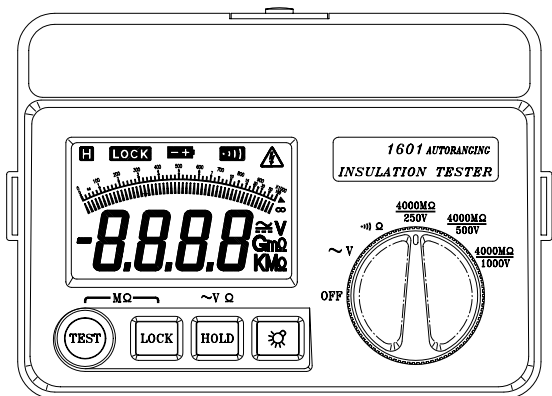




AUTORANGING INSULATION TESTER

TES-1601

INSTRUCTION MANUAL



TES ELECTRICAL ELECTRONIC CORP.

SAFETY INFORMATION

The circuit under test must be de-energized and isolated before connections are made except for voltage measurement.

Circuit connections must not be touched during a test.

After insulation tests, capacitive circuits must be allowed to be discharged.

Test leads (including crocodile clips), must be in good order, clean and have no broken or cracked insulation.

Do not push test button before all connection and preparation is done. The instrument must only be used by suitably trained and competent persons.

Warnings and Safety symbols:



Caution refer to this manual before using the meter.



Dangerous voltages.



Meter is protected throughout by double insulation or reinforced insulation.



Comply with IEC1010-1

When servicing, use only specified replacement parts.

1. SPECIFICATIONS

1-1 General Information

Environment conditions :

- ① Installation Categories II
- ② Pollution Degree 2
- ③ Altitude up to 2000 meters
- ④ Indoor use only
- ⑤ Relatively humidity 80% max.
- ⑥ Operation Ambient 0~40°C

Maintenance & Clearing:

- ① Repairs or servicing not covered in this manual should only be performed by qualified personnel.
- ② Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on this instruments.

Display:

80mm x 50mm LCD Display. 3 3/4 Digital readout with analog bar indication.

Back light Operation:

Press back light button will turn on LCD back light and it will go off after 30 sec. Or one can turn it off before 30 sec by press back light button again.


Measurement Range:

600V/ACV, 400Ω, 4000MΩ/250V, 4000MΩ/500V, 4000MΩ/1000V


Sampling Rate:

2.5 sample/sec for digital reading.
10 sample/sec for analog indication.

Over Range Indicator:

“——” will be displayed.

Low Battery Indication:

The () is displayed when the battery voltage drop below the operating voltage.

Operating Temperature and Humidity :

0°C to 40°C (32°F to 104°F)below 80% RH
(noncondensing)

Storage Temperature and Humidity:

-10°C to 60°C (14°F to 140°F) below 70% RH
(noncondensing)

Power Source:

DC12V (8 x 1.5V Size “AA” battery or equivalent)

Power Consumption:

Approx. 90mA (4000MΩ/1000V range) (Output open Circuit)

Approx. 60mA (4000MΩ/ 500V range) (Output open Circuit)

Approx. 45mA (4000MΩ/ 250V range) (Output open Circuit)

Approx. 20mA (ACV OHMS range)

Dimensions:

190 (L) x 140 (W) x 77(H) mm (7.5 x 5.5 x 3 inch)

Weight:

Approx. 900g (2 LB), include battery

Accessories :

Test leads , 8pcs battery, Carrying case, operation manual, 2pcs crocodile clip.

1-2 Electrical Specifications

Accuracies are specified as:

\pm (...% of reading + ...digits) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, below 80% RH.

OHMS & Continuity Beeper

Range	Resolution	Accuracy	Max. open Circuit Voltage	Max. Short Circuit Current	Overload Protection
40 Ω	0.01 Ω	1%+30	12.8V	280mA*	600Vrms

* Minimum Value: 200mA

Range	Resolution	Beeper Active	Max. open Circuit Voltage	Overload Protection
•••)	0.01 Ω	Resistance<4 Ω	12.8V	600Vrms

AC Voltage (40Hz~500Hz)

Range	Resolution	Accuracy (above 1V)	Input Impedance	Overload Protection
600V	0.1V	1.5%+3	4.5M Ω	750Vrms

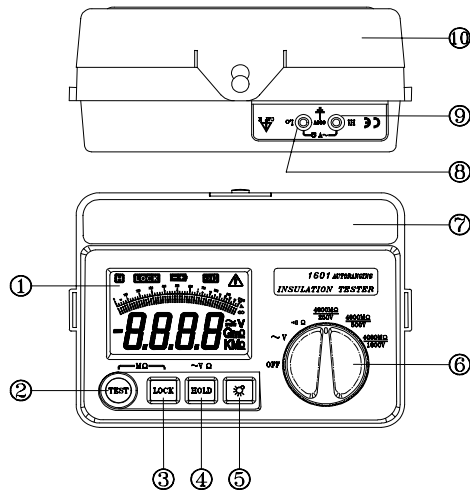
Meg OHMS (Auto Range)

Range	Resolution	Accuracy	Terminal Voltage
4M Ω /40M Ω /400M Ω /4000M Ω /250V	1K	3%+5 (<2000M)	250V +20%~-0%
4M Ω /40M Ω /400M Ω /4000M Ω /500V			500V +20%~-0%
4M Ω /40M Ω /400M Ω /4000M Ω /1000V		5%+5 (>2000M)	1000V +10%~-0%

Range	Test Current		Short circuit current
4000M Ω /250V	1mA	250K Ω (load)	$\leq 1.5\text{mA}$
4000M Ω /500V		500K Ω (load)	
4000M Ω /1000V		1M Ω (load)	

2. PARTS & CONTROLS

- ① LCD display
- ② Mega Ohm TEST button
- ③ Mega Ohm TEST power LOCK button
- ④ Data hold button
- ⑤ Back light button Auto power OFF(wake up)
- ⑥ Function selector
- ⑦ Storage compartment
- ⑧ Lo measuring terminal
- ⑨ Hi measuring terminal
- ⑩ Top cover




3. BEFORE OPERATION


3-1 How to connect test leads.

Connect the red test lead into the “ Hi” terminal and the black lead into the “ Lo” terminal.

3-2 Battery Check & Replacement

- a) . If battery power is not sufficient. LCD will display “”. Replacement of 8pcs new batteries, type 1.5V size “AA” is required.
- b) . Use a screw drive to unscrew the screw secured on battery cover, Take out the used batteries and replace 8pcs new batteries.
- c) . Place back the battery cover and secure the screw.

3-3 Test Leads Check

Set the range select switch to the 40Ω range. Connect the crocodile clips with the test lead tips, Clip alligator clips with lead other. The indicator should read $<0.5\Omega$. When the leads are not connected the display will read infinity indicated by “”. This will ensure that test lead are under working condition.

4. AC VOLTAGE MEASUREMENTS

- a). Set the range switch to $\sim V$ position
- b). Connect red test lead to “ Hi ” terminal and black test lead to “ Lo ” terminal.
- c). Connect test leads IN PARALLEL to the circuit being measured.
- d). Read the voltage value on LCD.

5. LOW RESISTANCE (CONTINUITY) MEASUREMENTS

- a). Set the range switch to Ω position.
- b). Connect the red test lead to the HI terminal and black test lead to the Lo terminal.
- c). Connect the tips of the test leads to both ends of the circuit under test and reading is displayed on the LCD.
- d). When the impedance on circuit is below 4Ω . It will be indicated by a continuous beeper.
- e). Press the **H** button to hold data.
- f). Press **H** again to release data hold operation.

WARNING

Max test voltage=12V, 200mA

Do not use this range to do diode test.

Do not proceed this test unless the ACV reading is zero.

6. INSULATION RESISTANCE MEASUREMENTS

a). Manual Testing Mode:

Set the selector switch to the test voltage required.

Connect the test lead, first to the instrument, and then the isolated item under test.

Press the test button to activate the test voltage and the reading will be displayed on the display and high voltage warning beeps will sound.

When the test button is released the test voltage will be deactivated and the test result will be hold automatically.

b). 3 Minutes Test Power Lock Mode:

Set the selector switch to the test voltage required.

Connect the test lead, first to the instrument, and then the isolated item under test.

Press the Lock button to set the testing mode to 3 min Lock Mode and “LOCK” symbol will be display on the LCD.

Press the TEST button once to begin the 3 min test period and activate the test voltage. The reading will be shown on the LCD display.

Press the TEST button again to deactivate the test voltage before 3 min and the reading will be hold automatically.

If the testing process is not interrupted within 3 min, the test voltage will turn off automatically.

The analog display bar can indicate range up to $10G\Omega$, when the reading is between $4G\Omega$ to $10G\Omega$, the LCD will show “—HI—”, when the resistance is higher than $10G\Omega$, the LCD will show “—OL—”.

Note: The charge stored in the tester will be discharged automatically when the testing process is finished.

WARNING

Do not proceed this test unless the ACV reading is Zero.

7. Auto Power Off

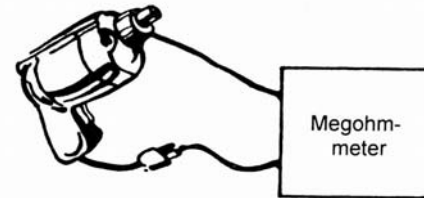
The tester will turn itself off if there is no switch or button operations after 30min.

Note: auto power off has a small power consumption and it is recommended that the instrument is switched to OFF when not in use. This is particularly important at the end of the working day, since no battery power is used in the OFF position.

8. POWER TOOLS AND SMALL APPLIANCES

This test would also apply to other similar equipment that has a line cord. For double insulated power tools, the megohmmeter lead shown connected to the housing would be connected to some metal part of the tool (e.g. chuck, blade).

Note: The switch of the device must be in the “ON” position and the main power should be disconnected.

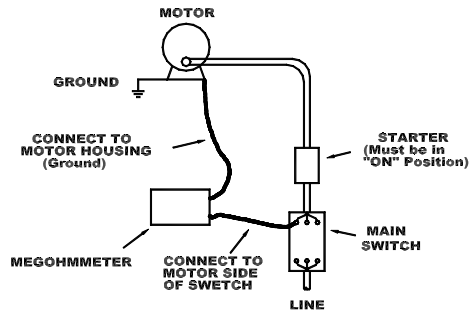


MOTORS

AC-Disconnect the motor from the line by disconnecting the wires at the motor terminals or by opening the main switch. If the main switch is used and the motor also has a starter then the starter must be held, by some means, in the “ON” position. In the latter case, the measured resistance will include the resistance of the motor, wire and all other components between the motor and the main switch. If a weakness is indicated, the motor and other components should be checked individually.

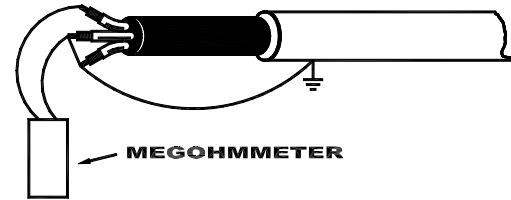
If the motor is disconnected at the motor terminals, connect one megohmmeter lead to the grounded motor housing and the other lead to one of the motor leads.

DC-Disconnect the motor from the line. To test the brush rigging, field coils and armature connect one megohmmeter lead to the grounded motor housing and the other lead to the brush on the commutator. If the resistance measurement indicates a weakness, raise the brushes off the commutator and separately test the armature, field coils and brush rigging by connecting one megohmmeter lead to each of them individually, leaving the other connected to the grounded motor housing. The above also applies to DC Generators.



CABLES

Disconnect the cable from the line. Also disconnect opposite end to avoid errors due to leakage from other equipment. Check each conductor to ground and /or lead sheath by connecting one megohmmeter lead to a ground and /or lead sheath and the other megohmmeter lead to each of the conductors in turn. Check insulation resistance between conductors by connecting megohmmeter leads to conductors in pairs.





TES ELECTRICAL ELECTRONIC CORP.

7F, No. 31, Lane 513, Rui Guang Road, Neihu Dist. Taipei.
Taiwan, R. O. C.

Tel : (02) 2799-3660 Fax : 886-2-2799-5099

E-Mail : tes@ms9.hinet.net Home page :

<http://www.tes.com.tw>
