



## [1] Safety Information Prior to use your equipment, read this Instruction Manual thoroughly.

Thank you very much for your purchasing the compact-size insulation resistance tester of Sanwa, DG9. For safe operation, read this Instruction Manual thoroughly prior to use. Save this Instruction Manual with your equipment for future reference. Be sure to observe instructions marked with  WARNING and  CAUTION to avoid accidents involving "shock hazards", "injuries and damages."

### 1-1 Information of warning marks and other symbols


Symbols and their meaning used on product and Instruction Manual


 Includes very important information for safe operation.

• WARNING identifies information to avoid a fatal accident that may result in "electric shock" and "injuries."

• CAUTION identifies information to avoid unsafe operation that may result in damages to the equipment.

DH Data hold display (While "DH" is displayed, the auto power save function is disabled.)

 Low Battery warning display

 Denotes equipment protected by double insulation or reinforced insulation.

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### 1-2 WARNING instruction for safe operation

#### WARNING

Observe the instructions listed below in operating this equipment to avoid a fatal accident that may result in "electric shock" and "injuries."

1. Do not operate the equipment with wet hands.
2. Use caution in handling a sharp edge of the test pin.
3. Do not touch the test pin during measurement.
4. The test pin is emitting voltage (50V/125V) during measurement. Check the withstand voltage of an object to be measured.
5. This is a device for measuring insulation resistance. (Do not use this equipment for measuring voltage.)
6. Do not operate the equipment when the main body or test cord is damaged or broken.
7. Do not operate the equipment with its case removed.
8. The main body is not of splash-proof construction. Use caution to avoid splashing water on the equipment.
9. Do not leave the equipment for a long time where it is exposed to impacts, frequent vibration, direct sunlight, high temperature (or low temperature), and high humidity. Remove batteries from the equipment when it is not used for an extended period.
10. Do not attempt to repair or modify the equipment except replacing batteries.
11. **Be sure to return the Power/Function knob to OFF after measurement.**
12. **While the data hold function is active, the auto power save function is disabled. So set the Power/Function control to OFF.**

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### 3-1 Auto power save function

- The auto power save function mode is entered in about 30 minutes after the Power/Function knob is switched from OFF to the measurement range and the knob key operation is terminated.
- To cancel the auto power save function, return the Power/Function knob to OFF and cycle the power on the equipment.
- **When the data hold function is active, the auto power save function is disabled.**

### 3-2 Knob key function

- Used for measurement starting measurement (MEA./) data hold (DH) functions.
- Move the Power/Function knob from OFF to the measurement range and press the knob key to start a measurement (MEA.) (LED lights up).
- To enter the data hold (DH) mode, press the knob key after measurement starts (DH lights up). At the same time, generated voltage is disabled (LED goes out).

### 3-3 LED display

- The LED (light-up, blinking) display shows that measurement is in progress. (INSUL. TEST VOLTAGE: Voltage for measuring insulation resistance)

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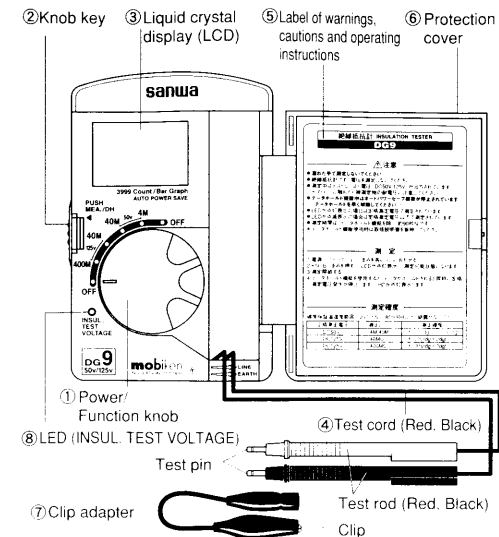
## [2] Features

- Pocket-size type convenient for carrying.
- Accurate measurement featured with resolution of 1K $\Omega$  equivalent to that of superior models.
- Data hold function convenient for measurement
- Wide measurement range (1K $\Omega$  to 400M $\Omega$ ) with a compact pocket-size equipment.
- For the convenience of carrying, the test cord can be housed in the main body after use.
- The auto power save function minimizes battery draining.
- A clip adapter adds to convenience in measurement.
- Suitable for measurement of low voltage insulation resistance of telephone circuit equipment, explosion-proof equipment and others.
- When the LED is blinking, measurement is being made at the rated voltage or less.

## [3] Part names and functions

- ① Power/Function knob  
Power and measurement range switching knob
- ② Knob key  
MEA./ DH switching knob
- ③ LCD display  
Display for measurement, data hold, etc.
- ④ Test cord (50cm)  
Connect the black test cord to the earth side (earth terminal)  
Connect the red test cord to the line side (line terminal)
- ⑤ Label  
Denotes warnings, cautions and operating instructions
- ⑥ Protection cover  
Main body protection cover
- ⑦ Clip adapter  
Clip for measurement
- ⑧ LED (INSUL. TEST VOLTAGE)  
LED light-up and blinking shows that measurement is under way.



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## [4] Notes for measurement

#### CAUTION

1. When  blinks, the internal batteries are drained. Replace the batteries with new ones (two batteries at the same time).
2. Since the measuring time expires in about 90 seconds (LED goes out), make a measurement without delay. Use the data hold function to read data. After reading the data, cancel the data hold function.
3. When high resistance is measured, the measured value may sometimes fluctuate.
4. The auto power save mode automatically starts if there is no key operation for about 30 minutes (except in the data hold mode).
5. In the over display, the highest-order digit blinks.
6. When insulation resistance including capacitive component and distributed capacity component is measured, the indicated value may not be stable.
7. The lower is the measured value, the more power consumption is required. For this reason, it is required to complete measurement quickly.
8. When the internal batteries are drained,  display may suddenly appear due to large power consumption when the measurement value is small.
9. Deduct the measurement portion of short-circuiting between the test pins from the measured value.
10. Before measurement, check the cord for damages.

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## [5] Measuring method

- 1) Measurements can be made by connecting the clip adapter to the test pin.
- 2) Move the Power/Function knob from OFF to the measurement range (4M $\Omega$ , 40M $\Omega$ , 400M $\Omega$ ).
- 3) All the LCD displays on the main body light up once and then XXXX M $\Omega$  is displayed. This has no bearing on measured values.
- 4) Press the knob key and start the measurement. (The LCD indicates the over display.) After measurement starts, the LED lights up.
- 5) Set the test pin on the measuring object and make a measurement. The measuring time is approx. 90 seconds.
- 6) Press the knob key again, and the data is fixed (DH is displayed) and voltage generation stops at the same time (LED goes out).
- 7) To make another measurement, press the knob key again and repeat Step 3 and thereafter
- 8) **Return the Power/Function knob to OFF after measurement.**

#### CAUTION

1. When DH is displayed during Step 4, press the knob key again. The DH display goes out with keeping the state of Step 6 (with the LED gone out).
2. When the LED is blinking, the measurement is being made at lower than the rated measurement voltage.
3. Do not leave the equipment in the data hold status. (In the data hold status, the auto power save function is disabled). Return the Power/Function knob to OFF promptly.
4. **Voltage on the positive side is outputted on the earth side (black test cord).**

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## mobiken Series

### INSULATION TESTER

### DG9

Instruction Manual

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## SANWA ELECTRIC INSTRUMENT CO.,LTD.

Dempa Bldg., 4-4 Sotokanda 2-Chome  
Chiyoda-Ku, Tokyo, Japan  
<http://www.sanwa-meter.co.jp/>

### General Specifications

Display	LCD max. display: 4000
Over display	The value at the highest digit blinks
Number sampling rate	Approx. 2 times/sec.
Bar graph sampling rate	Approx. 20 times/sec.
Response time	Approx. 3 seconds or less (time until the specified accuracy is achieved)
Low Battery Indication	<b>DL</b> mark lights up (Battery voltage: Approx. 2.7V)
Accuracy assurance	23 C ± 5 C, 80% RH or less.
temperature /humidity range	(Non condensing)
Operating temperature/ humidity range	5 C ~ 40 C, 80% RH or less (Non condensing)
Storage temperature/ humidity range	-10 C ~ 50 C, 80% RH or less (Non condensing)
Power supply	Silver oxide cell (SR44) x2
Auto power save time	In approx. 30 minutes after operation is terminated (Except when the data hold function is active)
Main body dimensions and weight	117 (H) x 76 (W) x 18 (D) mm. Approx. 125g
Cord length	Approx. 50cm both on black and red cords
Accessories	Instruction Manual, Clip adapter CL-15 (Black)
Guarantee class	II
Degree of pollution	2
Setting category	II
(Overvoltage category)	

Number of measurable times (at the minimum resistance to allow maintaining the rated measurement voltage)

Number of measurable times	continuous Approx. 1,700 times
Time required for one measurement	5 seconds (Allow an interval of approx. 25 seconds before starting the next measurement) (The number of measurable times varies with battery voltage)

The specifications and appearance of the product listed here are subject to change without notice for the reasons of improvement and others.

### [6] Maintenance and inspection

To maintain the required accuracy, calibrate and inspect your equipment at least once a year.

- Maintenance and inspection
  - Appearance check
    - Check the appearance for any damage caused by a drop or for any other reason.
    - Check the test cord for any damage or break.  
If any damage or break is observed, stop operating the equipment and have it repaired.
- Calibration
 

Contact the authorized agent of Sanwa Electric Instrument Co.,Ltd. for calibration and inspection of the equipment.
- Replacement of internal battery
 

Method of replacement

  - Unfasten the screw on the battery cover using a Phillips screwdriver.
  - Remove the battery cover and take out the drained battery.
  - Replace batteries with new ones paying attention to the correct polarity of batteries.
  - Put the battery cover back and fasten the screws.
- Storage
  - Since the panel and case are weak against volatile fluid and heat, do not wipe them with thinner and alcohol, nor put the equipment near an object generating high temperature (soldering gun, etc.)
  - Do not store the equipment where it is exposed to frequent vibration and where there is a risk of falling down.
  - Do not store the equipment where it is exposed to direct sunlight, high temperature, low temperature, high humidity or condensation.
  - When the equipment is not used for an extensive period of time, be sure to remove internal batteries from it.

### [7] After-sales service

- Warranty and Provision
 

This warranty policy is valid within the country of purchase only, and applied only to the product purchased from Sanwa authorized agent or distributor. Under Sanwa's general warranty policy, each instrument is warranted to be free from defects in workmanship or material under normal use for the period of one (1) year from the date of purchase.  
Sanwa reserves the right to inspect all warranty claims to determine the extent to which the warranty policy shall apply. This warranty shall not apply to fuses, disposables batteries, or any product or parts, which have been subject to one of the following causes:

  - A failure due to improper handling or use that deviates from the instruction manual.
  - A failure due to inadequate repair or modification by people other than Sanwa service personnel.
  - A failure due to causes not attributable to this product such as fire, flood and other natural disaster.
  - Non-operation due to a discharged battery.
  - A failure or damage due to transportation, relocation or dropping after the purchase.
- Repair
 

Customers are asked to provide the following information when requesting services:

  - Customer name, address, and contact information
  - Description of problem
  - Model Number
  - Product Serial Number
  - Proof of Date-of-Purchase
  - Where you purchased the product

Please contact Sanwa authorized agent / distributor / service provider, listed in our website, in your country with above information. When you send the product, to ensure the safety of the product during transportation, place the product in a box that is larger than the product 5 times or more in volume and fill cushion materials fully and then clearly mark "Repair Product Enclosed" on the box surface. The cost of sending and returning the product shall be borne by the customer.

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### Note :

- Prior to requesting repair, please check the following:  
Capacity of the built-in battery, polarity of installation and discontinuity of the test leads.
- Repair after the warranty period has expired:  
In some cases, repair and transportation cost may become higher than the price of the product. Please contact Sanwa authorized agent / service provider in advance.  
The minimum retention period of service parts is 6 years after the discontinuation of manufacture. Please note, however, if such parts become unavailable for reasons of discontinuation of manufacture, etc., the period of service may become shorter accordingly.

### Specifications

#### Rated measurement voltage (DC voltage)

Rated voltage	Accuracy (when unloaded)
DC50V	±1 to 1.2 times or less the rated measurement voltage
DC125V	±1 to 1.2 times or less the rated measurement voltage

#### Voltage between measuring terminals

Rated measurement voltage	Measurement range	Rated measurement current	Short-circuit current	Resistance to allow maintaining rated measurement voltage
DC50V	4M $\Omega$	Approx. 175 $\mu$ A	Approx. 175 $\mu$ A	Approx. 300k $\Omega$ or more
DC50V	40M $\Omega$	Approx. 52 $\mu$ A	Approx. 52 $\mu$ A	Approx. 1M $\Omega$ or more
DC125V	40M $\Omega$	Approx. 130 $\mu$ A	Approx. 130 $\mu$ A	Approx. 1M $\Omega$ or more
DC125V	400M $\Omega$	Approx. 13 $\mu$ A	Approx. 13 $\mu$ A	Approx. 10M $\Omega$ or more

Measurement accuracy: Guaranteed for one year  
(Accuracy assurance temperature /humidity range: 23 C ± 5 C, 80% RH or less. Non condensing)

Rated measurement voltage	Measurement range	Measurement accuracy
DC50V	4M-40M	±2%rdg+(0~4)dgt
DC125V	40M $\Omega$	±(2%rdg+2dgt)
DC125V	400M $\Omega$	±(3%rdg+2dgt)

rdg: reading dgt: digits

#### Measurement range display

Measurement range	Max. display	Resolution
4M $\Omega$	3.999M $\Omega$	0.001M $\Omega$
40M $\Omega$	39.99M $\Omega$	0.01M $\Omega$
400M $\Omega$	399.9M $\Omega$	0.1M $\Omega$

#### Power requirement (When the battery voltage is 3V)

Max. power consumption	Unloaded max. power	Power during power-on	Power in power save mode
Approx. 60mW	Approx. 12mW	Approx. 4mW	Approx. 0.1mW

#### Over input voltage

Model	Max. overvoltage (10 seconds at the time of power-on and power-off)
DG9	250V AC (50-60Hz) ON OFF 30 seconds

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### Calibration Assurance

SANWA ELECTRIC INSTRUMENT CO., LTD. hereby declares that this product was calibrated and tested in accordance with Sanwa calibration procedures during the manufacturing process conformable to the ISO9001-2000 (Quality systems - Requirements) quality management system.

The instruments used to calibrate this product are traceable, based on Sanwa traceability, to the national standard through the public institutions.

### Approved Certificate of Inspection

We certify that this product passed the QC inspection.



SANWA ELECTRIC INSTRUMENT CO., LTD.