SVENSK STANDARD SS-EN 61557-15

Fastställd	Utgåva	Sida	Ansvarig kommitté
2014-09-16	1	1 (1+78)	SEK TK 85

Elsäkerhet i elektriska starkströmsanläggningar för lågspänning – Utrustning för provning, mätning och övervakning av skyddsåtgärder – Del 15: Funktionella säkerhetsfordringar på utrustning avsedd för isolationsövervakning och lokalisering av isolationsfel i IT-system

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 15: Functional safety requirements for insulation monitoring devices in IT systems and equipment for insulation fault location in IT systems

Som svensk standard gäller europastandarden EN 61557-15:2014. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61557-15:2014.

Nationellt förord

Europastandarden EN 61557-15:2014

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61557-15, First edition, 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 15: Functional safety requirements for insulation monitoring devices in IT systems and equipment for insulation fault location in IT systems**

utarbetad inom International Electrotechnical Commission, IEC.

Standarden ska användas tillsammans med SS-EN 61557-8 och SS-EN 61557-9.

ICS 17.220.20; 29.080.01; 29.240.01

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EUROPEAN STANDARD

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EN 61557-15

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ICS 17.220.20; 29.080.01; 29.240.01

English Version

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 15: Functional safety requirements for insulation monitoring devices in IT systems and equipment for insulation fault location in IT systems (IEC 61557-15:2014)

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 15: Exigences de sécurité fonctionnelle pour les contrôleurs d'isolement de réseaux IT et les dispositifs de localisation de défauts d'isolement pour réseaux IT
(CEI 61557-15:2014)

Elektrische Sicherheit in Niederspannungsnetzen bis AC 1 000 V und DC 1 500 V - Geräte zum Prüfen, Messen oder Überwachen von Schutzmaßnahmen - Teil 15: Anforderungen zur Funktionalen Sicherheit von Isolationsüberwachungsgeräten in IT-Systemen und von Einrichtungen zur Isolationsfehlersuche in IT-Systemen
(IEC 61557-15:2014)

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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 61557-15:2014 E

SEK Svensk Elstandard

Foreword

The text of document 85/465/FDIS, future edition 1 of IEC 61557-15, prepared by IEC/TC 85 "Measuring equipment for electrical and electromagnetic quantities" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61557-15:2014.

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)	2014-12-19
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-03-19

This standard is to be used in conjunction with EN 61557-8 and EN 61557-9.

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 standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD).

Endorsement notice

The text of the International Standard IEC 61557-15:2014 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60300-3-1	NOTE	Harmonized as EN 60300-3-1.
IEC 60335-1:2001	NOTE	Harmonized as EN 60335-1:2002 [1)] (not modified).
IEC 60335-1:2001/A1:2004	NOTE	Harmonized as EN 60335-1:2002/A1:2004 [1)] (not modified).
IEC 60335-1:2001/A2:2006 + Corr. 08-2006	NOTE	Harmonized as EN 60335-1:2002/A2:2006 [1)] (not modified).
IEC 60364-4-41:2005	NOTE	Harmonized as HD 60364-4-41:2007 (modified).
IEC 60364-5-55:2011	NOTE	Harmonized as HD 60364-5-559:2012 (modified).
IEC 60364-7-710:2002	NOTE	Harmonized as HD 60364-7-710:2012 (modified).
IEC 60730-1:2010	NOTE	Harmonized as EN 60730-1:2011 (modified).
IEC 60812:2006	NOTE	Harmonized as EN 60812:2006 (not modified).
IEC 61010-1:2010 + Corr. 05-2011	NOTE	Harmonized as EN 61010-1:2010 (not modified).
IEC 61025	NOTE	Harmonized as EN 61025.
IEC 61078	NOTE	Harmonized as EN 61078.
IEC 61165	NOTE	Harmonized as EN 61165.
IEC 61508-7:2010	NOTE	Harmonized as EN 61508-7:2010 (not modified).
IEC 61709:1996	NOTE	Harmonized as EN 61709:1998 [2)] (not modified).
IEC 61784-3:2007	NOTE	Harmonized as EN 61784-3:2008 [3)] (not modified).
IEC 61800-5-2:2007	NOTE	Harmonized as EN 61800-5-2:2007 (not modified).
IEC/ISO 31010:2009	NOTE	Harmonized as EN 31010:2010 (not modified).
ISO 9001:2008	NOTE	Harmonized as EN ISO 9001:2008 (not modified).

[1)] Superseded by EN 60335-1:2012 (IEC 60335-1:2010, mod.)

[2)] Superseded by EN 61709:2011 (IEC 61709:2011).

[3)] Superseded by EN 61784-3:2010 (IEC 61784-3:2010).

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 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

Publication	Year	Title	EN/HD	Year
IEC 61326-2-4	2012	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	EN 61326-2-4	2013
IEC 61326-3-1 + corr. August	2008 2008	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 3-1: Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) - General industrial applications	EN 61326-3-1	2008
IEC 61508-1	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements	EN 61508-1	2010
IEC 61508-2	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems	EN 61508-2	2010
IEC 61508-3	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements	EN 61508-3	2010
IEC 61508-4	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations	EN 61508-4	2010
IEC 61508-5	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 5: Examples of methods for the determination of safety integrity levels	EN 61508-5	2010

Publication	Year	Title	EN/HD	Year
IEC 61508-6	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3	EN 61508-6	2010
IEC 61557-1	-	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 1: General requirements	EN 61557-1	-
IEC 61557-8	-	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	EN 61557-8	-
IEC 61557-9	2009	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	EN 61557-9	2009

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 15: Functional safety requirements for insulation monitoring devices in IT systems and equipment for insulation fault location in IT systems

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.
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International Standard IEC 61557-15 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities.

The text of this standard is based on the following documents:

FDIS	Report on voting
85/465/FDIS	85/470/RVD

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

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

This part of IEC 61557 is to be used in conjunction with Part 8 and Part 9.

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

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

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

INTRODUCTION

IEC 61508 deals with functional safety, this topic being of upmost importance for safety related systems. Functional safety may be applicable to IT systems where safety is based on insulation monitoring devices (IMD) and insulation fault location systems (IFLS), and also on additional safety related measures (e.g. circuit-breakers).

Insulation monitoring devices and insulation fault location systems comprise electrical and electronic components and can comprise embedded software.

Product requirements for these devices are defined in IEC 61557-8 and IEC 61557-9. These standards include elementary requirements which need to be taken into account for the functional safety approach according to IEC 61557-15, but do not cover the whole range of requirements which shall be fulfilled for the assignment of a defined level of functional safety and for the respective validation.

IEC 61508 series covers basic aspects to be considered when electrical and electronic systems are used to carry out safety functions. One of the major objectives of this series of standards is to facilitate the development of international application or equipment standards by the responsible technical committee. This will allow the technical committee to take the special requirements of their application fully into account.

It is recognized that there is a great variety of applications of insulation monitoring devices and of insulation fault location systems in IT systems. This part of IEC 61557 defines basic safety functions as well as their related levels of functional safety (SIL) and defines feasible measures and principles to develop and validate these devices and systems under functional safety aspects.

Figure 1 shows the link between IEC 61557-15 and the relevant product, safety and EMC standards as well as the link to the IEC 61508 series.

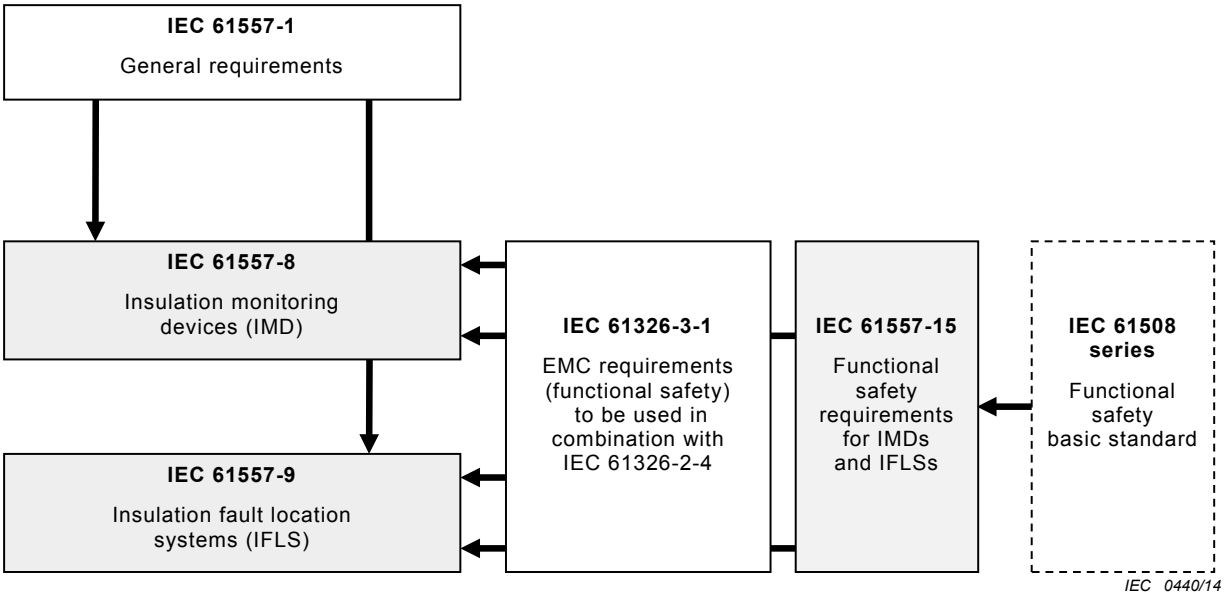

Figure 1 – Relationship between IEC 61557-15 and related standards

This part of IEC 61557 does not cover phases 1 to 9 and 11 to 16 of IEC 61508-1 for the complete IT systems. In particular, this standard does not cover the use of IMDs and IFLSs in customer application.

NOTE 1 An insulation fault location system (IFLS) can consist of several devices according to IEC 61557-9: insulation fault locator (IFL), locating current injector (LCI), locating current sensor (LCS), insulation monitoring device (IMD) according to IEC 61557-8.

IMDs and IFLSs are not protective devices in general, but they are part of the protective measures in IT systems. IMDs and IFLSs function as permanent monitoring of the insulation resistance of the unearthed IT system and the localization of insulation faults in any part of the system can be seen as safety functions which are part of the protective measures in an IT system.

This part of IEC 61557 only applies to IMDs and IFLSs implementing SIL 1 and SIL 2 related safety functions. Higher SIL levels are not specified in this standard because those levels are generally not required for IMDs and IFLSs in IT systems.

Conformance to this standard may be required for IMDs or IFLSs when functional safety is requested in the respective application within IT systems. However, it does not generally dictate that for these devices, a defined level of functional safety according to this standard is required.

NOTE 2 Examples of applications where functional safety can be requested depending on the risk analysis are:

– chemistry,
– mines,
– marine,
– hospital,
– photovoltaic farms,
– railway signalling systems,
– control systems (e.g. in nuclear power plants),
– etc.

Examples of typical applications are provided in Annex F.

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 15: Functional safety requirements for insulation monitoring devices in IT systems and equipment for insulation fault location in IT systems

1 Scope

This part of IEC 61557 specifies requirements related to functional safety and is based on the IEC 61508 standard series for the realization of insulation monitoring devices (IMD) as specified in IEC 61557-8 and for insulation fault location systems (IFLS) according to IEC 61557-9, according to phase 10 of the IEC 61508-1 lifecycle. These devices provide safety related functions for IT systems.

This part of IEC 61557 is:

– concerned only with functional safety requirements intended to reduce the functional risk during the use of IMDs and IFLSs;

– restricted to risks arising directly from the device itself or from several IMDs or IFLSs working together in a system;

– intended to define the basic safety functions provided by the devices.

This part of IEC 61557 does not:

– deal with electrical safety according to IEC 61010-1 and the requirements of IEC 61557-8 and IEC 61557-9;

– cover the hazard and risk analysis of a particular use of the IMD or IFLS;

– identify all the safety functions for the application in which the IMD or IFLS is used;

– cover the IMD or IFLS manufacturing process.

Functional safety requirements depend on the application and should be considered as part of the overall risk assessment of the specific application. The supplier of IMDs and IFLSs is not responsible for the application. The application designer is responsible for the risk assessment and for specifying the overall functional safety requirements of the complete IT system and he should select the functional safety level (SIL) of the IMD and/or IFLS when their safety function is part of the functional safety assessment in the IT system.

2 Normative references

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.

IEC 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements*

IEC 61508-2:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems*

IEC 61508-3:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 3: Software requirements*

IEC 61508-4:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 4: Definitions and abbreviations*

IEC 61508-5:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 5: Examples of methods for the determination of safety integrity levels*

IEC 61508-6:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3*

IEC 61557-1, *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 1: General requirements*

IEC 61557-8, *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, *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*

IEC 61326-2-4:2012, *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 61326-3-1:2008, *Equipment for measurement, control and laboratory use – EMC requirements – Part 3-1: Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety) – General industrial applications*