SLOVENSKI STANDARD
SIST EN 50155:2026

01-julij-2026

Nadomešča:
SIST EN 50155:2021

Železniške naprave - Tirna vozila - Elektronska oprema

Railway applications - Rolling stock - Electronic equipment

Bahnanwendungen - Elektronische Einrichtungen auf Schienenfahrzeugen

Applications ferroviaires - Équipements électroniques utilisés sur le matériel roulant

Ta slovenski standard je istoveten z: **EN 50155:2026**

ICS:

45.060.01	Železniška vozila na splošno	Railway rolling stock in general

SIST EN 50155:2026 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50155

May 2026

ICS 45.060.01

Supersedes EN 50155:2021

English Version

Railway applications - Rolling stock - Electronic equipment

Applications ferroviaires - Équipements électroniques utilisés sur le matériel roulant

Bahnanwendungen - Fahrzeuge - Elektronische Betriebsmittel

This European Standard was approved by CENELEC on 2026-03-09. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

Ref. No. EN 50155:2026 E

Contents

Page

European foreword

This document (EN 50155:2026) 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) 2027-05-31
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2029-05-31

This document supersedes EN 50155:2021 and all of its amendments and corrigenda (if any).

EN 50155:2026 includes the following significant technical changes with respect to EN 50155:2021:

a) Revision of Clause 1 Scope:

   1) first sentence is modified as follows: “This document is applicable to all electronic equipment for control, regulation, protection, diagnostic, energy supply installed on railway vehicles and any relevant elements of rolling stock subsystems.”;

   2) last sentence is modified as follows: “The software development requirements for on-board railway equipment are specified by EN 50716.”.

b) Updating of Clause 2 Normative references.

c) Revision of Clause 3 Terms, definitions and abbreviations, new definitions and reorganization of subclauses:

   1) first part of definition text of “operating temperature” is changed by: “<of electronic equipment> temperature range in which the electronic equipment is operating as specified”;

   2) definition of “performance classes” is deleted;

   3) definition of “performance criterion (A, B or C)” is changed by “**performance criterion** <for electronic equipment> criterion specified for validation of the operation of the electronic equipment throughout the test conditions”;

   4) definition of “apparatus” is deleted;

   5) definition of “commercial off-the-shelf equipment/components” is deleted;

   6) definition of “ancillary component” is added;

   7) definition of “life cycle” is added;

   8) definition of “operational life” is added.

d) Improvement of Clause 4 General requirements, in terms of better wording and reorganization of subclauses:

   1) precision given about concept of performance for all operational conditions;

2) “Environmental service condition” in 4.4, and in general in the document is modified by “Environmental operating conditions”;

3) wording improvements of 4.4.2 about “Operating temperature classes” and concept of temperature (45 °C) to consider during its operation with its effects on unit material ageing;

4) Class ST2 with the test cycle C is the recommended default class to apply for the increased operating temperature test at switch-on.

e) Improvement of Clause 5 Electrical operating conditions, with reorganization of subclauses:

1) 5.1.1: General”, is added before “5.1.2 DC supply system” and “5.1.3 AC supply system”;

2) nominal voltage (Un) of the electronic equipment “should” be selected amongst the following values: 24 V, 28 V, 36 V, 48 V, 72 V, 96 V, 110 V;

3) wording improvement of 5.2.2 “Equipment shall operate according to the performance criterion within the voltage range and duration defined in Table 4, measured at its power input terminals”;

4) wording improvement of 5.2.3 “Electronic equipment shall also operate at the values of the DC supply voltage, which are measured at the terminals of the equipment, within the entire range of temporary supply voltage variation defined in Table 4.”;

5) wording improvement of 5.2.6 “EXAMPLE 3 Considering the maximum and minimum temporary supply voltage for equipment designed to operate at nominal voltages from 24 V up to 110 V, the minimum temporary voltage is 0,6 × 24 V and the maximum temporary voltage is 1,4 × 110 V”;

6) wording improvement of 5.2.8 “Starting the combustion engine by a starter motor powered by the battery voltage supply system can cause voltage drops and fluctuations on the battery voltage supply system”;

7) 5.3.1: “Supply by a specific source” is renamed 5.3.1 “Supply by a specific DC or AC source”;

8) 5.3.2: “Supply by an AC auxiliary power converter”, the following sentence is added: “In some special cases more restrictive requirements for the voltage characteristics can be specified between the involved parties.”;

9) 5.3.4: “Design and test requirements for AC supply”, is an added subclause. The old informative Annex I about “Electronic equipment supplied from AC supply system” is moved as normative requirements with the applicability Table 7 into this 5.3.4 subclause.

10) 5.3.4: The following footnotes are added to Table 7:

“a Table 12 is applicable, except DC Power supply test”;

“b If AC voltage is derived from an “AC Auxiliary Power converter”, refer to EN 50533:2011 for static voltage tolerances and for short dips/interruptions.”;

“c If AC voltage is derived from any other AC source the technical specification of this local source, regarding tolerances and short dips/interruptions, shall be met. In the absence of information, EN 50160 for static voltage tolerances and EN IEC 61000-6-2 for short dips/interruptions should be used as a guide.”;

“d Test voltages can be derived from EN 50124-1, EN 61287-1 or EN 60077-1.”.

f) Improvement of Clause 6 Reliability, maintainability and expected useful life:

1) 6.3.3.1: The following sentence is added: “Maintenance or diagnostic procedures at this level shall not require the removal or replacement of any part of the defective LRU”;

2) 6.5: The following sentence is added: “The supplier shall provide information about purpose-built test equipment and/or special tools are required to carry out the user's maintenance procedures.”;

3) 6.5: the following sentence “Where on-board electronic equipment has been developed or tested using proprietary test equipment the supplier may offer this as an alternative for fault diagnosis within repair centres, provided that such test equipment is easy to install and to use, and all support details are made available to the user.”, is replaced by: “Purpose-built test equipment, used by the supplier for testing onboard electronic equipment, may be offered to the customer for fault diagnosis. The related detailed documentation shall be provided.”;

4) 6.5: The following sentence “Purpose-built test equipment does not necessarily have to comply with this standard”, is replaced by “Purpose-built test equipment does not necessarily need to be in accordance with the requirements of this document.”.

g) Wording improvements and precision added to Clause 7 Design:

1) 7.1.2: The sentence: “It is recommended to use the life cycle model given in EN 50126-1:2017”, is replaced by: “The reference model given in EN 50126-1:2017, Clause 6.2, should be taken into account for the implementation of the life cycle model.”;

2) 7.2.4: Rewording of the sentence about reference potential of galvanically isolated power supplies outputs;

3) 7.2.6: The following sentence is added: “The equipment shall restart in normal operating mode when the supply voltage is within the continuous voltage range (as specified in Table 4).”;

4) 7.4.4: The sentence “As far as possible, on detection of failure the processor shall record or indicate that such an event has occurred. It shall then enter a recovery state.”, is replaced by: “Detected failures shall be recorded or indicated.”.

h) Clause 9 Components:

1) 9.1: The acronym UPIC is used to identify the “user programmable integrated circuits”;

2) 9.2: Improvement of the text related to requirements that can be required at tender stage by the user about: “reliability, the life duration of components and the documentation of the electronic equipment.”.

i) Wording improvements and precisions added for Clause 10 Construction:

1) 10.2.5: Added recommendation: “It is recommended to avoid integrated circuit sockets and/or edge connectors as far as possible”;

2) 10.6.5: Applicable standard about defined flammability of rigid PCB: “The base material of the rigid PCB shall be epoxy and woven glass fabric laminated sheet of defined flammability in accordance with EN 45545-2:2020+A1:2023.”;

3) 10.7: Table 10: Sentence “Protective coating is also not required for equipment inside a sealed enclosure which fulfils the requirements for IP 65 or better (according to EN 60529:1991).”, is replaced by: For equipment inside a sealed enclosure which fulfils the requirements for IP65 or better (in accordance with EN 60529:1991) and if condensation inside the enclosure is considered not possible, a protective coating may be unnecessary. Special arrangements like 'breathing plug' or 'vent plug' can be used to avoid the possibility of condensation. NOTE Presence of condensed water inside an IP65 sealed enclosure cannot be totally excluded when this enclosure could be impacted by a ‘breathing

effect'. The 'breathing effect' is the absorption of humid outside air by negative pressure resulting from temperature variations inside the sealed enclosure.";

4) 10.8.2: Sentence: "Means shall be provided on the subracks and PBAs to indicate any revision/change in design or manufacturing.", is replaced by "Identification of subracks and PBAs shall be adequate to enable their correct identification including serial number and revision in design or manufacturing.";

5) 10.10: Sentences: "The full performance shall be maintained until the related protective device operates. The lifetime of the fans or pumps should be taken into account.", is replaced by: "The electronic equipment shall continue to operate as specified until the related protective device triggers (e.g. overtemperature protection). The life expectancy (e.g. fans or pumps) should be taken into account";

6) 10.11: Precision about "Materials and finishes": "Potting to provide additional protection should only be used if it is necessary for technical reasons" and "Coating and potting materials do not need to be dimensionally stable as long as their thermal coefficient is considered to avoid high stress on components or assemblies.".

j) Revision of Clause 11 Safety:

1) 11.2.2: The following note is added: "Test voltages regarding electrical safety can differ from those in Table 14.".

k) Revision of Clause 12 Documentation:

1) 12.1: Added requirement about identification of documents or drawings submitted to the user: "shall be identified by an appropriate and unambiguous reference, a date, a version or revision index, a record of changes and an explanatory title of the presented item and of the type of document or drawing.";

2) 12.3: Precision about the datasheet content: "This document shall contain all information which the user needs to evaluate whether the electronic equipment fulfils the requirements covered by the scope of this document.";

3) 12.7: The design documentation structure is reorganised on the main topics: Hardware, User Programmable Integrated Circuits (UPIC) and Software;

4) 12.7.1.6 Wiring diagrams: "should" is replacing "shall" in the following sentence: "The wiring diagram for any one unit shall be completely self-contained, self-explanatory, readily related to other wiring diagrams and should show":;

5) Subclauses that were previously in the topic "Repair documentation": (e.g. "12.7.10.2 Circuit diagrams", "12.7.10.3 Component list (Bill of material)" and 12.7.10.4 Component layout") are moved to the "Hardware" main documentation topic.;

6) 12.7.3: The new standard reference about "Requirements for software development" is used: "All identified information items (documentation) shall be in accordance with EN 50716:2023.".

EN 50716 specifies the documentation required for the software development process but does not specify the documentation to be provided to the user. In the EN 50155 scope, the following requirement is kept: "the supplier shall determine and list which information items are deliverable documents, consultable documents and non-deliverable documents and which information items are to be archived. The list shall be included in the quality plan.", but the following sentence is deleted: "At least the highly recommended documents (HR) in EN 50657:2017, Table A.1 column basic integrity shall be provided for non-safety related on-board equipment.";

7) 12.9.1: Precisions about Repair documentation – General: "The equipment detailed repair documentation is delivered only under specific request of the user and is subject to a contractual

agreement between supplier and user regarding the contents, the confidentiality and the rights of use of this documentation.";

"NOTE The list, the description, reference of special tools and the list of declared non-repairable items, are not subjected to contractual agreement, confidentiality and right of use (see 12.9.2 and 12.9.3).".

l) Improvements of Clause 13 Testing:

1) 13.1 General: Added precisions about the test specification: "A test specification defines the test procedures and the acceptance criteria of the individual tests and the test sequence, if relevant. The test specification shall be written by the supplier. The description for the performance criteria shall be defined in the test specification.";

"NOTE Additional information are provided by Annex B for the verification of equipment by the system integrator at system level.";

2) 13.2.2: Added precision about type tests and "production serial tests": "Equipment used for type tests shall previously have been subjected to routine test. If the production routine tests are not ready at this step, they may be replaced by equivalent tests.";

3) 13.4 title: "Test specification" is renamed "Description of the tests";

4) 13.4.2: Added precision about the performance test: "The performance test is carried out according to the test specification, which contains the performance test procedure, written by the supplier either for type test or for routine test.";

5) Test descriptions for 13.4.5.1, 13.4.5.2 and 13.4.6 are improved;

6) 13.4.7.1: The following sentence is added for insulation test: "During the test all input / output of the same equipotential area should be connected together in order to avoid damages due to unwanted voltages within the equipotential area.";

7) 13.4.7.2: Additional details are provided for Insulation resistance test acceptance requirements when high impedance bleeder resistors are inserted between adjacent equipotential areas or between an equipotential area and functional earth.;

8) 13.4.8: Cyclic damp heat test: Additional details are provided for final test acceptance requirements.

m) Improvement of informative Annex A - List of default requirements of EN 50155 and related subclauses content, is updated.

n) Improvement of informative Annex B - System testing approach (in particular for B.10 and Figure B.1).

o) Improvement of informative Annex C - Severity level of operating conditions in different vehicle locations (see Figure C.1).

p) Improvement of informative Annex D - Example is given for an equipment tests compliance summary sheet.

q) Informative Annex E User programmable integrated circuit life cycle example.

r) Improvement of informative Annex F – Design suggestions for electronic hardware used on rolling stock:

1) F.1: Added precision: "The values given in Table F.2 to Table F.19 are examples of typical use and can vary from one design to another.";

2) F.2.2: Added precision: “Between battery referenced ports and earth, the use of voltage suppressors is not recommended to ensure high dielectric isolation between battery referenced ports and earth.”;

F.2.6 Prototype testing: Rewording done as follows: “At prototype stage, all functions should be verified according to the specification. It is also recommended that the integrity of signals between parts of the circuit be investigated. Furthermore, it is strongly recommended to carry out the tests following the type test specification. These tests are intended as investigation tests, but they cannot be used to produce a type test report. One of the reasons is that, normally, the prototype equipment is not manufactured according to the same manufacturing process as a series equipment.”;

3) F.2.7 Interfacing: About analogue and digital interfaces: “They should be designed as differential inputs and/or outputs to ensure adequate common-mode noise rejection.”.

s) Improvement of informative Annex G - Electronic equipment not designed for use on rolling stock:

1) new text about “Applicability conditions for use of electronic equipment not designed for rolling stock”;

2) new text about “electronic equipment properties list” that should be comparable to the requirements in this document;

3) new text about “Possible deviations or mitigations for the suitability evaluation”.

t) Improvement of informative Annex H – Paragraphs with agreements between the involved parties:

1) added Note:

“NOTE Agreements between the involved parties (e.g. user and supplier) are not applicable to electronic equipment that can be purchased as catalogue parts with qualification according to EN 50155.”.

u) Improvement of informative Annex I - Typical content of datasheets.

v) Improvement of informative Annex J - Insulation test and testing matrix example.

w) Updated informative Annex ZZ - Relationship between this European Standard and the Essential Requirements of EU Directive.

x) Updated Bibliography.

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.

For the relationship with EU Legislation, see informative Annex ZZ, which is an integral part of this document.

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.