SLOVENSKI STANDARD
SIST EN 50293:2012

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Nadomešča:
SIST EN 50293:2002

Sistemi prometne signalizacije - Elektromagnetna združljivost

Road traffic signal systems - Electromagnetic compatibility

Straßenverkehrs-Signalanlagen - Elektromagnetische Verträglichkeit

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Systèmes de signaux de circulation routière - Compatibilité électromagnétique

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Ta slovenski standard je istoveten z: EN 50293:2012

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33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations

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2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 33.100.01; 93.080.30

Supersedes EN 50293:2000

English version

Road traffic signal systems - Electromagnetic compatibility

Systèmes de signaux de circulation routière - Compatibilité électromagnétique

Straßenverkehrs-Signalanlagen - Elektromagnetische Verträglichkeit

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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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 document (EN 50293:2012) has been prepared by CLC/BTTF 69-3 (TC 214 WG1) "Road traffic signal systems".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2013-05-11
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2015-05-11

This document supersedes EN 50293:2000.

EN 50293:2012 includes the following significant technical changes with respect to EN 50293:2000:

- adaption to the actual EMC-Standard;

- update of the normative-references;

- editorial revision.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

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This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

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1 Scope

This product standard for EMC requirements applies to road traffic signal systems. The range of products included within the scope of this European Standard are road traffic signal systems and devices including for example signal heads, signalling devices and traffic signs, controller and housing, supports, interconnections, traffic detectors, monitoring equipment, electrical supply. Road traffic signal systems operating in conjunction with other systems e.g. public lighting, railway systems should also comply with the respective standard and should not reduce the safety of all the equipment. Central Office equipment is excluded from this standard. Items with a radio-communication function should also refer to the European ETSI standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12368, *Traffic control equipment – Signal heads*

EN 12675, *Traffic signal controllers – Functional safety requirements*

EN 50556:2011, *Road traffic signal systems*

EN 55014-1, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission (CISPR 14-1)*

EN 55022, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 22)*

EN 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) (IEC 61000-3-2)*

EN 61000-3-3, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection (IEC 61000-3-3)*

EN 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test (IEC 61000-4-2)*

EN 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio frequency electromagnetic field immunity test (IEC 61000-4-3)*

EN 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test (IEC 61000-4-4)*

EN 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test (IEC 61000-4-5)*

EN 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6)*

EN 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test (IEC 61000-4-8)*

EN 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11)*

IEC 60050-161:1990, *International electrotechnical vocabulary – Chapter 161: Electromagnetic compatibility*

IEC Guide 107:2009, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications*

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3 Terms and definitions

For the purposes of this document, the terms and definitions related to EMC and to relevant phenomena given in the EEC Directive, in IEC 60050-161:1990, in IEC Guide 107:2009 and CISPR Publications apply. The following particular terms and definitions apply.

3.1
port
particular interface of the specified apparatus with the external electromagnetic environment, including communication interface (see Figure 1)

3.2
enclosure port
physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

3.3
signal/control port
points at which a conductor or a cable is connected to the apparatus. This includes cables to signal heads, signalling devices and traffic signs, traffic sensors, detectors and monitoring equipment.

[SOURCE: EN 50556]

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Figure 1 – Example of ports

4 Common test conditions

In general the EMC testing of equipment requires it to be operated under conditions similar to those which would be found in practice. Equipment may be tested individually or in a representative system as described below.

The modes of operation that are likely to cause highest levels of emission and in addition those likely to give rise to the most susceptible condition shall be selected. The equipment under test will be tested in such a manner so as to maximise emission and susceptibility levels at the highest operational frequencies.

Equipment having dimmed and undimmed conditions of operation shall be tested in that condition which produces the higher emission level.

For traffic controllers, tests shall be carried out in a system configuration as described in 5.6 with standard loads and standard cycles as defined in 5.4 and 5.5. The standard loads do not need to be installed in the test chamber.

Details of the test configuration and the length of the interconnecting cables used shall be included in the test report.

5 Test configuration

5.1 Equipment

The equipment shall be a standard production version.

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5.2 Supplier

The supplier shall specify the functions of the equipment.

5.3 Technical documentation

The equipment shall be accompanied by the necessary technical documentation.

This documentation shall at least define modes of operation, the configuration details for the test, the technical specification and installation details sufficient to repeat the test.

5.4 Standard load

For controller or system tests the controller shall be set for two signal group operations.

One signal group shall be connected to the maximum load and the other to the minimum load. These loads shall be either the standard signal heads together with their associated control gear or an electrical equivalent load.

5.5 Cycle rate

The cycle rate for vehicle controller shall be adjusted such that a minimum of **three** switching operations are carried out in one minute. A switching operation is defined as one intentional opening or closing of a switch or contact, i.e. when a lamp is switched ‘ON’ and then ‘OFF’ this constitutes two switching operations.

5.6 Test set up

5.6.1 All interconnecting cables shall be at least 7 m in length.

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5.6.2 All interconnecting cables shall be separated from the floor level by 100 mm. This shall be achieved by an insulated support and stand-offs.

5.6.3 If a controller is required to be used with loop detectors in its enclosure, at least one detector loop in the manufacturers configuration shall be installed in the calibration zone of the test chamber. This may be achieved by locating the manufacturers detector loop configuration and equipment side by side. Only the controller is required to be rotated during testing.

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NOTE The inclusion of a single loop detector does not infer certification of that loop detector product nor limit the controller to that specific detector type.

5.6.4 For tests on individual items of equipment, the actual loads/drivers shall be consistent with the requirements of 5.6.1, 5.6.2 and 5.6.3 and shall be agreed with the test house.

5.6.5 For vehicle detectors, the manufacturers loop configuration shall be separated from the floor level by 100 mm. This shall be achieved by an insulated support and stand-offs.

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6 Performance criteria

The manufacturer and the test house shall define precise criteria for the evaluation of the immunity test results.

Apparatus shall not become dangerous or unsafe as defined in EN 50556, EN 12368 and EN 12675 as a result of the application of the tests defined in this European Standard.

A functional description and a definition of the following performance criteria, during or as a consequence of the EMC testing, shall be noted in the test report.

Performance Criteria A: No change shall be observable in the operation. The traffic system shall conform to the standards EN 50556, EN 12368 and EN 12675.

Performance Criteria B: There shall be no degradation of safety requirements. There shall be no alteration in the operating mode or of the stored data (Timings, fault logs etc.). It is acceptable for the signals to switch on or off for a period less than the maximum failure detection time. It is acceptable for an additional vehicle to be detected or for the presence of a vehicle not to be detected during the period of the disturbance.

7 Emission

7.1 Objective

The objective of this section is to define limits and test methods for apparatus defined in the scope, in relation to electromagnetic emissions which may cause interference in other apparatus e.g. radio receivers.

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Test requirements are specified for each port considered.

NOTE 1 The limits in this standard may not, however, provide full protection against interference to radio and television reception when the apparatus is used closer than 10 m to the receiving antenna.

NOTE 2 In special cases, for instance when highly susceptible apparatus is being used in proximity, additional mitigation measures may have to be employed to reduce the electromagnetic emission further below the specified levels.

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7.2 Conditions during testing

The measurements shall be made in the operating mode producing the largest emission in the frequency band being investigated consistent with normal applications.

An attempt shall be made to maximise the emission by varying the configuration of the test sample.

If the apparatus is part of a system, or can be connected to auxiliary apparatus, then the apparatus shall be tested while connected to the normal configuration of auxiliary apparatus necessary to exercise the ports.

The configuration and mode of operation during testing shall be as stated in this European Standard and shall be noted in the test report.

If the apparatus has a large number of terminals, then a sufficient number shall be selected to simulate actual operating conditions and to ensure that all the different types of termination are covered.

The tests shall be carried out at ambient temperature and humidity or within the specified operating environment range for the apparatus and at its rated supply voltage.

7.3 Applicability

Measurements are made on the relevant ports of the apparatus according to Tables 1 to 3. Measurements shall only be carried out where the relevant ports exist.

It may be determined from consideration of the electrical characteristics and usage of a particular apparatus that some of the measurements are inappropriate and therefore unnecessary. In such a case, it is required that the decision not to measure be recorded in the test report.