IEC 62505-3-2

Edition 2.0 2020-03

INTERNATIONAL STANDARD

This document is a preview generated by EVS

Railway applications – Fixed installations – Particular requirements for AC switchgear –
Part 3-2: Measurement, control and protection devices for specific use in AC traction systems – Current transformers



IEC 62505-3-2:2020-03(en)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

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

Tel.: +41 22 919 02 11
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 corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
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 It also gives information on projects, replaced and withdrawn publications.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 once a month by email.

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: sales@iec.ch.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries 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
67 000 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.

This document is a preview generated by EVS

IEC 62505-3-2

Edition 2.0 2020-03

INTERNATIONAL STANDARD

This document is a preview generated by EVS

Railway applications – Fixed installations – Particular requirements for AC switchgear –
Part 3-2: Measurement, control and protection devices for specific use in AC traction systems – Current transformers

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 45.060.01

ISBN 978-2-8322-7851-2

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms, definitions and abbreviated terms 7
3.1 Terms and definitions 7
3.2 Abbreviated terms 8
4 Service conditions 8
5 Rating 8
5.1 General 8
5.2 Nominal voltage (U_n) 8
5.3 Rated voltage (U_{Ne}) 9
5.4 Insulation coordination 9
5.4.1 General 9
5.4.2 Rated insulation level 9
5.5 Rated frequency 10
5.6 Rated accuracy classes 10
6 Design and construction 11
6.1 General 11
6.2 Transformer construction 11
6.3 Requirements for the external insulation 11
6.4 Electromagnetic compatibility (EMC) 11
6.5 Nameplates 11
7 Tests 11
7.1 General 11
7.2 Electromagnetic compatibility tests (EMC) 12
7.3 Partial discharge test 12
8 Rules for transport, storage, erection, operation and maintenance 12
9 Safety 12
10 Influence of the product on the environment 12
11 Information to be given with enquiries, tenders and orders 12
Bibliography 13

Table 1 – Nominal voltages (U_n), rated voltages (U_{Ne}), rated impulse voltages (U_{Ni}) and power-frequency withstand voltages (U_d) for circuits connected to the contact line 10
Table 2 – Partial discharge test voltages and permissible levels 12

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

RAILWAY APPLICATIONS – FIXED INSTALLATIONS – PARTICULAR REQUIREMENTS FOR AC SWITCHGEAR –

Part 3-2: Measurement, control and protection devices for specific use in AC traction systems – Current transformers

This document is a preview generated by EVS

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 62505-3-2 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– this standard was revised to reflect the latest versions of standards referenced and to remove text already included in the IEC 61869 series.
– the structure of the document was adapted to that of IEC 62505-1 and IEC 62505-2.
– ratings have been added to provide designations in line with other railway standards, for example IEC 62497.

– test requirements have been detailed to meet operating conditions of railway applications.
– partial discharge voltages have been specified in Table 2.

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

FDIS	Report on voting
9/2564/FDIS	9/2576/RVD

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

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

This standard is to be read in conjunction with IEC 61869-1:2007 and IEC 61869-2:2012 (see Introduction).

A list of all parts in the IEC 62505 series, published under the general title *Railway applications – Fixed installations – Particular requirements for AC switchgear*, can be found on the IEC website.

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

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

A bilingual version of this publication may be issued at a later date.

This document is a preview generated by EVS

INTRODUCTION

Where a particular clause/subclause of IEC 61869-2 is not mentioned in this standard, that clause/subclause applies as far as reasonable. Where requirements relate exclusively to three-phase systems or to voltages outside those in use in traction systems, they are not applicable. Where this standard states “addition” or “replacement”, the relevant text of IEC 61869-2 is to be adapted accordingly.

The numbering of clauses in the IEC 61869 series is similar to that in the IEC 62505 series.

Where terms defined in IEC 61869-1 and IEC 61869-2 conflict with definitions of the same terms as given in IEC 60050-811:2017 or of the other railway applications documents listed in the normative references, the definitions in IEC 61869-1 and IEC 61869-2 are to be used.

NOTE The suffix N which appears in this document for rated values is not present in IEC 61869-1 and IEC 61869-2.

References in subclauses of IEC 61869-1 and IEC 61869-2 have to be replaced by references to applicable subclauses in this document as far as reasonably possible.

This document is a preview generated by EVS

RAILWAY APPLICATIONS – FIXED INSTALLATIONS – PARTICULAR REQUIREMENTS FOR AC SWITCHGEAR –

Part 3-2: Measurement, control and protection devices for specific use in AC traction systems – Current transformers

This document is a preview generated by EVS

1 Scope

This part of IEC 62505 is applicable to new current transformers which are:

– intended for use in indoor or outdoor fixed installations in traction systems, and

– operated with an AC line voltage and frequency as specified in IEC 60850.

NOTE 1 IEC 60850 specifies the AC traction systems:
15 kV 16,7 Hz,
12 kV 25 Hz,
12,5 kV, 20 kV also 25 kV with 50 Hz and
12,5 kV, 20 kV, 25 kV also 50 kV with 60 Hz z.

NOTE 2 As rails of AC traction systems are typically connected to earth and included in the return current path, all phase to earth voltages are subject to the limits as given in IEC 60850. Nevertheless, conductor to conductor voltages are some times higher, e.g. in autotransformer systems.

This document does not provide specific requirements for AC traction systems supplied with a frequency of 25 Hz or with a nominal voltage of 12,5 kV or 50 kV. Nevertheless requirements set out in this document can also be used as a guidance for these systems.

This document also applies to low-voltage current transformers which are operated in a traction system with an AC line voltage and frequency as specified in IEC 60850.

NOTE 3 These are e.g. current transformers without primary conductor and primary insulation of their own, e.g. of the cable or ring core type.

Current transformers are mainly used with:

– measuring instruments,

– protective devices.

This document also applies to current transformers other than inductive types as far as reasonably possible. Requirements of this document have priority.

NOTE 4 Combined current and voltage transformers are typically not used in fixed installations in traction systems.

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.

IEC 60850:2014, *Railway applications – Supply voltages of traction systems*

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

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

IEC 62236-5:2018, *Railway applications – Electromagnetic compatibility – Part 5: Emission and immunity of fixed power supply installations and apparatus*

IEC 62497-1:2010, *Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*
IEC 62497-1:2010/AMD1:2013

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61869-1:2007, except for 3.2.1 to 3.2.9 and IEC 61869-2:2012, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

NOTE Terms 3.2.1 to 3.2.3 of IEC 61869-1:2007 address voltage definitions which are differently defined in railway systems. Terms 3.2.4 to 3.2.9 of IEC 61869-1:2007 address aspects specific to three-phase systems.

3.1.1
nominal voltage
U_{n}
suitable approximate voltage value used to designate or identify a given supply system

Note 1 to entry: This value is also assigned to the current transformer to show its usability in the supply system.

Note 2 to entry: An autotransformer system which is supplied with 2 phases, having a phase shift of 180° between them, is commonly named 2 × U_{n} according to the U_{n} supplied to the contact line system.

[SOURCE: IEC 62497-1:2010, 3.4.1, modified – The notes 1 and 2 to entry have been added.]

3.1.2
rated voltage
U_{Ne}
value of voltage assigned by the manufacturer to the equipment or part of it and to which operating and performance characteristics are referred

Note 1 to entry: This value is also used to determine its dielectric characteristics and will be used instead of the rated insulation voltage (U_{Nm}) as defined and used in IEC 62497 1:2010.

Note 2 to entry: The symbol U_{r} is not used for current transformers used in railway systems.

[SOURCE: IEC 62497-1:2010, 3.4.3, modified – Symbol added, wording of definition adapted and NOTE replaced by Note 1 to entry and Note 2 to entry.]

3.1.3
overvoltage category
OV
numeral defining a transient overvoltage condition

Note 1 to entry: This definition uses different wording as in other parts of the IEC 62505 series.

[SOURCE: IEC 60050-581:2008, 581-21-02, modified – The Note 1 to entry has been added.]

This document is a preview generated by EVS