Low Voltage Switchgear and Control Gear
IEC 60947-3 Switches, disconnectors, switch-disconnectors and fuse-combination units

TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING

R= Required by Lab
S= May be subcontracted

Clause	Measurement / testing	Testing / measurement equipment, material required	Subcontracting
8.3.3	**Test sequence I: General performance characteristics**		
8.3.3.1	Temperature rise	Temperature acquisition unit Current/ voltage source	R
8.3.3.2	Test of dielectric properties (8.3.3.4.1 3))	Impulse voltage generator (1.2/50µs) Oscilloscope High voltage probe AC High-voltage source (0 – min. 3.5 KV) Voltmeter (min. 3.5 KV) Leakage current measurement (<6mA	R
8.3.3.3	Making and breaking capacities	unit for test currents higher than 1 kA (required capacity 10kA) Measuring devices for voltage, current, cos φ, time, I^2t, time constant, Oscilloscope for monitoring of arcing and measuring transient recovery voltage Robotic actuator to open and close switch or disconnector	S
8.3.3.4	Dielectric verification (8.3.3.4.1 4))	AC High-voltage source (0 – min. 3.5 KV) Voltmeter (min. 3.5 KV)	R
8.3.3.5	Leakage current	Leakage current measurement (<2mA)	R
8.3.3.6	Temperature rise verification	Temperature acquisition unit Current/ voltage source	R
8.3.3.7	Strength of actuator mechanism (for products suitable for isolation)	Operating force actuator Means for force measurement	R

8.3.4	**Test sequence II: Operational performance capability**		
8.3.4.1	Mechanical operation and operational performance capability	unit for test currents higher than 1 kA (required capacity 10kA) Measuring devices for voltage, current, cos φ, time, I²t, time constant, Oscilloscope for monitoring of arcing Robotic actuator to open and close switch or disconnector	S
8.3.5	**Test sequence III: Short circuit performance capability**		
8.3.5.1 and 8.3.5.2	Short time withstand current test	testing unit for currents higher than 10kA Measuring devices for voltage, current, cos φ, time, I²t, time constant, Measurement equipment (e.g. oscilloscope) for monitoring of arcing Robotic actuator to close switch or disconnector	S
8.3.6	**Test sequence IV: Conditional short circuit current**		
8.3.6.2	Fuse protected short-circuit withstand	testing unit for currents higher than 10kA Measuring devices for voltage, current, cos φ, time, I²t, time constant, Measurement equipment (e.g. oscilloscope) for monitoring of arcing Robotic actuator to close switch or disconnector	S
8.3.7	**Test sequence V: Overload performance capability**		
8.3.7.1	Overload test	Variable current source, measuring devices for current	R
8.4	**Electromagnetic compatibility tests**		S
8.5	**Special tests**	See 8.3.4	R
7.1.11	Degree of protection	Sphere 50 mm diameter Jointed test finger Test rod 2.5mm diameter Test wire 1.0mm diameter Sphere 12.5mm diameter	R
		Dust Chamber Drip box Drip box 15° Oscillating tube/ spray ± 60° or spray nozzle/spray ± 60° Oscillating tube/ spray ± 180° Oscillating tube/ spray ± 180° Water jet hose nozzle - nozzle 12.5mm diameter	S
		Immersion tank	S

	Resistance of insulating materials to heat	Heating chamber Ball pressure test apparatus	R
7.1.1.1	Resistance of insulating materials to abnormal heat and fire	Glow wire test apparatus	R
General	Mechanical strength of fastening means of enclosures	Sliding gauge Screwdriver or wrench for applying a torque	R
7.1.3	Clearances and creepage distances	Sliding gauge	R