SLOVENSKI STANDARD
SIST EN 12675:2002

01-september-2002

Krmilniki za svetlobne prometne znake - Funkcionalne varnostne zahteve

Traffic signal controllers - Functional safety requirements

Steuergeräte für Lichtsignalanlagen - Funktionale Sicherheitsanforderungen

Contrôleurs de signaux de circulation routiere - Exigences de sécurité fonctionnelle

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Ta slovenski standard je istoveten z: **EN 12675:2000**

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ICS:

93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations

SIST EN 12675:2002 **en**

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EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 12675

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English version

Traffic signal controllers - Functional safety requirements

Contrôleurs de signaux de circulation routière - Exigences de sécurité fonctionnelle

Steuergeräte für Lichtsignalanlagen - Funktionale Sicherheitsanforderungen

This European Standard was approved by CEN on 9 March 2000.

CEN 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 Central Secretariat or to any CEN 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 CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 226 "Road equipment", the secretariat of which is held by AFNOR.

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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of an identical text or by endorsement, at the latest by April 2001, and conflicting national standards shall be withdrawn at the latest by April 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The objective of this European Standard is to specify the functional safety requirements of equipment used for the control of traffic signals. It relates to the control of signals to traffic, and any associated signalled traffic movements. The primary concern is to safeguard persons and objects against hazards due to conflicting signals to traffic.

The hazards to be considered include, but are not limited to, the following types of possible signal failures:

a) the failure to display a red signal to traffic;

b) the display of a green signal to conflicting traffic;

c) the failure to display the correct signal sequence to traffic;

d) the failure to provide the correct timing of all signals.

Persons to be safeguarded are:

a) users of traffic signals, drivers and passengers of vehicles (including public transport), pedestrians, cyclists and equestrians, persons with physical disabilities;

b) maintenance and inspection personnel.

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1 Scope

This European Standard specifies the functional safety requirements for traffic signal controllers. It is applicable to traffic signal control equipment permanently and temporarily installed, but excludes portable traffic control equipment. Traffic signal controllers, as defined by this European Standard, are required to control conflicting traffic, both vehicular and pedestrian, e.g. junction signals, pedestrian crossings, shuttle signals, public transport signals, in a safe manner.

The electrical safety requirements and additional traffic safety requirements, the interfacing with external equipment and the test methods for verifying compliance with this European Standard are contained in HD 638.

NOTE National requirements may specify special conditions for public transport signals (PT) and for any other signal that is not specified in a European Standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12368
Traffic control equipment - Signal heads and poles

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HD 638:1999
Road traffic signal systems

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3 Definitions

For the purposes of this European Standard, the following definitions apply.

3.1
absent signal
an intended signal the luminous intensity of which does not comply with the signal "ON" requirements as specified in HD 638:1999

3.2
bicycle signal
a traffic signal for the exclusive purpose of directing bicycle traffic at signalized locations

3.3
central control
a system for co-ordinating and monitoring a network or group of traffic signals using a central computer, or equivalent device, and transmission systems

3.4
conflicting green (green/green conflict)
the simultaneous display of green signals allowing conflicting traffic movements

3.5
conflicting signal groups
two or more signal groups that will cause conflicting traffic movements if operated concurrently

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3.6
failure mode
a non operational state of the traffic signal controller in which, as a result of a major fault, the normal operation mode is replaced with a flashing yellow or a signals off condition.

3.7
green signal
a signal that is displayed to traffic having the colour "green" as specified in EN 12368.

3.8
major fault
a fault the occurrence of which has the effect that the safe operation of the signal traffic system cannot be guaranteed as defined in the national requirements

3.9
manual operation mode
an operational state of the traffic signal controller in which the state of the signals to traffic is controlled manually by an operator

3.10
memory device
a means of storing information in a manner permitting its retrieval

3.11
minor faults
a fault as defined in the national requirements, other than a major fault, that is capable of being identified and recorded

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3.12
mode
a specific condition of a traffic signal controller used to control the signals to traffic. Examples are:

– standby operation mode;

– manual operation mode;

– normal operation mode;

– failure mode.

3.13
monitoring
a method of collecting information about the traffic signal controller including diagnostic checks used to detect a fault condition

3.14
national signal regulation
the order and appearance of signal aspects, displayed to traffic, that are prescribed in national requirements

3.15
national signal sequence
the sequential order and appearance of signals, to traffic, to satisfy a specific national condition and/or application (e.g. signal start up sequence)

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3.16
normal operation mode
any operational state of the traffic signal controller, other than failure mode, especially the operational state in which the signals are in accordance with the national signal regulation

3.17
pedestrian signal
a traffic signal for the exclusive purpose of directing pedestrian traffic at signalized locations

3.18
portable traffic control equipment
traffic signal control equipment designed for temporary applications and designed for easy transportation from one site to another

3.19
power supply
the power source providing energy to an active device or circuit

3.20
public transport signals (PT)
a traffic signal for the exclusive purpose of directing public transport vehicles at signalized locations

3.21
red signal
a signal that is displayed to traffic having a colour "red" as specified in EN 12368

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3.22
safety timings
time settings that, in the event of an error, can effect the safety of the traffic signal control equipment

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3.23
shuttle signals
a set of traffic signals controlling a narrow section of road where traffic can only proceed in each direction alternatively

3.24
signal
a dynamic message supplied to road users

3.25
signal group
a group of signal heads that always receive identical signal light indications

3.26
signal head
a device which comprises one or more optical units, including the housing(s), together with all the mounting brackets, fixings, hoods, visors, cowls and background screens, whose task is to convey a visual message to road users

3.27
standby operation mode
an operational state of the traffic signal controller in which a flashing yellow signal, or signals off condition, is permitted by the national signal regulation

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3.28
start-up sequence
when requested under normal operation of the controller, it may be required to go through a controlled start up sequence to change from the display of either "all signals off" or "flashing yellow" to normal operation mode

3.29
time settings
all the time information relating to the traffic signal controller for a particular intersection

3.30
traffic control
regulation of traffic by traffic signals or traffic signs

3.31
traffic signal controller
an equipment driving traffic signals

3.32
traffic signal control equipment
a traffic signal controller, working together with the signal under control, and the associate interface equipment

3.33
unwanted signal
an unintended signal the luminous intensity of which does not comply with the signal "OFF" requirements as specified in HD 638:1999

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3.34
yellow signal
a signal that is displayed to traffic having a colour "yellow" as specified in EN 12368

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4 Functional safety requirements

4.1 General

This European Standard specifies the minimum safety requirements for traffic signal controllers to ensure the safe state of signals displayed to traffic. This safety consists of preventing a fault, or the consequences of a fault, that could result in the display of information liable to present a hazard to road users. A hazard to road users is prevented by the ability of the traffic signal controller to detect a specified fault condition and to change to a safe state.

The change to a safe state is determined by the ability of the traffic signal controller to respond to the occurrence of faults in accordance with clause 5.

A fault condition may be dependent on the configuration of signal groups for specific application requirements. The specified fault condition shall be classified as a major or minor fault condition and acted on accordingly.

Diagnostic checks shall be provided within the traffic signal controller for the detection of specified fault conditions. This is achieved by monitoring the appropriate:

a) outputs;
b) logic circuits;
c) inputs.

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4.2 Application of power

On application of power to the traffic signal controller, the controller shall undertake internal checks to ensure that the operating programs start in a pre-defined condition. These checks shall ensure that all memories are initialized to their correct state and that all memory devices are checked. In the event of an error, the traffic signal controller shall not change to the control mode of operation.

4.3 Diagnostic checks of traffic signal controller logic system

Diagnostic checks shall check the traffic signal controller logic system. The diagnostic check interval, and the action to be taken, as a result of diagnostic checks, shall not be greater than 10 s. In the event of an error, the traffic signal controller shall change to the failure mode.

4.4 Classification of faults

This European Standard defines the minimum specification for a traffic signal controller with respect to safety for the road user. This safety consists of avoiding the display of incorrect messages on signals that are liable to endanger road users (e.g. conflicting signals, missing or unwanted signals, wrong timing). The controller shall be capable of taking action as required by the selected class and taking into account the following:

a) Where a class includes a 0 there is no requirement to provide checks. Therefore, this European Standard does not specify the requirement to provide the function, the monitoring for the fault condition or the action to be taken if the function is provided.

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b) For specified major and minor faults the traffic signal controller shall record the faulty signal group outputs, record the affected signals, and record the fault as specified in 5.4.

c) For a traffic signal controller to comply with this European Standard, it shall comply with the requirements to declare a fault class including a 1 as follows:

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- For a traffic signal controller to comply with this European Standard, at least one of the classes AA1, AE1 as specified in 4.5.1 or AF1 shall be declared.

- For a traffic signal controller to comply with this European Standard, class DA1 as specified in 4.8 shall be declared, or at least one of the classes CA1, CB1, CC1, or CD1 as specified in clause 4.7.1, and class CE1 as specified in clause 4.7.2, shall be declared.

d) The time interval for the traffic signal controller to detect the occurrence of a fault and change to a safe state shall be in accordance with HD 638: 1999, 5.2.2.3.

e) The fault value of luminous intensity for an absent signal, signal "ON" requirement of signal intensity for safety, shall be as specified in HD 638: 1999, 5.2.1.

f) The fault value of luminous intensity for an unwanted signal, signal "OFF" requirement of signal intensity for safety, shall be as specified in HD 638: 1999, 5.2.1.

4.5 Conflict faults

4.5.1 Signal group conflicts (unwanted signals)

The simultaneous display of configured conflicting signal groups shall have an effect according to one or more of the following classes.

a) Green - green conflict

Class AA0: There is no requirement to check for conflicting green signals.