



**Low Voltage Switchgear and Control Gear  
IEC 60947-4-1 Contactors and motor-starters**

**TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING**

R= Required by Lab

S= May be subcontracted

Clause	Measurement / Testing	Testing / measuring equipment / material required	Subcontracting
	<b>Sequence I</b>		
9.3.3.3	Verification of temperature rise (test 8.3.2.5)	Temperature acquisition unit Current/ voltage source	R
9.3.3.1 9.3.3.2	Verification of operation and operating limits	Current/ voltage source Measuring device for time Temperature chamber(s) ( -5, 20, 40 degrees Celsius)	R
9.3.3.4	Verification of dielectric properties	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
	<b>Sequence II</b>		
9.3.3.5	Verification of rated making and breaking capacities, change-over ability and reversibility, where applicable	unit for test currents higher than 1 kA Measuring devices for voltage, current, cos φ, time, I <sup>2</sup> t Robotic actuator to operate the circuit if needed	S

		Voltage source to operate the contactor	
9.3.3.6	Verification of conventional operational performance	unit for test currents higher than 1 kA Measuring devices for voltage, current, $\cos \varphi$ , time, $I^2t$ Robotic actuator to operate the circuit if needed. Voltage source to operate the contactor	S
	<b>Sequence III</b>		
9.3.4	Performance under short circuit conditions	Short circuit testing unit for test currents higher than 10 kA Measuring devices for voltage, current, $\cos \varphi$ , time, $I^2t$ Robotic actuator to operate the circuit if needed. Voltage source to operate the contactor	S
	<b>Sequence IV</b>		
9.3.5	Verification of ability to withstand overload currents	unit for test currents higher than 1 kA Measuring devices for voltage, current, $\cos \varphi$ , time, $I^2t$	S
	<b>Sequence V</b>		
8.2.4 of part 1	Verification of mechanical properties of terminals	Sliding gauge Screwdriver or spanner for applying a torque. Test setup for flexion test	R
Annex C part 1	Verification of degrees of protection of enclosed contactors and starters	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 $\pm 60^\circ$ or spray nozzle/spray $\pm 60^\circ$ Oscillating tube/ spray $\pm 180^\circ$ Oscillating tube/ spray $\pm 180^\circ$ Water jet hose nozzle - nozzle 12.5mm diameter	S



IEC SYSTEM FOR CONFIRMITY TESTING AND  
CERTIFICATION OF ELECTRICAL EQUIPMENT

COMMITTEE OF TESTING LABORATORIES

		Immersion tank	
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