SLOVENSKI STANDARD
SIST EN 62689-2:2017

01-november-2017

Tokovna in napetostna zaznavala in detektorji, ki se uporabljajo za javljanje mesta okvare - 2. del: Sistemski vidiki (IEC 62689-2:2016)

Current and voltage sensors or detectors, to be used for fault passage indication purposes - Part 2: System aspects (IEC 62689-2:2016)

Ta slovenski standard je istoveten z: EN 62689-2:2017

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

SIST EN 62689-2:2017 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62689-2

September 2017

ICS 17.220.20

English Version

Current and voltage sensors or detectors, to be used for fault passage indication purposes - Part 2: System aspects (IEC 62689-2:2016)

Capteurs ou détecteurs de courant et de tension, à utiliser pour indiquer le passage d'un courant de défaut - Partie 2: Aspects systèmes (IEC 62689-2:2016)

Strom- und Spannungs-Sensoren oder Anzeigegeräte zur Erkennung von Kurz- und Erdschlüssen - Teil 2: Systemaspekte (IEC 62689-2:2016)

This European Standard was approved by CENELEC on 2017-06-17. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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 62689-2:2017 E

European foreword

The text of document 38/504/FDIS, future edition 1 of IEC 62689-2, prepared by IEC/TC 38 "Instrument transformers" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62689-2:2017.

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)	2018-03-22
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-09-22

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

Endorsement notice

The text of the International Standard IEC 62689-2:2016 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 60721-3-4	NOTE	Harmonized as EN 60721-3-4.
IEC 60870-5-101	NOTE	Harmonized as EN 60870-5-101.
IEC 60870-5-104	NOTE	Harmonized as EN 60870-5-104.
IEC 61850-7-2	NOTE	Harmonized as EN 61850-7-2.
IEC 61850-7-3	NOTE	Harmonized as EN 61850-7-3.
IEC 61869-1	NOTE	Harmonized as EN 61869-1.
IEC 61869-4	NOTE	Harmonized as EN 61869-4.
IEC 61869-6	NOTE	Harmonized as EN 61869-6.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where 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 62689-1	-	Current and voltage sensors or detectors, to be used for fault passage indication purposes - Part 1: General principles and requirements	EN 62689-1	-

IEC 62689-2

Edition 1.0 2016-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Current and voltage sensors or detectors, to be used for fault passage indication purposes – Part 2: System aspects

Capteurs ou détecteurs de courant et de tension, à utiliser pour indiquer le passage d'un courant de défaut – Partie 2: Aspects systèmes

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 17.220.20

ISBN 978-2-8322-3385-6

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

CURRENT AND VOLTAGE SENSORS OR DETECTORS, TO BE USED FOR FAULT PASSAGE INDICATION PURPOSES –

Part 2: System aspects

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.

International Standard IEC 62689-2 has been prepared by IEC technical committee 38: Instrument transformers.

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

FDIS	Report on voting
38/504/FDIS	38/511/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.

A list of all the parts in the IEC 62689 series, under the general title *Current and voltage sensors or detectors, to be used for fault passage indication purposes,* 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 proper 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, only using 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.

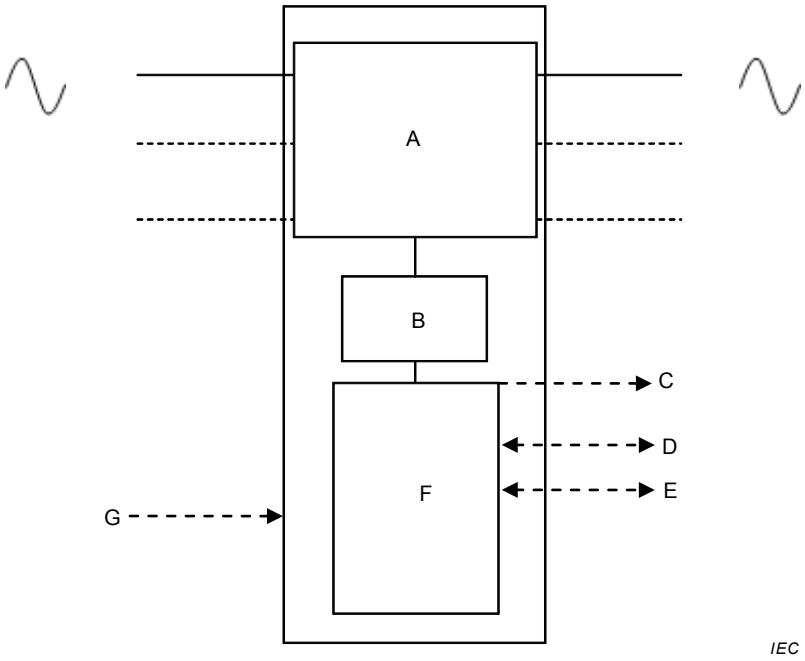
Profound experience with deep integration between electronics and instrument transformers has yet to be gathered on a broader basis, as this type of equipment is not yet widespread in the industry.

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.



Key

A Current (and, if necessary, voltage) sensors. 1 or 3 phases may be monitored.

B Transmission of signals between sensors and electronics.

C: Local indications (lamps, LEDs, flags, etc.).

D Analogue, digital and/or communication inputs/outputs for remote communication/commands (hard wired and/or wireless).

E Connections to field apparatus.

F Signal conditioning, processing and indicating unit (CPIU).

G Power supply.

Current sensor(s) may detect fault current passages without any need of galvanic connection to the phase(s) (for instance in case of cable type current sensors or of magnetic field sensor).

Not all the above listed parts or functions are necessarily included in the FPI, depending on its complexity and on its technology. However, at least 1 one of C or D functions shall be present.

Figure 1 – General architecture of an FPI

0.2 Position of this standard in relation to the IEC 61850 series

The IEC 61850 series is intended to be used for communication and systems to support power utility automation.

The IEC 62689 series will also introduce a dedicated namespace to support integration of FPIs/DSUs into power utility automation.

In addition, it defines proper data models and different profiles of communication interfaces to support the different use cases of these FPIs/DSUs.

Some of these use cases rely on the concept of extended substation, which is intended as the communication among intelligent electronic devices (IED) through IEC 61850 located both along MV feeders and in the main substation, for the most sophisticated FPI versions (and therefore DSUs) (for smart grid applications, for instance). Such a profile may not be limited to FPI/DSU devices, but may embrace features needed to support extensions of these substations along the MV feeders connected to the main substation themselves.

CURRENT AND VOLTAGE SENSORS OR DETECTORS, TO BE USED FOR FAULT PASSAGE INDICATION PURPOSES –

Part 2: System aspects

1 Scope

This part of IEC 62689 describes electric phenomena and electric system behaviour during faults, according to the most widely diffused distribution system architecture and to fault typologies, to define the functional requirements for fault passage indicators (FPI) and distribution substation units (DSU) (including their current and/or voltage sensors), which are, respectively, a device or a device/combination of devices and/or of functions able to detect faults and provide indications about their localization.

By localization of the fault is meant the fault position with respect to the FPI/DSU installation point on the network (upstream or downstream from the FPI/DSU's location) or the direction of the fault current flowing through the FPI itself. The fault localization may be obtained

- directly from the FPI/DSU, or
- from a central system using information from more FPIs or DSUs,

considering the features and the operating conditions of the electric system where the FPIs/DSUs are installed.

This part of IEC 62689 is therefore aimed at helping users in the appropriate choice of FPIs/DSUs (or of a system based on FPI/DSU information) properly operating in their networks, considering adopted solutions and operation rules (defined by tradition and/or depending on possible constraints concerning continuity and quality of voltage supply defined by a national regulator), and also taking into account complexity of the apparatus and consequent cost.

This part of IEC 62689 is mainly focused on system behaviour during faults, which is the "core" of FPI/DSU fault detection capability classes described in IEC 62689-1, where all requirements are specified in detail.

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 62689-1, *Current and voltage sensors or detectors, to be used for fault passage indication purposes – Part 1: General principles and requirements*

3 Terms, definitions, abbreviations and symbols

For the purposes of this document, the terms and definitions given in IEC 62689-1 and the following apply.