

IEEE Recommended Practice for Terminology Used for Direct Current Electric Transit Overhead Contact Systems

IEEE Vehicular Technology Society

Developed by the
Rail Transit Standards Committee

IEEE Std 1791™-2019

Currently in preview, click buy full version

IEEE Recommended Practice for Terminology Used for Direct Current Electric Transit Overhead Contact Systems

Developed by the

Rail Transit Standards Committee
of the
IEEE Vehicular Technology Society

Approved 5 September 2019

IEEE SA Standards Board

Abstract: Terms used for direct current electric transit overhead contact systems are defined in this standard.

Keywords: dictionary, IEEE 1791™, light rail vehicles (LRVs) overhead contact system (OCS), trolley

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2019 by The Institute of Electrical and Electronics Engineers, Inc.
All rights reserved. Published 30 October 2019. Printed in the United States of America.

IEEE is a registered trademark in the U.S. Patent & Trademark Office, owned by The Institute of Electrical and Electronics Engineers, Incorporated.

PDF: ISBN 978-1-5044-6151-1 STD23880
Print: ISBN 978-1-5044-6152-8 STDPD23880

IEEE prohibits discrimination, harassment, and bullying.

For more information, visit <https://www.ieee.org/web/aboutus/whatis/policies/p9-26.html>.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Important Notices and Disclaimers Concerning IEEE Standards Documents

IEEE documents are made available for use subject to important notices and legal disclaimers. These notices and disclaimers, or a reference to this page, appear in all standards and may be found under the heading “Important Notices and Disclaimers Concerning IEEE Standards Documents.” They can also be obtained on request from IEEE or viewed at <https://standards.ieee.org/ipr/disclaimers.html>.

Notice and Disclaimer of Liability Concerning the Use of IEEE Standards Documents

IEEE Standards documents (standards, recommended practices, and guides), both full-use and trial-use, are developed within IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (“IEEE SA”) Standards Board. IEEE (“the Institute”) develops its standards through a consensus development process, approved by the American National Standards Institute (“ANSI”), which brings together volunteers representing varied viewpoints and interests to achieve the final product. IEEE Standards are documents developed through scientific, academic, and industry-based technical working groups. Volunteers in IEEE working groups are not necessarily members of the Institute and participate without compensation from IEEE. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

IEEE Standards do not guarantee or ensure safety, security, health, or environmental protection, or ensure against interference with or from other devices or networks. Implementers and users of IEEE Standards documents are responsible for determining and complying with all appropriate safety, security, environmental, health, and interference protection practices and all applicable laws and regulations.

IEEE does not warrant or represent the accuracy or content of the material contained in its standards, and expressly disclaims all warranties (express, implied and statutory) not included in this or any other document relating to the standard, including, but not limited to, the warranties of: merchantability; fitness for a particular purpose; non-infringement; and quality, accuracy, effectiveness, currency, or completeness of material. In addition, IEEE disclaims any and all conditions relating to: results; and workmanlike effort. IEEE standards documents are supplied “AS IS” and “WITH ALL FAULTS.”

Use of an IEEE standard is wholly voluntary. The existence of an IEEE standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change from time to time about through developments in the state of the art and comments received from users of the standard.

In publishing and making its standards available, IEEE is not suggesting or rendering professional or other services for, or on behalf of, any person or entity nor is IEEE undertaking to perform any duty owed by any other person or entity to another. Any person utilizing any IEEE Standards document, should rely upon his or her own independent judgment in the exercise of reasonable care in any given circumstances or, as appropriate, seek the advice of a competent professional in determining the appropriateness of a given IEEE standard.

IN NO EVENT SHALL IEEE BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO: PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE PUBLICATION, USE OF, OR RELIANCE UPON ANY STANDARD, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE AND REGARDLESS OF WHETHER SUCH DAMAGE WAS FORESEEABLE.

Translations

The IEEE consensus development process involves the review of documents in English only. In the event that an IEEE standard is translated, only the English version published by IEEE should be considered the approved IEEE standard.

Official statements

A statement, written or oral, that is not processed in accordance with the IEEE SA Standards Board Operations Manual shall not be considered or inferred to be the official position of IEEE or any of its committees and shall not be considered to be, or be relied upon as, a formal position of IEEE. At lectures, symposia, seminars, and educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position of IEEE.

Comments on standards

Comments for revision of IEEE Standards documents are welcome from any interested party, regardless of membership affiliation with IEEE. However, IEEE does not provide consulting information or advice pertaining to IEEE Standards documents. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Since IEEE standards represent a consensus of concerned interests, it is important that any responses to comments and questions also receive the concurrence of a balance of interests. For this reason, IEEE and the members of its societies and Standards Coordinating Committees are not able to provide an instant response to comments or questions except in those cases where the matter has previously been addressed. For the same reason, IEEE does not respond to interpretation requests. Any person who would like to participate in revisions to an IEEE standard is welcome to join the relevant IEEE working group.

Comments on standards should be submitted to the following address:

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854 USA

Laws and regulations

Users of IEEE Standards documents should consult all applicable laws and regulations. Compliance with the provisions of any IEEE Standards document does not imply compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. IEEE does not, by the publication of its standards, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

IEEE draft and approved standards are copyrighted by IEEE under US and international copyright laws. They are made available by IEEE and are adopted for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of engineering practices and methods. By making these documents available for use and adoption by public authorities and private users, IEEE does not waive any rights in copyright to the documents.

Photocopies

Subject to payment of the appropriate fee, IEEE will grant users a limited, non-exclusive license to photocopy portions of any individual standard for company or organizational internal use or individual, non-commercial use only. To arrange for payment of licensing fees, please contact Copyright Clearance Center, Customer Service, 222 Rosewood Drive, Danvers, MA 01923 USA; +1 978 750 8400. Permission to photocopy portions of any individual standard for educational classroom use can also be obtained through the Copyright Clearance Center.

Updating of IEEE Standards documents

Users of IEEE Standards documents should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of amendments, corrigenda, or errata. An official IEEE document at any point in time consists of the current edition of the document together with any amendments, corrigenda, or errata then in effect.

Every IEEE standard is subjected to review at least every 10 years. When a document is more than 10 years old and has not undergone a revision process, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE standard.

In order to determine whether a given document is the current edition and whether it has been amended through the issuance of amendments, corrigenda, or errata, visit IEEE Xplore at <https://ieeexplore.ieee.org/> or contact IEEE at the address listed previously. For more information about the IEEE SA or IEEE's standards development process, visit the IEEE SA Website at <https://standards.ieee.org/>.

Errata

Errata, if any, for IEEE standards can be accessed via <https://standards.ieee.org/standard/index.html>. Search for standard number and year of approval to access the web page of the published standard. Errata links are located under the Additional Resources Details section. Errata are also available in IEEE Xplore: <https://ieeexplore.ieee.org/browse/standards/collection/ieee/>. Users are encouraged to periodically check for errata.

Patents

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken by the IEEE with respect to the existence or validity of any patent rights in connection therewith. If a patent holder or patent applicant has filed a statement of assurance via an Accepted Letter of Assurance, then the statement is listed on the IEEE SA Website at <https://standards.ieee.org/about/sasb/patcom/patents.html>. Letters of Assurance may indicate whether the submitter is willing or unwilling to grant licenses under patent rights without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination to applicants desiring to obtain such licenses.

Essential Patent Claims may exist for which a Letter of Assurance has not been received. The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patents Claims, or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from the IEEE Standards Association.

Participants

At the time this IEEE recommended practice was completed, the 1791 Working Group had the following membership:

Chris Pagni, Chair
Steve Norton, Vice Chair

Ronald Bennell
Alan Blatchford
Mike Cormia
Ray Davis

Kristy Gerig
Ian Hays
Moses Ramos

John Schlick
Suresh Shrivastava
Paul White
Herb Zwilling

The following members of the individual Standards Association balloting group voted on this recommended practice. Balloters may have voted for approval, disapproval, or abstention.

Steven Adkins
Ronald Bennell
Steven Bezner
William Bush
William Byrd
Keith Chow
Ray Davis
Luigi Dimichele
Robert Fisher
Paul Forquer
Andrew Gillespie
Christian Girard
H. Glickenstein
John Grantham
David Gregson
Randall Groves

Lee Herron
Werner Hoelzl
Andrew Jones
Walter Keevil
Yuri Khersonsky
Jim Kulchisky
Saumen Kundu
Thomas Kurihara
Greg Luri
Michael Newman
Craig Norman
Dev Paul
Mark Pfeiffer
David R. Phelps
Moses Ramos

Shakti Sarai
Bartier Sayegh
Suresh Shrivastava
Gil Smit
Alexander Sinyak
Gregory Sisson
Ralph Stell
Rick Straubel
Raymond Strittmatter
Brandon Swartley
Gary Touryan
John Vergis
Jeffrey Wharton
Paul White
Jian Yu
Matthew Zeedyk

When the IEEE SA Standards Board approved this recommended practice on 5 September 2019, it had the following membership:

Gary Hoffman, Chair
Ted Burse, Vice Chair
Jean-Philippe Faure, Past Chair
Konstantinos Karachalios, Secretary

Masayuki Ariyoshi
Stephen J. Barnes
J. Travis Griffith
Guido Hertel
Christel Hunter
Joseph L. Koepfinger*
Thomas Koshy
John D. Kulick

David J. Law
Joseph Levy
Howard Li
Xiaohui Liu
Kevin Lu
Daleep Mohla
Andrew Myles

Annette Reilly
Dorothy Stanley
Sha Wei
Phil Wennblom
Philip Winston
Howard Wolfman
Feng Wu
Jingyi Zhou

*Member Emeritus

Introduction

This introduction is not part of IEEE Std 1791™-2019, IEEE Recommended Practice for Terminology Used for Direct Current Electric Transit Overhead Contact Systems.

This document was inspired because of confusion in the meaning and use of words in overhead contact system (OCS) projects.

Currently in preview, click buy full version

Contents

1. Overview	9
1.1 Scope	9
1.2 Purpose	9
1.3 Helpful hints on the use of the document	9
1.4 Word usage	10
2. Acronyms	10
3. Definitions	11
Annex A (informative) Bibliography	16

Currently in preview, click buy full version

IEEE Recommended Practice for Terminology Used for Direct Current Electric Transit Overhead Contact Systems

1. Overview

1.1 Scope

This recommended practice defines terms used for dc electric transit overhead contact systems (OCSs).

1.2 Purpose

This recommended practice satisfies the requirements for the uniform terminology and definition of terms used for dc electric transit overhead contact systems. This document is also intended for those who are new to OCS work.

1.3 Helpful hints on the use of this document

This document is limited to technical terms used in overhead contact systems that supply dc electrical power to heavy rail, electric light rail vehicles (LRVs), streetcars with pantographs or trolley poles, and electric trolleybuses (ETBs) with trolley poles.

Most terms defined in this document were not given in the *IEEE Standards Dictionary Online*, or were not defined in it with reference to OCS. Some terms here were defined in the *IEEE Standards Dictionary Online*, and are so annotated.

This document does NOT define terms for alternating current (ac) electrification OCS, but refers the reader to American Railway Engineering and Maintenance-of-Way Association's *Manual for Railway Engineering*, Chapter 33 [B1]¹, which are recommendations for ac OCS.

Terms, which in OCS are synonymous, are shown with: (*Syn*).

OCS style can be either catenary where the contact wire is supported from a messenger wire by hangers, or direct suspension where the contact wire is directly supported by a cross-span, bridle, trapeze, pendulum, resilient arm, bracket arm, or cantilever.

¹The numbers in brackets correspond to those of the bibliography in Annex A.