

TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING

IEC 61558-1 : 2017, Edition 3.0

Safety of transformers, reactors, power supply units and combinations thereof

Part 1: General requirements and tests

“R”	Required
“S”	May be subcontracted, see OD 2012
“SP”	Specialized Facility, see IECEE 02-2
“W”	Witness testing in the categories “MED” and “MEAS”
“3PPS”	Three Phase Power Supply required

Clause	Measurement/testing	Testing / measuring equipment / material needed	Equipment Classification
8.15	Marking	Piece of cloth, water, hexane	R
9.1	Protection against accessibility to hazardous live parts	Standard test finger (IEC 60529), test pin according to Figure 3, multimeter, oscilloscope / Measuring network (Annex J)	SMT-1312 SMT-PBC
11.1 / 12 / 13	Output voltage and output current under load measures No-load output voltage measures / Short-circuit voltage test	Power supply, multimeter, amperometer, wattmeter	
14.2/ 14.3 /15.2 15.3 / 15.4 / 15.5	Heating test / Short circuit and overload protection test / Short circuit and overload protection test for fail safe transformers	Power supply, impedances, ohmmeter, thermocouples, thermometer, amperometer, oven without air circulation if $t_a > 25^\circ\text{C}$, black wooden painted support, pull test device (N), copper discs painted black with thermocouples, electric strength test equipment, fuse link, temperature recorder	GDJS-015B
14.3.3	Vibration	Vibration generator (IEC 60068-2-6 refers)	LVD-100KG
16.2 / 16.3 / 16.4	Mechanical strength tests	Spring hammer, steel plate, tumbling barrel, dynamometer and torque meter, calipers, weighing device (g) pull test device (N)	IK01-06
16.5.1 / 16.5.2	Transformers to be used in vehicles and railway applications / test requirements for the transportation of transformers	Vibration test equipment according to IEC 61373, vibration test equipment according to IEC 60721-3-2	LVD-100KG

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17	Protection against harmful ingress of dust, solid objects and moisture	- IP3X (2,5mm probe), IP4X (1mm probe), test finger IEC 60529, sphere 12.5 mm, dynamometer, dust chamber (IP 5X and IP 6X) - Apparatus for protection against water tests (IP X 1-8)	SMT-CT3 SMT-DT1 JL-X
17.2	Humidity test	Humidity cabinet	GDJS-015B
18.2	Insulation resistance tests	Megaohmmeter	
18.3	Dielectric strength tests	High voltage transformer, testing circuit according to IEC 60664-1 Annex C	
18.4	Insulation between and within windings	Frequency converter	
18.5	Touch current and protective earthing conductor current	Network of figure J.1, oscilloscope	
19.1	General construction	Ammeter, multimeter, oscilloscope, caliper/ruler, stopwatch	
19.2	Flammability of materials	Glow wire test apparatus	ZRS-3H
19.8	Bridging of separated conductive parts by resistors or capacitors	Multimeter, oscilloscope	
19.9	Insulating material separating input and output windings	Test apparatus for rubber parts in oxygen under pressure	
19.10	Ageing test / Impact test / Scratch test	Heating cabinet / Spring hammer / Hardened steel pin	GDJS-015B IK01-06
19.12.3	Insulated winding wires construction (according to IEC 60851-3/5/6)	Heating cabinet, high voltage transformer, mandrels	GDJS-015B
19.15	Strain on fixed socket-outlets caused by pin-transformers connection	Apparatus for torque measuring on socket	
19.17	Drain hole of transformers protected against ingress of water	Caliper - ruler	
19.20.1	Live parts of SELV circuits	Multimeter, oscilloscope	
20.8 20.9	- Thermal cut-out tests (based on IEC 60730-1) Tests on PTC resistor - Thermal-links	Power supply (cycled), heating cabinet	GDJS-015B
20.12	Overload protective devices	Power supply, programmable switch, inrush current instrument	
21	Internal wiring	Radius gauge	
22.9.4	Transformer provided with cords	Flexing test apparatus	SW-6
22.9.5 23	- Stationary transformers - Terminals for external conductors	Torque meter / Dynamometer, test cables of various sizes, suitable screw drivers	

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24	Provisions for protective earthing	Earthing test equipment, stopwatch	
25	Screws and connections (mechanical) and glands testing	Screwdriver or spanner, test rod, torque meter, torque driver	
26.2	Creepage and clearance distances	Sliding caliper / Thickness caliper / Climatic chamber	CK-1
26.3	Distance through insulation	Mandrel apparatus, multimeter, oscilloscope, power supply, high voltage source	
27	Resistance to heat, fire and tracking	Heating cabinet / Glow wire test apparatus / Ball pressure test apparatus (see also CTL DSH 391 D)	GDJS-015B ZRS-3H ZBP-T
27.3	Resistance to abnormal heat under fault conditions	Power supply, fuses, impedances, copper discs and thermocouples	
27.5	Resistance to tracking	Proof tracking test device	TTC-1
28	Resistance to rusting	Closeable glass vessel / Test solution / Heating cabinet / Facilities to wash samples after test	GDJS-015B

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