BS EN 60255-26:2013

BSI Standards Publication

Measuring relays and protection equipment

Part 26: Electromagnetic compatibility requirements

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 60255-26:2014 incorporating corrigendum October 2013. It is identical to IEC 60255-26:2013. It supersedes BS EN 60255-11:2010, BS EN 60255-22-1:2008, BS EN 60255-22-2:2008, BS EN 60255-22-3:2008, BS EN 60255-22-4:2008, BS EN 60255-22-5:2011, BS EN 60255-22-6:2001, BS EN 60255-22-7:2003, BS EN 60255-25:2000 and BS EN 60255-26:2009, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/95, Measuring relays and protection systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2014

ISBN 978 0 580 74106 7

ICS 29.120.70; 33.100.10; 33.100.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2014.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60255-26

September 2013

ICS 29.120.70

Incorporating corrigendum October 2013

English version

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

(IEC 60255-26:2013)

Relais de mesure et dispositifs de protection -
Partie 26: Exigences de comptibilité électromagnétiques
(CEI 60255-26:2013)

Messrelais und Schutzeinrichtungen -
Teil 26: Anforderungen an die elektromagnetische Verträglichkeit
(IEC 60255-26:2013)

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60255-26:2013 E

Foreword

The text of document 95/309/FDIS, future edition 3 of IEC 60255-26, prepared by IEC/TC 95 "Measuring relays and protection equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60255-26:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-03-28
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-06-28

This document supersedes EN 60255-11:2010, EN 60255-22-1:2008, EN 60255-22-2:2008, EN 60255-22-3:2008, EN 60255-22-4:2008, EN 60255-22-5:2011, EN 60255-22-6:2001, EN 60255-22-7:2003, EN 60255-25:2000, EN 60255-26:2009

EN 60255-26:2013 includes the following significant technical changes with respect to EN 60255-26:2009:

a) definition of test specifications, test procedures and acceptance criteria per phenomena and port under test in one document;
b) extension of radiated emission measurement for frequencies above 1 GHz;
c) limitation of radiated emission measurement at 3 m distance for small equipment only;
d) addition of zone A and zone B test level on surge test;
e) extension of tests on the auxiliary power supply port by a.c. and d.c. voltage dips, a.c. component in d.c. (ripple) and gradual shut-down / start-up;
f) harmonization of acceptance criteria for immunity tests.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60255-26:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 61000-4	NOTE Harmonized in EN 61000-4 series (not modified)

Annex ZA
(normative)
Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60255-1	2009	Measuring relays and protection equipment - Part 1: Common requirements	EN 60255-1	2010
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3 + A1 + A2	2006 2007 2010	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3 + A1 + A2	2006 2008 2010
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5 + corr. October	2005 2009	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006
IEC 61000-4-6	2008	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2009
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
IEC 61000-4-16 + A2	1998 2009	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	EN 61000-4-16 + A2	1998 2011
IEC 61000-4-17 + A1 + A2	1999 2001 2008	Electromagnetic compatibility (EMC) - Part 4-17: Testing and measurement techniques - Ripple on d.c. input power port immunity test	EN 61000-4-17 + A1 + A2	1999 2004 2009

Publication	Year	Title	EN/HD	Year
IEC 61000-4-18 + A1	2006 2010	Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test	EN 61000-4-18 + corr. September + A1	2007 2007 2010
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	EN 61000-4-29	2000
CISPR 11 (mod) + A1	2009 2010	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011 + A1	2009 2010
CISPR 22 (mod)	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022 + AC:2011	2010 2011

Annex ZZ
(informative)
Coverage of Essential Requirements of EC Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Article 1(a) of Annex I of EC Directive 2004/108/EC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

CONTENTS

INTRODUCTION 6
1 Scope 7
1.1 General 7
1.2 Emission 7
1.3 Immunity 7
2 Normative references 8
3 Terms and definitions 9
4 Definition of environmental levels 10
4.1 General 10
4.2 Zone A, severe electrical environment 10
4.3 Zone B, typical electrical environment 10
5 Emission 11
5.1 Emission enclosure 11
5.2 Emission auxiliary power supply port 11
6 Immunity 13
6.1 Immunity enclosure 13
6.2 Immunity auxiliary power supply port 14
6.3 Immunity communication port 16
6.4 Immunity input and output ports 18
6.5 Immunity functional earth port 20
7 Test set-up and procedures 20
7.1 Emission 20
7.1.1 General 20
7.1.2 Radiated emission 21
7.1.3 Conducted emission 21
7.2 Immunity 21
7.2.1 General 21
7.2.2 General test conditions 22
7.2.3 Electrostatic discharge 24
7.2.4 Radiated interference 25
7.2.5 Electrical fast transient 27
7.2.6 Slow damped oscillatory wave 28
7.2.7 Surge 29
7.2.8 Conducted interference 30
7.2.9 Power frequency immunity on d.c. binary inputs 32
7.2.10 Power frequency magnetic field 33
7.2.11 Voltage dips and voltage interruptions on power supply voltage (a.c. or d.c.) 34
7.2.12 Voltage ripple on d.c. power supply voltage 35
7.2.13 Gradual shut down / start-up tests 36
8 Criteria for acceptance 37
8.1 Emission 37
8.2 Immunity 38
9 Test report 39

Annex A (normative) Power frequency immunity tests on binary inputs 40
Annex B (informative) Background information for power frequency tests 44
Annex C (normative) Application of discharges for electrostatic discharge test 45
Bibliography 46

Figure 1 – Ports for measuring relays and protection equipment 9
Figure 2 – Gradual shut down/start-up test 36
Figure A.1 – Example of Class A differential mode tests 42
Figure A.2 – Example of Class B differential mode tests 42
Figure A.3 – Example of common mode tests 43

Table 1 – Emission tests – Enclosure port 11
Table 2 – Emission tests – Auxiliary power supply port 12
Table 3 – Immunity tests – Enclosure port 13
Table 4 – Immunity tests – Auxiliary power supply port 14
Table 5 – Immunity tests – Communication port 16
Table 6 – Immunity tests – Input and output ports 18
Table 7 – Immunity tests – Functional earth port 20
Table 8 – Radiated emission test 21
Table 9 – Conducted emission test 21
Table 10 – Electrostatic discharge immunity test 24
Table 11 – Radiated interference immunity test (frequency sweep) 25
Table 12 – Radiated interference immunity test (spot frequencies) 26
Table 13 – Electrical fast transient immunity test 27
Table 14 – Slow damped oscillatory wave immunity test 28
Table 15 – Surge immunity test 29
Table 16 – Conducted interference immunity test (frequency sweep) 30
Table 17 – Conducted interference immunity test (spot frequencies) 31
Table 18 – Power frequency immunity test 32
Table 19 – Power frequency magnetic field immunity test 33
Table 20 – Voltage dips and voltage interruptions test 34
Table 21 – Voltage ripple test 35
Table 22 – Gradual shutdown and start-up test 36
Table 23 – Acceptance criteria for immunity tests 38

INTRODUCTION

This part of the IEC 60255 series specifies all of the requirements for electromagnetic compatibility in a single document.

As such, it is considered as an overview document for measuring relays and protection equipment. The detailed test procedures are given in other referenced standards.

This part of IEC 60255 does not include the reversal of d.c. power supply polarity test which had been provided in IEC 60255-11, because this is a safety test. This test will be covered by future IEC 60255-27.

MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 26: Electromagnetic compatibility requirements

1 Scope

1.1 General

This part of the IEC 60255 series is applicable to measuring relays and protection equipment, taking into account combinations of devices to form schemes for power system protection including the control, monitoring, communication and process interface equipment used with those systems.

This standard specifies the requirements for electromagnetic compatibility for measuring relays and protection equipment.

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

The requirements specified in this standard are applicable to measuring relays and protection equipment in a new condition and all tests specified are type tests only.

1.2 Emission

The object of this standard is to specify limits and test methods, for measuring relays and protection equipment in relation to electromagnetic emissions which may 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 and auxiliary power supply ports.

1.3 Immunity

This standard is to specify 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 Safety considerations are not covered in this standard.

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