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6.1.5.3.8 Power-frequency magnetic field immunity

The purpose of this test is to verify the immunity of the electronic transformer when subjected to power-frequency magnetic fields related to the proximity of power conductors, transformers, etc. in normal or faulted conditions; this test is important because of the expected vicinity of electronic parts of the electronic transformer to main circuits.

6.1.5.3.9 Pulse magnetic field immunity

The purpose of this test is to verify the immunity of the electronic transformer when subjected to impulse magnetic field generated by lightning strokes on buildings, metal structures and earth networks; this test is relevant to HV and MV installations because of the increased lightning exposition.

6.1.5.3.10 Damped oscillatory magnetic field immunity

The purpose of this test is to verify the immunity of the electronic transformer when subjected to damped oscillatory magnetic field generated the switching of HV busbars by isolators. This test is mainly applicable to electrical equipment installed in HV substations.

6.1.5.3.11 Radiated, radiofrequency, electromagnetic field immunity

The purpose of this test is to verify the immunity of the electronic transformer against electromagnetic fields generated by radio transmitters or any other device emitting wave-radiated electromagnetic energy. The most important concern in HV and MV installations comes from the possibility of the use of walkie-talkie and portable phones, as the probability of vicinity of broadcasting stations or amateur radios is, in general, very low.

6.1.6 Signal-to-noise ratio

The minimum signal-to-noise ratio of the ECT output shall be 30 dB (relative to rated secondary output) over the bandwidth specified by the manufacturer.

6.1.7 Wake-up current

If relevant, the wake-up current shall be specified by the manufacturer.

6.1.8 Mechanical requirements

These requirements generally only apply to free-standing electronic current transformers having $U_m \geq 72,5$ kV and above.

In table 9, guidance is given on the static loads that electronic current transformers shall be capable of withstanding. The figures include loads due to wind and ice.

The specified test loads are intended to be applied in any direction to the primary terminals.

Table 9 – Static withstand test loads

Highest voltage for equipment U_m kV	Static withstand test load F_R N	
	Load class I	Load class II
72,5 to 100	1 250	2 500
123 to 170	2 000	3 000
245 to 362	2 500	4 000
≥420	4 000	6 000

NOTE 1 The sum of the loads acting in routine operating conditions should not exceed 50 % of the specified withstand test load.

NOTE 2 In some applications, electronic current transformers with through current terminals should withstand rarely occurring extreme dynamic loads (for example, short circuits) not exceeding 1,4 times the static withstand test load.

NOTE 3 For some applications, it may be necessary to establish the resistance to rotation of the primary terminals. The moment to be applied during test shall be agreed between manufacturer and purchaser.

6.1.9 Reliability and dependability

The manufacturer should provide information according to relevant standards, like IEC 60812 and IEC 61025, on the dependability and reliability of the ECT. This includes assessment of mean time to failure (MTTF), mean time between failures (MTBF) and also a failure mode and effect analysis (FMEA) related to main parts subjected to maintenance. A block diagram will be provided describing relationship between sub-parts and how the redundancy, if any, is managed. Parts subjected to maintenance and relevant maintenance procedures must be identified.

NOTE A solution to improve the reliability and dependability could be the implementation of proper redundancy.

The manufacturer shall endeavour to provide all the control necessary to avoid any spurious operation as a result of loss of supply or insufficient supply, loss of an internal component or as a result of a component malfunction.

The reliability and dependability aspects of electronic current transformers are comparable to those of the electrical components in the substation. Hence, the reliability and dependability of electronic current transformer shall be treated similarly.

At least, the electronic current transformer shall be able to maintain its accuracy class when some of those components are replaced, which need not to be calibrated after installation. A replacement of components is allowed only with components specified by the manufacturer of the electronic current transformer.

Components (i.e. sub-parts), which can be replaced on site without requiring calibration, shall be specially identified by an appropriate mark. This capability shall be demonstrated by test.

No other component can be replaced without recalibration of the complete electronic current transformer.

6.1.10 Requirements for liquids in equipment

The manufacturer shall specify the type and the required quantity and quality of the liquid to be used in equipment and provide the user with necessary instructions for renewing the liquid and maintaining its required quantity and quality.