

RAUDTEEALASED RAKENDUSED. RAUDTEEVEEREM.  
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ELEKTRITOITE SÜSTEEM JA SELLE PISTIKUD

Railway applications - Rolling Stock - Three-phase shore  
(external) supply system for rail vehicles and its  
connectors

## EESTI STANDARDI EESSÕNA

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ICS 29.120.30, 45.060.01

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EUROPEAN STANDARD

**EN 50546**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2020

ICS 29.120.30; 45.060.01

Supersedes CLC/TS 50546:2013 and all of its amendments and corrigenda (if any)

English Version

## Railway applications - Rolling Stock - Three-phase shore (external) supply system for rail vehicles and its connectors

Applications ferroviaires - Matériel roulant - Système externe d'alimentation triphasée des véhicules ferroviaires par connecteurs

Bahnanwendungen - Fahrzeuge - Dreiphasiges Fremdeinspeisungssystem für Schienenfahrzeuge und zugehörige Steckverbinder

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 50546:2020) has been prepared by CLC/SC 9XB, "Electrical, electronic and electromechanical material on board rolling stock, including associated software".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-08-17
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2023-08-17

This document supersedes CLC/TS 50546:2013.

EN 50546:2020 includes the following significant technical changes with respect to CLC/TS 50546:2013:

- a) Revision of Clause 1, Scope;
- b) Revision of Clause 2, Normative references;
- c) Revision of Clause 3, Terms and definitions, with reorganization of definitions;
- d) Revision of Clause 4, General requirements, to include reference to connectors and associated shore side requirements;
- e) Introduction of new Clause 5, Classification;
- f) Introduction of new Clause 6, Connector requirements;
- g) Introduction of new Clause 7, Tests;
- h) Introduction of the following mandatory Annexes:
  - 1) Annex A, Connector design 63 A/ 125 A;
  - 2) Annex B, Connector design 600 A;
- i) Bibliography, revised and corrected.

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.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

This standardization project was derived from the EU-funded Research project MODTRAIN (MODPOWER). It is part of a series of standards, referring to each other. The hierarchy of the standards is intended to be as set out in Figure 1:

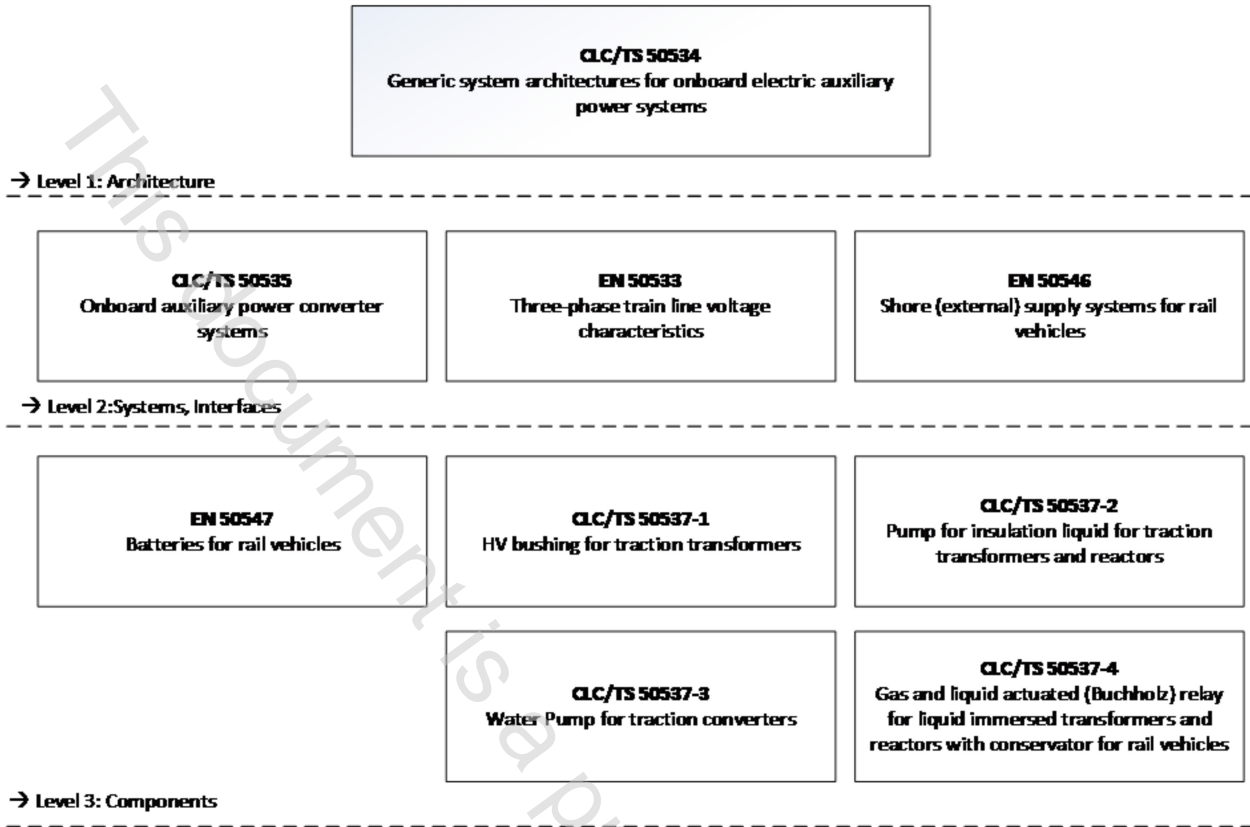


Figure 1 — Overview on the technical framework CLC/TS 50534 defines the basis for other dependent standards



## Introduction

The shore supply system is used within depots and sidings location for providing power to the auxiliary electrical supply (which may include battery charging) when the primary power supply is not available, and the train is static (0 km/h). This document defines connectors that are intermateable to provide interoperability for rolling stock that is to run across borders and has been equipped with batteries which are be charged in locations other than their normal depot or sidings location.

The connectors are dimensioned using standard rolling stock cables as set out in EN 50264-3-1:2008.

This document provides the requirements for compatibility of systems defined and good practice 3-phase AC + N; 400 V, 50 Hz shore (external) supply systems. It focuses on describing the defined interfaces regarding electrical power supply in stations, depots/workshops and sidings location into the rail vehicle.

This document provides recommended characteristics of power supply and the interface drawings for the shore supply connectors. The interface drawings are supplied to provide intermateability and interoperability of connectors. The fixed connector is provided with a protective cover to prevent any ingress when the connector is not in use.

Two connectors have been specified in this document. The first is suitable for either 63 A or 125 A shore supplies. The second is suitable for 600 A shore supplies. The 600 A connector is the existing UK standard three-phase shore supply connector which has a long service history.

## 1 Scope

This document specifies requirements for the shore supply system for auxiliaries and pre-conditioning and the related intermateable connector pairs. This standard specifies the characteristics of the connectors in order to achieve interoperability at the rolling-stock/shore power supply interface.

This document does not apply to shore supplies to move the rolling stock.

## 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.

EN 45545-2:2013+A1:2015, *Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components*

EN 50122-1:2011, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit Part 1: Protective provisions against electric shock*

EN 50124-1:2017, *Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*

EN 50125-1:2014, *Railway applications – Environmental conditions for equipment Part 1: Rolling stock and on-board equipment*

EN 50153:2014, *Railway applications – Rolling stock – Protective provisions relating to electrical hazards*

EN 50160, *Voltage characteristics of electricity supplied by public electricity networks*

EN 50264-3-1:2008, *Railway applications – Railway rolling stock power and control cables having special fire performance – Part 3-1: Cables with crosslinked elastomeric insulation with reduced dimensions – Single core cables*

EN 50467:2011, *Railway applications – Rolling stock – Electrical connectors, requirements and test methods*

EN 50533:2011<sup>1)</sup>, *Railway applications – Three-phase train line voltage characteristics*

EN 60512-1-4:1997, *Electromechanical components for electronic equipment - Basic testing procedures and measuring methods - Part 1: General - Section 4: Test 1d: Contact protection effectiveness (scoop-proof) (IEC 60512-1-4:1997)*

EN 60529:1991<sup>2)</sup>, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 61373:2010, *Railway applications - Rolling stock equipment - Shock and vibration tests (IEC 61373:2010)*

EN ISO 4892-2:2013, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013)*

ISO 1431-1:2012, *Rubber, vulcanized or thermoplastic – Resistance to ozone cracking – Part 1: Static and dynamic strain testing*

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1) Currently impacted by EN 50533:2011/A1:2016.

2) Currently impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/AC:2016-12.