[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, DG6, DG7, and DG8.
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 results in damages to the equipment.

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

BT ····· Low Battery warning display

REL ····· Displays that the relative value (0Ω/ADJ) is used

⧈ ····· Denotes equipment protected by double insulation or reinforced insulation.

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 (15V, 25V, or 50V) 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.**

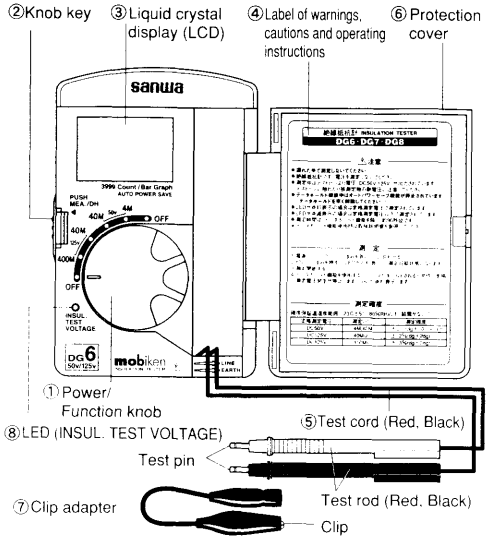
[2] Features

- Pocket-size type convenient for carrying.
- Accurate measurement featured with resolution of 1KΩ equivalent to that of superior models.
- Data hold function convenient for measurement.
- The 0Ω ADJ (REL) function further enhances the measurement accuracy.
- Wide measurement range (1KΩ to 40MΩ) 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/ REL switching knob
3 LCD display
Display for measurement, data hold and REL (relative value) functions
4 Label
Denotes warnings, cautions and operating instructions

⑤ 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)
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.



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/ 0Ω ADJ (REL) 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). Press the knob key again to cancel the data hold function.
- The 0Ω ADJ (REL) function is used for canceling the specific resistance portion for short-circuiting test pins (specific resistance values differ depending on rated measurement voltage).

3-3 LED display

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

[4] Notes for measurement

⚠ CAUTION

1. When BT 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 (The 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. When the DH key is pressed, the 0Ω ADJ (REL) mode may be entered depending on a measurement result.
5. The 0Ω ADJ (REL) function is enabled in measurement in the 0Ω ADJ (REL) operation.
6. The auto power save mode automatically starts if there is no key operation for about 30 minutes (except in the data hold mode).
7. In the over display, the highest-order digit blinks. However, in the over display of the 0Ω ADJ (REL) mode, the highest-order digit blinks and the other digits display values with the 0Ω ADJ (REL) portion deducted. (E.g.) When the measured value before entering the 0Ω ADJ (REL) operation mode is 0.08, the over display occurs at 3992. The number 3 blinks and other digits display 992.
8. When insulation resistance including capacitive component and distributed capacity component is measured, the indicated value may not be stable.
9. The lower is the measured value, the more power consumption is required. For this reason, it is required to complete measurement quickly.
10. When the internal batteries are drained, BT display may suddenly appear due to large power consumption when the measurement value is small.
11. Before measurement, check the cord for damages.

[5] General measuring method

1) Move the Power/Function knob from OFF to the measurement range (40MΩ, 4MΩ).
2) All the LCD displays light up once and then XXXXMΩ is displayed. This has no bearing on a measured value.
3) Measurement can also be made by connecting the clip adapter to the test pin.

4) Press the knob key to start the measurement. (The LCD indicates over display.) After measurement starts, the LED lights up.
LED light-up: Rated measurement voltage is being outputted between test pins.
LED blinking: Voltage lower than the rated measurement voltage is being outputted between test pins.
5) Read the displayed value (Deduct the indicated value for short-circuiting test pins.
6) Return the Power/Function knob to OFF after measurement.

⚠ CAUTION: To start another measurement after the completion of a measurement, press the knob key.

[6] Measuring method of 0Ω ADJ (REL)

1) Set the Power/Function knob from OFF to each range.
2) All the LCD displays on the main body lights up once and then XXXXMΩ is displayed. This has no bearing on a measured value.
3) Connect the clip adapter to the test pin.
4) Press the knob key and start the measurement. (The LCD indicates the over display.)
- The LED lights up.
- If DH is displayed, press the knob key again.

5) Short-circuit between the test pins. The measurement value (short-circuit measurement) differs according to rated measurement voltage.
(DC15V --- Approx. 0.08, DC25V --- Approx. 0.05, DC50V --- Approx. 0.03)
6) Press the knob key again to display 0Ω ADJ. REL display lights up and 00.00MΩ or 0.000MΩ is displayed.
7) Cancel the short-circuit between the test pins and measure the insulation resistance of the measuring object.

8) Return the Power/Function knob to OFF after the completion of measurement.

⚠ CAUTION: To cancel the 0Ω ADJ (REL) function, change the range or return the Power/Function knob to OFF.

[7] Data hold measuring method (When the data hold function is active, the auto power save function is disabled.)

1) Data hold operation in normal measurement operation
- When the knob key is pressed again after starting measurement, the data hold function starts (DH display lights up) to fix the measured value.
- If the measured value is approx. 0.10MΩ or less in the 40MΩ range and approx. 0.015MΩ or less in the 4MΩ range, the data hold function may be changed to the 0Ω ADJ (REL) function in some cases.
- To cancel the data hold function, press the knob key again (DH display goes out.)

2) Data hold operation in 0Ω ADJ (REL) measurement operation
- When the knob key is pressed again during measurement by the 0Ω ADJ (REL) function, the data hold function starts to fix the measurement display.
(REL and DH light up.)
- The measured is approx. 0.10MΩ or less in the 40MΩ range or approx. 0.015MΩ or less in the 4MΩ range, the data hold function may not start even if the knob key is pressed.
- To cancel the data hold function, press the knob key again.
(The DH display goes out and REL display alone lights up.)

⚠ **CAUTION: Voltage on the positive side is outputted on the earth side (black test cord).**

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mobiken Series

INSULATION TESTER

DG6・DG7・DG8

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 (Except in REL operation mode)
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	BT mark lights up (Battery voltage: Approx. 2.7V)
Accuracy assurance temperature /humidity range	23 C ±5 C, 80% RH or less, (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 (Overvoltage category)	II

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

Specifications

Rated measurement voltage (DC voltage)

Model	Rated measurement voltage	Accuracy (when unloaded)
DG6	15V/25V	1 to 1.2 times or less the rated measurement voltage
DG7	25V/50V	1 to 1.2 times or less the rated measurement voltage
DG8	15V/50V	1 to 1.2 times or less the rated measurement voltage

Voltage and current characteristics between measuring terminals

Rated measurement voltage	Measurement range	Rated measurement current	Short-circuit current	Resistance to allow maintaining rated measurement voltage
DC15V	40MΩ	Approx. 30μA	Approx. 30μA	Approx. 0.55MΩ or more
DC15V	4MΩ	Approx. 60μA	Approx. 60μA	Approx. 0.25MΩ or more
DC25V	40MΩ	Approx. 50μA	Approx. 50μA	Approx. 0.55MΩ or more
DC25V	4MΩ	Approx. 100μA	Approx. 100μA	Approx. 0.26MΩ or more
DC50V	40MΩ	Approx. 100μA	Approx. 100μA	Approx. 0.55MΩ or more
DC50V	4MΩ	Approx. 200μA	Approx. 200μA	Approx. 0.26MΩ 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	Measurement accuracy in QU.ADJ/REL operation mode
DC15V	4M/40M	±2%rdg+(0～10)dgt	±(2%rdg+2dgt)
DC25V	4M/40M	±2%rdg+(0～7)dgt	±(2%rdg+2dgt)
DC50V	4M/40M	±2%rdg+(0～4)dgt	±(2%rdg+2dgt)

rdg: reding dgt: digits

[8] Maintenance

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

1. Maintenance and inspection
   1) 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.
2. Calibration
   Contact the authorized agent of Sanwa Electric Instrument Co., Ltd. for calibration and inspection of the equipment.
3. Replacement of internal battery
   Method of replacement
   1) Unfasten the screw on the battery cover using a Phillips screwdriver.
   2) Remove the battery cover and take out the drained battery.
   3) Replace batteries with new ones paying attention to the correct polarity of batteries.
   4) Put the battery cover back and fasten the screws.
4. 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.

[9] After-sales service

1. 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:

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

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

1. Customer name, address, and contact information
2. Description of problem
3. Model Number
4. Product Serial Number
5. Proof of Date-of-Purchase
6. 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.

Note :
1) Prior to requesting repair, please check the following:
Capacity of the built-in battery, polarity of installation and discontinuity of the test leads.
2) 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.

Measurement range display

Measurement range	Max. display (Except in the REL operation mode)	Resolution
4MΩ	3.999MΩ	0.001MΩ
40MΩ	39.99MΩ	0.01MΩ

Power requirement (When the battery voltage is 3V)

Model	Max. power consumption	Unloaded max. power	Power during power-on (In data hold mode)	Power in power save mode
DG6	Approx. 15mW	Approx. 7mW	Approx. 4mW	Approx. 0.1mW
DG7	Approx. 60mW	Approx. 7mW	Approx. 4mW	Approx. 0.1mW
DG8	Approx. 60mW	Approx. 7mW	Approx. 4mW	Approx. 0.1mW

Over input voltage

Model	Max. overvoltage (10 seconds at the time of power-on and power-off)
DG6	15V/25V 125V AC (50/60Hz) ON/OFF 30 seconds
DG7	25V/50V 125V AC (50/60Hz) ON/OFF 30 seconds
DG8	15V/50V 125V AC (50/60Hz) ON/OFF 30 seconds

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

Model	Number of measurable times
DG6	continuous Approx. 2,500 times
DG7	continuous Approx. 1,800 times
DG8	continuous Approx. 1,800 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.)

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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.