



TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING
IEC 60730-1:2010-03, Edition 4.0
Automatic electrical controls for household and similar use
Part 1: General requirements

R = Required to be at Lab
S = May be subcontracted
W = May be witnessed at MTL
SF = Specialized Facility
3PPS = Three Phase Power Supply required

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	R
		Appropriate material analyzing equipment (e.g. scanning electron microscope, energy dispersive x-ray spectrometer)	S
10	Terminals and terminations	According to IEC 60998, 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, voltmeter, ammeter, freezer chamber, temperature recorder, torque tester, force gauge, time clock, test fingernail	R

Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
12	Moisture and dust resistance	According to IEC 60529, 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	Voltmeter, ammeter Equipment as required by Part 2-x depending on the type of control such as e.g. environmental chamber (heat, cold, humidity), temperature meter/recorder, humidity meter/recorder, pressure meter/recorder, etc. Remark: For those types of controls for which the atmospheric pressure is relevant for the determination of the manufacturer deviation and drift the atmospheric pressure has to be measured by a pressure meter or alternatively it is acceptable to get the information about the atmospheric pressure online via local metrological service.	R
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 3PPS
18	Mechanical strength	Apparatus in IEC 60068-2-75, impact tester (Fig. 4), tumbling barrel (Fig. 5), force tester, torque tester, pull tester All as required by Part 2	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, glow wire test apparatus, environmental chamber or heating cabinet, tracking test apparatus, voltmeter, ammeter	R
22	Resistance to corrosion	Humidity chamber, heating cabinet	R

Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
23	EMC requirements – emission	Apparatus in accordance with CISPR 14-1. Equipment in accordance with Clause 17, oscilloscope	S
24	Components	Test apparatus in accordance with IEC 60742 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, apparatus described in figure 8	R
Annex B	Measurement Guide	None	-
Annex C	Cotton for Mercury Switch Test	Common as described in Annex C	R
Annex D (informative)	Heat, fire and tracking	Informative guide – None	-
Annex E	Circuit for measurement leakage current	Circuit apparatus according to Figure E1	R
Annex F (informative)	Heat-Fire Resistance Categories	Informative guide – None	-
Annex G	Heat-Fire Resistance Tests	Glow-wire test apparatus, PTI Test apparatus	R
Annex H	Requirements for Electronic Controls	Refer to Annex H, sub-clauses below:	-
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
H22	EMC requirements – emission	Refer to Clause 23 above	S
H23	Normal Operation	Oscilloscope, ammeter, voltmeter	R

Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
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 radiofrequency 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 which are used for clauses 8 through 28	R
Annex K (informative)	Nominal voltages	None	-
Annex L	Overvoltage categories	None	-
Annex M (informative)	Typical usage	None	-
Annex N	Pollution degree	None	-
Annex P	Printed circuit board coating performance test	Heating chamber, humidity chamber, environmental cycling chamber, electric strength tester	R
Annex Q	Printed circuit board coating performance test	Freezing chamber, environmental cycling chamber, electric strength tester, freezing chamber	R
Annex R (informative)	Explanatory notes for surge immunity test	None	-
Annex S (informative)	Guidance for applying Clause 20	None	-
Annex T	Requirements for SELV and PELV	None	-
Annex U	Requirements for relays when used as controls in IEC 60335 appliances	Same which are used for clauses 7 through 28	R 3PPS