SLOVENSKI STANDARD

SIST EN 50293:2002

prva izdaja
maj 2002

Electromagnetic compatibility - Road traffic signal systems - Product standard

ICS 33.100.01; 93.080.30

Referenčna številka
SIST EN 50293:2002(en)

EUROPEAN STANDARD **EN 50293**

NORME EUROPÉENNE

EUROPÄISCHE NORM December 2000

ICS 33.100; 93.080.30

English version

Electromagnetic compatibility - Road traffic signal systems - Product standard

Compatibilité électromagnétique - Systèmes de signaux de circulation routière - Norme de produit

Elektromagnetische Verträglichkeit - Strassenverkehrs-Signalanlagen - Produktnorm

This European Standard was approved by CENELEC on 2000-04-01. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 50293:2000 E

Foreword

This European Standard has been prepared by the CENELEC BTTF 69-3 (TC 214 WG1), Road traffic signal systems.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50293 on 2000-04-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2001-06-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2003-04-01

Contents

1 General

1.1 Scope

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

1.2 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.

When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

HD 638	Road traffic signal systems
EN 12368	Signal Heads
EN 12675	Traffic Signal Controllers
EN 55014 series	Electromagnetic compatibility (EMC) - Requirements for household appliances, electrical tools and similar electrical apparatus (CISPR 14 series)
EN 55022	Information technology equipment Radio disturbance characteristics Limits and methods of measurement (CISPR 22, mod)
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, mod) NOTE The requirements of this standard shall apply when it comes into force (see CENELEC report R210-007)
EN 61000-3-3	Part 3-3: Limits - Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16 A (IEC 61000-3-3) NOTE The requirements of this standard shall apply when it comes into force (see CENELEC report R210-007)
EN 61000-4-2	Part 4-2: Testing and measuring techniques - Electrostatic discharge immunity test (IEC 61000-4-2)
EN 61000-4-3	Part 4-3: Testing and measuring techniques - Radiated, radio frequency electromagnetic field immunity test (IEC 61000-4-3, mod)
EN 61000-4-4	Part 4-4: Testing and measuring techniques - Electrical fast transient/burst immunity test (IEC 61000-4-4)
EN 61000-4-5	Part 4-5: Testing and measuring techniques - Surge immunity test (IEC 61000-4-5)
EN 61000-4-6	Part 4-6: Testing and measuring techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6)
EN 61000-4-8	Part 4-8: Testing and measuring techniques - Power frequency magnetic field immunity test (IEC 61000-4-8)
EN 61000-4-11	Part 4-11: Testing and measuring techniques - Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11)

IEC 60050-161 International electrotechnical vocabulary
Chapter 161: Electromagnetic compatibility

1.3 Definitions

Definitions related to EMC and to relevant phenomena may be found in the EEC Directive, in chapter 161 of the IEV (IEC 60050), in IEC guide 107 and CISPR Publications.

The following particular definitions are used in this standard:

port: Particular interface of the specified apparatus with the external electromagnetic environment (see figure 1).

enclosure port: The physical boundary of the apparatus through which electromagnetic fields may radiate or impinge.

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. See HD 638.

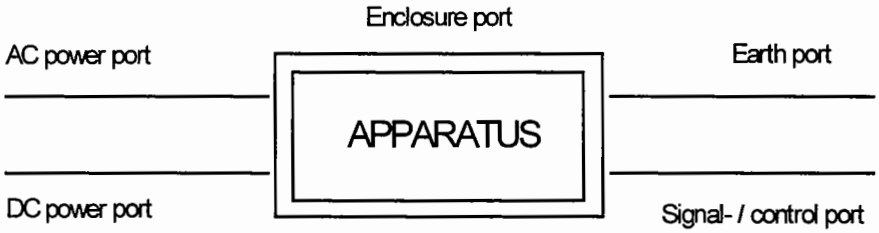

Figure 1: Example of ports

1.4 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 1.5.6 with standard loads and standard cycles as defined in 1.5.4 and 1.5.5. 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.

1.5 Test configuration

1.5.1 The equipment shall be a standard production version.

1.5.2 The Supplier shall specify the functions of the equipment.

1.5.3 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.

1.5.4 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.

1.5.5 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.

If a controller is defined to be used for Vehicle actuated Operation (VA) then for immunity tests this mode of operation shall be used.

1.5.6 Test set up

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

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

1.5.6.3 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.

1.5.6.4 For tests on individual items of equipment, the actual loads/drivers shall be consistent with the requirements of 1.5.6.1, 1.5.6.2 and 1.5.6.3 and shall be agreed with the test house.

1.5.6.5 If a controller is required to be used with loop detectors in it's 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.

1.6 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 HD 638, EN 12368 and EN 12675 as a result of the application of the tests defined in this 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 HD 638, 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.

2 Emission

2.1 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.

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.

2.2 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 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.

2.3 Applicability

Measurements are made on the relevant ports of the apparatus according to tables 1 and 2. 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.

2.4 Emission limits

The emission limits for apparatus covered by this standard are given on a port by port basis.

Measurements shall be performed in well-defined and reproducible conditions for each type of disturbance.

The description of the test, the test methods, and the test set-up are given in the reference standards which are referred to in tables 1 and 2.

The contents of these reference standards are not repeated here, however, modifications or additional information needed for the practical application of the tests are given in this standard.

Equipment with a telecommunication port shall comply with the relevant requirements of EN 55022 for that particular port.

For low frequency emission the requirements of EN 61000-3-2 and EN 61000-3-3 shall apply to the equipment in the scope of these two standards.