

AS 61869.4:2021



STANDARDS  
Australia



# Instrument transformers

**Part 4: Additional requirements for combined transformers  
(IEC 61869-4:2013 (ED.1.0) MOD)**

currently in preview, click buy full version

AS 61869.4:2021

This Australian Standard® was prepared by EL-013, Measurement and Protection Transformers. It was approved on behalf of the Council of Standards Australia on 15 February 2021.

This Standard was published on 26 February 2021.

The following are represented on Committee EL-013:

Australian Industry Group  
Energy Networks Australia  
Engineers Australia  
National Measurement Institute  
University of South Australia

This Standard was issued in draft form for comment as DR AS 61869.4:2020.

**Keeping Standards up-to-date**

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

[www.standards.org.au](http://www.standards.org.au)

ISBN 978 1 76113 226 1

# Instrument transformers

## Part 4: Additional requirements for combined transformers (IEC 61869-4:2013 (ED.1.0) MOD)

Originated as AS 60044.3—2004  
Revised and redesignated as AS 61869.4:2021.



© IEC 2021 — All rights reserved  
© Standards Australia Limited 2021

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of either the IEC or the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth). If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please see the contact details on the back cover or the contact us page of the website for further information.

## Preface

This Standard was prepared by the Standards Australia Committee EL-013, Measurement and Protection Transformers, to supersede AS 60044.3—2004, *Instrument transformers, Part 3: Combined transformers*.

The objective of this document is to apply to newly-manufactured combined transformers for use with electrical measuring instruments and electrical protective devices at frequencies from 15 Hz to 100 Hz.

The requirements and tests of this document, in addition to the requirements and tests of AS 61869.1, AS 61869.2 and AS 61869.3 cover current and inductive voltage transformers that are necessary for combined instrument transformers.

This document is an adoption with national modifications, and has been reproduced from, IEC 61869-4:2013, *Instrument transformers — Part 4: Additional requirements for combined transformers*. The modifications are additional requirements and are set out in [Appendix ZZ](#), which has been added at the end of the source text.

[Appendix ZZ](#) lists the variations to IEC 61869-4:2013 (ED.1.0) for the application of this document in Australia.

As this document has been reproduced from an International Standard, the following applies:

- (a) In the source text “this part of 61869” should read “this document”.
- (b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

NOTES

Currently in preview, click buy full version

CONTENTS

FOREWORD .....3

1 Scope .....7

2 Normative references .....7

3 Terms, definitions and abbreviations .....7

4 Normal and special service conditions .....10

5 Ratings .....10

6 Design and construction .....10

7 Tests .....11

8 Rules for transport, storage, erection, operation and maintenance.....18

9 Safety .....18

10 Influence of products on the natural environment.....18

Annexes .....18

Annex 4A (normative) The mutual influence of current and voltage transformers .....19

Figure 401 – Geometrical construction of the circuit.....14

Figure 402 – Measurement 4 .....16

Figure 403 – Measurement 5 .....16

Figure 404 – Error diagram of a voltage transformer class 0,2 .....17

Figure 405 – Error diagram of a current transformer class 0,2 at 5 % of rated current.....17

Figure 4A.1 – Current conductor and magnetic field influencing a voltage transformer .....20

Table 10 – List of tests.....11

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## INSTRUMENT TRANSFORMERS –

## Part 4: Additional requirements for combined 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.

This International Standard IEC 61869-4 has been prepared by IEC technical committee 38: Instrument transformers.

This standard replaces IEC 60044-3: Combined transformers.

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

FDIS	Report on voting
38/468/FDIS	38/472/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 standard is Part 4 of IEC 61869, published under the general title *Instrument transformers*.

This Part 4 is to be read in conjunction with, and is based on, IEC 61869-1 *General Requirements* – first edition (2007), IEC 61869-2, *Additional requirements for current transformers* first edition (2012) and IEC 61869-3, *Additional requirements for inductive voltage transformers* first edition (2011) – however, the reader is encouraged to use the most recent edition of these documents.

This Part 4 follows the structure of IEC 61869-1, IEC 61869-2 and IEC 61869-3 and supplements or modifies its corresponding clauses.

When a particular subclause of Part 1, 2 or 3 is not mentioned in this Part 4, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1, 2 or 3 is to be adapted accordingly.

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

- clauses, subclauses, tables and figures that are numbered starting from 01 are additional to those in Part 1, 2 or 3;
- additional annexes are lettered 4A, 4B, 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 (TC37) is available at the website: [www.iec.ch](http://www.iec.ch)

The contents of the corrigendum of August 2014 have been included in this copy.

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

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.

Currently in preview, click buy full version

## INSTRUMENT TRANSFORMERS –

### Part 4: Additional requirements for combined transformers

#### 1 Scope

This part of IEC 61869 applies to newly-manufactured combined transformers for use with electrical measuring instruments and electrical protective devices at frequencies from 15 Hz to 100 Hz.

The requirements and tests of this standard, in addition to the requirements and tests of IEC 61869-1, IEC 61869-2 and IEC 61869-3 cover current and inductive voltage transformers that are necessary for combined instrument transformers.

#### 2 Normative references

Clause 2 of IEC 61869-1:2007 is applicable with the following modifications:

*Addition:*

IEC 60028, *International Standard of resistance for copper*

IEC 60038, *IEC standard voltages*

IEC 61869-1:2007, *Instrument Transformers – Part 1: General requirements*

IEC 61869-2:2012, *Instrument Transformers – Part 2: Additional requirements for current transformers*

IEC 61869-3:2011, *Instrument Transformers – Part 3: Additional requirements for inductive voltage transformers*

#### 3 Terms, definitions and abbreviations

For the purposes of this document, the terms and definitions given in IEC 61869-1:2007, IEC 61869-2:2012 and IEC 61869-3:2011, as well as the following apply.

##### 3.1 General definitions

###### 3.1.401

###### **combined instrument transformer**

instrument transformer consisting of a current and a voltage transformer in the same enclosure

###### 3.1.402

###### **error of voltage transformer**

$\epsilon_v$

ratio error of voltage transformer determined with disconnected current transformer