

# Major Megger Insulation Resistance Testers



- **No scale multipliers**
- **Multiple test voltages for spot and step voltage testing**
- **Guard terminal to eliminate surface leakage current**

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## DESCRIPTION

Quality is crafted into every Major MEGGER® Insulation Tester, with excellent test voltage regulation, direct measurement readout and an external guard terminal to eliminate surface leakage current from the measurement. Five models are available for general purpose testing which include a low-voltage model.

All are portable, self-contained instruments designed to give rapid and accurate measurements.

Four of the models feature an analog display having four selectable test voltages of 100, 250, 500 and 1000 Vdc, measuring insulation resistance up to 2000 MΩ, and an ohm range to 5000 Ω. The other model has four test voltages of 50, 100, 250 and 500 Vdc measuring insulation resistance up to 1000 MΩ.

The only other difference between the five analog models is the type of power source. Power for models MJ159 and MJ160 is derived from a low-voltage, hand cranked generator which has been designed to be easy to turn even under full load conditions. The low-voltage generator is connected to an electronic inverter to provide a very stable test voltage. Accuracy of measurement is unaffected by variations in the generator cranking speed and the test voltage is maintained at its rated value. Power for model MJ359 is provided by 120 V ac 50/60 Hz or low-voltage generator. Model MJ559 is also 120 Vac 50/60 Hz or internal rechargeable batteries and model MJ459 is powered by 6 replaceable "AA" alkaline cells.

As a safety feature, the ac voltage range becomes effective as soon as the instrument is connected to the circuit under test. Therefore, a warning is given that the circuit under test is not de-energized before the instrument is operated. Though calibrated for ac voltage, this range also monitors the automatic discharge feature so that after equipment having capacitance (i.e. a cable), has been tested, an indication can be given that the voltage has discharged to a level that is safe for removing the test leads.

Each instrument has a guard terminal which may be used to prevent the effects of surface leakage from influencing the readings. This is achieved by diverting the leakage current through the guard terminal and away from the instrument's measuring circuit.

Each instrument is built into a strong ABS plastic case with a fold down carrying handle.

## APPLICATIONS

The Major Meggers have been designed for convenience and ease-of-use when testing complex or larger electrical installations, and commissioning, servicing or maintaining electrical equipment. They are designed for the safe testing of motors, generators, cables, switchgear, transformers, distribution networks, industrial and domestic installations, components and appliances.

The range of insulation test voltages available allows one instrument to be used for a variety of applications. For example, installations and equipment can be tested at

1000 V d.c. when this requirement is specified, also aircraft and tele-communications equipment can be tested at the relatively low 100 V d.c. and 110 V to 120 V a.c. systems can be tested using 250 V d.c.

Test leads with fused prods are available and it is recommended that these be used when checking that equipment has been isolated from the supply (by performing a voltage test), especially in high energy situations.

## SPECIFICATION

### Insulation Range

**Insulation Resistance:** 0.1  $\Omega$  - 2000 M $\Omega$  (0.1  $\Omega$  -1000 M $\Omega$  for MJ160)

**Accuracy:**  $\pm 1.25\%$  of fsd on a 2.8 in. (71.1mm) arc length

### Nominal Test Voltages

**d.c.:** 100 V, 250 V, 500 V, 1000 V.

(MJ160 is 50 V, 100 V, 250 V, 500 V)

### Accuracy

250 V, 500 V, 1000 V +30%, -0% max.

50 V, 100 V, +40%, -0% max.

**Midscale:** 4 M $\Omega$  (2 M $\Omega$  for MJ160)

**Short Circuit Current:** 1.9 mA

(0.65 mA for MJ160)

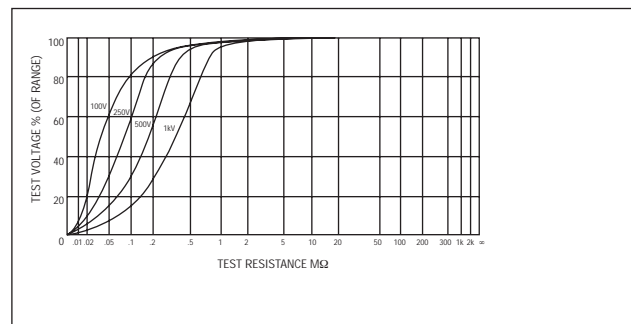
**Maximum Load Capacitance:** 1 $\mu$ F with less than  $\pm 0.1^\circ$  pointer movement

**Discharge:** Up to 1  $\mu$ F capacitance is discharged from 1000 V to less than 42.4 V in less than 4 secs

### Resistance Range

0.1  $\Omega$  - 5000  $\Omega$

### Test Voltage characteristics



**Open circuit Test voltage:** 3 V  $\pm 0.2$  V

**Short Circuit Current:** 2 mA  $\pm 10\%$

**Accuracy:**  $\pm 1.25\%$  of fsd on a 2.8 in. (71.1mm) arc length:

### Safety Voltage Check

**Voltage measurement:** 0.1 V - 600 V a.c.; the meter is RMS calibrated and average responding

**Safety voltage indicator:** Indicates the presence of d.c. voltages. Scaling is not the same as the a.c. meter. True d.c. voltage equals scale reading divided by 2.22

**Accuracy:** 2.5% of full scale

### Power Supplies

**MJ159 and MJ160:** Low voltage brushless a.c. generator. Cranking speed between 130 rpm and 170 rpm

**MJ359:** Dual operation low voltage brushless a.c. generator or 120 V 50/60 Hz mains (line) supply

**MJ459:** Six IEC LR6 cells (AA) Battery life: not less than 1300 insulation or Resistance range tests

**MJ559:** Dual operation 120 V 50/60 Hz mains (line) supply and rechargeable battery. Six Ni Cad cells (e.g. AA, NEDA 15 NC)

### Safety

The instruments meet the requirements for double insulation to IEC 1010-1(1995), EN 61010 (1995) to installation Category II, 300 V phase to earth (ground), 600 V installation Category I

### Flash Test

6 kV a.c. r.m.s.

## Fuses

500 mA (FF) 660 V Ceramic 50 kA HBC 11/4 x 1/4 in.  
(32 mm x 6 mm)

7A (F) 440 V Ceramic 10 kA HBC  
11/4 x 1/4 in. (32 mm x 6 mm)

100 mA (F) HBC 20 mm x 5 mm (for line protection only)

## MJ359 and MJ559 only:

Power connection plug fuse 100 mA 240 V HBC (20 mm x 6 mm)  
Mains power cord fused plug (when applicable) 3 A 250 V ceramic  
HBC fuse to BS1362 11/4 x 1/4 in. (32 mm x 6 mm)

## E.M.C.

In accordance with IEC 61326-1.

Note: These instruments are designed for use in a controlled  
electromagnetic environment

## Operating Temperature Range

32° to 113°F (0° to 45°C) for battery operated models

14° to 122°F (-10° to 50°C)

## Humidity Range

### Operating:

70% RH max. at 68°F (20°C)

60% RH max. at 95°F (35°C)

50% RH max. at 105°F (40°C)

**Storage:** 95% RH max. at 95° F (35°C)

## Dimensions

5.1 H x 4.9 W x 7 L in.

(130 H x 125 W x 180 L mm)

## Weight

Approximately 1 kg (2,3lb)

## Cleaning

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

## ORDERING INFORMATION

| Item  | Cat. No.  | Item  | Cat. No.   |
|---|-----------|---|------------|
| MJ159 Hand-cranked insulation tester              | 212159    | <b>Optional Accessories</b>                 |            |
| MJ359 120 Va.c./hand-cranked insulation tester..  | 212359    | Test record card (pack of 20)               | 6111-216   |
| MJ459 Battery powered insulation tester           | 212459    | Black test lead with large alligator clip   | 6220-295   |
| MJ559 120 Va.c. rechargeable insulation tester    | 212559    | Red test lead with large alligator clip     | 6220-586   |
| MJ160 Low voltage, hand cranked insulation tester | 212160    | Green test lead with large alligator clip   | 6220-587   |
|   |           | Set of test leads with fused prods (FPK5) - |            |
| <b>Included Accessories</b>                       |           | 1000 V a.c. 500 mA fuse                     | 6111-288   |
| User guide  | 6172-113  | Test lead set, 3.6m [12 ft] (1 pair)        | 210972     |
| Test lead set (3 leads, 3 prods, 3 clips)         | 6220-436  | Electrodes (for floor testing), 2.25 kg     |            |
| Power cord (where applicable)                     | 25970-002 | [5 lb] each (1 pair)                        | 260565     |
| Test record card (5 supplied)                     | 6172-111  | 'A Stitch In Time'                          | AVTM21-P8B |
| Carrying case                                     | 6420-111  |   |            |

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### UNITED STATES

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### OTHER TECHNICAL SALES OFFICES

Norristown USA, Toronto CANADA,  
Mumbai INDIA, Trappes FRANCE,  
Sydney AUSTRALIA, Madrid SPAIN  
and the Kingdom of BAHRAIN.

### ISO STATEMENT

Registered to ISO 9001:2000 Reg no. Q 09290  
Registered to ISO 14001 Reg no. EMS 61597  
**MJ\_TESTERS\_DS\_en\_V11**

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