SLOVENSKI STANDARD
oSIST prEN IEC 61557-9:2022

01-julij-2022

Električna varnost v nizkonapetostnih razdelilnih sistemih za izmenične napetosti do 1 000 kV in enosmerne napetosti do 1 500 kV - Oprema za preskušanje, merjenje ali nadzorovanje zaščitnih ukrepov - 9. del: Oprema za ugotavljanje mesta izolacijske okvare v IT-sistemih

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

Elektrische Sicherheit in Niederspannungsnetzen bis AC 1 000 V und DC 1 500 V – Geräte zum Prüfen, Messen oder Überwachen von Schutzmaßnahmen – Teil 9: Einrichtungen zur Isolationsfehlersuche in IT-Systemen

Sécurité électrique dans les réseaux de distribution basse tension de 1 000 V c.a. et 1 500 V c.c - Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection - Partie 9: Dispositifs de localisation de défauts d'isolement pour réseaux IT

Ta slovenski standard je istoveten z: **prEN IEC 61557-9:2022**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
29.080.01	Električna izolacija na splošno	Electrical insulation in general
29.240.01	Omrežja za prenos in distribucijo električne energije na splošno	Power transmission and distribution networks in general

oSIST prEN IEC 61557-9:2022 **en,fr,de**

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COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 85 : MEASURING EQUIPMENT FOR ELECTRICAL AND ELECTROMAGNETIC QUANTITIES	
SECRETARIAT: China	SECRETARY: Ms Guiju HAN
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 64	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

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

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL SAFETY IN LOW VOLTAGE DISTRIBUTION SYSTEMS UP TO 1 000 V AC AND 1 500 V DC – EQUIPMENT FOR TESTING, MEASURING OR MONITORING OF PROTECTIVE MEASURES –

Part 9: Equipment for insulation fault location in IT systems

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IEC 61557-9 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) New terms and definitions on maximum admissible locating AC and DC currents and voltages

b) The requirements locating current and locating voltage have been revised

c) Performance requirements have been added.

d) The test requirements for locating current and locating voltage have been revised

e) The structure of this part has been adapted to IEC 61557-1:2019

f) The limit values under A.2 were adapted to fit the changed test methods in 6.2.3

155 The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

156
157 Full information on the voting for its approval can be found in the report on voting indicated in
158 the above table.

159 The language used for the development of this International Standard is English.

160 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
161 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
162 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
163 described in greater detail at www.iec.ch/standardsdev/publications.

164 This part of IEC 61557 shall be used in conjunction with Part 1.

165 A list of all parts in the IEC 61557 series, published under the general title *Electrical safety in*
166 *low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing,*
167 *measuring or monitoring of protective measures,* can be found on the IEC website.

168 The committee has decided that the contents of this document will remain unchanged until the
169 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
170 specific document. At this date, the document will be

171 • reconfirmed,
172 • withdrawn,
173 • replaced by a revised edition, or
174 • amended.

175

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ELECTRICAL SAFETY IN LOW VOLTAGE DISTRIBUTION SYSTEMS UP TO 1 000 V AC AND 1 500 V DC – EQUIPMENT FOR TESTING, MEASURING OR MONITORING OF PROTECTIVE MEASURES –

Part 9: Equipment for insulation fault location in IT systems

1 Scope

This part of IEC 61557 specifies the requirements for the insulation fault location system (IFLS) that localizes insulation faults in any part of the system in unearthed IT AC systems and unearthed IT AC systems with galvanically connected DC circuits having nominal voltages up to 1 000 V AC, as well as in unearthed IT DC systems with voltages up to 1 500 V DC, independent of the measuring principle.

IT systems are described in IEC 60364-4-41. Additional data for a selection of devices in other standards should be noted.

NOTE Further information on insulation fault location can be found in the following standards: IEC 60364-4-41:2005, 411.6, and IEC 60364-5-53:2019, 531.3.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:2009, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60364-7-710:2021, *Electrical installations of buildings – Part 7-710: Requirements for special installations or locations – Medical locations*

IEC 60529, *Degree of protection provided by enclosures (IP Code)*

IEC 60721-3-1, *Classification of environmental conditions – Part 3-1: Classification of groups of environmental parameters and their severities – Storage*

IEC 60721-3-2, *Classification of environmental conditions – Part 3-2: Classification of groups of environmental parameters and their severities – Transportation and handling*

IEC 60721-3-3, *Classification of environmental conditions – Part 3-3: Classification of groups of environmental parameters and their severities – Stationary use at weatherprotected locations*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-1:2010/AMD1:2016

IEC 61010-2-030, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for equipment having testing or measuring circuits*

IEC 61010-031, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for hand-held and hand-manipulated probe assemblies for electrical test and measurement*

IEC 61010-2-032, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-032: Particular requirements for hand-held and hand-manipulated current sensors for electrical test and measurement*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61326-2-2, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-2: Particular requirements – Test configurations, operational conditions and performance criteria for portable test, measuring and monitoring equipment used in low-voltage distribution systems*

IEC 61326-2-4, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-4: Particular requirements – Test configurations, operational conditions and performance criteria for insulation monitoring devices according to IEC 61557-8 and for equipment for insulation fault location according to IEC 61557-9*

IEC 61557-1:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 1: General requirements*

IEC 61557-8:2014, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems*

IEC 61326-1:2020, *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*

3 Terms, definitions and abbreviations

3.1 Terms, definitions, symbols and units

For the purposes of this document, the terms and definitions given in IEC 61557-1, IEC 61557-8 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
insulation fault location system
IFLS
device, equipment or combination of devices used for insulation fault location in IT systems

Note 1 to entry: IFLS functionality can be used in addition to insulation monitoring functionality. It injects a locating current between the electrical system and earth and locates the insulation fault.

Note 2 to entry: The abbreviation ‘IFLS’ will be used in the document to denote insulation fault location system.

3.1.2
locating current
I_L
current that is injected by the locating current injector during the location process. The locating current can be generated by:

– an active locating source with a sufficiently large internal impedance using an independent voltage source different from the system to be monitored, or
– a passive locating current source driven directly from the system to be monitored

3.1.3
locating voltage
U_L
voltage present at the measuring terminals of the locating current injector during the measurement when the device has an active locating source

Note 1 to entry: In a fault-free, de-energized system, this represents the voltage present between the terminals of the locating device to the system to be monitored and the terminals for the connection to the PE conductor.

3.1.4
response sensitivity
value of the evaluating current or insulation resistance at which the insulation fault locator responds under specified conditions

Note 1 to entry: Response sensitivity can either be a fixed threshold or a response curve.

3.1.5
insulation fault locator
IFL
device or part of a device for the location of the insulation fault

3.1.6
locating current sensor
LCS
sensor for the detection of the locating current used for the location of the insulation fault

3.1.7
locating current injector
LCI
device or part of a device, that has the function to inject the locating current into the IT system in order to locate the insulation fault

3.1.8
passive locating current injector
locating current injector that generates the locating current directly from the system to be monitored

3.1.9
active locating current injector
locating current injector that generates the locating current from a locating voltage source which is different from the system to be monitored

3.1.10
insulation fault location system in medical locations
MED-IFLS
specific insulation fault location equipment dedicated to locating insulation faults in IT systems of group 2 medical locations

Note 1 to entry: The MED-IFLS is described in IEC 61557-9:20xx, Annex A.

Note 2 to entry: Medical locations are defined in IEC 60364-7-710.

3.1.11
response time
t_{al}
time required by insulation fault location equipment to respond under specified performance conditions

Note 1 to entry: The requirements for the condition can be found in IEC 61557-9:202x, A.2.2.4.

3.1.12
group 2 medical locations
medical location where ME equipment or ME systems are intended to be used intrusively, externally or invasively to any part of the patient and where discontinuity of the electrical supply, such as protection against electric shock, represents a risk to the safety of the patient

[SOURCE: IEC 60364-7-710:2021, 710.3.9]

3.1.13
portable equipment for insulation fault location
PIFL
equipment used for temporary insulation fault location in IT systems instead of, or in addition to, fixed installed equipment for insulation fault location

Note 1 to entry: The requirements for PIFL are defined in IEC 61557-9:202x, Annex B.

3.1.14
system leakage capacitance for IFLS
C_{el}
maximum value of the total capacitance to earth of the system to be monitored including any connected appliances up to which the IFLS can work as specified

Note 1 to entry: The system leakage capacitance is the sum of the leakage capacitances of all phase conductors including the neutral conductor to earth.

3.1.15
maximum admissible locating AC current
$I_{limit\ AC}$
maximum peak value of the locating current above a pre-set level of frequency

Note 1 to entry: The frequency and current levels are derived from IEC 61140.

3.1.16
maximum admissible locating DC current
$I_{limit\ DC}$
maximum peak value of the locating current below a pre-set level of frequency

Note 1 to entry: The frequency and current levels are derived from IEC 61140.

3.1.17
maximum admissible locating AC voltage
$U_{limit\ AC}$
maximum peak value of the locating voltage above a pre-set level of frequency

Note 1 to entry: The frequency and voltage levels are derived from IEC 61140.

3.1.18
maximum admissible locating DC voltage
$U_{limit\ DC}$
maximum peak value of the locating voltage below a pre-set level of frequency

Note 1 to entry: The frequency and voltage levels are derived from IEC 61140.

3.1.19
injection resistance
R_i
resistance of the locating current injector between the injection terminal and the earth terminal

3.1.20
injection impedance
Z_i
total impedance of the locating current injector between the injection terminal and the earth terminal, measured at the nominal frequency

3.2 Abbreviated terms and symbols

The abbreviated terms and symbols listed in Table 1 apply to this document.

Table 1 – Abbreviations and symbols

Abbreviation or symbol	Explanation	Referenced clause	Other referenced standard
C_{Ld}	System leakage capacitance downstream of the evaluating current sensor	Figure C.2	
C_{Lu}	System leakage capacitance upstream of the evaluating current sensor	Figure C.2	
C_{el}	system leakage capacitance for IFLS	3.1.14	
EMC	Electromagnetic compatibility	4.6	IEC 60050-161:1990, 161-01-07
FE	Functional earth terminal	4.5.2	IEC 61010-1
g_n	standard acceleration of free fall	Table 2	IEC 60068-2-27:2009, 3.3 IEV 60050-113, 113-01-40
IFL	Insulation fault locator	3.1.5, C.1	
IFLS	Insulation fault location system	3.1.1, Annex C	
I_L	Locating current	4.4.2, C.1	
IMD	Insulation monitoring device	Annex C	IEC 61557-8:2014, 3.1.14
IP	Degree of protection of enclosure	4.7.3	IEC 60050-426:2008, 426-04-02
LCI	Locating current injector	3.1.7, C.2	
LCS	Locating current sensor	3.1.6, C.1	
LLW	Local location warning	4.2.2	
PE	Protective conductor	4.5.3	IEC 60050-195:1998, 195-02-09
PIFL	Portable equipment for insulation fault location	3.1.13, Annex C	
PLCI	Passive locating current injector	3.1.8	
ALCI	Active locating current injector	3.1.9	
PLCS	Portable locating current sensor	B.2.2.1	
Q	Quality factor	Table 2	IEC 60050-195:2021, 151-15-46
R_F	Insulation resistance	6.2.2, C.2	IEC 61557-8:2014, 3.1.2