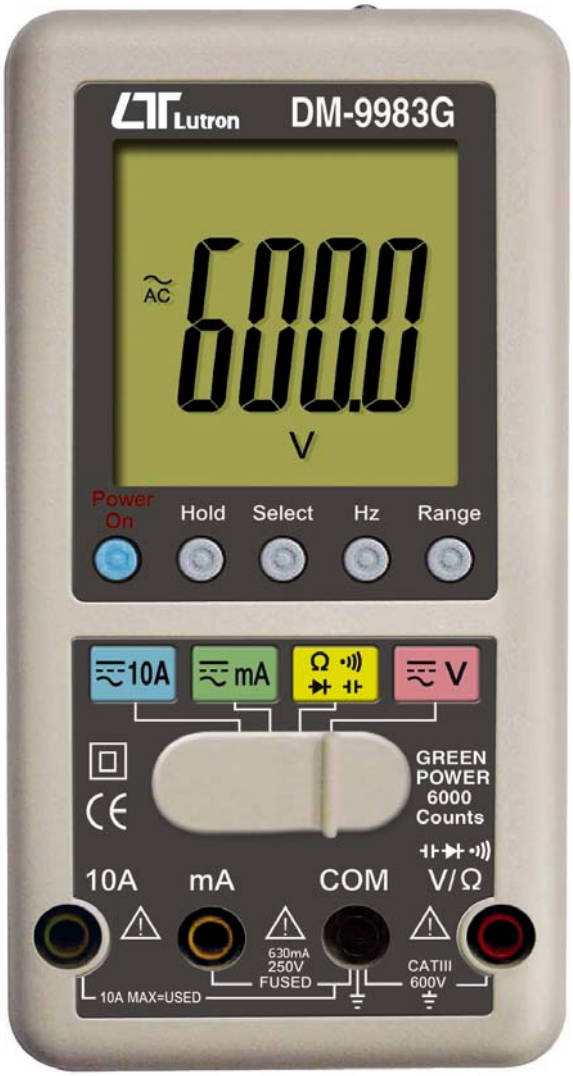
*Green power, hybrid power*

# SMART MULTIMETER

## Model : DM-9983G



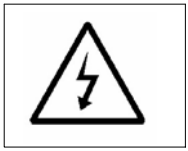

Your purchase of this SMART MULTIMETER marks a step forward for you into the field of precision measurement.

Although this MULTIMETER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed.

Please read the following instructions carefully and always keep this manual within easy reach.

# OPERATION MANUAL

## Caution Symbol



***Caution :***

*** Risk of electric shock !**

***Caution :***

*** Do not apply the overload voltage, current to the input terminal !**

*** Remove test leads before open the battery cover !**

*** Cleaning - Only use the dry cloth to clean the plastic case !**

## Environment Conditions

**** Installation Categories III 600V.***

**** Pollution Degree 2.***

**** Altitude up to 2000 meters.***

**** Indoor use.***

**** Relative humidity 80% max.***

***Equipment protected throughout by double insulation or reinforced insulation.***

# TABLE OF CONTENTS

# 1. FEATURES

* Green power, battery is no need, power supply from the handy generator, operate the generator 10 to 20 seconds will offer 10 minutes energy typically.
* Hybrid power, meter also can supply by the battery.
* Meet CAT III-600 V.
* 6000 counts A/D, high resolution.
* ACV, ACA, DCV, DCA, ohms, continuity, Hz, Capacitance, Diode, Data hold.
* Smart function, Auto range or manual range with hold.
* Smart operation, Build in 4 intelligent function : " V ", " Ω ", " mA ". " 10A ".
* " V " function can select ACV, DCV automatically with auto range.
* " Ω " function can select the Resistance , Diode, Continuity beeper, Capacitance automatically with auto range.
* " 10A " " mA " function can measure ACA, DCA with auto range.
* Data hold ( auto range ).
* Auto shut off is available to save battery life.
* Both 10 A, mA current range are build fuses for safety consideration.
* 10 M ohm impedance for voltage circuit.
* Built-in overload protection for most ranges.
* LSI circuit provides high reliability and durability.
* Patent.
* Uses durable, long-lasting components, enclosed in strong, light weight ABS-plastic housing.
* Full line optional adapters : Clamp adapter, Tachometer adapter, Pressure adapter, Humidity Adapter, Sound level adapter, Anemometer adapter, Light adapter, EMF adapter.

# 2. SPECIFICATIONS

### *2-1 General Specifications*

| | |
|---|---|
| Green power and Hybrid power | * Green power, battery is no need, power supply from the handy generator, operate 10 to 20 seconds the generator will offer 10 minutes energy typically.<br>* Hybrid power, meter also can supply by the battery power. |
| Display | 46 mm x 45 mm large LCD display. |
| Measurement | ACV, ACA, DCV, DCA, ohms, continuity beeper, Hz, Capacitance, Diode, Data hold. |
| A/D counts no. | 6000 counts. |
| Range selection | Smart function, auto range or manual range selecting. |
| Smart function | " V " function can select ACV, DCV automatically with auto range. |
| | " Ω " function can select the Resistance, Diode, Continuity beeper, Capacitance automatically with auto range. |
| | " 10A " " mA " function can measure ACA, DCA with auto range. |
| Data hold | To freeze the display reading on the LCD display.<br>** Available for auto range only.* |
| Power On/Off management | If meter is not operated within 3 minutes will auto power switch off. |
| Polarity | Automatic Switching, " - " indicates negative polarity. |
| Sampling time | Approx. 0.5 to 1 second. |
| Operating Temperature | 0 to 50 ℃ (32 to 122 ℉). |

| | |
|---|---|
| Operating humidity | Less than 80% RH. |
| Power Supply | Green power :<br>Power from the handy generator, battery is no need. |
| | Battery power :<br>DC 3V battery ( CR-2032 ) x 2 PCs. |
| Power consumption | DC 3 mA. |
| Weight | 340 g/0.75 LB. |
| Dimension | 152 x 78 x 45 mm<br>( 6.0 x 3.1 x 1.8 inch ) |
| Accessories Included | Red and Black Test Leads..... 1 Set<br>Instruction Manual..... 1 PC |
| Optional accessories | Full line adapters :<br>* ACA/DCA current adapter : CA-502, CA-203, CA-501<br>* ACA current adapter : CA-201<br>* Pressure adapter : PS-403<br>* Light adapter : LX-02<br>* EMF adapter : EMF-824<br>* Sound level adapter : SL-406<br>* High voltage probe : HV-40 |

### *2-2 Electrical specifications (23± 5℃ )*

| ***DC/AC Voltage*** | *** auto range** |
|---|---|
| Range | 6 V /60 V/600 V |
| Resolution | 0.001 V /0.01 V/0.1 V |
| Accuracy | DCV : ± ( 1 % + 2d ) |
| | ACV : ± ( 1.2 % + 5d ) |
| Input impedance | 10 M ohm. |
| Over load protection | AC/DC 600 V. |
| Remark | ** The input impedance is 10 Mega ohm.*<br>** ACV specification be tested on sine wave 50/60 Hz.*<br>** For smart function ,the ACV start measurement voltage is larger than 400 mV ± 100 mV.* |

| ***DC/AC Current*** | *** auto range** | |
|---|---|---|
| Range | mA range | 600 mA/60 mA |
| | 10 A range | 10A |
| Resolution | mA range | 0.1 mA/0.01 mA |
| | 10 A range | 0.01 A |
| Accuracy | mA range | ± ( 1.2% + 2d ) |
| | 10 A range | ± ( 1.5% + 2d ) |
| Over load protection | mA range | 630 mA fuse |
| | 10 A range | 10 A fuse |
| Remark | ** ACA specification be tested on sine wave 50/60 Hz.*<br>** For smart function ,the ACA start measurement is*<br>10 A range : 1.50 A.<br>mA range : 1.50 mA. | |

| ***OHMS*** | *** auto range** |
|---|---|
| Range | 600/6 K/60 K/600 K/6 M ohm |
| Resolution | 0.1/1/10/100/1 K ohm |
| Accuracy | ± ( 1% + 3d ) |
| Over load protection | ± 350 DCV, 350 ACV |

| ***Capacitance*** | *** auto range** |
|---|---|
| Range | 6 nF/60 nF/600 nF/6 uF/60 uF |
| Resolution | 0.001 nF/0.01 nF/0.1 nF/0.001 uF/ 0.01 uF |
| Accuracy | ± ( 3% + 5d ) |
| Remark | *Discharge capacitor before testing.* |

| ***Frequency*** | |
|---|---|
| Range | 40 Hz to 1 KHz. |
| Resolution | 1 Hz. |
| Accuracy | ± ( 0.3% + 2d ) |
| Input impedance | 10 M ohm. |
| Over load protection | AC/DC 600 V. |

| ***Diode*** |
| --- |
| Short/non conductance, good/defect test. |

| ***Continuity*** |
| --- |
| If measuring resistance is less than 10 ohm, the beeper will sound . |

# 3. FRONT PANEL DESCRIPTION

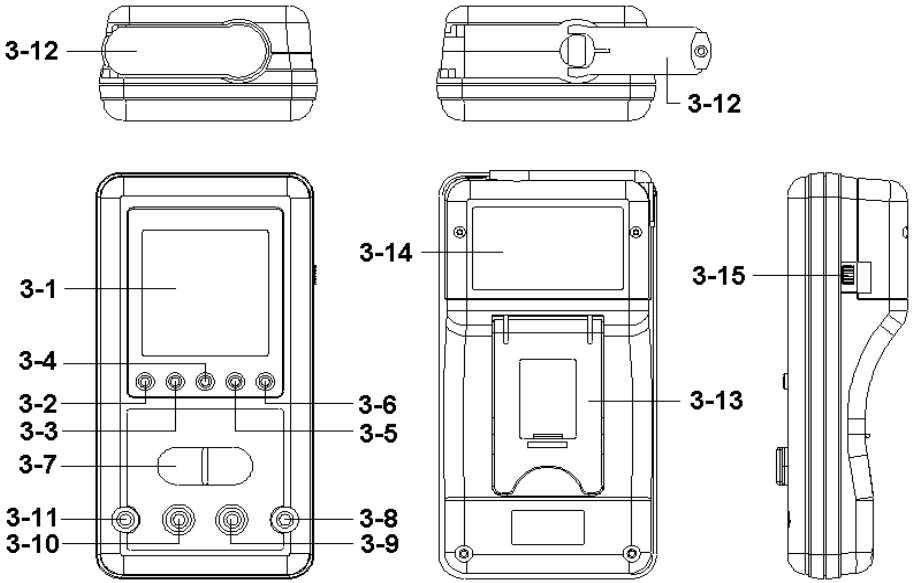



Fig. 1

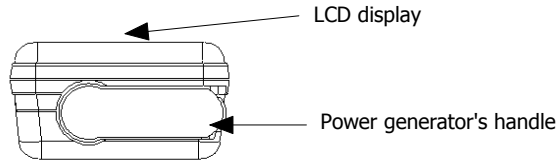
3-1 Display
3-2 Power On button.
3-3 Hold button
3-4 Select button
3-5 Hz button
3-6 Range button
3-7 Function switch
3-8 V/Ω terminal
3-9 COM terminal
3-10 mA terminal
3-11 10 A terminal
3-12 Handle of power generator
3-13 Stand
3-14 Battery compartment/cover
3-15 Power type switch ( G/B switch )

# 4. POWER TYPE SELECTION

***4-1 Power supply from the generator***
***( Green power supply )***

1) **Select the " Power type switch " ( 3-15, Fig. 1 ) to the " G position " ( Green power position ).**

There is a " Power generator's handle " ( 3-12, Fig. 1 ) on the top of the housing case.




2) Lift and extend the " Power generator's handle " and rotate the handle in clockwise direction will generate the power energy into the meter, refer to Fig. a, b, c.

Fig. a


Fig. b


Fig. c


c. Wind-up the generator 10 to 20 seconds will offer 10 minutes energy typically. If wind-up the generator more time, the meter will be saved more energy and let the meter be operated for a long period.

### *4-2 Power supply from the battery*

1) Install the " DC3V battery ( CR-2032 ) x 2 PCs " into the " Battery compartment " ( 3-14, Fig. 1)
2) Slide the " Power type switch " to the " B " position ( battery position ), the meter will offer the power source from the battery.

# 5. MEASURING PROCEDURE

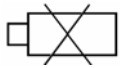
### *5-1 precautions & preparations for measurement*

1) Place the Red & Black Test Leads into the proper input terminal before making measurement.
2) Remove either of the test leads from the circuit when changing the measurement range.
3) Do not exceed the maximum rated voltage and current to the input terminal.
4) For safety consideration, when change the new test leads, it should use the replace approval test leads.

### *5-2 Power management*

1) Pressing the " Power On button " ( 3-2, Fig. 1 ) once, the meter will be power On.
2) The meter will be power Off automatically within 3 minutes after power On.

### *5-3 Symbols & units of display*

| Symbols Units | Descriptions |
|---|---|
| SMART | Appears when selecting " Smart " mode.<br>The meter default mode is " Smart " |
| AUTO | Appears when selecting " Automatic range " mode. |
| MANU | Appears when selecting " Manual range " mode. |
|  | Appears when selecting DC mode.<br>( DC voltage or DC current ) |
|  | Appears when selecting AC mode.<br>( AC voltage or AC current ) |
|  | * Appears when the " Data hold " function is operated.<br>* " Data hold " function is executed on the Automatic range " or " Manual mode " mode. |
|  | Power voltage is already under the low condition. |
|  | Appears when the " Continuity beeper " is operated. |
| V | Units for voltage measurements. |
| mA,A | Units for " Current " measurement. |
| Ω ,KΩ ,MΩ | Units for resistance measurements. |
| nF,uF | Units for " Capacitance " measurement. |
| KHz | Units for " Frequency " measurement. |
|  | Appears when the " Diode " function is operated. |
| — | Appears when measuring a DCV or DCA value is negative. |
| OL | Over range indicator for voltage and current, ohm function. |

### *5-4 Voltage ( ACV/DCV ) measurement*

1) Connect BLACK test lead into " COM " terminal ( 3-9, Fig. 1 ).
2) Connect RED test lead into " V " terminal ( 3-8, Fig. 1 ).
3) Select the " Function switch " ( 3-7, Fig. 1 ) to the " V " position.
4) Power On the meter by pressing the " Power On button " ( 3-2, Fig. 1 ) once, the Display will show " SMART ", the meter is under " Smart " mode for voltage measurement.
5) The meter can measure the ACV, DCV value automatically and with auto range selection.

### *5-5 Resistance measurement*

1) Connect BLACK test lead into " COM " terminal ( 3-9, Fig. 1 ).
2) Connect RED test lead into " Ω " terminal ( 3-8, Fig. 1 ).
3) Select the " Function switch " ( 3-7, Fig. 1 ) to the " Ω " position.
4) Power On the meter by pressing the " Power On button " ( 3-2, Fig. 1 ) once, the Display will show " SMART ", the meter is under " Smart " mode for resistance measurement.
5) The meter can measure the resistance value automatically and with auto range selection.

### *5-6 Continuity, Diode measurement*

**Continuity measurement**

1) Connect BLACK test lead into " COM " terminal ( 3-9, Fig. 1 ).
2) Connect RED test lead into " Ω " terminal ( 3-8, Fig. 1 ).
3) Select the " Function switch " ( 3-7, Fig. 1 ) to the " •)) " position.
4) Power On the meter by pressing the " Power On button " ( 3-2, Fig. 1 ) once, the Display will show " SMART ", the meter is under " Smart " mode for Continuity measurement.

5) When the resistance value is less than 10 ohm, the beeper sound will be generated, the Display will show " •)) " indicator.

## Diode measurement

1) Connect BLACK test lead into " COM " terminal ( 3-9, Fig. 1 ).
2) Connect RED test lead into " Ω " terminal ( 3-8, Fig. 1 ).
3) Select the " Function switch " ( 3-7, Fig. 1 ) to " ⊣◀ " position.
4) Power On the meter by pressing the " Power On button " ( 3-2, Fig. 1 ) once, the Display will show " SMART ", the meter is under " Smart " mode for Diode measurement.
5) a. When connected with polarity as shown in Fig. 2, a forward current flow is established and the approx. Diode Forward Voltage (VF) value in volt will appears on the display reading. If the diode under test is defective, " .000 " or near " .000 " value ( short circuit ) or " OL " ( open circuit ) will be displayed.

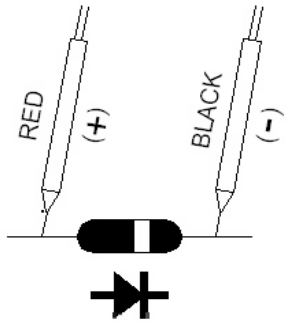



Fig. 2

b. When connected as shown in Fig. 3, a reverse check on the diode is made. If the diode under test is good, " OL " will be displayed. If the diode under test is defective, " .000 " or other numbers will be displayed. Proper diode testing should include both steps a. and b. above.

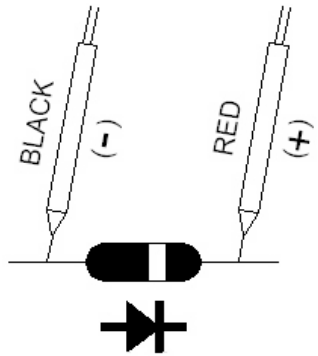



Fig. 3

### *5-7 Capacitance Measurement*

1) Connect BLACK test lead into " COM " terminal ( 3-9, Fig. 1 ).
2) Connect RED test lead into " Ω " terminal ( 3-8, Fig. 1 ).
3) Select the " Function rotary switch " ( 3-7, Fig. 1 ) to the " ⊣⊢ " position.
4) Power On the meter by pressing the " Power On button " ( 3-2, Fig. 1 ) once, the Display will show " SMART ", the meter is under " Smart " mode for capacitance measurement.
5) The meter can measure the capacitance value automatically and with auto range selection.

### *5-8 Current mA ( AC/DC ) measurement*

1) Connect BLACK test lead into " COM " terminal ( 3-9, Fig. 1 ).
2) Connect RED test lead into " mA " terminal ( 3-10, Fig. 1 ).

***Open the circuit in which current is to be measured. Now securely connect test leads in series with the load in which the current is be measured.***

3) Select the " Function switch " ( 3-7, Fig. 1 ) to the " mA " position.
4) Power On the meter by pressing the " Power On button " ( 3-2, Fig. 1 ) once, the Display will show " SMART ", the meter is under " Smart " mode for AC mA, DC mA measurement.
5) The meter can measure the AC mA, DC mA value automatically and with auto range selection ( 60 mA, 600 mA ).

**The max. measurement current for the mA range should less than 600 mA, otherwise the protection fuse will be broken.**

### *5-9 Current 10A ( AC/DC ) measurement*

1) Connect BLACK test lead into " COM " terminal ( 3-9, Fig. 1 ).
2) Connect RED test lead into " 10 A " terminal ( 3-11, Fig. 1 ).

***Open the circuit in which current is to be measured. Now securely connect test leads in series with the load in which the current is be measured.***

3) Select the " Function switch " ( 3-7, Fig. 1 ) to the " 10 A " position.
4) Power On the meter by pressing the " Power On button " ( 3-2, Fig. 1 ) once, the Display will show " SMART ". the meter is under " Smart " mode for ACA, DCA.
5) The meter can measure the ACA, DCA value with 10 A range.

**The max. measurement current for the 10 A range should less than 10 A, otherwise the protection fuse will be broken.**

### *5-10 Smart/Auto function selection*

When the Display show the " SMART ", the meter is ready for the Smart mode. Under the " Smart " mode if press the " Select button " ( 3-4, Fig. 1 ) once ( or once in sequence ) then can select the individual function, for example ACV, DCV, ACA, DCA , Diode, Capacitance, Continuity...testing. In the same time the Display will show the " AUTO " indicator ( auto range ) or " MANU " indicator ( manual range ).

### *5-11 Range selection*

Under the " Auto range " mode ( Display show the " AUTO " indicator ), if press the " Range button " ( 3-6, Fig. 1 ) once ( or once in sequence ) then can select the desired range ( manual range ) and also hold the measurement range.

### *5-12 Hz measurement*

During the measurement :
*Voltage ( ACV/DCV ) measurement ( Chapter 5-4 )*
*Current mA ( AC/DC ) measurement ( Chapter 5-8 )*
*current 10A ( AC/DC ) measurement ( Chapter 5-9 )*

if press the " Hz button " ( 3-5, Fig. 1 ) once, the Display will show " AUTO " and " Hz " indicator, now the meter is ready for frequency measurement of the measurement signal with auto range indication.

### *5-13 Data Hold*

1) During the auto range measurement ( Display show " AUTO " indicator ), if pressing the " Hold button " ( 3-3, Fig. 1 ) once will freeze the measured value and the LCD will indicate " **H** " symbol.
2) Push the " Hold Button " again to cancel the data hold function.

# 6. MAINTENANCE

**Caution :** ***Remove test leads before opening the battery cover or housing case !***

### *6-1 Cleaning*

**Caution :** ***Cleaning - Only use the dry cloth to clean the plastic case !***

### *6-2 Replacement of Fuse*

**Caution :** ***When make the replacement, should change the right spec. fuse .***

**a. Fuse A - Rating : 630 mA**

To be protected the circuit from overload current mA range ( 60 mA, 600 mA ).

**b. Fuse B - Rating : 10 A**

To be protected the circuit from overload current for the " 10 A " range.

1) When the mA current range can not operation, please check if the Fuse A is broken or not ?
2) When the 10 A current range can not operation, please check if the Fuse B is broken or not ?
3) When replace the fuse should take the test leads from the measuring circuit and power off the meter.
4) Take the screws away from the down case, loose the housing case, the fuses are install on the fuse socket on the PCB.
5) For safety consideration, when replace the fuse according the spec. ( should use the approval fuse ) and reinstall the cover.
6) Make sure the housing case is secured with the screw after replace the fuse.

***6-3 Replacement of batteries***

1) When use the battery power, if the Display show Low battery indicator "  " , it need to change the batteries.
2) open the " Battery Cover " ( 3-14, Fig. 1 ) away from the instrument and remove the battery.
3) Replace with batteries ( DC 3V, CR2032 X 2 PCs ) and reinstate the cover.
   **** When install the batteries, should make attention the battery polarity.***
4) Make sure the battery cover is secured after changing the batteries.

# 7. OPTIONAL ACCESSORIES and ADAPTERS

| ***Item*** | ***Model*** |
|---|---|
| ***Carrying Case*** | ***CA-03, CA-05A*** |
| ***Humidity Adapter*** | ***HA-702*** |
| ***Light Adapter*** | ***LX-02*** |
| ***EMF Adapter*** | ***EMF-824*** |
| ***Pressure Adapter*** | ***PS-403*** |
| ***Anemometer Adapter*** | ***AM-402*** |
| ***Tachometer Adapter*** | ***TA-601*** |
| ***Sound Adapter*** | ***SL-406*** |
| ***High Voltage Probe*** | ***HV-40*** |

# 8. PATENT

CHINA : ZL200620012764.3

GERMANY : Nr.202006007329.9

TAIWAN : M299401

JAPAN : 3130269

U.S.A. : PATENT PENDING

# 9. THE ADDRESS OF AFTER SERVICE CENTER