

SANWA

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PDR-301

EARTH RESISTANCE METER

発音: びやう さんびやく びやく

sanwa
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INSTRUCTION MANUAL

R:430

P:01

INTRODUCTION

Together with an insulation resistance meter and a circuit meter, an earth resistance meter is required for the inspection and maintenance of electrical construction work. The obligatory nature of this instrument has resulted in strong demand for an earth resistance meter with handling convenience and a maintenance facility.

The Sanwa PDR-301 Earth Resistance Meter is just the device to satisfy these requirements as it features solid-state circuitry and automatic direct reading of earth resistance using a battery-powered constant-current system. Some of the main benefits and advantages of the PDR-301 include:

1. The indication circuitry employs a phase detection system. This eliminates external noise interference and helps achieve high-precision measurement.
2. A stable, constant-current power source is used for measurement so self-calibration is not required each time a measurement is to be performed. Measurements can be quickly performed at the touch of a button.
3. The unit is powered by six R6 (SUMA-3) 1.5V batteries. The compact, lightweight design is easy to use.
4. An AC voltage range is reserved exclusively for measurement of grounded voltage (0 ~ 30V) to prevent indication errors of earth resistance values caused by leakage current that flows to the earth.
5. Earth resistance measurement is a simple push-button operation, making the unit easy to use and eliminating wasteful battery consumption.

⚠ WARNINGS

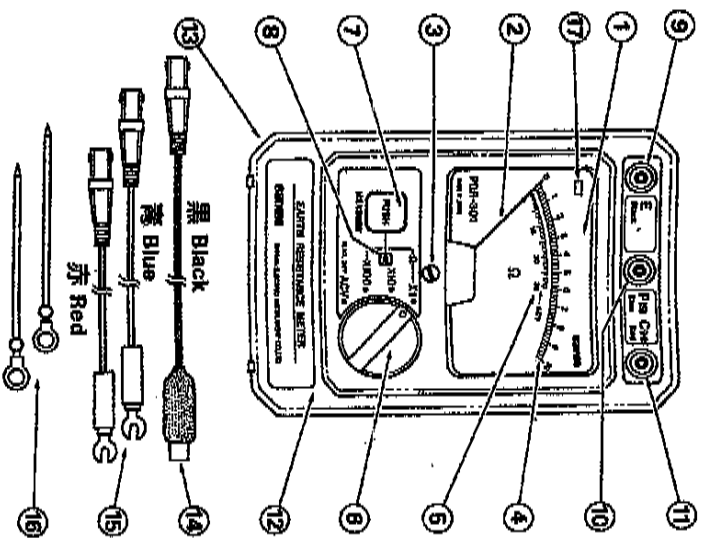
1. Do not input voltage or signals that exceed the specified allowable values.
2. Do not open the casing or battery compartment cover except to replace the batteries. Otherwise, do not attempt to repair, modify, or disassemble the unit.
3. Be sure to use the specified type of test lead.
4. Do not use the unit with high-power and high-voltage circuits.
5. Do not use a test lead with a damaged lead wire or exposed core wire. If the insulation coating is damaged, replace the test lead with a new one.
6. Do not use the unit when it is wet, your hands are wet, or when the humidity is high (80% RH or more relative humidity).
7. Do not touch the test pin during measurement.
8. Do not use the unit if it proves defective and is not capable of performing required measurements.

SPECIFICATIONS

1. Measurement Ranges
 Ω (earth resistance):
 X1 reading 0 ~ 10 Ω (0.2 Ω per scale)
 X10 reading 0 ~ 100 Ω (2 Ω per scale)
 X100 reading 0 ~ 1,000 Ω (20 Ω per scale)
 ACV (leakage voltage) 0 ~ 30V (1V per scale)
2. Accuracy
 $\pm 5\%$ fs for Ω x 1
 $\pm 2.5\%$ fs for Ω x 10, Ω x 100
 $\pm 2.5\%$ fs for ACV
3. Batteries
 R6 (SUM-3) x 6
4. Method of Measurement
 Constant-current system (tripolar & bipolar)
5. Constant Current AC Power
 Awt. 100V (1 kHz), through inverter
6. Auxiliary grounding value alarm LED lights at approx. 10 k Ω or more
7. Battery Alarm
 Blinking LED, approx. 6.5V operation voltage
 (LED normally lights during measurement)
8. Accuracy Guarantee Temperature/Humidity Range
 15°C ~ 35°C, 80% RH or less
 No dew condensation allowed
9. Operating Temperature/Humidity Range
 15°C ~ 35°C, 80% RH or less
 No dew condensation allowed
10. Accessories
 Measurement cords: 1 ea., 5 m/10 m/20 m
 Earth bars: 2 ea.
 Carrying case: 1
 Instruction manual: 1
11. Size & Weight
 175 x 118 x 55 mm, Awt. 500 g (main unit)

3

PANEL ARRANGEMENT AND ACCESSORIES



- | | |
|---|---|
| ① Meter (indicator/pointer) | ⑩ Power supply indicator/battery check |
| ② Zero adjuster | ⑪ E terminal (for grounding) |
| ③ Earth resistance scale (0 ~ 100 Ω), black | ⑫ Pts terminal (for auxiliary grounding) |
| ④ AC voltage scale (0 ~ 30V), red | ⑬ Cpt terminal (for auxiliary grounding) |
| ⑤ Range switch measurement switch (push-button) | ⑭ Panel |
| ⑥ Earth resistance measurement switch | ⑮ Rear case |
| ⑦ | ⑯ Grounding connector cable, Black, 5 m |
| | ⑰ Pts Blue, approx. 10 m |
| | ⑱ Cpt Red, approx. 20 m |
| | ⑲ Earth bars (metal), 2 pcs. |
| | ⑳ Auxiliary grounding value excess indicator lamp |

4

already detected or whose resistance is extremely low and can be regarded as immaterial with respect to the earth resistance in question, you can measure unknown earth resistance by taking advantage of the electrical circuit ground at hand.

2. The earth of unknown resistance is connected to the terminal E.
3. The P₁ and C₁ terminals are connected to the earth of known resistance.
4. The measured value is derived from the sum total of unknown and known resistance values. If the known resistance is available in advance, obtain the true value by subtracting the known value from the indicated value on the meter.

4. Measurement of Leakage Voltage Using the ACV

⚠ WARNINGS

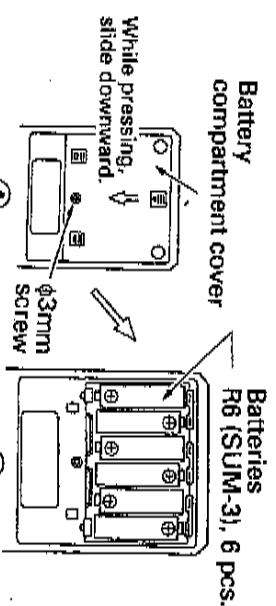
1. Never attempt to supply voltage over 30V — the maximum allowable voltage — since the ACV of this unit uses leakage AC voltage (ground voltage).
2. Never supply standard commercial voltage (AC 100V for example).

1. Once connections have been made, turn the range switch "ACV."
2. The pointer responds if there is any earth voltage present to indicate leakage AC current flowing into the earth circuit. The red 0 ~ 30V scale reads it.
3. If the scale reads above 5V, there will be interference with earth resistance measurement. In this case, before taking measurement, open either the power circuit, the equipment using the earth, or its earth circuit to reduce the effect of the voltage leak.
4. Earth voltage can be checked independently across E and P₁ without using the C₁ terminal.

5. Replacing the Batteries

1. When the batteries are low, the power indicator lamp (ON) starts blinking after the MEASURE PUSH switch is pressed.

When this happens, replace the batteries with new ones. Refer to Fig. 3 for replacing the batteries.



2. Unfasten the screw from the battery compartment cover on the back of the unit. While pressing the rectangular protrusion in the center of the cover as shown in Fig. 3 (A), slide it down to remove it. Insert new batteries and align them according to the battery directions shown in Fig. 3 (B).
3. When the new batteries are loaded, replace the cover on the battery compartment and tighten the screw to secure it.

CAUTIONS

1. Be sure to use specified batteries only. Never mix different types or brands of batteries even if the rated voltage is the same.
2. To avoid deterioration of performance, use only brand-new batteries when replacing batteries.

6. Maintenance

1. Remove the batteries when not using the tester for extended periods.
2. Do not drop the instrument or otherwise subject it to severe shock. Do not expose it to high temperatures or moisture.
3. The indicator cover is treated with anti-electrification coating. Do not rub it hard with a dry cloth. If the coating is found ineffective, you can spray it with disc cleaner as a temporary measure.