



MULTIMETER SAFETY TESTS

EN 61010-1:2010 3RD EDITION

EN 61010-2-033:2012 1ST EDITION

POLLUTION DEGREE 2 CLASS II (ISOLATED)

TESTS (LOW VOLTAGE DIRECTIVE) LVD

- 4.4.2.12 Short circuit
- 4.4.2.101 Input voltage
- 6.8 Dielectric strength
- 14.101 Impulse withstanding voltages
- 16.101 Multifunctional meter
- 101.2 Range switch
- 5.3 Markings
- 8.2.1-2 Static & Dynamic
- 8.3.2 Drop test
- 10.4-5.1 Heat test
- 10.5.2-3 Enclosure
- 11.2 Cleaning (Fluid)

4.4.2.1 2 SHORT CIRCUIT TEST

- Single Fault Conditions (Forms A1 A6 A18)
- Shorted varistor (MOV) and shorted current limiting resistor
- Check insulation between circuit and parts
- CAT IV 600V AC Test with 1100V AC for 3 hours (4.4.2.101)
- CAT III 1000V DC Test with 1100V DC for 3 hours (4.4.2.101)
- Pass if steady state, no damage and no hazard (4.4.4)

4.4.2.101 INPUT VOLTAGE TEST

- On terminals rated for MAINS voltage
- Up to 600V AC apply 1.9X Rated voltage not exceeding 920V AC
- Above 600V AC apply 1100V AC
- The meter shall continue to be able to indicate the presence of hazardous voltages up to the maximum CAT voltage

16.101 MULTIFUNCTIONAL METER

- The display shall give an unambiguous indication whenever the value is above or below of the range to which the equipment is set.
- The meter must display OL or similar

5.3 MARKINGS

- Visible, not put on removable parts
- Proper letter, symbols and graphics
- Manufacturer and model number
- Terminal rated current/CAT voltage and replaceable fuse markings
- Double insulation and probe markings
- Warning markings and documentation

6. PROTECTION AGAINST ELECTRIC SHOCK

- Protection maintained in single fault condition
- 6.6.101 Clearance/creepage distance between terminal circuits (Table 101)
- 6.7 Insulation requirements (Form A14)
- 6.8 Dielectric strength (Form A14 A18)

7/8 PROTECTION AGAINST MECHANICAL HAZARDS

- No sharp edges
- Mechanical stresses 5J rating
- Static test 8.2.1
- Drop test with no damage (no cracks)

9/10. PROTECTION AGAINST FIRE AND HEAT

- No fire spread, even in single fault condition
- Flammability class V-2 or better
- Enclosure V-1 or better
- Protection against burns

11/12. PROTECTION AGAINST FLUID & RADIATION

- Cleaning (Form A30)
- Sonic and ultrasonic pressure 67 DbA
- No hazardous sound emission

14. COMPONENTS AND SUBASSEMBLIES

- Printed circuit boards V-1 or better (IEC 60695-11-10)
- 8000V voltage applied between pair of terminals used to measure MAINS
- The fuse is replaced with an open - circuited fuse. A voltage of 2X the highest rated voltage for any terminal is applied to the terminals of the current measuring circuit for 1 min. The source of the test voltage shall be capable of delivering 500VA.
- During and after the test, no damage to the equipment shall occur

14.101 COMPONENTS (TRANSIENT OVERVOLTAGE)

- 5 positive and 5 negative 8KV impulses, spaced up to 1 min apart applied
- Generator produces a voltage waveform of $1,2/50 \mu\text{s}$ and a current waveform of $8/20\mu\text{s}$ (impedance 2 ohms) (CAT III 1000V/IV 600V)
- Impulses are added to the rated voltage of the terminals (400 V AC max)
- The voltage is applied between each pair of terminals used to measure mains (protected by voltage-limiting devices)
- **The component (MOV/GDT) shall not rupture and stay functional.** It shall not heat other materials to their ignition points.

(101) MEASURING CIRCUITS

- (101.2) No interruption of circuit while changing range during current measurement
- (101.3) No hazard when the highest rated voltage or current of a measuring circuit terminal is applied to any terminal, with any combination of function and range settings
- (101.3.2) The rated voltage of the fuse shall be at least the same as the highest CAT voltage and rated speed fast enough to avoid hazard
- The breaking capacity of the fuse must exceed the highest CAT voltage divided by circuit impedance or match the value in table AA-1