

INTERNATIONAL STANDARD



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

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CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 General	6
5 EMC test plan	6
5.1 General	6
5.2 Configuration of EUT during testing	6
5.3 Operation conditions of EUT during testing	9
5.4 Specification of FUNCTIONAL PERFORMANCE	9
5.5 Test description	9
6 Immunity requirements	9
6.1 Conditions during the tests	9
6.2 Immunity test requirements	10
6.3 Random aspects	10
6.4 Performance criteria	10
7 Emission requirements	10
8 Test results and test report	10
9 Instructions for use	10
Annex A (normative) Immunity test requirements for PORTABLE TEST AND MEASUREMENT EQUIPMENT powered by battery or from the circuit being measured	11
Annex B (informative) Guide for analysis and assessment for electromagnetic compatibility	12
Bibliography	13
Figure 101 – Test set-up for portable testing, measuring and monitoring equipment based on IEC 61000-4-3	7
Figure 102 – Example of connection details for voltage measurements	8
Figure 103 – Example of connection details for current measurements	9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONTROL AND LABORATORY USE –
EMC REQUIREMENTS –****Part 2-2: Particular requirements –
Test configurations, operational conditions and
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FOREWORD

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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 61326-2-2 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 changes with respect to the previous edition:

- update with respect to IEC 61326-1:2020.

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

FDIS	Report on voting
65A/977/FDIS	65A/988/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.

This part of IEC 61326 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 IEC 61326 series, under the general title *Electrical equipment for measurement, 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

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ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE – EMC REQUIREMENTS –

Part 2-2: Particular requirements – Test configurations, operational conditions and performance criteria for portable testing, measuring and monitoring equipment used in low-voltage distribution systems

1 Scope

In addition to the scope of IEC 61326-1, this part of IEC 61326 specifies more detailed test configurations, operational conditions and performance criteria for equipment covered by Annex A of IEC 61326-1:2020 which is:

- used for testing, measuring or monitoring of protective measures in low-voltage distribution systems, and;
- powered by battery and/or from the circuit measured, and
- portable.

Examples of such EUTs include, but are not limited to, voltage detectors, insulation testers, earth continuity testers, earth resistance testers, leakage current clamps, loop impedance testers, “residual-current-device-testers” (RCD-testers) and phase sequence testers as defined in IEC 61557 (all parts).

NOTE Particular EMC requirements for equipment covered by IEC 61557-8 and IEC 61557-9 are given in IEC 61326-2-4.

The manufacturer specifies the environment for which the product is intended to be used and/or selects the appropriate test level specifications of IEC 61326-1.

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 (all parts), *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61326-1:2020 and IEC 60050-161 apply.

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

Subclause 5.2 of IEC 61326-1:2020 applies, except as follows:

Addition:

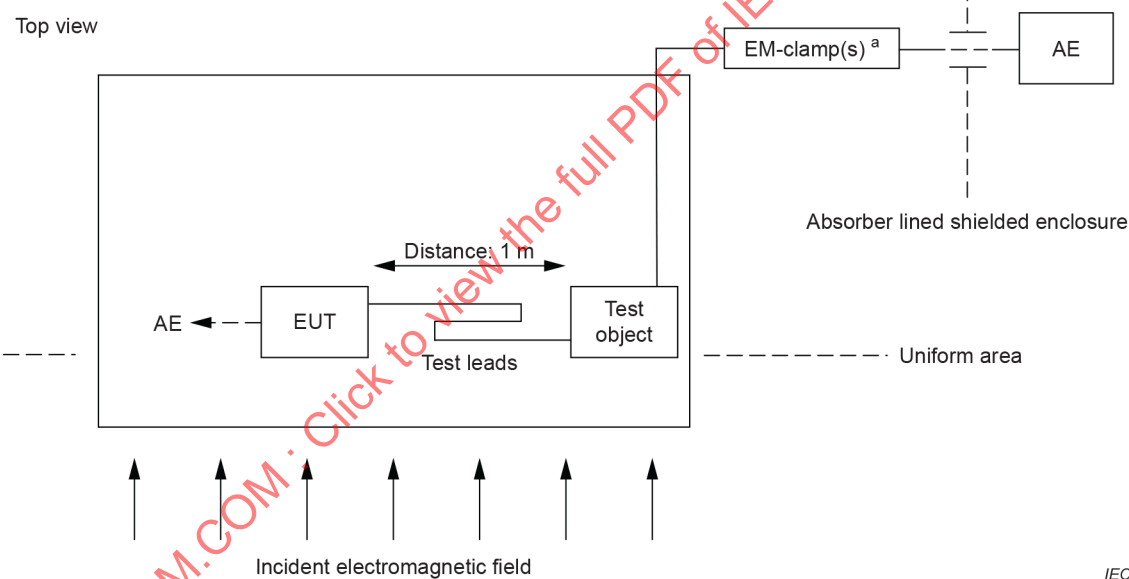
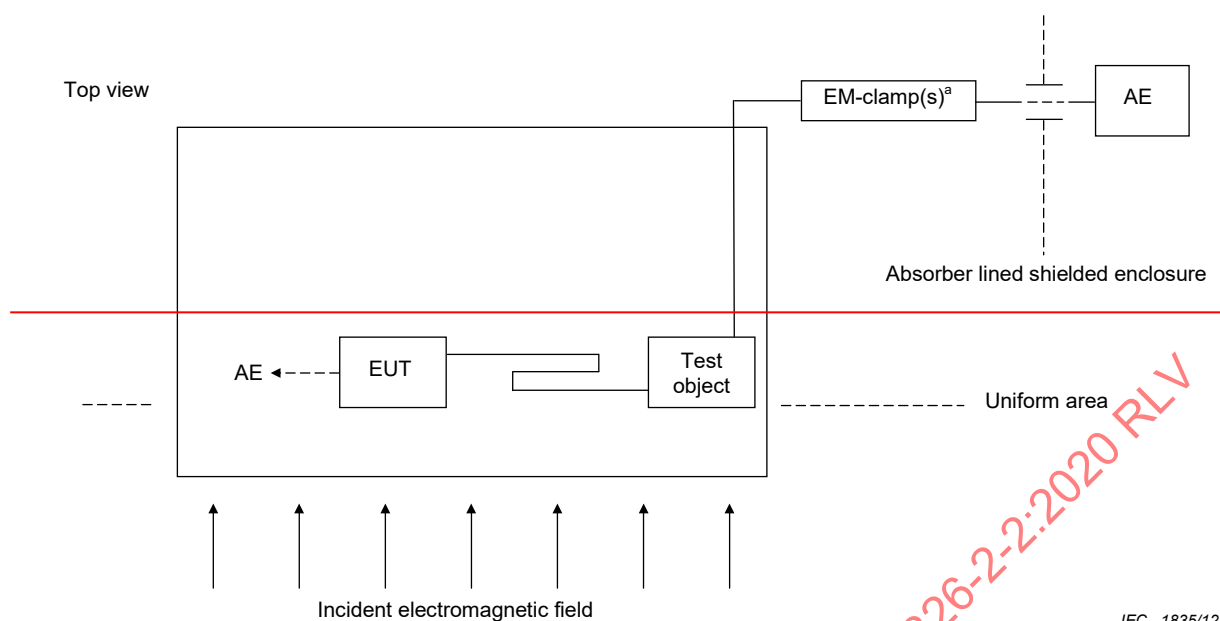
5.2.4.101 Test and measurement I/O ports

Electrostatic discharge shall be applied to ~~the housing, to the terminals of the EUT and to the coupling planes, but not to the inner pins of shielded port or cable connectors (for example, BNC, D-subminiature, IEEE 488 (GPIB), RS232, IEEE 1284 B (parallel printer port), etc.)~~ the mated connector or the shield of the unmated port, but not to the inner pins of shielded port or cable connectors (for example, BNC, D-subminiature, GPIB, RS232, USB, etc.).

For the test according to IEC 61000-4-3, the following conditions shall be met. Test and measurement ports shall be connected with test leads recommended or supplied with the EUT. Where the test leads are unspecified, typical test leads shall be used. The test leads shall be connected and arranged in a typical configuration for each operation mode, according to Figure 101.

If the test leads recommended or supplied are longer than 1 m, each one should be bundled ~~up~~ so that the test ~~or measurement~~ object is in a ~~(horizontal)~~ distance of 1 m to the EUT.

The test leads shall be arranged 0,1 m apart in a horizontal position on the test table.



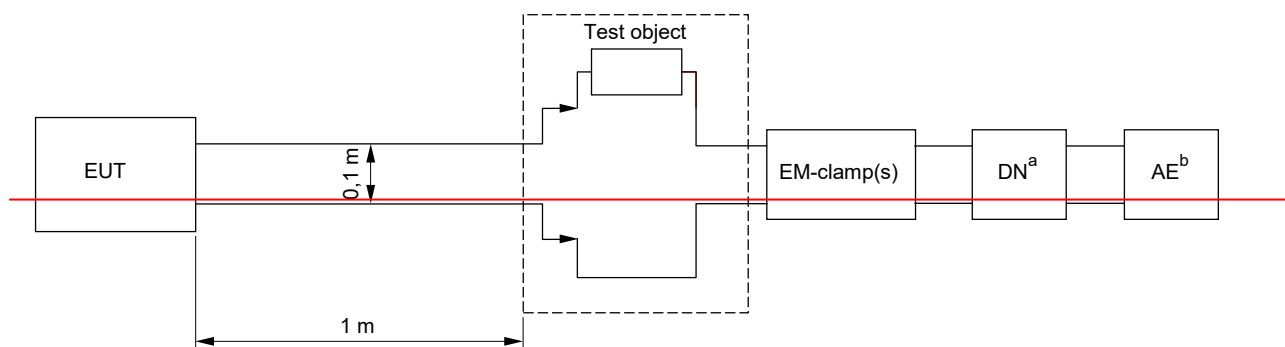
^a EM-clamp(s) (if necessary).

Figure 101 – Test set-up for portable testing, measuring and monitoring equipment based on IEC 61000-4-3

AUXILIARY EQUIPMENT (AE) required for generating or monitoring the test object signal shall be connected according to Figure 101 via EM-clamps if necessary as described in IEC 61000-4-6:2013, Clause A.3.

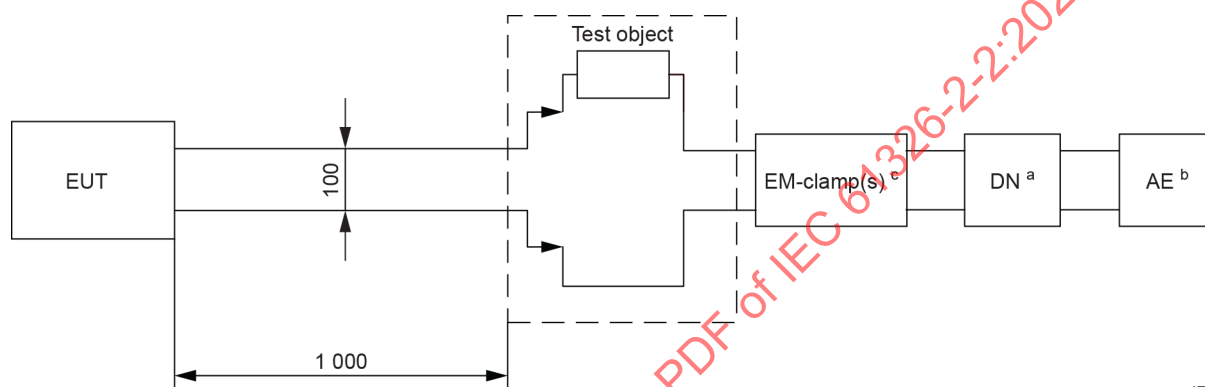
Voltage measurements shall be made with a $1\,000\,\Omega \pm 100\,\Omega$ resistor (test object) connected in series with one of the test leads as shown in Figure 102.

For other measurements, the test object shall be specified by the manufacturer and documented in the test report.



IEC 1836/12

Dimensions in millimetres



IEC

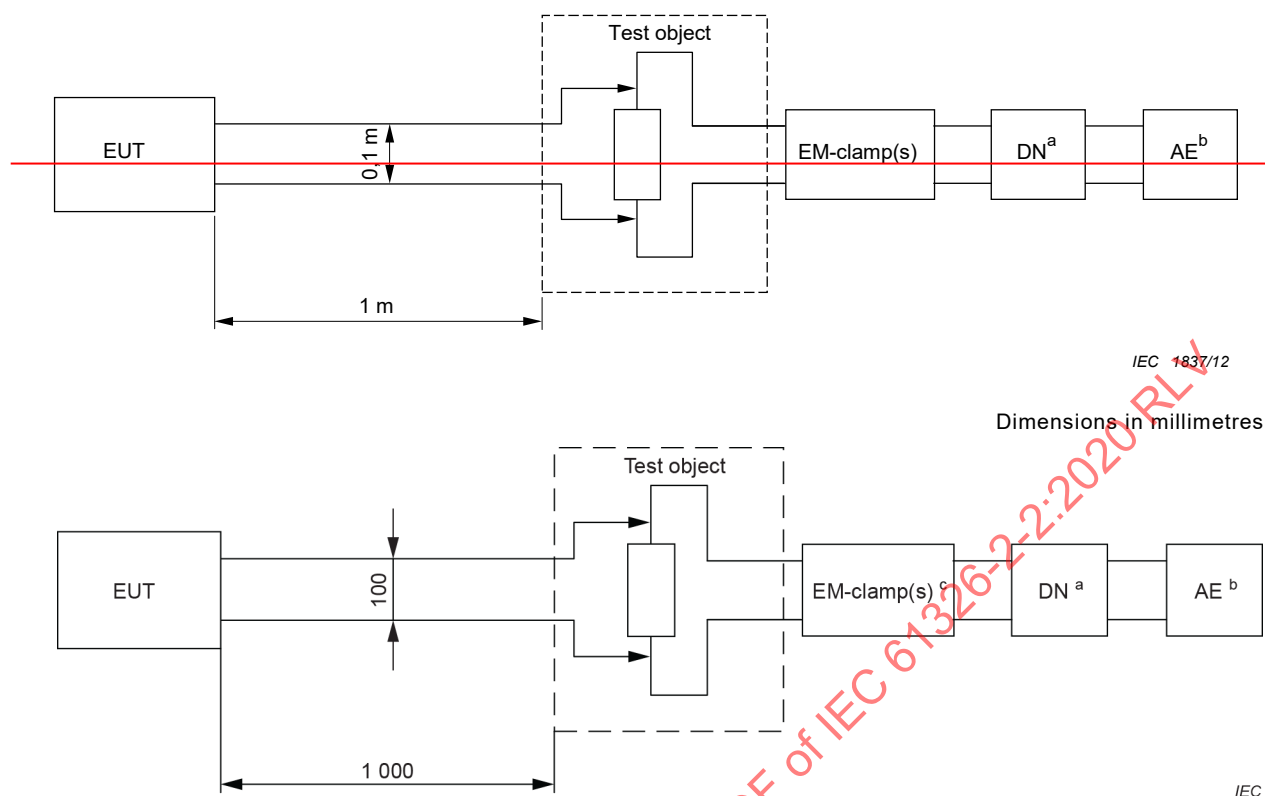
^a Decoupling network (if necessary)

^b Auxiliary equipment (for example, voltage source)

^c EM-clamp(s) (if necessary)

Figure 102 – Example of connection details for voltage measurements

Current measurements shall be made with a $100\ \Omega \pm 10\ \Omega$ resistor (test object) connected in parallel with the test leads as shown in Figure 103.



^a Decoupling network (if necessary)

^b Auxiliary equipment (for example, current source)

^c EM-clamp(s) (if necessary)

Figure 103 – Example of connection details for current measurements

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

Test and measurement equipment shall be set to the most sensitive ranges or combination of ranges unless other ranges are known to provide worst-case immunity results within normal application. Each function of multifunctional equipment shall be tested separately.

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.

6.2 Immunity test requirements

Subclause 6.2 of IEC 61326-1:2020 is replaced by the following:

Table A.1 of IEC 61326-1:2020 gives the immunity requirements for equipment covered by the scope of this document.

Addition:

6.2.101 Electromagnetic field

If the maximum dimension of the equipment enclosure is $<0,3$ m, the test is performed from only one side in accordance with Figure 101 and noted in the test report.

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 applies, except as follows:

~~Replacement for 6.4.2 of IEC 61326-1:~~

Addition:

6.4.2.101 Performance criterion A

During testing, normal performance within the specification limits. ~~This includes that permitted variations are allowed~~ outside the maximum intrinsic ~~error uncertainty~~ documented in the technical data of the instructions for use. The variations shall be limited to five times the intrinsic ~~error uncertainty~~ but not more than ± 20 % of the measured value when measured at between 50 % and 100 % of full scale.

7 Emission requirements

Clause 7 of IEC 61326-1:2020 applies.

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.

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Annex B
(informative)

Guide for analysis and assessment for electromagnetic compatibility

Annex B of IEC 61326-1:2020 applies.

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Bibliography

IEC 61326-2-4:2020, *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 61557-8:2014, *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*

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**Electrical equipment for measurement, control and laboratory use –
EMC requirements –**

**Part 2-2: Particular requirements – Test configurations, operational conditions
and performance criteria for portable testing, measuring and monitoring
equipment used in low-voltage distribution systems**

**Matériel électrique de mesure, de commande et de laboratoire –
Exigences relatives à la CEM –**

**Partie 2-2: Exigences particulières – Configurations d'essai, conditions de
fonctionnement et critères de performance des matériels portables d'essai,
de mesure et de surveillance utilisés dans des réseaux de distribution à basse
tension**

CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 General	6
5 EMC test plan	6
5.1 General	6
5.2 Configuration of EUT during testing	6
5.3 Operation conditions of EUT during testing	7
5.4 Specification of FUNCTIONAL PERFORMANCE	8
5.5 Test description	8
6 Immunity requirements	8
6.1 Conditions during the tests	8
6.2 Immunity test requirements	8
6.3 Random aspects	8
6.4 Performance criteria	8
7 Emission requirements	8
8 Test results and test report	9
9 Instructions for use	9
Annex A (normative) Immunity test requirements for PORTABLE TEST AND MEASUREMENT EQUIPMENT powered by battery or from the circuit being measured	10
Annex B (informative) Guide for analysis and assessment for electromagnetic compatibility	11
Bibliography	12
Figure 101 – Test set-up for portable testing, measuring and monitoring equipment based on IEC 61000-4-3	6
Figure 102 – Example of connection details for voltage measurements	7
Figure 103 – Example of connection details for current measurements	7

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Part 2-2: Particular requirements – Test configurations, operational conditions and performance criteria for portable testing, measuring and monitoring equipment used in low-voltage distribution systems

1 Scope

In addition to the scope of IEC 61326-1, this part of IEC 61326 specifies more detailed test configurations, operational conditions and performance criteria for equipment covered by Annex A of IEC 61326-1:2020 which is:

- used for testing, measuring or monitoring of protective measures in low-voltage distribution systems, and;
- powered by battery and/or from the circuit measured, and
- portable.

Examples of such EUTs include, but are not limited to, voltage detectors, insulation testers, earth continuity testers, earth resistance testers, leakage current clamps, loop impedance testers, “residual-current-device-testers” (RCD-testers) and phase sequence testers as defined in IEC 61557 (all parts).

NOTE Particular EMC requirements for equipment covered by IEC 61557-8 and IEC 61557-9 are given in IEC 61326-2-4.

The manufacturer specifies the environment for which the product is intended to be used and/or selects the appropriate test level specifications of IEC 61326-1.

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 (all parts), *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61326-1:2020 and IEC 60050-161 apply.

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

Subclause 5.2 of IEC 61326-1:2020 applies, except as follows:

Addition:

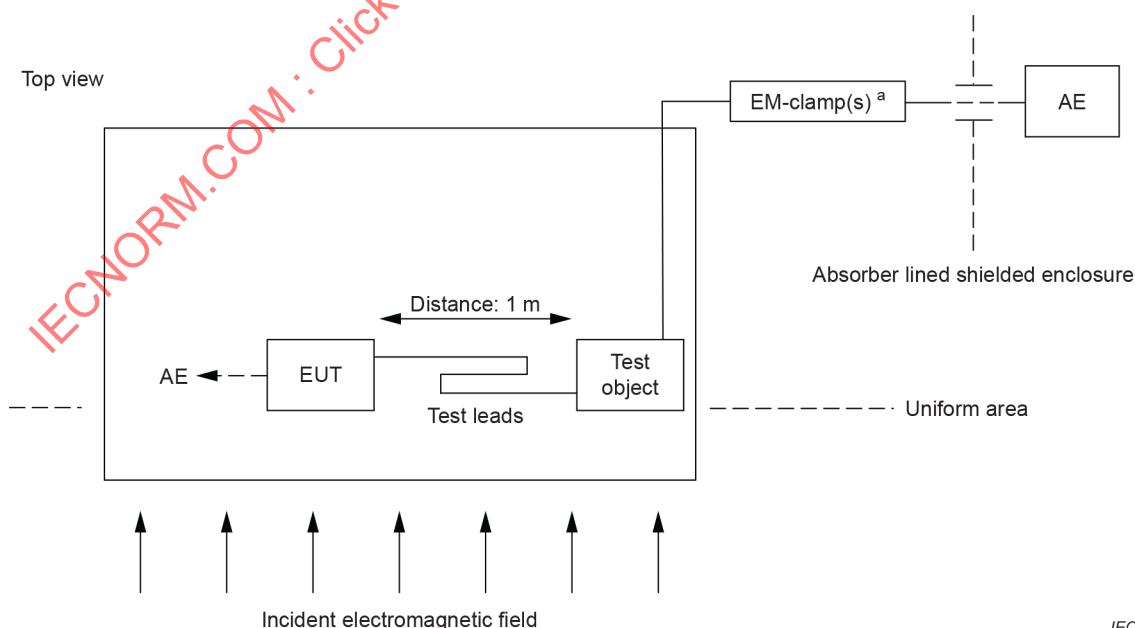
5.2.4.101 Test and measurement I/O ports

Electrostatic discharge shall be applied to the mated connector or the shield of the unmated port, but not to the inner pins of shielded port or cable connectors (for example, BNC, D-subminiature, GPIB, RS232, USB, etc.).

For the test according to IEC 61000-4-3, the following conditions shall be met. Test and measurement ports shall be connected with test leads recommended or supplied with the EUT. Where the test leads are unspecified, typical test leads shall be used. The test leads shall be connected and arranged in a typical configuration for each operation mode, according to Figure 101.

If the test leads recommended or supplied are longer than 1 m, each one should be bundled so that the test object is in a horizontal distance of 1 m to the EUT.

The test leads shall be arranged 0.1 m apart in a horizontal position on the test table.



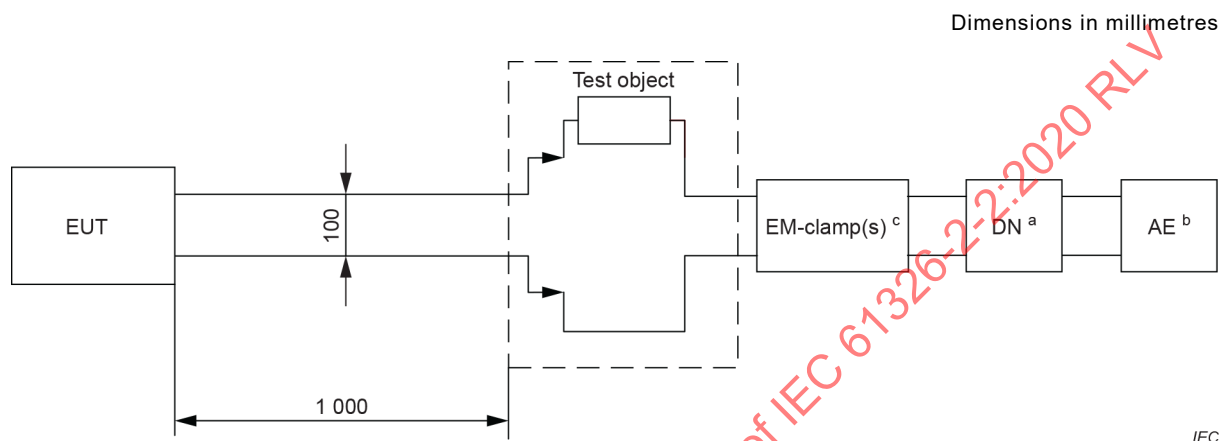
^a EM-clamp(s) (if necessary).

Figure 101 – Test set-up for portable testing, measuring and monitoring equipment based on IEC 61000-4-3

AUXILIARY EQUIPMENT (AE) required for generating or monitoring the test object signal shall be connected according to Figure 101 via EM-clamps if necessary as described in IEC 61000-4-6:2013, Clause A.3.

Voltage measurements shall be made with a $1\,000\,\Omega \pm 100\,\Omega$ resistor (test object) connected in series with one of the test leads as shown in Figure 102.

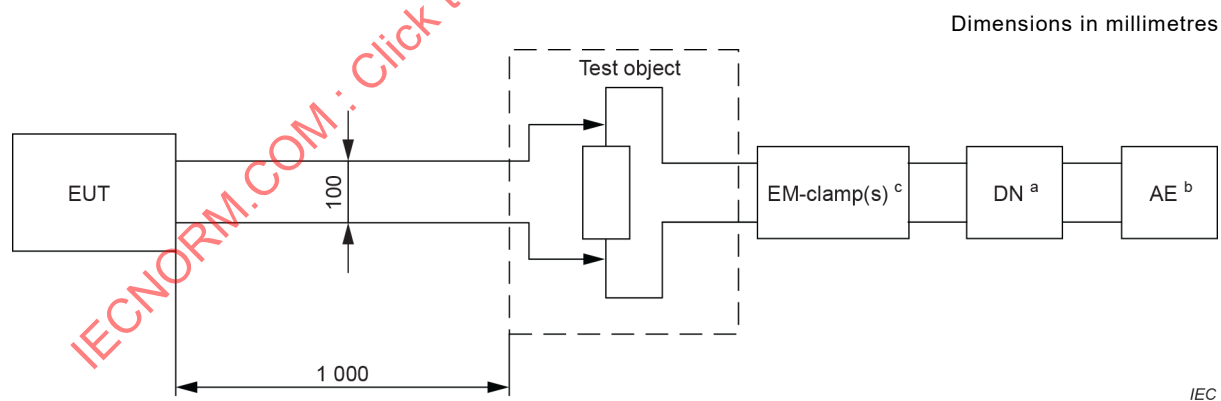
For other measurements, the test object shall be specified by the manufacturer and documented in the test report.



- Decoupling network (if necessary)
- Auxiliary equipment (for example, voltage source)
- EM-clamp(s) (if necessary)

Figure 102 – Example of connection details for voltage measurements

Current measurements shall be made with a $100\ \Omega \pm 10\ \Omega$ resistor (test object) connected in parallel with the test leads as shown in Figure 103.



- Decoupling network (if necessary)
- Auxiliary equipment (for example, current source)
- EM-clamp(s) (if necessary)

Figure 103 – Example of connection details for current measurements

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

Test and measurement equipment shall be set to the most sensitive ranges or combination of ranges unless other ranges are known to provide worst-case immunity results within normal application. Each function of multifunctional equipment shall be tested separately.

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.

6.2 Immunity test requirements

Subclause 6.2 of IEC 61326-1:2020 is replaced by the following:

Table A.1 of IEC 61326-1:2020 gives the immunity requirements for equipment covered by the scope of this document.

Addition:

6.2.101 Electromagnetic field

If the maximum dimension of the equipment enclosure is $<0,3$ m, the test is performed from only one side in accordance with Figure 101 and noted in the test report.

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 applies, except as follows:

Addition:

6.4.2.101 Performance criterion A

During testing, normal performance within the specification limits includes permitted variations outside the maximum intrinsic uncertainty documented in the technical data of the instructions for use. The variations shall be limited to five times the intrinsic uncertainty but not more than ± 20 % of the measured value when measured at between 50 % and 100 % of full scale.

7 Emission requirements

Clause 7 of IEC 61326-1:2020 applies.

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.

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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.

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Annex B
(informative)

Guide for analysis and assessment for electromagnetic compatibility

Annex B of IEC 61326-1:2020 applies.

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Bibliography

IEC 61326-2-4:2020, *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 61557-8:2014, *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*

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SOMMAIRE

1	Domaine d'application	17
2	Références normatives	17
3	Termes et définitions	18
4	Généralités	18
5	Plan d'essai de CEM	18
5.1	Généralités	18
5.2	Configuration de l'EST lors des essais	18
5.3	Conditions de fonctionnement de l'EST lors des essais	20
5.4	Spécification des PERFORMANCES FONCTIONNELLES	20
5.5	Description de l'essai	20
6	Exigences relatives à l'immunité	20
6.1	Conditions lors des essais	20
6.2	Exigences pour les essais d'immunité	20
6.3	Aspects aléatoires	21
6.4	Critères de performance	21
7	Exigences relatives à l'émission	21
8	Résultats d'essai et rapport d'essai	21
9	Instructions pour l'utilisation	21
	Annexe A (normative) Exigences concernant les essais d'immunité pour le MATERIEL D'ESSAI ET DE MESURE PORTABLE alimenté par batterie ou par le circuit mesuré	22
	Annexe B (informative) Guide destiné à l'analyse et à l'évaluation de la compatibilité électromagnétique	23
	Bibliographie	24
	Figure 101 – Montage d'essai pour les matériels portables d'essai, de mesure et de surveillance fondé sur l'IEC 61000-4-3	19
	Figure 102 – Exemple de détails de connexion pour les mesurages de tension	19
	Figure 103 – Exemple de détails de connexion pour les mesurages de courant	20

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**MATÉRIEL ÉLECTRIQUE DE MESURE, DE COMMANDE ET DE
LABORATOIRE – EXIGENCES RELATIVES À LA CEM –****Partie 2-2: Exigences particulières –
Configurations d'essai, conditions de fonctionnement et critères
de performance des matériels portables d'essai, de mesure et de
surveillance utilisés dans des réseaux de distribution à basse tension**

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La Norme internationale IEC 61326-2-2 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 les modifications techniques majeures suivantes par rapport à l'édition précédente:

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

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

FDIS	Rapport de vote
65A/977/FDIS	65A/988/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.

La présente partie de l'IEC 61326 doit être utilisée conjointement avec l'IEC 61326-1:2020 et suit la même numérotation des articles, paragraphes, tableaux et 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 61326-1 doit être adapté en conséquence.

NOTE Le système de numérotation suivant est utilisé:

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- 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.

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

Partie 2-2: Exigences particulières – Configurations d'essai, conditions de fonctionnement et critères de performance des matériels portables d'essai, de mesure et de surveillance utilisés dans des réseaux de distribution à basse tension

1 Domaine d'application

En complément au domaine d'application de l'IEC 61326-1, la présente partie de l'IEC 61326 donne des spécifications plus détaillées des configurations d'essai, des conditions fonctionnelles et des critères de performance pour les matériels couverts par l'Annexe A de l'IEC 61326-1:2020, qui sont:

- utilisés pour le contrôle, la mesure ou la surveillance de mesures de protection dans les réseaux de distribution à basse tension, et;
- alimentés par batterie et/ou par le circuit mesuré, et
- portables.

Exemples de tels EST (entre autres): détecteurs de tension, appareils d'essai d'isolement, appareils d'essai de continuité de terre, appareils d'essai de résistance à la terre, pinces de courant de fuite, appareils d'essai d'impédance de boucle, "appareils d'essai de dispositifs à courant résiduel" (appareils d'essai DCR) et appareils d'essai d'ordre de phases, tels que définis dans l'IEC 61557 (toutes les parties).

NOTE Les exigences CEM particulières pour les matériels couverts par l'IEC 61557-8 et l'IEC 61557-9 sont données dans l'IEC 61326-2-4.

Le fabricant spécifie l'environnement auquel le produit est destiné et/ou sélectionne les spécifications pertinentes du niveau d'essai de l'IEC 61326-1.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. 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 l'exception suivante:

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 (toutes les parties), *Sécurité électrique dans les réseaux de distribution basse tension au plus égale à 1 000 V c.a. et 1 500 V c.c. – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection*