* GPIB address	*7
* I/O	*USB
*Baud	*9600band
*Parity bit	* no (8 digits)

Calibration	Factor Defaults Setting
Calibration Stats	Password

NOTE*: Parameter with (*) are saved in non-volatile Reading Storage

6. Power Supply

Power Supply of DM3058 contains of Real Panel's switch of Power Supply and software switch that could be set three working mode.

Press ⒰⒯⒤⒧⒤⒯⒴ → System → Cfg → PwrOn to enter into the following interface
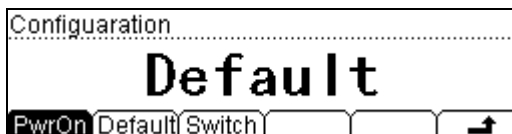
and select needed Power Supply Mode.

Figure 2-90 Choose power supply

PwrOn

Put through Power Supply and open the switch of Real Panel to startup the Multimeter.

Default

Put through Power Supply and open the switch of Real Panel, then the multimeter will resume last connecting state when the electricity is being cut forcibly.

Switch

Enable or Disable the front power switch.

Test/Cal

Press $\boxed{Utility}$ → $\boxed{Cal}$, enter the following interface:

```
Model: DM3058
Serial No.: DM3A020080808
Version: 99.00.00.00.00.00
      Info  PSW SecrOn  Cal      ⤴
```
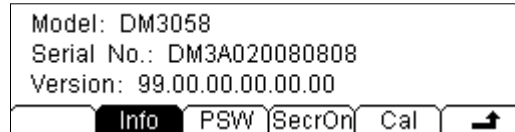
Figure 2-91 Inspective Interface

Table 2-36   Inspection Manu

Function Manuel	Settings	Explanation
Info		Check relative information about the instrument
PSW		Input Adjust password
SecrOn		Open or Close Safety Lock
Cal		Calibrate every range about the instrument
⤴		Save all the changes and go back to last Manu

NOTES:

● Safety Lock is open before inputting password.
● After input right password, Safety Lock will be open automatically.
● The instrument has been adjusted before leaving factory.

Print

This function helps users to send out the measure values through RS-232 interface.

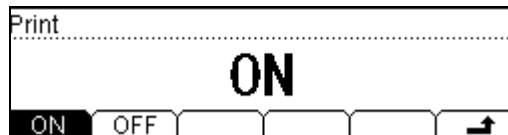Press (Utility) → print, enter the following interface:

Figure 2-92 Print interface

How to Use the Built-in Help System

The built-in help system provides application description of each button on the front panel.

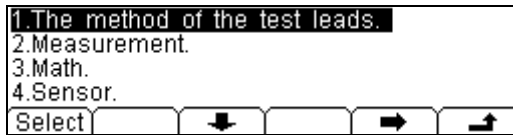Press (Help) button, the display shows below:

```
1.The method of the test leads.
2.Measurement.
3.Math.
4.Sensor.
Select          ↓          →      ↵
```

Figure 2-93 Help menu

```
5.Store and recall.
6.Utility.
7.I/O interface.
8.Online help.
Select    ↑      ↓      ←      →      ↵
```

Figure 2-94 Operation menu

Table 2-37   Help Function Menu Description

Function Menu	Settings	Description
Select		To select the help information you want.
↑		Move up the cursor and select the help menu.
↓		Move down the cursor and select the help menu.
←		Enter the last page help menu.
→		Enter the next page help menu.
↵		Back to a higher level menu.

NOTE: The arrowhead ↑ and ← are hidden before any operation is token.

The method of obtaining the help of the keyword:

1. **Connect the test lead**

   How to connect the lead in different measurements.

2. **Measure**

   How many functions can get when using Meas.

3. **Math measure**

   How to operate the math measure function when using Meas.

4. **Sensor measure**

   How to measure with the sensor.

5. **Storage and read**

   How to store and read the data/parameter/ sensors/scan task.

6. **To set the Utility**

   The method of setting the Utility.

7. **I/O interface**

   Use method of setting the I/O interface.

8. **Help on line**

   Press and hold the key for more than 3 seconds at any operation interface to obtain Help information of the key.

9. **To change the electric power fuse**

   How to change the electric power fuse.

10. **Technique support**

    Getting the technique support.

Chapter 3   Application Examples

■ Example 1: Reading Statistic Functions

■ Example 2: Elimination Leads Resistance

■ Example 3: dBm Measurement

■ Example 4: dB Measurement

■ Example 5: P/F Test

■ Example 6: Temperature Sensor

■ Example 7: Reading Hold

■ Example 8: Storage and Recall Preset

■ Example 9: Mirror Image Configuration

■ Example 10: To Realize Remote Control via LXI

Example 1: Reading Statistic Functions

How to realize the statistic function of maximum value for readings during measuring

The first reading is taken as the maximum value and being shown on the display. It will be refreshed to new maximum value sub sequentially.

Operating Steps:
1. To measure an AC Voltage. Connect test leads as shown below:

2. Press $\boxed{\sim V}$ button, select AC Voltage measurement function. Choose an appropriate measurement range.

3. Set the Statistic measurement function parameters.

    Press $\boxed{Math}$ → Stats → MAX →Open to statistic maximum value from the measurement result.

4. Lead test leads into the circuit and start to measure.
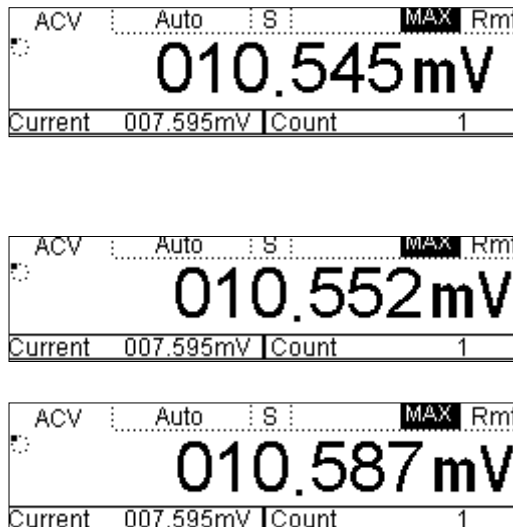   As shown in figure 3-2, current Statistic State is "MAX" and current reading is the maximum of all.

```
┌──────────────────────────────────┐
│ ACV     Auto    S      MAX  Rmt   │
│ ::.                               │
│        010.545mV                  │
│ Current   007.595mV  Count     1  │
└──────────────────────────────────┘
```

```
┌──────────────────────────────────┐
│ ACV     Auto    S      MAX  Rmt   │
│ ::.                               │
│        010.552mV                  │
│ Current   007.595mV  Count     1  │
└──────────────────────────────────┘
```

```
┌──────────────────────────────────┐
│ ACV     Auto    S      MAX  Rmt   │
│ ::.                               │
│        010.587mV                  │
│ Current   007.595mV  Count     1  │
└──────────────────────────────────┘
```

Figure 3-1 Statistic Maximum

Example 2: Elimination Leads Impedance

P/F Operation could eliminate impedance errors from leads when measuring smaller resistance.

Operating Steps:

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO.

2. Press $\boxed{\Omega}$ button, select Resistance (2WR) measurement function.

3. Choose an appropriate resistance range based on the measurement range. The default is Auto Range.

4. Lead impedance will be shown on the screen as follow after connecting with two leads together.
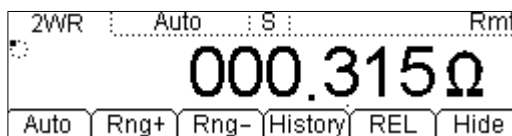
Figure 3-2 Lead impedance

5. Set parameters for Relative operation.

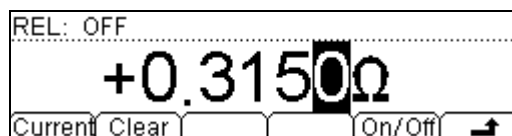(1)   Press $\boxed{\text{Meas}}$ PRE → Current and set the present value as current value.

Figure 3-3 Parameter settings

(2)   Press On/Off to open Relative measurement function.

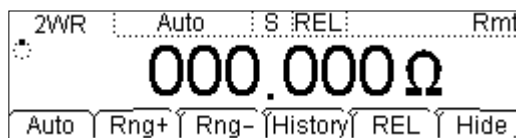(3)   Press ⬅ continuously and go back to main interface, then you will obtain final lead impedance.

Figure 3-4

Lead impedance after Relative operation

(4)   Besides, The REL on the measurement interface could also open Relative Operation.

Example 3: dBm Measurement

Operating Steps:

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO.

2. Press ⌒V button to start AC Voltage Measurement and choose an appropriate voltage range.

3. Set parameters of dBm operation

(1) Press (Math) → dBm to set the selective value of dBm as a reference value within supposed circuit by using Direction keys.
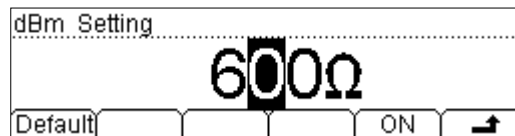

Figure 3-5

Select Reference resistance as measurement value

(2) Press (Math) → ON to turn on dBm measurement function. At this time, the reading shown on the screen is the Power value of reference resistance.

Figure 3-6 Operation result
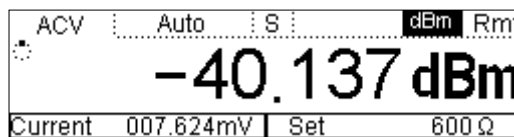
Example 4: dB Measurement

Operating Steps:

Method1：

Measure dBm, dBm_1 and dBm_2 existing in two circuits separately refers to Example 3, and then dB could be got:

$$dB = |dBm_1 - dBm_2|$$

Method2：

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO.

2. Press $\boxed{\sim V}$ button to start AC Voltage Measurement and choose an appropriate voltage range.
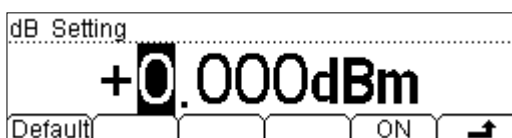
3. Set parameters of dB operation

Figure 3-7 Set the set value of dB

4. Press $\boxed{\text{Math}}$ → ON to open dB measurement function. At this time, the reading shown on the screen is the Power difference between two circuits.
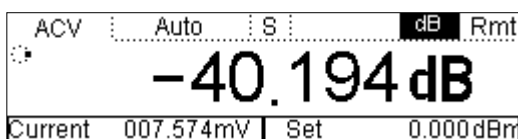

Figure 3-8 Operation result

Example 5: P/F Test

P/F Operation hints you the signal is overstep its range according to the selected High/Low Limit parameters; meanwhile the buzzer makes a sound to alarm (if Sound is open)

Operating Steps:
1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO.

2. Press $\boxed{\sim V}$ button to start AC Voltage Measurement and choose an appropriate voltage range.

3. Set the High/Low Limit Value.

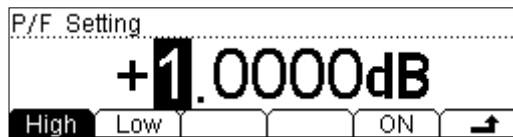(1) Press $\boxed{\text{Math}}$ → P/F → High to select.

Figure 3-9 Set the High Limit Value
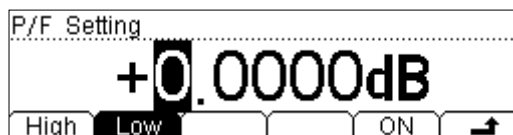
(2) Press $\boxed{\text{Math}}$ → P/F → Low to select.

Figure 3-10 Set the Low Limit Value

(3) Press Open to start P/F tesing. As shown in Figure 3-13, The test result is "PASS" as the Limit is between 0V and 1V.
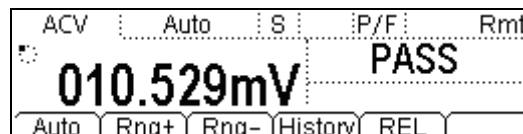

Figure 3-11 P/F Test result

Example 6: Temperature Sensor

As one of the most commonly detecting element of temperature, Thermocouple Sensor is successful applied in DM3058 which is used to measure temperature inside the machine near cold side of Thermocouple that is shown in main display.

Operating Steps:

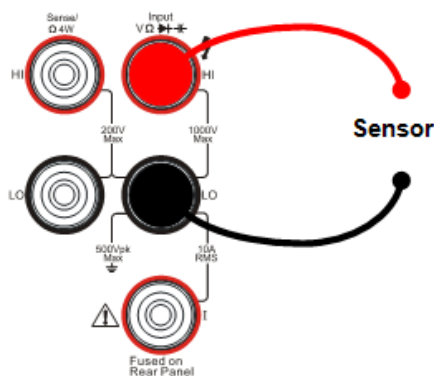About the connection of Sensor please refer to "To Measure Sensor" in chapter 2.

Figure 3-12 Sketch map for connecting

1. Press $\boxed{\text{Sensor}}$ → New to enter into the setting interface.
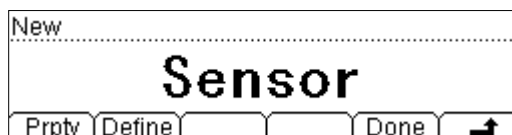

Figure 3-13 New interface

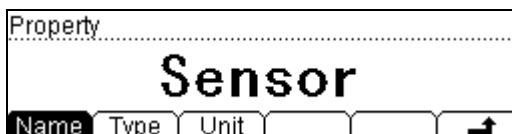2. Press Prpty to enter into the edit interface of Property.

Figure 3-14 Edit interface

(1) Press Name and input the name of this sensor: SensorT. Then, go back to Edit interface of Property via clicking Done.
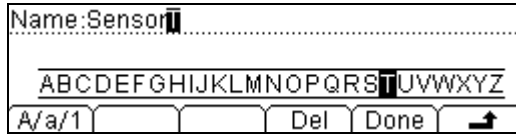
Name:Sensor█

ABCDEFGHIJKLMNOPQRS**T**UVWXYZ

A/a/1 | Del | Done | ◣

Figure 3-15   Edit interface of Name

(2) Press Type, to select the type of the sensor: Resistance.

Type

2WR

DCV | DCI | **2WR** | 4WR | FREQ | ➡
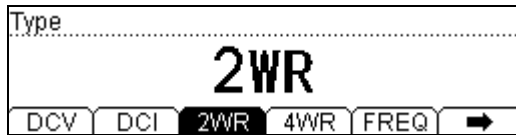
Figure 3-16   Edit interface of Type

(3) Press Unit → ℃, select the unit of the sensor: ℃

Unit

°C

USER | ° | **°C** | °F | % | ◣
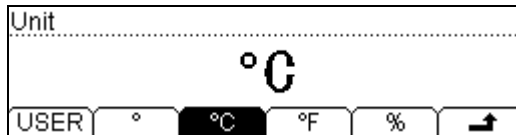
Figure 3-17   Edit interface of Unit

3.   Press Define button, the interface shows below:

Add | | | Top | End | ◣
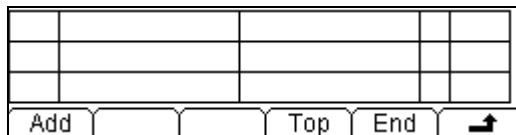
Figure 3-18   Edit interface of Reference value

4.   Press Add button, input the first group of reference value: 111.480Ω, 29.5℃.

Define

+29.**5**000

Meas | **Corrsp** | | Done | ◣
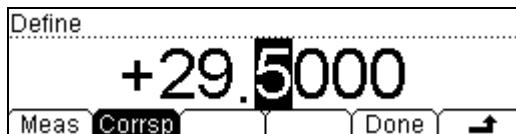
Figure 3-19 Input the first group of reference value

5. Press Done to get a fist group of reference value.

1	111.4800Ω	29.5000℃	⎰ Line
Add	Del	Edit	Top	End	◣

Figure 3-20   first group of reference value

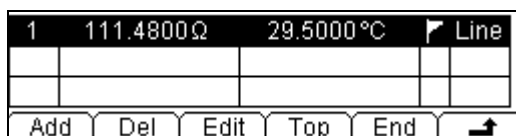6. Press Add button, input the second group of reference value: 112.570Ω、32.5℃

Figure 3-21

Input the second group of reference value

7. When finishing this group of reference value, press Done button, save all changes, and continue to input other values.

Figure 3-22 Edit interface of reference value

It allows deleting and editing the reference values that had been entered, select the group of reference value then press Del or Edit to perform the operations required. When you finish inputting all the data, press ◄┐ and save all the changes, back to a higher level menu.

8. Press ◄┐ → Done → Apply, save all the data into the local storage, and applies it immediately
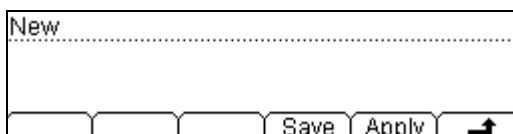
Figure 3-23 Finish interface

9. Press Save to load Sensor's file has been set to the Memory of DM3058. For the details please refer to **Storage and Recall**.

Select Apply to load settings into current Sensor and use it directly.
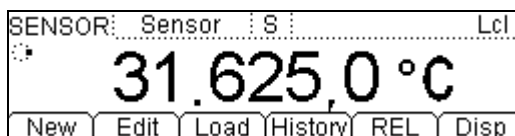

Figure 3-24 Apply interface

10. Press Show and select Display mode of measurement result as Full to view

measurement value and its corresponding value.

Figure 3-25 measure mode
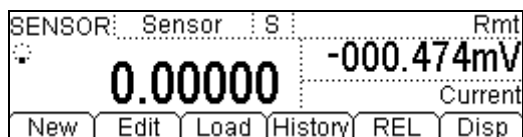
Figure 3-26 measure value

Example 7: Reading Hold

Reading Hold can help user to obtain a stable reading and hold it on the display of Front Panel. The reading would be hold all the same although testing pen had been withdrew**.**

Operating Steps:

1. Connecting the red lead (Test leads) to Terminal Input-HI (tested circuit) and black lead to Terminal Input-LO.

2. Press ⌐ᵛ to start DC Voltage Measurement and choose an appropriate range.

3. Set Parameters of Holding Trigger.

(1) Press (Trig) → Auto → Hold → On/Off → 0.1% , Holding range: 0.1%

Hold: ON
0.1%
On/Off 0.01% 0.1% 1% 10%

Figure 3-27 Reading holding interface

(2) Press ⬏ to save all changes.

(3) Repress (Trig) to finish setting and close menu.

4. Press (Run Hold) two times to start Hold function.

5. Connecting Test leads into circuit and start measuring.

Example 8: Storage and Recall Preset

Suppose the input power supply is AC 220V, output is DC12V, error is permitted within ±0.5V during testing the power supply.

Operating Steps:

1. Press ⌒ᵛ and then select Rang+/- or 750V level by Up/Down direction keys to test input voltage.

```
ACV    M 750V  : S :
 ⚡
        000.000 V
 Auto  Rng+  Rng-  History  REL  Hide
```
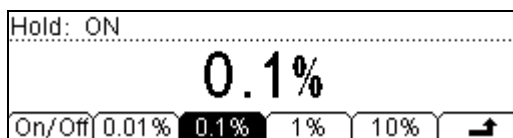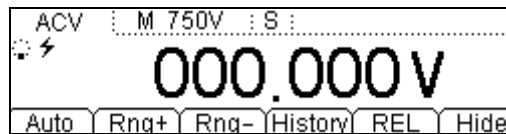
Figure 3-28 Manual measure interface

2. Save settings into Set1.

    Press (Preset) to enter "Preset" menu as shown in

```
Preset
      Select a Set
 Set1   Set2   Set3   Set4   Set5   ➡
```
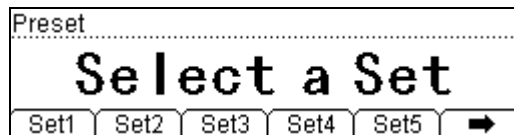
Figure 3-29 Preset menu interface

Press (2ND) → Set1 and store these settings into the first System Configuration

file, then press (Save).

```
▶ C:\   ▶SysSetting  File1: Set1
         MeasData    File2:
         MEAS_CSV    File3:
 Disk   Type  Read  Save  Erase   ⤴
```
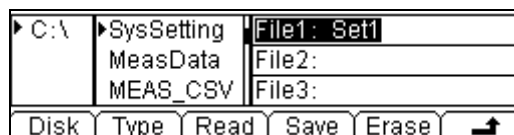
Figure 3-30 Configuration save interface

3. Press ⎓ᵛ and then elect Rang+/- or 20V level by Up/Down direction keys to test output voltage.
4. Open Relative operation, set High limit as 12.5V and Low limit as 11.5V so as to test whether the output DC 12v is exceed or not.
5. Save settings to Set2.

Example 9: Mirror Image Configuration

In virtue of this function, all the "System Configuration" and "Sensor Configuration" could be backupped via U-disc or clone to other DM3058. Up to 10 System Configuration files and 10 Sensor Configuration files could be stored in the instrument.　The following text will introduce you one of two files as example.

Operating Steps:
1. Store Configuration files ""Set1"and"Set2". The details have been mentioned in last example, please refer to.
2. Create a new Sensor Configuration file.

(1) Press Sensor→ New and enter into setting interface.
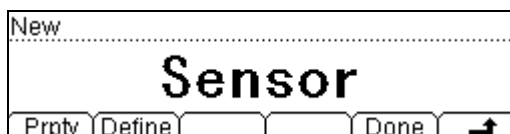
Figure 3-31 New interface

(2) Press Prpty to enter into edit interface.
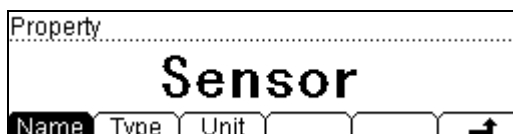
Figure 3-32 Edit interface

(3) Press Name and input the name of this sensor: SensorT. Then, go back to Edit interface of Property via clicking Done.
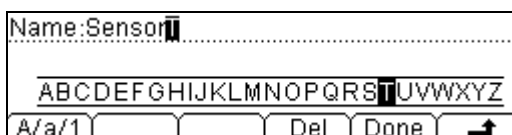
Figure 3-33 Edit interface of Name

(4) Press Type to select the type of the sensor as 2WR and click ⬅ to go back to edit interface.

Figure 3-34 Edit interface

(5) Press Unit → ℃, select the unit of the sensor: ℃
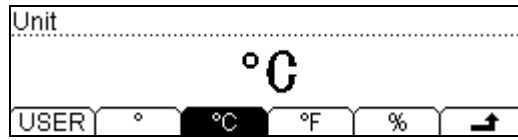
Figure 3-35   Edit interface of Unit

(6) Press Define button, the interface shows below:
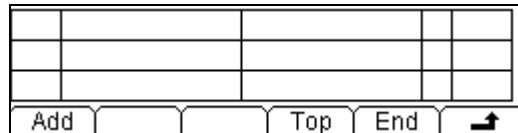
Figure 3-36   Edit interface of Reference value

(7) Press Add button, input the first group of reference value: 111.480Ω, 29.5℃.
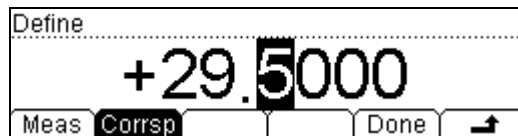
Figure 3-37 Input the first group of reference value

Press Done to get a fist group of reference value.
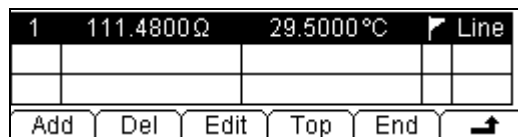
Figure 3-38   first group of reference value

(8) Press Add button, input the second group of reference value: 112.570Ω、32.5℃
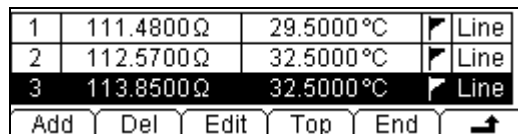
Figure 3-39 Edit interface of reference value

When you finish inputting all the data, press ⤴ and save all the changes, back to a higher level menu.

(9) Press ⤴ → Done → Apply, save all the data into the local storage, and applies it immediately.
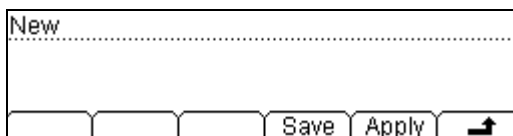
Figure 3-40 Finish interface

3. Press Save to store Sensor file has been selected into the interior Memory of DM3058, then you will get a file named a. Please create another file b as the same way.
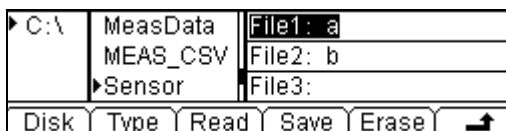
Figure 3-41 Save interface

4. Save the files form "System Configuration" and "Sensor Configuration" have been set to U-disc in the format of "Mirror Image".

Inset U-disc; select Location as A:\ and Type as "Mirror Image" see as follows:

Figure 3-42   Mirror Image interface

Press Save and input file name as "m", then a Mirror Image Configuration file will be obtained.

Figure 3-43 Mirror Image Configuration file

5. At present, m and mir file contains 2 System Configuration files which are "Set1" and "Set2" and 2 Sensor Configuration files which are b and a.

(1) You can delete the configuration files within DM3058 and Read m.mir file again to re-release them to corresponding location inside of DM3058.

(2) Also, you can colon them to other DM3058 via U-disk.

Example 10: To Realize Remote Control via LXI

Remote Control function based on LXI can help users to operate instrument remotely by internet. LAN setting offers two kinds of ways to get IP address: Auto IP and Manual IP, which enable users into the remote control system. The detailed operation steps are given in the following part:

Operation Steps:

1. Process $\boxed{\text{Utility}}$ → LAN → Auto IP, the instrument will get IP address automatically.
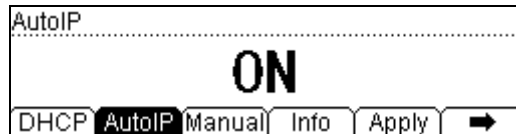
Figure 3-44   Auto IP

2. Choose info; view the internet setting message by $\bigcirc$ and $\bigcirc$ on the front panel.
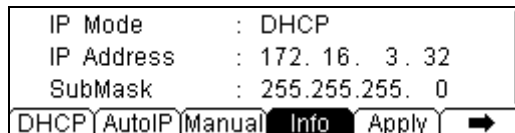
Figure 3-45   Auto IP interface

3. Please input the IP address into the IE browser, then remote control system interface will pop up as follows:
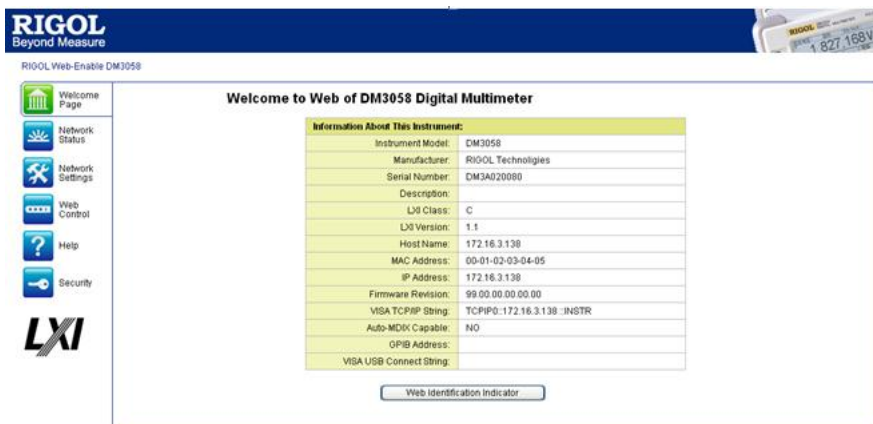
Figure 3-46   Welcome page

Remote control system offers 6 kinds of operations to users. You can choose any one by the menus on left of main interface.
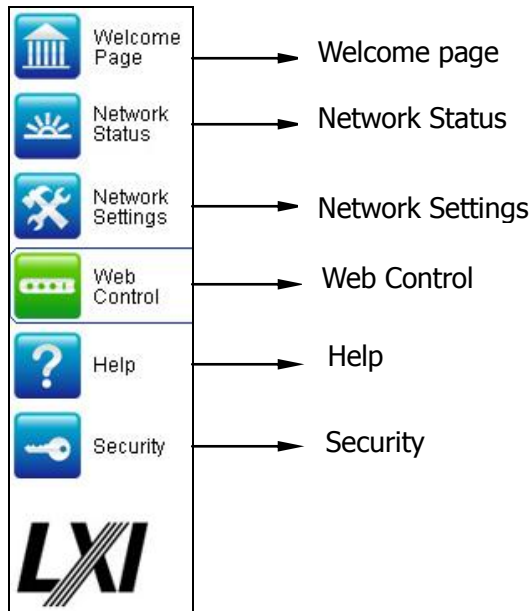
Figure 3-47   Remote control system menus

4.   Choose "Web control", and then an interface will pop up as follows. You can click the buttons to control instrument remotely. If you want to exit the system, please close the web, and press local button on instrument.
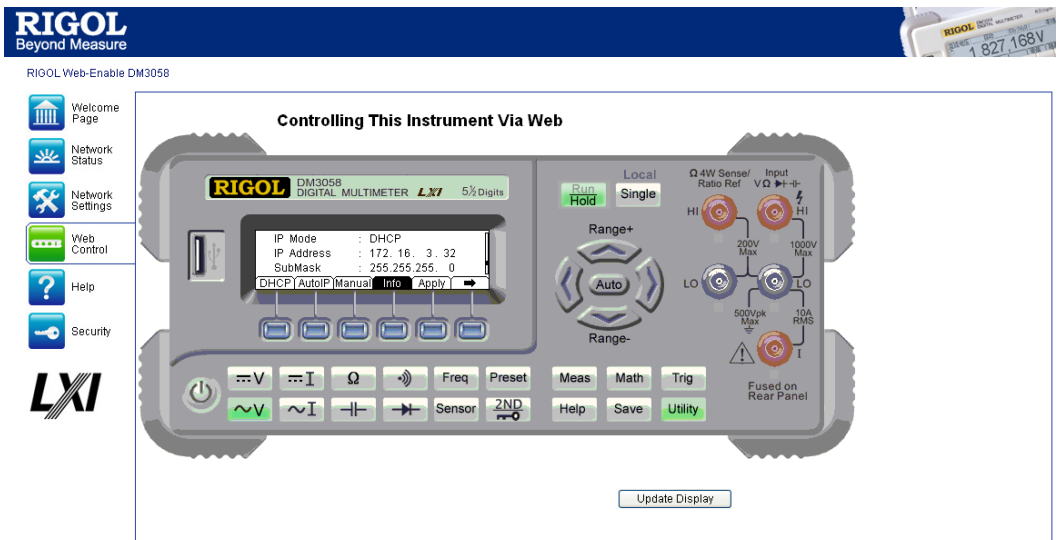
Figure 3-48   Operation interface

Chapter 4   Troubleshooting

1. When pressing the power switch, the multimeter is still in blank screen with nothing displaying:

(1) Check if the power is correctly connected.

(2) Check if the main power switch on the rear panel has been turn on.

(3) Check if the safety fuse has been blown, replace with a new one if necessary.

(4) Having done with the above steps, restart the instrument.

(5) If it still cannot work properly, please contact the local **RIGOL** Support center, let's serve for you.

2. When connecting a current signal, the reading has any change:

(1) Check if the test lead is correctly connected to current jack or the LO jack.

(2) Check if the safety fuse in the current location on the rear panel has been blown.

(3) Check if the measure location has switched to the DCI or ACI place correctly.

(4) Check whether the input is ACI but the shelves location is DCI.

3. When connecting a DC power signal, the reading display is abnormality:

(1) Check if the test lead is correctly connected with the current jack or the LO jack.

(2) Check if the safety fuse in the current location on the rear panel has been blown.

(3) Check the measure location has switched to the DCI or DCV place correctly.

(4) Check whether the input is DCI but the shelves location is ACI.

Chapter 5　Characteristics

General Technical Characteristics

Power Supply:
AC 100~120V, 45~440Hz
AC 200~240V, 45~66Hz
Power consumption: 20VA peak value

Dimension:
Height: 107.0mm
Width: 231.6mm
Depth: 290.5mm
Weight: 2.5kg

Display:
256×64 LCD display, support dual display, menu, Chinese and Englisjh languages, operation help.

Working Environment:
Precision 0~50℃, 80% R.H., 40℃, No coagulation
Storage Temperate: -20~70℃
Impact and Shake: According with MIL-T-28800E, III level, 5 Level (Only Sine)
Height above sea level: upper limit 3000m

Safety:
According with IEC61010-1: 2001.
Measure CAT II 1000V, CAT II 600V.
Class of pollution: 2.

Remote Interface: GPIB, 10/100Mbit LAN, USB2.0 Full Speed Device & Host (support U-disk), RS232.

Programming Language: RIGOL 3058 SCPI, FLUKE45, Agilent 34401A.

LXI Compatibility: LXI Class C, Version 1.1.

Warm-up Time: 30min.

Electric Technique Characteristics

DC Characteristics

Accuracy Specifications (% of reading + % of range)[1]

Function	Range[2]	Test Current or Burden Voltage	1 Year 23℃±5℃	Temperature Coefficient 0 ℃ to 18 ℃ 28 ℃ to 55 ℃
DC Voltage	200.000mV		0.015 + 0.004	0.0015+0.0005
	2.00000V		0.015 + 0.003	0.0010+0.0005
	20.0000V		0.015 + 0.004	0.0020+0.0005
	200.000V		0.015 + 0.003	0.0015+0.0005
	1000.00V[4]		0.015 + 0.003	0.0015+0.0005
DC Current[8]	200.000uA	<8mV	0.055 + 0.005	0.003+0.0010
	2.00000mA	<80mV	0.055 + 0.005	0.002+0.001
	20.0000mA	<0.05V	0.095 + 0.020	0.008+0.001
	200.000mA	<0.5V	0.070 + 0.008	0.005+0.001
	2.00000A	<0.1V	0.170 + 0.020	0.013+0.001
	10.0000A[5]	<0.3V	0.250 + 0.010	0.008+0.001
Resistance[3]	200.000Ω	1mA	0.030 + 0.005	0.0030+0.0006
	2.00000kΩ	1mA	0.020 + 0.003	0.0030+0.0005
	20.0000kΩ	100uA	0.020 + 0.003	0.0030+0.0005
	200.000kΩ	10uA	0.020 + 0.003	0.0030+0.0005
	2.00000MΩ	1uA	0.040 + 0.004	0.0040+0.0005
	10.0000MΩ	200nA	0.250 + 0.003	0.0100+0.0005
	100.000MΩ	200nA || 10MΩ	1.75 + 0.004	0.2000+0.0005
Diode Test	2.0000V[6]	1mA	0.05 + 0.01	0.0050+0.0005
Continuity	2000Ω	1mA	0.05 + 0.01	0.0050+0.0005

NOTE:

[1] Specifications are for 30 minute warm–up and select resolving index to 5 3/4 and calibration temperature 18 ℃~ 28 ℃.

[2] 20% over range on all ranges, except DCV 1000V, ACV 750V, DCI and ACI 10A range.

[3] Specifications are for 4–wire resistance function, or 2–wire resistance using P/F operation. Without P/F operation, add 0.2 Ω additional errors in 2–wire resistance function.

[4] For each additional volt over ± 500 VDC add 0.02 mV of error.

[5] For current terminal, > 7A DC or ACRMS for 30 seconds ON and 30 seconds OFF.

[6] Accuracy specifications are for the voltage measured at the input terminals only. 1 mA test current is typical. Variation in the current source will create some variation in the voltage drop across a diode junction.

Measurement Characteristics

DC Voltage

Input Resistance:	200mV and 2V range[1] 10MΩ or >10GΩ selectable
	(Input signals which exceed ±2.5V in these ranges will pass the 100kΩ
	(typical) clamp resistance.
	20V, 200V and 1000V range 10MΩ±2%
Input offset current:	<90pA, 25℃
Input Protection:	1000V on all ranges
CMRR (common mode rejection ratio):	120dB (For the 1kΩ unbalanced resistance in LO lead, maximum ±500VDC).
NMRR (normal mode rejection ratio):	80dB at "slow" measurement rate
	Add 20dB[3] when open the "AC filter" (Settling time adds 0.35s (source impedance near zero))

Resistance

Measurement Method:	Selectable 4-wire or 2-wire.
	Current source referenced to LO input.
Open-circuit Voltage:	P/F in <8V.
Max. Lead Resistance:	10% of range per lead for 200Ω, 1kΩ per lead (4-wire ohms) on all other ranges.
Input Protection:	1000V on all ranges.

DC Current

Shunt Resistor:	200uA sampling voltage<8mV
	2mA sampling voltage<80mV
	1Ω for 20mA, 200mA
	0.01Ω for 2A, 10A
Input Protection:	Externally accessible 10A, 250V fast-melt fuse
	Internal 12A, 250V slow-melt fuse

Continuity / Diode Test

Measurement Method:	1mA ±5% current source, <8V open-circuit voltage
Response Time:	123 samples / sec, with beeper
Continuity Threshold:	Adjustable from 1Ω to 2000Ω
Input Protection:	1000V

Setting time attentions:

Settling time in voltage measurement is affected by the source impedance, media characteristics of the cable and input signals.

AC Characteristics

Accuracy Specifications (% of reading + % of range)[1]

Function	Range[2]	Frequency Range	1 Year 23℃±5℃	Temperature Coefficient 0 ℃ to 18 ℃ 28 ℃ to 55 ℃
True RMS AC Voltage[[3]	200.000mV	20Hz - 45Hz	1.5 + 0.10	0.01+0.005
		45Hz - 20kHz	0.2 + 0.05	0.01+0.005
		20kHz - 50kHz	1.0 + 0.05	0.01+0.005
		50kHz - 100kHz	3.0 + 0.05	0.05+0.010
	2.00000V	20Hz - 45Hz	1.5 + 0.10	0.01+0.005
		45Hz - 20kHz	0.2 + 0.05	0.01+0.005
		20kHz - 50kHz	1.0 + 0.05	0.01+0.005
		50kHz - 100kHz	3.0 + 0.05	0.05+0.010
	20.0000V	20Hz - 45Hz	1.5 + 0.10	0.01+0.005
		45Hz - 20kHz	0.2 + 0.05	0.01+0.005
		20kHz - 50kHz	1.0 + 0.05	0.01+0.005
		50kHz - 100kHz	3.0 + 0.05	0.05+0.010
	200.000V	20Hz - 45Hz	1.5 + 0.10	0.01+0.005
		45Hz - 20kHz	0.2 + 0.05	0.01+0.005
		20kHz - 50kHz	1.0 + 0.05	0.01+0.005
		50kHz - 100kHz	3.0 + 0.05	0.05+0.010
	750.000V	20Hz - 45Hz	1.5 + 0.10	0.01+0.005
		45Hz - 20kHz	0.2 + 0.05	0.01+0.005
		20kHz - 50kHz	1.0 + 0.05	0.01+0.005
		50kHz - 100kHz	3.0 + 0.05	0.05+0.010
True RMS AC Current[5]	20.0000mA	20Hz-45Hz	1.5 + 0.10	0.015+0.015
		45Hz-2kHz	0.50 + 0.10	0.015+0.006
		2kHz-10kHz	2.50 + 0.20	0.015+0.006
	200.000mA	20Hz-45Hz	1.50 + 0.10	0.015+0.005
		45Hz-2kHz	0.30 + 0.10	0.015+0.005
		2kHz-10kHz	2.50 + 0.20	0.015+0.005
	2.00000A	20Hz-45Hz	1.50 + 0.20	0.015+0.005
		45Hz-2kHz	0.50 + 0.20	0.015+0.005
		2kHz-10kHz	2.50 + 0.20	0.015+0.005
	10.0000A	20Hz-45Hz	1.50 + 0.15	0.015+0.005
		45Hz-2kHz	0.50 + 0.15	0.015+0.005
		2kHz-5kHz	2.50 + 0.20	0.015+0.005

Additional wave crest factor error (not Sine)[5]	
Wave crest coefficient	Error (% range)
1 - 2	0.05
2 - 3	0.2

NOTE:

[1]   Specifications are for 30 minute warm–up and select measurement rate to "slow", calibration temperature 18℃ - 28℃.

[2] 20% over range on all ranges, except DCV 1000V, ACV 750V, DCI and ACI 10A range.

[3] Specifications are for sine wave input >5% of range. 750V range P/Fed to 8×10^7 Volt-Hz. For inputs from 1% to 5% of range and <50 kHz, add 0.1% of range additional error. For 50 kHz to 100 kHz, add 0.13% of range.

[4] Specifications are for sine wave input >5% of range. Add 0.1% of the range for the sine wave input is 1%~5% of the range.

[5] For frequency <100 kHz.

Measurement Characteristics

True RMS AC Voltage

Measurement Method: AC coupled true-RMS-measure, the DC component of input with up to 1000V on any range.

Crest factor: Crest factor on full range ≤ 3

Input Impedance: 1MΩ ± 2% in parallel with 100pF on any ranges

Input Protection: 750VRMS on all ranges

AC filter bandwidth: 20Hz~100kHz

CMRR (common mode rejection ratio): 60dB (For the 1kΩ unbalanced resistance in LO lead and <60Hz, maximum ±500VDC).

True RMS AC Current

Measurement Method: DC coupled to the fuse and shunt. AC coupled true RMS measurement (measures the ac component only)

Crest factor: Crest factor on full range ≤ 3

Max. Input: The DC + AC current peak value <300% of the range. The RMS current including DC current is <10A.

Shunt Resistor: 0.01Ω for 2A, 10A

1Ω for 20mA, 200mA

Input Protection: Externally accessible 10A, 250V fast-melt fuse

Internal 12A, 250V slow-melt fuse

Setting time attentions:

Make sure the R circuit of input terminal has been completely stable before accurate measurement.

Input >300Vrms (or >5Arms) will cause the self heating of the signal conditioning component to generate error, this error is included in the characteristics of the instrument. Internal temperature variation results from the self heating will cause additional error on ac range, this error is lower than 0.02% reading, and it will disappear after a few minutes.

Frequency/Period Characteristics

Accuracy Specifications (% of reading)[1]

Function	Range	Frequency Range	1 Year 23℃±5℃	Temperature Coefficient 0 ℃ to 18 ℃ 28 ℃ to 55 ℃
Frequency Period	200mV to 750V[2]	20Hz-2kHz	0.01+0.003	0.002+0.001
		2kHz-20kHz	0.01+0.003	0.002+0.001
		20kHz-200kHz	0.01+0.003	0.002+0.001
		200kHz-1MHz	0.01+0.006	0.002+0.002
	20mA to 10A[3]	20Hz-2kHz	0.01+0.003	0.002+0.001
		2kHz-10kHz	0.01+0.003	0.002+0.001

NOTE:

[1]   Specifications are for 30 minute warm–up.

[2]   For AC input voltages 12% to 120% of range except where noted. 750V range P/Fed to 750VRMS. 200mV range specifications are for full scale or greater inputs. For inputs from 24mV to 200mV, multiply total % of reading error by 10.

[3]   For AC input current from 12% to 120% of range except where noted. 20mA range specifications are for full scale. For inputs from 5mA to 20mA, multiply total % of reading error by 10. 10A range is for AC input current from 25% to 100% of range.

Measurement Characteristics

Frequency and Period

Measurement Method: Reciprocal-counting technique. AC-coupled input using the ac voltage or ac current measurement function.

Measurement attentions:

All frequency counters are susceptible to error when measuring low–voltage, low–frequency signals. Shielding inputs from external noise pickup is critical for minimizing measurement errors.

Setting time attentions:

Errors will occur when attempting to measure the frequency or period of an input following a dc offset voltage change. The input blocking RC time constant must be allowed to fully settle (up to 1 sec) before the most accurate measurements are possible.

Capacitance Characteristics

Accuracy Specifications (% of reading + % of range)[1,2]

Function	Range[2]	Test Current	1 Year 23℃±5℃	Temperature Coefficient 0 ℃ to 18 ℃ 28 ℃ to 55 ℃
Capacitance	2.000nF	200nA	3 + 1.0	0.08+0.002
	20.00nF	200nA	1 + 0.5	0.02+0.001
	200.0nF	2µA	1 + 0.5	0.02+0.001
	2.000uF	10µA	1 + 0.5	0.02+0.001
	200uF	100µA	1 + 0.5	0.02+0.001
	10000uF	1mA	2 + 0.5	0.02+0.001

NOTE:

[1] Specifications are for 30 minute warm–up using P/F operation. Additional errors may occur for non–film capacitors.

[2] Specifications are for 1% to 120% of range on the 1nF range and 10% to 120% of range on all other ranges.

Measurement Characteristics

Capacitance

Measurement Method: Current input with measurement of resulting ramp.

Connection Type: 2-wire

Input Protection: 1000V on all ranges

Measurement attentions:

Measurement of small capacitance is easily affected by external noise thus to cause measurement error, disable input will reduce this error.

Measurement Characteristics

Triggering and Memory

Samples per Trigger: 1 to 2,000

Trigger Delay: 8ms to 2 sec

External trigger input:

      Input Level: TTL compatible (High level when left trigger input open)

      Trigger Condition: Selectable Rising, Falling, Low-level, High-level.

      Input Impendence: $>20k\Omega$, in parallel with 400pF, DC-coupled

      Min Pulse Width: 500µs

VMC Output:

      Electric Level: TTL compensate (Input>=1kΩ load)

      Output polarity: positive, negative(selectable)

      Output impedance: 200Ω, typical

Arbitrary sensor measurement

Support thermocouple, DC voltage, DC current, resistance types (2-wire or 4-wire), capacitance and Frequency output type sensors. Build in thermocouple cold side compensate.

Preset 10groups standard sensors.

Math function

Pass/Fail, RELative, Maximum/Minimum/Average,   dBm, dB, Hold, Histogram, standard deviation.

History function

Volatile Memory: 2000 reading history record.

Nonvolatile Memory:

10 groups history data storage (2000 readings/group)

10 groups sensor data storage (1000 readings/group)

10 groups instrument settings storage

10 groups random sensor settings storage

Support U-disk external storage extend

Chapter 6　Appendix

Appendix A: DM3058 Accessories

Standard Accessories:

- A Power Cord that fits the standard of destination country.

- Two test leads (black and red)

- Two Alligator Clips (black and red)

- A USB Data Wire

- A backup fuse

- A Quick Guide

- A CD-ROM (User's Guide and Application software)

Choice Accessories:

- Kelvin Test Clip
- RS232 Cable

NOTE:
- To avoid affecting the product performance, the length of USB data wire, LAN Cable and RS232 Cable connected to the instrument should be less than 3m.

- All the accessories are available by contacting your local **RIGOL** office**.**

Appendix B: Warranty

RIGOL warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of three (3) years from the date of shipment from an authorized **RIGOL** distributor. If a product proves defective within the respective period, **RIGOL** will provide repair or replacement as described in the complete warranty statement.

To arrange for service or obtain a copy of the complete warranty statement, please contact your nearest **RIGOL** sales and service office.

RIGOL do not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hint guarantee items related to tradable characteristic and any particular purpose.

RIGOL will not take any responsibility in cases regarding to indirect, particular and ensuing damage.

Appendix C: General Care and Cleaning

General Maintenance

Do not store or leave the instrument in where the instrument will be exposed to direct sunlight for long periods of time.

Caution

To avoid damages to the instrument, do not expose it to sprays, liquids, or solvents.

Cleaning

Inspect the instrument often based on its operating conditions require. Before cleaning, please disconnect it from all power sources and clean it with a mild detergent and water. Make sure the instrument is completely dry before reconnecting it to a power source.

To clean the exterior surface, perform the following steps:

1. Remove loose dust on the outside of the instrument with a lint- free cloth. Take care to avoid scratching the clear plastic display filter.
2. Use a soft cloth dampened with water to clean the instrument.

> ⚠️ **NOTE:** To avoid damages to the surface of the instrument, do not use any abrasive or chemical cleaning agents.

Appendix D: Contact RIGOL

If you have any problem or requirement during using our products, please contact **RIGOL** Technologies, Inc. or the local distributors.

Domestic: Please call
Tel: (86-10) 8070 6688
Fax: (86-10) 8070 5070
Service & Support Hotline: 800 810 0002
9:00 am –5: 00 pm from Monday to Friday

Or by e-mail:
Service@rigol.com

Or mail to:
RIGOL Technologies, Inc.
156# CaiHe Village, ShaHe Town, ChangPing District, Beijing, China
Post Code: 102206

Overseas: Contact the local **RIGOL** distributors or sales office.
For the latest product information and service, visit our website: www.rigolna.com

Index