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**Varnost strojev – Električno občutljiva varovalna oprema – 1. del: Splošne zahteve in preskusi (IEC 61496-1:2004, spremenjen)**

Safety of machinery - Electro-sensitive protective equipment -- Part 1: General requirements and tests

Sicherheit von Maschinen - Berührungslos wirkende Schutzeinrichtungen -- Teil 1: Allgemeine Anforderungen und Prüfungen

Sécurité des machines - Equipements de protection électro-sensibles -- Partie 1: Prescriptions générales et essais

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**Ta slovenski standard je istoveten z: EN 61496-1:2004**

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EUROPEAN STANDARD

**EN 61496-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2004

ICS 29.260.99

Supersedes EN 61496-1:1997

English version

**Safety of machinery –  
Electro-sensitive protective equipment  
Part 1: General requirements and tests  
(IEC 61496-1:2004, modified)**

Sécurité des machines –  
Équipements de protection  
électro-sensibles  
Partie 1: Prescriptions générales et essais  
(CEI 61496-1:2004, modifiée)

Sicherheit von Maschinen –  
Berührungslos wirkende  
Schutzeinrichtungen  
Teil 1: Allgemeine Anforderungen und  
Prüfungen  
(IEC 61496-1:2004, modifiziert)

This European Standard was approved by CENELEC on 2004-03-16. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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**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**

## Foreword

The text of document 44/444/FDIS, future edition 2 of IEC 61496-1, prepared by IEC TC 44, Safety of machinery - Electrotechnical aspects, in collaboration with the Technical Committee CENELEC TC 44X, Safety of machinery: Electrotechnical aspects, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61496-1 on 2004-03-16 without inclusion of Annex C.

This European Standard supersedes EN 61496-1:1997.

In this edition of this part of EN 61496, general requirements for a Type 3 ESPE have been added. In addition, several small changes and corrections have been made to clarify the requirements and to align this standard with current practice.

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) 2005-01-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2007-04-01

This European Standard was prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and supports the essential requirements of Directive 98/37/EC.

This standard has the status of product family standard and may be used as a normative reference in a dedicated product standard for the safety of machinery.

This standard has been prepared as a specification of general requirements for electro-sensitive protective equipment (ESPE) specifically related to machinery safety and has been developed to meet the needs of manufacturers, industrial users and safety enforcement authorities.

This document can be applied for technical tests only together with the product specific parts of this series.

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### Endorsement notice

The text of the International Standard IEC 61496-1:2004 was approved by CENELEC as a European Standard with agreed common modifications as given below.

#### COMMON MODIFICATIONS

**Delete** Annex C.

In the Bibliography, **add** the following notes for the standards indicated:

IEC 60812	NOTE	Harmonized as HD 485 S1:1987 (not modified).
IEC 61025	NOTE	Harmonized as HD 617 S1:1992 (not modified).
ISO 9000-3	NOTE	Harmonized as EN ISO 9000-3:1987 (not modified).

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## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-191	1990	International Electrotechnical Vocabulary (IEV) Chapter 191: Dependability and quality of service	-	-
IEC 60068-2-6 + Corr. March	1995 1995	Environmental testing Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995
IEC 60068-2-29 + Corrigendum	1987	Part 2: Tests - Test Eb and guidance: Bump	EN 60068-2-29	1993
IEC 60204-1	1997	Safety of machinery - Electrical equipment of machines Part 1: General requirements	EN 60204-1	1997
IEC 60249-2	Series	Base materials for printed circuits Part 2: Specifications	EN 60249-2	Series
IEC 60439-1	1999	Low-voltage switchgear and controlgear assemblies Part 1: Type-tested and partially type-tested assemblies	EN 60439-1	1999
IEC 60445	1999	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system	EN 60445	2000
IEC 60447	1993	Man-machine interface (MMI) - Actuating principles	EN 60447	1993
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
A1	1999		A1	2000
IEC 60664-1	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	EN 60664-1 <sup>1)</sup>	2003

<sup>1)</sup> EN 60664-1 includes A1:2000 + A2:2002 to IEC 60064-1

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60947-5-1	1997	Low-voltage switchgear and controlgear Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices	EN 60947-5-1	1997
IEC 60950	Series	Information technology equipment - Safety	EN 60950	Series
IEC 61000-4-2	1995	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995
IEC 61000-4-3	2002	Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2002
IEC 61000-4-4	1995	Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	1995
IEC 61000-4-5	1995	Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	1995
A1	2000		A1	2001
IEC 61000-4-6	1996	Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	1996
A1	2000		A1	2001
IEC 61000-6-2 (mod)	1999	Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2	2001
IEC 61131-2	1992	Programmable controllers Part 2: Equipment requirements and tests	EN 61131-2	1994
IEC 61508	Series	Functional safety of electrical/electronic/programmable electronic safety-related systems	EN 61508	Series
ISO 9001	2000	Quality management systems - Requirements	EN ISO 9001	2000
ISO/TR 12100-1	1992	Safety of machinery - Basic concepts, general principles for design Part 1: Basic terminology, methodology	-	-
ISO/TR 12100-2	1992	Part 2: Technical principles and specifications	-	-
ISO 13849-1	1999	Safety of machinery - Safety-related parts of control systems Part 1: General principles for design	-	-

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**NORME  
INTERNATIONALE  
INTERNATIONAL  
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**CEI  
IEC**

**61496-1**

Deuxième édition  
Second edition  
2004-02

**Sécurité des machines –  
Equipements de protection électro-sensibles –**

**Partie 1:  
Prescriptions générales et essais**

**Safety of machinery –  
Electro-sensitive protective equipment –**

**Part 1:  
General requirements and tests**

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International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF MACHINERY –  
ELECTRO-SENSITIVE PROTECTIVE EQUIPMENT –**

**Part 1: General requirements and tests**

**FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61496-1 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects, in collaboration with CENELEC technical committee 44X: Safety of machinery – Electrotechnical aspects.

This second edition cancels and replaces the first edition, published in 1997. This edition constitutes a technical revision. In this edition of this part of IEC 61496, general requirements for a Type 3 ESPE have been added. In addition, several small changes and corrections have been made to clarify the requirements and to align this standard with current practice.

This standard has the status of a product family standard and may be used as a normative reference in a dedicated product standard for the safety of machinery.

This standard has been prepared as a specification of general requirements for electro-sensitive protective equipment (ESPE) specifically related to machinery safety and has been developed to meet the needs of manufacturers, industrial users and safety enforcement authorities.

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

FDIS	Report on voting
44/444/FDIS	44/445/RVD

Full information on the voting for the approval of this standard can be found in the report of voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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## INTRODUCTION

An electro-sensitive protective equipment (ESPE) is applied to machinery presenting a risk of personal injury. It provides protection by causing the machine to revert to a safe condition before a person can be placed in a hazardous situation.

This part of IEC 61496 provides general design and performance requirements of ESPEs for use over a broad range of applications. Essential features of equipment meeting the requirements of this standard are the appropriate level of safety-related performance provided and the built-in periodic functional checks/self-checks that are specified to ensure that this level of performance is maintained.

Each type of machine presents its own particular hazards and it is not the purpose of this standard to recommend the manner of application of the ESPE to any particular machine. The application of the ESPE should be a matter for agreement between the equipment supplier, the machine user and the enforcing authority, and in this context attention is drawn to the relevant guidance established internationally, for example ISO TR 12100.

This part of IEC 61496 specifies technical requirements of electro-sensitive protective equipment. The application of this standard may require the use of substances and/or test procedures that could be injurious to health unless adequate precautions are taken. Conformance with this standard in no way absolves either the supplier or the user from statutory obligations relating to the safety and health of persons during the use of the equipment covered by this standard.

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## SAFETY OF MACHINERY – ELECTRO-SENSITIVE PROTECTIVE EQUIPMENT –

### Part 1: General requirements and tests

#### 1 Scope

This part of IEC 61496 specifies general requirements for the design, construction and testing of non-contact electro-sensitive protective equipment (ESPE) designed specifically to detect persons as part of a safety related system. Special attention is directed to functional and design requirements that ensure an appropriate safety-related performance is achieved. An ESPE may include optional safety-related functions, the requirements for which are given in Annex A.

The particular requirements for specific types of sensing function are given in other parts of this standard.

This standard does not specify the dimensions or configuration of the detection zone and its disposition in relation to hazards in any particular application, nor what constitutes a hazardous state of any machine. It is restricted to the functioning of the ESPE and how it interfaces with the machine.

This standard may be relevant to applications other than those for the protection of persons, for example for the protection of machinery or products from mechanical damage. In those applications, different requirements can be necessary, for example when the materials that have to be recognized by the sensing function have different properties from those of persons.

This standard does not deal with electromagnetic compatibility (EMC) emission requirements.

#### 2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60050-191:1990, *International Electrotechnical Vocabulary (IEV) – Chapter 191: Dependability and quality of service* (standards.iteh.ai)

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-29:1987, *Basic environmental testing procedures – Part 2: Tests – Test Eb and guidance: Bump*

IEC 60204-1:1997, *Safety of machinery – Electrical equipment of industrial machines – Part 1: General requirements*

IEC 60249-2, *Base materials for printed circuits – Part 2: Specifications*

IEC 60439-1:1999, *Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies*

IEC 60445:1999, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system*

IEC 60447:1993, *Man-machine interface (MMI) – Actuating principles*

IEC 60529:2001, *Degrees of protection provided by enclosures (IP code)*

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60947-5-1:1997, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 60950 (all parts), *Information technology equipment – Safety*

IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test – Basic EMC publication*

IEC 61000-4-3:2002, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test – Basic EMC publication*

IEC 61000-4-4:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test – Basic EMC publication*

IEC 61000-4-5:2001, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity tests – Basic EMC publication*

IEC 61000-4-6:2001, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields – Basic EMC publication*

IEC 61000-6-2:1999, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*

IEC 61131-2:1992, *Programmable controllers – Part 2: Equipment requirements and tests*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

ISO 9001:2000, *Quality management systems – Requirements*

ISO/TR 12100-1:1992, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology*

ISO/TR 12100-2:1992, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles and specifications*

ISO 13849-1:1999, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*