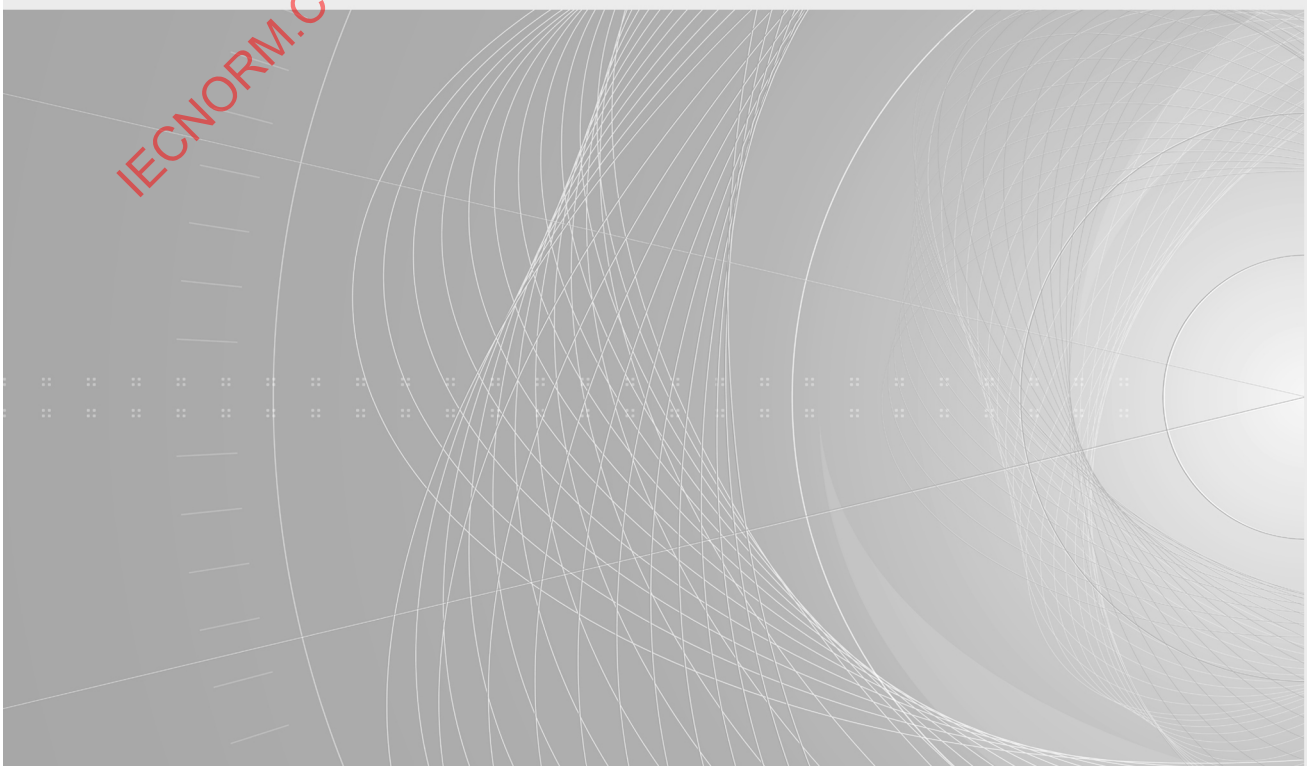
IEC 61326-2-4

Edition 3.0 2020-10
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

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 61326-2-4:2020-10 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
67 000 electotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC 61326-2-4

Edition 3.0 2020-10
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 17.220.20; 25.040.40; 33.100.20

ISBN 978-2-8322-9011-8

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 61326-2-4 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision.

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

– update of the document with respect to IEC 61326-1:2020.

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

FDIS	Report on voting
65A/981/FDIS	65A/992/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this document the following print types are used:

– Terms used throughout this document which have been defined in Clause 3 of this document and of IEC 61326-1:2020: SMALL CAPITALS.

This part of the IEC 61326 series is to be used in conjunction with IEC 61326-1:2020 and follows the same numbering of clauses, subclauses, tables and figures.

When a particular subclause of IEC 61326-1 is not mentioned in this part, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in IEC 61326-1 is to be adapted accordingly.

NOTE The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in IEC 61326-1;

– unless notes are in a new subclause or involve notes in IEC 61326-1, they are numbered starting from 101 including those in a replaced clause or subclause;

– additional annexes are lettered AA, BB, etc.

A list of all parts of the IEC 61326 series, under the general title *Electrical equipment for measurement, control and laboratory use, control and laboratory use – EMC requirements,* can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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

1 Scope

In addition to IEC 61326-1, this part of IEC 61326 specifies more detailed test configurations, operational conditions and performance criteria than IEC 61326-1 for equipment for

– insulation monitoring according to IEC 61557-8;

– insulation fault location according to IEC 61557-9.

This applies to insulation monitoring devices and for equipment for insulation fault location systems permanently or semi-permanently connected to the distribution system.

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.

Clause 2 of IEC 61326-1:~~2012~~2020 applies, except as follows:

Addition:

IEC 61326-1:~~2012~~2020, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*

IEC 61557-8:~~2007~~2014, *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 8: Insulation monitoring devices for IT systems*

IEC 61557-9:~~2009~~2014, *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61326-1:2020 apply, except as follows.

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

Addition:

3.101
insulation resistance
R_F
resistance in the system being monitored, including the resistance of all the connected appliances to earth

[SOURCE: IEC 61557-8:~~2007~~2014, 3.1.2]

3.102
specified response value
R_{an}
value of the INSULATION RESISTANCE, permanently set or adjustable, on the device and monitored if the INSULATION RESISTANCE falls below this limit

[SOURCE: IEC 61557-8:~~2007, 3.3~~ 2014, 3.1.4, modified – The note to entry has been deleted]

3.103
response sensitivity
value of the evaluating current or INSULATION RESISTANCE at which the evaluator responds under specified conditions

[SOURCE: IEC 61557-9:~~2009~~2014, 3.1.4]

3.104
~~**nominal voltage of the distribution system**~~ **nominal system voltage**
U_n
~~voltage by which a distribution system or equipment is designated and to which certain operating characteristics are referred~~

value of the voltage by which the distribution system is designated and to which certain characteristics are assigned

[SOURCE: IEC 61557-1:~~2007~~2019, 3.1]

3.105
supply voltage
~~U_S~~
~~voltage at a point where the measuring equipment does or can accept electric energy as a supply~~

voltage that is used to power the measurement equipment

Note 1 to entry: If a SUPPLY VOLTAGE is specified, for instance in the supply contract, then it is called "declared SUPPLY VOLTAGE".

[SOURCE: IEC 61557-1:~~2007, 3.8, modified~~ 2019, 3.7]

3.106
system leakage capacitance
C_e
maximum permissible value of the total capacitance to earth of the system to be monitored, including any connected appliances, up to which value the insulation monitoring device can work as specified

[SOURCE: IEC 61557-8:~~2007, 3.6~~ 2014, 3.1.6, modified – The end of the definition has been deleted]

4 General

Clause 4 of IEC 61326-1:~~2012~~2020 applies.

5 EMC test plan

5.1 General

Subclause 5.1 of IEC 61326-1:~~2012~~2020 applies.

5.2 Configuration of EUT during testing

5.2.1 General

Subclause 5.2.1 of IEC 61326-1:~~2012~~2020 applies, except as follows.

Addition:

During the tests, the EUT is supplied as specified by the manufacturer.

For EUTs having several ratings, the EUT shall be connected

– to the lowest nominal SUPPLY VOLTAGE U_S;
– to the highest NOMINAL VOLTAGE of the distribution system U_n, but not more than 400 V.

If the EUT has only a combined terminal for the SUPPLY VOLTAGE and the voltage of the distribution system, it shall be connected to the highest NOMINAL VOLTAGE, but not more than 400 V.

If the EUT has interfaces for remote functions, they shall be connected during the tests as specified by the manufacturer for normal installation.

Insulation monitoring devices and equipment for insulation fault location shall be tested separately.

5.2.2 Composition of EUT

Subclause 5.2.2 of IEC 61326-1:~~2012~~2020 applies.

5.2.3 Assembly of EUT

Subclause 5.2.3 of IEC 61326-1:~~2012~~2020 applies.

5.2.4 I/O PORTS

Subclause 5.2.4 of IEC 61326-1:~~2012~~2020 applies.

5.2.5 AUXILIARY EQUIPMENT

Subclause 5.2.5 of IEC 61326-1:~~2012~~2020 applies.

5.2.6 Cabling and earthing (grounding)

Subclause 5.2.6 of IEC 61326-1:~~2012~~2020 applies.

5.3 Operation conditions of EUT during testing

Subclause 5.3 of IEC 61326-1:~~2012~~2020 applies, except as follows.

Addition:

5.3.101 Operational conditions

The EUT shall be set as specified by the manufacturer for normal operation.

If the EUT has adjustable SPECIFIED RESPONSE VALUES, tests shall be performed as follows:

– for insulation monitoring devices, one value shall be selected by the manufacturer among the following possibilities:
  - at the value equal or closest to the internal DC resistance value;
  - at the value equal or closest to the internal AC impedance value;
– for insulation fault location equipment, at the value in the middle of the RESPONSE SENSITIVITY range;

The INSULATION RESISTANCE shall be simulated by a single phase INSULATION RESISTANCE.

If the EUT has a selectable time delay, the time delay shall be set to the minimum value.

The SYSTEM LEAKAGE CAPACITANCE shall be set to the maximum value as defined by the manufacturer but not more than 1 µF. The SYSTEM LEAKAGE CAPACITANCE is to be installed symmetrically to all phases of U_n. For example:

– 2 × 0,5 µF for single-phase AC and for DC systems,
– 3 × 0,33 µF for 3-phase AC systems.

5.4 Specification of FUNCTIONAL PERFORMANCE

Subclause 5.4 of IEC 61326-1:~~2012~~2020 applies.

5.5 Test description

Subclause 5.5 of IEC 61326-1:~~2012~~2020 applies.

6 Immunity requirements

6.1 Conditions during the tests

Subclause 6.1 of IEC 61326-1:~~2012~~2020 applies, except as follows.

Addition:

The configuration and modes of operation during the tests shall be precisely noted in the test report.

Tests shall be applied to the relevant PORTS in accordance with Table 101.

The tests shall be ~~conducted~~ performed in accordance with the basic EMC standards listed in the relevant table. The tests shall be carried out one at a time. If additional methods are required, the method and rationale shall be documented.

6.1.101 Electrostatic discharge immunity tests

The test shall be applied only to parts of the EUT which are accessible to the user in normal operations, for example, push-buttons and displays. This test does not apply to connection terminals.

Electrostatic discharges of positive and negative polarity shall be applied 10 times to each of the selected test points.

The points of application shall be stated in the report.

6.1.102 Electromagnetic field tests

The dwell time for each frequency shall be 1,5 times the longest response time of the EUT specified by the manufacturer, plus the time delay, see 5.3. The actual dwell time shall be stated in the test report.

6.1.103 Burst tests

PORTS for remote control functions shall be tested separately. Cables for functions not tested shall be disconnected.

The bursts shall be applied for a minimum time of 1 minute; however, the time of application shall be greater than the response time of the EUT specified by the manufacturer.

6.1.104 Surge immunity tests

In deviation from the general test conditions of 5.2.1, this test is applied at the maximum SUPPLY VOLTAGE U_S.

Pulses both with positive and negative polarity shall be injected. For AC lines, surge shall be applied with ~~a~~ phase angles being 90° and 270°.

A series of five pulses is applied for each polarity and each phase angle with a time between the pulses of 1 minute or less.

6.1.105 Conducted RF tests

The dwell time for each frequency shall be 1,5 times the longest response time of the EUT specified by the manufacturer, plus the time delay (see 5.3). The actual dwell time shall be stated in the test report.

6.1.106 Power frequency magnetic field tests

The test is performed only on EUT with ~~integrated magnetic~~ magnetically sensitive ~~components~~ equipment.

It is recommended to apply the test for a minimum time of 1 minute for each frequency and orientation of the EUT. However, the time of application should be greater than the response time of the EUT.

6.2 Immunity test requirements

Subclause 6.2 of IEC 61326-1:~~2012~~2020 does not apply.

Replacement:

The immunity requirements are given in Table 101.

NOTE The required tests correspond to the required tests applicable for equipment of INDUSTRIAL ELECTROMAGNETIC ENVIRONMENTS.

Table 101 – Immunity tests

PORT	Phenomenon	Basic standard	Test value	Performance criteria (as defined in 6.4)
Enclosure	ESD	IEC 61000-4-2	±4 kV contact discharge ±8 kV air discharge	A2 A2
Enclosure	Electromagnetic field	IEC 61000-4-3	~~80 MHz to 1 000 MHz, 10 V/m1,4 GHz to 2 GHz, 3 V/m 2,0 GHz to 2,7 GHz, 1 V/m~~ ~~80 % AM modulation~~ 10 V/m (80 MHz to 1 000 MHz) 3 V/m (1,4 GHz to 6 GHz) [a]	~~A1~~ A1 A1
AC and DC power supply, AC and DC connections to distribution system (including connection to earth) and I/O signal/control connected directly to distribution network	Fast transients (burst)	IEC 61000-4-4	~~2 kV (5/50 ns, 5 kHz)~~ ±2 kV (5 kHz or 100 kHz) [b]	A2
I/O signal/control (including functional earth lines and remote connections)			~~1 kV (5/50 ns, 5 kHz)~~ ±1 kV (5 kHz or 100 kHz)	A2
AC power supply, AC connections to distribution system (including connection to earth) and I/O signal/control connected directly to distribution network	Surge	IEC 61000-4-5	~~2 kV line to earth~~ ~~1 kV line to line~~ ±2 kV line-to-ground ±1 kV line-to-line	B A2
I/O signal/control (including functional earth lines and remote connections)			~~1 kV line to earth~~ ±1 kV line-to-ground	B
All PORTS except ENCLOSURE PORT	Conducted RF	IEC 61000-4-6	~~150 kHz to 80 MHz, 10 V~~ ~~Common mode~~ ~~80 % AM modulation~~ 10 V (150 kHz to 80 MHz)	A1
Enclosure	Power frequency magnetic field	IEC 61000-4-8	30 A/m (50 Hz, 60 Hz) Only for EUT with integrated magnetic sensitive components	A1

PORT	Phenomenon	Basic standard	Test value	Performance criteria (as defined in 6.4)
AC power	Voltage dip	IEC 61000-4-11	0 % during 1 cycle,	A2
			40 % during 10/12 ~~a~~ cycles [b]	C
			70 % during 25/30 cycles [c]	C
	Short interruptions	IEC 61000-4-11	0 % during 250/300 cycles [c]	C

[a] In case testing is performed also in the frequency range from 1 GHz to 1,4 GHz, the same test level as above 1,4 GHz is recommended.

[b] DC POWER PORTS intended to be connected to a low voltage DC supply (≤ 60 V), where secondary circuits (isolated from the AC mains supply) are not subject to transient overvoltages (i.e. reliably-grounded, capacitively-filtered DC secondary circuits) shall be regarded as I/O signal/control PORTS.

[c] For example, “25/30 cycles” means “25 cycles for 50 Hz test” or “30 cycles for 60 Hz test”.

6.3 Random aspects

Subclause 6.3 of IEC 61326-1:~~2012~~2020 applies.

6.4 Performance criteria

Subclause 6.4 of IEC 61326-1:~~2012~~2020 does not apply, with the exception of performance Criterion C defined in IEC 61326-1:2020, 6.4.4.

Replacement:

The performance criteria A1, A2 and B for the evaluation of the immunity test results are given in Table 102. ~~The performance criteria C defined in IEC 61326-1:2012, 6.4.4 applies.~~

Table 102 – Performance criteria definition

Function	Criterion A1 (for permanent phenomena)	Criterion A2 (for transient phenomena)	Criterion B
Alarm functions	In Quiescent mode [a]: The alarm digital output and the visual indicators shall not switch to the alarm state during the test.	In Quiescent mode [a]: The alarm digital output and the visual indicators shall not switch to the alarm state during the test.	In Quiescent mode [a]: The alarm digital output and the visual indicators may switch to the alarm state but shall not remain in the alarm state after the test.
	In Operate mode [a]: The alarm digital output and the visual indicators shall switch to the alarm state and remain in the alarm state during the test.	In Operate mode [a]: The alarm digital output and the visual indicators shall switch to the alarm state and remain in the alarm state during the test.	In Operate mode [a]: The alarm digital output and the visual indicators need not remain in the alarm state during this test but shall switch to or remain in the alarm state after the test.
Measurement functions	When insulation fault location equipment includes indicators for the INSULATION RESISTANCE or equivalent values, the measurement uncertainty during the immunity test shall not be greater than the specified measurement uncertainty declared by the manufacturer.	During the test, the measurement functions may be transiently influenced. After the test, the EUT shall continue to operate as intended for normal operation.	During the test, the measurement functions may be transiently influenced. After the test, the EUT shall continue to operate as intended for normal operation.

Function	Criterion A1 (for permanent phenomena)	Criterion A2 (for transient phenomena)	Criterion B
Man machine Interface functions	Visual indicators (for example, displays, LEDs) and remote functions (for example, analogue or digital control interfaces) shall work as intended.	Visual indicators (for example, displays, LEDs) and remote functions (for example, analogue or digital control interfaces) may be transiently influenced.	Visual indicators (for example, displays, LEDs) and remote functions (for example, analogue or digital control interfaces) may be transiently influenced.
[a] Quiescent mode and Operate mode are defined in Table 103.			

Table 103 – Test conditions for quiescent and operate modes

Operation modes	Definition
Quiescent mode (the device is operating under conditions where – as a result of INSULATION RESISTANCE measurement – no alarm should be detected)	For devices allowing the SPECIFIED RESPONSE VALUE R_{an} to be configured within a range of values, the test shall be performed in accordance with 5.3.101. For devices with a fixed value for the SPECIFIED RESPONSE VALUE R_{an}, the test shall be made with this specified value. For insulation monitoring devices, an INSULATION RESISTANCE R_F of 1,3 × R_{an} is applied. For equipment for insulation fault location, the following values shall be applied: – for equipment evaluating the INSULATION RESISTANCE: 1,3 × (the specified RESPONSE SENSITIVITY plus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer); – for equipment evaluating the current: 0,7 × (the specified RESPONSE SENSITIVITY minus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer).
Operate mode (the device is in a mode where an alarm should be detected)	For devices allowing R_{an} to be configured within a range of values, the test shall be performed in accordance with 5.3.101. For devices with a fixed value for R_{an}, the test shall be made with this specified value. For insulation monitoring devices, an INSULATION RESISTANCE R_F of 0,7 × R_{an} is applied. For equipment for insulation fault location, the following values shall be applied: – for equipment evaluating the INSULATION RESISTANCE: 0,7 × (the specified RESPONSE SENSITIVITY minus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer); – for equipment evaluating the current: 1,3 × (the specified RESPONSE SENSITIVITY plus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer).

After the immunity tests, the EUT shall operate as intended in accordance with the requirements of IEC 61557-8 or IEC 61557-9.

7 Emission requirements

7.1 Conditions during measurements

Subclause 7.1 of IEC 61326-1:~~2012~~2020 applies.

7.2 Emission limits

Subclause 7.2 of IEC 61326-1:~~2012~~2020 applies, except as follows:

Addition:

In a non-domestic environment, limits according to CISPR 11, Group 1, Class A, apply.

In a domestic environment, limits according to CISPR 11, Group 1, Class B, apply.

8 Test results and test report

Clause 8 of IEC 61326-1:~~2012~~2020 applies.

9 Instructions for use

Clause 9 of IEC 61326-1:~~2012~~2020 applies.

Annex A
(normative)

Immunity test requirements for PORTABLE TEST AND MEASUREMENT EQUIPMENT powered by battery or from the circuit being measured

Annex A of IEC 61326-1:~~2012~~2020 does not apply.

Bibliography

IEC 61557-1:~~2007~~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 61326-2-4

Edition 3.0 2020-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Matériel électrique de mesure, de commande et de laboratoire – Exigences relatives à la CEM –
Partie 2-4: Exigences particulières – Configurations d'essai, conditions de fonctionnement et critères de performance pour les contrôleurs d'isolement conformes à l'IEC 61557-8 et pour les dispositifs de localisation de défaut d'isolement conformes à l'IEC 61557-9

IEC 61326-2-4:2020-10(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61326-2-4 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision.

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

– update of the document with respect to IEC 61326-1:2020.

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

FDIS	Report on voting
65A/981/FDIS	65A/992/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this document the following print types are used:

– Terms used throughout this document which have been defined in Clause 3 of this document and of IEC 61326-1:2020: SMALL CAPITALS.

This part of the IEC 61326 series is to be used in conjunction with IEC 61326-1:2020 and follows the same numbering of clauses, subclauses, tables and figures.

When a particular subclause of IEC 61326-1 is not mentioned in this part, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text in IEC 61326-1 is to be adapted accordingly.

NOTE The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in IEC 61326-1;

– unless notes are in a new subclause or involve notes in IEC 61326-1, they are numbered starting from 101 including those in a replaced clause or subclause;

– additional annexes are lettered AA, BB, etc.

A list of all parts of the IEC 61326 series, under the general title *Electrical equipment for measurement, control and laboratory use, control and laboratory use – EMC requirements,* can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

1 Scope

In addition to IEC 61326-1, this part of IEC 61326 specifies more detailed test configurations, operational conditions and performance criteria than IEC 61326-1 for equipment for

– insulation monitoring according to IEC 61557-8;

– insulation fault location according to IEC 61557-9.

This applies to insulation monitoring devices and for equipment for insulation fault location systems permanently or semi-permanently connected to the distribution system.

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.

Clause 2 of IEC 61326-1:2020 applies, except as follows:

Addition:

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

IEC 61557-8:2014, *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 8: Insulation monitoring devices for IT systems*

IEC 61557-9:2014, *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61326-1:2020 apply, except as follows.

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

Addition:

3.101
insulation resistance
R_F
resistance in the system being monitored, including the resistance of all the connected appliances to earth

[SOURCE: IEC 61557-8:2014, 3.1.2]

3.102
specified response value
R_{an}
value of the INSULATION RESISTANCE, permanently set or adjustable, on the device and monitored if the INSULATION RESISTANCE falls below this limit

[SOURCE: IEC 61557-8:2014, 3.1.4, modified – The note to entry has been deleted]

3.103
response sensitivity
value of the evaluating current or INSULATION RESISTANCE at which the evaluator responds under specified conditions

[SOURCE: IEC 61557-9:2014, 3.1.4]

3.104
nominal system voltage
U_n
value of the voltage by which the distribution system is designated and to which certain characteristics are assigned

[SOURCE: IEC 61557-1:2019, 3.1]

3.105
supply voltage
voltage that is used to power the measurement equipment

Note 1 to entry: If a SUPPLY VOLTAGE is specified, for instance in the supply contract, then it is called "declared SUPPLY VOLTAGE".

[SOURCE: IEC 61557-1:2019, 3.7]

3.106
system leakage capacitance
C_e
maximum permissible value of the total capacitance to earth of the system to be monitored, including any connected appliances, up to which value the insulation monitoring device can work as specified

[SOURCE: IEC 61557-8:2014, 3.1.6, modified – The end of the definition has been deleted]

4 General

Clause 4 of IEC 61326-1:2020 applies.

5 EMC test plan

5.1 General

Subclause 5.1 of IEC 61326-1:2020 applies.

5.2 Configuration of EUT during testing

5.2.1 General

Subclause 5.2.1 of IEC 61326-1:2020 applies, except as follows.

Addition:

During the tests, the EUT is supplied as specified by the manufacturer.

For EUTs having several ratings, the EUT shall be connected

– to the lowest nominal SUPPLY VOLTAGE U_S;
– to the highest NOMINAL VOLTAGE of the distribution system U_n, but not more than 400 V.

If the EUT has only a combined terminal for the SUPPLY VOLTAGE and the voltage of the distribution system, it shall be connected to the highest NOMINAL VOLTAGE, but not more than 400 V.

If the EUT has interfaces for remote functions, they shall be connected during the tests as specified by the manufacturer for normal installation.

Insulation monitoring devices and equipment for insulation fault location shall be tested separately.

5.2.2 Composition of EUT

Subclause 5.2.2 of IEC 61326-1:2020 applies.

5.2.3 Assembly of EUT

Subclause 5.2.3 of IEC 61326-1:2020 applies.

5.2.4 I/O PORTS

Subclause 5.2.4 of IEC 61326-1:2020 applies.

5.2.5 AUXILIARY EQUIPMENT

Subclause 5.2.5 of IEC 61326-1:2020 applies.

5.2.6 Cabling and earthing (grounding)

Subclause 5.2.6 of IEC 61326-1:2020 applies.

5.3 Operation conditions of EUT during testing

Subclause 5.3 of IEC 61326-1:2020 applies, except as follows.

Addition:

5.3.101 Operational conditions

The EUT shall be set as specified by the manufacturer for normal operation.

If the EUT has adjustable SPECIFIED RESPONSE VALUES, tests shall be performed as follows:

– for insulation monitoring devices, one value shall be selected by the manufacturer among the following possibilities:
  - at the value equal or closest to the internal DC resistance value;
  - at the value equal or closest to the internal AC impedance value;
– for insulation fault location equipment, at the value in the middle of the RESPONSE SENSITIVITY range;

The INSULATION RESISTANCE shall be simulated by a single phase INSULATION RESISTANCE.

If the EUT has a selectable time delay, the time delay shall be set to the minimum value.

The SYSTEM LEAKAGE CAPACITANCE shall be set to the maximum value as defined by the manufacturer but not more than 1 µF. The SYSTEM LEAKAGE CAPACITANCE is to be installed symmetrically to all phases of U_n. For example:

– 2 × 0,5 µF for single-phase AC and for DC systems,
– 3 × 0,33 µF for 3-phase AC systems.

5.4 Specification of FUNCTIONAL PERFORMANCE

Subclause 5.4 of IEC 61326-1:2020 applies.

5.5 Test description

Subclause 5.5 of IEC 61326-1:2020 applies.

6 Immunity requirements

6.1 Conditions during the tests

Subclause 6.1 of IEC 61326-1:2020 applies, except as follows.

Addition:

The configuration and modes of operation during the tests shall be precisely noted in the test report.

Tests shall be applied to the relevant PORTS in accordance with Table 101.

The tests shall be performed in accordance with the basic EMC standards listed in the relevant table. The tests shall be carried out one at a time. If additional methods are required, the method and rationale shall be documented.

6.1.101 Electrostatic discharge immunity tests

The test shall be applied only to parts of the EUT which are accessible to the user in normal operations, for example, push-buttons and displays. This test does not apply to connection terminals.

Electrostatic discharges of positive and negative polarity shall be applied 10 times to each of the selected test points.

The points of application shall be stated in the report.

6.1.102 Electromagnetic field tests

The dwell time for each frequency shall be 1,5 times the longest response time of the EUT specified by the manufacturer, plus the time delay, see 5.3. The actual dwell time shall be stated in the test report.

6.1.103 Burst tests

PORTS for remote control functions shall be tested separately. Cables for functions not tested shall be disconnected.

The bursts shall be applied for a minimum time of 1 minute, however, the time of application shall be greater than the response time of the EUT specified by the manufacturer.

6.1.104 Surge immunity tests

In deviation from the general test conditions of 5.2.1, this test is applied at the maximum SUPPLY VOLTAGE U_S.

Pulses both with positive and negative polarity shall be injected. For AC lines, surge shall be applied with phase angles being 90° and 270°.

A series of five pulses is applied for each polarity and each phase angle with a time between the pulses of 1 minute or less.

6.1.105 Conducted RF tests

The dwell time for each frequency shall be 1,5 times the longest response time of the EUT specified by the manufacturer, plus the time delay (see 5.3). The actual dwell time shall be stated in the test report.

6.1.106 Power frequency magnetic field tests

The test is performed only on EUT with magnetically sensitive equipment.

It is recommended to apply the test for a minimum time of 1 minute for each frequency and orientation of the EUT. However, the time of application should be greater than the response time of the EUT.

6.2 Immunity test requirements

Subclause 6.2 of IEC 61326-1:2020 does not apply.

Replacement:

The immunity requirements are given in Table 101.

NOTE The required tests correspond to the required tests applicable for equipment of INDUSTRIAL ELECTROMAGNETIC ENVIRONMENTS.

Table 101 – Immunity tests

PORT	Phenomenon	Basic standard	Test value	Performance criteria (as defined in 6.4)
Enclosure	ESD	IEC 61000-4-2	±4 kV contact discharge, ±8 kV air discharge	A2 A2
Enclosure	Electromagnetic field	IEC 61000-4-3	10 V/m (80 MHz to 1 000 MHz) 3 V/m (1,4 GHz to 6 GHz) [a]	A1 A1
AC and DC power supply, AC and DC connections to distribution system (including connection to earth) and I/O signal/control connected directly to distribution network	Fast transients (burst)	IEC 61000-4-4	±2 kV (5 kHz or 100 kHz) [b]	A2
I/O signal/control (including functional earth lines and remote connections)			±1 kV (5 kHz or 100 kHz)	A2
AC power supply, AC connections to distribution system (including connection to earth) and I/O signal/control connected directly to distribution network	Surge	IEC 61000-4-5	±2 kV line-to-ground ±1 kV line-to-line	B A2
I/O signal/control (including functional earth lines and remote connections)			±1 kV line-to-ground	B
All PORTS except ENCLOSURE PORT	Conducted RF	IEC 61000-4-6	10 V (150 kHz to 80 MHz)	A1
Enclosure	Power frequency magnetic field	IEC 61000-4-8	30 A/m (50 Hz, 60 Hz) Only for EUT with integrated magnetic sensitive components	A1
AC power	Voltage dip	IEC 61000-4-11	0 % during 1 cycle, 40 % during 10/12 cycles [b] 70 % during 25/30 cycles [c]	A2 C C
	Short interruptions	IEC 61000-4-11	0 % during 250/300 cycles [c]	C

[a] In case testing is performed also in the frequency range from 1 GHz to 1,4 GHz, the same test level as above 1,4 GHz is recommended.

[b] DC power PORTS intended to be connected to a low voltage DC supply (≤ 60 V), where secondary circuits (isolated from the AC mains supply) are not subject to transient overvoltages (i.e. reliably-grounded, capacitively-filtered DC secondary circuits) shall be regarded as I/O signal/control PORTS.

[c] For example, “25/30 cycles” means “25 cycles for 50 Hz test” or “30 cycles for 60 Hz test”.

6.3 Random aspects

Subclause 6.3 of IEC 61326-1:2020 applies.

6.4 Performance criteria

Subclause 6.4 of IEC 61326-1:2020 does not apply, with the exception of performance Criterion C defined in IEC 61326-1:2020, 6.4.4.

Replacement:

The performance criteria A1, A2 and B for the evaluation of the immunity test results are given in Table 102..

Table 102 – Performance criteria definition

Function	Criterion A1 (for permanent phenomena)	Criterion A2 (for transient phenomena)	Criterion B
Alarm functions	In Quiescent mode [a]: The alarm digital output and the visual indicators shall not switch to the alarm state during the test.	In Quiescent mode [a]: The alarm digital output and the visual indicators shall not switch to the alarm state during the test.	In Quiescent mode [a]: The alarm digital output and the visual indicators may switch to the alarm state but shall not remain in the alarm state after the test.
	In Operate mode [a]: The alarm digital output and the visual indicators shall switch to the alarm state and remain in the alarm state during the test.	In Operate mode [a]: The alarm digital output and the visual indicators shall switch to the alarm state and remain in the alarm state during the test.	In Operate mode [a]: The alarm digital output and the visual indicators need not remain in the alarm state during this test but shall switch to or remain in the alarm state after the test.
Measurement functions	When insulation fault location equipment includes indicators for the INSULATION RESISTANCE or equivalent values, the measurement uncertainty during the immunity test shall not be greater than the specified measurement uncertainty declared by the manufacturer.	During the test, the measurement functions may be transiently influenced. After the test, the EUT shall continue to operate as intended for normal operation.	During the test, the measurement functions may be transiently influenced. After the test, the EUT shall continue to operate as intended for normal operation.
Man machine Interface functions	Visual indicators (for example, displays, LEDs) and remote functions (for example, analogue or digital control interfaces) shall work as intended.	Visual indicators (for example, displays, LEDs) and remote functions (for example, analogue or digital control interfaces) may be transiently influenced.	Visual indicators (for example, displays, LEDs) and remote functions (for example, analogue or digital control interfaces) may be transiently influenced.
[a] Quiescent mode and Operate mode are defined in Table 103.			

Table 103 – Test conditions for quiescent and operate modes

Operation modes	Definition
Quiescent mode (the device is operating under conditions where – as a result of INSULATION RESISTANCE measurement – no alarm should be detected)	For devices allowing the SPECIFIED RESPONSE VALUE R_{an} to be configured within a range of values, the test shall be performed in accordance with 5.3.101. For devices with a fixed value for the SPECIFIED RESPONSE VALUE R_{an}, the test shall be made with this specified value. For insulation monitoring devices, an INSULATION RESISTANCE R_F of 1,3 × R_{an} is applied. For equipment for insulation fault location, the following values shall be applied: – for equipment evaluating the INSULATION RESISTANCE: 1,3 × (the specified RESPONSE SENSITIVITY plus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer); – for equipment evaluating the current: 0,7 × (the specified RESPONSE SENSITIVITY minus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer).
Operate mode (the device is in a mode where an alarm should be detected)	For devices allowing R_{an} to be configured within a range of values, the test shall be performed in accordance with 5.3.101. For devices with a fixed value for R_{an}, the test shall be made with this specified value. For insulation monitoring devices, an INSULATION RESISTANCE R_F of 0,7 × R_{an} is applied. For equipment for insulation fault location, the following values shall be applied: – for equipment evaluating the INSULATION RESISTANCE: 0,7 × (the specified RESPONSE SENSITIVITY minus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer); – for equipment evaluating the current: 1,3 × (the specified RESPONSE SENSITIVITY plus uncertainty of RESPONSE SENSITIVITY declared by the manufacturer).

After the immunity tests, the EUT shall operate as intended in accordance with the requirements of IEC 61557-8 or IEC 61557-9.

7 Emission requirements

7.1 Conditions during measurements

Subclause 7.1 of IEC 61326-1:2020 applies.

7.2 Emission limits

Subclause 7.2 of IEC 61326-1:2020 applies, except as follows:

Addition:

In a non-domestic environment, limits according to CISPR 11, Group 1, Class A, apply.

In a domestic environment, limits according to CISPR 11, Group 1, Class B, apply.

8 Test results and test report

Clause 8 of IEC 61326-1:2020 applies.

9 Instructions for use

Clause 9 of IEC 61326-1:2020 applies.

Annex A
(normative)

Immunity test requirements for PORTABLE TEST AND MEASUREMENT EQUIPMENT powered by battery or from the circuit being measured

Annex A of IEC 61326-1:2020 does not apply.

Bibliography

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*

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

MATÉRIEL ÉLECTRIQUE DE MESURE, DE COMMANDE ET DE LABORATOIRE – EXIGENCES RELATIVES À LA CEM –

Partie 2-4: Exigences particulières – Configurations d'essai, conditions de fonctionnement et critères de performance pour les contrôleurs d'isolement conformes à l'IEC 61557-8 et pour les dispositifs de localisation de défaut d'isolement conformes à l'IEC 61557-9

AVANT-PROPOS

1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 61326-2-4 a été établie par le sous-comité 65A: Aspects systèmes, du comité d'études 65 de l'IEC: Mesure, commande et automation dans les processus industriels.

Cette troisième édition annule et remplace la deuxième édition parue en 2012. Cette édition constitue une révision technique.

Cette édition inclut la modification technique majeure suivante par rapport à l'édition précédente:

– mise à jour du document par rapport à l'IEC 61326-1:2020.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
65A/981/FDIS	65A/992/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Dans le présent document, les caractères d'imprimerie suivants sont utilisés:

– Termes définis à l'Article 3 du présent document et de l'IEC 61326-1:2020 et utilisés dans tout ce document: PETITES MAJUSCULES.

La présente partie de la série IEC 61326 doit être utilisée conjointement avec l'IEC 61326-1:2020 et suit la même numérotation d'articles, de paragraphes, de tableaux et de figures.

Lorsqu'un paragraphe particulier de l'IEC 61326-1 n'est pas mentionné dans la présente partie, ce paragraphe s'applique pour autant qu'il soit raisonnable. Lorsque la présente norme spécifie "addition", "modification" ou "remplacement", le texte correspondant de l'IEC 613261-1 doit être adapté en conséquence.

NOTE Le système de numérotation suivant est utilisé:

– paragraphes, tableaux et figures: ceux qui sont numérotés à partir de 101 sont complémentaires à ceux de l'IEC 61326-1;

– à l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de l'IEC 61326-1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont modifiés ou remplacés;

– les annexes supplémentaires sont appelées AA, BB, etc.

Une liste de toutes les parties de la série IEC 61326, publiées sous le titre général *Matériel électrique de mesure, de commande et de laboratoire – Exigences relatives à la CEM*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

MATÉRIEL ÉLECTRIQUE DE MESURE, DE COMMANDE ET DE LABORATOIRE – EXIGENCES RELATIVES À LA CEM –

Partie 2-4: Exigences particulières – Configurations d'essai, conditions de fonctionnement et critères de performance pour les contrôleurs d'isolement conformes à l'IEC 61557-8 et pour les dispositifs de localisation de défaut d'isolement conformes à l'IEC 61557-9

1 Domaine d'application

En complément de l'IEC 61326-1, la présente partie de l'IEC 61326 spécifie plus en détail que l'IEC 61326-1 les configurations d'essai, les conditions de fonctionnement et les critères de performance pour les équipements pour

– le contrôle de l'isolement conforme à l'IEC 61557-8;
– la localisation des défauts d'isolement conformes à l'IEC 61557-9.

Elle s'applique aux contrôleurs d'isolement et aux dispositifs relatifs aux systèmes de localisation des défauts d'isolement connectés de manière permanente ou semi-permanente au réseau de distribution.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

L'Article 2 de l'IEC 61326-1:2020 s'applique, avec les exceptions suivantes:

Addition:

IEC 61326-1:2020, *Matériel électrique de mesure, de commande et de laboratoire – Exigences relatives à la CEM – Partie 1: Exigences générales*

IEC 61557-8:2014, *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 8: Contrôleur permanent d'isolement pour réseaux IT*

IEC 61557-9:2014, *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*

3 Termes et définitions

Pour les besoins du présent document, les termes et définitions donnés dans l'IEC 61326-1:2020 s'appliquent, avec les exceptions suivantes:

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp

Addition:

3.101
résistance d'isolement
R_F
résistance dans le système sous surveillance, comprenant la résistance de tous les appareils qui sont raccordés à la terre

[SOURCE: IEC 61557-8:2014, 3.1.2]

3.102
valeur de réponse spécifiée
R_{an}
valeur de la RESISTANCE D'ISOLEMENT réglée de façon définitive ou réglable sur le dispositif, et sous surveillance si la RESISTANCE D'ISOLEMENT tombe en dessous de cette limite

[SOURCE: IEC 61557-8:2014, 3.1.4, modifiée – La note à l'article a été supprimée]

3.103
sensibilité de déclenchement
valeur du courant d'évaluation ou de la RESISTANCE D'ISOLEMENT à laquelle le localisateur réagit dans des conditions données

[SOURCE: IEC 61557-9:2014, 3.1.4]

3.104
tension de réseau nominale
U_n
valeur de la tension utilisée pour désigner le réseau de distribution et à laquelle certaines caractéristiques sont assignées

[SOURCE: IEC 61557-1:2019, 3.1]

3.105
tension d'alimentation
tension utilisée pour alimenter un appareil de mesure

Note 1 à l'article: Si une TENSION D'ALIMENTATION est spécifiée, par exemple dans le contrat de fourniture, elle est appelée "TENSION D'ALIMENTATION déclarée".

[SOURCE: IEC 61557-1:2019, 3.7]

3.106
capacité de fuite du réseau
C_e
valeur maximale admissible de la capacité totale par rapport à la terre du réseau à surveiller et de tous les matériels connectés, jusqu'à laquelle le contrôleur d'isolement peut fonctionner conformément aux caractéristiques spécifiées

[SOURCE: IEC 61557-8:2014, 3.1.6, modifiée – La fin de la définition a été supprimée]

4 Généralités

L'Article 4 de l'IEC 61326-1:2020 s'applique.

5 Plan d'essai de CEM

5.1 Généralités

Le Paragraphe 5.1 de l'IEC 61326-1:2020 s'applique.

5.2 Configuration de l'EST lors des essais

5.2.1 Généralités

Le Paragraphe 5.2.1 de l'IEC 61326-1:2020 s'applique, avec l'exception suivante:

Addition:

Pendant les essais, l'EST est alimenté comme cela est spécifié par le fabricant.

Pour les EST ayant plusieurs caractéristiques assignées, l'EST doit être connecté

– à la TENSION D'ALIMENTATION nominale la plus faible U_s;
– à la TENSION NOMINALE la plus élevée du réseau de distribution U_n, mais sans dépasser 400 V.

Si l'EST a seulement une borne combinée pour la TENSION D'ALIMENTATION et la tension du réseau de distribution, il doit être connecté à la TENSION NOMINALE maximale sans dépasser 400 V.

Si l'EST possède des interfaces pour des fonctions distantes, celles-ci doivent être connectées pendant l'essai comme cela est spécifié par le fabricant pour une utilisation normale.

Les contrôleurs d'isolement et les dispositifs pour la localisation des défauts d'isolement doivent être soumis aux essais séparément.

5.2.2 Composition de l'EST

Le Paragraphe 5.2.2 de l'IEC 61326-1:2020 s'applique.

5.2.3 Assemblage de l'EST

Le Paragraphe 5.2.3 de l'IEC 61326-1:2020 s'applique.

5.2.4 ACCES d'entrée/sortie

Le Paragraphe 5.2.4 de l'IEC 61326-1:2020 s'applique.

5.2.5 MATERIEL AUXILIAIRE

Le Paragraphe 5.2.5 de l'IEC 61326-1:2020 s'applique.

5.2.6 Câblage et mise à la terre

Le Paragraphe 5.2.6 de l'IEC 61326-1:2020 s'applique.

5.3 Conditions de fonctionnement de l'EST lors des essais

Le Paragraphe 5.3 de l'IEC 61326-1:2020 s'applique, avec l'exception suivante:

Addition:

5.3.1 Conditions de fonctionnement

L'EST doit être réglé comme cela est spécifié par le fabricant pour une utilisation normale.

Lorsque l'EST a des VALEURS DE REPONSE SPECIFIEES réglables, les essais doivent être effectués comme cela est indiqué ci-dessous:

– pour les contrôleurs d'isolement, une valeur doit être choisie par le fabricant parmi les possibilités suivantes:
  - à la valeur égale à ou la plus proche de la valeur de résistance interne en courant continu;
  - à la valeur égale à ou la plus proche de la valeur d'impédance interne en courant alternatif;
– pour les dispositifs de localisation de défaut d'isolement, à une valeur proche du milieu de la plage de la SENSIBILITE DE DECLENCHEMENT;

La RESISTANCE D'ISOLEMENT doit être simulée par une RESISTANCE D'ISOLEMENT monophasée.

Lorsque l'EST a un temps de réponse sélectionnable, ce dernier doit être réglé à sa valeur minimale.

La CAPACITE DE FUITE DU RESEAU doit être réglée sur la valeur maximale comme cela est défini par le fabricant sans dépasser 1 µF. La CAPACITE DE FUITE DU RESEAU doit être installée symétriquement à toutes les phases de U_n. Par exemple:

– 2 × 0,5 µF pour les réseaux monophasés en courant alternatif et en courant continu,
– 3 × 0,33 µF pour les réseaux triphasés en courant alternatif.

5.4 Spécification des PERFORMANCES FONCTIONNELLES

Le Paragraphe 5.4 de l'IEC 61326-1:2020 s'applique.

5.5 Description de l'essai

Le Paragraphe 5.5 de l'IEC 61326-1:2020 s'applique.

6 Exigences relatives à l'immunité

6.1 Conditions lors des essais

Le Paragraphe 6.1 de l'IEC 61326-1:2020 s'applique, avec l'exception suivante:

Addition:

La configuration et les modes de fonctionnement utilisés au cours des essais doivent être notés avec précision dans le rapport d'essai.

Les essais doivent être appliqués aux ACCES concernés conformément au Tableau 101.

Les essais doivent être réalisés conformément aux normes CEM fondamentales répertoriées dans le tableau concerné. Les essais doivent être effectués les uns après les autres. Si des