CSA GROUP
GROUPE CSA

**CSA C61869-10:20**
(IEC 61869-10:2017, MOD)
National Standard of Canada
Norme nationale du Canada

**CSA C61869-10:20**
**Instrument transformers — Part 10: Additional requirements for low-power passive current transformers**
(IEC 61869-10:2017, MOD)

**CSA C61869-10:20**
**Transformateurs de mesure — Partie 10 : Exigences supplémentaires concernant les transformateurs de courant passifs de faible puissance**
(IEC 61869-10:2017, MOD)



IEC

Standards Council of Canada
Conseil canadien des normes

# *Standards Update Service*

## *CSA C61869-10:20*
## *May 2020*

**Title:** *Instrument transformers — Part 10: Additional requirements for low-power passive current transformers*

To register for e-mail notification about any updates to this publication
- go to **store.csagroup.org**
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2427386**.

If you require assistance, please e-mail **techsupport@csagroup.org** or call 416-747-2233.

Visit CSA Group's policy on privacy at **www.csagroup.org/legal** to find out how we protect your personal information.

**Canadian Standards Association (operating as "CSA Group")**, under whose auspices this National Standard has been produced, was chartered in 1919 and accredited by the Standards Council of Canada to the National Standards system in 1973. It is a not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities.

CSA Group standards reflect a national consensus of producers and users — including manufacturers, consumers, retailers, unions and professional organizations, and governmental agencies. The standards are used widely by industry and commerce and often adopted by municipal, provincial, and federal governments in their regulations, particularly in the fields of health, safety, building and construction, and the environment.

Individuals, companies, and associations across Canada indicate their support for CSA Group's standards development by volunteering their time and skills to Committee work and supporting CSA Group's objectives through sustaining memberships. The more than 7000 committee volunteers and the 2000 sustaining memberships together form CSA Group's total membership from which its Directors are chosen. Sustaining memberships represent a major source of income for CSA Group's standards development activities.

CSA Group offers certification and testing services in support of and as an extension to its standards development activities. To ensure the integrity of its certification process, CSA Group regularly and continually audits and inspects products that bear the CSA Group Mark.

In addition to its head office and laboratory complex in Toronto, CSA Group has regional branch offices in major centres across Canada and inspection and testing agencies in eight countries. Since 1919, CSA Group has developed the necessary expertise to meet its corporate mission: CSA Group is an independent service organization whose mission is to provide an open and effective forum for activities facilitating the exchange of goods and services through the use of standards, certification and related services to meet national and international needs.

For further information on CSA Group services, write to
CSA Group
178 Rexdale Boulevard
Toronto, Ontario, M9W 1R3
Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at www.scc.ca.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

Standards Council of Canada
600-55 Metcalfe Street
Ottawa, Ontario, K1P 6L5
Canada

Standards Council of Canada
Conseil canadien des normes

Cette Norme Nationale du Canada est disponible en versions française et anglaise.

*Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users to judge its suitability for their particular purpose.*

*National Standard of Canada*

# *CSA C61869-10:20*

# ***Instrument transformers — Part 10: Additional requirements for low-power passive current transformers***

*(IEC 61869-10:2017, MOD)*

*Prepared by*
*International Electrotechnical Commission*

*Reviewed by*

*® A trademark of the Canadian Standards Association, operating as "CSA Group"*

*Published in May 2020 by CSA Group*
*A not-for-profit private sector organization*
*178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at store.csagroup.org or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 17.220.20*
*ISBN 978-1-4883-2760-5*

# *CSA C61869-10:20*
# *Instrument transformers — Part 10: Additional requirements for low-power passive current transformers*
# *(IEC 61869-10:2017, MOD)*

## *CSA Preface*

This is the first edition of CSA C61869-10, *Instrument transformers — Part 10: Additional requirements for low-power passive current transformers,* which is an adoption, with Canadian deviations, of the identically titled IEC (International Electrotechnical Commission) Standard 61869-10 (first edition, 2017-12). It replaces relevant parts of CAN/CSA-C60044-8:07 (adopted IEC 60044-8:2002), *Instrument transformers — Part 8: Electronic current transformers.* It is part of the CSA C61869 series of Standards on instrument transformers, which consists of adoptions with Canadian deviations of the IEC 61869 series of Standards.

For brevity, this Standard will be referred to as "CSA C61869-10" throughout.

This Standard is intended to be used in conjunction with CAN/CSA-C61869-1:14, *Instrument transformers — Part 1: General requirements* (adopted IEC 61869-1:2007, with Canadian deviations); and CSA C61869-6:20, *Instrument transformers — Part 6: Additional general requirements for low-power instrument transformers* (adopted IEC 61869-6:2016, with Canadian deviations).

Requirements common to all instrument transformer types are grouped in CAN/CSA-C61869-1. Requirements specific to conventional instrument transformer types are grouped in CAN/CSA-C61869-2, CAN/CSA-C61869-3, CAN/CSA-C61869-4, and CAN/CSA-C61869-5. Those CSA Group Standards present many inherited Canadian deviations justified by the specific conditions, practices, and regulations in Canada.

Requirements common to low-power instrument transformers (LPIT) used for ac applications having rated frequencies from 15 Hz to 100 Hz covering MV, HV, and EHV or used for dc applications are grouped in CSA C61869-6.

The remaining standards in the series state requirements for specific types of instrument transformers.

Canada has actively participated in the development of IEC 61869-10, in order to enforce specific Canadian conditions. It should be noted that Parts 6 to 13 of the IEC 61869 series specify the requirements for ac LPIT as well as the interfaces necessary to implement the LPIT into an integrated system for protection and measurement. Such a system uses a universal digital transmission protocol compatible with IEC 61850, and has a digital output. In order to ensure full interoperability, Canadian deviations in CSA C61869-10 are minimal.

This Standard was reviewed for Canadian adoption by the CSA Technical Committee on Instrument Transformers, under the jurisdiction of the CSA Strategic Steering Committee on Power Engineering and Electromagnetic Compatibility, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.



*Inquiries regarding this National Standard of Canada should be addressed to*
*CSA Group*
*178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*
*1-800-463-6727 • 416-747-4000*
*www.csagroup.org*

*To purchase standards and related publications, visit our Online Store at store.csagroup.org or call toll-free 1-800-463-6727 or 416-747-4044.*

*This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line:*

a) *Standard designation (number);*
b) *relevant clause, table, and/or figure number;*
c) *wording of the proposed change; and*
d) *rationale for the change.*

# *Canadian deviations*

The following deviations are intended to meet local product requirements and to align with electromagnetic compatibility requirements of relevant Canadian regulators.

International Standard IEC 61869-10:2017 (first edition) forms the basis for CSA C61869-10, which contains the following deviations in addition to those shown in CAN/CSA-C61869-1:14 and CSA C61869-6:20.

*[Replace all references to "IEC 61869-1" with "CAN/CSA-C61869-1"]*

*[Replace all references to "IEC 61869-6" with "CSA C61869-6"]*

## 1 Scope

*[Add the following note]*

**Note 1A:** *Measurement Canada and other local authorities should be contacted and consulted in regard to the applicable specifications and requirements for revenue metering.*

## 2 Normative references

*[Add the following]*

In this Standard, any reference to International Standards shall be replaced by the relevant National Standard of Canada.

Where reference is made to CSA Group publications, such reference shall be considered to refer to the latest edition and all amendments published to that edition. This Standard refers to the following publications, and the years shown indicate the latest editions available at the time of printing:

**CSA Group**

CAN/CSA-C61869-1:14 (R2019)
*Instrument transformers — Part 1: General requirements*

CAN/CSA-C61869-2:14 (R2019)
*Instrument transformers — Part 2: Additional requirements for current transformers*

CAN/CSA-C61869-3:14 (R2019)
*Instrument transformers — Part 3: Additional requirements for inductive voltage transformers*

CAN/CSA-C61869-4:14 (R2019)
*Instrument transformers — Part 4: Additional requirements for combined transformers*

CAN/CSA-C61869-5:15 (R2019)
*Instrument transformers — Part 5: Additional requirements for capacitor voltage transformers*

CSA C61869-6:20
*Instrument transformers — Part 6: Additional general requirements for low-power instrument transformers*

IEC 61869-10

Edition 1.0 2017-12

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

colour inside

## Instrument transformers –
## Part 10: Additional requirements for low-power passive current transformers

## Transformateurs de mesure –
## Partie 10: Exigences supplémentaires concernant les transformateurs de courant passifs de faible puissance



IEC 61869-10:2017-12

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
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 corrigenda or an amendment might have been published.

**IEC Catalogue - webstore.iec.ch/catalogue**
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

**IEC publications search - www.iec.ch/searchpub**
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 also once a month by email.

**Electropedia - www.electropedia.org**
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**IEC Glossary - std.iec.ch/glossary**
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

**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: csc@iec.ch.

---

**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.

**Catalogue IEC - webstore.iec.ch/catalogue**
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

**Recherche de publications IEC - www.iec.ch/searchpub**
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 aussi une fois par mois par email.

**Electropedia - www.electropedia.org**
Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

**Glossaire IEC - std.iec.ch/glossary**
65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

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

IEC 61869-10

Edition 1.0 2017-12

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

colour inside

## Instrument transformers –
## Part 10: Additional requirements for low-power passive current transformers

## Transformateurs de mesure –
## Partie 10: Exigences supplémentaires concernant les transformateurs de courant passifs de faible puissance

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.220.20

# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

# INSTRUMENT TRANSFORMERS –

# Part 10: Additional requirements for low-power passive current transformers

## 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 61869-10 has been prepared IEC technical committee 38: Instrument transformers.

This first edition of IEC 61869-10, together with IEC 61869-1, IEC 61869-6, IEC 61869-8 and IEC 61869-9, cancels and replaces the first edition of IEC 60044-8, published in 2002[1]. This edition constitutes a technical revision.

The technical changes concern IEC TC 38's decision to restructure the whole set of stand-alone standards in the IEC 60044 series and transform it into a new set of standards composed of general requirements documents and specific requirements documents.

[1] IEC 60044-8 will eventually be replaced by the IEC 61869 series, but until all the relevant parts of the IEC 61869 series will be published, this standard is still in force.

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

| FDIS | Report on voting |
|---|---|
| 38/550/FDIS | 38/551/RVD |

Full information on the voting for the approval of this part of IEC 61869 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 standard is Part 10 of IEC 61869, published under the general title *Instrument transformers.*

This Part 10 is to be read in conjunction with, and is based on, IEC 61869-1:2007, *General requirements* and IEC 61869-6:2016, *Additional general requirements for low-power instrument transformers* – however, the reader is encouraged to use the most recent edition of these documents.

This Part 10 follows the structure of IEC 61869-1:2007 and IEC 61869-6:2016 and supplements or modifies the corresponding clauses.

When a particular subclause of Part 1or part 6 is not mentioned in this Part 10, that subclause applies. When this part of IEC 61869 states “addition”, “modification” or “replacement”, the relevant text in part 1 or part 6 is to be adapted accordingly.

For additional clauses, subclauses, figures, tables, annexes or note, the following numbering system is used:

– clauses, subclauses, tables, figures and notes that are numbered starting from 1001 are additional to those in Part 1 and Part 6;
– additional annexes are lettered 10A, 10B, etc.

An overview of the planned set of standards at the date of publication of this document is given below. The updated list of standards issued by IEC TC 38 is available on the IEC website.

| PRODUCT FAMILY STANDARDS | | PRODUCT STANDARD | PRODUCTS | OLD STANDARD |
|---|---|---|---|---|
| IEC 61869-1<br>GENERAL REQUIREMENTS | | IEC 61869-2 | ADDITIONAL REQUIREMENTS FOR CURRENT TRANSFORMERS | IEC 60044-1<br>IEC 60044-6 |
| | | IEC 61869-3 | ADDITIONAL REQUIREMENTS FOR INDUCTIVE VOLTAGE TRANSFORMERS | IEC 60044-2 |
| | | IEC 61869-4 | ADDITIONAL REQUIREMENTS FOR COMBINED TRANSFORMERS | IEC 60044-3 |
| | | IEC 61869-5 | ADDITIONAL REQUIREMENTS FOR CAPACITIVE VOLTAGE TRANSFORMERS | IEC 60044-5 |
| | IEC 61869-6<br>ADDITIONAL GENERAL REQUIREMENTS FOR LOW-POWER INSTRUMENT TRANSFORMERS | IEC 61869-7 | ADDITIONAL REQUIREMENTS FOR ELECTRONIC VOLTAGE TRANSFORMERS | IEC 60044-7 |
| | | IEC 61869-8 | SPECIFIC REQUIREMENTS FOR ELECTRONIC CURRENT TRANSFORMERS | IEC 60044-8 |
| | | IEC 61869-9 | DIGITAL INTERFACE FOR INSTRUMENT TRANSFORMERS | |
| | | IEC 61869-10 | ADDITIONAL REQUIREMENTS FOR LOW-POWER PASSIVE CURRENT TRANSFORMERS | |
| | | IEC 61869-11 | ADDITIONAL REQUIREMENTS FOR LOW-POWER PASSIVE VOLTAGE TRANSFORMERS | IEC 60044-7 |
| | | IEC 61869-12 | ADDITIONAL REQUIREMENTS FOR COMBINED ELECTRONIC INSTRUMENT TRANSFORMER OR COMBINED LOW-POWER PASSIVE INSTRUMENT TRANSFORMERS | |
| | | IEC 61869-13 | STAND-ALONE MERGING UNIT | |
| | | IEC 61869-14 | ADDITIONAL REQUIREMENTS FOR CURRENT TRANSFORMERS FOR DC APPLICATIONS | |
| | | IEC 61869-15 | ADDITIONAL REQUIREMENTS FOR VOLTAGE TRANSFORMERS FOR DC APPLICATIONS | |

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

Low-power passive current transformers (LPCT) are based on passive technologies without any active electronic components. They can have an output signal proportional to the primary current, for example iron core coils with integrated shunt as a current to voltage converter (primary converter) or they can have an output signal proportional to the derivative of the primary current, for example air-core coils (Rogowski coils). This part of IEC 61869 does not cover the air-core coils with active integrator.

According to a general block diagram given in Figure 601 of IEC 61869-6:2016, the low-power passive current transformers do not use an active primary converter (i.e. without any active electronic component); therefore, there is no need for primary power supply. Additionally, neither the secondary converter nor the secondary power supply is used.

The general block diagram of a low-power passive current transformer is given in Figure 1001.

The applied technology decides which part is necessary for the realization of a low-power passive current transformer, i.e. it is not absolutely necessary that the transmitting cable or primary converter described in Figure 1001 be included in the low-power passive current transformer. The derivative LPCT solution considers only the air-core coil as the primary sensor and the transmission cable as the transmitting system. In this technology, the primary converter is not considered. In case of a proportional LPCT solution, the ferromagnetic-core coil is considered as the primary sensor, a burden resistance connected directly to the coil outputs works as a primary converter and the transmission cable is a transmitting system.

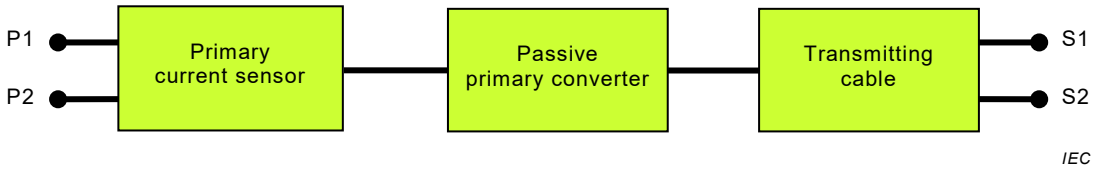


**Figure 1001 – General block diagram of a single-phase low-power passive current transformer**

# INSTRUMENT TRANSFORMERS –

# Part 10: Additional requirements for low-power passive current transformers

## 1 Scope

This part of IEC 61869 is a product standard and covers only additional requirements for low-power passive current transformers. The product standard for low-power passive current transformers comprises IEC 61869-1, together with IEC 61869-6 and this document with specific requirements.

This document is applicable to newly manufactured low-power passive current transformers with analogue output for use with electrical measuring instruments or electrical protective devices having a rated frequency from 15 Hz to 100 Hz.

This document covers low-power passive current transformers used for measurement or protection and multi-purpose low-power passive current transformers used for both measurement and protection.

Subclause 5.6.1001 covers the accuracy requirements that are necessary for low-power passive current transformers for use with electrical measuring instruments.

Subclause 5.6.1002 covers the accuracy requirements that are necessary for low-power passive current transformers for use with electrical protective relays, and particularly for forms of protection in which the prime requirement is to maintain the accuracy up to several times the rated current. If required, the transient accuracy of low-power passive current transformers during fault is also given in 5.6.1002.

Low-power passive current transformers have analogue voltage output only (for digital output or for technology using any kind of active electronic components refer to IEC 61869-8[2]). Such low-power passive current transformers can include the secondary signal cable (transmitting cable). The principle of operation of derivative low-power passive current transformers using air-core coils (Rogowski coils) is given in Annex 10B and the principle of operation of proportional low-power passive current transformers using iron-core coils with integrated shunt is given in Annex 10C.

## 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.

Clause 2 of IEC 61869-6:2016 is applicable with the following additions:

IEC 60059, *IEC standard current ratings*

IEC 61869-6:2016, I*nstrument transformers – Part 6: Additional general requirements for low-power instrument transformers*

2 Under preparation.