
Product	Insulation Fault Locator
Application	Low Voltage networks, ungrounded (IT networks) AC, DC and AC/DC
Document:	Product Technical Specification
Object:	This document describes the general rules to guarantee the maximum level of safety and performances for an Insulation Monitor

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General

The present specification applies to Insulation Fault Locator (IFL) fo AC (50-60Hz), DC or ACDC,

- The IFL shall permanently monitor simultaneously up to 12 feeders in terms of insulation between the feeder being monitored and the ground
- The IFL shall report that no insulation fault is detected through a global Insulation OK LED or No Alarm LED
- The IFL shall trigger an alarm (output relay toggle, Alarm LED per feeder and global Alarm LED) in case an insulation fault is detected on one or more of the feeders, including symmetrical and asymmetrical faults.
- The alarm threshold of the IFL shall be settable for all feeders among a choice of three
- The IFL shall detect and report (Alarm LED per feeder and global Alarm LED) a transient insulation fault
- The IFL shall detect and report a toroid connection loss (Alarm LED per feeder and global Alarm LED)
- The IFL shall be compliant with its associated range of Insulation Monitors (IM)
- The IFL shall have a dedicated commissioning procedure

Glossary

Acknowledgement	Is the fact to reset the alarm relay output and thus to stop reporting an insulation alarm while the isolation fault is still present.
Alarm threshold	Is the value of the resistance set in the IFL to trigger the alarm,
IFL	Insulation fault Locator
IT Network	Electrical network in which the active parts are isolated from ground
Insulation	Equivalent resistance of all the Equipment Under Control (EUC) between the active part and the earth
Insulation fault	Is the detection of an insulation resistance value below the set threshold.
Insulation alarm	Is the fact to report / trigger an alarm due to an insulation fault.
Transient	Insulation fault which disappears before the alarm is acknowledged

Compliance to Standards

Reference	Title	Comment
IEC 61557-1	Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 1: General requirements	
IEC 61557-9	Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 9: Equipment for insulation fault location in IT systems	
IEC 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements.	
IEC 60364-4-41	Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock	
IEC 61000-4-1	Electromagnetic compatibility (EMC) Testing and measurement techniques	EMC immunity
IEC 60068-2	Environmental testing	Climatic withstand
NF C 15-100	Safety in Industrial Control Equipment Low Voltage Electrical Installations	Standard applicable in France

Certificates of conformity

Reference	Title	Comment
CE		
EAC		
DNV		Marine Certificate
ISO9001		Quality Management Systems
RoHS	Reduction of Hazardous Substances	Environmental

IFL Functional requirements

Safety

The IFL shall be

- cased into a plastic moulded box
- IP54 on the front per IEC 60529
- IP20 on the rear per IEC 60529
- equipped with withdrawable connectors for each of its connections (toroids, power supply and alarm relay)
- equipped with an output relay to trigger an alarm in case of insulation fault per IEC61557-9
- offering a user triggered test function

Monitoring

The IFL shall

- be compliant with any of its associated Insulation Monitors
- be autonomous to make its measurements, no wiring shall be required between the IFL device and the Insulation Monitor
- monitor up to 12 feeders of an AC, DC or ACDC IT/ungrounded electrical Low Voltage network
- be compliant with its associated current sensors
- monitor simultaneously the insulation to ground of each of the 12 feeders
- to better adapt to its application, the IFL shall have settable filters. Short: 5 seconds or Medium: 40seconds;
- IFL response time per IEC 61557-9 test condition shall be: < 5 seconds

HMI

The IFL shall

- be equipped with a “product status LED” indicating
 - through a flashing green that the product is powered and able to perform its function
 - through a solid red that an internal product failure was detected
- be equipped with a “No alarm LED” indicating through a solid green that no insulation fault was detected on any of the 12 feeders
- be equipped with a “Alarm LED” indicating
 - through a solid yellow that a insulation fault is reported on at least one channel,
 - indicating through a flashing yellow that a transient fault was reported on at least one channel
- be equipped with 12 channel LEDs indicating
 - through a solid yellow that a insulation fault is reported the channel,
 - indicating through a flashing yellow that a transient fault was reported on the channel,
 - indicating through a flashing yellow that a toroid loss of connection was detected on the channel,
- be equipped with 4 push buttons to configuration the thresholds and the filtering, to trigger a test function and to reset (acknowledge) an insulation fault

Settings

The IFL shall allow the following settings

- choice of a threshold common to all 12 feeders among low-insulation, medium insulation and high insulation
- enable/disable of filtering
 - With “Filtering” enabled, spurious fault detection can be avoided
 - With “Filtering” disabled, less than 5 second response time is guaranteed

Alarming

The IFL shall trigger its Alarm output relay in the following cases

- Insulation fault detection,
- Internal product failure detected by the internal self-test
- Loss of toroid connection

Alarm relay shall be

- Changeover electromechanical relay
- 6A / 250V
- 1A / 48VDC

- 3mA minimum load

Power Supply (IFL12L)

The IFL shall be compliant with power supplies

- 24-48VDC
- 8W max with all option modules

Power Supply (IFL12)

The IFL shall be compliant with power supplies

- 100-440VACDC
- 50-60Hz
- 20VA max with all option modules

Installation

The IFL shall be

- door mounted or DIN mounted
- equipped with removable connectors to interface each of its input/output to the electrical network
- connectors for toroids connection shall be equipped with a common point for two toroids.
- operating under temperature
 - Operation -25°C to +55°C per IEC 60721-3, Class 3K6
 - Storage -40°C to +85°C per IEC 60721-3, Class 1K5

Commissioning Procedure

The IFL shall provide a dedicated commissioning procedure

- to auto-detect the connected toroids
- to check the correct installation of the toroids

Operations & Maintenance

- Internal self-tests start manually on demand through the IFL test button
- No specific maintenance planning shall be requested

Environment

- Production site organisation shall be non-polluting and certified to comply with ISO 9002 and ISO 14001 standards.
- IFL shall be designed per Eco-design complying with ISO 14062 Especially materials shall be of halogen free type
- IFLs shall be designed for easy disassembly and recycling at end of life, and complies with environmental directives RoHS and WEEE.

End
