



**[1] SAFETY PRECAUTIONS** Before use, read the following safety precautions.  
 This instruction manual explains how to safely use your new DG35/34 insulation resistance tester. Before use, please read this manual thoroughly. After reading it, keep it together with the product so you can refer to it when necessary.  
**INSTRUCTIONS** given under the **⚠ WARNING** and **⚡ CAUTION** headings must be followed to prevent accidental burns or electrical shock.

**1-1 Explanation of Warning Symbols**

The meanings of the symbols used in this manual and on the product are as follows.  
 ⚠ **Very important instruction for safe use.**

The warning messages are intended to prevent accidents to operating personnel such as burn and electrical shock. The caution messages are intended to prevent damage to the instrument.

- ⚡ High-voltage warning. (High voltage is generated from test pins.)
- Direct current (DC)      ± Ground
- ~ Alternating current (AC)      Ⓜ Double insulation (Protection Class II)
- LINE/ → Ⓜ LINE : Line/Plus input (Red)
- EARTH/ ← Ⓜ EARTH : Earth/Minus input (Black)

**1-2 Warning Instruction for Safe Use**

**⚠ WARNING**

- To ensure that you use the instrument safely, be sure to observe the instructions.
- 1. Never use the instrument on electric circuits that exceed 3.6 kVA.
- 2. Pay special attention when measuring voltages of AC 33 Vrms (46.7 V peak) or DC 70 V or more to avoid injury.
- 3. The clamp sensor provided with this instrument is exclusively for low-voltage use. Perform clamp current measurement with 600 V or less lines.
- 4. When measuring insulation resistance, disconnect the power supply of the device being measured.
- 5. Since high voltage (500 V/250 V/125 V) is generated during the measurement of insulation resistance, be careful about electric shock.
- 6. To avoid electric shock, always be sure to discharge the high voltage charged in the measured device after measuring insulation resistance.
- 7. Never apply an input signal exceeding the maximum rating input value.

- 8. Never use the instrument to measure a line connected to equipment (i.e. motors) that generates induced or surge voltage since it exceeds the maximum allowable voltage.
- 9. Never use the instrument if the main unit or test leads are damaged or broken.
- 10. Never use the instrument when it is not in its case.
- 11. Always keep your fingers behind the finger guards on the probe and the clamp sensor barrier when taking measurements.
- 12. Be sure to disconnect the test pins from the circuit when changing the function.
- 13. Before starting measurement, make sure that the function and range are properly set in accordance with the measurement.
- 14. Never touch the instrument with wet hands or use it in a damp environment.
- 15. When insulation resistance is measured, measurement voltage is generated from the black test probe connected to the ground side, so do not touch the test pin.
- 16. When measuring insulation resistance, first connect the black test probe to the ground side of the device being measured and then connect the red test probe to the line side. When disconnecting them, first remove the red test probe on the line side and then remove the black test probe on the ground side.
- 17. Never open the instrument case except when replacing batteries. Do not try to alter the original specifications.
- 18. To ensure safety and maintain accuracy, calibrate and check the instrument at least once a year.
- 19. The instrument is for indoor use only.

**⚠ CAUTION**

- 1. When insulation resistance is being measured, the measurement terminal of this instrument generates high voltage. It is recommended that devices and parts (such as semiconductors) with low or unknown withstanding voltage be disconnected from the electric wiring (circuit) before it is measured. This is particularly important with computer-related devices.
- 2. When measuring insulation resistance, set the value of the rated measurement voltage as close to the working voltage of the circuit being measured as possible. Example: With a 100 V circuit, use a rated measurement voltage of 125 V.

- 2-2 Features
  - Compact, lightweight, portable design that easily fits into a breast pocket.
  - Insulation resistant measurement settings can be switched between 3 rated measurement voltage ranges (500 V/250 V/125 V) with the full-scale value of 40.00 MΩ (DG35) or 400.0 MΩ (DG34).
  - Provided with a current clamp sensor that can measure up to 100 A DC/AC.
  - The clamp sensor has a thin U-shaped sensor design that is 7 mm thick. Also because the inclination angle of the sensor is variable between 0 and 180°, the display section of the main unit can be adjusted to an easy-to-view angle.
  - Provided with an AC/DC voltage measurement function that can be used for checking live line conditions on site.
  - The LCD panel incorporates an electroluminescent backlight for easier operation in dark or low-light conditions.
  - The storable sections of the test leads and test probes use an elastic material that is easy to wind and store.
  - Provided with a clip adapter useful for measurement.

**1-3 Overload Protections**

Function	Input terminals	Maximum rating input value	Maximum overload protection input
DCV · ACV	→ LINE ← LINE (Red)	DC/AC 400 V	DC/AC 400 V
40 MΩ (DG35) 400 MΩ (DG34) 125 V/250 V/500 V	← LINE ← EARTH (Black)	⚠ Voltage and current input prohibited	250 V AC (50/60 Hz) 30 sec.
DCA · ACA	Clamp sensor section	DC/AC 100 A	100 A DC/AC

Note: AC voltage and AC current are regulated by rms values of sinusoidal wave.

**[2] APPLICATION AND FEATURES**

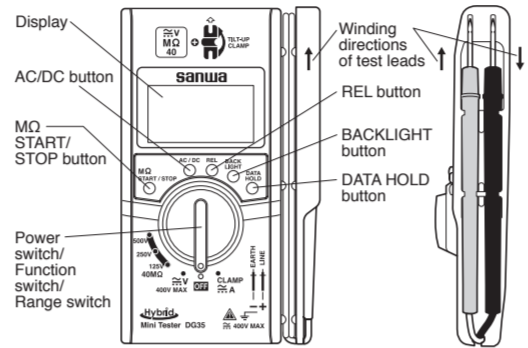
**2-1 Applications**  
 Integrating the measurement functions demanded at electrical work sites, including insulation resistance measurement, DC/AC clamp current measurement and DC/AC voltage measurement into a single unit, this instrument is a compact insulation resistance tester with clamp sensor ideal for electrical work.

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**[3] NAME OF COMPONENT UNITS**

**3-1 Multimeter**



**[6] MAINTENANCE**

**⚠ WARNING**

1. This section is very important for safety. Read and understand the following instructions fully and maintain your instrument properly.
2. The instrument must be calibrated and inspected at least once a year to maintain its safety and accuracy.

**6-1 Maintenance and Inspection**

- 1) Appearance
  - Has the appearance been damaged by falling?
- 2) Test leads
  - Is the test lead cord damaged?
  - Is the core wire exposed at any place on the test leads?

If the built-in fuse is blown, current measurement is impossible. Make sure that the test leads are not cut, referring to the section 5-1.

**6-2 Calibration**

The manufacturer may conduct calibration and inspection. For more information, please contact your dealer.

**6-3 Battery Replacement**

**⚠ WARNING**

1. To avoid electric shock, do not remove the battery compartment cover when input is applied to the measurement terminal and clamp sensor or when measurement is being performed.
2. Be sure to confirm that the function switch is set to "OFF" before replacing the batteries.

**⚠ CAUTION**

Set the batteries with their polarities facing in the correct directions.

- ① Remove the two fixing screws from the battery compartment cover.
- ② Slide the battery compartment cover downward to remove it.
- ③ Replace both of the two batteries in the battery compartment with new ones.

**[7] AFTER-SALE SERVICE**

**7-1 Warranty and Provision**

Sanwa offers comprehensive warranty services to its end-users and to its product resellers. 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.  
 This warranty policy is valid within the country of purchase only and applied only to the product purchased from Sanwa authorized agent or distributor.  
 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.

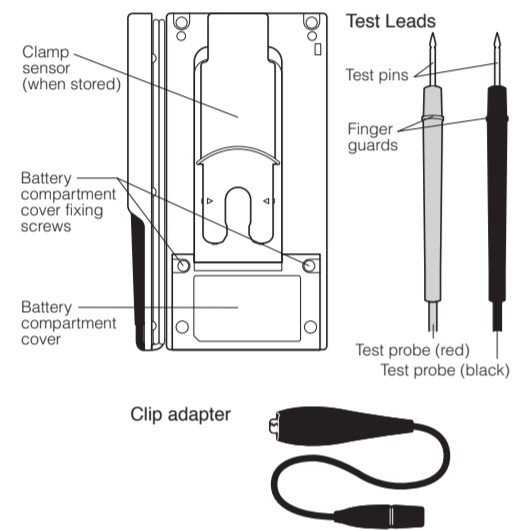
**7-2 Repair**

Customers are asked to provide the following information when requesting services:  
 1. Customer name, address, and contact information  
 2. Description of problem  
 3. Description of product configuration  
 4. Model Number  
 5. Product Serial Number  
 6. Proof of Date-of-Purchase  
 7. Where you purchased the product  
 Please contact Sanwa authorized agent / distributor / service provider, listed in our website, in your country with above information. An instrument sent to Sanwa / agent / distributor without those information will be returned to the customer.

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

- 2) Repair during the warranty period:  
 The failed instrument will be repaired in accordance with the conditions stipulated in "7-1 Warranty and Provision".
- 3) 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 functional parts is 6 years after the discontinuation of manufacture. This retention period is the repair warranty period. Please note, however, if such functional parts become unavailable for reasons of discontinuation of manufacture, etc., the retention period may become shorter accordingly.
- 4) Precautions when sending the product to be repaired:  
 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.

**7-3 SANWA Website**  
 http://www.sanwa-meter.co.jp  
 E-mail: exp\_sales@sanwa-meter.co.jp



**[4] DESCRIPTION OF FUNCTIONS**

**⚠ WARNING**

When canceling an operation, do not turn the function switch during measurement.

**4-1 Power Switch/Function Switch/Range Switch (All Functions):**

Turn this switch to turn the power ON and OFF and to select the measurement function, as well as the rated measurement voltage range of the MQ function.

**4-2 MQ START/STOP Button (MQ Function)**

In the MQ measurement voltage generation & MQ measurement mode, Ⓜ is illuminated on the display and the selected measurement voltage is generated.  
 In the MQ measurement voltage stop & measurement value data hold mode, the measurement voltage is stopped and the measurement value is maintained. Ⓜ is illuminated on the display.  
 Notes:  
 • The MQ measurement voltage generation mode automatically stops after about 30 seconds. Should this be the case, the measurement value will not be held.  
 • When the measurement function is switched, the measurement value data hold is canceled.

**4-3 AC/DC Button (V · CLAMP A Positions)**

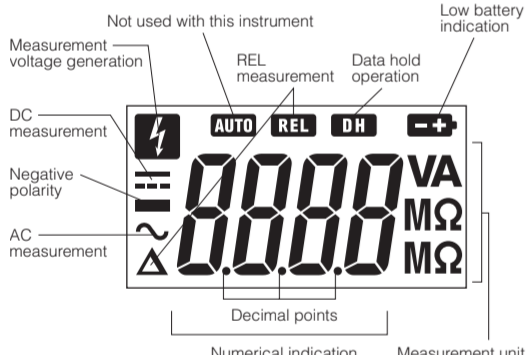
Each time this button is pressed in the V or CLAMP A position, the measurement function switches in the order of AC → DC → AC → .....

**4-4 REL Button (DCV · ACV · DCA · ACA Functions)**

When the DCV, ACV, DCA or ACA function is activated, press this button. Ⓜ and "△" will be illuminated on the display, and the measurement value will be set using the input value at the time the button was pressed as a reference. To cancel this mode, press the button again and keep it depressed for more than 2 seconds.  
 Ex.) Display after the REL button is pressed during DC 100 V input

Actual input value	Display in REL measurement
DC 120.0 V	⚠ DC 020.0 V
DC 100.0 V	⚠ DC 000.0 V
DC 090.0 V	⚠ DC -010.0 V

**3-2 Display**



**5-3 Insulation Resistance Measurement (MQ)**

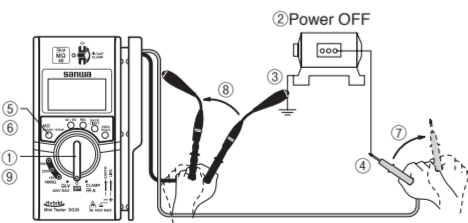
**⚠ WARNING**

1. Never apply an external voltage on the input terminal.
2. Do not turn the function switch during measurement.
3. Do not hold the test probe by a section closer to the test pin side behind the finger guard.
4. When the measured object has capacitance, it may remain charged by the applied voltage from this instrument for some time after measurement is completed. Be careful.

Function	Rated measurement voltage range	Max. rating input value	Measurement range
MQ (DG35)	125 V	40.00 MΩ	40.00 MΩ
	250 V		
	500 V		
MQ (DG34)	125 V	400.0 MΩ	400.0 MΩ
	250 V		
	500 V		

- 1) Applications: Measuring the insulation resistance (MQ) of electrical equipment and circuits.
- 2) Measurement procedure
  - ① Set the function switch to the desired measurement voltage range of MQ.
  - ② Short-circuit the test pins on the red and black test probes, then press the MQ START/STOP button to confirm that the test leads are connected (displayed value: 3 counts or less).
  - ③ Turn off the power of the device you are going to measure.
  - ④ Connect the black test probe (provided, with the black clip connected) to the ground line of the device you are going to measure.
  - ⑤ Connect the red test probe to the other end of the line of the device being measured.

- ⑥ Press the MQ START/STOP button. The measurement voltage will be applied between the test leads, and MQ measurement will start. Measurement time is about 30 seconds. Once that time has elapsed, the application of the measurement voltage will stop automatically. Measurement can be stopped at any time by pressing the MQ START/STOP button again. The measurement value will be fixed at the value when the button was pressed.
- ⑦ To perform the MQ measurement again, press the MQ START/STOP button again.
- ⑧ After the measurement is complete, release the pin of the red test probe from the device that was measured.
- ⑨ Release the black test probe from the ground line of the device that was measured.
- ⑩ Be sure to set the function switch to the OFF position after completing measurement.



- ◆ A numerical value appears in the display before the MQ START/STOP button is pressed (before the measurement voltage is applied). This is not a malfunction, and the displayed value is irrelevant to the measurement.
- ◆ During insulation resistance measurement, the least significant digit of the displayed measurement value may sometimes flicker.
- ◆ During insulation resistance measurement, use the rated measurement voltage that's as close as possible to the voltage used by the circuit being measured. Example: Use the rated measurement voltage of 125 V for an electrical circuit of 100 V.

**5-4 Clamp Current Measurement (CLAMP A)**

**⚠ WARNING**

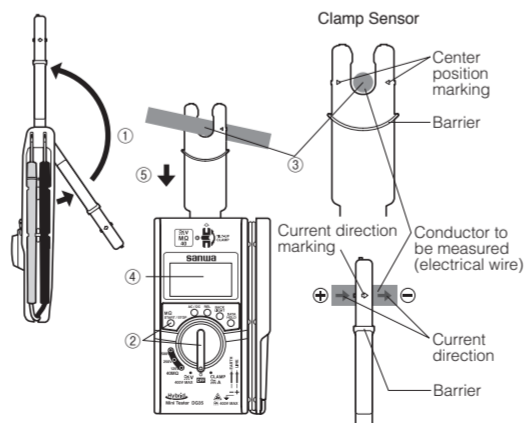
1. The clamp sensor of this instrument is exclusively for low voltage. Perform the clamp current measurement on a line with 600 V or less.
2. Do not turn the function switch during measurement.
3. During measurement, do not hold the clamp sensor at any point beyond the barrier.
4. To prevent electric shock, be sure to store the test probe and test lead in their designated storage compartments.

**⚠ CAUTION**

1. The measurable diameter of a conductor is 10 mm. Do not force a cable with an outer diameter of more than 10 mm into the clamp sensor section. Also do not apply external force to the clamp sensor section.
2. Make sure that the conductor to be measured is aligned with the center of the arrows on the clamp sensor. Otherwise, a measurement error will result.
3. Do not let this instrument come near a conductor in which large current flows or place it on a strong magnetic field. Such an environment may cause a current value to be displayed even though no measurement is made (an error may occur). Since the clamp sensor of this instrument is a U-shaped open-type sensor, it is more susceptible to such an environment compared than a closed-type sensor.

Function	Max. input rating value	Measurement range
DCA	DC100.0A	DC100.0A
ACA	AC100.0A	AC100.0A

- 1) Applications
  - DCA: Measures the current consumption of devices such as an automotive battery.
  - ACA: Measures the sine wave alternating current with 40 ~ 400 Hz frequency of power supply facilities.
- 2) Measurement procedure
  - ① Raise the clamp sensor from the rear of the main unit.
  - ② Set the function switch to the CLAMP A position, and press the SELECT button to select DCA or ACA.
  - DCA: Use the REL function to set the display value to "000.0A" before measurement.
  - ◆ When the position of this instrument is changed during DCA measurement, the display may fluctuate due to geomagnetism.
  - ◆ Because the AC sensing system of this instrument is an average value system, an error in the measured value will occur with waveforms other than sine waves.
  - ◆ Accuracy is guaranteed in ACA measurement between 40 ~ 400 Hz.
  - ◆ Measurement of an inverter power supply circuit may cause a malfunction.



- ◆ Accuracy is guaranteed in the case of sine wave.
- ◆ The frequencies where accuracy is guaranteed in the ACV measurement are 40 ~ 400 Hz.
- ◆ Measurement of an inverter power supply circuit may cause a malfunction.

Note: Correct measurement may not be possible in areas exposed to strong magnetic fields generated by electrical equipment such as a transformer or large current path, electromagnetic waves generated by wireless equipment, or areas where electrostatic charges are generated.

**Accuracy calculation**

Ex.) Measurement of AC voltage (ACV)  
 Display value: 100.0 V  
 Range accuracy: ± (1.6%rdg+7dgt)  
 Error: ± (100.0 V x 1.6%+7dgt) = ±2.1 V  
 True value: 100.0 V ± 2.1 mV (in a range of 97.9 ~ 102.1 V)  
 Note: 7 dgt corresponds to 0.7 V.

Specifications and external appearance of the product described above may be revised for modified without prior notice.

Function	Range	Accuracy	Input impedance	Remarks
DCV = DC Voltage	400.0 V	±(1.1%rdg+3dgt)	Approx. 10 MΩ	
ACV ~ AC Voltage	400.0 V	±(1.6%rdg+7dgt)	Approx. 10 MΩ	• Accuracy-guaranteed range: 40 ~ 400 Hz • Accuracy in the case of sin wave
	125 V			
MQ 40.00 MΩ (DG35)	250 V	±(3.0%rdg+3dgt)		
	500 V			
MQ 400.0 MΩ (DG34)	250 V	±(3.0%rdg+3dgt)		
	500 V			
DCA ~ Direct Current	100.0 A	±(2.0%rdg+5dgt)		• Accuracy was measured after canceling display value by the REL function.
ACA ~ Alternating Current	100.0 A	±(2.0%rdg+5dgt)		• Accuracy-guaranteed range: 40 ~ 400 Hz • Accuracy in the case of sin wave

\* Per measurement time: 5 sec. (measurement interval ~ 25 sec.). The number varies depending on the batteries used.

Power consumption  
 Double integral method  
 Display Max. 3999 count  
 Over ranging indication Most significant digit blinks  
 Polarity selection Automatic selection (- display only)  
 Low battery indication Displayed when built-in batteries are exhausted (to 2.6 V or less) with lit or blinking in display  
 Sampling rate Approx. 2 times/sec  
 Response time of insulation resistance measurement Approx. 3 sec. or less  
 Current measurement system CT clamp  
 Max. clamp conductor diameter 10 mm  
 AC sensing Averaging sensing  
 Environmental condition Operating altitude <2000 m, indoor use, pollution degree II  
 Accuracy-guaranteed temperature/humidity range 23 ± 5°C, <80% RH (without condensation)  
 Operating temperature/humidity range 5 ~ 40°C, <80% RH (without condensation)  
 Storage temperature/humidity range -10 ~ 50°C, <80% RH (without condensation)  
 Power supply Two LR03 alkaline batteries  
 Power consumption  
 DG35: Maximum power consumption — Approx. 100 mW (insulation resistance 500 V range, 10 MΩ load measurement)  
 DG34: Maximum power consumption — Approx. 40 mW (insulation resistance 500 V range, 100 MΩ load measurement)

Power consumption	Power consumption
Power consumption increases by approx. 120 mW when the backlight is on. Power consumption also varies depending on the measurement functions and ranges.	Power consumption increases by approx. 120 mW when the backlight is on. Power consumption also varies depending on the measurement functions and ranges.
Number of insulation resistance measurements that can be performed with brand-new batteries*	Approx. 2000 or more, successively, in 500 V range
Dimensions & weight	130 (L) x 75 (W) 19.9 (D) mm (excluding protrusions), approx. 160 g (including batteries)
Test lead length	Approx. 60 cm for both red and black
Accessories	Black alligator clip, instruction manual