

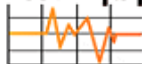
TEST BOX

Functional checking for RCD testers,
Loop testers and Insulation/Continuity testers

INSTRUCTION MANUAL



**Test Equipment
Depot**



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Visit us at www.TestEquipmentDepot.com

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Due to our policy of constant improvement and development, we reserve the right to change specifications without notice.

1. Warnings and safety

1. Read the following safety information carefully before attempting to operate or service the test box.
2. The test box should be operated only by a professional with understanding of the test box.
3. Do not expose the test box to direct sunlight, high temperature and humidity.
4. Do not use the test box while it is wet. Keep dry at all times!
5. Subjecting the test box to shock, vibration, and dropping may cause damage.
6. Take all necessary safety precautions to ensure that there is no risk of testing before using.
7. Safety standard: EN 61010-1 / EN 61326-1



IMPORTANT NOTE:

Dangerous voltages are present on the main sockets, testers which have damaged cables etc. Should not be tested before being repaired.

This warning indicates high voltages may be present on the sockets of the test box and suitable precautions should be taken.

2. Specification

RCD Testing

Range	10mA±4mA Trip, 14mA↑ over, 150mS±10% 30mA±12mA Trip, 42mA↑ over, 150mS±10% 150mA±60mA Trip, 210mA↑ over, 30mS±10%
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Insulation Testing

Range	1MΩ / 9.9MΩ / 99MΩ
Accuracy	± 1%
Max. Testing	1.2kV

Continuity Testing

Range	0.5Ω / 2Ω / 10Ω
Accuracy	± 0.05Ω / ± 0.1Ω / ± 0.2 Ω
Max. Current	300mA

LOOP Testing

Range	Supply Loop / Supply Loop + 1Ω
Accuracy	0.45Ω ± 0.05Ω / 1.45Ω ± 0.05Ω



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3. Safety notes

- Rated environmental conditions:
 1. Indoor use.
 2. Installation Category III.
 3. Pollution Degree 2.
 4. Altitude up to 2000 Meter.
 5. Relative Humidity 80% Max.
 6. Ambient Temperature 0°C~40°C.

- Observe the international electrical symbols listed below:



Meter is protected throughout by double insulation or reinforced insulation.



Warning ! Risk of electric shock.



Caution ! Refer to this manual before using the meter.



Alternating current.



IMPORTANT NOTE:

The earth line of TEST BOX is only a measuring line which is without any grounded protection!

4. Check RCD tester

A. CHECKING A RCD TESTER

RCD tester simulates a current between live and earth to trip TEST BOX.

The disconnect time of relay is shown on RCD tester usually in milli-seconds if TEST BOX and RCD tester select the correct current and the correct time range.

Generally, the tester has several current ranges plus a '5I' function which multiplies the current range set by 5.

As switches can switch off, it is important to check more than one current range. Leaving the instrument on the same range in every check.

If too much current is induced into the tester, the RCD will TRIP. For example, If you are checking a circuit which should have a 30mA RCD and the faulty range of your tester is on the 300mA range, this will open any trip up to 300mA.

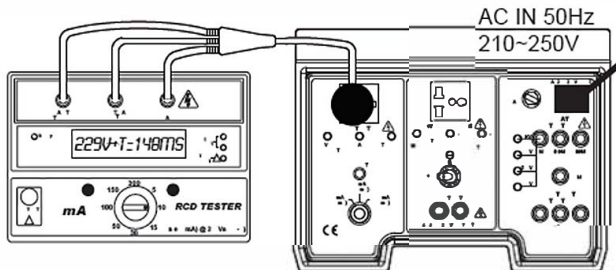
Test with both a long and a short trip time to ensure that it is correct. It is less important if the tester has a 'positive/negative' cycle switch. This will be better for timing measurement.

The unique features of the electronic trip of TEST BOX allow all the above to be tested quickly and easily. Accurate timing is ensured as the time period is not dependant on the current transition and an over-current LED can be lit. The positive/negative switch can be checked, as the time period will be 10mS longer than starting on the negative cycle.

If the TEST BOX RCD is "TRIPPED", it is almost no check the correct operation of the tester. There is no indication of over current and the timing accuracy is poor need to change current range on the tester.

B. CHECKING RCD TEST TIME & CURRENT

Plug the TEST BOX into an unprotected supply (no RCD trip) and plug the RCD tester into the left-hand socket marked 'RCD TESTER' on the TEST BOX is shown as below.



Set the 0 positive phase (if available), select the 10mA range on the tester and the 10mA/150mS range on the TEST BOX. Press the RESET button on the TEST BOX first. Wait for the "READY" LED to be lit, then press "test" button on the tester. The TEST BOX "TRIPPED" LED will lit but "OVER CURRENT" LED will not be lit. Record the time displayed on the tester. Allow from 135mS to 165mS, ± 2 mS.

Tripped is approximate to 3mA tolerance ($10\text{mA} \pm 3\text{mA}$).

Over current is over 13mA.

Repeat the same step on the 30mA range of RCD tester. The record of time shall be the same with the 10mA range.

Allow from 135mS to 165mS, ± 2 mS.

Tripped is approximate to 10mA tolerance ($30\text{mA} \pm 10\text{mA}$).

Over current is over 40mA.

Set the 180 negative phase if the tester has a 0/180 phase angle switch and 30mA range. Set the TEST BOX to 30mA/150mS and press the "test" button. Record the time displayed on the tester, which should be 10mS more than the last read of 0 positive phase.

Allow from 145mS to 175mS, ± 2 mS.

Select the 150mA or 30mA with "x5I" button (if available). Set the TEST BOX to 150mA/30mS and press the "test" button. Record the time displayed on the tester.

Allow from 27mS to 33mS, ± 1 mS.

Tripped is approximate to 45mA tolerance (150mA $\pm$ 45mA).

Over current is over 195mA.

Common Problems	Solution
Time period is over range for 10 mS	Tester set to 180 phase angle (negative Cycle)
Mains Power do not work	TEST BOX and unprotected supply are bad connection
RCD tester no power	A. TEST BOX no plugged in B. Fuse blown on the right-top of TEST BOX.

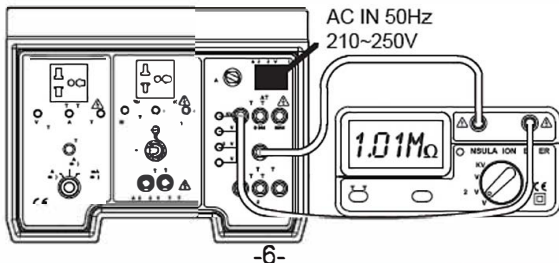
5. Checking an installation or insulation tester

The insulation tester uses a high voltage to measure a high resistance of Mega-Ohm. The TEST BOX must withstand the test without failure.

It is essential to measure both accuracy of the resistance and applied test voltage.

A. CHECKING FOR THE CORRECT APPLIED TEST VOLTAGE

For checking the applied test voltage, connect the TEST BOX to an unprotected supply. Connect the insulation tester to the TEST BOX COM and 1M as shown as below.



Select the lowest test voltage (100V or 250V) range on the tester. Press the “test” button on the tester. Note the voltage LED (100V or 250V) on the TEST BOX. It should be lit with the same range on the tester. Record the reading on the tester. Repeat the same step on the other test voltage ranges.

NOTE: FOR THE LEDS TO BE PROPERLY LIT ON THE TEST BOX, THE RED TERMINAL MUST BE POSITIVE. ON SOME TESTERS THE RED LEAD IS NEGATIVE, THE LEADS MUST BE REVERSE.

B. CHECKING THE READING ACCURACY

Connect the tester to the 1M terminal on the TEST BOX as shown above. Start with the lowest voltage range and record the reading on the tester. Allow from 0.99 MΩ to 1.01 MΩ, $\pm 0.01\text{M}\Omega$.

Connect the tester to the 9.9M terminal on the TEST BOX. Select the 500V test voltage range and record the reading on the tester. Allow from 9.8 MΩ to 10.0 MΩ, $\pm 0.05\text{M}\Omega$.

Connect the tester to the 99M terminal on the TEST BOX. Select the 1KV test voltage range and record the reading on the tester.

Allow from 98 MΩ to 100 MΩ, $\pm 0.5\text{M}\Omega$.

Common Problems	Solution
Only the lower Test Voltage LED lit	Low battery.
Tester reads over range all the time	Test leads open circuit. Note some testers require using the correct test leads.
Test Voltage LEDs do not light up	A: TEST BOX not plugged in. B: Tester faulty or low battery. C: Test leads open circuit, try to short tester leads together and check zero. D: Try to reverse test leads.

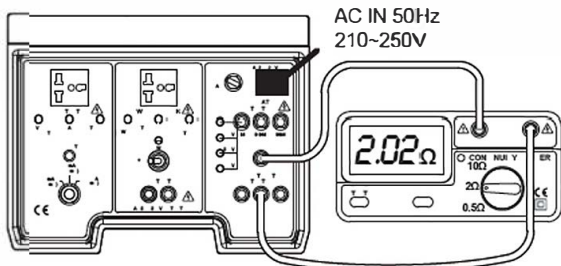
C. CHECKING THE CONTINUITY MEASUREMENT

The continuity or low resistance measures the resistance in TEST BOX has three low value resistors for precision measurement.

Many testers have a null function to zero out this leads resistance exactly before making measurement. The instruction shall show how to use this function.

First, null out test lead resistance if your tester has no null function.

The reading obtained with the test leads shorted together and take this reading off all other readings.



Connect the test leads to the “common” and the “2 Ohm” terminal as shown above. Select the lowest range on the tester and record the reading on the tester.

Allow readings from 1.90Ω to 2.10Ω , $\pm 0.05\Omega$.

Connect the test leads to the “common” and the “10 Ohm” terminal. Select the lowest range on the tester and record the reading on the tester.

Allow readings from 9.80Ω to 10.20Ω , $\pm 0.05\Omega$.

Connect the test leads to the “common” and the “0.5 Ohm” terminal. Select the lowest range on the tester and record the reading on the tester.

Allow readings from 0.45Ω to 0.55Ω , $\pm 0.05\Omega$.

Select the fitting range on the tester in order to read precise measurement from each range on the tester.

For example, if the tester has a 200Ω , 20Ω and 2Ω ranges.

Use the 200Ω range to measure " 10Ω ", the 20Ω to measure " 2Ω " and the 2Ω to measure " 0.5Ω ".

Common Problems	Solution
Reading unstable	Check connections are clean and tight in the sockets.
Reading high	Poor leads will give a high zero. Check tester is zeroed correctly with leads shorted together.
Tester reads over range	The test leads are open circuit. Note some test leads are fused and some use special connectors. Check leads are OK.

D. CHECKING FOR THE AC VOLTAGE MEASUREMENT FUNCTION

Some multi-function, insulation and installation testers can measure AC voltage.

WARNING: MAIN AC OUTPUT VOLTAGE IS PRESENT DURING THIS TEST AND WATCH OUT FOR AVOIDING ELECTRIC SHOCK.

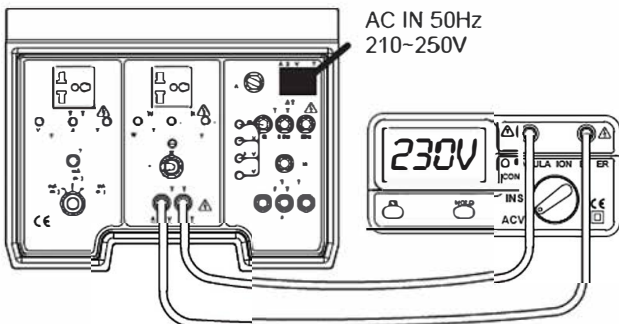


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Connect the TEST BOX to an unprotected supply. Connect test leads of installation tester to the AC OUTPUT on the TEST BOX as shown below.



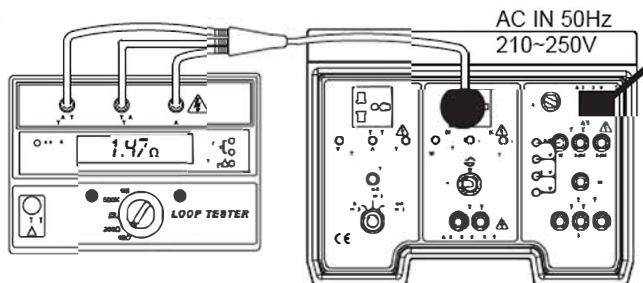
Record voltage value displayed on meter. Allow 210V to 250V.

Common Problems	Solution
No voltage displayed	A. TEST BOX and unprotected supply have poor connection. Check the POWER LED on the center. B. Fuse blown on the right-top of TEST BOX. C. Test leads open circuit.

6. Checking a LOOP tester

Loop tester is an instrument of measuring the resistance of the main supply. Its measurement is made in Ohm.

Plug the TEST BOX into an unprotected supply (no RCD trip) and plug the loop tester into the central socket marked 'WIRING CHECK' on the TEST BOX is shown as below.



IMPORTANT NOTE:

THE FUSE ON THE RIGHT-TOP OF TEST BOX WILL BLOW IF A LOOP TESTER IS PLUGGED INTO THE RCD SOCKET WHILE A LOOP TEST IS PERFORMING.

Loop test switch set on the "SUPPLY LOOP" position on TEST BOX.

Select the lowest range on the tester and press the test button on the loop tester. Record the reading (internal resistance approximate 0.45 ± 0.05 Ohm) on the tester.

Loop test switch set on the opposite position "LOOP+1R" on TEST BOX. Select the lowest range on the tester and press the test button again on the Loop tester. Record the reading is higher +1 Ohm on the tester.

Allow reading from 1.40Ω to $1.50\Omega \pm 0.05\Omega$.

Many testers have both "no trip" mode and normal measurement mode. Reading should be adopted for both modes.

Common Problems	Solution
Supply trips out when test button pressed	TEST BOX must plug into unprotected supply.
No power to Loop Tester	A: Faulty loop tester main supply. B: TEST BOX does not plugged into AC supply.
No reading on tester	Noise on main supply. Try a different main Socket for the TEST BOX.

7. Limited warranty

We warrant the product manufactured by us to be free from defective material or factory workmanship and agree to repair or replace this product which, under normal use and service, disclose the defect to be the fault of our manufacturing, with no charge for parts and service.

If we are unable to repair or replace this product, we will make a full refund of the purchase price.

Consult the user's manual for proper instruction regarding use of this instrument.

Our obligation under this warranty is limited to repairing, replacing or making refund of this test equipment which proves to be defective within twelve months from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence or accident or which have had the serial numbers altered, defaced or removed.

Accessories of this instrument are not our manufactures, which is not covered by this warranty.

All warranties implied by law are hereby limited to a period of twenty four months, and the provisions of the warranty are expressly in lieu of any other warranties expressed or implied. The purchaser agrees to assume all liability for any damages or bodily injury which may result from the use or misuse of the product by the purchaser, or its user, his employees, or others, and the remedies provided for in this warranty are expressly in lieu of any other liability we may have including incidental or consequential damages.

We reserve the right to discontinue models at any time, or change specification, price or design, without notice and without incurring any obligation.



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