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Maskinsikkerhed –Tvangskoblingsanordninger i forbindelse med afskærmninger – Principper for konstruktion og udvælgelse

Safety of machinery – Interlocking devices associated with guards – Principles for design and selection (ISO 14119:2024)

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Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2024)

Sécurité des machines - Dispositifs de verrouillage associés à des protecteurs - Principes de conception et de choix (ISO 14119:2024)

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European foreword

This document (EN ISO 14119:2025) has been prepared by Technical Committee ISO/TC 199 "Safety of machinery" in collaboration with Technical Committee CEN/TC 114 “Safety of machinery” the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2025, and conflicting national standards shall be withdrawn at the latest by September 2025.

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

This document supersedes EN ISO 14119:2013.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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Annex ZA
(informative)

Relationship between this European Standard and the essential requirements of 2006/42/EC aimed to be covered

This European Standard has been prepared under a Commission's standardization request "M/396 Mandate to CEN and CENELEC for Standardisation in the field of machinery" to provide one voluntary means of conforming to essential requirements of Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast).

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Annex I of Directive 2006/42/EC

The relevant Essential Requirements of Directive 2006/42/EC	Clause(s)/subclause(s) of this EN	Remarks/Notes
1.1.2	6, 7, 8, Annex K	
1.2.1	6, 9	
1.2.2	6, 7, Annex K	
1.2.3	9	
1.2.4	9	
1.4.2.2	5, 6, 7, 8	
1.5.4.	6	
1.5.14	6, 7, Annex K	
1.6.1	6, 8, 10	
1.7.3	10	
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Table ZA.2 — Applicable Standards to confer presumption of conformity as described in this Annex ZA

Reference in Clause 2	International Standard Edition	Title	Corresponding European Standard Edition
ISO 12100:2010	ISO 12100:2010	Safety of machinery — General principles for design — Risk assessment and risk reduction	EN ISO 12100:2010
ISO 13849-1:2023	ISO 13849-1:2023	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design	EN ISO 13849-1:2023
ISO 13849-2:2012	ISO 13849-2:2012	Safety of machinery — Safety-related parts of control systems — Part 2: Validation	EN ISO 13849-2: 2012
ISO 13855:20—	ISO 13855:2023	Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body	EN ISO 13855: 20—
ISO 14118:2017	ISO 14118:2017	Safety of machinery — Prevention of unexpected start-up	EN ISO 14118:2017
IEC 60204-1:2016 +AMD1:2021	IEC 60204-1:2016 + AMD1:2021	Safety of machinery — Electrical equipment of machines — Part 1: General requirements	EN 60204-1:2018
IEC 60947-1:2020	IEC 60947-1:2020	Low-voltage switchgear and controlgear — Part 1: General rules	EN IEC 60947-1: 2021
IEC 60947-3	IEC 60947-3	Low-voltage switchgear and controlgear — Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN IEC 60947-3: 2021
IEC 60947-5-1:2016 +COR:2016	IEC 60947-5-1:2016 +COR:2016	Low voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices	EN 60947-5-1:2017

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IEC 60947-5-3	IEC 60947-5-3	Low-voltage switchgear and controlgear — Part 5-3: Control circuit devices and switching elements — Requirements for proximity devices with defined behaviour under fault conditions (PDDB)	EN 60947-5-3:2013
IEC 62061:2021	IEC 62061:2021	Safety of machinery - Functional safety of safety-related control systems	EN IEC 62061:2021

The documents listed in the Column 1 of Table ZA.2, in whole or in part, are normatively referenced in this document, i.e. are indispensable for its application. The achievement of the presumption of conformity is subject to the application of the edition of Standards as listed in Column 4 or, if no European Standard Edition exists, the International Standard Edition given in Column 2 of Table ZA.2.

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

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International

ISO 14119

Safety of machinery — Interlocking devices associated with guards — Principles for design and selection

Sécurité des machines — Dispositifs de verrouillage associés à des protecteurs — Principes de conception et de choix

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 199, *Safety of machinery*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 114, *Safety of machinery,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 14119:2013), which has been technically revised.

The main changes are as follows:

— ISO/TS 19837 has been integrated as new Annex K with specific requirements for Type 5 interlocking devices – “trapped key interlocking devices” (see definition 3.18.1);

— trapped key interlocking systems and Type 5 interlocking devices have been defined;

— Table 5 has been improved and renamed;

— test procedures are described in new Annex I;

— ISO/TR 24119 has been integrated into new Annex J.

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The structure of safety standards in the field of machinery is as follows:

a) type-A standards (basic safety standards) giving basic concepts, principles for design, and general aspects that can be applied to all machinery;

b) type-B standards (generic safety standards) dealing with one safety aspect or one type of safeguard that can be used across a wide range of machinery:

   — type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);

   — type-B2 standards on safeguards (e.g. two-hand controls, interlocking devices, pressure-sensitive devices, guards);

c) type-C standards (machine safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This document is a type-B2 standard as stated in ISO 12100.

This document is of relevance, in particular for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate in the drafting process of this document.

In addition, this document is intended for standardization bodies elaborating type-C standards.

The requirements of this document can be supplemented or modified by a type-C standard.

For machines which are covered by the scope of a type-C standard and which have been designed and built according to the requirements of that standard, the requirements of that type-C standard take precedence.

This document has been prepared to give guidance to machinery designers and writers of product safety standards on how to design and select interlocking devices associated with guards.

Relevant clauses of this document, used alone or in conjunction with provisions from other standards, may be used as a basis for verification procedures for the suitability of a device for interlocking duties.

Annexes A to E describe the technology and the typical characteristics of the defined interlocking devices types 1 to 4. Other solutions may be adopted, provided that they are in conformity with the principles of this document.

Annexes F to H give information on particular aspects such as interlocking devices used within safety functions, risk assessment considering the motivation to defeat and static action forces.

Annex I describes a locking force test and an impact resistance test for guard-locking devices.

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Annex K provides requirements for trapped key interlocking systems and describes their technology.

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Safety of machinery — Interlocking devices associated with guards — Principles for design and selection

1 Scope

This document specifies principles for the design and selection (independent of the nature of the energy source) of interlocking devices associated with guards and provides guidance on measures to minimize the possibility of defeat of interlocking devices in a reasonably foreseeable manner.

This document covers principles for the design, selection and application of the following:

— parts of the guards which actuate interlocking devices;

— trapped key interlocking devices and systems for machinery applications.

NOTE ISO 14120 specifies general requirements for the design and construction of guards provided primarily to protect persons from mechanical hazards. The processing of the signal from the interlocking device to stop the machine and prevent unexpected start up is covered in ISO 14118, ISO 13849-1 and IEC 62061.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

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ISO 13855:—[1)], *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 14118:2017, *Safety of machinery — Prevention of unexpected start-up*

IEC 60204-1:2016+AMD1:2021, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60947-1:2020, *Low-voltage switchgear and controlgear — Part 1: General rules*

IEC 60947-3, *Low-voltage switchgear and controlgear — Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-5-1:2016+COR:2016, *Low voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices*

IEC 60947-5-3, *Low-voltage switchgear and controlgear — Part 5-3: Control circuit devices and switching elements — Requirements for proximity devices with defined behaviour under fault conditions (PDDB)*

IEC 62061:2021, *Safety of machinery — Functional safety of safety-related control systems*

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