

## TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING

### Automatic electrical controls for household and similar use

#### IEC 60730-1 3. Edition (1999-04)

R=Required by Lab

S=May be subcontracted

Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
3	General requirements	None	-
4	General notes on tests	None	-
5	Rating	None	-
6	Classification	None	-
7	Information	None	-
8	Protection against electric shock	Test finger (Fig. 2), force gauge, test pin (Fig. 1), milliammeter, voltmeter, ruler, micrometer	R
9	Provision of protective earthing	Ammeter, voltmeter, corrosion resistance analysis materials	R
10	Terminals and terminations	According to IEC60998, Torque tester, force gauge tester, screwdriver, micrometer, ruler, flexing tester	R
11	Construction requirements	Electric strength tester, HV test supply, isolation transformer, insulation tester, DC voltage supply, flexing tester (Fig. 9), voltmeter, ammeter, freezer chamber, temperature recorder, torque tester, force gauge, time clock, test fingernail (Fig. 3)	R
12	Moisture and dust resistance	According to IEC60529, electric strength tester, conditioning chambers: heater-humidity, leakage current meter	R
13	Electric strength and insulation resistance	Insulation tester, electric strength tester, leakage current tester	R
14	Heating	Temperature meter/recorder, fine wire thermocouples, winding resistance measurement system, environmental chambers (heat, freeze), current loads per ratings, voltmeter, ammeter	R
15	Manufacturing deviation and drift	Environmental chamber (heat, cold, humidity), voltmeter, ammeter, temperature meter/recorder, humidity meter, pressure meter, recorders, oscilloscope. All as required by the Part 2.	R

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16	Environmental stress	Environmental chambers – heat, freeze, humidity	R
17	Endurance	Environmental chambers – heat, freeze, humidity. Voltmeter, ammeter, power analyzer meter, oscilloscope, inductive loads, resistive loads, pilot duty loads, motor loads. Activation source and cycling mechanism as required by the Part 2.	R
18	Mechanical strength	Apparatus in IEC60068-2-75, impact tester (Fig. 4), tumbling barrel (Fig. 5), force tester, torque tester, pull tester	R
19	Threaded parts and connections	Screwdrivers, torque tester	R
20	Creepage distances, clearances and distances through solid insulation	Measuring ruler, force tester, test finger (Fig. 2), impulse voltage tester, electric voltage tester, insulation resistance meter, oscilloscope, electric strength tester, micrometer	R
21	Resistance to heat, fire and tracking	Ball pressure test apparatus, horizontal burning test apparatus (Annex G) and needle flame apparatus, glow wire test apparatus, environmental chamber or heating cabinet, tracking test apparatus, voltmeter, ammeter	R
22	Resistance to corrosion	Humidity chamber, heating cabinet	R
23	EMC requirements – emission	Apparatus in accordance with CISPR14-1. Equipment in accordance with Clause 17, oscilloscope	S
24	Components	Test apparatus in accordance with IEC60742 and other IEC component standards.	S
25	Normal operation	Refer to Annex H	-
26	EMC requirements – immunity	Refer to Annex H	-
27	Abnormal operation	Voltmeter, ammeter, electric strength tester.	R
28	Guide of the use of electronic disconnection	Refer to Annex H	-
Annex A	Indelibility of Marking	Petroleum spirit, water, cloth	R
Annex B	Measurement Guide	None	-
Annex C	Cotton for Mercury Switch Test	Common as described in Annex C	R
Annex D	Heat, fire, and tracking	Arc-tracking resistance apparatus. High voltage-arc resistance apparatus. Aging chambers, tensile tester, electric strength tester, flexural strength tester, izod impact tester, flame test burner, insulation resistance measuring apparatus, CTI testing apparatus, apparatus for tests in Table D2.	R
Annex E	Circuit for measurement leakage current	Circuit apparatus according to Fig. E1.	R
Annex F	Heat-Fire Resistance Categories	Informative guide – None	-
Annex G	Heat-Fire Resistance Tests	Needle flame apparatus, glow-wire test apparatus, PTI Test apparatus	R
Annex H	Requirements for Electronic Controls	Refer to Annex H sub-clauses below:	-

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H8	Protection against electric shock	Leakage current meter	R
H11	Constructional requirements	Ammeter, voltmeter, chart recorder.	R
H13	Electric strength and insulation resistance	Same as Clause 13 above	R
H17	Endurance	Thermal cycling test apparatus	R
H18	Mechanical Strength	Refer to Clause 18 above	R
H20	Creepage distance, clearance and distance through insulation	Refer to Clause 20 above	R
H21	Resistance to heat, fire and tracking	Refer to Clause 21 above	R
H23	EMC requirements – emission	Refer to Clause 23 above	S
H25	Normal Operation	Oscilloscope, ammeter, voltmeter	R
H26	EMC requirements – immunity	Environmental chamber, voltage dips and short voltage interruption apparatus, variable voltage supply, 3-phase auto-transformer, surge test apparatus, fast transient/burst test apparatus, ring wave surge test apparatus, conducted radio-frequency test apparatus radiated EM field test apparatus	S
H27	Abnormal Operation	Voltmeter, ammeter, oscilloscope, temperature meter	R
H28	Guide on use of electronic disconnection	None	-
Annex J	Requirements for controls using thermistors	Same as Clauses 8 through 28 above	R
Annex K	Nominal voltages	None	-
Annex L	Overvoltage categories	None	-
Annex M	Typical usage	None	-
Annex N	Pollution degree	None	-
Annex P	Printed circuit board coating	Heating chamber, humidity chamber, environmental cycling chamber, electric strength tester, freezing chamber	R
Annex R	Explanatory notes for surge immunity test	None	-
Annex S	Guidance for applying Clause 20	None	-

Note: The presence of equipment alone does not indicate a satisfactory situation. Assessors must evaluate the equipment design, calibration, uncertainty and documentation to ensure compliance with the directions of the standard. The requirements of ISO Guide 25 regarding validation are applicable, as the tests of this standard are not standardised tests.