



SLOVENSKI STANDARD

SIST HD 481.1 S1:1997

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Electromagnetic compatibility for industrial-process measurement and control equipment - Part 1: General introduction (IEC 801-1:1984)

Electromagnetic compatibility for industrial-process measurement and control equipment -- Part 1 : General introduction

Elektromagnetische Verträglichkeit von Betriebsmitteln der industriellen Prozeßautomatisierung -- Teil 1: Allgemeine Einführung

Compatibilité électromagnétique pour les matériels de mesure et de commande dans les processus industriels -- Partie 1: Introduction générale

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Ta slovenski standard je istoveten z: **HD 481.1 S1:1987**

ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
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ELECTROMAGNETIC COMPATIBILITY FOR
INDUSTRIAL-PROCESS MEASUREMENT AND CONTROL
EQUIPMENT
PART 1: GENERAL INTRODUCTION

Compatibilité électromagnétique
pour les matériels de mesure et
de commande dans les processus
industriels
Première partie: Introduction
générale

Elektromagnetische
Verträglichkeit von
Betriebsmitteln der
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BODY OF THE HD

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The Harmonization Document consists of:

- IEC 801-1 (1984) ed 1; IEC/TC 65, not appended

This Harmonization Document was approved by CENELEC on 1986-09-10.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text. The German translation is available.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level by or before 1987-03-15

to publish their new harmonized national standard by or before 1987-09-15

to withdraw all conflicting national standards by or before 1987-09-15.

Harmonized national standards are Listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC Central Secretariat.

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Compatibilité électromagnétique pour les matériels de mesure
et de commande dans les processus industriels

Première partie: Introduction générale
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Electromagnetic compatibility for industrial-process measurement
and control equipment

Part 1: General introduction



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY FOR INDUSTRIAL-PROCESS
MEASUREMENT AND CONTROL EQUIPMENT

Part 1: General introduction

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by IEC Technical Committee No. 65: Industrial-process Measurement and Control.

It forms Part 1 of IEC Publication 801.

The text of this standard is based on the following documents:

Six Months' Rule	Report on Voting
65(CO)28	65(CO)31

Further information can be found in the Report on Voting indicated in the table above.

ELECTROMAGNETIC COMPATIBILITY FOR INDUSTRIAL-PROCESS MEASUREMENT AND CONTROL EQUIPMENT

Part 1: General introduction

1. Scope

This part is applicable to electromagnetic compatibility of industrial-process measurement and control. It deals with general considerations in the context of the complexity of electromagnetic compatibility and the problems with which manufacturers and users of industrial-process measurement and control equipment may be confronted.

2. Object

The object of this part is to make manufacturers and users of industrial-process measurement and control equipment aware of the problems involved in achieving and maintaining electromagnetic compatibility. In addition, this part is intended to provide the background information necessary to understand the development of the different parts of the standard on electromagnetic compatibility in the field of industrial-process measurement and control.

3. General

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New electronic systems containing more sensitive electronic circuits (e.g. micro and mini-computers) have come into service in recent years. This equipment has found wide application in the commercial field where they have been installed in office environments. More recently such equipment has found wide application in areas of measurement, control, protection, etc., associated with the less favourable industrial environments such as chemical plants, rolling mills, oil processing plants, power plants and substations, etc. In many cases the equipment must have a high level of reliability. Due to the less favourable environment, however, the equipment is exposed to electromagnetic interference generated by various types of industrial equipment. To ensure that the sensitive electronic circuits will perform satisfactorily in service it is necessary to subject them to interference tests which represent and simulate the conditions of interference which may be expected in their service location.

In this part, the forms of interference considered are those arising from sources external to the equipment/systems. The interference may be introduced through the connecting cabling, by the capacitive or inductive coupling with the source, or through a difference of potential between the respective earth references of the local equipment and remotely connected equipment. In addition, interference may be generated by electrostatic discharges from the operators to panels, enclosures or cabinets and by radiated electromagnetic fields the sources of which may be walkie-talkies, broadcasting and television stations, as well as radar stations.

4. Electromagnetic compatibility

4.1 Exposure to interference

The exposure of an item of equipment to interference can be related to the electrical environment in which it is situated. The degree of interference is related to the characteristics of the source, the nature of the coupling impedances, the sensitivity of the electronic equipment and the quality of the earthing and protective measures utilized at the installation site. Thus, the systems boundaries for penetration of the interference may be:

- 1) Power feed lines.
- 2) Input signal lines.
- 3) Output signal lines.
- 4) Equipment enclosure.

The coupling mechanisms by which interference can be injected into the electrical circuits are:

- 1) Common impedance (resistive).
- 2) Inductive coupling.
- 3) Capacitive coupling.
- 4) Electromagnetic radiation.

It can be said that the environment determines the type of interference (i.e. its frequency and repetition rate) and the installation conditions determine the interference level stressing the equipment.

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4.2 Sources of interference

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Depending on the different industrial environments a wide variety of interference sources can be encountered. The following sources are among the most conspicuous ones: switchgear, contactors, relays, welders, radio and television transmitters, walkie-talkies, vehicle radio transmitters and electrostatically charged operators. The interference generated by this wide variety of different sources can be grouped into three main types of interferences:

- 1) Magnetic.
- 2) Electrical (broadband, narrowband).
- 3) Electromagnetic.

Transient disturbances, which occur most frequently, usually appear for short random periods of time and mostly result from interferences caused by lightning, earth-faults or the switching of inductive circuits. These disturbances can have a frequency range from 50 Hz up to a few hundred megahertz with time durations including transients ranging from less than 10 ns to a few seconds.

The dominant source of electromagnetic interference is the transceiver (walkie-talkie), which normally operates at frequencies between 27 MHz and 460 MHz. Close to the antenna a very high field can exist, which is likely to give rise to disturbances in exposed electronic equipment.

In a dry atmosphere and especially where carpets are used in a computer room, the operator can be charged to high voltage. If a computer unit is touched by such a charged operator a discharge spark can occur and result in a malfunctioning. In unfavourable conditions the charge voltage can be more than 15 kV.