IEC 60255-26

Edition 4.0 2023-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

This document is a preview generated by EVS

Measuring relays and protection equipment – Part 26: Electromagnetic compatibility requirements

Relais de mesure et dispositifs de protection – Partie 26: Exigences de compatibilité électromagnétique

IEC 60255-26:2023-01(en-fr)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2023 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
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 It also gives information on projects, replaced and withdrawn publications.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.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

This document is a preview generated by EVS

IEC 60255-26

Edition 4.0 2023-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Measuring relays and protection equipment – Part 26: Electromagnetic compatibility requirements

Relais de mesure et dispositifs de protection – Partie 26: Exigences de compatibilité électromagnétique

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.120.70

ISBN 978-2-8322-6317-4

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

This document is a preview generated by EVS

CONTENTS

FOREWORD 5
1 Scope 7
1.1 General 7
1.2 Emission 7
1.3 Immunity 7
2 Normative references 7
3 Terms, definitions, and abbreviated terms 9
3.1 Terms and definitions 9
3.2 Abbreviated terms 12
4 Electromagnetic environmental levels 13
4.1 General 13
4.2 Zone A, severe electromagnetic environment 13
4.3 Zone B, typical electromagnetic environment 14
5 Emission 14
5.1 Radiated emission 14
5.2 Conducted emission 15
6 Immunity 16
6.1 Immunity of enclosure 16
6.2 Immunity of auxiliary power supply port 17
6.3 Immunity of signal/control port and wired network port 20
6.4 Immunity of input and output ports 21
6.5 Immunity of earth port 24
7 Test set-up and procedures 24
7.1 General 24
7.2 Emission 25
7.2.1 General 25
7.2.2 Radiated emission 26
7.2.3 Conducted emission 26
7.3 Immunity 26
7.3.1 General 26
7.3.2 Electrostatic discharge immunity test 28
7.3.3 Radiated electromagnetic field immunity test 29
7.3.4 Electrical fast transient/burst immunity test 31
7.3.5 Damped oscillatory wave immunity test 32
7.3.6 Surge immunity test 33
7.3.7 Conducted RF immunity test 35
7.3.8 Conducted power frequency immunity test on binary inputs 37
7.3.9 Power frequency magnetic field immunity test 38
7.3.10 Voltage dips and short interruptions test (AC or DC) 38
7.3.11 Ripple on DC input power port immunity test 39
7.3.12 Gradual shutdown / start-up tests 40
8 Criteria for acceptance 40
8.1 Emission 40
8.2 Immunity 41
9 Test report 42
Annex A (normative) Power frequency immunity tests on binary inputs 43

This document is a preview generated by EVS

A.1 General ... 43
A.2 Test classes ... 43
A.3 Test equipment ... 43
A.3.1 General ... 43
A.3.2 Test generator ... 43
A.3.3 Verification of the test generator ... 44
A.3.4 Coupling networks ... 44
A.4 Test set-up ... 44
A.4.1 General ... 44
A.4.2 Earthing connections ... 44
A.4.3 Auxiliary equipment ... 44
Annex B (informative) Background information for power frequency tests ... 47
Annex C (informative) Background information about spot frequency tests ... 48
Annex D (informative) EMC risk assessment ... 50
D.1 EMC design risk assessment ... 50
D.2 Product platform risk assessment ... 52
Annex E (informative) Considerations regarding radio interfaces ... 54
Annex F (informative) Immunity test to be considered in future ... 55
Bibliography ... 56

Figure 1 – Gradual shutdown / start-up test ... 40
Figure A.1 – Example of Zone A differential mode tests ... 45
Figure A.2 – Example of Zone B differential mode tests ... 45
Figure A.3 – Example of Zone A and Zone B common mode tests ... 46

Table 1 – Radiated emission tests – Enclosure port ... 14
Table 2 – Required highest frequency for radiated measurement ... 15
Table 3 – Conducted emission tests – AC and DC auxiliary power supply port ... 15
Table 4 – Conducted emission tests – Wired network port ... 15
Table 5 – Immunity tests – Enclosure port ... 16
Table 6 – Immunity tests – Auxiliary power supply port ... 17
Table 7 – Immunity tests – signal/control port and wired network port ... 20
Table 8 – Immunity tests – Input and output port ... 21
Table 9 – Immunity tests – Earth port ... 24
Table 10 – Radiated emission test ... 26
Table 11 – Conducted emission test ... 26
Table 12 – Electrostatic discharge immunity test ... 28
Table 13 – Radiated electromagnetic field immunity test (frequency sweep) ... 29
Table 14 – Radiated electromagnetic field immunity test (spot frequencies) ... 30
Table 15 – Electrical fast transient/burst immunity test ... 31
Table 16 –Damped oscillatory wave immunity test ... 32
Table 17 – Surge immunity test ... 33
Table 18 – Conducted RF immunity test (frequency sweep) ... 35
Table 19 – Conducted RF immunity test (spot frequencies) ... 36
Table 20 – Conducted power frequency immunity test on binary inputs ... 37

This document is a preview generated by EVS

Table 21 – Power frequency magnetic field immunity test 38
Table 22 – Voltage dips and short interruptions test (AC or DC) 38
Table 23 – Ripple on DC input power port immunity test 39
Table 24 – Gradual shutdown and start-up test 40
Table 25 – Acceptance criteria for immunity tests 41
Table C.1 – Selection of spot frequencies 48
Table D.1 – Risk assessment based on a hardware design modification 51
Table D.2 – Risk assessment, selecting representative EUT configuration(s) 52
Table E.1 – Listed standard with relevance 54
Table F.1 – Immunity test to be considered in future 55

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 26: Electromagnetic compatibility requirements

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.

IEC 60255-26 has been prepared by IEC technical committee 95: Measuring relays and protection equipment. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2013. This edition constitutes a technical revision.

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

a) update of normative references
b) introduction of a wired network port and signal/control port in accordance with CISPR 32;
c) introduction of low-power instrument transformer (LPIT) and battery monitor port;
d) expansion of the frequency range on radiated radio-frequency immunity test up to 6 GHz;
e) updated requirements on electrostatic discharge tests;
f) introduction of fast damped oscillatory wave test for Zone A applications;
g) specification of higher immunity requirements on power frequency magnetic field tests;

This document is a preview generated by EVS

h) update of the spot frequency test and addition of a new annex with background information;
i) addition of details and further guidance on the relay settings;
j) additional test condition for AC voltage dips and interruptions;
k) addition of an annex about EMC risk assessments;
l) addition of an annex on radio interfaces.

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

Draft	Report on voting
95/515/FDIS	95/525/RVD

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

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

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

A list of all the parts in the IEC 60255 series, published under the general title *Measuring relays and protection equipment*, 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 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.

This document is a preview generated by EVS

MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 26: Electromagnetic compatibility requirements

This document is a preview generated by EVS

1 Scope

1.1 General

This part of IEC 60255 specifies the requirements for electromagnetic compatibility for measuring relays and protection equipment. It is applicable to measuring relays and protection equipment and combinations of devices to form schemes for power system protection including the control, monitoring, communication and process interface equipment used with those systems.

Tests specified in this document are not required for equipment not incorporating electronic circuits, for example electromechanical relays.

The requirements specified in this document are applicable to measuring relays and protection equipment in a condition representative of how new equipment is provided by the manufacturer. All tests specified are type tests only.

1.2 Emission

This document specifies limits and test methods, for measuring relays and protection equipment in relation to electromagnetic emissions which might cause interference in other equipment.

These emission limits represent electromagnetic compatibility requirements and have been selected to ensure that the disturbances generated by measuring relays and protection equipment, operated normally in substations and power plants, do not exceed a specified level which could prevent other equipment from operating as intended.

Test requirements are specified for the enclosure, auxiliary power supply ports, input/output ports, signal/control ports and wired network ports.

1.3 Immunity

This document specifies the immunity test requirements for measuring relays and protection equipment in relation to continuous and transient, conducted and radiated disturbances, including electrostatic discharges.

These test requirements represent the electromagnetic compatibility immunity requirements and have been selected so as to ensure an adequate level of immunity for measuring relays and protection equipment, operated normally in substations and power plants.

NOTE 1 Product safety considerations are not covered in this document.

NOTE 2 In special cases, situations will arise where the levels of disturbance could exceed the levels specified in this document, for example where a hand-held transmitter or a mobile telephone is used close to measuring relays and protection equipment. In these instances, special precautions and procedures could be needed.

2 Normative references

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

For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60255-1:2022, *Measuring relays and protection equipment – Part 1: Common requirements*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*
IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61000-4-16:2015, *Electromagnetic compatibility (EMC) – Part 4-16: Testing and measurement techniques – Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz*

IEC 61000-4-17:1999, *Electromagnetic compatibility (EMC) – Part 4-17: Testing and measurement techniques – Ripple on d.c. input power port immunity test*
IEC 61000-4-17:1999/AMD1:2001
IEC 61000-4-17:1999/AMD2:2008

IEC 61000-4-18:2019, *Electromagnetic compatibility (EMC) – Part 4-18: Testing and measurement techniques – Damped oscillatory wave immunity test*

IEC 61000-4-29:2000, *Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016
CISPR 11:2015/AMD2:2019

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*
CISPR 32:2015/AMD1:2019

This document is a preview generated by EVS