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Current and voltage sensors or detectors, to be used for fault passage indication purposes - Part 1: General principles and requirements

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 62689-1:2016 sisaldab Euroopa standardi EN 62689-1:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 62689-1:2016 consists of the English text of the European standard EN 62689-1:2016.
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English Version

Current and voltage sensors or detectors, to be used for fault
passage indication purposes - Part 1: General principles and
requirements
(IEC 62689-1:2016)

Capteurs ou détecteurs de courant et de tension, à utiliser
pour indiquer le passage d'un courant de défaut -
Partie 1: Exigences et principes généraux
(IEC 62689-1:2016)

Strom- und Spannungs-Sensoren oder Anzeigergeräte zur
Erkennung von Kurz- und Erdschlüssen - Teil 1: Allgemeine
Grundsätze und Anforderungen
(IEC 62689-1:2016)

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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

European foreword

The text of document 38/503/FDIS, future edition 1 of IEC 62689-1, prepared by IEC/TC 38 "Instrument transformers" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62689-1:2016.

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) 2017-06-16
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-12-16

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Endorsement notice

The text of the International Standard IEC 62689-1:2016 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 60044-7	NOTE	Harmonized as EN 60044-7.
IEC 60044-8	NOTE	Harmonized as EN 60044-8.
IEC 60068-2-64	NOTE	Harmonized as EN 60068-2-64.
IEC 60068-2-75	NOTE	Harmonized as EN 60068-2-75.
IEC 60255-1:2009	NOTE	Harmonized as EN 60255-1:2010 (not modified).
IEC 60660	NOTE	Harmonized as EN 60660
IEC 60695-1-10	NOTE	Harmonized as EN 60695-1-10.
IEC 60721-3-3	NOTE	Harmonized as EN 60721-3-3.
IEC 60721-3-4	NOTE	Harmonized as EN 60721-3-4.
IEC 61000-4-30	NOTE	Harmonized as EN 61000-4-30.
IEC 61109	NOTE	Harmonized as EN 61109.
IEC 61850-6	NOTE	Harmonized as EN 61850-6.
IEC 61850-7-3	NOTE	Harmonized as EN 61850-7-3.
IEC 61850-7-4	NOTE	Harmonized as EN 61850-7-4.
IEC 61869-1	NOTE	Harmonized as EN 61869-1.
IEC 61869-2	NOTE	Harmonized as EN 61869-2.
IEC 61869-3	NOTE	Harmonized as EN 61869-3.
IEC 61869-4	NOTE	Harmonized as EN 61869-4.
IEC 61869-6	NOTE	Harmonized as EN 61869-6.
IEC 62262	NOTE	Harmonized as EN 62262.
IEC 62689-2	NOTE	Harmonized as EN 62689-2.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60028	-	International standard of resistance for copper	-	-
IEC 60038	-	IEC standard voltages	EN 60038 ¹⁾	-
IEC 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-30	-	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60071-1	-	Insulation co-ordination - Part 1: Definitions, principles and rules	EN 60071-1	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60121	-	Recommendation for commercial annealed-aluminium electrical conductor wire	-	-
IEC 60270	-	High-voltage test techniques - Partial discharge measurements	EN 60270	-
IEC 60417-DB	-	Graphical symbols for use on equipment	-	-

¹⁾ The title of EN 60038 is "CENELEC standard voltages".

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60455	Series	Resin based reactive compounds used for electrical insulation	EN 60455	Series
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 60695-1-30	-	Fire hazard testing - Part 1-30: Guidance for assessing the fire hazard of electrotechnical products - Preselection testing process - General guidelines	EN 60695-1-30	-
IEC 60695-7-1	-	Fire hazard testing - Part 7-1: Toxicity of fire effluent - General guidance	EN 60695-7-1	-
IEC/TS 60815	Series	Selection and dimensioning of high-voltage-insulators intended for use in polluted conditions		-
IEC/TS 60815-1	-	Selection and dimensioning of high-voltage-insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles		-
IEC/TS 60815-2	-	Selection and dimensioning of high-voltage-insulators intended for use in polluted conditions - Part 2: Ceramic and glass insulators for a.c. systems		-
IEC/TS 60815-3	-	Selection and dimensioning of high-voltage-insulators intended for use in polluted conditions - Part 3: Polymer insulators for a.c. systems		-
IEC 60870-5-101	-	Telecontrol equipment and systems - Part 5-101: Transmission protocols - Companion standard for basic telecontrol tasks	EN 60870-5-101	-
IEC 60870-5-104	-	Telecontrol equipment and systems - Part 5-104: Transmission protocols - Network access for IEC 60870-5-101 using standard transport profiles	EN 60870-5-104	-
IEC 61000-4-10	-	Electromagnetic compatibility (EMC) - Part 4-10: Testing and measurement techniques - Damped oscillatory magnetic field immunity test	EN 61000-4-10	-
IEC 61000-4-11	-	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	-
IEC 61000-4-12	-	Electromagnetic compatibility (EMC) - Part 4-12: Testing and measurement techniques - Ring wave immunity test	EN 61000-4-12	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-16	-	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	-
IEC 61000-4-18	-	Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test	EN 61000-4-18	-
IEC 61000-4-2	-	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	-
IEC 61000-4-3	-	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	-
IEC 61000-4-4	-	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	-
IEC 61000-4-5	-	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	-
IEC 61000-4-6	-	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	-
IEC 61000-4-8	-	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	-
IEC 61000-4-9	-	Electromagnetic compatibility (EMC) - Part 4-9: Testing and measurement techniques - Pulse magnetic field immunity test	EN 61000-4-9	-
IEC 61000-6-2	2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2	2005
IEC 61850-7-2	-	Communication networks and systems for power utility automation - Part 7-2: Basic information and communication structure - Abstract communication service interface (ACSI)	EN 61850-7-2	-
IEC 60255-27	2013	Measuring relays and protection equipment - Part 27: Product safety requirements	EN 60255-27	2014

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-13	-	Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signaling at a.c. power port, low frequency immunity tests	EN 61000-4-13	-
IEC 61000-4-29	-	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	-

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INTRODUCTION

0.1 General

The IEC 62689 series is a product family standard for current and voltage sensors or detectors, to be used for fault passage indication purposes by suitable devices or functions, indicated as fault passage indicator (FPI) or distribution substation unit (DSU), depending on their performances.

Different names are used to indicate FPIs depending on the region of the world and on their functionalities concerning capability to detect different kinds of faults, for instance:

- fault detector;
- smart sensor;
- faulted circuit indicator (FCI);
- short circuit indicator (SCI);
- earth fault indicator (EFI);
- test point mounted FCI.
- combination of the above.

Simpler versions, using only local information/signals and/or local communication, are called FPI, while very evolved versions are called DSU. The latter are explicitly designed for smart grids and based on IEC 60870-5 and IEC 61850 communication protocols. Compared to instrument transformers, digital communication technology is subject to on-going changes which are expected to continue in the future.

Profound experience with deep integration between electronics and instrument transformers has yet to be gathered on a broader basis, as this type of equipment is not yet widespread in the industry.

DSUs, besides FPI basic functions, may also optionally integrate additional auxiliary functions such as:

- voltage presence/absence detection for medium voltage (MV) network automation, with and without distributed energy resources presence (not for fault confirmation, which can be a basic FPI function depending on the adopted fault detection method, neither for safety-related aspects, which are covered by IEC 61243-5);
- measuring of voltage, current, and active and reactive power, etc., for various applications, such as MV network automation, monitoring of power flows, etc.;
- smart grid management (such as voltage control and unwanted island operation) by means of a proper interface with local distributed generators (DER);
- local output of collected information by means of suitable interfaces;
- remote transmission of collected information;
- others.

A general FPI scheme is outlined in Figure 1.

A DSU may have a much more complex scheme.