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Standard Recommendation  
S.R. CLC/TS 50534:2010

# Railway applications - Generic system architectures for onboard electric auxiliary power systems

## S.R. CLC/TS 50534:2010

*Incorporating amendments/corrigenda issued since publication:*

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<i>This document replaces:</i>	<i>This document is based on:</i> CLC/TS 50534:2010	<i>Published:</i> 30 April, 2010
This document was published under the authority of the NSAI and comes into effect on: 7 May, 2010		ICS number: 45.060.01
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TECHNICAL SPECIFICATION

**CLC/TS 50534**

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

April 2010

ICS 45.060.01

English version

**Railway applications -  
Generic system architectures for onboard electric auxiliary power  
systems**

Applications ferroviaires -  
Architectures des systèmes génériques  
pour le système d'alimentation en énergie  
embarqué de véhicules ferroviaires

Bahnanwendungen -  
Generische Systemarchitekturen  
für elektrische Bordnetze  
zur Hilfsbetriebeversorgung

This Technical Specification was approved by CENELEC on 2010-03-26.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

This Technical Specification was prepared by SC 9XB, Electromechanical material on board rolling stock, of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways.

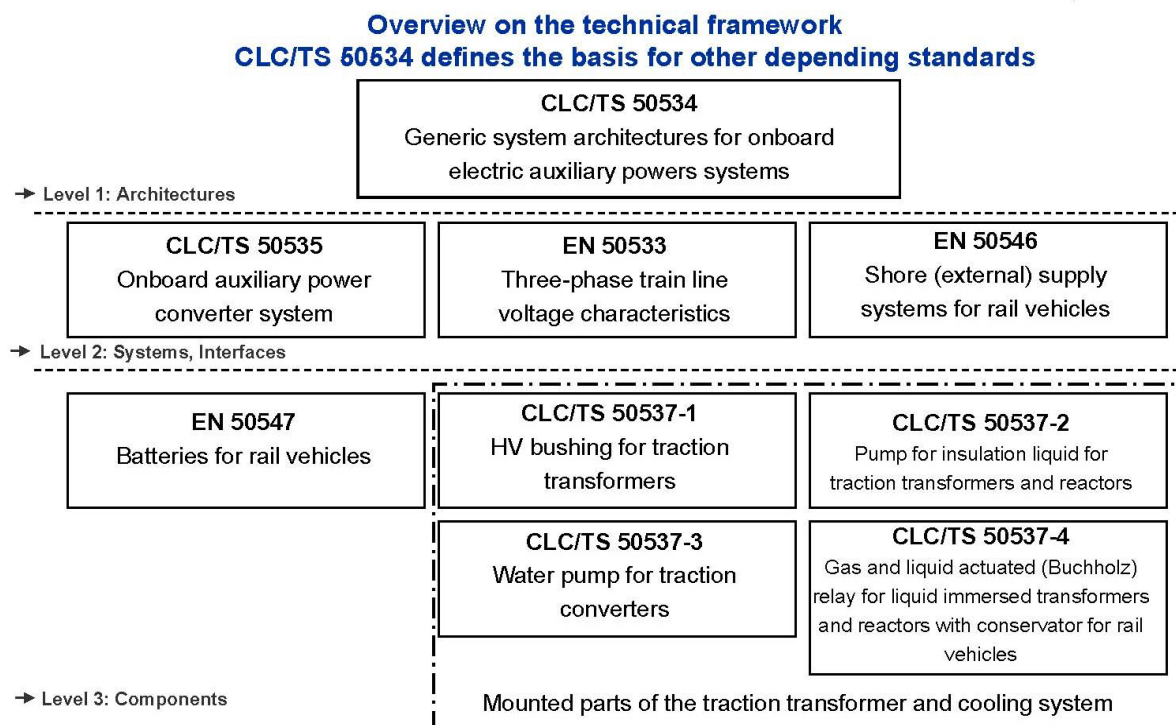
It was circulated for voting in accordance with the Internal Regulations, Part 2, Subclause 11.3.3.3 and was accepted as a CENELEC Technical Specification on 2010-03-26.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following date was fixed:

- latest date by which the existence of the CLC/TS  
has to be announced at national level (doa) 2010-09-26

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 follows:



Annexes defined to be normative belong to the content of this Technical Specification; annexes defined as informative are used only for information.

Annex A is classified as normative and Annex B is classified as informative.

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## Introduction

This Technical Specification defines characteristics and interfaces for electric onboard power supply systems. The following European Standards and Technical Specifications refer to the defined target energy supply system in this present Technical Specification:

CLC/TS 50535	Railway applications – Onboard auxiliary power converter systems <i>(Auxiliary converter interfaces applicable for the different options defined in the target system architectures)</i>
EN 50533 <sup>1)</sup>	Railway applications – Three-phase train line voltage characteristics <i>(Characteristics of the voltage system used for auxiliary power supply)</i>
EN 50546 <sup>2)</sup>	Railway applications – Shore (external) supply system for rail vehicles <i>(Interface description of the shore supply including protection functions)</i>
EN 50547 <sup>2)</sup>	Railway applications – Batteries for rail vehicles <i>(Standardized batteries for rail vehicles and charging characteristics)</i>
CLC/TS 50537 (series)	Railway applications – Mounted parts of the traction transformer and cooling system <i>(Standardized products used in conjunction with traction transformers and traction cooling systems)</i>

CLC/TS 50534 has to be understood as a basic document of a set of hierarchically structured specifications. This set of European Standards and Technical Specifications defines a consistent technical framework beginning on an architectural level, followed by standards belonging to important system interfaces and concluding this hierarchy with Technical Specifications on component level. The diagram in the foreword points up these different system integration levels and shows the dependencies between the documents.

One main objective of this standardisation initiative is to simplify the cooperation between concerned railway stakeholders in charge of operating onboard auxiliary power systems, designing systems able to cope with the operational requirements and stakeholders manufacturing auxiliary power system components, which provide the requested services.

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<sup>1)</sup> At draft stage.

<sup>2)</sup> Under development.

## 1 Scope

This Technical Specification defines characteristics and interfaces for electric onboard power supply systems. It applies to locomotive hauled passenger trains and electric multiple units with distributed power as well as trains with concentrated power for main-line application.

The objective of this Technical Specification is to define target systems, as regards the following interfaces and characteristics in order to enable further standardisation:

- interface between traction system and auxiliary power supply system;
- train line type: voltage, frequency and number of poles;
- interface between auxiliary power supply system and battery system;
- interface of the auxiliary power supply system as well as the low voltage grid to a shore supply (stationary workshop supply or external supply);
- supply concepts for essential loads e.g. HVAC systems and battery chargers;
- redundancy concept within the supply systems;
- auxiliary load control and protection strategy at train level.

Described system and interface characteristics define the technical basis for dependent European Standards and Technical Specifications. The introduction of this Technical Specification shows this dependency to adjacent documents.

Starting from a generic functional description of electric onboard energy supply systems structured in line with EN 15380-4 and a description of the related vehicle concepts, generic system architectures are derived, which are illustrated by examples of consistent sets of system designs showing interfaces and dependencies among concerned subsystems.

Relevant train configuration and concerned energy supply subsystems in scope of this Technical Specification are defined in Clause 4.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

CLC/TS 50535		<i>Railway applications – Onboard auxiliary power converter systems</i>
EN 50125-1	1999	<i>Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock</i>
EN 15380-4	3)	<i>Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock</i>
EN 50153	2002	<i>Railway applications – Rolling stock – Protective provisions relating to electrical hazards</i>
EN 50155	2007	<i>Railway applications – Electronic equipment used on rolling stock</i>
EN 50533	3)	<i>Railway applications – Three-phase train line voltage characteristics</i>

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3) At draft stage.

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