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

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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EN 50546

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English Version

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

Applications ferroviaires - Matériel roulant - Système d'alimentation à quai (externe) 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

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European foreword

This document (EN 50546:2024) 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) 2025-07-29
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2027-07-29

This document supersedes EN 50546:2020 and all of its amendments and corrigenda (if any).

EN 50546:2024 includes the following significant technical changes with respect to EN 50546:2020:

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) Introduction of new Clause 4, System overview;

e) Introduction of new Clause 5 (revision and completion of previous Clause 4), General requirements;

f) The previous Clause 5 contents where redistributed among other clauses;

g) Updates of Clause 6, Connector requirements;

h) Updates of Clause 7, Tests;

i) Updates of the following mandatory Annexes:

   1) Annex A, Connector design 63/125 A;

   2) Annex B, Connector design 600 A;

j) New Annex C (Informative), Explanations about some protection features;

k) 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 standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

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:

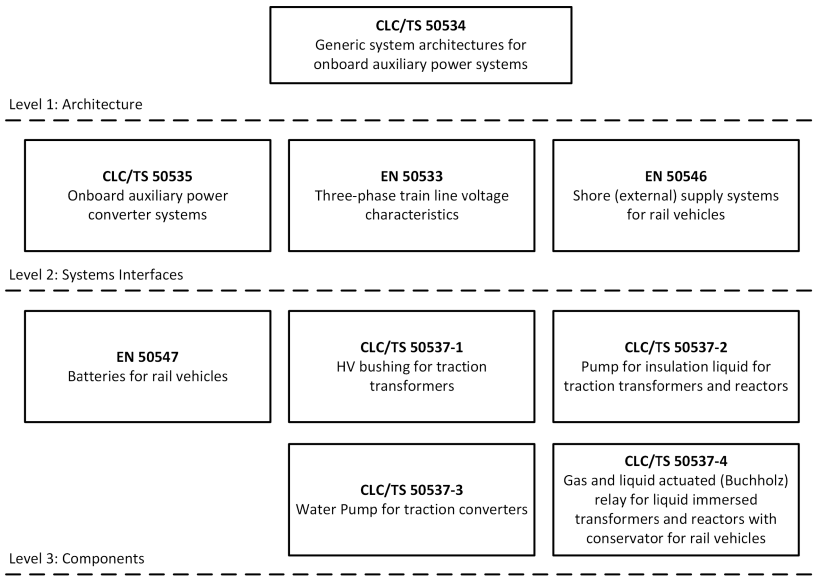

Figure 1 — Overview on the technical framework CLC/TS 50534:2010 defines the basis for other dependent standards

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Introduction

This document is part of the technical framework as given in Figure 1 and describes a 63/125 A shore supply system, the safety devices and provides requirements for the connectors. For a 600 A shore supply, this document describes the connector requirements.

The workgroup did take notice from the many technical comments on the final version of the first edition and tried, as best as we could, to address these comments.

While drafting this edition of the document, input was received from various rolling stock manufacturers, infra structure experts, safety experts and operators.

1 Scope

The shore supply system is used while the rolling stock is standing still within depots and sidings location for providing power to the AC auxiliary loads (which can include battery charging) when the primary power supply (contact line) is not available or used.

This document:

— specifies requirements to the shore supply and to the rolling stock for safe operation on shore supply operation;

— specifies the requirements to ensure compatibility of class C0 and C1 train types as given in CLC/TS 50534:2010 systems and three-phase shore power supply systems;

— provides a complete system design for 63/125 A shore supplies including the interfaces (power and control loop) between shore supply and rolling stock;

— specifies the requirements with regards to interoperability with AC and DC fed traction systems in order to prevent undesired stray currents and adverse interaction with signalling systems when operating on shore supply;

— defines the electrical characteristics of the 63/125 A shore power supply;

— defines the 63/125 A connectors and its intermateability to provide interoperability for rolling stock that is to run across borders;

— defines the 600 A connector and its intermateability;

— can be used for other type of rail vehicles and purposes, if agreed by the manufacturer and customer

— does not apply to shore supplies to move the rolling stock;

— does not describe the 600 A shore supply system.

NOTE 1 The 600 A connector is the existing UK standard three-phase shore supply connector which has a long service history.

NOTE 2 The connectors are dimensioned using standard rolling stock cables as set out in EN 50264-3-1:2008.

NOTE 3 Examples of other usage and rail vehicles are: e.g. light rail vehicles, class A train types, traction battery charging etcetera.

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 45545-2:2020+A1:2023, *Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components*

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*

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EN 50153:2014,[1] *Railway applications - Rolling stock - Protective provisions relating to electrical hazards*

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 50264-3-2:2008, *Railway applications - Railway rolling stock power and control cables having special fire performance - Part 3-2: Cables with crosslinked elastomeric insulation with reduced dimensions - Multicore cables*

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

EN 50533:2011,[2] *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 + COR1:2000)*

EN 60529:1991,[3] *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989 + A1:1999 and A2:2013)*

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 1431-1:2022, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

CLC/TS 50535:2010, *Railway applications - Onboard auxiliary power converter systems*

EN 60947-5-1:2017, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices (IEC 60947-5-1:2016*

[1] As impacted by EN 50153:2014/A1:2017 and EN 50153:2014/A2:2020.
[2] As impacted by EN 50533:2011/A1:2016.
[3] As impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/AC:2016-12.