

SLOVENSKI STANDARD
oSIST prEN ISO 13851:2018
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Varnost strojev - Dvoročne krmilne naprave - Funkcionalni vidiki in načela načrtovanja (ISO/DIS 13851:2017)

Safety of machinery - Two-hand control devices - Functional aspects and design principles (ISO/DIS 13851:2017)

Sicherheit von Maschinen - Zweihandschaltungen - Funktionelle Aspekte und Gestaltungsleitsätze (ISO/DIS 13851:2017)

Sécurité des machines - Dispositifs de commande bimanuelle - Aspects fonctionnels et principes de conception (ISO/DIS 13851:2017)

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ICS:

13.110	Varnost strojev	Safety of machinery
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Safety of machinery — Two-hand control devices — Functional aspects and design principles

Sécurité des machines — Dispositifs de commande bimanuelle — Aspects fonctionnels et principes de conception

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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Types of THCD and their selection	3
5 Characteristics of two hand control device	3
5.1 General	3
5.2 Use of both hands (simultaneous actuation)	4
5.3 Relationship between input signals and output signal	4
5.4 Cessation of the output signal	4
5.5 Prevention of accidental operation	4
5.6 Prevention of defeat	4
5.7 Re-initiation of the output signal	4
5.8 Synchronous actuation	4
6 Two hand control safety functions	5
6.1 Prevention of unexpected start-up	5
6.2 Prevention of blocking	5
7 Prevention of accidental actuation and of defeat	5
7.1 Common considerations	5
7.2 Prevention of defeat using one hand	6
7.3 Prevention of defeat using the hand and elbow of the same arm	6
7.4 Prevention of defeat using the forearm(s) or elbow(s)	6
7.5 Prevention of defeat using one hand and any other part of the body (e.g. knee, hip)	7
7.6 Prevention of defeat by blocking one control actuating device	7
7.7 Accidental actuation	7
8 General requirements	7
8.1 Ergonomic requirements	7
8.2 Operating conditions and environmental influences	8
8.3 Enclosures	8
8.4 Selection, design and installation of control actuating devices	8
8.5 Prevention of unintended output signals by acceleration forces	8
8.6 Unintended operation of mobile and portable hand-held machines	8
8.7 Mobile THCDs	9
8.8 Safety distance	9
9 Verification	10
9.1 General requirements for verification	10
9.2 Visual inspection	11
9.3 Performance check	11
9.4 Measurement	11
9.5 Prevention of defeat	11
10 Marking	12
11 Information for installation, use and maintenance	12
11.1 Provision of information	12
11.2 Installation instructions	13
11.3 Instructions for use	13
11.4 Maintenance instructions	13
Annex A (normative) Measurement test for the prevention of defeat	14
Bibliography	19

ISO/DIS 13851:2017(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 199, *Safety of machinery*.

[Annex A](#) forms a normative part of this International Standard.

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Introduction

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 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-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 International Standard is a type-B1 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 etc.);
- 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 at 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 that are covered by the scope of a type-C standard and have been designed and built according to the requirements of that standard, the requirements of that type-C standard take precedence.

A two-hand control device (THCD) is a safety device (safety component). It provides a measure of protection for the operator against reaching danger zones during hazardous situations by locating the control actuating devices in a specific position. For hand-held machinery, it should be taken into consideration that the danger zone is not stationary.

The selection of a THCD as an appropriate safety device will depend upon the risk assessment made by designers, standard makers and others in accordance with ISO 12100.

The definition of a THCD is given in [3.1](#) and takes precedence over the definition given in ISO 12100.

In some arrangements, enabling devices (see ISO 12100) and/or hold-to-run devices (see ISO 12100) may comply with the definition of a THCD in this International Standard. Additionally, some special control devices — such as teach pendants for robots and some crane controls — require the use of two hands and can comply with the definition of a THCD in this International Standard.

Safety of machinery — Two-hand control devices — Functional aspects and design principles

1 Scope

This International Standard specifies the safety requirements of a THCD and the dependency of the output signal from the input signals.

This International Standard describes the main characteristics of THCDs for the achievement of safety and sets out combinations of functional characteristics for three types. It does not apply to devices intended to be used as enabling devices, as hold-to-run devices or as special control devices.

This International Standard does not specify with which machines THCDs shall be used. It also does not specify which types of two-hand-control device shall be used. Moreover, it does not specify the distance between the THCD and the danger zone (see 8.8).

This International Standard provides requirements and guidance on the design and selection (based on a risk assessment) of THCDs including their assessment, the prevention of defeat and the avoidance of faults.

This International Standard applies to all THCDs, independent of the energy used, including:

- THCDs which are or are not integral parts of a machine;
- THCDs which consist of one or more than one separate element.

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*

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

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

EN 894-3, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators*

3 Terms and definitions

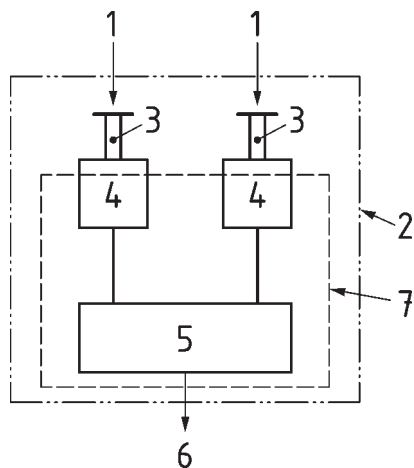
For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

ISO/DIS 13851:2017(E)

3.1 two-hand control device (THCD)
 device which requires simultaneous actuation by the use of both hands in order to initiate and to maintain any hazardous operation of a machine, whilst a hazardous condition exists to which the operator is exposed, providing protection only for the person who actuates the device See [Figure 1](#).

**Key**

- | | | | |
|---|--------------------------|---|---------------------|
| 1 | actuation by hand | 5 | signal processor(s) |
| 2 | THCD | 6 | output signal(s) |
| 3 | control actuating device | 7 | logic unit |
| 4 | signal converter(s) | | |

Figure 1 — Schematic representation of a THCD

3.2 input signal
 externally actuated signal applied by hand to a control-actuating device

SEE: [Figure 1](#).

3.3 control actuating device
 component of the THCD which senses an input signal from one hand and transmits it to a signal converter

SEE: [Figure 1](#).

3.4 signal converter
 component of the THCD which receives an input signal from a control actuating device and which transmits and/or converts this signal into a form acceptable to the signal processor

SEE: [Figure 1](#).

3.5 signal processor
 part of the THCD which generates the output signal as a consequence of the two input signals

SEE: [Figure 1](#).

3.6 output signal
 signal generated by the THCD to be fed into the machinery to be controlled, and which is based on one pair of input signals