



**SLOVENSKI STANDARD**  
**oSIST prEN 50668:2018**  
**01-maj-2018**

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**Železniške naprave - Signalni in kontrolni sistemi za urbane železniške sisteme, ki niso v sistemu UGTMS**

Railway applications - Signalling and control systems for non UGTMS Urban Rail systems

Bahnanwendungen - Nicht UGTMS Signal- und Zugbeeinflussungssysteme für den städtischen schienengebundenen Personennahverkehr

Applications ferroviaires - Systèmes de signalisation et de contrôle pour systèmes ferroviaires urbains non-UGTMS

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ICS

English Version

## Railway applications - Signalling and control systems for non UGTMS Urban Rail systems

Applications ferroviaires - Systèmes de signalisation et de  
contrôle pour systèmes ferroviaires urbains non-UGTMS

Bahnanwendungen - Nicht UGTMS Signal- und  
Zugbeeinflussungssysteme für den städtischen  
schienengebundenen Personennahverkehr

This draft European Standard is submitted to CENELEC members for enquiry.  
Deadline for CENELEC: 2018-06-15.

It has been drawn up by CLC/SC 9XA.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC in three official versions (English, French, German).  
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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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Europäisches Komitee für Elektrotechnische Normung

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## Introduction

This standard covers systems restricted to train operations on sight (TOS/GOA0) and non-automated train operations (NTO/GOA1a with intermittent control), and covers signalling on tramways and other urban rail systems which do not fall directly within either existing railway or highway standards. This would typically be for parts of systems which are along off-street alignment, and which operate to line of sight, or automatic block signalling with intermittent train control (i.e. as defined in EN 62290: GOA0 and GOA1 with intermittent control systems). This standard does not conflict with the scope and requirements of EN 62290.

This standard does not set any operational rules, any system architecture or any rules for application conditions of technical systems for the different categories of urban rail systems.

In this standard GOA1a describes GOA1 with intermittent control systems.

This standard covers all GOA0 and GOA1a urban guided transport systems.

Such systems require more functionality than that provided by traffic signal controllers (as set out in EN 12675) but avoid the requirements inherent in railway signalling systems which from a tramway perspective may be over-onerous and lacking in flexibility.

Numerous states in Europe use these systems to control points, manage train movements along single lines and prevent conflicts at junctions as well as on at grade crossings with road and pedestrian traffic. Whilst adopting much of the functional requirements and safeguards used in standard traffic signal controllers, there is additional functionality required and currently in use to fulfil the needs of urban rail.

Mainline railway signalling systems include a lot of such additional functionality, but in terms of this and the required safety integrity, they are not ideally suited to the needs of urban rail.

The two fundamentally different approaches for the design of appropriate equipment are:

- technology as used for traffic signal controllers, or
- technology as used for signalling systems to be developed in accordance with Safety Integrity Levels sufficient for tramways and urban rail,

both of which are currently in use to some extent on most systems. This may leave system owners and operators vulnerable to challenge, particularly after an incident, because there is no relevant accepted standard to justify appropriate use of such equipment.

## 1 Scope

This standard specifies functional requirements for urban rail signalling and control systems

- which operate on line of sight or using automatic block signalling with intermittent train control,
- not covered by existing UGTMS standard EN 62290,
- not forming a part of an urban traffic control system but possibly interfaced with such systems.

The standard is restricted to functional requirements which allow users to define more specific requirements based on the given framework of the system requirements at top level. This standard is not applicable to command and control systems for urban rail using continuous data transmission and continuous supervision of train movements by train protection profile (already covered by EN 62290).

## 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 62290:2014, (*all parts*), Railway applications - Urban guided transport management and command/control systems

IEC 60050-821:2017, *International electrotechnical vocabulary - Signalling and security apparatus for railways*

## 3 Terms, definitions and abbreviations

For the purposes of this document, the following terms and definitions 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 <http://www.iso.org/obp>

### 3.1 Terms and definitions

#### 3.1.1

##### **external device**

device providing external demand inputs to elements of signalling control

Note 1 to entry: The methods of making these demand inputs can vary from simple manual inputs to automatic data derived inputs from train-borne equipment.

Note 2 to entry: Examples of input systems include:

- Remote inputs from control rooms
- Input from external device
- A request transmitted from a train.

#### 3.1.2

##### **indicator**

variable sign that gives information to be observed by train drivers and staff entrusted to observe it

**prEN 50668:2018****3.1.3****level crossing****level grade crossing**

crossing of a railway and a road at the same level

Note 1 to entry: In some member states when a tramway on its own alignment crosses a road used by other traffic it does not normally do so as a level crossing within the meanings of national road and rail traffic legislation, but is usually termed a road junction or crossing at grade. References to level crossing in this standard equate to a crossing at grade when the urban rail system under consideration is a tramway.

[SOURCE: IEC 60050-821:2017, 821-07-01, modified – Note 1 to entry has been added]

**3.1.4****level crossing area**

portion of the level crossing between the road stop lines on either side of the railway

**3.1.5****road traffic**

road vehicles, pedestrians, equestrians, bicycles and any other road users

**3.1.6****route, <in signalling>**

predefined path for a traffic movement

Note 1 to entry: This is as distinct from the meaning in railway signalling of a secure route. With respect to TOS/GOA0, the driver is the person in charge of the vehicle and is required to be able to stop the train within his sighting distance.

[SOURCE: IEC 60050-821:2017, 821-01-22, modified – Note 1 to entry has been added]

**3.1.7****signal, <in railway signalling>**

apparatus by means of which a conventional indication is given

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Note 1 to entry: This conventional indication, visual or acoustic, generally concerning the movements of railway vehicles, is transmitted to the staff entrusted to observe it.

Note 2 to entry: When a tramway or part of a tramway is in an area which is part of the highway or public road it cannot be called a signal under some national legislation unless it complies with prescribed diagrams and usage to control traffic. Equipment used only to confirm such things as the lie and blocking of points may therefore described in some countries as a point indicator. In this standard where the terms point signal or point blocking signal appear, it shall be taken that these refer to a point indicator or point blocking indicator as appropriate.

[SOURCE: IEC 60050-821:2017, 821-02-01, modified – Note 2 to entry has been added]

**3.1.8****train**

combination of rolling stock coupled together

Note 1 to entry: Rolling stock includes banking locomotives.

Note 2 to entry: The term is used in this standard for all categories of urban rail, such as trams, light rail, underground urban rail, local rail systems and does not imply a specific term used exclusively in the railway domain.

[SOURCE: IEC 60050-811:2017, 811-01-08, modified – Note 2 to entry has been added]



### 3.2 Abbreviations

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

GOA	Grade of Automation
GOA0	Grade of Automation 0
GOA1a	Grade of Automation 1 with Intermittent Supervision
HMI	Human Machine Interface
NTO	Non-automated Train Operations
(O)	Optional
TOS	Train Operations on Sight
UGTMS	Urban Guided Transport Management System

## 4 General provisions and boundary conditions

### 4.1 General

The systems covered by this standard and their components should be suitable for use on street alignment or off-street alignment.

Figures 1 to 3 below provide an overview of the areas of non UGTMS Urban Rail systems for which operational scenarios need to be considered. In each area a train passes through, specific functionality is required.

This standard covers the following areas:

- **Independent points** used for TOS/GOA0 operations, to direct trains to different tracks of the network.
- **Single track sections** used for TOS/GOA0 operations where the guideway layout is restricted to a single track for train movements in either direction of travel.
- **Level crossings (crossings at grade)** used for both TOS/GOA0 and NTO/GOA1a operation, where an off-street guideway crosses public streets and/or footpaths.
- **Route control area** used for:
  - o TOS/GOA0 where the guideway layout has a higher complexity and it is reasonable to set a route consisting of various route elements for passage of the train,
  - o NTO/GOA1a where train movements on safe routes are compulsory.

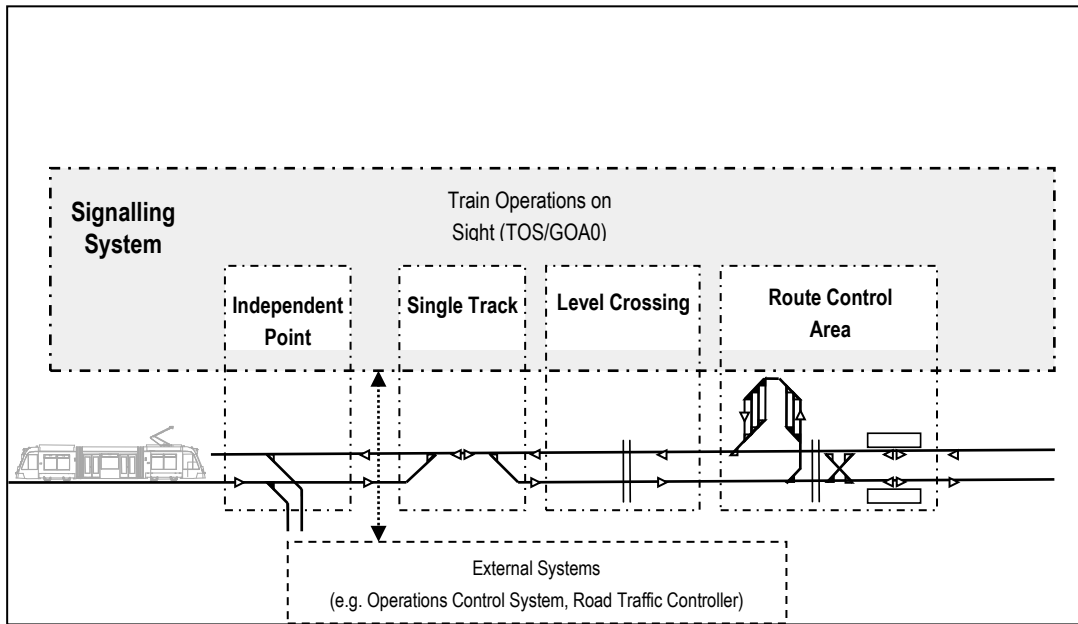


Figure 1 – Train operations on sight (TOS/GOA0)

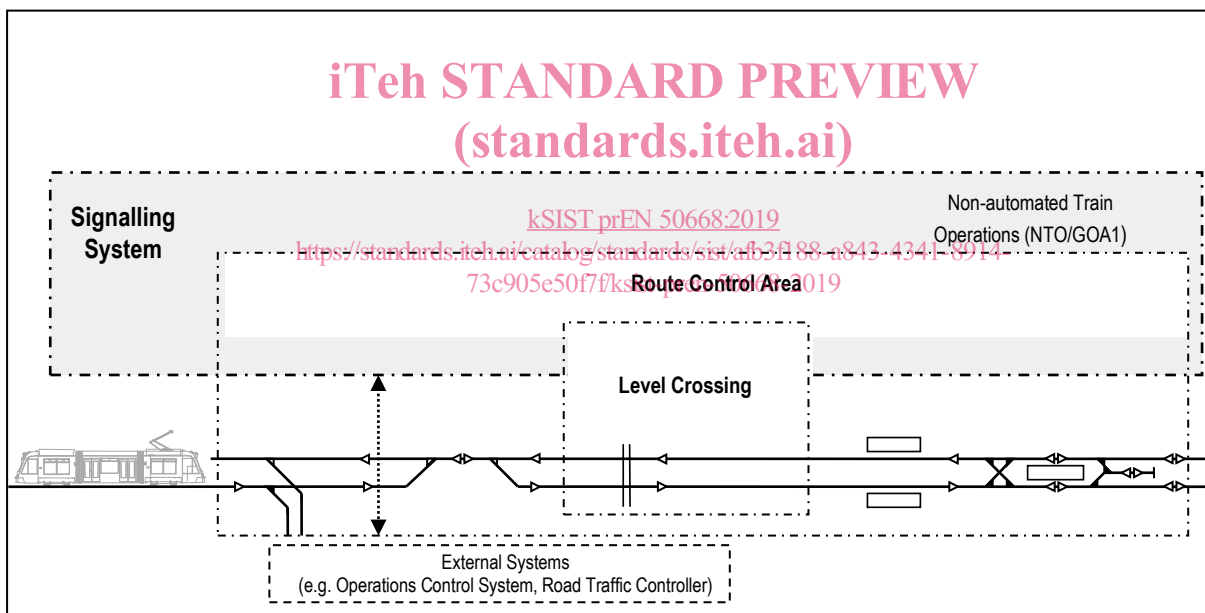
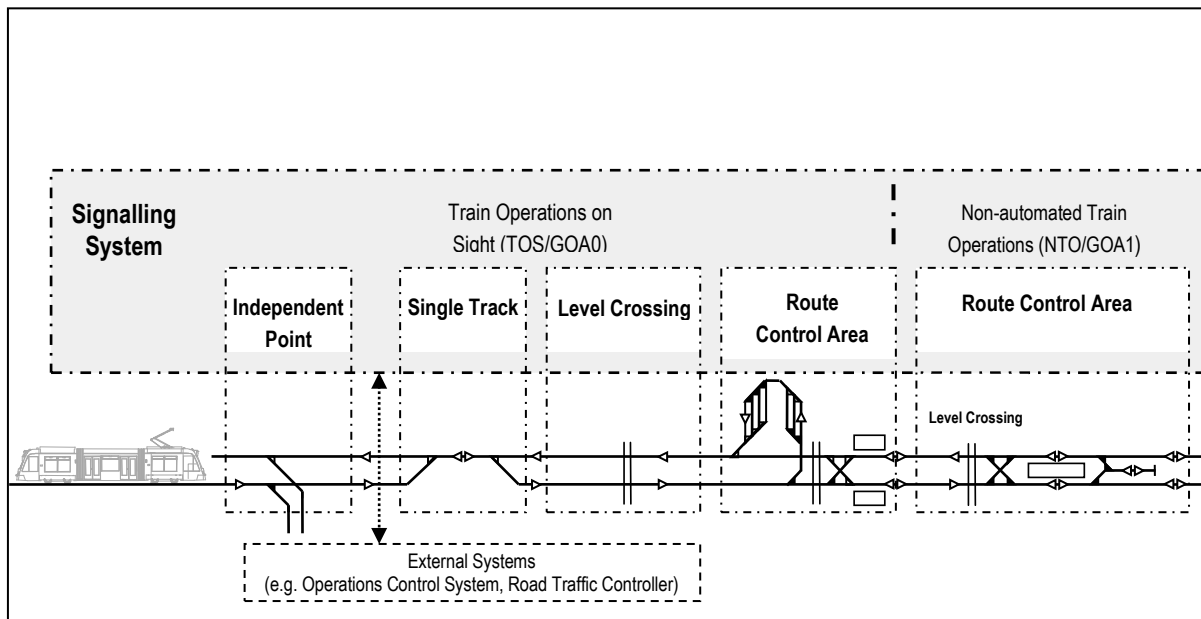


Figure 2 – Non-automated train operations (NTO/GOA1a)



**Figure 3 – Combined train operations on sight (TOS/GOA0) and non-automated train operations (NTO/GOA1a)**

#### 4.2 Independent point control

Independent point control is used to set points in different positions and to avoid points moving under trains by:

- setting and securing points,
- indication of points (by displaying the position of the points).

Independent point control is used for train operations on sight (TOS/GOA0) and covers independent points which may be linked together, but it is not part of a route control area.

#### 4.3 Single track section control

Single track section control is to prevent concurrent use of a single track section by trains travelling in opposite directions by:

- ensuring single track sections are set and secured,
- signalling of single track sections.

Single track section control is used for TOS/GOA0 operation. Control of points is treated separately.

#### 4.4 Level crossing control

Level crossing control is to prevent concurrent use of the guideway by rail and crossing road/pedestrian traffic by:

- signalling and/or signage of level crossings for rail and road traffic, and
- when signalled, closing to road /pedestrian traffic and holding level crossing for use by rail traffic.

Level crossing control is used for both TOS/GOA0 and NTO/GOA1a operations.

Some functionalities of level crossing control are covered by route control for NTO/GOA1a operation.

## 4.5 Route control

Route control is used to set routes via various route elements for:

### TOS/GOA0

the prevention of conflicting movements and points moving under trains, by:

- setting and securing routes via switchable (e.g. points) and non-switchable (e.g. level crossings, track sections) route elements,
- signalling of routes.

### NTO/GOA1a

the prevention of conflicting movements and points moving under trains, by:

- setting and securing routes via switchable (e.g. points) and non-switchable (e.g. crossing, track sections) route elements,
- ensuring safe separation of trains,
- signalling of routes and supervision of train movements at specific locations.

## 5 Hazards to be covered

### 5.1 General

Boundary conditions depending on grades of automation:

In TOS/GOA0 operation, it is assumed that

- whilst operating on street alignment, conflicts with other road and pedestrian traffic are covered by highway legislation and means of prevention (e.g. traffic signs, road traffic signals and controllers) are therefore not part of this hazard identification,
- the train driver is responsible for carrying out such functions, within the boundary conditions defined by national or operational rules,
- the separation of trains is the responsibility of the driver, and the driving speed is such that the braking distance of the train remains shorter than the sighting distance,
- the determination of appropriate speed to avoid collisions is the responsibility of the train driver,
- the observance of appropriate speed to avoid derailment is the responsibility of the train driver.

In NTO/GOA1a operation

- trains operate on a segregated guideway,
- the separation of trains is managed through the signalling system,
- speed supervision is part of the signalling system (O).