



Standard Specification for Electrical Insulation Monitors for Monitoring Ground Resistance in Active Electrical Systems [Metric]¹

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1. Scope

1.1 This specification covers electrical insulation monitoring devices, intended as permanently installed units, for use in the detection of ohmic insulation faults to ground in active, ac ungrounded electrical systems.

1.2 *Limitations*—This specification does not cover devices which are not intended for operation for: dc ungrounded systems or ac ungrounded systems with dc components unless ac to dc conversion is isolated from the monitored system with transformers.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 The following precautionary caveat pertains only to the test methods portion, Section 9, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *UL Standard:*

UL 1053 Ground-Fault Sensing and Relaying Equipment²

3. Terminology

3.1 *Definitions:*

3.1.1 *ac internal resistance*—a monitor's impedance between the measuring terminals and ground terminals.

3.1.2 *ac ungrounded electrical system*—a monitored system that has no intentional connection from phase or neutral to ground and can continue to perform normally if one conductor becomes connected to ground.

3.1.3 *dc internal resistance*—a monitor's ohmic resistance between the measuring and ground terminals.

3.1.4 *input voltage*—the supply voltage at the terminals of an insulation monitor.

3.1.5 *measuring voltage*—the output dc voltage from the insulation monitor that is superimposed between the ac ungrounded system and ground.

3.1.6 *nominal contact voltage*—the voltage rating for a monitor's internal relay contacts.

3.1.7 *nominal frequency*—the frequency of a monitored system.

3.1.8 *nominal voltage*—the voltage (phase-to-phase) of a monitored system.

3.1.9 *response value*—the adjustable or preset set point value of system insulation resistance for which an insulation monitor will provide alarm indication.

3.1.10 *system insulation resistance*—the total insulation resistance to ground to be monitored which is measured by dc voltage.

4. Monitor Classification

4.1 *Type 1*—Insulation monitor for 115-V, 3-phase or single-phase, 60-Hz, ac ungrounded electrical systems.

4.2 *Type 2*—Insulation monitor for 115-V, 3-phase or single-phase, 400-Hz, ac ungrounded systems.

4.3 *Type 3*—Insulation monitor for 440-V, 3-phase or single-phase, 60-Hz, ac ungrounded systems.

4.4 *Type 4*—Insulation monitor for 440-V, 3-phase or single-phase, 400-Hz, ac ungrounded systems.

4.5 *Type 5*—Insulation monitor for up to 1000-V, 3-phase or single-phase, 50 to 400-Hz, ac ungrounded systems.

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² Available from Underwriters Laboratories, Inc., 333 Pfingsten Rd., Northbrook, IL 60062.