



# SLOVENSKI STANDARD SIST EN 16334-2:2020

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**Železniške naprave - Potniški alarmni sistem - 2. del: Systemske zahteve za mestno železnico**

Railway applications - Passenger alarm system - Part 2: System requirements for urban rail

Bahnanwendungen - Fahrgastalarmsystem - Teil 2: Systemanforderungen für Schienennahverkehr

Applications ferroviaires - Système d'alarme passager Partie 2 : Prescriptions relatives au système pour le rail urbain

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## Railway applications - Passenger alarm system - Part 2: System requirements for urban rail

Applications ferroviaires - Système d'alarme passager -  
Partie 2 : Prescriptions relatives au système pour le rail  
urbain

Bahnanwendungen - Fahrgastalarmsystem - Teil 2:  
Systemanforderungen für städtische Schienenbahnen

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## European foreword

This document (EN 16334-2:2020) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2020, and conflicting national standards shall be withdrawn at the latest by August 2020.

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**EN 16334-2:2020 (E)****1 Scope**

This document specifies the characteristics of the Passenger Alarm System (PAS) for Urban Rail.

This document covers the PAS fitted to the passenger carrying Urban Rail rolling stock and specifies:

- the safety related requirements;
- the functional requirements of PAS triggered by passengers;
- the requirements for the communication channel between passengers and the driver or Operations Control Centre (OCC);
- the requirements for the functional behaviour of the PAS;
- the requirements for the degraded modes management;
- the requirements for the Passenger Alarm Device (PAD) and PAD area.

This document is applicable to the categories I to III of Urban Rail rolling stock defined in CEN/CLC Guide 26:

- (I) metros;
- (II) trams;
- (III) light rail.

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NOTE 1 CEN/CLC Guide 26 defines Metro, Tram and Light Rail as public transport systems permanently guided at least by one rail, intended for the operation of local, urban and suburban passenger services with self-propelled vehicles and operated either segregated or not from general road and pedestrian traffic.

NOTE 2 The PAS function on existing vehicles could require modification to work in conjunction with vehicles that comply with this document.

NOTE 3 This document covers urban rail rolling stock, both with or without a driver.

NOTE 4 For rolling stock devoted to suburban passenger services, this document applies when the TSIs do not apply.

**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 13272-2, *Railway applications — Electrical lighting for rolling stock in public transport systems — Part 2: Urban rail*

EN 13452-1, *Railway applications — Braking — Mass transit brake systems — Part 1: Performance requirements*

EN 14478:2017, *Railway applications — Braking — Generic vocabulary*

EN 62267:2009, *Railway applications — Automated urban guided transport (AUGT) — Safety requirements (IEC 62267:2009)*

EN 62290 (all parts), *Railway applications — Urban guided transport management and command/control systems (IEC 62290, all parts)*

ISO 3864-4:2011, *Graphical symbols — Safety colours and safety signs — Part 4: Colorimetric and photometric properties of safety sign materials*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478 and EN 13452-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 3.1

##### **automated urban guided transport**

##### **AUGT**

system featuring driverless or unattended train operation with self-propelled, guided vehicles, operating on an exclusive guideway

[SOURCE: IEC 60050-821:2017, 821-09-08]

#### 3.2

##### **passenger alarm system**

##### **PAS**

alarm system for passengers that is intended to initiate appropriate measures in case of an emergency situation

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#### 3.3

##### **closed circuit television system**

##### **CCTV**

system consisting of camera equipment, storage, monitoring and associated equipment for transmission and controlling purposes

[SOURCE: EN 50132-1:2010, 3.1.27, modified — The term originally defined was “CCTV system”.]

#### 3.4

##### **passenger alarm device**

##### **PAD**

interface to the PAS through which the requirement for a defined Passenger Alarm System demand is indicated or initiated by passengers or on-board operational staff

Note 1 to entry: The PAD is sometimes called emergency handle or alarm handle. These short-terms should only be used where misunderstanding is not possible or in descriptions prepared for passengers.

[SOURCE: EN 16334:2014, 3.4, modified — The end of the definition was altered and the Note 1 to entry was shortened.]

**EN 16334-2:2020 (E)****3.5****PAD operated**

status indicated in the PAS by the PAD when operated by changing its mechanical position

[SOURCE: EN 16334:2014, 3.2, modified – The notion of handle is removed as in urban rail it may be another type of device.]

**3.6****passenger alarm interface****PAI**

arrangement of equipment close to each other or one single equipment, which includes at least the following elements:

- PAD (see 3.4);
- microphone;
- loudspeaker;
- visual indicators (e.g. lights);
- resetting device(s), if any;
- information labels;
- a seal (optional)

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[SOURCE: EN 16334:2014, 3.3, modified – “If any” was added after “resetting device(s)” and “lights” is now introduced by “e.g.”.] <https://standards.iteh.ai/catalog/standards/sist/91415234-e4ee-482c-9598-d9ad2f1796ac/sist-en-16334-2-2020>

**3.7****standstill state**

state that indicated that the vehicle is at a standstill

Note 1 to entry: Standstill state is used for door release and/or braking control. The standstill condition is normally related to minimum velocity.

Note 2 to entry "standstill" is used as defined in EN 14478:2017, 4.6.22

**3.8****operations control centre****OCC**

centre from which operation of the line or the network is supervised and managed

[SOURCE: IEC 60060-821:2017, 821-01-64]

**3.9****operational rules**

set of operational specifications and requirements defined by transport operators

Note 1 to entry: The precise content of these rules is defined in CEN/CLC Guide 26:2013, 5.1.2.



### 3.10 train control and monitoring system TCMS

means of controlling and monitoring function of the train internally, whether by software or hardware, and of providing information to the driver of the status of equipment on-board the train

[SOURCE: EN 16186-3:2016+A1:2018, 3.37]

### 3.11 on-board operational staff

persons on-board the train who are involved in the operation process of the train (including the driver)

### 3.12 driver

person tasked with operating a vehicle or a train by operating controls in a driver's cab or on a remote control unit

[SOURCE: EN 16186-1:2014+A1:2018, 3.1.1]

### 3.13 passenger area

area which is freely accessible to passengers

[SOURCE: EN 45545-1:2013 3.43]

## 4 Symbols and abbreviations

For the purposes of this document, the following abbreviated terms apply

<b>AUGT</b>	Automated urban guided transport (see 3.1)
<b>CCTV</b>	Closed Circuit Television (see 3.3)
<b>OCC</b>	Operations Control Centre (see 3.8)
<b>PAI</b>	Passenger Alarm Interface (see 3.6)
<b>PAD</b>	Passenger Alarm Device (see 3.4)
<b>PAS</b>	Passenger Alarm System (see 3.2)
<b>TCMS</b>	Train Control and Monitoring System (see 3.10)

## 5 System overview, architecture and interfaces

An example of a system overview is given in Annex E.

## 6 Safety requirements

### 6.1 Minimum safety requirements

**6.1.1** The maximum failure rate of the PAS for the request of the brake application shall be less than  $10^{-5}$  failure/h.

NOTE 1 Experience shows that for urban rail vehicles, a maximum failure rate of  $10^{-5}$  failure/h is an acceptable threshold (VDV 161/2:2009).

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NOTE 2 The requirement is limited to the events 'request of brake application' without considering the engagement of the action.

Based on the safety analysis in accordance with EN 50126-1, stricter requirements may be requested (e.g. for driverless operation).

**6.1.2** The maximum failure rate of the PAS for a PAD activation announcement (acoustic and visual signalling) shall be less than  $10^{-5}$  failure/h. For failure analysis a redundancy effect of the acoustic and the visual signalling may be taken into account.

NOTE Experience shows that for urban rail vehicles, a maximum failure rate of  $10^{-5}$  failure/h is an acceptable threshold (VDV 161/2:2009).

Based on the safety analysis in accordance with EN 50126-1, stricter requirements may be requested (e.g. for driverless operation).

**6.1.3** The ability of the PAS to transmit the activation signal of a PAD to the driver shall be monitored by dedicated technical devices, if the reliability of the system in conveying the activation signal is insufficient (more than  $10^{-5}$  failure/h). This may be reached by permanent monitoring of that ability, and it shall be demonstrated through a safety analysis.

**6.1.4** It shall not be possible to automatically or remotely bypass or switch off a PAI.

NOTE 1 This is to ensure that a member of the on-board operational staff carries out this action.

NOTE 2 The consequence is that this PAI has no more function.

**6.1.5** Further operation of the train after the bypass or the switch off of a part of the PAS shall only be possible if authorized by appropriate substitute measures (e.g. operational rules).

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## **6.2 Complementary safety requirements for AUGT**

The complementary safety requirements for AUGT are defined in EN 62267:2009, 8.5.10 and 8.5.11.

## **7 Functional requirements**

### **7.1 General**

The aim of this Passenger Alarm System is to:

- a) permit passengers in case of emergency situations to alert the driver or the Operations Control Centre (OCC);
- b) stop the train according to the operational rules;
- c) permit the train to keep moving, subject to conditions, or to stop at a safe location.

### **7.2 Advise the driver (and optionally other on-board operation staff or OCC) of a potential danger**

#### **7.2.1 Mandatory functions**

**7.2.1.1** PAD shall be available in the passenger area (see Clause 10 for PAD installation requirements).

PAI shall be available in the passenger area for AUGT and in all cars without the possibility of direct communication with operational staff. This is necessary in order to ensure that a communication link is present.

**7.2.1.2** The information that at least one PAD has been operated shall be transmitted to the driver or in case of an AUGT to the OCC.

**7.2.1.3** An acoustic and visual signal shall be given to the driver when a PAD has been operated. For the duration of signals and triggering conditions see Clause 8.

Colour and frequency of visual and acoustic signals in the driver's cab can conform to the requirements of the EN 16186 series.

**7.2.1.4** In addition, if remote resetting of PADs is available, an acoustic signal shall be activated for each new activation of a PAD, in accordance with the safety requirements given in Clause 6.

**7.2.1.5** The maximum permitted delay from any PAD operated and the acoustic and visual signal for the driver shall be 2 s. If the optional link to the OCC is used the maximum permitted delay to trigger the train based subsystem that transmits the information to the OCC shall be 2 s.

**7.2.1.6** When the driver has acknowledged, each acoustic signal shall be turned off within 1 s, and the visual signal should change within 1 s. It is permitted to retain a flashing light as a reminder for the driver. A visual signal shall remain until all the operated PADs have been reset.

NOTE The way the OCC manages this internal information is outside of the scope of this document.

**7.2.1.7** Detected functional faults of the PAS shall be indicated to the driver or the OCC for appropriate action.

## 7.2.2 Additional optional functions

**7.2.2.1** There may be a reminder for the driver that a PAD has been operated by repeating the acoustic signal at intervals until all the PADs have been reset (cycling through 7.2.1.3 to 7.2.1.6). The time interval between reminders may be selected taking into account the proposed train service.

**7.2.2.2** The PAS may indicate, on the outside of the train, that a PAD has been operated.

EXAMPLE An external flashing light on the vehicle where the PAD has been operated.

**7.2.2.3** For a vehicle with more than one PAD, the PAS may give information to identify the activated PAD.

**7.2.2.4** If train CCTV is available, the PAS may inform the CCTV of the location of the PAD that has been operated to allow priority surveillance of that area.

**7.2.2.5** If remote resetting of PAD is available, an acoustic signal may be activated for each new activation of a PAD. Remote resetting shall only be applicable if CCTV is used.

## 7.3 Automated and semi-automated rolling stock

In case of automated or semi-automated rolling stock the requirements of the EN 62290 series relative to passenger request management shall apply.