SLOVENSKI STANDARD
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Železniške naprave - Voznikova kabina - 6. del: Združevanje slikovnih zaslonov ter krmilnih in prikazovalnih elementov za tramvajska vozila

Railway applications - Driver's cab - Part 6: Integration of displays, controls and indicators for tram vehicles

Bahnanwendungen - Führerraum - Teil 6: Integration von Displays, Bedien- und Anzeigeelementen für Straßenbahnfahrzeuge

Applications ferroviaires - Cabine de conduite - Partie 6 : Intégration des afficheurs, commandes et indicateurs pour tramways

Ta slovenski standard je istoveten z: **prEN 16186-6**

ICS:

45.060.10	Vlečna vozila	Tractive stock
45.140	Oprema za podzemne vlake, tramvaje in lahka tirna vozila	Metro, tram and light rail equipment

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Railway applications - Driver's cab - Part 6: Integration of displays, controls and indicators for tram vehicles

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 16186-6:2021) has been prepared by Technical Committee CEN/TC 256 “Railway Applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

EN 16186, Railway applications — Driver's cab is written as an EN series on all the aspects to be considered when designing a driver's cab, from anthropometric data and visibility, over the integration of displays, controls and indicators as well as the design of displays to cab layout and access facilities. The background information on the anthropometric data used is provided in CEN/TR 16823 [2].

EN 16186, *Railway applications — Driver’s cab currently* consists of the following parts:

— *Part 1: Anthropometric data and visibility;*

— *Part 2: Integration of displays, controls and indicators;*

— *Part 3: Design of displays for heavy rail vehicles;*

— *Part 4: Layout and access;*

— *Part 5: External visibility for tram vehicles;*

— *Part 6: Integration of displays, controls and indicators for tram vehicles;*

— *Part 7: Design of displays for tram vehicles* [1)];

— *Part 8: Layout and access for tram vehicles.*

1) To be published.

Introduction

This document addresses the operating and perception requirements of controls and displays elements in tram vehicles driver cabs. It provides current cab design principles.

1 Scope

This document is applicable to vehicles operating on tram networks.

This document gives design requirements and guidance in order to ensure visibility and operability of screens, controls and indicators in the cab in all operating conditions (day, night, natural or artificial lighting).

It covers four aspects:

— the characteristics of the displays, controls and indicators in order to ensure proper visibility: i.e. range of luminance and contrast as well as the possibility of adjustment of perceived brightness;

— the requirements for the location of the displays, keyboards, controls and indicators in the cab and on the driver's desk: i.e. position, angle of visibility, etc. with consideration of the normal driving position and the working environment (windscreen, natural or artificial lighting in the cab, unwanted glare and reflections, etc.);

— the characteristics and requirements for the location of microphones and loudspeakers;

— design of symbols.

NOTE All element numbers within the text refer to Table B.1.

This document does not apply to refurbishment of existing vehicles. This document is not intended to be applicable to driver's auxiliary desk, except for 5.3.10, Clauses 6, 8, 9 and Tables B.1, C.1.

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 894-2, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

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

EN 15227, *Railway applications — Crashworthiness requirements for railway vehicle bodies*

FprEN 16168-5:2021, *Railway applications — Driver's cab — Part 5: External visibility for tram vehicles*

prEN 16168-8:2019, *Railway applications — Driver's cab — Part 8: Layout and access for tram vehicles*

ISO 3381, *Railway applications — Acoustics — Measurement of noise inside railbound vehicles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in FprEN 16186-5:2021, prEN 16186-8:2019 and the following apply.

3.1
alarm
audible and/or visual warning requiring immediate action, with a defined priority

3.2
cab lighting
lighting that illuminates the whole driver's cab to provide safe operation

3.3
contrast
perception of a difference visually between one surface or element of a building/rail vehicle and another be reference to their light reflectance values according to BS 8300:2009

[SOURCE: EN 16584-1:2017]

3.4
control
device used to interact with the vehicle

3.5
display
hardware device or system that shows text and/or graphic information to the user

3.6
driver multifunctional interface
DMI
hardware including at least a display and an input device (e.g. keyboard)

3.7
emergency braking
application of a pre-defined brake force that, whilst taking into consideration the usable brake equipment types, achieves the specified emergency braking performance and level of safety

Note 1 to entry: The braking performance and safety level of the emergency braking are typically equal to or superior to that of the maximum service brake, assuming the demanded wheel-rail adhesion, etc. is available, and is described in vehicle specific EN standards.

[SOURCE: EN 14478:2017]

3.8
indicator
element designed to indicate the system status

3.9
instrument lighting
lighting that illuminates specific gauges to make there scales visible

3.10
operation aided system display
display that allows the driver to enter operational related information and to get real time information (train number, route information, driver ID, track status, electronic timetable, messages, …)

3.11
position-dependent control
control which command is proportional to the position of the operating part of the device within a defined range

3.12
RAL xxxx
colour codification from the German Institute for Quality Assurance and Certification, former Reichs-Ausschuss für Lieferbedingungen

Note 1 to entry: RAL 3020 is the coding for traffic red.

3.13
safety braking
braking intended to achieve a higher level of system integrity than that achieved when service and emergency braking

Note 1 to entry: The safety braking performance can be lower than achieved when full service braking or emergency braking.

[SOURCE: EN 14478:2017, modified: “specific to mass-transit brake systems” deleted]

3.14
warning
visual and/or audible indication triggered by an event of which the recipient needs to be aware and which may not require immediate action

4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

ATP	Automatic Train Protection
BP	Brake Pipe
CCTV	Closed Circuit Television
DAC	Driver Activity Control
DMI	Driver Multifunctional Interface
ep	electro-pneumatic
HVAC	Heating, Ventilation and Air Conditioning
OCC	Operations Control Centre
OASD	Operation Aided System Display
PACM	Pedestrian Anti-Crush Mechanism
PAS	Passenger Alarm System
PEMD	Passenger Exchange Monitoring Display
PIS	Passenger Information System
RAL	“Reichs-Ausschuss für Lieferbedingungen” (German Institute for Quality Assurance and Certification)
RVD	Rear-View Display
SRP	Seat reference Point

TCMS Train Control and Monitoring System

TDD Technical and Diagnostic Display

5 Driver's cab displays, controls and indicators for operational functions

5.1 General

The elements and symbols used for operation are shown in Annex B.

In the following text, two-digit numbers refer to Table B.1 that lists all the elements.

Controls and displays shall not impede visibility, as defined in FprEN 16186-5.

5.2 Display for communication, monitoring and control

Vehicle monitoring and vehicle control shall be provided, as a minimum, by 01 - Technical and Diagnostic Display (TDD) and 05 – Speedometer. Additional displays can be provided, for example:

— 02 - Passenger exchange monitoring display (PEMD);

— 03 - Rear view display (RVD);

— 04 - Operation aided system display (OASD)

5.3 Controls

5.3.1 Control for driver activity

There shall be at least one 17 - Driver's activity control element for the DAC function.

NOTE DAC is also called "Deadman".

5.3.2 Control for running direction selection

There shall be a control for the selection of direction of running: 18 - Direction of running (forwards/backwards).

The direction selected shall be indicated.

5.3.3 Controls for external lights

Controls for the 36 - Dipped lights - main beam lights switching (head), 38 - External lights (head, tail), 39 - Hazard warning lights and 40 - Direction indicators shall control all external lights of the vehicle.

Activated external lights shall be indicated.

If a fog lamp is available, a 33 – Fog lamp control shall be provided.

5.3.4 Controls for Intercom

The driver's cab shall have a communication device in accordance with FprEN 17355:

— 038/030 - A device (e.g. microphone) to support the communication function;

— 038/030 – A device for acknowledging the request for communication;

— 038/030 - A control to cancel the communication link to the operated device.

These devices can be integrated or combined with other devices or functionalities.

Activated devices for communication shall be indicated.

5.3.5 Controls for external passengers access

The driver shall be able to select door side selection and release with 41 - Door side selection and release and to cancel door release with 42 – Door release cancellation. The following functions should also be provided:

— 43 - Opening of the passenger door nearest to the cab;

— 44 – Open/close door centrally;

— 45 - Forced closing of doors;

— 02 - Passenger exchange monitoring display.

NOTE For vehicles with doors on one side, the door side selection function is not needed.

Open doors shall be indicated.

Depending on operational requirements, door side selection and door release may be combined.

5.3.6 Controls for obstacle detection and pedestrian protection

Depending on the technical solution, the following controls shall be provided:

— 30 – Obstacle detection control;

— 31 – PACM (pedestrian anti-crush mechanism) control for resetting;

— 32 – PACM (pedestrian anti-crush mechanism) activated.

5.3.7 Controls for driver's cab temperature

There shall be a device for regulating the temperature: 25 - Driver's cab heating and ventilation. This should be compliant with EN 14813 series.

5.3.8 Controls for passenger area temperature

There shall be a device for regulating the temperature: 26 - Passenger area heating and ventilation. This should be compliant with EN 14750 series.

5.3.9 Controls for coupling and uncoupling of vehicles

If the vehicle is equipped with an automatic coupler, the cab shall have a 57- Coupler control to manage the coupling function.

Coupled vehicles shall be indicated.

5.3.10 Controls for auxiliary desk

If auxiliary desks are provided, they shall include at least the following operating elements:

— 06 – Switch/point control;

— 08 – Warning horn

— 09 – Warning bell;

— 13 - Safety braking control;

— 17 - Driver activity control (DAC) (can be integrated in the traction/brake controller);

— 18 - Direction of running (forwards/backwards);

— 38 – External light control;

— 39 - Hazard warning lights;

— 40 – Direction indicator (turn indicator) control;

— 43 – Open/release the passenger door nearest the cab;

— 53 - Inter-cab ringer and voice communication activation command;

— 54 – Combined traction/brake controller with minimum functionality (T+, T, T-, emergency braking) or (T+, T, 0, emergency braking) or (T, 0, B, emergency braking);

NOTE T+ means increasing traction set point; T means constant traction set point, T- means decreasing traction set point. 0 means ramp down of any set point. B - means decreasing brake set point. B means constant brake set point, B+ means increasing brake set point.

— 55 - Activation of the auxiliary driver desk;

— 56 – Speed limit control (can be integrated into another control);

— 57 - Coupler control (if a coupler is provided).

If auxiliary desk is used with passengers on board, the following door controls shall be added:

— 41 – Door side selection and release

— 42 – Door release cancellation;

— 44 – Open/close doors centrally;

— 45 – Forced closing of doors.

As an option, auxiliary desk may include:

— 05 – Speedometer;

— 49 – Microphone activation for announcements.

5.3.11 Other controls

Other controls shall be provided:

— 10 – Release of continuously applied brake;

— 21 – Mirror retracting (if retractable mirror is provided);

— 22 – Mirror adjustment (if external mirror is provided);

— 23 – Windscreen wiping/washing control;

— 24 – Window de-icing;

— 34 – Lighting in passenger area (if not automatic);

— 46 – General alarm acknowledgement;