

Megger. 210600 Insulation & Low Resistance Tester

User Guide



SAFETY WARNINGS

- ★ **Safety Warnings** and **Precautions** must be **read and understood** before the instrument is used. They must be **observed** during use.
- ★ The circuit under test **must** be switched off, de - energized and isolated **before** Insulation or Continuity tests are made.
- ★ Circuit connections **must not** be touched during a test.
- ★ The test button **must not** be pressed while connecting the test leads or while changing ranges. (May cause 'Live Circuit Warning' to become inoperable).
- ★ The 'Test' button must **not** be pressed when making a voltage test.
- ★ The **Default Voltmeter**, 'Live Circuit Warning' and **Automatic discharge** are additional safety features and **should not** be regarded as a substitute for normal safe working practice.
- ★ The **210600** is protected for connection to Power distribution systems up to 300 V **Line - Ground**, and 500 V **Line - Line** for Installation Category III*.
- ★ It is recommended that fused test leads are used when measuring voltage on high energy systems.
- ★ After insulation tests, capacitive circuits **must** be allowed to discharge **before** disconnecting the test leads.
- ★ Test leads, prods and alligator clips **must be** in good order; clean, and with no broken or cracked insulation.
- ★ Replacement fuses **must be** of the correct size, type and rating.

NOTE

THE INSTRUMENT MUST ONLY BE USED BY SUITABLY TRAINED AND COMPETENT PERSONS.

Symbols used on the instrument



Caution: risk of electric shock

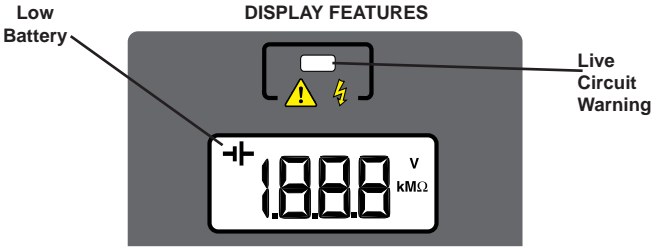


Caution: refer to accompanying notes



Equipment protected throughout by Double Insulation (Class II)

DISPLAY FEATURES



OPERATION



Refer to Safety Warnings before using the instrument

Live Circuit Warning

The live circuit warning indicator will illuminate if 60 V or more is detected at the terminals. Testing should be **aborted** if lit.

Default Voltage measurement

The **210600** will act as a direct reading default voltmeter (0 to 600 V a.c./d.c.) in the '**Standby**' mode (when switched '**On**', and any of the Insulation test positions is selected). The '**Test**' push **must not** be pressed when making a voltage test. **Note:-** The **210600** is internally fuse protected to 500 V. For fuse protection with supplies above 500 V, use Fuse Probe Kit **FPK5**.

1. Turn the instrument '**On**' by pressing the '**On/Off**' switch-button once.
2. Select any Insulation test position with the rotary selector switch. '**V**' is displayed.
3. Carefully connect the test leads to the circuit under test. **Do not press the 'Test' push.**
4. Read the voltage measurement directly from the display.
5. Carefully disconnect the test leads and turn the instrument '**Off**' by pressing the '**On/Off**' switch-button once.

Low Resistance measurement ($k\Omega$)

1. Turn the instrument '**On**' by pressing the '**On/Off**' switch-button once.
2. Select $k\Omega$ with the rotary selector switch.
3. Ensure that all test leads are clean and in good condition, and connect them to the **isolated** circuit under test.
4. Press the '**Test**' push and read the measurement directly from the display.
5. Disconnect the test leads and turn the instrument '**Off**' by pressing the '**On/Off**' switch-button once.

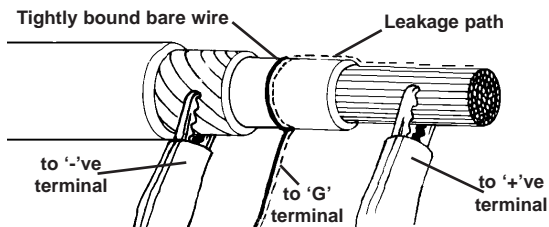
Insulation Testing ($M\Omega$)

Automatic circuit discharge is effective when the '**Test**' push is released, and decaying voltage is displayed until the circuit is discharged.

1. Turn the instrument '**On**' by pressing the '**On/Off**' switch-button once.
2. Ensure that all test leads are clean and in good condition, and connect them to the **isolated** circuit under test.
3. Select the required test voltage with the rotary selector switch.
4. Press the '**Test**' push and read the measurement directly from the display. Overrange is indicated by '**!**'.
5. Release the '**Test**' push and monitor any displayed voltage to confirm when any discharging voltage decays to zero.
6. When the circuit has discharged, disconnect the test leads and turn the instrument '**Off**' by pressing the '**On/Off**' switch-button once.

Using the Guard Terminal

For basic insulation tests and where there is little possibility of surface leakage affecting the measurement, it is unnecessary to use the guard terminal. In cable testing, there may be surface leakage paths across the insulation between the bare cable and the external sheathing due to the presence of moisture or dirt. Where it is required to remove the effect of this leakage, particularly at high testing voltages, a bare wire may be bound tightly around the insulation and connected via the third test lead to the guard terminal 'G'.



The guard terminal is at the same potential as the negative terminal. Since the leakage resistance is effectively in parallel with the resistance to be measured, the use of the guard causes the current flowing through surface leakage to be diverted from the measuring circuit. The instrument therefore reads the leakage of the insulator, ignoring leakage across its surface.

SPECIFICATION

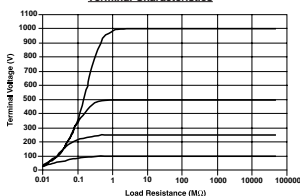
Insulation Ranges

Measuring Ranges: 0 - 1.999M Ω at all test voltages
19.99 M Ω at all test voltages
199.9 M Ω at all test voltages
1999 M Ω at 500 V and 1000 V d.c. test voltages
Fully auto - ranging at all voltages

Test Voltages (d.c.): 100 V; 250 V; 500 V; 1kV

Test V. Accuracy: $\pm 5\%$ at open circuit

Terminal Characteristics



Short Cct. Current: 1.2 mA nominal

Accuracy (73.4°F \pm 3.6°F): <500 M Ω : $\pm 3\% \pm 2$ digits
500 M Ω to 1999 M Ω : $\pm 5\% \pm 2$ digits

Temp. Co-efficient: <500 M Ω : $\leq 86^\circ\text{F}$, $\pm 0.06\%$ per $^\circ\text{F}$, $> 86^\circ\text{F}$ $\pm 0.14\%$ per $^\circ\text{F}$
500 M Ω to 1999 M Ω : $\leq 86^\circ\text{F}$ $\pm 0.11\%$ per $^\circ\text{F}$, $> 86^\circ\text{F}$, $\pm 0.28\%$ per $^\circ\text{F}$,

Hum Rejection: Within twice the normal accuracy if the noise current does not exceed 1 mA for the 1 kV range, or 0.5 mA for the other ranges and is within 45 Hz to 65 Hz.

Low resistance Range

Measuring Range: 0 - 1.999 k Ω
19.99 k Ω

Open Cct. Voltage: 4.3 V nominal

Accuracy (73.4°F \pm 3.6°F): $\pm 2\%$ of reading ± 1 digit

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This instrument is manufactured in the United Kingdom.
The company reserves the right to change the specification or design without prior notice.
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Short Cct. Current: 2.75 mA nominal

Temp. Coefficient: $\pm 0.06\%$ per $^{\circ}\text{F}$

Default Voltage measurement

Range: 0 - 600 V a.c. / d.c. (effective on Insulation ranges with 'Test' push not pressed)

Input impedance: 300 k Ω to 1 M Ω depending on input voltage

Discharge Rate: A 1 μF capacitor will discharge to a safe level in ≤ 2 s

Accuracy: $\pm 2\%$ of reading ± 1 digit d.c. or a.c. at 45 Hz to 65 Hz

Temp. Coefficient: $\pm 0.06\%$ per $^{\circ}\text{F}$

General Specifications

Overload rating: The **210600** is protected for connection to Power distribution systems up to 300 V **Line - Ground**, and 500 V **Line - Line** for Installation Category III*.

Temp. Range:

Operating: 23 $^{\circ}\text{F}$ to 122 $^{\circ}\text{F}$

Storage: 4 $^{\circ}\text{F}$ to 158 $^{\circ}\text{F}$

Humidity:

Operating: 70% RH at 68 $^{\circ}\text{F}$, 60% RH at 95 $^{\circ}\text{F}$, 50% RH at 104 $^{\circ}\text{F}$ for measurements < 200 M Ω

Storage: 95% RH at 95 $^{\circ}\text{F}$


Display: 3½ digit L.C.D. Maximum reading 1999

Automatic Discharge: Capacitive circuits are automatically discharged when the 'Test' push is released following an insulation test

Power Supply: 6 x 1.5 V AA (Alkaline) type cells

Battery life: Typically 2100 x 5 second operations (worst case)

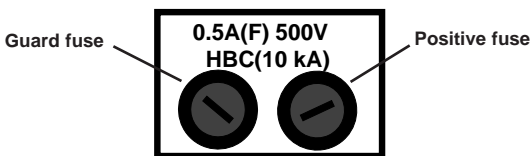
Note:- Battery cells should not be left in an instrument which may remain unused for extended periods of time.

Low Battery Indicator: The low battery indicator symbol  will appear when the battery cells are exhausted.

Battery Replacement: The rear cover **must not** be opened if the test leads are connected. To remove the rear cover, release the screw at the bottom of the cover and lift the cover upwards. To avoid the possibility of shock, **do not** press the 'Test' push when changing batteries.

Fuses: 2 x 500 mA 500 V (F) H.B.C. 10 kA min 1¼" x ¼"

To check the **+ve** fuse, short the **+ve** and **-ve** test leads and press the 'Test' push. An '1' reading indicates that the **+ve** fuse has ruptured.



Fuse Replacement: Held in screw type holders located in the base of the instrument. Use a flat blade screwdriver to release the center part of each fuse holder. Remove the fuses and test each in turn. Replace with fuse(s) of the correct type, size and rating.

Weight: 2.2 lb (including batteries)

Dimensions: 7" x 5" x 5"

Cleaning: Wipe disconnected instrument with a clean cloth dampened with soapy water or Isopropyl Alcohol (IPA)

*Relates to transient overvoltage likely to be found in fixed installation wiring.

ACCESSORIES

Supplied

Part Number

User Guide	6172-373
Battery - 6 x 1.5 V AA (Alkaline) type	
Test Record Card (5 supplied)	

Optional

Carrying case	217740
Fuses 500 mA, 500 V (F) H.B.C. (pack of 5)	6121-289
Fused probe kit FPK4	6111-287
Test lead set comprising:-	
1 black, 1 red, 1 green test lead, with alligator clips	6220-436
Test Record cards (Pack of 20)	6111-216
Publication - 'A Stitch in Time'	AVTM21-P8B

REPAIR AND WARRANTY

The instrument contains static sensitive devices, and care must be taken in handling the printed circuit board. If an instrument's protection has been impaired it should not be used, but sent for repair by suitably trained and qualified personnel. The protection is likely to be impaired if for example; it shows visible damage; fails to perform the intended measurements; has been subjected to prolonged storage under unfavourable conditions, or has been subjected to severe transport stresses.

NEW INSTRUMENTS ARE GUARANTEED FOR 1 YEAR FROM THE DATE OF PURCHASE BY THE USER.

Note: Any unauthorized prior repair or adjustment will automatically invalidate the Warranty.

INSTRUMENT REPAIR AND SPARE PARTS

For service requirements for Megger Instruments contact :-

Megger Limited

or

Megger

Valley Forge Corporate Center
2621 Van Buren Avenue
Norristown, PA 19403
U.S.A.

Archcliffe Road
Dover
Kent, CT17 9EN
England

Tel: +1 (610) 676-8579

Tel: +44 (0) 1304 502243

Fax: +1 (610) 676-8625

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or an approved repair company.

Approved Repair Companies

A number of independent instrument repair companies have been authorised for repair work on most Megger instruments, using genuine Megger spare parts. Consult the Appointed Distributor / Agent regarding spare parts, repair facilities, and advice on the best course of action to take.

Returning an Instrument for Repair

If returning an instrument to the manufacturer for repair, it should be sent freight pre-paid to the appropriate address. A copy of the invoice and of the packing note should be sent simultaneously by airmail to expedite clearance through Customs. A repair estimate showing freight return and other charges will be submitted to the sender, if required, before work on the instrument commences.

MeterCenter

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