

SVENSK STANDARD

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Maskinsäkerhet – Nödstoppsutrustning – Konstruktionsprinciper (ISO 13850:2015)

**Safety of machinery – Emergency stop function – Principles for
design (ISO 13850:2015)**



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Denna standard ersätter SS-EN ISO 13850:2008, utgåva 2.

The European Standard EN ISO 13850:2015 has the status of a Swedish Standard. This document contains the official English version of EN ISO 13850:2015.

This standard supersedes the Swedish Standard SS-EN ISO 13850:2008, edition 2.

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EUROPEAN STANDARD

EN ISO 13850

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2015

ICS 13.110

Supersedes EN ISO 13850:2008

English Version

Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)

Sécurité des machines - Fonction d'arrêt d'urgence -
Principes de conception (ISO 13850:2015)

Sicherheit von Maschinen - Not-Halt -
Gestaltungsleitsätze (ISO 13850:2015)

This European Standard was approved by CEN on 5 September 2015.

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European foreword

This document (EN ISO 13850:2015) 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of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

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

This document supersedes EN ISO 13850:2008.

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

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

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Endorsement notice

The text of ISO 13850:2015 has been approved by CEN as EN ISO 13850:2015 without any modification.

Introduction

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

- a) Type-A standards (basic safety standards) give basic concepts, principles for design, and general aspects that can be applied to machinery.
- b) Type-B standards (generic safety standards) deal with one or more safety aspect(s) or one or more type(s) 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-hands controls, interlocking devices, pressure sensitive devices, guards).
- c) Type-C standards (machinery safety standards) deal with detailed safety requirements for a particular machine or group of machines.

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

When provisions of a type-C standard are different from those which are stated in type-A or type-B standards, the provisions of the type-C standard take precedence.

Safety of machinery — Emergency stop function — Principles for design

1 Scope

This International Standard specifies functional requirements and design principles for the emergency stop function on machinery, independent of the type of energy used.

It does not deal with functions such as reversal or limitation of motion, deflection of emissions (e.g. radiation, fluids), shielding, braking or disconnecting, which can be part of the emergency stop function.

The requirements for this International Standard apply to all machines, with exception to:

- machines where an emergency stop would not reduce the risk;
- hand-held or hand-operated machines.

NOTE The requirements for the realization of the emergency stop function based on electrical/electronic technology are described in IEC 60204-1.

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.

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

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

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

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60947-5-5:2005, *Low-voltage switchgear and controlgear — Part 5-5: Control circuit devices and switching elements — Electrical emergency stop device with mechanical latching function*

IEC 62061, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010 and the following apply.

3.1

emergency stop (E-stop)

emergency stop function

function which is intended to

- avert arising or reduce existing hazards to persons, damage to machinery or to work in progress, and
- be initiated by a single human action

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[SOURCE: ISO 12100:2010, 3.40]

**3.2
emergency stop equipment**

safety related parts of a control system which perform the emergency stop function

Note 1 to entry: Typically emergency stop equipment is divided into input, processing and output elements.

**3.3
emergency stop device**

manually actuated control device used to initiate an emergency stop function

[SOURCE: IEC 60947-5-5:2005, 3.2]

**3.4
machine actuator**

power mechanism of the machine used to effect motion

Note 1 to entry: Example of machine actuators are motor, solenoid, pneumatic or hydraulic cylinder.

**3.5
safety function**

function of a machine whose failure can result in an immediate increase of risk(s)

[SOURCE: ISO 12100:2010, 3.30]

**3.6
span of control of emergency stop device(s)**

predetermined section of the machinery under control of specific emergency stop device(s)

**3.7
protective shroud**

mechanical measure provided to reduce the possibility of unintended actuation of an emergency stop device

**3.8
emergency situation**

hazardous situation needing to be urgently ended or averted

Note 1 to entry: An emergency situation can arise during normal operation of the machine (for example due to human interaction or as a result of external influences) or as a consequence of a malfunction or failure of any part of the machine.

[SOURCE: ISO 12100:2010, 3.38, modified]

**3.9
operator control station**

assembly of one or more control actuators fixed on the same panel or located in the same enclosure

Note 1 to entry: Actuator is a part of a device to which an external manual action is to be applied (see IEC 60204-1:2005, 3.1).

[SOURCE: IEC 60204-1:2005, 3.13, modified.]

4 Safety requirements

4.1 General requirements

4.1.1 Emergency stop function

4.1.1.1 The purpose of the emergency stop function is to avert actual or impending emergency situations arising from the behaviour of persons or from an unexpected hazardous event.

The emergency stop function is to be initiated by a single human action.

4.1.1.2 The emergency stop function shall be available and operational at all times. It shall override all other functions and operations in all operating modes of the machine without impairing other protective functions (e.g. release of trapped persons, fire suppression).

When the emergency stop function is activated:

- it shall be maintained until it is manually reset;
- it shall not be possible for any start command to be effective on those operations stopped by the initiation of the emergency stop function.

The emergency stop function shall be reset by intentional human action. Resetting of the emergency stop function shall be operated by disengagement of an emergency stop device (see [4.1.4](#)). The reset shall not initiate machine start up.

NOTE The emergency stop function cannot be considered as measure of prevention of unexpected start up as described in ISO 12100.

4.1.1.3 The emergency stop function is a complementary protective measure and shall not be applied as a substitute for safeguarding measures and other functions or safety functions.

4.1.1.4 The emergency stop function shall not impair the effectiveness of other safety functions.

NOTE For this purpose, it can be necessary to ensure the continuing operation of auxiliary equipment such as magnetic chucks or braking devices.

4.1.1.5 The emergency stop function shall be so designed, that after actuation of the emergency stop device, hazardous movements and operations of the machine are stopped in an appropriate manner, without creating additional hazards and without any further intervention.

NOTE An “appropriate manner” can include:

- choice of an optimal deceleration rate taking into account the necessary design restraints of the machine;
- selection of the stop category (see [4.1.3](#));
- necessity for a predetermined shutdown sequence.

Depending on the machine and the specific risks, the emergency stop function can initiate other functions other than stopping to minimize the risk of harm (e.g. reversal or limitation of motion, rate of braking) which can be part of the emergency stop function but not dealt with in this International Standard.

4.1.1.6 The emergency stop function shall be so designed that a decision to activate the emergency stop device does not require the consideration of the resultant effects.