

SLOVENSKI STANDARD

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SIST EN 50206-1:1998

**Železniške naprave - Vozna sredstva - Odjemniki toka: karakteristike in preskusi -
1. del: Odjemniki toka za železniška vozila na magistralnih progah**

Railway applications - Rolling stock - Pantographs: Characteristics and tests - Part 1:
Pantographs for main line vehicles

Bahnanwendungen - Schienenfahrzeuge - Merkmale und Prüfungen von
Stromabnehmern - Teil 1: Stromabnehmer für Vollbahnfahrzeuge

Applications ferroviaires - Matériel roulant - Pantographes: Caractéristiques et essais -
Partie 1: Pantographes pour véhicules grandes lignes

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ICS:

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general

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English version

Railway applications - Rolling stock - Pantographs: Characteristics and tests - Part 1: Pantographs for main line vehicles

Applications ferroviaires -
Matériel roulant -
Pantographes: Caractéristiques et essais
-
Partie 1: Pantographes pour véhicules
grandes lignes

Bahnanwendungen -
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CENELEC

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

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Foreword

This European Standard 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 submitted to the CENELEC formal vote and was approved by CENELEC as EN 50206-1 on 2010-05-01.

This document supersedes EN 50206-1:1998.

The main changes brought by this revision are:

- simplification and standardisation of the tolerances for static contact force (Annexes A and B);
- definition of a new investigation test "Measurement of mean static contact force at ambient temperature" (6.3.4);
- definition of a new combined test "Check of operating system at maximum speed" (6.14);
- adjustment of terms to TSI (static contact force instead of static force);
- deletion of Clause 10;
- update of normative references.

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 dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical EN 50206-1:2011
national standard or by endorsement https://standards.iteh.ai/catalog/standards/sist/064c344b-50a8-4688-9391-e207443eacad/sist-en-50206-1-2011 (dop) 2011-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) - *

* D115/202: No dow fixed as long as EN 50206-1:1998 is referenced as such in Technical Specifications for Interoperability (TSIs).

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Introduction

The electrical power supply of a tractive unit is achieved by the collection of current from one or more contact wires by means of one or more pantograph(s), installed on the traction unit or on the trainset's vehicle.

The contact strips of the pantograph which slide along the contact wire facilitate the transmission of power.

The pantograph and the overhead contact line system form two oscillating sub-systems which can be displaced. There exists a unilateral sliding linkage between them, which shall ensure continuous contact. Their design shall allow for minimum wear of both sub-systems when used.

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1 Scope

This European Standard specifies the general assembly characteristics which are to be applied to pantographs, to enable current collection from the overhead contact line system. It also specifies the tests the pantographs have to perform, excluding insulators.

This European Standard is not applicable to pantograph dielectric tests, which are to be performed on the pantograph installed on the vehicle roof. If no other requirement is agreed between customer and supplier, insulation coordination according to EN 50124-1 may be used.

This European Standard is not applicable to pantographs used on isolated metros and light rail systems. These pantographs are considered in EN 50206-2.

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.

EN 50125-1, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*

EN 50126 series, *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*

EN 50163, *Railway applications – Supply voltages of traction systems*

EN 50317, *Railway applications – Current collection systems – Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line*

EN 50367, *Railway applications – Current collection systems – Technical criteria for the interaction between pantograph and overhead line (to achieve free access)*

EN 60077 (series), *Railway applications – Electric equipment for rolling stock* (IEC 60077 series)

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 General

3.1.1

supplier

manufacturer of the pantograph

3.1.2

customer

either operating authority or vehicle manufacturer

3.1.3**pantograph** (see Figure 1)

apparatus that collects current on one or more contact wires. It consists of a base frame, an operating system, a frame and a collector head. It is of variable geometry. In the "operating" position, the apparatus is entirely or partly under voltage. It is electrically insulated only generally at its interfaces, on the vehicle roof. It enables current to be transmitted from the overhead contact line system to the vehicle electrical system

3.2 Design

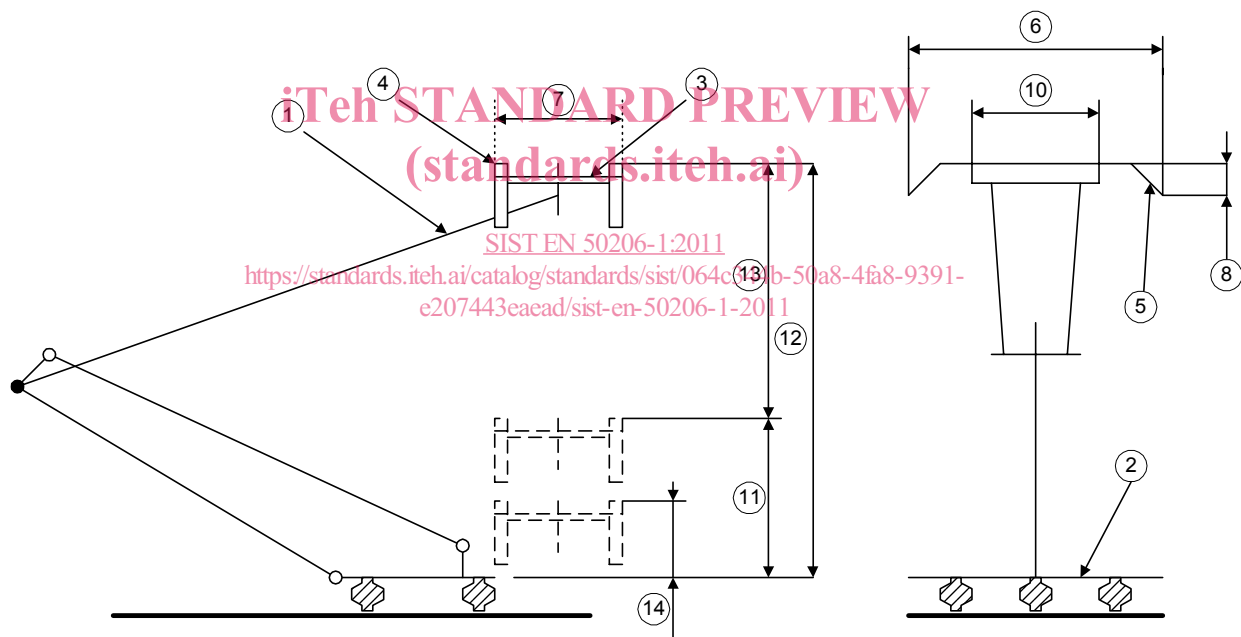
The definitions in Table 1 are related to Figure 1, except items 9, 15, 16, 17, 18.

Table 1 – Design definitions

Def. No.	Term	Item No.	Definition
3.2.1	frame	1	articulated structure which enables the collector head to move in a vertical direction with respect to the base frame of the pantograph
3.2.2	base frame	2	fixed part of the pantograph which supports the frame and is mounted on insulators fixed to the vehicle roof
3.2.3	collector head	3	part of the pantograph supported by the frame which includes contact strips, horns and may include a suspension
3.2.4	contact strip	4	replaceable wearing part of the collector head which interfaces with the overhead contact line system
3.2.5	horns	5	ends of the collector head which ensure smooth engagement with the contact wire
3.2.6	collector head length	6	dimension of collector head measured transversely in the horizontal plane in relation to the vehicle
3.2.7	collector head width	7	dimension of collector head measured longitudinally in relation to the vehicle
3.2.8	collector head height	8	vertical distance between the lowest point of the horns and the upper most point of the contact strips
3.2.9	collector head pivot	9	pitching axis of the collector head
3.2.10	length of contact strips	10	total length of wearable material intended for normal interaction measured transversely in relation to the vehicle
3.2.11	height at "lower operating position"	11	vertical distance between the pantograph mounting plane on the top of insulators and the upper surface of contact strips, the pantograph being raised to the lowest level at which it is designed to collect current
3.2.12	height at "upper operating position"	12	vertical distance between the pantograph mounting plane on the top of insulators and the upper surface of the contact strips, the pantograph being raised to the highest level at which it is designed to collect current
3.2.13	working range	13	difference between the "upper operating position" height and the "lower operating position" height

Table 1 – Design definitions (*continued*)

Def. No.	Term	Item No.	Definition
3.2.14	housed height	14	vertical distance between the pantograph mounting plane on the top of insulators and the upper surface of the contact strips or any other part of the pantograph structure if higher (pantograph being in the housed position)
3.2.15	pantograph "electrical thickness"	15	vertical distance between the highest live part and the lowest live part of the pantograph at housed position
3.2.16	operating system	16	device which provides a force to raise or to lower the pantograph
3.2.17	maximum extension	17	maximum extended height to mechanical stops (without any device which will limit the pantograph extension within the working range)
3.2.18	limited maximum extension	18	reduced extension allowed by intermediate mechanical stops



The sketch in Figure 1 is an example only and does not exclude other types of pantographs (diamond type, for example).

Figure 1 – Pantograph terminology

3.3 General characteristics

3.3.1

rated voltage

voltage at which the pantograph is designed to function

3.3.2

rated current, vehicle at standstill

average value of that current withstood for 30 min by the pantograph at standstill

3.3.3**maximum current, vehicle at standstill**

value of that current withstood by the pantograph at standstill for a given time

3.3.4**rated current, vehicle running**

continuous current transfer capacity of the pantograph

3.3.5**static contact force**

vertical force exerted upward by the collector head on the overhead contact line system at standstill

3.3.6**nominal static contact force**

specified set point for the static contact force

3.3.7**mean static contact force**

average of the actual values of static contact forces evaluated as follows: the static contact forces are measured continually within the working range during raising (F_r) and lowering (F_l) operation. By convention, the mean static contact force at any point is equal to $\frac{F_r + F_l}{2}$

3.3.8**total mean uplift force**

vertical force measured at the collector head, the latter not touching the contact wire. It is equal to the sum of static contact force and the aerodynamic force caused by the air at the considered speed for a given collector height, the results being referred to zero ambient wind conditions

3.3.9**total contact force**

total force between collector head and contact wire while running

3.3.10**housing force**

force applied vertically to the collector head to maintain the whole pantograph in housed position

4 Technical requirements

All general characteristics are given in the customer specifications. Unless otherwise specified, environmental conditions are defined in EN 50125-1. The category of environment has to be specified by the customer.

4.1 Gauge

The pantograph, at housed position and operating position, shall comply with the gauge specified in the customer specifications or shall be in accordance with EN 50367 and UIC Leaflet 608.

4.2 Extension of the pantograph

The customer specifications shall state the values in relationship with items 10 to 13 in Table 1. In the absence of specifications in the tender documents, when the pantograph is raising or lowering, the collector head trajectory over the working range shall be within a range of ± 50 mm in the longitudinal direction, and ± 10 mm in the lateral direction in relation to the vertical line.